

Synapse
Energy Economics, Inc.

Analysis of the Proposed Ottawa Street - Bedeque 138 kV Transmission Line Project

**Economic, Technical and Policy Analysis
to Assist the Prince Edward Island
Regulatory and Appeals Commission**

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1. Introduction

A. Background

The Prince Edward Island Regulatory and Appeals Commission ('IRAC') is a quasi-judicial tribunal that regulates electric utilities in the province of Prince Edward Island, Canada. The commission is currently overseeing proceedings under Docket UE30402 which is an application by Summerside Electric for the approval of transmission services connecting Summerside Electric's Ottawa Street Substation to Maritime Electric Company Limited's Bedeque Substation.

The commission contracted with Synapse Energy Economics Inc. a research and consulting firm specializing in the energy, economic and environmental topics to provide consulting services regarding economic analysis of the projected costs and the overall impact of the proposal by Summerside Electric. This report presents Synapse's analysis and recommendations on the proposal.

Electric System on Prince Edward Island

Electricity consumers on Prince Edward Island ('PEI') are primarily served by two entities – Maritime Electric Company Limited ('MECL) for most part of the island, and the City of Summerside Electric Utility also referred to as Summerside Electric ('SE') mostly serving electricity consumers of the city. The total peak load on PEI in 2011 was about 221 MW¹ and there is an installed fossil fuel generation capacity of 160 MW on the island. However, most of the electricity supplied to island consumers, besides the wind energy generated on PEI is purchased from off-island resources and supplied via two provincially owned submarine transmission cables under the Northumberland Strait linking PEI to New Brunswick. Each cable is rated at 100 MW and thus the total transfer capability to the island is 200 MW via the two cables.

Maritime Electric Company Limited

MECL is a public utility that serves electricity consumers across most of PEI. MECL, which is regulated by the IRAC, operates approximately 5000 kilometers of transmission lines on PEI including 138 KV, 69 kV and distribution circuits and its consumers account for approximately 90% of the total provincial load. MECL owns and operates two fossil fuel generating stations on PEI with a cumulative rated capacity of about 150 MW². MECL also purchases up to 52 MW of wind generation from PEI's North Cape and Eastern Kings Wind Farms in providing wind energy to island consumers.

MECL has filed a proposed Open Access Transmission Tariff ('OATT') with the IRAC on October 3, 2007. The transmission rates and charges of the OATT are approved by the IRAC on an interim basis, effective June 30th, 2008 and amended by IRAC Order UE09-06, effective July 30th, 2009 to account for additional generation on the electric system. Only rates and charges in the tariff are currently in effect and all other aspects of the OATT are pending final approval by the IRAC.

¹ Reference IR-17(e), Maritime Electric Company Limited's responses to the Interrogatories of the City of Summerside/Summerside Electric dated March 16, 2012.

² Charlottetown and Borden Generating Stations, IR-17(e) and referenced from MECL website.

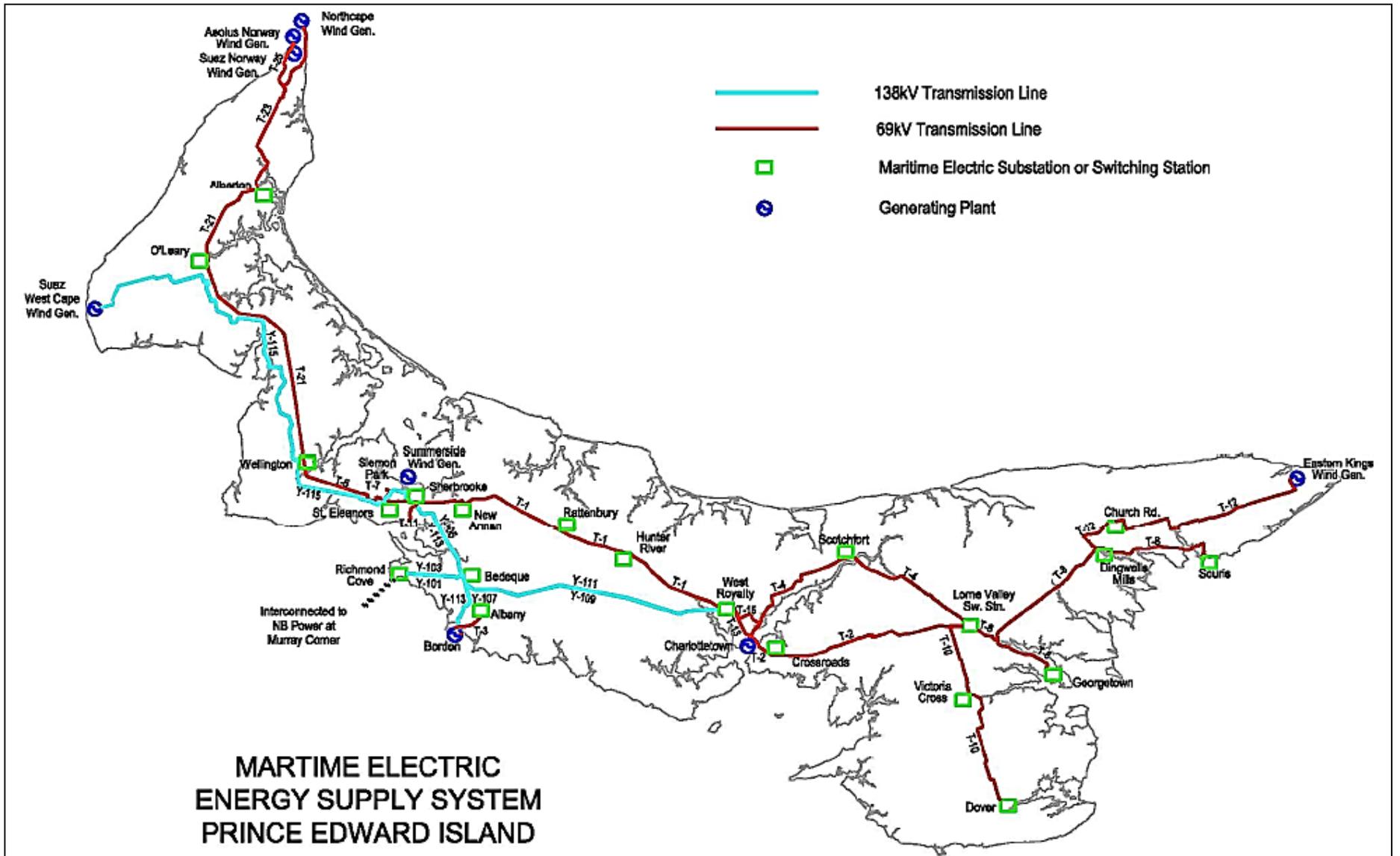


Figure 1: MECL Energy Supply System, Prince Edward Island (Source: MECL)

City of Summerside Electric Utility

SE is a municipal utility on Prince Edward Island primarily serving the electricity consumers residing in the City of Summerside. SE, which is not regulated by the commission as to its rates, is engaged in the purchase, sale, production, transmission and distribution of electricity and has about 6900 residential, business and institutional customers within the city's municipal limits and about 82 customers outside of the city limits. However, within the boundaries of the City of Summerside, there are also approximately 800³ customers that receive service from MECL. This is an historical anomaly triggered by the amalgamation of the city in 1995.

SE's annual peak load was 22.138 MW in the year 2010⁴ and roughly represents 10% of the provincial load on Prince Edward Island. SE purchases generated power for its retail customers from three sources in the following approximate proportions: 52% from NB Power; 25% from City of Summerside; and 23% from West Cape Energy. In addition to wind energy, SE has about 10 MW of fossil fuel generation on the island.

The power sourced from the City of Summerside is about 12 MW from its wind farm which has a direct electrical connection to SE's distribution system. Additional wind power of about 9 MW is sourced from the West Cape wind farm. Therefore a total wind energy capacity of 21 MW is available to SE and is utilized whenever available. SE obtains replacement power from NB Power when wind generation of the island is insufficient or not available.

In obtaining power from NB Power and West Cape Energy, SE utilizes the transmission system of MECL. Currently SE takes service over MECL's 69 kV T-11 transmission line from the Sherbrooke Substation to the Ottawa Street Substation. SE utilizes a combination of monthly firm and hourly non-firm transmission service⁵.

