Joint Letter to the Chicken Industry VIA EMAIL

Dear Stakeholder,

The purpose of this letter is to convey to stakeholders the following:

a. the DRAFT Pricing Review Decision of the BC Chicken Marketing Board;

b. the BC Broiler Hatching Egg Commission's pricing package (previously provided to stakeholders); and,

c. an overview of the joint strategic approach being taken to pricing by the Chicken Board and Commission as the first instance regulators of the BC chicken industry.

The first attachment is the January 7, 2022, DRAFT decision and reasons of the Chicken Board for its cost-based approach to live weight pricing in the longer term; as well as its proposed pricing formula in the interim.

The second attachment is a January 7, 2022, cover letter from the Hatching Egg Commission resubmitting its pricing package concerning cost of production pricing, hatchery margin and breeder chick/vaccine pricing copied to stakeholders earlier in the process. Also included in the letter is an update on recent discussions between Hatching Egg Commission and BC Egg Hatchery Association representatives.

Both the Chicken Board and the Hatching Egg Commission have stated in previous correspondence that there is a need for a new, strategic approach to pricing in BC. It is over 25 years since the first major pricing review in 1995, after which linkage was established. It has been over 10 years since the 2010 review. Changes in the structure of the industry in BC, in the west and nationally continue to unfold. The evolving national marketplace is placing increased pressure on BC as a high-cost province. To remain competitive with Ontario and respond to pricing, allocation and other regulatory initiatives in that province requires a more concerted, focused effort by BC stakeholders representing the third largest chicken and hatching egg producing province.

To this end, since 2019 the Chicken Board and Hatching Egg Commission have increased regulatory cooperation and coordination between the two boards, including co-locating in 2020. Both boards are working closely with their western counterparts in developing approaches to pricing and other issues. Jointly, the boards launched their Chicken Industry Strategic Framework initiative in 2019. This was suspended in 2020 due to COVID but by that time the boards (and stakeholders) had identified a critical issue that needed addressing as an essential prerequisite. That was resolving ongoing pricing issues in BC.

The Chicken Board and Hatching Egg Commission have approached this pricing review as part of their overall strategy for the BC chicken industry. Recent events have shown the strengths and weaknesses of the food industry. Providing pricing stability and certainty in the long-term is essential to allow the BC chicken industry to address such opportunities and challenges and go forward on a strategic basis. The goal is to better position the BC industry in the western and national chicken and hatching egg sectors.

Key Elements of the Joint Pricing Strategy

1. A joint commitment by both boards to work cooperatively on regulatory issues, including pricing, product quality issues, reviewing the current Pricing and Production Advisory Committee performance and structure and examining further regulatory synergies between the boards.

2. Establishing pricing frameworks (cost of production and cost-based) that parallel those used by their respective counterparts in other provinces, including Ontario.

3. Incorporating hatcheries into a pricing framework that results in transparent, cost-based pricing from breeder chicks to saleable chicks to a hatchery margin to broiler chicks. This provides pricing certainty and stability in support of the full value chain.

4. Establishing a new approach to a pricing "linkage" that includes the entirety of the production chain, allowing for the Hatching Egg Commission and Chicken Board to have a coordinated and systemic response such as guardrails to protect processor competitiveness as evidence warrants. This will be perfected once the Chicken Board effects its proposed long-term pricing framework, which will be incorporated into a cost-based tripartite pricing relationship between hatching egg producers, hatcheries, and growers.

5. Establishing a transition plan to accommodate the movement of the Hatching Egg Commission to its new cost of production (COP) formula, providing for an increase in the hatchery margin and incorporating the hatcheries into the new tripartite framework.

   This will involve the Hatching Egg Commission pricing off its new COP formula by a phased approach that will commence at 95-percent (in A176) and increase by 0.5-percent every subsequent period until 100-percent COP for efficient producers is achieved. Modelling to date has shown no significant difference between the existing linkage price and the proposed COP formula price and this phased in approach should provide full opportunity for stakeholders to adjust to this pricing certainty. This approach is addressed in more detail in the Hatching Egg Commission's documentation.

   This and other pricing processes, including provision for exceptional circumstances, will be incorporated into the Hatching Egg Commission's Consolidated Order once approval is provided. This will ensure that the Hatching Egg Commission's pricing processes are transparent and

accessible to all stakeholders. The Hatching Egg Commission and the Chicken Board will continue to work closely together as both boards manage their respective transition to a new pricing framework for the BC chicken industry.

SAFETI Analysis

Strategic. It is the joint view of the boards that establishing a new, cost-based approach to pricing – complete with built-in efficiency factors – in the BC chicken industry is a critical precursor to better positioning BC in the longer-term. This includes within BC and encouraging future western and national pricing approaches that do not rely solely on Ontario pricing decisions. Pricing will accurately reflect the actual costs of growers, producers, and hatcheries in support of a comprehensive response to evidence regarding processor competitiveness. A stable, certain pricing system will enable BC stakeholders to focus on other critical issues that need to be addressed to protect the BC chicken industry's long-term sustainability.

Accountable. Meets the objectives of supply management to provide a cost of production for efficient producers as a baseline for addressing issues such as processor competitiveness. Provides for integrating efficiencies into the regulatory pricing structure. Provides pricing certainty and stability for all stakeholders. Provides a transparent pricing structure accountable to the BC agri-food economy and the BC public. Facilitates the boards meeting the objectives of Government's Regulated Marketing Economic Policy. Provides a more stable base for industry to respond to evolving animal care, food safety and farm practices.

Fair. The process leading to these decisions of the boards has been extensive and thorough. All stakeholders have had opportunity to participate, provide feedback and both boards have addressed that feedback as appropriate.

Effective. Brings long-term certainty and stability via a permanent approach to pricing. Supports the pricing requirements of the production chain. Adjustments to pricing that may be required at any given time (e.g., in response to processor competitiveness) will be determined within a standard, known tripartite pricing framework. Issues arising will be determined within that framework versus re-inventing formulae. Reducing opportunity to challenge pricing mechanisms will result in more focused and timely resolution of emerging pricing issues. Regulatory efficiencies are and will be built into cost-based pricing mechanisms, monitored and reported on, reducing costs to the system. Will lay a foundation in BC for engaging with its western and national counterparts concerning larger pricing initiatives.

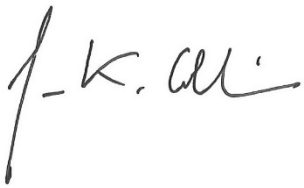
Transparent. Full transparency with stakeholders through the Roundtable process.

Inclusive. Full inclusivity of stakeholders through the Roundtable process.

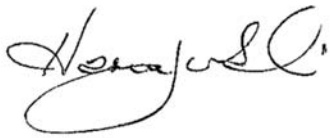
Sound Marketing Policy

It is the view of both the Chicken Board and the Hatching Egg Commission that this new approach to pricing in the BC chicken sector is sound marketing policy that will narrow and focus the resolution of future pricing issues so that they based on a firm, transparent and cohesive foundation from which evidence-based decision can be made. Providing this resolution to pricing is also critical to the overall ability of the BC chicken industry to position itself for the future.

Yours truly,



Jim Collins, Chair
BC Broiler Hatching Egg Commission



Harvey Sasaki, Chair
BC Chicken Marketing Board

HATCHING EGG SECTOR
PROPOSED COP-BASED PRICING PACKAGE
FINAL DRAFT

CHICKEN SECTOR PRICING SUPERVISORY REVIEW

JANUARY 7, 2022

BC
BH
EC

Contents

Cover Letter to the Industry

BCBHEC January 7, 2022 Pricing Decision – Final Draft

The comprehensive documents and timeline appended to this package support the BC Broiler Hatching Egg Commission's (the Commission) approach to a new pricing regime for the BC hatching egg sector. Once approved by the BC Farm Industry Review Board (BCFIRB), it is set for implementation commencing in Period A176. All attached documents have previously been tabled and discussed throughout the Supervisory Review Process. In addition, the attached documents have been examined in consultation with the BC Chicken Marketing Board (BCCMB) as part of a combined pricing strategy for the BC chicken sector.

It is essential to have the pricing stability and certainty to allow all stakeholders to focus on improving the BC chicken industry. After three years of preparation, the Commission is in a position to implement that stability and certainty in the hatching egg sector. It will do so via a thoroughly vetted and transparent pricing system that provides certainty and stability with respect to pricing from breeder chicks to broiler chicks and through its continued commitment to its Official Flock Plan, which provides production certainty to hatcheries and to their processors.

Background

The purpose of this letter is to provide a recap of the Commission's position on pricing as background to its finalized draft decision. It is not to offer a full review of the reasons underlying the Commission's position on exercising its pricing authority under the British Columbia Broiler Hatching Egg Scheme. Those reasons have been outlined extensively in previous correspondence, beginning with the Pricing Positions document published on April 18, 2018. The joint January 7, 2022 letter of the Commission and the BCCMB provides a strategic overview as well as a SAFETI analysis.

As per the transition proposal outlined below and as noted at #5 of its April 18, 2018 Pricing Positions document, the Commission continues to be prepared to respond to the pricing concerns of other stakeholders:

> "Likewise, transparent, defensible COP and linkage mechanisms providing growers and producers with a fair return must be matched by appropriate transparency and substantiation by other stakeholders in making requests related to pricing."

The Commission's positions on the issues have been consistent, clear, and supported with data for the last three years. In addition, the input received from and discussion with all stakeholders during the Roundtable process was helpful to the Commission in addressing questions arising from those sessions.

New BC Hatching Egg COP

A COP for efficient producers is a cornerstone of supply management and is the Commission's definition of a 'reasonable return' for hatching egg producers. A COP must be transparent, defensible and regularly updated, accompanied by measures to support efficiencies, and incentivize producers to maximize their production management. Such a COP can also reduce pricing tensions and pressure points, as demonstrated by the national COP in the egg sector. That COP has also provided producers in the egg sector with the total capacity to meet evolving animal care and other standards required of all producers.

Modelling of the proposed new COP against the current linkage price in recent periods has demonstrated that the new COP – with revenue streams and efficiencies introduced – is competitive with the current linkage pricing.

The Commission has two objectives. The first, establishing a transition plan to accommodate the movement of the Hatching Egg Commission to its new cost of production (COP) formula. The second, providing for an increase in the hatchery margin and incorporating the hatcheries into the new tripartite framework.

This will involve the Hatching Egg Commission pricing off its new COP formula by a phased approach that will commence at 95-percent (in A176) and increase by 0.5-percent every subsequent period until 100-percent COP for efficient producers is achieved. Modelling to date has shown no significant difference between the existing linkage price and the proposed COP formula price and this phased in approach should provide full opportunity for stakeholders to adjust to this pricing certainty. This approach is addressed in more detail in the Hatching Egg Commission's documentation.

This and other pricing processes, including provision for exception circumstances, will be incorporated into the Hatching Egg Commission's Consolidated Order once approval is provided. This will ensure that the Hatching Egg Commission's pricing processes are transparent and accessible to all stakeholders. The Hatching Egg Commission and the BCCMB will continue to work closely together as both boards manage their respective transition to a new pricing framework for the BC chicken industry.

Ongoing Work Regarding the Hatchery Margin

Hatcheries are critical stakeholders. Their capacity to maximize operations, efficiencies and meet food safety and other regulatory requirements also need to be supported by an appropriate pricing regime. This pricing balance is as essential to hatcheries as it is to hatching egg producers.

In consultation with the hatcheries, the Commission examined options as to how the Commission would exercise its pricing authority under the Scheme to address these issues. The outcome was the October 2019 'agreement in principle' that would establish formulae for hatchery margin, breeder chick and vaccine pricing. This agreement has been further refined throughout the Supervisory Review Process. Further discussion on key implementation components and related issues, such as redefining 'marketable eggs' is ongoing and is a priority key initiative in the Commission's 2022 Strategic Plan.

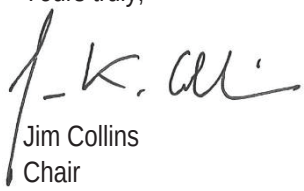
Historically, the hatchery margin has been updated from time to time but never defined in terms of a 'reasonable margin' for hatcheries or updated on a focused, regular basis. The October 2019 approach was reviewed by MNP LLP to determine the veracity of the calculations used by the Commission and the BC Egg Hatchery Association. Moving toward a cost of production for hatcheries over time, commencing with verifying hydro and labour costs on a regular basis (as contemplated by the October 2019 agreement) is a start to defining and regularizing a hatcheries pricing framework as part of a tripartite relationship between hatcheries, hatching egg producers and chicken growers.

As mentioned, the Commission has consulted with the BCCMB regarding the Commission pricing of broiler chicks and the new hatchery margin formula. The boards will be formalizing these processes, including conditions for hatchery performance, following further consultation with the hatcheries in 2022.

Supporting Information and Documents

Although previously distributed, for your convenience, links to all documents circulated by the Commission within the Supervisory Review Process are embedded in the Documentation and Timeline section of this package.

Yours truly,



Jim Collins
Chair

Documentation and Timeline

BCFIRB – Active Appeals and Complaints

N1912 BCCGA v BCBHEC – 2019-12-27 – Adjustment to price linkage formula – Transferred to Supervisory

https://www2.gov.bc.ca/gov/content/governments/organizational-structure/ministries-organizations/boards-commissions-tribunals/bc-farm-industry-review-board/active-bcfirb-appeals-and-complaints

BCFIRB – Regulated Marketing Decisions

PPPABC-BCCGA v BCBHEC – Deferral – 2020-02-25

https://www2.gov.bc.ca/assets/gov/british-columbians-our-governments/organizational-structure/boards-commissions-tribunals/bc-farm-industry-review-board/regulated-marketing/regulated-marketing-appeal-decisions/2020feb25_pppabc-bccga_v_bcbhec_-_deferral.pdf

BCBHEC-BCCMB Pricing Website

All non-confidential information, submissions and stakeholder engagement pertaining to the Pricing Supervisory Review.

https://bcchickensectorpricingreview.com/

Roundtable Process – Key Presentations by BCBHEC

January 28, 2021 – COP survey presentation by Serecon Inc.

February 3, 2021 – PowerPoint on background, hatchery margin, breeder chick and vaccine pricing.

March 8, 2021 – PowerPoint on COP Pricing Effect Follow-up.

May 5, 2021 – Proposed COP-Based Pricing Package distributed with cover letter to the industry, on the 2020 COP Survey Report by Serecon Inc. and response to third-party review by MNP LLP, 2020 COP third-party review by MNP LLP, proposed COP update mechanisms and efficiencies, COP-based pricing effects, and hatchery margin, breeder chick and vaccine pricing.

July 23, 2021 – Clarifying questions to stakeholder submissions to BCBHEPA, BCEHA, PPPABC and BCCGA.

November 10, 2021 – Further analysis to the May 5, 2021 Proposed COP-Based Pricing Package (as an excerpt) on the COP-Based Pricing Effects which include mechanisms and efficiencies analyses, pricing period comparisons, proposed phased-in approaches and illustrations of the approaches.

January 7, 2022 – Final Draft of the Proposed COP-Based Pricing Package containing a cover letter to the industry, May 5, 2021 Proposed COP-Based Pricing Package and November 10, 2021 further analyses – provided hereinafter.

2020 COP Survey Report by Serecon Inc.

See attachment.

May 6th, 2021

Ms. Stephanie Nelson, Executive Director
BC Broiler Hatching Egg Commission
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Abbotsford, British Columbia
V2S 0H9

e-mail: stephanie@bcbhec.com

Ms. Nelson:

Re: **FINAL RESULTS** - COP 2020

The following outlines our results from the analysis as outlined in our LOE dated September 21st, 2020. We have incorporated the elements that were identified upfront as well as any feedback following the presentation of preliminary results on November 26, 2020. This work continues to maintain the link to the Alberta COP approach other than the fact that we do a survey of the whole population in Alberta vs. a statistically valid sample for British Columbia (27 producers).

This report provides a detailed summary of the process that has been used to generate the COP for broiler breeders in BC as of October 31, 2020. Specific Results of the COP Study are then presented, and an analysis of individual cost elements provided.

The report follows a four-part approach to the presentation:

1. The first section provides a discussion of the valuation methodology recommendations from Serecon on several key areas. The methodologies were proposed because we were tasked to perform analysis on several COP components in what we refer to as the COP Study Protocol which is the protocol developed out of the LOE.
2. The next section outlines the results of the fieldwork and discusses the data weighting, demographics, and data validation. This section provides an outline of the validation process used to ensure that the data is accurate and reflective of the participant's input.
3. Section 3 of the main report provides a detailed summary of the results from the process.
4. The final section of the report provides a detailed updating process so that the COP can be implemented and kept current. We have assumed that you would be continuing to update this every A period.

Project Context

The BCHEC is looking at moving from a pricing model based on the Linkage System Model initially developed in 2006 to a pricing approach based wholly on their own COP alone[1]. As part of this process, there is a need to collect up to date cost information from hatching egg producers to validate both the variable and fixed costs of production.

One of the key drivers is the extent of equivalence with pricing in Alberta, and it is understood that the BCHEC Board wants to collect enough data to allow for a detailed assessment of options to be consistent with their approach.

As a result of this request, we assessed the results of previous analysis in BC. In those results it was determined that the coefficient of variation in the results was approximately .08 which means that with approximately 28 surveys you would have a statistically valid sample at a 95% level of confidence at a 3% margin of error. We have used this as the basis for the selection of the sample.

One final comment relates to the approach to data collection. We have always conducted one-on-one interviews at the farm sites previously. This has enabled us to view the facilities and facilitate the development of an opinion on the relative age of the structures and associated equipment. As a result of COVID 19 precautions, we could not visit the facilities as part of this review. On the other hand, we did meet with all the farmers face-to-face at your offices. The only exception were 3 producers who could not meet in person due to concerns about the need to physically distance as a result of a potential contact with COVID 19.

It is critical to note that while these exceptions created significant inconvenience, they do not have a material impact on the results in our opinion. We spent a significant amount of time with these farmers using various type of technology and were able to validate their results remotely.

Engagement Specifics

Serecon was engaged as an **independent valuator** and contracted under a consulting services engagement. We have provided an expression of value for the costs of production incurred by hatching egg producers in BC.

We were not hired as advocates for the BCHEC and remain advocates only for our own opinion as developed under the terms specified in this document. Our remuneration was in no way based on the results of the valuation.

We understand that we may be asked to defend our approach and results as part of legal proceedings. We also understand that you may request that the accumulated raw data be provided to another third party. While we would protect the individual participants, we have agreed to release the data to an accounting/consulting-type firm as directed by you.

[1] The linkage model uses equivalent costing model approaches for both broiler and breeder production and calculates a breeder price that provides the same cost recovery for both categories of production. Given that the live price in BC is a fixed number per kg based off Ontario, and the fact that breeder prices are part of the broiler costing model, an iterative calculation is used to ensure cost recovery equivalency is achieved.

Project Objectives

The specific objective of the engagement was to:

> ***Use a stratified, structured survey process, whose size is statistically valid at a 95% LOS at a 3% margin of error, to update and validate costs of producing hatching eggs in BC. The model would consider all costs faced by producers – both cash and opportunity costs. This model needs to be replicable, defendable, and easily understood by all parties if it is challenged by hatcheries and/or the BCCMB.***

Project Scope

The calculated costs have been based on a survey of 27 hatching egg producers of various sizes and from various locations, recognizing the limited geographical area that is covered by the production base. Producers have been advised that their data would potentially be discoverable should the costing model be challenged. Confidentiality concerns have been limited to this potential issue. This is a critical point, as the information we use must be made available to opposing experts in the event of a dispute, otherwise the model will be justifiably criticized. We are strongly of the opinion that if the raw data used in the development of the model is provided to other valuation experts, their interpretation could not vary significantly from ours.

Cost Basis & Statistical Validity

Calculated costs are based on a survey of a statistically valid number of farms currently registered as hatching egg producers. These costs consider both pullet and layer operations. We have used market information unless it is not available.

Need for Verifiable Data & Transparency

One of the key principles used in the development of the methodology was the need for full transparency while ensuring clarity and simplicity in the approach. As a result, we collected specific and detailed data from the producers and this enables the model to be broken down into a significant number of cost elements – ultimately aggregated to a more macro level for reporting purposes, but available at the detailed level for anyone wanting to audit the process and/or conduct sensitivity or scenario analysis on given variables.

This ability to identify and outline specific data elements is necessary if the results from BC are to be compared to those in other provinces. There is a need for a full normalization of cost elements to ensure that a fair and valid comparison is made. Only when the data is normalized can comparisons be used, otherwise they result in inaccurate assessments and are not useful in terms of motivating appropriate behavior.

As discussed with the Board we have included validation and documentation that outlines how labour costs have been calculated and why the Activity Based Costing Approach would be most appropriate for the COP. This practice of justifying our approach has also been applied to other elements where the raw data was not used to produce results – equipment, buildings, etc.

Flexibility in Approach in Order to Facilitate Decisions & Inform Discussion

Finally, we have used best valuation practices in the calculation and presentation of results. It is our opinion that the treatment of depreciation used in previous models has little or no influence on the relative pricing if an appropriate rate of return on producers' equity is considered when using an adjusted book value to depreciation approach. This approach is even more important given the fact that we are not able to physically visit the farms.

A similar approach would also be taken when looking at labour costs, where we will both collect information directly from the farmers but will add additional context based on a "greenfield" labour approach[2] using typical time in motion information based on typical work/activity patterns used in the production process.

Ultimately it is our opinion that this model is robust enough to enable a scenario analysis on any one of the cost elements.

Project Schedule and Activity Summary

We completed this project in four steps:

1. **Planning, Preparation, and Documentation** – the first phase began with development and refinement of the overall project plan and schedule. Data collection materials were developed including the survey interview instrument and questionnaire, and a set of introductions and data requirements that would be sent to the sample that was selected.
2. **Sample Selection & Fieldwork** – BCHEC provided a list of producers from which we were able to segregate them into three size categories and determine the selection protocol – described in detail later in this document. We initiated the calling and arranged to meet the farmers in the BCHEC offices following a strict physical distance protocol.
3. **Data Compilation, Analysis, and Follow-up** - survey results were compiled, validated, and analyzed to calculate the COP. We used a validation process that included considerable common sizing and data mining in order to ensure correct interpretation. It is important to note that no data had to be removed. The data was then brought up to the valuation date of October 31, 2020 by adjusting the cost basis to current values.
4. **Reporting** – A preliminary report was provided and discussed and reviewed with the Board in November 2020. The need for additional context and/or explanation has been incorporated into this final report.

Critical Considerations & Validation of Approach

There were a few elements where market information was not consistently available and/or reflective of the actual cost of production – most specifically labour and capital. In all cases we followed a basic set of principles in determining how they should be applied.

In summary, Serecon followed a structured approach to the task of making recommendations to the BCHEC. Serecon was guided by our professional opinion that the COP must accurately measure all costs incurred by a producer to produce the commodity and these should be included, except for any costs related to quota value. These costs are to be based on a Free on Board (FOB) farm gate basis and measured as the net expenditures related specifically to the production of the commodity after accounting for any rebates or cash discounts. Serecon used statistical theory to obtain a statistically valid sample that accurately reflected the eligible population of breeder producers in BC. The data collected from this representative sample was then extrapolated to the population based on the expected weighed average COP for a typical farm which is defined based on the average farm size in the province.

[2] A greenfield approach means that labour costs are calculated based on what a reasonable person would expect to incur given the activities that have to be conducted and the current market price for labour. Essentially it starts fresh without any restrictions or dependences on existing arrangements.

The basic criteria that guide the development of the questionnaire is that the survey approach must:

- Use survey values where and when possible;
- Use appropriate substantive equivalents where this is not possible; and,
- Test these substantive equivalent's vs fair market values and validate any differences.

The Data Itself

Producers provided significant detail regarding cycle production information (e.g., eggs sold, eggs set, chicks hatched, mortality, Mt of feed used, price of feed used, feed conversion, etc). Operating costs other than chick and feed costs were generally reported for the most recent fiscal year (2019 in most cases). All costs were updated to October 31, 2020 pricing by indexing costs vs. actual pricing. In some cases this was done using CPI, but in the majority of cases we were able to compare actuals – as an example we have been tracking utility costs etc. - over time so were able to index the reported pricing vs. what current costs are.

All costs were calculated on a $ per hen and per dozen hatching egg basis. The "hen" currently used is the chick placed and paid for equivalent (vs hens housed). Weighted averages were then calculated based on quota size.

Analysis concepts used were based on generally accepted business valuation principles, including accrual accounting and historic cost valuation with provision for including capital improvements and depletions. Only costs that are directly attributed to the hatching egg and pullet enterprises were used in generating the costing model. It was accepted that quota value was not to be included in the costing process.

Sampling

The sampling process followed a structured approach to ensure that a valid random distributed sample generated. There are several critical elements that have to be considered as part of this and the following definitions are critical to the process.

- **Variance (σ^2)** – the average of squared differences from the mean. It can also be described as the expected value of the squared deviation from the mean and essentially provides a measure of how spread out a set of numbers are.
- **Standard Deviation (σ)** – is the square root of the variance and has the advantage of being expressed in the same units as the mean. As a result, it is a more intuitive descriptive statistic.
- **Margin of Error (MoE)** – is a statistic that provides an assessment of the amount of random sampling error in the survey's results. The larger the MoE the less confidence you have that the sample results truly represent the population results. It is calculated by multiplying the critical value (from the Z or T distribution) by the standard deviation divided by the square root of the number of sample observations.
- **Confidence Interval (CI)** – A confidence interval gives an estimated range of values which is likely to include an unknown population parameter, the estimated range being calculated from a given set of sample data. They essentially provide a range of plausible values that one would expect in a given sample.
- **Coefficient of Variation (CV)** – this is really a normalized measure of dispersion and calculated as the ratio of the standard deviation to the mean.

At its most basic form, the key determinant of the sample size is the MoE that is desired. The MoE essentially provides the user of the information with an indication of how confident they can be that the mean of the information

collected reflects the population. This is usually expressed in the form of a confidence interval (as mentioned in the CI definition above) – providing a range within which the result could be expected to fall.

Sample Selection

The total population of 54 quota holders was segregated into four different categories:

- Those with under 2,500 annualized quota (were excluded due to a concern that they are not reflective of a going concern operation);
- Category 1: Those with between 6,000 and 7,500 annualized quota (3 producers in total);
- Category 2: Those with between 7,500 and 15,000 annualized quota (18 producers in total); and
- Category 3: Those with greater than 15,000 annualized quota (25 producers in total).

We used this distribution to determine how many producers from each category we needed to interview in order to get a weighted average representative COP with a target of 30 producers. This included:

- 2 in Category 1;
- 12 in Category 2;
- 16 in Category 3.

Each quota holder from those categories was allocated a random number using a random number generator, which was used to identify the specific producers to be targeted. We proceeded to contact each producer within each of the categories in the order that they were given by the random number generator. This ensured that the sample was valid and reflective of the population.

While we were targeting 30 producers, we were able to collect data from 27 producers. We had to substitute 4 producers in Category 2 and 2 in category 3. Only 2 producers absolutely refused to participate. The others had significant issues that precluded their participation – family death and COVID.

The summary survey demographics are:

Table 1: Summary of Quota Numbers

Quota Holders		
Actual	Sample	% of Total
54	27	50%

The sample represented 50% of total producers and 58% of total production. Table 2 presents a summary of the demographics of the survey sample. Note that quota has been annualized in the table below. It is our opinion that the individual production units selected for the survey are representative of the production units in the province.

Table 2: Summary of Sample Demographics – Quota Information

	Average	Median	Minimum	Maximum
Population	17,996	15,034	2,500	57,413
Original Sample	18,466	15,172	6,000	57,413
Final Result	18,809	15,310	6,003	57,413

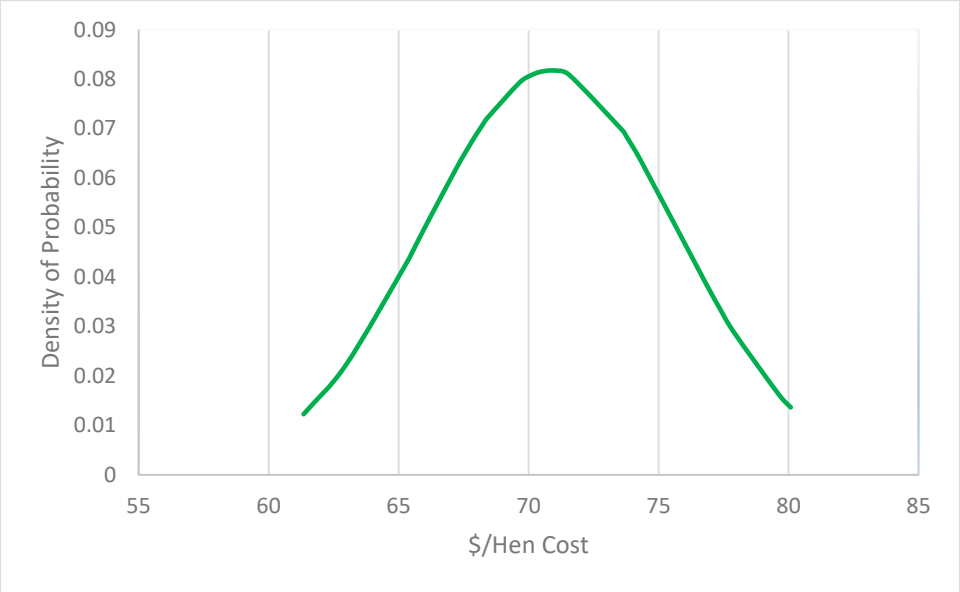
Statistical Validity

Survey results from the 27 producers have a weighted average cost of production of $70.44/hen ($70.85 simple average) with an associated standard deviation of 4.9. Table 3 presents a distribution of the $/Hen results while Figure 1 illustrates the probability density of the results which closely resemble a normal curve. These results have a 95% level of confidence with 2.6% margin of error. This margin of error means that the calculated COP will be within 2.6% percentage points of the real population value 95% of the time.

Table 3: Summary of Results - $/Hen

	Weighted Average	Median	Minimum	Maximum
Survey Results	$70.44	$70.33	$61.34	$80.08

Figure 1: Distribution Density ($/Hen)



Description of Cost Components

Operating Costs

• **Chick** costs are based on the average of the survey sample and indexed to December 22nd, 2020 based on receipts received from individual producers for their most recent flocks, validated with the information collected by BCHEC as of A-167. Service and vaccine costs for the day-old chick were separated based on invoiced figures. These have also been reported separately in the results. Farm labour for the vaccine application has also been collected and reported separately. This provides useful information as the various hatcheries have different vaccination protocols and provide various levels of service and the survey information provides insight on how this impacts the cost to the producer.

• **Feed** costs are based on the average of the survey sample with feed costs and Mt used reported by each participant for the periods provided. Feed prices used were the actual weighted averages of all feed types used in the reported cycles after all discounts received by the grower.

These prices have been updated to October 31, 2020 pricing by creating indexes between the reported pricing from the feed survey and the price actually paid for that period for the production timeframe used in the survey. This procedure was used for both the pullet and grower costs and uses the information for the various feed companies that Serecon has been tracking since 2000.

• **Veterinary and Medicine** costs were separated from the cost of vaccines. In most cases this cost was associated with lab testing, but there were a few situations where costs were allocated to a flock in production.

• **Utilities Costs** include power, water, gas, and telephone costs and is based on the weighted average of the survey sample on an annual basis. While a few of the growers surveyed reported all utilities as one value without a breakdown, most were able to provide specific hydro and gas prices for the flock being used in the analysis. Telephone costs were included with administrative and office costs in some cases having the impact of reducing the average telephone cost with a resultant increase in the office costs.

• **Vehicle and Equipment Operating** costs (fuel, oil and maintenance) are based on the average of the survey sample on a flock cycle length basis and include the cost of operating all trucks, tractors and other motorized equipment. Vehicle and equipment operating costs were included with repairs and maintenance by several survey participants, thereby reducing the average vehicle and equipment operating costs and increasing the average cost of repairs and maintenance.

• The cost of **Repairs and Maintenance** includes building repairs and maintenance, equipment repairs, and maintenance, alarm and security systems and barn supplies reported on an annual basis. Most of the growers surveyed were able to separate equipment and building repair and maintenance costs. We excluded all capital additions that would typically be capitalized vs. expensed. These additions to the building would be captured in the aged life approach used to estimate depreciation and are discussed in greater detail below.

• **Bedding** costs for most of the survey sample were based on the production cycles provided for the survey and validated with receipts from the farm records.

• **Administrative, Office Costs, and Professional fees** include the cost of legal and accounting services and office supplies and services. Some of the operators included telephone cost with office costs.

• **Insurance** costs include the cost of insurance for buildings, vehicles and equipment as well as business interruption and farm liability costs. These were typically reported by producers surveyed on an annual basis from their annual financial statements or their insurance policies.

