PROPOSED AUSTRALIAN ANIMAL WELFARE STANDARDS AND GUIDELINES

POULTRY

Consultation Regulatory Impact Statement

animalhealth
AUSTRALIA

Title page

This Regulation Impact Statement (RIS) has been prepared to fulfill the requirements of the Council of Australian Governments, and to facilitate public consultation on the proposed Australian animal welfare standards and guidelines for the welfare of animals - Poultry.

Public comments and submissions are invited on the proposed standards and guidelines, in response to information provided in this RIS. Submissions can be made via email or post. All submissions will be treated as public documents.

This document is also available in PDF format on the internet at
http://www.animalwelfarestandards.net.au/poultry/poultry-public-consultation/

Email poultry submissions to: publicconspoultry@animalhealthaustralia.com.au

Post to:
Animal Welfare Standards Public Consultation
PO Box 5116
Braddon ACT 2612

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Tim Harding & Associates

ABN 55 102 917 624
PO Box 5113,
Cheltenham East VIC 3192

In association with

ABN 86 933 238 261
PO Box 3046,

Wheelers Hill VIC 3150

Summary

This Regulation Impact Statement (RIS) evaluates options for addressing identified policy problems, the main one of which is to minimise risks to the welfare of poultry due to deficiencies in existing codes of practice and other standards in this area.

One such option is the *Proposed Draft Australian Animal Welfare Standards and Guidelines for Poultry*. The purpose of the proposed standards are to set minimum acceptable standards for the welfare of various species of poultry reared or bred in captivity, such as layer and meat chickens, ducks, emus, turkeys, geese, pheasants, ostriches, guinea fowl, partridge, quail and pigeons. The proposed standards provide the basis for developing and implementing consistent poultry welfare regulations across all Australian jurisdictions, as the states and territories control their own animal welfare legislation.

The guidelines are the recommended practices to achieve desirable animal welfare outcomes. Guidelines use the word 'should' and complement the standards. The position taken by the relevant Ministerial Council is that guidelines, regardless of their purpose in existing codes of practice and the new standards and guidelines documents, will not be regulated.

These standards and guidelines inform all those with responsibilities for the care and management of poultry. It is intended that the proposed standards, if adopted, will replace the existing *Model Code of Practice for the Welfare of Animals – Domestic Poultry 4th edition (2002)*, plus equivalent Model Codes of Practice for welfare of poultry at slaughtering establishments, the farming of ostriches and of captive bred emus ('the existing MCOPs').

As only mandatory standards impose costs, this RIS evaluates the standards and alternatives to them only – not the guidelines. For ease of reference, these standards (without the guidelines) are from here on referred to as 'the proposed standards' in this RIS.

The proposed standards are but one of several options evaluated in this RIS. The preferred option will be subject to endorsement by the Agriculture Senior Officials Committee (AGSOC) and the endorsement/noting by the Agriculture Ministers Forum (AGMIN). The standards were developed under the direction of the Animal Welfare Task Group (AWTG), which is ultimately responsible to AGSOC and AGMIN.

Development was initially undertaken by a small drafting group managed by Animal Health Australia (AHA), and supported by a widely representative Stakeholder Advisory Group (SAG). The SAG is comprised of representatives of national organisations representing the poultry industries, animal welfare organisations, state and federal government agencies, policy specialists and technical experts. Part 1.4 of this RIS discusses the relevant consultation processes in more detail. Although the SAG has agreed to release the draft standards for public comment. It must be acknowledged **that the draft poultry standards and guidelines document does not necessarily represent the views of all parties that contributed to it.**

Australian poultry industries covered by the proposed standards can be divided into four groups as follows:

1. The egg industry, including production of both fresh whole eggs for consumption and processed or pulped eggs for the manufacturing of cakes and other products;

2. The chicken meat industry, for production of chicken meat;

3. The breeding industry for the production of fertile eggs to be used for the supply of hens to the egg industry and chickens to the chicken meat industry; and

4. Non-chicken poultry industries such as ducks, emus, turkeys, geese, pheasants, ostriches, guinea fowl, partridge, quail and pigeons – raised for meat, eggs and other purposes.

Animal welfare is becoming increasingly important to industry, government, retailers, consumers and the general public, both in Australia and internationally. Practices which may have been deemed acceptable in the past are now being reassessed in light of new knowledge and changing attitudes, including marketing initiatives.

Animal welfare can be assessed using three different frameworks, based on measures of biological functioning, affective state or natural living. The biological functioning framework accepts that welfare will be compromised if an animal is unable to adapt to its environment. Severe challenges may overwhelm an animal's capacity to adapt and may result in death, while less severe challenges may have impacts on growth, reproduction and health. The second framework assesses the affective (or emotional) state of the animal, which can be positive or negative. A positive affective state is linked with a predominance of positive experiences, such as the experience an animal has when it engages with a rewarding behaviour. The third framework uses the concept of natural living. It assumes that the welfare of an animal is better when it can express its normal patterns of behaviour.

The scope or terms of reference for the RIS are established by *'Best Practice Regulation - A Guide for Ministerial Councils and National Standard Setting Bodies'* as endorsed by the Council of Australian Governments (COAG) in October 2007.

According to these COAG guidelines, the RIS is required, amongst other things, to demonstrate a case for action, or other words, a need for the proposed standards. This is best achieved by identifying the problems that the proposed standards are endeavouring to address.

Australia's existing model codes for the welfare of domestic poultry are now 15 years old. Those for ostriches are 14 years old and those for emus are 11 years old. These codes have not kept pace with community and trading partner expectations, which are that risks to animal welfare will be managed through regulatory standards that are clear and verifiable for implementation and enforcement purposes, and are informed by evolving animal welfare science.

As the codes have not kept pace with animal welfare science and society's expectations, some stakeholders consider a number of current practices present risks to poultry wellbeing. Key determinants of wellbeing not covered by current mandatory standards are: legal responsibility, stocking densities, lighting, litter management, facilities to allow innate behaviour, water for ducks, and animal intervention practices aimed at reducing mortality or increasing productivity (e.g. beak trimming, induced moulting, pinioning, castrating). A more detailed list of these deficiencies in given in Table 14.1, and the evidence for concern about these deficiencies in summarised in Part 2.3 of the RIS.

In some cases, there is not a clear cut solution to the need to minimise risks to animal welfare. There are also some welfare trade-offs that need to be considered, such as:

- freedom to express natural behaviours versus adverse welfare from other causes (e.g. pecking, cannibalism, disease and predators);
- optimal lighting for wellbeing versus optimal lighting for productivity.

Of lesser concern are two areas of regulatory failure that have been identified in relation to the welfare of poultry. These are the unsuitability of existing codes of practice to be adopted in government regulations; and secondly, excess regulatory burden on industry from having to meet the different requirements of eight jurisdictions. These secondary problems are discussed in Part 2.4 of the RIS.

The specific problems that create a need for the proposed standards may be summarised as follows:

> **Problem 1**: Risks to the welfare of poultry due to deficiencies in the existing MCOPs and jurisdictional codes of practice for the welfare of poultry (described more fully in section 2.3);

and to a lesser extent:

> **Problem 2**: Uncertainty for industry due to a lack of clear and verifiable standards (a confusing mixture of 'musts' and 'shoulds') (described more fully in section 2.4); and
>
> **Problem 3**: Excess regulatory burden arising from a lack of national consistency.

These problems need to be considered within the context of the base case, as outlined in Part 2.2. of this RIS. The base case includes existing legislation, regulations, codes of practice, normal industry practice and market forces.

The main risks to the welfare of poultry discussed in this RIS (see section 2.3.1) are:

- Lack of clear responsibilities for personnel in charge of poultry;
- Lack of freedom of poultry to express innate behaviours;
- Inadequate space allowances for poultry (stocking density);
- Lack of perches, nests and litter for layer hens (production systems);
- Lack of quantitative lighting standards;
- Need for restrictions on routine beak trimming;
- Risky litter management;
- Need to restrict routine use of induced moulting;
- Care of meat chickens and turkeys awaiting slaughtering; and
- Access to water for ducks.

It is sometimes argued that market forces alone can prevent animal suffering because vendors have an economic incentive to protect animal welfare – that is to say, it is in the financial interest of a vendor to maintain positive physical attributes and reduce mortality rates. This argument has some validity on farms where continued deterioration in the physical attributes of livestock can adversely affect sales prices. Producers also have an incentive to improve animal welfare to meet changing consumer demands for higher welfare products.

It is possible to have a physically healthy productive animal that is in a poor state of welfare due to, for instance, mental stress. Indeed, apart from physiological functioning, physical condition and performance – brain state, behaviour, and even an animal's emotions are now all recognised as key factors in assessing an animal's welfare. In terms of this broader understanding of animal welfare there can be insufficient economic incentive for a poultry farm to reduce risks to animal welfare, especially where doing so would increase costs with little or no offsetting gains to the business. In fact, egg laying rates are higher in cages than in barns

or free range farms; and lowering stocking densities in non-cage egg production systems provides no offsetting benefits to the producer.

Arising from this case for action, the policy objective of such action is identified as:

To minimise risks to poultry welfare; and to reduce both industry uncertainty and excess regulatory burden in a way that is practical for implementation and industry compliance.

The main criterion for evaluating the proposed standards and the feasible alternatives is net benefit for the community, in terms of achieving this policy objective.

The proposed form of government intervention is the adoption of either the proposed standards or another option by AGMIN with the intent of the adopted standards being implemented by legislation in each participating jurisdiction.

The options evaluated in terms of costs and benefits are:

- **Option A**: Maintain the status quo (i.e. the base case as described in Part 2.2 of this RIS);
- **Option B**: convert the proposed national standards into national voluntary guidelines (the minimum intervention option) in addition to the base case;
- **Option C**: adopt the proposed standards as currently drafted, which would replace in the MCOPs in the base case;

The following Options D, E, F and G are all **variations of Option C** (the proposed standards as currently drafted) and are not mutually exclusive. The Option eventually preferred could therefore be Option A, B, C or a combination of one or more of the Options D, E, F or G.

- **Option D**: vary the proposed standards (option C) to phase out conventional cages for chicken layers over 10 or 20 years in favour of alternative systems 'typical' free range/barn/aviary or furnished cages. (nest/perch/space/forage).
- **Option E**: vary the proposed standards (option C) to reduce maximum stocking densities in barns or sheds for non-cage layer hens to 9 birds per m2 and meat chickens 30kg/m2.
- **Option F**: vary the proposed standards (option C) to require the availability of nests, perches and litter for all chicken layers in cage and non-cage systems.
- **Option G**: vary the proposed standards (option C) to ban castration, pinioning and devoicing, hot blade beak trimming at hatcheries, and routine second beak trim – unless there are exceptional circumstances (hot blade permitted in this circumstance).

The costs and benefits of these options are evaluated relative to the base case by using the following criteria (I to II) to compare the effectiveness of each option in achieving the relevant part of the policy objective:

I. Poultry welfare benefits; and

II. Net compliance costs to industry, including any reduction in regulatory burden.

As discussed in Part 4.2.1 of this RIS, in the absence of any ability to quantify the impacts on individual animals, the number of animals affected is used as a rough proxy of the quantitative animal welfare impacts of different options. These impacts are summarised in some detail in

Table 49.1 in Part 4.3 of the RIS. Approximately 50% of the proposed standards are new standards compared to those under the existing MCOPs. Large numbers of birds are expected to be better off under any of the Options B to G, as a result of a reduction of risks to their welfare.

As shown in Appendix 18, the existing *Model Code of Practice for the Welfare of Animals – Domestic Poultry (4th edition)* applies in all jurisdictions, except in Victoria and Western Australia which have their own codes of practice based on this model code. Thus the existing standards for all jurisdictions are similar.

Table 49.2 summarises and compares the distribution of cost impacts of all options by jurisdiction.

Table 49.2: Distribution of estimated quantifiable incremental costs of Options C, D, E, F and G by state grouping – present value dollars ($m)[1]

State grouping	10-year PV cost of Option C	10-year PV cost of Option D (10-year phase out of cages)	10-year PV cost of Option D (20-year phase out of cages	10-year PV cost of Option E	10-year PV cost of Option F	10-year PV cost of Option G
NSW, QLD and VIC	$594.14	$1,318.33	$960.25	$1,249.79	$964.04	$696.73
SA, WA and TAS	$115.58	$213.56	$165.10	$277.90	$164.07	$139.70
Total	***$709.72***	***$1,531.89***	***$1,125.35***	***$1,527.68***	***$1,128.11***	***$836.44***

The incremental costs and benefits of the options relative to the base case are summarised in Table 50.

[1] See Table A15.3 of Appendix 15 for source of estimates.

Table 50: Summary of relative 10-year costs and benefits as compared to the base case (Options B, C, D, E, F and G)

Option	Poultry welfare benefits (Criterion I)	Net compliance costs (Criterion II)
Option A (base case)	0	0
Option B (guidelines only)	greater than base case	0
Option C (proposed national standards)	greater than Option B unclear for D (10), D (20), E, G less than F	$709.72m greater than B less than D (10), D (20), E, F and G
Option D (10) (10-year phase out of cages)	greater than Option B unclear for C, D (20), E, G less than F	$1,531.89m greater than B, C, D (20), F, G less than E
Option D (20) (20-year phase out of cages)	greater than Option B unclear for C, D (10), E, G less than F	$1,125.35m greater than B, C, G less than D (10), E, F
Option E (reduction in stocking densities)	greater than Option B and unclear for C, D (10), D (20), G less than F	$1,518.77m greater than B, C, D (10), D (20), F, G
Option F (require the availability of nests, perches and litter)	greater than Option B and greater than C, D (10), D (20), E, G	$1,119.20m greater than B, C, G less than D (10), D (20), E
Option G (no routine hot blade and no routine second beak trim)	greater than Option B and unclear for C, D (10), D (20), E less than F	$827.53m greater than B, C less than D (10), D (20), E, F
Rank 1 highest benefit (Criterion I) or lowest cost (Criterion II) **Rank 2** highest benefit (Criterion I) or lowest cost (Criterion II) **Rank 3** highest benefit (Criterion I) or lowest cost (Criterion II) **Rank 4** highest benefit (Criterion I) or lowest cost (Criterion II) **Rank 5** highest benefit (Criterion I) or lowest cost (Criterion II) **Rank 6** highest benefit (Criterion I) or lowest cost (Criterion II) **Rank 7** highest benefit (Criterion I) or lowest cost (Criterion II)	F C, D (10), D (20), E, G? B	B C G D (20) F D (10) E

Table 50 shows that:

- all options would provide greater poultry welfare benefits than the base case.
- all options other than Option B, would be costlier than the base case.
- Options C, D (10), D (20), E, F and G would provide greater poultry welfare benefits than Option B but would also be costlier than Option B.

- Option F would provide the greatest poultry welfare benefit but would also be one of the most expensive options.

To assist easier cost comparisons, the following table lists the incremental 10-year cost differences for Options D, E, F and G as compared to Option C. This table may be used by those wishing to calculate the cost of various combinations of Options D, E, F or G.

Table 50.1: Summary of relative 10-year costs of Options E, F and G as compared to Options C

Option	Net compliance costs	Cost difference compared to Option C
Option C (proposed national standards)	$709.72m	N/A
Option D (10) (10-year phase out of cages)	$1,531.89m	+$822.17m
Option D (20) (20-year phase out of cages)	$1,125.35m	+$415.63m
Option E (reduction in stocking densities)	$1,527.68m	+$817.97m
Option F (require the availability of nests, perches and litter)	$1,128.11m	+$418.39m
Option G (no routine hot blade and no routine second beak trim)	$836.44m	+$126.72m

The basis of the selection of the preferred option is the one that generates the greatest net benefit for the community. Option C is estimated to be the least expensive option regardless of the discount rate chosen, however it is likely to provide lower net poultry welfare benefits than Option F.

Option F is ranked higher in terms of having a lower cost (in relative terms) with a 3.5% discount rate but is still more expensive than either Options, C or G. Moreover, it is indeterminate whether phasing out cages over 10 years and 20 years under Option D, reducing stocking densities under Option E or banning hot blade trimming and routine second beak trimming under Option G are likely to generate more benefits than Option C.

The selection of a preferred option has therefore been postponed pending responses from the public consultation process. The public consultation now seeks the views and advice of interested parties on which of the above Options A, B, C or combination of one or more Options D, E, F or G in their opinion would provide the greatest net benefit for the Australian community.

The views and advice of interested parties are also sought in providing information or data that would further assist in the assessment of the impacts (costs and benefits) expected under each of the options/variations. Some specific public consultation questions are asked at various points throughout the main body of the RIS, to which answers in written submissions would be appreciated (A complete list of these public consultation questions and their location in the RIS is provided at the end of this summary).

After the public consultation process and consideration of written submissions, there will then be a final cost/benefit comparison between Options A, B, C, D, E, F and G with a view to making a recommendation on a preferred option to AGMIN as part of the Decision RIS.

List of public consultation questions

The following is a list of public consultation questions asked at various points throughout the RIS, together with the heading under which each question is found. The questions are grouped here into requests for additional information, requests for reader opinions or value judgements, and requests related to the selection of a preferred option or group of options.

Requests for additional information about the problems addressed by this Consultation RIS, to inform the subsequent Decision RIS

2.3.1 Risks to animal welfare

> **Public consultation question 1:** Do you agree with the summary list of the advantages and disadvantages of layer hen farming systems in Part 2.3.1? Do you think that any advantages or disadvantages are missing from this list? If so, please include them in your written submission.

2.4.1 Lack of clarity in standards

> **Public consultation question 4**: In your experience, to what extent do the existing Model Codes of Practice (MCOPs) and related regulations create uncertainty for industry? Does such uncertainty vary between different states and territories?

2.4.2 Excess regulatory burden

> **Public consultation question 6:** Are you aware of any poultry farming businesses in addition to those given in Part 2.4.2 that operate in more than one state or territory? If so, please list them.

4.3 Preferred option

> **Public consultation question 17**: Do you have any further information or data that would assist in the assessment of the impacts (costs and benefits) expected under each of the options/variations.

Requests for reader opinions or value judgements about the problems addressed by this Consultation RIS

2.3.1 Risks to animal welfare

Public consultation question 2: Do you think the risks to the welfare of poultry discussed in Part 2.3.1 are sufficient to justify the introduction of better standards and/or guidelines?

Public consultation question 3: Which of the above mentioned areas of risk to poultry welfare do you think are of the greatest concern? Are there any other areas of concern to poultry welfare? Please provide reasons for your answers in your written submission, together with supporting scientific evidence.

2.4.1 Lack of clarity in standards

Public consultation question 5: In your experience, how does this type of uncertainty for industry adversely affect productivity? If possible, please provide some case examples in your written submission.

2.4.2 Excess regulatory burden

Public consultation question 7: In your experience, what is the effect of cross-jurisdictional inconsistencies on industry (i.e. even where jurisdictional standards are clear and verifiable)? If possible, please provide some case examples in your written submission of where additional costs have been imposed on industry as a result of such inconsistencies.

Public consultation question 8: Do you think there needs to be national consistency in animal welfare standards for poultry? Please provide reasons for your answer.

Requests related to the selection of a preferred option or group of options

4.2.4 Option B: (non-regulatory option – voluntary national guidelines)

Public consultation question 9: Do you believe that the net benefits to poultry welfare likely to be achieved under **Option B**, are justified? Would the combination of costs and benefits under **Option B** be preferable to other options?

4.2.5 Option C: (the proposed national standards as drafted)

Public consultation question 10: Do you think that the proposed national standards under **Option C** reflect community values and expectations regarding the acceptable treatment of poultry?

Public consultation question 11: Do you believe that the net benefits to poultry welfare likely to be achieved under **Option C**, are justified? Would the combination of costs and benefits under **Option C** be preferable to other options?

4.2.6 Option D: (vary the proposed standards [Option C] to include phasing out conventional cages for layer hens)

Public consultation question 12: Do you believe that the net benefits to poultry welfare likely to be achieved with a 10 or 20-year phase out of conventional cages under **Option D**, are justified? Would the combination of costs and benefits under variations of **Option D** be preferable to other options, either as a stand-alone option or in combination with other options?

4.2.7 Option E (vary the proposed standards [Option C] to reduce maximum stocking densities in barns or sheds for layer hens and meat chickens)

Public consultation question 13: Do you believe that the net benefits to poultry welfare likely to be achieved under **Option E**, are justified? Would the combination of costs and benefits under **Option E** be preferable to other options, either as a stand-alone option or in combination with other options?

4.2.8 Option F (vary the proposed standards [Option C] to require the availability of nests, perches and litter for all chicken layers in cage and non-cage systems)

Public consultation question 14: Do you believe that the net benefits to poultry welfare likely to be achieved under **Option F**, are justified? Would the combination of costs and benefits under **Option F** be preferable to other options, either as a stand-alone option or in combination with other options?

4.2.9 Option G (vary the proposed standards [option C] to ban castration, pinioning and devoicing, hot blade beak trimming at hatcheries, and routine second beak trim)

Public consultation question 15: Do you believe that the net benefits to poultry welfare likely to be achieved under **Option G**, are justified? Would the combination of costs and benefits under **Option G** be preferable to other options, either as a stand-alone option or in combination with other options?

4.3 Preferred option

Public consultation question 16: Which of the Options A, B, C, or combination of one or more Options D, E, F or G, in your opinion would provide the greatest net benefit for the Australian community?

Public consultation question 17: Do you have any further information or data that would assist in the assessment of the impacts (costs and benefits) expected under each of the options/variations.

Public consultation question 18: Do you think that any of the Options A to G are likely to have a disproportionate impact on small businesses compared to medium and large business? Do you think that any of these options are likely to have a greater impact on small business than other options? Please provide reasons for your answers in your written submission together with available supporting evidence.

Table of Contents

1.0 Background

1.1. Introduction

The purpose of this Regulation Impact Statement (RIS) is to evaluate options for addressing the policy problems identified in Part 2.0, the main one of which is to minimise risks to the welfare of poultry due to deficiencies in existing codes of practice and other standards in this area.

One such option is the *Proposed Draft Australian Animal Welfare Standards and Guidelines for Poultry*, which is introduced in Part 1.3 of this RIS. These standards and guidelines have been prepared as part of a program of developing national welfare standards and guidelines for various industry sectors. This program has been endorsed by all state and territory governments.

The purpose of the proposed standards is to set minimum standards for the welfare of the following species of poultry reared or bred in captivity: layer and meat chickens, ducks, emus, turkeys, geese, pheasants, ostriches, guinea fowl, partridge, quail and pigeons.[2] The standards provide the basis for developing and implementing consistent poultry welfare regulations across Australia.

The guidelines are the recommended practices to achieve desirable animal welfare outcomes. Guidelines use the word 'should' and complement the standards. The position taken by the former Primary Industries Ministerial Council (PIMC), in May 2009, is that guidelines, regardless of their purpose in existing codes of practice and the new standards and guidelines documents, will not be regulated.

These standards and guidelines inform all those with responsibilities for the care and management of poultry reared or bred in captivity. It is intended that the proposed standards will replace the existing *Model Code of Practice for the Welfare of Animals – Domestic Poultry 4th edition (2002)*, plus equivalent Model Codes of Practice for welfare of poultry at slaughtering establishments, the farming of ostriches and of captive bred emus ('the existing MCOPs').

As only mandatory standards impose costs, this RIS evaluates the standards and alternatives to them only – not the guidelines. For ease of reference, these standards (without the guidelines) are from here on referred to as 'the proposed standards' in this RIS. For evaluation purposes, the RIS will need to treat the proposed standards and other options as if they are mandatory;[3] and must use relevant existing Australian legislation, standards[4], industry practices and market forces as the base case for measurement of incremental costs and benefits (see Part 2.2 of this RIS).

The proposed standards are but one of several options evaluated in this RIS. The preferred option will be subject to endorsement by the Agriculture Senior Officials Committee (AGSOC) and endorsement/noting by the Agriculture Ministers Forum (AGMIN). If an option specifying a set of standards is so endorsed, such standards will be recommended to be adopted or

[2] Standards and Guidelines Part A apply to exhibition poultry. Because of the diversity of species and breeds, Part B Standards and Guidelines do not necessarily apply to exhibition poultry.
[3] No costs are imposed if compliance with standards is voluntary.
[4] 'Must' statements or practices specified as unacceptable in government codes of practice.

incorporated into regulations by the various jurisdictions, after which compliance with the standards will become mandatory.[5]

The proposed standards and guidelines were developed under the direction of the Animal Welfare Task Group (AWTG), which is ultimately responsible to AGSOC and AGMIN. AWTG membership includes one representative from each State and Territory and a representative from the Commonwealth and New Zealand, at Deputy Secretary level or equivalent (or their delegate).

Initially, development of the proposed standards and guidelines was undertaken by a small drafting group managed by Animal Health Australia (AHA), and supported by a widely representative Stakeholder Advisory Group (SAG). The SAG is comprised of representatives of national organisations representing the poultry industries, animal welfare organisations, state and federal government agencies, policy specialists and technical experts. However, it must be acknowledged although the SAG has agreed to release the draft standards for public comment. **The draft poultry standards and guidelines document does not necessarily represent the views of all parties that contributed to it.** Part 1.4 of this RIS discusses the relevant consultation processes in more detail.

The RIS is required to comply[6] with the *'Best Practice Regulation - A Guide for Ministerial Councils and National Standard Setting Bodies'* as endorsed by the Council of Australian Governments (COAG) in October 2007. COAG has agreed that all governments will ensure that regulatory processes in their jurisdiction are consistent with the following principles:

- establishing a case for action before addressing a problem;
- a range of feasible policy options must be considered, including self-regulatory, co-regulatory and non-regulatory approaches, and their benefits and costs assessed;
- adopting the option that generates the greatest net benefit for the community;
- in accordance with the Competition Principles Agreement, legislation should not restrict competition unless it can be demonstrated that:-
    a. the benefits of the restrictions to the community as a whole outweigh the costs, and
    b. the objectives of the regulation can only be achieved by restricting competition;
- providing effective guidance to relevant regulators and regulated parties in order to ensure that the policy intent and expected compliance requirements of the regulation are clear;
- ensuring that regulation remains relevant and effective over time;
- consulting effectively with affected key stakeholders at all stages of the regulatory cycle; and
- Government action should be effective and proportional to the issue being addressed.

[5] It is not intended that compliance with guidelines ('should' statements) will be mandatory
[6] As independently assessed by the Commonwealth Office of Best Practice Regulation (OBPR).

Accordingly, the RIS contains information on –

- the nature and extent of the relevant problems that need to be addressed; the policy objectives of proposed solutions to the problems;
- key stakeholder consultation to date; and proposed public consultation;
- feasible alternative options to the proposed standards and why other alternatives are not feasible;
- analysis of relevant existing legislation and standards in both Australia and internationally (to establish the base case);
- a cost-benefit evaluation of the proposed standards and alternative policy options; relative to the base case;
- selection of a preferred option that generates the greatest net benefit for the community;
- impacts of the preferred option including on competition; and
- implementation and review processes.

Phase 1 has been to prepare this preliminary draft RIS for public consultation. **Phase 2** will be to prepare a comprehensive decision RIS for AGMIN, taking into account public submissions.

It should be emphasised that the scope of this RIS is limited to evaluating the proposed standards and other feasible options, rather than commonwealth or state legislation or other standards or codes of practice. However, the following relevant background information may be helpful to interested parties in understanding the proposed standards within their legislative, economic, national and international contexts.

1.2. Setting the scene

1.2.1 Overview of the Australian poultry industries

Australian poultry industries covered by the proposed standards can conveniently be divided into four groups as follows:

1. The egg industry, including production of both fresh whole eggs for consumption and processed or pulped eggs for the manufacturing of cakes and other products;
2. The chicken meat industry, for production of chicken meat;
3. The breeding industry for the production of fertile eggs to be used for the supply of hens to the egg industry and chickens to the chicken meat industry; and
4. Non-chicken poultry industries such as ducks, emus, turkeys, geese, pheasants, ostriches, guinea fowl, partridge, quail and pigeons – raised for meat, eggs and other purposes.

The Australian egg industry

The Australian egg industry comprises a few large producers and many small and medium sized producers as well as some domestic 'backyard' egg production.[7] Commercial egg production occurs throughout Australia, but is largest in the eastern seaboard states of New South Wales, Queensland and Victoria. Together these states account for over 75% of industry revenue.

New South Wales accounts for the largest percentage of businesses, with more than 32% of businesses located in the state. Victoria has increased production over the past five years and is now home to almost 30% of industry operators. Queensland and Western Australia have increased their share of industry revenue over the past five years and are now home to more than a quarter of egg farms. There are no commercial egg farms situated in the Northern Territory.[8]

An overview of the Australian Egg Industry (as at 30 June 2016) is available from the 2016 Australian Egg Corporation Limited (AECL) annual report as follows.[9]

There were an estimated 337 egg farms in Australia in November 2016 with a gross annual value of egg production (wholesale equivalent) estimated at $724.4m in the 2015/16 financial year, and a grocery egg sales value estimated at $880.8m in the 2016 calendar year.

For the purposes of this RIS, the following definitions of poultry housing systems are used:

Conventional cages: a system of housing where the birds are confined to cages either singly or in multiples with a wire floor.[10]

Furnished cages: cages that contain furnishing such as nest boxes, perches and/or scratch-pads.

Barns: large sheds where thousands, or even tens of thousands of hens may be kept together, and where the floor is often covered with litter. Nesting places are provided for egg laying and where these are provided in vertical tiers (with free movement) these are called 'aviaries'.

Free-range: Birds in free-range systems are often housed in shedding and have access to an outdoor range.[11]

[7] No collated information is available on the extent of domestic 'backyard' egg production in Australia.
[8] http://www.ibisworld.com.au/industry/default.aspx?indid=22
[9] https://www.aecl.org/assets/About-us/Annual-Report-2016.pdf
[10] With this system the stock do not come into contact with their own or other bird's faeces which is an important disease control measure.
[11] Except Ratites which may not include sheds.

The grocery sales housing system market share and average prices as at June 2016 were;

Table 1

Farming system	Egg volume	Egg value	Average price per dozen
Cage eggs[12]	49.5%	37%	$3.24
Barn laid eggs	8.5%	9.2%	$4.68
Free range eggs	40.7%	50.6%	$5.40
Specialty eggs	1.3%	2%	$9.24

The majority of eggs produced in Victoria are consumed domestically, with the remainder processed into egg products for the domestic and export markets.
Annual egg product exports (fresh, dried, preserved sweetened and albumin) for the 2016 calendar year were estimated at $3m. Equivalent imports for the same period were $21m.[13]

More recent data (as at November 2016) for NSW, QLD and VIC and SA, WA and TAS has been combined for confidentiality and commercial in confidence reasons at the request of AECL.

Table 2: No. hens housed (capacity)

Farm type	NSW, QLD and VIC	SA, WA and TAS	Total
Cage	9,474,772	1,241,941	**10,716,713**
Barn	1,625,050	162,500	**1,787,550**
Free Range	5,674,185	1,480,500	**7,154,685**
Total	***16,774,007***	***2,884,941***	***19,658,948***

Table 3: % of hens housed by system

Farm type	NSW, QLD and VIC	SA, WA and TAS	Total
Cage	56.48%	43.05%	**54.51%**
Barn	9.69%	5.63%	**9.09%**
Free Range	33.83%	51.32%	**36.39%**
Total	***85.33%***	***14.67%***	***100.00%***

Table 4: No. layer hen farms

Farm type	NSW, QLD and VIC	SA, WA and TAS	Total
Cage	70	18	**88**
Barn	36	14	**50**
Free Range	152	47	**199**
Total	***258***	***79***	***337***

Table 5: Average farm hen numbers

Farm type	NSW, QLD and VIC	SA, WA and TAS	Total
Cage	135,354	68,997	**121,781**
Barn	45,140	11,607	**35,751**
Free Range	37,330	31,500	**35,953**
Total	***65,016***	***36,518***	***58,335***

[12] Almost all in conventional cages.
[13] https://www.aecl.org/assets/About-us/Annual-Report-2016.pdf

The Australian chicken meat industry

The chicken meat industry is predominantly vertically integrated. This means that generally, individual companies own almost all aspects of production - breeding farms, fertile egg production farms, hatcheries, feed mills, some broiler growing farms, and processing plants. This makes chicken meat unlike most other livestock production industries, which typically operate through a more complex supply chain the chicken meat industry.

Two large integrated national companies supply more than 70% of Australia's broiler chickens - Baiada and Inghams Enterprises - following the acquisition of Bartter/Steggles by Baiada in July 2009. The balance of the market is supplied by another six medium-sized, privately owned companies, with each supplying between approximately 3% and 9% of the national market, and a myriad of smaller processors. [14]

The following data as at November 2016 for SA, WA and TAS have been combined for confidentiality and commercial in confidence reasons at the request of the Australian Chicken Meat Federation (ACMF).

Table 6: Category of meat chicken farm sizes

Size of meat chicken farm	Number of staff employed (FTE) [15]
Large	200+FTEs
Medium	21 to 199 FTEs
Small	up to 20 FTEs

Table 7: No. of meat chicken farms by farm size - November 2016

Farm size	QLD	NSW	VIC	SA, WA and TAS	Total
Large	29	11	16	9	**65**
Medium	0	24	4	11	**39**
Small	103	189	175	114	**581**
Total	***132***	***224***	***195***	***134***	***685***

Table 8: Distribution of meat chicken farms by farm size - November 2016

Farm size	QLD	NSW	VIC	SA WA and TAS	Total
Large	21.97%	4.91%	8.21%	6.72%	**9.49%**
Medium	0.00%	10.71%	2.05%	8.21%	**5.69%**
Small	78.03%	84.38%	89.74%	85.07%	**84.82%**
Total	***100.00%***	***100.00%***	***100.00%***	***100.00%***	***100.00%***

Table 9: Total annual tonnes of chicken meat produced by quarter and state (2015-16)

Quarter	QLD	NSW	VIC	SA and WA	Total
Dec-2015	59,751	84,700	65,947	72,886	**283,284**
Mar-2016	59,530	87,541	62,533	77,027	**286,631**
Jun-2016	64,759	89,136	63,582	81,023	**298,500**
Sep-2016	66,368	87,748	64,220	77,451	**295,787**

[14] http://www.chicken.org.au/page.php?id=2
[15] Full Time Equivalent employees.

Quarter	QLD	NSW	VIC	SA and WA	Total
Total annual	***250,408***	***349,125***	***256,282***	***308,387***	***1,164,202***

Table 10: Total annual no. chicken's slaughtered by quarter and state (2015-16)

Quarter	QLD	NSW	VIC	SA and WA	Total
Dec-2015	33,140,771	45,335,369	33,683,943	39,700,529	151,860,612
Mar-2016	33,546,864	46,711,501	35,709,728	42,219,928	158,188,021
Jun-2016	36,874,619	47,747,131	35,390,982	43,121,151	163,133,883
Sep-2016	37,350,651	46,654,452	36,007,347	42,442,852	162,455,302
Total annual	***140,912,905***	***186,448,453***	***140,792,000***	***167,484,460***	***635,637,818***

Non-chicken poultry industries

The following data are available on the non-chicken poultry industries.

Turkey data (raw data provided by ACMF 21 November 2016):

Table 11: No. of turkey farms by farm size – November 2016

Farm size	NSW	VIC	SA	Total
Large	10	5	0	**15**
Small	51	0	1	**52**
Total	***61***	***5***	***1***	***67***

Table 12: Distribution of turkey farms by farm size – November 2016

Farm size	NSW	VIC	SA	Total
Large	16.39%	100.00%	0.00%	**22.39%**
Small	83.61%	0.00%	100.00%	**77.61%**
Total	***100.00%***	***100.00%***	***100.00%***	***100.00%***

Table 13: Total non-chicken poultry[16] slaughtered and estimated retail value

Species	Birds processed	Dressed weight range(kg/bird)[17]	Retail value	Year of estimate
Duck*	10,000,000	1.6–2.2	$100,000,000	2003, 2005 or 2009
Quail**	6,500,000	0.12–0.36	$35,000,000	2011-12
Turkey***	4,200,000	3–10	$200,000,000	2001-02
Squab (Pigeon)^	323,000	0.2–0.5	$12,000,000	2011-12
Pheasants^^^	60,000	1.0–1.2	$600,000	2003, 2005 or 2009
Guinea Fowl#	40,000	0.85–1.2	$1,000,000	2003, 2005 or 2009
Partridge##	18,000	0.9–1.2	$300,000	2001-02
Emus###	7,400	36.29	$4,347,500	2007
Ostriches###	6,200	36-50	$1,700,000	2007

[16] Information on ducks, pheasants or guinea fowl is based on surveys carried out by the Rural Industries Research and Development Council and published in 2003, 2005 and 2009. Pheasants, partridges and guinea fowl are often farmed together (See http://www.farmdiversity.com.au/Animal/3adc1e84-d63b-40f8-bfa7-a341010a5502)

[17] Dressed weight data (apart from Emus and Ostriches) taken from Lee A, et al (October 2003) *Opportunities for exporting game birds*, RIRDC.

Table 13: Total non-chicken poultry[16] slaughtered and estimated retail value				
Species	Birds processed	Dressed weight range(kg/bird)[17]	Retail value	Year of estimate
Goose^^	5,000	3.0–5.0	$730,000	2011-12
Total	***19,659,600***			

*see http://www.poultryhub.org/species/commercial-poultry/duck/)
** 2011-12 data (see http://www.farmdiversity.com.au/Animal/3adc1e84-d63b-40f8-bfa7-a341010a5502)
*** 2009 data (see Scolexia Animal and Avian Health Consultancy (December 2009) *Structure and Dynamics of Australia's Commercial Poultry and Ratite Industries*, Report prepared for what is now the Australian Department of Agriculture and Water Resources DAWR, Office of the Chief Veterinary Officer.)
^2011-12 data (see http://www.farmdiversity.com.au/Animal/3adc1e84-d63b-40f8-bfa7-a341010a5502)
^^2011-12 data (see http://www.farmdiversity.com.au/Animal/3adc1e84-d63b-40f8-bfa7-a341010a5502)
^^^see http://www.poultryhub.org/species/game-birds/pheasant/
#see http://www.poultryhub.org/species/game-birds/guinea-fowl/
see Lee A, et al (October 2003) *Opportunities for exporting game birds*, RIRDC.
###see http://www.poultryhub.org/species/ratites/ (Value for emus estimated as the product of the average price between $575 to $600 per emu (i.e. $587.5) and 7,400 emus slaughtered.

Export of poultry products

Australia exported the equivalent of 1.035 million dozen eggs in 2015 representing only 0.24% of total egg production. The major markets were Hong Kong, Papua New Guinea and Singapore. In terms of product type, liquid whole egg (pulp) was the largest product exported.[18]

Only around 4% by weight of chicken, duck and turkey meat produced in Australia is exported.[19] According to ACMF, this is in part due to high local demand for chicken meat, and in part because international demand is largely met by countries which benefit from a lower cost base than Australian producers and are, in some cases, supported by government subsidies. Australian chicken meat is exported primarily to South Africa, the Philippines, Hong Kong, Singapore and the South Pacific islands.[20]

1.2.2 Animal welfare issues

Animal welfare is becoming increasingly important to industry, government, retailers, consumers and the general public, both in Australia and internationally. Practices which may have been deemed acceptable in the past are now being reassessed in light of new knowledge and changing attitudes, including marketing initiatives.

According to a recent Productivity Commission report on the regulation of Australian agriculture:

> 'Australians generally accept that it is appropriate to rear animals for commercial purposes (as revealed by their consumption of animals as food or in other products). They also place a value on the welfare of farm animals and expect, and benefit from knowing, that farm animals are being treated humanely (both from an animal wellbeing and animal health perspective)'. [21]

[18] Australian Egg Corporation. Egg and egg product exports 2015
[19] Australian Department of Agriculture (2014) Australian food statistics 2012–13. (This is the most recent report available on the DAWR web site).
[20] <http://www.chicken.org.au/industryprofile/page.php?id=5.3_Exports>
[21] Productivity Commission, 2016.

'Animal welfare' is a difficult term to define and has several dimensions including both the mental and physical aspects of the animal's well-being. Some claim that this term includes people's subjective ethical preferences as to how animals should be treated.[22]

Barnett and Hemsworth establish that the most credible scientific definition of animal welfare relates to the attempt of an animal to cope with its environment.[23] Broom and Johnson add to this definition of animal welfare stating:

> [The animal's] state as regards its attempts to cope with its environment and includes both the extent of failure to cope and the ease or difficulty in coping. Health is an important part of welfare whilst feelings – such as pain, fear and various forms of pleasure – are components of the mechanisms for attempting to cope and should be evaluated where possible in welfare assessment.[24]

Under the former AAWS, Australia accepted the agreed international definition of animal welfare from the World Organisation for Animal Health (OIE):

> Animal welfare means how an animal is coping with the conditions in which it lives. An animal is in a good state of welfare if (as indicated by scientific evidence) it is healthy, comfortable, well nourished, safe, able to express innate behaviour, and if it is not suffering from unpleasant states such as pain, fear, and distress. Good animal welfare requires disease prevention and veterinary treatment, appropriate shelter, management, nutrition, humane handling and humane slaughter/killing. Animal welfare refers to the state of the animal; the treatment that an animal receives is covered by other terms such as animal care, animal husbandry, and humane treatment.[25]

In accordance with this definition, it is important when dealing with animal welfare to separate factual considerations of welfare from attitudes and moral judgments about what is appropriate (ethics).[26]

Animal welfare can be assessed using three different frameworks, based on measures of biological functioning, affective state or natural living[27]. The biological functioning framework accepts that welfare will be compromised if an animal is unable to adapt to its environment. Severe challenges may overwhelm an animal's capacity to adapt and may result in death, while less severe challenges may have impacts on growth, reproduction and health.[28]

The second framework assesses the affective (or emotional) state of the animal. Affective states may be positive or negative. A positive affective state is linked with a predominance of positive experiences, such as the experience an animal has when it engages with a rewarding behaviour.[29] Affective states may be assessed using such measures as preference testing, behavioural observation and physiological testing.[30]

The third framework uses the concept of natural living. It assumes that the welfare of an animal is better when it can express its normal patterns of behaviour. This approach draws attention to the potential welfare benefits of providing opportunities for animals to engage in natural behaviours. However, the concept of 'natural' is often poorly defined, and this framework does not provide a rigorous scientific basis for welfare assessments.[31]

[22] Productivity Commission, 1998
[23] Barnett and Hemsworth, 2003.
[24] Broom and Johnson, 1993.
[25] Article 7.1.1. World Organisation for Animal Health 2010, code. Viewed 10 June 2012
[26] Productivity Commission, 1998
[27] Hemsworth et al., 2015.
[28] Hemsworth et al., 2015
[29] Mellor, 2015.
[30] Hemsworth et al., 2015.
[31] Hemsworth et al., 2015.

These conceptual frameworks have influenced the development of what is known as The Five Domains of Potential Welfare Compromise (the Five Domains) model which was originally developed in 1994 to assess the welfare of animals used in research. [32] This model was subsequently adopted in New Zealand as part of the regulatory requirements for assessing the welfare of animals used for scientific purposes. The model integrates biological functioning and affective states by considering internally regulated as well as externally generated inputs. [33]

Specifically in relation to the welfare of poultry, the standards drafting group supported by a widely representative SAG has identified the following welfare principles.

Poultry welfare principles

Poultry in Australia are managed in a range of farming systems including cage, barn and free range.

In achieving improved welfare outcomes envisaged by the standards, it is important that people responsible for poultry have the necessary knowledge, experience and skills to undertake the various procedures and meet the requirements of the standards, in a manner that minimises the risk to poultry welfare.

Adherence to good animal husbandry principles is essential to meet the welfare requirements of animals. Good husbandry principles that also meet the basic physiological and behavioural needs of poultry include:

- a level of nutrition adequate to sustain good health and welfare
- access to sufficient water of suitable quality to meet physiological needs
- social contact with other poultry
- space to stand, lie and stretch their wings and limbs and perform normal patterns of behaviour
- handling facilities, equipment and procedures that minimise stress to the poultry
- procedures to minimise the risk of pain, injury or disease
- provision of appropriate treatment including humane killing if necessary
- minimising the risk of predation
- provision of reasonable precautions against extremes of weather and the effects of natural disasters
- selection of poultry appropriate for the farming system and the level of planned bird management to be provided

[32] Mellor and Reid 1994.
[33] RSPCA Australia, 2016.

- assessment of the need to undertake any management procedures that may result in significant short-term pain or distress against alternative strategies for the long-term welfare of the poultry
- undertaking any management procedures required for planned bird management in a manner that reduces the impact of these procedures and minimises risks to poultry welfare

Innovative husbandry and housing systems which enhance bird welfare should be encouraged, and applied to commercial egg farming as practical.[34]

The problems, risks and policy objectives underlying the need for the proposed standards are identified in Part 2.0 of this RIS.

1.2.3 Relevant legislation, standards and guidelines

1.2.3.1 Responsibilities of governments

Animal welfare legislation provides a basis for community acceptance of the use of animals for various purposes. The successful pursuit of many industries involving animals is dependent on community confidence in the regulation of animal welfare.

Under constitutional arrangements, the primary responsibility for animal welfare within Australia rests with individual states and territories, which exercise legislative control through 'prevention of cruelty to animals Acts' and other legislation as outlined in Appendix 18 of this RIS. The purposes of such legislation include the considerate treatment of animals as well as to prevent cruelty. Most jurisdictions have regulations and/or codes of practice under their legislation setting standards and guidelines for the welfare of poultry (see Appendix 18).

The existing *Model Code of Practice for the Welfare of Animals – Domestic Poultry (4th edition)* applies in all jurisdictions, except in Victoria and Western Australia which have their own codes of practice based on this model code. However, there are significant deficiencies and inconsistencies in some of these codes, as discussed in Part 2.1 of this RIS. Such deficiencies can restrict government and industry capacity to influence the welfare of poultry; and can also create unnecessary regulatory burden for businesses operating in more than one jurisdiction.

The main method of dealing with animal welfare issues at the national level to date has been through the development of national model codes of practice in consultation with industry and other stakeholders, for endorsement by the former Standing Council on Primary Industries (SCoPI). SCoPI consisted of the Australian/state/territory and New Zealand government ministers responsible for agriculture, food, fibre, forestry, fisheries and aquaculture and rural adjustment policy. The Council was the peak government forum for consultation, coordination and, where appropriate, integration of action by governments on primary industries issues, including animal health and welfare.

[34] *Australian Animal Welfare Standards and Guidelines for Poultry*. Animal Health Australia (AHA) 2017. Version: Public Consultation 2017

These model codes have then been used as a guide by the various state and territory governments in the development of their own regulations and codes of practice, as listed in Appendix 18 to this RIS. (Victoria and Western Australia have published their own codes of practice based on the model codes). The model codes of practice are now being progressively converted into national mandatory standards such as the proposed standards for poultry, alongside voluntary guidelines. As these model codes or standards are developed primarily in recognition of government purposes (that being to provide a basis for implementing consistent legislation and enforcement across Australia), they also provide a basis for voluntary codes of practice and quality assurance (QA) programs that may be developed from time to time by industry associations.

However, these model codes and state codes of practice are a mixture of standards ('must' requirements) and guidelines ('should' advisory statements). As such, these codes are not sufficiently clear or verifiable for implementation and enforcement purposes; nor for integration into mandatory industry training and QA programs. This problem is discussed in greater detail in Part 2.2 of this RIS.

The Australian Government has specific powers in relation to external trade and treaties that encompasses some animal welfare issues. Its legislative responsibility for the live animal import and export trade and animals in quarantine can potentially affect the poultry industry; however, import and export of live poultry is outside the scope of the proposed standards and guidelines. For this reason, the Australian Government has no direct jurisdiction with respect to the proposed standards.

Local governments have responsibility for some environmental or amenity aspects of backyard poultry regulation, such as noise, odours and other nuisances. If poultry welfare issues are discovered by local Councils, they are usually referred to the RSPCA or the relevant state government department.

1.2.3.2 Australian Animal Welfare Strategy (AAWS)

The background to national animal welfare standards is that in 2006, the former Primary Industries Ministerial Council (PIMC) (until recently SCoPI) asked the former Primary Industries Standing Council (PISC) to develop a nationally consistent approach to the development, implementation and enforcement of Australian animal welfare standards.

The former AAWS endorsed in May 2004 by the former PIMC outlined directions for future improvements in the welfare of animals and provided national and international communities with an appreciation of animal welfare arrangements in Australia. As part of the former AAWS, enhanced national consistency in regulation and sustainable improvements in animal welfare based on science, national and international benchmarks and changing community standards were identified as areas of priority effort. Work is now underway to update the Model Codes of Practice and convert them into Australian Animal Welfare Standards and Guidelines. The new documents will incorporate both national welfare standards and industry guidelines for each species or enterprise.

The aim of the former AAWS was to assist in the creation of a more consistent and effective animal welfare system in Australia. The former AAWS, through its participants and projects, helped to clarify the roles and responsibilities of key community, industry and government organisations. The animal welfare system in Australia aims to ensure all animals receive a

standard level of care and treatment. This requires that all animals be provided with adequate habitat, handling, sanitation, nutrition, water, veterinary care, and protection from extreme weather conditions and, as much as reasonably possible, other forms of natural disasters.

The period to which the former AAWS applied expired in 2014 and the relevant web site is now maintained by the Australian Veterinary Association (AVA).

1.2.3.3 The Model Codes of Practice (MCOP) Review

For the past 35 years, the welfare of livestock in Australia has been supported by a series of Model Codes of Practice for the Welfare of Animals. Over this time, animal welfare science has matured, community values and expectations have changed, and our international trading partners have placed greater emphasis on livestock welfare. As a result, the usefulness and relevance of these model codes has been called into question; as has the process by which they have been developed and revised.

The purpose of the original model codes was to increase consistency in the existing state and territory codes of practice and their use of animal welfare legislation. The process used to develop or review a model code was conducted by one of the states or territories in consultation with the others. As there was no official system for developing or reviewing a code there was substantial variation in the quality, consultation, (the membership of standards writing groups and the consultation process varied widely), timeliness and content of the codes. The lack of consistency between and within individual codes meant that farmers and workers that operated between jurisdictions were uncertain about their responsibilities in relation to animal welfare. Livestock industries, service providers and animal welfare groups often rated this lack of consistency as a major problem and one that needed to be given a very high priority for attention. In addition the reviews of codes did not routinely consider contemporary animal welfare science as a basis for a standard or involve the preparation of a rigorous economic impact assessment. Another problem was that the development and review process was unfunded and relied on the in-kind contribution of stakeholders including representatives of state and territory governments and the Federal Government.

To address these issues, the former PISC asked the Australian Government Department of Agriculture and Water Resources to consider arrangements for reviewing and developing the model codes as a basis for Australia's future livestock welfare regulation. These arrangements were reviewed in 2005[35], and a new approach was recommended that would ensure consistency, scientific soundness, appropriate consultation and legal enforceability. This collaborative process resulted in the development of the Australian Animal Welfare Standards and Guidelines Business Plan,[36] which was endorsed by the former PIMC10 in May 2006. Livestock industries and governments agreed to a recommendation to develop standards to be underpinned by legislation and advisory guidelines clearly separated but contextually linked in the same document.

Livestock industries have not found the existing model codes useful as communication documents because of their inconsistent, complex and often confusing mixture of standards and guidelines (refer to Part 2.1.2 of this RIS). The new standards provide greater certainty for all stakeholders, and in particular livestock industries, than the model codes by regulating

[35] Neumann, 2005

[36] http://www.animalwelfarestandards.net.au/files/2011/01/Animal-Welfare-Standards-and-Guidelines-Development-Business-Plan.pdf

standards in legislation and by achieving more nationally consistent outcomes. Improved national consistency in the implementation of standards and guidelines will promote the development and efficient operation of national QA programs. This means that QA schemes will be more consistent in the various jurisdictions and that auditing the schemes will be much simpler.

The overall situation within agriculture departments and livestock industry bodies was and is:

> There is general agreement about the desirability of having national standards of livestock welfare that are consistently mandated and enforced in all states and territories. The need for improved processes, broader consultation and linkages to industry QA programs also is generally acknowledged. There is broad consensus amongst all governments and peak industry bodies regarding a preferred process for revising and developing new welfare standards and guidelines.[37]

The first endorsed Australian animal welfare standards and guidelines development was for the land transport of livestock in 2009.[38]

1.2.3.4 Role of standards and guidelines

For the purposes of this RIS, and especially the cost/benefit assessment in Part 4.0 of the RIS, it is important to clearly distinguish between standards and guidelines. These terms are defined in the proposed national standards document as follows:

Standards — the animal welfare requirements designated in this document. The requirements that must be met under law for livestock welfare purposes.

As stated in the introductory sections of the standards and guidelines document, the standards are intended to be clear, essential and verifiable statements. However, not all issues are able to be well defined by scientific research or are able to be quantified. Science cannot always provide an objective or precise assessment of an animal's welfare and consequently where appropriate science is not available, the standards reflect a value judgement that has to be made for some circumstances. Some standards describe the required welfare outcome without prescribing the exact actions that must be done.

Standards use the word **'must'**. They are presented in a box and are numbered with the prefix 'S'.

Guidelines — the recommended practices to achieve desirable animal welfare outcomes. Guidelines use the word '**should**' and are to complement the standards. The guidelines are numbered with the prefix 'G'. Non-compliance with one or more guidelines will not constitute an offence under law.

The position taken by former PIMC 15, in May 2009, is that guidelines, regardless of their purpose in existing Codes and the new Standards and Guidelines documents, will not be regulated.

In particular agreement was reached that:

[37] http://www.animalwelfarestandards.net.au/files/2011/01/Animal-Welfare-Standards-and-Guidelines-Development-Business-Plan.pdf
[38] Australian Animal Welfare Standards and Guidelines - Land Transport of Livestock

"All future revisions of Model Codes and 'Australian Standards and Guidelines' documents must provide a number of:

> a. clear essential requirements ('standards') for animal welfare that can be verified and are transferable into legislation for effective regulation, and
>
> b. guidelines, to be produced concurrently with the standards but not enforced in legislation, to be considered by industry for incorporation into national industry QA along with the standards."

Non-compliance with one or more guidelines will not constitute an offence under law. For these reasons, it would not be appropriate for jurisdictions to convert the guidelines into standards.

It is important to note that the standards and guidelines form a dual purpose document serving as the basis for development of regulations (the standards); and also to communicate to the Australian community the desirable welfare practice and recommendations (guidelines) for better welfare practice. The non-regulation of the recommendations (guidelines) is a fundamental premise on which industry engagement and support for this process is based. The need for regulatory certainty and stability is important for businesses that own and invest in poultry.

It should be noted that the terms 'best practice' or 'better practice' are not used in the proposed standards document. These are concepts used by industry for business benchmarking purposes, rather than as aspects of an enforceable standard or a recommended guideline. 'Best practice' is defined in Oxford Dictionaries Online as 'commercial or professional procedures that are accepted or prescribed as being correct or most effective'.

1.2.3.5 Relevant industry guidelines and initiatives

Animal welfare is recognised as a characteristic of product quality and in some instances is now a requirement for certain markets. There is increasing recognition by livestock industries that animal welfare is an integral part of good animal production.

As well as participating in the development of the proposed standards and guidelines, poultry industries have on their own initiative introduced animal welfare programs such as the Egg Corp Assured (ECA) Program.

The ECA Program has been developed by the AECL. It is a national egg QA program designed to help commercial egg producers develop an approved QA program for their business and be recognised for doing so. The ECA Program addresses issues including food safety, quarantine and biosecurity, hen health and welfare, egg labelling and environmental sustainability. ECA is audited by accredited, third party auditors.[39]

AECL develops and delivers training programs to meet a long term need of the egg industry. AECL's stated goal is to develop a sustainable training program and culture within the egg industry.[40]

[39] https://www.aecl.org/quality-assurance/
[40] https://www.aecl.org/skills-and-knowledge/

AECL also uses funds raised from industry levies to conduct research and development (R&D). One of the four major R&D subprograms is the Hen Welfare and Best Practice Production Systems Program. This program is targeted towards generating environmentally and economically sustainable egg production in all egg farming systems. It covers the key scientific research and development disciplines relating to hen welfare and hen health including disease management, nutrition, uniformity, feed availability and environmental stewardship.[41]

The ACMF has developed a model welfare audit program which covers hatchery, breeder rearing, breeder laying, grower, and the pick-up, transport and processing sectors. Several companies have incorporated elements of this welfare audit in their own quality plans. The ACMF states that all companies incorporate elements of good practice for bird welfare in their grower manuals.[42] The Rural Industries Research and Development Corporation (RIRDC) Chicken Meat Program also uses funds raised from industry levies to conduct R&D.

1.2.3.6 Relevant international standards

Internationally, there has been an increasing trend to introduce animal welfare legislation and standards. This part of the RIS is included to provide a brief international context, while acknowledging that Australia's poultry exports are a relatively small proportion of annual production, as summarised in Part 1.2.1 of this RIS. Australian production systems may vary from production systems, poultry breeds and climatic conditions in other countries. Comparable poultry industries operate in the United States of America and Canada.

World Organisation for Animal Health (OIE)

Since May 2005, the World Assembly of OIE Delegates (representing the 178 Member Countries and Territories of the World Organisation for Animal Health including Australia) has adopted animal welfare standards in the Terrestrial Code.[43]

The OIE is an inter-governmental standard setting organisation, rather than a treaty or regulatory organisation. As such, OIE does not enforce a country's compliance with any of the health or welfare standards. Members countries have the right to implement trade conditions over and above the OIE standard if required to meet the country's Appropriate Level of Protection (ALOP). Further information on the OIE and animal welfare is available at: http://www.oie.int/en/animal-welfare/animal-welfare-at-a-glance/

Australia's main interests in OIE animal welfare standards are as an international benchmark and to ensure that Australian exporters do not become uncompetitive in overseas trade as a result of excessive cost burdens. However, in this case overseas exports are a very minor proportion of Australian poultry production.

In general terms, the World Assembly of OIE Delegates endorsed animal welfare guiding principles for livestock at its General Assembly in 2012. These are published in the *OIE International Animal Health Code. Article 7.1.4* [44] and are as follows:

[41] https://www.aecl.org/r-and-d/overview/
42 http://www.chicken.org.au/page.php?id=44
[43] http://www.oie.int/en/animal-welfare/animal-welfare-key-themes/
[44] http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_1.7.1.htm

OIE Eleven general principles for the welfare of animals in livestock production systems:

Genetic selection should always take into account the health and welfare of animals.

Animals chosen for introduction into new environments should be suited to the local climate and able to adapt to local diseases, parasites and nutrition.

The physical environment, including the substrate (walking surface, resting surface, etc.), should be suited to the species so as to minimise risk of injury and transmission of diseases or parasites to animals.

The physical environment should allow comfortable resting, safe and comfortable movement including normal postural changes, and the opportunity to perform types of natural behaviour that animals are motivated to perform.

Social grouping of animals should be managed to allow positive social behaviour and minimise injury, distress and chronic fear.

For housed animals, air quality, temperature and humidity should support good animal health and not be aversive. Where extreme conditions occur, animals should not be prevented from using their natural methods of thermo-regulation.

Animals should have access to sufficient feed and water, suited to the animals' age and needs, to maintain normal health and productivity and to prevent prolonged hunger, thirst, malnutrition or dehydration.

Diseases and parasites should be prevented and controlled as much as possible through good management practices. Animals with serious health problems should be isolated and treated promptly or killed humanely if treatment is not feasible or recovery is unlikely.

Where painful procedures cannot be avoided, the resulting pain should be managed to the extent that available methods allow.

The handling of animals should foster a positive relationship between humans and animals and should not cause injury, panic, lasting fear or avoidable stress.

Owners and handlers should have sufficient skill and knowledge to ensure that animals are treated in accordance with these principles.

These OIE general principles were informed by a scientific paper written by Professor David Fraser and other world experts on animal welfare science. The paper was published in the Veterinary Journal in June 2013.[45] The proposed Australian Animal Welfare Standards and Guidelines for Poultry are generally consistent with these principles.

[45] Fraser et al, 2013.

The *OIE Terrestrial Animal Health Code* for broiler chickens (meat chickens) was developed to cover all broiler growing areas in the world and thus provides a wide diversity of production management options and was designed to be a basis for countries to develop their own standards. The OIE Code does not have a chapter for layer hens.[46]

More specific international animal welfare standards for layer hens and ducks are provided in Appendix 20 to this RIS.

1.3 Proposed changes to existing standards

The proposed standards are to be found in a separate stand-alone document titled *Proposed Draft Australian Animal Welfare Standards and Guidelines for Poultry*.[47] The draft new document is divided into two parts. Part A lists general standards and guidelines for all species of poultry (68 standards). Part B lists standards and guidelines for individual poultry species (57 standards).

This document was prepared on the basis of relevant scientific literature, current practice and community expectations, in consultation with relevant stakeholder organisations as discussed in Part 1.4 of the RIS.

Unlike the existing codes of practice, this draft new document separates out the proposed standards ('must statements') from the proposed guidelines ('should statements'). The proposed standards comprise roughly around 30% of the document, with the proposed guidelines comprising the remaining 70%. Once again, it is intended that only the standards with be regulated. It will not be an offence under law to fail to comply with the proposed guidelines.

Each section of the proposed standards and guidelines document includes one or more animal welfare objectives, which are the intended outcome(s) for that section, and which once again will not be regulated.

Approximately 50% of the proposed standards are the same as the equivalent existing standards in the relevant codes of practice. Table 14 lists the proposed new standards.

Table 14 - proposed new standards

Std. No.	Subject matter
1	**Responsibilities**
SA1.1	A person must take reasonable actions to ensure the welfare of poultry under their care.
SA1.2	A person involved in any part of poultry production must be competent to perform their required task, or must be supervised by a competent person.
2	**Feed and water**
SA2.6	A person in charge must ensure poultry except for emus and ostriches over 4 days old are not deprived of feed for more than 12 hours prior to depopulation or pick up.
3	**Risk management of extreme weather, natural disasters, disease, injury and predation**
SA3.4	A person must ensure poultry which are unable to access feed and water are treated or killed as soon as possible.
5	**Management of outdoor systems**

[46] However, the OIE is currently forming a chapter for layer hens that is likely to be adopted in 2-3 years.
[47] http://www.animalwelfarestandards.net.au/poultry/poultry-public-consultation/

SA5.4	A person in charge must take reasonable actions to minimise access to feed and drinking water by wild birds.
6	**Lighting**
SA6.3	A person in charge must ensure that the light intensity for poultry is at least 5 Lux on average during light periods.
SA6.4	A person in charge must ensure poultry are not exposed to continuous light or darkness in any 24 hour period except on the day of pick-up (meat chickens) and meat chickens during very hot weather.
SA6.5	A person in charge must ensure poultry except for emus, ostriches and quail are exposed to at least 4 hours of continuous darkness within a 24 hour period.
8	**Litter management**
SA8.1	Where litter is used, a person in charge must ensure litter material is suitable for the species and of a good quality.
SA8.2	Where litter is used, a person in charge must ensure the risk of contamination of litter with toxic agents is minimal.
9	**Handling and husbandry**
SA9.1	A person must manage and handle poultry in a manner that minimises pain, stress or injury to birds.
SA9.2	A person must ensure care is taken in catching poultry to avoid creating panic and subsequent injury or smothering of the birds.
SA9.4	A person in charge must ensure that induced moulting is not routinely practiced.
SA9.5	A person in must ensure poultry are in adequate physical condition to endure an induced moult if necessary.
SA9.6	A person in charge must ensure that poultry induced to moult are: 1) in adequate physical condition to withstand endure another lay cycle; and 2) not deprived of feed or water; and 3) not fed a high fibre/low energy diet for longer than 20 days or body weight loss of no more than 25%; and 4) provided with a calcium supplement.
SA9.9	A person must not perform desnooding or dubbing[48] for cosmetic purposes on poultry.
SA9.12	A person must use appropriate pain relief when carrying out surgical procedures on poultry.
SA9.13	A person must not pluck live poultry.
SA9.15	A person must not remove more than one-third of the upper and lower beaks.
SA9.17	A person in charge must monitor hatching systems daily including back-up systems and/or alarms.
SA9.18	A person must monitor incubators at regular intervals during hatching and hatchlings that are found outside the trays must be returned to the tray or placed in brooders as soon as possible.
SA9.19	A person must treat hatchery waste, including unhatched embryos, quickly and effectively to ensure the rapid killing of all unhatched embryos.
10	**Humane killing**
SA10.1	A person in charge must ensure killing methods for poultry result in rapid death, or loss of consciousness, followed by death while unconscious.
SA10.2	A person must have the relevant knowledge, experience and skills to be able to humanely kill poultry, or be under the direct supervision of a person who has the relevant knowledge, experience and skills, unless: 1) the poultry are suffering and need to be killed to prevent undue suffering; and 2) there is an unreasonable delay until direct supervision by a person who has the relevant knowledge, experience and skills becomes available.
SA10.3	A person in charge of poultry which are suffering from severe distress, disease or injury and that cannot be reasonably treated or which have no prospect of recovery must ensure that the poultry are killed at the first reasonable opportunity.
SA10.4	A person killing poultry must take reasonable action to confirm the bird is dead.
11	**Poultry at slaughtering establishments**

[48] Dubbing is the procedure of removing the comb, wattles and sometimes earlobes of poultry.

SA11.3	A person must ensure that if poultry are not fit for slaughter they will be killed humanely.
B1	**Laying Chickens**
SB1.1	A person in charge must not allow the excreta of laying hens in cages to accumulate to the stage that compromises poultry health and welfare.
SB1.5	A person in charge must ensure that after the training period, where hens are housed under artificial light, lighting schedules must provide a minimum of 4 hours of continuous darkness in each 24-hour period.
B2	**Meat chickens**
SB2.1	A person in charge must ensure that after 7 days of age, lighting patterns must encourage activity and provide a minimum period of 4 hours of continuous darkness each day except on the day of pickup (meat chickens) and meat chickens during very hot weather.
SB2.2	A person must not routinely undertake surgical procedures, such as beak trimming, on meat chickens.
B3	**Meat and Laying Chicken Breeders**
SB3.1	A person in charge must not allow the excreta of chicken breeders in cages to accumulate to the stage that compromises poultry health and welfare.
SB3.4	A person in charge must ensure, in relation to useable areas on one or more levels of a multideck cage and for any area occupied by feeding and watering equipment and nest boxes that: 1) each level is easily accessible to the hens 2) headroom between the levels is at least 45 cm[49]
SB3.5	A person in charge must ensure that after the training period, where hens are housed under artificial light, lighting schedules must provide a minimum of 4 hours of continuous darkness in each 24-hour period.
SB3.6	A person in charge must ensure meat and laying chicken breeders are not be lifted or carried by the head, neck, wings, feathers or tail feathers unless otherwise supported by the breast. Except if lifted and carried by the base of both wings.
SB3.7	Nest boxes must be provided during the egg production phase.
B4	**Ducks**
SB4.4	A person in charge must ensure facilities are provided to allow ducks to dip their heads under water or misters/showers to allow ducks to wet preen, and to clean their eyes and nostrils.
SB4.5	A person in charge must ensure nest boxes are provided for duck breeders when in lay.
B5	**Emus**
SB5.2	A person must house chicks in groups of up to 200 for the first 4 weeks of life at a shed density of up to 30 chicks per m2 provisional that adequate heating is provided to prevent huddling that would cause smothering.
SB5.3	A person in charge must ensure the maximum shed density for emus from 4 weeks to 4 months old is 10 per m^2 and above 4 months old is 2 per m^2.
SB5.6	A person in charge must ensure stocking rates for birds raised in open conditions vary from 175 per hectare for dry or bare conditions to 250 per hectare for lush or irrigated conditions.
SB5.7	A person in charge must ensure yearlings are housed in open conditions at stocking rates from 100 per hectare for dry or bare conditions to 175 per hectare for lush or irrigated conditions.
SB5.8	A person in charge must ensure where emus are kept as breeding pairs, each pair are provided with a minimum pen size of 400 m2 which must be securely fenced.
SB5.9	A person in charge must ensure in low rainfall areas and where there is little vegetation, stocking rates are decreased, except if supplementary feed is provided.
B6	**Geese**
SB6.2	A person must not catch geese by the legs or feet.
SB6.3	A person must not lift or carry geese by the head, neck, legs or feet, wings, feathers or tail feathers unless otherwise supported by the breast.
SB6.4	A person in charge must ensure shelters provide 1m2/bird floor space.
SB6.5	A person in charge must ensure a single pair of geese are kept in an area of a minimum of 3m2

[49] The other components of SB3.4 are the same as existing standards.

SB6.6	A person must ensure the maximum recommended stocking densities for geese are according to housing type and under good management conditions and as follows; **Age/In housing (indoors)** Goslings to 10 days/12 birds/m2 Goslings at 8 weeks/2 birds/m2 Breeders/2 birds/3m2 **Age/In runs** Goslings- at 8 weeks/1,250 birds/ha or 500/acre Breeders/250 birds/ha or 100/acre
B7	**Guinea Fowl**
SB7.1	A person must not lift or carry guinea fowl by the head, legs, neck, wings, feathers or tail feathers unless otherwise supported by the breast.
B9	**Partridges**
SB9.1	A person must not lift or carry partridge by the head, legs, neck, wings, feathers or tail feathers unless otherwise supported by the breast.
SB9.2	A person must ensure the maximum recommended stocking densities for partridge are 10kg/m2.
B10	**Pheasants**
SB10.1	A person must not lift or carry pheasants by the head, legs, neck, wings, feathers or tail feathers unless otherwise supported by the breast.
SB10.2	A person must ensure the maximum recommended stocking densities for pheasants are 10kg/m2.
B11	**Pigeons**
SB11.1	A person in charge must ensure every effort is made to avoid aggression towards both hen birds and immature nestlings by the appropriate selection of breeding stock coupled with appropriate housing.
SB11.2	A person must not lift or carry pigeons by the head, legs, neck, wings, feathers or tail feathers unless otherwise supported by the breast.
SB11.4	A person in charge must ensure that at all times there are more perches, either box or V shaped, available in the loft than resident pigeons.
SB11.5	A person in charge must ensure racing pigeons are not released away from the home loft for racing into extreme weather conditions or if there is fog in any portion of the return journey.
B12	**Quail**
SB12.2	A person must not lift or carry quail by the head, legs, neck, wings, feathers or tail feathers unless otherwise supported by the breast.
B13	**Turkeys**
SB13.1	A person performing artificial breeding procedures on turkeys must have the relevant knowledge, experience and skills, or be under the direct supervision of a person who has the relevant knowledge, experience and skills.
SB13.2	A person performing artificial breeding procedures on turkeys must take reasonable actions to minimise pain, distress or injury.
SB13.3	A person must not lift or carry turkeys by the head, neck, wings, feathers or tail feathers unless otherwise supported by the breast. Except when lifted by the tail feathers and neck or by a leg and a wing by the base of both or wings for vaccination.
SB13.4	A person in charge must ensure nest boxes are provided for turkey breeders when in lay.