B. Application for Transmission Line Permit

On November 7th 2008, SE made an application for a permit pursuant to Subsection 2.1(2) of the Electric Power Act, R.S.P.E.I. 1988 Cap E-4 allowing SE to construct transmission facilities from the Ottawa Street Substation to the Bedeque Substation and to provide service through those facilities.

SE proposes to construct a 138 kV transmission line, approximately 20 km in length, from its Ottawa Street Substation to the provincially owned 138 kV submarine cable transmission system via an interconnection at MECL's Bedeque Substation. This line would be connected to the existing 69 kV switching station on Ottawa Street and thereafter to the SE's existing distribution system.

Prior to the initial application, the line was proposed to be rated at either 69 kV or 138 kV, but as it was anticipated that the lower voltage option would make the application exempt from environmental assessment requirements, an application was made for the 69 kV alternative. However, it was later discovered that the same requirements apply to the higher voltage alternative as well and therefore the application was revised to include the 138 kV option.

³ Submission of Summerside Electric, Response to Question 18, January 13th, 2012

⁴ Exhibit SE-1-Rev, Revised Direct Evidence of the City of Summerside, December 2, 2011, Page 5

⁵ Submission of Summerside Electric, Response to Question 22, January 13th, 2012

C. IRAC Directions on Procedure

In April 2009, a meeting between MECL, SE and the commission staff was held at the offices of the IRAC regarding MECL's OATT application, outstanding before the commission. The objective of the meeting was to discuss and set the process regarding the OATT application under Docket UE20935 and the impact regarding the transmission line application under Docket UE30402. It was agreed by the respective parties that the proposed OATT will be held in abeyance by the IRAC until the transmission line application is resolved.

The IRAC issued Directions on Procedures involving the two Dockets and while holding the OATT application in abeyance, directed SE to submit the balance of its evidence for the transmission line application. The directions also set the schedule for the issuance of public notice of the application, opening of an intervention period, deadlines for interveners such as MECL and specific deadlines for issuances and responses to interrogatories from each party. It was anticipated that the Commission would have commenced a hearing into SE's transmission line application on October 28th 2009 and that the hearing would have continued into November as required.

However, in October 2009, the Commission identified an issue relating to its jurisdiction in applying the 'public convenience and necessity' test in section 2.1(2) of the Electric Power Act. After lengthy submissions on the issues, IRAC made a decision which was appealed by MECL to the Appeals Court and subsequently cross-appealed by SE.

D. Appeals Courts Ruling

The Prince Edward Island Court of Appeal, on July 13th 2011, ruled that the Commission, in applying the public convenience and necessity test to SE's application, must consider the interests of all electricity customers in the City of Summerside, who will be served by the transmission line that SE proposes to construct. It was also ruled that SE would require procuring a permit to provide the transmission service which included construction of the transmission line and interconnection with MECL electric system at the Bedeque Substation. It was additionally determined that subject to the IRAC's determination in applying Section 8 of the *Electric Power Act* ('Act'), the commission did not have jurisdiction in applying the public convenience and necessity test to consider the interests of those customers who were beyond the municipal limits of the City of Summerside and beyond the area where the City's 80⁶ 'outside customers' reside.

E. Commission Proceeding

Since the initial application for the transmission line permit in 2008, the IRAC and the parties to this proceeding have spent a considerable amount of time navigating the jurisdictional and procedural issues pertaining to SE's application for the transmission line permit. In the fall of 2011, the various parties agreed to file updated information incorporating various changes to the initial application materials which may have occurred since 2008. As a consequence, the following materials were filed to the IRAC and mostly comprise costing updates on the construction of the proposed line and various interrogatories and responses from the concerned parties.

⁶ Prince Edward Island Court of Appeal, CFN S1-CA-1201, Order dated July 13th 2011.

Documents filed with IRAC

The following documents were filed with the IRAC:

1. City of Summerside, the Applicant – Updated application information filing as Exhibit SE-1-Rev, December 2nd, 2011
2. Maritime Electric Company Limited, the Intervener – Interrogatories on the updated application information, filed Dec 21st, 2011.
3. City of Summerside – Response to Maritime Electric’s interrogatories, dated January 17th, 2012
4. Maritime Electric Company Limited – Updated information, including Affidavit of John D. Gaudet dated February 10th 2012.
5. City of Summerside – Interrogatories on Maritime Electric Company Limited’s updated information dated March 12th 2012
6. Maritime Electric Company Limited response to City of Summerside’s interrogatories, dated March 16th 2012
7. City of Summerside, Final Comments on the updated information, April 17th 2012

The current issue before the commission therefore, is to consider the cost of the proposed 138 kV Bedeque to Ottawa Street transmission line and to consider the impact on the ratepayers on the City of Summerside compared to the continuation of paying a transmission tariff. Details contained in the aforementioned documents form the basis of information upon which further analysis is conducted by Synapse.

2. Cost Analysis for the Proposed Transmission Line

A. Ottawa Street to Bedeque 138 kV Transmission Line Project

SE has proposed to construct a 138 kV transmission line from its Ottawa Street Substation to the provincially owned 138 kV submarine cable transmission system at Richmond Cove Substation via an interconnection at MECL's Bedeque Substation. The proposed line is approximately 20-km in length and utilizes an existing provincial government public right of way.

The general design concept is to construct the 138 kV transmission line from the 138 kV side of the Bedeque Substation, with a 138/69 kV autotransformer at the Ottawa Street Substation end along with required and adequate system protection and communication equipment.

B. Transmission Line Configurations and Cost Estimates

Both SE and MECL have provided independent cost estimates of the proposed transmission line project. Each entity has contracted with independent third-party engineering consultants in estimating and providing the cost estimates.

Summerside Electric

Since the filing of the original application and associated evidence, SE have provided cost estimate reports in January 2003, September 2004, February 2008 and finally an update in December 2011 prepared by Coles Associates. The December update to the cost estimate titled '*High Voltage 138 kV Transmission Line Revised Cost Update, Rev 1*' reflects SE's most recent cost estimate for the project ('**Coles Report**'). This option includes individual circuit breakers at the Ottawa Street and Bedeque Substations and is a Class C estimate.

SE additionally commissioned and provided a peer review of the Coles Report by Mr. Blaine Irving which contains one fundamental design change, compared to the former. The peer review report dated December 2nd, 2011 ('**Irving Report**') proposes a slight modification in which the need of an additional 138 kV circuit breaker at the Ottawa Street Substation is eliminated by use of alternative lower voltage equipment.

Maritime Electric

In response to SE's cost estimates, MECL has also provided its own cost estimates for both the aforementioned options (through '**Affidavit of John Gaudet**'). In addition to MECL's own estimates, they commissioned and provided an independent review of MECL's transmission system design philosophy and cost estimates ('**Strum Report**') by Strum Engineering Associates Limited. The report also reviewed the cost estimates and details presented in both the Coles and the Irving Reports.

Consequently, two separate design configurations of the proposed transmission line project have evolved over the course of SE's application to the IRAC. One configuration is without a 138 kV circuit breaker at the Ottawa Street Substation while the other configuration includes one. Associated with this are a total of six relevant cost estimates for the proposed project as provided in the various independent project cost estimate reports.

C. Cost Comparison

Besides relevant jurisdictional and procedural issues in the application process for the transmission line permit, the single most important aspect of importance to the commission is consideration to the cost of the proposed transmission line. As there are two design configurations and three cost estimates per design, it is useful to review the presented cost estimates in detail.

The design inclusive of a 138 kV circuit breaker at Ottawa Street Substation is hereafter referred to Option A, while the one without the 138 kV circuit breaker referred to as Option B.

The following tables indicate the cost estimates from both SE and MECL and for convenience the line items are subdivided under three categories: Bedeque Substation, Transmission Line and Ottawa Street Substation. SE's estimates are sourced from the Coles and Irving Reports while MECL's estimates are sourced from the Affidavit of John Gaudet and the Strum Report. Some of the itemized cost estimate details are also sourced from Appendix A to the Final Comments of City of Summerside dated April 17th 2012.

Configuration with 138 kV Circuit Breaker at Ottawa Street: Option A

This configuration proposes a separate 138 kV circuit breaker at the Ottawa Street Substation, in addition to the other circuit breaker at Bedeque Substation.

