NON-CONFIDENTIAL

Request IR-1:

Reference: NSPML Interim Cost Assessment Application, December 16, 2016, page 5 lines 20-21. The NS Block is a "contractually guaranteed benefit… no matter when it starts. Delay does not mean a loss of that benefit to customers".

(a) Is it NSPML's contention that the quantitative value of the benefits of the NS Block to NSP ratepayers, as explicitly computed (in comparison to alternatives) in NSPML's Maritime Link Application in 2013, does not depend at all on the timing of when the NS Block flows?

(b) Related, does NSPML contend that the overall quantitative benefit of the ML Project in its entirety (inclusive of the NS Block and the Supplemental Block, and Surplus energy) is not dependent on the timing of when Muskrat Falls' energy flows to Nova Scotia?

(c) Please provide any and all such analysis of the timing of the benefits that NSPML has prepared since the approval of the ML Project in 2013.

Response IR-1:

(a-b) NSPML has not advanced the contention stated in this Information Request. John Reed expands upon the point raised by NSPML in the referenced evidence in his Direct Evidence filed in support of NSPML's Application. Please refer to Exhibit N-1, Appendix B, Direct Evidence of John Reed, pages 10 to 16, where he provides a qualitative assessment of the effects of a two-year delay in the availability of NS Block power as follows:

The delay does not materially change the total benefit of the ML Project. It has the effect of removing the Nova Scotia Block power from the 2018 to 2019 period, which is when NS Power does not expect to need new resources and has less expensive sources of power available to it, and adds this power as a resource in the 2053 to 2054 timeframe, when NS Power expects to need this power and does not anticipate having less expensive resources available. Taken as a whole, this delay should not adversely affect NS Power's customers over the life of the project.

(c) NSPML has not provided any further analyses of the timing of the benefits of the NS Block since the approval of the Maritime Link Project in 2013. Further analysis of the timing and magnitude of the benefits of the Maritime Link is provided in NSPML's Supplementary Evidence in this proceeding.

Request IR-2:

Reference: NSPML Interim Cost Assessment Application, December 16, 2016, page 5 lines 22-23, concerning market-priced energy transactions.

(a) Please confirm or explain otherwise that the reference here is not in consideration of market-priced energy transactions contemplated by the April 13, 2015 Energy Access Agreement between Nalcor, Emera and NSPI.

(b) Please state whether, and to what extent, the transactions considered here were included as part of the benefits included in NSPML's analysis at the time of the 2013 ML Project Application filing.

Response IR-2:

(a-b) No. These transactions are incremental to the market-priced transactions in the Energy Access Agreement. The benefits listed in NSPML Interim Cost Assessment Application Supplementary Evidence, Confidential Appendix B are incremental to the benefits calculated in NSPML's analysis at the time of the 2013 filing.

Request IR-3:

Reference: NSPML Interim Cost Assessment Application, December 16, 2016, page 9, footnote 15.

(a) Is the overall project for which revenue recovery in line with the interim cost assessment filing is requested the "…20 percent of the LCP Phase I and Maritime Link facilities costs" as noted in the referenced footnote, or is NSPML asking for recovery of just the portion of the "LCP Phase I and Maritime Link facilities" that is represented by the transmission system assets generally reported upon in the regular quarterly reports to the NS UARB, such as Appendix A to the Application (NSPML Quarterly Report Q4 2016)?

(b) Please provide supporting discussion, explanation and any further analysis concerning the fact that while the Maritime Link transmission assets, as reported upon in regular reports to the NS UARB, are projected to be in service by January 1, 2018, the facilities associated with producing the energy and capacity at Muskrat Falls needed to meet the ML Project energy transactions will not be in service on January 1, 2018.