• **Custom Charges** were related to the cost of catching spent fowl in the lay flock and the cost of catching for vaccination and moving in the pullet flock. Virtually every farm did their own cleaning and disinfection.

• **Levies** include board levies reported by all producers. Quota lease costs were not included as part of the survey as this is related to quota which cannot be included in the COP.

Labour

The COP needs to reflect the reality that there will typically be more than a single type of labour on a farm. This fact was addressed in our approach where different classes of work required different rates of pay – in this study there are two labour categories: management and skilled. In determining the most appropriate wage rate to be paid, the following must be considered:

- Complexity/judgement;
- Education;
- Experience;
- Initiative;
- Character of supervision; and,
- Scope of supervision.

Given the fact that family labour constitutes a large proportion of farm labour in BC it was critical to find a way to recognize this contribution accurately. It is our experience that it is common for family labour to be overlooked, underpaid, or not tracked in accounting records on farms.

As suggested above, there was a decision that there would be two main labour categories: management and skilled labour. Given this, the key questions that had to be addressed by Serecon were for non-arm's length labour, and these were:

- How many hours should be allocated by task;
- What category of labour should be used as the basis for compensation; and,
- At what rate do these categories get paid?

Serecon attempted to address the first two issues by providing a matrix of on-farm activities to the farmers for their review and consideration. While the items were vast, there was a consensus that providing more details to participants when addressing non-arm's length labour was an important consideration.

The justification of considering non-arm's length labour was developed in consideration of the precedence (jurisprudence) on how this has been addressed for family and non-arm's length labour in Canadian law. Essentially, how to establish proxy values when market values do not exist

A review of the court rulings clearly illustrated how the BCHEC needs to deal with many of the issues around non-arm's length labour in developing its COP:

1) **Value for Family Labour is Equivalent to Arm's-Length Labour (based on activity)** – Three court cases clearly illustrated that family members need to be "appropriately" compensated for their contributions to a farm operation. The rulings were clear that it is important to either estimate a substantive equivalent wage rate OR incorporate non-monetary forms of compensation when considering the cost of labour.

2) **Non-Monetary Forms of Compensation** - Although these costs do not show up on the accounting statements, they do have an intrinsic cost and benefit to an individual farm operation. Non-monetary forms of compensation are included in court rulings and settlements where fair compensation must be determined. This is especially the case when family labour is used for on-farm activities. These law cases prove that all benefits, both monetary and non-monetary, are recognized as a cost/benefit in the eyes of Canadian law and need to be estimated when determining the cost of labour. Non-Monetary adjustments would be required for both arm's length and non-arm's length labour calculations as discussed below.

The findings from the jurisprudence above had an implication on the questions asked in the field work. There was a need to determine if non-monetary forms of compensation are being used by the participants. It was critical that the

questions facilitate the collection of any and all compensation paid by participants, including any potential benefit from providing housing, providing meals, supplying transportation to and from the farm, paying for any education not directly related to on-farm training, and/or any other potential compensation that might offset salary costs. These issues were addressed with the survey participants during the fieldwork.

After a significant amount of analysis & consideration, Serecon came to several conclusions regarding the labour element (specifically non-arm's length labour) of the study. These have been included in the calculation of the COP and can be summarized as:

- Serecon provided the full labour worksheet to all participants as part of the pre-survey package so that they could ensure they have considered all the relevant labour components – even those with arm's length labour, since the labour updating would require this in the future. As a result, all participants – with both arm's length and non-arm's length were able to provide information on the breakdown of labour.
- For those with arm's length labour Serecon asked how many full vs. part time employees they have as well as the number of hours per week they work.
- For those with non-arm's length labour, Serecon discussed the hours spent by activity and had them specify the approximate percentage of each that is accomplished by a full-time staff or part-time staff. Respondents were also given the option of giving total labour hours and costs by aggregate category if they preferred but we then needed the part-time vs. full-time breakdown.
- In cases where a farm has both arm's length and non-arm's length labour Serecon validated the reported arm's length labour cost to test the model data what was used as the proxy for for equivalent tasks on that farm.
- As part of the survey, we also collected information on the actual amount paid on a per hour basis from those with arm's length labour ensuring that any "in-kind" elements are considered and normalized for. These types of adjustments for non-arm's length labour were already made when applying the proxy
- Given the approach ultimately used there was no need to consider non-monetary compensation with arm's length labour.

Ultimately, we spent significant time discussing labour with producers and are comfortable with the approach. While this is a difficult area for the producers to fully record their activities, in general the labour matrix that was provided helped focus the discussion on the specific activities undertaken and provide a relatively accurate estimate of the time required.

In terms of family and management labour we considered activity-based labour application with (where valid):

- 12 different categories of activity for pullet production: brooding; 2-8 weeks; 9-20 weeks; water vaccinations; subcutaneous vaccinations; cockerel transfer and vaccination; pullet transfer and vaccination; pullet barn cleanout; cockerel barn cleanout; pullet barn setup; cockerel barn setup; and flock placement.
- 7 categories for layer production: from transfer to 24 weeks; 25 to peak production; 31 to 45 weeks; 46 to 51 weeks; 52 to 60 weeks; flock ship out; and layer barn cleanout.
- 3 general activity categories: non-flock specific related to lay; non flock specific related to pullet; and non-flock specific related to overall farm operations.

The full details of the labour matrix are provided in the Appendix.

Capital Costs

The appropriate return on and of capital were approached in a systematic way. Ultimately, we have used a straight-line depreciation where a deemed cost of the assets is divided by the years of useful life of the respective assets. One of the issues that we face is that the cost and age of barns and associated equipment varies dramatically between operations as does the method of calculating the cost and reporting this on their financial statements (e.g., replacement cost, insured value, market value, book values). While we have a statistically valid sample, the reality is that using accounting statements alone to capture the cost of capital does not accurately capture the true economic cost.

As a result, we considered three approaches:

1. The extent of **net book value** reported on the financial statements – in this case we have had to normalize the financial statements to ensure that we are considering all relevant additions to capital. Farming operations typically expense barn additions vs. adding it to the capital base. They also typically do not include the value of unpaid owner and/or neighbor labour in this cost. This typically means going through historical operating statements and moving components of R&M into the fixed asset base.

   We have also had to work through the financials with the producer to ensure that quota costs have not been included as part of the capital base. This involves assessing the value of quota in the year purchased and ensuring that the value reported on the financial statements was consistent with this figure.

   Opinion: Virtually all the producers could provide specific examples of capital expenditures on buildings and/or equipment that was expensed vs. capitalized. Other producers provided recent appraisals where the book value reported was significantly different from the appraised value. As a result, it is our opinion that the book value does not reflect an accurate true cost to the producer and should not be used to estimate the economic depreciation to be charged in the cost of production.

2. **The aged life approach** to get an accurate estimate of the market value of the assets in place – as outlined above, the problems inherent with the use of reported net book value are significant. A more accurate option would be to obtain an appraisal of the market value of assets in place and use this as the basis to determine the effective depreciation and return on investment required. While full appraisals for each survey location were beyond the scope of this study, our experience in appraisal work would typically enable us to provide an opinion on the aged life value of the buildings based on the current conditions of the assets in place and records of maintenance and upgrades.

   This information can then used to determine the extent of useful life remaining and thus determining an appropriate depreciation and return on investment required based on an historical cost. It is important to note that this historical cost would essentially equal the adjusted net book value of the asset had capital upgrades been capitalized vs. expensed.

   Opinion: This approach is commonly used in valuations and appraisals to get an estimate of the fair economic value of an asset. This is an accurate way to determine the necessary return of and return on equity. Unfortunately, the situation with COVID does not allow us to visually inspect the barns so as a result we are not confident using this approach.

3. **The Modelled Approach -** this approach is like the cost approach often used by valuators and appraisers. Essentially, information on the cost to build that is publicly available is used to estimate what the cost to replace the facilities use to produce the flocks assessed as part of the COP. This cost is then normalized to

reflect the cost to build the facility at a halfway point in its useful life. In other words, what would it have cost to build the barn 20 years ago (assuming a 40-year life of buildings)? In this way the remaining equity and associated deprecation cost can be determined.

Opinion: In our opinion this approach is the preferred way, not only because we were unable to view the facilities, but also because it most closely reflects the approach being used in other jurisdictions and this thus more comparable and easier to defend. Ultimately, using the approach is consistent with the development of a sustainable industry since it captures the necessary costs to ensure that on average the capital structure is an average age – halfway through its useful life.

Some of the main assumptions used in generating the capital costs included:

• **Barns & Associated Equipment** - The standard current cost that was discounted to the appropriate age life was estimated based on the size of the operation. We split the surveys into the three categories described above (6,000 to 7,5000 annualized quota, 7,500 to 15,000 annualized quota and >15,000 annualized quota). Based on the surveyed data, we determined the averaged annualized flock size for each of the three groups (Table 4). Based on the annualized flock sizes, we estimated the build costs (Table 5).

Table 4: Weighted Average Annualized Flock Sizes

Operation Size Category (Annualized Quota)[3]	Weighted Average Birds Placed Per Year
6,000 to 7,500	6,000
7,500 to 15,000	11,732
>15,000	25,039

Table 5: Build Costs by Operation Size

Operation Size Category (Annualized Quota)	Pullet Barn ($/ft^2)		Lay Barn ($/ft^2)	
	Barn	Equipment	Barn	Equipment
6,000 to 7,500	$48.17	$9.10	$44.18	$33.58
7,500 to 15,000	$44.18	$9.10	$42.01	$33.58
>15,000	$39.74	$9.10	$39.74	$33.58

The Douglas Cost Guide was used to determine build costs. Information from Marshall Swift was then used to adjust current cost to the effective cost given the aged life of the barn. Barns were depreciated over 40 years. A standard equipment cost of $33.58 per square foot was used for associated equipment including computer automation, generators, feed bins, and electrical and mechanical equipment in the lay barns. In the pullet barns equipment costs were fixed at $9.10 per square foot. Associated equipment was depreciated over 15 years for 75% of it and 5 years for 25% of it. For the spiker barns, costs were fixed at $52.12 per square foot for barns and $15.05 per square foot for equipment. Seven of the producers sampled had spiker barns.

The costs identified above were increased by $3 per square foot for facilities with automatic egg collection – a corresponding reduction in labour associated with egg collection was also considered.

• **Other Buildings** included manure storage facilities, machine sheds, tool sheds, other small storage buildings, and office space. Unlike the main barns, accounting records were used to capture the cost of these buildings. Care was taken to ensure that they were specific to the production of breeders. Capital costs as reported for other buildings were depreciated over 40 years.

[3] Quota size categories are based on the total quota, which is over a two-year period. The annualized quota is based on one year.

• **Tractors and Vehicles** included all motorized equipment, bobcats, trucks and other vehicles used in the poultry enterprise. These elements were itemized and then their market value was estimated by looking at recent sales reported in western Canada at auctions. These estimates of market value were depreciated over 10 years. A breakdown of the total motorized equipment estimates used for the calculations can be found in the Appendix.

• **Other Equipment** costs included manure spreaders, sawdust blowers, incinerators, pressure washers, and other equipment. The capital costs reported for other equipment were depreciated over 5 years.

• **Trucks/Automobiles** were normalized to account for a single farm vehicle with an estimated market value of $32,000. We determined the cost for a 3-year-old 4x4 and allocated this rather than using the actual farm vehicle reported by producers.

• **Taxes** were the weighted averages based on the annual property taxes reported by the survey participants and were adjusted to reflect actual production cycle length.

• **Return on Equity –** the discussion above relates how the value of physical assets was determined. The next step was to establish an appropriate return on equity. Considerations for capital items and the return on invested capital (ROI) are a critical part of the Study and resulting COP. While determining the ROI is not without its challenges, the Canadian court system and the valuation community in Canada have been very clear on the starting point in relation to calculating costs of production.

A number of Court Decisions on this issue have been summarized in *The Valuation & Pricing of Privately Held Business Interests* by Ian R. Campbell/Robert B. Low/Nora Murrant and Canadian Valuation Services, The Student Edition 2015, where costs are clearly defined to be:

- "the total sum of money needed to produce a particular quantity of output"; and,
- "Production Costs are the costs which should be essentially received by resource owners so as to presume that they will continue to supply them in a specific period of time"; and finally,
- They are defined to "signify the money costs which are to be incurred for acquisition of the factors of production."

These examples clearly indicate the basic valuation principle that money has value regardless who provides it, and ultimately that producers should not be penalized because they have invested capital into breeder production. This principle extends to both the costs incurred and the necessary return required in order to convince the producer to continue to cover them.

The following section outlines and discusses three key components necessary when determining what the ROI is composed of and how it is measured:

1. **Types of Capital** – in this case operating, land, as well as buildings and equipment. Each of these is defined and the implications of that definition are explained.
2. **Cost and allocation of Equity and Debt** – in this section we identify how the cost of equity and debt are calculated and how they are combined using a weighted average cost of capital (WACC) to get an effective return on investment figure that is applied to buildings and equipment.
3. **Valuing the relevant capital items** – in this section we outline how the assets were valued.

In accordance with the basic principles of this study, it is important that the capital differentiates between three

main groups of assets reflecting all aspects of producer investment including:

- Buildings and Equipment (B&E) – barns and other buildings plus equipment. It is a long-term investment: its value depreciates with time and it is important to consider operating reality.
- Operating capital – pullets, feed inventory, accounts payable for labour etc. Short-term, typically financed with a Line of Credit.
- Land - Long-term, its value typically appreciates with time, farmland has a lower risk than other farm asset classes.

As a result, we developed three different methods for calculating and updating ROI for each of the asset classes that are discussed below.

Category 1: Operating Capital

The final formula for the cost of operating capital for the Conventional and Enriched COP Study, as follows:

(Feed cost/52 + Skilled Labour/52 + Pullet costs/2) * (Prime + 2%)

The approach to determining the cost of operating capital was based on the principle that money has value regardless who spends it and where it comes from. The key with determining the appropriate cost, is to find a substantively equivalent source of capital

Serecon contacted resources across Canada to assess the cost of operating capital. It is important to state that these costs:

- Are rarely posted publicly, and when done so it is only a starting point for the negotiation with producers; and
- Are almost all secured in some way either through having a mortgage and/or other business with the institution or having some form of General Security Agreement (GSA) in place.

When approaching the financial institutions, we requested information on what an established farm operation with a medium risk profile would be charged for an operating line of credit (LOC) used to pay for pullets, feed, and skilled labour. As expected, results varied across institutions. On the other hand, contacts were able to narrow the range as they determined what the line would be used for and engaged in further discussion with Serecon.

The contacts from the four institutions all had significant involvement in agricultural lending portfolios and represented:

- The Royal Bank of Canada (RBC);
- The Bank of Montreal (BMO);
- The Toronto Dominion Bank; and,
- Alberta Treasury Branches.

All four respondents provided input that fell within a range of between Prime + 0.5% to Prime +3%. The most frequently quoted price in the discussion was between Prime + 1.5% and Prime +2.5%. This would appear to be a reasonable range given the fact that consideration for quota and land needs to be removed from the COP process. Producers typically sign a General Security Agreement with the lending institution which is not as secure for the bank as a loan backed by specific assets, which is one of the reasons LOC rates are higher than those for mortgage.

It is obvious that different farms would have access to different costs of capital. As part of this process, it is important to consider what a typical farm would pay for its operating line.

After careful consideration, it is our opinion that the figures provided by the four commercial financial institutions that are involved in providing conventional lines of credit should be the basis for the development of the ROI on the LOC. We would not use the information provided by FCC since they are not typically involved in providing lending and LOC outside of land-based financing. This approach would provide the strongest and most defendable substantive equivalent calculation for incorporation in the COP.

Given the work completed, it is our opinion that the most appropriate cost of operating capital would be Prime + 2% which is the mid-point between the low and the high figures most frequently cited by the contacts. While some producers who are deemed to have a lower risk would be able to obtain capital on the lower end of this, there would be others who would be forced to pay the higher cost due to perceived risk to the financial institution. As a result, the mid-point is the most defendable and realistic figure to be used in the context of the

Category 2: Land

The return on land uses the following approach:

1) Determine the land required based on the acres / layers ratio as per what was agreed to in the Alberta COP development since it was agreed to in the development by all stakeholders in the pricing process and has been tested in the hearings with the Farm Products Council;
2) Calculate a current market value for the lower mainland in BC (FCC reports). This value is then adjusted to estimate what that price would have been 20 years ago to be consistent with the treatment of other long-term assets;
3) A Rental Rate of 1% is used to calculate the Annual Cost.

There is an obvious difference with the appropriate opportunity cost of land compared to other asset classes because it is not equivalent in terms of its risk attributes: land is not a depreciating asset, and it represents a lower risk to producers than their other operating and capital expenditures. The reality is that land will retain its market value regardless of the poultry operation. It does not have to be replaced and while there are some maintenance issues, most of those would be expensed vs. capitalized.

Given these facts, a reasonable person may expect that the ROI applied to land assets should be lower than that for other asset classes. On the other hand, this assumes that land is valued accurately. In our opinion, based on analysis conducted for numerous clients and as part of appraisal work done across Canada over the past 25 years, rental rates for land are directly correlated to land values since typical land purchase decisions are based on the rental cost of land in the area. In addition, Serecon also conducted a correlation between available values and rental rates to validate this assumption. While the data was from appraisal client's information and therefore cannot be presented, it confirmed the relative rental rates assumed for this project.

The average cost of land ownership was also included in calculating the investment costs. While producers reported a very wide range of land values and acres required for their operations, we have followed the sizes as agreed to from the Alberta study which were consistent with how you have be dealing with it in previous studies as well:

- 10 acres of land was used for operations with 6,000 to 7,500 annualized quota;
- 20 acres of land for operations with between 7,500 to 15,000 annualized quota, and
- 30 acres of land was used for producers with more than 15,000 annualized quota.

The value of land was based on our assessment of the value of AGRICULTURAL land in various regions of production. Our contacts suggested that the weighted average current market value was $86,000/acre. As per the discussion above this figure needs to be adjusted to reflect this value in 2000 (20 years ago) and then used to estimate the appropriate rental rate.

Category 3: Buildings & Equipment

The ROE for this category has undergone a significant adjustment in terms of how it is calculated so that it is more robust and transparent. As a result, the calculation now must consider the debt equity ratio, the actual return on both equity and debt along with several additional factors as outlined below.

To summarize, the return on buildings and equipment uses the following approach:

1) Return on Equity: The return on equity will be based on a capital asset pricing model (CAPM).
2) Return on Debt: the cost of borrowing will be established as Prime +
3) Debt/Equity ratio: The final ROI for B&E will be calculated using the weighted average cost of capital (WACC) with:
    a. 10:90 debt to equity ratio (which excludes land and quota)

The final formula for the return on building and equipment for the COP Study is:

ROE = [Cost of Equity x 90%] + [Cost of Debt x 10%]
Cost of Debt = Prime + 1.06%
Cost of Equity = Risk-Free Rate + Beta of Security (Expected Market Return – Risk Free Rate)

The approach follows equity market (entrepreneurs and investors) rather than creditors market (Prime +), which is less volatile. On the other hand, it provides much higher level of clarity, logic transparency and objectivity in its calculation.

As mentioned in the beginning, the Cost of Equity component reflects the combination of risks associated with entrepreneurship in egg farming. We present below the overview and effect of the various elements along with their historical values. We will then discuss each component in detail.

We used the Capital Asset Pricing Model (CAPM) presented as a "Building Blocks" method for a structured approach to find the B&E ROI required:

$$\boldsymbol{CAPM = rf + \beta(rm - rf)}$$

$$\boldsymbol{rf = risk\ free\ rate\ of\ return}$$
$$\boldsymbol{\beta = Beta\ of\ Security}$$
$$\boldsymbol{rm = expected\ market\ return}$$

Long-term risk-free rate

Represents the Bank of Canada bonds with over 10 years to maturity, which reflects the investment horizon faced by producers in making barn and equipment spending decisions. Current Benchmark Bond Yields for 10-year bonds from the Bank of Canada are 1.25%.[4]

[4] Bond yields updated December 11, 2020.

Implied Equity Premium

Investors need to be compensated for undertaken risk that is commonly represented by the required return more than the risk-free rate. Since there is a chance that an investor may lose money on an investment (risk of default), there needs to be significant enough incentive for an investor to be willing to take on the risk.

The general risk premium is an indicator of a society's tolerance towards risk at any given point in time. It increases as economic outlook becomes better and decreases during the beginning of a slowdown. In theory, the general risk premium should encompass all kinds of investments including real estate, commercial debt, equity and other instruments. In practice, this premium is almost always calculated based on S&P 500 as the most liquid, well known and controlled index-type equity instrument. Many investors would argue that it is the best available practical alternative since it represents geared equity in a lot of industries.

We recommended to calculate general risk premium based on S&P 500 as well since the Canadian inflation and long-term risk-free growth is accounted for in Bank of Canada's securities. The high liquidity of CAD, easiness and openness to investments in the USA are enough to assume the same level of risk tolerance.

There are several ways in calculating the general risk premium, including historical values, implied return models (also called dividend models), cross-industry regressions (like the one we have described in the CAPM model), expert surveys and others. The range of expectations usually varies within the 3.5-8.5% corridor. We used one of the implied return models that has both a sound underlying set of assumptions and has exhibited better predictability in the past. An implied return Calculation of a general risk premium may by complicated, we therefore used the model developed by the New York University[5] that reported **5.23%** as an Implied Equity Risk Premium for 2020. We expect the probable outcomes to be within the 4% to 6.5% range in the future.

The overall market risk for larger businesses traded on a stock exchange, an average return an investor should expect can then be calculated by adding the long-term risk-free rate to the Implied Equity Risk Premium: **1.25% + 5.23% = 6.48%.**

Small Size Premium

This block reflects the fact that smaller entities such as farms are less diversified and therefore bear a higher systematic risk compared to larger firms that form the general Implied Equity Risk Premium in practical calculations.

We used the small size premium calculated and reported publicly by the Tuck School of Business, which reported **4.44%.**[6]

Expected Market Return

Together, the overall average market risk (*rm*) for the year 2020 for smaller businesses may be found by adding the risk-free rate, implied equity premium and small size premium:

$$\boldsymbol{Expected\ Market\ Return\ (rm) = 10.92\%_{rm} = 1.25\%_{rf} + 5.23\%_{Implied\ Equity\ Premium} + 4.44\%_{Small\ Size\ Premium}}$$

The Beta of Security

[5] Country Default Spreads and risk Premiums update July 1, 2020 (New York University).
[6] Current Research Returns from Kenneth R. French, Tuck School of Business.

A **Beta** is an industry adjustment to the overall market risk level. Some industries tend to be more volatile and therefore are considered riskier than other. A beta of 1 represents an average market risk while 0.9 suggests that the industry is less risky than average.

We used a 5-year moving average unlevered beta that is a midpoint between Farming/Agriculture of **0.61** and regulated Water Utilities of **0.45**.[7] It is a common practice in valuation field to use 3- or 5-year moving averages in applying comparable level of risks due to the fact that other industries taken as comparable may experience significant outstanding events in any given year.

As an example, we could use the unlevered beta for Farming/Agriculture of **0.61**. This could be used to calculate what ROI for a farming operation in a non-regulated environment using the CAPM model:

$$\boldsymbol{CAPM = rf + \beta\,(rm - rf)}$$

$$\boldsymbol{7.15\% = 1.25\%_{rf} + 0.61_{\beta}\, x\, \left(10.92\%_{rm} - 1.25\%_{rf}\right)}$$

However, this may over represent the risk associated with a regulated agricultural sector like broiler hatching egg producers. At the same time, it is important to point out that while there is limited price risk in the supply managed industry, producers do have significant production risk given they are working with the issues associated with animal husbandry and the management of a biological system. This is totally consistent with the precedence for regulated utilities and other regulated areas where the oversight body has been clear that there are risks even when pricing is set. As a result, the precedential evidence clearly indicates that risk does exist for regulated industries. More importantly, given the fact that there is probably more risk with biological systems vs engineered systems, one could make an argument that egg production would be riskier than that of the regulated utilities (such as Water Utilities). This reality needs to be considered in the development and application of the CAPM.

As a result, we adopted an element of regulated Water Utilities as a comparable industry for breeder farms because of the close level of regulations and some similar risks associated with biological systems. Still, we believe that breeders have slightly higher production risks than water utilities, therefore, we decided to use a midpoint between Water Utilities and Farming Agriculture.

$$\boldsymbol{Midpoint\ unlevered\ beta = \ 0.53 = \frac{0.61_{Farming} + 0.45_{Utilities}}{2}}$$

The midpoint unlevered beta of 0.53 is used to calculate the expected return for a broiler hatching egg operation in a regulated environment using the CAPM model:

$$\boldsymbol{6.38\% = 1.25\%_{rf} + 0.53_{\beta}\, x\, \left(10.92\%_{rm} - 1.25\%_{rf}\right)}$$

Summary

When all this is considered the process of generating a reasonable return on equity involves the following for Category 3 assets (building and equipment): The Bank of Canada long-term rate on its

[7] Unlevered Betas are obtained from New York University Stern School of Business. Betas are available by Sector for the United States. We have taken U.S. unlevered betas for farming/agriculture and water utilities as measures the market risk of broiler hatching egg operations in British Columbia. While obtaining unlevered betas specific to BC's poultry industry would be preferrable, there are no readily available unlevered betas at this time.

bonds with over 10 years of maturity (1.25%), the general market risk (5.23%), and the small-size premium (4.44%), which brought the combined rate for smaller enterprises to 10.92%. The midpoint volatility between the Farming/Agriculture and regulated Water utilities industries used in the CAPM model was 0.53. Working this data into the CAPM formula above produces 6.38%. Current Bank of Canada Prime Rate is 2.45%. Cost of Debt in the calculation is Prime + 1.06%, equaling 3.51%.

The final building block is determining the weighted average cost of capital, which has been carefully considered for this work. Statistics Canada indicates that all BC farms are carrying around 17% debt.[8] While this may reflect farming operations in general, we do not feel it is reflective of the poultry sector. Portfolio data from Farm Credit Canada (FCC) reveals that the median debt-to-equity ratio is about 1.1 for poultry operations.[9] This ratio is more in line with our experience in the sector. We have applied this normalized leverage ratio for broiler hatching egg producers in BC:

ROE = [Cost of Equity x 90%] + [Cost of Debt x 10%]

$$6.09\%_{ROE} = \left(6.38\%_{Cost\ of\ Equity}\ x\ 90\%\right) + \left(3.51\%_{Cost\ of\ Debt}\ x\ 10\%\right)$$

The ROE for Buildings and Equipment has been calculated in a robust and transparent manner using the methodology described above. The calculation has considered the debt equity ratio, the actual return on both equity and debt along with several additional factors outlined above. The final ROI for Building and Equipment has been calculated using the weighted average cost of capital (WACC) of 6.09%.

Results

Breeder Demographics and Production

Table 6 shows the comparison of breeder demographics and production. In comparison with the previous sampling taken to produce A-166, the weighted average annualized quota size is smaller. This is driven by the larger stratified sampling of producers used for the 2020 survey, which provides a more even distribution across producer size categories.[10] The Sampling section provides more detail on this process. The average quota females placed per cycle from the 2020 survey is 8,758 birds, compared with 9,503 in A-166. However, the key indicators of productivity below are saleable eggs per hen, percent hatchability and saleable chicks per hen. A-166 is based off average length of production of 59.4 weeks, whereas the weighted average length of production cycle from the survey in 2020 is 56.1 weeks. A-166 is reflective of an additional 3.3 weeks of production. Total barn space/quota bird placed is in line with the requirements of 1.6ft^2/pullet and 1.8ft^2/breeder.

[8] Sourced from the Balance sheet of the agricultural sector as at December 31st (Statistics Canada).
[9] Article: "Balance sheet of agriculture - debt increased faster than equity in 2019" (FCC).
[10] A-166 is based on a sample of 14 producers with a weighted average of 32,821 annualized quota. The sampling for A-166 included more weighting from larger operations. The 2020 survey results are based on a sample of 27 producers with a weighted average annualized quota of 24,442. The weighted average has come down because the 2020 sampling is more evenly distributed across the three size categories, whereas A-166 had a larger weighting given to larger producer size categories. For example, the largest producer in A-166 accounted for nearly 20% of the total weighting, whereas in the 2020 survey the same producer accounts for closer to 10%. The same effect is present with the average quota females placed per cycle.

Table 6: Comparison of Breeder Demographics and Production

Key Production Elements	2020	A-166
Weighted Average Annual Quota	24,442	32,821
Average Quota Females Placed per Cycle	8,758	9,503
Production as a % of Quota	105.3%	96.1%
Age at Transfer to Layer Barn (Weeks)	18.5	18.6
Length of Production Cycle (Weeks)	56.1	59.4
Female Mortality (Life of Flock)	3.74%	2.14%
Saleable Eggs per Hen	133.5	142.7
% Hatchability	82.7%	80.6%
Saleable Chicks Per Hen	110.4	115.1
Pullet Barn Space/Quota Bird (Ft^2/bird)	1.65	N/A
Lay Barn Space/Quota Bird (Ft^2/bird)	1.95	N/A

Note: Pullet Barn Space and Lay Barn Space for A-166 are industry standards, not reflective of a previous COP survey.

Breeder Results

Table 7 below provides the breeder results ($/hen & $/chick) from the 2020 survey and compares them to A-166. Before factoring in spent hen revenue and salvage egg revenue, the Total Cost of Production in 2020 is $71.34/hen compared with A-166 at $70.82/hen. This works out to a $0.52/hen difference. Once spent hen revenue and salvage egg revenue are accounted for the total COP is $70.44/hen in 2020, compared to $69.44/hen in A-166. This is a $1.00/hen increase in the 2020 COP compared with A-166.

Regarding cost of production in a $/dozen saleable egg format, the difference is $0.17/dozen. As Table 6 above shows, there are differences in the saleable eggs per hen due to the different production cycle lengths. Using 133.5 saleable eggs per hen for 2020 and 142.7 saleable eggs per hen for A-166, we get $6.33/dozen for the 2020 COP and $6.50/dozen for A-166.

Operating Costs for 2020 are $49.22/hen, which is a $1.92/hen increase on A-166 ($47.30/hen). This is driven primarily by the cost of raising pullets. Pullet costs are driven primarily by chick prices, feed, and vaccination costs. Labour Costs in the 2020 COP are $8.95/hen or $0.80/dozen saleable eggs. It is important to recognize that the labour costs in Table 7 show only the labour costs for raising breeders. The labour costs for raising pullets are included in the weighted average $/hen cost of pullets ($28.44/hen). While there has been a shift in the breakdown of labour costs when compared with A-166, total labour costs are within $0.40/hen. The shift in the breakdown of labour costs can be attributed to the methodology that has been adopted to model labour, which breaks down each phase involved in raising pullets and lay birds as well as the unallocated labour elements. A full breakdown of labour can be found in the Appendix. We have applied the most recent hourly labour rates for farm labour in British Columbia to 2020 COP.

Overall capital costs in the 2020 COP are $13.17/hen, down from $14.17/hen in A-166. We have explained in detail in the previous section (Capital Costs) how we have dealt with capital costs in the survey. For depreciation and amortization of buildings and equipment we have used a weighted average cost of capital of 6.09%. This has been used to calculate ROE on buildings and equipment. Our approach to dealing with operating capital and land have also been explained in detail throughout the previous sections.

The changes in the ROE from $6.44/hen in A-166 to $4.91/hen in the 2020 COP are a direct result to two main adjustments: (1) a much more robust calculation of the weighted average cost of capital including a revision in the benchmark risk free rate (vs the A-Period adjustments) and (2) a more reflective barn space allocation approach and cost to build.

ROE is calculated using the weighted average cost of capital (WACC) of 6.09% as indicated in the previous section and is much more robust than the more simplistic approach of adding a risk element to the risk-free rate. One of the key factors in the weighted average cost of capital are Bank of Canada's long-term rates of 1.25%, which has contributed to the overall drop in the return on equity for hatching egg producers in BC.

In addition, we added 3 size categories to the building cost estimate calculation. As a result, the cost to build more accurately reflects what a reasonable person would expect to pay for the necessary barn space. As a result, this approach includes gains to scale that were not considered in the previous approach. This adds significant validity to the calculation of physical asset cost in our opinion.

Another noticeable shift comes in the spent hen revenue when comparing the 2020 survey results to A-166. The decrease in payment from $0.40/kg to $0.20/kg has led to a drop in spent hen revenue. The spent hen revenue and salvage egg revenue are subtracted from the Total Cost of Production.

Overall, the $70.44/hen result from the 2020 COP presented in Table 7 is based on data from stratified sampling of 27 producers (58% of total production in BC). The results have a 95% level of confidence with a 2.6% margin of error. This margin of error means that the calculated COP will be within 2.6% percentage points of the real population value 95% of the time.