Table 1: Itemized Cost Estimates from SE and MECL

Estimates	2012 MECL Feb 10	2012 STRUM Feb 10	2011 SE(Coles) Dec 1
Description	(A)	(B)	(C)
Bedeque Substation			
Land Acquisition, 2 acres	\$0	\$0	\$0
Site Preparation	\$10,000	\$0	\$57,500
Foundations	\$114,000	\$38,000	\$21,000
Circuit Switch	\$0	\$75,450	\$0
Breaker & Protective Devices	\$305,000	\$267,200	\$180,000
Metering Tank	\$107,000	\$78,000	\$0
SCADA	\$0	\$274,500	\$0
Line Relocation	\$0	\$0	\$0
Bus Infrastructure	\$0	\$76,000	\$42,000
Bedeque Substation Total	\$536,000	\$809,150	\$300,500
Transmission Line (60 MVA)			
Construction	\$2,000,000	\$2,843,710	\$1,105,000
5.5km of distribution underbuild	\$192,000	\$0	\$0
Joint Use Line Relocation	\$80,000	\$400,000	\$350,000
Tree Trimming	\$10,000	\$0	\$0
Raise existing Trans Lines	\$60,000	\$0	\$0
Communication Infrastructure	\$500,000	\$313,480	\$0

Easement	\$0	\$0	Annual
Transmission Line Subtotal	\$2,842,000	\$3,557,190	\$1,455,000
Ottawa Street Substation			
Site Preparation	\$60,000	\$77,000	\$30,000
Foundations	\$232,000	\$70,500	\$0
Breaker & Protective Devices	\$385,000	\$470,900	\$180,000
Transformer, 30/40/50 MVA	\$1,000,000	\$1,226,000	\$1,500,000
Communication	\$79,000	\$306,250	\$50,000
Bus Infrastructure	\$0	\$130,300	\$52,500
Protection & Trans. Test	\$0	\$0	\$0
Ottawa Street Substation Subtotal	\$1,756,000	\$2,280,950	\$1,812,500
Subtotal 1	\$5,134,000	\$6,647,290	\$3,568,000
Contingency	\$807,600	\$341,691	\$535,200
Contingency (%)	16%	5%	15%
Subtotal Construction	\$5,941,600	\$6,988,981	\$4,103,200
Environmental Studies	\$250,000	\$0	\$262,500
Subtotal 2	\$6,191,600	\$6,988,981	\$4,365,700
Engineering and Proj. Mgmt.	\$866,824	\$900,000	\$0
Engg. and Proj. Mgmt. (%)	14%	13%	0%
Total	\$7,058,424	\$7,888,981	\$4,365,700

Configuration without 138 kV Circuit Breaker at Ottawa Street: Option B

This configuration proposes a design without the need for a 138 kV circuit breaker at the Ottawa Street Substation and proposes to utilize alternative lower voltage equipment. This design philosophy was proposed in the Irving Report, a peer review of the Coles Report.

Table 2: Itemized Cost Estimates from SE and MECL

Estimate	2012 MECL Feb 10	2012 STRUM Feb 10	2011 SE (Irving) Dec 1
Description	(D)	(E)	(F)
Bedeque Substation			
Land Acquisition, 2 acres	\$0	\$0	\$0
Site Preparation	\$10,000	\$0	\$67,000
Foundations	\$114,000	\$38,000	\$0
Circuit Switch	\$0	\$75,450	\$0
Breaker & Protective Devices	\$305,000	\$267,200	\$170,000
Metering Tank	\$107,000	\$78,000	\$0

SCADA	\$0	\$274,500	\$0
Line Relocation	\$0	\$0	\$50,000
Bus Infrastructure	\$0	\$76,000	\$50,000
Bedeque Substation Total	\$536,000	\$809,150	\$337,000
Transmission Line (60 MVA)			
Construction	\$2,000,000	\$2,843,710	\$1,600,000
5.5km of distribution underbuild	\$192,000	\$0	\$0
Joint Use Line Relocation	\$80,000	\$0	\$0
Tree Trimming	\$10,000	\$0	\$0
Raise existing Trans Lines	\$60,000	\$0	\$0
Communication Infrastructure	\$500,000	\$313,480	\$25,000
Easement	\$0	\$0	\$15,000
Transmission Line Subtotal	\$2,842,000	\$3,157,190	\$1,640,000
Ottawa Street Substation			
Site Preparation	\$60,000	\$70,500	\$60,000
Foundations	\$206,000	\$70,500	\$32,000
Breaker & Protective Devices	\$265,000	\$323,600	\$0
Transformer, 30/40/50 MVA	\$1,000,000	\$1,226,000	\$1,500,000
Communication	\$79,000	\$306,250	\$0
Bus Infrastructure	\$0	\$124,200	\$55,000
Protection & Trans. Test	\$0	\$0	\$90,000
Ottawa Street Substation Subtotal	\$1,610,000	\$2,121,050	\$1,737,000
Subtotal 1	\$4,988,000	\$6,087,390	\$3,714,000
Contingency	\$785,700	\$332,196	\$594,600
Contingency (%)	16%	5%	16%
Subtotal Construction	\$5,773,700	\$6,419,586	\$4,308,600
Environmental Studies	\$250,000	\$0	\$250,000
Subtotal 2	\$6,023,700	\$6,419,586	\$4,558,600
Engineering and Proj. Mgmt.	\$843,318	\$870,000	\$455,860
Engg. and Proj. Mgmt. (%)	14%	14%	10%
Total	\$6,867,018	\$7,289,586	\$5,014,460

D. Key Differences

Each presented project cost estimate is built upon a particular design philosophy, choice of equipment and appropriate estimation level. For the purposes of analyzing cost estimates and their economic impacts, it is important to identify the key differences by segregating the various configurations and corresponding cost estimates in itemized detail.

SE has provided the initial cost estimates for the proposed transmission line and MECL has subsequently provided their own and Strum Engineering's estimates. SE's projected costs generally represent the lower bound of the range of costs while those from Strum Engineering represent the higher bound. Therefore, it is useful to observe the difference or 'Delta' from SE's itemized cost estimates to the others. In the following tables, SE's itemized cost estimates are provided and the net change (positive or negative) to that particular item cost from MECL's and Strum Reports is provided.

Configuration with 138 kV Circuit Breaker at Ottawa Street: Option A

Table 3: Itemized Cost Differences between SE and MECL

Description	Configuration With Circuit Breaker		
	SE (Coles) Estimate	MECL Delta	STRUM Delta
Bedeque Substation			
Land Acquisition, 2 acres	\$0	\$0	\$0
Site Preparation	\$57,500	-\$47,500	-\$57,500
Foundations	\$21,000	\$93,000	\$17,000
Circuit Switch	\$0	\$0	\$75,450
Breaker & Protective Devices	\$180,000	\$125,000	\$87,200
Metering Tank	\$0	\$107,000	\$78,000
SCADA	\$0	\$0	\$274,500
Line Relocation	\$0	\$0	\$0
Bus Infrastructure	\$42,000	-\$42,000	\$34,000
Bedeque Substation Total	\$300,500	\$235,500	\$508,650
Transmission Line (60 MVA)			
Construction ('000)	\$1,105	\$895	\$1,739
5.5 km of distribution underbuild	\$0	\$192,000	\$0
Joint Use Line Relocation	\$350,000	-\$270,000	\$50,000
Tree Trimming	\$0	\$10,000	\$0
Raise existing Trans Lines	\$0	\$60,000	\$0
Communication Infrastructure	\$0	\$500,000	\$313,480
Easement	Annual		
Transmission Line Subtotal ('000)	\$1,455	\$1,387	\$2,102
Ottawa Street Substation			

Site Preparation	\$30,000	\$30,000	\$47,000
Foundations	\$0	\$232,000	\$70,500
Breaker & Protective Devices	\$180,000	\$205,000	\$290,900
Transformer, 30/40/50 MVA ('000)	\$1,500	-\$500	-\$274
Communication	\$50,000	\$29,000	\$256,250
Bus Infrastructure	\$52,500	-\$52,500	\$77,800
Protection & Trans. Test	\$0	\$0	\$0
Ottawa Street Substation Subtotal ('000)	\$1,813	-\$57	\$468
Subtotal 1 ('000)	\$3,568	\$1,566	\$3,079
Contingency	\$535,200	\$272,400	-\$193,509
Contingency (%)	\$0	\$0	\$0
Subtotal Construction ('000)	\$4,103	\$1,838	\$2,886
Environmental Studies	\$262,500	-\$12,500	-\$262,500
Subtotal 2 ('000)	\$4,366	\$1,826	\$2,623
Engineering and Project Management	\$0	\$866,824	\$900,000
Total ('000)	\$4,366	\$2,693	\$3,523

