



BRITISH COLUMBIA
FERRY COMMISSION

ORDER
NUMBER: 21-01

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IN THE MATTER OF

Approval of a Major Capital Expenditure for
Electrification of Six Island Class Vessels
Proposed by British Columbia Ferry Services Inc.
Pursuant to Section 55(2) of the *Coastal Ferry Act*

BEFORE: Eva Hage, BC Ferries Commissioner (the “Commissioner”)

ORDER

WHEREAS:

- A. On May 28, 2021, British Columbia Ferry Services Inc. (“BC Ferries”) submitted an application (the “Application”) under section 55(2) of the *Coastal Ferry Act* (the “Act”) seeking the Commissioner’s approval of a proposed major capital expenditure for the electrification of six Island class vessels and nine terminals collectively referred to as the Island Class Electrification Program (“ICEP” or the “Program”).
- B. By Orders 17-01 and 19-02 the Commissioner has previously approved BC Ferries’ applications under section 55(2) of the Act for the proposed major capital expenditures for the procurement of the first two and subsequent four diesel-electric Island class vessels.

- C. Pursuant to Order 19-03, the proposed capital expenditures for ICEP exceeds the threshold of \$25 million for non-vessel related capital expenditures and, therefore, Section 55(2) of the Act applies.
- D. BC Ferries proposes to convert its six diesel-electric Island class vessels to permit them to operate exclusively in battery-electric mode as plug-in vessels with the ability to recharge from shore-based electrical power supply. Corresponding electrical upgrades will be made to up to nine terminals on the routes connecting Powell River and Texada Island (route 18– one vessel), Nanaimo Harbour and Gabriola Island (route 19 – two vessels), Campbell River and Quadra Island (route 23 – two vessels) and Port McNeill with Malcolm Island and Cormorant Island (route 25 – one vessel).
- E. In its Application, BC Ferries states that capital cost estimates are preliminary and that the Program cannot proceed until detailed engineering work is completed.
- F. BC Ferries also maintains that the ICEP will not proceed without the Federal Government funding as described in the Application and the ability to generate carbon credits under the provincial Low Carbon Fuel Standard.
- G. Upon receipt of the Application, the Commissioner issued a press release inviting public comments on the proposed Program.
- H. The Commissioner has reviewed the Application and has noted that the capital costs for ICEP have been developed without any detailed engineering at this initial stage. Despite this, the Commissioner believes the underlying assumptions and the methodology for determining preliminary capital cost estimates are reasonable based on the information contained in the Application and subsequent information provided by BC Ferries to the Commissioner.
- I. In accordance with Section 55(4) of the Act, the Commissioner has determined that the proposed major capital expenditure as generally described in the Application, and provided the scope and impact on future price caps do not materially change, is reasonable, prudent and

consistent with the Coastal Ferry Services Contract and BC Ferries' long term capital plan.

- J. The Commissioner also deems the proposed major capital expenditure as generally described in the Application to be in the public interest and affordable due to the reduction in greenhouse gas emissions and noise and the expectation that there will be no upward pressure on future price caps from this investment as external funding will cover a major portion of the capital costs of the Program and the electrification will lower operating costs.

NOW THEREFORE the Commissioner orders as follows:

1. Pursuant to section 55(2) of the Act, the proposed major capital expenditure for the electrification of six Island class vessels and related terminals, as generally described in the Application (and net of external one time funding), is approved, subject to the conditions outlined below. The approved maximum amount of total major capital expenditures for the Program will be confirmed by a separate confidential order to BC Ferries.
2. The approved maximum amount of total major capital expenditures referred to in paragraph 1 shall remain confidential until completion of the Program or such later date as the Commissioner may determine.
3. BC Ferries must inform the Commissioner of the outcome of the Federal Government funding application and the Provincial and Federal carbon credit programs.
4. After completing detailed engineering, but prior to entering into contracts for vessel and terminal modifications, BC Ferries must satisfy the Commissioner that the Program is as generally as described in the Application and the capital cost does not exceed the Approved Program Expenditure.

5. Before entering into contracts for vessel and terminal modifications, BC Ferries must provide the Commissioner with procurement milestones and dates.

DATED at Victoria, in the Province of British Columbia, this 26th day of July 2021.

BY ORDER

A handwritten signature in blue ink, appearing to read 'Eva Hage', is positioned above the printed name and title.

Eva Hage
BC Ferries Commissioner



ORDER 21-01 REASONS

In the Matter of Section 55(2) of the *Coastal Ferry Act*
And
A Major Capital Expenditure for the Electrification of six Island Class Vessels
proposed by
British Columbia Ferry Services Inc.

July 26, 2021

Table of Contents

Background	3
Regulatory Framework	3
Approval of Major Capital Expenditures	3
Summary of the Application	5
Scope of the Review	6
Review Process	6
Commissioner’s Findings and Determinations	8
Summary	11
Appendices	12
A. Questions and Answers from BC Ferries	12
B. Public Comments	12

Background

On May 28, 2021 British Columbia Ferry Services Inc. (“BC Ferries”) submitted an application (the “Application”) under section 55(2) of the *Coastal Ferry Act* (the “Act”) seeking the British Columbia Ferries Commissioner’s (the “Commissioner”) approval of a proposed major capital expenditure for the electrification of six Island class vessels and up to nine terminals (the “Program”).

Regulatory Framework

Role of Commissioner

Section 38 in the Act describes the role, responsibilities and powers of the Commissioner.

38 (1) Without limiting any other power of the commissioner under this Act, the commissioner must, after considering public feedback obtained under this Act, regulate each ferry operator in relation to the core ferry services that are to be provided by that ferry operator and the tariffs, including, without limitation, reservation fees, that may be charged for those core ferry services, and must undertake that regulation in the public interest and in accordance with the following principles:

(a) the primary role of the commissioner is to balance, in the manner the commissioner considers appropriate,

(i) the interests of ferry users,

(ii) the interests of taxpayers, and

(iii) the financial sustainability of ferry operators;

(a.1) ferry operators are to be encouraged to meet provincial greenhouse gas emission targets in their operations and when developing capital plans;

(b) ferry operators are to be encouraged to be innovative and to minimize expenses without adversely affecting their safe compliance with core ferry services.”