Table 7: Breeder Results ($/hen & $/chick) From 2020 vs. A-166

Cost of Production - $ per Hen	2020	A-166	Diff ($/Hen)	Diff ($/Chick)
A) Operating Costs				
Pullets	$28.44	$26.31	$2.13	$0.019
Feed	$15.82	$16.08	($0.25)	($0.002)
Veterinary & Medicines	$0.10	$0.11	($0.01)	($0.000)
Utilities	$1.15	$1.33	($0.18)	($0.002)
Vehicle & Equipment Operation (Fuel & Oil)	$0.26	$0.31	($0.05)	($0.000)
Repairs & Maintenance	$1.29	$1.27	$0.01	$0.000
Bedding	$0.13	$0.12	$0.01	$0.000
Administrative & Office Costs	$0.84	$0.47	$0.36	$0.003
Insurance	$0.62	$0.66	($0.04)	($0.000)
Custom Charges	$0.57	$0.62	($0.05)	($0.000)
Operating Costs ($/hen)	**$49.22**	**$47.30**	**$1.92**	**$0.017**
B) Labour				
Full-Time Hired Labour	$6.92	$4.43	$2.48	$0.022
Owner/Manager Labour	$2.04	$4.92	($2.88)	($0.026)
Labour Costs ($/hen)	**$8.95**	**$9.35**	**($0.40)**	**($0.004)**
C) Capital Costs				
Depreciation & Amortization	$6.90	$7.04	($0.15)	($0.001)
ROE	$4.90	$6.44	($1.55)	($0.014)
Operating Interest	$0.87	$0.45	$0.42	$0.004
Taxes	$0.50	$0.23	$0.27	$0.002
Capital Costs ($/hen)	**$13.17**	**$14.17**	**($1.00)**	**($0.009)**
Total Cost of Production ($/hen)	**$71.34**	**$70.82**	**$0.52**	**$0.005**
Less:				
Salvage Egg Revenue	**$0.181**	**$0.179**	**$0.002**	**$0.000**
Spent Hen Revenue	**$0.720**	**$1.202**	**($0.482)**	**($0.004)**
Cost of Production ($/hen)	**$70.44**	**$69.44**	**$1.00**	**$0.009**

Appendix

Labour Cost Identification by Activity

Activity-based labour application was separated into pullet production, lay production and general activity. The following breakdown provides a description of the hours of labour used in the labour model to determine labour costs in the COP. Each section is broken up into daily activities and periodic activities as well as specific one-off tasks such as "ten-week vaccination".

Cost Identification by Activity	
Labour – Grow Operation	
Brooding	
Daily Activities	Refill feeder flats
	Clean & Refill Supplemental Drinkers
	Monitor Birds eating/drinking/crop fill and the environment (heating & Vent)
	Gradually remove Feeder Flats/Drinkers & operationalize regular feeders
One Time Activity	At 14 days disassemble & remove Brooding Pen
Total Brooding Labour: 65	
Two to 8 Weeks	
Daily Activities	determine feed amount (evaluate uniformity weight gains and targets etc.)
	raise feed lines & dump debris from pans
	Prep feed for next day - ensure equal distribution of feed at all hoppers
	Check water system (filters and line pressure) - flush lines, adjust water line and feedline height as required, Monitor birds & environment (heating ventilating), cull birds. maintain records
Periodic Activity	At 14 days disassemble & remove Brooding Pen
Total – 2 to 8 weeks Labour: 132	
Nine to 20 Weeks	
Daily Activities	determine feed amount (evaluate uniformity weight gains and targets etc.)
	Prep feed for next day - ensure equal fill distribution of feed at all hoppers
	Check water system (filters and line pressure) - flush lines, adjust water line and feedline height as required, Monitor birds & environment (heating ventilating), cull birds. maintain records
One Time Activity	At 14 days disassemble & remove Brooding Pen
Total Nine to 20 Weeks: 174	
Water Vaccinations	
Periodic Activity	Vaccination Prep (day before a vaccination) - Switch water source to non chlorinated - flush lines - shut off water 2 hours before end of day – fill batching tank
	Vaccinations - determine /select vaccines required - premix then blend into batching tank - lower water lines - flush vaccine into lines
Total – Water Vaccinations; 11	
Subcutaneous Vaccination	
Ten Week Vacc.	Wash & disinfect catching gates - raise all feed and water lines, push birds, set up catching gates
	Labour to Vaccinate - (2 people) NB does not include contract labour
	Reassemble and operationalize water & Feeding Equipment

Total – Ten Week Vaccination: 11	
Cockerel Transfer & Vaccinations	
Transfer at 18 wks.	Wash & disinfect catching gates - raise all feed and water lines, push birds, set up catching gates
	Labour to catch, vaccinate & transfer Males to lay house (3 people). NB - does not include contract labour
Total – Male Transfer: 8	
Pullet Transfer & Vaccination	
Transfer at 20 wks.	Wash & disinfect catching gates - raise all feed and water lines, push birds, set up catching gates
	Labour to catch, vaccinate & transfer pullets to lay house (3 people). NB - does not include contract labour or second skid steer operator
Total – Pullet Transfer: 15.5	
Pullet Barn Cleanout	
Pullet Barn Cleanout	Blow down dust - clean furnaces - remove blackout units
	Hot water wash - building interior and equipment
	Remove and stockpile manure
	Soap and wash building interior and equipment
	Scrape down/sweep floor
	Complete disinfect
	Apply pesticide for beetle control (debantic)
Total for Pullet Barn Cleanout: 35	
Cockerel Barn Cleanout	
Cockerel Barn Cleanout	Blow down dust - clean furnaces - remove blackout units
	Hot water wash - building interior and equipment
	Remove and stockpile manure
	Soap and wash building interior and equipment
	Scrape down/sweep floor
	Complete disinfect
	Apply pesticide for beetle control (debantic)
Total for Cockerel Barn Cleanout: 10	
Pullet Barn Set-up	
Pullet Barn Set-up	Wash and reinstall Blackouts
	Place, level and compact shavings, reseal and insulate back door
	Disinfect and flush water lines & batching tank, lower and level water lines
	Prepare vitamins & 4-way acid pack in batching tank, preheat water
	Set up brooding pen walls
	Wash and disinfect supplemental drinkers
	Assemble, place and fill feeder flats and supplemental drinkers
Total for Cockerel Barn Cleanout: 16	
Cockerel Barn Set-up	
Cockerel Barn Set-up	Wash and reinstall Blackouts
	Place, level and compact shavings, reseal and insulate back door
	Disinfect and flush water lines, lower and level water lines
	Set up brooding pen walls
	assemble, place and fill feeder flats and supplemental drinkers

Total for Cockerel Barn Cleanout: 4.5	
Flock Placement	
Flock Placement	Check/monitor floor temp consistency, relative humidity (RH), air movement
	Water down litter outside of brooding pen to raise RH as required
	Unload & place chicks, remove chick pads, stack, and reload chick trays
Total for Flock Placement: 4	
Totals for Pullet Operation **Total per Flock Labour during Grow: 485** **General Labour: 372.8** **Management: 112**	
Labour – Lay Operation	
From Transfer to 24 Weeks	
Feeding -1st 3 days	Manually run feeders, push birds up on slats (2 hours per day)
Hand weighing Birds	Both males and females each week
Culling/Monitoring	Walk Barn, cull small, injured, underdeveloped and birds with abnormalities, inspect and flesh male condition
Nest Set-up	Lower nests, install nest passageways install belts, service/adjust egg table
Monitor/measure/manage	Daily - record flock data (body weight, uniformity, fleshing, water consumption etc.), decide on feed increases to achieve target weights and optimal male/female synchronization & determine when to photostimulate
Total for Transfer to 24 Weeks: 61	
25 Weeks to Peak Production (approximately 30 weeks)	
Monitor/Measure/Manage	Daily – record flock data (body weight, uniformity, fleshing, water consumption, feed clean-up time, egg production, egg weights, percent double yolks, etc.), decide/adjust feeder run times and feed increase to optimize egg production and achieve body weight and fleshing.
	Four times daily – walk barns (scratch and slat areas) and pick-up floor egg
	Weekly – Hand weight and flesh males – cull all glossy over/under weight
Remove/Transfer/Spike Males	Daily starting at week 25 and through week 27, select and weigh heavier males - if properly fleshed and sexually mature - transfer to older flock – approx. 5 males daily
Egg Collection	Week 25 & 26 - run egg collection system 3 times daily (2 persons) – sort smalls and double yolks and discard to manure storage area Week 27 through 30 - run egg collection system 5 times daily (2 persons), - sort smalls and double yolks and discard to manure storage area
Feed and Water Systems	Monitor and adjust water line pressure and height - administer vitamins monthly, flush lines, monitor bird eating activity and adjust feeder height as males and females mature
End of Day Shutdown	Spread 2 pales of scratch feed in litter, inspect nest pads & clean as required, close nests
Total for 25 Weeks to Peak Production: 256.65	
31 weeks to 45 Weeks	
Monitor/Measure/Manage	Daily - record flock data (body weight, uniformity, fleshing, water consumption, feed clean-up time , egg production, egg weights, percent double yolks etc.), manage feed allocation to optimize egg production & achieve target Body weight and male fleshing
	Three times daily – walk barns (scratch and slat areas) and pick-up floor egg
Egg Collection	Run Egg collection system 5 times daily (2 persons)

Feed and Water Systems	Monitor and adjust water line pressure - administer vitamins monthly, flush lines, monitor bird eating and drinking activity
End of Day Shutdown	Spread 2 pales of scratch feed in litter, inspect nest pads & clean as required, close nests
	Remove cull eggs to manure storage area, clean and sanitize egg pails
Total for 31 to 45 weeks: 480.5	
46 to 51 Weeks	
Monitor/Measure/Manage	Daily - record flock data (body weight, uniformity, fleshing, water consumption, feed clean-up time , egg production, egg weights, percent double yolks etc.), manage feed allocation to optimize egg production & achieve target Body weight and male fleshing
	Three times daily – walk barns (scratch and slat areas) and pick-up floor egg
Egg Collection	Run Egg collection system 4 times daily (2 persons)
Feed and Water Systems	Monitor and adjust water line pressure - administer vitamins monthly, flush lines, monitor bird eating and drinking activity
End of Day Shutdown	Spread 2 pales of scratch feed in litter, inspect nest pads & clean as required, close nests
	Remove cull eggs to manure storage area, clean and sanitize egg pails
Total for 46 to 51 weeks: 213.5	
52 to 60 weeks	
Monitor/Measure/Manage	Daily - record flock data (body weight, uniformity, fleshing, water consumption, feed clean-up time , egg production, egg weights, percent double yolks etc.), manage feed allocation to optimize egg production & achieve target Body weight and male fleshing
	Three times daily – walk barns (scratch and slat areas) and pick-up floor egg
Egg Collection	Run Egg collection system 4 times daily (2 persons)
Feed and Water Systems	Monitor and adjust water line pressure - administer vitamins monthly, flush lines, monitor bird eating and drinking activity
End of Day Shutdown	Spread 2 pales of scratch feed in litter, inspect nest pads & clean as required, close nests
	Remove cull eggs to manure storage area, clean and sanitize egg pails
Total for 52 weeks to 60 weeks: 337	
Flock Shipout	
	Disassemble and remove feed hopper bags, raise all feed lines, remove egg belts and connecting egg belt passageways, raise nests, raise water lines, push birds to the back of the barn and set up catching gates
	Set up change area for catchers in Service hallway, clean-up and disinfect area upon completion of ship out
	Supervise/Monitor/Assist Catching Crew - Periodically push up birds
Total for Flock Shipout: 12	
Layer Barn Cleanout	
	Blow down dust - clean furnaces - remove blackout units
	Hot water wash - building interior and equipment including nests and nest bottoms
	Supervise/Monitor/Assist Catching Crew - Periodically push up birds
	Remove slats and trusses
	Remove and stockpile manure
	Soap and wash building interior and all equipment
	Wash slats and trusses
	Reinstall slat and trusses

	Wash and reinstall blackouts
	Complete disinfect including walls floors and equipment
	Spray walls, slats, and floors with (pesticide) debantic
	Install and compact shavings
	Disinfect and flush watering system and lines
Total for Layer Barn Cleanout: 79.5	

Totals for Lay Operation
Total per Flock Labour during Lay: 1140
General Lay: 1276
Management Lay: 163.75

Non-Flock Specific tasks that Relate to the Ongoing Operation of the Lay Facility

Water Treatment System	Monitor Water Quality, weekly - test chlorine and water PH, adjust injectors as required, replenish Chlorine & acetic acid as required
Egg Loading	Assist Loading Eggs
Service Egg Packer	Clean & Lubricate Packer components as per Manufacturer
Cleaning/Sanitization	Sweep Service Area Floors Daily
	Clean/Sanitize Egg Collection Tables Daily
	Wash/Disinfect Egg conveyors and floors Monthly
OFFSP Activity Re lay Op	Inspect and replenish mouse bait stations (4 Lay barns)
	Maintain OFFSAP records, Review and adjust SOPs, complete audits as required
Total Non-Flock for Lay Facility: 350	

Non-Flock Specific tasks that Relate to the Ongoing Operation of the Grow Facility

Water Treatment System	Monitor Water Quality, weekly - test chlorine and water PH, adjust injectors as required, replenish Chlorine & acetic acid as required
Cleaning/Sanitization	Sweep/Clean/Disinfect Barn Service Area
OFFSP Activity Re lay Op	Inspect and replenish mouse bait stations (4 Lay barns)
	Maintain OFFSAP records, Review and adjust SOPs, complete audits as required
Total Non-Flock for Grow Facility: 207.9	

Service/Maintenance/Administration Tasks Relating to Overall Farm Operations

Clearing/Removal of Snow	Clear Roads as per Hatchery and Feed Company Requirements - Eggs are picked up twice per week, two loads of feed delivered per week NB - the labour varies from winter to winter - The hours indicated are based on winter conditions over the past 3 years
Maintaining Road Systems	Grade and Maintain Roads
Maintain Clear Zone	Maintain/Cut Grass around barns
	Spray Herbicide for weed control
	Maintain/Replenish/Grade gravel strip around perimeter of all barns
Building & Equipment R&M	Maintain/Service/Repair all farm equipment including skid steers, two stand-by generators, mowers. trimmers, sprayers etc.& maintain logs
	Maintain/Service/Repair/ Replace production related equipment including feeding & nesting systems, furnaces, fans, lighting, water supply and treatment & electronic controls
	Maintain all farm Buildings including eavestroughs, soffits, facia, siding, insulation, and electrical systems. NB - In recent years our insurance company has completed several inspections of the electrical (Panels and Wiring) in our barns. In each case they have identified concerns, most of which have/will require substantial corrective actions

Administration	Banking, paying bills, filing, payroll, Tax Prep, Telephone and email correspondence with suppliers, hatchery Processor, AHEP board, Veterinarian, nutritionist, Aviagen Breeder Tech
	Order Feed

Totals for Non-Flock Specific Tasks

Total Tasks Related to Overall Farm Operations: 478
Total Annual Non-Flock Specific Labour: 1036
Management: 400.8

Totals for Pullet, Lay and Non-Flock Specific Tasks

Total Hours (Lay + Pullet + Non-Flock Specific): 2960
Total Management Hours: 676.60
Total General Labour Hours: 2283.60

Capital Cost of Other Equipment

Based on consultation with producers during the data collection for the 2020 COP, we were able to produce average estimates of the capital costs of other equipment by operation size. We received detailed information from 60% of producer in the sample. We received estimates of capital costs from all producers in the 6,000-7,5000 annualized quota category, 55% of the 7,500-15,000 annualized quota category, and 60% of the producers in the >15,000 annualized quota category. The estimates varied considerably by size of operation, with the larger operations having more equipment on site for their poultry operations.

Size Category (Annualized Quota)	Number of Producers Providing Data	Percent of Total in Size Category	Estimate of Average Capital Costs (Without Truck)
6,000 to 7,5000	1	100%	$26,500
7,500 to 15,000	6	55%	$66,833
>15,000	9	60%	$93,722

The estimates of average capital costs include all other equipment in addition to a truck, which has been valued at $32,000. The equipment included in this category includes tractors, bobcats, spreaders, and lifts, etc. We were careful to consult with producers to determine if any of the equipment was used primarily for another segment of their operation (e.g., haying), in which case it was not included in the above list (unless it was a key element of the poultry operation.

2020 COP Third-Party Review Response by Serecon Inc.

See attachment.

A draft report was prepared by MNP LLP which formed the basis of this response. The MNP LLP final report is provided thereafter.

April 27th, 2021

Ms. Stephanie Nelson, Executive Director
BC Broiler Hatching Egg Commission
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V2S 0H9

e-mail: stephanie@bcbhec.com

Ms. Nelson:

RE: Comments Relating to The MNP Review of 2020 COP Methodology

We have reviewed the DRAFT Report prepared for BC Broiler Hatching Egg Commission on April 17, 2021 and have considered your comments during our call on April 22nd. In general, we do not find any element of the review to be material to the results. In some cases, there appears to be a misunderstanding of what was done, and in other cases it is a difference in potential approach, both of which could be considered valid in our opinion. In the following text we outline why we chose the approach in cases where it has been questioned by MNP and provide additional support for this based on our understanding of the operating reality of the sector.

Indexing Costs

One general comment throughout MNP's review is their observation around indexing of certain items (e.g., vehicle & equipment operation, repair & maintenance, custom charges, etc.). The observations were that in certain select cases there were costs that were indexed for one producer and not indexed for another. In other cases, they observe that certain items were not indexed (e.g., bedding) where they feel they should have been.

This finding is not surprising, and quite factual given that we cannot simply index everything because it would result in double counting in many cases and guarding against this was one of our key considerations throughout this process. The main reason costs were indexed from some producers and not for others is because the costs for a number of producers were already from 2020. In other words, many producers taking part in the COP either came to their appointments with receipts from the 2020 production year or followed up by email with this information. Where possible, the 2020 data was recorded and used to update the costs directly in the operating tab of the individual producer data files, rather than using the 2019 data and indexing. Similarly, for those items (e.g., bedding) that were not indexed, producers provided us the actual 2020 data during their meeting or through follow up calls and email communication. As a result, we did not index any costs that were already expressed in 2020-dollar values.

Text Discrepancies

MNP identified a couple of issues with the text in the FINAL COP 2020 report. While these discrepancies in no way impact the final $/hen result or effect the validity of the methodology used for the COP, we acknowledge that they need to be updated. This is a simple text-based correction in the methodology section of the final report. Specifically, MNP observes one discrepancy in the methodology section of final text on hired labour (p. 12) and one on the use of a salvage value on barns and equipment (p. 14). Both should be updated to reflect what happened.

$/hen COP discrepancy

MNP also highlights an apparent discrepancy between the final COP reported in the 2020 COP report (i.e., $69.56/hen) and the data files provided to us ($70.44/hen), and states that it is not clear to them what the final COP per hen is (p. 24). This is a matter of timing of reports provided to MNP and the final adjustments made in the document provided to you.

First, we can confirm that the final COP is $70.44/hen, and the data we provided MNP was for this result. When we were submitting the Final Report to BCBHEC on December 22, 2020, we originally submitted the report with a COP of $69.56/hen. However, we immediately noticed that the final COP results were still incorporating Breeder Prices (chick prices) from A166 period instead of A167. We then re-submitted the report with a final COP of $70.44/hen, using A167 chick prices. As confirmation of this, we also gave a presentation to the Board on January 28th, 2021, where we presented the final COP of $70.44/hen.

A) Operating Costs

Pullets

MNP's observations on the operating costs in the COP primarily revolve around pullets (p. 4). MNP finds the methodology of surveying vaccine costs, feed costs, and other operational costs and adding these to the surveyed chick costs a reasonable approach for the COP. Their key observation on pullet operating costs focuses on the approach to indexing chick and feed prices.

While we acknowledge that their suggested approach to indexing chick and feed prices would also be a valid approach to handling these costs, we believe our selected approach is more suitable to the COP process. In our opinion, our approach to collecting actual chick prices every A period reflects true costs more accurately than indexing chick prices using the CPI, or some other published index.

Feed

In terms of feed, again we believe that our chosen indexing approach is more robust. The only assumption being used in our approach is that the producer premium/discount stays constant. To the best of our knowledge, this assumption has only been violated once in the past 20 years and that was due to the feed industry restructure after Avian Influenza and the closure of several plants. We have reviewed the COP & Linkage results from 2010; 2015 and 2018 and can confirm that the adjustment to the feed conversion accounts for well over 95% of all feed cost changes between the modeled approach and actual price received from the producers between those survey dates.

Perhaps more importantly is the precedence for using this type of approach to updating feed costs across Canada in other COP work. In fact, the same approach is used by EFC and was validated by Farm Products Council of Canada (FPCC) and is currently used by Ontario Broiler Hatching Egg Commission (OBHEC) and Chicken Farmers of Ontario (CFO) in the Cost of Production Formula (COPF) used in Ontario.

Chicken Farmers of Ontario in the COPF use an 8-week updating period collecting reported feed prices from the Ontario Agri Business Association (OABA) and adjust by a factor "determined through the 2017 cost collected from a farmer survey" which is essentially the same way the BCHEC COP approach is designed.

B) Labour

Hired Labour

The review by MNP also identified several observations regarding labour (p. 11). Regarding hired labour, MNP observes how, in their opinion, it is not clear why the reported hired labour costs were not indexed. Our interpretation of this observation is that MNP is referring to the "Labour" category in the *Annual Unallocated Costs* section of the Operating Tab of the data collection template for each individual producer.

While we collected hired labour data from producers (and inserted it into the "Labour" cell in the *Annual Unallocated Costs* section of the Operating Tab) this data does not directly feed into the pullet and layer tabs in the Survey Guide and Template (Appendix A) document. In other words, while this labour data was used to refine the estimates from the labour model used for the COP, it does not directly feed into the remainder of the model and has no need to be indexed.

The labour matrix was used across all participants to be consistent. As a result, hired labour (and management labour) do not need to be indexed because they are calculated using the labour model and up-to-date hourly wage rates.

As with the feed discussion above, we have relied heavily on precedence set by FPCC in their acceptance of this approach for EFC. The key element of this acceptance was the extensive nature of the labour categorization in the survey itself. We have provided evidence of the considerations taken in developing this approach in the Final Report. We do not take issue with the fact that this is always a very difficult area to aggregate true costs, and as such have relied on the development of a **reliable proxy** for the labour cost element. We have taken care to reflect the realty that this proxy must account for scale efficiencies associated with labour costs.

C) Capital Costs

Depreciation – Barns and Associated Equipment

Regarding capital costs, MNP observes that the cost estimates used for barns are subject to economies of scale, whereas the estimates used for the two types of equipment are not (p. 14). To help address this observation, we provide a table of the cost estimates below:

Operation Size Category (Annualized Quota)	Pullet Barn ($/ft^2)		Lay Barn ($/ft^2)	
	Barn	Equipment	Barn	Equipment
Small	$48.17	$9.10	$44.18	$33.58
Medium	$44.18	$9.10	$42.01	$33.58
Large	$39.74	$9.10	$39.74	$33.58

Note: this table was also presented on page 12 of the Final 2020 COP Report.

As outlined in the final report, the Douglas Cost Guide was used to determine build costs. What MNP is referring to here are the economies of scale that allow the $/ft^2 barn build costs to come down as the size the barn increases, whereas the equipment costs are held constant regardless of the barns size. Our response to this observation is that using the Douglas Cost Guide to model capital build costs for barns and associated equipment was the agreed upon methodology at the outset of this work and it is the approach used for the COP process across Canada. The $/ft^2 equipment costs are sourced directly from the Douglas Cost Guide, and it is their opinion that equipment costs do not change related to the scale of the structure that houses it.

MNP also expresses concern regarding the approach to modelling barn sizes (for depreciation) based on quota, animal care code requirements, and the weighted average number of birds from a limited number of producers in the industry (p. 15). This was an element of the COP approach that was discussed in depth with the Board prior to our work. MNP suggests that the model farm approach does not provide them confidence that the results reflect the industry.

While we acknowledge that there are alternative methodologies that would be suitable for calculating depreciation of barns and equipment, we feel the model farm approach is valid. In addition, we also feel that it is misleading to suggest that our results are built off a "limited number of producers" when they are in fact built off a representative sampling of the industry (27 out 54 producers) covering 50% of the quota holders and nearly 60% of total production. With hindsight, we were quite happy with the level of producer participation we achieved during a pandemic. We think it is a credit to your industry that so many hatching egg producers chose to participate in this process, even when asked to travel to the Commission office with all their financial records.

This is yet another area where obtaining true cost information is challenging as farmers have many different motivations when building their barns. We feel strongly that if the premise of value in the COP is that of a going concern industry, the actual costs considered as part of the pricing model should not motivate behavior in capitalization. In other words, farmers who chose to build new facilities that are larger than required should not drive the COP up. While farmers who are currently using older buildings and equipment should not drive the COP down. In our opinion the true reflection of the capital structure should reflect the average farmer with the average buildings and equipment – which is what the model reflects. We accept the critique that if we have a valid survey sample this figure would emerge, and in fact it has in the past. However, given that we were not able to physically view the facilities and determine the aged life value of them, we feel that this is an appropriate way to develop a **reliable proxy** for this.

Depreciation – Other Equipment

While MNP agrees that the rates of depreciation and salvage values applied are fairly common within financial industries to measure depreciation of assets (p. 16), they express concern that the capital cost for tractors & vehicles are is based on "a handful" of producers. In our opinion, this somewhat misleading given that we collected and used equipment data from 16 out of 27 producers (60% of the total sample) to determine the capital cost estimates for other equipment. We did ask everyone to provide this as part of the process and reported what we received.

In addition, one of the main reasons that we adjusted our approach to sampling other equipment was driven by MNP's previous review submitted to the BCBHEC on April 13, 2020. At that time, we were determining the capital costs of other equipment using the model farm approach, based on discussions between BCCMB and BCBHEC for a total other equipment cost of $80,000. MNP's observation in the report was that next time it is recommended that a survey be completed to test the assumption of $80,000, and this is what we did in this survey.

To be clear, we collected actual data from producers and used it to estimate other equipment, by size category (small, medium, and large operation). While there are various approaches that would have been methodologically sound, we feel that our chosen approach both took into consideration MNP's previous concerns with the 2018 COP and provides good indication of the equipment on a hatching egg operation. The reality with this data point is that it is always going to be difficult to collect equipment data from producers during the COP process, no matter the selected methodology.

ROE – Land

With regard to the ROE on land, MNP observes that the methodology used is commonly applied in other cost of production calculations. However, MNP observes that the size categories (10, 20 and 30 acres) are arbitrary, and we do not argue with that finding since it is very difficult to determine the actual amount of land that is 100% correlated to breeder production as part of the operating reality. This is a common problem with all COP's but we believe that assigning land to units of production is less damaging than using the actual farm acreage which is very difficult to defend, especially in the case of BC where the land values are so high.

In developing our categories and the resulting acres, we did consider the EFC allocation of 2,000 birds per acre which has been accepted by the FPCC. While direct comparisons are difficult as barn space requirements under the Codes are complex, the facts we considered include:

- Conventional layers require 67 in^2/bird;
- Breeders can have a max of 34 kg/m^2;
- Breeder weight in the survey was 3.98 kg/bird;
- 1 m^2 = 1,550 in^2;
- 1,550/67 = 23.13 leghorns /m^2;
- 34/3.98 = 8.5 breeders/m^2;

Therefore, the acreage required by breeders (not even considering the males which reflect 13% of the population) is 23.13/8.5 = 2.72 times that required by layers.

Using this direct comparison & the layer number converted to a breeder equivalent:

- The large flock (26,359 birds) would require 26,359/2*2.72 = 35.8 acres (vs the 30 allocated);
- The medium flock (11,732 birds) would require 11,732/2*2.72 = 15.95 acres (vs the 20 allocated);
- The small flock (6,000 birds) would require 6,000/2*2.72 = 8.2 acres (vs the 10 allocated).

As a result, while there is not a perfect way to develop the proxy, the approach is consistent with that used by EFC and approved by FPCC.

E) COP Calculation

Sampling Methodology

Throughout the report, MNP makes various comments around the chosen sampling methodology for the 2020 COP. In the sampling methodology section, they begin by agreeing with the approach our team adopted of treating one address as one quota holder to be able have those operations with joined financial and production records be part of the sample (p. 24). MNP then goes on to expresses concern regarding the approach of removing the three smaller producers from the original sample.

In response to this concern, we begin by suggesting this may come down to a simple misunderstanding. In our background documents to MNP (provided on March 22, 2021) we provided a detailed step-by-step breakdown of our sampling methodology, including an explanation of why we chose to remove 3 outlier (small) producers from the sample prior to conducting the stratified random sampling. We removed those quota holders who had less than or equal to 5,000 quota (3 producers).

MNP expressed concern in their review with our removal of these three producers with less than or equal to 5,000 annualized quota. The misunderstanding is with quota and annualized quota. To be clear we removed producers with less than or equal to 2,500 annualized quota (5,000 quota). Our reason for doing this is that we are concerned that these producers do not accurately reflect producers that are going concern breeder operations – they are simply too small and their costs would not reflect costs with a typical production unit. Excluding small unit holders is not unusual in conducting COP's. It is our understanding that scale is considered in the selection of producers for the COPF in Ontario and we know that this is the case in the EFC COP which has been accepted by FPCC for setting prices.

MNP expresses further concern with the random sampling approach used for this COP. They observe how "forcing" the population into three categories (small, medium, and large) does not necessarily provide the same results as a random sample from the final population of 46 quota holders. They further suggest that if a random selection were conducted, the statistics behind randomization would result in size categories being represented. We acknowledge MNP's point about how a random sampling of the entire population of quota holders would, in theory, result in all size categories being represented.

To address this concern about our stratified random sampling approach, we want to circle back to MNP's comments on our sampling methodology in their review from April 13, 2020. At that time, MNP was concerned that the medium size category was likely underrepresented compared to the population in the 2018 COP. This concern was one of the underlying reasons we adopted the approach we did for the 2020 survey, i.e., separating into size categories and doing a random sampling within those size categories. The 2018 sampling did not result in the level of representation from each size category MNP would have liked to see a that time, and we adopted the 2020 approach to ensure we addressed this concern. However, regardless of the approach, we feel that the sampling for the 2020 survey resulted in an appropriate representation from across the producer size categories.

To be clear, we have not and do not suggest that the statistics within these categories are statistically valid at any level of significance. All our assumptions are directly related to the full sample. Further, stratified random samples are commonly recognized as valid approaches to conducting surveys when different strata's are expected to have different mean values for key variables. This is certainly the case in the breeder industry where scale does play an important role in capital utilization. It is our experience that the hatcheries and processors often argue this point during hearings and dispute settlement discussions. As a result, we feel that being proactive about ensuring this is recognized is a reasonable and theoretically valid approach.

Summary

In summary, we would like to thank you for the opportunity to respond to the comments provided by MNP. We would also like to complement them on the nature and tone of their critique; it was reasoned and professional. While there are areas of disagreement on approach, I do not believe that changes or alterations would have significant impacts on the final number.

Much of the discussion relates to the use of costs vs reliable proxies for costs and when they are used and considered appropriate. We are of the opinion that in conducting an assignment of this nature that is intended to be used for pricing it is critical that all costs be normalized as necessary to reflect a reasonable value, reflecting what a fair market for the cost element would provide. In this way the resulting COP ensures that producers receive the appropriate return of and on their investment and minimizes motivation to game the costs included to increase their returns. We appreciate that this requires some subjectivity in cost attribution but feel that this is an essential element in the approach, and that it is much more defendable in the long term.

If you would like us to provide further comment on any other elements of the MNP Review, please let us know. We look forward to discussing further once you have had the opportunity to review our feedback.

Thank you,

Bob Burden

Yours truly,
SERECON INC.

2020 COP Third-Party Review by MNP LLP Final Report

See attachment.

Review of 2020 COP Methodology

Final Report

Prepared for **BC Broiler Hatching Egg Commission**

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May 6, 2021

Stephanie Nelson

Executive Director

BC Broiler Hatching Egg Commission

180-32160 South Fraser Way

Abbotsford, BC V2T 1W5

Dear Ms. Nelson,

RE: Review of COP Methodology

Thank you for the opportunity to use MNP LLP ("MNP") to provide BC Broiler Hatching Egg Commission ("BCBHEC") a review of its 2020 Cost of Production (COP) Survey calculations as well as to provide opinions and feedback on the validity, as we are able, of the process you used. The scope of the study included:

1. Are the inputs and structure for the COP correct?
2. Were the surveys conducted in a manner that allowed conclusions to be drawn appropriately for the COP calculation?
3. Is the COP being calculated correctly under the current methodology from the survey data?
4. Provide a statement, as appropriate, that the COP methodology would reasonably permit the Commission to price off

The attached report describes our observations, a review of the COP calculations, and providing an answer to the questions above.

Should you have any questions regarding this report, please feel free to contact us at 204.788.6063.