Configuration without 138 kV Circuit Breaker at Ottawa Street: Option B

Table 4: Itemized Cost Differences between SE and MECL

Description	Configuration without Circuit Breaker		
	SE (Irving)	MECL	STRUM
	Estimate	Delta	
Bedeque Substation			
Land Acquisition, 2 acres	\$0	\$0	\$0
Site Preparation	\$67,000	-\$57,000	-\$67,000
Foundations	\$0	\$114,000	\$38,000
Circuit Switch	\$0	\$0	\$75,450
Breaker & Protective Devices	\$170,000	\$135,000	\$97,200
Metering Tank	\$0	\$107,000	\$78,000
SCADA	\$0	\$0	\$274,500
Line Relocation	\$50,000	-\$50,000	-\$50,000
Bus Infrastructure	\$50,000	-\$50,000	\$26,000
Bedeque Substation Total	\$337,000	\$199,000	\$472,150
Transmission Line (60 MVA)			
Construction ('000)	\$1,600	\$400	\$1,244

5.5 km of distribution underbuild	\$0	\$192,000	\$0
Joint Use Line Relocation	\$0	\$80,000	\$0
Tree Trimming	\$0	\$10,000	\$0
Raise existing Trans Lines	\$0	\$60,000	\$0
Communication Infrastructure	\$25,000	\$475,000	\$288,480
Easement	\$15,000	-\$15,000	-\$15,000
Transmission Line Subtotal ('000)	\$1,640	\$1,202	\$1,517
Ottawa Street Substation			
Site Preparation	\$60,000	\$0	\$10,500
Foundations	\$32,000	\$174,000	\$38,500
Breaker & Protective Devices	\$0	\$265,000	\$323,600
Transformer, 30/40/50 MVA ('000)	\$1,500	-\$500	-\$274
Communication	\$0	\$79,000	\$306,250
Bus Infrastructure	\$55,000	-\$55,000	\$69,200
Protection & Trans. Test	\$90,000	-\$90,000	-\$90,000
Ottawa Street Substation Subtotal ('000)	\$1,737	-\$127	\$384
Subtotal 1 ('000)	\$3,714	\$1,274	\$2,373
Contingency	\$594,600	\$191,100	-\$262,404
Contingency (%)	\$0	\$0	\$0
Subtotal Construction ('000)	\$4,309	\$1,465	\$2,111
Environmental Studies	\$250,000	\$0	-\$250,000
Subtotal 2 ('000)	\$4,559	\$1,465	\$1,861
Engineering and Project Management	\$455,860	\$387,458	\$414,140
Total ('000)	\$5,014	\$1,853	\$2,275

It is important to note that SE's costs for both design configurations stem from Class C estimates at which level, the treatment to design detail is broad. The potential variances with actual costs range from -15% to 25%, a range and estimate level agreed upon between SE and MECL⁷. To that end, any comparison and differences in costs should also be treated with the same level of potential variance.

Based on the tabulated details, it is apparent that there are differences in cost estimates for almost all line items under the applicable heads. However, a careful inspection of the itemized cost differences reveals consistency across both the design configurations. Stated otherwise, there are certain noteworthy differences in item costs that exist, irrespective of the choice of transmission line design Option A or B.

⁷ Submission of Summerside Electric, Question 1, January 13th, 2012

Some details behind the design philosophy, choice of certain equipment, their costs and potential alternatives are addressed in the various interrogatories and responses from both SE and MECL. These tend to be the items where the variances between the estimates are highest or the design philosophy changes significantly. There are also some items for which differences in estimates are not relatively significant, not necessarily supported by quotations and therefore probably not addressed specifically through the various interrogatories and responses.

The follows is a brief discussion of some of the items where differences in cost estimates are most significant and hold the potential to significantly alter the expected cost of the transmission line project.

1. **Transmission Line Construction:** SE's estimates for transmission line construction are \$1,105,000 and \$1,600,000 for Options A and B respectively. The Irving Report, which is the source of Option B, presents an average construction cost of \$80,000 per km with the span of the transmission line split as 20% non-joint use, 20% urban joint use and 60% are rural joint use on the basis of a field visit.

MECL's estimates for transmission line construction are \$2 million for the proposed 20-km line, representing an increase of \$895,000 and \$400,000 over SE's estimates for the Options A and B respectively. Per the Affidavit of John Gaudet, MECL's costs were determined by conducting an examination of the proposed route and based upon MECL's experience with costs of similar projects.

The Strum Report estimates the transmission line construction costs at \$2,900,000, representing an increase of \$1,739,000 and \$1,244,000 over SE's estimates for Options A and B respectively. These estimates are based Strum Engineering's recent experiences with installed costs in the Nova Scotia and PEI regions for a 138 kV single pole, armless construction for new transmission lines with 60 meter pole spans. The report indicates that MECL's cost estimates for the project represent the minimum end of the range of costs that can be expected. The report further opines that the proposed transmission line, if to be constructed to typical power utility standards and good engineering practices, could not be constructed within the budget proposed by the Coles Report.

There is limited information available in the application materials, interrogatories and responses regarding the basis for this cost estimate. It appears that SE has previously not proposed and constructed a transmission line project at this voltage level and magnitude, whereas MECL being the predominant provider of electricity over PEI, own and operate several 138 kV transmission lines. Strum Engineering's estimates are substantially higher than even those of MECL's. It should be noted that the Strum Report assumes the full equipment supply and installation scope to be undertaken by a qualified electrical contractor and includes contractor overheads and profit margins which are not explicitly specified in the report.

To that end, it is not possible to clearly establish a reasonable estimate of such costs. However, it may be reasonable to expect that MECL's estimates represent a hybrid of conservative and aggressive estimates and therefore offer a better insight towards the actual expected costs of transmission line construction.

- 2. Transmission Line Communication Infrastructure:** SE's estimates for communication infrastructure over the proposed transmission line are none for Option A and \$25,000 for Option B. The Irving Report assumes that since both Bedeque and Ottawa Street Substations are existing facilities with some communication capabilities, and only slight modifications or additional equipment would accommodate the requirement for communication. The report also mentions the potential availability of recent and alternative communication technology.

It is SE's current position to not use new fiber optic cables for communication, but potentially utilizing the existing fiber optic communication link between SE's Ottawa Street Substation to MECL's Sherbrooke Substation and thereafter MECL's link from Sherbrooke to Bedeque Substation. SE has also proposed alternatives such as utilizing third party or wireless communication links and proposed annual costs of such an arrangement.

MECL's estimates for transmission line communication infrastructure for both Option A and B are \$500,000 which represents an increase of \$500,000 for Option A and \$475,000 for Option B. The costs estimates presented by MECL are presumably for providing a point-to-point (i.e., between Ottawa St. and Bedeque) optical fiber link on the proposed transmission line.

The Strum Report estimates exceed SE's costs by \$313,480 and \$288,480 for Options A and B respectively and the difference between Strum's and MECL's estimates mainly relates to the fiber termination equipment in the terminal Substations of the proposed transmission line.

Through the interrogatories and various responses, it is clear that in MECL's view, there needs to be a point to point communication link between Bedeque and Ottawa Street Substations for effective electric system protection at Bedeque Substation. MECL's 138 kV Bedeque Substation is the most important link between the New Brunswick and PEI electric power systems and any inadequacies with system protection at Bedeque may make PEI susceptible to an island-wide outage. Therefore, it is reasonable to accept MECL's requirement of a point to point communication system between the two Substations.

However, MECL has not specified or mandated the choice of any particular technology for providing such point to point communications. It remains unclear whether the use of alternative choices such as leased communication lines or wireless links will suffice for the purpose. If so, it holds the potential to significantly reduce the cost estimate under this head. Therefore, it is not possible to clearly establish the expected costs of transmission line communication, until the parties agree to a specific arrangement.

However it may be reasonable to expect that such costs will perhaps be in a range bounded by SE's estimates on the lower side and MECL's costs on the higher side. Also, until established otherwise, the Net Present Value (NPV) of the alternative arrangement proposed by SE may better represent the higher end of the estimate. We show these estimated NPV effects in Section 3 of this report.