Response IR-3:

(a) The fundamental commercial arrangement that was established by the 20 for 20 Principle as outlined in NSPML's original application for approval of the Maritime Link and NSPML's Interim Cost Assessment Application, page 9, footnote 15, has not changed. In 2014, NSPML's capital cost budget was set at $1.577 billion (excluding financing costs). Based on that capital cost budget, given the 20 for 20 Principle, NS Power customers will pay no more than $1.555 billion (excluding financing costs) for the capital cost of the Maritime Link. The Interim Assessment requested in this Application is based upon this

cost and schedule and as transparently reported in the status reports filed with the Board on a quarterly basis, as ordered by the Board in the Supplemental Decision on the Maritime Link. NSUARB IR-41 demonstrates the application of the 20 for 20 Principle.

(b) Discussion, explanation and analysis respecting the projected timing for the Maritime Link to be in-service and the expected in-service date for the Muskrat Falls generating facilities is set out in NSPML's evidence in this matter.

Request IR-4:

Reference: NSPML Interim Cost Assessment Application. December 16, 2016. Page 14, lines 28-31.

(a) Please provide any portion of NS Power's 2017-2019 Fuel Stability Plan Application (M07348) that is not available on the Board's website.

(b) Please provide all supporting spreadsheets (with original excel formulas intact) and other documents underlying the application for Base Cost of Fuel.

Response IR-4:

(a) All non-confidential portions of NS Power's 2017-2019 Fuel Stability Plan Application are available on the Board's website under the Matter Number M07348. The confidential portions of the application have been posted to the Board's confidential repository hosted on TitanFile.

(b) All supporting spreadsheets and other documents underlying the Application for the Base Cost of Fuel were submitted as appendices to the Application under M07348. This includes the Fuel Forecast Standardized Filing outlined in the Fuel Adjustment Mechanism Plan of Administration.

Request IR-5:

Reference: NSPML Interim Cost Assessment Application. December 16, 2016. Page 15, lines 16-19.

(a) Please provide citations to Maritime Link Act that are "consistent" with NS Power's "revenue recovery of the Interim Assessment by NSPML."

(b) Please provide citations to the "EPIA" that are "consistent" with NS Power's "revenue recovery of the Interim Assessment by NSPML."

(c) Please provide citations to Maritime Link Cost Recovery Process Regulations that are "consistent" with NS Power's "revenue recovery of the Interim Assessment by NSPML."

Response IR-5:

(a) The *Maritime Link Act*, SNS 2012, c. 9, s. 2, s. 5E;

(b) The *Electricity Plan Implementation (2015) Act*, SNS 2015, c. 31, s. 4, s. 6; and

(c) The *Maritime Link Cost Recovery Process Regulations*, NS Reg. 189/2012, s. 2, s. 4, s. 8

Request IR-6:

Reference: NSPML Interim Cost Assessment Application. December 16, 2016. Page 17, Figure 1.

(a) Please provide all supporting spreadsheets (with original excel formulas intact) and other documents underlying the cost summary in Figure 1.

Response IR-6:

(a) Please refer to Attachment 1 for the Excel version of this figure.

Supporting calculations and documents of the nature requested in this IR will be provided during NSPML's final cost application. The Interim Assessment Application is limited to a request for the Board's approval of the forecasted assessment for the Maritime Link, and payment of forecasted assessment amounts from NS Power to NSPML. Allowing for the completion of the Project and the development of final costing by NSPML is in the best interests of customers as opposed to conducting a detailed public review of costs while key Project contracts remain commercially active.

As noted in the Interim Assessment Application, at Exhibit N-1, page 7, lines 11 to 27, NSPML commits to provide a detailed reporting of the components and breakdown of the actual costs of the entire completed Project when the actual costs of the Project are known, to ensure the final costing of the Project can be reviewed in a manner that is clear and transparent to the Board and stakeholders.