Approval of Major Capital Expenditures

Under the Act, the Commissioner regulates ferry operators including determining price caps for each performance term and approving major capital expenditures. In determining price caps, the Commissioner includes those capital expenditures that are determined to be reasonable,

including capital expenditures that have received approval under Section 55 of the Act.

Section 55 states:

- “(1) Subject to subsections (2) to (5), before deploying capital assets on, or incurring capital expenditures in connection with, a designated ferry route or terminal, the ferry operator may apply to the commissioner and the commissioner must, within one month after the application, declare whether the capital assets proposed to be deployed on, or the capital expenditures proposed to be incurred in connection with, the designated ferry route or terminal are reasonably required.*
- (2) A ferry operator must not incur a major capital expenditure without first obtaining the commissioner’s approval of the expenditure.*
- (3) A ferry operator may apply to the commissioner for approval of a proposed major capital expenditure and the commissioner must respond to the application within 2 months after its receipt by the commissioner.*
- (4) The commissioner may approve a proposed major capital expenditure if the proposed major capital expenditure is*
- (a) reasonable,*
 - (b) prudent, and*
 - (c) consistent with*
 - (i) the current Coastal Ferry Services Contract, and*
 - (ii) any long-term capital plan established by the ferry operator.*
- (5) For the purposes of this section, a capital expenditure of a ferry operator is a major capital expenditure if it meets the criteria*
- (a) established from time to time by the commissioner, and*
 - (b) most recently provided by the commissioner to the ferry operator.”*

Pursuant to subsection 55(5) of the Act, the Commissioner established the criteria of a major capital expenditure by issuing Order 19-03 dated January 25, 2019, which defines a major capital expenditure.

- 1. Any capital expenditure for any new vessel or mid-life upgrade to a vessel (“Vessel Expenditure”) is a major capital expenditure if the expenditure exceeds \$50 million inclusive of vessel related component programs and interest during construction;*

2. *Any capital expenditure for new terminals, terminal upgrades, information technology systems or other non-vessel capital expenditures (“Non-Vessel Expenditure”) is a major capital expenditure if the expenditure exceeds \$25 million, inclusive of non-vessel related component programs and interest during construction;*
3. *In the case where a single project (“Project”) planned by a ferry operator includes capital expenditures of a type referenced in both paragraphs (1) and (2) above, the entire capital expenditure for the Project will be a major capital expenditure if either the Vessel Expenditure or Non-Vessel Expenditure exceeds the applicable threshold; and*
4. *When estimating the amount of a planned capital expenditure for purposes of this Order, a ferry operator may exclude the amount of any third-party contributions.*

As the proposed capital expenditure for the Program exceeds \$25 million for terminal upgrades, Section 55(2) of the Act applies.

Summary of the Application

BC Ferries proposes to convert its six diesel-electric Island class ferries to permit them to operate exclusively in battery-electric mode as plug-in vessels with the ability to recharge from shore-based electrical power supply. Corresponding electrical upgrades will be made to up to nine terminals on the routes connecting Powell River and Texada Island (route 18– one vessel), Nanaimo Harbour and Gabriola Island (route 19 – two vessels), Campbell River and Quadra Island (route 23 – two vessels) and Port McNeill with Malcolm Island and Cormorant Island (route 25 – one vessel).

The Application states that due to the significant capital investment required, the Program can only proceed if additional funding is secured from external sources. Funding will be sought from the Federal Government and carbon credits from two regulatory frameworks, namely the provincial Low Carbon Fuel Standard and the pending federal Clean Fuel Standard. The Commissioner was advised by BC Ferries that to secure such funding, the Federal Government expects all approvals have been attained.

BC Ferries supplied a large number of supporting documents with the Application and responded to additional Commissioner’s questions regarding the Program. The Application also contained a summary of support from numerous stakeholder groups regarding the electrification of the six

Island Class vessels.

The Application included the estimated total capital expenditure for the Program. At this time the estimate is preliminary as detailed engineering has not yet been completed pending confirmation of external funding. The preliminary cost estimate has been redacted from the Application as shown on BC Ferries' or the BC Ferry Commission's website due to the commercially sensitive nature of such information. The Commissioner accepts BC Ferries' position that disclosure of such information could reasonably be expected to harm their negotiating position with shipyards and other suppliers. Accordingly, a separate order will be released to BC Ferries with the actual amount of major capital expenditure approved by the Commissioner. This separate order shall remain confidential until completion of the Program.

Scope of the Review

The Commissioner's review of the Application relied on documents and representations of BC Ferries' management and their consultants, as well as comments received from stakeholders and the public. The review did not constitute an audit, but rather an assessment of the reasonableness of the assumptions and analyses underlying the proposed Program. In addition, the Commissioner's review did not involve an assessment of proposed design of the electrification system proposed for the six Island Class vessels and related terminals. However, the Commissioner is satisfied that electrification technology is a proven technology for vessels of this size and are in operation elsewhere¹.

Review Process

The Commissioner reviewed the Application and all supporting documentation. The Commissioner presented BC Ferries with a series of questions which BC Ferries responded to. All questions and responses by BC Ferries are appended to this document. The Commissioner was satisfied with the responses received from BC Ferries.

¹ <http://www.ppmc-transport.org/battery-electric-car-ferry-in-norway>
<https://www.electrive.com/2021/03/02/worlds-largest-electric-ferry-yet-goes-into-service-in-norwa>
<https://www.electrive.com/2019/08/16/powerful-electric-ferry-ellen-takes-to-the-sea>
<https://www.ship-technology.com/features/elektra-finlands-first-hybrid-electric-ferry>

The Commissioner made further enquiries of BC Ferries about the process BC Ferries engaged in to determine contingencies and was provided information that satisfied the Commissioner that BC Ferries followed a comprehensive and rigorous process in estimating the contingencies.