- 3. Engineering and Project Management:** Both MECL's and Strum Engineering's estimates attribute and add 14% of the total construction costs as additional costs for

engineering, testing, commissioning and project management. The Coles Report does not add any additional expense under this head, while the Irving Report assumes 10% of the total construction costs. With this, the MECL and Strum Engineering's estimate exceed those of SE by \$866,824 and \$900,000 for Option A and \$387,458 and \$414,140 for Option B. It is SE's position that while a 14% estimate may represent costs where a project is designed and managed by consulting engineers; projects are always managed by SE's own staff.

As stated previously, it appears that SE has not proposed and constructed a transmission line project of this voltage and magnitude before, and as such, it seems reasonable to expect that there will be additional engineering and project management costs incurred.

However, the allocation of costs under this head represents a percentage of the total cost of materials and construction. Therefore even at 14% of SE's estimates in the Coles Report, the costs of engineering and project management will be \$611,198 raising the total cost estimate for the project to \$4,976,898 for Option A. SE's other estimate for Option B, contains a 10% allocation for engineering and project management, but applying the same 14% will yield costs of \$638,204 raising the total estimate to \$5,196,804. It seems appropriate to expect these costs are more representative of engineering and project management costs.

4. **Circuit Breaker and Protection Devices at Bedeque Substation:** Transmission line design Options A and B both propose the utilization of a 138 kV circuit breaker at the Bedeque Substation. However, MECL's and Strum Engineering's estimates exceed those of SE by \$125,000 and \$87,200 for Option A respectively and \$135,000 and \$97,200 for Option B respectively. There are presumably several equipment items under this head such as breaker frame, lightning arrestors, isolating switches and grounding switches, in addition to the main 138 kV circuit breaker. The Affidavit of John Gaudet provides manufacturer quotations for some of these items. However, SE, through one of the interrogatories, has only provided manufacturer quotations for power transformer, insulators and conductor.

Any cost estimation of electrical substation equipment should be on the basis of quotations from manufacturers of repute and the proposed equipment should satisfy all expected standards consistent with good utility practice. It should however be noted that equipment prices can be volatile and only the most recent quotations should be referred to. In this case SE has not provided any manufacturer quotations for the circuit breaker to be used at Bedeque Substation and therefore MECL's costs could represent a better estimate of this item.

5. **Circuit Breaker and Protection Devices at Ottawa Street Substation:** Likewise to the aforementioned, MECL's and Strum Engineering's estimates exceed those of SE by \$205,000 and \$290,900 for Option A. For Option B, the use of a 69 kV circuit breaker is proposed at the Ottawa Street Substation along with 138 kV and 69 kV switches. In this case, the estimates exceed those of SE by \$265,000 and \$323,600 respectively. It appears that for Option B, SE does not propose the use of an independent circuit breaker.

Likewise to the observation made under item 4 above, SE has not provided any manufacturer quotations for required equipment under circuit breaker and protection devices for the Ottawa Street Substation. For this option, the difference may directly relate to the manufacturer quotations obtained by MECL.

For Option B, SE has not considered any additional costs under this head, perhaps indicating use of some existing equipment. MECL has indicated that Option B is an acceptable, but not desirable design configuration. However, MECL's specifics reveal the potential use of a 138 kV switch a 69 kV circuit breaker and two 69 kV switches and protective devices. Therefore, the estimated costs under this head pivot on the engineering requirements of system protection at Ottawa Street Substation.

6. **SCADA Systems:** The Strum Report includes an estimate of \$274,500 for SCADA systems, a portion of which presumably includes the need of a small control building for housing the protection and control panels, batteries and SCADA panels, within SE's Ottawa Street Substation. This is not included in any other estimate from SE or MECL. It appears that SE has an existing control building within the Ottawa Street Substation but it is unknown if there is adequate space for additional equipment. It is also important to note that a portion of this expense may also depend on the choice of systems used for point to point communication between Bedeque and Ottawa Street Substations.

The Strum Report mentions that if it is established that there is no need of a new control building, then the differences between Strum Engineering's and MECL's estimates will reduce by \$174,000. As a consequence, it is not possible to clearly establish the need for this item and the expected costs until further details are known.

7. **Foundations at Ottawa Street Substation:** MECL and Strum Engineering's estimates exceed those of SE by \$232,000 and \$70,500 for Option A and \$174,000 and \$38,500 for Options B. The need for this expense will also depend on the exact design configuration and as such it is not possible to clearly establish the expected costs.
8. **Others:** There are several other items for which differences in cost estimates exist, but perhaps not to a significantly high level and there are other non-equipment items for which estimates are not substantiated by manufacturer quotations or guided by any specific design considerations. Some of the items are:

- a. **Metering:** The Irving Report assumes the use of existing metering and therefore does not provision additional equipment. MECL and Strum Engineering's estimates exceed those of SE by \$107,000 and \$78,000 for both Option A and B. MECL has provided manufacturer quotations for this equipment. The Strum Reports mentions that the metering requirement would need to be a 'revenue class' equipment.

The need of additional metering equipment needs to be clearly established so as to include this item cost towards the total estimated costs.

- b. **Circuit Switch at Bedeque Substation:** Only the Strum Report assumes an additional circuit switch at the Bedeque Substation and therefore exceeds the SE and MECL estimate by \$75,450. The use of two switches is already included in

MECL's estimates and presumably covers the requirement for adequate switching equipment. Any need of additional switches is not clearly demonstrated in the Strum Report and therefore it seems reasonable to exclude the additional estimated expense.

- c. **Distribution under build for 5.5 km:** Only the MECL estimate includes \$192,000 for this item for both Options A and B. It is not clear from any of the interrogatories and responses if this item would be required. Through the interrogatories and responses, it is not clear if there is a need for distribution under building for the span of 5.5 kilometers on the proposed transmission line. As such, it seems reasonable to exclude such costs from the total estimate, until determined otherwise.
- d. **Contingency:** Contingency costs are calculated as a percentage of total estimated construction costs and do not reflect actual item expenditures. For Option A, the Coles Report uses 15%, the MECL estimate uses 16% and the Strum Report uses 5%. For Option B, both the Irving Report and the MECL estimate uses 16%, while the Strum Report uses a 5% factor for estimating the contingency amount.

MECL has stated that the Strum Report presents cost estimates that have a better accuracy than a Class D estimate⁸. If that's the case then it may be reasonable to allocate a smaller percentage of total costs as contingency funds. In all other cases, the level of contingency funds assumed is not substantially different.

In addition to the noteworthy differences enumerated above, there are general equipment construction costs such as bus infrastructure, site preparation, tree trimming, and raising existing transmission for which the cost differences between SE, MECL and Strum Engineering are marginal. These expenses do not create substantial variances to the total estimated construction costs and are thus neglected for the purposes of this analysis.

E. Hybrid Cost Estimates

Cost components creating the most significant variance to the total cost estimate of the proposed transmission line are presented in Section D above. As discussed in itemized detail, it's intuitive to expect that some cost estimates from SE are reasonable, while some estimates from MECL seem to be more probable.

Therefore in order to aid further analysis, the total estimated cost of the project can be viewed as a range that is bound by the estimates on the lower side by SE and the higher side by MECL or Strum Engineering. By applying the distinguishing factors discussed in Section D above, we can create hybrid scenarios which may represent more realistic cost estimates of the project.

The following section presents such hybrid cost estimates. For each option, there is a low and a high estimate that represents the foreseeable range of costs for the proposed transmission project.

⁸ Response to IR 29(a), Maritime Electric Company Limited's responses to the Interrogatories of the City of Summerside/Summerside Electric dated March 16, 2012

For Option A the low and high estimates are identified as IV and V; and for Option B as IX and X. Cost adjustment assumptions for each line item costs are indicated in the adjoining columns. The basis for these adjustments is explained in the preceding section.

Note that only changes to items discussed in Section D above are applied in creating the hybrid scenarios and all other costs under the three subdivisions: Bedeque Substation, Transmission Line and Ottawa Street Substation are combined together as component subtotals.