1.4 Consultation processes

The Consultation Guidelines (Appendix F of the COAG Guidelines) have been considered in the consultation strategy for the proposed standards and this RIS.

The development process for the standards and guidelines is transparent and inclusive. Relevant scientific literature, current practice and community expectations are utilised to support an evidence-based approach. The process follows an agreed project plan for the development of standards and guidelines.[50]

The proposed standards were developed under the direction of the AWTG, which is ultimately responsible to AGMIN. AWTG membership includes one representative from each State and Territory and a representative from the Commonwealth and New Zealand, at Deputy Secretary level or equivalent (or their delegate). Development of the proposed standards was initially undertaken by a small drafting group, supported by a widely representative SAG. Further drafts of the standards were developed by the drafting and advisory groups.

The SAG is comprised of representatives of national organisations representing the poultry industries, animal welfare organisations, state and territory government agencies, policy specialists and technical experts. Dr. Steven Atkinson, a veterinary scientist, acts as an independent Chair. Apart from AHA and the government agencies, the organisations represented on the SAG (in alphabetical order) are:

- **Animals Australia Inc**. (AA) - a federation representing some 40 member animal welfare societies and thousands of individual supporters throughout Australia;
- **Australian Chicken Growers Council** (ACGC) - represents contract chicken meat growers and turkey producers on a range of industry issues at a national level;
- **Australian Chicken Meat Federation** (ACMF) - the peak coordinating body for participants in the chicken meat industries in Australia;
- **Australian Duck Meat Association Inc.** (ADMA), representing the duck meat industries.
- **Australian Egg Corporation Limited** (AECL) - an Industry Services Body or provider of marketing and Research & Development (R&D) services for the benefit of all stakeholders, principally egg producers;
- **Australian National Pigeon Association Inc.** – representing the show and racing pigeon industry;
- **Australasian Turkey Federation** (ATF) - is an organisation for turkey producers and turkey breeders that provides turkey information and relevant guidelines for turkey growers;

[50] AHA web site < http://www.animalwelfarestandards.net.au/about-2/>

- **Australian Veterinary Association** (AVA) - the professional organisation for veterinarians. The core objective of the AVA is to advance veterinary science;
- **Commercial Poultry Veterinarians Special Interest Group** (AVA);
- **Egg Farmers of Australia** (EFA) - aims to further the interests of the Australian egg industry through developing and advocating policies, engaging with relevant stakeholders and participating in public debate.
- **Egg Industry Research & Development Corporation** (RDC)
- **Emu Industry Federation of Australia Inc.** – the peak emu industry body in Australia;
- **Federal Council of Agricultural Societies** (FCAS) - there are over 500 country show societies, who each belong to a governing state body. These state organisations join together to form this national organisation.
- **Goose Breeders Association -** representing the goose industry;
- **Ostrich industry -** representing the ostrich industry;
- **Quail industry** member**;** representing the quail industry;
- **RSPCA Australia** - a federation of the eight autonomous state and territory RSPCAs in Australia. RSPCA Australia establishes national policies and positions on animal welfare, and liaises with government and industry on national animal welfare issues;
- **Independent animal welfare scientist,** Faculty of Veterinary and Agricultural Sciences University of Melbourne.

During the development of the proposed standards and guidelines, several meetings of the SAG were held, which were regularly attended by almost all of the above mentioned representatives. All members of the SAG had an equal opportunity to express their opinions. The SAG has agreed to release the proposed standards and guidelines for public consultation. The alternative options considered in this RIS were also selected by the SAG, as discussed in in Part 3.0 of this RIS.

The following statement has been provided by the Australian Chicken Meat Federation.

ACMF Statement Re the Poultry Welfare S&Gs Consultation RIS

The Australian chicken meat industry welcomes the opportunity for the public to participate in the consultation on the standards that will apply to animal welfare practices adopted by the Australian chicken industry in the future.

The chicken industry has actively engaged in the process of standards development, including by providing funding for the project, and in consultations with a range of stakeholders throughout the development of the standards and guidelines.

From the outset, it was understood that the standards would need to take into account any underpinning scientific evidence (where it is available), current industry practice and the knowledge and experience of those with day to day responsibility for caring for the birds, and consumer expectations. However, as acknowledged in the draft standards and guidelines, the interpretation of animal welfare science is "influenced by the worldview and convictions (values) of the individual reader", and "this interplay of values and science can lead to people drawing different conclusions about the same piece of animal welfare science". The expectations of individual consumers are likewise influenced.

In willingly entering into and engaging in the standards development process, the ACMF accepted that there would be a range of divergent views held by various stakeholders on a range of matters, that it therefore may not be an easy process, and inevitably not all parties (including the chicken industry) would get exactly what they wanted out of it. This proved to be the case.

Nevertheless, all parties represented on the Standards Advisory Group (SAG) had the opportunity to contribute their views and to provide supplementary information and evidence to support their position on key issues.

Given the range of views held by parties involved in the process, it is inevitable that the consultation process resulted in some robust debate, and compromises and difficult decisions had to be made. On balance, the ACMF feels that the outcomes of the Drafting Group's consideration of all evidence presented on key issues was fair and reasonable. We remain fully supportive of the process, including the current consultation with the broader stakeholders and general public.

The following statement has been provided by the Australian Egg Industry

EFA Statement Re the Poultry Welfare S&Gs Consultation RIS

The Australian egg industry welcomes and supports the S&G process as it moves to this important next phase of public consultation. Egg Farmers of Australia has participated in this process from its commencement and has provided information to inform consideration of animal welfare as it relate to egg farming.

The process to date has been detailed and thorough with a range of organisations providing input and perspectives to the development of the RIS. While it is not possible for a RIS to deal with every possible issue in full detail and remain fit for its purpose, the egg industry is confident that the RIS will support a public consultation process in which all the meaningful issues are put forward to the public for comment.

In particular, the egg industry is aware of ongoing conjecture from animal welfare groups regarding the scientific evidence underpinning the RIS. Given the opportunity, EFA would prefer to have supplementary points reflecting the experience of the egg industry included in the RIS to assist the public to better understand the interaction between animal welfare science and farming practices. As egg farmers, we view these issues in context and would like to see that full context brought to life in the public papers. Whilst we recognise that the

RIS cannot provide an account of all and every perspective, we are comfortable that the inputs allow for a robust and meaningful debate.

Further, the egg industry recognises that it is the nature of scientific research that it can be interpreted subjectively. The S&G process has sought to minimise this by providing ample opportunity for industry, government and animal welfare groups to provide input on available scientific evidence. In doing so, a balance of scientific evidence has been captured that appropriately informs the S&G process and the public consultation.

In this context, the egg industry looks forward to engaging with the public on these important issues and assisting in progressing the S&G process to its conclusion."

RSPCA Australia (RSPCA) has a specific policy standard on layer hens that forms part of the RSPCA Approved Farming Scheme. The RSPCA does not support conventional cage systems and the website states that:

"The RSPCA has developed standards for layer hens. The Standards allow for higher-welfare indoor and outdoor systems which focus on providing for hens behavioural and physical needs.

RSPCA approved hens have more space than those raised in conventional systems. Hens can perch, dustbathe, scratch and forage, and lay their eggs in a nest. Battery cages are **not** allowed under the RSPCA Approved Farming Scheme."

A dissenting statement from the RSPCA and Animals Australia has been provided as follows.

RSPCA Australia and Animals Australia dissent report

'RSPCA Australia and Animals Australia wish to note their opposition to several draft standards proposed in the Australian Animal Welfare Standards and Guidelines for Poultry on the basis of their detrimental impact on animal welfare and failure to properly reflect current animal welfare science.

The primary areas of opposition raised by RSPCA Australia and Animals Australia are outlined in the following non-exhaustive list of issues:

1. The lack of any standards in Part B1 requiring layer hens to be afforded the ability to express innate behaviours including perching, nesting, dust bathing and ground-scratching, as well as comfort behaviours including wing-stretching.

2. The lack of any proposed phase-out of conventional cage systems. Worldwide, scientific evidence is conclusive that housing hens in conventional cages results in negative states of welfare.

3. The current stocking densities for meat chickens, layer pullets, layer hens, and turkeys outlined in Part B. Scientific evidence shows that stocking density is an important determinant of welfare. Stocking density has a direct, negative linear relationship with welfare, with evidence demonstrating that lower densities lead to improved welfare.

4. The minimum light intensities outlined in Part A6. Scientific evidence demonstrates that low lighting levels of this nature have negative welfare impacts

including eye abnormalities, a reduction in locomotion and activity levels, and an increase in lameness and skin problems such as hock burn, breast blisters and foot pad dermatitis in some species.

5. The lack of restrictions placed on the practice of beak trimming in Part A9. Beak trimming should only be performed:

- when other options to reduce feather pecking and cannibalism have been implemented and exhausted;
- by an accredited operator;
- using an infrared beam;
- on chicks within 3 days of hatching;
- to remove the tip of the beak (one-fifth) only; and
- once, unless a second trim is required in exceptional circumstances to address outbreaks of severe feather pecking.'

6. In addition to these primary areas of opposition (points 1-5) Animals Australia and RSPCA Australia remain concerned that other substantive issues are not adequately addressed in the Draft Standards, for example the ongoing acceptance of skip-a-day feeding of breeding poultry and inadequate standards to protect poultry at slaughter.

The RSPCA has also prepared a report titled *The Welfare of Layer Hens in Cage and Cage-Free Housing Systems.* [51] This report and other references provided by the RSPCA, Animals Australia and Voiceless[52] have been considered during the preparation of this RIS.

An extensive consultation process will be undertaken. This RIS is an important part of the process to assess the proposed standards, and evaluate the costs resulting from changes to existing requirements.

To make a submission email publicconspoultry@animalhealthaustralia.com.au

Assessment of submissions from the public consultation process will give consideration to;

- the extent to which suggestions strengthen the intent and objectives of the standards
- the volume and variety of responses making similar suggestions
- form letters will be considered as providing a collective submission
- anticipated benefits or adverse impacts if submitted suggestions were to be implemented

[51] RSPCA Australia (2016) *The Welfare of Layer Hens in Cage and Cage-Free Housing Systems*. RSPCA Australia, Deakin West.
[52] Burgess, Elise (2017) *Unscrambled: The hidden truth of hen welfare in the Australian egg industry* Voiceless, Paddington.

- the viability of implementing any suggested change.

The main decision-making principles used for developing the revised standards are to ensure the standards are:

- desirable for livestock welfare
- feasible for industry and government to implement
- important for the livestock-welfare regulatory framework, and
- achieve the intended outcome for livestock welfare.

The consultation period will be conducted via a dedicated web page, plus specific approaches to key stakeholders. National industry bodies and state/territory jurisdictions (SAG members) are committed to consult with representational state/territory-based stakeholders with regard to the development, implementation and enforcement of animal welfare standards and guidelines. To complement jurisdiction-level communications, it is proposed that AHA will circulate the standards and guidelines consultation draft to relevant state/territory Ministers, government departments, peak industry bodies, peak animal welfare groups, state farming organisations, state Animal Welfare Advisory Committee (AWACs) and others for the public consultation period. This circulation list will include the Australian Small Business and Family Enterprise Ombudsman plus appropriate state and territory small business officials.
After the 90 day consultation period, an independent consultant will provide a report on public submissions to AHA. AHA will provide the submissions report to AWTG for review and comment and to the drafting group, who will make any necessary changes to the draft standards and guidelines document.

The revised standards and guidelines document and submissions report will then be provided to the SAG for discussion and advice to AWTG. The RIS consultant will commence work on the draft Decision RIS, which will include recommendation of a preferred option identified in the consultation RIS or in the public consultation period.

The draft Decision RIS, revised proposed final standards and guidelines and submissions report will be provided to AWTG. The SAG will also get the opportunity to comment on the documents and provide advice to AWTG. Once AWTG has endorsed the documents, these will be progressed for approval to OBPR, endorsement by the AGSOC and for endorsement/noting by the AGMIN.

It is then a policy decision for each state and territory jurisdiction to implement the poultry standards in legislation as they see fit.
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2.0 The problems and policy objective

2.1 Introduction

Australia's existing standards for the welfare of domestic poultry[53] are now 15 years old. Those for ostriches are 14 years old[54] and those for emus are 11 years old[55]. These standards have not kept pace with community and trading partner expectations, which are that risks to animal welfare will be managed through standards that are clear and verifiable for implementation and enforcement purposes, and are informed by evolving animal welfare science.

Because they have not kept pace with animal welfare science and society's expectations, a number of current practices present significant risks to poultry wellbeing. Key determinants of wellbeing not covered by current mandatory standards are: legal responsibility, stocking densities, lighting, litter management, facilities to allow innate behaviour, water for ducks, and animal intervention practices aimed at reducing mortality or increasing productivity (e.g. beak trimming, induced moulting, pinioning, castrating). A more detailed list of these deficiencies in given in Table 14 below, and the evidence for concern about these deficiencies in summarised in Part 2.3 of the RIS.

In some cases, there is not a clear cut solution to the need to minimise risks to animal welfare. There are also some welfare trade-offs that need to be considered, such as:

- freedom to express natural behaviours versus adverse welfare from other causes (e.g. pecking, cannibalism, disease and predators);
- optimal lighting for wellbeing versus optimal lighting for productivity.

Of lesser concern are two areas of regulatory failure which have been identified in relation to the welfare of poultry. These are the unsuitability of existing codes of practice to be adopted in government regulations; and secondly, excess regulatory burden on industry from having to meet the different requirements of eight jurisdictions. These secondary problems are discussed in Part 2.4 of the RIS.

According to COAG guidelines, the RIS is required to demonstrate a case for action, or in other words, a need for the proposed standards. This is best achieved by identifying the specific problems that the proposed standards are endeavouring to address. At this stage, these problems may be summarised as follows:

Problem 1: *Risks to the welfare of poultry* due to deficiencies in the existing MCOPs and jurisdictional codes of practice for the welfare of poultry;

and to a lesser extent:

[53] Model Code of Practice for the Welfare of Animals: Domestic Poultry 4th Edition SCARM Report 83 (2002).
[54] Model Code of Practice for the Welfare of Animals: Farming of Ostriches, Primary Industries Report Series 84 (2003).
[55] Model Code of Practice for the Welfare of Animals: Husbandry of Captive-Bred Emus Second Edition, Primary Industries Report Series 90 (2006)

Problem 2: *Uncertainty for industry* due to a lack of clear and verifiable standards (a confusing mixture of 'musts' and 'shoulds'); and

Problem 3: *Excess regulatory burden* arising from a lack of national consistency.

These problems need to be considered within the context of the base case, as outlined in Part 2.2. of this RIS.

Arising from this case for action, the policy objective of such action is identified in Part 2.5.

2.2 The base case

The term 'base case' means the relevant status quo, or the situation that would exist if the proposed standards or other options were not adopted i.e. existing standards plus market forces and the relevant federal, state and territory legislation (refer to Appendix 18 for details). The base case provides the benchmark for measuring the incremental costs and benefits of the proposed standards and other options. (As listed in Part 3.0, the base case or status quo is also an option to be considered in the RIS, but by definition the incremental costs and benefits of the base case are zero).

It is important to note that market forces apply to the benefits as well as the costs. Just as the influence of market forces is part of the base case that is subtracted from the costs, if there are financial returns from improved production, then these market forces are also part of the base case that should be subtracted from the benefits as well. In other words, if rational and informed producers can save themselves money by improving welfare, then they will do it without being forced to by regulated standards.

Cruelty and other unlawful practices can already be prosecuted under cruelty and other offence provisions of animal welfare legislation. For example, animals must not be allowed to suffer malnutrition, dehydration or sunburn, or worse still die from lack of feed or water.

The proposed standards are intended to replace the following model codes of practice:

- *Model Code of Practice for the Welfare of Animals: Domestic Poultry* 4th Edition SCARM Report 83 (2002).
- *Model Code of Practice for the Welfare of Animals: Farming of Ostriches*, Primary Industries Report Series 84 (2003)
- *Model Code of Practice for the Welfare of Animals: Husbandry of Captive-Bred Emus* Second Edition, Primary Industries Report Series 90 (2006)

These proposed standards are aimed to be consistent with those in the:

- *Australian Animal Welfare Standards and Guidelines – Land Transport of Livestock,* Edition One, Version 1.1, 21 September 2012.[56]
- *Model Code of Practice for the Welfare of Animals - Livestock at Slaughtering Establishments,* Chapter 3 – Poultry, Primary Industries Report Series 89.

[56] http://www.animalwelfarestandards.net.au/land-transport/

It is open to states and territories at any time to adopt the existing model codes as standards, and indeed some have already done so. Similarly, it is open to these jurisdictions to adopt or not adopt the proposed standards as state or territory requirements. If and when the a set of standards is submitted to the AGMIN for endorsement/noting, the decision to be made by AGMIN will be whether to replace the existing model codes and relevant state codes with the proposed standards or alternative options. For this reason, it is necessary for this RIS to assess the costs and benefits of the proposed changes in **standards**, rather than changes in the level of implementation or enforcement of the standards. In other words, the RIS needs to separate out and hold constant other factors (such as the level of implementation or enforcement) in order to measure the incremental costs and benefits of changes in standards; that is, to compare 'like' with 'like'. To do otherwise would introduce unnecessary complexity and potential confusion into the evaluation.

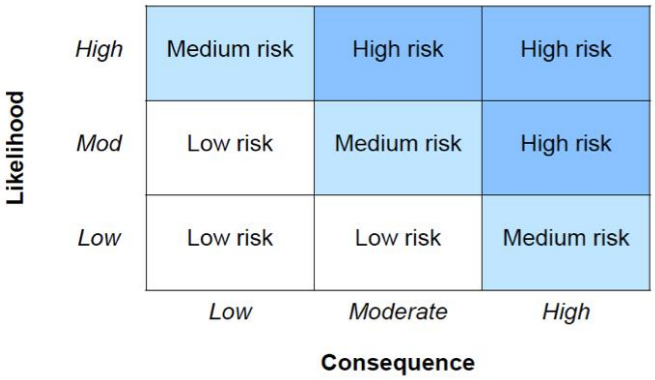
2.3 Risks to animal welfare and market failure

2.3.1 Problem 1: Risks to animal welfare

The farming of poultry can pose risks to animal welfare. This is the primary problem intended to be addressed by the proposed standards and alternative options. Regulatory differences between the jurisdictions and excess regulatory burden, whilst relevant, are a secondary problem in this RIS.

Before discussing such risks in detail, it should be noted that risk assessment has two dimensions – the likelihood of an adverse event occurring; and the severity of the consequences if it does occur, as illustrated in Figure 2.

Figure 2 - Assessing the level of risk



Source: Victorian Competition and Efficiency Commission

So whilst the number of animals affected by risks to animal welfare from various practices may seem as an obvious measure – such a measure fails to take into consideration a) whether or not a practice is ongoing and b) the impact of the procedure or practice on individual animals. That is to say, simply providing information on the number of animals affected does not provide any information regarding the duration of the effect nor the impact of the effect on each animal. (A cruelty prosecution with potentially substantial penalties can be launched for cruelty to only one animal).

For these reasons, the combination of factors that determine the *severity of the consequence* include:

- Number of animals affected (small or large); and
- Impact[57] of animal husbandry or handling procedure on individual animals.

There are no quantitative measures of the impacts of procedures on individual animals, other than stress measurements such as the levels of cortisol in blood. No such studies have been done on any significant scale in poultry. Impacts on individual animals is therefore a matter for qualitative judgement. Nevertheless, a public consultation question on this issue has been asked at the end of this Part of the RIS. So the only impact that can quantitatively be estimated is the number of animals affected by each of the identified welfare risks

Notwithstanding this caveat, the number of animals affected by each practice or procedure is discussed *only* where there is certainty or where there are robust assumptions based on experience in the industry. The public consultation process seeks further data via consultation questions at appropriate points in the RIS text.

As discussed in Part 1.2.2 of this RIS, animal welfare means how an animal is coping with the conditions in which it lives. An animal is in a good state of welfare if (as indicated by scientific evidence) it is healthy, comfortable, well nourished, safe, able to express innate behaviour, and if it is not suffering from unpleasant states such as pain, fear, and distress.[58]

It is important to note that poor animal welfare includes, but is not restricted to, practices that could attract a prosecution under the cruelty provisions of existing animal welfare legislation. Animal welfare standards are intended to bridge this legislative gap between a cruelty investigation and no further action.

Poor animal welfare outcomes can be linked to both market failure and regulatory failure, as discussed in Part 2.3.2 of this RIS. These failures give rise to various risks to animal welfare as discussed below. Although there is no evidence that these risks are systemic throughout the industries, there is a need to safeguard against any rogue operators who are unwilling or unable to adequately mitigate these risks. Even if current practices are inadequate in only a small minority of poultry farms, that does not negate the need for animal welfare standards. In fact, most laws are broken by only a small percentage of the population; but that is not a sound argument that such laws should not exist.

Inadequacy of existing codes of practice

The risks to poultry welfare stem from deficiencies in the relevant standards across all jurisdictions – they are not the result of inconsistencies between jurisdictions. As outlined in in Part 1.2.3.1 and Appendix 18 of this RIS, all jurisdictions have existing standards based on the national model codes of practice (MCOPs).

The proposed new national standards are not starting from a zero base. National standards are not being introduced for the first time – they are replacing inadequate existing codes of practice (refer to Part 1.2.3.3 of this RIS) which need updating. The risks associated with poultry farming are all currently managed by the various state and territory governments in co-

[57] Impact includes both the nature and the duration of the effect.
[58] Article 7.1.1 World Organisation for Animal Health 2010, Terrestrial animal health code. Viewed 10 June 2012

operation with the industry. They all have relevant Acts and Regulations in place dealing with the welfare of animals in general; and all jurisdictions except the Northern Territory have regulations dealing specifically with domestic fowls. Victoria and Western Australia have their own specific codes of practice based on the domestic poultry MCOP. In South Australia the essential elements of the Code are regulated. As listed in Appendix 18 to this RIS, other jurisdictions use the existing MCOPs as a set of guidelines.

It is important to note that the existing MCOPs are not sunsetting (automatically expiring). Unless they are specifically revoked, the MCOPs will remain in place as part of the base case if the problems outlined in this RIS are not addressed. It is therefore not possible to discuss the problems being addressed in this RIS without reference to the inadequacies of the existing MCOPs.

Deficiencies in standards

The existing MCOP relating to the welfare of domestic poultry was originally published in 1983. The current 4th edition was published in 2002. It is in need of updating in the light of new knowledge and experience. Whilst there are some voluntary guidelines, there are no existing MCOP standards ('must' statements) at all addressing the following areas of risk to animal welfare:

Table 14.1 – list of deficiencies in current MCOP for poultry

• allocation of responsibility of ensuring the welfare of poultry; • ensuring that poultry which are unable to access feed and water are treated or killed as soon as possible; • contamination of litter with toxic agents; • desnooding[59] or dubbing[60] of poultry for cosmetic purposes; • disposing of hatchery waste, including unhatched embryos; • excessive accumulation of excreta from laying hens in cages; • routine bill trimming of ducks; • facilities to allow ducks to access water to wet preen, and to clean their eyes and nostrils; • stocking densities for geese, partridges or pheasants;	• competency of poultry carers to perform their required tasks; • quantitative standards for lighting for poultry other than for young poultry for the first 3 days after hatching; • ensuring that induced moulting is not routinely practiced; • monitoring of incubators at regular intervals during hatching or dealing with escaped hatchlings; • ensuring that if poultry are not fit for slaughter they will be killed humanely; • provision of nest boxes during egg production by breeding hens, ducks or turkeys; • the catching of geese by the legs or feet, nor the lifting or carrying of geese, partridges, pheasants, quail or pigeons by the head,

[59] Desnooding is the removal of the snood or dewbill from turkeys.
[60] Dubbing is the procedure of removing the comb, wattles and sometimes earlobes of poultry.

• aggression amongst pigeons, perches for pigeons or the weaning of pigeons; • artificial breeding procedures on turkeys.	neck, legs or feet, wings, feathers or tail feathers; • ensuring that racing pigeons are not released away from the home loft for racing into extreme weather conditions.

These deficiencies or problems will now be discussed in greater detail. The following information is based on the support papers provided to the SAG, supplemented by additional scientific evidence provided by RSPCA and Animals Australia. The main areas of specific risk to the welfare of poultry are as follows:

Table 14.2 – main areas of specific risk to the welfare of poultry

• lack of clear responsibilities for personnel in charge of poultry	• need for restrictions on routine beak trimming
• lack of freedom of poultry to express innate behaviours	• risky litter management
• inadequate space allowances for poultry (stocking density)	• need to restrict routine use of induced moulting
• lack of perches, nests and litter for layer hens	• care of meat chickens and turkeys awaiting slaughtering
• lack of quantitative lighting standards	• access to water for ducks

These specific areas of risk to poultry welfare are summarised below, together with estimates of numbers of poultry affected where these are possible. More detailed scientific evidence in support of these risks is given in Appendix 21 to this RIS.

Lack of clear responsibilities for personnel in charge of poultry

The importance of defining responsibilities for animal welfare is particularly important for poultry, which are handled by various staff during the farming process. The central idea is that a designated 'person in charge' should be responsible and accountable for the welfare of poultry under their care. Under the current situation, nobody is held accountable within organisations for adverse animal welfare outcomes, meaning that all poultry are potentially at risk from this deficiency in standards. It is also important that the 'person in charge' at each stage of the process be competent, although market forces are usually an effective driver of competence amongst production staff.

Lack of freedom of poultry to express innate behaviours

At this stage, the most controversial animal welfare issue for poultry appears to be the keeping of layers hens in 'conventional' cages, on the grounds of the lack of freedom in cages for layer hens to express innate behaviours, including perching, nesting, dust bathing, ground-scratching

and wing-stretching. The importance of these behaviours to the birds is a matter of contention; and the extent of this lack of freedom varies according to the type of cage system used. The major cage systems available are:

• Conventional cages – hens are housed indoors, in groups of up to nine hens, usually in multi-tiered systems with wire mesh floors.

• Colony cages - cages are larger, housing a greater number of hens (e.g. 40-100), and may include a perch.

• Furnished cages – cages that contain furnishing such as nest boxes, perches and/or scratch-pads.

The overall assessment of the welfare of birds in different production systems is complex, with significant overlap possible in net welfare state between poultry businesses with different housing systems. There are advantages and disadvantages with each of the three main layer hen farming systems – cages, barns and free range, as defined in Part 1.2.1 of this RIS. No single system has a clear advantage over the others, except that free-range systems have highest the freedom to express natural behaviours.

These advantages and disadvantages are summarised in the following tables. It should be noted that the relative numbers of advantages and disadvantages are not necessarily the most important factor. Clearly some advantages and disadvantages are more important than others, not only to hen welfare, but also to financial and environmental aspects. For instance, cages provide the least freedom to express natural behaviours but they also have the lowest incidences of feather pecking and cannibalism. Some people might consider that freedom to express natural behaviours is overwhelmingly the most important factor, whilst others might prefer a different weighting. Tradeoffs like these are very difficult to quantify for individual birds, without further research into animal behavioural preferences.

Caged farming systems

Advantages	**Disadvantages**
Animal welfare • reliable provision of feed and water; • efficient management of adverse weather risk, temperature and ventilation (provided appropriate and functioning equipment is used); • cleanest hens with the best method of manure removal; • easiest system for inspecting individual hens;	• conventional cages provide the lowest freedom to express innate behaviours; although furnished cages allow freedom to perch and nest, and in some cases scratch the floor of the cage (if a scratch pad is provided); • a greater risk of leg weakness and bone fractures is found in conventional cages than in other systems; • if disease occurs, it can spread faster in high density systems such as cages.

• lowest incidence of disease because of highest level of biosecurity and easiest system to control disease by isolation; • ensures predator risks are controlled, with little or no predation (because of lack of predator access); • cages have stable pecking orders - lowest incidence of feather pecking; • lowest incidence of cannibalism (which sometimes follows outbreaks of feather pecking); <u>Financial</u> • highest laying rates;[61] • least space required (land costs) for hens • lowest need for vaccinations (20% less than free-range); • hens eat and drink less than in other systems – more efficient; • produces cleanest and safest eggs for consumption – no routine egg washing needed; • reduced need to use antibiotics; • more control over feed than free- range, but similar control as for barn farming systems ; • cheapest eggs for consumers because of lowest production costs and land requirements plus highest laying rates; <u>Environmental</u> • improves control of the environmental impacts, including protection to surrounding land, surface and ground water resources from nutrient runoff on free-range farms.	

[61] 97% of cage hens lay an egg every day, compared to 95% in barns and 80% in free range.

Barn farming systems (including aviaries)

Advantages	Disadvantages
Animal Welfare • some freedom to express innate behaviours (more than for furnished cages); • perches improve leg bone strength; • more control over feed than free- range but similar control as for cage systems; • hens prefer nesting in barns than outdoors because they are darker and more secluded; • ensures predator risks are controlled, with little or no predation; • protection from diseases carried by wild birds; • more biosecure than free-range. Environmental • similar control of environmental impacts as for cages. • less environmental concerns than from free-range because no nutrient runoff to waterways from open areas;	Animal Welfare • can get crowded in some parts of barn, with risks of smothering, especially if there is lightning or thunder sufficient to cause panic amongst the hens; • pecking orders are less stable than in cages; • incidence of feather pecking higher than in cages; • hardest to inspect hens because of high density and hens keep moving; Financial • more space (land costs) required for hens than cages, but less space than free range; • highest cleaning costs; • requires egg washing machine; • problems with eggs laid on barn floor (and not in nests); Work Health & Safety (WHS)[62] • Poorer air quality from dust in litter-based systems (floor housing and aviary) compared with furnished cages; • issues from bending down to collect eggs; • increased problem with rodent control and possible contamination with rodenticide.

[62] Whilst the proposed standards and other options are focussed on animal welfare problems and issues, WHS issues can be an unintended consequence that needs to be considered.

Free-range farming systems

Advantages	**Disadvantages**
Animal Welfare • highest freedom to express natural behaviours; • lowest risks of overcrowding and smothering; • easier to inspect hens than barns if there is a lower stocking density; • perches are usually provided leading to improved leg bone strength from perching and greater movement generally. Financial • highest pricing margins, which can offset the higher production and land costs than for cages or barns;	Animal Welfare • highest risk of predation because of easiest access of birds of prey; • highest incidence of disease because of lowest level of biosecurity; • long grass can get caught in crop, leading to starvation; • incidence of feather pecking and cannibalism higher than in cages, because pecking orders are less stable than in cages; • exposure to severe environmental conditions, or alternatively restriction to indoors in inclement weather which causes stress to birds because of changes in their daily routines; • difficulty in cleaning range area between flocks thus leading to buildup of pathogens in the environment; • increased risk of exposure to wild birds and infection with emergency diseases such as Avian Influenza requiring occasional large-scale destruction of hens. Financial • highest feed costs (as hens expend the most energy foraging and generally moving around); • highest land costs to provide the necessary additional space for hens; • highest mortality rates as a result of highest incidences of disease, predation and cannibalism; • most expensive eggs for consumers (although buying is free choice);

	• requires egg washing machine; • difficult to inspect hens (because they keep moving) but easier than barns if there is a lower stocking density than barns; • WHS issues from dust in litter based systems and from staff bending down to collect eggs; • future supply of free-range eggs could be a problem because of planning restrictions and suitable land shortages; • problems with eggs laid on the range and not in nests; • problems with rodent control and possible contamination with rodenticide • cost of eradication of emergency diseases. <u>Environmental</u> • highest environmental concerns from nutrient runoff to waterways from open areas;

Public consultation question 1: Do you agree with the above summary list of the advantages and disadvantages of layer hen farming systems? Do you think that any advantages or disadvantages are missing from this list? If so, please include them in your written submission.

In terms of the numbers of hens affected by the different farming systems, the following figures were provided in Table 15 of Part 1.2.1. of this RIS.

Table 15

Farm type	Total hens	% hens
Cage[63]	**10,716,713**	**54.51%**
Barn	**1,787,550**	**9.09%**
Free Range	**7,154,685**	**36.39%**
Total	***19,658,948***	***100.00%***

This means that an estimated 10.7 million layer hens kept in conventional cages are denied the freedom to express innate behaviours, while 7.1 million layer hens are exposed to higher risks

[63] These are almost all conventional cages.

and higher mortality due to predation, disease, extreme weather and cannibalism on free range farms.

Nevertheless, it is difficult to compare different housing systems due to the wide variation across systems. Specific design features within systems may have greater effects on bird welfare than the differences between the systems per se.[64] Management of intrinsic factors within each enterprise including housing design, stockmanship, rearing conditions and the strain of bird will impact on bird welfare.[65] The EU Laywel System provides a framework for welfare assessment acknowledging that each flock and each farm is unique and welfare problems may also vary from day to day.[66]

Positive states are more readily achieved for some behaviours in non-cage systems but implementation of less confinement will not alone guarantee an improvement in bird welfare. The nutrition, environment and health domains are important and contribute to the affective experience domain.[67] Non-cage systems allow poultry to express a wider behavioural repertoire (foraging, scratching, dust bathing, wing flapping, perching, and nesting) but expose poultry to greater risks of feather pecking, predation, smothering by other birds, climatic extremes, accidents, parasites, bone breakages and other diseases with resultant higher sickness and deaths.

In conventional cages, these behavioural restrictions also contribute to bone weakness.[68] Birds from conventional cages have a very high rate of bone fractures when handled. Typically, furnished cages allow hens to perch, which contributes to improved bone strength, but may also contribute to bone fractures when birds jump off the perch.[69] However, they are still unable to perform their full behavioural repertoire.

Some members of the Australian community seek to improve the possible range of bird behaviours through reduced confinement. Current market forces (consumer choice) supported by clear labelling standards is promoting the production of barn and free range produced eggs, but cage eggs still represent about half the retail fresh egg market volume.

The focus of the standards and guidelines is on achieving acceptable welfare outcomes for birds in all commercial systems while also taking into account environmental, food safety, financial and social considerations. One of the options considered in this RIS (Option D) is to vary the proposed standards to phase out conventional cages for layer hens over 10 and 20 years in favour of alternative systems - free range, barn, aviary or furnished cages. These options are evaluated in Part 4.0 of this RIS.

Inadequate space allowances for poultry (stocking density)

The available scientific literature on the effects of space allowance in layer cages shows that in general as floor space decreases, within a range of 650 to 300 cm2 per hen, bird welfare generally decreases, as measured by either higher mortality, lower egg production and body weight or poorer feed conversion. This scientific evidence on stocking density is summarised in Appendices 19 and 21 to this RIS.

[64] Widowski et al., 2016a.
[65] Widowski et al., 2013.
[66] Laywel, 2006.
[67] Green and Mellor, 2011.
[68] Laywel, 2006.
[69] Lay et al. 2011.

This space issue affects an estimated 2 million layer hens and 16.4 million meat chickens housed indoors, and an estimated 48.9 thousand turkeys housed indoors.[70]

Lack of perches, nests and litter for layer hens

In this RIS, poultry cages with perches and nests (plus or minus an area for dust-bathing/foraging) are referred to as 'furnished cages'; those without these furnishings are referred to as 'conventional cages'.

Gallinaceous birds (chickens, quail etc.) are motivated to perch, nest, dust-bathe and forage as part of their behavioural repertoire.[71] Provision of perches, nests and substrate for dust-bathing in poultry housing may allow the birds to express a greater range of these 'natural behaviours' during confinement in caged and non-caged housing systems.

Apart from the positive effect of perching on bone strength in caged birds, there is little physiological evidence to indicate that bird welfare is impaired if these resources are not provided. However, there is substantial behavioural evidence that chickens are motivated to perform these behaviours if given the opportunity.[72] 'The welfare implications of depriving hens of these behavioural opportunities remain largely unknown, but the opportunity to perform them may be conducive of positive welfare states'.[73]

The available scientific evidence on cage features is summarised in Appendix 21 to this RIS.

This problem also affects an estimated 10.7 million layer hens kept in conventional cages.

Lack of quantitative lighting standards

As most commercial poultry is maintained in indoor housing, the majority of birds are exposed to artificial lighting rather than natural daylight. Factors such as light intensity, photoperiod (light-dark cycles) length and distribution (intermittent), type of light source and wavelength may all have separate impacts.

Day length influences many physiological processes, including laying, growth rate, skeletal development, and behaviour. Light influences the development and function of a layer hen's reproductive system, influencing the age at which she starts laying and how many eggs she will lay in a given period. Increasing day length accelerates sexual maturity of growing pullets, stimulating egg production, and decreasing day length retards sexual maturity and restrains egg production.[74]

The available scientific evidence on lighting is summarised in Appendix 21 to this RIS.

The current MCOP for domestic poultry requires that the light intensity on poultry must be adequate to allow poultry and equipment to be inspected and any problems to be identified. But beyond these, there are no standards setting quantitative minimum lighting standards for poultry.

[70] See Appendix 16 for details.
[71] Olsson and Keeling, 2005; Hester et al, 2014; Widowski, 2016.
[72] Widowski et al., 2016 unpublished.
[73] Widowski et al., 2016 unpublished.
[74] Bolla, 2007.

In the absence of quantitative minimum lighting standards, an estimated 5.6 million layer hens are at risk of adverse welfare from this problem.[75]

Clause 5.1 of the MCOP states that the required light intensity for young poultry for the first 3 days after hatching is about 20 Lux, but this has been interpreted by the meat chicken industry as a guideline rather than a standard. The welfare of an estimated 127.1 million meat chicken hatchlings per annum is at risk from this problem.[76]

During periods of hot weather, continuous lighting may be used to allow meat chickens to continue to consume water and food during the cooler part of the night, and to prevent huddling. Continuous lighting may also be used in the day/s before pick-up of meat chickens to allow continued access to water after withdrawal of feed and facilitate crop-emptying, which is desirable for processing.[77]

Turkeys
Very little research has been conducted on lighting regimes for turkeys, and the results of such research are conflicting.[78]

Need for restrictions on routine beak trimming

Feather pecking, peck injury and peck mortality (cannibalism) in poultry occurs at variable rates and may unpredictably become severe and cause high rates of distress, injury and death in a flock.[79] It occurs in all production systems, but is more significant in non-caged systems.

Advantages of beak trimming may include 'reduced pecking, reduced feather pulling, reduced cannibalism, better feather condition, less fearfulness, less nervousness, less chronic stress and decreased mortality. Welfare disadvantages may include reduced ability to feed following beak trimming/treatment, short-term pain, perhaps chronic pain, and acute stress'.[80]

Birds are likely to experience acute pain during the procedures of beak trimming due to the presence of pain receptors in the tip of the beak. Neuroma formation in the beak as a result of beak trimming may also be associated with chronic pain. Beak trimming younger birds (less than one week of age) appears to avoid the long-term chronic pain that can occur in the stump of the beak when older birds are trimmed.[81]

There are currently two methods for routine beak trimming: either infrared beak trimming of chicks at the hatchery, or hot blade trimming at 10 days old or younger. A second trim is sometimes performed out at 8-12 weeks of age to prevent the beak growing back enough to cause pecking damage. Therapeutic beak trimming is occasionally carried out on older birds to control an outbreak of pecking behaviour.

[75] See Appendix 16 for details.
[76] See Appendix 16 for details.
[77] Nunes, 2005.
[78] Schwean-Lardner et al., 2013.
[79] American Veterinary Medical Association, 2010.
[80] United Egg Producers, 2014.
[81] Lunam et al., 1996.

Infrared beak trimming (IRBT) does not create an open wound as hot blade trimming does. After use of infrared, the beak remains intact until 10-14 days of age, after which the treated portion separates from the beak. A guide on the IRBT machine is used to control how much of the beak is trimmed.

The available scientific evidence on beak trimming is summarised in Appendix 21 to this RIS.

Clause 13.2.2. of the current poultry MCOP requires accredited operators and methods for beak trimming. However, it does not specify the tools or methods to be used. The MCOP requires that a person must not remove more than one-third of the upper and lower beaks of turkeys, pheasants and partridges, but there are no standards regarding this problem for other species. The welfare of an estimated average of 19.66 million layer hens is at risk from this procedure.[82]

Risky litter management

Litter is defined as the combination of bedding material, excreta, feathers, wasted feed and wasted water found on the floor or ground of non-cage systems. This includes litter from meat chickens (broilers), egg laying chickens (layers) kept under barn conditions, turkeys, ducks and quail.

Bedding materials should be absorbent, fast drying, insulating and non-toxic. They may be used at the start of a grow-out to provide a cushioning and insulating surface for the birds and to absorb fresh excreta. Materials commonly include wood products and harvest crop residues but may be any organic or inorganic material that has appropriate properties.

Deep litter is the system of housing where litter is provided on the poultry house floor on which the birds live.

If litter is used, its condition may influence poultry health and welfare. Litter management is an issue for meat chickens, layer hens, turkeys, ducks and quail that are kept under barn or free-range conditions.

The litter or bedding material serves a number of important functions. For example it:

- absorbs excess moisture from droppings and drinkers and promotes drying by increasing the surface area of the house floor;
- insulates chicks from cooling effects of the ground and provides a protective cushion between the birds and the floor substrate; and
- allows birds to display behaviours such as dust bathing.

An effective bedding material must be absorbent, inexpensive and non-toxic. Ideal materials will have high moisture absorption and release qualities to minimise caking. In addition, a bedding material must be compatible as a fertilizer or soil additive after it has served its purpose for poultry production. Litter is increasingly being used in energy generation, so it may also need to be combustible.

[82] See Appendix 16.

Not all poultry are required to have access to litter - slatted floors are a common alternative. Environments in which hens are exposed to litter and soil, such as non-cage and outdoor systems, provide a greater risk of disease and parasites. The more complex the environment, the more difficult it is to clean, and the larger the group size, the more easily disease and parasites are able to spread.

The available scientific evidence on litter management is summarised in Appendix 21 to this RIS.

The current MCOP for poultry does not expressly require that where litter is used, the litter material is suitable for the species and of a good quality. In particular, the MCOP does not require that the risk of contamination of litter with toxic agents is minimal.[83] An estimated 86 million meat chickens and 3.98 million turkeys per annum risk being adversely affected by excessive caking, dustiness or wetness of litter and potentially by the presence of toxic agents in litter.[84]

Need to restrict routine use of induced moulting

Induced moulting is a husbandry practice used to extend the period of lay of chickens. The practice is not recommended for routine use but may be needed:

- to replenish flock numbers in the event of a disease outbreak;
- where there is a limitation on available grower space;
- where there is a shortage in the availability of replacement pullets; or
- when there is a restriction on the importation of breeder stock due to exotic disease outbreaks overseas which necessitates the moulting of grandparent flocks.

Moulting is a normal process in birds. In their natural state, birds shed old plumage and grow new feathers in preparation for cold weather and migration. The environment for poultry housed for commercial egg production is constant with respect to temperature, lighting and feed, thus removing the normal seasonal influences. Induced moulting of housed birds therefore involves dietary restrictions and/or changes to lighting (photoperiod).

Induced moulting rejuvenates the reproductive cycle of the hen, extending her productive life. All hens in a flock are brought into moult at the same time, which sustains more efficient egg production and improves egg quality.

The available scientific evidence on induced moulting is summarised in Appendix 21 to this RIS.

The current MCOP for poultry does not restrict induced moulting from being routinely practiced. Nor does it require that poultry are in adequate physical condition to endure an induced moult if necessary, or place conditions on dietary restrictions or weight loss. It is estimated that 2.95 million layer hens are affected by routine moulting.[85]

[83] The *Primary Production and Processing Standards*, under the Australia New Zealand Food Standards Code, deals with this risk for food safety purposes, but not for animal welfare purposes.
[84] See Appendix 16 for details.
[85] See Appendix 16 for details.

Care of meat chickens and turkeys awaiting slaughtering

As a general welfare principle,[86] all livestock ought to be protected from direct sunlight, radiant and reflected heat, and adverse weather such as rain and wind. The welfare of an estimated 10.2 million meat chickens and 19.5 thousand turkeys per annum is at risk from such inadequate weather protection whilst awaiting slaughter.[87]

Access to water for ducks

Historically, duck production has frequently involved the provision of trough systems that complemented nipple drinking systems or provided stand-alone drinking water. These systems were traditionally external to the sheds or were constructed on concrete drains with a mesh system to enable leakage and spillage to flow to containment dams.

In the 1990s, nipple drinking systems were developed for commercial poultry that significantly reduced the amount of water leakage and spillage. These systems were then adapted to duck production to improve the management of water and litter moisture within the sheds. These new technologies were associated with highly significant improvements in litter management, reductions in mortality through bacterial disease and a marked improvement in the management practices for shed effluent. However, they may reduce the opportunities for duck wet-preening behaviour by restricting access to surface water.

The available scientific evidence on access to water for ducks is summarised in Appendix 21 to this RIS.

The current poultry MCOP does not require that facilities are provided to allow ducks to dip their heads under water or misters/showers to allow ducks to wet preen, and to clean their eyes and nostrils. It is understood that this is current practice amongst most duck producers, but a standard is required to safeguard the welfare of ducks farmed by a small minority operators. The welfare of an estimated 9.14 million ducks per annum is at risk from this problem.[88]

Conclusions

This part of the RIS has identified several deficiencies in the existing MCOPs regarding the welfare of poultry. Scientific evidence has shown that these deficiencies expose poultry to unacceptable welfare risks.

As discussed earlier, animal welfare impacts are a function of:
- number of animals affected (small or large); and
- impact of animal husbandry or handling procedure on individual animals.

In descending order of the numbers of birds affected by each welfare risk, these are as follows:

Table 15.2 – numbers of birds affected by each welfare risk

Risk to poultry welfare	Estimated numbers of birds affected

[86] See Part 1.2.2. of this RIS.
[87] See Appendix 16 for details.
[88] See Appendix 16 for details.

Lack of clear responsibilities for personnel in charge	All poultry
Lack of quantitative lighting standards	5.6 million layer hens , 127.1 million meat chicken hatchlings per annum
Risky litter management	86 million meat chickens and 3.98 million turkeys per annum
Need for restrictions on routine beak trimming	19.66 million layer hens
Inadequate space allowances for poultry	2 million layer hens and 16.4 million meat chickens housed indoors, and an estimated 48.9 thousand turkeys housed indoors
Lack of freedom of poultry to express innate behaviours	10,716,713 cage hens
Lack of perches, nests and litter for layer hens	10.7 million layer hens kept in conventional cages
Care of meat chickens and turkeys awaiting slaughtering	10.2 million meat chickens and 19.5 thousand turkeys per annum
Access to water for ducks	9.14 million ducks per annum
Need to restrict routine use of induced moulting	that 2.95 million layer hens

As we cannot objectively measure the impact on individual animals, because the adverse impacts in question are largely mental rather than physical, a specific public consultation questions has been asked below.

Public consultation question 2: Do you think the risks to the welfare of poultry are sufficient to justify the introduction of better standards and/or guidelines?

Public consultation question 3: Which of the abovementioned areas of risk to poultry welfare do you think are of the greatest concern? Are there any other areas of concern to poultry welfare? Please provide reasons for your answers in your written submission, together with supporting scientific evidence.

2.3.2 Market failure

It is sometimes argued that market forces alone can prevent animal suffering because vendors have an economic incentive to protect animal welfare – that is to say, it is in the financial interest of a vendor to maintain positive physical attributes and reduce mortality rates.[89] [90] This argument has some validity on farms where continued deterioration in the physical attributes of livestock can adversely affect sales prices. Producers also have an incentive to improve animal welfare to meet changing consumer demands for higher welfare products.[91]

Moreover, it is possible to have a *physically healthy productive animal* that is in a *poor state of welfare* due to, for instance, mental stress. Indeed, apart from physiological functioning, physical condition and performance – brain state, behaviour, and even an animal's emotions are now all recognised as key factors in assessing an animal's welfare.[92] In terms of this broader understanding of animal welfare there can be insufficient economic incentive for a poultry farm to reduce risks to animal welfare, especially where doing so would increase costs with little or no offsetting gains to the business. In fact, egg laying rates are higher in cages

[89] See: https://theconversation.com/why-market-forces-dont-protect-animal-welfare-15501
[90] Productivity Commission, 2016.
[91] Productivity Commission, 2016.
[92] Broom, D.M. (in prep) The roles of science and industry in improving animal welfare. See: http://www.daff.gov.au/animal-plant-health/welfare/aaws/aaws_international_animal_welfare_conference/animal_welfare_future_knowledge,_attitudes_and_solution.

than in barns or free range farms;[93] and lowering stocking densities in non-cage egg production systems provides no offsetting benefits to the producer.[94]

The shortcomings (i.e. failures) of market forces completely delivering on the full spectrum of animal welfare are now discussed. Specifically, this RIS identifies three key sources of market failure relevant to this RIS, each of which is explained in the following paragraphs:

Public good nature of animal welfare risk management itself;

Negative externalities (risks to animal welfare) of poultry farming; and

Information failure – a lack of information available to poultry product buyers.

In economics, a *public good* is a good that is both non-excludable and non-rivalrous, in that individuals cannot be effectively excluded from the use of or benefit from the good, and where use by one individual does not reduce availability to others. Any beneficial outcomes associated with better risk management practices on behalf of poultry producers are non-excludable, in that in animal welfare benefits accrue beyond the producer to the animals and the wider community. They also non-rivalrous, in that the provision of animal welfare benefits by one producer does not reduce the provision of such benefits by the other producers.

Many poultry farmers may be motivated by animal welfare considerations as well as financial returns. However, if a poultry farm were to voluntarily invest in say, better infrastructure, this would not necessarily be reflected in product prices, especially where buyers are not fully aware of the welfare state of the animal products they are buying. Therefore some poultry farmers may under-invest in such management practices. That is to say:

> First and foremost is the fact that animal welfare is not priced in any conventional way…[and]…it is relatively difficult to ascertain the price of higher farm animal welfare. Without a price, the market will not necessarily work its magic in efficiently allocating resources to their most valued use.[95]

In economic terms, there is a market incentive to prioritise 'productivity'. Animal suffering is treated as a market externality. Market signals will generally cause welfare standards to fall below community expectations, in the absence of regulation.[96] To the extent that animal welfare conditions are externality effects, therefore, 'there can be no expectation that market data for food products will ever provide a sufficient route to their measurement.'[97]

In short, 'because animal welfare is evidently a public good externality there is an obvious role for government policy in establishing and enforcing standards.'[98] The recent Productivity Commission report on the regulation of agriculture states:

> 'Farm animal welfare is important both to consumers of animal products as well as others in the community (those who are not consumers of animal products and are not directly involved in the production of animal products) who feel concern or discomfort about the mistreatment of animals. Viewed in this way, farm animal production can impose negative externalities on society which points

[93] 97% of cage hens lay an egg every day, compared to 95% in barns and 80% in free range.
[94] Productivity Commission, 2016.
[95] Lusk, J.L, and Norwood, F.B., Animal Welfare Economics, Applied Economic Perspectives and Policy (2011), p.2.
[96] See: https://theconversation.com/why-market-forces-dont-protect-animal-welfare-15501
[97] McInerney, J. (2004), Animal Welfare, Economics and Policy, Report on a study undertaken for the Farm & Animal Health Economics Division of Defra
[98] McInerney, J. (2004), Animal Welfare, Economics and Policy, Report on a study undertaken for the Farm & Animal Health Economics Division of Defra

> to a role for government, but only if the costs of government intervention are outweighed by the benefits to the community'.[99]

For example, as discussed in Section A3.3.1 of Appendix 3 to this RIS, intentions have been indicated by various supermarket, fast food chains and a small number of processed food manufacturers to phase out selling cage eggs over various periods up until the year 2025. It is not clear whether they mean all cages (including furnished cages) or just conventional cages; nor is it clear whether consumer resistance is to all cages or conventional cages. However, at the time of writing, there is a lack of certainty as to whether and when these phase-outs will occur;[100] and even then, the supermarkets and fast food outlets do not cover the entire egg market. There are also smaller retailers, and the use of processed eggs in manufactured foods and for making cakes etc. where consumers are unaware of the egg farming system used.

2.4 Regulatory failure

Two areas of regulatory failure have been identified in relation to the welfare of poultry. These are the unsuitability of existing codes of practice to be adopted in government regulations; and secondly, excess regulatory burden on industry from having to meet the different requirements of eight jurisdictions. These secondary problems are relatively minor in proportion to the risks to poultry welfare identified in Part 2.3 of this RIS.

2.4.1 Problem 2: Uncertainty for industry due to a lack of clarity in standards

The existing MCOPs and state codes of practice are a confusing mixture of both standards ('must' requirements) and guidelines ('should' statements) – sometimes even within the same clause. 'Should' statements cannot be made mandatory because the wording does require compliance. No court would convict for failure to comply with a 'should' statement. As such, these codes are not sufficiently clear or verifiable for implementation and enforcement purposes.

For example, Clause 11.5 of the Domestic poultry MCOP states as follows:

> Poultry should be checked regularly for evidence of parasites and effective treatment should be instituted. Poultry must also be checked regularly for signs of infectious disease and appropriate action taken promptly *(our emphasis).*

Clause A4.2.1 of Appendix 4 states in part:

> It [bill trimming] should be carried out only when it is essential to reduce damage and suffering in the flock. It must be carried out only by a skilled operator and only the rim at the front of the upper bill should be removed *(our emphasis).*

Similarly, Clause 2.4.3.3 of the Victorian *Code Of Accepted Farming Practice For The Welfare Of Poultry* states in part:

> Available linear perches should allow not less than 15cm per hen. Perches must be without sharp edges, and must be positioned to minimise fouling of any birds below *(our emphasis).*

Once again, Clause 2.4.5.4 of the *Code Of Practice For Poultry In Western Australia* states:

> Birds on the range must have ready access to shaded areas and shelter from rain, and windbreaks should be provided in exposed areas (our emphasis).

[99] Productivity Commission, 2016.
[100] Coles brand eggs are now cage free, but cage eggs of other brands are still sold at Coles supermarkets.

Similar deficiencies exist in the other applicable model codes of practice. For example, Clause 5.1 of the MCOP for the Farming of Ostriches states:

> Fencing must be sufficient to ensure that ostriches cannot escape. Predator control must also be catered for, particularly with chicks, as they are the birds most susceptible to predators. Fencing should be sufficiently close to the ground to prevent birds pushing under the wire. Where possible on fences, wire should be fixed on the inside of the posts *(our emphasis).*

Clause of the MCOP for the Husbandry of Captive Bred Emus states:

> Emus other than newly hatched chicks, should have *ad libitum* access to adequate quantities of appropriate food but must have access to adequate quantities of appropriate food at least once each 24 hours.

Such lack of clear and verifiable standards would make their integration into industry programs such as training and QA much more difficult, creating another restriction on adequately managing animal welfare risks.

As discussed in Part 1.2.3.5 there are industry guidelines covering some of these risks. However, industry guidelines and QA programs are generally unsuitable for adoption as government regulations (but are part of the base case).

The original MCOPs did not incorporate an official system for developing or reviewing a code, which resulted in substantial variation in the quality, consultation, timeliness and content of the codes. The review of codes did not comprehensively consider contemporary animal welfare science as a basis for a standard or include a regulatory impact analysis. The development and review process was unfunded and relied on the in-kind contributions of representatives of government and other stakeholders.

Under the former AAWS, there was a national recognition of and commitment to the need to review and update the existing codes in line with contemporary science and community views. The development of Australian Animal Welfare Standards represents a commitment to simultaneous refreshment of the legislation that will achieve greater effect and harmonisation than if done unilaterally and over time.

Public consultation question 4: In your experience, to what extent do the existing MCOPs and related regulations create uncertainty for industry? Does such uncertainty vary between different states and territories?

Public consultation question 5: In your experience, how this type of uncertainty for industry adversely affect productivity? If possible, please provide some case examples in your written submission.

2.4.2 Problem 3: Excess regulatory burden

Excess regulatory burden can potentially arise from both unnecessary existing standards and from additional compliance costs resulting from lack of national consistency in standards.

A lack of national consistency between jurisdictions is not in itself a problem, unless it results in unnecessary additional costs to businesses that operate in more than one jurisdiction, from having to comply with different standards in each jurisdiction.

Poultry businesses known to operate in more than one jurisdiction include:

- **Farm Pride Foods Ltd**. has egg farming operations in both Victoria and New South Wales;
- **Pace Farm Pty Ltd** has egg farming operations in Victoria, New South Wales, Australian Capital Territory and Queensland;
- The two largest integrated meat chicken companies (**Inghams Enterprises Pty Ltd**. and **Baiada Poultry Pty Limited**) are headquartered in NSW, but have operations in all other states.

Public consultation question 6: Are you aware of any other poultry farming businesses that operate in more than one state or territory? If so, please list them.

Inconsistencies in animal welfare standards have the potential to cause unnecessary regulatory burden as a result of interstate businesses having to comply with different standards if and when regulations are made. Where those differences are not risk–based, any additional costs will represent waste. Whilst it is not possible to quantify the precise extent of this problem, it is likely to be significant because of the numbers of affected businesses operating in more than one jurisdiction.

In addition, a lack of consistency in standards can result in increased costs to establish or operate national QA schemes and training programs by industry associations.

For instance, there are some jurisdictional differences in regulated standards for layer hen cage heights and door dimensions as follows.

Table 16 – Jurisdictional differences in standards for cage heights

MCOP standard	Victorian regulation[101]	South Australian regulation[102]
2.3.1.5. In cages, birds must be able to stand at a normal height. Cages must be at least higher than the maximum height of all the poultry standing normally. The height of all cages must be at least 40 cm over 65% of the cage floor area.	7(4) The person must ensure that the height of each cage is greater than the maximum height of any domestic fowl standing normally in that cage.	23(1) A person who keeps domestic fowls confined in a cage must comply with the following requirements: … (c) the height of the cage must be higher than the maximum height of a fowl confined in the cage while the fowl is standing normally;

Table 17 – Jurisdictional differences in standards for cage door heights and widths

MCOP standard	Victorian regulation	South Australian regulation
2.3.1.6. The design and size of the cage openings must be such that birds can be placed in them and removed from them without	7(5)The person must ensure that each cage has a door with the following dimensions—	23(1)(d) the cage must be constructed with a door as follows:

[101] Victorian *Prevention Of Cruelty To Animals (Domestic Fowl) Regulations 2016.*
[102] South Australian *Animal Welfare Regulations 2012.*

causing injury or unnecessary suffering. Cages must have doors the full height and width of the cage. Since 1995, larger cages have been introduced and their doors must open either to full width or to a width of 50cm.	(a) a height equal to the full height of the cage; (b) a width that is either— (i) at least 50 centimetres; or (ii) if the width of the cage is less than 50 centimetres, the full width of the cage.	(i) the height of the door must be the full height (not including the feed trough) of the cage; and (ii) the width of the door must be— (A) if the cage is less than 0.5 metres wide—the full width of the cage; (B) in any other case—at least 0.5 metres wide.

Whilst the meanings of the relevant Victorian and South Australian regulations on cage heights and widths are equivalent, they differ from Clause 2.3.1.5. of the MCOP on cage heights; and the meaning of Clause 2.3.1.6. of the MCOP is somewhat ambiguous and unclear in relation to cage widths and doors (that is, whether full cage width or 50 cm is required).

Where regional or other critical differences are not apparent, industry-wide standards not only have a positive effect on the economy as a whole, but also provide benefits for individual businesses that use them as strategic market instruments. Standardisation can lead to lower transaction costs in the economy as a whole, as well to savings for individual businesses.[103]

As discussed in Part 1.2.2.3 of this RIS, a key objective of the former AAWS was 'to facilitate improved consistency of legislation across states and territories for improved and sustainable animal welfare outcomes.' The aim was to ensure all animals receive an acceptable standard level of care and treatment. Australia's animal welfare ministers agreed in April 2006 on the need for a nationally consistent approach for the development, implementation and enforcement of animal welfare standards. At the AAWS Second National Australian Animal Welfare Strategy Workshop participants reiterated that having consistent legislation across states and territories was a major objective of the former AAWS.

Public consultation question 7: In your experience, what is the effect of cross-jurisdictional inconsistencies on industry (i.e. even where jurisdictional standards are clear and verifiable)? If possible, please provide some case examples in your written submission of where additional costs have been imposed on industry as a result of such inconsistencies.

Public consultation question 8: Do you think there needs to be national consistency in animal welfare standards for poultry? Please provide reasons for your answer.

2.5 Policy objective

In relation to the proposed standards the following overarching policy objective is identified:

To minimise risks to poultry welfare; and to reduce both industry uncertainty and excess regulatory burden in a way that is practical for implementation and industry compliance.

[103] TU Dresden and Fraunhofer Institute, 2000.

The main criterion for evaluating the extent to which the proposed standards and the feasible alternatives meet this objective is net benefit for the community. As part of the evaluation, there will be a need to ensure that the benefits of the proposed standards justify their costs, and that they take into account the expectations of the Australian community.

The proposed form of government intervention is the adoption of either the proposed standards or another option determined by AGMIN with the intent of the adopted standards being implemented by legislation in each participating jurisdiction.

3.0 Options to be considered

In accordance with the COAG guidelines, a RIS is required to identify feasible alternatives to the proposed standards, which are only one of several options to be considered. Conversely, a RIS is not required to identify alternatives which are not practicable, nor where there are no significant cost burdens being imposed.

Having no standards at all is not a feasible option, as some jurisdictions already have their own regulated standards as part of the base case. (It is outside the scope of this RIS to consider revocation of individual state or territory standards).

Industry guidelines and QA programs are generally unsuitable for adoption as government regulations, because they are intended to be advisory rather than mandatory, and are worded accordingly.

Education and publicity campaigns attempting to raise awareness regarding the welfare of poultry have been conducted over several years by a number of animal welfare lobby groups. This experience has shown that public education campaigns as an alternative to national standards are unlikely to be effective and therefore not a feasible alternative. The industry practices that need to be changed are displayed by a minority of producers, most of whom are already aware of the risks to animal welfare. These producers are much less likely to be influenced by public education campaigns than by enforceable standards.

Better enforcement of existing standards has also been considered as an alternative. However, as shown in Part 2.3 of this RIS, there are many deficiencies in existing standards, that this alternative would not solve the problems that have been identified, even if enforcement was 100% effective. Also, the guidelines or 'should' statements in codes of practice are not enforceable.

The possibility of improving compliance by 'naming and shaming' poultry producers/owners who do not comply with codes of practice has also been suggested. For example, the NSW Food Authority website publishes the names of people who have been issued infringement notices by inspectors (as well as the outcomes of prosecution proceedings). However, because the codes of practice would not be mandatory under this alternative, operators and agents would not be liable to be prosecuted for any offence or issued with infringement notices. It would not be sufficient to rely on the media to fairly present both sides of the story. 'Naming and shaming' would therefore deny producers an opportunity to defend their reputations in court or in other public forums, resulting in significant injustices.

The practicable alternatives below have emerged from discussions with the SAG referred to in Part 1.4 of this RIS. The suggested variations to the proposed national standards are those where standards are likely to be costly and/or contentious amongst stakeholders.

The options to be evaluated in terms of costs and benefits will be:

- **Option A**: Maintain the status quo (i.e. the base case as described in Part 2.2 of this RIS);
- **Option B**: convert the proposed national standards into national voluntary guidelines (the minimum intervention option);[104]
- **Option C**: adopt the proposed standards as currently drafted.[105]

The following Options D, E, F and G are all **variations of Option C** and are not mutually exclusive. In other words, a combination of one or more of these options can be considered when choosing a preferred option.

- **Option D** – vary the proposed standards (Option C) to phase out conventional cages for chicken layers over 10 and 20 years in favour of alternative systems 'typical' free range, barn/aviary, or furnished cages (which include a nest, a perch, and space to forage).[106]
- **Option E** – vary the proposed standards (Option C) to reduce maximum stocking densities in barns or sheds for non-cage layer hens to 9 birds per m2 and meat chickens 30kg/m2.
- **Option F** – vary the proposed standards (Option C) to require the availability of nests, perches and litter for all layer hens in cage and non-cage systems.
- **Option G** – vary the proposed standards (Option C) to ban castration, pinioning and devoicing. No hot blade beak trimming at hatcheries, and no routine second beak trimming – unless exceptional circumstances (hot blade permitted in this circumstance).

[104] Option B is additional to the base case.
[105] Option C would replace the MCOPs in the base case but would otherwise be additional to the base case.
[106] SAG discussion on furnished cages concluded that a 'typical' furnished cage, as defined internationally and available for purchase, included a perch, nest box and scratching pad. The egg industry strongly objected to the definition of a furnished cage including all 3 items, and in particular noted that they would be unlikely to adopt furnished cages with scratch pads.

4.0 Evaluation of Costs and Benefits

4.1 Introduction

The purpose of this Part of the RIS is to compare and contrast the costs and benefits of the proposed standards against the 'base case'.

The evaluation of the relative benefits and costs for the proposed standards will be conducted in relation to how well the policy objective identified in Part 2.2 of this RIS is likely to be achieved. Where data exists, quantitative estimates of costs and benefits are made, using stated reasonable assumptions to fill in any essential data gaps. However, where sufficient cost and benefit data are not available, the evaluation will be made using qualitative criteria regarding the achievement of the policy objective.

This part of the RIS identifies the relative costs and benefits for the proposed national standards and each of the other options, as identified in Part 3.0, in comparison with the 'base case'. The 'base case' is used as a reference point for measuring the incremental costs and benefits of each of the options, including the proposed standards. Each of the options is assessed in relation to how well the underlying policy objective identified in Part 2.2 of this RIS is likely to be achieved.

Where data exists, discounted[107] quantitative estimates of costs and benefits are provided over 10 years of expected implementation. Whilst it is expected that the standards would be reviewed every 5 years, a 10-year analysis has been conducted to effectively capture their full impact, taking into consideration implementation lag times. A detailed discussion of the estimation of costs is provided in the appendices to this RIS; however, these appendices are optional reading and are provided for reference purposes if needed. Some lengthy summary tables relevant to the cost/benefit analysis have been also located in Appendix 22 to this RIS for ease of readability.

All data used are sufficiently certain, and robust assumptions are stated. However, where cost and benefit data or assumptions are not available, then a quantitative measure is not possible and the assessment is made using qualitative criteria about the achievement of the policy objective. All costs and benefits reported are incremental to the base case (refer to Part 2.2 of this RIS).

The costs and benefits of Options A, B, C, D, E, F and G (the practical alternatives) are evaluated by using the following criteria (**I to II**) to compare the effectiveness of each option in achieving the relevant part of the policy objective:

I Poultry welfare benefits[108]; and

II Net compliance costs to industry including any reduction in regulatory burden[109].

Advice from jurisdictions is that no significant incremental government enforcement costs would be incurred as a result of replacing the existing standards with any of the options evaluated in this RIS, as discussed in Part 5.0 of this RIS.

[107] A discount factor of 7% is used for present value calculations in this RIS, as recommended by OBPR
[108] Beyond animals being simply hungry or thirsty
[109] OBPR have requested that reduction in regulatory burden be offset against compliance costs within the same criterion in another recent RIS

4.2 Evaluation of options relative to the base case

This Part will discuss the expected costs versus expected benefits with reference to the overarching policy objective. Costs and benefits will be analysed in comparison with the 'base case' in terms of economic criteria where relevant. Common drivers of costs and benefits will be listed early, to avoid repetition later on. Information on likely jurisdictional differences in costs will be included plus distributions of costs and benefits between stakeholders (e.g. who bears the initial costs and whether these costs are likely to be passed on).

Public consultation questions are also included in this part of the RIS where further information or opinions are sought.

The following assessment of the costs and benefits of the proposed standards and other options is conducted by discussing each option in terms of its expected incidence and distribution of costs and benefits, relative to the 'base case' (defined in Part 2.2 of the RIS).

The data used in this analysis and the assumptions and qualifications to the data on which the costs and benefits have been estimated are provided in Appendices 1 to 16 and Appendix 22. (The Australian DAWR has confirmed that no incremental costs would be incurred by the Commonwealth as a result of the endorsement of the proposed standards or alternative options).

In order to consolidate the analysis by removing duplication and thereby making the options easier to compare, the following main benefit and cost features of the proposed national standards are outlined in Part 4.2.1 and 4.2.2, respectively. The discussion of options therefore highlights their differences, thereby avoiding the repetition of text and figures.

4.2.1 Benefit drivers of the proposed standards

This part of the RIS highlights the main benefit drivers, which underlie the proposed standards (Option C). Differences for other options are discussed in later sections of Part 4.0. These are identified as unquantifiable benefits in terms of improved welfare outcomes and reduced regulatory burden.

Drivers of unquantifiable poultry welfare benefits – Criterion I

As discussed in Part 1.2.2 of this RIS, 'animal welfare' is a difficult term to define and has several dimensions including the mental and physical aspects of the animal's well-being. Animal welfare can be assessed using three different frameworks, based on measures of biological functioning, affective state or natural living. The biological functioning framework accepts that welfare will be compromised if an animal is unable to adapt to its environment. Severe challenges may overwhelm an animal's capacity to adapt and may result in death, while less severe challenges may have impacts on growth, reproduction and health. The second framework assesses the affective (or emotional) state of the animal, which can be positive or negative. A positive affective state is linked with a predominance of positive experiences, such as the experience an animal has when it engages with a rewarding behaviour. The third framework uses the concept of natural living. It assumes that the welfare of an animal is better when it can express its normal patterns of behaviour. However, this RIS does not deal with

people's subjective ethical preferences, but rather looks strictly at factual considerations relevant to the above three frameworks, based on scientific evidence where available.

The proposed standards take a balanced approach to address risks to the welfare of poultry in all of these areas. There is a focus on standards that address farming practices that cause pain, and on confinement issues.

Animal welfare benefits are also difficult to quantify. So whilst the number of animals affected by risks to animal welfare from various practices may seem as an obvious measure – such a measure fails to take into consideration a) whether or not a practice is ongoing and b) the impact of the procedure or practice on individual animals. That is to say, simply providing information on the number of animals affected does not provide any information regarding the duration of the effect nor the impact of the effect on each animal. (A cruelty prosecution with potentially substantial penalties can be launched for cruelty to only one animal).

For these reasons, the combination of factors that determine the *severity of the consequence* include:

- Number of animals affected (which can be quantitatively estimated) ; and
- Impact[110] of animal husbandry or handling procedure on individual animals (which can only be discussed in qualitative terms).

In the absence of any ability to quantify the impacts on individual animals, the number of animals affected is used as a rough proxy of the quantitative animal welfare impacts of different options. However, the number of animals affected by each practice or procedure is discussed *only* where there is certainty or where there are robust assumptions based on experience in the industry.