The Commissioner issued a press release asking for public comments on BC Ferries' application in gauging the public interest regarding electrification of the six Island Class vessels. These responses, in addition to stakeholder support received by BC Ferries, were taken into consideration. The public comments received by the Commissioner are appended to this document.

In accordance with Section 55(4) of the Act, the Commissioner is required to determine whether the proposed capital expenditures to be incurred in connection with the designated ferry routes are reasonably required and whether the proposed major capital expenditure is:

- 1) Reasonable;
- 2) Prudent; and
- 3) Consistent with the current Coastal Ferry Services Contract and the long-term capital plan of the ferry operator.

For purposes of applying the requirements of Section 55 the Commissioner is guided by the following definitions as stated in the Commissioner's Section 55 Application Guidelines²:

"Reasonable" is defined as:

"An intelligent approach supported or justified by reason; fair, proper, sound behavior that avoids needless error and steers clear of extremes." (BusinessDictionary.com)

"Prudent", is defined as:

"Good judgment or wisdom gained from experience, expressed in a realistic and frugal attitude. Prudence, however, is not the same as grave caution or wariness concerned only

² Guidelines for British Columbia Ferry Services Inc. for Applications under Section 55 of the Coastal ferry Act, December 30 2019, www.bcferrycommission.ca

with preserving the status quo.” (BusinessDictionary.com)

The Commissioner’s determinations are also guided by paragraph 5 in Order 19-03 which states:

5. The commissioner’s determinations of a Section 55(2) application for approval of a major capital expenditure, as defined in paragraphs (1) and (2) above, will be based on whether or not the proposed capital expenditure is:

- a) reasonable, affordable and prudent;*
- b) consistent with the approved and current 12-year capital plan submitted to the commissioner for the current performance term;*
- c) consistent with the current Coastal Ferry Services Contract; and*
- d) consistent with any government long-term vision for the future evolution of coastal ferry services;*

Commissioner’s Findings and Determinations

After reviewing the Application, supporting documentation and considering all public comments and stakeholder support received, the Commissioner has made the following determinations:

1) Is the preferred option of electrification reasonable, affordable and prudent?

In its Application, BC Ferries presented two options:

- **Status Quo:** This refers to operating the six Island class vessels in their current diesel-electric hybrid configuration from the available and planned berths, without further vessel or terminal upgrades that would enable full battery-electric operations for at least another 25 years.
- **Option 1- Island Class Electrification:** This option involves implementing all terminal and vessel work necessary to operate the island class vessels in full electric mode on routes 18, 19, 23 and 25 within the next four years.

The Application includes a financial Net Present Value (“NPV”) analysis comparing the two options over a 20-year period after the electrification assets are assumed to be in service. It assumes that with the Status Quo there would be no new capital expenditures incurred, and no projected changes to the operating costs for the Island class vessels for at least 25 years.

The NPV analysis identifies the amount of external funding required for Option 1 to achieve a net zero rate of return equivalent to the Status Quo option over a 25-year period.

The NPV analysis is based on a number of assumptions with respect to initial and recurring capital costs and fuel savings over the life of the Program. As detailed engineering has not yet been completed and won’t be initiated until there is confirmation of Federal Government funding as presented in the Application, the capital cost estimates are by nature preliminary. Contingencies have been added to address uncertainty.

The Commissioner reviewed these assumptions and has determined they are reasonable given recent experience by BC Ferries on previous major capital projects and the detailed process followed to determine the contingencies. However, the Commissioner recognizes there is a risk that the contingencies may be inadequate given the uncertainties prior to detailed engineering and completion of the procurement process. Despite this risk, the Commissioner is of the view that, provided the scope and impact on future price caps do not materially change, the Program is reasonable.

The Commissioner also considered whether the preferred option is affordable. Affordability is measured in terms of how the Program would impact price caps in the next performance term and beyond. Since external funding will cover a major portion of the capital costs of the Program and the electrification is expected to lower operating costs, there should be no upward pressure on future price caps for the next 20 years from this investment. Accordingly, the Commissioner has determined the Program is also affordable.

Proposed Federal Government funding presents BC Ferries with an opportunity to electrify the six Island Class vessels sooner than would otherwise occur due to the reduction in the capital costs involved. The Commissioner finds that taking advantage of Federal

Government funding to accelerate electrification demonstrates good judgment combined with a realistic and frugal attitude, therefore the Commissioner has determined that the Program is prudent.

2) *Is the preferred option consistent with the Coastal Ferry Services Contract and BC Ferries' most recent long-term capital plan?*

The Commissioner considered whether the proposed major capital expenditure is consistent with the Coastal Ferry Services Contract (“CFSC”). Schedule A of the CFSC stipulates core service levels for each regulated route expressed as the minimum number of round trips to be delivered per contract year, the minimum number of round trips per day and the minimum hours of operation that BC Ferries must operate. The capacity provided on each designated ferry route must be sufficient to carry the previous year’s traffic (Appendix 1 of Schedule “A” to CFSC).

The Commissioner has previously approved the six diesel-electric Island Class vessels, under Orders 17-01 and 19-02, and determined that the vessels were compliant with the CFSC. Further, Order 19-02 sets out the Commissioner’s expectation that the vessels would one day be converted to full electrification.

The Commissioner reviewed BC Ferries’ most recent long-term capital plan approved by BC Ferries’ Board of Directors in February 2021. The capital plan includes the Program with substantially same scope as outlined in the Application. Therefore, the Commissioner has determined that the Program is consistent with the plan.

3) *Is the preferred option consistent with government’s long-term vision for the future evolution of coastal ferry services?*

Section 38(1)(a.1) in the Act states that *“ferry operators are to be encouraged to meet provincial greenhouse gas emission targets in their operations and when developing capital plans”*. The Commissioner infers from this that the Program, which will lead to reduction in greenhouse gas emissions, is consistent with the government’s long-term vision for coastal ferry services.