Yours truly,

Ian Craven, CPA, CMA, MBA, P.Ag.

Partner, Consulting Services

Table of Contents

Introduction

We have approached the review of the Cost of Production (COP) for BC Broiler Hatching Egg Producers by assessing each cost line item as presented to us in the raw data from the 2020 Survey file ("Appendix B") and addressed in that order, as well as their underlying information and calculations. In the next sections, we have set out our understanding to date of the methodologies, assumptions, and processes used by Serecon and BCBHEC for the 2020 COP and have provided our observations and commentary regarding the validity of each process based on that understanding. After all cost items are addressed, we end with overall conclusions on the validity of the 2020 COP.

A) Operating Costs

Overview of Process

Several cost items were included under Operating Costs, which are discussed below. Some items were recorded as flock-specific costs and treated as such (e.g. feed, bedding), whereas others were recorded on an annual basis. All costs were based on actual costs surveyed as opposed to a model farm approach used for other cost items, and were calculated as the average for all flocks per participant (in the case of flock-specific costs) followed by the weighted average of all participants based on their quota size (see Survey section).

In general, operating costs that were recorded on an annual basis were allocated to pullets and layers based on a cost allocation formula. In most cases, 40% of these annual costs were allocated to pullets and 60% to layers. This split was determined based on the time spent in the respective barns as well as using consultations with producers and BCBHEC. The exception to using this cost allocation formula was where a producer would not grow his own pullets, in those cases 100% of the annual operating costs were allocated to layers.

All operating costs were reported for 2019. It is unclear to us what the 12-month period was in all cases and therefore, how the indexing was applied to create October 31, 2020 equivalent data using the Consumer Price Index (CPI). The index for all items in BC as published in Table 18-10-0004-13 by Statistics Canada was used. The indexing approach for cost items that were not indexed using the CPI is discussed for each cost item separately below.

MNP's Observations

The overall approach of calculating weighted averages of cost items and indexing these cost items using the CPI is a valid approach that is also applied in Cost of Production calculations for other industries.

Pullets

Overview of Process

Ultimately the costs reported under this line item included both the costs of buying chicks to be placed in the pullet barn, as well as the operating costs incurred during the growing stage of the pullets and allocated using the cost allocation formula discussed in the previous section.

The chick costs reported are the average of the survey sample based on receipts that participants received for any flocks that experienced some growing time in 2019, for both female chicks and male chicks. These costs were indexed to October 31, 2020 based on information collected by BCBHEC from the various hatcheries as of period A167 (December 20, 2020 – February 13, 2021) and the 2019 prices paid by producers. It is our understanding that in going forward, at every A period the four hatcheries will report their prices to be charged for both male and female chicks to BCBHEC. The Commission will relay this pricing information to Serecon to be able to calculate the COP for every A period. There is no need therefore to index base chick costs every A period, as the prices are reflective of current prices at that date.

Other operating costs that were included in this line item and not discussed in the previous section are the cost of vaccines, which were reported as the average of the survey sample based on receipts from participants, and feed. Feed costs for the pullet growing stage were surveyed in both metric tonnes and dollar amounts for different rations as some feed is used across all flocks. Feed prices used were the weighted averages of all feed used for the reported flocks after discounts received by the producer were removed. We are not able to confirm if this was after all discounts, but it appears it might be. Feed costs were then averaged across all participants and indexed to October 31, 2020 based on changes in pricing information received from the feed mills.

MNP's Observations

The methodology of surveying vaccine costs, feed costs, and other operational costs and adding these to the surveyed chick costs is reasonable. Using the base feed costs as collected from producers provides for an accurate base for feed costs. It does not appear to be the case that adjustments have been made for flocks that were only raised for a few weeks or months in 2019 and the remainder of their growing period occurred in a different calendar year. The fact that the index used to update chick costs to October 31, 2020 is less complicated than in previous COP calculations is positive. However, gathering pricing information directly from feed mills to create an index to account for feed prices over time may have potential biases or inaccuracies as the listed prices from feed mills may or may not be the actual prices producers paid. That being said, Serecon has been able to review the COP & Linkage results from 2010, 2015 and 2018 and have confirmed that the adjustment to the feed conversion accounts for well over 95% of all feed cost changes between the modeled approach and actual prices received from producers between those survey dates.

Spikers (Cockerels Purchased)

Overview of Process

The cost of any spikers purchased has been included in total chick costs as discussed in the previous section.

MNP's Observations

The approach of combining the cost of male chicks with the cost of female chicks is a valid approach.

Feed

Overview of Process

The same process was used to calculate the feed cost for the laying stage as for the pullet growing stage. The cost of feed for the laying stage was surveyed in both metric tonnes and dollar amounts for different rations as some feed is used across all flocks. We understand that feed prices used were the weighted averages of all feed used for the reported flocks after discounts received by the producer were removed although we were not able to confirm that in the producer data. Feed costs were then averaged across all participants and indexed to October 31, 2020 based on changes in pricing information received from the feed mills.

MNP's Observations

The same concerns exist for updating the feed costs for the layer stage using information of price changes as received from the feed mills as described in the Pullet section. As above, Serecon has been able to state that they have reviewed the COP & Linkage results from 2010,2015 and 2018 and have confirmed that the adjustment to the feed conversion accounts for well over 95% of all feed cost changes between the modeled approach and actual prices received from producers between those survey dates.

Veterinary & Medicine

Overview of Process

Veterinary & Medicine costs consisted of mostly annual laboratory testing costs and some flock-specific costs, were based on actual surveyed costs, reported as the weighted average across all participants, and indexed to October 31, 2020 using the CPI as discussed in the Operating Costs section.

MNP's Observations

The approach to determine and index Veterinary & Medicine costs seems reasonable.

Utilities

Overview of Process

Utility costs mostly consisted of annual power, water, gas, and telephone costs, although in some cases telephone costs were mixed in with Administrative & Office costs. These costs were based on actual surveyed costs, reported as the weighted average across all participants, and indexed to October 31, 2020 using the CPI as discussed in the Operating Costs section.

MNP's Observations

The approach to determine and index Utility costs seems reasonable.

Vehicle & Equipment Operation (Fuel & Oil)

Overview of Process

Fuel & Oil costs were based on actual surveyed costs, and in some cases also included surveyed Repair & Maintenance costs. These costs were reported as the weighted average across all participants, and indexed to October 31, 2020 using the CPI as discussed in the Operating Costs section.

MNP's Observations

The approach to determine and index Fuel & Oil costs seems reasonable, even if they include surveyed Repair & Maintenance costs in some cases. However, MNP noticed that in most of the producer data files provided to us, these costs were only indexed on the pullet side and not on the layer side. Subsequently Serecon has provided information stating that generally only 2019 information was indexed, meaning that costs related to pullet production were incurred in 2019 whereas costs related to layer production were incurred in 2020. There was therefore no need to index the costs related to layer production. MNP agrees that this is a reasonable approach.

Repair & Maintenance

Overview of Process

Repair & Maintenance costs were based on actual surveyed costs for building repair and maintenance, equipment repairs, maintenance of alarm and security systems, and barn supplies on an annual basis. It was verified with producers that these costs did not include any capital upgrades. These costs were allocated to both pullets and layers using the cost allocation formula as described in the Operating Costs section. A limit was set on the building R&M costs of 3% of the build cost, resulting in caps of approximately $8,000, $16,000, and $33,000 per flock for the small, medium, and large flock sizes, respectively. Repair & Maintenance costs were reported as the weighted average across all participants, but were not indexed as these were reported as 2020 costs (see our observation under Vehicle & Equipment Operation (Fuel & Oil)).

MNP's Observations

Recording actual Repair & Maintenance costs as opposed to a model farm approach is a positive. It is not clear to us how capping building R&M costs at 3% of the at build cost improves the accuracy of the COP. That being said, we have not found any cases of the data provided to us in which the 3% was actually implemented.

Bedding

Overview of Process

Bedding costs were based on actual surveyed costs per flock using receipts provided by producers, reported as the weighted average costs across all participants, but were not indexed as these were reported as 2020 costs (see our observation under Vehicle & Equipment Operation (Fuel & Oil)).

MNP's Observations

The approach to determine Bedding costs seems reasonable.

Administrative & Office Costs

Overview of Process

Administrative & Office costs mostly consisted of administrative costs, office supplies, and professional fees, although in some cases telephone costs were mixed in as well. These costs were based on actual surveyed costs, reported as the weighted average across all participants, and indexed to October 31, 2020 using the CPI as discussed in the Operating Costs section.

MNP's Observations

The approach to determine and index Administrative & Office costs seems reasonable, even if they include surveyed telephone costs in some cases. However, MNP noticed that in one of the producer data files provided to us, these costs were not indexed as these were reported as 2020 costs (see our observation under Vehicle & Equipment Operation (Fuel & Oil)).

Insurance

Overview of Process

Insurance costs mostly consisted of insurance premiums for buildings, vehicles, equipment, business interruption, and farm liability. These costs were based on actual surveyed costs on an annual basis, reported as the weighted average across all participants, and indexed to October 31, 2020 using the CPI as discussed in the Operating Costs section.

MNP's Observations

The approach to determine and index Insurance costs seems reasonable.

Custom Charges

Overview of Process

Custom charges mostly consisted of labour hired to catch the spent hens, to catch the flock when moving it from the pullet barn to the layer barn, to clean the barns after a flock, to remove any manure, or to administer vaccinations to the day-old chicks. These costs were based on actual surveyed costs on an annual basis, reported as the weighted average across all participants, but were not indexed as these were reported as 2020 costs (see our observation under Vehicle & Equipment Operation (Fuel & Oil)).

MNP's Observations

The approach to determine Custom Charges seems reasonable. Since the majority of custom charges only occurs only about once a year, MNP believes they are accurately reflected.

Other/Miscellaneous Costs

Overview of Process

Other or Miscellaneous Costs were reported only in those cases where producers did not raise their own pullets, and therefore captured the custom raising costs of the pullet flock. These costs were based on actual surveyed costs on an annual basis, reported as the weighted average across all participants, but were not indexed.

MNP's Observations

The approach to determine Other or Miscellaneous Costs seems reasonable. However, MNP noticed in the producer data files provided to us that these costs were actually reported under Custom Charges and therefore were not indexed. That being said, the indexing amount is probably immaterial to the total COP.

Levies

Overview of Process

The cost item Levies was included to reflect any levies paid to BCBHEC, excluding quota lease costs, however no levies were recorded for all producers.

MNP's Observations

If board levies were actually zero for all producers, then this is a reasonable approach. We have subsequently received additional information from BCBHEC that in the current Linkage model levies are not part of the price setting process as these are both set and known by the Commission. There is therefore no reason to survey this item.

B) Labour

Overview of Process

A model farm approach was used to determine both hired labour costs and owner or manager labour costs. After discussions with BCBHEC, it was decided to use an Activity Based Costing approach and a detailed labour matrix was developed based on advice from BCBHEC, experience in the poultry sector, research, as well as input from a small set of producers. By using the labour matrix, labour costs were calculated given the activities that have to be conducted regarding hatching egg production and the current market price for labour. The approach was mainly chosen to quantify non-arm's length or family labour for which market values do not uniformly exist and to deal with the possible many forms of non-monetary compensation provided to both hired labour and non-arm's length labour.

As such, the labour matrix consisted of the following categories and sub-categories:

- Pullet production:
  - Brooding
  - Growing for 2-8 weeks
  - Growing for 9-20 weeks
  - Water vaccinations
  - Subcutaneous vaccinations
  - Cockerel transfer and vaccination
  - Pullet transfer and vaccination
  - Pullet barn cleanout
  - Cockerel barn cleanout
  - Pullet barn setup
  - Cockerel barn setup
- Layer production:
  - Egg laying for transfer from pullet barn-24 weeks
  - Egg laying for 25 weeks-peak production
  - Egg laying for 31-45 weeks
  - Egg laying for 46-51 weeks
  - Egg laying for 52-60 weeks
  - Flock ship out
  - Layer barn cleanout
- General activities:
  - Non-flock-specific but related to layer production
  - Non-flock-specific but related to pullet production
  - Non-flock-specific but related to overall farm operations

The following steps were undertaken using the labour matrix:

1. A fixed number of hours was assigned to the categories and sub-categories listed above
2. These numbers were aggregated in terms of:
   - Hours per flock per barn for both pullets (general labour and management labour) and layers (general labour and management labour)
   - Annual hours that are not flock-specific for both pullets (general labour and management labour) and layers (general labour and management labour)
   - Annual hours that are not flock-specific and not specific to either pullets or layers (general labour and management labour)

These aggregated hours for the three categories were then further modelled in terms of hours per flock based on the following assumptions:

- Hours per flock per barn for both pullets (general labour and management labour) and layers (general labour and management labour). In other words, the aggregate hours under the first category of Step 2 stayed the same as they were already expressed in hours per flock
- Annual hours that are not flock-specific for both pullets (general labour and management labour) and layers (general labour and management labour) were converted to hours per flock using a barn utilization of 2.368 for pullets (i.e. a pullet barn can house 2.368 flocks per year) and 1.18 for layers (i.e. a layer barn can house 1.18 flocks per year)
- Annual hours that are not flock-specific and not specific to either pullets or layers (general labour and management labour) were converted to ours per flock using an assumed annual of quota of 23,079 birds and 2 layer barns on the farm (as determined by the labour consultation prior to the COP survey)

3. Hours were further converted into fixed and variable costs for both pullets (general labour and management labour) and layers (general labour and management labour) based on the following:
    - Pullet – Variable – General Labour: activities related to pullet barn cleanout, cockerel barn cleanout, pullet barn setup, and cockerel barn setup
    - Pullet – Variable – Management Labour: activities related to flock placement
    - The remainder of the pullet hours were considered fixed hours and categorized as either general labour or management labour
    - Layer – Variable – General Labour: activities related to egg laying in weeks 31-45 for two layer barns, egg laying in weeks 46-51 for two layer barns, egg laying in weeks 52-60 for two layer barns, flock ship out for two layer barns, and layer barn cleanout for 2 layer barns
    - Layer – Variable – Management Labour: activities related to daily flock monitoring in weeks 31-45 for two layer barns, in weeks 46-51 for two layer barns, in weeks 52-60 for two layer barns, and supervising the catching crew as part of the flock ship out for two layer barns
    - The remainder of the layer hours were considered fixed hours and categorized as either general labour or management labour
4. A dollar amount is applied to the resulting eight labour categories and based on the following assumptions (as determined by the labour consultation prior to the COP survey)
    - Pullet – General Labour – Variable Costs: number of hours calculated under Step 3, multiplied by $21.15, divided by 10,080 ft^2 for a pullet barn
    - Pullet – General Labour – Fixed Costs: number of hours calculated under Step 3, multiplied by $21.15
    - Pullet – Management Labour – Variable Costs: number of hours calculated under Step 3, multiplied by $33.00, divided by 10,080 ft^2 for a pullet barn
    - Pullet – Management Labour – Fixed Costs: number of hours calculated under Step 3, multiplied by $33.00

- Layers – General Labour – Variable Costs: number of hours calculated under Step 3, multiplied by $21.15, divided by 17,600 ft^2 for a layer barn
- Layers – General Labour – Fixed Costs: number of hours calculated under Step 3, multiplied by $21.15
- Layers – Management Labour – Variable Costs: number of hours calculated under Step 3, multiplied by $33.00, divided by 17,600 ft^2 for a layer barn
- Layers – Management Labour – Fixed Costs: number of hours calculated under Step 3, multiplied by $33.00

MNP's Observations

Although attempting to normalize non-monetary forms of compensation and to quantify non-arm's length labour (family labour) that easily gets overlooked or underestimated on farms are both good things, the resulting labour matrix is quite complicated in nature and difficult to follow. For example, under Step 3, having the remainder of both pullet and layer hours being considered as fixed hours and further categorized as either general labour or management labour makes it difficult to trace back which activities they were sourced from, as the hours have undergone so many classifying processes. In addition, we also noticed a couple of errors in some of the formulas of the labour matrix, e.g. the hours categorized as Layer – Variable – Management Labour, in Step 3, seem also be included in the total hours for Layer – Variable – General Labour. Finally, we noticed that the hourly rate used for management labour decreased from the previous COP survey to the 2020 COP survey. We have subsequently received additional information stating that the rate used in the previous COP survey was determined based on discussions between BCCMB and BCBHEC to ensure parity between the two organizations as the price received was capped and needed to be divided between chicken growers and broiler hatching egg producers. The approach adopted for the current COP survey is a verified approach, is also employed by Egg Farmers of Canada (EFC) in the calculation of the COP for table eggs, and is for that reason approved by the Farm Products Council of Canada (FPCC).

Hired Labour

Overview of Process

In the case a farm employed hired labour, the hours as determined in the labour matrix were validated by the farm's actual hours. The activities and their associated value of the labour matrix performed by employees were disregarded and replaced by the actual salaries paid to the employees. The actual hourly wage rate was verified by recording the number of full-time and part-time employees, as well as to ensure no non-monetary compensation was included in the salaries surveyed. For the one producer that provided non-monetary compensation (i.e. housing) to his employees, the salary surveyed was adjusted using the actual cost of the non-monetary compensation provided.

In those cases where a farm fully relied on hired labour for its puller and layer operations, the labour matrix was used entirely as employees were often involved in other enterprises than the pullet or layer enterprise, making it difficult to separate the hours spent across multiple enterprises.

The vast majority of producers only reported non-arm's length labour, which resulted in the use of the labour matrix to calculate a value for the general labour performed by family members. The hours used in the labour matrix were discussed with producers and validated by recording the number of full-time and part-time family members. The labour costs were then calculated using the farm's actual square footage of its pullet and layer barns.

Labour costs were adjusted for the one producer that indicated having an automatic egg collection system by disregarding the activities in the labour matrix regarding egg collection. Finally, labour costs were not indexed as the labour rates used coincides with the time period that the 2020 COP reflects.

MNP's Observations

The 2020 COP Report implies that when a farm employs a combination of hired labour and non-arm's length labour, the reported hired labour cost was used as a proxy for the non-arm's length labour cost of equivalent tasks. From the process described above, it becomes clear that the labour matrix was used across all participants to be consistent, and therefore we recommend revising the 2020 COP Report. Overall, the methodology used to estimate hired labour costs and general family labour costs may be appropriate given that this information is not collected from producers on a regular basis using timesheets for example. However, it is not clear to us that actual labour costs were sufficiently calculated based on the real effort required by farm family members. It appears that a proxy labour cost was assumed and applied based on certain activities, but we were unable to trace back whether the estimates reflect the reality or able to assess whether the estimates have a margin of error and if the margin of error is material. As such, we are not able to comment on the validity of this approach or accuracy of labour costs estimates.

Owner/Manager Labour

Overview of Process

The value for Owner or Management Labour was calculated using the labour matrix and the farm's actual square footage of pullet and layer barns as discussed in the Labour section. Owner or Management Labour cost were not indexed as the management rate used is reflective of the time period captured in the 2020 COP.

MNP's Observations

The observation above also under Hired Labour also applies to Owner or Management Labour. We are not confident that the modelled management labour cost reflects the real management labour cost for hatching egg producers in BC.

C) Capital Costs

Depreciation – Barns & Associated Equipment

Overview of Process

A model farm approach was used to determine the capital cost of Barns & Associated Equipment, from which depreciation was calculated. Publicly available cost information from the Douglas Cost Guide was used to estimate what the cost would be to replace the existing pullet and layer facilities, which is then adjusted to reflect the fact that existing facilities are halfway through their useful life.

Participants were divided into the three size categories (see Sampling Methodology section), and a weighted average number of birds placed per year was calculated for each size category.

Operation Size	Annualized Quota Units	Weighted Average Number of Birds Placed per Year
Small	6,000-7,500	6,000
Medium	7,500-15,000	11,732
Large	>15,000	25,039

Barn sizes for pullet barns and layer barns were then modelled for the three size categories based on this weighted average number of birds placed per year, as well as animal care code requirements of 1.6 ft^2 for pullets and 1.8 ft^2 for layers. Other model assumptions included that pullet barns are one storey floor barns, layer barns are two storey barns, and all prices used were based on steel siding of the barns and sourced from the Douglas Cost Guide 2020. As such, the following figures were used to calculate the capital cost of barns and associated equipment (of which the latter is defined as computer automation, generators, feed bins, and electrical and mechanical equipment):

Operation Size	Size of Pullet Barn (ft^2)	Pullet Barn Cost ($/$ft^2$)		Size of Layer Barn (ft^2)	Layer Barn Cost ($/$ft^2$)	
		Barn	Equipment		Barn	Equipment
Small	9,600	$48.17	$9.10	10,800	$44.18	$33.58
Medium	18,771	$44.18	$9.10	21,118	$42.01	$33.58
Large	40,062	$39.74	$9.10	45,070	$39.74	$33.58

Capital cost of barns and associated equipment were then calculated as follows for the different size categories:

- Barns: pullet barn cost per ft^2 multiplied by the calculated required square footage (if applicable) plus the layer barn cost per ft^2 multiplied by the calculated required square footage
- Fixed Equipment: 75% of the pullet equipment cost per ft^2 multiplied by the calculated required square footage plus 75% of the layer equipment cost per ft^2 multiplied by the calculated required square footage
- Control Equipment: 25% of the pullet equipment cost per ft^2 multiplied by the calculated required square footage plus 25% of the layer equipment cost per ft^2 multiplied by the calculated required square footage

As these capital cost are based on rates for 2020, the original cost of barns and associated equipment is then calculated by indexing the 2020 amounts backwards using a ratio of the full-life and half-life index

of the asset (for which 2020 = 100) on the assumption that barns and associated equipment are halfway through their useful life:

- The full-life index equaled 3284.5 for barns and associated equipment
- The half-life indices equaled 1642.1 for barns, 2632.8 for fixed equipment, and 3016.9 for control equipment, respectively

These indices were sources from the Marshall & Swift building guide, which provides annual indices as part of its Current Building Cost Indices.

For the one producer in the sample with an automatic egg collection system, these capital costs were increased by $3/ft^2 based on invoices for purchase and installation of this system.

For the seven producers in the sample that also had spiker barns, these capital costs were increased based on the reported square footage of these barns and rates of $52.12/ft^2 for barns and $15.05/ft^2 for equipment.

Depreciation of Barns & Associated Equipment was then calculated using a straight-line approach by dividing the calculated cost at build by the years of useful life of the assets. As such, barns were depreciated over 40 years, 75% of the associated equipment (i.e. fixed equipment) was depreciated over 15 years, and the remaining 25% of the associated equipment (i.e. control equipment) was depreciated over 5 years. A salvage value was not applied as it was assumed that producers are not selling their facilities but rather replacing them, and therefore no material value exists after 40 years for these outdated barns and equipment. Depreciation costs were not indexed using the CPI or a different method.

MNP's Observations

MNP agrees that the rates of depreciation applied are fairly common within financial industries to measure depreciation of assets of this nature. However, there are a few underlying assumptions in the estimation of capital costs of Barns & Associated Equipment that causes us concern to whether the accuracy of the calculations result in truly representing the actual capital costs, and therefore depreciation, for BC hatching egg producers. It seems that the pullet and layer barn figures are following the model farm approach, however it is not clear to us why there is no consistency in methodology for estimating costs of spiker barns as their square footages are based on actual surveyed information. It is also not clear to us why the cost estimates used for barns are subject to economies of scale, whereas the estimates used for the two types of equipment are not. Serecon has subsequently provided rationale behind this approach. MNP also noticed that, even though a salvage value was not applied, it was stated in the 2020 COP Report that that was the case. We therefore recommend revising the 2020 COP Report.

Even so, a bigger concern is that modelling barn sizes based on quota, animal care code requirements, and the weighted average number of birds of only a few producers in the industry does not provide us confidence that these reflect the industry, in particular since the different size categories used are determined in an arbitrarily way (see Sampling Methodology section). In addition, it is our opinion that the model farm approach, and in particular the use of the half-life rule, is difficult to rely on when sooner or later the industry will have to invest in new barns. Therefore, given that these underlying

assumptions seem very static without sufficient testing of actual costs, we are concerned they may not represent actual costs sufficiently for COP.

Depreciation – Other Buildings

Overview of Process

A model farm approach was used to determine the capital cost of Other Buildings, from which depreciation was calculated. Depreciation cost for buildings like manure storage facilities, machine sheds, tool sheds, other small storage buildings, and office space were included in this cost item. It was assumed that approximately 1,600 ft^2 per producer would be a sufficient approximation to account for these types of buildings. The capital costs of these other buildings were calculated by multiplying the 1,600 ft^2 by \$47.74/ft^2 for barns and \$14.23/ft^2 for equipment.

Depreciation of Other Buildings was then calculated using the same approach as for Barns & Associated Equipment as these other buildings are often attached to the main barns, i.e. using a straight-line approach by dividing the calculated cost at build by the years of useful life of the assets. As such, buildings were depreciated over 40 years, 75% of the associated equipment was depreciated over 15 years, and the remaining 25% of the associated was depreciated over 5 years. Depreciation costs were not indexed using the CPI or a different method.

MNP's Observations

Including and determining the capital cost and depreciation of other buildings that might be present on the farm is a plus, however we were not able to get information that sufficiently shows that the size and cost of these buildings as they are modelled in the COP are accurately representing the situation of BC hatching egg producers.

Depreciation – Tractors & Vehicles (Other Equipment)

Overview of Process

A model farm approach was used to determine the capital cost of Other Equipment, from which depreciation was calculated. Depreciation cost for the following items were included in this cost item:

- Tractors & Vehicles: all motorized equipment, bobcats, etc. used for the poultry enterprise
- Other Equipment: such as manure spreaders, sawdust blowers, lifts, incinerators, pressure washers, etc.
- Trucks & Automobiles: trucks and other vehicles used for the poultry enterprise

Capital costs for these three categories were determined as follows:

- Tractors & Vehicles: the average of estimates of capital costs that were obtained from producers in the different size categories according to the following figures:

Operation Size	Number of Producers Providing Data	% of Total in Size Category	Estimate of Average Capital Costs for Tractors & Vehicles
Small	1	100%	$26,500
Medium	6	55%	$66,833
Large	9	60%	$93,722

- Trucks & Automobiles: modelled as a single 4WD farm vehicle of about three years old and with an estimated market value of $32,000.

Depreciation of Other Equipment was then calculated using a straight-line approach by dividing the calculated cost minus a 10% salvage value by the years of useful life of the assets, i.e. 10 years for Tractors & Vehicles, by 5 years for Other Equipment, and by 10 years for Trucks & Automobiles. Depreciation costs were not indexed using the CPI or a different method. Depreciation costs were not indexed using the CPI or a different method.

MNP's Observations

MNP agrees that the rates of depreciation and salvage values applied are fairly common within financial industries to measure depreciation of assets of this nature. However, it is unclear to us how the capital cost for Other Equipment was determined, whereas it is concerning to us that the capital cost for Tractors & Vehicles is based on information from only a handful of producers and further extrapolated using the arbitrarily determined size categories (see Sampling Methodology section). Therefore, MNP is of the opinion that there is not sufficient evidence to provided that these assets and their dollar values are representative for BC hatching egg producers, MNP is unable to comment on the validity of this approach.

ROE – Land

Overview of Process

A model farm approach was used to determine the capital cost of Land, from which the Return on Equity (ROE) was calculated. The capital cost of land was calculated based on ratios between layers and acres for the different size categories, and as used in other jurisdictions. As such, the following figures were used to calculate the capital cost land:

Operation Size	Number of Acres Used
Small	10
Medium	20
Large	30

The value applied to these acres was based on strictly agricultural land and determined as the weighted average of current market values from Farm Credit Canada (FCC) across the Lower Mainland, resulting in a value of $86,000/acre. This figure was then deescalated to reflect the cost of land of 20 years ago, and to be consistent with the calculation for other long-term assets.

The ROE on land was then calculated by applying a rental rate of 1% to the cost for the different size categories, to which a medium-term cost of borrowing defined as the prime rate plus 1% was added. This medium-term cost of borrowing was chosen as the midpoint between line of credit and mortgage rates for FCC clients in supply-managed industries.

MNP's Observations

The methodology used to calculate ROE on Land is commonly used in other cost of production calculation. Although Serecon did provide a calculation of the acreage required by breeders (which is consistent with the approach employed by EFC for layer birds per acre, approved by FPCC, and adjusted for breeders), it appears that the actual number of acres assigned to each size category was loosely based on this calculation. In addition, the size categories themselves were determined in an arbitrary way (see Sampling Methodology section). MNP is therefore not confident that the number of acres used to calculate the COP resembles the actual number of acres BC hatching egg producers use for their poultry operations. Even though the 2020 COP Report stated that a medium-term cost of borrowing was added to the rental rate to calculate ROE on Land, we did not encounter this in the calculations provided to us. We have received subsequent information from Serecon stating that the wording in the 2020 COP Report was an error and therefore the medium-term cost of borrowing was not added to the rental rate to calculate ROE on Land. Given this information, MNP recommends revising the 2020 COP Report.

ROE – Barns & Associated Equipment

Overview of Process

Using the capital cost calculation of Barns and Associated Equipment as discussed before, the remaining equity of these assets is calculated using the half-life rule. This equity amount is then multiplied by a ROE percentage, which is based on the following elements:

- Cost of Equity: modelled after the Capital Asset Pricing Model (CAPM) that follows the equity market to reflect the combination of risks associated with entrepreneurship in egg farming. As such, it is calculated as a function of the following elements:
    - Long-term risk-free rate of 1.25%: determined as the rate for Bank of Canada long-term bonds (i.e. with more than 10 years to maturity) to reflect the investment horizon of BC hatching egg producers when making investment decisions regarding barns and equipment
    - Beta of security of 0.53: to adjust for the fact that some industries bear a higher investment risk than others. The beta used was the 5-year average for the midpoint between the farming and agriculture beta and the regulated water utilities beta to reflect the supply-managed nature of the broiler hatching egg industry.
    - Expected market return: defined as the overall average market risk for 2020 for smaller businesses and based on the long-term risk-free rate, an implied equity premium, and a small size premium.

    - Implied equity premium of 5.23% to reflect the fact that investors generally invest in riskier businesses than embodied by the long-term risk-free rate, determined by a model developed by New York University.
    - Small size premium of 4.44% to reflect the fact that smaller businesses such as farms are less diversified and therefore bear a higher risk, determined by a calculation by the Tuck School of Business.
- Cost of Debt: the cost of borrowing is determined as the prime rate of 2.45% plus 1.06%, of which the latter is the midpoint between line of credit and mortgage rates for FCC clients in supply-managed industries
- Debt/Equity ratio: according to FCC, this ratio equals 1.1 for poultry operations in Canada[1]

Using these figures, this results in the final formula of ROE = (Cost of Equity x 90%) + (Cost of Debt x 10%) = (6.38% x 90%) + (3.51% x 10%) = 6.093%, which is applied to the remaining equity of Barns and Associated Equipment.

MNP's Observations

As the methodology used to calculate ROE on barns and associated equipment is ultimately based on the half-life rule, which might not accurately represent the value of these assets, the ROE on these assets might also not be accurate. That being said, the methodology to arrive at a risk rate to apply against asset values to calculate ROE is a reasonable approach and is also used in other COP studies.

ROE – Other Buildings

Overview of Process

ROE on Other Buildings was calculated using the same approach as for Barns & Associated Equipment as the underlying capital cost calculation is similar.

MNP's Observations

The methodology to arrive at a risk rate to apply against asset values to calculate ROE is a reasonable approach and is also used in other COP studies.

ROE – Vehicles & Tractors (Other Equipment)

Overview of Process

ROE on Other Equipment was calculated using the same approach as for Barns & Associated Equipment as asset values were also determined using a model farm approach.

[1] https://www.fcc-fac.ca/en/knowledge/economics/debt-increased-faster-than-equity.html

MNP's Observations

The methodology to arrive at a risk rate to apply against asset values to calculate ROE is a reasonable approach and is also used in other COP studies.

Operating Interest

Overview of Process

The cost of operating interest is calculated using 50% of the operating inputs, multiplied by the prime rate plus 2%. The 2% was determined as the midpoint of operating Line of Credit rates of multiple financial institutions.

MNP's Observations

The methodology used to calculate operating interest is commonly used in other cost of production applications, however the added 2% to the prime rate might be charged to a producer but does not automatically mean that it reflects the actual charge to BC hatching egg producers.

Taxes

Overview of Process

Taxes (i.e. property taxes) were based on actual annual costs surveyed, allocated to pullets and layers based on the cost allocation formula (i.e. 40% to pullets, 60% to layers), and were calculated as the weighted average of all participants based on their quota size.

MNP's Observations

The overall approach of calculating weighted averages of property taxes is a valid approach that is also applied in Cost of Production calculations for other industries.

D) Revenues

Revenue from Salvage Eggs

Overview of Process

Auxiliary revenue from salvage eggs is subtracted from the COP in order to reduce costs. Salvage eggs are paid at a set rate of $0.70 per dozen eggs, which has been constant since approximately 2015 and is therefore not indexed.