The relevant proposed standards for addressing *animal welfare problems*, identified in Part 2.3.1, aim to provide welfare benefits to poultry, from improving compliance by explicitly stating required standards of welfare. In some cases the standards spell out unacceptable behaviours that could result in a cruelty prosecution. Some jurisdictions already have equivalent legislation or standards under the base case. A summary of unquantifiable *positive and negative welfare affects to be achieved under the proposed standards* is provided in Table 18. Due to commercial confidentiality reasons, the impacts of the proposed standards (both costs and benefits) have not been identified by single jurisdiction.

[110] Impact includes both the nature and the duration of the effect.

Table 18: Summary of estimated number of poultry (housed/per annum) affected by positive and negative welfare impacts under the proposed standards (Option C)[111]

Standard/Option	Description of positive welfare effect of standard/Option	Poultry No. with positive welfare effects (as per Column 2)	Description of negative welfare effect of standard/Option	Poultry No. with negative welfare effects(as per Column 4)
Layer hens				
SA6.3 + SA6.4 + SA6.5	Improved lighting intensity (5 lux) and exposure to light and darkness for layer hens.	5,580,000 layer hens housed	N/A	N/A
SA9.4 + SA9.5 + SA9.6	Routine moulting prohibited for layer hens or where layer hens are in good condition where moulting is necessary	2,948,842 layer hens housed	N/A	N/A
SA9.15	Removal of more than one-third of the upper and lower beaks prohibited for layer hens	19,658,948 layer hens housed	Increased mortality from higher incidence of pecking	1,430,235 layer hens per annum
Meat chickens				
SA6.2	Improved lighting intensity for young meat chickens for the first 3 days after hatching is at least 20 Lux.	127,127,564 meat chicken hatchlings per annum	N/A	N/A
SA8.3	Meat chickens no longer exposed to excessive caking, dustiness or wetness	86,195,165 meat chickens per annum	N/A	N/A
SA11.7	Meat chickens awaiting slaughtering must be protected from direct sunlight, radiant and reflected heat, and adverse weather such as rain and wind.	10,205,000 meat chickens per annum		

[111] See Table A16.1 of Appendix 16 for source of estimates

Turkeys				
SA8.3	Turkeys no longer exposed to excessive caking, dustiness or wetness	3,981,150 turkeys per annum	N/A	N/A
SA9.11	Toe (claw) trimming prohibited on turkeys except on day old hatchlings selected as potential breeders and emus and ostriches which may have toes trimmed on commercial stock up to 5 days of age	826,200 turkeys per annum	Increased injury from higher incidence of scratching	231,336 turkeys per annum
SA11.7	Turkeys awaiting slaughtering must be protected from direct sunlight, radiant and reflected heat, and adverse weather such as rain and wind.	19,500 turkeys per annum	N/A	N/A
SB13.5	Turkeys housed at maximum recommended stocking densities according to housing type and under good management conditions	48,940 turkeys housed	N/A	N/A
Ducks				
SB4.4	Ducks allowed to dip their heads under water or misters/showers to allow ducks to wet preen, and to clean their eyes and nostrils.	9,447,853 ducks per annum	N/A	N/A

Moreover, a number of other drivers of incremental unquantifiable and unspecific poultry welfare benefits have been identified by the remaining proposed standards as shown in Table 19 in Appendix 22.

4.2.2 Cost drivers of the proposed standards

This part of the RIS highlights the main cost drivers, which underlie the proposed standards (Option C). Differences for other options are discussed in later sections of Part 4.0. These are identified as quantifiable incremental costs and reductions in unquantifiable costs relating to regulatory burden.

Drivers of quantifiable incremental costs – Criterion II

As shown in Table 20 of Appendix 22, the total incremental cost of the proposed standards with respect to layer hens is estimated to be ***$517.01m over 10 years in present value dollars***[112] with 52.8% of the cost being incurred by small layer hen farms and mainly with respect to proposed standard SA9.15 (46.95%). Moreover, the main production system affected by the proposed standards would be free range incurring 62.96% of the total cost (see Table 20). The largest cost item for free-range producers is SA9.15 related to beak trimming restrictions. The specific costs incurred under each of these proposed standards includes:

[112] Using a 7% discount rate.

- SA6.3, SA6.4, SA6.5 – One-off cost of ensuring adequate light intensity at 5 lux on average and ensuring at least 4 hours of continuous darkness within a 24-hour period;
- SA9.4, SA9.5, SA9.6 - Ongoing cost of bird replacement built into the beginning of the laying cycle and one-off cost of new shed infrastructure; and
- SA9.15 – Ongoing cost of bird replacement and a loss in egg sales (due to increased mortality from pecking)

As shown in Table 21 of Appendix 22, the total incremental cost of the proposed standards with respect to meat chickens is estimated to be ***$104.38m over 10 years in present value dollars*** with small businesses incurring 74.32% of the cost. Moreover, 91.19% of total costs relates to proposed standard SA8.3 (see Table 21). The specific costs incurred under each of these proposed standards include:

- SA6.2 – One-off cost of lighting infrastructure;
- SA8.3 – One-off cost of upgrading infrastructure per business plus an ongoing cost of litter labour and energy; and
- SA11.7 – One-off cost of upgrading infrastructure per processing plant (install large commercial shade sail or to extend the existing canopy).

As shown in Table 22 of Appendix 22, the total incremental cost of the proposed standards with respect to turkeys is estimated to be ***$88.01m over 10 years in present value dollars*** with small businesses incurring 78.42% of the cost and mainly with respect to proposed standards SB13.5 and SA8.3 (see Table 22). The specific costs incurred under each of these proposed standards include:

- SA8.3 – One off cost of litter management tools; a one-off cost of ventilation upgrade and an annual cost of litter, labour and energy;
- SA9.11 – One off cost of additional floor space and ongoing operational costs;
- SA11.7 – One of cost of upgrading infrastructure for processing plants; and
- SB13.5 – One-off cost of additional floor space (creating new shedding) and new assets required for additional pick up plus ongoing annual transport and catching costs and additional ongoing operating cost of litter + labour + Gas

Table 22: Summary of estimated quantifiable incremental costs of the proposed standards for turkeys by business size and states/grouping of states – present value dollars ($m)[113]

States/grouping of states	Business type (size)	SA8.3	SA9.11	SA11.7	SB13.5	Total
NSW	Broiler turkey business (small)	$25.42	$14.40	$0.00	$28.68	$68.50
NSW	Breeder turkey business (large)	$9.14	$0.00	$0.00	$4.54	$13.67
VIC	Breeder turkey business (large)	$2.58	$0.00	$0.00	$2.27	$4.85
NSW	Turkey processing Business (large)	$0.00	$0.00	$0.47	$0.00	$0.47
Subtotal NSW, QLD and VIC		$37.14	$14.40	$0.47	$35.49	$87.49
SA	Broiler turkey business (small)	$0.52	$0.00	$0.00	$0.00	$0.52
Subtotal SA, WA and TAS		$0.52	$0.00	$0.00	$0.00	$0.52
Total		***$37.65***	***$14.40***	***$0.47***	***$35.49***	***$88.01***
Business size						
Small		$25.94	$14.40	$0.00	$28.68	$69.02
Large		$11.72	$0.00	$0.47	$6.81	$18.99
Total		***$37.65***	***$14.40***	***$0.47***	***$35.49***	***$88.01***
Percentage of cost by business size						
Small		29.47%	16.36%	0.00%	32.59%	78.42%
Large		13.31%	0.00%	0.53%	7.73%	21.58%
Total percentage of cost by business size		***42.79%***	***16.36%***	***0.53%***	***40.32%***	***100.00%***

As shown in Table 23, the cost of proposed standard SB4.4 for duck farms is estimated to be approximately $44,315 per annum or ***$0.31m over 10 years in present value dollars***. The cost of proposed standard SB4.4 would involve additional ongoing misting costs for sheds with one megalitre (ML) and 750kWh required per shed per annum.

Table 23: Estimated 10-year cost of proposed standard SB4.4 with respect to duck farms by state – present value dollars[114]

States	Size of farms	10-year cost	Total 10-year cost (PV)
NSW	Large	$287,761	$202,111
VIC	Large	$143,881	$101,056
VIC	Small	$11,510	$8,084
Subtotal NSW, QLD and VIC		$443,152	$311,252
SA	Large	$0	$0
Subtotal SA, WA and TAS		$0	$0
Total		***$443,152***	***$311,252***

[113] See Table A13.1 of Appendix 13 for source of estimates
[114] See Table A14.1 of Appendix 14 for source of estimates.

Finally, Table 24 shows a summary of the total quantifiable and incremental costs of the proposed standards for all poultry species with a total of ***$709.72m over 10-years in present value dollars***. The bulk of incremental costs is incurred by small layer hen farms (38.46%) followed by medium layer hen farms (27.16%) (see Table 24).

Table 24: Summary of estimated costs of the proposed standards by business size and poultry species – present value dollars ($m)[115]

Poultry species	Business size	Option C	%
Layer hens			
	Large	$45.62	6.43%
	Medium	$192.77	27.16%
	Small	$272.98	38.46%
	Micro	$5.64	0.79%
Sub-total layers		*$517.01*	*72.85%*
Meat chickens			
	Large	$5.74	0.81%
	Medium	$21.07	2.97%
	Small	$77.58	10.93%
Sub-total meat chickens		*$104.38*	*14.71%*
Layer and meat chicken Breeders			
	Large	$0.00	0.00%
Sub-total breeders		$0.00	*0.00%*
Turkeys			
	Large	$18.99	2.68%
	Small	$69.02	9.72%
Sub-total turkeys		*$88.01*	*12.40%*
Ducks			
	Large	*$0.31*	0.04%
	Small	*$0.00*	0.00%
Sub-total ducks		*$0.31*	0.04%
Total		***$709.72***	*100.00%*

Drivers of unquantifiable cost savings – Criterion II

Nation-wide standards would also result in an unquantifiable reduction[116] in regulatory burden by removing any compliance costs associated with a lack of national consistency. Moreover, clear and verifiable national standards would make their integration into industry programs such as training and quality assurance (QA) much easier.

Clear and verifiable national standards would also reduce future uncertainty for poultry businesses, especially in jurisdictions without any standards as yet. If governments are to take action with respect to poultry businesses it would be beneficial if operators had some certainty and stability regarding what is expected of them. Such certainty and stability can be provided in the form of transparent national standards.

[115] See Table A15.1 of Appendix 15 for source of estimates.

[116] There is also the potential to reduce regulatory burden by removing unnecessary existing standards and while none have yet been identified, this is a question that those making submissions during the public consultation period may wish to comment upon.

Specifically, consistency in poultry welfare standards would reduce the regulatory burden for poultry businesses operating across state or territory borders, where different standards may apply (see Part 2.3.2 of this RIS for a more detailed discussion of inconsistencies). Poultry businesses known to operate in more than one jurisdiction include:

- **Farm Pride Foods Ltd**. has egg farming operations in both Victoria and New South Wales;
- **Pace Farm Pty Ltd** has egg farming operations in Victoria, New South Wales, Australian Capital Territory and Queensland;
- The two largest integrated meat chicken companies (**Inghams Enterprises Pty Ltd**. and **Baiada Poultry Pty Limited**) are headquartered in NSW, but have operations in all other states.

Consistencies in poultry welfare standards would reduce unnecessary waste as a result of interstate businesses no longer having to comply with different non-risked based standards if and when regulations are made. Specifically, there would be a savings in the costs normally associated with having to analyse and assess business impacts, train staff and ensure compliance arising from vastly different sets of requirements in each jurisdiction.

Finally, cost savings may be provided from a reduced need for industry associations to liaise with eight different jurisdictions in their efforts to ensure appropriate poultry welfare standards in each jurisdiction.

However, no statistics are currently available on either:

- the number of poultry businesses operating across state borders;
- which specific standards for which poultry businesses result in waste as a result of operating in multiple jurisdictions; or
- the frequency of liaising between industry associations and the eight different jurisdictions; and

therefore, the cost savings associated with these issues are unquantifiable.

4.2.3 Option A: (the base case)

Option A involves maintaining the status quo (i.e. the base case as described in Part 2.2 of this RIS). Therefore, the *incremental* costs and benefits of Option A, both quantifiable and unquantifiable, are equal to zero.

4.2.4 Option B: (non-regulatory option – voluntary national guidelines)

Option B would involve the issuing and promotion of endorsed/noted national risk-based guidelines once every 5 years by AGMIN, to meet the policy objective as discussed in Part 2.4 of this RIS. These endorsed/noted national guidelines would encompass ‘should statements’ as opposed to ‘must statements’ and, unlike the proposed standards, these guidelines would not

become regulations and therefore would not be mandatory (i.e. adherence[117] would be voluntary). These endorsed/noted national guidelines would be additional to industry in the 'base case' (see Part 2.2 of this RIS for further discussion). The voluntary national guidelines would also be additional to existing state or territory standards and codes of practice and guidelines under the 'base case'.

Unquantifiable incremental net benefits of Option B (Criterion I - poultry welfare)

Option B would lead to improved poultry welfare outcomes, depending on the level of voluntary adherence with the national guidelines, through a better management of risks to animal welfare in poultry businesses. For a detailed summary of the benefit drivers for poultry welfare see Part 4.2.1 of this RIS. However, any resulting improvement over the base case is likely to be significantly less than that which would occur under the potential for mandatory compliance with enforceable risk-based standards, as envisaged under Options C to G.

Potential and unquantifiable incremental net costs of Option B (Criterion II –voluntary adherence costs)

Under Option B, operators of poultry businesses would incur voluntary costs, depending on the degree of adherence to the voluntary guidelines. However, there would be *no incremental costs imposed under Option B* as compared to the 'base case'. Importantly, *any voluntary cost incurred* would be driven by the degree of adherence to the guidelines. A description of potential voluntary costs with respect to guidelines that might be incurred are summarised in Part 4.2.2 of this RIS for each poultry species – layer hens, meat chickens, turkeys and ducks – as part of the discussion around Tables 20 to 24. The potential voluntary costs with respect to guidelines per state or territory under Option B (as illustrated in Tables 20 to 24 in Part 4.2.2) will again depend on the degree of adherence to the guidelines.

Option B would be likely to be marginally more effective in promoting consistency than the base case, albeit only by the *encouragement* of consistent guidelines. Industry-wide guidelines would be likely to have some positive effect on the economy and reducing transaction costs by having a common set of minimum welfare guidelines for poultry. However, because adherence with these guidelines would be voluntary, Option B would be limited in its ability to facilitate improved consistency of poultry welfare outcomes across states and territories. This option would also be limited in its ability to reduce any potential regulatory burden with respect to training staff and ensure compliance arising from vastly different sets of requirements in each jurisdiction, or liaising by Industry associations, in particular.

Public consultation question 9: Do you believe that the net benefits to poultry welfare likely to be achieved under **Option B**, are justified? Would the combination of costs and benefits under **Option B** be preferable to other options?

4.2.5 Option C: (the proposed national standards as drafted)

[117] Compliance is not relevant as guidelines are not binding or enforceable.

Option C would entail the endorsement/noting of the proposed national risk-based standards by the AGMIN, to meet the policy objective as discussed in Part 2.4 of this RIS. These endorsed/noted national standards would encompass 'must statements' and, unlike Option B, these standards would be implemented as regulations by states and territories and thus compliance would become mandatory.[118]

Unquantifiable incremental net benefits of Option C (Criterion I - poultry welfare)

As compared with Option B, Option C would lead to much improved poultry welfare outcomes, through a better management of risks to animal welfare in poultry businesses due to the potential for mandatory compliance with enforceable risk-based standards. Specifically, there would be improvements in the welfare of animals with respect to the protection from injury, fear and distress as a result of increased compliance from explicitly stating implied standards of care. For a more detailed summary of the benefit drivers of poultry welfare under the proposed standards, see Part 4.2.1 of this RIS.

Quantifiable and unquantifiable incremental net costs of Option B (Criterion II – compliance costs)

Quantifiable costs of proposed standards:

With respect to the proposed standards – Option C would lead to higher incremental costs than the 'base case', of approximately ***$709.72m*** over 10 years in 2016-17 dollars (discounted at a rate of 7%), as summarised in Table 24 in this RIS. Also, as shown in Table 25, the distribution of incremental costs would be 9.96%, 30.13%, 59.12% and 0.79% for large, medium, small and micro size businesses, respectively.

Table 25: Distribution of estimated quantifiable incremental costs of Options C by business size – present value dollars ($m)[119]

Size of business	10-year PV cost of Option C	% of cost
Large	$70.66	9.96%
Medium	$213.84	30.13%
Small	$419.57	59.12%
Micro	$5.64	0.79%
Total	***$709.72***	***100.00%***

As shown in Table 26 in this RIS, the quantifiable costs of the proposed standards would fall mainly on NSW, VIC and QLD with a cost share of 83.71% for this state grouping.

Table 26: Distribution of estimated quantifiable incremental costs of Option C by state grouping – present value dollars ($m)[120]

[118] The standards document would also include guidelines which would be 'should' statements and would not be enforceable by regulations.
[119] See Table A15.2 of Appendix 15 for source of estimates.
[120] See Table A15.3 of Appendix 15 for source of estimates.

State grouping	10-year PV cost of Option C	% of cost
NSW, QLD and VIC	$594.14	83.71%
SA, WA and TAS	$115.58	16.29%
Total	***$709.72***	***100.00%***

These costs would mainly be incurred with respect to standards relating to layer hen businesses of $517.01m over 10 years in present value dollars (see Table 20).

Unquantifiable cost savings of proposed standards:

Option C would be effective in promoting industry-wide standards, would have a positive effect on the economy by reducing transaction costs of compliance. The proposed standards would facilitate improved consistency of poultry welfare outcomes across states and territories. This would mean more certainty and increased compliance, as well as a slight reduction in regulatory burden.

Public consultation question 10: Do you think that the proposed national standards under **Option C** reflect community values and expectations regarding the acceptable treatment of poultry?

Public consultation question 11: Do you believe that the net benefits to poultry welfare likely to be achieved under **Option C**, are justified? Would the combination of costs and benefits under **Option C** be preferable to other options?

4.2.6 Option D: (phase out conventional cages for layer hens)

Option D would entail the endorsement/noting of the proposed national risk-based standards by the AGMIN, to meet the policy objective as discussed in Part 2.4 of this RIS and would be a variation on the proposed standards that would phase out conventional cages over 10 years and 20 years.

Unquantifiable incremental net benefits of Option D (Criterion I - poultry welfare)

As with Option C, the variation of the proposed standards under Option D with a 10-year and 20-year phase out of conventional cages would lead to improved poultry welfare outcomes (compared to Option B), through a better management of risks to animal welfare in poultry businesses due to the potential for mandatory compliance with enforceable risk-based standards. As with Option C, there would be similar improvements in the welfare of animals with respect to the provision of protection from injury, fear and distress (see Tables 18 and 19 in Part 4.2.1 of this RIS) except for an increase in the number of layers affected by positive welfare impacts under proposed standards SA9.4, SA9.5, SA9.6 (relating to moulting) and positive and negative welfare impact under SA9.15 (relating to beak trimming) (see Table 27). This is because under Option D there would need to be additional layers housed to maintain current egg production of around 300m dozen eggs per annum due to production and cost factors (see Appendix 3 for full discussion).

Moreover, under Option D there would be a higher freedom for layer hens to express innate behaviours affecting around 10.72m and 5.36m layer hens housed under a 10-year and 20-year phase out of cages, respectively. However, for these same number of layer hens under a 10-year and 20-year phase out, there would also be negative welfare outcomes including a higher incidence of disease, cannibalism, predation risks, and feather pecking. Furthermore, there would be less reliable access to feed and water and less efficient management of adverse weather risk, temperature, ventilation and biosecurity for the prevention of disease introduction.

In conventional cages, behavioural restrictions also contribute to bone weakness. Birds from conventional cages have a very high rate of bone fractures when handled. Typically, furnished cages allow hens to perch, which contributes to improved bone strength, but may also contribute to bone fractures when birds jump off the perch.

Table 27: Summary of estimated number of poultry (housed/per annum) affected by positive and negative welfare impacts under Option D[121]

Standard/Option	Description of positive welfare effect of standard/Option	Poultry No. with positive welfare effects(as per Column 2)	Description of negative welfare effect of standard/Option	Poultry No. with negative welfare effects(as per Column 4)
Option D (10-year phase out of cages)				
Layer hens				
	Higher freedom to express innate behaviours for layer hens	10,716,713 layer hens housed	Higher incidence of disease, manure, cannibalism, predation risks, and feather pecking. Less reliable provision of feed and water. Less efficient management of adverse weather risk, temperature, ventilation and biosecurity for the prevention of disease introduction.	10,716,713 layer hens housed
SA9.4 + SA9.5 + SA9.6	Routine moulting prohibited for layer hens or layer hens need to be in good condition where moulting is necessary	3,102,683 layer hens housed	N/A	N/A
SA9.15	Removal of more than one-third of the upper and lower beaks prohibited for layer hens	20,684,550 layer hens housed	Increased mortality from higher incidence of pecking in non-cage systems	1,874,167 layer hens housed

[121] See Table A16.1 for source of estimates.

Option D (20-year phase out of cages)				
Layer hens				
	Higher freedom to express innate behaviours for layer hens	5,358,357 layer hens housed	Higher incidence of disease, manure, cannibalism, predation risks, and feather pecking. Less reliable provision of feed and water. Less efficient management of adverse weather risk, temperature, ventilation and biosecurity for the prevention of disease introduction.	5,358,357 layer hens housed
SA9.4 + SA9.5 + SA9.6	Routine moulting prohibited for layers or layers need to be in good condition where moulting is necessary	3,025,762 layer hens housed	N/A	N/A
SA9.15	Removal of more than one-third of the upper and lower beaks prohibited for layers	20,171,749 layer hens housed	Increased mortality from higher incidence of pecking	1,652,201 layer hens per annum

Quantifiable and unquantifiable incremental net costs of D (10-year and 20-year phase out of conventional cages) (Criterion II – compliance costs)

Quantifiable costs of standards:

The costs of Option D comprise the costs of Option C plus the costs of a variation on the proposed standards that would phase out conventional cages over 10 years and 20 years. As with Option C, there would be identical incremental costs with respect to meat chickens, breeders, turkeys and ducks (see Tables 21, 22 and 23 in Part 4.2.2 of this RIS) under Option D – with both a 10-year and 20-year phase out of cages. However as shown in Tables 28 and 29, the total incremental cost of Option D with respect to layers with a phase out of conventional cages over 10 and 20 years, respectively would be much greater than the cost of the proposed standards for layers under Option C.

With respect to layer hens, a phase out of cages over 10 years under Option D is estimated to be ***$1.34b over 10 years in present value dollars***, as shown in Table 28 of Appendix 22, with 41.8% of total being incurred by medium size businesses and 53.81% of total cost being incurred by cage production systems.

As shown in Table 29 of Appendix 22, the total incremental cost of Option D with a phase out of conventional cages over 20 years is estimated to be ***$932.64m over 10 years in present value dollars*** with respect to layers - with 43.5% of total cost being incurred by small size businesses and 46.75% of total cost being incurred by cage production systems.

Finally, Table 30 below shows a summary of the total quantifiable and incremental costs of the proposed standards *for all poultry species under Option D* with a 10-year and 20-year phase out of conventional cages with a total estimated cost of ***$1.53b and $1.13b, respectively over 10-years in present value dollars***.

With a 10-year phase out of cages under Option D, the bulk of incremental costs is incurred by medium layer hen farms (36.54%) followed by small layer hen farms (35.04%) (see Table 30). With a 20-year phase out of cages under Option D, the bulk of incremental costs is incurred by small layer hen farms (36.05%) followed by medium layer hen farms (33.64%) (see Table 30).

Table 30: Summary of estimated quantifiable incremental costs of the variation of the proposed standards under Option D by business size and poultry species – present value dollars ($m)[122]

Poultry class	Business size	Option D (10-year phase out of cages)	% of cost (10-year phase out of cages)	Option D (20-year phase out of cages)	% of cost (20-year phase out of cages)
Layer hens					
	Large	$232.42	15.17%	$140.49	12.48%
	Medium	$559.75	36.54%	$378.54	33.64%
	Small	$536.77	35.04%	$405.67	36.05%
	Micro	$10.25	0.67%	$7.95	0.71%
Sub-total layers		*$1,339.18*	87.42%	*$932.64*	82.88%
Meat chickens					
	Large	$5.74	0.37%	$5.74	0.51%
	Medium	$21.07	1.38%	$21.07	1.87%
	Small	$77.58	5.06%	$77.58	6.89%
Sub-total meat chickens		*$104.38*	6.81%	*$104.38*	9.28%
Layer and meat chicken Breeders					
	Large	$0.00	0.00%	$0.00	0.00%
Sub-total breeders		*$0.00*	0.00%	*$0.00*	0.00%
Turkeys					
	Large	$18.99	1.24%	$18.99	1.69%
	Small	$69.02	4.51%	$69.02	6.13%
Sub-total turkeys		*$88.01*	5.74%	*$88.01*	7.82%
Ducks					
	Large	*$0.31*	0.02%	*$0.31*	0.03%
	Small	*$0.00*	0.00%	*$0.00*	0.00%
Sub-total ducks		*$0.31*	0.02%	*$0.31*	0.03%
Total		***$1,531.89***	100.00%	***$1,125.35***	100.00%

Also, as shown in Table 31, the distribution of incremental costs under Option D with a 10-year phase out of conventional cages would be 16.81%, 37.92%, 44.61% and 0.67% for large, medium, small and micro size businesses, respectively. the distribution of incremental costs under Option D with a 20-year phase out of conventional cages would be 14.71%, 35.51%, 49.07% and 0.71% for large, medium, small and micro size businesses,[123] respectively (see Table 31).

[122] See Table A15.1 of Appendix 15 for source of estimates.
[123] These categories are defined in Table A1.2 of Appendix 1.

Table 31: Distribution of estimated quantifiable incremental costs of Option D by business size – present value dollars ($m)[124]

Size of business	10-year PV cost of Option D (10-year phase out of cages)	%	10-year PV cost of Option D (20-year phase out of cages	%
Large	$257.46	16.81%	$165.53	14.71%
Medium	$580.81	37.92%	$399.60	35.51%
Small	$683.36	44.61%	$552.26	49.07%
Micro	$10.25	0.67%	$7.95	0.71%
Total	***$1,531.89***	***100.00%***	***$1,125.35***	***100.00%***

As shown in Table 32, the quantifiable costs of the proposed standards would fall mainly on NSW, VIC and QLD with a cost share of 86.06% and 85.33% for a 10-year and 20-year phase out of conventional cages, respectively, under Option D for this state grouping.

Table 32: Distribution of estimated quantifiable incremental costs of Option D by state grouping – present value dollars ($m)[125]

State grouping	10-year PV cost of Option D (10-year phase out of cages)	%	10-year PV cost of Option D (20-year phase out of cages	%
NSW, QLD and VIC	$1,318.33	86.06%	$960.25	85.33%
SA, WA and TAS	$213.56	13.94%	$165.10	14.67%
Total	***$1,531.89***	***100.00%***	***$1,125.35***	***100.00%***

Unquantifiable cost savings of variation to proposed standards:

Both a 10-year and 20-year phase out of conventional cages under Option D would be as effective in promoting consistency as Option C. As with Option C, this would be likely to result in more certainty and increased compliance, as well as reduced regulatory burden.

Public consultation question 12: Do you believe that the net benefits to poultry welfare likely to be achieved with a 10 and 20-year phase out of conventional cages under **Option D**, are justified? Would the combination of costs and benefits under variations of **Option D** be preferable to other options, either as a stand-alone option or in combination with other options?

4.2.7 Option E

Option E would entail the endorsement/noting of the proposed national risk-based standards by the AGMIN, to meet the policy objective as discussed in Part 2.4 of this RIS and would be a variation on the proposed standards that would vary the proposed standards to reduce

[124] See Table A15.2 of Appendix 15 for source of estimates.
[125] See Table A15.3 of Appendix 15 for source of estimates.

maximum stocking densities in barns or sheds for non-cage layer hens to 9 birds per m2 and meat chickens 30kg/m^2.

Unquantifiable incremental net benefits of Option E (Criterion I - poultry welfare)

As with Option C, the variation of the proposed standards under Option E would lead to improved poultry welfare outcomes, through a better management of risks to animal welfare in poultry businesses due to the potential for mandatory compliance with enforceable risk-based standards. As with Option C, there would be similar improvements in the welfare of animals with respect to the provision of protection from injury, fear and distress (see Tables 18 and 19 in Part 4.2.1 of this RIS).

Under Option E with a reduction in stocking densities there would be an ***indeterminable improvement in welfare*** for around 2 million and 16.4 layer hens and meat chickens housed, respectively as illustrated in Table 33, and as estimated in Appendix 19.

Table 33: Summary of estimated number of poultry (housed/per annum) affected by positive and negative welfare impacts under Option E[126]

Standard/Option	Description of positive welfare effect of standard/Option	Poultry No. with positive welfare effects (as per Column 2)	Description of negative welfare effect of standard/Option	Poultry No. with negative welfare effects (as per Column 4)
Option E	Reduce maximum stocking densities for layer hens to 9 birds per m2 and meat chickens to 30kg/m2.			
Layer hens				
	Indeterminable improvement in welfare from reduced stocking density for layers	2,015,233 layer hens housed (indeterminate whether or not there is a positive welfare impact)	N/A	N/A
Meat chickens				
	Indeterminable improvement in welfare from reduced stocking density for meat chickens	16,434,325 meat chickens housed (80,000,000 meat chickens annually) (indeterminate whether or not there is a positive welfare impact)	N/A	N/A

[126] See Table A16.1 of Appendix 16 for source of estimates.

Quantifiable and unquantifiable incremental net costs of E (reduction in maximum stocking densities) (Criterion II – compliance costs)

Quantifiable costs of standards:

As with Option C, there would be identical incremental costs with respect to breeders, turkeys and ducks (see Tables 22 and 23 in Part 4.2.2 of this RIS) under Option D phase out of conventional cages. However as shown in Table 34 of Appendix 22, the total incremental cost of Option E would be much greater than the cost of the proposed standards under Option C for layers and meat chickens.

With respect to layer hens a reduction in maximum stocking densities under Option E is estimated to result in an incremental cost of ***$699.34m over 10 years in present value dollars***. as shown in Table 34 of Appendix 22, with 56.17% of total cost being incurred by small size businesses and 67.48% of total cost being incurred by free range production systems.

With respect to meat chickens a reduction in maximum stocking densities under Option E is estimated to result in an incremental cost of ***$740.03m over 10 years in present value dollars***. as shown in Table 35 of Appendix 22, with 79.78% of total cost being incurred by small businesses.

Finally, Table 36 shows a summary of the total quantifiable and incremental costs of the proposed standards *for all poultry species under Option E* with a total estimated cost of ***$1.53b over 10-years in present value dollars***. Under Option E the bulk of incremental costs is incurred by small meat chicken businesses (38.65%) followed by small layer hen farms (25.86%) (see Table 36).

Table 36: Summary of estimated quantifiable incremental costs of Option E, business size and poultry species – present value dollars ($m)[127]

Poultry species	Business size	Option E	% of cost
Layer hens			
	Large	$45.62	2.99%
	Medium	$252.37	16.52%
	Small	$392.79	25.71%
	Micro	$8.56	0.56%
Sub-total layers		*$699.34*	45.78%
Meat chickens			
	Large	$79.53	5.21%
	Medium	$70.11	4.59%
	Small	$590.38	38.65%
Sub-total meat chickens		*$740.03*	48.44%
Layer and meat chicken Breeders			
	Large	$0.00	0.00%
Sub-total breeders		*$0.00*	0.00%
Turkeys			
	Large	$18.99	1.24%

[127] See Tale A15.1 of Appendix 15 for source of estimates.

Poultry species	Business size	Option E	% of cost
	Small	$69.02	4.52%
Sub-total turkeys		*$88.01*	5.76%
Ducks			
	Large	*$0.31*	0.02%
	Small	*$0.00*	0.00%
Sub-total ducks		*$0.31*	0.02%
Total		***$1,527.68***	100.00%

Also, as shown in Table 37, the distribution of incremental costs under Option E would be 9.46%, 21.11%, 68.87% and 0.56% for large, medium, small and micro size businesses, respectively.

Table 37: Distribution of estimated quantifiable incremental costs of Option E by business size – present value dollars ($m)[128]

Size of business	10-year PV cost of Option E	%
Large	$144.45	9.46%
Medium	$322.48	21.11%
Small	$1,052.19	68.87%
Micro	$8.56	0.56%
Total	***$1,527.68***	***100.00%***

As shown in Table 38, the quantifiable costs of the proposed standards under Option E would fall mainly on NSW, VIC and QLD with a cost share of 82.29% for this state grouping.

Table 38: Distribution of estimated quantifiable incremental costs of Option E by state grouping – present value dollars ($m)[129]

State grouping	10-year PV cost of Option E	%
NSW, QLD and VIC	$1,249.79	81.81%
SA, WA and TAS	$277.90	18.19%
Total	***$1,527.68***	***100.00%***

Unquantifiable cost savings of variation to proposed standards:

Option E would be as effective in promoting consistency as Option C. As with Option C, this would be likely to result in more certainty and increased compliance, as well as reduced regulatory burden.

[128] See Table A15.2 of Appendix 15 for source of estimates.
[129] See Table A15.3 of Appendix 15 for source of estimates.

Public consultation question 13: Do you believe that the net benefits to poultry welfare likely to be achieved under **Option E**, are justified? Would the combination of costs and benefits under **Option E** be preferable to other options, either as a stand-alone option or in combination with other options?

4.2.8 Option F

Option F would entail the endorsement/noting of the proposed national risk-based standards by the AGMIN, to meet the policy objective as discussed in Part 2.4 of this RIS and would be a variation on the proposed standards that would require the availability of nests, perches and litter for all chicken layers in cage and non-cage systems.

Unquantifiable incremental net benefits of Option F (Criterion I - poultry welfare)

As with Option C, the variation of the proposed standards under Option F would lead to improved poultry welfare outcomes, through a better management of risks to animal welfare in poultry businesses due to the potential for mandatory compliance with enforceable risk-based standards. As with Option C, there would be similar improvements in the welfare of animals with respect to the provision of protection from injury, fear and distress (see Tables 18 and 19 in Part 4.2.1 of this RIS).

Under Option F there would be an improvement of welfare for around 10,716,713[130] layer hens housed with respect to a freedom to perch, nest and, in some cases, scratch the floor of the cage (if a scratch pad is provided).[131]

Quantifiable and unquantifiable incremental net costs of F (require the availability of nests, perches and litter) (Criterion II – compliance costs)

Quantifiable costs of standards:

As with Option C, there would be identical incremental costs with respect to meat chickens, breeders, turkeys and ducks (see Tables 21, 22 and 23 in Part 4.2.2 of this RIS) under Option F. However, as shown in Table 39, the total incremental cost of Option F would be much greater than the cost of the proposed standards under Option C with respect to layer hens.

With respect to layer hens, the provision of nests, perches and litter under Option F is estimated to result in an incremental cost of ***$935.41m over 10 years in present value dollars***, as shown in Table 39 of Appendix 22, with 43.01% of total cost being incurred by medium size businesses and 59.94% of total cost being incurred by current conventional cage production systems.

Table 40 shows a summary of the total quantifiable and incremental costs of the proposed standards *for all poultry species under Option F* with a total estimated cost of ***$1.13b over 10-years in present value dollars***. Under Option F the bulk of incremental costs is incurred by medium layer farms (35.66%) followed by small layer hen farms (30.66%) (see Table 40).

[130] See Table A16.1 of Appendix 16 for source of estimate.
[131] It is possible that a scratch pad might be provided in some commercially purchased furnished cages, whether required or not.

Table 40: Summary of estimated quantifiable incremental costs of Option F, business size and poultry species – present value dollars ($m)[132]

Poultry class	Business size	Option F	% of costs
Layer hens			
	Large	$180.91	16.04%
	Medium	$402.27	35.66%
	Small	$345.85	30.66%
	Micro	$6.37	0.56%
Sub-total layers		*$935.41*	82.92%
Meat chickens			
	Large	$5.74	0.51%
	Medium	$21.07	1.87%
	Small	$77.58	6.88%
Sub-total meat chickens		*$104.37*	9.25%
Layer and meat chicken Breeders			
	Large	$0.00	0.00%
Sub-total breeders		*$0.00*	0.00%
Turkeys			
	Large	$18.99	1.68%
	Small	$69.02	6.12%
Sub-total turkeys		*$88.01*	7.80%
Ducks			
	Large	*$0.31*	0.03%
	Small	*$0.00*	0.00%
Sub-total ducks		*$0.31*	0.03%
Total		***$1,128.11***	100.00%

Also, as shown in Table 41, the distribution of incremental costs under Option F would be 18.26%, 37.53%, 43.65% and 0.56% for large, medium, small and micro size businesses, respectively.

Table 41: Distribution of estimated quantifiable incremental costs of Option F by business size – present value dollars ($m)[133]

Size of business	10-year PV cost of Option F	%
Large	$423.34	37.53%
Medium	$492.44	43.65%
Small	$6.37	0.56%
Micro	***$1,128.11***	***100.00%***
Total		

As shown in Table 42, the quantifiable costs of the proposed standards under Option F would fall mainly on NSW, VIC and QLD with a cost share of 86.14% for this state grouping.

[132] See Tale A15.1 of Appendix 15 for source of estimates.
[133] See Table A15.2 of Appendix 15 for source of estimates.

Table 42: Distribution of estimated quantifiable incremental costs of Option F by state grouping – present value dollars ($m)[134]

State grouping	10-year PV cost of Option F	%
NSW, QLD and VIC	$964.04	85.46%
SA, WA and TAS	$164.07	14.54%
Total	***$1,128.11***	***100.00%***

Unquantifiable cost savings of variation to proposed standards:

Option F would be as effective in promoting consistency as Option C. As with Option C, this would be likely to result in more certainty and increased compliance, as well as reduced regulatory burden.

Public consultation question 14: Do you believe that the net benefits to poultry welfare likely to be achieved under **Option F**, are justified? Would the combination of costs and benefits under **Option F** be preferable to other options, either as a stand-alone option or in combination with other options?

4.2.9 Option G

Option G would entail the endorsement/noting of the proposed national risk-based standards by the AGMIN, to meet the policy objective as discussed in Part 2.4 of this RIS and would be a variation on the proposed standards that would ban castration, pinioning, devoicing, hot blade beak trimming at hatcheries, and routine second beak trimming – unless there are exceptional circumstances (hot blade permitted in this circumstance).[135]

Unquantifiable incremental net benefits of Option G (Criterion I - poultry welfare)

As with Option C, the variation of the proposed standards under Option G would lead to improved poultry welfare outcomes, through a better management of risks to animal welfare in poultry businesses due to the potential for mandatory compliance with enforceable risk-based standards. As with Option C, there would be similar improvements in the welfare of animals with respect to the provision of protection from injury, fear and distress (see Tables 18 and 19 in Part 4.2.1 of this RIS).

As shown in Table 43, there would be an additional improvement in welfare with respect to routine second beak trimming being banned for around 2,600,000 layer hens housed; and second beak trimming and hot blade being banned for around 690,000 breeders per annum; and hot blade being banned for around 60,000 turkeys per annum. However, there would be 357,689 layers, 24,304 breeders and an unknown number of turkeys per annum subject to *increased mortality from a higher incidence of pecking*.

Table 43: Summary of estimated number of poultry (housed/per annum) affected by positive and negative welfare impacts[136]

[134] See Table A15.3 of Appendix 15 for source of estimates.
[135] Exceptional circumstances include outbreaks of severe feather pecking.
[136] See Table A16.1 of Appendix 16 for source of estimates.

Standard/Option	Description of positive welfare effect of standard/Option	Poultry No. with positive welfare effects (as per Column 2)	Description of negative welfare effect of standard/Option	Poultry No. with negative welfare effects (as per Column 4)
Option G				
Layer hens				
	Layer hens no longer subjected to routine second beak trim in the free range and barn segments	2,600,000 layer hens housed	Increased mortality from higher incidence of pecking	357,689 layers per annum
Breeders				
	Breeders no longer subjected to routine second beak trim or hot blade	690,000 breeders per annum	Increased mortality from higher incidence of pecking	24,304 breeders per annum
Turkeys				
	Turkeys no longer subjected to hot blade beak trimming	60,000per annum	Increased mortality from higher incidence of pecking	Unknown

Quantifiable and unquantifiable incremental net costs of G (no hot blade at hatcheries and no routine 2nd beak trim) (Criterion II – compliance costs)

Quantifiable costs of standards:

As with Option C, there would be identical incremental costs with respect to meat chickens and ducks (see Tables 21 and 23 in Part 4.2.2 of this RIS) under Option G. However, as shown in Table 44, the total incremental cost of Option G would be greater than the cost of the proposed standards under Option C with respect to layer hens; breeders, and turkeys.

With respect to layer hens Option G is estimated to result in an incremental cost of ***$637.12m over 10 years in present value dollars***, as shown in Table 44 of Appendix 22, with 55.26% of total cost being incurred by small size businesses and 66.63% of total cost being incurred by free range production systems.

As shown in Table 45, with respect to breeders, the annual cost of the variation of the proposed standards under Option G is estimated to be approximately ***$6.18m over 10 year in 2016-17 dollars***. Information on which states/state groupings are affected has been omitted at the request of the ACMF for commercial and confidentiality reasons.

Table 45: Estimated 10-year quantifiable incremental cost of variation of the proposed standards under Option G for layer and meat chicken breeder farms by farm size[137]

Breeder farm type	Size of breeder farm	Total breeder birds affected	Annual mortality cost and lease cost	10-year cost	PV discounted at 7%
Layer	Large	200,000	$251,840	$2,518,400	$1,768,819
Meat GP	Large	250,000	$384,000	$3,840,000	$2,697,055
Layer, Meat GGP and Meat GP	Large	490,000	$62,000	$620,000	$435,462
Meat GGP	Large	40,000	$182,400	$1,824,000	$1,281,101
Total		***690,000***	***$880,240***	***$8,802,400***	***$6,182,437***

With respect to turkeys Option G is estimated to result in an incremental cost of ***$0.44m over 10 years in present value dollars***, as shown in Table 46, with 100% of total cost being incurred by small size businesses.

Table 46: Estimated 10-year quantifiable incremental cost of variation of the proposed standards under Option G for turkey farms by business size[138]

States	Size of turkey business	Total turkey business affected	Annual leasing cost	10-year cost	PV discounted at 7%
NSW	Small	1	$62,000	$620,000	$435,462
Subtotal NSW, QLD and VIC		0	$62,000	$620,000	$435,462
Subtotal SA, WA and TAS		0	$0	$0	$0
Total		***0***	***$62,000***	***$620,000***	***$435,462***

Table 47 shows a summary of the total quantifiable and incremental costs of the proposed standards *for all poultry species under Option G* with a total estimated cost of ***$836.44m over 10 years in present value dollars***. Under Option G the bulk of incremental costs is incurred by small layer farms (42.09%) followed by medium layer hen farms (27.75%) (see Table 47).

[137] See Table A10.1 of Appendix 10 for source of estimates.
[138] See Table A12.1 of Appendix 12 for source of estimates.

Table 47: Summary of estimated quantifiable incremental costs of Option G, business size and poultry species – present value dollars ($m)[139]

Poultry species	Business size	Option G	% of cost
Layer hens			
	Large	$45.62	5.45%
	Medium	$232.07	27.75%
	Small	$352.05	42.09%
	Micro	$7.38	0.88%
Sub-total layers		*$637.12*	76.17%
Meat chickens			
	Large	$5.74	0.69%
	Medium	$21.07	2.52%
	Small	$77.58	9.27%
Sub-total meat chickens		*$104.38*	12.48%
Layer and meat chicken Breeders			
	Large	$6.18	0.74%
Sub-total breeders		*$6.18*	0.74%
Turkeys			
	Large	$18.99	2.27%
	Small	$69.45	8.30%
Sub-total turkeys		*$88.44*	10.57%
Ducks			
	Large	*$0.31*	0.04%
	Small	*$0.00*	0.00%
Sub-total ducks		*$0.31*	0.04%
Total		***$836.44***	100.00%

Also, as shown in Table 48, the distribution of incremental costs under Option G would be 9.19%, 30.26%, 59.67% and 0.88% for large, medium, small and micro size businesses, respectively.

Table 48: Distribution of estimated quantifiable incremental costs of Option G by business size – present value dollars ($m)[140]

Size of business	10-year PV cost of Option G	%
Large	$76.85	9.19%
Medium	$253.14	30.26%
Small	$499.08	59.67%
Micro	$7.38	0.88%
Total	***$836.44***	***100.00%***

As shown in Table 49 the quantifiable costs of the proposed standards under Option G would fall mainly on NSW, VIC and QLD with a cost share of 84.19% for this state grouping.

[139] See Table A15.1 of Appendix 15 for source of estimates.
[140] See Table A15.2 of Appendix 15 for source of estimates.

Table 49: Distribution of estimated quantifiable incremental costs of Option G by state grouping – present value dollars ($m)[141]

State grouping	10-year PV cost of Option G	%
NSW, QLD and VIC	$696.73	83.30%
SA, WA and TAS	$139.70	16.70%
Total	***$836.44***	***100.00%***

Unquantifiable cost savings of variation to proposed standards:

Option G would be as effective in promoting consistency as Option C. As with Option C, this would be likely to result in more certainty and increased compliance, as well as reduced regulatory burden.

Public consultation question 15: Do you believe that the net benefits to poultry welfare likely to be achieved under **Option G**, are justified? Would the combination of costs and benefits under **Option G** be preferable to other options, either as a stand-alone option or in combination with other options?

4.3 Preferred option

The costs and benefits of Options B, C, D, E, F and G have been evaluated in Part 4.2 by using the following criteria (**I to II**) to compare the effectiveness of each option in achieving the relevant part of the policy objective:

I. Poultry welfare benefits[142]; and

II. Net compliance costs to industry including any reduction in regulatory burden[143].

This Part of the RIS will now summarise and compare the poultry welfare benefits and net compliance costs of all options.

As discussed in Part 4.2.1 of this RIS, in the absence of any ability to quantify the impacts on individual animals, the number of animals affected is used as a rough proxy of the quantitative animal welfare impacts of different options. These impacts are summarised in Table 49.1 below.

[141] See Table A15.3 of Appendix 15 for source of estimates.
[142] Beyond animals being simply hungry or thirsty.
[143] OBPR have requested that reduction in regulatory burden be offset against compliance costs within the same criterion in another recent RIS.

Table 49.1: Summary of estimated number of poultry (housed/per annum) affected by positive and negative welfare impacts Options C, D, E, F and G (all options have the same effects summarised in Option C unless otherwise specified)[144]

Standard/Option	Description of positive welfare effect of standard/Option	No. poultry effected with positive welfare	Description of negative welfare effect of standard/Option	No. of poultry effected by negative welfare
Option C	Proposed Standards			
Layer hens				
SA6.3 + SA6.4 + SA6.5	Improved lighting intensity (5 lux) and exposure to light and darkness for layer hens.	5,580,000 layer hens housed	N/A	N/A
SA9.4 + SA9.5 + SA9.6	Routine moulting prohibited for layer hens except where moulting is necessary and layer hens are in good condition	2,948,842 layer hens housed	N/A	N/A
SA9.15	Removal of more than one-third of the upper and lower beaks prohibited for layer hens	19,658,948 layer hens housed	Loss of plumage from higher incidence of pecking	1,430,235 layer hens per annum
Meat chickens				
SA6.2	Improved lighting intensity for young meat chickens for the first 3 days after hatching is at least 20 Lux.	127,127,564 meat chicken hatchlings per annum	N/A	N/A
SA8.3	Meat chickens not exposed to excessive caking, dustiness or wetness	86,195,165 meat chickens per annum	N/A	N/A
SA11.7	Meat chickens awaiting slaughtering must be protected from direct sunlight, radiant and reflected heat, and adverse weather such as rain and wind.	10,205,000 meat chickens per annum		
Turkeys				
SA8.3	Turkeys not exposed to excessive caking, dustiness or wetness	3,981,150 turkeys per annum	N/A	N/A
SA9.11	Toe (claw) trimming prohibited on turkeys except on day old hatchlings selected as potential breeders and emus and ostriches which may have toes trimmed on commercial stock up to 5 days of age	826,200 turkeys per annum	Increased injury from higher incidence of scratching	231,336 turkeys per annum

[144] See Table A16.1 of Appendix 16 for source of estimates

Standard/Option	Description of positive welfare effect of standard/Option	No. poultry effected with positive welfare	Description of negative welfare effect of standard/Option	No. of poultry effected by negative welfare
SA11.7	Turkeys awaiting slaughtering must be protected from direct sunlight, radiant and reflected heat, and adverse weather such as rain and wind.	19,500 turkeys per annum	N/A	N/A
SB13.5	Turkeys housed at maximum recommended stocking densities according to housing type and under good management conditions	48,940 turkeys housed	N/A	N/A
Ducks				
SB4.4	Ducks able to dip their heads under water or misters/showers to allow ducks to wet preen, and to clean their eyes and nostrils.	9,447,853 ducks per annum	N/A	N/A
Option D (10-year phase out of cages)	Phase out conventional cages for chicken layers over 10 years in favour of alternative systems.			
Layer hens				
	Greater freedom to express innate behaviours for layer hens	10,716,713 layer hens housed	Higher incidence of disease, cannibalism, predation risks, and feather pecking. Less reliable provision of feed and water. Less efficient management of adverse weather risk, temperature, ventilation and biosecurity for the prevention of disease introduction.	10,716,713 layer hens housed
SA9.4 + SA9.5 + SA9.6	Routine moulting prohibited for layer hens except where moulting is necessary and layer hens are in good condition	3,102,683 layer hens housed	N/A	N/A
SA9.15	Removal of more than one-third of the upper and lower beaks prohibited for layer hens	20,684,550 layer hens housed	Loss of plumage from higher incidence of pecking	1,874,167 layer hens per annum

Option D (20-year phase out of cages) Phase out conventional cages for chicken layers over 20 years in favour of alternative systems

Layer hens				
	Greater freedom to express innate behaviours for layer hens	5,358,357 layer hens housed	Higher incidence of disease, cannibalism, predation risks, and feather pecking. Less reliable provision of feed and water. Less efficient management of adverse weather risk, temperature, ventilation and biosecurity for the prevention of disease introduction.	5,358,357 layer hens housed
SA9.4 + SA9.5 + SA9.6	Routine moulting prohibited for layer hens except where moulting is necessary and layer hens are in good condition	3,025,762 layer hens housed	N/A	N/A
SA9.15	Removal of more than one-third of the upper and lower beaks prohibited for layers	20,171,749 layer hens housed	Loss of plumage from higher incidence of pecking	1,652,201 layer hens per annum

Option E Reduce maximum stocking densities for layer hens to 9 birds per m2 and meat chickens to 30kg/m2.

Layer hens				
	Indeterminable improvement in welfare from reduced stocking density for layers	2,015,233 layer hens housed (indeterminate whether or not there is a positive welfare impact)	N/A	N/A
Meat chickens				
	Indeterminable improvement in welfare from reduced stocking density for meat chickens	16,434,325 meat chickens housed (80,000,000 meat chickens annually) (indeterminate whether or not there is a positive welfare impact)	N/A	N/A

Option F Require the availability of nests, perches and litter for all chicken layers in cage and non-cage systems

Layer hens				
	Freedom to perch, nest and, in some cases, scratch the floor of the cage (if a scratch pad is provided)	10,716,713 layer hens housed	N/A	N/A

Option G	Ban castration, pinioning and devoicing. And no hot blade beak trimming at hatcheries, no routine 2nd beak trimming and devoicing. And no hot blade beak trimming in this circumstance).

Layer hens				
	Layer hens no longer subjected to routine second beak trim in the free range and barn segments	2,600,000 layer hens housed	Increased mortality from higher incidence of pecking	357,689 layers per annum
Breeders				
	Breeders no longer subjected to routine second beak trim or hot blade	690,000 breeders per annum	Increased mortality from higher incidence of pecking	24,304 breeders per annum
Turkeys				
	Turkeys no longer subjected to routine hot blade beak trimming	60,000 per annum	Increased mortality from higher incidence of pecking	Unknown

As shown in Appendix 18, the existing *Model Code of Practice for the Welfare of Animals – Domestic Poultry (4th edition)* applies in all jurisdictions, except in Victoria and Western Australia which have their own codes of practice based on this model code. Thus the existing standards for all jurisdictions are similar.

Table 49.2 summarises and compares the distribution of cost impacts of all options by jurisdiction.

Table 49.2: Distribution of estimated quantifiable incremental costs of Options C, D, E, F and G by state grouping – present value dollars ($m)[145]

State grouping	10-year PV cost of Option C	10-year PV cost of Option D (10-year phase out of cages)	10-year PV cost of Option D (20-year phase out of cages	10-year PV cost of Option E	10-year PV cost of Option F	10-year PV cost of Option G
NSW, QLD and VIC	$594.14	$1,318.33	$960.25	$1,249.79	$964.04	$696.73
SA, WA and TAS	$115.58	$213.56	$165.10	$277.90	$164.07	$139.70
Total	***$709.72***	***$1,531.89***	***$1,125.35***	***$1,527.68***	***$1,128.11***	***$836.44***

The overall incremental costs and benefits of the options relative to the base case are summarised and compared in Table 50.

[145] See Table A15.3 of Appendix 15 for source of estimates.

Table 50: Summary of relative 10-year costs and benefits as compared to the base case (Options B, C, D, E, F and G)

Option/variation	Criterion I (poultry welfare benefits)	Criterion II (net compliance costs)
Option A (base case)	0	0
Option B (guidelines only)	greater than base case	0
Option C (proposed national standards)	greater than Option B unclear for D (10), D (20), E, G less than F	$709.72m greater than B less than D (10), D (20), E, F and G
Variation D (10) (10-year phase out of cages)	greater than Option B unclear for C, D (20), E, G less than F	$1,531.89m greater than B, C, D (20), F, G less than E
Variation D (20) (20-year phase out of cages)	greater than Option B unclear for C, D (10), E, G less than F	$1,125.35m greater than B, C, G less than D (10), E, F
Variation E (reduction in stocking densities)	greater than Option B and unclear for C, D (10), D (20), G less than F	$1,527.68m greater than B, C, D (10), D (20), F, G
Variation F (provision of nests, perches and litter)	greater than Option B and greater than C, D (10), D (20), E, G	$1,128.11m greater than B, C, G less than D (10), D (20), E
Variation G (no routine hot blade and 2nd beak trim)	greater than Option B and unclear for C, D (10), D (20), E less than F	$836.44m greater than B, C less than D (10), D (20), E, F
Rank 1 highest benefit (Criterion I) or lowest cost (Criterion II)	F	B
Rank 2 highest benefit (Criterion I) or lowest cost (Criterion II)	C, D (10), D (20), E, G?	C
Rank 3 highest benefit (Criterion I) or lowest cost (Criterion II)	B	G
Rank 4 highest benefit (Criterion I) or lowest cost (Criterion II)		D (20)
Rank 5 highest benefit (Criterion I) or lowest cost (Criterion II)		F
Rank 6 highest benefit (Criterion I) or lowest cost (Criterion II)		D (10)
Rank 7 highest benefit (Criterion I) or lowest cost (Criterion II)		E

To assist easier cost comparisons, the following table lists the incremental 10-year cost differences for Options D, E, F and G as compared to Option C. This table may be used by those wishing to calculate the cost of various combinations of Options D, E, F or G.

Table 50.1: Summary of relative 10-year costs of Options E, F and G as compared to Options C,

Option	Net compliance costs	Cost difference compared to Option C
Option C (proposed national standards)	$709.72m	N/A
Option D (10) (10-year phase out of cages)	$1,531.89m	+$822.17m
Option D (20) (20-year phase out of cages)	$1,125.35m	+$415.63m
Option E (reduction in stocking densities)	$1,527.68m	+$817.97m
Option F (require the availability of nests, perches and litter)	$1,128.11m	+$418.39m
Option G (no routine hot blade and no routine second beak trim)	$836.44m	+$126.72m

As stated in Part 3.0 of this RIS, Options D, E, F and G are all variations of Option C (the proposed standards) and are not mutually exclusive. This means that the Option eventually preferred could therefore be Option A, B, C or a combination of one or more of the Options D, E, F or G.

The above table shows that all options would provide greater poultry welfare benefits than the base case. All options would, other than Option B, be costlier than the base case. Option C, D (10), D (20), E, F and G would provide greater poultry welfare benefits than Option B but would also be costlier than Option B. Option F would provide the greatest poultry welfare benefit but would also be one of the most expensive options.

As shown in Table 51, a sensitivity analysis reveals a change in the ranking of Options in terms of quantifiable incremental costs (from lowest to highest) based on a change in the discount rate of 3.5%. Specifically, the ordering of lowest to highest incremental cost of D (20), F, D (10) and E (with a 7% or 10% discount rate) becomes F, D (20), E, and D (10) (with a 3.5% discount rate).

Table 51: Sensitivity analysis of 10-year incremental costs as compared to the base case (Options B, C, D, E, F and G) ($m)

Option	7% discount rate		3.5% discount rate		10% discount rate
Option B	$0.00	Option B	$0.00	Option B	$0.00
Option C	$709.72	Option C	$773.18	Option C	$637.06
Variation G	$836.44	Variation G	$910.61	Variation G	$747.55
Variation D (20)	$1,125.35	Variation F	$1,205.72	Variation D (20)	$999.74
Variation F	$1,128.11	Variation D (20)	$1,258.42	Variation F	$1,044.05
Variation E	$1,527.68	Variation E	$1,654.80	Variation D (10)	$1,354.46
Variation D (10)	$1,531.89	Variation D (10)	$1,732.90	Variation E	$1,409.28

The basis of the selection of the preferred option is the one that generates the greatest net benefit for the community. Option C is estimated to be the least expensive option regardless of the discount rate chosen, however it is likely to provide lower net welfare benefits than Option F. Option F is ranked higher in terms of having a lower cost (in relative terms) with a 3.5% discount rate but is still more expensive than either Options, C or G. Moreover, it is indeterminate whether phasing out conventional cages over 10 years and 20 years under Option D, reducing stocking densities under Option E or banning hot blade trimming and routine second beak trimming under Option G are likely to generate more poultry welfare benefits than Option C.

The selection of a preferred option has therefore been postponed pending responses from the public consultation process. The public consultation now seeks the views and advice of interested parties on which of the above Options A, B, C, or combination of one or more Options D, E, F or G in their opinion would provide the greatest net benefit the for the Australian community.

The views and advice of interested parties are also sought in providing any further information or data that would assist in the assessment of the impacts (costs and benefits) expected under each of the options/variations.

After the public consultation process and consideration of written submissions, there will then be a final cost/benefit comparison between Options A, B, C, D, E, F and G with a view to making a recommendation on a preferred option to AGMIN as part of the Decision RIS.

Public consultation question 16: Which of the Options A, B, C, or combination of one or more Options D, E, F or G in your opinion would provide the greatest net benefit the for the Australian community?

Public consultation question 17: Do you have any further information or data that would assist in the assessment of the impacts (costs and benefits) expected under each of the options/variations.

4.4. Impacts on competition and small business

In accordance with the Competition Principles Agreement, legislation should not restrict competition unless it can be demonstrated that:-

- the benefits of the restrictions to the community as a whole outweigh the costs, and
- the objectives of the regulation can only be achieved by restricting competition.

Where the costs of compliance with regulations comprise a significant proportion of business costs, small businesses[146] may be affected disproportionately by such costs compared to large businesses.

The relative cost impacts on large, medium and small business have been analysed in Part 4.2 of the RIS and the costing appendices. However, in this Consultation RIS a preferred option has not yet been selected, so it is not yet possible to analyse the impacts of the preferred option on competition and small business.

Public consultation question 18: Do you think that any of the Options A to G are likely to have a disproportionate impact on small businesses compared to medium and large business? Do you think that any of these options are likely to have a greater impact on small business than other options? Please provide reasons for your answers in your written submission together with available supporting evidence.

5.0 Implementation issues

The intent of preparing the proposed national standards and variations is to replace the existing MCOPs and current jurisdictional standards, if and when adopted by the AGMIN. The method of implementation is a matter for each jurisdiction according to the provisions of their own enabling legislation, as listed in Appendix 18 to this RIS. However, the most likely method is via the adoption of the proposed standards or variations by regulations made under existing animal welfare legislation.

As discussed in Part 4.2.2 of this RIS, the cost of making the necessary regulations to adopt the standards is likely to be relatively small and in any case, is part of the normal role of government. Advice from jurisdictions is that no incremental government enforcement costs would be incurred as a result of replacing the existing standards with the proposed standards (Option C). However, one jurisdiction has foreshadowed the possibility of some relatively minor incremental enforcement costs if one or more of the other Options D to G is eventually selected as a preferred option. Any such costs will be estimated in the Decision RIS, depending on which option or options are selected.

[146] The Australian Bureau of Statistics (ABS) definition of a small business is one that has less than 20 full-time employees.

Depending upon which option or combination of options is eventually selected by AGMIN, for any option(s) other than Option A or B, the resulting regulations or codes of practice will mandate a new set of poultry welfare standards in each jurisdiction. Enforcement of these standards should see a progressive improvement in the reduction of risks to poultry welfare

6.0 Evaluation and review strategy

In this Consultation RIS a preferred option has not yet been selected, so it is not yet possible to fully outline a relevant evaluation and review strategy until the Decision RIS stage. The effectiveness of the proposed standards will be evaluated when the standards are next reviewed or in 10 years' time (whichever is the sooner). Indicators are likely include the extent to which the standards have been:

- officially adopted by the various government jurisdictions;
- implemented by the poultry industries;
- accepted by the Australian community.

Future reviews of poultry welfare standards should aim to assess, and where possible quantitatively measure improvements in poultry welfare to gauge their cost-effectiveness.

7.0 Conclusions and findings

The main conclusions and findings of the RIS, particularly regarding the cost benefit evaluation, are as follows:

According to COAG guidelines, the RIS is required to demonstrate a case for action, or other words, a need for the proposed standards. This is best achieved by identifying the problems that the proposed standards are endeavouring to address. At this stage, these problems may be summarised as follows:

Problem 1: Risks to the welfare of poultry due to deficiencies in the existing MCOPs and jurisdictional codes of practice for the welfare of poultry; and to a lesser extent:

Problem 2: Uncertainty for industry due to a lack of clear and verifiable standards (confusing mixture of 'musts' and 'should' statements); and

Problem 3: Excess regulatory burden arising from a lack of national consistency and regulatory failure.

These problems need to be considered within the context of the base case, as outlined in Part 2.2. of this RIS. The base case includes existing legislation, regulations, codes of practice, normal industry practice and market forces.

The main risks to the welfare of poultry discussed in this RIS are:

- Lack of clear responsibilities for personnel in charge of poultry;
- Lack of freedom of poultry to express innate behaviours;
- Inadequate space allowances for poultry (stocking density);
- Lack of perches, nests and litter for layer hens
- Lack of quantitative lighting standards;
- Need for restrictions on routine beak trimming ;
- Risky litter management;
- Need to restrict routine use of induced moulting;
- Care of meat chickens and turkeys awaiting slaughtering; and
- Access to water for ducks.

Specifically, this RIS identifies three key sources of market failure relevant to this RIS:

- Public good nature of animal welfare risk management itself;
- Negative externalities (risks to animal welfare) of poultry farming; and
- Information failure – a lack of information available to poultry product buyers.

Arising from this case for action, the policy objective of such action is identified as:

To minimise risks to poultry welfare; and to reduce both industry uncertainty and excess regulatory burden in a way that is practical for implementation and industry compliance.

The main criterion for evaluating the proposed standards and the feasible alternatives is net benefit for the community, in terms of achieving this policy objective.

The proposed form of government intervention is the adoption of either the proposed standards or another option by AGMIN with the intent of the adopted standards being implemented by legislation in each participating jurisdiction.

The options evaluated in terms of costs and benefits are:

- Option A: Maintain the status quo (i.e. the base case as described in Part 4.2 of this RIS);
- Option B: convert the proposed national standards into national voluntary guidelines (the minimum intervention option);
- Option C: adopt the proposed standards as currently drafted;
- Option D – vary the proposed standards (option C) to phase out conventional cages for chicken layers over 10 and 20 years in favour of alternative systems 'typical' free range, barn/aviary or furnished cages, providing a nest, perch, and space for forage.
- Option E – vary the proposed standards (option C) to reduce maximum stocking densities in barns or sheds for non-cage layer hens to 9 birds per m^2 and meat chickens 30kg/m^2.
- Option F – vary the proposed standards (option C) to require the availability of nests, perches and litter for all chicken layers in cage and non-cage systems.
- Option G – vary the proposed standards (option C) to ban castration, pinioning, devoicing, hot blade beak trimming at hatcheries, and routine second beak trimming – unless there are exceptional circumstances (hot blade permitted in this circumstance).

The costs and benefits of these options are evaluated relative to the base case by using the following criteria (I to II) to compare the effectiveness of each option in achieving the relevant part of the policy objective:

I. Poultry welfare benefits and

II. Net compliance costs to industry including any reduction in regulatory burden.

The incremental costs and benefits of the options relative to the base case are summarised in Table 50.

Table 50: Summary of relative 10-year costs and benefits as compared to the base case (Options B, C, D, E, F and G)

Option/variation	Poultry welfare benefits (Criterion I)	Net compliance costs (Criterion II)
Option A (base case)	0	0
Option B (guidelines only)	greater than base case	0
Option C (proposed national standards)	greater than Option B unclear for D (10), D (20), E, G less than F	$709.72m greater than B less than D (10), D (20), E, F and G
Variation D (10) (10-year phase out of cages)	greater than Option B unclear for C, D (20), E, G less than F	$1,531.89m greater than B, C, D (20), F, G less than E
Variation D (20) (20-year phase out of cages)	greater than Option B unclear for C, D (10), E, G less than F	$1,125.35m greater than B, C, G less than D (10), E, F
Variation E (reduction in stocking densities)	greater than Option B and unclear for C, D (10), D (20), G less than F	$1,527.68m greater than B, C, D (10), D (20), F, G
Variation F (require the availability of nests, perches and litter)	greater than Option B and greater than C, D (10), D (20), E, G	$1,128.11m greater than B, C, G less than D (10), D (20), E
Variation G (no routine hot blade and 2nd beak trim)	greater than Option B and unclear for C, D (10), D (20), E less than F	$836.44m greater than B, C less than D (10), D (20), E, F
Rank 1 highest benefit (Criterion I) or lowest cost (Criterion II)	F	B
Rank 2 highest benefit (Criterion I) or lowest cost (Criterion II)	C, D (10), D (20), E, G?	C
Rank 3 highest benefit (Criterion I) or lowest cost (Criterion II)	B	G
Rank 4 highest benefit (Criterion I) or lowest cost (Criterion II)		D (20)
Rank 5 highest benefit (Criterion I) or lowest cost (Criterion II)		F
Rank 6 highest benefit (Criterion I) or lowest cost (Criterion II)		D (10)
Rank 7 highest benefit (Criterion I) or lowest cost (Criterion II)		E

The above table shows that all options would provide greater poultry welfare benefits than the base case. All options would, other than Option B, be costlier than the base case. Options C, D (10), D (20), E, F and G would provide greater benefits than Option B but would also be costlier than Option B. Option F would provide the greatest poultry welfare benefit but would also be one of the most expensive options.

To assist easier cost comparisons and combinations of options, the following table lists the incremental 10-year cost differences for Options D, E, F and G as compared to Option C.

Table 50.1: Summary of relative 10-year costs of Options E, F and G as compared to Options C,

Option	Net compliance costs	Cost difference compared to Option C
Option C (proposed national standards)	$709.72m	N/A
Option D (10) (10-year phase out of cages)	$1,531.89m	+$822.17m
Option D (20) (20-year phase out of cages)	$1,112.35m	+$415.63m
Option E (reduction in stocking densities)	$1,527.68m	+$817.97m
Option F (require the availability of nests, perches and litter)	$1,128.11m	+$418.39m
Option G (no routine hot blade and no routine second beak trim)	$836.44m	+$126.72m

The basis of the selection of the preferred option is the one that generates the greatest net benefit for the community. Option C is estimated to be the least expensive option regardless of the discount rate chosen, however it is likely to provide lower net welfare benefits than Option F. Option F is ranked higher in terms of having a lower cost (in relative terms) with a 3.5% discount rate but is still more expensive than either Options, C or G. Moreover, it is indeterminate whether phasing out cages over 10 years and 20 years under Option D, reducing stocking densities under Option E or banning hot blade trimming and routine 2nd beak trimming under Option G are likely to generate more benefits than Option C.

The selection of a preferred option has therefore been postponed pending responses from the public consultation process. The public consultation now seeks the views and advice of interested parties on which of the above Options A, B, C or combination of one or more Options D, E, F or G in their opinion would provide the greatest net benefit the for the Australian community.

The views and advice of interested parties are also sought in providing any further information or data that would assist in the assessment of the impacts (costs and benefits) expected under each of the options/variations.

After the public consultation process and consideration of written submissions, there will then be a final cost/benefit comparison between Options A, B, C, D, E, F and G with a view to making a recommendation on a preferred option to AGMIN as part of the Decision RIS.