4) *Is the preferred option in the public interest?*

In addition to assessing the Application against the requirements under s. 55(4) of the Act as above, the Commissioner is mindful of her statutory responsibilities under s. 38(1) in the Act to consider the public interest and to balance the interests of ferry users, taxpayers and the ferry operator. Based on the public comments, which are overwhelmingly in favour of the Program, and extensive stakeholder support, the Commissioner is satisfied that the Program is in the public interest in view of the reduction in greenhouse gas emissions and noise. Since Federal and Provincial support programs would offset a significant portion of the total Program capital costs there should be no upward pressure on future price caps, which the Commissioner determines to be in the public interest.

In addition, the Commissioner is of the view that the public interest is served if the proposed major capital expenditure meets the criteria set out in section 55(4) above.

5) *Was BC Ferries' community engagement process adequate to support the preferred option and do the public comments submitted to the Commissioner support the preferred option?*

BC Ferries conducted a preliminary outreach and engagement process which resulted in many letters of support from customers, communities and other stakeholders.

The Commissioner issued a press release inviting the public to comment on the Application and received comments that were overwhelmingly in support of the Program.

Accordingly, based on the feedback BC Ferries obtained from their engagement processes and the public comments submitted to the Commissioner, the Commissioner is satisfied that there is considerable support for the Program.

Summary

In summary, the Commissioner has determined that the proposed major capital expenditure as described in the Application is consistent with S. 55(4) of the Act.

The Commissioner has also found the Application to be in the public interest of reducing greenhouse gas emissions and noise and having a positive impact on future price caps, which is consistent with the Commissioner's role under s.38(1) of the Act.

Accordingly, the proposed major capital expenditure is approved subject to the following conditions:

- a) The Approved Program Expenditure will be confirmed by a separate confidential order to BC Ferries. The amount will remain confidential until completion of the Program or such later date as the Commissioner may determine;
- b) BC Ferries must inform the Commissioner of the outcome of the Federal Government funding application and the Provincial and Federal carbon credit programs;
- c) After completing detailed engineering, but prior to entering into contracts for vessel and terminal modifications, BC Ferries must satisfy the Commissioner that the Program is as generally as described in the Application and the capital cost does not exceed the Approved Program Expenditure; and
- d) Before entering into contracts for vessel and terminal modifications, BC Ferries must provide the Commissioner with procurement milestones and dates.

Appendices

A. Questions and Answers from BC Ferries

B. Public Comments

**British Columbia Ferry Services Inc.
("BC Ferries" or "the Company")**

**Application to the
British Columbia Ferries Commissioner**

**Pursuant to
Section 55(2) of the *Coastal Ferry Act* ("section 55")**

**For the
Island Class Electrification Program (the "Program" or "ICEP")**

RESPONSES TO QUESTIONS OF JUNE 7, 2021

[Note: In this version of the responses to the questions of June 7, 2021, information of a confidential and commercially-sensitive nature has been redacted.]

1. *Regarding the determinations for the contingencies, please provide details of how the amounts were calculated based on the research materials for estimating costs as quoted in the application. How confident are you regarding the 25% contingency for terminals and 18% for vessels?*

The contingency was calculated based on the estimated accuracy of estimates for direct budget line items. The accuracy for each element was expressed as a plus/minus range and the contingency was set to provide 95 percent confidence that the budget would not be exceeded, assuming a normal (bell curve) probability distribution.

2. *Can you please provide us with analysis of contingencies budgeted for recent major capex projects versus actual costs (eg first two Island Class and all Salish Class vessels plus any significant terminal projects).*

There are no past BC Ferries projects directly comparable to the Program; however, other BC Ferries projects have followed a similar path of development and approvals as proposed by ICEP.

For example, the Route 23 lay-by berth project ("Route 23 project") was required as part of the overall program for Four Island Class Vessels and One Salish Class Vessel (i.e., the Bowen Class Replacement Program). As the Route 23 project was brought forward in the section 55 Application while it was early in the preliminary design stage, a 30 percent contingency was included to address risks and uncertainties. As design work progressed, the Company determined that the placeholder budget was more than sufficient to cover the necessary costs of the project. Once the design work was completed and construction contracts signed, BC Ferries reduced the overall budget for the Route 23 project and also reduced its contingency to 10 percent.

A similar stage-gated approach is being proposed for ICEP. Due to the early stages of design for electrifying terminals and Island class vessels and potential risks identified to date, the Program requires a level of contingency be carried to address cost

uncertainties. As design work progresses and costs are confirmed by vendors, the level of uncertainty will decrease and financial estimates and projections will be revised. The Company expects that overall contingency levels will be reduced as design progresses and construction contracts are in place and, in due course, overall contingency for terminals and vessels will be set at 10 percent, which is comparable to similar projects.

The following table summarizes capital cost estimates for the first two Island class vessels (Island Phase 1), the next four Island class vessels built as part of the Bowen Class Replacement Program (Island Phase 2), and the Route 23 project. The table shows how contingency levels changed as designs matured and service providers signed contracts:

Initial S.55 Application			
	90988 - Island Phase 1	91071 - Island Phase 2	92192 - Rt 23 Lay-by
Capital Budget before Contingency	\$69.9	\$< >	\$< >
Contingency	\$9.5	\$< >	\$< >
Total Capital Budget	\$79.4	\$< >	\$< >
Contingency %	13.6%	10.0%	30.0%
Current			
	90988 - Island Phase 1	91071 - Island Phase 2	92192 - Rt 23 Lay-by
Capital Budget before Contingency	\$69.9	\$< >	\$< >
Contingency	\$9.5	\$< >	\$< >
Total Capital Budget	\$79.4	\$< >	\$< >
Contingency %	13.6%	5.2%	10.0%

- Island Phase 1
 - Project is now closed
 - Actual capital costs were \$76.2 million
- Island Phase 2
 - Budget increased from initial submission once market pricing was received (and section 55 Application was updated); however, contingency was reduced significantly once contract pricing was determined
 - The current Island Phase 2 forecast to complete is ~\$< > million
- Route 23 project
 - Budget and contingency were decreased from initial section 55 Application once design work was completed and market pricing received
 - The current Route 23 forecast to complete is ~\$< > million

3. *Is the division of responsibilities with BC Hydro entirely clear?*

Responsibilities are clearly divided between BC Hydro and BC Ferries, with delineation at the property line. BC Hydro infrastructure work encompasses all the improvements required outside BC Ferries' properties, and BC Ferries infrastructure work includes everything inside its properties. BC Hydro has established processes in place to work

with proponents to develop designs and to fund improvements for electrical infrastructure.