Option A: Hybrid Cost Estimates

Table 5: Hybrid Cost Estimates for Option A (With 138 kV Circuit Breaker at Ottawa Street)

	Option A: With Circuit Breaker at Ottawa Street Substation						
Estimate	2012 MECL Feb 10 (A)	2012 STRUM Feb 10 (A)	2011 Coles Dec 1	Hybrid - Low	Assumptions	Hybrid - High	Assumptions
Identifier	I	II	III	IV		V	
Bedeque Substation							
Bedeque Substation Component Subtotal	\$124,000	\$114,000	\$120,500	\$120,500	Per Coles Report	120,500	Per Coles Report
Circuit Switch	\$0	\$75,450	\$0	\$0	Per Coles Report, not assuming requirement of additional switch	\$0	Per Coles Report, not assuming requirement of additional switch
Breaker & Protective Devices	\$305,000	\$267,200	\$180,000	\$180,000	Per estimate in Coles Report	\$305,000	Per MECL's estimate
Metering Tank	\$107,000	\$78,000	\$0	\$0	Per Coles Report and existing metering assumed sufficient	\$107,000	Per MECL, requirement of additional metering equipment assumed
SCADA	\$0	\$274,500	\$0	\$0	No additional SCADA requirement assumed	\$0	No additional SCADA requirement assumed
Bedeque Substation Total	\$536,000	\$809,150	\$300,500	\$300,500		\$532,500	
Transmission Line (60 MVA)							
Transmission Line Component Subtotal	\$150,000	\$400,000	\$350,000	\$350,000	Per Coles Report	\$350,000	Per Coles Report

Construction	\$2,000,000	\$2,843,710	\$1,105,000	\$1,552,500	Average of Coles and MECL estimates	\$2,000,000	Per MECL's estimates
5.5 km of distribution under build	\$192,000	\$0	\$0	\$0	No additional transmission underbuild requirement	\$0	No additional transmission underbuild requirement
Communication Infrastructure	\$500,000	\$313,480	\$0	\$25,000	Baseline costs Per Irving Report in Option B	\$157,000	Net Present Value of SE's leased communications fees
Transmission Line Total	\$2,842,000	\$3,557,190	\$1,455,000	\$1,927,500		\$2,507,000	
Ottawa Street Substation							
Ottawa Street Substation Component Subtotal	\$139,000	\$513,550	\$132,500	\$132,500	Per Coles Report	\$139,000	Per MECL
Transformer, 30/40/50 MVA	\$1,000,000	\$1,226,000	\$1,500,000	\$1,000,000	Per Coles Report, assuming decreasing cost of equipment	\$1,000,000	Per Coles Report, assuming decreasing cost of equipment
Foundations	\$232,000	\$70,500	\$0	\$32,000	Baseline costs Per Irving Report for Option B	\$70,500	Per Strum Report, representing a mid-range expense
Breaker & Protective Devices	\$385,000	\$470,900	\$180,000	\$180,000	Per estimate in Coles Report	\$282,500	Average of Coles and MECL estimates
Ottawa Street Substation Total	\$1,756,000	\$2,280,950	\$1,812,500	\$1,344,500		\$1,492,000	
Subtotal 1	\$5,134,000	\$6,647,290	\$3,568,000	\$3,572,500		\$4,531,500	
Contingency	\$807,600	\$341,691	\$535,200	\$535,875		\$679,725	

Contingency (%)	16%	5%	15%	15%	Applied same percentage for contingency, Per Coles Report	15%	Applied same percentage for contingency, Per Coles Report
Subtotal Construction	\$5,941,600	\$6,988,981	\$4,103,200	\$4,108,375		\$5,211,225	
Environmental Studies	\$250,000	\$0	\$262,500	\$262,500	Applied same costs, Per Coles Report	\$262,500	Applied same costs, Per Coles Report
Subtotal 2	\$6,191,600	\$6,988,981	\$4,365,700	\$4,370,875		\$5,473,725	
Engineering and Project Management	\$866,824	\$900,000	\$0	\$611,923		\$766,322	
Engineering and Project Management (%)	14%	13%	0%	14%	Per 14% used by MECL	14%	Per 14% used by MECL
Total	\$7,058,424	\$7,888,981	\$4,365,700	\$4,982,798		\$6,240,047	

Option B: Hybrid Cost Estimates

Table 6: Hybrid Cost Estimates for Option B (Without 138 kV Circuit Breaker at Ottawa Street)

Estimate	Option B: Without Circuit Breaker at Ottawa Street Substation						
	2012 MECL Feb 10 (B)	2012 STRUM Feb 10 (B)	2011 Irving Dec 1	Hybrid - Low	Assumptions	Hybrid - High	Assumptions
Identifier	VI	VII	VIII	IX		X	
Bedeque Substation							
Bedeque Substation Component Subtotal	\$124,000	\$114,000	\$167,000	\$167,000	Per Irving Report	\$167,000	Per Irving Report
Circuit Switch	\$0	\$75,450	\$0	\$0	Per Irving Report, not assuming requirement of additional switch	\$0	Per Irving Report, not assuming requirement of additional switch

Breaker & Protective Devices	\$305,000	\$267,200	\$170,000	\$180,000	Per Coles Report estimate for Option A	\$180,000	Retained Coles Report estimate for Option A, as Irving Report's component subtotal exceeds MECL by \$43,000 and likely includes some station equipment under this category
Metering Tank	\$107,000	\$78,000	\$0	\$0	Per Irving Report, and existing metering assumed sufficient	\$107,000	Per MECL, requirement of additional metering equipment assumed
SCADA	\$0	\$274,500	\$0	\$0	No additional SCADA requirement assumed	\$0	No additional SCADA requirement assumed
Bedeque Substation Total	\$536,000	\$809,150	\$337,000	\$347,000		\$454,000	
Transmission Line (60 MVA)							
Transmission Line Component Subtotal	\$150,000	\$0	\$15,000	\$15,000	Per Irving Report	\$15,000	Per Irving Report
Construction	\$2,000,000	\$2,843,710	\$1,600,000	\$1,552,500	Average of Coles and MECL	\$2,000,000	Per MECL
5.5 km of distribution under build	\$192,000	\$0	\$0	\$0	No additional transmission underbuild requirement	\$0	No additional transmission underbuild requirement
Communication Infrastructure	\$500,000	\$313,480	\$25,000	\$25,000	Per Irving Report	\$157,000	Net Present Value of SE's leased communications fees

Transmission Line Total	\$2,842,000	\$3,157,190	\$1,640,000	\$1,592,500		\$2,172,000	
Ottawa Street Substation							
Ottawa Street Substation Component Subtotal	\$139,000	\$500,950	\$205,000	\$205,000	Per Irving report	\$205,000	Per Irving report
Transformer, 30/40/50 MVA	\$1,000,000	\$1,226,000	\$1,500,000	\$1,000,000	Per Coles Report, assuming decreasing cost of equipment	\$1,000,000	Per Coles Report, assuming decreasing cost of equipment
Foundations	\$206,000	\$70,500	\$32,000	\$32,000	Per estimates in Irving Report	\$70,500	Per Strum Report, representing a mid- range expense
Breaker & Protective Devices	\$265,000	\$323,600	\$0	\$180,000	Per estimate in Coles Report for Option A, assuming requirement of some 69 kV equipment.	\$265,000	Per MECL's estimates.
Ottawa Street Substation Total	\$1,610,000	\$2,121,050	\$1,737,000	\$1,417,000		\$1,540,500	
Subtotal 1	\$4,988,000	\$6,087,390	\$3,714,000	\$3,356,500		\$4,166,500	
Contingency	\$785,700	\$332,196	\$594,600	\$503,475		\$666,640	
Contingency (%)	16%	5%	16%	15%	Applied same percentage for contingency, Per Coles Report	16%	Applied same percentage for contingency, Per Coles Report
Subtotal Construction	\$5,773,700	\$6,419,586	\$4,308,600	\$3,859,975		\$4,833,140	

Environmental Studies	\$250,000	\$0	\$250,000	\$250,000	Applied same costs, Per Irving Report	\$250,000	Applied same costs, Per Irving Report
Subtotal 2	\$6,023,700	\$6,419,586	\$4,558,600	\$4,109,975		\$5,083,140	
Engineering and Project Management	\$843,318	\$870,000	\$455,860	\$575,397		\$711,640	
Engineering and Project Management (%)	14%	14%	10%	14%	Per 14% used by MECL	14%	Per 14% used by MECL
Total	\$6,867,018	\$7,289,586	\$5,014,460	\$4,685,372		\$5,794,780	