Glossary of terms and acronyms used in this document

ABS:	Australian Bureau of Statistics
ABARE:	Australian Bureau of Agricultural and Resource Economics
AGMIN:	Agriculture Ministers Forum
animal welfare	The state of an animal and how well it is coping with the conditions in which it lives.
AVA:	Australian Veterinary Association.
aviaries:	Barns where nesting places are provided in vertical tiers, with free movement between each tier and the floor of the barn
barns:	Large sheds where up to several thousand hens may be kept together, and where the floor is often covered with litter. Nesting places are provided for egg laying, but hens are not confined to them.
base case:	The situation that would exist if the proposed standards or another option were not adopted.
beak trimming	The removal of the tip of the beak of poultry by specially designed equipment to reduce the incidence of cannibalism and its associated vices.
broiler	A young bird of either sex that is bred and grown specifically for highly efficient chicken meat production. Broilers are usually killed at 5 to 7 weeks of age (alternative term – meat chicken). OIE Broiler: means a bird of the species Gallus gallus kept for commercial meat production.
brooding	The period of the first weeks of a chicken's life when it requires a very high standard of care including the provision of special diets and supplementary warmth.
cage systems	Birds in cage systems are continuously housed in cages within a shed.
cages	A system of housing where the birds are confined to cages either singly or in multiples with a wire floor. With this system the stock do not come into contact with their own or other bird's faeces which is an important disease control measure.
conventional cages	Hens are housed indoors, in groups of up to 9 hens, usually in multi-tiered systems with wire mesh floors.
COAG	Council of Australian Governments
economic efficiency:	When an output of goods and services is produced making the most efficient use of scarce resources and when that output best meets the needs and wants and consumers and is priced at a price that fairly reflects the value of resources used up in production
externality:	The cost or benefit related to a good or service that accrues to persons other than the buyer or the seller of that good or service.
guidelines:	The recommended practices to achieve desirable animal welfare outcomes. The guidelines complement the standards. They should be used as guidance. Guidelines use the word 'should'. Non-compliance with one or more guidelines will not in itself constitute an offence under law. Compare with *Standards.*

EU:	European Union
free-range systems	Birds in free-range systems are often housed in shedding and have access to an outdoor range. Except Ratites which may not include sheds.
enriched cages	A term used in the EU to refer to furnished cages.
furnished cages	Cages that contain furnishing such as nest boxes, perches and/or scratch-pads.
hen	A female after the first moult. It is often used to describe females after they have started to lay.
housing systems (non-cage systems)	Birds in housing systems roam within a shed which may have more than one level. The floor may be based on litter and/or other material such as slats or wire mesh.
inspection	The visual check of the health and welfare of poultry on an individual or bird group basis.
layer hen	A female in lay. Usually used to refer to females kept solely for egg production for human consumption.
litter	A mixture of the source material used for the initial bedding placed on the floor of a clean shed, and the excreta, feathers and other detritus from the chickens plus wasted feed and water.
market:	An area of close competition between firms, or the field of rivalry in which firms operate.
market failure:	The situation which occurs when freely functioning markets, operating without government intervention, fail to deliver an efficient or optimal allocation of resources.
moult	The process whereby the bird sheds its feathers and ceases egg production. It is usually initiated by hormonal influences but may be triggered by stress.
OIE:	World Organisation for Animal Health
poultry	The following bird species reared or bred in captivity: chickens, ducks, emus, geese, guinea fowl, ostriches, partridges, pheasants, pigeons, quail and turkeys. Birds that are kept in captivity for any reason, including those that are kept for shows, races, exhibitions, competitions or for breeding or selling.
prescribed:	Specified by regulations made under an Act.
public good:	A good or service that will not be produced in private markets because there is no way for the producer to keep those who do not pay for the good or service from using it.
restriction of competition:	Something that prevents firms in a market or potential entrants to a market from undertaking the process of economic rivalry.
RIS:	Regulatory impact statement.
QA:	Quality Assurance.
RSPCA:	Royal Society for the Prevention of Cruelty to Animals.
standards:	The acceptable animal welfare requirements designated in the proposed standards document. The requirements that must be met under law for livestock welfare purposes. The standards are intended to be clear, essential and verifiable statements; however, not all

	issues are able to be well defined by scientific research or are able to be quantified. Standards use the word 'must'.
stress:	A response by animals that activates their behavioural, physiological or psychological coping mechanisms.
supply chain:	A group of businesses linked together for mutual benefit to supply products to customers.

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Appendices

Appendix 1: Layer hen population data

Appendix 2: Estimation of incremental quantifiable costs of proposed standards (Layer Hens) under Options C, D, E, F and G

Appendix 3: Estimation of incremental costs under variation to the proposed standards under Option D (layer hens)

Appendix 4: Estimation of incremental costs of variations to the proposed standards under Options E, F and G (layer hens)

Appendix 5: Summary of incremental costs under Options C, D, E, F and G (layer hens)

Appendix 6: Population data for meat chickens and meat turkeys

Appendix 7: Estimation of incremental quantifiable costs of proposed standards under Options C, D, E, F and G (meat chickens)

Appendix 8: Estimation of incremental costs under variation to the proposed standards under Option E (meat chickens)

Appendix 9: Summary of incremental costs under Options C, D, E, F and G (meat chickens)

Appendix 10: Estimation of incremental quantifiable costs of proposed standards under Option G (meat chicken and layer breeders)

Appendix 11: Estimation of incremental quantifiable costs of proposed standards under Options C, D, E, F and G (Turkeys)

Appendix 12: Estimation of incremental quantifiable costs of proposed standards under Option G (Turkeys)

Appendix 13: Summary of incremental costs under Options C, D, E, F and G (Turkeys)
Appendix 18 - List of relevant federal, state and territory legislation

Appendix 14: Estimation of incremental quantifiable costs of proposed standards under Options C, D, E, F and G (Ducks)

Appendix 15: Summary of all incremental costs under Options C, D, E, F and G (layers, meat chickens, breeders and turkeys)

Appendix 16: Summary of poultry numbers affected by welfare impacts under Options C, D, E, F and G (layers, meat chickens, breeders and turkeys)

Appendix 17 - List of proposed standards assessed as imposing nil or negligible incremental costs relative to the base case.

Appendix 18 - List of relevant federal, state and territory legislation

Appendix 19 - Discussion of animal welfare benefits of Option E

Appendix 20 – Specific international animal welfare standards for layer hens and water access for ducks

Appendix 21 – Summary of scientific evidence on animal welfare issues

Appendix 22 – Summary tables for cost/benefit analysis

Appendix 1: Layer hen population data

The following data in Appendix 1 is used to estimate the quantifiable costs of the relevant proposed standards on the egg industry in Appendix 2 and Appendix 3. All data for NSW includes the ACT. Where specified, data and estimates have been provided by the Australian Egg Corporation Limited (AECL) as part of the RIS process and are used for the following analysis in Appendix 1 (part A1.2) and Appendices 2 and 3.

Please note that whilst no rounding has been done in the underlying spreadsheets, large figure estimates are shown in this RIS as whole numbers for simplicity of presentation, and therefore may be give the appearance of rounding errors if calculations are made manually from the tables. In other words, there are no rounding errors in the total figures presented in the tables, because these are derived from the underlying unrounded spreadsheets.

A1.1 Data for estimating one off capital costs for all options and annual costs for all options excluding Option D (layer hens)

The data presented in Tables A1.1 to Tables A1.5[147] is relevant for the costing of Options C, E, F and G and reflects the current distribution of production systems between conventional cage, barn and free range[148]. This data in terms of the number of farms, is also relevant for Option D with regards to the estimation of one off and up front capital costs (prior to the phasing out of conventional cage production systems).

Information regarding individual states has been grouped at the request of AECL for commercial confidentiality purposes. Average farm capacity in Table A1.1 is determined by dividing the number of hens housed (capacity) by the number of layer hen farms.

Table A1.1: No. and % of hens housed; No. layer hen farms; and average farm capacity by production system and state grouping (as at November 2016)

Production system	NSW, QLD and VIC	SA, WA and TAS	Total
No. hens housed (capacity) by production system			
Cage	9,474,772	1,241,941	**10,716,713**
Barn	1,625,050	162,500	**1,787,550**
Free Range	5,674,185	1,480,500	**7,154,685**
Total	***16,774,007***	***2,884,941***	***19,658,948***
% of hens housed by production system			
Cage	56.48%	43.05%	**54.51%**
Barn	9.69%	5.63%	**9.09%**
Free Range	33.83%	51.32%	**36.39%**
Total	***85.33%***	***14.67%***	***100.00%***
No. layer hen farms by production system			
Cage	70	18	**88**
Barn	36	14	**50**

[147] Provided by AECL

[148] Option D proposes to phase out conventional cages for chicken layers in favour of alternative systems: tems: conventional cages for chicken layers in o? and therefore data in Appendix 1 would not be relevant in assessing an option that would change the distribution of production systems (see Appendix 3 for population data used for Option D).

Free Range	152	47	**199**
Total	***258***	***79***	***337***
Average farm capacity by production system			
Cage	135,354	68,997	**121,781**
Barn	45,140	11,607	**35,751**
Free Range	37,330	31,500	**35,953**
Total	***65,016***	***36,518***	***58,335***

The size of a layer hen farm is defined according to the number of layer hens housed. This categorisation is used to define farm size for the purposes of this RIS.

Table A1.2: Categorisation of layer hen farm size according to the number of layer hens housed

Layer hen farm size	Number of layer hens housed
Large	>500,000
Medium	>100,000 to 500,000
Small	> 5,000 to 100,000
Micro	up to 5,000

Table A1.3: No. layer hen farms by size, production system and state grouping (as at November 2016)

Layer hen farm size	NSW, QLD and VIC	SA, WA and TAS	Total
No. cage farms by farm size			
Large	3	1	**4**
Medium	23	2	**25**
Small	40	13	**53**
Micro	4	2	**6**
Total	***70***	***18***	***88***
No. barn farms by farm size			
Large	0	0	**0**
Medium	4	0	**4**
Small	27	11	**38**
Micro	5	3	**8**
Total	***36***	***14***	***50***
No. free range farms by farm size			
Large	0	0	**0**
Medium	9	4	**13**
Small	115	33	**148**
Micro	28	10	**38**
Total	***152***	***47***	***199***

Table A1.4: No. hens housed by farm size, production system and state grouping (as at November 2016)

Layer hen farm size	NSW, QLD and VIC	SA, WA and TAS	Total
No. hens housed in cage farms			
Large	2,880,194	585,240	**3,465,434**
Medium	5,132,070	234,045	**5,366,115**
Small	1,448,868	417,560	**1,866,428**

Layer hen farm size	NSW, QLD and VIC	SA, WA and TAS	Total
Micro	13,640	5,096	**18,736**
Total	**9,474,772**	**1,241,941**	**10,716,713**
No. hens housed in barn farms			
Large	0	0	**0**
Medium	598,000	0	**598,000**
Small	1,014,350	151,100	**1,165,450**
Micro	12,700	11,400	**24,100**
Total	***1,625,050***	***162,500***	***1,787,550***
No. hens housed in free range farms			
Large	0	0	**0**
Medium	1,720,715	609,000	**2,329,715**
Small	3,878,970	840,900	**4,719,870**
Micro	74,500	30,600	**105,100**
Total	***5,674,185***	***1,480,500***	***7,154,685***

A1.2 Data for estimating annual costs for Option D (layer hens)

The following data in part A1.2 has been modified from data in A1.1 and reflects the phasing out of conventional cages. This data on the *annual change in layer hen numbers by production system and size of layer farm* is used to estimate the quantifiable production system and size of layer farmts the November 2016)ndustry in Appendix 2 (see parts A2.3 and A2.5). This data reflects the proposed distribution of production systems with a phasing out of conventional cages in favour of alternative systems – 'typical' free range/barn/aviary or furnished cages under Option D. Again, information regarding individual states has been grouped at the request of AECL for commercial confidentiality purposes. Because hens are less productive in non-cage systems, the numbers of hens would need to be increased in order to maintain the same volume of egg supply.[149] The *annual change in layer hen numbers by production system and size of layer farm* used for estimating annual costs under Option D is determined by:

- estimating the number of hens housed by production system and by size of farm under the proposed egg production system arrangements under Option D (see Table A1.5 in part A1.2.1); and
- estimating the difference in the number of hens housed by production system and by size of farm under current egg production system arrangements (see Table A1.4) and the proposed egg production system arrangements under Option D (see Table A1.5)); and
- dividing the difference by either 10 (reflecting a phase out over 10 years) or 20 (reflecting a phase out over 20 years).

A1.2.1 Estimating number of layer hens housed by production system under Option D

The following key assumptions as shown in Panel A1.1 are used to modify the data in Table A1.4 and are based on analysis of conventional cage conversion and new facilities required as a result of phasing out of conventional cages under Option D – ***see Appendix 3.***

[149] 97% of cage hens lay an egg every day, compared to 95% in barns and 80% in free range.

Panel A1.1: Assumptions used to modify hen and farm population data in Appendix 2 due to phasing out of conventional cages under Option D[150]

Hens required from conversion of existing facilities	**4,495,473**
Furnished cages	*2.00%*
Barn	*80.00%*
Free Range	*18.00%*
Hens required in new facilities	**8,085,971**
Barn	*38.00%*
Free Range	*62.00%*
Total hens to be redistributed to new systems	***12,581,444***
Distribution of hens housed in each grouping of states[151]:	
NSW, QLD and VIC	*87.31%*
SA, WA and TAS	*12.69%*

The number of hens *to be (-) removed* from conventional cages includes (see Table A1.1):

Cages NSW, QLD and VIC = -9,474,772 layer hens
Cages SA, WA and TAS = -1,241,941 layer hens.

The number of 12,581,444 hens *to be (+) added to* the current population of hens housed in non-conventional cage systems including those removed from conventional cages (above) plus the additional hens required to maintain current egg production (see Table A1.1 of Appendix 1). This number is based on the following formulas and distributed by grouping of states based on current distribution of hens housed in each grouping (see Table A1.1 of Appendix 1):

Furnished cages NSW, QLD and VIC = 2% x 4,495,473 x 87.21% = +78,497
Furnished cages SA, WA and TAS = 2% x 4,495,473x 12.69% = +11,413
Barn NSW, QLD and VIC = [(80% x 4,495,473) + (38% x 8,085,971)] x 87.31% = +5,822,513
Barn SA, WA and TAS = [(80% x 4,495,473) + (38% x 8,085,971)] x 12.69% = +846,534
Free range NSW, QLD and VIC = [(80% x 4,495,473) + (38% x 8,085,971)] x 87.31% = +5,083,411
Free range SA, WA and TAS = [(80% x 4,495,473) + (38% x 8,085,971)] x 12.69% = +739,076.

The estimated number of hens housed by production system and farm size in Table A1.5 uses the additional hens to be housed in furnished cages, barn and free range production systems (above) and multiplies these by *the proportions of large, medium, small and micro size farms in each production system* taken from Table A1.4 in Appendix 1 and then adds these to the existing number of large, medium, small and micro size farms in Table A1.4 in each production system. The exception is for furnished cages which is taken to be the same number as the total number of hens housed – but in the small category only.

[150] Provided by AECL – see Columns 2 and 4 in Table A3.5 of Appendix 3 for conversion of existing facilities and columns 2 and 5 in Table A3.7 for new facilities
[151] Based on % of hens housed in Table A1.1 in Appendix 1

Table A1.5: Estimated No. hens to be housed by farm size, production system and grouping of states with a phase out of cages

Layer hen farm size	NSW, QLD and VIC	SA, WA and TAS	Total
No. hens housed in furnished cage farms			
Large	0	0	**0**
Medium	0	0	**0**
Small	78,497	11,413	**89,909**
Micro	0	0	**0**
Total	**78,497**	**11,413**	**89,909**
No. hens housed in barn farms			
Large	0	0	**0**
Medium	2,740,619	0	**2,740,619**
Small	4,648,740	938,247	**5,586,987**
Micro	58,204	70,788	**128,991**
Total	***7,447,563***	***1,009,034***	***8,456,597***
No. hens housed in free range farms			
Large	0	0	**0**
Medium	3,262,276	913,017	**4,175,293**
Small	7,354,077	1,260,683	**8,614,760**
Micro	141,243	45,876	**187,119**
Total	***10,757,596***	***2,219,576***	***12,977,172***

A1.2.2 Estimating the annual difference in layer hens housed by production system and layer farm size under Option D with a phase out of conventional cages over 10 years and 20 years

Phase out of conventional cages over 10 years

The annual difference in capacity between current production systems (see Table A1.4) and capacity in the proposed production system under Option D (see Table A1.5) over 10 years, is estimated by dividing the total difference by a numeraire of 10, as shown in Table A1.6 and assumes an equal change in capacity each year during the phase out over 10 years.

Table A1.6: Estimated annual change in No. hens housed by farm size, production system and grouping of states with a phase out of conventional cages over 10 years

Layer hen farm size	NSW, QLD and VIC	SA, WA and TAS	Total
Annual change in No. hens housed in cage farms			
Large	-288,019	-58,524	**-346,543**
Medium	-513,207	-23,405	**-536,612**
Small	-137,037	-40,615	**-177,652**
Micro	-1,364	-510	**-1,874**
Total	**-939,628**	**-123,053**	**-1,062,680**
Annual change in No. hens housed in barn farms			
Large	0	0	**0**
Medium	214,262	0	**214,262**
Small	363,439	78,715	**442,154**

Micro	4,550	5,939	**10,489**
Total	***582,251***	***84,653***	***666,905***
Annual change No. hens housed in free range farms			
Large	0	0	**0**
Medium	154,156	30,402	**184,558**
Small	347,511	41,978	**389,489**
Micro	6,674	1,528	**8,202**
Total	***508,341***	***73,908***	***582,249***

Adding these annual changes to the total current capacity every year over 10 years to the numbers in Table A1.4 provides the following dynamic change in egg production systems over 10 years with a phase out of conventional cage systems over 10 years under option D – as shown in Table A1.7.

Table A1.7: Estimated number of No. hens housed by farm size, production system and grouping of states with a phase out of conventional cages over 10 years (millions of layers)

(Production method) - states	Current capacity[152]	Year 1[153]	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
(Cage)											
NSW, QLD and VIC	2.88	2.59	2.30	2.02	1.73	1.44	1.15	0.86	0.58	0.29	0.00
NSW, QLD and VIC	5.13	4.62	4.11	3.59	3.08	2.57	2.05	1.54	1.03	0.51	0.00
NSW, QLD and VIC	1.45	1.31	1.17	1.04	0.90	0.76	0.63	0.49	0.35	0.22	0.08
NSW, QLD and VIC	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
(Barn)											
NSW, QLD and VIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NSW, QLD and VIC	0.60	0.81	1.03	1.24	1.46	1.67	1.88	2.10	2.31	2.53	2.74
NSW, QLD and VIC	1.01	1.38	1.74	2.10	2.47	2.83	3.19	3.56	3.92	4.29	4.65
NSW, QLD and VIC	0.01	0.02	0.02	0.03	0.03	0.04	0.04	0.04	0.05	0.05	0.06
(Free range)											
NSW, QLD and VIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NSW, QLD and VIC	1.72	1.87	2.03	2.18	2.34	2.49	2.65	2.80	2.95	3.11	3.26
NSW, QLD and VIC	3.88	4.23	4.57	4.92	5.27	5.62	5.96	6.31	6.66	7.01	7.35
NSW, QLD and VIC	0.07	0.08	0.09	0.09	0.10	0.11	0.11	0.12	0.13	0.13	0.14
Subtotal NSW, QLD, and VIC	16.77	16.92	17.08	17.23	17.38	17.53	17.68	17.83	17.98	18.13	18.28
(Cage)											
SA, WA and TAS	0.59	0.53	0.47	0.41	0.35	0.29	0.23	0.18	0.12	0.06	0.00
SA, WA and TAS	0.23	0.21	0.19	0.16	0.14	0.12	0.09	0.07	0.05	0.02	0.00
SA, WA and TAS	0.42	0.38	0.34	0.30	0.26	0.21	0.17	0.13	0.09	0.05	0.01
SA, WA and TAS	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(Barn)											
SA, WA and TAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SA, WA and TAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SA, WA and TAS	0.15	0.23	0.31	0.39	0.47	0.54	0.62	0.70	0.78	0.86	0.94
SA, WA and TAS	0.01	0.02	0.02	0.03	0.04	0.04	0.05	0.05	0.06	0.06	0.07
(Free range)											
SA, WA and TAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SA, WA and TAS	0.61	0.64	0.67	0.70	0.73	0.76	0.79	0.82	0.85	0.88	0.91
SA, WA and TAS	0.84	0.88	0.92	0.97	1.01	1.05	1.09	1.13	1.18	1.22	1.26

[152] See Table A1.4 for source of estimates.
[153] Estimated by subtracting the annual change in the number of hens housed in Table A1.6 from the current capacity of hens housed by production system and layer farm size in Table A1.4

(Production method) - states	Current capacity[152]	Year 1[153]	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
SA, WA and TAS	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05
Sub total SA, WA and TAS	2.88	2.92	2.96	2.99	3.03	3.06	3.10	3.13	3.17	3.20	3.24
Total	***19.66***	***19.85***	***20.03***	***20.22***	***20.40***	***20.59***	***20.78***	***20.96***	***21.15***	***21.34***	***21.52***

Phase out of conventional cages over 20 years

The annual difference in capacity between current production systems (see Table A1.4) and capacity in the proposed production system under Option D (see Table A1.5) over 20 years, is estimated by dividing the total difference by a numeraire of 20, as shown in Table A1.6 and assumes an equal change in capacity each year during the phase out over 20 years.

Table A1.8: Estimated annual change in No. hens housed by farm size, production system and grouping of states with a phase out of conventional cages over 20 years

Layer hen farm size	NSW, QLD and VIC	SA, WA and TAS	Total
Annual change in No. hens housed in cage farms			
Large	-144,010	-29,262	**-173,272**
Medium	-256,604	-11,702	**-268,306**
Small	-68,519	-20,307	**-88,826**
Micro	-682	-255	**-937**
Total	**-469,814**	**-61,526**	**-531,340**
Annual change in No. hens housed in barn farms			
Large	0	0	**0**
Medium	107,131	0	**107,131**
Small	181,720	39,357	**221,077**
Micro	2,275	2,969	**5,245**
Total	***291,126***	***42,327***	***333,452***
Annual change No. hens housed in free range farms			
Large	0	0	**0**
Medium	77,078	15,201	**92,279**
Small	173,755	20,989	**194,744**
Micro	3,337	764	**4,101**
Total	***254,171***	***36,954***	***291,124***

Adding these annual changes to the total current capacity every year over 10 years to the numbers in Table A1.4 provides the following dynamic change in egg production systems over 10 years with a phase out of conventional cage systems over 20 years under option D – as shown in Table A1.9.

Table A1.9: Estimated number of No. hens housed by farm size, production system and grouping of states with a phase out of conventional cages over 20 years (millions of layers)

(Production method) - states	Current capacity[154]	Year 1[155]	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
(Cage)											
NSW, QLD and VIC	2.88	2.74	2.59	2.45	2.30	2.16	2.02	1.87	1.73	1.58	1.44
NSW, QLD and VIC	5.13	4.88	4.62	4.36	4.11	3.85	3.59	3.34	3.08	2.82	2.57
NSW, QLD and VIC	1.45	1.38	1.31	1.24	1.17	1.11	1.04	0.97	0.90	0.83	0.76
NSW, QLD and VIC	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
(Barn)											
NSW, QLD and VIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NSW, QLD and VIC	0.60	0.71	0.81	0.92	1.03	1.13	1.24	1.35	1.46	1.56	1.67
NSW, QLD and VIC	1.01	1.20	1.38	1.56	1.74	1.92	2.10	2.29	2.47	2.65	2.83
NSW, QLD and VIC	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04
(Free range)											
NSW, QLD and VIC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NSW, QLD and VIC	1.72	1.80	1.87	1.95	2.03	2.11	2.18	2.26	2.34	2.41	2.49
NSW, QLD and VIC	3.88	4.05	4.23	4.40	4.57	4.75	4.92	5.10	5.27	5.44	5.62
NSW, QLD and VIC	0.07	0.08	0.08	0.08	0.09	0.09	0.09	0.10	0.10	0.10	0.11
Subtotal NSW, QLD, and VIC	16.77	16.85	16.92	17.00	17.08	17.15	17.23	17.30	17.38	17.45	17.53
(Cage)											
SA, WA and TAS	0.59	0.56	0.53	0.50	0.47	0.44	0.41	0.38	0.35	0.32	0.29
SA, WA and TAS	0.23	0.22	0.21	0.20	0.19	0.18	0.16	0.15	0.14	0.13	0.12
SA, WA and TAS	0.42	0.40	0.38	0.36	0.34	0.32	0.30	0.28	0.26	0.23	0.21
SA, WA and TAS	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(Barn)											
SA, WA and TAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SA, WA and TAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SA, WA and TAS	0.15	0.19	0.23	0.27	0.31	0.35	0.39	0.43	0.47	0.51	0.54
SA, WA and TAS	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.04	0.04	0.04
(Free range)											
SA, WA and TAS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SA, WA and TAS	0.61	0.62	0.64	0.65	0.67	0.69	0.70	0.72	0.73	0.75	0.76
SA, WA and TAS	0.84	0.86	0.88	0.90	0.92	0.95	0.97	0.99	1.01	1.03	1.05
SA, WA and TAS	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04

[154] See Table A1.4 for source of estimates.
[155] Estimated by subtracting the annual change in the number of hens housed in Table A1.8 from the current capacity of hens housed by production system and layer farm size in Table A1.4

Sub total SA, WA and TAS	2.88	2.90	2.92	2.94	2.96	2.97	2.99	3.01	3.03	3.04	3.06
Total	***19.66***	***19.75***	***19.85***	***19.94***	***20.03***	***20.13***	***20.22***	***20.31***	***20.40***	***20.50***	***20.59***

Appendix 2: Estimation of incremental quantifiable costs of proposed standards (Layer Hens) under Options C, D, E, F and G

Appendix 2 has been provided to show how the incremental quantifiable costs of the proposed standards as compared to the base case (Option A) have been estimated, including all assumptions made for those estimations. Proposed standards have been costed for a period of 10 years with an implementation of 2017/18. Net present value measures have been performed according to OBPR guidelines using a 7% discount rate with sensitivity discount rates of 3.5% and 10%.[156]

A2.1 Incremental cost of proposed standards SA6.3, SA6.4 and SA6.5 – lighting (Options C, D, E, F and G) (layer hens)

Proposed standard SA6.3 would require that light intensity for poultry be at least 5 Lux[157] on average during light periods. In relation to layer hens, proposed standard SA6.4 would require that poultry not be exposed to continuous light or darkness in any 24-hour period[158]. Finally proposed standard SA6.5 would require that poultry[159] are exposed to at least 4 hours of continuous darkness within a 24-hour period.

Proposed standards on lighting SA6.3, SA6.4 and SA6.5 have been grouped for the purposes of costing on advice from AECL. The assumptions used to estimate the cost of these proposed standards is summarised in Panel A1.1 and include a non-compliance rate of 30% a one-off cost of $30,000 to provide for the necessary shed lighting infrastructure per shed to meet the proposed standards and the average number of sheds relevant to each layer hen farm size.

Panel A2.1: Assumptions used to estimate the cost of proposed standards SA6.3, SA6.4 and SA6.5[160]

Non-compliance rate	30%
One off cost of lighting infrastructure/shed	$30,000
Large layer hen farm average no. sheds	4.00
Medium layer hen farm average no. sheds	3.00
Small layer hen farm average no. sheds	2.00
Micro layer hen farm average no. sheds	0.00

[156] Please note that whilst no rounding has been done in the underlying spreadsheets, large figure estimates are shown in this RIS as whole numbers for simplicity of presentation, and therefore may be give the appearance of rounding errors if calculations are made manually from the tables. In other words, there are no rounding errors in the total figures presented in the tables, because these are derived from the underlying unrounded spreadsheets.

[157] 5 lux is roughly equivalent to the light intensity received when standing about 0.3 metres away from a candle in a dark room.

[158] Except on the day of pick-up (meat chickens) and meat chickens during very hot weather.

[159] Except for emus, ostriches and quail.

[160] Provided by AECL.

As shown in Table A2.1, the one-off cost of proposed standards SA6.3, SA6.4 and SA6.5 is estimated to be approximately $5.58m or ***$5.21m over 10 years in 2016-17 dollars***.

Given sheds hold 'on average' 30,000 layers[161], the estimated number of layer hens affected by proposed standards SA6.3, SA6.4 and SA6.5 in relation to lighting is hens is 4,356,000 in NSW, QLD and VIC and 1,224,000 in SA, WA ad TAS – 5,580,000 in total.

[161] Provided by AECL

Table A2.1: Estimated one-off cost of proposed standards SA6.3, SA6.4 and SA6.5 by production system and farm size (Options C, D, E, F and G)

(Production method) - states	Size of layer hen farms	Total no. farms[162]	Number of sheds affected[163]	One of cost of lighting infrastructure per shed[164]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
(Cage)								
NSW, QLD and VIC	Large	3	4	$108,000	$108,000	$100,935	$104,348	$98,182
NSW, QLD and VIC	Medium	23	21	$621,000	$621,000	$580,374	$600,000	$564,545
NSW, QLD and VIC	Small	40	24	$720,000	$720,000	$672,897	$695,652	$654,545
NSW, QLD and VIC	Micro	4	0	$0	$0	$0	$0	$0
(Barn)								
NSW, QLD and VIC	Large	0	0	$0	$0	$0	$0	$0
NSW, QLD and VIC	Medium	4	4	$108,000	$108,000	$100,935	$104,348	$98,182
NSW, QLD and VIC	Small	27	16	$486,000	$486,000	$454,206	$469,565	$441,818
NSW, QLD and VIC	Micro	5	0	$0	$0	$0	$0	$0
(Free range)								
NSW, QLD and VIC	Large	0	0	$0	$0	$0	$0	$0
NSW, QLD and VIC	Medium	9	8	$243,000	$243,000	$227,103	$234,783	$220,909
NSW, QLD and VIC	Small	115	69	$2,070,000	$2,070,000	$1,934,579	$2,000,000	$1,881,818
NSW, QLD and VIC	Micro	28	0	$0	$0	$0	$0	$0
Subtotal NSW, QLD and VIC		258	145	$4,356,000	$4,356,000	$4,071,028	$4,208,696	$3,960,000
(Cage)								
SA, WA and TAS	Large	1	1	$36,000	$36,000	$33,645	$34,783	$32,727
SA, WA and TAS	Medium	2	2	$54,000	$54,000	$50,467	$52,174	$49,091
SA, WA and TAS	Small	13	8	$234,000	$234,000	$218,692	$226,087	$212,727
SA, WA and TAS	Micro	2	0	$0	$0	$0	$0	$0
(Barn)								
SA, WA and TAS	Large	0	0	$0	$0	$0	$0	$0
SA, WA and TAS	Medium	0	0	$0	$0	$0	$0	$0
SA, WA and TAS	Small	11	7	$198,000	$198,000	$185,047	$191,304	$180,000
SA, WA and TAS	Micro	3	0	$0	$0	$0	$0	$0
(Free range)								
SA, WA and TAS	Large	0	0	$0	$0	$0	$0	$0

[162] See Table A1.3 for source of estimates
[163] Taken as the number of layer hen farms x 30% non-compliance x average number of shed by farm size (see Panel A2.1)
[164] Taken as the number of sheds affected x $30,000 per shed (see Panel A2.1)

(Production method) - states	Size of layer hen farms	Total no. farms[162]	Number of sheds affected[163]	One of cost of lighting infrastructure per shed[164]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
SA, WA and TAS	Medium	4	4	$108,000	$108,000	$100,935	$104,348	$98,182
SA, WA and TAS	Small	33	20	$594,000	$594,000	$555,140	$573,913	$540,000
SA, WA and TAS	Micro	10	0	$0	$0	$0	$0	$0
Subtotal SA, WA and TAS		79	41	$1,224,000	$1,224,000	$1,143,925	$1,182,609	$1,112,727
Total		***337***	***186***	***$5,580,000***	***$5,580,000***	***$5,214,953***	***$5,391,304***	***$5,072,727***

A2.2 Incremental cost of proposed standards SA9.4, SA9.5 and SA9.6 – moulting (Options C, E, F and G) (layer hens)

Proposed standard SA9.4 would require that induced moulting is not routinely practiced. Proposed standard SA9.5 would require that poultry be in adequate physical condition to endure an induced moult if necessary. Finally proposed standard SA9.6 would require that poultry induced to moult are:

1) in adequate physical condition to withstand endure another lay cycle; and

2) not deprived of feed or water; and

3) not fed a high fibre/low energy diet for longer than 20 days or body weight loss of no more than 25%; and

4) provided with a calcium supplement.

Proposed standards on moulting SA9.4, SA9.5 and SA9.6 have been grouped for the purposes of costing on advice from AECL. The following estimation for proposed standard SA9.4, SA9.5 and SA9.6 is relevant for all options except for Option D which reconfigures the production system (with the phasing out of conventional cages over time), which instead is estimated in part A2.3.

Under these proposed standards, it is estimated that as a long-term average, approximately 15%[165] of the egg industry currently practices moulting routinely. Ceasing routine moulting practices would reduce the period of lay from 66 to 56 weeks (by 16%) leading to a reduction in national egg volume of 2.4% (0.15 x 0.16). Replacing this volume would require an increase in overall flock size and corresponding increase in infrastructure capacity so that additional hens could produce the 2.4% of lost egg volume over the full laying cycle. Hence if the proposed standard was implemented additional hens would be required at the beginning of the annual production cycle to maintain the same level of production across the cycle, with a replacement cost of $10 per hen[166]. With regards to additional infrastructure capacity, producers would incur a one-off cost of $49.97, $82.40, or $84.20 per layer affected for new facilities, for cage, barn and free range systems, respectively (see Table A3.3 of Appendix 3).

As shown in Table A2.2, the annual cost of proposed standards SA9.4, SA9.5 and SA9.6 is estimated to be approximately $4.72m with a one-off cost of $30.84m or a total cost of ***$61.97m***

[165] Provided by AECL.
[166] Provided by AECL.

over 10 years in 2016-17 dollars. The estimated number of layer hens affected annually by proposed standards SA9.4, SA9.5 and SA9.6 in relation to moulting is 402,976 in NSW, QLD and VIC and 69,239 in SA, WA ad TAS – 471,815 hens in total.

Table A2.2: Estimated annual and 10-year cost of proposed standards SA9.4, SA9.5 and SA9.6 by production system and farm size (Options B, C, E, F and G)

Production method) - states	Size of layer hen farms	No. hens affected[167]	Annual cost of bird replacement[168]	One-off cost of shed infrastructure[169]	10-year cost[170]	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
(Cage)								
NSW, QLD and VIC	Large	69,125	$691,247	$3,453,929	$10,366,394	$8,082,997	$9,085,954	$7,387,346
NSW, QLD and VIC	Medium	123,170	$1,231,697	$6,154,378	$18,471,346	$14,402,678	$16,189,795	$13,163,133
NSW, QLD and VIC	Small	34,773	$347,728	$1,737,483	$5,214,766	$4,066,114	$4,570,646	$3,716,170
NSW, QLD and VIC	Micro	327	$3,274	$16,357	$49,093	$38,279	$43,029	$34,985
(Barn)						$0	$0	$0
NSW, QLD and VIC	Large	0	$0	$0	$0	$0	$0	$0
NSW, QLD and VIC	Medium	14,352	$143,520	$1,182,605	$2,617,805	$2,113,263	$2,336,213	$1,956,964
NSW, QLD and VIC	Small	24,344	$243,444	$2,005,979	$4,440,419	$3,584,595	$3,962,771	$3,319,475
NSW, QLD and VIC	Micro	305	$3,048	$25,116	$55,596	$44,880	$49,615	$41,561
(Free range)						$0	$0	$0
NSW, QLD and VIC	Large	0	$0	$0	$0	$0	$0	$0
NSW, QLD and VIC	Medium	41,297	$412,972	$3,477,221	$7,606,937	$6,150,279	$6,794,155	$5,698,642
NSW, QLD and VIC	Small	93,095	$930,953	$7,838,623	$17,148,151	$13,864,438	$15,315,915	$12,846,322
NSW, QLD and VIC	Micro	1,788	$17,880	$150,550	$329,350	$266,282	$294,159	$246,728
Subtotal NSW, QLD, and VIC		*402,576*	*$4,025,762*	*$26,042,239*	*$66,299,855*	$52,613,806	$58,642,254	$48,411,325
(Cage)						$0	$0	$0
SA, WA and TAS	Large	14,046	$140,458	$701,820	$2,106,396	$1,642,422	$1,846,217	$1,501,069
SA, WA and TAS	Medium	5,617	$56,171	$280,667	$842,375	$656,826	$738,326	$600,297
SA, WA and TAS	Small	10,021	$100,214	$500,738	$1,502,882	$1,171,843	$1,317,248	$1,070,990

[167] Estimated as the number of hens housed by farm size (see Table A1.4) x 2.4%
[168] Estimated as the number of hens affected annually x $10 per replacement hen.
[169] Estimated the product of the cost of new infrastructure per layer of $49.97, $82.40, or $84.20 for cage, barn and free range systems, respectively x no. hens affected.
[170] Calculated by multiplying the annual cost in Column 4 by 10 and adding the one-off cost in Column 5.

Production method) - states	Size of layer hen farms	No. hens affected[167]	Annual cost of bird replacement[168]	One-off cost of shed infrastructure[169]	10-year cost[170]	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
SA, WA and TAS	Micro	122	$1,223	$6,111	$18,342	$14,301	$16,076	$13,071
(Barn)						$0	$0	$0
SA, WA and TAS	Large	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Medium	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Small	3,626	$36,264	$298,815	$661,455	$533,970	$590,304	$494,477
SA, WA and TAS	Micro	274	$2,736	$22,545	$49,905	$40,286	$44,536	$37,307
(Free range)						$0	$0	$0
SA, WA and TAS	Large	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Medium	14,616	$146,160	$1,230,667	$2,692,267	$2,176,723	$2,404,605	$2,016,878
SA, WA and TAS	Small	20,182	$201,816	$1,699,291	$3,717,451	$3,005,593	$3,320,251	$2,784,882
SA, WA and TAS	Micro	734	$7,344	$61,836	$135,276	$109,372	$120,823	$101,341
Sub total SA, WA and TAS		*69,239*	*$692,386*	*$4,802,490*	*$11,726,348*	$9,351,337	$10,398,387	$8,620,311
Total		***471,815***	***$4,718,148***	***$30,844,729***	***$78,026,204***	***$61,965,143***	***$69,040,641***	***$57,031,636***

A2.3 Incremental cost of proposed standards SA9.4, SA9.5 and SA9.6 – moulting (Option D with phase out of conventional cages over 10 years and 20 years) (layer hens)

Due to the change in the configuration of production systems under Option D with a phasing out of conventional cages over 10 years or 20 years, the following estimations of incremental costs under proposed standards SA9.4, SA9.5 and SA9.6 has been estimated separately (for each variation of Option D) and uses data from part A1.2.2 of Appendix 1.

Phase out of conventional cages over 10 years

In Table A2.3 the number of hens housed over 10 years is taken from Table A1.7 and is the sum of each column in that table against each row. Again, under these proposed standards, it is estimated that as a long term average approximately 15%[171] of the egg industry, currently practices moulting routinely, and if the proposed standard was implemented, additional 2.4% hens would be required at the beginning of the annual production cycle to maintain the same level of production across the cycle with a replacement cost of $10 per hen[172]. Hence the number of hens affected annually under Option D with a phase out of conventional cages over 10 years is taken to be 2.4% of the number of hens housed over 10 years divided by 10. Moreover, there would need to be additional shed infrastructure provided at a one-off cost of $49.97, $82.40, or $84.20 per layer affected for new facilities, for cage, barn and free range systems, respectively (see Table A3.3 of Appendix 3).

As shown in Table A2.3, the annual cost of proposed standards SA9.4, SA9.5 and SA9.6 is estimated to be approximately $4.96m with an estimated one-off cost of $37.56m for new shed infrastructure – a ***total cost of $69.97m over 10 years in 2016-17 dollars***. Note that this is higher than under Options C, E, F and G as there would be additional layers required to maintain egg supply due to loss of capacity in barn and free range systems and therefore the amount of bird replacement would be higher over 10 years under Option D.

The estimated number of layer hens affected per annum by proposed standards SA9.4, SA9.5 and SA9.6 in relation to moulting is 422,504 in NSW, QLD and VIC and 73,926 in SA, WA ad TAS ms and therefore the amou

[171] Provided by AECL
[172] Provided by AECL

Table A2.3: Estimated annual and 10-year cost of proposed standards SA9.4, SA9.5 and SA9.6 by production system and farm size (Option D (10-year phase out of conventional cages))

(Production method) - states	Size of layer hen farms	No. hens housed over 10 years with 10-year phase out of cages[173]	No of hens affected annually with 10-year phase out of cages[174]	Annual cost[175]	One-off cost of shed infrastructure[176]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
(Furnished Cage)									
NSW, QLD and VIC	Large	12,960,873	31,106	$311,061	$1,554,268	$4,664,877	$3,637,349	$4,088,679	$3,324,306
NSW, QLD and VIC	Medium	23,094,315	55,426	$554,264	$2,769,470	$8,312,106	$6,481,205	$7,285,408	$5,923,410
NSW, QLD and VIC	Small	6,951,639	16,684	$166,839	$833,640	$2,502,034	$1,950,913	$2,192,987	$1,783,010
NSW, QLD and VIC	Micro	61,380	147	$1,473	$7,361	$22,092	$17,226	$19,363	$15,743
(Barn)									
NSW, QLD and VIC	Large	0	0	$0	$0	$0	$0	$0	$0
NSW, QLD and VIC	Medium	17,764,404	42,635	$426,346	$3,513,089	$7,776,545	$6,277,734	$6,940,037	$5,813,427
NSW, QLD and VIC	Small	30,132,647	72,318	$723,184	$5,959,032	$13,190,868	$10,648,528	$11,771,951	$9,860,952
NSW, QLD and VIC	Micro	377,271	905	$9,054	$74,609	$165,154	$133,323	$147,389	$123,462
(Free range)									
NSW, QLD and VIC	Large	0	0	$0	$0	$0	$0	$0	$0
NSW, QLD and VIC	Medium	25,685,734	61,646	$616,458	$5,190,573	$11,355,149	$9,180,743	$10,141,881	$8,506,568
NSW, QLD and VIC	Small	57,902,787	138,967	$1,389,667	$11,700,995	$25,597,664	$20,695,948	$22,862,620	$19,176,170
NSW, QLD and VIC	Micro	1,112,088	2,669	$26,690	$224,731	$491,632	$397,489	$439,102	$368,300
Subtotal NSW, QLD, and VIC		176,043,138	422,504	$4,225,035	$31,827,768	$74,078,122	$59,420,458	$65,889,418	$54,895,348

[173] See Table A1.7 for source of estimates (sum)
[174] Estimated as the No. hens housed over 10 years with 10-year phase out of cages (see Table A2.3) x 2.4%/10
[175] Estimated as the number of hens affected annually x $10 per replacement hen.
[176] Estimated the product of the cost of new infrastructure per layer of $49.97, $82.40, or $84.20 for cage, barn and free range systems, respectively x no. hens affected.

(Production method) - states	Size of layer hen farms	No. hens housed over 10 years with 10-year phase out of cages[173]	No of hens affected annually with 10-year phase out of cages[174]	Annual cost[175]	One-off cost of shed infrastructure[176]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
(Furnished Cage)									
SA, WA and TAS	Large	2,633,580	6,321	$63,206	$315,819	$947,878	$739,090	$830,798	$675,481
SA, WA and TAS	Medium	1,053,203	2,528	$25,277	$126,300	$379,069	$295,572	$332,247	$270,134
SA, WA and TAS	Small	1,941,790	4,660	$46,603	$232,859	$698,889	$544,945	$612,563	$498,045
SA, WA and TAS	Micro	22,932	55	$550	$2,750	$8,254	$6,436	$7,234	$5,882
(Barn)									
SA, WA and TAS	Large	0	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Medium	0	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Small	5,840,306	14,017	$140,167	$1,154,979	$2,556,653	$2,063,896	$2,281,638	$1,911,249
SA, WA and TAS	Micro	440,632	1,058	$10,575	$87,139	$192,891	$155,714	$172,142	$144,197
(Free range)									
SA, WA and TAS	Large	0	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Medium	7,762,095	18,629	$186,290	$1,568,564	$3,431,467	$2,774,373	$3,064,823	$2,570,640
SA, WA and TAS	Small	10,717,808	25,723	$257,227	$2,165,855	$4,738,129	$3,830,821	$4,231,872	$3,549,510
SA, WA and TAS	Micro	390,017	936	$9,360	$78,815	$172,419	$139,402	$153,996	$129,165
Sub total SA, WA and TAS		30,802,362	73,926	$739,257	$5,733,080	$13,125,647	$10,550,248	$11,687,314	$9,754,303
Total		***206,845,500***	***496,429***	***$4,964,292***	***$37,560,849***	***$87,203,769***	***$69,970,706***	***$77,576,732***	***$64,649,651***

Phase out of conventional cages over 20 years

In Table A2.4 the number of hens housed over 10 years is taken from Table A1.9 and is the sum of each column in that table against each row. The number of hens affected annually under Option D with a phase out of conventional cages over 20 years is taken to be 2.4% of the number of hens housed over the first 10 years of that 20-year period divided by 10.

As shown in Table A2.4, the annual cost of proposed standards SA9.4, SA9.5 and SA9.6 under Option D with a phase out of conventional cages over 20 years is estimated to be approximately $4.94m with a one-off cost of infrastructure of $34.2m – a ***total cost of $65.97m over 10 years in 2016-17 dollars***. Note that this is lower than under Option D (phase out of 10-Years) as there would be fewer additional layers required to maintain egg supply in the instance of a loss of capacity in barn and free range systems and therefore the amount of bird replacement would be lower over 20 years under this variation of Option D.

The estimated number of layer hens affected per annum by proposed standards SA9.4, SA9.5 and SA9.6 in relation to moulting is 412,540 in NSW, QLD and VIC and 71,582 in SA, WA ad TAS – 484,122 in total.

Table A2.4: Estimated annual and 10-year cost of proposed standards SA9.4, SA9.5 and SA9.6 by production system and farm size (Option D (20-year phase out of conventional cages))

(Production method) - states	Size of layer hen farms	No. hens housed over 10 years	No. hens affected annually	Annual cost	One-off cost of shed infrastructure	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
(Furnished Cage)									
NSW, QLD and VIC	Large	20,881,407	50,115	$501,154	$2,504,098	$7,515,636	$5,860,173	$6,587,317	$5,355,826
NSW, QLD and VIC	Medium	37,207,508	89,298	$892,980	$4,461,924	$13,391,726	$10,441,942	$11,737,602	$9,543,271
NSW, QLD and VIC	Small	10,720,159	25,728	$257,284	$1,285,561	$3,858,400	$3,008,513	$3,381,816	$2,749,590
NSW, QLD and VIC	Micro	98,890	237	$2,373	$11,859	$35,592	$27,753	$31,196	$25,364
(Barn)									
NSW, QLD and VIC	Large	0	0	$0	$0	$0	$0	$0	$0
NSW, QLD and VIC	Medium	11,872,202	28,493	$284,933	$2,347,847	$5,197,175	$4,195,498	$4,638,125	$3,885,195
NSW, QLD and VIC	Small	20,138,074	48,331	$483,314	$3,982,505	$8,815,643	$7,116,561	$7,867,361	$6,590,213
NSW, QLD and VIC	Micro	252,135	605	$6,051	$49,862	$110,375	$89,102	$98,502	$82,512

(Production method) - states	Size of layer hen farms	No. hens housed over 10 years	No. hens affected annually	Annual cost	One-off cost of shed infrastructure	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
(Free range)									
NSW, QLD and VIC	Large	0	0	$0	$0	$0	$0	$0	$0
NSW, QLD and VIC	Medium	21,446,442	51,471	$514,715	$4,333,897	$9,481,043	$7,665,511	$8,468,018	$7,102,605
NSW, QLD and VIC	Small	48,346,243	116,031	$1,160,310	$9,769,809	$21,372,907	$17,280,193	$19,089,268	$16,011,246
NSW, QLD and VIC	Micro	928,544	2,229	$22,285	$187,640	$410,491	$331,886	$366,631	$307,514
Subtotal NSW, QLD, and VIC		171,891,604	412,540	$4,125,398	$28,935,003	$70,188,988	$56,017,132	$62,265,836	$51,653,337
(Furnished Cage)									
SA, WA and TAS	Large	4,242,990	10,183	$101,832	$508,819	$1,527,137	$1,190,756	$1,338,507	$1,088,275
SA, WA and TAS	Medium	1,696,826	4,072	$40,724	$203,483	$610,722	$476,199	$535,286	$435,215
SA, WA and TAS	Small	3,058,695	7,341	$73,409	$366,799	$1,100,885	$858,394	$964,906	$784,518
SA, WA and TAS	Micro	36,946	89	$887	$4,431	$13,298	$10,369	$11,655	$9,476
(Barn)									
SA, WA and TAS	Large	0	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Medium	0	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Small	3,675,653	8,822	$88,216	$726,897	$1,609,054	$1,298,933	$1,435,971	$1,202,863
SA, WA and TAS	Micro	277,316	666	$6,656	$54,842	$121,398	$98,000	$108,339	$90,752
(Free range)									
SA, WA and TAS	Large	0	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Medium	6,926,047	16,623	$166,225	$1,399,616	$3,061,867	$2,475,548	$2,734,714	$2,293,759
SA, WA and TAS	Small	9,563,404	22,952	$229,522	$1,932,573	$4,227,790	$3,418,207	$3,776,061	$3,167,196
SA, WA and TAS	Micro	348,008	835	$8,352	$70,326	$153,848	$124,387	$137,409	$115,253
Sub total SA, WA and TAS		29,825,886	71,582	$715,821	$5,267,785	$12,425,998	$9,950,793	$11,042,850	$9,187,307
Total		***201,717,490***	***484,122***	***$4,841,220***	***$34,202,789***	***$82,614,986***	***$65,967,925***	***$73,308,687***	***$60,840,644***

A2.4 Incremental cost of proposed standard SA9.15 – trimming of upper and lower beaks (Options C, E, F, and G) (layer hens)

Under proposed standard SA9.15, a person would be required to not remove more than one-third of the upper and lower beaks. The following estimation for proposed standard SA9.15 is relevant for all options except for Option D which reconfigures the production system (with the phasing out of conventional cages over time) which instead is estimated in part A2.5.

A lot of discussion with the standards and guidelines working group has been undertaken on proposed standards SA9.15 and it has been deemed to be a significant cost due to likely increased mortality (with mortality rates depending on the production system) which will have an impact on the hen flocks. This has been considered on an average industry wide basis reflecting that a lower proportion of the industry could be impacted but that for those producers affected, the losses could be substantial. The implication of increased mortality is that there would:

- need to be a replacement of hens; and
- be a loss in productivity (i.e. there would be a loss in the eggs that hens would otherwise would have produced).

The assumptions used to estimate the cost of proposed standard SA9.15 are shown in Panel A2.2.

Panel A2.2: Assumptions used to estimate the cost of proposed standard SA9.15[177]

Average increased mortality rate in conventional cage production system	4%
Average increased mortality rate in barn production system	8%
Average increased mortality rate in free range production system	12%
Replacement cost	$10
Average farm gate price of a dozen cage eggs	$1.78[178]
Average farm gate price of a dozen barn eggs	$2.13[179]
Average farm gate price of a dozen free rang eggs	$2.62[180]
Dozen eggs per layer lost	15

As shown in Table A2.5, the annual cost of proposed standard SA9.15 is estimated to be approximately $13.68m for the replacement of hens and $49.74m for the loss in egg sales at farm gate f proposed standard SA9***$449.83m over 10 years in 2016-17 dollars***.

The estimated number of layer hens affected by average increased mortality under proposed standards SA9.15 in relation to trimming of upper and lower beaks in hens is 1,189,897 hens in NSW, QLD and VIC and 240,338 hens in SA, WA ad TAS er proposed standards SA9.1

[177] Provided by AECL.
[178] Weighted average farm gate price for first grade and second grade cage eggs 92% x $1.85 + 8% x $1.00 (see Table A3.1 of Appendix 3)
[179] Weighted average farm gate price for first grade and second grade barn eggs 89% x $2.27 +11% x $1.00 (see Table A3.1 of Appendix 3)
[180] Weighted average farm gate price for first grade and second grade free rang eggs 87% x $2.80 + 13% x $1.40 (see Table A3.1 of Appendix 3)

Table A2.5: Estimated annual and 10-year cost of proposed standard SA9.15 by production system and farm size (Options C, E, F and G)

(Production method) - states	Size of layer hen farms	No of hens affected annually [181]	Annual replacement cost[182]	Annual loss in egg sales at farm gate[183]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
(Cage)								
NSW, QLD and VIC	Large	115,208	$1,152,078	$3,079,503	$42,315,810	$29,720,854	$32,317,640	$26,001,234
NSW, QLD and VIC	Medium	205,283	$2,052,828	$5,487,209	$75,400,372	$52,958,066	$57,585,145	$46,330,265
NSW, QLD and VIC	Small	57,955	$579,547	$1,549,130	$21,286,769	$14,950,936	$16,257,236	$13,079,798
NSW, QLD and VIC	Micro	546	$5,456	$14,584	$200,399	$140,752	$153,050	$123,136
(Barn)								
NSW, QLD and VIC	Large	0	$0	$0	$0	$0	$0	$0
NSW, QLD and VIC	Medium	47,840	$478,400	$1,528,703	$20,071,033	$14,097,054	$15,265,225	$12,332,781
NSW, QLD and VIC	Small	81,148	$811,480	$2,593,044	$34,045,238	$23,911,950	$25,893,446	$20,919,325
NSW, QLD and VIC	Micro	1,016	$10,160	$32,466	$426,258	$299,386	$324,195	$261,917
(Free range)								
NSW, QLD and VIC	Large	0	$0	$0	$0	$0	$0	$0
NSW, QLD and VIC	Medium	206,486	$2,064,858	$8,108,697	$101,735,554	$71,454,796	$77,039,889	$62,512,094
NSW, QLD and VIC	Small	465,476	$4,654,764	$18,279,258	$229,340,222	$161,078,975	$173,669,328	$140,919,639
NSW, QLD and VIC	Micro	8,940	$89,400	$351,074	$4,404,738	$3,093,704	$3,335,516	$2,706,521
Subtotal NSW, QLD and VIC		*1,189,897*	*$11,898,971*	*$41,023,668*	*$529,226,392*	$371,706,472	$401,840,670	$325,186,708
(Cage)								
SA, WA and TAS	Large	23,410	$234,096	$625,739	$8,598,346	$6,039,118	$6,566,771	$5,283,311
SA, WA and TAS	Medium	9,362	$93,618	$250,241	$3,438,589	$2,415,121	$2,626,136	$2,112,864
SA, WA and TAS	Small	16,702	$167,024	$446,455	$6,134,792	$4,308,821	$4,685,293	$3,769,564
SA, WA and TAS	Micro	204	$2,038	$5,449	$74,870	$52,586	$57,180	$46,005
(Barn)								
SA, WA and TAS	Large	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Medium	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Small	12,088	$120,880	$386,266	$5,071,460	$3,561,981	$3,857,150	$3,116,193
SA, WA and TAS	Micro	912	$9,120	$29,143	$382,625	$268,740	$291,009	$235,107
(Free range)								
SA, WA and TAS	Large	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Medium	73,080	$730,800	$2,869,852	$36,006,516	$25,289,470	$27,266,161	$22,124,445
SA, WA and TAS	Small	100,908	$1,009,080	$3,962,657	$49,717,372	$34,919,401	$37,648,793	$30,549,173
SA, WA and TAS	Micro	3,672	$36,720	$144,199	$1,809,194	$1,270,702	$1,370,024	$1,111,672
Subtotal SA, WA and TAS		*240,338*	*$1,776,600*	*$8,720,000*	*$111,233,764*	$78,125,941	$84,368,518	$68,348,333
Total		***1,430,235***	***$13,675,571***	***$49,743,668***	***$640,460,157***	***$449,832,413***	***$486,209,188***	***$393,535,041***

[181] Based on number of hens housed (see Table A1.4) x relevant mortality rate based on the production system (see Panel A2.2)
[182] Calculated as number of hens affected annually x $10 (see Panel A2.2)
[183] Calculated as no of hens affected annually x 15 dozen eggs per layer lost x average farm gate price of a dozen cage, barn or free range eggs (see Panel A2.2)

A2.5 Incremental cost of proposed standard SA9.15 – trimming of upper and lower beaks (Option D with phase out of conventional cages over 10 years and 20 years) (layer hens)

Due to the change in the configuration of production systems under Option D with a phasing out of conventional cages over 10 years or 20 years, the following estimations of incremental costs under proposed standard SA9.15 has been estimated separately (for each variation of Option D) and uses data from part A1.2.2 of Appendix 1.

Phase out of conventional cages over 10 years

As shown in Table A2.6, the annual cost of proposed standard SA9.15 is estimated to be approximately $18.01m for the replacement of hens and $67.96m for the loss in egg sales at farm gate f proposed standard SA9***$608.97m over 10 years in 2016-17 dollars***. Note that this is higher than under Options C, E, F and G as there would be higher mortality rates in barn and free range systems under Option D and more layer hens being switched into alternative production systems over 10 years.

The estimated number of layer hens affected by average increased mortality under proposed standards SA9.15 in relation to trimming of upper and lower beaks in hens under Option D (10-year phase out of conventional cages) is 1,574,875 in NSW, QLD and VIC and 299,293 in SA, WA ad TAS mming of upper and low**Table A2.6: Estimated annual and 10-year cost of proposed standard SA9.15 by production system and farm size (Option D (10-year phase out of conventional cages))**

(Production method) - states	Size of farms	No of hens affected annually[184]	Annual replacement cost[185]	Annual loss in egg sales at farm gate[186]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
(Cage)								
NSW, QLD and VIC	Large	51,843	$518,435	$1,385,777	$19,042,115	$13,374,384	$14,542,938	$11,700,555
NSW, QLD and VIC	Medium	92,377	$923,773	$2,469,244	$33,930,168	$23,831,130	$25,913,315	$20,848,619
NSW, QLD and VIC	Small	27,807	$278,066	$743,269	$10,213,347	$7,173,428	$7,800,188	$6,275,660
NSW, QLD and VIC	Micro	246	$2,455	$6,563	$90,179	$63,338	$68,872	$55,411
(Barn)								
NSW, QLD and VIC	Large	0	$0	$0	$0	$0	$0	$0
NSW, QLD and VIC	Medium	142,115	$1,421,152	$4,541,221	$59,623,735	$41,877,216	$45,347,429	$36,636,204
NSW, QLD and VIC	Small	241,061	$2,410,612	$7,702,989	$101,136,012	$71,033,703	$76,920,007	$62,143,702
NSW, QLD and VIC	Micro	3,018	$30,182	$96,444	$1,266,257	$889,366	$963,064	$778,060
(Free range)								
NSW, QLD and VIC	Large	0	$0	$0	$0	$0	$0	$0
NSW, QLD and VIC	Medium	308,229	$3,082,288	$12,104,146	$151,864,337	$106,663,155	$115,000,226	$93,314,061

[184] Based on number of hens housed (see Table A2.3) x relevant mortality rate based on the production system (see Panel A2.2)
[185] Calculated as number of hens affected annually x $10 (see Panel A2.2)
[186] Calculated as number of hens affected annually x 15 dozen eggs per layer lost x average farm gate price of a dozen cage, barn or free range eggs (see Panel A2.2)

(Production method) - states	Size of farms	No of hens affected annually[184]	Annual replacement cost[185]	Annual loss in egg sales at farm gate[186]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
NSW, QLD and VIC	Small	694,833	$6,948,334	$27,286,109	$342,344,436	$240,448,406	$259,242,481	$210,355,836
NSW, QLD and VIC	Micro	13,345	$133,451	$524,061	$6,575,112	$4,618,083	$4,979,045	$4,040,121
Subtotal NSW, QLD and VIC		*1,574,875*	*$15,748,747*	*$56,859,822*	*$726,085,696*	$509,972,210	$550,777,564	$446,148,229
(Cage)								
SA, WA and TAS	Large	10,534	$105,343	$281,582	$3,869,256	$2,717,603	$2,955,047	$2,377,490
SA, WA and TAS	Medium	4,213	$42,128	$112,608	$1,547,365	$1,086,805	$1,181,761	$950,789
SA, WA and TAS	Small	7,767	$77,672	$207,616	$2,852,877	$2,003,742	$2,178,813	$1,752,970
SA, WA and TAS	Micro	92	$917	$2,452	$33,692	$23,664	$25,731	$20,702
(Barn)								
SA, WA and TAS	Large	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Medium	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Small	46,722	$467,225	$1,492,993	$19,602,171	$13,767,744	$14,908,627	$12,044,685
SA, WA and TAS	Micro	3,525	$35,251	$112,641	$1,478,920	$1,038,731	$1,124,807	$908,732
(Free range)								
SA, WA and TAS	Large	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Medium	93,145	$931,451	$3,657,809	$45,892,608	$32,233,047	$34,752,466	$28,199,021
SA, WA and TAS	Small	128,614	$1,286,137	$5,050,660	$63,367,970	$44,507,011	$47,985,795	$38,936,875
SA, WA and TAS	Micro	4,680	$46,802	$183,791	$2,305,934	$1,619,592	$1,746,183	$1,416,897
Subtotal SA, WA and TAS		*299,293*	*$2,264,390*	*$11,102,154*	*$140,950,792*	$98,997,938	$106,859,231	$86,608,160
Total		***1,874,167***	***$18,013,138***	***$67,961,976***	***$867,036,488***	***$608,970,148***	***$657,636,796***	***$532,756,389***

Phase out of conventional cages over 20 years

As shown in Table A2.7, the annual cost of proposed standard SA9.15 is estimated to be approximately $15.84m for the replacement of hens and $58.85m for the loss in egg sales at farm gate f proposed standard SA9***$529.40m over 10 years in 2016-17 dollars***. Note that this is lower than under Option D (10-year phase out of conventional cages) as whilst there are higher mortality rates in barn and free range systems, under Option D (20-year phase out of conventional cages) there would be fewer layer hens being switched into alternative production systems over 10 years.

The estimated number of layer hens affected by average increased mortality under proposed standards SA9.15 in relation to trimming of upper and lower beaks in hens under Option D (10-year phase out of conventional cages) is 1,382,386 in NSW, QLD and VIC and 269,815 in SA, WA ad TAS – 1,652,201 in total.

Table A2.7: Estimated annual and 10-year cost of proposed standard SA9.15 by production system and farm size (Option D (20-year phase out of conventional cages))

(Production method) - states	Size of farms	No of hens affected annually [187]	Annual replacement cost [188]	Annual loss in egg sales at farm gate [189]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
(Cage)								
NSW, QLD and VIC	Large	83,526	$835,256	$2,232,640	$30,678,962	$21,547,619	$23,430,289	$18,850,894
NSW, QLD and VIC	Medium	148,830	$1,488,300	$3,978,227	$54,665,270	$38,394,598	$41,749,230	$33,589,442
NSW, QLD and VIC	Small	42,881	$428,806	$1,146,199	$15,750,058	$11,062,182	$12,028,712	$9,677,729
NSW, QLD and VIC	Micro	396	$3,956	$10,573	$145,289	$102,045	$110,961	$89,274
(Barn)								
NSW, QLD and VIC	Large	0	$0	$0	$0	$0	$0	$0
NSW, QLD and VIC	Medium	94,978	$949,776	$3,034,962	$39,847,384	$27,987,135	$30,306,327	$24,484,492
NSW, QLD and VIC	Small	161,105	$1,611,046	$5,148,017	$67,590,625	$47,472,827	$51,406,727	$41,531,513
NSW, QLD and VIC	Micro	2,017	$20,171	$64,455	$846,257	$594,376	$643,629	$519,988
(Free range)								
NSW, QLD and VIC	Large	0	$0	$0	$0	$0	$0	$0
NSW, QLD and VIC	Medium	257,357	$2,573,573	$10,106,421	$126,799,945	$89,058,975	$96,020,057	$77,913,077
NSW, QLD and VIC	Small	580,155	$5,801,549	$22,782,684	$285,842,329	$200,763,690	$216,455,904	$175,637,737
NSW, QLD and VIC	Micro	11,143	$111,425	$437,567	$5,489,925	$3,855,893	$4,157,280	$3,373,321
Subtotal NSW, QLD and VIC		*1,382,386*	*$13,823,859*	*$48,941,745*	*$627,656,044*	$440,839,341	$476,309,117	$385,667,468
(Cage)								
SA, WA and TAS	Large	16,972	$169,720	$453,660	$6,233,801	$4,378,361	$4,760,909	$3,830,401
SA, WA and TAS	Medium	6,787	$67,873	$181,425	$2,492,977	$1,750,963	$1,903,949	$1,531,827
SA, WA and TAS	Small	12,235	$122,348	$327,036	$4,493,834	$3,156,281	$3,432,053	$2,761,267
SA, WA and TAS	Micro	148	$1,478	$3,950	$54,281	$38,125	$41,456	$33,353
(Barn)								
SA, WA and TAS	Large	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Medium	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Small	29,405	$294,052	$939,629	$12,336,815	$8,664,863	$9,382,888	$7,580,439
SA, WA and TAS	Micro	2,219	$22,185	$70,892	$930,772	$653,736	$707,908	$571,919
(Free range)								
SA, WA and TAS	Large	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Medium	83,113	$831,126	$3,263,831	$40,949,562	$28,761,259	$31,009,314	$25,161,733
SA, WA and TAS	Small	114,761	$1,147,609	$4,506,659	$56,542,671	$39,713,206	$42,817,294	$34,743,024
SA, WA and TAS	Micro	4,176	$41,761	$163,995	$2,057,564	$1,445,147	$1,558,103	$1,264,284
Subtotal SA, WA and TAS		*269,815*	*$2,020,495*	*$9,911,077*	*$126,092,278*	$88,561,940	$95,613,875	$77,478,246
Total		***1,652,201***	***$15,844,354***	***$58,852,822***	***$753,748,322***	***$529,401,280***	***$571,922,992***	***$463,145,715***

[187] Based on number of hens housed (see Table A2.4) x relevant mortality rate based on the production system (see Panel A2.2)
[188] Calculated as number of hens affected annually x $10 (see Panel A2.2)
[189] Calculated as number of hens affected annually x 15 dozen eggs per layer lost x average farm gate price of a dozen cage, barn or free rang eggs (see Panel A2.2)

Appendix 3: Estimation of incremental costs under variation to the proposed standards under Option D (layer hens)

The estimated costs of phasing out conventional cages over 10 years and 20 years under Option D, are provided in this appendix in part A3.3. In order to estimate the cost of phasing out conventional cages, it is necessary to understand egg productivity and other factors affecting cost of production. This is necessary in order to estimate the likely activities or consequences entailed in phasing out conventional cages as well as the cost of conversion and new facilities per hen as discussed in part A3.1.[190]

A3.1 Egg productivity and costs of production

Egg productivity data in Table A3.1 reflects the most up to date understanding of current production systems including: eggs per hens housed; weeks in shed; down time; % of first and second grade eggs (including $ per dozen); mortality; cost of production ($ per dozen); capacity loss in moving from conventional cage to alternative production systems; and feed cost ($ per dozen) – as provided by AECL.

Table A3.1: Egg productivity data by production system[191]

Production system	Eggs/ hen housed	Wks in shed	Down time (wks)	% First grade eggs	% Second grade eggs	First grade eggs $/doz	Second grade eggs $/doz	Morta-lity	Cost of production $/doz	Capacity Loss (From Cage)	Feed $/doz
Cage	349	62	1	92%	8%	$1.85	$1.00	3.50%	$1.61	N/A	$0.65
Furnished cage	343	60	1	90%	10%	$1.85	$1.00	3.50%	$1.66	24.9%	$0.65
Colony	341	60	1	90%	10%	$1.85	$1.00	3.50%	$1.58	16.7%	$0.65
Single Level Barn (12^m2)	315	60	1	89%	11%	$2.27	$1.00	7.50%	$1.95	78.8%	$0.67
Multilevel Barn AV	315	60	1	89%	11%	$2.27	$1.00	7.50%	$1.93	57.6%	$0.67
Free Range 1500 SL (9h/m^2)	275	56	3	87%	13%	$2.80	$1.40	10.00%	$2.35	78.8%	$0.73
Free Range 1500 SL (12h/m^2)	275	56	3	87%	13%	$2.80	$1.40	10.00%	$2.33	71.8%	$0.73
Free Range 1500 AV	275	56	3	87%	13%	$2.80	$1.40	10.00%	$2.35	57.6%	$0.73
Free Range 10000 AV	275	56	3	87%	13%	$2.80	$1.40	10.00%	$2.33	57.6%	$0.73
Free Range 10000 SL (9h/m^2)	275	56	3	87%	13%	$2.80	$1.40	10.00%	$2.35	71.8%	$0.73
Free Range 10000 SL (12h/m^2)	275	56	3	87%	13%	$2.80	$1.40	10.00%	$2.33	57.6%	$0.73

[190] Please note that whilst no rounding has been done in the underlying spreadsheets, large figure estimates are shown in this RIS as whole numbers for simplicity of presentation, and therefore may be give the appearance of rounding errors if calculations are made manually from the tables. In other words, there are no rounding errors in the total figures presented in the tables, because these are derived from the underlying unrounded spreadsheets.

[191] Provided by AECL

'Capacity loss000 SL (12h/m^2) egg production as a result of moving from conventional cages to other production systems, and is estimated in the following Table A3.1.1.

Table A3.1.1: estimated capacity loss by housing system

	Capacity Loss		m^2 floor area
Cage	0.0%	42.5	hens/m^2
Furnished	24.9%	31.9	hens/m^1
Flat Deck	78.8%	9.0	hens/m^2
Flat Deck	71.8%	12.0	hens/m^2
Aviary	57.6%	18.0	hens/m^2

Table A3.2 is estimated using data in Table A3.1 and provides the income, cost of production and margin per hen housed for different production systems

Table A3.2: Income, cost of production and margin by production system

Production system	Income/hen housed[192]	Cost of production/ hen housed[193]	Margin/hen housed[194]	Margin/week [195]
Conventional cage	$51.83	$46.81	$5.02	$0.08
Furnished cage	$50.45	$47.39	$3.06	$0.05
Colony	$50.16	$44.90	$5.26	$0.09
Single Level Barn (12^m2)	$55.92	$51.19	$4.73	$0.08
Multilevel Barn AV	$55.92	$50.66	$5.26	$0.09
Free Range 1500 SL (9h/m^2)	$60.00	$53.90	$6.10	$0.11
Free Range 1500 SL (12h/m^2)	$60.00	$53.40	$6.60	$0.12
Free Range 1500 AV	$60.00	$53.85	$6.14	$0.11
Free Range 10000 AV	$60.00	$53.40	$6.60	$0.12
Free Range 10000 SL (9h/m^2)	$60.00	$53.85	$6.14	$0.11
Free Range 10000 SL (12h/m^2)	$60.00	$53.40	$6.60	$0.12

Data around the cost of setting up new or converting existing sheds for 20,000, 30,000 and 40,000 layer hens by alternative production systems is provided by AECL and shown in Table A3.3.