4. *Please explain relevance of IMO targets for GHG reduction. Isn't the only relevant target the CleanBC target? What about a Federal Target?*

The International Maritime Organization's Maritime Environment Protection Committee Seventy-Fifth session (MEPC 75) held in November 2020 approved draft mandatory regulations to reduce the carbon intensity of existing ships. The draft regulations are an amendment to the International Convention for the Prevention of Pollution from Ships' MARPOL Annex VI and are short-term measures to reduce greenhouse gas emissions in the shipping sector.

At this point, it has not been fully determined how BC Ferries will be affected by these new regulations. BC Ferries is primarily awaiting feedback from Transport Canada, the deciding authority on application of the regulations. However, ICEP will be well-positioned to meet/exceed regulatory requirements if they are adopted federally. BC Ferries' engineering team has been closely monitoring the status of these requirements, including updates from Transport Canada. The regulations include the following:

- Energy Efficiency Existing Ship Index ("EEXI"): requirement equivalent to the Energy Efficiency Design Index (EEDI) to all existing ships more than 400 GT regardless of the year of build. The EEXI would be verified and an Energy Efficiency Certificate issued by the first annual International Air Pollution Prevention (IAPP) survey on or after January 1, 2023.
- Enhanced Shipboard Energy Efficiency Management Plan ("SEEMP"): As part of SEEMP, all ships above 400 GT need to develop a revised energy efficiency improvement and decarbonisation plan, and all ships above 5,000 GT will include a carbon intensity indicator (see next bullet).
- Carbon Intensity Indicator (CII): Each ship above 5,000 GT will be given an annual rating from A to E; ships must achieve a C rating or higher with rating thresholds increasing in stringency towards 2030. Ships that obtain a D rating for three consecutive years or an E rating in one year will need to develop a corrective action plan.

BC Ferries currently refers to CleanBC to help set its emissions reduction goals. We have not formally adopted federal targets but continue to reference federal objectives for further guidance.

5. *Please provide calculation or explain how emissions of CO₂e are calculated.*

The emissions calculation was completed by S&T Squared Consultants Incorporated ("S&T Squared"), which has extensive experience developing tools and quantification methodology for greenhouse gas emissions. As an example, S&T Squared developed

GHGenius, the tool used by the Province's Low Carbon Fuels Branch to calculate fuel carbon intensity under BC's Low Carbon Fuel Standard. S&T Squared is also a member of the Technical Working Group that is developing the federal Clean Fuel Standard.

Please see the attached workbook for a detailed breakdown of calculations, including emissions factors. Please note that these calculations were based on the energy analysis completed by Damen Shipyards in January 2019. This analysis is currently being updated with recent in-service operating data.

6. *Please explain how carbon credits are calculated.*

For the Part 3 Agreement:

- The monetary value of low carbon fuel credits was determined using \$283/credit, which was the stated value within the 2020 Part 3 Agreement Program Request for Proposals based on the average credit market price over the period April 1, 2019 to March 31, 2020.

See page 7 of of the Province's *2020 Part 3 Agreement Program Request for Proposals* at: https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/electricity-alternative-energy/transportation/renewable-low-carbon-fuels/2020_part_3_agreement_program_-_rfp.pdf

- The Part 3 Agreement defines a specific amount of credits awarded based on project implementation milestones. The total amount of credits included in the Part 3 Agreement is < > for an estimated value of \$< > million (at \$283/credit).

The general calculation:

The formula used to calculate low carbon fuel credits generated by using electricity as the primary energy source is based on the *Greenhouse Gas Reduction (Renewable and Low Carbon Fuel Requirements) Act*:

- Credit or Debit = (CI class × EER fuel – CI fuel) × EC fuel/1,000,000

Where:

- Credit or Debit = the number of credits generated, if the number is positive, or the number of debits incurred, if the number is negative, for the compliance period;
- CI Class = the prescribed carbon intensity ("CI") limit for the compliance period for the class of fuel of which the fuel is a part;
- EER fuel = the prescribed energy effectiveness ratio for that fuel in that class of fuel;
- CI fuel = the carbon intensity of the fuel;

- EC fuel = the energy content of the fuel calculated in accordance with the regulations.

The Program's Estimated Carbon Credit Revenue = \$ < > million per year
 (< > x < > - < >) x ((< > million x < >)/1,000,000) x \$283 sale price x
 < > percent of total

Calculated based on 2020 CI Class, at \$283 per credit (< > percent of the maximum sale price during calendar 2019, and < > percent of the maximum sale price during calendar 2020), with < > percent of sale going to BC Ferries.

Whereas:

CI Class = 86.15 gCO₂e/MJ

(Note: this changes annually. See:

<https://www2.gov.bc.ca/gov/content/industry/electricity-alternative-energy/transportation-energies/renewable-low-carbon-fuels/fuel-supplier-compliance-50005>)

EER fuel = < >

CI fuel = 19.73 gCO₂e/MJ

(See the Renewable And Low Carbon Fuel Requirements Regulation, at

https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/394_2008)

Energy density = < >

EC fuel = quantity of fuel supplied X energy density (< > million x < >)

7. *Please provide milestones for further BoD approvals.*

The Company's Board of Directors has approved the Program with a budget of \$ < > million (including external funding) and a net program cost to BC Ferries of no greater than \$ < > million, all as described in the section 55 Application. The Board's approval to proceed is subject to the Commissioner's approval of the section 55 Application, as well as receipt of sufficient external funding.