MNP's Observations

The set rate paid for salvage eggs has not been adjusted for a long time, but it only has a small impact on reducing total expenses.

Revenue from Spent Hens

Overview of Process

Auxiliary revenue from spent hens is subtracted from the COP in order to reduce costs. Spent hens are paid at a set rate of $0.20 per kg, which has been updated since the previous COP survey and is therefore not indexed.

MNP's Observations

The approach of including revenue from spent hens using updated rates is a valid approach.

Revenue from Cockerels

Overview of Process

Auxiliary revenue from cockerels is subtracted from the COP in order to reduce costs. This revenue was not reported in the 2020 COP as the cockerels are removed from the barns along with the spent hens at zero cost and zero revenue.

MNP's Observations

The approach used to treat revenue from cockerels seems reasonable.

E) COP Calculation

Sampling Methodology

Overview of Process

The goal of the sampling methodology used was to arrive at a statistically significant sample defined by a 95% confidence level and a 3% margin of error. In order to reach these numbers, previous COP surveys were analyzed in terms of their coefficient of variation to be able to calculate the minimum number of participants required for the 2020 COP survey. This process resulted in a target of 28 producers to be selected for the 2020 COP survey, to which another two producers were added to account for producer refusal.

When examining the total producer population of 54 quota holders, it appeared that multiple operations were located at the same address with joined financial and operating records. It was therefore decided to treat one address as one quota holder, resulting in a producer population of 49 quota holders. After discussions with BCBHEC, it was further decided to remove the three quota holders with less than 2,500 annual quota units (or 5,000 quota units) from the producer population as these producers are new to the industry and would therefore not be reflective of a going concern operation. As such, the final producer population equaled 46 quota holders.

The final producer population was then divided into three size categories and it was calculated how many producers from each size category were needed to arrive at the target sample based on the share of the specific size category in the final producer population. Producers were then selected using a random number generator, resulting in a COP sample of 27 quota holders. The following table summarizes these calculations and selection processes:

Operation Size	Number of Annual Quota Units	Total Number of Producers	Share in Total Number of Producers	Target Sample	Actual Sample
Small	6,000 – 7,500	3	7%	2	1
Medium	7,500 – 15,000	18	39%	12	11
Large	> 15,000	25	54%	16	15
Total		**46**	**100%**	**30**	**27**

MNP's Observations

MNP recognizes Serecon's approach regarding the sampling methodology in response to our feedback on the previous COP survey. We agree with the approach of treating one address as one quota holder to be able have these operations with joined financial and production records be part of the sample. However, we do not see the validation behind removing those quota holders with less than 5,000 quota units from the sample as these producers are part of the BC hatching egg industry even if their experience to the industry is limited. We question whether sufficient research has been undertaken to understand the COP of this group to verify their removal from the sample. It also not clear to us why the boundary of this group was drawn at 5,000 quota units, as opposed to a different number, which likely would have resulted in a different number of producers classified as this group. We have received subsequent information that the boundary of this group was set at 2,500 annual quota units as the producers making up this group are New Entrant Program producers and are required per orders of BCBHEC to grow from 5,000 quota units (or 2,500 annual quota units) to 12,000 quota units in one expansion. MNP agrees that it makes sense to draw the line at 5,000 quota units, however we are of the opinion that these producers should have been part of the sample even though their experience with the industry is limited. Due to their limited experience, their COP might be higher than other producers in the industry and should therefore be taken into account in the pricing of their hatching eggs to be able to offset their (initial) higher cost.

Although stratifying the sample by size category is a plus, there does not seem to be any logic in defining the size categories. Arbitrarily forcing the population into three categories does not necessarily provide the same results as a random sample from the final population of 46 quota holders. If a random selection was conducted, the statistics behind randomization would result in size categories being represented. We are therefore not fully confident that the final selection was a random selection of the population of producers.

Survey

Overview of Process

The 2020 COP surveys were conducted in BCBHEC's office to be able to sufficiently distance given the COVID-19 pandemic. Operational costs were reported for the fiscal year ending in 2019, whereas flock-specific costs were reported for those flocks raised during 2019. Costs were then indexed to October 31, 2020 as discussed for the separate cost items.

All costs, whether actuals or modelled, were recorded on a per hen basis and then converted to a per dozen hatching eggs based on 133.5 eggs per hen. Weighted averages of individual cost items were calculated based on quota holdings as a percentage of total quota in the sample. This resulted in a final 2020 COP of $69.56 per hen with a normal distribution on a 95% confidence level with a 2.6% margin of error.

MNP's Observations

The approach of reporting operational costs as per fiscal year as well as other costs per flock seems reasonable, however to be able to better compare apples to apples adjustments could have been made to both operational costs and flock-specific costs to reflect the same time period across participants. The approach of calculating the COP based on weighted averages based on quota holdings is a valid approach that is also applied in Cost of Production calculations for other industries.

Conclusions

Question 1: Are the inputs and structure for the COP correct?

The input items are the correct costs to include in the COP. In some cases, the inputs rely on approximations of actual costs as we understand are agreed to by the BCBHEC. Given the explanations provided for using these approximations, the approach seems reasonable.

Question 2: Were the surveys conducted in a manner that allowed conclusions to be drawn appropriately for the COP calculation?

For the cost items that were based on actual survey data, for the overall population they seem to be drawn in an appropriate manner. As has been subsequently noted by Serecon, using the surveyed data to try to segregate it into different size categories of farms does not provide reliable results and analysis should only be considered on the sample as a whole.

Question 3: Is the COP being calculated correctly under the current methodology from the survey data?

Given all the methodologies applied, we were able to trace the actual calculations used and can verify that all calculations are correct under the current methodology and as indexed forward from survey data except specifically identified. Even though all calculations were mathematically correct, we did find some discrepancies between a few of the figures which have been noted in our observations above.

Question 4: Does the COP methodology reasonably permit BCBHEC to price off?

Our analysis above served the purpose of both our ability to validate the accuracy of the methodology of COP items to represent actual costs for BC broiler hatching egg producers, as well as to assess our confidence in the accuracy of calculating the COP for BC broiler hatching egg producers. These items in turn would then give evidence to confirm that the current COP methodology would reasonably permit the BCBHEC to determine prices.

Our analysis showed that MNP was able to confirm the methodology of several COP items. In addition, there are a few items that we were represented by methodologies to approximate actual costs and cannot be stated as true actual costs. Serecon has provided more extensive background on these methodologies and in most cases has stated that the BCBHEC has approved these methodologies; plus, Serecon has been able to point to other areas of the industry where these approaches have been accepted. For these cost items in the COP we can observe that these seem to be reasonable approaches to preparing approximations of these costs. We did not attempt to assess the materiality of those items and their impact on the total COP. Based on the review of the costs we were able to validate and based on the assumption that approximations of other costs are reasonable in their approach, MNP is able to confirm that the current COP methodology would give the Commission reason to determine prices. We have summarized the outcome for every COP item in the table below.

Validated COP items	Identified as reasonable approaches to approximate cost
• Pullets • Spikers (Cockerels Purchased) • Feed • Operating Inputs • Depreciation – Barns and Associated Equipment • Depreciation – Other Buildings • Depreciation – Tractors and Vehicles (Other Equipment) • ROE – Land • ROE – Barns and Associated Equipment • ROE – Other Buildings • ROE – Vehicles and Tractors (Other Equipment) • Operating Interest • Taxes • Revenue from Salvage Eggs • Revenue from Spent Hens • Revenue from Cockerels • Survey	• Hired Labour • Owner/Management Labour • Capital Cost of Barns and Associated Equipment • Capital Cost of Other Equipment • Capital Cost of Land • Sampling Methodology

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Proposed COP Update Mechanisms & Efficiencies

Background

The BC Broiler Hatching Egg Commission gave the BC Chicken Marketing Board (BCCMB) and the BC Farm Industry Review Board (BCFIRB) formal notice of its intention to leave the linkage pricing formula effective for Period A158 (August 4, 2019), on April 18, 2019. Following that notice, BCFIRB commenced exercising its supervisory authority, culminating in the current Chicken Sector Pricing Supervisory Review. During this Review process the Commission has continued to prepare an alternative solution to the current Linkage-based pricing model.

The alternative solution developed by the Commission is a Cost of Production (COP) Pricing Formula – applying the framework currently used in Alberta. This framework is the basis for ongoing discussions on the implementation of a western-based pricing approach, which the Commission believes to be the ideal approach. To remain cohesive with the western-based pricing approach, the Commission has aligned the BC mechanisms and efficiencies as closely to the Alberta pricing model as possible. The Commission has committed to transparency in its COP Pricing Formula initiative; therefore, it has included within these documents both the proposed mechanisms used to calculate the COP and the efficiencies proposed to ensure the calculation reflects accurate and up-to-date inputs as quickly as possible.

COP Update Mechanisms

How inputs of the COP are updated and recalculated to ensure the use of the most recent information. Updates to the inputs below are made every cycle unless otherwise specified.

Feed

Three weeks before the start of the period, Serecon will survey the feed companies in BC to obtain pricing. These will be indexed against the baseline reported price.

This does not depart from how this cost has historically been updated.

Further Analysis

As noted in Serecon's COP report dated May 6, 2021 (p.14), "Feed prices used were the actual weighted averages of all feed types used in the reported cycles after all discounts received by the grower." Further, Serecon "…created indexes between the reported pricing from the feed survey and the price actually paid for that period for the production timeframe used in the survey." This is to ensure the COP appropriately captures discounts received by Producers in future pricing periods.

MNP's made an observation of this approach (p. 51) and was concluded that it was a validated COP item (p. 69).

Thus, a change in the surveyed feed company prices would be reasonably reflected in the underlying cost to producers after discounts, with the index adjusted accordingly.

The feed costs as captured in the COP:

Component	Cost per bird	Comments
Feed – Pullets	$4.1138	Contained in the *Pullets* line item
Feed – Hen	$15.8248	The *Feed* line item
Total	$19.9386	

Of total surveyed costs of $71.34, feed accounts for 28.0%. Pullets are up to end of week 20 (140 days).

Effect on pricing example: Surveyed feed company prices increase 5.0% on average.

Component	Cost per bird	Increase	New cost
Feed – Pullets	$4.1138	$0.2057	$4.3195
Feed – Hen	$15.8248	$0.7912	$16.6160
Total	$19.9386	$0.9969	$20.9355

	$ / Hen	$ / Saleable Doz	$ / Saleable Chick
Base (A167)	$71.34	$6.4144	$0.6682
Change	$0.9969	$0.0897	$0.0093
New cost	$72.34	$6.5041	$0.6775

All else being equal, the saleable chick cost increases $0.0093 (0.93¢) in response to a 5.0% increase in feed cost.

Processing Dates

Updated utilizing a simple average of the previous cycle's actual dates and the upcoming cycle's planned dates based on hatchery forecasting information.

This is a prescribed change to the input calculation and reflects stakeholder concerns that the Commission can subjectively adjust the processing age, which in turn reduces or increases the eggs and chicks over which the period price is allocated.

A change in planned processing age may be required in certain instances, such as rate-of-lay changes (breed performance and/or animal husbandry practices), BCCMB allocation changes (on a per-cycle basis), and CHEP allocation changes (on an annual basis updated up to three times per year), among others. These are encapsulated within the meat-to-egg ratio (kilograms of eviscerated chicken that come from eggs set) which is not directly controllable by the Commission. While some concerns are addressed on an annual basis through the Utilization mechanism, further review may be required.

It is critical for the Commission and hatcheries to work closely together in domestic and import production management and that there be timely reporting, including through the Hatching Egg Reporting System.

Further Analysis

The lay cycle length is immediately reflected in the period to be priced. A comparison of the COP surveyed length of 56.1 weeks and the previous 55-week and planned 58-week lay cycles is provided in *COP-Based Pricing Effects* which follows this *Mechanisms and Efficiencies* section.

Components of the COP that change with lay cycle changes include feed (lay-house only), utilities (hydro, gas/propane), and full-time hired labour. While there is more variable cost for the additional week, there are more saleable eggs over which to recover those costs and the fixed costs. Therefore, the cost is reduced on a saleable dozen and salable chick basis.

Effect on pricing example: A one-week increase to lay cycle to 57.1 weeks.

A167	New (2020) COP	1 Week Increase	Change
Lay cycle (weeks)	56.1	57.1	1.0
Equivalent ($/doz)	$6.4144	$6.2994	$(0.1150)
Equivalent (per chick)	$0.6682	$0.6562	$(0.0120)
Hatchery margin (fixed)	$0.1894	$0.1894	$0.00
Day-old (per chick)	$0.8576	$0.8456	$(0.0120)
Recovery	100%	100%	100%

All else being equal, the saleable chick cost decreases by $0.0120 (1.2¢) in response to an increase of one week to the lay cycle.

Breeder Chick Pricing

The breeder chick prices are in the "Pullet" line item of the COP. The planned lay cycle of a breeder is from week 26 to week 58, or 32 weeks of production. This equals four 8-week pricing periods, with eggs beginning to be laid near the start of the fourth pricing period after placement.

Beginning in the fourth period following the price being set, and extending to the seventh period, the cost of that breeder chick price for males and females will be included as an average. By way of example, breeder chick prices for Period A170 would incorporate the average prices set for Periods A167, A166, A165 and A164.

The recommendation for the breeder chick margin, as discussed later in this document, will not result in a further change to the methodology presented here.

Further Analysis

Breeder chick costs at placement date are included in the *Pullets* COP line item and comprise $13.56 of the $28.44 total cost (47.7%). The balance the costs are for feed, veterinary & medicine, utilities, labour, etc. while the pullet is reared to transfer age.

The $13.56 includes an average includes both males and females. The male-to-female ratio surveyed was 13% and is to be used going forward, which is the recommended order ratio.

Example of breeder chick price inclusion:

Period of Original Cost to Producer	Start Date	Example Price*	Hatching egg production start (~26 weeks later)	Periods cost is brought into COP for pricing purposes
A167	2020-12-20	$9.25	2021-06-20 (A170)	A170, A171, A172, A173
A168	2021-02-14	$9.75	2021-08-15 (A171)	A171, A172, A173, A174
A169	2021-04-11	$10.00	2021-10-10 (A172)	A172, A173, A174, A175
A170	2021-06-06	$9.25	2021-12-05 (A173)	A173, A174, A175, A176
A171	2021-08-01	$9.50	2022-01-30 (A174)	A174, A175, A176, A177
A172	2021-09-26	$10.00	2022-03-27 (A175)	A175, A176, A177, A178
A173	2021-11-21	$9.60	2022-05-22 (A176)	A176, A177, A178, A179

**Randomly chosen figures*

Shown another way, price would be set (and included in the COP) as follows:

Period of Original Cost to Producer	Periods cost is brought into COP for pricing purposes									
	…	A169	A170	A171	A172	A173	A174	A175	A176	…
…	…	…	…	…	…	…	…	…	…	
A167	…		$9.25	$9.25	$9.25	$9.25				…
A168	…			$9.75	$9.75	$9.75	$9.75			…
A169	…				$10.00	$10.00	$10.00	$10.00		…
A170	…					$9.25	$9.25	$9.25	$9.25	…
A171	…						$9.50	$9.50	$9.50	…
A172	…							$10.00	$10.00	…
A173	…								$9.60	…
…	…	…	…	…	…	…	…	…	…	…
AVG	…	…	…	…	$9.5000	$9.5625	$9.6250	$9.6875	$9.5875	…

For greater clarity, an effect on pricing example: Increase of 5.0% to breeder chick prices in Period A167 which remains in place in following periods.

Period of Original Cost to Producer	Periods cost is brought into COP for pricing purposes										
	…	A168	A169	A170	A171	A172	A173	A174	A175	A176	…
…	…	…	…	…	…	…	…	…	…	…	
A166	…		$13.56	$13.56	$13.56	$13.56					…
A167	…			$14.24	$14.24	$14.24	$14.24				…
A168	…				$14.24	$14.24	$14.24	$14.24			…
A169	…					$14.24	$14.24	$14.24	$14.24		…
A170	…						$14.24	$14.24	$14.24	$14.24	…
A171	…							$14.24	$14.24	$14.24	…
A172	…								$14.24	$14.24	…
A173	…									$14.24	…
…	…	…	…	…	…	…	…	…	…	…	…
AVG	…	…	$13.56	$13.73	$13.90	$14.07	$14.24	$14.24	$14.24	$14.24	…
Change	…	…	$0.00	$0.17	$0.17	$0.17	$0.17	$0.00	$0.00	$0.00	…
Cumul. Change	…	…	$0.00	$0.17	$0.34	$0.51	$0.68	$0.68	$0.68	$0.68	…

Here is the cumulative effect on price:

	$ / Hen	$ / Saleable Doz	$ / Saleable Chick
Base (A167)	$71.34	$6.4144	$0.6682
A170 cumul. change	$0.17*	$0.0154	$0.0016
New cost	$71.52*	$6.4298	$0.6698

**Due to rounding*

	$ / Hen	$ / Saleable Doz	$ / Saleable Chick
Base (A167)	$71.34	$6.4144	$0.6682
A171 cumul. change	$0.34*	$0.0307	$0.0032
New cost	$71.69*	$6.4451	$0.6714

**Due to rounding*

	$ / Hen	$ / Saleable Doz	$ / Saleable Chick
Base (A167)	$71.34	$6.4144	$0.6682
A172 cumul. change	$0.51*	$0.0460	$0.0048
New cost	$71.86*	$6.4604	$0.6730

**Due to rounding*

	$ / Hen	$ / Saleable Doz	$ / Saleable Chick
Base (A167)	$71.34	$6.4144	$0.6682
A173 cumul. change	$0.68*	$0.0613	$0.0064*
New cost	$72.03*	$6.4757	$0.6745*

**Due to rounding*

All else being equal, the saleable chick cost increases by $0.0016 (0.16¢) per period, and $0.0064 (0.64¢) once fully incorporated over four periods, in response to an increase of 5.0% to the breeder chick prices.

Vaccine Adjustment Mechanism

Updated during the COP surveys every three years and adjusted as per the vaccination update mechanism once established through a proposed committee process.

The process to be put in place would create a BC vaccination program to ensure the protection of all progenies, making vaccinations non-competitive in BC. This process is under current review of the Commission to ensure it captures chick quality concerns flagged by Growers.

Further Analysis

Vaccine costs are included in the *Pullets* COP line item and comprise $1.43 of the $28.44 total cost (5.0%). Costs are currently indexed using the CPI.

Effect on pricing example: Introduction of a vaccine costing $0.15 (15¢) per bird on average.

Component	Cost per bird	Increase	New cost
Pullets – Vet & Medicine	$1.43	$0.15	$1.58

	$ / Hen	$ / Saleable Doz	$ / Saleable Chick
Base (A167)	$71.34	$6.4144	$0.6682
Change	$0.15	$0.0135	$0.0014
New cost	$71.49	$6.4279	$0.6696

All else being equal, the saleable chick cost increases $0.0014 (0.14¢) in response to a $0.15 (15¢) increase in vaccine cost.

Utilization

Effective quota utilization is included in the calculation; as hens begin laying eggs approximately 6 months following placement, the 'absolute' utilization (of quota) that begins on July 1, 202x must be aligned with the eggs using a rolling-average which begins 6 months after placement. For example, eggs coming from flocks placed at the previous 100% utilization from July 1, 2019 to June 30, 2020 will be in lay, to some extent, from January 2020 to late July-early August 2021.

Contribution margin elements would be impacted, up or down, and include all the items under Investment Cost, and Management Labour. For instance, if utilization were to increase, it would mean a better return to capital and management and those costs would correspondingly decrease.

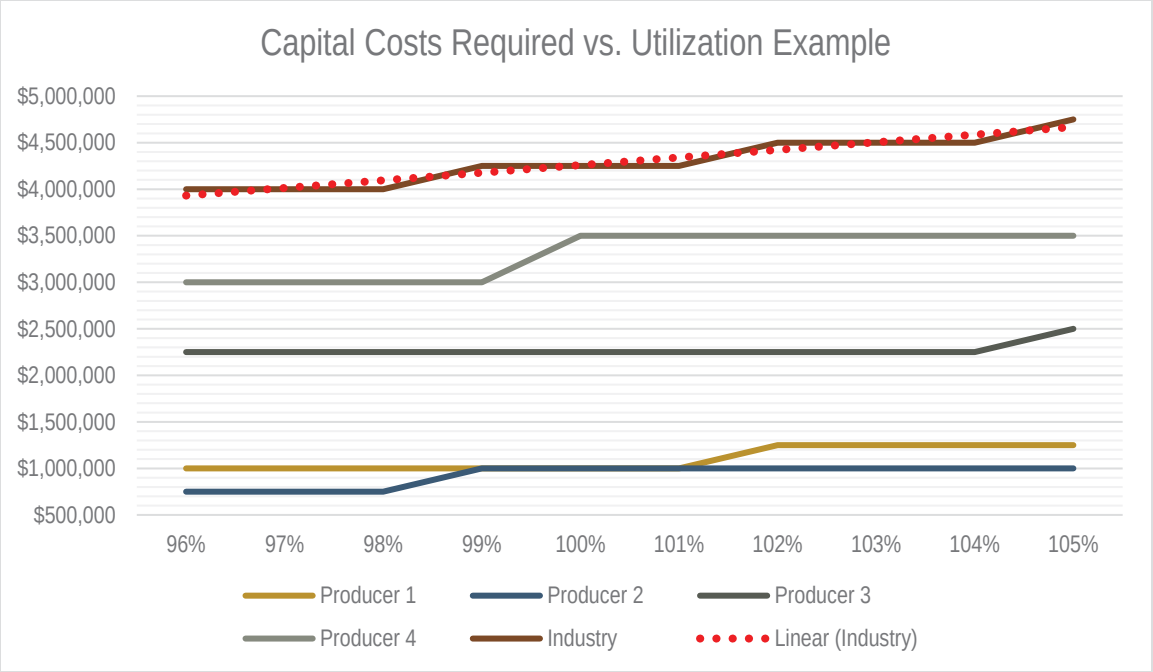
This input was removed at the last linkage interaction but is to be reintroduced as the COP is not linked to the Grower's COP and must again be considered.

Further Analysis

As in past, the utilization at the time of the surveys becomes the base for the period in which the COP is in use. This would encapsulate the efficiencies and productivity by producers during the period surveyed. If a change in utilization as set annually by the Commission would increase utilization, say from 96% to 98%, a corresponding 2% increase in efficiencies and additional productivity could be considered.

Under the capital cost model approach, this efficiency can be more easily factored in as capital cost per square foot was used; however, it is difficult to adjust an element such as utilization that affects many other variables upon which the values were obtained during the survey period and not tracked each pricing period. Caution in updating this variable outside of the survey period is urged by Serecon.

Below is a visual depiction of a four-producer industry who would need to expand their operations at various utilizations to be able to farm any additional placeable hens due to an increase in utilization.



This shows that the industry overall experiences close to a linear increase in capital costs as each producer has a separate "step up" when they must incur more capital (quota excluded) to put one more bird in (e.g., build a new barn; increase equipment; change equipment, etc.).

The effects on production via utilization versus lay cycle, all else being equal, on egg production:

- 1% of utilization at current hen performance ≈ 1.4 M eggs for a full year
- 1 week of lay at 96% utilization at current hen performance at 58-week lay cycle ≈ 3.2 M eggs for a full year

The effects on egg production are much more pronounced – over two-times the effect – with a change in lay cycle than with utilization.

Industry Benefit Index

A calculation of the historical linkage levy portion put toward the management of the Official Flock Schedule, and industry initiatives such as SE sampling, blood work programs, and audit verification processes that benefit the entire chicken industry (e.g., chick quality concerns). This is similar to the approach in Alberta and Saskatchewan.

These costs were included in the levy within the linkage model but will be removed from the levy in the COP pricing formula to ensure that industry betterment costs are reflected in the cost of production and are evenly distributed throughout the supply chain.

Further Analysis

Calculating the average cost of the Industry Benefit Index can be accomplished on a per dozen basis or per chick basis.

Effect on pricing example: IBI inclusion of $100,000 annually.

Hatching eggs picked up (produced) in 2020	119,400,269
Dozens	9,950,022
Dozens (rounded)	10,000,000
IBI inclusion amount	$100,000
Cost per dozen	$0.0104
Cost per chick (80% saleable rate)	$0.0010 0.10¢

As this inclusion amount is annually estimated by the Commission as part of its budget, it would be possible to ascribe this cost annually, as in the above example. However, chicks of differing amounts are needed on a period-by-period basis, in addition to hatching egg production not being a flat-line throughout the year. It may be more precise to divide the IBI inclusion amount by 6.5 pricing periods (≈ $15,385 per cycle in this example) and spread that over hatching egg dozens anticipated to be produced, which would factor in the most recent lay cycle among others.

Ostensibly these costs may increase productivity or reduce costs elsewhere in the supply chain, mitigating its total impact at the end of the supply chain. These would require much further analyses with multiple stakeholders incorporating significant assumptions that cannot be readily quantified at this time.

Hatch Average

On the Pricing Formulae, the COP when expressed on a saleable chick basis uses an 80% assumed average saleable rate. Commission staff will instead calculate the industry's current average hatch and adjust this based on industry actuals. If the industry is hatching at a higher rate, the cost will be spread across more chicks resulting in lower costs for Growers and Processors, while ensuring Producers continue to receive their full costs back. Use of an actual rate eliminates another element of modelling.

	Base	Current Formula (actual rate = 82%)	Proposed Formula (actual rate = 82%)
Saleable dozen price	$6.5000	$6.5000	$6.5000
Average saleable rate	80%	80%	82%
Average chicks/dozen	9.6	9.6	9.8
Saleable chick price	$0.6771	$0.6771	$0.6606

Effect on Producers	Base	Current Formula	Proposed Formula
Eggs	125,000,000	125,000,000	125,000,000
Average saleable rate	80%	82%	82%
Chicks sold	100,000,000	102,500,000	102,500,00
Receipts	$67,708,333	$69,401,042	$67,708,333

The proposed formula would recognize industry efficiencies on saleable chick rates that exceed 80% to the benefit of those further in the supply chain, beginning with the Growers. The effects on hatcheries are limited to volume changes in saleable chicks as the hatchery margin remains static (currently 18.94 cents per saleable chick). With COP-based pricing, the average, efficient producer would receive their full costs back.

Guardrails, or a hatch band, would be set with an 80% floor and 85% ceiling. This would incentivize hatcheries to hatch above 85%. The average saleability rate may be best obtained through the Production Trimming efficiency reporting (dual purpose). At this point, this mechanism is only prospective in nature and will require further examination.

Further Analysis

It was confirmed that hatch average updates would only affect the conversion from a saleable dozen price to a saleable chick price. Other information points that would be required include distinct reporting of hatch results between domestic and import product by hatcheries, and the choice on whether to use current hatch results or life-of-flock results on the most recently processed flocks.

Adjusting the average saleable rate would add complexity to the pricing model which may exceed the benefit received by stakeholders from its refinement.

Fowl and Breaker Quality Eggs Revenues

These ancillary revenues are to be reintroduced into the COP Pricing Formula.

Recently, the Commission removed the fowl and breaker egg revenues from the Linkage-Based Pricing Formula (although they remained in the COP) to balance the non-inclusion of the grower premiums. The Commission will reintroduce them within the COP Pricing Formula.

Further Analysis

Effect on pricing example: Reincorporation of the ancillary revenues.

Component	Cost per bird
Salvage Egg Revenue	($0.1810)
Spent Hen Revenue	($0.7196)
Total	($0.9006)

	$ / Hen	$ / Saleable Doz	$ / Saleable Chick
Base (A167)	$71.34	$6.4144	$0.6682
Change	($0.90)	($0.0810)	($0.0085)
New cost	$70.44	$6.3334	$0.6597

All else being equal, the saleable chick cost decreases $0.0085 (0.85¢) in response to ancillary revenue inclusion. The current ancillary revenue rates for salvage egg and spent hen are $0.7000 per dozen and $0.2000 per kilogram, respectively.

Hatcheries without an associated processor (e.g., company or division) may be receiving the benefit of not paying for the spent fowl revenue to producers, through receiving the same, ancillary revenue-reduced saleable chick price. This benefit would be $0.7196 per bird, which equates to $0.0067 (0.67¢) per saleable chick. The net ‘cost’ or benefit processors earn on products containing spent hen meat is not quantifiable by the Commission.

Solutions to this, such as setting two prices, would add complexity to the pricing model which may exceed the benefit received by stakeholders from its refinement.

New Costs

Should a new cost be experienced before it can be reasonably surveyed as part of the next COP iteration, depending on the manner of the cost (i.e., voluntary vs. involuntary), all relevant information will be forwarded to the Commission PPAC and, if necessary, the BCCMB PPAC. The Commission will review the advice and determine whether the cost is substantiated and can or should be included in the COP or, alternatively, covered by Commission levies (funded by Producers) and added to the Industry Benefit Index, noted above.

Further Analysis

The nature of the cost is paramount to ensuring whether a cost should be added before the next COP update surveys, over what basis it is updated, and whether it is a cost that should be borne by producers or the industry at all.

For example, if a cost inclusion is determined to best be incorporated over dozens produced or chicks hatched and is annual, the inclusion may follow the example of the Industry Benefit Index.

The cost could also be determined to be best expressed using a weighted-average farm in the survey to represent what a typical farm would experience. This again converts the cost to a per bird basis (effectively the IBI example) and while some farmers would receive a bit too much, some would receive a bit too little.

Effect on pricing example: New cost inclusion of $1.00 per bird.

Element	Value
Increased cost per bird	$1.00
Eggs/hen (base)	133.5
Increased cost per egg	$0.0075
Increased cost per dozen	$0.0899
Cost per saleable chick (new)	$0.6775
Cost per saleable chick (base)	$0.6682
Change per saleable chick	$0.0094 (0.94¢)

All else being equal, the saleable chick cost increases $0.0094 (0.94¢) in response to a $1.00 increased cost per bird.

COP Efficiencies

The way in which the COP Pricing Formula ensures balance between Producer costs and sector cost-effectiveness.

Saleable Chick Payment

Producers are paid on a saleable chick as this incentivizes producers to manage fertility and off-sets hatch issues as hatcheries only pay for what is hatched and saleable. Already standard industry practice, this information sources the average hatch information for inclusion at each cycle discussed in the Hatch Average mechanism above.

Further Analysis

A common practice to increase fertility is to introduce new males into a lay barn referred to as spiking males. The cost of this practice, which is to keep up fertility and thus, saleability which is how a Producer is paid, is estimated below:

Flock size	10,000 hens
Male-to-female ratio	10%
Males	1,000
Spiking males	50 (or 5%)
Cost per male (estimate)	$30.00
Cost (estimate)	$1,500.00

If fertility is maintained to permit the Producer to ship at least one additional buggy/dolly to their hatchery, by way of a prolonged lay cycle, the potential (minimum) revenue and net revenue earned may be estimated as follows:

Additional eggs due to prolonged lay cycle	5,040
Saleable rate (minimum due to 70% hatch rule)	70%
Saleable chicks	3,528
Price (A172)	$0.6709
Revenue	$2,366.94
Net revenue	$866.94

The return to the producer exceeds the cost, even after a levy rate is applied (not included here). This positive return also benefits the hatcheries through higher, or maintained, hatch rates, thereby improving efficiency. Unfortunately, this net revenue return is often difficult to ascertain as at times it is only an opportunity cost (when not done).

It should be noted that many Producers have invested in their own spiking barn facilities and do not need to source externally. For those who do source off their own farm, the Commission has a Spiking Male testing program to facilitate this practice while addressing biosecurity concerns.

70% Hatch

Processes are currently in place within the Consolidated Order to address underperforming flocks and ensure that hatcheries only need to continue to set eggs that hatch greater than or equal to 70%. This assists hatcheries with machine efficiencies and labour costs.

Further Analysis

In 2018, four flocks were identified as having low hatches and with performance data reviewed and lay cycles adjusted accordingly. In 2019 and 2020, one and four flocks had low hatches and had their lay cycles adjusted, respectively.

In 2021, hatcheries monitored, and the Commission was kept up-to-date on, hatch rate changes due to the heat dome in June. Rates rebounded following a brief reduction and no flock's lay cycle was reduced as a result of hatch rate.

The 70% hatch efficiency is currently employed, and flocks having lay cycles adjusted as a result of low hatch may likely be eliminated in the Production Trimming efficiency below.

Production Trimming

To be updated every pricing period, the current average chicks per hen is calculated using a trimmed average of 5%, both top and bottom, of the total data set of flocks that finished producing (life-of-flock data) on a rolling 12-months. This method ensures any outliers, e.g., "hot flocks" or "disaster flocks", are not considered in the calculation.

This approach has been adopted from the updated Alberta framework to ensure alignment with the western provinces.

Further Analysis

The indexing approach is used by other provinces, notably in the Alberta framework.