The following chart summarizes the transmission line project cost tables above,

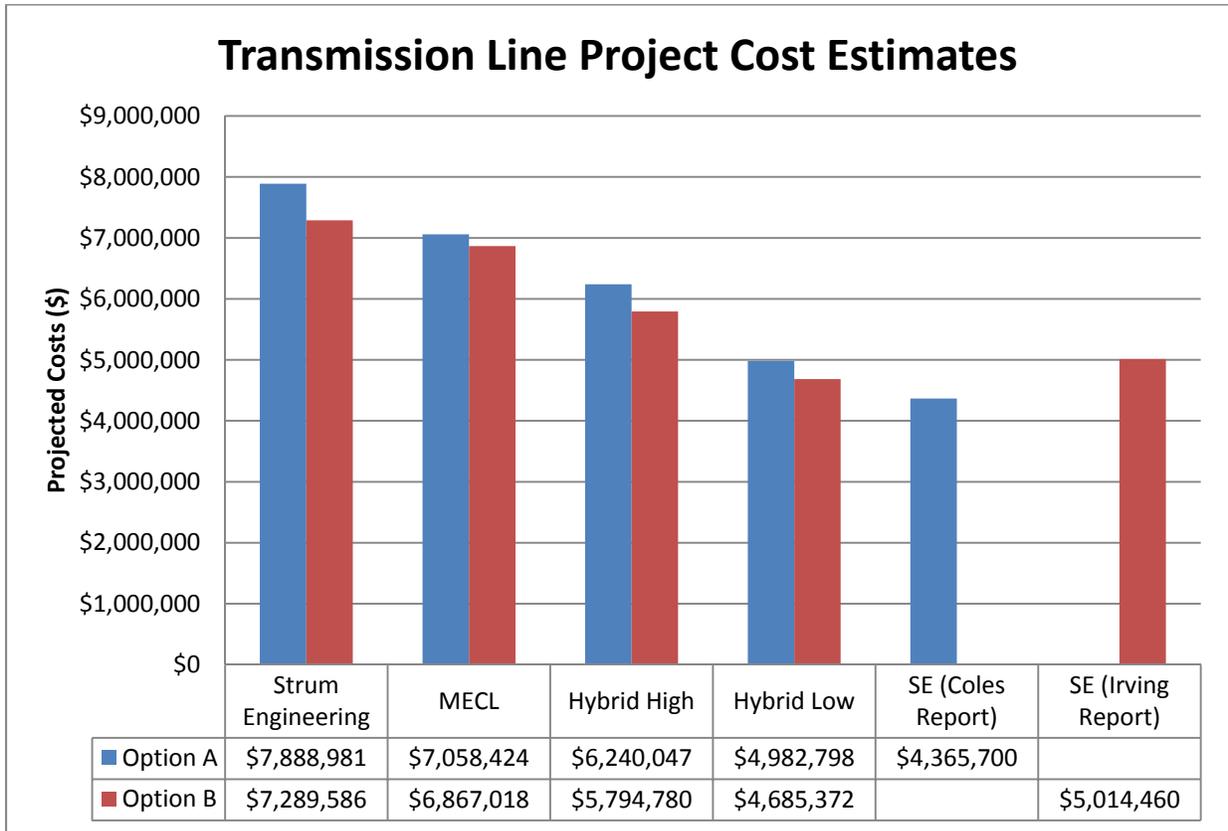


Figure 2: Transmission Line Project Cost Estimates

3. Other Considerations

A. Technical Need

Based on the information provided by the parties and our synopsis of the transmission and generation infrastructure in place on Prince Edward Island, it is clear that the proposed transmission line is not needed now, or in the near future, to ensure reliable electric serve for the City of Summerside.

Electric power transmission service to Prince Edward Island is provided from the mainland via two provincially owned submarine cables, rated 100 MW each connected from the Murray Corner Substation in New Brunswick to MECL's Bedeque Substation on the island. Although the intent of the government owned cables is to benefit all consumers of electricity on Prince Edward Island, it appears that the cables are nevertheless, solely leased to MECL.

Summerside Electric purchases generated power for all its retail customers. The total combined wind energy capacity available to SE is 21 MW, through the City of Summerside and the West Cape Wind Farm. This cumulatively represents 48% of SE's purchased power. The balance, 52% is procured from NB Power. Whenever sufficient wind energy is not available on the island, SE procures replacement power from NB Power.

SE utilizes MECL's transmission system for the power purchases from NB Power and the West Cape Wind Farm. The provincially owned 138 kV submarine cables Y-101 (Cable 1) and Y-103 (Cable 2) from New Brunswick directly connect to MECL's Bedeque Substation which is connected to the Sherbrooke Substation by line Y-105. The West Cape Wind Farm is connected to the Sherbrooke Substation by a 138 kV transmission line Y-115. The City of Summerside's wind farm is directly connected to SE's distribution system and therefore does not require any transmission service from MECL.

SE takes transmission service from MECL over the T-11 line from MECL's Sherbrooke Substation to the SE's Ottawa Street Substation. The T-11 line is a 69 kV transmission line and has a thermal capacity of 32 MW⁹. Per MECL, this line currently carries a peak load of 24.5 MW which indicates about 76.5 % thermal loading on the line.

From a purely technical standpoint, it appears that the current transmission system configuration on Prince Edward Island and the transmission service arrangement between MECL and SE is adequate to serve SE's peak load requirements, provided the information on line rating and utilization provided by MECL is reasonably accurate. SE claims that the peak load was about 22 MW in 2010 with a growing at a rate of about 3.3% over the past 22 years. By the same growth rate, the T-11 will not meet its thermal limit till approximately year 2021.

B. Economic Need

SE currently takes a combination of monthly firm and non-firm transmission service from MECL at the service rates under MECL's filed Open Access Transmission Tariff (OATT) approved by the

⁹ Affidavit of John D. Gaudet, MECL, Paragraph 33, February 10th, 2012

IRAC on an interim basis. Non-firm transmission service offers an economical alternative to a transmission service customer with a tradeoff that such service carries a higher curtailment priority. Stated otherwise, non-firm service can be curtailed before firm loads or service during periods of emergency. This does not generally imply loss of electric power for the non-firm load customers; it just means that the increased costs associated with use of higher-per-unit-cost on-island fossil-fired generation would be allocated to those non-firm customers.

On Prince Edward Island, any curtailment of service or loads is currently done on a pro-rata basis between MECL and SE, irrespective of the transmission service selected or used by SE. In other words, for all purposes of practicality, SE is treated like a firm transmission service customer even if taking non-firm service. For example, if one of the cables connecting New Brunswick and PEI is out of service and if load on the island needs to be curtailed, both MECL's and SE's loads would be curtailed by the same percentage. In this case, if the total island load is 200 MW, and if the curtailment is for 100 MW i.e. 50%, both SE and MECL will be curtailed for 50% of their respective loads. This is presumably due to the fact that the OATT's interim approval only applies to service rates and charges, but not to any other provisions.

However, it is anticipated that after the final approval of MECL's OATT, other provisions of the tariff, such as curtailment priority between classes of transmission service will come into effect. In that scenario, non-firm service will be curtailed to the highest extent required, before curtailing customer under firm service. The economic effect of this provision is that overall costs associated with using more expensive on-island generation would be first allocated to non-firm load. The total effect would depend upon the frequency and duration of any need to curtail the less-expensive energy flows from New Brunswick.

In case of MECL's OATT application and approval before the IRAC however, the various parties to the proceeding and the IRAC itself have agreed to defer the matter until issues pertaining to this application for transmission service by SE are resolved. To that end, the entire premise under which SE's seeks a permit to construct a transmission line serving its consumers is yet to be formalized.

A central concern with any potential curtailment arising from the use of non-firm service under contingencies is that SE will have to utilize on-island fossil fuel generators to meet its load. This generation would be in uneconomic merit order compared to other sources and depending on the duration of the event, would result in the higher cost to operate the system. However, to the extent any transmission contingencies on the submarine cables between New Brunswick and Prince Edward Island, for which SE has to utilize on-island backup generation, the addition of the proposed 138 kV transmission line between Bedeque and Ottawa Street Substations will not mitigate any concerns of uneconomic generation.

C. Business Case: Net Present Value of Project

Table 7 below illustrates the business cases put forth by Summerside and MECL. The table illustrates that the overall costs of the transmission project comprise no more than roughly half the total costs of the project, on a net present value (NPV) basis, independent of which set of capital costs are considered. The table shows that the projection for transmission rate savings by Summerside or by MECL dominates the overall economic analysis framework. Summerside's projection of a 20% transmission rate increase (occurring in the second year after the project is

built) leads to a projection of accumulated transmission savings (i.e., savings accruing to Summerside because of the economic bypass) that is computed to be worth \$22 million (in present value terms) over the 40 year accounting life illustrated in the business case calculations.