At this point no further approval milestones have been identified by the Board, although it will receive quarterly updates on the Program's performance and budget. The Board has directed that their approval is required before any contingency funds for this program are released.

8. *Please clarify what is meant by item (c) in footnote on page 17. Is this a comparison between full electric and the current fully diesel operated vessels? And what is the relevance?*

Item (c) of footnote 10 states:

Six Island class ferries on four routes (18, 25, 19 and 23) running in battery-electric mode will potentially reduce annual GHG emissions by 95-97 percent on those routes (in comparison to the same ferries powered by diesel) and reduce air contaminants: particulate matter (PM), nitrogen oxides (NOx) and sulfur oxides (SOx) by 95-99 percent.

The purpose of this item is to present the anticipated reduction in greenhouse gas ("GHG") emissions and criteria air contaminants for electrified Island class vessels on the four specified routes compared to the Island class vessels operating fully on diesel. The relevance is to illustrate the percentage difference operating the same ships with the two different energy sources.

9. *Please provide any update on timing for decision from Federal Government.*

BC Ferries has been actively engaged in Ottawa to seek funding. In early June 2021, federal officials directed BC Ferries to apply to the Net Zero Accelerator program established by the Government of Canada to accelerate the adoption of clean technology. Details of this \$8 billion program have not been fully released. BC Ferries will be ready to apply to this program as soon as the application process opens. The program is expected to open in the next few weeks.

10. *What indication have you been given that funding will be forthcoming before the completion of the program?*

BC Ferries initiated preliminary design work to inform the development of the business case and the section 55 Application. Once the preliminary designs are completed in Autumn 2021, no further Program activities will be undertaken until all necessary approvals and the required level of external funding to proceed with the Program are secured. Funding from the federal government is expected to be disbursed throughout the Program as milestones are achieved. Funding from the BC Government Part 3 Agreement will also be disbursed as Program milestones are achieved.

Public Comments on BC Ferries' Proposal for Electrification of Six Island Class Vessels

June 30, 2021

	Date	Comments
1	June 28, 2021	<p>The British Columbia Sustainable Energy Association (BCSEA) is a multi-sector, multi-disciplinary member-based registered charity that exists to provide education and well-reasoned, policy oriented research, analysis and recommendations on sustainable energy issues and innovations in British Columbia. Our goal is to achieve a 100% renewable British Columbia.</p> <p>In order to reach the greenhouse gas (GHG) reduction goals mandated by CleanBC and by the Paris Climate Accords we must reduce all unnecessary GHG emissions in BC as quickly as possible. Due to the almost completely carbon free generation of electricity in BC, BCSEA supports electrification wherever applicable as an efficient and quick way to completely eliminate GHG emissions. We have also believed for a number of years that the electrification of ferries on BC Ferries' Island Class routes is both technically and financially feasible. We therefore welcome BC Ferries' proposal to electrify it's six Island Class vessels and strongly support the application.</p>
2	June 15, 2021	<p>Hello,</p> <p>I am in support of all six island-class ferries running on electric power. I would like to see all ferries switch to electric as soon as possible!</p>
3	June 15, 2021	<p>Hello,</p> <p>I wish to see all six new Island-class ferries run on battery-electric power.</p> <p>I fully support the electrification of BC Ferries' fleet and would like to see the transition occur as swiftly as possible.</p>
4	June 14, 2021	<p>Hi</p> <p>I am responding to the invitation in the Times Colonist to express an opinion on electrification of ferries for BC Ferry:</p>

		<p>We are wholeheartedly in favour of converting the ferries to electric motor propulsion. The sooner the better.</p> <p>Thank you</p>
5	June 14, 2021	<p>I read in the June 10 edition of the Victoria Times-Colonist about BC Ferries' request for public comments on BC Ferries' plan to run six new island-class ferries on battery-electric power.</p> <p>I am supportive of moving toward this emission reduction solution. My request would be to:</p> <ol style="list-style-type: none"> a) provide to the public the cost of making the transition to battery-electric powered b) indicate the reduction in greenhouse gas emissions and other expected savings such as maintenance costs. Also provide other considerations that have gone into proposing this solution. <p>Thanks for the opportunity to input.</p>
6	June 12, 2021	<p>I live on Gabriola Island and I am pro electric ferries.</p>
7	June 12, 2021	<p>Hello,</p> <p>I would like to support BC ferry's application for electric ferries. I think this proposal is most definitely in the public interest for the following reasons:</p> <ol style="list-style-type: none"> 1. It will provide better service 2. It will be quieter for passengers and people who live near ferry routes 3. It will be quieter for the ocean inhabitants, and in particular whales. 4. It will reduce our contribution to greenhouse gases. <p>Thanks for listening,</p>
8	June 12, 2021	<p>To Whom It May Concern:</p> <p>I support the electrification of six island class ferries. Electric ferries are quieter and therefore easier on marine life. These ferries don't pollute local waterways or the air, and they don't emit GHGs. Under the Paris agreement we are committed to reducing GHG emissions to 50% of 2020 levels by 2030 and to nothing (zero, 0) by 2050. This would be a small step in that direction, and it would send a message to Canadians and others that we must get serious about this.</p>