For reporting and comparability purposes, the Commission reviews life-of-flock eggs and hatch data and prorates to the same lay cycle length. For the last three years of complete data, here is how an Olympic average would look at a point in time (December 31):

Eggs per bird, average to 60 weeks	143.09	139.37	140.70
Flocks trimmed (5%)	5 top & 5 bottom	5 top & 5 bottom	5 top & 5 bottom
Trimmed average	143.25	140.45	142.22
Change	0.16 (0.1%)	1.08 (0.8%)	1.52 (1.1%)
Average change	0.92 eggs/bird		

Sourced from data housed by the Commission; Serecon Inc. maintains confidentiality of the actual surveyed results.

A comparison of the effects at the surveyed lay cycle length (56.1 weeks) and target lay cycle length (58 weeks) is as follows:

At 56.1 weeks	$ / Hen	Eggs/hen	$ / Saleable Doz	$ / Saleable Chick
Base (A167)	$71.34	133.5	$6.4144	$0.6682
Trimmed	$71.34	134.5	$6.3667	$0.6632
Change	$0.00	1.0	($0.0477)	($0.0050) (0.50¢)

At 58.0 weeks	$ / Hen*	Eggs/hen	$ / Saleable Doz	$ / Saleable Chick
Base (A167)	$72.27	139.9	$6.1989	$0.6457
Trimmed	$72.27	140.9	$6.1549	$0.6411
Change	$0.00	1.0	($0.0440)	($0.0046) (0.46¢)

Average $/hen increases due to lay cycle length increase (variable costs), but overall $/saleable dozen decreases.

A slightly higher effect on saleable chick price is expected at a lower lay cycle (56.1 weeks) given a trimmed average adjustment of 1.0 eggs/hen over a base of 133.5 is larger than the 58.0-week base of 139.9. This assumes the saleable chick rate remains constant.

A rolling 12-month average would require complete data being captured through the Hatching Egg Reporting System. This would then lead the Commission to be able to complete adjustments to the total eggs per hen and be able to link any adjustments to lay cycle with appropriate adjustments to the eggs for that number of weeks. Adjusting lay cycle without a similar adjustment to total eggs per hen (as shown above) is a concern voiced by stakeholders, namely the BC Chicken Marketing Board. The Commission's understanding of this link, or indexing approach, with Serecon Inc.

The complete data set being captured through HERS would also permit the Commission to further review whether the adjustment from saleable dozen to saleable chick can be updated to match changes in the saleable chick rate; that conversion rate has remained a constant at 80.0%.

Notes

Reporting guidelines and timelines for time-sensitive information that are to be included in the calculation are to be updated to ensure that expectations are clear. For example, end-of-flock information needs to be reported within 40 days of processing to ensure that the Commission can capture it within the pricing structure. Breeder company direct costs need to be provided to ensure that cost is captured within the pricing update.

Further Analysis

The Commission has reviewed further improvements to the Hatching Egg Reporting System to support data collection necessary to enable staff to perform the COP Update Mechanisms and Efficiencies. The most significant data point affected by these improvements will be permitting the Commission to perform a rolling 12-month average for the Production Trimming efficiency.

COP-Based Pricing Effects

At the COP Roundtable the Commission presented the difference between the current Linkage-Based Pricing and the proposed COP-Based Pricing. The 2020 COP survey yielded a $1.00/hen increase from the last COP, or $0.009/saleable chick. The following tables for Period A167 to A168 were part of the follow-up slide deck that was provided to attendees which review the effects; Period A169 is now also available.

The current lay cycle for these periods is 55 weeks, as noted in the middle columns.

A167	Base New (2020) COP	Current Lay Cycle*	Target Lay Cycle*
Lay cycle (weeks)	56.1	55	58
Equivalent ($/doz)	$6.4144	$6.5461	$6.1989
Equivalent (per chick)	$0.6682	$0.6819	$0.6457
Hatchery margin (fixed)	$0.1894	$0.1894	$0.1894
Day-old (per chick)	$0.8576	$0.8713	$0.8351
Recovery	100%	100%	100%
v. A167 Linkage price ($0.6633)	-	97.3%	-

** No other variables changed*

A168	Base New (2020) COP	Current Lay Cycle*	Target Lay Cycle*
Lay cycle (weeks)	56.1	55	58
Equivalent ($/doz)	$6.4314	$6.5634	$6.2152
Equivalent (per chick)	$0.6699	$0.6837	$0.6474
Hatchery margin (fixed)	$0.1894	$0.1894	$0.1894
Day-old (per chick)	$0.8593	$0.8731	$0.8368
Recovery	100%	100%	100%
v. A168 Linkage price ($0.6845)	-	100.1%	-

** No other variables changed*

A169	Base New (2020) COP	Current Lay Cycle*	Target Lay Cycle*
Lay cycle (weeks)	56.1	55	58
Equivalent ($/doz)	$6.5681	$6.7013	$6.3502
Equivalent (per chick)	$0.6842	$0.6981	$0.6615
Hatchery margin (fixed)	$0.1894	$0.1894	$0.1894
Day-old (per chick)	$0.8736	$0.8875	$0.8509
Recovery	100%	100%	100%
v. A169 Linkage price ($0.7127)	-	102.1%	-

** No other variables changed*

The comparison between the two COP's shows that the price as derived by the current Linkage-Based Pricing Model has yielded both higher and lower returns than the proposed COP-based pricing formulae over the past four pricing periods. As not all the effects of the proposed mechanisms and efficiencies are quantifiable at this time, a complete comparison between the current Linkage-based price a stand-alone COP-based price is not possible.

Further Analysis

A170	Base New (2020) COP	Current Lay Cycle*	Target Lay Cycle*
Lay cycle (weeks)	56.1	55	58
Equivalent ($/doz)	$6.7013	$6.7137	$6.3621
Equivalent (per chick)	$0.6855	$0.6993	$0.6627
Hatchery margin (fixed)	$0.1894	$0.1894	$0.1894
Day-old (per chick)	$0.8749	$0.8887	$0.8521
Recovery	100%	100%	100%
v. A170 Linkage price ($0.7090)	-	101.4%	-

** No other variables changed*

A171	Base New (2020) COP	Current Lay Cycle*	Target Lay Cycle*
Lay cycle (weeks)	56.1	57	58
Equivalent ($/doz)	$6.7335	$6.6222	$6.5138
Equivalent (per chick)	$0.7014	$0.6898	$0.6785
Hatchery margin (fixed)	$0.1894	$0.1894	$0.1894
Day-old (per chick)	$0.8908	$0.8792	$0.8679
Recovery	100%	100%	100%
v. A171 Linkage price ($0.6915)	-	100.2%	-

** No other variables changed*

A172	Base New (2020) COP	Current Lay Cycle*	Target Lay Cycle*
Lay cycle (weeks)	56.1	58	58
Equivalent ($/doz)	$6.7213	$6.5011	$6.5011
Equivalent (per chick)	$0.7001	$0.6772	$0.6772
Hatchery margin (fixed)	$0.1894	$0.1894	$0.1894
Day-old (per chick)	$0.8895	$0.8666	$0.8666
Recovery	100%	100%	100%
v. A172 Linkage price ($0.6709)	-	99.1%	-

** No other variables changed*

Note that in Period A171 the lay cycle increased to 57 weeks, and in Period A172 to 58 weeks. As of Period A172, the target lay cycle was achieved and is why this and the current lay cycle columns have equal values.

Summarizing the tables above of the six periods:

Price	A167	A168	A169	A170	A171	A172
New (2020) COP, Per S.C.	$0.6819	$0.6837	$0.6981	$0.6993	$0.6898	$0.6772
Linkage-COP, per S.C.	$0.6633	$0.6845	$0.7127	$0.7090	$0.6915	$0.6709
Difference	($0.0186) (1.86¢)	$0.0008 0.08¢	$0.0146 1.46¢	$0.0097 0.97¢	$0.0017 0.17¢	($0.0063) (0.63¢)
% Recovery vs. Linkage-COP-derived price	97.3%	100.1%	102.1%	101.4%	100.2%	99.1%

The comparison, possible by using the same lay cycle length for each period, and holding other variables constant, shows that the New (2020) COP-derived price exceeds the Linkage-COP-derived price in Periods A167 and A172 at 100% recovery. For Periods A168 to A171, the New (2020) COP-derived price is less than the Linkage-COP-derived price at 100% recovery.

The percentage recovery comparison ranges from 97.3% to 102.1%, or a band of 4.8% (1.86¢ deficient to 0.97¢ excessive, or a band of 2.83¢).

To further the analysis, the following table is presented to view the layering in of the mechanisms:

Price per Saleable Chick	A167	A168	A169	A170	A171	A172
New (2020) COP, Per S.C.	$0.6819	$0.6837	$0.6981	$0.6993	$0.6898	$0.6772
Mechanisms						
+/- Feed[1]	-	-	-	-	-	-
+/- Processing dates[2]	-	-	-	-	-	-
+/- Breeder chick[3]	-	-	-	-	-	-
+/- Vaccine adjustment[4]	-	-	-	-	-	-
+/- Utilization[5]	-	-	-	-	-	-
+/- Industry Benefit Index[6]	$0.0010	$0.0010	$0.0010	$0.0010	$0.0010	$0.0010
+/- Hatch average[7]	-	-	-	-	-	-
+/- Ancillary revenues[8]	($0.0085)	($0.0085)	($0.0085)	($0.0085)	($0.0085)	($0.0085)
+/- New costs[9]	-	-	-	-	-	-
New (2020) COP with Mechanisms	$0.6744	$0.6762	$0.6906	$0.6918	$0.6823	$0.6697

1 No change to process; no change to price currently.
2 Processing date (lay cycle) at 58 weeks in A172. Prices set at the then lay cycle length. No change to price.
3 Potential cost formula change, moving profit margin by hatcheries out of cost and into hatchery margin. No net change to day-old chick price to Growers.
4 No final formula or additional cost; no change to price currently.
5 Recommended approach as previous; no change to utilization outside of survey period. No change to price currently.
6 At the example rate of $100,000 annually.
7 Adjustable once tracking of domestic hatch rates on a per-period basis is available. No change to price currently.
8 Estimated at lay cycle at 56.1 weeks.
9 Prospective mechanism; no change to price currently.

The New (2020) COP with Mechanisms Price would then have the Production Trimming efficiency applied. It should be noted that with having the efficiencies of Saleable Chick Payment and 70% Hatch in the Consolidated Order, the results of the surveys would have these efficiencies embedded already.

Price per Saleable Chick	A167	A168	A169	A170	A171	A172
New (2020) COP with Mechanisms	$0.6819	$0.6837	$0.6981	$0.6993	$0.6898	$0.6772
Expressed as Recovery of Cost	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Efficiencies						
+/- Saleable Chick Payment	-	-	-	-	-	-
+/- 70% Hatch	-	-	-	-	-	-
+/- Production trimming[1]	($0.0052)	($0.0052)	($0.0052)	($0.0052)	($0.0048)	($0.0046)
New (2020) COP w/ Mechanisms & Efficiencies – for Pricing	$0.6767	$0.6785	$0.6929	$0.6941	$0.6850	$0.6726
Expressed as Recovery of Cost	99.2%	99.2%	99.3%	99.3%	99.3%	99.3%

1 Periods A167-170 were at a 55-week lay cycle; A171 at a 57-week lay cycle; A172 at a 58-week lay cycle.

Comparing the New (2020) COP Price set at 99.2% to 99.3% recovery:

Price per Saleable Chick	A167	A168	A169	A170	A171	A172
New (2020) COP w/ Mechanisms & Efficiencies – for Pricing	$0.6767	$0.6785	$0.6929	$0.6941	$0.6850	$0.6726
Expressed as Recovery of Cost	99.2%	99.2%	99.3%	99.3%	99.3%	99.3%
Linkage-COP, per S.C.	$0.6633	$0.6845	$0.7127	$0.7090	$0.6915	$0.6709
Difference	($0.0134) (1.34¢)	$0.0060 0.60¢	$0.0198 1.98¢	$0.0149 1.49¢	$0.0065 0.65¢	($0.0017) (0.17¢)
% Recovery of efficient New (2020) COP-derived price*	97.3%	100.1%	102.1%	101.4%	100.2%	99.1%
Spread not covered at Expressed Recovery of Cost	1.9%	-	-	-	-	0.2%

**This is not to be confused with recovery parity.*

In three of these pricing periods, it is shown that the current Linkage-COP-derived price is less than the efficient New (2020) COP-derived price. Therefore, we would anticipate a phased-in approach for a transition period.

There were two potential approaches reviewed:

1. Add an incremental percentage to the Linkage-COP-derived price, over 'X' periods, unless and until the efficient New (2020) COP-derived recovery is consistently achieved, capping the maximum at the efficient New (2020) COP-derived price in any one period.

2. Use a rising floor to the efficient New (2020) COP-derived recovery, over 'X' periods, and take the maximum price between this and the current Linkage-COP-derived price, capping the maximum at the efficient New (2020) COP-derived price in any one period.

Under both approaches, the price set would never exceed the efficient New (2020) COP-derived price, even in instances where the Linkage-COP-derived price would indicate such a price is valid.

First Approach

An incremental percentage of 0.5% is added to the "% Recovery of efficient New (2020) COP-derived price" each period, with a maximum cap set at the efficient New (2020) COP-derived price in any one period.

Single period example:

A167 Linkage-COP-derived price	$0.6633
% Recovery of efficient New (2020) COP-derived price*	97.3%
Full return (100%)	$0.6819
x Recovery + incremental percentage	x 97.8% [97.3% + 0.5%]
	$0.6669 [A]
Efficient New (2020) COP-based price at 99.2%	$0.6767 [B]
Maximum price, recovery [lesser of A or B]	$0.6669, 97.8%

**This is not to be confused with recovery parity.*

Based on recovery percentages over the past few years, 20 pricing periods would equal 10.0% and should more than cover any spread between the Linkage-COP-derived price and the efficient New (2020) COP-derived price. At this point, the price set is the efficient New (2020) COP-derived price.

For Periods A167-A172:

Period	A167	A168	A169
Linkage-COP-derived price	$0.6633	$0.6845	$0.7127
% Recovery of efficient New (2020) COP-derived price*	97.3%	100.1%	102.1%
Full return (100%)	$0.6819	$0.6837	$0.6981
x Recovery + incremental percentage	x 97.8% [97.3% + 0.5%]	x 101.1% [100.1% + 1.0%]	x 103.6% [102.1% + 1.5%]
	$0.6669 [A]	$0.6912 [A]	$0.7232 [A]
Efficient New (2020) COP-based price at 99.2-99.3%	$0.6767 [B]	$0.6785 [B]	$0.6929 [B]
Maximum price, recovery [lesser of A or B]	$0.6669, 97.8%	$0.6785, 99.2%	$0.6929, 99.3%

**This is not to be confused with recovery parity.*

Period	A170	A171	A172
Linkage-COP-derived price	$0.7090	$0.6915	$0.6709
% Recovery of efficient New (2020) COP-derived price*	101.4%	100.2%	99.1%
Full return (100%)	$0.6993	$0.6898	$0.6772
x Recovery + incremental percentage	x 103.4% [101.4% + 2.0%]	x 102.7% [100.2% + 2.5%]	x 102.1% [99.1% + 3.0%]
	$0.7231 [A]	$0.7084 [A]	$0.6914 [A]
Efficient New (2020) COP-based price at 99.2-99.3%	$0.6941 [B]	$0.6850 [B]	$0.6726 [B]
Maximum price, recovery [lesser of A or B]	$0.6941, 99.3%	$0.6850, 99.3%	$0.6726, 99.3%

**This is not to be confused with recovery parity.*

The first phase-in approach shows that in Periods A168 to A171, there is no incremental percentage required to be applied as the Linkage-COP-derived price exceeds that which would be set under the efficient New (2020) COP.

In Period A167, the spread of 1.9% is reduced by the incremental percentage of 0.5%, leaving 1.4% unrecovered. In Period A172, the spread of 0.2% is reduced by the incremental percentage 3.0%, leaving 0.0% unrecovered.

It is important to note that in each pricing period, the maximum price does not exceed an efficient recovery of 99.2%-99.3%.

Second Approach

Maximum of current Linkage-based price or floor of 95.0% of the efficient New (2020) COP-derived price is established, increasing incrementally by 0.5% per period for 'X' periods until the price is set at the efficient recovery percentage (99.2% to 99.3%), with a maximum cap set at the efficient New (2020) COP-derived price in any one period.

While it would take 9 pricing periods, or 72 weeks, to fully implement this approach, in periods in which the current Linkage-based price exceeds the efficient New (2020) COP-derived price, the efficient New (2020) COP-derived price would effectively be in place.

Single period example:

A167 Efficient New (2020) COP-derived price	$0.6767 [A]
% Recovery	99.2%
Full return (100%)	$0.6819
x Floor	x 95.0%
	$0.6478 [B]
Linkage-COP-derived price	$0.6633 [C]
[Greater of B or C]	$0.6633 [D]
Capped return [A]	$0.6767
Maximum price, recovery [lesser of A or D]	$0.6633, 97.3%

For Periods A167-A172:

Period	A167	A168	A169
Efficient New (2020) COP-derived price	$0.6767 [A]	$0.6785 [A]	$0.6929 [A]
% Recovery	99.2%	99.2%	99.3%
Full return (100%)	$0.6819	$0.6837	$0.6981
x Floor	x 95.0%	x 95.5%	x 96.0%
	$0.6478 [B]	$0.6529 [B]	$0.6702 [B]
Linkage-COP-derived price	$0.6633 [C]	$0.6845 [C]	$0.7127 [C]
[Greater of B or C]	$0.6633 [D]	$0.6845 [D]	$0.7127 [D]
Capped return [A]	$0.6767	$0.6785	$0.6929
Maximum price, recovery [lesser of A or D]	$0.6633, 97.3%	$0.6785, 99.2%	$0.6929, 99.3%

Period	A170	A171	A172
Efficient New (2020) COP-derived price	$0.6941 [A]	$0.6850 [A]	$0.6726 [A]
% Recovery	99.3%	99.3%	99.3%
Full return (100%)	$0.6993	$0.6898	$0.6772
x Floor	x 96.5%	x 97.0%	x 97.5%
	$0.6748 [B]	$0.6691 [B]	$0.6603 [B]
Linkage-COP-derived price	$0.7090 [C]	$0.6915 [C]	$0.6709 [C]
[Greater of B or C]	$0.7090 [D]	$0.6915 [D]	$0.6709 [D]
Capped return [A]	$0.6941	$0.6850	$0.6726
Maximum price, recovery [lesser of A or D]	$0.6941, 99.3%	$0.6850, 99.3%	$0.6709, 99.1%

The second phase-in approach shows that in Periods A167 to A172, the floor is not the limit, but instead the Linkage-COP-derived price is [C]. In A172, the floor of 97.5% does not trigger an increase in the price as the Linkage-COP-derived price [D] is at 99.1%. Therefore, the price is set at 99.1%.

It is important to note that in each pricing period, the maximum price does not exceed an efficient recovery of 99.2%-99.3%.

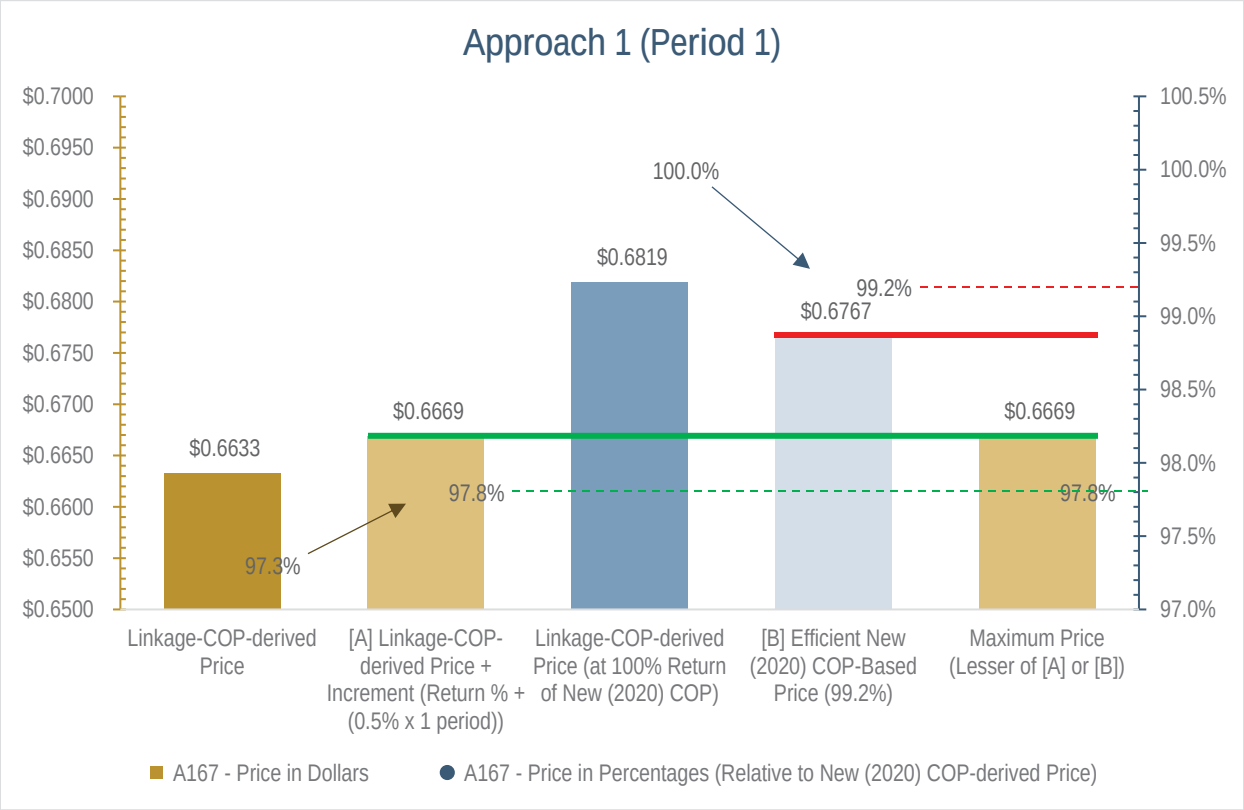
Summary of Phased-In Approaches

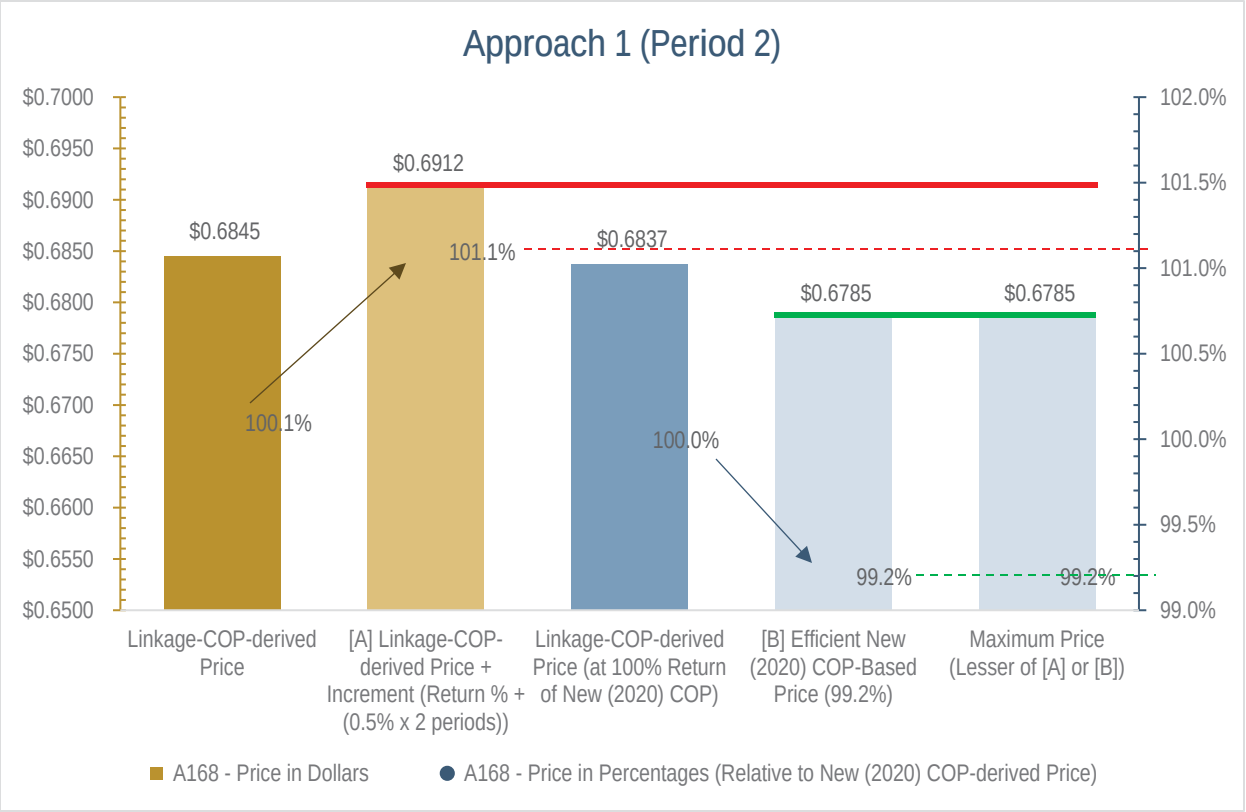
Price	A167	A168	A169	A170	A171	A172
First approach	$0.6669, 97.8%	$0.6785, 99.2%	$0.6929, 99.3%	$0.6941, 99.3%	$0.6850, 99.3%	$0.6726, 99.3%
Second approach	$0.6633, 97.3%	$0.6785, 99.2%	$0.6929, 99.3%	$0.6941, 99.3%	$0.6850, 99.3%	$0.6709, 99.1%
Difference	($0.0036), (0.5%)	$0.0000, 0.0%	$0.0000, 0.0%	$0.0000, 0.0%	$0.0000, 0.0%	($0.0017), (0.2%)

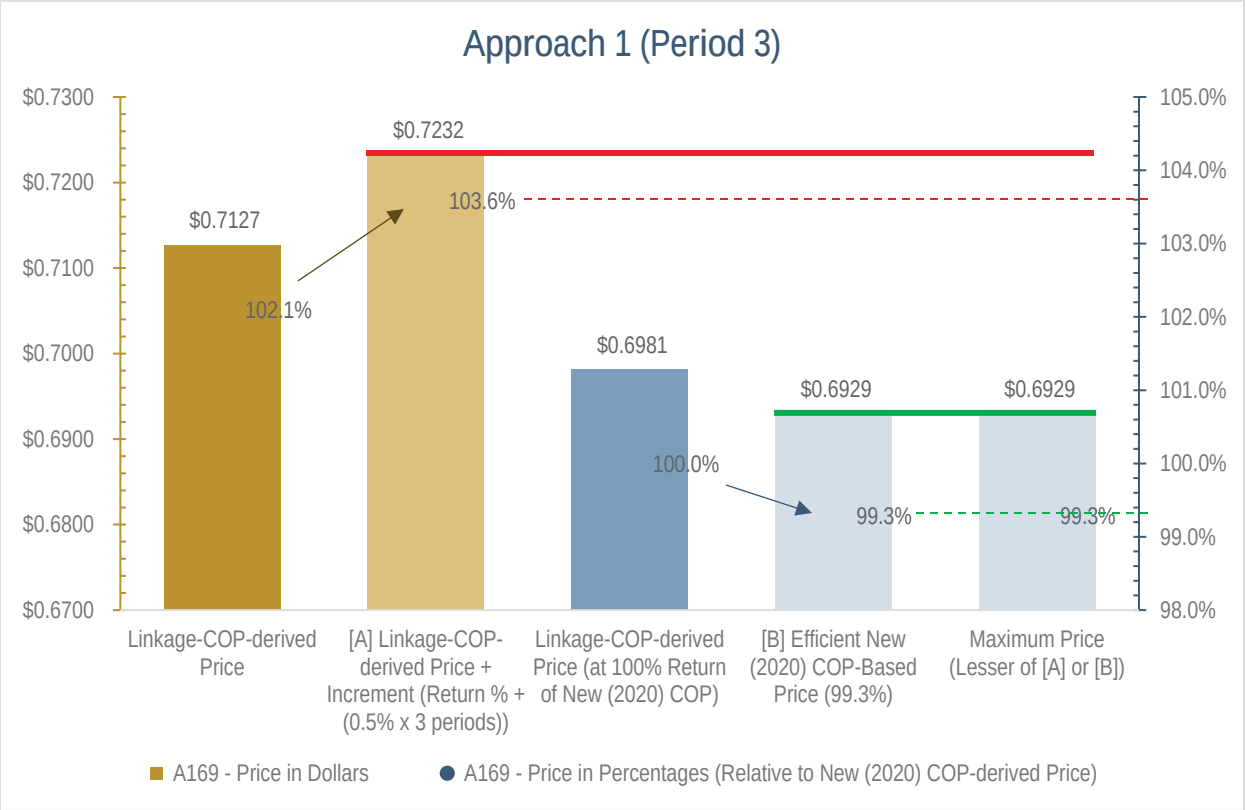
The results and comparison of the phased-in approaches are similar, and are generally capped at the maximum of the efficient New (2020) COP-derived price; this is due to the efficient New (2020) COP costs being comparable or slightly less overall than the current Linkage-COP used.

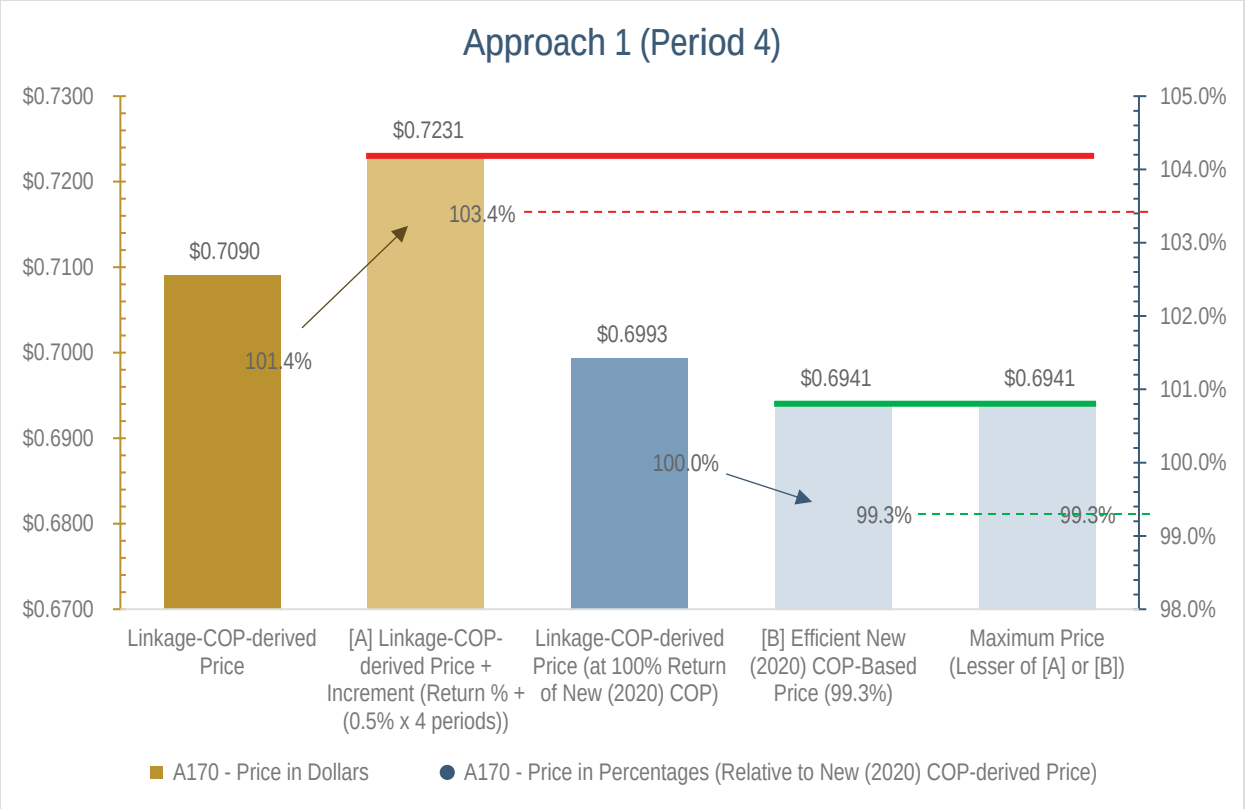
Therefore, it is not anticipated that the supply chain would be significantly affected in moving to the efficient New (2020) COP, either during the transition period or thereafter.