[192] Calculated as the product of eggs/hen housed and the weighted value of first grade and second grade eggs (% first grade eggs x first grade eggs $/doz + (% second grade eggs x second grade eggs $/doz) from Table A3.1
[193] Calculated as the product of eggs/hen housed and the cost of production $/doz from Table A3.1
[194] Calculated as the difference between income/hen housed and cost of production/hen housed in Table A3.2.
[195] Calculated as margin per hen housed (Table A3.1) as a proportion of (Wks in shed + down time (wks)) (Table A3.2)

Table A3.3: Total cost per hen of setting up new or converting existing sheds by production system

Production system	Barn			Free range[196]			Conventional cage			Furnished cage		
Number of hens	20,000	30,000	40,000	20,000	30,000	40,000	20,000	30,000	40,000	20,000	30,000	40,000
Flat deck or aviary	Flat Deck	Aviary	Aviary	Flat Deck	Aviary	Aviary	Flat Deck	Aviary	Aviary	Flat Deck	Aviary	Aviary
Shed (including concrete)	$37.50	$27.00	$25.00	$37.50	$27.00	$25.00	$17.00	$17.00	$17.00	$22.50	$22.50	$22.50
Fittings (including electricals + Water Tanks)	$30.00	$33.00	$30.00	$30.00	$33.00	$30.00	$15.00	$15.00	$15.00	$27.00	$27.00	$27.00
Total shed and fittings installed	*$67.50*	*$60.00*	*$55.00*	*$67.50*	*$60.00*	*$55.00*	*$32.00*	*$32.00*	*$32.00*	*$49.50*	*$49.50*	*$49.50*
Rearing (like for like)	$22.00	$22.00	$22.00	$22.00	$22.00	$22.00	$12.00	$12.00	$12.00	$12.00	$12.00	$12.00
Total rearing per bird 2.5 times per year	*$8.80*	*$8.80*	*$8.80*	*$8.80*	*$8.80*	*$8.80*	*$4.80*	*$4.80*	*$4.80*	*$4.80*	*$4.80*	*$4.80*
Water Supply	$1.20	$1.20	$1.10	$1.20	$1.20	$1.10	$1.20	$1.20	$1.10	$1.20	$1.20	$1.10
Fire Services	$5.00	$3.33	$2.50	$5.00	$3.33	$2.50	$5.00	$3.33	$2.50	$5.00	$3.33	$2.50
Fencing	$1.00	$1.00	$1.00	$2.20	$2.20	$2.20	$1.00	$0.90	$0.80	$1.00	$0.90	$0.80
Roads	$2.40	$1.60	$1.20	$2.40	$2.20	$2.00	$2.00	$1.80	$1.60	$2.00	$1.80	$1.60
Power to site	$3.20	$2.13	$1.60	$3.20	$2.13	$1.60	$1.60	$1.60	$1.60	$1.60	$1.60	$1.60
Total infrastructure	*$12.80*	*$9.27*	*$7.40*	*$14.00*	*$11.07*	*$9.40*	*$10.80*	*$8.83*	*$7.60*	*$10.80*	*$8.83*	*$7.60*
Total planning & development	*$6.50*	*$4.33*	*$3.25*	*$6.50*	*$4.33*	*$3.25*	*$6.50*	*$4.33*	*$3.25*	*$6.50*	*$4.33*	*$3.25*
Total cost per hen (new facility)[197]	***$95.60***	***$82.40***	***$74.45***	***$96.80***	***$84.20***	***$76.45***	***$54.10***	***$49.97***	***$47.65***	***$71.60***	***$67.47***	***$65.15***
Total cost per hen (converted facility)[198]	***$45.00***	***$49.50***	***$45.00***	***$47.20***	***$51.70***	***$47.20***	***$10.00***	***$10.00***	***$10.00***	***$40.50***	***$40.50***	***$40.50***

Table A3.4 shows the number of hens that would need to be housed in cages and other production systems to produce a million eggs per week based on the number of first grade eggs per week per hens housed in each production system (see column 2 in Table A3.4).

[196] Based on current mix of densities, which vary between farms.
[197] Calculated as the sum of Total shed and fittings installed + Total rearing per bird 2.5 times per year + Total infrastructure + Total planning & development.
[198] Calculated as 1.5 x Fittings (including electricals + Water Tanks) for Barn and furnished cage; 1.5 x (Fittings (including electricals + Water Tanks) + Fencing) for free range; and simply provided as $10 for cage.

Table A3.4: Number and % of hens to be housed in converted and new facilities per 1 million eggs per week by production system

Production system	First grade eggs/wk /hen housed [199]	Hens housed/ million eggs/wk	Hens housed in converted facilities/ million eggs[200]/wk	Hens housed in new facilities /million eggs[201]/wk	% of 196,213 convert-ed	% of 196,213 new facilities	Total % of 196,213	Conver-sion cost/ hen	New facility cost/ hen
Conventional cage	5.10	**196,213**	0	0	0	0	0	0	0
Furnished cage	5.06	197,603	147,275	50,328	75.06%	25.65%	100.71%	$40.50	$68.07
Colony[202]	5.03	198,762	163,445	35,317	83.30%	18.00%	101.30%	0	0
Single Level Barn (12^m2)	4.60	217,585	41,551	176,034	21.18%	89.72%	110.89%	$45.00	$95.60
Multilevel Barn AV	4.60	217,585	83,102	134,483	42.35%	68.54%	110.89%	$47.25	$78.43
Free Range 1500 SL (9h/m^2)	4.06	246,604	41,551	205,053	21.18%	104.51%	125.68%	$62.93	$129.07
Free Range 1500 SL (12h/m^2)	4.06	246,604	55,401	191,203	28.24%	97.45%	125.68%	$47.20	$96.80
Free Range 1500 AV	4.06	246,604	83,102	163,502	42.35%	83.33%	125.68%	$49.45	$78.43
Free Range 10000 AV	4.06	246,604	83,102	163,502	42.35%	83.33%	125.68%	$48.35	$77.33
Free Range 10000 SL (9h/m^2)	4.06	246,604	55,401	191,203	28.24%	97.45%	125.68%	$62.43	$127.97
Free Range 10000 SL (12h/m^2)	4.06	246,604	83,102	163,502	42.35%	83.33%	125.68%	$46.10	$95.70

Column 4 in Table A3.4 then works out the equivalent number of hens that would be required in a converted facility (see column 4 in Table A3.4) to maintain a million eggs per week (produced in combined converted and new facilities) by taking the product of hens housed per million eggs per week under a current conventional cage system (196,213) and a conversion factor of one minus the capacity lost by going from conventional cages to other production systems (see Table A3.1). For example, for Multilevel Barn AV this would be:

196,213 x (100%-57.6%[203]) = 83,102 hens in a converted facility per million eggs per week

Given that you would need to house 217,585 hens to produce a million eggs per week in a Multilevel Barn AV – you would need to house an additional 134,483 hens (the balance) in new facilities to top up the shortfall (see Column 5 in Table A3.4).

Columns 6 and 7 show the percentage of hens housed/million eggs/wk in conventional cages (i.e. 196,213) to be converted and the percentage of hens housed/million eggs/wk in conventional cages (i.e. 196,213) to be housed in new facilities s e of hens housThese add up to more than 100% as there is a loss in productivity in moving to alternative non-cage production systems and is captured by the proportion of converted and new facilities required as compared to existing conventional cage facilities housing 196,213 hens to produce a million eggs per week.

[199] Calculated as (eggs/hen housed x % first grade eggs) as a proportion of (wks in shed + downtime (wks)) (see Table A3.1)
[200] To be produced in combined converted and new facilities
[201] To be produced in combined converted and new facilities
[202] Not currently used in Australia to any significant extent.
[203] Taken from Table A3.1

Finally, conversion costs and new facility costs per hen in Table A3.4 are taken from Table A3.3 and estimated in the following way:

- Furnished cages, the conversion cost per hen and new facility cost per hen are both taken as averages;
- Single Level Barn (12/m^2) conversion and new facility costs per hen correspond to those for a 20,000-layer flat deck facility;
- Multilevel Barn AV, the conversion cost per hen and new facility cost per hen are both taken as averages;
- Free Range 1500 SL (12/m^2), conversion and new facility costs per hen correspond to those for a 20,000-layer flat deck facility;
- Free Range 1500 SL (9h/m^2), conversion and new facility costs per hen correspond to those for Free Range 1500 SL (12h/m^2) – multiplied by a factor of 9/12;
- Free Range 1500 AV, the conversion cost per hen and new facility cost per hen are both taken as averages;
- Free Range 10000 AV, conversion and new facility costs per hen correspond to those for Free Range 1500 AV and subtracting half of the per hen cost for fencing (0.5 x $2.20[204]);
- Free Range 10000 SL (9h/m^2), conversion cost per hen corresponds to the per hen conversion cost for Free Range 1500 SL (9h/m^2) and subtracting half of the per hen cost for fencing (0.5 x $1.00[205]). The new facility cost per hen corresponds to the per hen conversion cost for Free Range 1500 SL (9h/m^2) and subtracting half of the per hen cost for fencing (0.5 x $2.20[206]); and
- Free Range 10000 SL (12h/m^2), conversion cost per hen corresponds to the per hen conversion cost for Free Range 1500 SL (12h/m^2) and subtracting half of the per hen cost for fencing (0.5 x $2.20[207]). The new facility cost per hen corresponds to the per hen conversion cost for Free Range 1500 SL (12h/m^2) and subtracting half of the per hen cost for fencing (0.5 x $2.20[208]).

The estimation of the costs of phasing out conventional cages over 10 years and 20 years assumes that egg volumes would be maintained at 54,617,813 eggs per week based on 10,716,713 layer hens currently housed in conventional cage systems[209] and 5.1 first grade eggs per week per hen housed[210]. The costs of phasing out conventional cages are broken up into:

- existing facility conversion costs;
- existing facility conversion downtime costs;
- new facility infrastructure costs;
- new facility land costs; and
- new facility ongoing business fragmentation costs.

[204] This is for a 20,000-layer flat deck free range facility
[205] This is for a 20,000-layer flat deck cage facility
[206] This is for a 30,000-layer aviary free range facility
[207] This is for a 20,000-layer flat deck free range facility
[208] This is for a 30,000-layer aviary free range facility
[209] See Table A1.1 in Appendix 1.
[210] See Table A3.4.

A3.2 Costs of conversion and set up of new facilities (no net market forces and complete phase out of conventional cages in 2016/17).

Existing facility conversion costs (one-off)

In Table A3.5, the percentage of conventional cage conversions to alternative production systems in column 2, is provided by AECL. The number of hens housed in converted facilities is estimated by taking the product of 10,716,713 layer hens currently housed in conventional cage systems[211] the percentage of conventional cage conversions to alternative production systems (column 2) and the percentage of 196,213 hens housed per million eggs per week to be converted (column 3).

Taking the product of hens housed in converted facilities and first grade eggs per week per hen housed provides 20,293,672 first grade eggs produced per week. The total one-off cost of conversion is estimated to be $211.81m and estimated taking the product of hens housed in converted facilities and conversion cost per hen. This cost estimate assumes no net market forces and a complete phase out of conventional cages in 2016/17.

Table A3.5: Total estimated one-off cost of existing facility conversion by production system

Production system	% of cage conversions to alternative production systems	% of 196,213 conver-ted[212]	Hens housed in converted facilities	First grade eggs/wk /hen housed [213]	Total first grade eggs/wk	Conversion cost/ hen[214]	Total cost of conversion
Furnished cage	2%	75.06%	160,877	5.06	814,142	$40.50	$6,515,509
Colony	0%	83.30%	0	5.03	0	$0.00	$0
Single Level Barn (12^m2)	5%	21.18%	113,471	4.60	521,502	$45.00	$5,106,199
Multilevel Barn AV	75%	42.35%	3,404,132	4.60	15,645,058	$47.25	$160,845,254
Free Range 1500 SL (9h/m^2)	0%	21.18%	0	4.06	0	$62.93	$0
Free Range 1500 SL (12h/m^2)	0%	28.24%	0	4.06	0	$47.20	$0
Free Range 1500 AV	3%	42.35%	136,165	4.06	552,162	$49.45	$6,733,374
Free Range 10000 AV	12%	42.35%	544,661	4.06	2,208,647	$48.35	$26,334,368
Free Range 10000 SL (9h/m^2)	0%	28.24%	0	4.06	0	$62.43	$0
Free Range 10000 SL (12h/m^2)	3%	42.35%	136,165	4.06	552,162	$46.10	$6,277,220
Total	**100%**		**4,495,472**	**4.51**	**20,293,672**	**$47.12**	**$211,811,924**

Existing facility conversion downtime costs

Table A3.6 assumes that there are 16 weeks of downtime costs whilst facilities are converted to alternative non-cage production systems under Option D. The existing facility conversion downtime costs is estimated to be $5.76m.

[211] See Table A1.1 in Appendix 1.
[212] See Table A3.4 for source of estimates
[213] See Table A3.4 for source of estimates.
[214] See Table A3.4 for source of estimates.

Table A3.6: Total estimated one-off cost of existing facility conversion 'downtime' costs by production system

Production system	Margin/hens housed[215]	Margin/week[216]	Additional weeks down time	Hens housed in converted facilities[217]	Down time cost[218]
Furnished cage	$5.02	$0.08	16	160,877	$204,977
Colony	$3.06	$0.05	16	0	$0
Single Level Barn (12^m2)	$5.26	$0.09	16	113,471	$156,466
Multilevel Barn AV	$4.73	$0.08	16	3,404,132	$4,225,923
Free Range 1500 SL (9h/m^2)	$5.26	$0.09	16	0	$0
Free Range 1500 SL (12h/m^2)	$6.10	$0.10	16	0	$0
Free Range 1500 AV	$6.60	$0.11	16	136,165	$243,713
Free Range 10000 AV	$6.14	$0.10	16	544,661	$907,153
Free Range 10000 SL (9h/m^2)	$6.60	$0.11	16	0	$0
Free Range 10000 SL (12h/m^2)	$6.14	$0.10	16	136,165	$226,788
Total				**4,495,472**	**$5,760,044**

New facility infrastructure costs (one-off)

In Table A3.7, the percentage of new facilities provided in alternative production systems is provided by AECL. Assuming that former conventional cage egg volumes would be maintained at 54,617,813 eggs per week and that 20,293,672 eggs per week would be provided by converted conventional cage facilities – the balance of 34,324,141 eggs per week would need to be supplied by new facilities. Column 3 in Table A3.7 distributes these eggs against non-cage alternative production systems. New facilities would house 8,085,972 birds at an infrastructure cost of $661.50 million in 2016/17 dollars and assumes no net market forces.

[215] See Table A3.2 for source of estimates
[216] See Table A3.2 for source of estimates
[217] See Table A3.5 for source of estimates
[218] Calculated as margin/week x additional weeks downtime x Hens housed in converted facilities

Table A3.7: Total estimated one-off cost of new facility infrastructure by production system

Production system	% of new facilities provided in alternative production systems	Total first grade eggs/wk	First grade eggs/wk/hen housed[219]	Hens housed in new facilities[220]	New facility cost/hen[221]	Total infrastructure cost of new facilities[222]
Furnished cage	0%	0	5.06	0	$68.07	$0
Colony	0%	0	5.03	0	$0.00	$0
Single Level Barn (12^m2)	3%	1,029,724	4.60	224,053	$95.60	$21,419,439
Multilevel Barn AV	35%	12,013,449	4.60	2,613,948	$78.43	$204,998,894
Free Range 1500 SL (9h/m^2)	2%	686,483	4.06	169,289	$129.07	$21,849,617
Free Range 1500 SL (12h/m^2)	7%	2,402,690	4.06	592,513	$96.80	$57,355,244
Free Range 1500 AV	13%	4,462,138	4.06	1,100,381	$78.43	$86,297,381
Free Range 10000 AV	35%	12,013,449	4.06	2,962,564	$77.33	$229,080,283
Free Range 10000 SL (9h/m^2)	0%	0	4.06	0	$127.97	$0
Free Range 10000 SL (12h/m^2)	5%	1,716,207	4.06	423,223	$95.70	$40,502,486
Total	**100%**	**34,324,141**	**4.24**	**8,085,972**	**$81.81**	**$661,503,345**

New facility land costs (one-off)

New facility land costs in Table A3.8 assumes a land cost per hectare of $9,759 as provided by AECL and reflects the need for buffers, proximity to towns, access to water and planning considerations. Land required per 80,000 hens is provided by AECL. Hectares required is estimated as the hens housed in new facilities divided by the product of 80,000 and land required per 80,000 hens. Total land cost of $91.57m in 2016/17 dollars is estimated as the product of hectares required and the land cost per hectare of $9,750 however does not consider the impact of net market forces.

[219] See Table A3.4 for source of estimates
[220] Calculated as total first grade eggs/week divided by first grade eggs per week per hen housed.
[221] See Table A3.4 for source of estimates.
[222] Calculated as the product of hens housed in new facilities and new facility cost per hen

Table A3.8: Total estimated one-off cost of new facility land by production system

Production system	Land required/80,000 hens	Hens housed in new facilities[223]	Hectares required	Land Cost per hectare	Total Land Cost
Furnished cage	0	0	0	$9,750	$0
Colony	50	0	0	$9,750	$0
Single Level Barn (12^m2)	50	224,053	140	$9,750	$1,365,321
Multilevel Barn AV	50	2,613,948	1,634	$9,750	$15,928,747
Free Range 1500 SL (9h/m^2)	50	169,289	106	$9,750	$1,031,607
Free Range 1500 SL (12h/m^2)	120	592,513	889	$9,750	$8,665,501
Free Range 1500 AV	120	1,100,381	1,651	$9,750	$16,093,072
Free Range 10000 AV	120	2,962,564	4,444	$9,750	$43,327,503
Free Range 10000 SL (9h/m^2)	100	0	0	$9,750	$0
Free Range 10000 SL (12h/m^2)	100	423,223	529	$9,750	$5,158,036
Total		**8,085,972**	**9,392**		**$91,569,787**

New facility business fragmentation costs (ongoing)

Table A3.9 illustrates additional ongoing costs per hen due to business fragmentation (management, transport/logistics) where some farms would have to be split into multiple sites due to constraints on expanding existing farms in relation to buffers and council requirements. AECL estimates that this would add roughly 5% to the cost of production of hens housed. Based on the number of hens housed in new facilities this would create an annual cost of $21.24m.

Table A3.9: Total estimated annual business fragmentation cost of new facility by production system

Production system	Cost of production/ hens housed[224]	Additional annual cost per hen due to fragmentation	Hens housed in new facilities	Annual fragmentation cost
Furnished cage	$47.39	$2.37	0	$0
Colony	$44.90	$2.24	0	$0
Single Level Barn (12^m2)	$51.19	$2.56	224,053	$573,435
Multilevel Barn AV	$50.66	$2.53	2,613,948	$6,621,458
Free Range 1500 SL (9h/m^2)	$53.90	$2.70	169,289	$456,235
Free Range 1500 SL (12h/m^2)	$53.40	$2.67	592,513	$1,581,886
Free Range 1500 AV	$53.85	$2.69	1,100,381	$2,963,005
Free Range 10000 AV	$53.40	$2.67	2,962,564	$7,909,429
Free Range 10000 SL (9h/m^2)	$53.85	$2.69	0	$0
Free Range 10000 SL (12h/m^2)	$53.40	$2.67	423,223	$1,129,918
Total			**8,085,972**	**$21,235,366**

[223] See Table A3.7 for source of estimates
[224] See Table A3.2 for source of estimates

A summary of conversion and new facility costs is provided in Table A3.10 in 2016/17 dollars and ***do not*** factor either net market forces or the phasing out of conventional cages over 10 years and 20 years. These issues are considered in part A3.3 of this appendix.

Table A3.10: Summary of conventional cage conversion and new facility costs in 2016/17 dollars

Category of cost	$
One-off capital costs	
Existing facility conversion costs	$211,811,924
Existing facility conversion downtime costs	$5,760,044
New facility infrastructure costs	$661,503,345
New facility land costs	$91,569,787
Total capital cost	**$970,645,100**
Annual costs	
New facility business fragmentation costs	$21,235,366
Total annual cost	**$21,235,366**

A3.3 Costs of conversion and set up of new facilities with adjustment for net market forces and phase out of conventional cages over 10 and 20 years (layer hens)

A3.3.1 Market forces

An assessment of the cost of phasing out conventional cages requires taking into account the cost of conversion and the extent to which conversion will be required. This requires an assessment of market forces through potential changes in demand.

Assessing market forces is challenging as it requires an assessment of future matters which are inherently uncertain. The most appropriate approach to assessing future considerations is to make observations on available evidence as the most robust indication of future outcomes.

There are competing factors indicating that conversion will be both required and avoided. We have assessed these factors to arrive at a net position with respect to market forces and then applied the net market forces to adjust the estimated cost of conversion.

Relevant available evidence regarding net market forces can be categorised as:

- factors indicating ongoing demand for caged eggs; and
- factors indicating reduced demand for caged eggs.

There are also other relevant factors that could be taken into account in assessing net market forces, including:

- supply constraints for non-cage eggs;
- disruption to supply arising from the fact that it would not be practicable to phase out cage capacity on a straight-line basis over the relevant period; and
- broader macro-economic conditions such as the prospect of recession which could be expected to increase demand for lower priced conventional cage eggs.

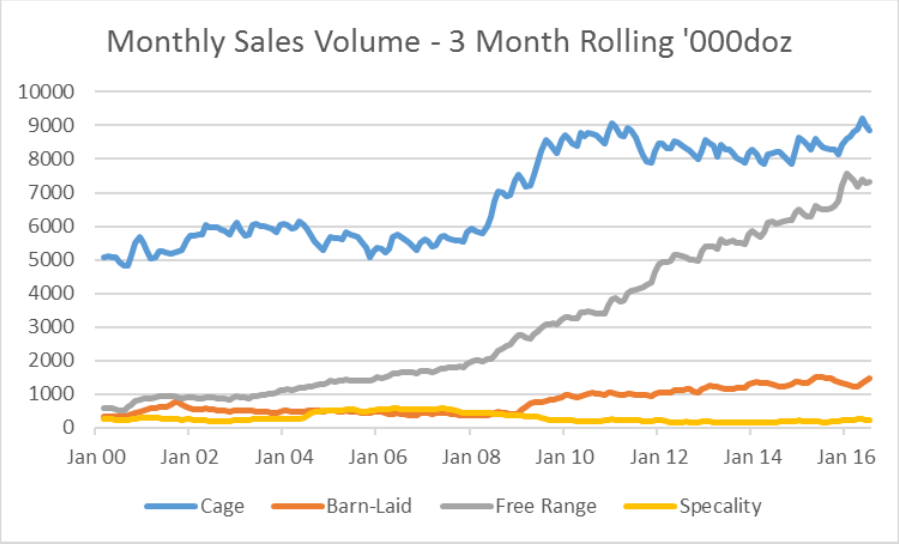
It is beyond the scope of this analysis to make meaningful assessments of these factors.

However, it should be noted that these factors would result in an increase in the conversion required, as the supply of caged eggs would have to increase from its current level prior to phase out. As a result, the exclusion of these factors could over-estimate the impact of reduced demand for caged eggs, and so the approach to taking account of market developments should be interpreted in this context.

Ongoing demand

The predominant market force with respect to any product, including conventional cage eggs, is consumer demand. There has been a steady trend in growth of non-cage eggs over the last 10 years, predominantly as a result of growth in free range egg supply. However, when conventional cage eggs are viewed in isolation, the available evidence indicates that conventional cage eggs are not a disappearing category and have in fact grown in key segments. IRi grocery scan data indicates that conventional cage egg sales reached record levels in terms of volume in 2016 as shown in Figure A3.1.

Figure A3.1: Monthly sales volume – supermarket retailers



Source: IRi Grocery Scan Data

In terms of recent trends, table A3.11 shows growth in volume vs the previous year for total eggs and each segment for major supermarket retailers.

Table A3.11: Eggs (dozens 000s) growth (%) - growth in volume vs the previous year between 29/11/15 to 27/11/2016

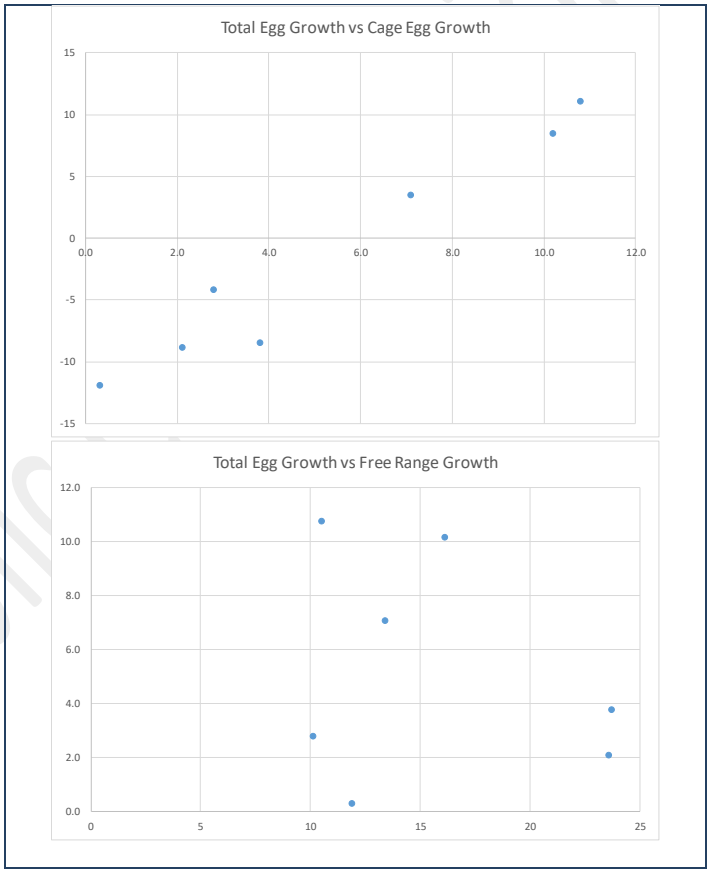
State	Total Eggs	Total Barn	Total Caged	Total Free Range	Total Speciality
National	7.1	-2.1	3.5	13.4	23.7
Queensland	10.2	-1.4	8.5	16.1	15.8
New South Wales	10.8	6.5	11.1	10.5	36
Victoria	2.8	5.9	-4.1	10.1	9.3
South Australia	0.3	3.2	-11.9	11.9	12.4
West Australia	3.8	-34.1	-8.4	23.7	45.2
Tasmania	2.1	-29.9	-8.8	23.6	NA

Source: IRi Grocery Scan Data

Whilst this table shows a growth in free-range egg volumes, the growth in conventional cage egg volume is consistent with IRi grocery scan data which indicates that approximately 26% of retail egg consumers nationally only purchase conventional cage eggs, suggesting that this group of consumers would be unlikely to purchase eggs from a grocery retailer that did not supply conventional cage eggs. This is based on a consumer desire for convenience – only a small proportion of consumers would be prepared to shop elsewhere on the same trip in addition to a supermarket.

Moreover, it appears that there is a correlation between the growth in total market growth and conventional cage egg volumes. If IRi Grocery scan data is viewed on a state basis, it appears that the states in which total egg sales increased were those in which conventional cage eggs volume increased and vice versa. This correlation cannot be observed for the free-range category. Chart A3.1 shows that this correlation is quite clear. For each graph, both axes measure volume growth in national retail scan sales for the 12 months to 27/11/16 compared to the prior 12 months. The vertical axis measures the % volume growth in Caged/Free range eggs. The horizontal axis measures the % volume growth in total eggs.

Chart A3.1 correlation between the growth in total eggs and growth in conventional cage egg and free range egg market segments



Source: IRi Grocery Scan Data

Based on this evidence, it appears that conventional caged eggs are likely to form a significant part of the egg market into the future, both as a growing category and as an important part of total egg market growth.

Reduced demand

The extent to which demand for conventional caged eggs may be reduced will also be strongly influenced by the actions of major egg retailers. In the context of significant conjecture regarding conventional cage eggs and public campaigning from animal welfare organisations, some retailers have indicated an intention to phase out supply of cage eggs, although it is unclear whether eggs from furnished cages would be acceptable.

This includes some large and high profile food service egg retailers, such as Sodexo, Compass Group, McDonald's and Hungry Jacks, which have moved or committed to move to the supply of cage free eggs only. Although very large businesses, these retailers are likely to represent a relatively minor proportion of food service egg retailers, in the order of 5% of food service caged egg volume.

This is because the food service sector is large and diverse and there is no evidence to suggest that a significant proportion of food service institutions and processed food manufacturers are considering announcing an intention to move away from caged eggs.

In contrast, grocery retail markets are relatively concentrated such that it is likely that the impact of retailer action on the cost of conversion will be predominantly influenced by the actions of the major grocery chains.

Grocery retailers that have made announcements regarding caged eggs include Aldi, which has stated that it intends to cease the supply of caged eggs by no later than 2025 on the basis that ctions of the major grocery chains. ion to move away from cagfree only industry"[225]. In addition, Woolworths had previously announced an intention to cease the supply of caged eggs by 2018 but has subsequently indicated that this will not be implemented. Woolworths has recently made media statements that its goal is to phase out caged eggs by 2025 subject to supply constraints, consumer demand and affordability.

Given the two largest grocery retailers (Woolworths and Coles) and the remainder of grocery retailers have not made a commitment to cease supplying caged eggs, it could be projected that a relatively low proportion of cage egg retailers are likely to cease supply in the future, representing significantly below 50% of grocery retail caged egg volume.

While this could change in the face of ongoing conjecture and public campaigning regarding cage eggs, even where retailers would prefer to cease the supply of caged eggs, retail competition in the context of ongoing demand for caged eggs is likely to restrict their ability to do so. In particular, 26% of egg grocery consumers purchase only cage eggs and it is likely that the majority of grocery retailers would continue to sell caged eggs such that there is likely to be significant leakage in egg sales from retail volume supplied by retailers that had ceased supplying caged eggs to those that continue to do so. Such competition could also prevent retailers that have committed to phase out caged eggs from implementing that commitment.

There has been recent media coverage regarding a price war between major supermarket chains Coles, Woolworths and Aldi in relation to their own brand free-range eggs which involved retail price reductions of as much as $0.40 a dozen/carton). This strategy is consistent with retail strategies that have been applied in the past in which retailers pursue market share by

[225] See http://www.ausfoodnews.com.au/2016/05/30/aldi-to-phase-caged-eggs-out-by-2025.html (accessed January 2017)

using grocery staple products as loss leading retail offers to entice consumers to their stores in an effort to generate revenue on the entire basket of groceries purchased by the consumer. This approach was famously applied in Australia in relation to milk and has been the subject of conjecture between farmers, retailers, consumers and regulators.

It is unclear at this stage whether the recent discounting on eggs will result in a sustained price war or whether supermarkets will seek to recover reduced retail margins by reducing prices paid to free range egg farmer suppliers. However, each of these outcomes appears to be a possibility and there is a potential market effect with respect to the ability of egg farmers to transition from cage to cage-free production. In particular, the ability of egg farmers to establish new cage-free infrastructure would be impacted by margins available for cage-free eggs. If margins are reduced the likelihood that new free range capacity will be developed will also be reduced and the timeframe for a feasible transition of cage production to cage-free production would be expanded. There is also the prospect that the current level of free range supply could be reduced as the substantial price reductions, if passed on, would put some farmers in a position where free range egg production was not viable.

This is despite the fact that lower free range prices would be expected to stimulate additional consumer demand for eggs and that the strategy is consistent with some retailers commitments or intentions to go ns to go ange prices would be expected to stimulate additional consumer demand for eggs and that the strategy is consistent with some gins by reducing prices paid to free range egg farmer suppliersapacity.

In the context of these factors, a conservative approach has been adopted in which the proportion of egg retailers which have made commitments to phase out cage eggs has been doubled to reflect the prospect that more may follow in the future. This translates to an assumption that:

- approximately 10% of food service egg retailers by volume will cease supplying caged eggs and;
- approximately 30% of grocery retailers by volume will cease supplying cage eggs (reduced to 20% to account for leakage to other retailer through competition).

Given the high level of uncertainty in relation to these developments, no allowance has been made regarding differences in the likelihood of caged eggs being phased out in 10 and 20-year time periods.

Net market forces

In applying the analysis and assumptions above for the purpose of estimating the cost of phasing out conventional cages over 10 years and 20 years under Option D the following calculations have been applied as shown in Panel A3.1.

Panel A3.1: Assumptions used to estimate the impact of net market effect on phasing out of conventional cages

	Percentage	Net market effect
Food service estimated share of cage volume	67%	
Volume of food service retail likely to become cage free	10%	
Total food service (net market effect)		*-6.7%*[226]
Retail estimated share of cage volume	33%	
Volume of grocery retail likely to move to cage free (reduced for leakage to other retailers)	20%	
Total retail (net market effect)		*-6.6%*[227]
Total net market effect		***-13.3%***

A3.3.2 Cost of variation of the proposed standards under Option D – 10-year phase out of conventional cages with net market effects

Estimates in Table A3.12 are taken from Tables A3.5, A3.6, A3.7 and A3.8 for the cost of conversion, conversion downtime, new infrastructure and new land. All estimates for each year are taken to be 10% of the value (an evenly distributed phase out of conventional cages over 10 years) in terms of the costs estimates provided in Tables A3.5, A3.6, A3.7 and A3.8 and adjusted by a factor of *0.87* taking into account the assumption of a -13% net market effect on conventional cage egg production systems (see Panel A3.1)

Table A3.12: 10-year undiscounted one-off cost of conversion, conversion downtime, new infrastructure and new land – Option D (10-year phase out of conventional cages)

Phase out s over 10 years	Conversion cost of existing cages[228]	Infrastructure cost for new facilities[229]	Land cost for new facilities[230]	Downtime loss for conversion of existing cages[231]	Total one off capital cost
2017/18	$18,364,094	$57,352,340	$7,939,101	$499,396	$84,154,930
2018/19	$18,364,094	$57,352,340	$7,939,101	$499,396	$84,154,930
2019/20	$18,364,094	$57,352,340	$7,939,101	$499,396	$84,154,930
2020/21	$18,364,094	$57,352,340	$7,939,101	$499,396	$84,154,930
2021/22	$18,364,094	$57,352,340	$7,939,101	$499,396	$84,154,930
2022/23	$18,364,094	$57,352,340	$7,939,101	$499,396	$84,154,930
2024/25	$18,364,094	$57,352,340	$7,939,101	$499,396	$84,154,930
2025/26	$18,364,094	$57,352,340	$7,939,101	$499,396	$84,154,930
2026/27	$18,364,094	$57,352,340	$7,939,101	$499,396	$84,154,930
2027/28	$18,364,094	$57,352,340	$7,939,101	$499,396	$84,154,930
Total 10-year cost	**$183,640,938**	**$573,523,400**	**$79,391,006**	**$4,993,958**	**$841,549,301**

[226] 10% of 67% = 6.7%
[227] 20% of 33% = 6.6%
[228] 10% x 0.87 x $211,811,924 (see Table A3.5)
[229] 10% x 0.87 x $661,503,345 (see Table A3.7)
[230] 10% x 0.87 x $91,569,787 (see Table A3.8)
[231] 10% x 0.87 x $5,760,044 (see Table A3.6)

Based on data in Table A1.4 the following share of capacity in Table A3.13.1 is used for large, medium, small and micro cage farms to distribute the aforementioned costs in Table A3.12.

Table A3.13.1: Share of capacity of large, medium, small and micro cage farms

Layer hen farm size	NSW, QLD and VIC	SA, WA and TAS
Large	26.88%	5.46%
Medium	47.89%	2.18%
Small	13.52%	3.90%
Micro	0.13%	0.05%
Total	**88.41%**	**11.59%**

Table A3.13.2 provides a ***10-year one-off cost of $591.07m in present value dollars*** under Option D with the replacement of conventional cage occurring over 10 years.

Table A3.13.2: Estimated one-off cost of phasing out conventional cages under Option D (10-year phase out) by layer farm size and grouping of states

(Production method) - states	Size of layer hen farms	One off capital cost of cage abandonment over 10 years[232]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
(Cage)						
NSW, QLD and VIC	Large	$226,172,451	$226,172,451	$158,854,065	$188,098,701	$138,973,180
NSW, QLD and VIC	Medium	$403,005,093	$403,005,093	$283,053,913	$335,163,430	$247,629,184
NSW, QLD and VIC	Small	$113,774,984	$113,774,984	$79,910,788	$94,622,164	$69,909,803
NSW, QLD and VIC	Micro	$1,071,106	$1,071,106	$752,300	$890,796	$658,148
Subtotal NSW, QLD and VIC		$744,023,635	$744,023,635	$522,571,067	$618,775,092	$457,170,315
(Cage)						
SA, WA and TAS	Large	$45,957,031	$45,957,031	$32,278,296	$38,220,649	$28,238,606
SA, WA and TAS	Medium	$18,378,808	$18,378,808	$12,908,505	$15,284,929	$11,292,982
SA, WA and TAS	Small	$32,789,655	$32,789,655	$23,030,082	$27,269,862	$20,147,824
SA, WA and TAS	Micro	$400,173	$400,173	$281,065	$332,808	$245,889
Subtotal SA, WA and TAS		$97,525,667	$97,525,667	$68,497,947	$81,108,248	$59,925,300
Total		**$841,549,301**	**$841,549,301**	**$591,069,014**	**$699,883,340**	**$517,095,616**

Estimates in Table A3.14 are taken from Table A3.9 for the ongoing annual cost of business fragmentation. All estimates for each year are taken to be 10%, 20%, 30% etc. of the value $21,235,366 (growing consecutively larger each year) (an evenly distributed phase out of conventional cage over 10 years) and adjusted by a factor of *0.87* taking into account the assumption of a -13% net market effect on cage egg production systems.

[232] Estimated by taking the product of $841,549,301 in Table A3.12 and share of capacity by grouping of state and layer farm size in Table A3.13.1.

Table A3.14: 10-year undiscounted annual cost of business fragmentation – Option D (10-year phase out of conventional cage)

Phase out of conventional cages over 10 years	Annual business fragmentation costs
2017/18	$1,841,106
2018/19	$3,682,213
2019/20	$5,523,319
2020/21	$7,364,425
2021/22	$9,205,531
2022/23	$11,046,638
2024/25	$12,887,744
2025/26	$14,728,850
2026/27	$16,569,956
2027/28	$18,411,063
Total 10-year cost	**$101,260,845**

Table A3.15 provides a ***10-year business fragmentation cost of $63.96m in present value dollars*** under Option D with the replacement of conventional cages occurring over 10 years.

Table A3.15: Estimated annual business fragmentation cost of phasing out conventional cage under Option D (10-year phase out) by layer farm size and grouping of states

(Production method) - states	Size of layer hen farms	Annualised business fragmentation cost of cage abandonment over 10 years	10-year business fragmentation cost of cage abandonment over 10 years[233]	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
(Cage)						
NSW, QLD and VIC	Large	$2,721,458	$27,214,583	$17,189,292	$21,467,689	$14,367,276
NSW, QLD and VIC	Medium	$4,849,227	$48,492,270	$30,628,717	$38,252,173	$25,600,312
NSW, QLD and VIC	Small	$1,369,017	$13,690,168	$8,646,992	$10,799,219	$7,227,390
NSW, QLD and VIC	Micro	$12,888	$128,883	$81,405	$101,667	$68,040
Subtotal NSW, QLD and VIC		$8,952,590	$89,525,904	$56,546,406	$70,620,748	$47,263,019
(Cage)						
SA, WA and TAS	Large	$552,986	$5,529,858	$3,492,772	$4,362,119	$2,919,354
SA, WA and TAS	Medium	$221,146	$2,211,461	$1,396,804	$1,744,468	$1,167,487
SA, WA and TAS	Small	$394,547	$3,945,471	$2,492,041	$3,112,307	$2,082,915
SA, WA and TAS	Micro	$4,815	$48,151	$30,413	$37,983	$25,420
Subtotal SA, WA and TAS		$1,173,494	$11,734,941	$7,412,031	$9,256,877	$6,195,176
Total		**$10,126,085**	**$101,260,845**	**$63,958,436**	**$79,877,625**	**$53,458,195**

[233] Estimated by taking the product of $101,260,845 in Table A3.14 and share of capacity by grouping of state and layer farm size in Table A3.13.1

A3.3.3 Cost of variation of the proposed standards under Option D – 20-year phase out of conventional cage with net market effects (layer hens)

Estimates in Table A3.16 are taken from Tables A3.5, A3.6, A3.7 and A3.8 for the cost of conversion, conversion downtime, new infrastructure and new land. All estimates for each year are taken to be 5% of the value (an evenly distributed phase out of conventional cages over 10 years) in terms of the costs estimates provided in Tables A3.5, A3.6, A3.7 and A3.8 and adjusted by a factor of *0.87* taking into account the assumption of a -13% net market effect on cage egg production systems (see Panel A3.1)

Table A3.16: 10-year undiscounted one-off cost of conversion, conversion downtime, new infrastructure and new land – Option D (20-year phase out of conventional cage)

Phase out cages over 10 years	Conversion cost of existing cages[234]	Infrastructure cost for new facilities[235]	Land cost for new facilities[236]	Downtime loss for conversion of existing cages[237]	Total one off capital cost
2017/18	$9,182,047	$28,676,170	$4,578,489	$288,002	$42,724,708
2018/19	$9,182,047	$28,676,170	$4,578,489	$288,002	$42,724,708
2019/20	$9,182,047	$28,676,170	$4,578,489	$288,002	$42,724,708
2020/21	$9,182,047	$28,676,170	$4,578,489	$288,002	$42,724,708
2021/22	$9,182,047	$28,676,170	$4,578,489	$288,002	$42,724,708
2022/23	$9,182,047	$28,676,170	$4,578,489	$288,002	$42,724,708
2024/25	$9,182,047	$28,676,170	$4,578,489	$288,002	$42,724,708
2025/26	$9,182,047	$28,676,170	$4,578,489	$288,002	$42,724,708
2026/27	$9,182,047	$28,676,170	$4,578,489	$288,002	$42,724,708
2027/28	$9,182,047	$28,676,170	$4,578,489	$288,002	$42,724,708
Total 10-year cost	**$91,820,469**	**$286,761,700**	**$45,784,894**	**$2,880,022**	**$427,247,084**

Table A3.17 provides a ***10-year one-off cost of $300.08m in present value dollars*** under Option D with the replacement of conventional cages occurring over 20 years.

[234] 5% x 0.87 x $211,811,924 (see Table A3.5)
[235] 5% x 0.87 x $661,503,345 (see Table A3.7)
[236] 5% x 0.87 x $91,569,787 (see Table A3.8)
[237] 5% x 0.87 x $5,760,044 (see Table A3.6)

Table A3.17: Estimated one-off cost of phasing out conventional cages under Option D (20-year phase out) by layer farm size and grouping of states

(Production method) - states	Size of layer hen farms	One off capital cost of cage abandonment over 20 years[238]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
(Cage)						
NSW, QLD and VIC	Large	$114,825,739	$114,825,739	$80,648,794	$95,496,035	$70,555,446
NSW, QLD and VIC	Medium	$204,602,096	$204,602,096	$143,703,951	$170,159,488	$125,719,131
NSW, QLD and VIC	Small	$57,762,546	$57,762,546	$40,569,995	$48,038,830	$35,492,584
NSW, QLD and VIC	Micro	$543,791	$543,791	$381,936	$452,249	$334,136
Subtotal NSW, QLD and VIC		$377,734,172	$377,734,172	$265,304,676	$314,146,603	$232,101,297
(Cage)						
SA, WA and TAS	Large	$23,331,975	$23,331,975	$16,387,403	$19,404,283	$14,336,489
SA, WA and TAS	Medium	$9,330,757	$9,330,757	$6,553,533	$7,760,022	$5,733,346
SA, WA and TAS	Small	$16,647,016	$16,647,016	$11,692,167	$13,844,666	$10,228,871
SA, WA and TAS	Micro	$203,164	$203,164	$142,694	$168,964	$124,836
Subtotal SA, WA and TAS		$49,512,912	$49,512,912	$34,775,798	$41,177,935	$30,423,541
Total		**$427,247,084**	**$427,247,084**	**$300,080,474**	**$355,324,538**	**$262,524,838**

Estimates in Table A3.18 are taken from Table A3.9 for the ongoing annual cost of business fragmentation. All estimates for each year are taken to be 5%, 10%, 15% etc. of the value $21,235,366, growing consecutively larger each year (an evenly distributed phase out of conventional cage over 20 years with 50% of conventional cage phased out by 2027-28) and adjusted by a factor of *0.87* taking into account the assumption of a -13% net market effect on cage egg production systems.

Table A3.18: 10-year undiscounted annual cost of business fragmentation egg product (20-year phase out of conventional cages)

Phase out of conventional cages over 20 years	Annual business fragmentation costs
2017/18	$920,553
2018/19	$1,841,106
2019/20	$2,761,659
2020/21	$3,682,213
2021/22	$4,602,766
2022/23	$5,523,319
2024/25	$6,443,872
2025/26	$7,364,425
2026/27	$8,284,978
2027/28	$9,205,531
Total 10-year cost	**$50,630,423**

[238] Estimated by taking the product of $427,247,084 in Table A3.16 and the share of capacity by grouping of state and layer farm size in Table A3.13.1.

Table A3.19 provides a ***10-year business fragmentation cost of $31.98m in present value dollars*** under Option D with the replacement of conventional cages occurring over 20 years.

Table A3.19: Estimated annual business fragmentation cost of phasing out conventional cages under Option D (20-year phase out) by layer farm size and grouping of states

(Production method) - states	Size of layer hen farms	Annualised business fragmentation cost of cage abandonment over 20 years	10-year business fragmentation cost of cage abandonment over 20 years[239]	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
(Cage)						
NSW, QLD and VIC	Large	$1,360,729	$13,607,292	$8,594,646	$10,733,844	$7,183,638
NSW, QLD and VIC	Medium	$2,424,614	$24,246,135	$15,314,359	$19,126,087	$12,800,156
NSW, QLD and VIC	Small	$684,508	$6,845,084	$4,323,496	$5,399,610	$3,613,695
NSW, QLD and VIC	Micro	$6,444	$64,441	$40,702	$50,833	$34,020
Subtotal NSW, QLD and VIC		$4,476,295	$44,762,952	$28,273,203	$35,310,374	$23,631,509
(Cage)						
SA, WA and TAS	Large	$276,493	$2,764,929	$1,746,386	$2,181,060	$1,459,677
SA, WA and TAS	Medium	$110,573	$1,105,731	$698,402	$872,234	$583,744
SA, WA and TAS	Small	$197,274	$1,972,735	$1,246,020	$1,556,154	$1,041,458
SA, WA and TAS	Micro	$2,408	$24,076	$15,207	$18,992	$12,710
Subtotal SA, WA and TAS		$586,747	$5,867,471	$3,706,015	$4,628,439	$3,097,588
Total		**$5,063,042**	**$50,630,423**	**$31,979,218**	**$39,938,813**	**$26,729,097**

[239] Estimated by taking the product of $50,630,423 in Table A3.18 and the share of capacity by grouping of state and layer farm size in Table A3.13.1.

Appendix 4: Estimation of incremental costs of variations to the proposed standards under Options E, F and G (layer hens)

Appendix 4 provides estimations for incremental costs of variations to the proposed standards under Options E, F and G. Option E.[240]

A4.1 Incremental costs of Option E (layer hens)

Option E represents a variation on the proposed standards to reduce maximum stocking densities for layer hens to 9 birds per m2 in non-cage facilities. The estimation of the incremental cost of Option E is based on the following assumptions as shown in Panel A4.1.

Panel A4.1: Assumptions used to estimate the incremental cost of variations to the proposed standards under Option E

Cost of infrastructure/hen	
Barn	*$84.15*[241]
Free range	*$85.82*[242]
Current commercial free range or barn production that stocks at this level (9 per m^2)	10%[243]
Additional hen capacity required in going from 12 to 9 hens	25%[244]
Cost of land/hen	***$11.32***[245]

The number of hens affected by Option E is estimated by taking the product of the capacity of hens in Table A1.4 in Appendix 1 (excluding conventional cage) against each layer farm size in each grouping of states; the current commercial free range and barn operations non-compliance rate with the proposed stocking density of 90%; and the additional and hen capacity required of 25%.

The additional 10-year one-off cost of the variation to the proposed standards under Option E is estimated to be $182.33m in present value dollars (see Table A4.1).

[240] Please note that whilst no rounding has been done in the underlying spreadsheets, large figure estimates are shown in this RIS as whole numbers for simplicity of presentation, and therefore may be give the appearance of rounding errors if calculations are made manually from the tables. In other words, there are no rounding errors in the total figures presented in the tables, because these are derived from the underlying unrounded spreadsheets.

[241] Based on average cost per hen for new facility for barn (see Table A3.3 of Appendix 3)

[242] Based on average cost per hen for new facility for free range (see Table A3.3 of Appendix 3)

[243] Based on advice from AECL January 2017

[244] Based on advice from AECL January 2017

[245] Estimated as the total cost of new land $91,569,787 divided by the number of hens that have to be housed 8,085,972 (see Table A3.8 of Appendix 3)

Table A4.1: Estimated one-off cost of reducing stocking densities under Option E by layer farm size and grouping of states

(Production method) - states	Size of layer hen farms	No. of hens affected [246]	One off cost of additional shed infrastructure [247]	One off cost of additional land [248]	Total 10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
(Barn)								
NSW, QLD and VIC	Large	0	$0	$0	$0	$0	$0	$0
NSW, QLD and VIC	Medium	134,550	$11,322,383	$1,523,715	$12,846,097	$12,005,698	$12,411,688	$11,678,270
NSW, QLD and VIC	Small	228,229	$19,205,449	$2,584,582	$21,790,031	$20,364,515	$21,053,170	$19,809,119
NSW, QLD and VIC	Micro	3,175	$267,176	$35,955	$303,132	$283,301	$292,881	$275,574
(Free range)								
NSW, QLD and VIC	Large	0	$0	$0	$0	$0	$0	$0
NSW, QLD and VIC	Medium	387,161	$33,224,856	$4,384,413	$37,609,269	$35,148,849	$36,337,458	$34,190,244
NSW, QLD and VIC	Small	872,768	$74,898,062	$9,883,685	$84,781,747	$79,235,278	$81,914,732	$77,074,316
NSW, QLD and VIC	Micro	18,625	$1,598,335	$210,919	$1,809,255	$1,690,892	$1,748,072	$1,644,777
Subtotal NSW, QLD and VIC		1,644,508	$140,516,261	$18,623,270	$159,139,531	$148,728,533	$153,758,001	$144,672,301
(Barn)								
SA, WA and TAS	Large	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Medium	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Small	33,998	$2,860,890	$385,006	$3,245,895	$3,033,547	$3,136,131	$2,950,814
SA, WA and TAS	Micro	2,850	$239,828	$32,275	$272,102	$254,301	$262,901	$247,366
(Free range)							$0	$0
SA, WA and TAS	Large	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Medium	137,025	$11,759,029	$1,551,743	$13,310,772	$12,439,974	$12,860,649	$12,100,702
SA, WA and TAS	Small	189,203	$16,236,728	$2,142,628	$18,379,356	$17,176,968	$17,757,832	$16,708,506
SA, WA and TAS	Micro	7,650	$656,498	$86,633	$743,130	$694,514	$718,000	$675,573
Subtotal SA, WA and TAS		370,725	$31,752,971	$4,198,284	$35,951,256	$33,599,304	$34,735,513	$32,682,960
Total		**2,015,233**	**$172,269,232**	**$22,821,554**	**$195,090,786**	**$182,327,838**	**$188,493,513**	**$177,355,260**

[246] Hens per system from Table A4.1 x 25% extra capacity x 90% non-compliance.
[247] The one-off cost of additional shed infrastructure is estimated as the no of hens affected x cost of new infrastructure per hen (see Panel A4.1) for barn and free range production systems.
[248] The one-off cost of additional land is estimated as the no of hens affected x cost of new land per hen (see Panel A4.1).

A4.2 Incremental costs of Option F (layer hens)

Option F represents a variation on the proposed standards to require the availability of nests, perches and litter for all chicken layers in cage and non-cage systems. The estimation of the incremental cost of Option F is based on the following assumptions[249] including that all conventional cages would have to convert to furnished cages under Option F[250] at a conversion cost of $40.50 per layer hen[251] and a conversion downtime cost of $1.27 per hen[252].

The number of hens affected by Option F is estimated by taking the numbers of hens housed in conventional cage farms in Table A1.4 in Appendix 1 against each layer farm size in each grouping of states.

The additional 10-year one-off cost of the variation to the proposed standards under Option F is estimated to be $418.39m in present value dollars (see Table A4.2).

Table A4.2: Estimated one-off cost of conversion and downtime under Option F by layer farm size and grouping of states

(Production method) - states	Size of layer hen farms	No. of hens affected	One off cost of conversion to furnished cages[253]	Down time cost[254]	Total 10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
(Cage)								
NSW, QLD and VIC	Large	2,880,194	$116,647,857	$3,669,733	$120,317,590	$112,446,346	$116,248,879	$109,379,627
NSW, QLD and VIC	Medium	5,132,070	$207,848,835	$6,538,909	$214,387,744	$200,362,377	$207,137,917	$194,897,949
NSW, QLD and VIC	Small	1,448,868	$58,679,154	$1,846,042	$60,525,196	$56,565,604	$58,478,450	$55,022,905
NSW, QLD and VIC	Micro	13,640	$552,420	$17,379	$569,799	$532,523	$550,531	$517,999
Subtotal NSW, QLD and VIC		9,474,772	$383,728,266	$12,072,063	$395,800,329	$369,906,849	$382,415,776	$359,818,481
(Cage)								
SA, WA and TAS	Large	585,240	$23,702,220	$745,670	$24,447,890	$22,848,495	$23,621,150	$22,225,355
SA, WA and TAS	Medium	234,045	$9,478,823	$298,203	$9,777,026	$9,137,407	$9,446,401	$8,888,205
SA, WA and TAS	Small	417,560	$16,911,180	$532,024	$17,443,204	$16,302,060	$16,853,338	$15,857,459
SA, WA and TAS	Micro	5,096	$206,388	$6,493	$212,881	$198,954	$205,682	$193,528
Subtotal SA, WA and TAS		1,241,941	$50,298,611	$1,582,391	$51,881,001	$48,486,917	$50,126,571	$47,164,546
Total		**10,716,713**	**$434,026,877**	**$13,654,453**	**$447,681,330**	**$418,393,766**	**$432,542,348**	**$406,983,027**

[249] However, there is a possibility that some sheds would be converted to other types of housing eg barn/aviary.
[250] Base on advice from AECL January 2017
[251] See Table A3.3 for source of estimate
[252] Calculated as down time cost for conversion of cage to furnished cage ($204,977) divided by the number of hens housed in converted facilities (furnished cage) 160,877 (see Table A3.6 of Appendix 3).
[253] The one-off cost of conversion to furnished cages is estimated as the no of hens affected x cost of conversion of $40.50 per hen.
[254] The one-off cost of conversion downtime is estimated as the no of hens affected x cost of downtime of $1.27 per hen.

A4.3 Incremental costs of Option G (layer hens)

Option G represents a variation to the proposed standards to ban castration, pinioning and devoicing and no hot blade beak trimming at hatcheries, no routine 2nd beak trim – unless exceptional circumstances (hot blade permitted in this circumstance). There are seven hatcheries in Australia. Under Option G, two small hatcheries in QLD and VIC which do not have sufficient scale to upgrade their equipment to infrared, would be likely to shut down. These two hatcheries are responsible for about 1.75m day old chicks a year and these would be absorbed by four other hatcheries which would have infrared capabilities. While this would have a devastating impact on the two hatcheries affected, the net effect on revenue in the industry is likely to be minimal.

However, there would be an estimated average 4% mortality cost in not allowing a second beak trim in the free range and barn segments under Option G. The implication of average increased mortality is that there would:

- need to be a replacement of hens; and
- be a loss in productivity (i.e. there would be a loss in the eggs that hens would otherwise would have produced).[255]

The assumptions used to estimate the cost of Option G are shown in Panel A2.2.

Panel A4.2: Assumptions used to estimate the cost of a variation to the standards under Option G[256]

Average increased mortality rate in barn production system	4%
Average increased mortality rate in free range production system	4%
Replacement cost	$10
Average farm gate price of a dozen barn eggs	$2.13[257]
Average farm gate price of a dozen free rang eggs	$2.62[258]
Average farm gate price of a dozen eggs	$2.50
Dozen eggs per layer lost	15

As shown in Table A4.3, the annual cost of Option G is estimated to be approximately $3.58m for the replacement of hens and $13.52m for the loss in egg sales at farm gate f Option G is estimate ***$120.11m over 10 years in present value dollars***.

The estimated number of layer hens affected by average increased mortality under Option G in relation to no second beak trimming is 291,969 hens in NSW, QLD and VIC and 65,720 in SA, WA ad TAS ere are sevens in total.

[255] Provided by AECL.
[256] Provided by AECL.
[257] Weighted average farm gate price for first grade and second grade barn eggs 89% x $2.27 +11% x $1.00 (see Table A3.1 of Appendix 3)
[258] Weighted average farm gate price for first grade and second grade free range eggs 87% x $2.80 + 13% x $1.40 (see Table A3.1 of Appendix 3)

Table A4.3: Estimated annual replacement cost and loss in egg sales under Option G by layer farm size and grouping of states

(Production method) - states	Size of layer farms	No. hens affected annually[259]	Annual replace-ment cost[260]	Annual loss in egg sales at farm gate[261]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
(Barn)								
NSW, QLD and VIC	Large	0	$0	$0	$0	$0	$0	$0
NSW, QLD and VIC	Medium	23,920	$239,200	$764,352	$10,035,516	$7,048,527	$7,632,612	$6,166,390
NSW, QLD and VIC	Small	40,574	$405,740	$1,296,522	$17,022,619	$11,955,975	$12,946,723	$10,459,662
NSW, QLD and VIC	Micro	508	$5,080	$16,233	$213,129	$149,693	$162,097	$130,958
(Free range)								
NSW, QLD and VIC	Large	0	$0	$0	$0	$0	$0	$0
NSW, QLD and VIC	Medium	68,829	$688,286	$2,702,899	$33,911,851	$23,818,265	$25,679,963	$20,837,365
NSW, QLD and VIC	Small	155,159	$1,551,588	$6,093,086	$76,446,741	$53,692,992	$57,889,776	$46,973,213
NSW, QLD and VIC	Micro	2,980	$29,800	$117,025	$1,468,246	$1,031,235	$1,111,839	$902,174
Subtotal NSW, QLD and VIC		*291,969*	*$2,919,694*	*$10,990,116*	*$139,098,102*	$97,696,686	$105,423,011	$85,469,762
(Barn)								
SA, WA and TAS	Large	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Medium	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Small	6,044	$60,440	$193,133	$2,535,730	$1,780,991	$1,928,575	$1,558,096
SA, WA and TAS	Micro	456	$4,560	$14,571	$191,313	$134,370	$145,505	$117,553
(Free range)								
SA, WA and TAS	Large	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Medium	24,360	$243,600	$956,617	$12,002,172	$8,429,823	$9,088,720	$7,374,815
SA, WA and TAS	Small	33,636	$336,360	$1,320,886	$16,572,457	$11,639,800	$12,549,598	$10,183,058
SA, WA and TAS	Micro	1,224	$12,240	$48,066	$603,065	$423,567	$456,675	$370,557
Subtotal SA, WA and TAS		*65,720*	*$657,200*	*$2,533,274*	*$31,904,737*	$22,408,552	$24,169,072	$19,604,079
Total		**357,689**	**$3,576,894**	***$13,523,390***	***$171,002,839***	***$120,105,238***	***$129,592,083***	***$105,073,842***

[259] Based on number of hens housed (see Table A1.4) x 4% mortality rate (see Panel A4.2)
[260] Calculated as number of hens affected annually x $10 (see Panel A4.2)
[261] Calculated as No. hens affected annually x 15 dozen eggs per layer lost x average farm gate price of a dozen barn or free range eggs (see Panel A2.2).

Appendix 5: Summary of incremental costs under Options C, D, E, F and G (layer hens)

Appendix 5 summarises the costs of the proposed standards (taken from appendix 2), as well as the costs of phasing out conventional cages over 10 years and 20 years under Option D (taken from appendix 3) and the costs of adopting variations of the standards under Options E (densities), F (furnished cages) and G (no hot blade or 2nd beak trim).

As shown in Table A5.1, the total incremental cost of Option C is estimated to be ***$517.01m over 10 years in present value dollars***.

Table A5.1: Summary of estimated costs of Option C by layer farm size and grouping of states – present value dollars ($m)

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Total
(Cage)					
NSW, QLD and VIC	Large	$0.10	$8.08	$29.72	$37.90
NSW, QLD and VIC	Medium	$0.58	$14.40	$52.96	$67.94
NSW, QLD and VIC	Small	$0.67	$4.07	$14.95	$19.69
NSW, QLD and VIC	Micro	$0.00	$0.04	$0.14	$0.18
(Barn)					
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.10	$2.11	$14.10	$16.31
NSW, QLD and VIC	Small	$0.45	$3.58	$23.91	$27.95
NSW, QLD and VIC	Micro	$0.00	$0.04	$0.30	$0.34
(Free range)					
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.23	$6.15	$71.45	$77.83
NSW, QLD and VIC	Small	$1.93	$13.86	$161.08	$176.88
NSW, QLD and VIC	Micro	$0.00	$0.27	$3.09	$3.36
Subtotal NSW, QLD and VIC		$4.07	$52.61	$371.71	$428.39
(Cage)					
SA, WA and TAS	Large	$0.03	$1.64	$6.04	$7.72
SA, WA and TAS	Medium	$0.05	$0.66	$2.42	$3.12
SA, WA and TAS	Small	$0.22	$1.17	$4.31	$5.70
SA, WA and TAS	Micro	$0.00	$0.01	$0.05	$0.07
(Barn)					
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Small	$0.19	$0.53	$3.56	$4.28
SA, WA and TAS	Micro	$0.00	$0.04	$0.27	$0.31
(Free range)					
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.10	$2.18	$25.29	$27.57

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Total
SA, WA and TAS	Small	$0.56	$3.01	$34.92	$38.48
SA, WA and TAS	Micro	$0.00	$0.11	$1.27	$1.38
Subtotal SA, WA and TAS		$1.14	$9.35	$78.13	$88.62
Total		***$5.21***	***$61.97***	***$449.83***	***$517.01***
Layer farm size					
Total large		$0.13	$9.73	$35.76	$45.62
Total Medium		$1.06	$25.50	$166.21	$192.77
Total Small		$4.02	$26.23	$242.73	$272.98
Total Micro		$0.00	$0.51	$5.13	$5.64
Total		***$5.21***	***$61.97***	***$449.83***	***$517.01***
Production system					
Total cage		$1.66	$30.08	$110.59	$142.32
Total barn		$0.74	$6.32	$42.14	$49.20
Total free range		$2.82	$25.57	$297.11	$325.50
Total		***$5.21***	***$61.97***	***$449.83***	***$517.01***

As shown in Table A5.2, the total incremental cost of Option D with a phase out of conventional cages over 10 years is estimated to be ***$1.34b over 10 years in present value dollars***.

Table A5.2: Summary of estimated costs of Option D (10-year phase out of conventional cages) by layer farm size and grouping of states – present value dollars ($m)

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option D phase out of conventional cages over 10 years	Total
(Cage)						
NSW, QLD and VIC	Large	$0.10	$3.64	$17.30	$176.04	$193.16
NSW, QLD and VIC	Medium	$0.58	$6.48	$30.82	$313.68	$344.58
NSW, QLD and VIC	Small	$0.67	$1.95	$9.28	$88.56	$98.36
NSW, QLD and VIC	Micro	$0.00	$0.02	$0.08	$0.83	$0.91
(Barn)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.10	$6.28	$47.41	$0.00	$48.26
NSW, QLD and VIC	Small	$0.45	$10.65	$80.42	$0.00	$82.14
NSW, QLD and VIC	Micro	$0.00	$0.13	$1.01	$0.00	$1.02
(Free range)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.23	$9.18	$102.83	$0.00	$116.07
NSW, QLD and VIC	Small	$1.93	$20.70	$231.81	$0.00	$263.08
NSW, QLD and VIC	Micro	$0.00	$0.40	$4.45	$0.00	$5.02
Subtotal NSW, QLD and VIC		$4.07	$59.42	$525.41	$579.12	$1,152.58

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option D phase out of conventional cages over 10 years	Total
(Cage)						
SA, WA and TAS	Large	$0.03	$0.74	$3.51	$35.77	$39.26
SA, WA and TAS	Medium	$0.05	$0.30	$1.41	$14.31	$15.74
SA, WA and TAS	Small	$0.22	$0.54	$2.59	$25.52	$28.29
SA, WA and TAS	Micro	$0.00	$0.01	$0.03	$0.31	$0.34
(Barn)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Small	$0.19	$2.06	$15.59	$0.00	$16.02
SA, WA and TAS	Micro	$0.00	$0.16	$1.18	$0.00	$1.19
(Free range)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.10	$2.77	$31.08	$0.00	$35.11
SA, WA and TAS	Small	$0.56	$3.83	$42.91	$0.00	$48.89
SA, WA and TAS	Micro	$0.00	$0.14	$1.56	$0.00	$1.76
Subtotal SA, WA and TAS		$1.14	$10.55	$99.85	$75.91	$186.60
Total		***$5.21***	***$69.97***	***$625.26***	***$655.03***	***$1,339.18***
Layer farm size						
Total large		$0.13	$4.38	$20.81	$211.81	$232.42
Total Medium		$1.06	$25.01	$213.54	$327.99	$559.75
Total Small		$4.02	$39.74	$382.60	$114.08	$536.77
Total Micro		$0.00	$0.85	$8.31	$1.15	$10.25
Total		***$5.21***	***$69.97***	***$625.26***	***$655.03***	***$1,339.18***
Production system						
Total cage		$1.66	$13.67	$65.02	$655.03	$720.63
Total barn		$0.74	$19.28	$145.61	$0.00	$148.63
Total free range		$2.82	$37.02	$414.64	$0.00	$469.93
Total		***$5.21***	***$69.97***	***$625.26***	***$655.03***	***$1,339.18***

As shown in Table A5.3, the total incremental cost of Option D with a phase out of conventional cages over 20 years is estimated to be ***$932.64m over 10 years in present value dollars***.

Table A5.3: Summary of estimated costs of Option D (20-year phase out of conventional cage) by layer farm size and grouping of states – present value dollars ($m)

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option D phase out of conventional cages over 20 years	Total
(Cage)						
NSW, QLD and VIC	Large	$0.10	$5.86	$27.87	$89.24	$116.75
NSW, QLD and VIC	Medium	$0.58	$10.44	$49.65	$159.02	$208.44
NSW, QLD and VIC	Small	$0.67	$3.01	$14.31	$44.89	$59.64
NSW, QLD and VIC	Micro	$0.00	$0.03	$0.13	$0.42	$0.55
(Barn)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.10	$4.20	$31.69	$0.00	$32.28
NSW, QLD and VIC	Small	$0.45	$7.12	$53.75	$0.00	$55.04
NSW, QLD and VIC	Micro	$0.00	$0.09	$0.67	$0.00	$0.68
(Free range)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.23	$7.67	$85.86	$0.00	$96.95
NSW, QLD and VIC	Small	$1.93	$17.28	$193.55	$0.00	$219.98
NSW, QLD and VIC	Micro	$0.00	$0.33	$3.72	$0.00	$4.19
Subtotal NSW, QLD and VIC		$4.07	$56.02	$461.19	$293.58	$794.51
(Cage)						
SA, WA and TAS	Large	$0.03	$1.19	$5.66	$18.13	$23.74
SA, WA and TAS	Medium	$0.05	$0.48	$2.26	$7.25	$9.53
SA, WA and TAS	Small	$0.22	$0.86	$4.08	$12.94	$17.17
SA, WA and TAS	Micro	$0.00	$0.01	$0.05	$0.16	$0.21
(Barn)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Small	$0.19	$1.30	$9.81	$0.00	$10.15
SA, WA and TAS	Micro	$0.00	$0.10	$0.74	$0.00	$0.75
(Free range)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.10	$2.48	$27.73	$0.00	$31.34
SA, WA and TAS	Small	$0.56	$3.42	$38.29	$0.00	$43.69
SA, WA and TAS	Micro	$0.00	$0.12	$1.39	$0.00	$1.57
Subtotal SA, WA and TAS		$1.14	$9.95	$90.02	$38.48	$138.14
Total		***$5.21***	***$65.97***	***$551.21***	***$332.06***	***$932.64***
Layer farm size						
Total large		$0.13	$7.05	$33.53	$107.38	$140.49
Total Medium		$1.06	$25.25	$197.19	$166.27	$378.54
Total Small		$4.02	$32.98	$313.78	$57.83	$405.67
Total Micro		$0.00	$0.68	$6.70	$0.58	$7.95

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option D phase out of conventional cages over 20 years	Total
Total		***$5.21***	***$65.97***	***$551.21***	***$332.06***	***$932.64***
Production system						
Total cage		$1.66	$21.87	$104.01	$332.06	$436.02
Total barn		$0.74	$12.80	$96.66	$0.00	$98.91
Total free range		$2.82	$31.30	$350.54	$0.00	$397.71
Total		***$5.21***	***$65.97***	***$551.21***	***$332.06***	***$932.64***

As shown in Table A5.4, the total incremental cost of Option E is estimated to be ***$699.34m over 10 years in present value dollars***.

Table A5.4: Summary of estimated costs of Option E by layer farm size and grouping of states – present value dollars ($m)

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option E reduce stocking densities	Total
(Cage)						
NSW, QLD and VIC	Large	$0.10	$8.08	$29.72	$0.00	$37.90
NSW, QLD and VIC	Medium	$0.58	$14.40	$52.96	$0.00	$67.94
NSW, QLD and VIC	Small	$0.67	$4.07	$14.95	$0.00	$19.69
NSW, QLD and VIC	Micro	$0.00	$0.04	$0.14	$0.00	$0.18
(Barn)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.10	$2.11	$14.10	$12.01	$28.32
NSW, QLD and VIC	Small	$0.45	$3.58	$23.91	$20.36	$48.32
NSW, QLD and VIC	Micro	$0.00	$0.04	$0.30	$0.28	$0.63
(Free range)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.23	$6.15	$71.45	$35.15	$112.98
NSW, QLD and VIC	Small	$1.93	$13.86	$161.08	$79.24	$256.11
NSW, QLD and VIC	Micro	$0.00	$0.27	$3.09	$1.69	$5.05
Subtotal NSW, QLD and VIC		$4.07	$52.61	$371.71	$148.73	$577.12
(Cage)						
SA, WA and TAS	Large	$0.03	$1.64	$6.04	$0.00	$7.72
SA, WA and TAS	Medium	$0.05	$0.66	$2.42	$0.00	$3.12
SA, WA and TAS	Small	$0.22	$1.17	$4.31	$0.00	$5.70
SA, WA and TAS	Micro	$0.00	$0.01	$0.05	$0.00	$0.07
(Barn)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Small	$0.19	$0.53	$3.56	$3.03	$7.31

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option E reduce stocking densities	Total
SA, WA and TAS	Micro	$0.00	$0.04	$0.27	$0.25	$0.56
(Free range)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.10	$2.18	$25.29	$12.44	$40.01
SA, WA and TAS	Small	$0.56	$3.01	$34.92	$17.18	$55.66
SA, WA and TAS	Micro	$0.00	$0.11	$1.27	$0.69	$2.07
Subtotal SA, WA and TAS		$1.14	$9.35	$78.13	$33.60	$122.22
Total		***$5.21***	***$61.97***	***$449.83***	***$182.33***	***$699.34***
Layer farm size						
Total large		$0.13	$9.73	$35.76	$0.00	$45.62
Total Medium		$1.06	$25.50	$166.21	$59.59	$252.37
Total Small		$4.02	$26.23	$242.73	$119.81	$392.79
Total Micro		$0.00	$0.51	$5.13	$2.92	$8.56
Total		***$5.21***	***$61.97***	***$449.83***	***$182.33***	***$699.34***
Production system						
Total cage		$1.66	$30.08	$110.59	$0.00	$142.32
Total barn		$0.74	$6.32	$42.14	$35.94	$85.14
Total free range		$2.82	$25.57	$297.11	$146.39	$471.88
Total		***$5.21***	***$61.97***	***$449.83***	***$182.33***	***$699.34***

As shown in Table A5.5, the total incremental cost of Option F is estimated to be ***$935.41m over 10 years in present value dollars***.