		<p>“Is it in the public interest?” It is definitely in the public interest that BC Ferries reduce emissions by electrifying the fleet. It's also in the public interest that electric ferries are cheaper to operate and maintain than fossil-fuel ferries.</p>
9	June 12, 2021	<p>To whom it may concern,</p> <p>Under the Paris agreement we are committed to reducing GHG emissions to 50% of 2020 levels by 2030. Electrification of island class vessel would be a step in that direction. To my mind that means it is in the public interest. Add to that less pollution of waterways and air, less noise pollution of the marine environment, and it seems to be an all-round sensible move.</p>
10	June 12, 2021	<p>I am writing to say that I fully support electrification of the Island Class Ferries. Moving away from hybrids to pure electric should occur as soon as possible. Only by radically reducing the use of fossil fuels can Canada and the world have a chance of meeting the UN climate change goals.</p> <p>Indeed, I urge BC ferries to move as quickly as possible to the electrification of your entire fleet.</p>
11	June 12, 2021	<p>What a wonderful opportunity and a no-brainer! Quieter, GHG reduction, marine-life friendly - what else could one want? Electric? How exciting!</p>
12	June 12, 2021	<p>Pursuant to the request for public input as per the article in the Times Colonist newspaper of last Friday June 11, 2021 on the proposal to convert the diesel-electric Island Class Ferries to full battery electric powered vessels please consider the following comment.</p> <p>The urgent and immediate action required to combat global warming and the resulting climate changes that the earth is experiencing calls for the electrification of all industry, commerce, construction and transportation, and the phase-out of all fossil fueled activity, promotion and subsidies.</p> <p>While converting the Coastal Ferry Class vessels to battery electric propulsion systems will be a major step in reducing Greenhouse Gas emissions, the logical next step will be to achieve the same result by adding Hydrogen Fuel Cell systems to provide the required power for the ferries.</p> <p>Hydrogen Fuel Cell ferries are in service in Norway and planned for service for the San Francisco Bay area in the near future.</p> <p>By using the vast experience of Ballard Industries in Vancouver, a world leader in Hydrogen Fuel Cell research and development, and new Hydrogen producing plants that are rapidly reducing the cost of</p>

		<p>this fuel, the cost of installing battery charging stations can be eliminated from the program and diverted to the Hydrogen Fuel Cell acquisition to power the Coastal Ferry Fleet.</p>
13	June 11, 2021	<p>Hello BC ferries,</p> <p>Yes, it is reasonable, yes, it is prudent, yes it is within your mandate to implement electrification as quickly as possible.</p> <p>In fact, it is a no-brainer! We must do everything that we can to lower our GHG emissions so that we can reach the targets even more quickly than outlined. Electrifying the ferries as soon as possible will be a big step forward and will also spur individuals to make reasonable reductions themselves.</p> <p>Not to mention the benefits to the marine life which inhabits these Gulf Island waters through noise and pollution reduction.</p> <p>Please implement this change now rather than at some point down the road. Also make it a top priority when replacing the 'big' ferries.</p> <p>Ever thought of giving a 'bonus' break on vehicle fares for those which are fully electric?</p>
14	June 11, 2021	<p>Please support and fund the electrifying of Gulf Island Ferry Terminals.</p>
15	June 11, 2021	<p>Re: Public opinion on electrification of new BC ferries</p> <p>My name is _____, I am a resident of Gabriola Island and rely on the ferry to get to Vancouver Island.</p> <p>I understand BC Ferries is considering converting the new ferries from hybrid to fully electric. Given the sensitive nature of the Salish Sea, the number of freighters and other marine vessels, and the sensitivity of marine life, particularly whales, I fully support this electrification of ferries. Everything we do, or don't do, makes a difference and it is time to reduce emissions and pollution. It makes good sense for BC Ferries to be progressive and responsible by facilitating the conversion to fully electric ferries.</p> <p>Thank you,</p>

16	June 11, 2021	<p>Dear BC Ferries: I strongly support modification of Island-class ferries to run solely on electric power and installation of onshore infrastructure to charge the ferries by the federal government.</p> <p>I request further information, please. I would like to know the projected cost of the onshore installation for the federal government. I would also like to know the projected reduction in operating costs for BC Ferries from full electrification of vessels. Also I would like to know more detail about the proposed reduction in greenhouse gas emissions from the change. The article in the paper mentioned a 6% reduction in emissions by BC Ferries. Why only 6%? I would expect the change to be more dramatic. What is an estimate of green house gas emissions with current hybrid diesel-electric ferries?</p> <p>Thanks for your help.</p>
17	June 11, 2021	<p>Dear Commission, yes, please move toward making our BC Ferry system electric. We need to do a better job of protecting the environment.</p> <p>Thank you.</p>
18	June 11, 2021	<p>Hello,</p> <p>I think this is a great idea! Anything we do to reduce emissions should be done since the world is in big trouble after decades of inadequate response to climate change.</p> <p>B.C. Ferries should also consider the Canadian Dynacert solution for reducing diesel emissions while improving efficiency as a low cost add-on to existing diesels.</p> <p>This technology has a payback of as little as 1 year and could serve as a means of making significant environmental improvements until the larger vessels are electrified!</p>
19	June 11, 2021	<p>____ a lifelong resident of BC, and 23-year resident of Vancouver Island, and I, ____, newly arrived to the Island, both support the electrification of all BC ferries.</p> <p>This move toward use of electricity may be expensive to set up, but will be much better for the environment.</p> <p>We depend on the ferries to get to the lower mainland, so this is a request based on our own lifestyle and concern for Mother Nature.</p>

		Thank you for seeking the public's input.
20	June 11, 2021	Just do one at first to see how reliable the system is. Do the rest when the evidence is in. I am still troubled by the fast ferry fiasco on Clarkes NDP government. Don't do it for just for show.
21	June 11, 2021	To whom it may concern, At this point in history any government investment improving our capacity to wean ourselves from fossil fuel is to be commended. It's an excellent use of tax dollars to build the charging station for ferries in BC. Thank you for your timely consideration of this matter.
22	June 11, 2021	I would heartily encourage the commission and our federal government to support the fulfilment of BC Ferries electrification strategy. This should be integrated with an overall provincial strategy to charge busses, trucks and passenger cars. Our province has an opportunity to demonstrate world class leadership in public transportation.
23	June 11, 2021	Hello. I'm writing simply to express my support for the move to electrify the ferries and to seek federal support for charging infrastructure. Thank you,
24	June 11, 2021	Absolutely electrification of all ferries should go ahead! This is a no-brainer. Fossil fuels are on the way out. ~
25	June 11, 2021	Hi I'm in favour of the 6 new ferries running electric. I live next to the Nanaimo terminal that services Gabriola Island. I have heard rumours that the Nanaimo terminal might be moved towards the Cruise Ship Terminal to allow for a more traditional docking process. Can you provide some clarity on this?