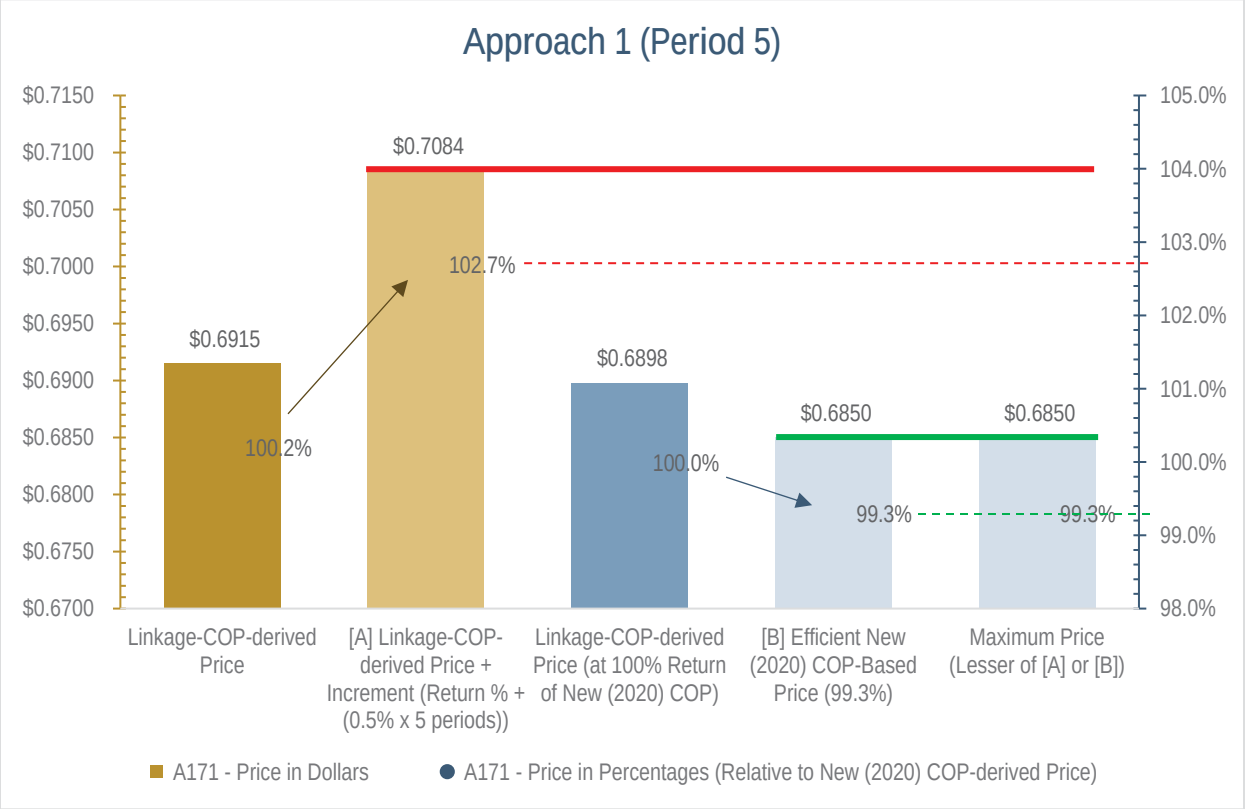
Illustrations of Phased-In Approaches

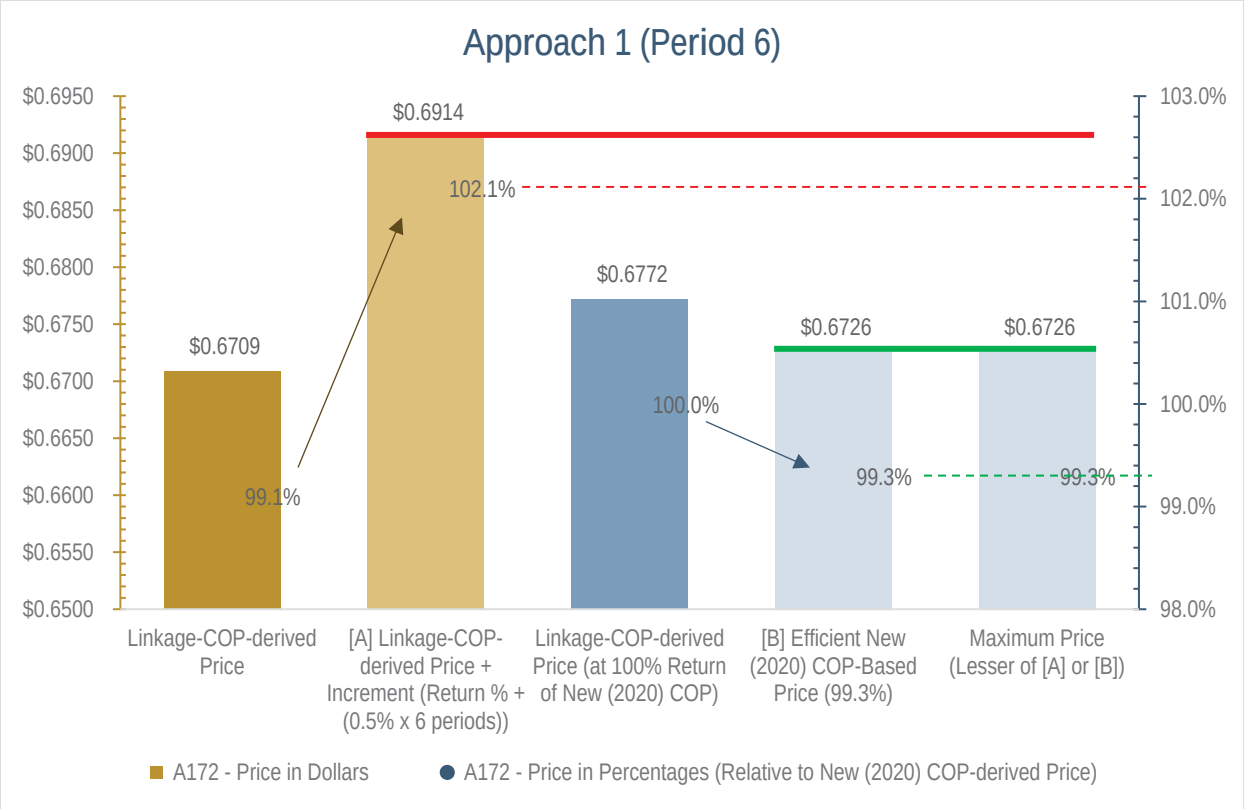


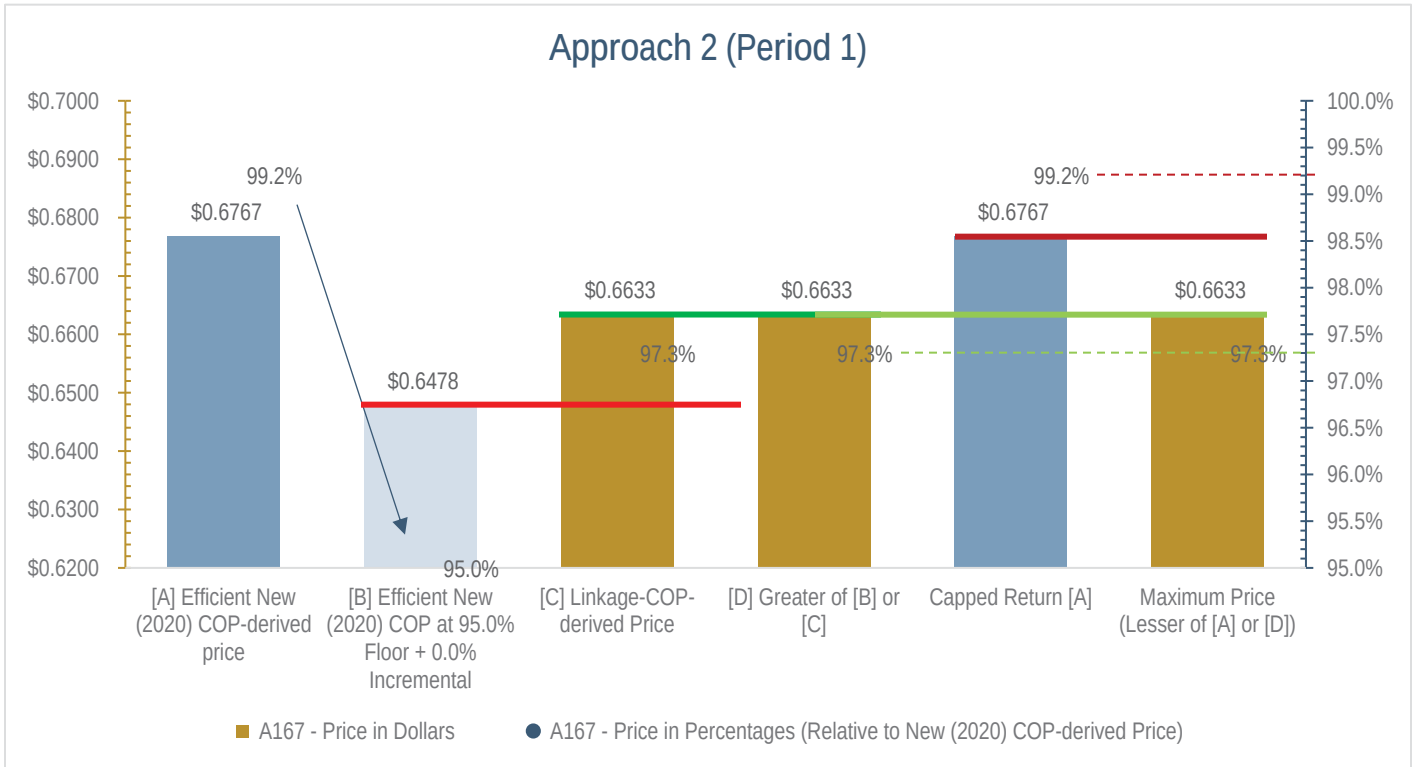

Approach 1 (Period 2)
$0.7000
$0.6950
$0.6900
$0.6850
$0.6800
$0.6750
$0.6700
$0.6650
$0.6600
$0.6550
$0.6500
102.0%
101.5%
101.0%
100.5%
100.0%
99.5%
99.0%
$0.6845
$0.6912
$0.6837
$0.6785
$0.6785
100.1%
101.1%
100.0%
99.2%
99.2%
Linkage-COP-derived Price
[A] Linkage-COP-derived Price + Increment (Return % + (0.5% x 2 periods))
Linkage-COP-derived Price (at 100% Return of New (2020) COP)
[B] Efficient New (2020) COP-Based Price (99.2%)
Maximum Price (Lesser of [A] or [B])
A168 - Price in Dollars
A168 - Price in Percentages (Relative to New (2020) COP-derived Price)

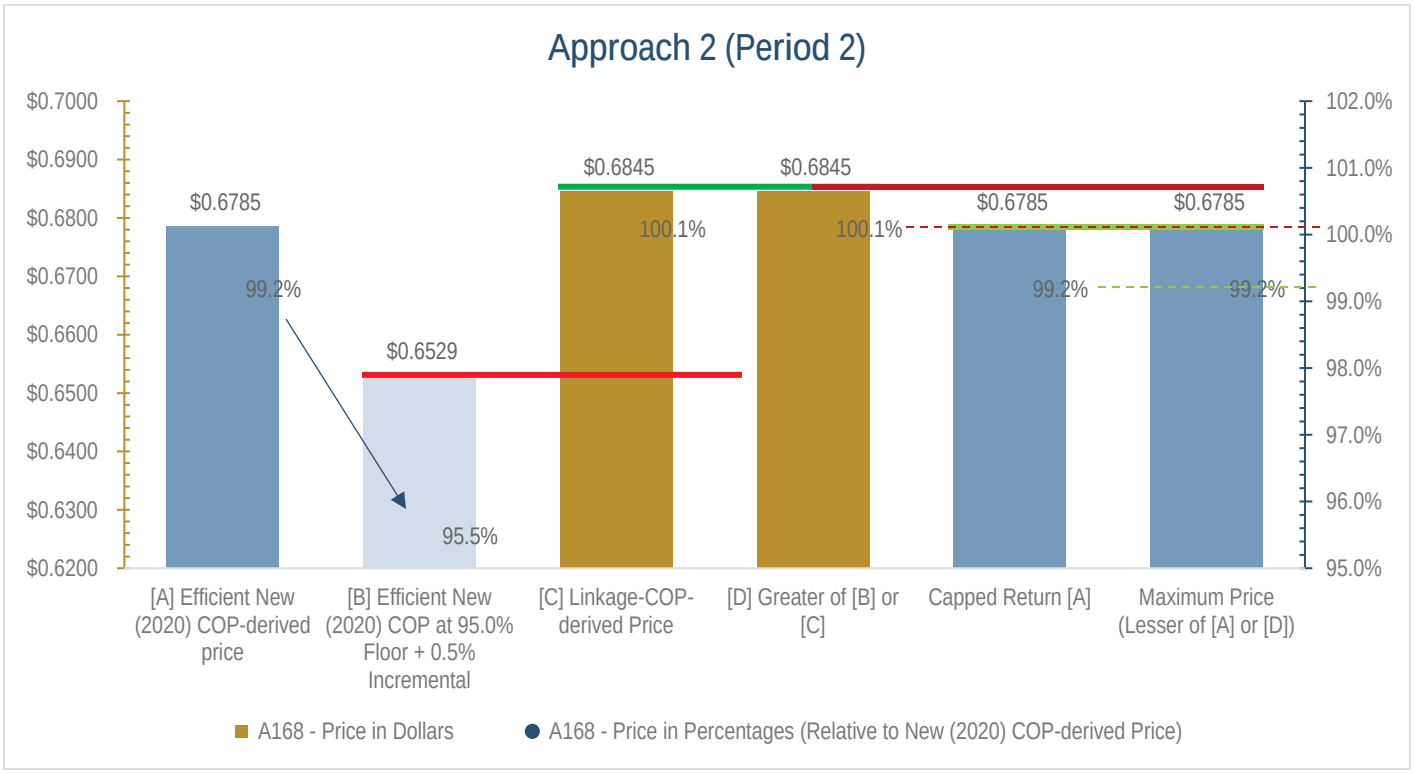

Approach 1 (Period 3)
$0.7300
$0.7200
$0.7100
$0.7000
$0.6900
$0.6800
$0.6700
105.0%
104.0%
103.0%
102.0%
101.0%
100.0%
99.0%
98.0%
$0.7127
$0.7232
$0.6981
$0.6929
$0.6929
102.1%
103.6%
100.0%
99.3%
99.3%
Linkage-COP-derived Price
[A] Linkage-COP-derived Price + Increment (Return % + (0.5% x 3 periods))
Linkage-COP-derived Price (at 100% Return of New (2020) COP)
[B] Efficient New (2020) COP-Based Price (99.3%)
Maximum Price (Lesser of [A] or [B])
A169 - Price in Dollars
A169 - Price in Percentages (Relative to New (2020) COP-derived Price)

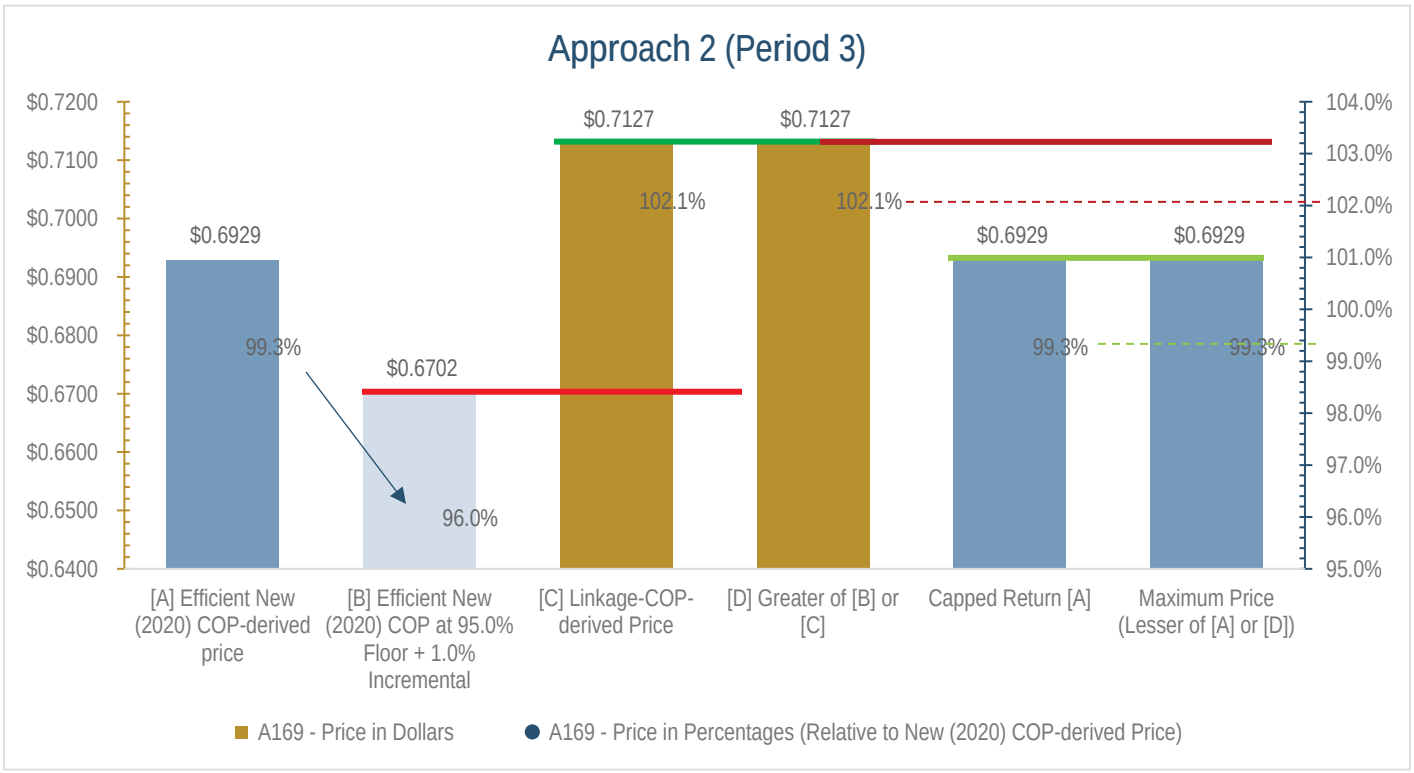

Approach 1 (Period 4)
$0.7300
$0.7200
$0.7100
$0.7000
$0.6900
$0.6800
$0.6700
105.0%
104.0%
103.0%
102.0%
101.0%
100.0%
99.0%
98.0%
$0.7090
$0.7231
$0.6993
$0.6941
$0.6941
101.4%
103.4%
100.0%
99.3%
99.3%
Linkage-COP-derived Price
[A] Linkage-COP-derived Price + Increment (Return % + (0.5% x 4 periods))
Linkage-COP-derived Price (at 100% Return of New (2020) COP)
[B] Efficient New (2020) COP-Based Price (99.3%)
Maximum Price (Lesser of [A] or [B])
A170 - Price in Dollars
A170 - Price in Percentages (Relative to New (2020) COP-derived Price)

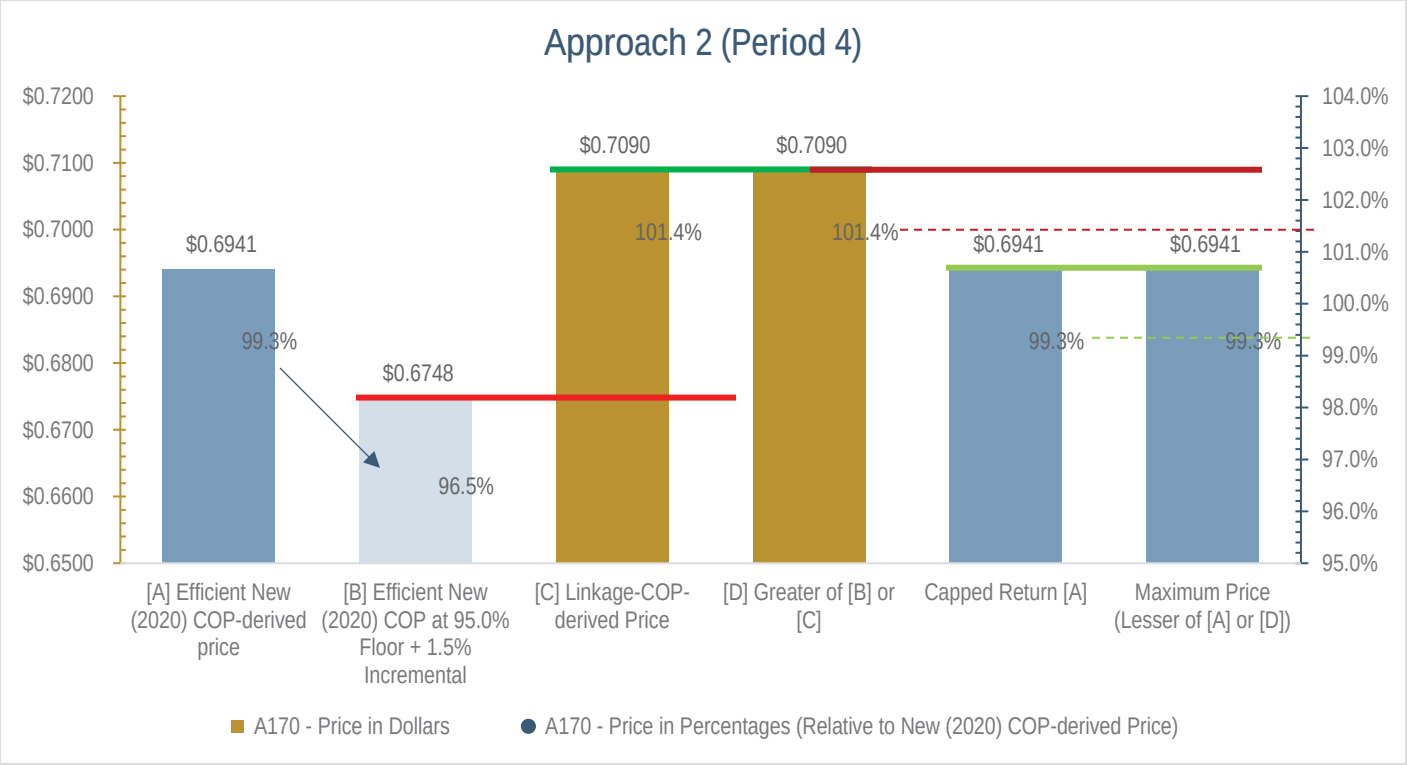

Approach 1 (Period 5)
$0.7150
$0.7100
$0.7050
$0.7000
$0.6950
$0.6900
$0.6850
$0.6800
$0.6750
$0.6700
105.0%
104.0%
103.0%
102.0%
101.0%
100.0%
99.0%
98.0%
$0.6915
$0.7084
$0.6898
$0.6850
$0.6850
100.2%
102.7%
100.0%
99.3%
99.3%
Linkage-COP-derived Price
[A] Linkage-COP-derived Price + Increment (Return % + (0.5% x 5 periods))
Linkage-COP-derived Price (at 100% Return of New (2020) COP)
[B] Efficient New (2020) COP-Based Price (99.3%)
Maximum Price (Lesser of [A] or [B])
A171 - Price in Dollars
A171 - Price in Percentages (Relative to New (2020) COP-derived Price)

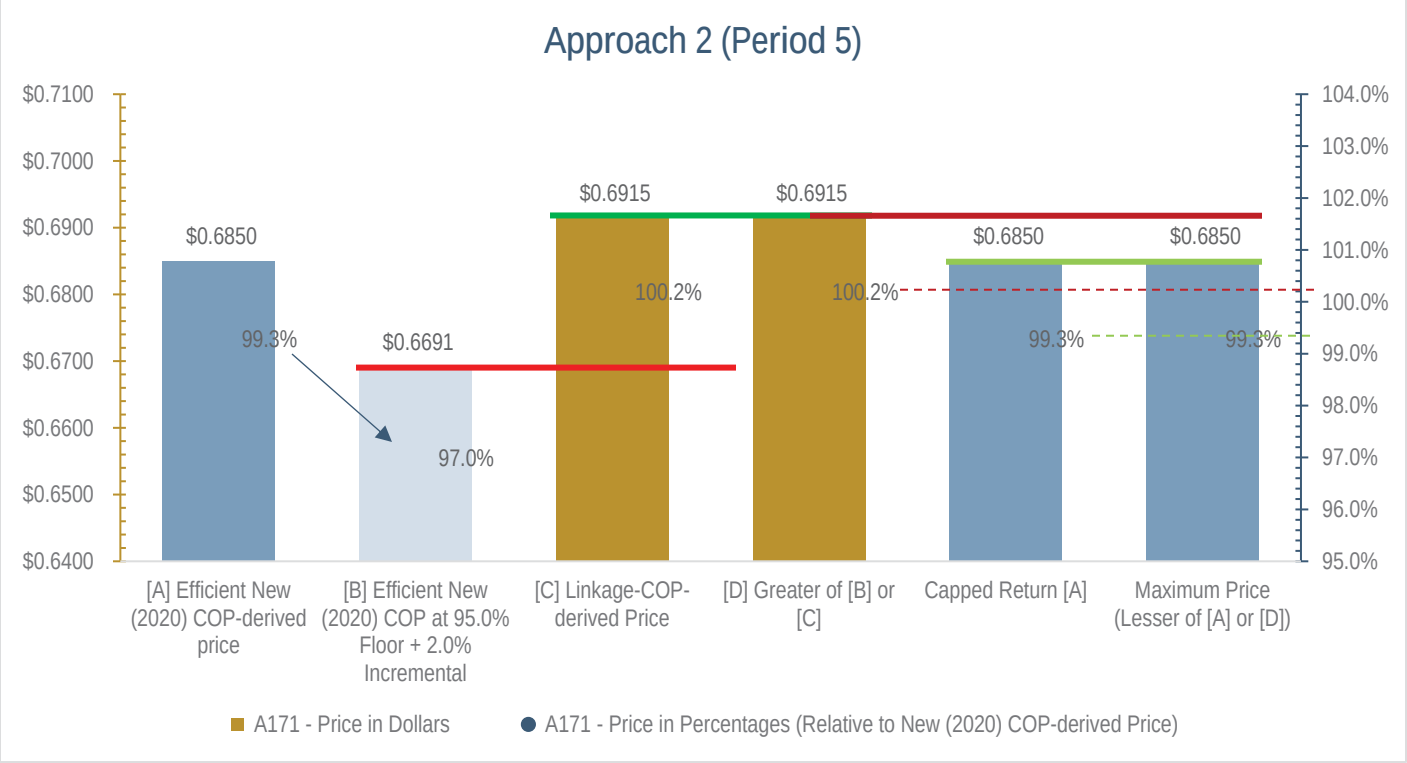

Approach 1 (Period 6)
$0.6950
$0.6900
$0.6850
$0.6800
$0.6750
$0.6700
$0.6650
$0.6600
$0.6550
$0.6500
103.0%
102.0%
101.0%
100.0%
99.0%
98.0%
$0.6709
$0.6914
$0.6772
$0.6726
$0.6726
99.1%
102.1%
100.0%
99.3%
99.3%
Linkage-COP-derived Price
[A] Linkage-COP-derived Price + Increment (Return % + (0.5% x 6 periods))
Linkage-COP-derived Price (at 100% Return of New (2020) COP)
[B] Efficient New (2020) COP-Based Price (99.3%)
Maximum Price (Lesser of [A] or [B])
A172 - Price in Dollars
A172 - Price in Percentages (Relative to New (2020) COP-derived Price)

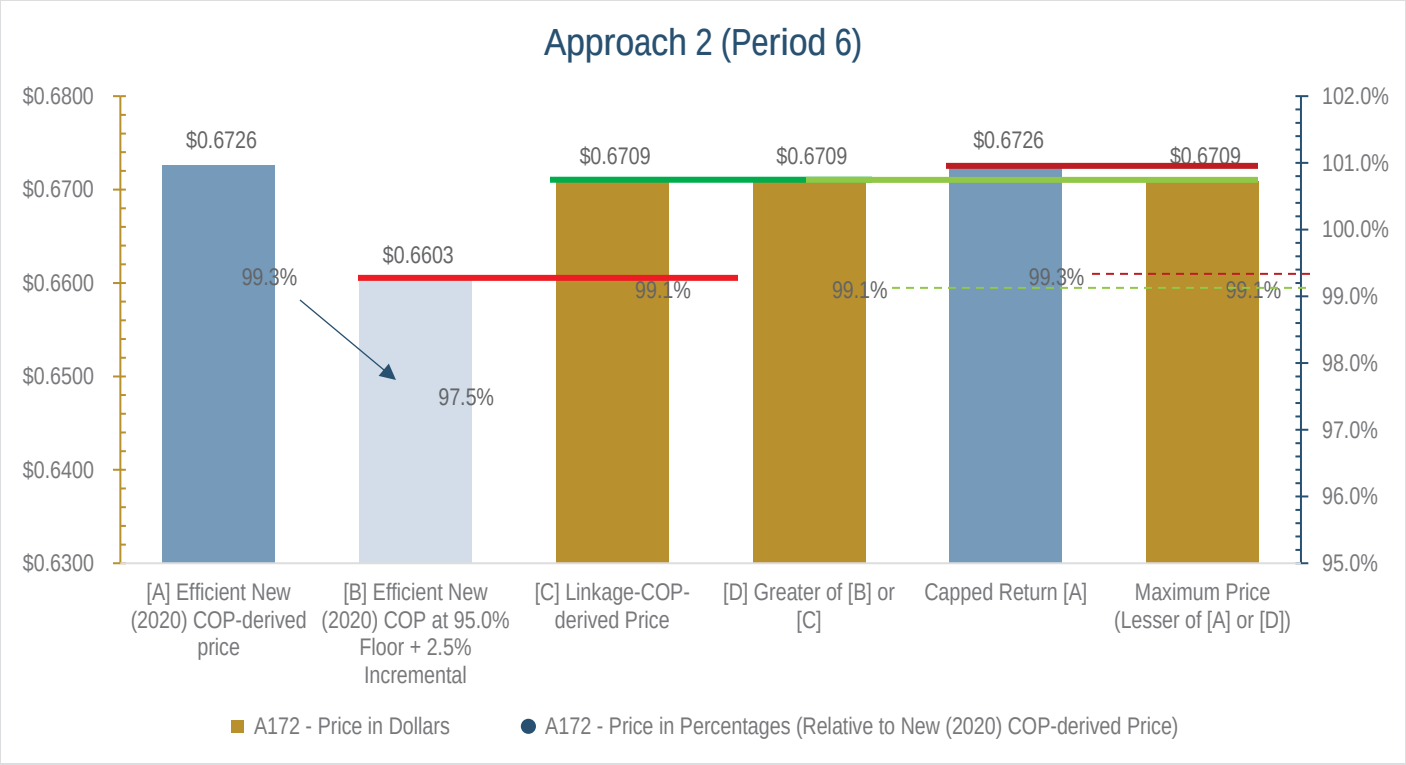

Approach 2 (Period 1)
$0.7000
$0.6900
$0.6800
$0.6700
$0.6600
$0.6500
$0.6400
$0.6300
$0.6200
100.0%
99.5%
99.0%
98.5%
98.0%
97.5%
97.0%
96.5%
96.0%
95.5%
95.0%
99.2%
$0.6767
$0.6478
$0.6633
$0.6633
99.2%
$0.6767
$0.6633
97.3%
97.3%
97.3%
95.0%
[A] Efficient New (2020) COP-derived price
[B] Efficient New (2020) COP at 95.0% Floor + 0.0% Incremental
[C] Linkage-COP-derived Price
[D] Greater of [B] or [C]
Capped Return [A]
Maximum Price (Lesser of [A] or [D])
A167 - Price in Dollars
A167 - Price in Percentages (Relative to New (2020) COP-derived Price)


Approach 2 (Period 2)
$0.7000
$0.6900
$0.6800
$0.6700
$0.6600
$0.6500
$0.6400
$0.6300
$0.6200
102.0%
101.0%
100.0%
99.0%
98.0%
97.0%
96.0%
95.0%
$0.6785
$0.6529
$0.6845
$0.6845
$0.6785
$0.6785
99.2%
95.5%
100.1%
100.1%
99.2%
99.2%
[A] Efficient New (2020) COP-derived price
[B] Efficient New (2020) COP at 95.0% Floor + 0.5% Incremental
[C] Linkage-COP-derived Price
[D] Greater of [B] or [C]
Capped Return [A]
Maximum Price (Lesser of [A] or [D])
A168 - Price in Dollars
A168 - Price in Percentages (Relative to New (2020) COP-derived Price)


Approach 2 (Period 3)
$0.7200
$0.7100
$0.7000
$0.6900
$0.6800
$0.6700
$0.6600
$0.6500
$0.6400
104.0%
103.0%
102.0%
101.0%
100.0%
99.0%
98.0%
97.0%
96.0%
95.0%
$0.6929
$0.6702
$0.7127
$0.7127
$0.6929
$0.6929
99.3%
96.0%
102.1%
102.1%
99.3%
99.3%
[A] Efficient New (2020) COP-derived price
[B] Efficient New (2020) COP at 95.0% Floor + 1.0% Incremental
[C] Linkage-COP-derived Price
[D] Greater of [B] or [C]
Capped Return [A]
Maximum Price (Lesser of [A] or [D])
A169 - Price in Dollars
A169 - Price in Percentages (Relative to New (2020) COP-derived Price)


Approach 2 (Period 4)
$0.7200
$0.7100
$0.7000
$0.6900
$0.6800
$0.6700
$0.6600
$0.6500
104.0%
103.0%
102.0%
101.0%
100.0%
99.0%
98.0%
97.0%
96.0%
95.0%
$0.6941
99.3%
$0.6748
96.5%
$0.7090
101.4%
$0.7090
101.4%
$0.6941
99.3%
$0.6941
99.3%
[A] Efficient New (2020) COP-derived price
[B] Efficient New (2020) COP at 95.0% Floor + 1.5% Incremental
[C] Linkage-COP-derived Price
[D] Greater of [B] or [C]
Capped Return [A]
Maximum Price (Lesser of [A] or [D])
A170 - Price in Dollars
A170 - Price in Percentages (Relative to New (2020) COP-derived Price)


Approach 2 (Period 5)
$0.7100
$0.7000
$0.6900
$0.6800
$0.6700
$0.6600
$0.6500
$0.6400
104.0%
103.0%
102.0%
101.0%
100.0%
99.0%
98.0%
97.0%
96.0%
95.0%
$0.6850
99.3%
$0.6691
97.0%
$0.6915
100.2%
$0.6915
100.2%
$0.6850
99.3%
$0.6850
99.3%
[A] Efficient New (2020) COP-derived price
[B] Efficient New (2020) COP at 95.0% Floor + 2.0% Incremental
[C] Linkage-COP-derived Price
[D] Greater of [B] or [C]
Capped Return [A]
Maximum Price (Lesser of [A] or [D])
A171 - Price in Dollars
A171 - Price in Percentages (Relative to New (2020) COP-derived Price)



Recommended Phased-In Approach

There were two potential approaches reviewed:

1. Add an incremental percentage to the Linkage-COP-derived price, over 'X' periods, unless and until the efficient New (2020) COP-derived recovery is consistently achieved, capping the maximum at the efficient New (2020) COP-derived price in any one period.