Table A5.5: Summary of estimated costs of Option F by layer farm size and grouping of states – present value dollars ($m)

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option F furnished cages[262]	Total
(Cage)						
NSW, QLD and VIC	Large	$0.10	$8.08	$29.72	$112.45	$150.35
NSW, QLD and VIC	Medium	$0.58	$14.40	$52.96	$200.36	$268.30
NSW, QLD and VIC	Small	$0.67	$4.07	$14.95	$56.57	$76.26
NSW, QLD and VIC	Micro	$0.00	$0.04	$0.14	$0.53	$0.71
(Barn)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.10	$2.11	$14.10	$0.00	$16.31
NSW, QLD and VIC	Small	$0.45	$3.58	$23.91	$0.00	$27.95
NSW, QLD and VIC	Micro	$0.00	$0.04	$0.30	$0.00	$0.34
(Free range)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00

[262] Sourced from Table A4.2

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option F furnished cages[262]	Total
NSW, QLD and VIC	Medium	$0.23	$6.15	$71.45	$0.00	$77.83
NSW, QLD and VIC	Small	$1.93	$13.86	$161.08	$0.00	$176.88
NSW, QLD and VIC	Micro	$0.00	$0.27	$3.09	$0.00	$3.36
Subtotal NSW, QLD and VIC		$4.07	$52.61	$371.71	$369.91	$798.30
(Cage)						
SA, WA and TAS	Large	$0.03	$1.64	$6.04	$22.85	$30.56
SA, WA and TAS	Medium	$0.05	$0.66	$2.42	$9.14	$12.26
SA, WA and TAS	Small	$0.22	$1.17	$4.31	$16.30	$22.00
SA, WA and TAS	Micro	$0.00	$0.01	$0.05	$0.20	$0.27
(Barn)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Small	$0.19	$0.53	$3.56	$0.00	$4.28
SA, WA and TAS	Micro	$0.00	$0.04	$0.27	$0.00	$0.31
(Free range)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.10	$2.18	$25.29	$0.00	$27.57
SA, WA and TAS	Small	$0.56	$3.01	$34.92	$0.00	$38.48
SA, WA and TAS	Micro	$0.00	$0.11	$1.27	$0.00	$1.38
Subtotal SA, WA and TAS		$1.14	$9.35	$78.13	$48.49	$137.11
Total		***$5.21***	***$61.97***	***$449.83***	***$418.39***	***$935.41***
Layer farm size						
Total large		$0.13	$9.73	$35.76	$135.29	$180.91
Total Medium		$1.06	$25.50	$166.21	$209.50	$402.27
Total Small		$4.02	$26.23	$242.73	$72.87	$345.85
Total Micro		$0.00	$0.51	$5.13	$0.73	$6.37
Total		***$5.21***	***$61.97***	***$449.83***	***$418.39***	***$935.41***
Production system						
Total cage		$1.66	$30.08	$110.59	$418.39	$560.71
Total barn		$0.74	$6.32	$42.14	$0.00	$49.20
Total free range		$2.82	$25.57	$297.11	$0.00	$325.50
Total		***$5.21***	***$61.97***	***$449.83***	***$418.39***	***$935.41***

As shown in Table A5.6, the total incremental cost of Option G is estimated to be ***$637.12m over 10 years in present value dollars***.

Table A5.6: Summary of estimated costs of Option G by layer farm size and grouping of states – present value dollars ($m)

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option G no 2nd beak trim	Total
(Cage)						
NSW, QLD and VIC	Large	$0.10	$8.08	$29.72	$0.00	$37.90
NSW, QLD and VIC	Medium	$0.58	$14.40	$52.96	$0.00	$67.94
NSW, QLD and VIC	Small	$0.67	$4.07	$14.95	$0.00	$19.69
NSW, QLD and VIC	Micro	$0.00	$0.04	$0.14	$0.00	$0.18
(Barn)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.10	$2.11	$14.10	$7.05	$23.36
NSW, QLD and VIC	Small	$0.45	$3.58	$23.91	$11.96	$39.91
NSW, QLD and VIC	Micro	$0.00	$0.04	$0.30	$0.15	$0.49
(Free range)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.23	$6.15	$71.45	$23.82	$101.65
NSW, QLD and VIC	Small	$1.93	$13.86	$161.08	$53.69	$230.57
NSW, QLD and VIC	Micro	$0.00	$0.27	$3.09	$1.03	$4.39
Subtotal NSW, QLD and VIC		$4.07	$52.61	$371.71	$97.70	$526.09
(Cage)						
SA, WA and TAS	Large	$0.03	$1.64	$6.04	$0.00	$7.72
SA, WA and TAS	Medium	$0.05	$0.66	$2.42	$0.00	$3.12
SA, WA and TAS	Small	$0.22	$1.17	$4.31	$0.00	$5.70
SA, WA and TAS	Micro	$0.00	$0.01	$0.05	$0.00	$0.07
(Barn)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Small	$0.19	$0.53	$3.56	$1.78	$6.06
SA, WA and TAS	Micro	$0.00	$0.04	$0.27	$0.13	$0.44
(Free range)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.10	$2.18	$25.29	$8.43	$36.00
SA, WA and TAS	Small	$0.56	$3.01	$34.92	$11.64	$50.12
SA, WA and TAS	Micro	$0.00	$0.11	$1.27	$0.42	$1.80
Subtotal SA, WA and TAS		$1.14	$9.35	$78.13	$22.41	$111.03
Total		***$5.21***	***$61.97***	***$449.83***	***$120.11***	***$637.12***
Layer farm size						
Total large		$0.13	$9.73	$35.76	$0.00	$45.62
Total Medium		$1.06	$25.50	$166.21	$39.30	$232.07
Total Small		$4.02	$26.23	$242.73	$79.07	$352.05
Total Micro		$0.00	$0.51	$5.13	$1.74	$7.38
Total		***$5.21***	***$61.97***	***$449.83***	***$120.11***	***$637.12***

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option G no 2nd beak trim	Total
Production system						
Total cage		$1.66	$30.08	$110.59	$0.00	$142.32
Total barn		$0.74	$6.32	$42.14	$21.07	$70.27
Total free range		$2.82	$25.57	$297.11	$99.04	$424.53
Total		***$5.21***	***$61.97***	***$449.83***	***$120.11***	***$637.12***

Finally, Table A5.7, summarises the total incremental cost of all Options. The most expensive option is deemed to be Option D (phasing out of conventional cages over 10 years) at $1.34b over 10 years in 2016-17 dollars.

Table A5.7: Summary of estimated costs of Options B, C, D (10-year and 20-year phase out of conventional cages), E, F and G by layer farm size and grouping of states – present value dollars ($m)

Option	Description	Additional cost of option	SA6.3 6.4 6.5	SA9.4 9.5 9.6	SA9.15	Total cost
B	Convert the proposed national standards into national voluntary guidelines (the minimum intervention option)	N/A	$0	$0	$0	***$0***
C	Adopt the proposed standards as currently drafted]	N/A	$5.21	$61.97	$449.83	***$517.01***
D (10-year phase out of cages)	Vary the proposed standards to phase out conventional cages for chicken layers over 10 years in favour of alternative systems 'typical' free range/barn/aviary or furnished cages.	$655.03	$5.21	$69.97	$608.97	***$1,339.18***
D (20-year phase out of cages)	Vary the proposed standards to phase out conventional cages for chicken layers over 20 years in favour of alternative systems 'typical' free range/barn/aviary or furnished cages.	$332.06	$5.21	$65.97	$529.40	***$932.64***
E	Vary the proposed standards to reduce maximum stocking densities for layer hens to 9 birds per m^2	$182.33	$5.21	$61.97	$449.83	***$699.34***
F	Vary the proposed standards to require the availability of nests, perches and litter for all chicken layers in cage and non-cage systems	$418.39	$5.21	$61.97	$449.83	***$935.41***
G	Vary the proposed standards to ban castration, pinioning and devoicing. And no hot blade beak trimming at hatcheries, no routine 2nd beak trim – unless exceptional circumstances (hot blade permitted in this circumstance)	$120.11	$5.21	$61.97	$449.83	***$637.12***

Appendix 6: Population data for meat chickens and meat turkeys

The following data in Appendix 6 is used to estimate the quantifiable costs of the relevant proposed standards or variations under the options on the meat chicken industry (Appendices 7 and 8) and turkey broiler and breeder farming industries (Appendices 11 and 12). Where specified, data and estimates have been provided by the Australian Chicken Meat Federation (ACMF) as part of the RIS process and are used for the analysis in Appendices 7 to 12.[263]

A6.1 Meat chicken population data

The data presented in Tables A6.1 to Tables A6.3264 is relevant for the costing of Options C (the proposed standards) and E (variation of the proposed standards) - as relevant for the analysis of the meat chicken farming industry in Appendices 7 and 8 under these two options, respectively. Information regarding individual states of South Australia, Western Australia and Tasmania has been grouped at the request of ACMF for commercial confidentiality purposes. The number and distribution of chicken meat farms is provided in Tables A6.1 and A6.2, respectively.

Table A6.1: No. meat chicken farms by business size and state/state grouping as at November 2016

Size of meat chicken farm	QLD	NSW	VIC	SA WA and TAS	Total
Large	29	11	16	9	**65**
Medium	0	24	4	11	**39**
Small	103	189	175	114	**581**
Total	***132***	***224***	***195***	***134***	***685***

Table A6.2: Distribution of meat chicken farms by size of business ownership and state/state grouping as at November 2016

Size of meat chicken business	QLD	NSW	VIC	SA WA and TAS	Total
Large	21.97%	4.91%	8.21%	6.72%	**9.49%**
Medium	0.00%	10.71%	2.05%	8.21%	**5.69%**
Small	78.03%	84.38%	89.74%	85.07%	**84.82%**
Total	***100.00%***	***100.00%***	***100.00%***	***100.00%***	***100.00%***

The ACMF defines the size of a meat chicken business according to the number of full time equivalent employees (FTEs) as shown in Table A6.3. This categorisation is used to define business size for the purposes of this RIS.

[263] Please note that whilst no rounding has been done in the underlying spreadsheets, large figure estimates are shown in this RIS as whole numbers for simplicity of presentation, and therefore may be give the appearance of rounding errors if calculations are made manually from the tables. In other words, there are no rounding errors in the total figures presented in the tables, because these are derived from the underlying unrounded spreadsheets.

[264] Provided by ACMF

Table A6.3: Categorisation of meat chicken business size according to no. FTEs

Size of meat chicken business	No. FTEs
Large	200+
Medium	21 to 199
Small	up to 20

Tables A6.4 and A6.5 show the total annual tonnes of chicken meat produced and chickenime equivalent employees (FTEs) as shown in Table A6.3. This ing for 2015-16

Table A6.4: Total annual tonnes of chicken meat produced by quarter and state (2015-16)

Quarter	QLD	NSW	VIC	SA and WA	Total
Dec-2015	59,751	84,700	65,947	72,886	**283,284**
Mar-2016	59,530	87,541	62,533	77,027	**286,631**
Jun-2016	64,759	89,136	63,582	81,023	**298,500**
Sep-2016	66,368	87,748	64,220	77,451	**295,787**
Total annual	***250,408***	***349,125***	***256,282***	***308,387***	***1,164,202***

Source: *ABS, Cat.no.7215.0 - Livestock Products, Australia, Sept 2016*

Table A6.5: Total annual no. chicken's slaughtered by quarter and state (2015-16)

Quarter	QLD	NSW	VIC	SA and WA	Total
Dec-2015	33,140,771	45,335,369	33,683,943	39,700,529	151,860,612
Mar-2016	33,546,864	46,711,501	35,709,728	42,219,928	158,188,021
Jun-2016	36,874,619	47,747,131	35,390,982	43,121,151	163,133,883
Sep-2016	37,350,651	46,654,452	36,007,347	42,442,852	162,455,302
Total annual	***140,912,905***	***186,448,453***	***140,792,000***	***167,484,460***	***635,637,818***

Source: *ABS, Cat.no.7215.0 - Livestock Products, Australia, Sept 2016*

A6.2 Meat Turkey population data

The data presented in Table A6.6[265] is relevant for the costing of Options C and G - as relevant for the analysis of the turkey broiler and turkey breeder farming industries in Appendices 11 and 12. The number and distribution of turkey broiler farms is provided in Tables A6.6 and A6.7, respectively.

[265] Provided by ACMF

Table A6.6: No. turkey broiler farms by business size and state as at November 2016

Size of turkey broiler business	NSW	VIC	SA	Total
Large	10	5	0	**15**
Small	51	0	1	**52**
Total	***61***	***5***	***1***	***67***

Appendix 7: Estimation of incremental quantifiable costs of proposed standards under Options C, D, E, F and G (meat chickens)

Appendix 7 has been provided to show how the incremental quantifiable costs of the proposed standards as compared to the base case (Option A) have been estimated, including all assumptions made for those estimations. Proposed standards have been costed for a period of 10 years with an implementation of 2017/18. Net present value measures have been performed according to OBPR guidelines using a 7% discount rate with sensitivity discount rates of 3.5% and 10%.[266]

A7.1 Incremental cost of proposed standard SA6.2– lighting (Options C, D, E, F and G) (meat chickens)

Proposed standard SA6.2 would require that a person in charge must ensure that the light intensity for young poultry for the first 3 days after hatching is at least 20 Lux. The implication of this proposed standard for farms affected would be that in most cases there would need to be a rewiring of sheds, including the provision of more light points, and in some cases a need to completely upgrade the power supply to the entire farm – at an average cost of $7,700 per shed.

Panel A7.1: Assumptions used to estimate the cost of proposed standard SA6.2[267]

% of sheds affected on large size farms	8%
% of sheds affected on medium size farms	31%
% of sheds affected on small size farms	21%
Cost per shed	***$7,700***
no. sheds large size farms	5
No. sheds medium size farms	8
No. sheds small size farms	5

As shown in Table A7.1, the on-off cost of proposed standard SA6.2 is estimated to be approximately *$5.64m* or ***$5.27m over 10 years in 2016-17 dollars***.

[266] Please note that whilst no rounding has been done in the underlying spreadsheets, large figure estimates are shown in this RIS as whole numbers for simplicity of presentation, and therefore may be give the appearance of rounding errors if calculations are made manually from the tables. In other words, there are no rounding errors in the total figures presented in the tables, because these are derived from the underlying unrounded spreadsheets.

[267] Provided by ACMF.

Table A7.1: Estimated 10-year cost of proposed standard SA6.2 by business size (Options C, D, E, F and G)

States	Size of business	Total No. farms[268]	No. sheds affected[269]	Total one off cost of lighting infrastructure[270]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
QLD	Large	29	12	$89,320	$89,320	$83,477	$86,300	$81,200
QLD	Medium	0	0	$0	$0	$0	$0	$0
QLD	Small	103	108	$832,755	$832,755	$778,276	$804,594	$757,050
NSW	Large	11	4	$33,880	$33,880	$31,664	$32,734	$30,800
NSW	Medium	24	60	$458,304	$458,304	$428,321	$442,806	$416,640
NSW	Small	189	198	$1,528,065	$1,528,065	$1,428,098	$1,476,391	$1,389,150
VIC	Large	16	6	$49,280	$49,280	$46,056	$47,614	$44,800
VIC	Medium	4	10	$76,384	$76,384	$71,387	$73,801	$69,440
VIC	Small	175	184	$1,414,875	$1,414,875	$1,322,313	$1,367,029	$1,286,250
Subtotal NSW, QLD and VIC		551	582	$4,482,863	$4,482,863	$4,189,592	$4,331,269	$4,075,330
SA, WA and TAS	Large	9	4	$27,720	$27,720	$25,907	$26,783	$25,200
SA, WA and TAS	Medium	11	27	$210,056	$210,056	$196,314	$202,953	$190,960
SA, WA and TAS	Small	114	120	$921,690	$921,690	$861,393	$890,522	$837,900
Subtotal SA, WA and TAS		134	151	$1,159,466	$1,159,466	$1,083,613	$1,120,257	$1,054,060
Total		***685***	***733***	***$5,642,329***	***$5,642,329***	***$5,273,205***	***$5,451,526***	***$5,129,390***

A7.2 Incremental cost of proposed standard SA8.3– managing litter (Options C, D, E, F and G) (meat chickens)

Proposed standard SA8.3 would require that where litter is used a person in charge must manage litter to avoid excessive caking, dustiness or wetness that impacts on the welfare of poultry. The costs in involved in meeting this proposed standard for non-compliant farms would include:

- A one-off cost of purchase of facility upgrades and litter conditioning equipment;
- An ongoing cost of 1-2cm of additional litter per shed per batch[271];

[268] See Table A6.1 of Appendix 6 for source of estimates.
[269] Estimated as the product of the total no. farms (see Table A7.1) and the % of sheds affected by size of farm (see Panel A7.1)
[270] Estimated as the product of the no. sheds affected (see Table A7.1) and the cost per shed (see Panel A7.1)
[271] Litter is normally placed at 4-5 cm deep at the beginning of the batch

- An ongoing cost of additional labour for the time required for managing the litter[272] (mostly in tilling the litter); and
- Extra energy for the tilling of litter.

The assumptions used to estimate the cost of this proposed standard, including the percentage of meat chicken farms affected (i.e. non-compliant), is summarised in Panel A7.2.

Panel A7.2: Assumptions used to estimate the cost of proposed standard SA8.3[273]

% of farms affected (QLD Small)	8%
% of farms affected (NSW Medium)	100%
% of farms affected (NSW Small)	16%
% of farms affected (VIC Large)	12%
% of farms affected (VIC Small)	11%
% of farms affected (SA Small)	25%
One-off additional average cost of upgrading infrastructure per farm affected	$500,000
Annual additional average cost of litter required per farm affected	$34,000
Annual additional average labour cost per farm affected	$9,200
Annual additional average energy cost needed for tilling of the litter per farm affected	$11,110[274]

As shown in Table A7.2, the cost of proposed standard SA8.3 is estimated to be approximately *$106.03m* or ***$86.27m over 10 years in 2016-17 dollars***.

Table A7.2: Estimated 10-year cost of proposed standard SA8.3 by business size (Options C, D, E, F and G)

State/state grouping	Size of business	Total no. farms [275]	No. farms affected[276]	One off cost* of upgrading infrastructure [277]	Annual cost of additional litter labour and energy[278]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
QLD	Large	29	0	$0	$0	$0	$0	$0	$0
QLD	Medium	0	0	$0	$0	$0	$0	$0	$0
QLD	Small	103	8	$4,120,000	$447,513	$8,595,129	$6,993,611	$7,702,465	$6,495,228
NSW	Large	11	0	$0	$0	$0	$0	$0	$0
NSW	Medium	24	24	$12,000,000	$1,303,436	$25,034,357	$20,369,740	$22,434,364	$18,918,139
NSW	Small	189	30	$15,120,000	$1,642,329	$31,543,290	$25,665,873	$28,267,298	$23,836,856
VIC	Large	16	2	$960,000	$104,275	$2,002,749	$1,629,579	$1,794,749	$1,513,451
VIC	Medium	4	0	$0	$0	$0	$0	$0	$0
VIC	Small	175	19	$9,625,000	$1,045,464	$20,079,641	$16,338,229	$17,994,229	$15,173,924

[272] Mostly in tilling the litter
[273] Provided by ACMF.
[274] Estimated as the additional average labour cost per farm per annum ($21,035) divided by the additional energy (electricity and gas) needed for tilling of the litter per farm per annum ($17,419) (see Panel A11.1 of Appendix 11) x the average labour cost per farm affected ($9,200) (see Panel A7.1).
[275] See Table A6.1 for source of estimates
[276] Taken as the number of meat chicken farms by state and farm size x % of farms affected (i.e. non-compliance) by state and enterprise size (see Panel A7.2)
[277] Estimated as the product of the number of farms affected (see Table A7.2) x $500,000 per farm (see Panel A7.2)
[278] Estimated as the product of the number of farms affected (see Table A7.2) x $34,000 + $9,200 +$11,110 per farm (see Panel A7.2)

State/state grouping	Size of business	Total no. farms [275]	No. farms affected[276]	One off cost* of upgrading infrastructure [277]	Annual cost of additional litter labour and energy[278]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
Subtotal NSW, QLD and VIC		551	84	$41,825,000	$4,543,017	$87,255,167	$70,997,033	$78,193,105	$65,937,598
SA, WA and TAS	Large	9	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Medium	11	0	$0	$0	$0	$0	$0	$0
SA, WA and TAS	Small	114	29	$14,250,000	$1,547,830	$29,728,299	$24,189,067	$26,640,807	$22,465,290
Subtotal SA, WA and TAS		134	29	$14,250,000	$1,547,830	$29,728,299	$24,189,067	$26,640,807	$22,465,290
Total		***685***	***112***	***$56,075,000***	***$6,090,847***	***$116,983,466***	***$95,186,100***	***$104,833,911***	***$88,402,888***

* Including ventilation) and purchasing litter conditioning equipment

A7.2 Incremental cost of proposed standard SA11.7 – awaiting slaughter requirements (Options C, D, E, F and G) (meat chickens)

Proposed standard SA11.7 would require that a person must ensure all poultry held awaiting slaughtering must be protected from direct sunlight, radiant and reflected heat, and adverse weather such as rain and wind. Non-compliant processing plants would need to install large commercial shade sails, build additional standalone covered areas, or extend the existing lairage area under cover. The additional one-off cost of proposed standards SA11.7 therefore relates to the cost of upgrading facilities by extending the amount of undercover area in the lairage.

The assumptions used to estimate the cost of this proposed standard including the number of processing plants affected is summarised in Panel A7.3.

Panel A7.3: Assumptions used to estimate the cost of proposed standard SA11.7 for meat chickens at slaughtering plants[279]

No. processing plants[280]:	
QLD	2
NSW	3
VIC	1
SA, WA and TAS	3
Average one-off cost to upgrade a processing facility:	
Average one-off cost to upgrade a processing facility in QLD	$375,000
Average one-off cost to upgrade a processing facility in NSW	$666,667
Average one-off cost to upgrade a processing facility in VIC	$200,000
Average one-off cost to upgrade a processing facility in SA, WA and TAS	$416,667

[279] Provided by ACMF.
[280] All processing plants are large

As shown in Table A7.3, the one-off cost of proposed standard SA11.7 is estimated to be approximately *$4.2m* or ***$3.93m over 10 years in 2016-17 dollars***.

Table A7.3: Estimated one-off cost of proposed standard SA11.7 by state (Options C, D, E, F and G)

States	No. large processing plants affected[281]	One-off cost of upgrading a processing facility[282]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
QLD	2	$750,000	$750,000	$700,935	$724,638	$681,818
NSW	3	$2,000,000	$2,000,000	$1,869,159	$1,932,367	$1,818,182
VIC	1	$200,000	$200,000	$186,916	$193,237	$181,818
Subtotal NSW, QLD and VIC	6	$2,950,000	$2,950,000	$2,757,009	$2,850,242	$2,681,818
SA, WA and TAS	3	$1,250,000	$1,250,000	$1,168,224	$1,207,729	$1,136,364
Subtotal SA, WA and TAS	3	$1,250,000	$1,250,000	$1,168,224	$1,207,729	$1,136,364
Total	***9***	***$4,200,000***	***$4,200,000***	***$3,925,234***	***$4,057,971***	***$3,818,182***

Appendix 8: Estimation of incremental costs under variation to the proposed standards under Option E (meat chickens)

The estimation of the costs of reducing stocking densities of meat chickens to a maximum of 30kg/m^2 under Option E, is provided in this appendix. The estimation of costs under Option E is contingent to the data points provided in the following Panels A8.1 to A8.6 which has been provided by the ACMF based on consultation with the meat chicken industry. Costs per square metre or per shed can vary between states depending on the variability of geographical and/or local market considerations.[283] The *additional* costs of Option E are divided up into the following main categories:

- One-off *cost of creating new capacity* to accommodate a new maximum density of 30kg/m^2. This represents the cost of creating the additional floor space needed to grow the same number of birds as currently being grown[284];
- One-off *costs of pick up assets* required to accommodate additional floor space (sheds and/or farms), requiring more runs, more travel time between pickups etc. These pick-up assets include additional forklifts, prime movers and modules;
- One-off *costs of feed delivery assets* (i.e. feed trucks etc.) required to accommodate additional floor space (sheds and/or farms), requiring more runs (delivery points) more travel time between deliveries etc.;

[281] See Panel A7.3 for source of estimates
[282] Estimated as the product of the no. large processing plants affected (See Table A7.3) and the cost of upgrading a processing facility per state (See Panel A7.3)
[283] Please note that whilst no rounding has been done in the underlying spreadsheets, large figure estimates are shown in this RIS as whole numbers for simplicity of presentation, and therefore may be give the appearance of rounding errors if calculations are made manually from the tables. In other words, there are no rounding errors in the total figures presented in the tables, because these are derived from the underlying unrounded spreadsheets.
[284] Additional floor space assumes 14.5 birds/m2 per batch placed to stay under 30kg/m2.

- Annual *pick up labour costs* (i.e. additional labour to pick-up from additional farms and/or sheds required to accommodate additional floor space required by change).
- Annual *feed delivery costs* (i.e. delivering feed to new farms/sheds needed to accommodate the additional floor space required by change); and
- Annual *on-farm costs* required to accommodate the additional sheds/farms. These include ongoing power, litter supply, clean out, and farm labour costs.

Please note that whilst no rounding has been done in the underlying spreadsheets, large figure estimates are shown in this RIS as whole numbers for simplicity of presentation, and therefore may be give the appearance of rounding errors if calculations are made manually from the tables. In other words, there are no rounding errors in the total figures presented in the tables, because these are derived from the underlying unrounded spreadsheets.

Panel A8.1: Assumptions used to estimate the one-off cost of creating new capacity to accommodate a new maximum density of 30kg/m2 under Option E for meat chicken businesses[285]

State details	Data value
QLD	
Total additional square metres required	**246,696**
Total additional No. Sheds required	**110**
% of farms owned by large size businesses affected by new capacity requirement	13%
% of farms owned by medium size business affected by new capacity requirement	0%
% of farms owned by small size businesses affected by new capacity requirement	87%
Cost of new capacity per square metre	**$396**
NSW	
Total additional square metres required	**359,200**
Total additional No. Sheds required	**160**
% of farms owned by large size businesses affected by new capacity requirement	9%
% of farms owned by medium size businesses affected by new capacity requirement	25%
% farms of owned by small size businesses affected by new capacity requirement	66%
Cost of new capacity per square metre	**$482**
VIC	
Total additional square metres required	**202,033**
Total additional No. Sheds required	**90**
% of farms owned by large size businesses affected by new capacity requirement	9.3%
% of farms owned by medium size businesses affected by new capacity requirement	0.0%
% of farms owned by small size businesses affected by new capacity requirement	90.7%
Cost of new capacity per square metre	**$400**
SA	
Total additional square metres required	**127,832**

[285] Provided by ACMF.

State details	Data value
Total additional No. Sheds required	**57**
% of farms owned by large size businesses affected by new capacity requirement	0%
% of farms owned by medium size businesses affected by new capacity requirement	0%
% of farms owned by small size businesses affected by new capacity requirement	100%
Cost of new capacity per square metre	**$367**
WA	
Total additional square metres required	**30,964**
Total additional No. Sheds required	**14**
% of farms owned by large size businesses affected by new capacity requirement	23%
% of farms owned by medium size businesses affected by new capacity requirement	0%
% of farms owned by small size businesses affected by new capacity requirement	77%
Cost of new capacity per square metre	**$546**

Panel A8.2: Assumptions used to estimate the one-off cost of additional pick up assets under Option E for meat chicken businesses[286]

State details	Data value
QLD	
% costs incurred by large size businesses affected by additional pick up assets	100%
% costs incurred by medium size businesses affected by the need for additional pick up assets	0%
% costs incurred by small size businesses affected by the need for additional pick up assets	0%
Cost of additional pick up assets per new shed	**$38,000**
NSW	
% costs incurred by large size businesses affected by additional pick up assets	100%
% costs incurred by medium size businesses affected by the need for additional pick up assets	0%
% costs incurred by small size businesses affected by the need for additional pick up assets	0%
Cost of additional pick up assets per new shed	**$57,000**
VIC	
% costs incurred by large size businesses affected by additional pick up assets	100%
% costs incurred by medium size businesses affected by the need for additional pick up assets	0%
% costs incurred by small size businesses affected by the need for additional pick up assets	0%
Cost of additional pick up assets per new shed	**$54,700**
SA	

[286] Provided by ACMF.

State details	Data value
% costs incurred by large size businesses affected by additional pick up assets	87.7%
% costs incurred by medium size businesses affected by the need for additional pick up assets	12.3%
% costs incurred by small size businesses affected by the need for additional pick up assets	0%
Cost of additional pick up assets per new shed	**$40,000**
WA	
% costs incurred by large size businesses v affected by additional pick up assets	100%
% costs incurred by medium size businesses affected by the need for additional pick up assets	0%
% costs incurred by small size businesses affected by the need for additional pick up assets	0%
Cost of additional pick up assets per new shed	**$34,000**

Panel A8.3: Assumptions used to estimate the one-off cost of additional feed delivery assets under Option E for meat chicken businesses[287]

State details	Data value
QLD	
% costs incurred by large size businesses affected by the need for additional feed delivery assets	100%
% costs incurred by medium size businesses affected by the need for additional feed delivery assets	0%
% costs incurred by small size businesses affected by the need for additional feed delivery assets	0%
Cost of additional feed delivery assets per new shed	**$38,000**
NSW	
% costs incurred by large size businesses affected by the need for additional feed delivery assets	100%
% costs incurred by medium size businesses affected by the need for additional feed delivery assets	0%
% costs incurred by small size businesses affected by the need for additional feed delivery assets	0%
Cost of additional feed delivery assets per new shed	**$63,000**
VIC	
% costs incurred by large size businesses affected by the need for additional feed delivery assets	100.0%
% costs incurred by medium size businesses affected by the need for additional feed delivery assets	0.0%
% costs incurred by small size businesses affected by the need for additional feed delivery assets	0.0%
Cost of additional feed delivery assets per new shed	**$13,460**
SA	
% costs incurred by large size businesses affected by the need for additional feed delivery assets	100.0%
% costs incurred by medium size businesses affected by the need for additional feed delivery assets	0.0%

[287] Provided by ACMF.

State details	Data value
% costs incurred by small size businesses affected by the need for additional feed delivery assets	0%
Cost of additional feed delivery assets per new shed	**$30,000**
WA	
% costs incurred by large size businesses affected by the need for additional feed delivery assets	100%
% costs incurred by medium size businesses affected by the need for additional feed delivery assets	0%
% costs incurred by small size businesses affected by the need for additional feed delivery assets	0%
Cost of additional feed delivery assets per new shed	**$42,800**

Panel A8.4: Assumptions used to estimate the annual cost of additional pick up under Option E for meat chicken businesses[288]

State details	Data value
QLD	
% costs incurred by large size businesses affected by additional annual pick up costs	100%
% costs incurred by medium size businesses affected by additional annual pick up costs	0%
% costs incurred by small size businesses affected by additional annual pick up costs	0%
Cost of additional annual pick up per new shed	**$20,000**
NSW	
% costs incurred by large size businesses affected by additional annual pick up costs	100%
% costs incurred by medium size businesses affected by additional annual pick up costs	0%
% costs incurred by small size businesses affected by additional annual pick up costs	0%
Cost of additional annual pick up per new shed	**$20,000**
VIC	
% costs incurred by large size businesses affected by additional annual pick up costs	100%
% costs incurred by medium size businesses affected by additional annual pick up costs	0%
% costs incurred by small size businesses affected by additional annual pick up costs	0%
Cost of additional annual pick up per new shed	**$20,000**
SA	
% costs incurred by large size businesses affected by additional annual pick up costs	87.7%
% costs incurred by medium size businesses affected by additional annual pick up costs	12.3%
% costs incurred by small size businesses affected by additional annual pick up costs	0%
Cost of additional annual pick up per new shed	**$20,000**

[288] Provided by ACMF.

State details	Data value
WA	
% costs incurred by large size businesses affected by additional annual pick up costs	100%
% costs incurred by medium size businesses affected by additional annual pick up costs	0%
% costs incurred by small size businesses affected by additional annual pick up costs	0%
Cost of additional annual pick up per new shed	**$20,000**

Panel A8.5: Assumptions used to estimate the annual cost of additional feed delivery under Option E for meat chicken farms[289]

State details	Data value
QLD	
% costs incurred by large size businesses affected by additional feed delivery costs	100%
% costs incurred by medium size businesses affected by additional annual feed delivery costs	0%
% costs incurred by small size businesses affected by additional annual feed delivery costs	0%
Cost of additional annual feed delivery per new shed	**$13,360**
NSW	
% costs incurred by large size businesses affected by additional feed delivery costs	100%
% costs incurred by medium size businesses affected by additional annual feed delivery costs	0%
% costs incurred by small size businesses affected by additional annual feed delivery costs	0%
Cost of additional annual feed delivery per new shed	**$30,900**
VIC	
% costs incurred by large size businesses affected by additional feed delivery costs	100%
% costs incurred by medium size businesses affected by additional annual feed delivery costs	0%
% costs incurred by small size businesses affected by additional annual feed delivery costs	0%
Cost of additional annual feed delivery per new shed	**$12,000**
SA	
% costs incurred by large size businesses affected by additional feed delivery costs	87.7%
% costs incurred by medium size businesses affected by additional annual feed delivery costs	12.3%
% costs incurred by small size businesses affected by additional annual feed delivery costs	0%
Cost of additional annual feed delivery per new shed	**$10,640**
WA	
% costs incurred by large size businesses affected by additional feed delivery costs	100%

[289] Provided by ACMF.

State details	Data value
% costs incurred by medium size businesses affected by additional annual feed delivery costs	0%
% costs incurred by small size businesses affected by additional annual feed delivery costs	0%
Cost of additional annual feed delivery per new shed	**$16,790**

Panel A8.6: Assumptions used to estimate the annual cost of additional on-farm requirements including litter, labour and energy under Option E for meat chicken businesses[290]

State details	Data value
QLD	
% costs incurred by large size businesses affected by additional annual on-farm costs	13%
% costs incurred by medium size businesses affected by additional annual on-farm costs	0%
% costs incurred by small size businesses affected by additional annual on-farm costs	87%
Cost of additional annual on-farm costs per new shed	**$97,171.00**
NSW	
% costs incurred by large size businesses affected by additional annual on-farm costs	9%
% costs incurred by medium size businesses affected by additional annual on-farm costs	25%
% costs incurred by small size businesses affected by additional annual on-farm costs	66%
Cost of additional annual on-farm costs per new shed	**$97,171.00**
VIC	
% costs incurred by large size businesses affected by additional annual on-farm costs	9.3%
% costs incurred by medium size businesses affected by additional annual on-farm costs	0.0%
% costs incurred by small size businesses affected by additional annual on-farm costs	90.7%
Cost of additional annual on-farm costs per new shed	**$97,171.00**
SA	
% costs incurred by large size businesses affected by additional annual on-farm costs	0%
% costs incurred by medium size businesses affected by additional annual on-farm costs	0%
% costs incurred by small size businesses affected by additional annual on-farm costs	100%
Cost of additional annual on-farm costs per new shed	**$97,171.00**
WA	
% costs incurred by large size businesses affected by additional annual on-farm costs	23%
% costs incurred by medium size businesses affected by additional annual on-farm costs	0%
% costs incurred by small size businesses affected by additional annual on-farm costs	77%
Cost of additional annual on-farm costs per new shed	**$97,171.00**

As shown in Table A8.1, the total combined one-off costs of the variation of the proposed standards under Option E is estimated to be approximately $423.88m with combined total annual costs of *$34.10m* or overall costs of ***$635.64m over 10 years in 2016-17 dollars***.

[290] Provided by ACMF.

Table A8.1: Estimated 10-year cost of variation of the proposed standards under Option E for meat chicken farms by business size ($m)

States	Size of meat chicken business	New sheds needed [291]	Square metres new capacity needed[292]	One-off cost of new capacity[293]	One-off cost of[294] pick up assets	One-off cost of food delivery assets[295]	Annual additional pick up costs[296]	Annual additional cost of delivering feed[297]	Annual additional on-farm costs[298]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
QLD	Large	14	31,084	$12.31	$0.53	$0.53	$0.28	$0.19	$0.17	$19.68	$16.93	$18.17	$16.03

[291] Sheds affected is estimated taking the product of the number of additional sheds required in each state and the % of large, medium and small meat chicken businesses affected in that state (See Panel A8.1).
[292] Square metres affected is estimated taking the product of the number of square metres required in each state and the % of large, medium and small meat chicken businesses affected in that state (See Panel A8.1).
[293] Estimated as the product of square metres affected in Table A8.1 and the cost of new capacity per square metre in each state (see Panel A8.1). For SA, WA and TAS this is estimated as sum of the product of square metres affected in these states; the % of large, medium and small meat chicken businesses affected in each state; and the cost of new capacity per square metres in each state (see Panel A8.1).
[294] Estimated as the product of new sheds needed in Table A8.1; the % of the costs borne by different size businesses affected by additional pick up asset costs in each state; and the cost of additional pick up assets per shed in each state (see Panel A8.2). For SA, WA and TAS this is estimated as the sum of the product of the number of sheds affected in these states; the % of the costs incurred by large, medium and small meat chicken businesses affected by additional pick up asset costs in each state; and the cost of additional pick up assets per shed in each state (see Panel A8.2).
[295] Estimated as the product of new sheds needed in Table A8.1; the % of the costs borne by different size businesses affected by additional food delivery asset costs in each state; and the cost of additional food delivery assets per new shed in each state (see Panel A8.3). For SA, WA and TAS this is estimated as the sum of the product of the number of new sheds needed in these states; the % of the cost borne by large, medium and small meat chicken businesses affected by additional food delivery asset costs in each state; and the cost of additional food delivery assets per new shed in each state (see Panel A8.3).
[296] Estimated as the product of new sheds needed in Table A8.1; the % of the costs borne by different sized businesses affected by additional by additional annual pick up costs in each state; and the cost of additional annual pick up per new shed in each state (see Panel A8.4). For SA, WA and TAS this is estimated as the sum of the product of the number of new sheds needed in these states; the % of the cost borne by large, medium and small meat chicken businesses affected by additional annual pick up costs in each state; and the cost of additional annual pick up per shed in each state (see Panel A8.4).
[297] Estimated as the product of new sheds needed in Table A8.1; the % of the costs borne by different sized businesses affected by additional by additional annual feed delivery costs in each state; and the cost of additional annual feed delivery per new shed in each state (see Panel A8.4). For SA, WA and TAS this is estimated as the sum of the product of the number of new sheds needed in these states; the % of the costs borne by large, medium and small meat chicken businesses affected by additional annual feed delivery costs in each state; and the cost of additional annual feed delivery per new shed in each state (see Panel A8.5).
[298] Estimated as the product of new sheds needed in Table A8.1; the % of the costs borne by different sized businesses of the additional annual on-farm costs in each state; and the additional annual on-farm costs per new shed needed in each state (see Panel A8.4). For SA, WA and TAS this is estimated as the sum of the product of the number of new sheds needed in these states; the % of the costs borne by different sized businesses affected by additional annual on-farm costs in each state; and the additional annual on farm costs per new shed needed in each state (see Panel A8.6).

States	Size of meat chicken business	New sheds needed [291]	Square metres new capacity needed[292]	One-off cost of new capacity[293]	One-off cost of[294] pick up assets	One-off cost of food delivery assets[295]	Annual additional pick up costs[296]	Annual additional cost of delivering feed[297]	Annual additional on-farm costs[298]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
QLD	Medium	0	0	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
QLD	Small	96	215,612	$85.38	$0.00	$0.00	$0.00	$0.00	$8.16	$167.03	$137.14	$150.40	$127.79
NSW	Large	14	32,328	$15.58	$0.82	$0.91	$0.29	$0.44	$0.13	$25.90	$22.21	$23.87	$21.01
NSW	Medium	40	89,800	$43.28	$0.00	$0.00	$0.00	$0.00	$0.97	$53.00	$47.28	$49.90	$45.32
NSW	Small	106	237,072	$114.27	$0.00	$0.00	$0.00	$0.00	$6.77	$181.99	$154.36	$166.73	$145.49
VIC	Large	8	18,789	$7.52	$0.46	$0.11	$0.17	$0.10	$0.08	$11.52	$9.97	$10.67	$9.46
VIC	Medium	0	0	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
VIC	Small	82	183,244	$73.30	$0.00	$0.00	$0.00	$0.00	$7.19	$145.24	$119.03	$130.65	$110.84
Subtotal NSW, QLD and VIC		360	807,929	$351.64	$1.81	$1.55	$0.73	$0.73	$23.47	$604.37	$506.92	$550.39	$475.95
SA, WA and TAS	Large	3	7,122	$3.89	$2.48	$2.31	$1.28	$0.77	$0.31	$32.27	$24.68	$28.00	$22.38
SA, WA and TAS	Medium	0	0	$0.00	$0.28	$0.00	$0.14	$0.07	$0.00	$2.43	$1.77	$2.06	$1.57
SA, WA and TAS	Small	68	151,674	$59.93	$0.00	$0.00	$0.00	$0.00	$6.59	$125.79	$102.27	$112.68	$94.95
Subtotal SA, WA and TAS		71	158,796	$63.82	$2.76	$2.31	$1.42	$0.84	$6.90	$160.49	$128.72	$142.74	$118.91
Total		***431***	***966,725***	***$415.46***	***$4.56***	***$3.86***	***$2.15***	***$1.57***	***$30.37***	***$764.86***	***$635.64***	***$693.13***	***$594.86***

Appendix 9: Summary of incremental costs under Options C, D, E, F and G (meat chickens)

Appendix 9 summarises the costs of the proposed standards (taken from Appendix 7) as they apply to Options C, D, F and G, as well as the costs of reduced stocking densities under Option E (taken from Appendix 8).

As shown in Table A9.1, the total incremental cost of the proposed standards under Options C, D, F and G is estimated to be***$104.38m over 10 years in present value dollars***.

Table A9.1: Summary of estimated costs of Options C, D, F and G (meat chickens) by operation type/size and states/grouping of states – present value dollars ($m)

States/grouping of states	Business size/type	SA6.2	SA8.3	SA11.7	Total
QLD	Large meat chicken businesses	$0.08	$0.00	$0.00	$0.08
QLD	Medium meat businesses	$0.00	$0.00	$0.00	$0.00
QLD	Small meat chicken businesses	$0.78	$6.99	$0.00	$7.77
NSW	Large meat chicken businesses	$0.03	$0.00	$0.00	$0.03
NSW	Medium meat chicken businesses	$0.43	$20.37	$0.00	$20.80
NSW	Small meat chicken businesses	$1.43	$25.67	$0.00	$27.09
VIC	Large meat chicken businesses	$0.05	$1.63	$0.00	$1.68
VIC	Medium meat chicken businesses	$0.07	$0.00	$0.00	$0.07
VIC	Small meat businesses	$1.32	$16.34	$0.00	$17.66
QLD	Large chicken processing businesses	$0.00	$0.00	$0.70	$0.70
NSW	Large chicken processing businesses	$0.00	$0.00	$1.87	$1.87
VIC	Large chicken processing businesses	$0.00	$0.00	$0.19	$0.19
Subtotal NSW, QLD and VIC		$4.19	$71.00	$2.76	$77.94
SA, WA and TAS	Large meat chicken businesses	$0.03	$0.00	$0.00	$0.03
SA, WA and TAS	Medium meat chicken businesses	$0.20	$0.00	$0.00	$0.20
SA, WA and TAS	Small meat chicken businesses	$0.86	$24.19	$0.00	$25.05
SA, WA and TAS	Large chicken processing businesses	$0.00	$0.00	$1.17	$1.17
Subtotal SA, WA and TAS		$1.08	$24.19	$1.17	$26.44
Total		***$5.27***	***$95.19***	***$3.93***	***$104.38***
Business size					
Large		$0.19	$1.63	$3.93	$5.74
Medium		$0.70	$20.37	$0.00	$21.07
Small		$4.39	$73.19	$0.00	$77.58
Total		***$5.27***	***$95.19***	***$3.93***	***$104.38***

As shown in Table A9.2, the total incremental cost of the proposed standards under Option E is estimated to be ***$740.03m over 10 years in present value dollars***.

Table A9.2: Summary of estimated costs of Option E (meat chickens) by business size and states/grouping of states – present value dollars ($m)

States/grouping of states	Business size/type	SA6.2	SA8.3	SA9.11	Option E reduce stocking density	Total
QLD	Large meat chicken farms	$0.08	$0.00	$0.00	$16.93	$17.01
QLD	Medium meat chicken farms	$0.00	$0.00	$0.00	$0.00	$0.00
QLD	Small meat chicken farms	$0.78	$6.99	$0.00	$137.14	$144.92
NSW	Large meat chicken farms	$0.03	$0.00	$0.00	$22.21	$22.24
NSW	Medium meat chicken farms	$0.43	$20.37	$0.00	$47.28	$68.07
NSW	Small meat chicken farms	$1.43	$25.67	$0.00	$154.36	$181.45
VIC	Large meat chicken farms	$0.05	$1.63	$0.00	$9.97	$11.65
VIC	Medium meat chicken farms	$0.07	$0.00	$0.00	$0.00	$0.07
VIC	Small meat chicken farms	$1.32	$16.34	$0.00	$119.03	$136.69
QLD	Processing plants	$0.00	$0.00	$0.70	$0.00	$0.70
NSW	Processing plants	$0.00	$0.00	$1.87	$0.00	$1.87
VIC	Processing plants	$0.00	$0.00	$0.19	$0.00	$0.19
Subtotal NSW, QLD and VIC		$4.19	$71.00	$2.76	$506.92	$584.86
SA, WA and TAS	Large meat chicken farms	$0.03	$0.00	$0.00	$24.68	$24.70
SA, WA and TAS	Medium meat chicken farms	$0.20	$0.00	$0.00	$1.77	$1.97
SA, WA and TAS	Small meat chicken farms	$0.86	$24.19	$0.00	$102.27	$127.32
SA, WA and TAS	Processing plants	$0.00	$0.00	$1.17	$0.00	$1.17
Subtotal SA, WA and TAS		$1.08	$24.19	$1.17	$128.72	$155.16
Total		***$5.27***	***$95.19***	***$3.93***	***$635.64***	***$740.03***
Business size						
Large		$0.19	$1.63	$3.93	$73.79	$79.53
Medium		$0.70	$20.37	$0.00	$49.05	$70.11
Small		$4.39	$73.19	$0.00	$512.81	$590.38
Total		***$5.27***	***$95.19***	***$3.93***	***$635.64***	***$740.03***

Appendix 10: Estimation of incremental quantifiable costs of proposed standards under Option G (meat chicken and layer breeders)

According to ACMF, the requirement of *no hot blade beak trimming at hatcheries on poultry* under Option G, would result in at least one large breeder business in South Australia having to lease a Nova-tech infra-red beak trimmer at a minimum cost of $5,200/month or $62,000 per annum as summarised in Table A10.1.

In terms of the requirement of *no routine second beak trim except in exceptional circumstances* under Option G, there would be an increased mortality rate of 4% and 1% for breeders (birds) to point of lay and after point of lay, respectively.

The estimation of costs under Option G is contingent to the data points provided in Panel A10.1 to which has been provided by the ACMF based on consultation with the layer and meat chicken *breeder* industry.

Panel A10.1: Assumptions used to estimate the annual cost of lease of equipment and mortality under Option G for layer and meat chicken breeder farms[299]

No hot blade beak trimming at hatcheries on poultry	
Total layer breeders (birds) affected	200,000
Total meat chicken Grand Parent (GP) breeders	250,000
Total meat chicken Great Grandparent (GGP)	40,000
Annual cost of leasing one Nova-tech infra-red beak trimmer at a minimum cost of $5,200/month	$62,000
No routine second beak trim except in exceptional circumstances	
Total meat chicken Great Grandparent (GGP) meat breeders (birds) affected	40,000
Increased mortality rate of meat GGPs to point of lay	4%
Cost per meat GGP affected SA to point of lay	$90
Increased mortality rate of GGP meat breeders after point of lay	1%
Cost per GGP meat breeder affected SA after point of lay	$100
Total layer breeders (birds) affected	200,000
Increased mortality rate of layer breeders to point of lay	4%
Cost per layer breeder affected NSW to point of lay	$25
Increased mortality rate of layer breeders after point of lay	1%
Cost per layer breeder affected NSW after point of lay	$27
Total meat chicken Grand Parent (GP) breeders (birds) affected	250,000
Increased mortality rate of GP meat breeders to point of lay	4%
Cost per GP meat breeder affected NSW to point of lay	$30
Increased mortality rate of GP meat breeders after point of lay	1%
Cost per GP meat breeder affected NSW after point of lay	$35

[299] Provided by ACMF.

As shown in Table A10.1, the annual cost of the variation of the proposed standards under Option G is estimated to be approximately *$0.88m* or ***$6.18m over 10 year in 2016-17 dollars***. Information on which states/state groupings are affected has been omitted at the request of the ACMF for commercial and confidentiality reasons.

Table A10.1: Estimated 10-year cost of variation of the proposed standards under Option G for layer and meat chicken breeder farms by farm size

Breeder farm type	Size of breeder farm	Total breeder birds affected[300]	Annual mortality cost[301] and lease cost[302]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
Layer	Large	200,000	$251,840	$2,518,400	$1,768,819	$2,094,454	$1,547,448
Meat GP	Large	250,000	$384,000	$3,840,000	$2,697,055	$3,193,576	$2,359,514
Layer, Meat GGP and Meat GP	Large	490,000	$62,000	$620,000	$435,462	$515,630	$380,963
Meat GGP	Large	40,000	$182,400	$1,824,000	$1,281,101	$1,516,949	$1,120,769
Total		***690,000***	***$880,240***	***$8,802,400***	***$6,182,437***	***$7,320,609***	***$5,408,694***

[300] See Panel A10.1 for source of estimates

[301] Estimated as (total breeder birds affected x mortality rate to point of lay x cost of breeder (layer or meat chicken breeder) to point of lay) + (total breeder birds affected x 96% x mortality rate after point of lay x cost of breeder (layer or meat chicken) after point of lay) (see Panel A10.1).

[302] Lease cost of a Nova-tech infra-red beak trimmer at a minimum cost of $5,200/month (i.e. $62,000 per annum)

Appendix 11: Estimation of incremental quantifiable costs of proposed standards under Options C, D, E, F and G (Turkeys)

Appendix 11 has been provided to show how the incremental quantifiable costs of the proposed standards as compared to the base case (Option A) have been estimated, including all assumptions made for those estimations. Proposed standards have been costed for a period of 10 years with an implementation of 2017/18. Net present value measures have been performed according to OBPR guidelines using a 7% discount rate with sensitivity discount rates of 3.5% and 10%.[303]

A11.1 Incremental cost of proposed standard SA8.3– managing litter (Options C, D, E, F and G) (Turkeys)

Proposed standard SA8.3 would require that where litter is used a person in charge must manage litter to avoid excessive caking, dustiness or wetness that impacts on the welfare of poultry. The costs in involved in meeting this proposed standard for non-compliant broiler and breeder turkey farms would include:

- One off cost of the need to upgrade/replace the ventilation in sheds, and the structural changes that accompany this (i.e. converting to tunnel ventilated sheds plus minimum ventilation);
- One-off cost of additional litter management equipment (including tractors and implements) plus drinker upgrades
- Annual costs of additional litter required (500 m3 pa x @$28/m3);
- Annual costs of additional labour required per farm for the time required for managing the litter (most in tilling the litter) (40 weeks @ $40/hr – an average of 13.1 hr/week); and
- Annual costs of additional energy (electricity and gas) needed for tilling of the litter

The estimation of costs of proposed standard SA8.3 under Options C, D, E, F and G is contingent to the data points provided in Panels A11.1 and A11.2 which have been provided the ACMF based on consultation with the turkey industry.

Panel A11.1: Assumptions used to estimate the cost of litter management equipment and annual cost of litter, labour and energy under proposed standard SA8.3 for turkey broiler and turkey breeder farms[304]

Data point	Value
% of turkey farms affected by litter management equipment and ongoing litter, labour and energy costs	
% broiler farms (NSW Large businesses)	0%
% broiler farms affected (NSW Small businesses)	65%
% broiler farms affected (VIC Large businesses)	0%
% broiler farms affected (SA Small businesses)	100%

[303] Please note that whilst no rounding has been done in the underlying spreadsheets, large figure estimates are shown in this RIS as whole numbers for simplicity of presentation, and therefore may be give the appearance of rounding errors if calculations are made manually from the tables. In other words, there are no rounding errors in the total figures presented in the tables, because these are derived from the underlying unrounded spreadsheets.

[304] Provided by ACMF.

Data point	Value
% breeder farms affected (NSW Large businesses)	100%
% breeder farms affected (VIC Large businesses)	100%
No. of turkey breeder farms	
No. of breeder farms (NSW Large)	10
No. of breeder farms (VIC Large)	5
One off average cost of litter management equipment per turkey broiler farm (6396m2)	
Tractors	$60,000
Implements	$10,000
Drinker upgrades	$89,000
Total cost of litter management equipment per turkey broiler farm	***$159,000***
Additional annual cost of litter, labour and energy	
Additional average cost of litter required per farm per annum	$13,900
Additional average labour cost per farm per annum	$21,035
Additional energy (electricity and gas) needed for tilling of the litter per farm per annum	$17,419
Total additional annual cost of litter, labour and energy per farm	***$52,354***

Panel A11.2: Assumptions used to estimate the cost of upgrading shedding and ventilation under proposed standard SA8.3 for turkey broiler and turkey breeder farms[305]

Data point	Value
One off average cost of upgrading shedding to tunnel plus minimal ventilation system for turkey breeder farms	
% of turkey broiler farms affected (NSW Small businesses)	41%
% of turkey breeder farms affected (NSW Large businesses)	100%
Total cost of upgrading shedding to tunnel plus minimal ventilation system per breeder farm	***$425,000***

As shown in Table A11.1, the total combined one-off costs of the variation of the proposed standards under Options C and E for turkey breeder and turkey broiler farms is estimated to be approximately $20.95m with combined total annual costs of *$2.57m* or overall costs of ***$37.65m over 10 year in 2016-17 dollars***.

[305] Provided by ACMF.

Table A11.1: Estimated 10-year cost of proposed standard SA8.3 under Options C, D, E, F and G for turkey broiler and turkey breeder farms by business size and state

States (farm type)	Size of business	Total No. farms [306]	No. farms affected[307]	One-off cost of litter management equipment and new drinker systems[308]	One-off cost of shedding and ventilation upgrade (only required on some farms)[309]	Annual cost of litter + Labour + energy[310]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
NSW (Broilers)	Large	10	0	$0	$0	$0	$0	$0	$0	$0
NSW(Broilers)	Small	51	33	$5,270,850	$8,886,750	$1,735,535	$31,512,951	$25,421,074	$28,112,601	$23,534,657
NSW (Breeders)	Large	10	10	$1,590,000	$4,250,000	$523,540	$11,075,400	$9,135,070	$9,996,588	$8,526,018
VIC (Broilers)	Large	5	0	$0	$0	$0	$0	$0	$0	$0
VIC (Broilers)	Small	0	0	$0	$0	$0	$0	$0	$0	$0
VIC (Breeders)	Large	5	5	$795,000	$0	$261,770	$3,412,700	$2,581,554	$2,945,154	$2,331,191
Subtotal NSW, QLD and VIC		81	48	$7,655,850	$13,136,750	$2,520,845	$46,001,051	$37,137,698	$41,054,342	$34,391,866
SA (Broilers)	Large	0	0	$0	$0	$0	$0	$0	$0	$0
SA (Broilers)	Small	1	1	$159,000	$0	$52,354	$682,540	$516,311	$589,031	$466,238
Subtotal SA, WA and TAS		1	1	$159,000	$0	$52,354	$682,540	$516,311	$589,031	$466,238
Total		82	***49***	***$7,814,850***	***$13,136,750***	***$2,573,199***	***$46,683,591***	***$37,654,008***	***$41,643,373***	***$34,858,104***

[306] See Table A6.6 in Appendix 6 for source of estimates for broiler farms and Panel A11.1 for estimates of number of breeder farms.
[307] Estimated as the product of the total no. of farms (see Table A11.1) and the % of turkey broiler and breeder farms affected by the one-off cost of litter management equipment and ongoing costs of litter, labour and energy by relevant state and farm size (see Panel A11.1)
[308] Estimated as the product of the no. of farms affected (see Table A11.1) and the one-off cost of litter management equipment of $159,000 per farm (see Panel A11.1).
[309] Estimated as total number of farms (see Table A11.1) and the % of breeder and broiler farms affected by the one-off cost of shedding and ventilation upgrades (i.e. 41% or 21 small NSW broiler farms and 100% or 10 large NSW breeder farms would need shedding and ventilation upgrades of $425,000 per farm (see Panel A11.2).
[310] Estimated as the product of the no. farms affected (see Table A11.1) and the ongoing costs of litter, labour and energy per farm of $52,354 (see Panel A11.1).

A11.2 Incremental cost of proposed standard SA9.11 – toe trimming (Options C, D, E, F and G) (Turkeys)

Proposed standard SA9.11 would require that a person must only perform toe trimming on day old hatchlings selected as potential breeders, except for emus and ostriches which may have toes trimmed on commercial stock up to 5 days of age. If claw treatment ceases, 14% additional turkeys would be required due to downgrading of product due to scratching. To accommodate this, floor space would need to be increased by 14% in enterprises where claw treatment is currently practiced (40% of turkey broiler farms owned by small businesses). There would also be ongoing additional operational costs for farms affected including litter, gas and other variable costs including labour.

The estimation of costs of proposed standard SA9.11 under Options C, D, E, F and G is contingent to the data points provided in Panel A11.3 which has been provided the ACMF based on consultation with the turkey industry.

Panel A11.3: Assumptions used to estimate the cost of additional space requirements under proposed standard SA9.11 for turkey broiler farms[311]

One off average cost of additional space per turkey broiler farm	
Total square metres of broiler farms	134,312
% of additional space that will need to be created	14%
Additional square metres that would need to be created	18,804
Additional square metres that would need to be created per farm affected	*922*
% of broiler farms affected (small NSW)	*40%*
Cost per square metre	**$450[312]**
Total annual operating cost per farm affected by additional space requirements	***$45,267[313]***

As shown in Table A11.2, the one-off cost of additional floor space of proposed standard SA9.11 under Options C and G for turkey broiler farms is estimated to be $8.47m with ongoing costs $0.92m per annum - a total of approximately ***$14.4m over 10 years in 2016-17 dollars***.

[311] Provided by ACMF.
[312] Based on total cost per square metre of $549 adjusted down by 18% to account for the cost of new land (36% of all new shedding costs – see discussion in Part A11.4 of Appendix 11) in half the instances where farms are affected.
[313] Based on total annual operating cost per farm affected by stocking density of $55,204 (see Panel A11.4) adjusted down by 18% to account for the cost of management for new land (36% of all new shedding costs – see discussion in Part A11.4 of Appendix 11) in half the instances where farms are affected.

Table A11.2: Estimated 10-year cost of proposed standard SA9.11 under Options C, D, E, F and G for turkey broiler farms by farm size and state

States	Size of farms	Total no. farms[314]	No. farms affected[315]	One off cost of additional floor space[316]	Ongoing operational costs[317]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
NSW Broilers	Large	10	0	$0	$0	$0	$0	$0	$0
NSW Broilers	Small	51	20	$8,465,041	$923,452	$17,699,563	$14,397,195	$15,858,771	$13,369,706
NSW Breeders	Large	10	0	$0	$0	$0	$0	$0	$0
VIC Broilers	Large	5	0	$0	$0	$0	$0	$0	$0
VIC Broilers	Small	0	0	$0	$0	$0	$0	$0	$0
VIC Breeders	Large	5	0	$0	$0	$0	$0	$0	$0
Subtotal NSW, QLD and VIC		81	20	$8,465,041	$923,452	$17,699,563	$14,397,195	$15,858,771	$13,369,706
SA Broilers	Large	0	0	$0	$0	$0	$0	$0	$0
SA Broilers	Small	1	0	$0	$0	$0	$0	$0	$0
Subtotal SA, WA and TAS		1	0	$0.00	$0.00	$0.00	$0	$0.00	$0.00
Total		***82***	***20***	***$8,465,041***	***$923,452***	***$17,699,563***	***$14,397,195***	***$15,858,771***	***$13,369,706***

[314] See Table A6.6 in Appendix 6 for source of estimates for turkey broiler farms and Panel A11.1 for estimates of number of breeder farms.
[315] Estimated as the product of total no. of farms (see Table A11.2) and the % of turkey broiler farms affected (see Panel A11.3 = 40%).
[316] Estimated as the product of the total no. of farms affected (See Table A11.2) the additional square metres that would need to be created per farm (922 square metres) and the cost per square metre ($494/square metre) (see Panel A11.3)
[317] Estimated as the product of the total no. of farms affected (See Table A11.2) and the additional operating cost of $49,684 (see panel A11.3)

A11.3 Incremental cost of proposed standard SA11.7 – awaiting slaughter requirements (Options C, D, E, F and G) (Turkeys)

Proposed standard SA11.7 would require that a person must ensure all poultry held awaiting slaughtering must be protected from direct sunlight, radiant and reflected heat, and adverse weather such as rain and wind. Non-compliant processing plants would need to install large commercial shade sails, to build additional covered facilities or to extend the existing lairage area. The additional one-off cost of proposed standards SA11.7 therefore relates to the cost of upgrading facilities by extending the amount of undercover area in the lairage. ACMF has identified one processing plant that would be affected for broiler turkeys in NSW which would need to incur a one-off cost of $500,000. As shown in table A11.3 the ***10-year cost would be $0.47m in present value dollars***.

Table A11.3: Estimated one-off cost of proposed standard SA11.7 by turkey business size (Options C, D, E, F and G)

States	Total no. processing plants affected	One of cost of upgrading infrastructure per farm	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
QLD	0	$0	$0	$0	$0	$0
NSW	1	$500,000	$500,000	$467,290	$483,092	$454,545
VIC	0	$0	$0	$0	$0	$0
Subtotal NSW, QLD and VIC	1	$500,000	$500,000	$467,290	$483,092	$454,545
SA, WA and TAS	0	$0	$0	$0	$0	$0
Subtotal SA, WA and TAS	0	$0	$0	$0	$0	$0
Total	***1***	***$500,000***	***$500,000***	***$467,290***	***$483,092***	***$454,545***

A11.4 Incremental cost of proposed standard SB13.5 – stocking densities (Options C, D, E, F and G) (Turkeys)

Under Options C, D, E, F and G, standard SB13.5 would require that a person must ensure the maximum recommended stocking densities for turkeys are according to housing type and under good management conditions and as follows:

Live weight	Bird density in useable area
6 kgs	30 kg/m^2
7-10 kgs	35 kg/m^2
10-13 kgs	42 kg/m^2
13+ kgs	46 kg/m^2

According to the ACMF, the current practice for a large percentage of the industry is for both sexes of turkey broilers to be separated in a single shed allowing 5.9 birds/m2 placed. The lower maximum densities proposed in standard SB13.5 would mean a reduction to 4.66 birds/m2 at placement, or a 27% reduction in the birds and kilograms that can be grown in existing shedding.

The implication of this proposed standard would mean the following additional costs being incurred including:

- *one-off costs of providing for additional shedding* for broiler and breeder turkeys (Breakdown of new shedding cost is: shedding and equipment 51% land 36% site works 3% power and water 6% and planning 4%);
- *one-off pick up costs per farm* of 500 m^3 pa x @$28/m3 (and the following equipment required: (2 trailers, 40 pick-up modules and one prime mover)).
- *annual transport costs per farm location affected* (200 km additional travel round trip from processing plant at $2.15/km travel for 318 trailer loads per year);
- *annual catching costs per farm* including: catchers; vehicle costs; and stand down costs (as close to plant and not required, but services retained but not fully utilised).
- *annual operating costs for all farms* including litter (Litter @$30/$m^3$ spread, 10 cm deep, 2.5 times per year ($7.50/$m^2$ of additional floor space per annum)), gas ($1.75/$m^2$ @ 2.5 batches per year ($4.38/$m^2$ of additional floor space per annum) and other variable costs including labour ($38/$m^2$ of additional floor space per annum).

The estimation of costs under Option C, D, E, F and G for broiler and breeder turkeys is contingent to the data points provided in Panel A11.4 which have been provided by the ACMF based on consultation with the turkey industry.

Panel A11.4: Assumptions used to estimate the cost of additional space requirements under proposed standard SB13.5 for turkey broiler and turkey breeder farms[318]

Data point	Value
% of broiler and breeder farms affected	
% of turkey broiler farms affected (NSW Large)	0%
% of turkey broiler farms affected (NSW Small)	40%
% of turkey broiler farms affected (VIC Large)	0%
% of turkey broiler farms affected (SA Small)	0%
% of turkey breeder farms affected (NSW Large)	80%
% of turkey breeder farms affected (VIC Large)	80%
No. of breeder farms (NSW Large)	10
No. of breeder farms (VIC Large)	5
Additional one-off cost of shedding (broiler farms)	
Average cost of creating new turkey broiler shedding per m2	$549
Square metres of shedding required for broiler famers	35,868
Square metres of shedding required per broiler famer	1,758
Additional one-off cost of shedding per broiler farm	**$965,271**
Additional one off cost of shedding (breeder farms)	
Average cost of creating new turkey breeder shedding per m2	$640
Square metres of shedding required for breeder farms	3,600
Square metres of shedding required per breeder farm	300
Additional one-off cost of shedding per breeder farm	**$1,080,000**
Additional one-off pick up costs NSW	
No. sites affected	6
No of sheds affected	24
Cost of 2 additional trailers[319]	$196,000
Cost of 40 pickup modules to suit[320]	$136,800
Cost of 1 prime mover	$327,200
Total cost	*$660,000*
No. of farms affected	**6**
Total one off cost of additional pick up per farm affected across 6 sites	***$110,000***
Additional transport costs per annum NSW	**$136,740**
No. of farms affected by stocking density	**6**
Additional annual transport costs per farm affected across 6 sites	***$22,790***
Additional catching costs per annum NSW	
Catchers[321]	$57,876
Vehicle costs[322]	$7,886.40
Stand down costs	$47,000
Additional catching costs per annum	**$112,762.40**
No. of farms affected by stocking density	**6**
Additional catching costs per annum per farm affected across 6 sites	***$18,794***
Annual operating costs per annum	

[318] Provided by ACMF.
[319] $98,000 per trailer
[320] $3,420 per module
[321] 2 hours per man, 1.3 men per trailer loaded @$70/h (as run into overtime)
[322] average of 5 trailers per night @ 0.68c/km

Data point	Value
Litter cost	$269,000
Gas	$156,625
Other variable costs including Labour	$1,362,984
Total annual additional operating costs	**$1,788,609**
No. of farms affected by stocking density	**32**
Total annual operating cost per farm affected by stocking density	***$55,204***

As shown in Table A11.4, the additional one off cost of proposed standard SB13.5 under Options C, D, E, F and G for turkey broiler and breeder farms is estimated to be approximately $22.66m with another $2.04m of annual costs ately y practiced (cost of ***$35.49m over 10 year in 2016-17 dollars***.

Table A11.4: Estimated 10-year cost of proposed standard SB13.5 under Options C, D, E, F and G for turkey broiler and breeder farms by farm size and state

States (farm type)	Size of farms	Total no. farms	No. farms affected [323]	One-off cost of additional floor space (creating new shedding)[324]	One off cost of assets required for additional pick up[325]	Annual transport and catching costs[326]	Annual additional operating costs of litter + Labour + Gas[327]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
NSW (Broilers)	Large	10	0	$0	$0	$0	$0	$0	$0	$0	$0
NSW (Broilers)	Small	51	20	$19,691,532	$660,000	$249,502	$1,126,161	$34,108,168	$28,682,209	$31,104,167	$26,954,250
NSW (Breeders)	Large	10	8	$1,536,000	$0	$0	$441,632	$5,952,319	$4,537,351	$5,156,936	$4,110,000
VIC (Broilers)	Large	5	0	$0	$0	$0	$0	$0	$0	$0	$0
VIC (Broilers)	Small	0	0	$0	$0	$0	$0	$0	$0	$0	$0
VIC (Breeders)	Large	5	4	$768,000	$0	$0	$220,816	$2,976,159	$2,268,676	$2,578,468	$2,055,000
Subtotal NSW, QLD and VIC		81	32	$21,995,532	$660,000	$249,502	$1,788,609	$43,036,646	$35,488,236	$38,839,571	$33,119,250
SA (Broilers)	Large	0	0	$0	$0	$0	$0	$0	$0	$0	$0

[323] Estimated as the product of the total no of farms (see Table A6.6 of Appendix 6 for broiler turkey farm numbers and Panel A11.4 for breeder turkey farm numbers) and the % of broiler and breeder farms affected in each state (See Panel A11.4).
[324] Estimated as the product of the no.of farms affected (see Table A11.4) and the additional cost of floor space per turkey broiler or turkey breeder farm (see Panel A11.4).
[325] Estimated as the product of the no. of farms affected across 6 sites in NSW (see Panel A11.4) and the one-off cost of additional pick up per farm affected by stocking density (see Panel A11.4).
[326] Estimated as the product of the no. of farms affected across 6 sites in NSW (see Panel A11.4) and the additional annual transport and catching costs per farm (see Panel A11.4).
[327] Estimated as the product of the no. of farms affected (see Table A11.4) and the additional annual operating costs per farm affected by stocking density (see Panel A11.4).