Even in the “curtailment risk” case, wherein Summerside takes a lower level of transmission service and assumes a greater risk of paying higher costs for power in the event of curtailment, the transmission rate savings is still roughly \$15 million (NPV basis). In comparison to this estimate, MECL projects a NPV of transmission rate savings of \$12.6 million over the 40 year period (assuming Summerside interest rate of 3.85%).

Clearly, whether or not the business case is positive or negative depends not just on transmission line project cost assumptions, but the assumptions made about ongoing costs over the life of the line. Based on the information in front of us, we are unable to definitively state whether the business case for Summerside customers is positive or negative. Even if the line costs are as high as MECL’s Option A (\$7.058 million) or even the higher Strum estimate (\$7.9 million), if MECL’s transmission tariff rates were to rise as Summerside projects, Summerside’s avoided transmission costs (i.e., the transmission rate savings) still outweigh these costs, and the NPV is positive – even with Summerside contracting for less transmission service, as seen in the “curtailment risk” result shown in the table. Conversely, even if the transmission line costs are as much as \$2 million lower, as Summerside projects (\$7.058 million, MECL Option A, vs. \$5.014 million, CoS Option B – Irving), if the transmission rates remain as MECL projects, and MECL is correct concerning ongoing annual costs, the business case would remain negative, i.e. costs would outweigh savings.

We note in particular the four largest cost components (NPV basis) associated with ongoing annual costs that stand out from the table:

- Operation and maintenance of the line. There is an almost \$2 million (net present value) difference between the parties’ estimates. This component alone can swing the business case between positive and negative. Neither party has provided conclusive information about just what the level of O&M costs will be. MECL bases its estimate of annual costs (starting at \$122,030 per year) on a percentage of the costs of the overall project, and Summerside’s estimate is only 40% of this annual cost, but is not founded on any particular bottom-up estimate of labor and/or material requirements.
- Cost of access to the submarine cables. There is a \$0.5 million difference (net present value) between the respective estimates of costs for access to the submarine cables. MECL references a submission in its 2009 evidence (Exhibit 17) but that exhibit does not explain how MECL determined the value it used in its business case estimate.
- T-11 backup charges. The difference between Summerside and MECL is roughly \$0.7 million (net present value basis) and could be a significant factor in swinging the business case between positive and negative. Synapse believes that Summerside’s zero-cost estimate of backup charges is more in line with the nature of service over the T-11 line, since as a direct assignment facility they have already incurred the expenses to keep the line in service. While the actual costs of using the T-11 line will be greater than zero (taking service over the line when necessary, such as during an outage of the new line),

MECL's assumption that a standing firm reservation is required does not appear reasonable.

- Communications facilities. We note that it has yet to be ascertained exactly what communications facilities will be required, pending a System impact study. The difference in annual operating costs associated with this item is more than \$0.3 million (NPV basis). While it does not appear unreasonable to give weight to Summerside's plan to use the most cost-effective communications infrastructure, we believe that MECL has the prerogative to determine the most reliable protection systems to use on its 138 kV grid.

Lastly, we note that the business case results reflect only the economic effect on Summerside customers, and do not account for the need for MECL to make up any lost revenue (arising from the loss of Summerside as a major transmission customer) with tariff changes (increases) to its customers.

Table 7: Net Present Value – By Component

Component	NPV Estimate, by Component, for Different CoS/MECL Assumptions									
	City of Summerside Opt B Apr2012 Irving Est.	share of costs by component	City of Summerside Option B with Curtail Risk Oct2012	share of costs by component	MECL Opt B	share of costs by component	MECL Opt A	share of costs by component	MECL Opt A w/ 4.75% Interest Rate	share of costs by component
Capital Expenditure excluding 138 kV commun. infrast.	(\$4,819,899)	46%	(\$4,819,899)	47%	(\$6,017,330)	41%	(\$6,198,223)	41%	(\$5,652,564)	41%
Annual Easement Cost	(\$41,319)	0%	(\$41,319)	0%	(\$41,319)	0%	(\$41,319)	0%	(\$36,109)	0%
Operation and Maintenance, 2% Escalation	(\$1,284,978)	12%	(\$1,284,978)	13%	(\$3,136,117)	21%	(\$3,136,117)	21%	(\$2,648,824)	19%
Share of Submarine Cable Operation and Maintenance	(\$1,503,861)	14%	(\$1,503,861)	15%	(\$2,003,795)	14%	(\$2,003,795)	13%	(\$1,692,443)	12%
One time fuel costs for work at Bedeque Stn	(\$92,857)	1%	(\$92,857)	1%	(\$185,714)	1%	(\$185,714)	1%	(\$180,968)	1%
Communications facilities lease or infrastructure	(\$157,288)	2%	(\$157,288)	2%	(\$472,539)	3%	(\$472,539)	3%	(\$933,009)	7%
T-11 Backup Charges	\$0	0%	\$0	0%	(\$696,095)	5%	(\$696,095)	5%	(\$587,935)	4%
Schedule 9 Charges	(\$419,337)	4%	(\$419,337)	4%	(\$346,732)	2%	(\$346,732)	2%	(\$292,857)	2%
Incremental Property Taxes	(\$415,403)	4%	(\$271,679)	3%	(\$256,996)	2%	(\$256,996)	2%	(\$217,063)	2%
Transmission Rates, West Cape Contract	(\$1,671,812)	16%	(\$1,671,812)	16%	(\$1,632,604)	11%	(\$1,632,604)	11%	(\$1,503,010)	11%
Subtotal cost components	(\$10,406,752)	100%	(\$10,263,028)	100%	(\$14,789,240)	100%	(\$14,970,134)	100%	(\$13,744,783)	100%
Transmission Rate Savings	\$22,441,959		\$15,255,745		\$12,616,627		\$12,616,627		\$10,726,251	
Total NPV	\$12,035,207		\$4,992,717		(\$2,172,614)		(\$2,353,507)		(\$3,018,532)	

Sources: City of Summerside Final Comments, and Email w/ Curtail Risk Sensitivity. MECL, Exhibit E and F, February 2012 Affidavit of John Gaudet. MECL Option B computed by Synapse based on Option B costs listed in Appendix A of City of Summerside Final Comments, April 2012.

4. Conclusions

Synapse draws the following key conclusions from our analysis:

1. While reported potential costs for the proposed line range from roughly \$4.37 to \$7.89 million overall – a fairly wide range – we believe a narrower cost range exists, depending on the Ottawa Street breaker configuration option chosen, and bounded roughly by Summerside’s estimates on the low end and MECL’s estimates on the high end.
2. Taking into account the information reported by Summerside and MECL, Synapse has estimated “hybrid” cost ranges that give different weight to the different cost components reported by the parties, as explained in Section E of our report. For Option A, Synapse computed a range of \$4.98 to \$6.24 million as potential costs, and for Option B we computed a range of \$4.68 to \$5.79 million.
3. Irrespective of the ultimate costs of the proposed line, whether or not there is a business case for the line from the perspective of Summerside ratepayers depends on the assumptions made about ongoing costs (annual costs other than those associated with the initial project investment) and avoided costs (transmission rate savings).
4. The project itself represents no more than just under 50% of the total costs that will be seen by Summerside customers (on a net present value basis). The majority of costs are reflected in ongoing annual costs associated with use of the line.
5. The largest single component affecting the business case results is the assumption of transmission rate savings, or Summerside’s avoided transmission costs. The parties report a range of possible savings between \$12 and \$22 million (net present value terms) over the period considered (40 years plus two years to plan/build the line).
6. It is reasonable to conclude that the business case from Summerside’s perspective could be either positive or negative, depending in large part on the outcome of issues that affect the following factors:
 - a. Transmission rate savings,
 - b. Annual operation and maintenance charges for the new line,
 - c. Costs to access the New Brunswick grid,
 - d. T-11 backup charges, and
 - e. Final determination of requirements for communications facilities for line protection.
7. There is no technical or reliability need for the line, and no overall economic efficiency gain from building the line. The primary effect of building the line would be to allow Summerside to economically bypass costs associated with using the MECL transmission grid. Synapse presumes that lost revenue would be made up with increased tariff charges on MECL customers.