2. Use a rising floor to the efficient New (2020) COP-derived recovery, over 'X' periods, and take the maximum price between this and the current Linkage-COP-derived price, capping the maximum at the efficient New (2020) COP-derived price in any one period.

The second approach is recommended as it provides clarity to the return at which each pricing period is to be set, and a timeline of approximately 9 pricing periods, or 72 weeks, to fully implement (should the efficient New (2020) COP-derived recovery percentage remain at 99.2-99.3%).

Further, the "take the maximum price between this and the current Linkage-COP-derived" portion is not recommended, for added clarity and assurance, thereby revising the second approach to:

2. Use a rising floor to the efficient New (2020) COP-derived recovery, over 'X' periods.

The following phase-in schedule can be constructed, with estimated actual pricing periods:

Pricing Period	Estimated Actual Pricing Period	Starting Date	New (2020) COP-derived recovery
1	A176	May 8, 2022	95.0%
2	A177	July 3, 2022	95.5%
3	A178	August 28, 2022	96.0%
4	A179	October 23, 2022	96.5%
5	A180	December 18, 2022	97.0%
6	A181	February 12, 2023	97.5%
7	A182	April 9, 2023	98.0%
8	A183	June 4, 2023	98.5%
9	A184	July 30, 2023	99.0%
10*	A185	September 24, 2023	99.2% (estimate)

*The actual final period of the phase-in is dependent on the Production Trimming efficiency which is recalculated for each pricing period, as detailed previously.

Hatchery Margin, Breeder Chick & Vaccine Pricing

Sub-Committee

To further discussion on pricing-related topics, a sub-committee was established between the BC Egg Hatchery Association (BCEHA) and the BC Broiler Hatching Egg Commission (BCBHEC). These topics fell into three main categories:

1. Hatchery Margin
2. Breeder Chick Costs
3. Vaccine Costs

Discussions were productive and a summary document was prepared that laid the groundwork for what was tabled to the BCEHA representatives to take back to its members in October 2019. The proposal was tabled with the Commission PPAC but not response has been received from the BCEHA with respect to the methodologies agreed to in the proposal.

Hatchery Margin

Background

The hatchery margin is the amount earned by the hatchery, on a per chick basis, between what they pay to Producers (saleable chick price) and the price they charge to Growers (day-old chick price).

The hatchery margin is fixed at $0.1894 per chick.

In the current Linkage-based pricing model, the prices received by Producers for their saleable chicks and paid by Growers for their day-old chicks are heavily influenced by the live kg price.

The price for kilograms of eviscerated chicken, as set by the BCCMB (per its pricing model) is inputted into the Linkage algorithm which is set to balance the returns between Producers and Growers: parity.

The extent to which the saleable chick and day-old prices may move each period to achieve parity does not affect the hatchery margin – it remains at $0.1894 as demonstrated below:

Period	Saleable Chick	Hatchery Margin	Day-Old Chick	Live Price	Recovery (Parity)
A165	$0.6330	$0.1894	$0.8224	$1.684/kg	93.16%
A166	$0.6431	$0.1894	$0.8325	$1.690/kg	93.18%
A167	$0.6633	$0.1894	$0.8527	$1.757/kg	96.11%
A168	$0.6845	$0.1894	$0.8739	$1.812/kg	96.56%

The hatchery margin since the establishment of Linkage has been a fixed margin. Beginning in period A108 and over three periods, an additional 2.0 cents (11.8%) were added to the margin to address stakeholder concerns, on the argument of increasing costs and gross margin comparisons.

Period	Effective Date (Chicks)	Saleable Chick	Hatchery Margin	Day-Old Chick
A107	October 30, 2011	$0.5606	$0.1693	$0.7299
A108	December 25, 2011	$0.5386	$0.1793 ($0.0100 ↑)	$0.7179
A109	February 19, 2012	$0.5220	$0.1793	$0.7013
A110	April 15, 2012	$0.53075	$0.1893 ($0.0100 ↑)	$0.7200

Per the joint BCCMB and Commission communiqué dated March 26, 2012, the inclusion of a 10 cent per kilogram fowl price increase was realized, and those savings (within the Hatching Egg COP) helped achieve an agreed-upon split of 75% / 25% (Chicken / Hatching Eggs) of how the margin increase was to be included. There was a 1.5 cent increase in the day-old broiler chick price and a 0.5 cent reduction in the saleable chick price.

Now, as was the case then, there is no set review period regarding the hatchery margin. Consultations with affected stakeholders are required to facilitate any request to change (increase) the hatchery margin as they arise.

In other provinces, notably Ontario, hatcheries fully participate in the pricing system with a COP. The COP is a full Cost of Production for Ontario Hatching Egg Producers, Pullet Growers and Hatcheries. This allows for a transparent and equitable approach to the setting of price and, thus, sharing of returns; this in turn provides for a hatchery margin that is not fixed.

At this time the BCEHA has not supported a third party-verified hatchery COP comparable to that of Ontario's COP, but instead to a third party-verified specific costs report on those it believes are most directly attributable to the incubation and hatching of hatching eggs (e.g., hydro and labour). The Commission reviewed this possibility through the lens of a CPI/COLA hatchery margin mechanism. Although the Commission appreciates that such an approach could be a useful transition to a full hatchery COP, it remains of the opinion that costs should not be selectively chosen; when conversely, all costs and ancillary revenue streams are captured by Hatching Egg Producers' latest COP.

Hatchery Margin Increase Request

The initial request made by the BCEHA at the Sub-Committee level was for a 3.0 cent increase to the hatchery margin but subsequently agreed to a 1.75 cent increase.

Current	Increase	New
$0.1894	$0.0175 (9.2%)	$0.2069

This equates to a 9.2% increase. With the last increase in April 2012, nine years ago, the effective annual compound rate would be approximately 1.0%, as illustrated:

Year	Rate	New Price
2013	1.0%	$0.1913
2014	1.0%	$0.1932
…	…	…
2020	1.0%	$0.2049
2021	1.0%	$0.2069

As illustrated at the Roundtable on the Commission's COP, as lay cycle increases, price per saleable chick and day-old chick price decrease.

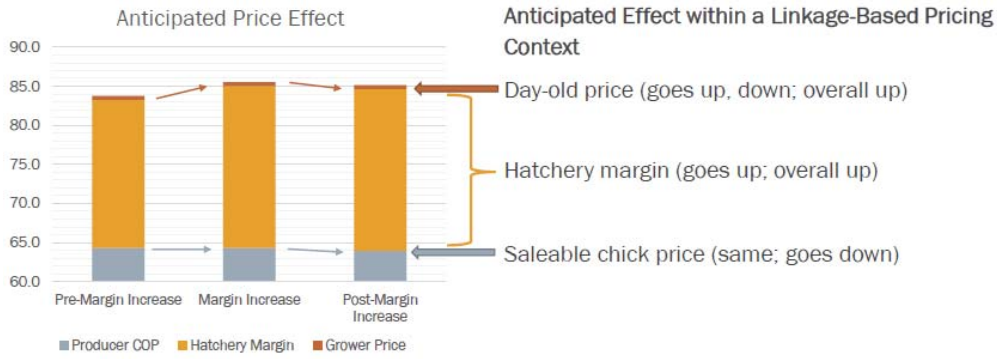
Again, it is important to note that as the hatchery margin is static, hatcheries may not participate in efficiencies that may be experienced in the system as more chicks are throughput (beyond current + incremental costs divided by a higher chick throughput number). A third party-verified COP of hatcheries would better enable the Chicken Industry to

identify and address hatchery competitiveness as part of an overall approach to increasing the competitiveness of the BC industry generally.

Pricing Effects

Difficulties arise in building scenarios given the many inter-related aspects of pricing. However, based on the live kg pricing algorithm, it is generally understood that 75% of any increase in day-old price is, over time, recovered through the live kg price.

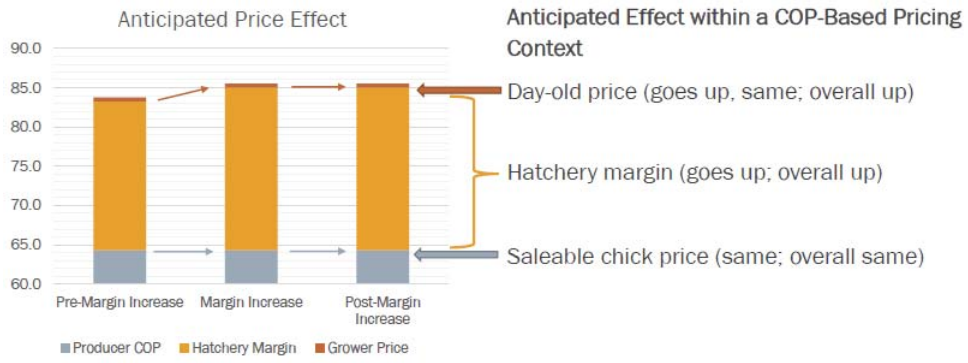
Illustrated below is the effect under the Linkage-Based Pricing Model currently employed:



Under the Linkage-Based Pricing Model, returns to Producers and Growers are equalized (parity) with the price paid by Processors ultimately decided by the Pricing Model employed by BCCMB. The day-old chick price differential between BC and Ontario (Ontario live price is upon which the Pricing Model is based) is permitted to be added to BC's live kg price at an inclusion rate of 75%. Therefore, if the hatchery margin is increased, the day-old chick price is increased of which 75% is captured (25% unrecovered in the system), all else equal.

Producers and Growers would see this increase in their price but not returns through an increased live kg price. Over at least the last nine years, farmers have not been receiving a full return of their costs and any hatchery margin increase would result in farmers being out-of-pocket 25% of the hatchery margin increase.

Illustrated below is the effect under the recommended COP-Based Pricing Model:



Under the recommended COP-Based Pricing Model, the hatching egg price, continuing to be expressed as both a per dozen and saleable chick, would be set at the price derived by the Hatching Egg COP (less any adjustments contemplated as part of a transition period). The saleable chick price would remain unchanged under a hatchery margin increase as Hatching Egg Producers will have received their full costs back; the hatchery margin would be 'added on' and the result would be the day-old chick price, all else equal.

BC's hatching egg allocation, 2022 (first allocation)	124,209,571 eggs
Current hatchability rate, 2021 YTD	83.6%
Less cull rate, estimate	(2.0%)
Saleable Chick rate	81.6%
Saleable Chicks	101,355,010
Hatchery Margin increase, per Chick	$0.0175
Hatchery Margin increase, total cost	$1,773,713

Hatchery Margin Increase Mechanism

It has been noted by all parties that historically there has been no set review period, hatchery efficiency standards requirement, or memorandum of understanding that lays out the hatchery margin request process. The Commission has recognized that an established, regular process that is not relationship dependent is best in removing the acrimonious and ad-hoc nature of the current process.

In its October 2019 proposal, the Sub-Committee explored the prospect of a CPI-type margin adjustment mechanism that would automatically adjust the hatchery margin and be verified through a third-party review of costs/COP at regular intervals. The costs most noted by hatcheries were hydro and labour, with a full COP of hatchery costs not supported by BCEHA representatives.

The Sub-Committee reviewed possible indices that may be suitable for these purposes while acknowledging that there may yet be one more suitable to representing hatchery costs:

Sampled Indices	April 2012 – October 2018
CPI – all items, Canada	1.44%
CPI – all items, BC	1.40%
Industrial Products Price Index (IPPI) – excl. petroleum & coal	1.44%
IPPI – meat, fish and dairy products	1.90%
Raw Materials Price Index (RMPI)	Excluded – below 0%
RMPI – excl. mineral fuels	Excluded – below 0%
RMPI – animal and animal products	Excluded – below 0%
Employees, average hourly wages – Natural resources, agriculture and related production occupations	3.07%

No one index produced 'stable' results or consistency on a year-over-year basis outside of the CPI, which, by its nature, encompasses a wide 'basket' of goods and services that go well beyond the purview of the Commission. Significant variability existed in all others, whether a price or cost index. It would not be in keeping with the historical nature of the hatchery margin or understanding of hatchery costs to peg its margin to a highly variable index, not to mention of introducing pricing instability into the system.

Alternatively, while most hatchery wages may be set well above minimum wage standards, the percentage increase in the provincial minimum wage may act as the best proxy to eliminate some variability.

Costs generally increase over time, but the underlying costs that hatcheries consider most directly attributable to the incubation and hatching of hatching eggs (e.g., hydro and labour) may not actually do so predictably.

Under any index that may be employed, a general three-year review of the underlying costs was assumed; this would parallel the usual timeline of the Hatching Eggs COP update.

Hatchery Efficiencies

A common refrain by certain stakeholders is production efficiency in the Hatching Egg Producer's COP. The Commission agrees that efficiencies and driving costs out of the system are important. These are concepts that should apply equally to all stakeholders, including the non-farmer benefactors of supply management – notably the Hatcheries and Processors. Increasing the competitiveness of the BC industry should be a priority for all stakeholders.

As shown under the pricing effects above, the costs of any hatchery margin increase are borne by those further down the supply chain. To what extent depends both upon the underlying pricing model and efficiency factors. It is not lost on the Commission that hatchery efficiency, and definitions thereon, were not addressed by the Sub-Committee while awaiting the BCEHA's response to the proposed formulae. It is now critical to establish a hatchery margin increase mechanism and efficiencies in support of implementing the proposed formulae.

Recommendation

The proposed 1.75 cent per saleable chick hatchery margin increase equates to an approximate 1.0% annualized increase over the nine years since last changed. In consideration of the costs incurred by hatcheries, which were generally described as hydro and labour, it is recommended that the margin be increased by the 1.75 cents as proposed within the context of a COP-Based Pricing Model only. It would be neither sustainable nor palatable to require farmers (Producers and Growers) to pay for one-quarter of the hatchery margin increase while continuing to not receive their full COP returns.

With respect to the hatchery margin being updated annually, the Commission remains of the opinion that a full COP of BC hatcheries, similar to the process in other provinces, would yield the best cost 'index' to use in updating the hatchery margin on a consistent basis. This considers the unique and somewhat protected business environment in which Hatcheries find themselves operating.

Likewise, without such a COP it is difficult for the Commission to attribute a sufficient and appropriate return for the Hatcheries. Setting the Hatchery margin is a regulatory pricing decision of the Commission that must be defensible. As the same time, the purpose of the proposed formulae approach is to establish a constructive approach to addressing the Hatchery margin issue without introducing further pricing instability into the system.

Before implementing the new hatchery margin with a COLA-type mechanism, the Commission will work with the BCEHA and undertake further consultation with the BCCMB to confirm an acceptable cost verification method that will provide for better transparency and stability while enhancing stakeholder confidence in the pricing system.

Breeder Chick Pricing

Background

A significant cost input in the HE COP is the breeder chick price (Pullets line item). As the BC Broiler Hatching Egg industry operates using a hen-based quota system, staff run an Official Flock Schedule to ensure the right eggs at the right time, and that the right hens are ordered, based on the most recent data available. Few decisions regarding placements and breeder chicks remain with the Producer.

Current Approach

Placement Orders

- Female breeder chick – number, extras, date and by which hatchery, are all set by the Commission.
- Breed choice (Ross vs. Cobb) and supply method (breeder eggs hatched locally vs. chick fly-ins/truck-ins) are determined by hatcheries.
- Producers decide the number of male breeders to purchase (the Commission recommends 12-13% of the female breeder number).

Placement Cost

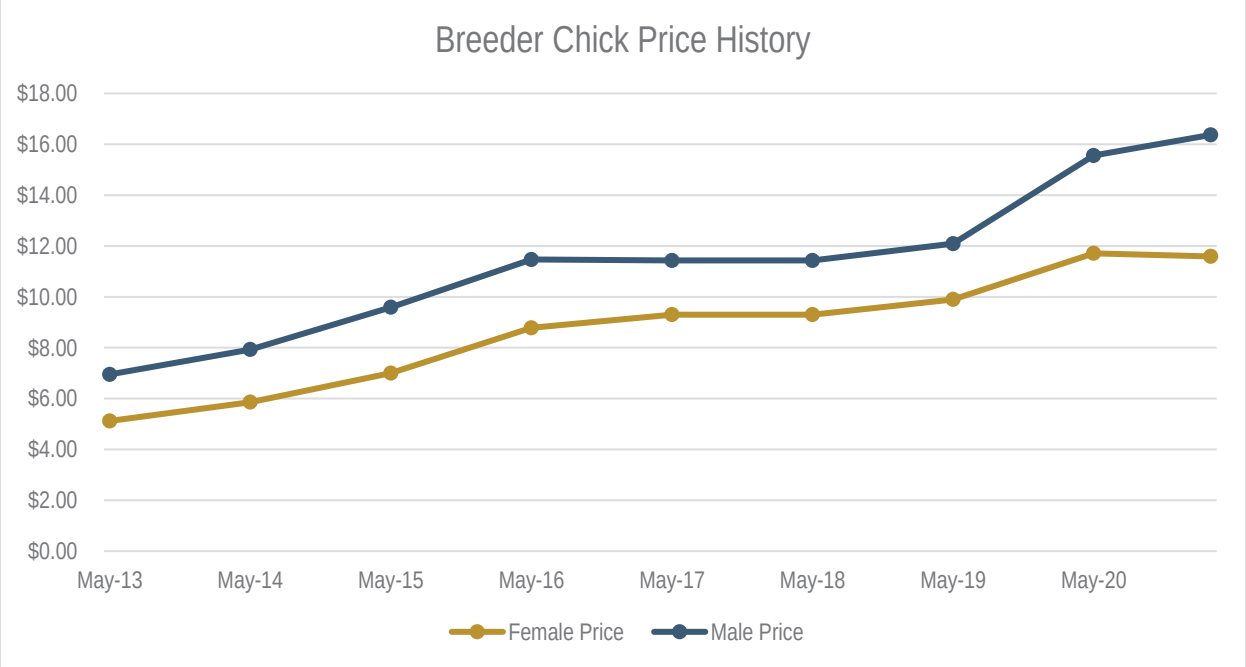
- Hatcheries advise the Commission at the beginning of each pricing period the female and male breeder chick price they will charge to their assigned producers who have placements in that period.
    - These costs are incorporated into the COP.
- Hatcheries provide one female breeder chick price, and one male breeder chick price.
- Hatcheries do not provide a breakdown or rationale on the cost.
- A significant portion of the costs are in United States Dollars, then converted.
- A significant portion of the costs are generally not within the control of either the hatchery or producer (e.g., breeder company prices, foreign exchange, etc.).
- The cost incorporates an approximate 20% margin to the hatcheries.
- Services and time provided by the hatcheries to supply the female and male breeder chicks generally remain the same regardless of the change in costs.
    - Therefore, if foreign exchange costs increased, an additional 20% is pass through into the COP system.
- As agreed to by the Sub-Committee, the cost does not factor in other benefits received by hatcheries, such as:
    - Breeder company reward programs
    - Reductions in price with faster payment terms
    - Offlines placed resulting from hatching breeder eggs locally (viable chicks in excess of the breeder chick order as set by the Commission that are placed onto broiler farms); such offlines are counted against domestic producers' allocation on a one-to-one basis.
- Breeder companies generally increase the price once a year and those increases have exceeded inflation for several years.
- Producers are required by the Consolidated Order to pay their hatchery chick bill within 30 days.
    - Hatcheries are permitted to withhold other payments to producers (i.e., on saleable chicks) to resolve the debt.

Price History

A significant increase in pricing has been experienced by the sector. A large amount of the increase is attributable to breeder company price increases, per hatcheries.

Month	Female Price	Male Price
March 2021	$11.59	$16.37
May 2020	$11.71	$15.56
May 2019	$9.90	$12.09
May 2018	$9.30	$11.43
May 2017	$9.30	$11.43
May 2016	$8.78	$11.47
May 2015	$7.00	$9.59
May 2014	$5.86	$7.93
May 2013	$5.12	$6.95

Month	Female Price	Male Price
March 2021	$11.59	$16.37
May 2013	$5.12	$6.95
Increase	$6.47 (126%)	$9.42 (136%)
Annualized	10.8%	11.3%



The cost of breeder chicks is factored into the Linkage. Given that the pricing of breeder chicks falls within the purview of the Commission, it is important that this pricing be transparent and defensible while supporting increased cost efficiencies.

Recommended Approach

The parties to the Sub-Committee made a commitment to transparency and establishing formulae to achieve this.

Significant components of the current breeder chick price include the breeder company cost, foreign exchange, other services and a margin:

Breeder Company

Cost (USD)

At this time, prices paid by Producers depend on the breed selected by their assigned hatchery. Therefore, although the Linkage is updated each period, it uses an average price and so Producers do not experience the same costs at the placement of their flock.

Therefore, the Commission would establish a weighted-average cost per female breeder and male breeder each pricing period that would be charged to producers regardless of chosen breed. Specific elements would include:

- The cost as charged by the breeder companies (currently Aviagen and Cobb).
    - Breeder Company cost sheets provided by the BCEHA, or preferably directly from the breeder companies to the Commission. This would reduce administration burden.
- The breed mix, as determined by using a rolling average of actual placements in preceding 12 months.
    - Alternative: use projected placement orders and multiply each hatchery's current market share as determined by chick placements. This adds additional variables and an element of modelling – this alternative is not recommended.
- A separate cost for female and male breeders is calculated.
    - Alternative: use a combined female and male breeder chick cost by 'locking in' an assumed order of male-to-female ratio of 'x' percent, say 10%. This adds additional variables, removes a potential business choice from the Producer (which may be inconsistent with their Spiking Male Farm Plan), does not permit the price of an order to be changed by hatcheries based on a male-to-female ratio that is not 10% and adds elements of modelling – this alternative is not recommended.

Services (USD)

The services or vaccines included by breeder companies as described to the Sub-Committee included:

- Beak trimming
- Merek 2177
- Coccivac
- Merek Innovac ILT

This list was neither completed nor had a cost appropriately ascribed to each element.

It is recommended that the list be finalized, with these costs provided by the BCEHA, or preferably directly from the breeder companies to the Commission each pricing period. Changes to the list would require consultation with the Commission PPAC. No alternatives were identified.

Foreign Exchange

As the cost and services provided by the breeder companies are denominated in US dollars, an exchange into Canadian dollars is required. Specific elements would include:

- Using the Bank of Canada posted rate
    - Alternative: None identified.
- Using the average monthly rate of the last posted month available.
    - Alternative: use the spot rate. This rate is highly volatile and given its nature may not be as indicative of what the exchange rate may be over the course of the next 8 weeks – this alternative is not recommended.
    - Alternative: rate that aligns with the current period, immediately preceding this one being priced (e.g., A168's exchange rate history for setting A169 breeder chick prices). This rate, close to eight-weeks in length, may not be current enough and is incomplete given pricing is generally set by the week preceding the start of the next period.
- Use the blended buy and sell rate.
    - Alternative: take the buy rate or take the blended rate plus an increment. As neither the Commission nor the hatcheries forecast foreign exchange rate, and such rates may go up or down, adding this additional variable introduces an element of modelling – this alternative is not recommended.

Other Costs

Local costs incurred by hatcheries as described to the Sub-Committee included:

- Brokerage. A price of $0.1000 per chick was ascribed to brokerage. This figure requires verification before the Commission can include this in its decision to approve the pricing formula.
    - Alternative: None identified.
- Blood work and lab costing $2,500 for the lab, mileage of $500 and labour $500 for each flock. The reported cost on an 8,000-hen flock was $0.4375 per chick. Upon closer review, the lab cost for the Broiler Breeder Bloods Program is currently paid by the Commission, and no supporting documentation was provided for mileage and labour. It is recommended that this line item is not included in the breeder chick price formulae.
    - Alternative: None identified.

It is recommended that the list be finalized, with these costs provided by the BCEHA to the Commission each pricing period. Changes to the list impacting on pricing would require the approval of the Commission.

Breeder Chick Margin

It was stated that the hatcheries apply a 20% gross margin to the costs of the breeder chick after foreign exchange conversion and brokerage fees. This is to cover the cost of providing the service of placing the breeder chicks on the Producers' farms.

The margin % can be expressed as gross profit / selling price. To achieve what the profit margin in dollars is one multiplies the selling price by the margin % sought. Our understanding of this was confirmed by the BCEHA representatives.

Month	Female Price	20% Margin	Implied Cost before Margin	Male Price	20% Margin	Implied Cost before Margin
March 2021	$11.59	$2.318	$9.272	$16.37	$3.274	$13.096
May 2013	$5.12	$1.024	$4.096	$6.95	$1.390	$5.560
Increase	$6.47 (126%)	$1.294	$5.176	$9.42 (136%)	$1.884	$7.536
Annualized	10.8%			11.3%		

Over the past eight years, the margin has increased while utilization has also increased. As the quota system is hen-based, this has a direct impact upon pricing and the supply chain. Utilization is currently at 96% but has varied from 86% to 106% over this period of time.

The Commission manages 1,766,182 quota hens over a two-year cycle. The effect of this price variance on the industry:

	Females	Males
Quota	1,766,182	-
Per year	883,091	-
Utilization	96%	-
Placed	847,767	105,971 (12.5% ratio assumed)
Increased Margin	$1.294	$1.884
Increased Cost to Producer	$1,097,010	$199,649

	Total
Cost to Producers & Growers	$1,296,659
Recovery rate at sub-optimal Linkage-Based Pricing	75%
Cost to Processors, estimated	$972,494

The breeder chick margin increase is 55%, more than half, of the hatchery margin increase request of 1.75 cents, calculated to be $1.78 million.

To put this in perspective, the cost of the breeder chick margin increase and total margin included in the price charged to producers can be expressed on a per chick basis, using an average of 115 saleable chicks per hen:

	Per Hen	Per Saleable Chick
Breeder chick margin increase	$1.294 + ($1.884 x 12.5%) = $1.530	$0.0133 or 1.33 cents
Breeder chick margin, total	$2.318 + ($3.274 x 12.5%) = $2.727	$0.0237 or 2.37 cents

It can be ascertained that due to the increase in breeder chick costs (for which it is acknowledged there is little that can be controlled save for the breeder chick margin hatcheries impose), hatcheries have attained an implied 1.33 cents per saleable chick margin increase when considering the female and male breeder chick margins. It could be stated that most of the 1.75 cent hatchery margin increase request has already been received by hatcheries under this pricing approach where hatcheries set the price without full transparency.

Breeder chick placements are a necessary part of the hatching egg industry; hatcheries must place breeder chicks so that Producers have flocks to meet our provincial allocation obligation. A service is clearly provided, but now clarity on compensation hatcheries receive providing this ancillary service is also required.

In order to achieve this and reduce the deleterious effects that arise from a margin being based on costs not in our control, the Commission recommends ‘locking in’ or ‘crystallizing’ the margin or portion thereof. Consistent with the

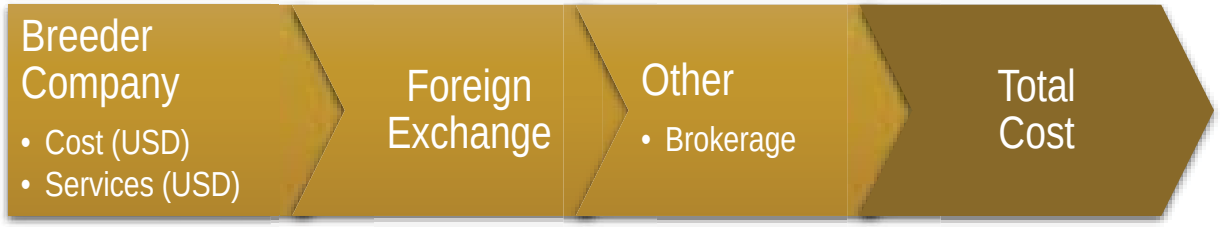
principles of a hatchery margin increase mechanism, no mechanism to change this figure is recommended without consultation with the BCEHA and other stakeholders about an acceptable cost verification method.

The Commission also recommends the margin be expressed on a saleable chick basis, as part of the hatchery margin. This would bring the costing of breeder chicks more closely in line with that of Ontario, where Producers receive a true 'flow-through' cost and transparent invoicing.

Under a COP-Based Pricing Model, the expression of the margin as either a cost to Producers on the date of placement ($ per breeder chick) or addition to the hatchery margin (¢ per saleable chick) results in the same day-old price for Growers. A charge per breeder chick, flowed through the COP, and returned to Producers via their price plus hatchery margin will equal the same as a lower, leaner COP plus hatchery margin plus breeder chick margin expressed on a saleable chick basis (an overall increased hatchery margin). This leaner COP would also have a positive result upon the calculated returns to Producers while having no effect on the day-old chick price paid by the Grower. Therefore, this alternative is recommended.

The Commission recommends crystallization of the breeder chick margin at a rate of 1.25 cents per saleable chick, approximately one-half of the implied 2.37 cent margin within the system currently. This would be an approximate crystallization of a 10.5% breeder chick margin. Combining this with hatchery margin request would equal a net hatchery margin increase of 3.0 cents (1.25 cent breeder chick margin cost translation + 1.75 cent hatchery margin increase). This reflects the agreement reached by the Sub-Committee.

Final breeder chick price formula components:



As discussed by the Sub-Committee, it is acknowledged that this final formula does not address other benefits received by hatcheries under the current pricing method, such as: breeder company reward programs, reductions in price with faster payment terms, or offlines placed as a result from hatching breeder eggs locally. On the other side it does not address the carrying costs incurred by hatcheries in paying the breeder company directly before receiving payments from Producers, whether or not it achieves a reduction in the final bill by way of payment terms.

Example pricing:

	Female	Male
Breeder company cost (USD)	$7.0000	$10.0000
Services (USD)	$0.1444	$ 0.1444
Subtotal (USD)	$7.1444	$10.1444
Foreign exchange – 2021-03	1.2574	1.2574
Subtotal (CAD)	$8.98	$12.76
Other – brokerage (CAD)	$0.10	$ 0.10
Price (CAD)	$9.08	$12.86

The example pricing uses actual data for only the foreign exchange rate.

Vaccine Pricing

Background

Vaccinations have a significant impact on Producer flocks' progeny. Similar to the breeder chick price, the amount paid by Producers varies depending on the vaccination schedule of their assigned hatchery.

There are also differences in cost depending on whether the vaccine is commercial or autogenous (more expensive).

Mandatory vaccination schedules are routinely updated by hatcheries in response to disease issues on broiler farms; the inclusion of a cost in the COP/Linkage requires attention to ensure timely incorporation.

Recommendation

The Commission has prepared a separate Work Action Plan to address the vaccination schedule and establishment of a cost sleeve. The current costs of vaccines were captured in the COP, and the updating of these costs as laid out in the COP Update Mechanisms section of this Pricing Package.