		Thank you
26	June 11, 2021	<p>Dear Commissioner:</p> <p>Can you please provide a link to the business plan that BC Ferries submitted to support their application to electrify part of their fleet.</p> <p>Thanks</p>
27	June 11, 2021	<p>I am in total support for this plan to electrify BC's island-class ferries and would like to see the entire fleet transition to electric eventually. It is important to reduce carbon pollution and promote electrification of all forms of transportation since BC has an abundance of hydro electric power to tap into.</p>
28	June 11, 2021	<p>I think this is a great idea, I support it 100%.</p> <p>Thanks,</p>
29	June 10, 2021	<p>To whom it may concern.</p> <p>Of course our wonderful ferry service should lead the pack away from fossil fuels and into sustainable energy. If governments and crown corporations do not show the way on the massive changes coming our way over the rest of the decade who will? If we wait for private enterprise and ordinary citizens to lead the way it will be too late.</p> <p>Already our governments have fallen behind on lowering our carbon footprint. Canada is actually putting more carbon into the atmosphere year after year. Future generations are threatened today because of governments unwillingness to treat climate change as a crisis. Our government in BC has rightfully earned kudos for its handling of the COVID-19 pandemic. Climate change is an existential crisis far worse than COVID-19 so why can't they act in a like manner?</p> <p>And they shouldn't stop with the ferries. All government departments and crown corporations should be rapidly electrifying to set the tone for the people to follow.</p>
30	June 10, 2021	<p>BC Ferries has submitted an application pursuant to Section 55(2) of the Coastal Ferry Act ("Act") seeking the commissioner's approval of the ICEP major capital expenditures.</p>

		<p>In considering the public interest, the commissioner may approve a major capital expenditure if the proposed major capital expenditure is: a) reasonable, b) prudent, and c) consistent with (i) the current Coastal Ferry Services Contract, and (ii) any long term capital plan established by the ferry operator</p> <p>Dear BC Ferry Commission</p> <p>We are in a climate crisis. The global temperature has risen by over a degree in the past 60 years, and that is causing serious climate impacts. Year after year we have seen record wildfires, intense tropical storms, deadly heat waves, and widespread crop failures. We have to ensure that the temperature doesn't rise by more than another 0.5 degrees because the consequences of that will be even worse. Canada, along with almost every other country, has agreed to abide by the terms of the Paris agreement, and that means that we must reduce our carbon emissions to less than 50% of 2020 levels by 2030, and to 0 by 2050. We now have less than a decade to turn things around, and less than 3 decades to stop this massive carbon-emitting enterprise altogether. There is no doubt that this is in the public interest. It is what most Canadians want us to do, and it is what most British Columbians expect of their government and its agencies (including the BCFC and BCF).</p> <p>BC Ferries should have started electrifying the fleet 5 years ago, but they didn't, and so <u>now</u>, of course, is the time to start. Electric ferries have been in use in other places for some time, and have proven to be a) reasonable, b) prudent, and c) in the public interest. They are cheaper to operate than fossil fuel ferries, they are easier to maintain, they make less noise, produce less local pollution and have less impact on marine ecosystems. And of course, they don't emit greenhouse gases (at least not here in BC because our electricity is mostly clean), and so they will help British Columbia and Canada meet our commitments under the Paris Agreement. Electrifying these vessels will also send a message to other Canadians and to other countries that everyone needs to start taking climate change seriously.</p> <p>So yes, of course, I support electrification of the Island Class vessels. The capital cost will be significant, but so will the payoff, both in terms of dollars, but much, much more in terms of lower environmental and ecosystem impacts in our precious waterways, less noise and pollution, and most critical of all, in reducing the GHG emissions of these vessels to almost zero.</p>
31	June 10, 2021	<p>Your commission invites comments on the proposal by BCFS to fit "Island Class" ferries with sufficient battery capacity, to enable them to operate using battery energy only, and to recharged while berthed. BCFS states its proposal is contingent on receiving core capital funding from the Government of Canada. It does not provide cost estimates which would allow even a cursory analysis of its business</p>

		<p>case. Obviously your Commission can have no opinion as to whether or not the current federal government will provide such funding. This severely your Commission’s analysis.</p> <p>Secondly, Canada does not have a national market for carbon reductions, or emission offsets, which would allow estimation of the benefits of greenhouse gas reduction through electrification, versus emissions from diesel. The electrification proposal lacks essential facts as to its financial feasibility. The letters of support assume your Commission’s brief is to make a political decision based on unsupported opinions. The proposal does not meet a standard we expect in a prospectus, or in a “Management Decision and Analysis”, that provincial securities commissions require for public companies, to limit the potential for fraudulent or unsupported assertions. It short, BCFS has put forward nothing more than an interesting and popular concept.</p> <p>Third, , it neglects to state the kind of battery it intends to use. The proposal requires a technical addendum to explain, with justification, the kind of batteries it favours and intends to install, including life cycle accounting of the external costs for each battery type. For example, some lithium batteries have electrolytes with are inflammable if not explosive, and would never receive <i>Shipping Act</i> approval; others require cobalt, and there are no Canadian sources for that rare metal; or, Canada would discourage its purchase from sources controlled by China. Alternatively, lead acid cells have been used for over a century in submarines, just as Canada has been a major supplier of lead, and the technology for lead acid batteries, though old, continues to advance; and of course as BCFS engineers know very well, the added weight of lead acid batteries is of little consequence in a ship with a displacement hull, operating at just below hull speeds.</p> <p>I recommend the Commission hold the proposal in abeyance until</p> <ul style="list-style-type: none"> • BCFS provides more clarity on amounts and sources of capital needed for conversion. • the proposed economics of carbon offsets necessary to justify conversion, and • a detailed, peer reviewed, technical brief on its preferred battery type. <p>This is particularly important because electrical storage is an area of very active industrial research, and much of it will of course, be proprietary.</p>
32	June 10, 2021	<p>Please do it as soon as possible; what a blessing for marine and harbour life, including humans, but they’re not my biggest concern.</p> <p>Thank you kindly</p>