States (farm type)	Size of farms	Total no. farms	No. farms affected [323]	One-off cost of additional floor space (creating new shedding)[324]	One off cost of assets required for additional pick up[325]	Annual transport and catching costs[326]	Annual additional operating costs of litter + Labour + Gas[327]	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
SA (Broilers)	Small	1	0	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal SA, WA and TAS		1	0	$0.00	$0	$0	$0	$0	$0	$0	$0
Total		***82***	***32***	***$21,995,532***	***$660,000***	***$249,502***	***$1,788,609***	***$43,036,646***	***$35,488,236***	***$38,839,571***	***$33,119,250***

Appendix 12: Estimation of incremental quantifiable costs of proposed standards under Option G (Turkeys)

According to ACMF, the requirement of *no hot blade beak trimming at hatcheries on poultry* under Option G, would result in one small turkey business in NSW having to lease a Nova-tech infra-red beak trimmer at a minimum cost of $5,200/month or $62,000 per annum as summarised in Table A12.1.

As shown in Table A12.1, the annual cost of the variation of the proposed standards under Option G for turkeys is estimated to be approximately *$0.06m* or ***$0.44m over 10 years in 2016-17 dollars***.

Table A12.1: Estimated 10-year cost of variation of the proposed standards under Option G for turkey farms by business size

States	Size of turkey business	Total turkey business affected	Annual leasing cost	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
NSW	Small	1	$62,000	$620,000	$435,462	$515,630	$380,963
Subtotal NSW, QLD and VIC		0	$62,000	$620,000	$435,462	$515,630	$380,963
Subtotal SA, WA and TAS		0	$0	$0	$0	$0	$0
Total		***0***	***$62,000***	***$620,000***	***$435,462***	***$515,630***	***$380,963***

Appendix 13: Summary of incremental costs under Options C, D, E, F and G (Turkeys)

Appendix 13 summarises the costs of the proposed standards (taken from Appendix 11) for Option C, D, E, F, as well as the costs of no hot blade beak trimming under Option G (taken from Appendix 12).

As shown in Table A13.1, the total incremental cost of the proposed standards under Option C (turkeys) is estimated to be ***$88.01m over 10 years in present value dollars***.

Table A13.1: Summary of estimated costs of Option C, D, E and F (turkeys) by business size and states/grouping of states – present value dollars ($m)

States/grouping of states	Business type (size)	SA8.3	SA9.11	SA11.7	SB13.5	Total
NSW	Broiler turkey business (small)	$25.42	$14.40	$0.00	$28.68	$68.50
NSW	Breeder turkey business (large)	$9.14	$0.00	$0.00	$4.54	$13.67
VIC	Breeder turkey business (large)	$2.58	$0.00	$0.00	$2.27	$4.85
NSW	Turkey processing Business (large)	$0.00	$0.00	$0.47	$0.00	$0.47
Subtotal NSW, QLD and VIC		$37.14	$14.40	$0.47	$35.49	$87.49
SA	Broiler turkey business (small)	$0.52	$0.00	$0.00	$0.00	$0.52
Subtotal SA, WA and TAS		$0.52	$0.00	$0.00	$0.00	$0.52
Total		***$37.65***	***$14.40***	***$0.47***	***$35.49***	***$88.01***
Business size						
Small		$25.94	$14.40	$0.00	$28.68	$69.02
Large		$11.72	$0.00	$0.47	$6.81	$18.99
Total		***$37.65***	***$14.40***	***$0.47***	***$35.49***	***$88.01***

As shown in Table A13.2, the total incremental cost of the proposed standards under Option G (turkeys) is estimated to be ***$88.44m over 10 years in present value dollars***.

Table A13.2: Summary of estimated costs of Option G (turkeys) by operation business size and states/grouping of states – present value dollars ($m)

States/grouping of states	Business type (size)	SA8.3	SA9.11	SA11.7	SB13.5	Option G (not hot blade trimming)	Total
NSW	Broiler turkey business (small)	$25.42	$14.40	$0.00	$28.68	$0.00	$68.50
NSW	Breeder turkey business (large)	$9.14	$0.00	$0.00	$4.54	$0.00	$13.67
NSW	Breeder turkey business (small)	$0.00	$0.00	$0.00	$0.00	$0.44	$0.44
VIC	Breeder turkey business (large)	$2.58	$0.00	$0.00	$2.27	$0.00	$4.85
NSW	Turkey processing business (large)	$0.00	$0.00	$0.47	$0.00	$0.00	$0.47
Subtotal NSW, QLD and VIC		$37.14	$14.40	$0.47	$35.49	$0.44	$87.93
SA	Broiler turkey business (small)	$0.52	$0.00	$0.00	$0.00	$0.00	$0.52
Subtotal SA, WA and TAS		$0.52	$0.00	$0.00	$0.00	$0.00	$0.52
Total		***$37.65***	***$14.40***	***$0.47***	***$35.49***	***$0.44***	***$88.44***
Business size							
Small		$25.94	$14.40	$0.00	$28.68	$0.44	$69.45
Large		$11.72	$0.00	$0.47	$6.81	$0.00	$18.99
Total		***$37.65***	***$14.40***	***$0.47***	***$35.49***	***$0.44***	***$88.44***

Appendix 14: Estimation of incremental quantifiable costs of proposed standards under Options C, D, E, F and G (Ducks)

Proposed standard SB4.4 would require that a person in charge must ensure facilities are provided to allow ducks to dip their heads under water or misters/showers to allow ducks to wet preen, and to clean their eyes and nostrils. According to the Australian Duck Meat Association (ADMA) there are approximately 163 duck sheds operating in Australia with an average capacity of around 20,000 ducks per duck shed with around 109 sheds in NSW and 54 sheds in Victoria.[328]

ADMA advises that of these 163 sheds, around 154 sheds would require additional use of misting systems with approximately one megalitre of water per shed per annum and 750 kWh of electricity per shed per annum equating to running misting systems for approximately an additional 50 hours[329] per shed per annum. Water flow rates are regulated for safety reasons. The cost of a megalitre (ML) of water is estimated to be between $107/ML and $83/ML d $n average of $95/ML[330] per shed. The price of a kWh of $0.26 is taken to be an average of the peak and off peak rates of $0.35376 and $0.16027[331]. For 750 kWh, this would mean an average charge of $192.76 per shed.

For sheds that do not have misting capabilities, additional one-off equipment costs are between $5,000 to $10,000 (an average of $7,500) per shed however AMDA advises that the number of sheds that do not have misting capabilities is negligible.[332]

As shown in Table A14.1, the additional annual cost of proposed standard SB4.4 under Options C, D, E, F and G for duck farms is estimated to be approximately $44,315 or ***$0.31m over 10 years in 2016-17 dollars***.

[328] Please note that whilst no rounding has been done in the underlying spreadsheets, large figure estimates are shown this RIS as whole numbers for simplicity of presentation, and therefore may be give the appearance of rounding errors if calculations are made manually from the tables. In other words, there are no rounding errors in the total figures presented in the tables, because these are derived from the underlying unrounded spreadsheets.

[329] Around 7 hours per batch for 7 batches.

[330] <http://www.dairyaustralia.com.au/~/media/Documents/Stats%20and%20markets/Farm%20inputs%20and%20costs/Production%20Inputs%20Monitor%20-%20Issue%20136%20-%20December%202016.pdf> (as at November 2016)

[331] <https://www.originenergy.com.au/content/dam/origin/business/Documents/energy-price-fact-sheets/vic/VIC_Electricity_Small%20Business_United%20Energy_Standard%20Published%20Rate.PDF >(as at October 2016)

[332] There might possibly be some sheds that AMDA does not know about.

Table A14.1: Estimated 10-year cost of proposed standard SB4.4 under Options C, D, E, F and G for duck farms by state

States	Size of farms	No. sheds affected	Annual cost of water @$95/ML	Annual cost of electricity @ $192.76/kWh	10-year cost	PV discounted at 7%	PV discounted at 3.5%	PV discounted at 10%
NSW	Large	100	$9,500	$19,276	$287,761	$202,111	$239,320	$176,817
VIC	Large	50	$4,750	$9,638	$143,881	$101,056	$119,660	$88,408
VIC	Small	4	$380	$771	$11,510	$8,084	$9,573	$7,073
Subtotal NSW, QLD and VIC		154	$14,630	$29,685	$443,152	$311,252	$368,552	$272,298
SA	Large	N/A	$0	$0	$0	$0	$0	$0
Subtotal SA, WA and TAS		N/A	$0	$0	$0	$0	$0	$0
Total		***154***	***$14,630***	***$29,685***	***$443,152***	***$311,252***	***$368,552***	***$272,298***

Appendix 15: Summary of all incremental costs under Options C, D, E, F and G (layers, meat chickens, breeders, turkeys and ducks)

Appendix 15 provides a complete summary of the incremental cost of each option against layers, meat chickens, breeders, turkeys and ducks by business size as shown in Table A15.1 and the distribution of incremental costs of those options by business size and state grouping are shown in Tables A15.2 and A15.3, respectively. The most expensive Option across all poultry types and business sizes is Option E at an estimated incremental cost of ***$1.53b over 10 years in present value dollars***. The cheapest Option would be Option C with an estimated incremental cost of ***$709.72m over 10 years in present value dollars***.

Table A15.1: Summary of estimated costs of Options C, D, E, F and G by business size and poultry class – present value dollars ($m)

Poultry class	Business size	Option C[333]	Option D (10-year phase out of cages)[334]	Option D (20-year phase out of cages)[335]	Option E[336]	Option F[337]	Option G[338]
Layer hens							
	Large	$45.62	$232.42	$140.49	$45.62	$180.91	$45.62
	Medium	$192.77	$559.75	$378.54	$252.37	$402.27	$232.07
	Small	$272.98	$536.77	$405.67	$392.79	$345.85	$352.05
	Micro	$5.64	$10.25	$7.95	$8.56	$6.37	$7.38
Sub-total layers		*$517.01*	*$1,339.18*	*$932.64*	*$699.34*	*$935.41*	*$637.12*
Meat chickens							
	Large	$5.74	$5.74	$5.74	$79.53	$5.74	$5.74
	Medium	$21.07	$21.07	$21.07	$70.11	$21.07	$21.07
	Small	$77.58	$77.58	$77.58	$590.28	$77.58	$77.58
Sub-total meat chickens		*$104.38*	*$104.38*	*$104.38*	*$740.03*	*$104.38*	*$104.38*
Layer and meat chicken Breeders							
	Large	$0.00	$0.00	$0.00	$0.00	$0.00	$6.18
Sub-total breeders		$0.00	*$0.00*	*$0.00*	*$0.00*	*$0.00*	*$6.18*

[333] Estimates taken from Table A5.1 for layers (Appendix 5); Table A9.1 for meat chickens (Appendix 9); Table A13.1 for turkeys (Appendix 13) and Table A14.1 for ducks.
[334] Estimates taken from Table A5.2 for layers (Appendix 5); Table A9.1 for meat chickens (Appendix 9); Table A13.1 for turkeys (Appendix 13) and Table A14.1 for ducks.
[335] Estimates taken from Table A5.3 for layers (Appendix 5); Table A9.1 for meat chickens (Appendix 9); Table A13.1 for turkeys (Appendix 13) and Table A14.1 for ducks.
[336] Estimates taken from Table A5.4 for layers (Appendix 5); Table A9.2 for meat chickens (Appendix 9); Table A13.1 for turkeys (Appendix 13) and Table A14.1 for ducks.
[337] Estimates taken from Table A5.5 for layers (Appendix 5); Table A9.1 for meat chickens (Appendix 9); Table A13.1 for turkeys (Appendix 13) and Table A14.1 for ducks.
[338] Estimates taken from Table A5.6 for layers (Appendix 5); Table A9.1 for meat chickens (Appendix 9); Table A10.1 for breeders (Appendix 10); Table A13.2 for turkeys (Appendix 13) and Table A14.1 for ducks.

Poultry class	Business size	Option C[333]	Option D (10-year phase out of cages)[334]	Option D (20-year phase out of cages)[335]	Option E[336]	Option F[337]	Option G[338]
Turkeys							
	Large	$18.99	$18.99	$18.99	$18.99	$18.99	$18.99
	Small	$69.02	$69.02	$69.02	$69.02	$69.02	$69.45
Sub-total turkeys		*$88.01*	*$88.01*	*$88.01*	*$88.01*	*$88.01*	*$88.44*
Ducks							
	Large	*$0.31*	*$0.31*	*$0.31*	*$0.31*	*$0.31*	*$0.31*
	Small	*$0.00*	*$0.00*	*$0.00*	*$0.00*	*$0.00*	*$0.00*
Sub-total ducks		*$0.31*	*$0.31*	*$0.31*	*$0.31*	*$0.31*	*$0.31*
Total		***$709.72***	***$1,531.89***	***$1,125.35***	***$1,527.68***	***$1,128.11***	***$836.44***

Table A15.2: Distribution of estimated costs of Options C, D, E, F and G by business size – present value dollars ($m)[339]

Size of business	10-year PV cost of Option C	%	10-year PV cost of Option D (10-year phase out of cages)	%	10-year PV cost of Option D (20-year phase out of cages	%	10-year PV cost of Option E	%	10-year PV cost of Option F	%	10-year PV cost of Option G	%
Large	$70.66	9.96%	$257.46	16.81%	$165.53	14.71%	$144.45	9.46%	$205.96	18.26%	$76.85	9.19%
Medium	$213.84	30.13%	$580.81	37.92%	$399.60	35.51%	$322.48	21.11%	$423.34	37.53%	$253.14	30.26%
Small	$419.57	59.12%	$683.36	44.61%	$552.26	49.07%	$1,052.19	68.87%	$492.44	43.65%	$499.08	59.67%
Micro	$5.64	0.79%	$10.25	0.67%	$7.95	0.71%	$8.56	0.56%	$6.37	0.56%	$7.38	0.88%
Total	***$709.72***	***100.00%***	***$1,531.89***	***100.00%***	***$1,125.35***	***100.00%***	***$1,527.68***	***100.00%***	***$1,128.11***	***100.00%***	***$836.44***	***100.00%***

Table A15.3: Distribution of estimated costs of Options C, D, E, F and G by state grouping – present value dollars ($m)

State grouping	10-year PV cost of Option C[340]	%	10-year PV cost of Option D (10-year phase out of cages)[341]	%	10-year PV cost of Option D (20-year phase out of cages[342]	%	10-year PV cost of Option E[343]	%	10-year PV cost of Option F[344]	%	10-year PV cost of Option G[345]	%
NSW, QLD and VIC	$594.14	83.71%	$1,318.33	86.06%	$960.25	85.33%	$1,249.79	81.81%	$964.04	85.46%	$696.73	83.30%
SA, WA and TAS	$115.58	16.29%	$213.56	13.94%	$165.10	14.67%	$277.90	18.19%	$164.07	14.54%	$139.70	16.70%
Total	***$709.72***	***100.00%***	***$1,531.89***	***100.00%***	***$1,125.35***	***100.00%***	***$1,527.68***	***100.00%***	***$1,128.11***	***100.00%***	***$836.44***	***100.00%***

[339] Estimates taken from Table A14.1.
[340] Estimates taken from Table A5.1 for layers (Appendix 5); Table A9.1 for meat chickens (Appendix 9); Table A13.1 for turkeys (Appendix 13) and Table A14.1 for ducks.
[341] Estimates taken from Table A5.2 for layers (Appendix 5); Table A9.1 for meat chickens (Appendix 9); Table A13.1 for turkeys (Appendix 13) and Table A14.1 for ducks.
[342] Estimates taken from Table A5.3 for layers (Appendix 5); Table A9.1 for meat chickens (Appendix 9); Table A13.1 for turkeys (Appendix 13) and Table A14.1 for ducks.
[343] Estimates taken from Table A5.4 for layers (Appendix 5); Table A9.2 for meat chickens (Appendix 9); Table A13.1 for turkeys (Appendix 13) and Table A14.1 for ducks.
[344] Estimates taken from Table A5.5 for layers (Appendix 5); Table A9.1 for meat chickens (Appendix 9); Table A13.1 for turkeys (Appendix 13) and Table A14.1 for ducks.
[345] Estimates taken from Table A5.6 for layers (Appendix 5); Table A9.1 for meat chickens (Appendix 9); Table A10.1 for breeders (Appendix 10); Table A13.2 for turkeys (Appendix 13) and Table A14.1 for ducks.

Appendix 16: Summary of poultry numbers affected by welfare impacts under Options C, D, E, F and G (layers, meat chickens, breeders and turkeys)

Appendix 16 provides the numbers of poultry affected by positive and negative welfare impacts for the proposed standards under Option C as well as the variation to the standards under Options D, E, F and G.

A16.1: Summary of estimated number of poultry (housed/per annum) affected by positive and negative welfare impacts

Standard/Option	Description of positive welfare effect of standard/Option	Poultry No. with positive welfare effects as per Column 1	Description of negative welfare effect of standard/Option	Poultry No. with negative welfare effects as per Column 3
Option C (Proposed standards)				
Layer hens				
SA6.3 + SA6.4 + SA6.5	Improved lighting intensity (5 lux) and exposure to light and darkness for layer hens.	5,580,000[346] layer hens housed	N/A	N/A
SA9.4 + SA9.5 + SA9.6	Routine moulting prohibited for layer hens except where moulting is necessary and layer hens are in good condition	2,948,842[347] layer hens housed	N/A	N/A
SA9.15	Removal of more than one-third of the upper and lower beaks prohibited for layer hens	19,658,948[348] layer hens housed	Loss of plumage from higher incidence of pecking	1,430,235 layer hens per annum[349]
Meat chickens				
SA6.2	Improved lighting intensity for young meat chickens for the first 3 days after hatching is at least 20 Lux.	127,127,564[350] meat chicken hatchlings per annum	N/A	N/A
SA8.3	Meat chickens not exposed to excessive caking, dustiness or wetness	86,195,165[351] meat chickens per annum	N/A	N/A

[346] Estimated as 186 sheds affected (see Table A2.1 of Appendix 2) x an average of 30,000 layers per shed (see Table A3.3 of Appendix 3)
[347] Estimated as 15% (routine moulting) (see Part A2.2 of Appendix 2 for source) x total no. hens housed as at November 2016 (i.e. 19,658,948 layers) (See Table A1.1 of Appendix 1)
[348] See Table A1.1 of Appendix 1 for source of estimate.
[349] See Table A2.5 of Appendix 2 for source of estimate.
[350] Estimated as 20% (as advised by ACMF) of the number of meat chickens slaughtered per annum (see Table A6.5 of Appendix 6).
[351] Estimated as 5.5%, 33%, 12% and 24% (as advised by ACMF) of the number of meat chickens slaughtered per annum for Queensland, NSW, Victoria, SA and WA (See Table A6.5 of Appendix 6). Number slaughtered for SA is not provided separately in Table A6.5 for commercial confidentiality reasons.

Standard/Option	Description of positive welfare effect of standard/Option	Poultry No. with positive welfare effects as per Column 1	Description of negative welfare effect of standard/Option	Poultry No. with negative welfare effects as per Column 3
SA11.7	Meat chickens awaiting slaughtering must be protected from direct sunlight, radiant and reflected heat, and adverse weather such as rain and wind.	10,205,000[352] meat chickens per annum		
Turkeys				
SA8.3	Turkeys not exposed to excessive caking, dustiness or wetness	3,981,150[353] turkeys per annum	N/A	N/A
SA9.11	Toe (claw) trimming prohibited on turkeys except on day old hatchlings selected as potential breeders and emus and ostriches which may have toes trimmed on commercial stock up to 5 days of age	826,200[354] turkeys per annum	Increased injury from higher incidence of scratching	231,336[355] turkeys per annum
SA11.7	Turkeys awaiting slaughtering must be protected from direct sunlight, radiant and reflected heat, and adverse weather such as rain and wind.	19,500[356] turkeys per annum	N/A	N/A
SB13.5	Turkeys housed at maximum recommended stocking densities according to housing type and under good management conditions	48,940[357] turkeys housed	N/A	N/A
Ducks				
SB4.4	Ducks able to dip their heads under water or misters/showers to allow ducks to wet preen, and to clean their eyes and nostrils.	9,447,853[358] ducks per annum	N/A	N/A

[352] 628,000 meat chickens slaughtered per day (provided by ACMF) x 260 days a year x 6.25% (based on 4 hours out of 16 production hours per day (25% of daily production) with only front modules that have direct sunlight on them (50%) and then only an estimated half of the birds in the module drawer (50%) = 25%x 50% x 50% of birds)

[353] 49 farms affect (see Table A11.1 of Appendix 11) with an average of 81,000 turkeys per farm per year (provided by ACMF).

[354] 20 broiler farms affected (see Table A11.2 of Appendix 11) with an average of 81,000 turkeys per farm per year (provided by ACMF) and 50% of turkeys affected (provided by ACMF).

[355] 20 broiler farms affected (see Table A11.2 of Appendix 11) with an average of 81,000 turkeys per farm per year (provided by ACMF) and 14% additional hens will be required due to downgrading of product due to scratching (provided by ACMF).

[356] 1,200 turkeys slaughtered per day (provided by ACMF) x 260 days a year x 6.25% (based on 4 hours out of 16 production hours per day (25% of daily production) with only front modules that have direct sunlight on them (50%) and then only an estimated half of the birds in the module drawer (50%) = 25%x 50% x 50% of birds)

[357] Estimated as the change in birds per square meter (going from average of 5.9 to average of 4.66) of 1.24 turkeys x additional square meters required by broilers (1,758 square meters) + change in birds per square meter of 1.24 turkeys x additional square meters required by breeders (300 square meters) (provided by ACMF)

[358] Estimated as the product of the no. of sheds affected (94% or 154 sheds out of 163 sheds) (see Table A14.1 of Appendix 14) with a total of 10,000,000 ducks produced per annum (based on advice from the Australian Duck Meat Association (ADMA).

Standard/Option	Description of positive welfare effect of standard/Option	Poultry No. with positive welfare effects as per Column 1	Description of negative welfare effect of standard/Option	Poultry No. with negative welfare effects as per Column 3
Option D (10-year phase out of cages)	Phase out conventional cages for chicken layers over 10 years in favour of alternative systems 'typical' free range/barn/aviary or furnished cages. (nest/perch/space/forage).			
Layer hens				
	Greater freedom to express innate behaviours for layer hens	10,716,713[359] layer hens housed	Higher incidence of disease, cannibalism, predation risks, and feather pecking. Less reliable provision of feed and water. Less efficient management of adverse weather risk, temperature, ventilation and biosecurity for the prevention of disease introduction.	10,716,713[360] layer hens housed
SA9.4 + SA9.5 + SA9.6	Routine moulting prohibited for layer hens except where moulting is necessary and layer hens are in good condition	3,102,683[361] layer hens housed	N/A	N/A
SA9.15	Removal of more than one-third of the upper and lower beaks prohibited for layer hens	20,684,550[362] layer hens housed	Loss of plumage from higher incidence of pecking	1,874,167[363] layer hens per annum
Option D (20-year phase out of cages)	Phase out conventional cages for chicken layers over 20 years in favour of alternative systems 'typical' free range/barn/aviary or furnished cages. (nest/perch/space/forage).			
Layer hens				
	Greater freedom to express innate behaviours for layer hens	5,358,357[364] layer hens housed	Higher incidence of disease, cannibalism, predation risks, and feather pecking.	5,358,357[365] layer hens housed

[359] See Table A1.1 of Appendix 1 for source of estimate.
[360] See Table A1.1 of Appendix 1 for source of estimate.
[361] Estimated as 15% (routine moulting) (see Part A2.2 of Appendix 2 for source) x total no. hens housed with the phasing out of cages over 10 years (i.e. 206,845,500 layers) divided by 10 (See Table A2.3 of Appendix 2 for total number of layers to be housed with a phasing out of cages)
[362] Total no. hens housed with the phasing out of cages over 10 years (i.e. 206,845,500 layers) divided by 10 (See Table A2.3 of Appendix 2 for total number of layers to be housed with a phasing out of cages)
[363] See Table A2.6 of Appendix 2 for source of estimate.
[364] See Table A1.1 of Appendix 1 for source of estimate (10,716,713 divided by 2).
[365] See Table A1.1 of Appendix 1 for source of estimate (10,716,713 divided by 2).

Standard/Option	Description of positive welfare effect of standard/Option	Poultry No. with positive welfare effects as per Column 1	Description of negative welfare effect of standard/Option	Poultry No. with negative welfare effects as per Column 3
			Less reliable provision of feed and water. Less efficient management of adverse weather risk, temperature, ventilation and biosecurity for the prevention of disease introduction.	
SA9.4 + SA9.5 + SA9.6	Routine moulting prohibited for layer hens except where moulting is necessary and layer hens are in good condition	3,025,762[366] layer hens housed	N/A	N/A
SA9.15	Removal of more than one-third of the upper and lower beaks prohibited for layers	20,171,749[367] layer hens housed	Loss of plumage from higher incidence of pecking	1,652,201[368] layer hens per annum
Option E	Reduce maximum stocking densities for layer hens to 9 birds per m2 and meat chickens to 30kg/m2.			
Layer hens				
	Indeterminable improvement in welfare from reduced stocking density for layers	2,015,233[369] layer hens housed (indeterminate whether or not there is a positive welfare impact)	N/A	N/A
Meat chickens				
	Indeterminable improvement in welfare from reduced stocking density for meat chickens	16,434,325[370] meat chickens housed (80,000,000[371] meat chickens	N/A	N/A

[366] Estimated as 15% (routine moulting) (see Part A2.2 of Appendix 2 for source) x total no. of hens housed with the phasing out of cages over 20 years (i.e. 201,717,490 layers) divided by 10 (See Table A2.4 of Appendix 2 for total number of layers to be housed with a phasing out of cages)
[367] Total no. of hens housed with the phasing out of cages over 20 years (i.e. 201,717,490 layers) divided by 10 (See Table A2.4 of Appendix 2 for total number of layers to be housed with a phasing out of cages)
[368] See Table A2.7 of Appendix 2 for source of estimate.
[369] See Table A4.1 of Appendix 3 for source of estimate
[370] Estimated as 966,725 square metres affected (see Table A8.1 of Appendix 8 for source of estimate) x 17 meat chickens per square metre (estimated weighted average 17 birds per square metre = *22% stocking* at 30kg per square metre and *15 birds per square metre + 50% stocking* at 34kg per square metre and *17 birds per square* metre + *28% stocking* at 34kg per square metre and *19 birds per square metre*)
[371] On advice from ACMF

Standard/Option	Description of positive welfare effect of standard/Option	Poultry No. with positive welfare effects as per Column 1	Description of negative welfare effect of standard/Option	Poultry No. with negative welfare effects as per Column 3
		annually) (indeterminate whether or not there is a positive welfare impact)		
Option F	Require the availability of nests, perches and litter for all chicken layers in cage and non-cage systems			
Layer hens				
	Freedom to perch, nest and, in some cases, scratch the floor of the cage (if a scratch pad is provided)	10,716,713[372] layer hens housed	N/A	N/A
Option G	Ban castration, pinioning and devoicing. And no hot blade beak trimming at hatcheries, no routine 2nd beak trim – unless exceptional circumstances (hot blade permitted in this circumstance).			
Layer hens				
	Layer hens no longer subjected to routine second beak trim in the free range and barn segments	2,600,000 [373] layer hens housed	Increased mortality from higher incidence of pecking	357,689[374] layers per annum
Breeders				
	Breeders no longer subjected to routine second beak trim or hot bald	690,000 breeders per annum[375]	Increased mortality from higher incidence of pecking	24,304[376] breeders per annum
Turkeys				
	Turkeys no longer subjected to routine hot blade beak trimming	60,000[377] per annum	Increased mortality from higher incidence of pecking	Unknown

[372] See Table A1.1 in Appendix 1 for source of estimate.
[373] See Table A1.1 in Appendix 1 for source of estimate.
[374] See Table A4.3 of Appendix 4
[375] See Table A10.1 of Appendix 10 for source of estimate.
[376] No. of breeders affected per annum (see Table A10.1 of Appendix 10) x the mortality rate at point of lay x mortality rate after point of lay x (1 - the mortality rate at point of lay)
[377] Based on advice from ACMF

Appendix 17 - List of proposed standards assessed as imposing nil or negligible incremental costs relative to the base case.

Std. No.	Subject matter	Base case
1	**Responsibilities**	
SA1.1	A person must take reasonable actions to ensure the welfare of poultry under their care.	Normal industry practice
SA1.2	A person involved in any part of poultry production must be competent to perform their required task, or must be supervised by a competent person.	Normal industry practice
2	**Feed and water**	
SA2.1	A person in charge must ensure poultry have reasonable access to adequate and appropriate feed and water.	POCTA[378] (Such deficiencies could be regarded as cruelty under POCTA). Poultry MCOP[379] 9.2, 9.4, 10.1, 10.2, 10.3. TAS Reg 5[380] ACT code.[381]
SA2.2	A person in charge must ensure poultry, other than newly hatched poultry or where skip-a-day feeding is acceptable (for broiler breeders) have access to food at least once in each 24 hour period.	Poultry MCOP 9.1. Vic reg[382] 6(1). Vic Code 9.1,[383] SA Reg[384] 22(2)(b). QLD Reg[385] 15. WA Code.[386]
SA2.3	A person in charge must ensure poultry, other than poultry less than 3 days old, have reasonable access to drinking water at least once in each 24 hour period.	Poultry MCOP 10.1. Vic reg 6(2), Vic Code 9.1, SA Reg 22(1). NSW Reg 5 [387]. QLD Reg 16.
SA2.4	A person in charge must ensure newly hatched poultry are provided with feed and water within 60 hours of take-off or 72 hours following take-off if provided with hydrating material	Poultry MCOP 9.1, 10.1 Vic reg 6(1) and (2), Vic Code 9.1 and 10.1, SA Reg 22(1) and (2). NSW Reg 5. QLD Reg 15 and 16.

[378] The Prevention of Cruelty to Animals Acts or equivalents in every jurisdiction.
[379] Model Code of Practice for the Welfare of Animals – Domestic Poultry 4th edition 2002. Only the 'must', 'required' or 'acceptable' standards are included in this comparison (i.e. no 'shoulds'). The *Code Of Practice For Poultry In Western Australia* (2003) is almost identical to this MCOP and therefore will not be referred to separately in this analysis.
[380] Tasmania Animal Welfare (Domestic Poultry) Regulations 2013.
[381] The ACT has adopted the Poultry MCOP and therefore will not be further referred to separately in this document.
[382] Victorian Prevention of Cruelty to Animals (Domestic Fowl) Regulations 2006
[383] Victorian Code of Accepted Farming Practice for the Welfare of Poultry, Note No. AG1143.
[384] South Australia Animal Welfare Regulations 2012.
[385] Queensland Animal Care and Protection Regulation 2012.
[386] Code Of Practice for Poultry in Western Australia is based on the MCOP and therefore will not be further referred to separately in this document.
[387] NSW Prevention of Cruelty to Animals Regulation 2012.

Std. No.	Subject matter	Base case
SA2.5	A person in charge must ensure that feed and water are provided to poultry in ways that prevent undue competition and injury.	Poultry MCOP 9.3.1, 10.6, 10.6.1. Vic Code 4.1
SA2.6	A person in charge must ensure poultry except for emus and ostriches over 4 days old are not deprived of feed for more than 12 hours prior to depopulation or pick up.	SB10.2 in the LTS.[388]
SA2.7	A person in charge must ensure feeding and watering systems are checked daily to ensure all poultry have access to feed and water.	POCTA (Required to ensure implementation of SA2.1). Poultry MCOP 4.2. Vic Code11.3
3	**Risk management of extreme weather, natural disasters, disease, injury and predation**	
SA3.1	A person in charge must take reasonable actions to protect poultry from threats, including extremes of weather, fires, floods, disease, injury and predation.	POCTA (Such deficiencies could be regarded as cruelty under POCTA). Poultry MCOP 7.2, 8.1. Vic Code 7.2.1, 8.1, 8.2 and 8.3 Market forces (Poultry MCOP 8.2 is a guideline only).
SA3.2	A person in charge must ensure the inspection of poultry daily, at a level appropriate to the management system and the risk to the welfare of poultry.	Poultry MCOP 11.2, Vic Code 11.2. market forces.
SA3.3	A person in charge must ensure appropriate action for sick, injured or diseased poultry at the first reasonable opportunity.	Poultry MCOP 11.3 and 11.5 (infectious disease), market forces.
SA3.4	A person in charge must ensure poultry which are unable to access feed and water are treated or killed as soon as possible.	POCTA
SA3.5	A person in charge must ensure poultry have access to shelter from adverse weather that is likely to cause heat or cold stress, and to minimise the risk of predation.	POCTA (heat and cold stress), MCOP 8.1 (predators) market forces.
SA3.6	A person in charge must ensure dead poultry are removed and disposed of at least daily and in a way that minimises disease risks.	Poultry MCOP 12.8, market forces
4	**Facilities and equipment**	
SA4.1	A person in charge must take reasonable actions in the construction, maintenance and operation of facilities and equipment to ensure the welfare of poultry.	Poultry MCOP 2.2.2 and 4.1, market forces.

[388] *Australian Standards and Guidelines for the Welfare of Animals — Land Transport of Livestock* (Edition 1, 2008). AHA, Canberra.

Std. No.	Subject matter	Base case
SA4.2	A person in charge must ensure all housing systems are designed to allow poultry to maintain a natural standing posture.	Poultry MCOP 2.3.1.5. Vic Code 2.3.1.5.
SA4.3	A person in charge must ensure openings provided for poultry to access an outside area are designed and positioned to; 1) allow the birds to maintain a normal posture; and, 2) not obstruct movement of birds; and 3) minimise the risk of smothering or injury.	Poultry MCOP 2.4.5.3, QLD REG 14(2)(f). Vic Code 2.4.5.3. Market forces
SA4.4	A person in charge must ensure any slatted, wire or perforated floors are constructed to support the forward facing toes, prevent entrapment and facilitate removal of manure.	POCTA and Poultry MCOP 2.3.1.1. Vic Code 2.4.2.3. Market forces.
SA4.5	A person must ensure that poultry on perches are protected from excreta from birds perching above.	Poultry MCOP 2.3.1.2 and 2.4.3.3 (layer hens, pullets and breeder hens). Vic Code 2.3.1.1.
5	**Management of outdoor systems**	
SA5.1	A person in charge must ensure that young poultry are adequately feathered before access to an outdoor area.	Poultry MCOP 2.4.5.3. Vic Code 2.4.5.3.
SA5.2	A person in charge must ensure poultry kept in housing with access to an outdoor area have ready access to the shed and shaded areas.	Poultry MCOP 2.4.5.4. Vic Code 2.4.5.4.
SA5.3	A person in charge must not keep poultry on land which has become contaminated with poisonous plants or chemicals which cause disease to an extent which could seriously prejudice the health of poultry.	POCTA and market forces (Poultry MCOP 2.4.5.2 is guideline only). QLD Reg 14(2)(d). Vic Code 2.4.5.2.
SA5.4	A person in charge must take reasonable actions to minimise access to feed and drinking water by wild birds.	Market forces re: biosecurity (MCOP 12.12 is a guideline only).
SA5.5	A person in charge must ensure that poultry are able to be confined as required in compliance with housing standards to manage welfare risks to birds in the outdoor area.	MCOP 2.4.5.3. Also implied by Poultry MCOP 2.4.5.4. Market forces.
6	**Lighting**	
SA6.1	A person in charge must ensure that the light intensity on poultry must be adequate to allow	Poultry MCOP 5.3

Std. No.	Subject matter	Base case
	poultry and equipment to be inspected and any problems to be identified.	
7	**Temperature and ventilation**	
SA7.1	A person in charge must ensure airflow and temperature in enclosed housing facilities minimises the risk to poultry welfare from heat, cold, humidity, dust or noxious gases.	POCTA[389] (Such deficiencies could be regarded as cruelty under POCTA). Poultry MCOP 6.1. Vic Code 6.1 in part (ventilation).
SA7.2	A person in charge must ensure that mechanically ventilated sheds have: 1) a back-up power supply that is tested weekly; and 2) automatic alarm systems to warn immediately of ventilation failure; and 3) a system in place to respond and take action at the first reasonable opportunity.	Poultry MCOP 6.7. Vic Code 6.7.
SA7.3	A person in charge must monitor ammonia levels and ensure immediate corrective action is taken if ammonia levels reach 20 ppm at bird level in sheds.	Poultry MCOP 6.4. Vic Code 6.4.
8	**Litter management**	
SA8.1	Where litter is used, a person in charge must ensure litter material is suitable for the species and of a good quality.	Implied by Poultry MCOP 2.4.2.2
SA8.2	Where litter is used, a person in charge must ensure the risk of contamination of litter with toxic agents is minimal.	Market forces. Normal industry practice
9	**Handling and husbandry**	
SA9.1	A person must manage and handle poultry in a manner that minimises pain, stress or injury to birds.	POCTA (Such deficiencies could be regarded as cruelty under POCTA).
SA9.2	A person must ensure care is taken in catching poultry to avoid creating panic and subsequent injury or smothering of the birds.	POCTA (Such deficiencies could be regarded as cruelty under POCTA). MCOP 15 (transport of poultry) MCOP A4.2.2 (catching of ducks).
SA9.3	A person must free entrapped poultry at the first reasonable opportunity and if possible prevent this situation from recurring.	POCTA (Such treatment could be regarded as cruelty under POCTA). Poultry MCOP 12.6. Vic Code 12.6.

[389] The Prevention of Cruelty to Animals Acts or equivalents in every jurisdiction.

Std. No.	Subject matter	Base case
SA9.7	A person in charge must ensure that where wing and leg bands are used they are checked regularly and where necessary, loosened or removed.	Poultry MCOP 13.10.1
SA9.8	A person other than a veterinarian must not perform pinioning, castration or devoicing, on poultry.	Poultry MCOP 13.7.1 (castration) Poultry MCOP 13.8.1 (devoicing) Poultry MCOP 13.9.1 (pinioning). All three procedures are banned entirely. Vic Code 13.7, 13.8. 13.9.1.
SA9.9	A person must not perform desnooding or dubbing[390] for cosmetic purposes on poultry.	Normal industry practice.
SA9.10	A person must only perform desnooding, dubbing, despurring and web marking on day old hatchlings selected as potential breeders.	Poultry MCOP 13.3.1 (dubbing), Poultry MCOP 13.5.2 (despurring). Normal industry practice for desnooding.
SA9.12	A person must use appropriate pain relief when carrying out surgical procedures on poultry.	New standard. POCTA (Such treatment could be regarded as cruelty under POCTA).
SA9.13	A person must not pluck live poultry.	New standard. POCTA (Such treatment could be regarded as cruelty under POCTA).
SA9.14	A person must use appropriate tools and methods to trim the beaks of poultry.	Poultry MCOP 13.2.2. requires accredited operators and methods. Vic Code 13.2.2. Normal industry practice.
SA9.16	A person must not use blinkers or contact lenses on poultry unless under veterinary advice.	Poultry MCOP 13.6. Vic Code 13.6.4. and 13.6.5.
SA9.17	A person in charge must monitor hatching systems daily including back-up systems and/or alarms.	Implied Poultry MCOP 11.2. (Specific MCOP 11.1 is a guideline only). Normal industry practice.
SA9.18	A person must monitor incubators at regular intervals during hatching and hatchlings that are found outside the trays must be returned to the tray or placed in brooders as soon as possible.	Normal industry practice.
SA9.19	A person must treat hatchery waste, including unhatched embryos, quickly and effectively to ensure the rapid killing of all unhatched embryos.	Normal industry practice.
SA9.20	A person in charge must ensure cull or surplus hatchlings awaiting disposal are treated humanely and are killed as soon as practicable.	Poultry MCOP 14.1.
10	**Humane killing**	
SA10.1	A person in charge must ensure killing methods for poultry result in rapid death, or loss of	POCTA (Such deficiencies could be regarded as cruelty under POCTA).

[390] Dubbing is the procedure of removing the comb, wattles and sometimes earlobes of poultry.

Std. No.	Subject matter	Base case
	consciousness, followed by death while unconscious.	
SA10.2	A person must have the relevant knowledge, experience and skills to be able to humanely kill poultry, or be under the direct supervision of a person who has the relevant knowledge, experience and skills, unless: 1) the poultry are suffering and need to be killed to prevent undue suffering; and 2) there is an unreasonable delay until direct supervision by a person who has the relevant knowledge, experience and skills becomes available.	POCTA (this standard is needed to implement SA10.1). Vic Code 12.10 in part.
SA10.3	A person in charge of poultry which are suffering from severe distress, disease or injury and that cannot be reasonably treated or which have no prospect of recovery must ensure that the poultry are killed at the first reasonable opportunity.	POCTA (Such deficiencies could be regarded as cruelty under POCTA). (MCOP 12.13 is a guideline only).
SA10.4	A person killing poultry must take reasonable action to confirm the bird is dead.	POCTA (this standard is needed to implement SA10.1).
11	**Poultry at slaughtering establishments**	
SA11.1	A person must ensure that poultry at a slaughtering establishment are treated in a manner that minimises handling and stress.	Poultry MCOP 17.1,17.3, Slaughter MCOP[391] 3.1.1.1 Vic Code 17.1 and 17.3.
SA11.2	A person in charge must ensure killing methods for poultry result in rapid loss of consciousness, followed by death while unconscious.	POCTA, Slaughter MCOP 3.5 Vic Code 17.3.
SA11.3	A person must ensure that if poultry are not fit for slaughter they will be killed humanely.	POCTA
SA11.4	A person must ensure that devices which use blunt force to the head, pinch or crush the spinal cord are not used to stun poultry.	POCTA, Poultry MCOP 17.3 Vic Code 17.3.
SA11.5	A person in charge must ensure slaughtering establishments have a contingency plan to be used in case the main stunning system does not work.	Slaughter MCOP 3.5
SA11.6	A person must ensure that if there is an extended delay in slaughtering, alternative arrangements	Slaughter MCOP 3.3

[391] Model Code of Practice for the Welfare of Animals – Livestock at Slaughtering Establishments (2002)

Std. No.	Subject matter	Base case
	are made for slaughter at an alternative facility, or humane killing.	
SA11.8	A person in charge must ensure that the effectiveness of the stun is monitored and that birds are dead prior to entering the scalder.	POCTA, Slaughter MCOP 3.6.3
B1	**Laying Chickens**	
SB1.1	A person in charge must not allow the excreta of laying hens in cages to accumulate to the stage that compromises poultry health and welfare.	New standard. Market forces.[392]
SB1.2	A person in charge must ensure multi deck cages are arranged so that the poultry in the lower tiers are protected from excreta from above.	Poultry MCOP 2.3.1.2, Vic Reg 7(1). SA Reg 23(1). NSW Reg 9. QLD Reg 3(2)(b). TAS Reg 5(3). [393]
SB1.3	A person in charge must ensure poultry in cages are able to stand at a normal height. Cages must be at least higher than the maximum height of all the poultry standing normally. The height of all cages must be at least 40 cm over 65% of the cage floor area.	Poultry MCOP 2.3.1.5, Vic Reg 7(3). SA Reg 23(1). NSW Reg 7. QLD Reg 4. TAS Reg 5A(6).
SB1.4	A person in charge must ensure that, for useable areas and any area occupied by feeding and watering equipment and nest boxes, on one or more levels ensure that; 1) each level is easily accessible to the hens 2) headroom between the levels is at least 45 cm 3) all levels are accessible to stock workers to observe and reach birds which are sick or injured 4) feeding and watering facilities are distributed to provide equal and ready access to all hens; and 5) levels are sited so as not to foul birds below.	Poultry MCOP Appendix 2 Clause A2.1.1. Vic Reg 10(3), NSW Reg 15 QLD Reg 13, TAS Reg 5(3)[394]Vic Code A2.1.1. Poultry MCOP 2.3.1.6 and 11.4. Poultry MCOP 2.3.1.3, 2.3.1.4, 10.6 Poultry MCOP 2.3.1.2, Vic Reg 7(1). SA Reg 23(1). NSW Reg 9. QLD Reg 3(2)(b). TAS Reg 5(3)
SB1.5	A person in charge must ensure that after the training period, where hens are housed under	Costed under standard SA6.5.

[392] The small number of businesses that allow this and the net cost of removing accumulated excreta from under cages, given that it can be used or sold as fertiliser, is considered to be so low as to be negligible.
[393] Tasmania Animal Welfare (Domestic Poultry) Regulations 2013.
[394] Tasmania Animal Welfare (Domestic Poultry) Regulations 2013

Std. No.	Subject matter	Base case
	artificial light, lighting schedules must provide a minimum of 4 hours of continuous darkness in each 24-hour period.	
SB1.6	A person in charge must ensure that all caged laying chickens weighing less than 4.5 kg live weight have the following minimum acceptable space allowances: **Birds per cage/Minimum cage floor area per bird** 3 or more birds (<2.4 kgs) per cage/550 cm^2 3 or more birds >/=2.4 kgs) per cage/600 cm^2 2 birds per cage/675 cm^2 Single bird cages/1000 cm^2 *NB: Floor area is measured in a horizontal plane and includes the area under the egg/waste baffle and the area under the drinking nipples and vee-trough for water.* *Maximum acceptable live weight density for rearing laying pullets is 40 kg live weight per m^2 cage floor area.*	Poultry MCOP A1.4. Vic Reg 8. SA Reg 23 (2). NSW Reg 10. QLD Regs 5-7. TAS Reg 5A.Vic Code A1.4.
SB1.7	A person in charge must ensure that all laying chickens weighing 4.5 kg or more live weight do not exceed the following stocking densities: **Birds per cage/Maximum live weight per unit of floor** 3 or more birds per cage - 46 kg/ m^2 2 birds per cage - 40 kg/ m^2 Single birds cages - 26 kg/ m^2 *NB: Floor area is measured in a horizontal plane and includes the area under the egg/waste baffle and the area under the drinking nipples and vee-trough for water.* *Maximum acceptable live weight density for rearing laying pullets is 40 kg live weight per m^2 cage floor area.*	Poultry MCOP A1.5. Vic Reg 9. SA Reg 23(2). NSW Reg 10. QLD Regs 5-7. Vic Code A1.4.
SB1.8	A person in charge must not exceed a stocking density of 30 kg/m2 (measured as bird density in	Poultry MCOP A2.1.2 . Vic Reg 11 (30 kg/m2). NSW Reg 17 (30 kg/m2). QLD Reg 8 requires 40

<table>
<tr><th>Std. No.</th><th>Subject matter</th><th>Base case</th></tr>
<tr><td></td><td>the useable area) for rearing laying pullets and for managing adult laying chickens.</td><td>kg/m2. Existing industry practice. Vic Code A2.1.1.</td></tr>
<tr><td>SB1.9</td><td>A person in charge must provide nest boxes for layer hens in lay in non-caged systems.</td><td>Poultry MCOP 2.4.4.1 NSW Reg 14.</td></tr>
<tr><td>B2</td><td>Meat chickens</td><td></td></tr>
<tr><td>SB2.1</td><td>A person in charge must ensure that after 7 days of age, lighting patterns must encourage activity and provide a minimum period of 4 hours of continuous darkness each day except on the day of pickup (meat chickens) and meat chickens during very hot weather.</td><td>Normal industry practice.</td></tr>
<tr><td>SB2.2</td><td>A person must not routinely undertake surgical procedures, such as beak trimming, on meat chickens.</td><td>Normal industry practice.</td></tr>
<tr><td>SB2.3</td><td>A person in charge must not exceed the following stocking densities for meat chickens:
Housing Type/Minimum Requirements/Maximum Density
<table><tr><td>Tunnel ventilated or other extractive systems /Evaporative cooling system capable of 1 air exchange per minute</td><td>40 kg/m^2 year-round</td></tr><tr><td>Other mechanically ventilated/Stirring fans, Water-based cooling system</td><td>40 kg/m^2 in winter, 36 kg/m2 in summer</td></tr><tr><td>Non-mechanically ventilated</td><td>28 kg/m^2 year-round</td></tr></table>NB: Winter – is pick up occurring between 1 April and 30 September
Summer – is pick up occurring between 1 October and 31 March</td><td>Poultry MCOP A2.1.3. Vic Reg 12. SA Reg 24(b), QLD Reg 12. Vic Code A2.1.3.</td></tr>
<tr><td>B3</td><td>Meat and Laying Chicken Breeders</td><td></td></tr>
<tr><td>SB3.1</td><td>A person in charge must not allow the excreta of chicken breeders in cages to accumulate to the stage that compromises poultry health and welfare.</td><td>New standard. Market forces. (Unlikely to happen in wire cages).</td></tr>
</table>

Std. No.	Subject matter	Base case
SB3.2	A person in charge must ensure multi deck cages are arranged so that the poultry in the lower tiers are protected from excreta from above.	Poultry MCOP 2.3.1.2. Vic Reg 7(1), SA Reg 24, NSW 9, QLD Reg 3(2)(b).
SB3.3	A person in charge must ensure poultry in cages are able to stand at a normal height. Cages must be at least higher than the maximum height of all the poultry standing normally. The height of all cages must be at least 40 cm over 65% of the cage floor area.	Poultry MCOP 2.3.1.5. Vic Reg 7(3). SA Reg 23(1), QLD Reg 4.
SB3.4	A person in charge must ensure, in relation to useable areas on one or more levels of a multideck cage and for any area occupied by feeding and watering equipment and nest boxes that: 1) each level is easily accessible to the hens 2) headroom between the levels is at least 45 cm 3) all levels are accessible to stock workers to observe and reach birds which are sick or injured 4) feeding and watering facilities are distributed to provide equal and ready access to all hens; and 5) levels are sited as to minimise the risk of soiling birds below.	Normal industry practice for meat breeders Poultry MCOP 2.3.1.6 Poultry MCOP 2.3.1.3, 2.3.1.4, 10.6 Poultry MCOP 2.3.1.2
SB3.5	A person in charge must ensure that after the training period, where hens are housed under artificial light, lighting schedules must provide a minimum of 4 hours of continuous darkness in each 24-hour period.	Normal industry practice for meat breeders.
SB3.6	A person in charge must ensure meat and laying chicken breeders are not lifted or carried by the head, neck, wings, feathers or tail feathers unless otherwise supported by the breast, except if lifted and carried by the base of both wings.	POCTA
SB3.7	Nest boxes must be provided during the egg production phase.	Normal industry practice for meat breeders.
SB3.8	A person in charge must ensure that all caged chicken breeders weighing up to 4.5 kg live weight have the following minimum acceptable space allowances: **Birds per cage/Minimum cage floor area per bird**	Poultry MCOP A1.4 Vic Reg 8. SA Reg 23(2). NSW Reg 10. QLD Regs 5-7.

Std. No.	Subject matter	Base case
	3 or more birds (<2.4 kgs) per cage/550 cm^2 3 or more birds (>/= 2.4 kgs) per cage/600 cm^2 2 birds per cage/675 cm^2 Single birds cages/1000 cm^2 *NB: Floor area is measured in a horizontal plane and includes the area under the egg/waste baffle and the area under the drinking nipples and vee-trough for water.* *Maximum acceptable live weight density for rearing layer pullets is 40 kg live weight per m^2 cage floor area.* *Birds per cage includes roosters run with hens.*	
SB3.9	A person in charge must ensure that all caged chicken breeders weighing 4.5 kg or more live weight have the following minimum acceptable space allowances: **Birds per cage/Maximum live weight per unit of floor** 3 or more birds per cage - 46 kg/ m2 2 birds per cage - 40 kg/ m2 Single birds cages - 26 kg/ m2 *NB: Floor area is measured in a horizontal plane and includes the area under the egg/waste baffle and the area under the drinking nipples and vee-trough for water.* *Maximum acceptable live weight density for rearing chicken breeders is 40 kg live weight per m^2 cage floor area.*	Poultry MCOP A1.5 Vic Reg 9. SA Reg 23(2). NSW Reg 10. QLD Regs 5-7.
SB3.10	A person in charge must not exceed a stocking density of 30kg/m^2 (measured as bird density in the useable area) for pullets and adult birds (including roosters).	Poultry MCOP A2.1.2
B4	**Ducks**	
SB4.1	A person must ensure ducks are not lifted or carried by the head, legs, wings, feathers or tail feathers unless otherwise supported by the breast.	POCTA. MCOP A4.2.2 MCOP 15 in part. Vic Code A4.2.2 in part.
SB4.3	A person in charge must ensure bill trimming is carried out by a skilled operator at day old and	MCOP A4.2.1

Std. No.	Subject matter	Base case
	only the rim at the front of the upper bill is to be removed.	
SB4.5	A person in charge must ensure nest boxes are provided for duck breeders when in lay.	Normal industry practice
SB4.6	A person must ensure the maximum recommended stocking densities for ducks are according to housing type and under good management conditions and as follows: **Age/In confinement** Ducklings – to 10 days/50 birds/m^2 Ducklings – at 8 weeks/8 birds/m^2 or 20-24 kg/m^2 Breeders/5 birds/m^2 or17-20 kg/m^2 **In runs** Ducklings - at 8 weeks/5000 birds/ha Breeders/4000 birds/ha *Note: Lighter stocking densities necessary for heavier breeds such as Muscovies.*	Poultry MCOP A4.1 Vic Code A4.1
B5	**Emus**	
SB5.1	A person in charge must ensure that natural aggression is effectively managed.	MCOP emus[395] 7.3.1. Market forces
SB5.2	A person must house chicks in groups of up to 200 for the first 4 weeks of life at a shed density of up to 30 chicks per m^2 provisional that adequate heating is provided to prevent huddling that would cause smothering.	New standard. Market forces (MCOP emus 2.2.3.2 recommends groups up to 50 at 3 chicks per square metre as a guideline only).
SB5.3	A person in charge must ensure the maximum shed density for emus from 4 weeks to 4 months old is 10 per m^2 and above 4 months old is 2 per m^2.	New standard. Market forces (MCOP emus 2.2.3.2 recommends 3 birds/m2 to 12 weeks and an outside run MUST be provided at density of 5m^2 per chick).
SB5.4	A person in charge must ensure emus kept inside are provided with access to an outside run of at least 15m x 2m.	MCOP emus 2.2.3.2 requires that an outside run MUST be provided at density of 5m^2 per chick.
SB5.5	A person in charge must ensure blackhead/juveniles in open conditions are provided with effective windbreaks or other shelter.	MCOP emus 2.1.3.

[395] Model Code Of Practice For The Welfare Of Animals: Husbandry Of Captive-Bred Emus 2nd Edition (2006).

Std. No.	Subject matter	Base case
SB5.6	A person in charge must ensure stocking rates for birds raised in open conditions vary from 175 per hectare for dry or bare conditions to 250 per hectare for lush or irrigated conditions.	Normal industry practice.
SB5.7	A person in charge must ensure yearlings are housed in open conditions at stocking rates from 100 per hectare for dry or bare conditions to 175 per hectare for lush or irrigated conditions.	Normal industry practice.
SB5.8	A person in charge must ensure where emus are kept as breeding pairs, each pair are provided with a minimum pen size of 400 m^2 which must be securely fenced.	Normal industry practice.
SB5.9	A person in charge must ensure in low rainfall areas and where there is little vegetation, stocking rates are decreased, except if supplementary feed is provided.	Market forces. Normal industry practice
B6	**Geese**	
SB6.1	A person in charge must ensure geese are not force fed for any reason including pâté production.	MCOP poultry A5.2.2 Vic Code A5.2.2.
SB6.2	A person must not catch geese by the legs or feet.	POCTA. Normal industry practice
SB6.3	A person must not lift or carry geese by the head, neck, legs or feet, wings, feathers or tail feathers unless otherwise supported by the breast.	POCTA. LTS SB10.6 (during transport operations).
SB6.4	A person in charge must ensure shelters provide 1m^2/bird floor space.	All existing geese producers are free-range, so no current businesses affected. [396]
SB6.5	A person in charge must ensure a single pair of geese are kept in an area of a minimum of 3m^2	All existing geese producers are free-range, so no current businesses affected.
SB6.6	A person must ensure the maximum recommended stocking densities for geese are according to housing type and under good management conditions and as follows; **Age/In housing (indoors)** Goslings to 10 days/12 birds/m^2 Goslings at 8 weeks/2 birds/m^2 Breeders: 2 birds/3m^2 **Age/In runs**	All existing geese producers are free-range, so no current businesses affected.

[396] The density standards are there for if and when any intensive geese businesses start up in Australia.

Std. No.	Subject matter	Base case
	Goslings - at 8 weeks/1,250 birds/ha or 500/acre Breeders/250 birds/ha or 100/acre	
B7	**Guinea Fowl**	
SB7.1	A person must not lift or carry guinea fowl by the head, legs, neck, wings, feathers or tail feathers unless otherwise supported by the breast.	New standard. POCTA MCOP 15 in part. LTS SB10.6 (during transport operations).
SB7.2	A person must ensure the maximum stocking densities for guinea fowl are according to housing type and under good management conditions and as follows; **Bird type/Age/Number** Growing stock/0-4 weeks/20 birds/m^2 Growing stock/5-10 weeks/14 birds/m^2 Growing stock /11-14 weeks/10 birds/m^2 Adult birds/…./4 birds/m^2 Adult birds – cages/…/10 birds/m^2 Range area/…./1000 birds/ha	Poultry MCOP A7.1
B8	**Ostriches**	
SB8.1	A person must ensure where a bird has suffered leg rotation it must be managed. If the bird has difficulty in rising or walking and has significant heat, pain and swelling, the bird must be humanely killed.	POCTA MCOP farming of ostriches[397] 7.3
B9	**Partridges**	
SB9.1	A person must not lift or carry partridge by the head, legs, neck, wings, feathers or tail feathers unless otherwise supported by the breast.	POCTA
SB9.2	A person must ensure the maximum stocking densities for partridge are 10kg/m^2.	Market forces. Normal industry practice?
B10	**Pheasants**	
SB10.1	A person must not lift or carry pheasants by the head, legs, neck, wings, feathers or tail feathers unless otherwise supported by the breast.	POCTA LTS SB10.6, MCOP 15 in part (during transport operations).
SB10.2	A person must ensure the maximum stocking densities for pheasants are 10kg/m^2.	Market forces Normal industry practice?

[397] MCOP farming of ostriches PISC –SCARM report 84, (2003).

Std. No.	Subject matter	Base case
B11	**Pigeons**	
SB11.1	A person in charge must ensure every effort is made to avoid aggression from male birds towards both hen birds and immature nestlings by the appropriate selection of breeding stock coupled with appropriate housing.	Market forces. Normal industry practice?
SB11.2	A person must not lift or carry pigeons by the head, legs, neck, wings, feathers or tail feathers unless otherwise supported by the breast.	POCTA
SB11.3	A person in charge must ensure pigeons are not weaned before they are capable of feeding and drinking independently of their parents.	POCTA (MCOP poultry A10.3.1 is a guideline only). Normal industry practice?
SB11.4	A person in charge must ensure that at all times there are more perches, either box or V shaped, available in the loft than resident pigeons.	New standard. (Previous guideline MCOP A10.1.3was less prescriptive). Market forces
SB11.5	A person in charge must ensure racing pigeons are not released away from the home loft for racing into extreme weather conditions or if there is fog in any portion of the return journey.	POCTA
B12	**Quail**	
SB12.1	A person in charge must ensure that the flooring provides secure footing and prevents leg injuries.	POCTA. Poultry MCOP A9.1
SB12.2	A person must not lift or carry quail by the head, legs, neck, wings, feathers or tail feathers unless otherwise supported by the breast.	POCTA
SB12.3	A person must ensure the maximum recommended stocking densities for quail are according to housing type and under good management conditions and as follows: **Age/Number** 0-2 weeks/16kg/m^2 2-6 weeks/20-24kg/m^2 Breeders /20-24kg/m^2	Poultry MCOP A9.2 (specified in terms of birds/m^2). MCOP max is: 7.2kg/m^2 19.2kg/m^2 14kg/m^2 So assume no increase in cost.
B13	**Turkeys**	
SB13.1	A person performing artificial breeding procedures on turkeys must have the relevant knowledge, experience and skills, or be under the	Normal industry practice.

Std. No.	Subject matter	Base case
	direct supervision of a person who has the relevant knowledge, experience and skills.	
SB13.2	A person performing artificial breeding procedures on turkeys must take reasonable actions to minimise pain, distress or injury.	POCTA
SB13.3	A person must not lift or carry turkeys by the head, neck, wings, feathers or tail feathers unless otherwise supported by the breast. Except when lifted by the tail feathers and neck or by a leg and a wing by the base of both or wings for vaccination.	POCTA
SB13.4	A person in charge must ensure nest boxes are provided for turkey breeders when in lay.	Normal industry practice.

Appendix 18 - List of relevant federal, state and territory legislation

Table A18.1: Summary of relevant state and territory legislation

Jurisdiction	Act	Existing regulations	Other standards and guidelines
ACT	Animal Welfare Act 1992.	*Animal Welfare Regulation 2001*	*Model Code of Practice for the Welfare of Animals – Domestic Poultry* (4th edition) *Model Code of Practice for the Welfare of Animals: Farming of Ostriches*, Primary Industries Report Series 84 *Model Code of Practice for the Welfare of Animals: Husbandry of Captive-Bred Emus* Second Edition, Primary Industries Report Series 90
NSW	Prevention of Cruelty to Animals Act 1979	*Prevention of Cruelty to Animals Regulation, 2012*	*Model Code of Practice for the Welfare of Animals – Domestic Poultry* (4th edition) *Model Code of Practice for the Welfare of Animals: Farming of Ostriches*, Primary Industries Report Series 84 *Model Code of Practice for the Welfare of Animals: Husbandry of Captive-Bred Emus* Second Edition, Primary Industries Report Series 90
NT	Animal Welfare Act	*Animal Welfare Regulations*[398]	*Model Code of Practice for the Welfare of Animals – Domestic Poultry* (4th edition) *Model Code of Practice for the Welfare of Animals: Farming of Ostriches*, Primary Industries Report Series 84 *Model Code of Practice for the Welfare of Animals: Husbandry of Captive-Bred Emus* Second Edition, Primary Industries Report Series 90
QLD	Animal Care and Protection Act 2001	*Animal Care and Protection Regulation 2012*	*Model Code of Practice for the Welfare of Animals – Domestic Poultry* (4th edition)

[398] Regulations are not needed in NT to adopt standards. This can be done by the Minister by notice in the gazette. NT regulations do not have dates in their titles.

Jurisdiction	Act	Existing regulations	Other standards and guidelines
			Model Code of Practice for the Welfare of Animals: Farming of Ostriches, Primary Industries Report Series 84 *Model Code of Practice for the Welfare of Animals: Husbandry of Captive-Bred Emus* Second Edition, Primary Industries Report Series 90
SA	Animal Welfare Act 1985	*Animal Welfare Regulations 2012*	*Model Code of Practice for the Welfare of Animals – Domestic Poultry* (4th edition) *Model Code of Practice for the Welfare of Animals: Farming of Ostriches*, Primary Industries Report Series 84 *Model Code of Practice for the Welfare of Animals: Husbandry of Captive-Bred Emus* Second Edition, Primary Industries Report Series 90
TAS	Animal Welfare Act 1993	*Animal Welfare (Domestic Poultry) Regulations 2013*	*Model Code of Practice for the Welfare of Animals – Domestic Poultry* (4th edition) *Model Code of Practice for the Welfare of Animals: Farming of Ostriches*, Primary Industries Report Series 84 *Model Code of Practice for the Welfare of Animals: Husbandry of Captive-Bred Emus* Second Edition, Primary Industries Report Series 90
VIC	Prevention of Cruelty to Animals Act 1986 Livestock Management Act 2010	*Prevention of Cruelty to Animals (Domestic Fowl) Regulations 2016*	*Victorian Code of Accepted Farming Practice for the Welfare of Poultry (Revision 2)* *Model Code of Practice for the Welfare of Animals: Farming of Ostriches*, Primary Industries Report Series 84 *Model Code of Practice for the Welfare of Animals: Husbandry of Captive-Bred Emus* Second Edition, Primary Industries Report Series 90
WA	Animal Welfare Act 2002	*Animal Welfare (Commercial Poultry) Regulations 2008*	*Code of practice for poultry in Western Australia (March 2003)*

Jurisdiction	Act	Existing regulations	Other standards and guidelines
			Model Code of Practice for the Welfare of Animals: Farming of Ostriches, Primary Industries Report Series 84 *Model Code of Practice for the Welfare of Animals: Husbandry of Captive-Bred Emus* Second Edition, Primary Industries Report Series 90

Appendix 19: Discussion of animal welfare benefits of Option E

The purpose of Option E is to vary the proposed standards to reduce maximum stocking densities in barns or sheds for non-cage layer hens to 9 birds per m^2 from 30 kg/m^2; and meat chickens to 30kg/m^2 from the following standards:

Tunnel ventilated or other extractive systems /Evaporative cooling system capable of 1 air exchange per minute./40 kg/m^2 year-round
Other mechanically ventilated/Stirring fans, Water-based cooling system /40 kg/m^2 in winter, 36 kg/m^2 in summer
Non-mechanically/28 kg/m^2 year-round

Housing Type	Minimum Requirements	Maximum Density
Tunnel ventilated or extractive systems etc.	Evaporative cooling system capable of 1 air exchange per minute	40 kg/m^2 year-round
Other mechanically ventilated	Stirring fans Water-based cooling system	40 kg/m^2 in winter
		36 kg/m^2 in summer
Non-mechanically ventilated		28 kg/m^2 year-round

RPSCA has provided the following evidence in support of Option E:

> 'Stocking density has a direct, linear relationship with welfare. At high densities, there is less opportunity to perform natural behaviours such as wing-flapping. Locomotion and environmental exploration are also inhibited, which predisposes birds to contact dermatitis. High stocking densities reduce activity, and increase fearfulness in broiler chickens.[399]
>
> Leg strength can decrease with increased stocking densities, while hock dermatitis, footpad dermatitis and fearfulness can increase with increasing stocking densities.[400] Birds at a high stocking density of 42kg/m2 have worse footpad burn and gait scores, compared to a lower stocking density of 26kg/m2. Increased stocking densities also have a negative effect on tibia curvature which can cause lameness, bruised hocks, dislocation in the hock joint, and fracture.[401] Chickens have also demonstrated motivation and preferences for densities below 40kg/m2.[402] Feed conversion, bodyweight gain, digestive microbiota, and litter quality have been found to be negatively affected when meat chickens

[399] Andrews et al. 1997.
[400] Buijs et al. 2009.
[401] Bradshaw et al. 2002; Buijs et al. 2012.
[402] Buijs et al. 2011.

were reared at 17 birds per m2 compared to 12 m2.[403] A study comparing 34kg/m2 with 40kg/m2 in commercial conditions found that at the higher stocking density, daily mortality was greater, leg problems, contact dermatitis and carcass bruising increased, resting behaviour was increasingly disturbed, locomotion and ground pecking decreased, and lying and preening patterns were affected.[404] A study found that the highest stocking density studied, 30 birds/m2, caused acute stress in female broilers'.[405]

Rault and Matthews state in the RIRDC Meat Chicken Review 2014: [406]

'A large number of scientific studies examining the effects of stocking density on bird welfare have been conducted in laboratory settings but few in commercial production environments … However, a causal link between stocking density and chicken welfare is far from clear as many contradictory results have been reported across the studies, an exception being a reasonably consistent increase in behavioural disturbance or associated conditions (such as scratches to the body) with increases in stocking density.[407]

An issue that has been reported at high densities, and which is logically connected to behavioural disturbance, is the amount of space that a bird would prefer to have available for its activities. Under commercial conditions, Febrer et al. (2006) showed that close proximity to other birds was not aversive, as birds clustered more than would be expected from a random distribution. Other studies conducted in laboratory settings have reported that, even at relatively low densities (15 kg/m2), birds avoid each other.[408] Further, Buijs et al. (2011b) has shown that birds kept at 40 kg/m2 showed a strong motivation to move to an area of lower density (23 or 32 kg/m2). Measures of the physical space requirements of birds indicate that they are compressed at densities above 40 kg/m2.[409]'

On the other hand, Prof. Marian Stamp Dawkins et al have found from their studies that it is not clear whether reducing stocking densities for meat chickens will genuinely improve bird welfare because evidence is contradictory. They concluded that, although very high stocking densities do affect chicken welfare, stocking density per se is, within limits, less important than other factors in the birds' environment.[410]

[403] Guardia et al. 2011.
[404] Hall 2001.
[405] Villagra et al. 2009.
[406] Rault and Matthews, 2014.
[407] de Jong et al., 2012a; Ventura et al. 2012.
[408] Buijs et al., 2011a.
[409] Bokkers et al., 2011.
[410] Dawkins et al, 2004.

No similar research has been published for chickens grown in Australia, yet the Dawkins research in the UK explicitly recognises the pre-eminence of local environmental conditions (in combination with high stocking density) in determining bird welfare.

In view of the estimated high cost of changing stocking densities Option E ($182.33[411] for layer hens, $635.64[412] for meat chickens over 10 years in present value dollars), there is doubt as to whether there is sufficient evidence of welfare benefits to justify these costs.

[411] See Table 34 in Part 4.3.7 of this RIS.
[412] See Table 35 in Part 4.3.7 of this RIS.,

Appendix 20 – Specific international animal welfare standards for layer hens and water access for ducks

Housing systems for laying hens

European Union (EU)

The **European Union (EU)** establishes minimum standards for the welfare of laying hens kept in various systems of rearing in order to protect the hens and prevent distortions of competition between producers in different Member States. Council Directive 1999/74/EC of 19 July 1999 laying down minimum standards for the protection of laying hens came into full force on 1st January 2012. Its key requirement is a ban on the use of conventional cages for laying hens, although enriched cages, increasing the space and facilities for hens, will be allowed. (While European legislation refers to enriched cages, this RIS refers to furnished cages. They are essentially the same idea, although the detailed specifications might be different in each case).

From 1 January 2002, all enriched cages must comply at least with the following requirements. Each laying hen must have:

- at least 750 cm2 of cage floor area;
- a nest;
- litter such that pecking and scratching are possible;
- appropriate perches of at least 15 cm length per hen;
- a feed trough that may be used without restriction must be provided. Its length must be at least 12 cm multiplied by the number of hens in the cage;
- each cage must have an appropriate drinking system;
- there must be a minimum aisle width of 90 cm between tiers of cages and a space of at least 35 cm must be allowed between the floor of the building and the bottom tier of cages;
- cages must be fitted with suitable claw-shortening devices.

New Zealand

New Zealand's *Animal Welfare (Layer Hens) Code of Welfare 2012* in effect states that conventional cages will be phased out by the end of 2022 with no new conventional cages allowed.

a) Hens must have the opportunity to express a range of normal behaviours. These include, but are not limited to nesting, perching, scratching, ground pecking, and dustbathing.
b) Any cage installed prior to 31 December 1999 must be replaced with a housing system that meets the requirements of Minimum Standard 12(a) by 31 December 2016.
c) Any cage installed prior to 31 December 2001 must be replaced with a housing system that meets the requirements of Minimum Standard 12(a) by 31 December 2018.
d) Any cage installed on or prior to 31 December 2003 must be replaced with a housing system that meets the requirements of Minimum Standard 12(a) by 31 December 2020.
e) Any cage installed between 1 January 2004 and the date of issue of this code must be replaced with a housing system that meets minimum standard 12(a) by 31 December 2022.
f) Any housing systems installed after the date of issue of this code must meet the requirements of Minimum Standard 12(a).

NZ Cage standards

1. must be a minimum of 500 sq. cm per hen for cages built prior to 1 January 2005.
2. must be a minimum of 550 sq. cm per hen for cages built from 1 January 2005.
3. must be a minimum of 550 sq. cm per hen for all cages from 1 January 2014.

NZ Colony cage standards

1. must be a minimum of 750 cm^2 per hen or 13 hens per m^2.

New Zealand's *Animal Welfare (Layer Hens) Code of Welfare 2012* in effect states that for furnished cages:
(i) A secluded nest area must be provided and the floor of the nest area must be covered with a suitable substrate that prevents direct contact of hens with the wire mesh floor.
(ii) Floor slope must not exceed 8 degrees which supports the forward facing claws.
(iii) A colony cage height must be at least 45 cm other than in the nest area.
(iv) Perches must be provided and designed to allow the hen to grip without risk of trapping its claws and must provide at least 15 cm of space per hen to allow all birds to perch at the same time.
(v) A scratching area must be provided.
(vi) Suitable claw shortening devices must be fitted.

Canada

In March 2017, Egg Farmers of **Canada** (EFC) announced, on behalf of the more than 1,000 Canadian egg farms, the release of a new Code of Practice for the Care and Handling of Layers. [413]

[413] http://www.nfacc.ca/news?articleid=287

The **Canadian** Code of Practice for the Care and Handling of Pulletsand Laying Hens *(2017)* mandates the phasing out of conventional cages for laying hens but states that during the transition period:

Transitional Space Allowance Requirements for flocks placed after 1April 2017
For cages with furnishings installed prior to 1 April 2017, each hen must be provided with a minimum space allowance of 580.6 cm2 (90.0 sq in).

Effective January 1, 2020
For Conventional Cages installed prior to July 1, 2016, each bird must be provided with a minimum space allowance of 432.0 cm2 (67.0 sq in) for white birds and 484.0 cm2 (75.0 sq in) for brown birds.

Final Space Allowance Requirements - Effective for all holdings installed, newly built or rebuilt or brought into use for the first time after 1 April 2017
A minimum height of 45.0 cm (17.7 in) must be provided between the floor and ceiling of each level.

Enriched Cages, each hen must be provided with a minimum of 750.0 cm2 (116.25 sq in) of total space, including nests, of which 600.0 cm2 (93.0 sq. in) does not include nest boxes.

The Canadian Code of Practice for the Care and Handling of Pullets and Laying Hens (2017) includes the following requirements:

- All housing systems to which hens are transitioned must support nesting, perching, and foraging (pecking and scratching) behaviour.
- If any hens have not been transitioned from conventional cages by July 1, 2031, each of those hens still kept in conventional cages must be provided with a minimum space allowance in those systems of 580.6 cm^2 (90.0 sq in) effective July 1, 2031.
- All hens must be housed in enriched cages or non-cage housing systems that meet this Code's requirements by July 1, 2036.

Water access for ducks

The OIE does not have a code for duck welfare. The Council of Europe recommends that ducks are able to dip their heads in water and shake it over their feathers.

RSPCA UK (2015) has promoted the adoption of surface water technology that can facilitate dabbling and possibly swimming. The guidelines recommended by RSPCA recommend changing surface water every 16 hours or twice in 24 hours.

The American Veterinary Medical Association has no policy regarding the provision of surface water for ducks.

The Canadian Agri-food Research Council does not have a Code of Practice for ducks.

The New Zealand National Animal Welfare Advisory Committee does not have a Code of Welfare for ducks

In the United Kingdom, the welfare of ducks and geese is protected by the general requirements of the *Welfare of Farmed* Animals (England) Regulations 2007. There is also a *Code of Recommendations for the Welfare of Ducks*, which although voluntary, is made under the new UK Animal Welfare Act.

Code of Recommendations for the Welfare of Livestock: Domestic ducks and Muscovy ducks and their hybrids Published by the Department for Environment, Food and Rural Affairs (DEFRA). Printed in the UK, June 2004,

53. Provision of water for bathing
Where practicable, access to an outside run and water for bathing can assist ducks in meeting their biological requirements. It is accepted that in practice this cannot be provided for most birds and that there are risks to duck health, hygiene and safety if they are given unlimited access to open water. Ducks should be provided with water facilities sufficient in number and designed to allow water to cover the head and be taken up by the beak so that the duck can shake water over the body without difficulty. Where possible facilities should be provided to allow ducks to dip their heads under water.

54. Consideration should be given to the provision of water troughs or wide channeled bell drinkers as these allow opportunities for a wider range of water related activities.

In 2004 the Department for Environment, Food and Rural Affairs (DEFRA) in the UK was particularly interested in industry comments on the provision of bathing water for ducks. It concluded that a balance needs to be struck between the welfare needs of the birds and the risks to duck health, hygiene and food safety if ducks are given unlimited access to open water. DEFRA has funded two three-year research projects that assessed the welfare of ducks by means of a comprehensive assessment of different commercial systems currently in use in the country, as well as trying to ascertain the importance of bathing water to ducks by quantifying their motivation to gain access to water in which they can bathe. UK law still currently allows nipple drinkers.

The British Poultry Council Duck Assurance Scheme requires duck breeders to provide water facilities designed to allow ducks to cover their heads and take water into their beaks to shake over their body.

Appendix 21 – summary of scientific evidence on animal welfare issues

Inadequate space allowances (stocking density)

There is evidence from Europe that furnished cages which comply with the EU Directive (199/74/EC) can achieve the lowest death rates of commercial poultry

housing systems for layer hens (3% cumulative mean mortality) and free range the worst, at up to 22%.[414] However, there is little information on the effects of space allowance on mortality in larger flocks (of 30 hens or more).

The literature on the effects of space allowance in layer cages shows that in general as floor space decreases, within a range of 650 to 300 cm2 per hen, bird welfare generally decreases, as measured by either higher mortality, lower egg production and body weight or poorer feed conversion.[415] At high densities, there is also less opportunity to perform natural behaviours such as wing-flapping. Locomotion and environmental exploration are also inhibited, which predisposes birds to contact dermatitis. High stocking densities reduce activity, and increase fearfulness in broiler chickens.[416] Leg strength can decrease with increased stocking densities, while hock dermatitis, footpad dermatitis and fearfulness can increase with increasing stocking densities.[417]

Febrer et al. (2006) showed that under commercial conditions in non-cage systems, close proximity to other birds was not aversive, as birds clustered more than would be expected from a random distribution. Other studies conducted in laboratory settings have reported that, even at relatively low densities (15 kg/m^2), birds avoid each other.[418] Further, Buijs et al. (2011) has shown that birds kept at 40 kg/m^2 showed a strong motivation to move to an area of lower density (23 or 32 kg/m2). Measures of the physical space requirements of birds indicate that they are compressed at densities above 40 kg/m^2.[419]

Dawkins and Hardie (1989) showed that group-housed hens require an average of approximately 475 cm^2 for standing, 540-1005 cm^2 for scratching, 771-1377 cm^2 for turning, 652-1118 cm^2 for wing stretching, 860-1980 cm^2 for wing flapping, 676-1604 cm^2 for feather ruffling and 814-1270 cm2 for preening. These figures are above the current regulated space allowances in Australia, being 550 cm^2 for an average layer in a conventional cage. Where birds are kept in groups and less space is available, some behaviours such as ground-scratching, turning and preening become compressed into a smaller space, whereas feather-ruffling, wing-stretching and wing-flapping do not, possibly because wings can be flapped above the other birds.[420] Space allowance has been found to have an effect on behavioural and physiological measures used to assess welfare, although the effects of space and group size are often confounded.[421] (The greater the actual size of each cage the more chance there is for birds to cluster and so the more actual room for individual birds to have plenty of space for wing flapping, stretching, laying etc).

Lack of perches, nests and litter for laying hens

[414] Elson, 2015.
[415] Widowski et al., 2016a.
[416] Andrews et al. 1997.
[417] Buijs et al. 2009.
[418] Buijs et al., 2011.
[419] Bokkers et al., 2011.
[420] Dawkins and Hardie, 1989.
[421] Downing, 2012.

Gallinaceous birds (chickens, quail etc.) are motivated to perch, nest, dust-bathe and forage as part of their behavioural repertoire.[422] Provision of perches, nests and substrate for dust-bathing in poultry housing may allow the birds to express a greater range of these 'natural behaviours' during confinement in caged and non-caged housing systems.

Apart from the positive effect of perching on bone strength in caged birds, there is little physiological evidence to indicate that bird welfare is impaired if these resources are not provided. However, there is substantial behavioural evidence that chickens are motivated to perform these behaviours if given the opportunity.[423] 'The welfare implications of depriving hens of these behavioural opportunities remain largely unknown, but the opportunity to perform them may be conducive of positive welfare states'.[424]

In this RIS, poultry cages with perches and nests (plus or minus an area for dust-bathing/foraging) are referred to as 'furnished cages'; those without these furnishings are referred to as 'conventional cages'.

A review by Widowski et al. (2016b) found that the behavioural repertoire of hens in conventional cages is more compromised than hens in non-cage housing due to the lack of suitable sites or resources for activities. Furthermore, hens are highly motivated and prefer to access a nest when one is provided (the "affective state" view). However, they found little physiological evidence to indicate that hen welfare is impaired, based on biological disruption such as a stress response, when resources are not provided (the "biological functioning" view).

A study by Engel (2016) showed that hens did not show detrimental effects of not being provided a nest box (based on measures such as corticosterone concentration and behaviour). However, hens that had experience of a nest box chose a nest box over feed prior to egg laying. Altogether, the literature supports the view that not providing a nest box does not result in biological dysfunction, but that provision of a nest appears to provide experienced hens with positive experiences based on their motivation to access them prior to egg laying.

Furnished cages refer to cages that include some or all of a nest(s), perch(es), litter and claw shortening device(s). There is evidence that furnished cages can offer more behavioural opportunities than conventional cages and result in better health than non-cage systems.[425]

Perches

Where a perch is present, it is well used by the hens, particularly to roost at night. Perches have been shown to improve bone strength.[426] . However, their position, size and shape are crucial to optimize use and avoid landing failures, which can cause broken bones and keel bone deviation, and to minimize cracked eggs. Perching skills

[422] Olsson and Keeling, 2005; Hester et al, 2014; Widowski, 2016.
[423] Widowski et al., 2016 unpublished.
[424] Widowski et al., 2016 unpublished.
[425] Tauson, 2005.
[426] Barnett et al., 2009.

are partly developed at a young age,[427] highlighting the importance of rearing conditions. Birds reared on the floor and then transferred to cage systems suffer from an increased incidence of osteoporosis.[428]

Nests
Based on evidence of a strong motivation to lay in a nest box, differences in pre-laying behaviours in the absence of a nest, and increased vocalizations when access to a nest is blocked, it has been concluded that a suitable nest site is important to layer hens and that welfare is reduced when a 'suitable' nest box is not available.[429] Nevertheless, the lack of a nest box or the sudden denial of access to a nest box does not result in detrimental biological disruption based on the physiological stress response.[430]

Litter/dust-bathing substrate
Hens appear moderately motivated to dust bathe, and sham dust bathing on wire does not fully substitute for dust bathing on a suitable substrate. However, studies investigating the motivation to dust bath provide variable and inconsistent results, and highlight that dust bathing behaviour relies on a complex interaction of internal and environmental factors.[431] There is no clear evidence that hens experience frustration or some negative affective state from being deprived of dust bathing in substrate.[432] Conversely, dust bathing may result in higher rates of conjunctivitis and respiratory disease.

Lack of quantitative lighting standards

As most commercial poultry is maintained in indoor housing, the majority of birds are exposed to artificial lighting rather than natural daylight. Factors such as light intensity, photoperiod (light-dark cycles) length and distribution (intermittent), type of light source and wavelength may all have separate impacts.

Day length influences many physiological processes, including laying, growth rate, skeletal development, and behaviour. Light influences the development and function of a layer hen's reproductive system, influencing the age at which she starts laying and how many eggs she will lay in a given period. Increasing day length accelerates sexual maturity of growing pullets, stimulating egg production, and decreasing day length retards sexual maturity and restrains egg production.[433]

Lighting programs for meat chickens are used to stimulate and control feed intake. Lighting regimes can also be used to control behaviours such as feather pecking.

Light intensity must be sufficient to allow inspection of the flock, in order to monitor bird health, feed and water consumption and behaviour. This may require a temporary increase in the light intensity throughout the shed, or focal increase in light intensity

[427] Appleby and Duncan, 1989.
[428] Lay et al., 2011.
[429] Widowski et al., 2016b.
[430] Cronin et al., 2012.
[431] Olsson and Keeling, 2005.
[432] Widowski et al., 2016.
[433] Bolla, 2007.

through use of a torch. Light intensity should be sufficient to allow young birds to find feed and water in the first days after placement in housing. Recommended light intensity for the first 3-7 days (20-50 lux) is generally higher than for the rearing/growing period for commercial flocks (5-10 lux).[434]

Continuously low light intensities (1 lux or less) can have negative impacts on poultry welfare, and have been associated with increased foot pad lesions and poor eye development in meat chickens.[435] Recommendations for light intensity may vary depending on the housing system (caged vs non-aged systems), and light intensity may be greater over feeders than in other parts of the housing. A gradual change in light intensity during change from light to dark and vice versa allows birds in non-caged systems to safely locate perches (at onset of dark) and move in a more controlled manner to feeders (at light onset).

Layer hens

Changes to light intensity may be used to control injurious behaviour, such as feather pecking and cannibalism, particularly in birds during laying. Kjaer and Vestergaard (1999) compared two levels of light intensity for laying hens during rearing (0-15 weeks) and lay (16-46 weeks) and found that a lower level of light (3 lux) was associated with a greater rate of non-injurious pecking than the higher level (30 lux) which was associated with a greater level of injurious pecking. They proposed that the non-injurious pecking at low levels was due to more exploratory pecking compared with the severe pecking observed at higher levels which had greater potential to progress to cannibalism. These effects were more evident during rearing than adult birds.

An assessment of lighting needs of layer hens via preference tests showed that older layer hens (23-30 weeks) preferred to spend more of their time in dimmer light (5 lux) than in brighter light (15 or 30 lux).[436] However, the authors did observe that the experiment was not necessarily comparable with conventional poultry housing in which birds are housed in consecutive light and dark hours during the day.

Meat Chickens

Deep et al. (2013) investigated the effects of different light intensities on meat chicken production and welfare. They concluded that a level of 5 lux should be the minimum level for performance, breast meat yield and bird welfare. Lower levels were associated with higher levels of mortality and poor growth rate.

Turkeys

Low light intensity (1.1 lux) in the first two weeks after hatching had adverse effects on feed intake, bird weight and mortality of poults (Siopes et al., 1984). The effects of light intensities between 1.1 and 11 lux were not investigated in that study. Up to 50 lux is recommended for poults during the first 3 days after placement to stimulate feed and water intake, after which light intensity can be reduced.

[434] Aviagen, 2014; Hy-line, 2016a; Hy-line, 2016b.
[435] Deep et al., 2010.
[436] Ma et al., 2015.

Ducks
Ducks kept at light intensities of 5 lux had better feed to gain ratios and greater live weight gain than ducks maintained at 60 lux in an experimental study. There was no significant difference in feather damage or other behavioural patterns in ducks kept at 5 lux and 60 lux.[437]

Lighting duration

General
During the brooding period, lighting duration is generally maximised to encourage chicks to access feeding and watering equipment. Continuous lighting is not recommended, but lights may be left on for up to 23 hours a day in the first 3-7 days (to help them find feed and water). Alternatively, intermittent lighting (four hours on, two hours off) may be used for layer chicks during the first week after placement.

Following the brooding period, light duration is altered to allow birds to rest. After placement, birds should be 'trained' to become accustomed to periods of darkness to avoid panic in the event of a black-out. Such training may consist of sudden short intervals of darkness (e.g. 15 minutes).

Layers
After the brooding period, light duration is adjusted to maximise pullet growth and optimise the onset of sexual maturity. There is a slow step-down of lighting from 0-8 weeks, until lights are on for 10 hours of the day, after which there are gradual increases in light from 16 to 30 weeks of age. A slower step-down of light hours from 0-12 weeks can be used to prevent early sexual maturity, maximize pullet growth and promote the production of larger eggs from young hens.[438]

Darkness benefits birds by allowing them to sleep and develop diurnal rhythms. One or two periods of 4 hours (or more) of continuous darkness in each 24 period support positive welfare outcomes in poultry reared under artificial light (Schwean-Lardner et al., 2013).

Meat chickens
Various combinations of light and dark regimes have been trialled including continuous lighting with one hour of darkness or intermittent lighting of two hours on and two hours off. Intermittent programs give broilers discrete feeding times followed by periods of digestion, improving efficiency of feed utilization. Current recommendations by one large broiler company are for a minimum of four hours' darkness from seven days of age.[439]

During periods of hot weather, continuous lighting may be used to allow meat chickens to continue to consume water and food during the cooler part of the night, and to prevent huddling. Continuous lighting may also be used in the day/s before

[437] Downing, 2014.
[438] Hy-line, 2016a.
[439] Aviagen, 2014.

pick-up of meat chickens to allow continued access to water after withdrawal of feed and facilitate crop-emptying, which is desirable for processing.[440]

Turkeys
Very little research has been conducted on lighting regimes for turkeys, and the results of such research are conflicting.[441]

Need for restrictions on routine beak trimming

McKeegan and Philbe (2012) found that Infrared Beak Trimming (IRBT) does not result in chronic adverse consequences for sensory function, nor does it demonstrate evidence of chronic pain when carried out on day old chicks. Beak measurements at day-old in this study demonstrated that application of the IRBT at day old affected on average 36% of beak area (using area forward of the nostrils as a basis for comparison). Detailed beak measurement data indicated that the IRBT treatment had resulted in a 40% reduction in overall beak length when compared with control birds by 4 weeks of age. Looking at the long-term effects of IRBT on birds up to the age of 50 weeks, they found that re-innervation and scarring was visible, but no neuromas or abnormal proliferations of nerve fibres were observed at any age.

It is essential that beak trimming is carried out by trained operators. If beak trimming is not done correctly, birds can suffer from a reduced ability to eat and drink as well as acute and chronic stress.[442] Lunam et al. (1996) studied hot blade trimming with treatments varying with the amount of beak trimmed and the length of cauterization time. They found that all treatments resulted in neuromas at 10 weeks of age, but those in the less severely trimmed group regressed and were not found at 70 weeks of age. Severely trimmed birds also had more deformed beaks. They concluded that a lighter trim allows neuromas to resolve, but made no specific recommendations regarding the amount that should be removed. The authors pointed out that the presence of anatomical neuromas is not necessarily associated with chronic pain.

It is possible to breed more docile birds to minimize the need for beak trimming, however, under some management conditions such as exposure to high intensity natural lighting, and with some genetic stocks, beak trimming may be required.[443] In addition, a number of nutritional, management and environmental strategies are being promoted as an alternative to beak trimming.[444] The alternatives have some potential to be effective in various management situations, but there is no guarantee that cannibalism and feather pecking will be prevented.[445]

Jongman et al. (2008) found that there was no difference in pecking behaviour at 20 weeks between control pullets, those trimmed at hatch only and those re-trimmed at 14

[440] Nunes, 2005.
[441] Schwean-Lardner et al., 2013.
[442] Glatz, 2000.
[443] United Egg Producers, 2014.
[444] Jendral and Robinson, 2004; Poultry CRC, 2016.
[445] Glatz and Hinch, 2008.

weeks of age, suggesting that the re-trimmed birds were not subject to severe chronic pain. These birds were trimmed with a hot blade.

Widowski (2013) in a review of scientific research on priority issues in layers noted that when performed properly neither hot-blade trimming nor infrared treatment of beaks results in long term pain but the majority of scientific literature suggests that the infrared technique is more precise, reduces the development of abnormal beaks, and causes less pain or discomfort after application. Although not all studies have shown a reduction in cannibalistic mortality, it is important to understand that this behaviour does not occur in every flock but rather is sporadic in nature.[446]

Weeks et al. (2016) found there was some evidence that cumulative mortality was reduced in beak trimmed flocks kept in free range housing systems, the only housing system for which a number of beak trimmed and intact beak flocks were represented in their data sets. Predicted mean levels of cumulative mortality may be 27% higher in an intact beak flock at 40 weeks of age.

Hartcher et al. (2015) investigated the effect of beak trimming and environmental enrichment during the rearing period on later behaviour. They found that beak-trimming was associated with an improvement in plumage condition, but that environmental enrichment during rearing had no effect on plumage damage later in life. They also observed that higher rates of severe feather pecking during rearing may be predictive of plumage damage later in life. The birds in this study were trimmed using infrared at one day of age but required a light trim using a hot blade at 11 weeks of age due to subsequent regrowth of the beak.

Injurious pecking is a serious issue for turkey producers.[447] Causes are multi-factorial, involving interactions between genetics, environment and nutrition. At this stage they are not well understood and research is necessary to understand the causes more clearly so that interventions that do not involve beak trimming may be devised. Many turkey operations are on a small-scale and these producers do not have access to IRBT. Allinson et al. (2013) evaluated the effect of beak trimming on turkeys. They found that beak trimming had no significant effect on the performance of the turkeys. Beak trimmed turkeys recorded higher feed intake, protein intake and feed conversion ratio than turkeys with intact beaks. The severity of damage from pecking was higher in untrimmed turkeys than the turkeys that had been beak trimmed. They suggested that one quarter of the beak should be removed at the sixth and fourteenth weeks.

Clause 13.2.2. of the current poultry MCOP requires accredited operators and methods for beak trimming. However, it does not specify the tools or methods to be used. The MCOP requires that a person must not remove more than one-third of the upper and lower beaks of turkeys, pheasants and partridges, but there are no standards regarding this problem for other species. The welfare of an estimated average of 19.66 million layer hens is at risk from this procedure.[448]

[446] Widowski, 2013.
[447] Dalton et. al. 2013.
[448] See Appendix 16.

Risky litter management

Litter is defined as the combination of bedding material, excreta, feathers, wasted feed and wasted water found on the floor or ground of non-cage systems. This includes litter from meat chickens (broilers), egg laying chickens (layers) kept under barn conditions, turkeys, ducks and quail.

Bedding materials should be absorbent, fast drying, insulating and non-toxic. They may be used at the start of a grow-out to provide a cushioning and insulating surface for the birds and to absorb fresh excreta. Materials commonly include wood products and harvest crop residues but may be any organic or inorganic material that has appropriate properties.

Deep litter is the system of housing where litter is provided on the poultry house floor on which the birds live.

If litter is used, its condition may influence poultry health and welfare. Litter management is an issue for meat chickens, layer hens, turkeys, ducks and quail that are kept under barn or free-range conditions .

The litter or bedding material serves a number of important functions. For example it:

- absorbs excess moisture from droppings and drinkers and promotes drying by increasing the surface area of the house floor;
- insulates chicks from cooling effects of the ground and provides a protective cushion between the birds and the floor substrate; and
- allows birds to display behaviours such as dust bathing.

An effective bedding material must be absorbent, inexpensive and non-toxic. Ideal materials will have high moisture absorption and release qualities to minimise caking. In addition, a bedding material must be compatible as a fertilizer or soil additive after it has served its purpose for poultry production. Litter is increasingly being used in energy generation, so it may also need to be combustible.

Not all poultry are required to have access to litter - slatted floors are a common alternative. Environments in which hens are exposed to litter and soil, such as non-cage and outdoor systems, provide a greater risk of disease and parasites. The more complex the environment, the more difficult it is to clean, and the larger the group size, the more easily disease and parasites are able to spread.

Some studies suggest bacterial infections are the most common cause of mortality in birds raised on litter- based systems.[449] Many of the infectious diseases of layer hens are a result of contact with soil, litter, and fomites (e.g. rodents, beetles, and equipment) known to carry the agents of those diseases.

[449] Fossum et al., 2009.

Air quality has been shown to be poorer in litter-based systems (floor housing and aviary) compared with furnished cages, which can also have adverse WHS implications for employees. Lameness is often the first sign of the condition and is the most costly problem for birds reared in deep litter.

Poorly designed and maintained perches used in floor systems have been associated with bumblefoot[450] because of accumulation of manure and litter on the surface of the perch, especially under wet litter conditions.[451]

Hens are strongly motivated to forage, even though feed is available *ad libitum* in the feed trough.[452] Motivation to access litter for dust bathing is more variable and, despite the provision of litter, some hens sham dust bathe on the wire floor (Olsson and Keeling, 2005). Restricted access to litter in both time and space could be stressful, especially when subordinate hens are excluded from the litter area by dominant hens (Shimmura et al., 2008a).

Litter serves to absorb moisture and provide insulation and cushion between the birds and the floor. Because birds are in constant contact with litter, litter conditions will significantly influence bird welfare.

The practice of built-up litter requires a higher degree of management to be successful. Growers need to be alert to changes in litter quality and take actions to maintain an appropriate in-house environment for optimal bird performance. Controlling litter moisture can help growers manage litter quality. Proper litter management helps to improve in-house air quality. Poor litter management may lead to litter that is caked, wet or excessively dusty, and attempts must be made to prevent these conditions and rectify them should they occur.

Need to restrict routine use of induced moulting

Induced moulting is a husbandry practice used to extend the period of lay of chickens. The practice is not recommended for routine use but may be needed:

- to replenish flock numbers in the event of a disease outbreak;
- where there is a limitation on available grower space;
- where there is a shortage in the availability of replacement pullets; or
- when there is a restriction on the importation of breeder stock due to exotic disease outbreaks overseas which necessitates the moulting of grandparent flocks.

Moulting is a normal process in birds. In their natural state, birds shed old plumage and grow new feathers in preparation for cold weather and migration. Stevens (1996) commented, 'There are times when birds in the wild do not eat in spite of having food readily available, e.g. during moulting, breeding, and egg incubation.' The environment

[450] Bumblefoot (ulcerative pododermatitis) is a bacterial infection and inflammatory reaction on the feet of birds and rodents.
[451] Tauson and Abrahamsson, 1994b.
[452] Bubier, 1996; Lindqvist et al., 2002.

for poultry housed for commercial egg production is constant with respect to temperature, lighting and feed, thus removing the normal seasonal influences. Induced moulting of housed birds therefore involves dietary restrictions and/or changes to lighting (photoperiod).

Induced moulting rejuvenates the reproductive cycle of the hen, extending her productive life. All hens in a flock are brought into moult at the same time, which sustains more efficient egg production and improves egg quality.

A US study has shown that moulting results in the need to add 40-50% fewer hens per year than would be needed without induced moults.[453] This, in turn, results in significantly fewer spent hens that are culled and also fewer male chicks that are killed. Induced moulting has an environmental benefit in that there is a reduction in the resources required and waste generated in growing more birds for egg production. Using moulted hens is also a key strategy for industry to response to disease outbreaks such as avian influenza. Restocking sheds with moulted hens allows farms to return to production and economic viability faster than can be achieved through increased hatchings and replacement pullets.

Traditionally, moulting has been induced by withdrawal of feed and/or water from the hens and reducing the photoperiod (day length) to that of a natural day length or less. The optimum age for moulting depends on the current flocks' performance, local egg markets, and scheduling of the next pullet flock, but is usually around 65 weeks.[454]

Fasting during moulting has a number of detrimental effects including a stress-induced increase in corticosteroids which can result in impaired immunity. In the United States, induced moulting of hens has been associated with an increased incidence of *Salmonella enteritidis* (although this bacterial species is not endemic in Australian flocks). Fasting also reduces skeletal strength and is associated with an increase in pecking behaviour, especially in the early stages of moulting.[455] Using dual-energy x-ray absorptiometry, Mazzuco and Hester (2005) showed that a nonfasted moulting regime is less deleterious to tibial bone mineral density and bone mineral content than a fasted moulting regime. Davis et al. (2000) found the physiological demands of peak egg production and moult (fasting) appeared to be similar as indicated by the levels of corticosterone and 3,5,3′-triiodothyronine (T3).

Water deprivation results in higher mortality and morbidity during the early stages of moulting.[456]

Anderson et al. (2004) found that aggression levels were no different between the first and second-cycle phases and that these observations indicated that fasting does not increase aggression with the feed-restricted moult group having the lowest levels of aggression. Conversely, McCowan et al. (2006) found that birds which underwent induced moulting were more aggressive during the moulting period. Webster's (2000) research showed feed withdrawal hens exhibited an increased level of behavioural

[453] United Egg Producers, 2014.
[454] Hy-line, 2016.
[455] Patwardhan and King, 2010.
[456] American Veterinary Medical Association, 2010.

activation and attentiveness on the second day of feed withdrawal as indicated by increased standing and head movement. Non-nutritive pecking also was elevated on this day. Webster suggested that these behaviours may be interpreted as adaptive responses because, in the natural circumstances under which the chicken species would have originally acquired behavioural responses to food shortage, such responses would increase the likelihood of a chicken actually finding food.

Webster (2000) indicated that there was no indication that hens experienced harm or debilitation when deprived of feed until a body weight loss of 35% occurred, nor was their behaviour suggestive of suffering. Webster suggests that it would be premature to conclude that the feed withdrawal hens did not suffer, but if they did, such a fact was not obvious from observation of the feed withdrawal behavioural repertoire. Webster's research showed that by the end of the period of feed deprivation, hens spent 40% of their time resting. While at rest, they would appear to be drawn in upon themselves and to have reduced attentiveness. Such hens sometimes are described colloquially as appearing depressed, however they were capable of vigorous activity during the entire feed withdrawal period.[457]

It is essential that factors such as flock health, bird weights and mortality rates are monitored during the moulting period.[458] Hy-line International (2016) recommend the best post-moult egg production is achieved after a complete cessation of egg production that lasts for at least 2 weeks and a concomitant loss of body weight to the 18-week target weight (although, in the case of heavy birds, it is not recommended that the body weight loss exceed 24-25% of the pre-moult body weight for white laying hen breeds and 21-22% for brown laying hen breeds).

The current MCOP for poultry does not restrict induced moulting from being routinely practiced. Nor does it require that poultry are in adequate physical condition to endure an induced moult if necessary. It is estimated that 2.95 million layer hens are affected by routine moulting.[459]

Access to water for ducks

More recent behavioural research has indicated that Pekin Ducks have a strong instinctive behaviour to dabble with surface water and undertake behaviours to immerse the beak and head in surface water (Jones et al., 2008). Initiatives in Europe have recommended that surface water technologies be reintroduced using either an 'in shed drain system' or an outside veranda system with accompanying drain.

Some studies have shown ducks have shown a preference for open water without prior experience, and have worked to obtain access to open water, indicating an innate attraction (Cooper et al., 2002; Heyn et al., 2006a; Heyne et al., 2006b). Water is required for ducks to perform many species-specific behaviours such as head dipping, wet preening, wing rubbing, and shaking movements (O'Driscoll and Broom, 2012)(Heyn et al., 2009). Surface water and the provision of water immersion systems bring management challenges that impact on shed hygiene and litter conditions, and

[457] Webster, 2000.
[458] American Veterinary Medical Association, 2010.
[459] See Appendix 16 for details.

need to be managed precisely to achieve good health and production outcomes. The maintenance of friable litter (if litter is used) is an important priority in maintaining bird health, hygiene and plumage condition. Surface water in a trough or the water immersion technology for ducks needs careful management to minimise litter moisture accumulation, and reduce risks of micro-organism ingestion with drinking water.

There has been some limited experimentation with surface water systems in Australia, but the industry needs additional time to evaluate the technologies and learn from the European experience that appears more advanced. Not all objective information on these issues can be obtained from institutional research models that have a constrained focus on duck behaviour and do not thoroughly evaluate animal health issues.

If these technologies were to be adopted consideration would need to be given to establishing an understanding with the Environment Protection Authorities to facilitate the effluent management and some commitments on planning provisions for new farms and farms that may require retro-fitting. Many existing planning approvals are contingent on having no water effluent/emissions from duck housing.

Any new technology to enhance the immersion of the duck's heads in water, or provide showers to improve the behavioural repertoire and body condition, will require a sophisticated technical solution that minimises entry of water and moisture to the shed litter material. The technology will also have to maintain water quality continuously, and have a capacity for recycling to meet environmental constraints. Surface water pondage is not an option due to biosecurity risks and effluent releases to the environment pose a significant constraint to farm establishment.

Appendix 22 – summary tables for cost/benefit analysis

Table 19: Summary of estimated number of poultry (housed/per annum) affected by positive non-specific minor unquantifiable welfare impacts under the proposed standards

Standard[460]	Poultry No. with positive welfare effects[461]	Jurisdictions affected
Minor unquantifiable welfare benefits to poultry from likely improvements in compliance as a result of clearer allocations of responsibilities (person in charge).		
SA1.1; SA2.6; SA3.5; SA2.5; SA3.2; SA3.3; SA3.6; SA4.1; SA4.2; SA4.4; SA4.5; SA5.1; SA5.2; SA5.4; SA5.5, SA6.1; SA.6.2, SA7.2; SA7.3; SA8.1; SA8.3; SA9.7; SA9.14; SA9.20; SA11.1 SA11.5; SA11.6; SA11.7; SB1.8; SB3.10; SB5.5; SB4.3; SB4.6; SB5.1; SB5.4; SB6.1; SB7.2; SB12.3; SB13.5	Up to 19,658,948 layer hens housed Up to 635,637,818 meat chickens per annum Up to 690,000 breeders per annum Up to 4,200,000 turkeys per annum Up to 10,000,000 ducks per annum Up to 6,500,000 quail per annum Up to 323,000 squabs per annum Up to 60,000 pheasants per annum Up to 40,000 guinea fowl per annum Up to 18,000 partridges per annum Up to 5,000 geese per annum Up to 7,400 emus per annum Up to 6,200 ostriches per annum	All
SA4.3; SA5.3	Up to 19,658,948 layer hens housed Up to 635,637,818 meat chickens per annum Up to 690,000 breeders per annum Up to 4,200,000 turkeys per annum Up to 10,000,000 ducks per annum Up to 6,500,000 quail per annum Up to 323,000 squabs per annum Up to 60,000 pheasants per annum Up to 40,000 guinea fowl per annum Up to 18,000 partridges per annum Up to 5,000 geese per annum Up to 7,400 emus per annum Up to 6,200 ostriches per annum	All except for QLD
SA2.4; SB1.7; SB3.2; SB3.8; SB3.9	Up to 19,658,948 layer hens housed Up to 635,637,818 meat chickens per annum Up to 690,000 breeders per annum Up to 4,200,000 turkeys per annum Up to 10,000,000 ducks per annum Up to 6,500,000 quail per annum Up to 323,000 squabs per annum Up to 60,000 pheasants per annum Up to 40,000 guinea fowl per annum Up to 18,000 partridges per annum Up to 5,000 geese per annum Up to 7,400 emus per annum	All except VIC, SA, NSW, QLD

[460] See Appendix 17 for full description of proposed standards.
[461] See Tables 2, 10 and 13 and A10.1 of Appendix 10 (for breeders) in this RIS for poultry numbers.

Standard[460]	Poultry No. with positive welfare effects[461]	Jurisdictions affected
	Up to 6,200 ostriches per annum	
SB1.2; SB1.3; SB1.6	Up to 19,658,948 layer hens housed	All except VIC, SA, NSW, QLD, TAS
SB2.3; SB3.3	Up to 635,637,818 meat chickens per annum Up to 690,000 breeders per annum	All except VIC, SA, QLD
SB1.9	Up to 18,000 partridges per annum	All except for NSW

Minor unquantifiable welfare benefits to poultry from likely improvements in compliance as a result of more specific wording.

SA3.4; SA9.12; SA9.1; SA9.2; SA9.13; SA10.1; SA10.2; SA10.3; SA10.4; SA11.3; SB3.1; SB3.6; SB4.1; SB6.2; SB6.3; SB7.1; SB8.1; SB9.1; SB11.2; SB11.3; SB11.5; SB12.1; SB12.2; SB13.2; SB13.3	Up to 19,658,948 layer hens housed Up to 635,637,818 meat chickens per annum Up to 690,000 breeders per annum Up to 4,200,000 turkeys per annum Up to 10,000,000 ducks per annum Up to 6,500,000 quail per annum Up to 323,000 squabs per annum Up to 60,000 pheasants per annum Up to 40,000 guinea fowl per annum Up to 18,000 partridges per annum Up to 5,000 geese per annum Up to 7,400 emus per annum Up to 6,200 ostriches per annum	All

Minor unquantifiable welfare benefits to poultry from likely improvements in compliance as a result of more specific wording and clearer allocation of responsibilities (person in charge).

Standard[460]	Poultry No. with positive welfare effects[461]	Jurisdictions affected
SA3.1; SA7.1; SA9.3; SA11.2; SA11.4; SA11.8; SB1.1;	Up to 19,658,948 layer hens housed Up to 635,637,818 meat chickens per annum Up to 690,000 breeders per annum Up to 4,200,000 turkeys per annum Up to 10,000,000 ducks per annum Up to 6,500,000 quail per annum Up to 323,000 squabs per annum Up to 60,000 pheasants per annum Up to 40,000 guinea fowl per annum Up to 18,000 partridges per annum Up to 5,000 geese per annum Up to 7,400 emus per annum Up to 6,200 ostriches per annum	All
SA2.1	Up to 19,658,948 layer hens housed Up to 635,637,818 meat chickens per annum Up to 690,000 breeders per annum Up to 4,200,000 turkeys per annum Up to 10,000,000 ducks per annum Up to 6,500,000 quail per annum Up to 323,000 squabs per annum Up to 60,000 pheasants per annum Up to 40,000 guinea fowl per annum Up to 18,000 partridges per annum Up to 5,000 geese per annum Up to 7,400 emus per annum Up to 6,200 ostriches per annum	All except TAS
SA2.2	Up to 19,658,948 layer hens housed Up to 635,637,818 meat chickens per annum Up to 690,000 breeders per annum Up to 4,200,000 turkeys per annum Up to 10,000,000 ducks per annum Up to 6,500,000 quail per annum Up to 323,000 squabs per annum Up to 60,000 pheasants per annum Up to 40,000 guinea fowl per annum Up to 18,000 partridges per annum Up to 5,000 geese per annum Up to 7,400 emus per annum Up to 6,200 ostriches per annum	All except VIC, SA, QLD

Standard[460]	Poultry No. with positive welfare effects[461]	Jurisdictions affected
SA2.3	Up to 19,658,948 layer hens housed Up to 635,637,818 meat chickens per annum Up to 690,000 breeders per annum Up to 4,200,000 turkeys per annum Up to 10,000,000 ducks per annum Up to 6,500,000 quail per annum Up to 323,000 squabs per annum Up to 60,000 pheasants per annum Up to 40,000 guinea fowl per annum Up to 18,000 partridges per annum Up to 5,000 geese per annum Up to 7,400 emus per annum Up to 6,200 ostriches per annum	All except VIC, SA, NSW, QLD
Minor unquantifiable welfare benefits to poultry from likely improvements in compliance as a result of more specific wording and clearer allocation of responsibilities (person in charge) plus minor unquantifiable welfare benefits to poultry from having the option of these procedures being performed by a veterinarian (assuming with pain relief).		
SA9.8	Up to 19,658,948 layer hens housed Up to 635,637,818 meat chickens per annum Up to 690,000 breeders per annum Up to 4,200,000 turkeys per annum Up to 10,000,000 ducks per annum Up to 6,500,000 quail per annum Up to 323,000 squabs per annum Up to 60,000 pheasants per annum Up to 40,000 guinea fowl per annum Up to 18,000 partridges per annum Up to 5,000 geese per annum Up to 7,400 emus per annum Up to 6,200 ostriches per annum	All
Minor unquantifiable welfare benefits to poultry from likely improvements in compliance as a result of more specific wording and clearer allocation of responsibilities (person in charge) plus minor unquantifiable welfare benefits to poultry from lowering of aggression levels		
SA9.16	Up to 19,658,948 layer hens housed Up to 635,637,818 meat chickens per annum Up to 690,000 breeders per annum Up to 4,200,000 turkeys per annum Up to 10,000,000 ducks per annum Up to 6,500,000 quail per annum Up to 323,000 squabs per annum Up to 60,000 pheasants per annum Up to 40,000 guinea fowl per annum Up to 18,000 partridges per annum Up to 5,000 geese per annum Up to 7,400 emus per annum Up to 6,200 ostriches per annum	All

Table 20: Summary of estimated quantifiable incremental costs of the proposed standards by layer farm size and grouping of states – present value dollars ($m)[462]

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Total
(Cage)					
NSW, QLD and VIC	Large	$0.10	$8.08	$29.72	$37.90
NSW, QLD and VIC	Medium	$0.58	$14.40	$52.96	$67.94
NSW, QLD and VIC	Small	$0.67	$4.07	$14.95	$19.69
NSW, QLD and VIC	Micro	$0.00	$0.04	$0.14	$0.18
(Barn)					
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.10	$2.11	$14.10	$16.31
NSW, QLD and VIC	Small	$0.45	$3.58	$23.91	$27.95
NSW, QLD and VIC	Micro	$0.00	$0.04	$0.30	$0.34
(Free range)					
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.23	$6.15	$71.45	$77.83
NSW, QLD and VIC	Small	$1.93	$13.86	$161.08	$176.88
NSW, QLD and VIC	Micro	$0.00	$0.27	$3.09	$3.36
Subtotal NSW, QLD and VIC		$4.07	$52.61	$371.71	$428.39
(Cage)					
SA, WA and TAS	Large	$0.03	$1.64	$6.04	$7.72
SA, WA and TAS	Medium	$0.05	$0.66	$2.42	$3.12
SA, WA and TAS	Small	$0.22	$1.17	$4.31	$5.70
SA, WA and TAS	Micro	$0.00	$0.01	$0.05	$0.07
(Barn)					
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Small	$0.19	$0.53	$3.56	$4.28
SA, WA and TAS	Micro	$0.00	$0.04	$0.27	$0.31
(Free range)					
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.10	$2.18	$25.29	$27.57
SA, WA and TAS	Small	$0.56	$3.01	$34.92	$38.48
SA, WA and TAS	Micro	$0.00	$0.11	$1.27	$1.38
Subtotal SA, WA and TAS		$1.14	$9.35	$78.13	$88.62
Total		***$5.21***	***$61.97***	***$449.83***	***$517.01***
Layer farm size					
Total large		$0.13	$9.73	$35.76	$45.62
Total Medium		$1.06	$25.50	$166.21	$192.77
Total Small		$4.02	$26.23	$242.73	$272.98

[462] See Table A5.1 of Appendix 5 for source of estimates

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Total
Total Micro		$0.00	$0.51	$5.13	$5.64
Total		***$5.21***	***$61.97***	***$449.83***	***$517.01***
Production system					
Total cage		$1.66	$30.08	$110.59	$142.32
Total barn		$0.74	$6.32	$42.14	$49.20
Total free range		$2.82	$25.57	$297.11	$325.50
Total		***$5.21***	***$61.97***	***$449.83***	***$517.01***
Percentage of cost by business size					
Total large		0.03%	1.88%	6.92%	8.82%
Total Medium		0.20%	4.93%	32.15%	37.29%
Total Small		0.78%	5.07%	46.95%	52.80%
Total Micro		0.00%	0.10%	0.99%	1.09%
Total Percentage of cost by business size		***1.01%***	***11.99%***	***87.01%***	***100.00%***
Percentage of cost by production system					
Total cage		0.32%	5.82%	21.39%	27.53%
Total barn		0.14%	1.22%	8.15%	9.52%
Total free range		0.55%	4.95%	57.47%	62.96%
Total Percentage of cost by production system		***1.01%***	***11.99%***	***87.01%***	***100.00%***

Table 21: Summary of estimated quantifiable incremental costs of the proposed standards by meat chicken operation type/size and states/grouping of states – present value dollars[463] ($m)[464]

States/grouping of states	Business size and type	SA6.2	SA8.3	SA11.7	Total
QLD	Large meat chicken businesses	$0.08	$0.00	$0.00	$0.08
QLD	Medium meat businesses	$0.00	$0.00	$0.00	$0.00
QLD	Small meat chicken businesses	$0.78	$6.99	$0.00	$7.77
NSW	Large meat chicken businesses	$0.03	$0.00	$0.00	$0.03
NSW	Medium meat chicken businesses	$0.43	$20.37	$0.00	$20.80
NSW	Small meat chicken businesses	$1.43	$25.67	$0.00	$27.09
VIC	Large meat chicken businesses	$0.05	$1.63	$0.00	$1.68
VIC	Medium meat chicken businesses	$0.07	$0.00	$0.00	$0.07
VIC	Small meat businesses	$1.32	$16.34	$0.00	$17.66
QLD	Large chicken processing businesses	$0.00	$0.00	$0.70	$0.70
NSW	Large chicken processing businesses	$0.00	$0.00	$1.87	$1.87
VIC	Large chicken processing businesses	$0.00	$0.00	$0.19	$0.19
Subtotal NSW, QLD and VIC		$4.19	$71.00	$2.76	$77.94
SA, WA and TAS	Large meat chicken businesses	$0.03	$0.00	$0.00	$0.03
SA, WA and TAS	Medium meat chicken businesses	$0.20	$0.00	$0.00	$0.20

[463] Discounted using a 7% discount rate.
[464] See Table A9.1 of Appendix 9 for source of estimates.

States/grouping of states	Business size and type	SA6.2	SA8.3	SA11.7	Total
SA, WA and TAS	Small meat chicken businesses	$0.86	$24.19	$0.00	$25.05
SA, WA and TAS	Large chicken processing businesses	$0.00	$0.00	$1.17	$1.17
Subtotal SA, WA and TAS		$1.08	$24.19	$1.17	$26.44
Total		***$5.27***	***$95.19***	***$3.93***	***$104.38***
Business size					
Large		$0.19	$1.63	$3.93	$5.74
Medium		$0.70	$20.37	$0.00	$21.07
Small		$4.39	$73.19	$0.00	$77.58
Total		***$5.27***	***$95.19***	***$3.93***	***$104.38***
Percentage of cost by business size					
Large		0.18%	1.56%	3.76%	5.50%
Medium		0.67%	19.51%	0.00%	20.18%
Small		4.21%	70.11%	0.00%	74.32%
Total percentage of cost by business size		***5.05%***	***91.19%***	***3.76%***	***100.00%***

Table 22: Summary of estimated quantifiable incremental costs of the proposed standards for turkeys by business size and states/grouping of states – present value dollars ($m)[465]

States/grouping of states	Business type (size)	SA8.3	SA9.11	SA11.7	SB13.5	Total
NSW	Broiler turkey business (small)	$25.42	$14.40	$0.00	$28.68	$68.50
NSW	Breeder turkey business (large)	$9.14	$0.00	$0.00	$4.54	$13.67
VIC	Breeder turkey business (large)	$2.58	$0.00	$0.00	$2.27	$4.85
NSW	Turkey processing Business (large)	$0.00	$0.00	$0.47	$0.00	$0.47
Subtotal NSW, QLD and VIC		$37.14	$14.40	$0.47	$35.49	$87.49
SA	Broiler turkey business (small)	$0.52	$0.00	$0.00	$0.00	$0.52
Subtotal SA, WA and TAS		$0.52	$0.00	$0.00	$0.00	$0.52
Total		***$37.65***	***$14.40***	***$0.47***	***$35.49***	***$88.01***
Business size						
Small		$25.94	$14.40	$0.00	$28.68	$69.02
Large		$11.72	$0.00	$0.47	$6.81	$18.99
Total		***$37.65***	***$14.40***	***$0.47***	***$35.49***	***$88.01***
Percentage of cost by business size						
Small		29.47%	16.36%	0.00%	32.59%	78.42%
Large		13.31%	0.00%	0.53%	7.73%	21.58%
Total percentage of cost by business size		***42.79%***	***16.36%***	***0.53%***	***40.32%***	***100.00%***

[465] See Table A13.1 of Appendix 13 for source of estimates

Table 28: Summary of estimated costs of Option D (10-year phase out of conventional cages) by layer farm size and grouping of states – present value dollars ($m)[466]

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option D phase out of conventional cages over 10 years	Total
(Cage)						
NSW, QLD and VIC	Large	$0.10	$3.64	$13.37	$176.04	$193.16
NSW, QLD and VIC	Medium	$0.58	$6.48	$23.83	$313.68	$344.58
NSW, QLD and VIC	Small	$0.67	$1.95	$7.17	$88.56	$98.36
NSW, QLD and VIC	Micro	$0.00	$0.02	$0.06	$0.83	$0.91
(Barn)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.10	$6.28	$41.88	$0.00	$48.26
NSW, QLD and VIC	Small	$0.45	$10.65	$71.03	$0.00	$82.14
NSW, QLD and VIC	Micro	$0.00	$0.13	$0.89	$0.00	$1.02
(Free range)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.23	$9.18	$106.66	$0.00	$116.07
NSW, QLD and VIC	Small	$1.93	$20.70	$240.45	$0.00	$263.08
NSW, QLD and VIC	Micro	$0.00	$0.40	$4.62	$0.00	$5.02
Subtotal NSW, QLD and VIC		$4.07	$59.42	$509.97	$579.12	$1,152.58
(Cage)						
SA, WA and TAS	Large	$0.03	$0.74	$2.72	$35.77	$39.26
SA, WA and TAS	Medium	$0.05	$0.30	$1.09	$14.31	$15.74
SA, WA and TAS	Small	$0.22	$0.54	$2.00	$25.52	$28.29
SA, WA and TAS	Micro	$0.00	$0.01	$0.02	$0.31	$0.34
(Barn)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Small	$0.19	$2.06	$13.77	$0.00	$16.02
SA, WA and TAS	Micro	$0.00	$0.16	$1.04	$0.00	$1.19
(Free range)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.10	$2.77	$32.23	$0.00	$35.11
SA, WA and TAS	Small	$0.56	$3.83	$44.51	$0.00	$48.89
SA, WA and TAS	Micro	$0.00	$0.14	$1.62	$0.00	$1.76
Subtotal SA, WA and TAS		$1.14	$10.55	$99.00	$75.91	$186.60
Total		***$5.21***	***$69.97***	***$608.97***	***$655.03***	***$1,339.18***
Layer farm size						
Total large		$0.13	$4.38	$16.09	$211.81	$232.42
Total Medium		$1.06	$25.01	$205.69	$327.99	$559.75

[466] See Table A5.2 of Appendix 5 for source of estimates.

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option D phase out of conventional cages over 10 years	Total
Total Small		$4.02	$39.74	$378.93	$114.08	$536.77
Total Micro		$0.00	$0.85	$8.25	$1.15	$10.25
Total		*$5.21*	*$69.97*	*$608.97*	*$655.03*	*$1,339.18*
Production system						
Total cage		$1.66	$13.67	$50.27	$655.03	$720.63
Total barn		$0.74	$19.28	$128.61	$0.00	$148.63
Total free range		$2.82	$37.02	$430.09	$0.00	$469.93
Total		***$5.21***	***$69.97***	***$608.97***	***$655.03***	***$1,339.18***
Percentage of total cost by business size						
Total large		0.01%	0.33%	1.20%	15.82%	17.36%
Total Medium		0.08%	1.87%	15.36%	24.49%	41.80%
Total Small		0.30%	2.97%	28.30%	8.52%	40.08%
Total Micro		0.00%	0.06%	0.62%	0.09%	0.77%
Total percentage of cost by business size		***0.39%***	***5.22%***	***45.47%***	***48.91%***	***100.00%***
Percentage of total cost by production system						
Total cage		0.12%	1.02%	3.75%	48.91%	53.81%
Total barn		0.06%	1.44%	9.60%	0.00%	11.10%
Total free range		0.21%	2.76%	32.12%	0.00%	35.09%
Total percentage of cost by production system		***0.39%***	***5.22%***	***45.47%***	***48.91%***	***100.00%***

Table 29: Summary of estimated costs of Option D (20-year phase out of conventional cage) by layer farm size and grouping of states – present value dollars ($m)[467]

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option D phase out of conventional cages over 20 years	Total
(Cage)						
NSW, QLD and VIC	Large	$0.10	$5.86	$21.55	$89.24	$116.75
NSW, QLD and VIC	Medium	$0.58	$10.44	$38.39	$159.02	$208.44
NSW, QLD and VIC	Small	$0.67	$3.01	$11.06	$44.89	$59.64
NSW, QLD and VIC	Micro	$0.00	$0.03	$0.10	$0.42	$0.55
(Barn)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00

[467] See Table A5.3 of Appendix 5 for source of estimates.

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option D phase out of conventional cages over 20 years	Total
NSW, QLD and VIC	Medium	$0.10	$4.20	$27.99	$0.00	$32.28
NSW, QLD and VIC	Small	$0.45	$7.12	$47.47	$0.00	$55.04
NSW, QLD and VIC	Micro	$0.00	$0.09	$0.59	$0.00	$0.68
(Free range)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.23	$7.67	$89.06	$0.00	$96.95
NSW, QLD and VIC	Small	$1.93	$17.28	$200.76	$0.00	$219.98
NSW, QLD and VIC	Micro	$0.00	$0.33	$3.86	$0.00	$4.19
Subtotal NSW, QLD and VIC		$4.07	$56.02	$440.84	$293.58	$794.51
(Cage)						
SA, WA and TAS	Large	$0.03	$1.19	$4.38	$18.13	$23.74
SA, WA and TAS	Medium	$0.05	$0.48	$1.75	$7.25	$9.53
SA, WA and TAS	Small	$0.22	$0.86	$3.16	$12.94	$17.17
SA, WA and TAS	Micro	$0.00	$0.01	$0.04	$0.16	$0.21
(Barn)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Small	$0.19	$1.30	$8.66	$0.00	$10.15
SA, WA and TAS	Micro	$0.00	$0.10	$0.65	$0.00	$0.75
(Free range)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.10	$2.48	$28.76	$0.00	$31.34
SA, WA and TAS	Small	$0.56	$3.42	$39.71	$0.00	$43.69
SA, WA and TAS	Micro	$0.00	$0.12	$1.45	$0.00	$1.57
Subtotal SA, WA and TAS		$1.14	$9.95	$88.56	$38.48	$138.14
Total		***$5.21***	***$65.97***	***$529.40***	***$332.06***	***$932.64***
Layer farm size						
Total large		$0.13	$7.05	$25.93	$107.38	$140.49
Total Medium		$1.06	$25.25	$185.95	$166.27	$378.54
Total Small		$4.02	$32.98	$310.83	$57.83	$405.67
Total Micro		$0.00	$0.68	$6.69	$0.58	$7.95
Total		*$5.21*	*$65.97*	*$529.40*	*$332.06*	*$932.64*
Production system						
Total cage		$1.66	$21.87	$80.43	$332.06	$436.02
Total barn		$0.74	$12.80	$85.37	$0.00	$98.91
Total free range		$2.82	$31.30	$363.60	$0.00	$397.71
Total		***$5.21***	***$65.97***	***$529.40***	***$332.06***	***$932.64***
Percentage of total cost by business size						
Total large		0.01%	0.76%	2.78%	11.51%	15.06%

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option D phase out of conventional cages over 20 years	Total
Total Medium		0.11%	2.71%	19.94%	17.83%	40.59%
Total Small		0.43%	3.54%	33.33%	6.20%	43.50%
Total Micro		0.00%	0.07%	0.72%	0.06%	0.85%
Total percentage of cost by business size		***0.56%***	***7.07%***	***56.76%***	***35.60%***	***100.00%***
Percentage of total cost by production system						
Total cage		0.18%	2.35%	8.62%	35.60%	46.75%
Total barn		0.08%	1.37%	9.15%	0.00%	10.61%
Total free range		0.30%	3.36%	38.99%	0.00%	42.64%
Total percentage of cost by production system		***0.56%***	***7.07%***	***56.76%***	***35.60%***	***100.00%***

Table 34: Summary of estimated costs of Option E by layer farm size and grouping of states – present value dollars ($m)[468]

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option E reduce stocking densities	Total
(Cage)						
NSW, QLD and VIC	Large	$0.10	$8.08	$29.72	$0.00	$37.90
NSW, QLD and VIC	Medium	$0.58	$14.40	$52.96	$0.00	$67.94
NSW, QLD and VIC	Small	$0.67	$4.07	$14.95	$0.00	$19.69
NSW, QLD and VIC	Micro	$0.00	$0.04	$0.14	$0.00	$0.18
(Barn)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.10	$2.11	$14.10	$12.01	$28.32
NSW, QLD and VIC	Small	$0.45	$3.58	$23.91	$20.36	$48.32
NSW, QLD and VIC	Micro	$0.00	$0.04	$0.30	$0.28	$0.63
(Free range)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.23	$6.15	$71.45	$35.15	$112.98
NSW, QLD and VIC	Small	$1.93	$13.86	$161.08	$79.24	$256.11
NSW, QLD and VIC	Micro	$0.00	$0.27	$3.09	$1.69	$5.05
Subtotal NSW, QLD and VIC		$4.07	$52.61	$371.71	$148.73	$577.12
(Cage)						
SA, WA and TAS	Large	$0.03	$1.64	$6.04	$0.00	$7.72
SA, WA and TAS	Medium	$0.05	$0.66	$2.42	$0.00	$3.12
SA, WA and TAS	Small	$0.22	$1.17	$4.31	$0.00	$5.70

[468] See Table A5.4 of Appendix 5 for source of estimates.

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option E reduce stocking densities	Total
SA, WA and TAS	Micro	$0.00	$0.01	$0.05	$0.00	$0.07
(Barn)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Small	$0.19	$0.53	$3.56	$3.03	$7.31
SA, WA and TAS	Micro	$0.00	$0.04	$0.27	$0.25	$0.56
(Free range)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.10	$2.18	$25.29	$12.44	$40.01
SA, WA and TAS	Small	$0.56	$3.01	$34.92	$17.18	$55.66
SA, WA and TAS	Micro	$0.00	$0.11	$1.27	$0.69	$2.07
Subtotal SA, WA and TAS		$1.14	$9.35	$78.13	$33.60	$122.22
Total		***$5.21***	***$61.97***	***$449.83***	***$182.33***	***$699.34***
Layer farm size						
Total large		$0.13	$9.73	$35.76	$0.00	$45.62
Total Medium		$1.06	$25.50	$166.21	$59.59	$252.37
Total Small		$4.02	$26.23	$242.73	$119.81	$392.79
Total Micro		$0.00	$0.51	$5.13	$2.92	$8.56
Total		***$5.21***	***$61.97***	***$449.83***	***$182.33***	***$699.34***
Production system						
Total cage		$1.66	$30.08	$110.59	$0.00	$142.32
Total barn		$0.74	$6.32	$42.14	$35.94	$85.14
Total free range		$2.82	$25.57	$297.11	$146.39	$471.88
Total		*$5.21*	*$61.97*	*$449.83*	*$182.33*	*$699.34*
Percentage of total cost by business size						
Total large		0.02%	1.39%	5.11%	0.00%	6.52%
Total Medium		0.15%	3.65%	23.77%	8.52%	36.09%
Total Small		0.57%	3.75%	34.71%	17.13%	56.17%
Total Micro		0.00%	0.07%	0.73%	0.42%	1.22%
Total percentage of cost by business size		***0.75%***	***8.86%***	***64.32%***	***26.07%***	***100.00%***
Percentage of total cost by production system						
Total cage		0.24%	4.30%	15.81%	0.00%	20.35%
Total barn		0.11%	0.90%	6.03%	5.14%	12.17%
Total free range		0.40%	3.66%	42.48%	20.93%	67.48%
Total percentage of cost by production system		***0.75%***	***8.86%***	***64.32%***	***26.07%***	***100.00%***

Table 35: Summary of estimated incremental quantifiable costs of Option E (meat chickens) by business size and states/grouping of states – present value dollars ($m)[469]

States/grouping of states	Business size/type	SA6.2	SA8.3	SA9.11	Option E reduce stocking density	Total
QLD	Large meat chicken farms	$0.08	$0.00	$0.00	$16.93	$17.01
QLD	Medium meat chicken farms	$0.00	$0.00	$0.00	$0.00	$0.00
QLD	Small meat chicken farms	$0.78	$6.99	$0.00	$137.14	$144.92
NSW	Large meat chicken farms	$0.03	$0.00	$0.00	$22.21	$22.24
NSW	Medium meat chicken farms	$0.43	$20.37	$0.00	$47.28	$68.07
NSW	Small meat chicken farms	$1.43	$25.67	$0.00	$154.36	$181.45
VIC	Large meat chicken farms	$0.05	$1.63	$0.00	$9.97	$11.65
VIC	Medium meat chicken farms	$0.07	$0.00	$0.00	$0.00	$0.07
VIC	Small meat chicken farms	$1.32	$16.34	$0.00	$119.03	$136.69
QLD	Processing plants	$0.00	$0.00	$0.70	$0.00	$0.70
NSW	Processing plants	$0.00	$0.00	$1.87	$0.00	$1.87
VIC	Processing plants	$0.00	$0.00	$0.19	$0.00	$0.19
Subtotal NSW, QLD and VIC		$4.19	$71.00	$2.76	$506.92	$584.86
SA, WA and TAS	Large meat chicken farms	$0.03	$0.00	$0.00	$24.68	$24.70
SA, WA and TAS	Medium meat chicken farms	$0.20	$0.00	$0.00	$1.77	$1.97
SA, WA and TAS	Small meat chicken farms	$0.86	$24.19	$0.00	$102.27	$127.32
SA, WA and TAS	Processing plants	$0.00	$0.00	$1.17	$0.00	$1.17
Subtotal SA, WA and TAS		$1.08	$24.19	$1.17	$128.72	$155.16
Total		***$5.27***	***$95.19***	***$3.93***	***$635.64***	***$740.03***
Business size						
Large		$0.19	$1.63	$3.93	$73.79	$79.53
Medium		$0.70	$20.37	$0.00	$49.05	$70.11
Small		$4.39	$73.19	$0.00	$512.81	$590.38
Total		***$5.27***	***$95.19***	***$3.93***	***$635.64***	***$740.03***
Percentage of total cost by business size						
Total large		0.03%	0.22%	0.53%	9.97%	10.75%
Total Medium		0.09%	2.75%	0.00%	6.63%	9.47%
Total Small		0.59%	9.89%	0.00%	69.30%	79.78%
Total percentage of cost by business size		***0.71%***	***12.86%***	***0.53%***	***85.89%***	***100.00%***

Table 39: Summary of estimated quantifiable incremental costs of Option F by layer farm size and grouping of states – present value dollars ($m)[470]

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option F furnished cages	Total
(Cage)						

[469] See Table A9.2 of Appendix 9 for source of estimates.
[470] See Table A5.5 of Appendix 5 for source of estimates

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option F furnished cages	Total
NSW, QLD and VIC	Large	$0.10	$8.08	$29.72	$112.45	$150.35
NSW, QLD and VIC	Medium	$0.58	$14.40	$52.96	$200.36	$268.30
NSW, QLD and VIC	Small	$0.67	$4.07	$14.95	$56.57	$76.26
NSW, QLD and VIC	Micro	$0.00	$0.04	$0.14	$0.53	$0.71
(Barn)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.10	$2.11	$14.10	$0.00	$16.31
NSW, QLD and VIC	Small	$0.45	$3.58	$23.91	$0.00	$27.95
NSW, QLD and VIC	Micro	$0.00	$0.04	$0.30	$0.00	$0.34
(Free range)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.23	$6.15	$71.45	$0.00	$77.83
NSW, QLD and VIC	Small	$1.93	$13.86	$161.08	$0.00	$176.88
NSW, QLD and VIC	Micro	$0.00	$0.27	$3.09	$0.00	$3.36
Subtotal NSW, QLD and VIC		$4.07	$52.61	$371.71	$369.91	$798.30
(Cage)						
SA, WA and TAS	Large	$0.03	$1.64	$6.04	$22.85	$30.56
SA, WA and TAS	Medium	$0.05	$0.66	$2.42	$9.14	$12.26
SA, WA and TAS	Small	$0.22	$1.17	$4.31	$16.30	$22.00
SA, WA and TAS	Micro	$0.00	$0.01	$0.05	$0.20	$0.27
(Barn)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Small	$0.19	$0.53	$3.56	$0.00	$4.28
SA, WA and TAS	Micro	$0.00	$0.04	$0.27	$0.00	$0.31
(Free range)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.10	$2.18	$25.29	$0.00	$27.57
SA, WA and TAS	Small	$0.56	$3.01	$34.92	$0.00	$38.48
SA, WA and TAS	Micro	$0.00	$0.11	$1.27	$0.00	$1.38
Subtotal SA, WA and TAS		$1.14	$9.35	$78.13	$48.49	$137.11
Total		***$5.21***	***$61.97***	***$449.83***	***$418.39***	***$935.41***
Layer farm size						
Total large		$0.13	$9.73	$35.76	$135.29	$180.91
Total Medium		$1.06	$25.50	$166.21	$209.50	$402.27
Total Small		$4.02	$26.23	$242.73	$72.87	$345.85
Total Micro		$0.00	$0.51	$5.13	$0.73	$6.37
Total		***$5.21***	***$61.97***	***$449.83***	***$418.39***	***$935.41***
Production system						
Total cage		$1.66	$30.08	$110.59	$418.39	$560.71
Total barn		$0.74	$6.32	$42.14	$0.00	$49.20

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option F furnished cages	Total
Total free range		$2.82	$25.57	$297.11	$0.00	$325.50
Total		***$5.21***	***$61.97***	***$449.83***	***$418.39***	***$935.41***
Percentage of total cost by business size						
Total large		0.01%	1.04%	3.82%	14.46%	19.34%
Total Medium		0.11%	2.73%	17.77%	22.40%	43.01%
Total Small		0.43%	2.80%	25.95%	7.79%	36.97%
Total Micro		0.00%	0.05%	0.55%	0.08%	0.68%
Total percentage of cost by business size		***0.56%***	***6.62%***	***48.09%***	***44.73%***	***100.00%***
Percentage of total cost by production system						
Total cage		0.18%	3.22%	11.82%	44.73%	59.94%
Total barn		0.08%	0.68%	4.50%	0.00%	5.26%
Total free range		0.30%	2.73%	31.76%	0.00%	34.80%
Total percentage of cost by production system		***0.56%***	***6.62%***	***48.09%***	***44.73%***	***100.00%***

Table 44: Summary of estimated costs of Option G by layer farm size and grouping of states – present value dollars ($m)[471]

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option G no 2nd beak trim	Total
(Cage)						
NSW, QLD and VIC	Large	$0.10	$8.08	$29.72	$0.00	$37.90
NSW, QLD and VIC	Medium	$0.58	$14.40	$52.96	$0.00	$67.94
NSW, QLD and VIC	Small	$0.67	$4.07	$14.95	$0.00	$19.69
NSW, QLD and VIC	Micro	$0.00	$0.04	$0.14	$0.00	$0.18
(Barn)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.10	$2.11	$14.10	$7.05	$23.36
NSW, QLD and VIC	Small	$0.45	$3.58	$23.91	$11.96	$39.91
NSW, QLD and VIC	Micro	$0.00	$0.04	$0.30	$0.15	$0.49
(Free range)						
NSW, QLD and VIC	Large	$0.00	$0.00	$0.00	$0.00	$0.00
NSW, QLD and VIC	Medium	$0.23	$6.15	$71.45	$23.82	$101.65
NSW, QLD and VIC	Small	$1.93	$13.86	$161.08	$53.69	$230.57
NSW, QLD and VIC	Micro	$0.00	$0.27	$3.09	$1.03	$4.39

[471] See Table A5.6 of Appendix 5 for source of estimates.

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option G no 2nd beak trim	Total
Subtotal NSW, QLD and VIC		$4.07	$52.61	$371.71	$97.70	$526.09
(Cage)						
SA, WA and TAS	Large	$0.03	$1.64	$6.04	$0.00	$7.72
SA, WA and TAS	Medium	$0.05	$0.66	$2.42	$0.00	$3.12
SA, WA and TAS	Small	$0.22	$1.17	$4.31	$0.00	$5.70
SA, WA and TAS	Micro	$0.00	$0.01	$0.05	$0.00	$0.07
(Barn)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Small	$0.19	$0.53	$3.56	$1.78	$6.06
SA, WA and TAS	Micro	$0.00	$0.04	$0.27	$0.13	$0.44
(Free range)						
SA, WA and TAS	Large	$0.00	$0.00	$0.00	$0.00	$0.00
SA, WA and TAS	Medium	$0.10	$2.18	$25.29	$8.43	$36.00
SA, WA and TAS	Small	$0.56	$3.01	$34.92	$11.64	$50.12
SA, WA and TAS	Micro	$0.00	$0.11	$1.27	$0.42	$1.80
Subtotal SA, WA and TAS		$1.14	$9.35	$78.13	$22.41	$111.03
Total		***$5.21***	***$61.97***	***$449.83***	***$120.11***	***$637.12***
Layer farm size						
Total large		$0.13	$9.73	$35.76	$0.00	$45.62
Total Medium		$1.06	$25.50	$166.21	$39.30	$232.07
Total Small		$4.02	$26.23	$242.73	$79.07	$352.05
Total Micro		$0.00	$0.51	$5.13	$1.74	$7.38
Total		***$5.21***	***$61.97***	***$449.83***	***$120.11***	***$637.12***
Production system						
Total cage		$1.66	$30.08	$110.59	$0.00	$142.32
Total barn		$0.74	$6.32	$42.14	$21.07	$70.27
Total free range		$2.82	$25.57	$297.11	$99.04	$424.53
Total		***$5.21***	***$61.97***	***$449.83***	***$120.11***	***$637.12***
Percentage of total cost by business size						
Total large		0.02%	1.53%	5.61%	0.00%	7.16%
Total Medium		0.17%	4.00%	26.09%	6.17%	36.43%
Total Small		0.63%	4.12%	38.10%	12.41%	55.26%
Total Micro		0.00%	0.08%	0.80%	0.27%	1.16%
Total percentage of cost by business size		***0.82%***	***9.73%***	***70.60%***	***18.85%***	***100.00%***
Percentage of total cost by production system						
Total cage		0.26%	4.72%	17.36%	0.00%	22.34%

(Production method) - grouping of states	Size of layer hen farms	SA6.3,6.4,6.5	SA9.4,9.5,9.6	SA9.15	Option G no 2nd beak trim	Total
Total barn		0.12%	0.99%	6.61%	3.31%	11.03%
Total free range		0.44%	4.01%	46.63%	15.54%	66.63%
Total percentage of cost by production system		***0.82%***	***9.73%***	***70.60%***	***18.85%***	***100.00%***