(000's of Canadian Dollars)	Actual Costs							Forecast		Total Project Estimate at Completion
Description	2011-2013	2014	2015	Q1 2016	Q2 2016	Q3 2016	Total Project to Date	Q4 2016	2017	
Emera NL Project Management Costs	**44,379**	**42,315**	**24,599**	**6,818**	**8,275**	**4,038**	**130,424**	**8,748**	**39,737**	**178,909**
Nalcor Project Support Costs	**-**	**15,232**	**425**	**(20)**	**241**	**255**	**16,134**	**65**	**135**	**16,334**
Construction and Engineering Initiatives	**14,975**	**167,980**	**259,751**	**83,891**	**89,966**	**161,024**	**777,587**	**129,897**	**315,053**	**1,222,536**
Environmental Approval	2,651	4,378	1,082	81	255	619	9,066	2,672	9,642	21,379
Submarine and related	3,359	83,797	74,439	9,946	23,534	15,115	210,191	5,804	106,823	322,817
Converters, structures, and other ancillary equipment	1,517	48,747	106,195	40,317	47,347	102,771	346,894	53,718	138,918	539,530
AC and DC Transmission	7,448	31,057	78,035	33,547	18,830	42,519	211,437	67,703	59,670	338,810
Total	**59,354**	**225,527**	**284,775**	**90,689**	**98,482**	**165,317**	**924,144**	**138,710**	**354,925**	**1,417,779**
Escalation								-	**33,954**	**33,954**
Contingency								-	**125,621**	**125,621**
Grand Total	**59,354**	**225,527**	**284,775**	**90,689**	**98,482**	**165,317**	**924,144**	**138,710**	**514,500**	**1,577,355**

Request IR-7:

Reference: NSPML Interim Cost Assessment Application. December 16, 2016. Page 18, lines 4-6.

(a) Please provide actual AFUDC reported by month.

(b) Please provide projected AFUDC by month that was used in comparison to actual AFUDC.

(c) Please provide all supporting spreadsheets (with original excel formulas intact) and other documents supporting (a) and (b).

Response IR-7:

(a-c) Please refer to Attachment 1. The actual AFUDC is as reported in NSPML's audited financial statements and consistent with NSPML's approved Accounting Policy for AFUDC. The projected AFUDC by month is based on the original forecast included in the 2013 Maritime Link Project Application.

Actual AFUDC ($M)

	AFUDC Equity	AFUDC Debt	Total AFUDC	Cumulative AFUDC
2011-13	6.1	0.0	6.1	6.1
2011 to 2013 Total:	**6.1**	**0.0**	**6.1**	
Jan-14	0.5		0.5	6.6
Feb-14	0.6		0.6	7.2
Mar-14	0.6		0.6	7.9
Apr-14	0.7		0.7	8.5
May-14	1.1	2.4	3.6	12.1
Jun-14	1.1	2.0	3.1	15.2
Jul-14	1.2	2.0	3.1	18.3
Aug-14	1.2	1.9	3.1	21.4
Sep-14	1.2	2.1	3.2	24.7
Oct-14	1.2	2.0	3.2	27.8
Nov-14	1.2	2.1	3.3	31.1
Dec-14	1.2	2.1	3.3	34.4
Annual Total:	**11.6**	**16.7**	**28.3**	
Jan-15	1.2	2.2	3.4	37.8
Feb-15	1.2	2.4	3.6	41.4
Mar-15	1.2	2.3	3.5	44.9
Apr-15	1.2	2.4	3.6	48.4
May-15	1.2	2.3	3.5	52.0
Jun-15	1.2	2.4	3.6	55.5
Jul-15	1.3	2.4	3.7	59.2
Aug-15	1.3	2.4	3.7	62.9
Sep-15	1.3	2.5	3.7	66.6
Oct-15	1.3	2.5	3.7	70.4
Nov-15	1.3	2.5	3.8	74.2
Dec-15	1.3	2.6	3.9	78.0
Annual Total:	**14.9**	**28.7**	**43.6**	
Jan-16	1.4	2.6	4.0	82.1
Feb-16	1.4	2.7	4.1	86.2
Mar-16	1.5	2.6	4.1	90.3
Apr-16	1.5	2.7	4.2	94.5
May-16	1.6	2.7	4.3	98.9
Jun-16	1.2	2.8	4.0	102.8
Jul-16	1.8	2.8	4.6	107.5
Aug-16	1.9	2.8	4.7	112.2
Sep-16	2.0	2.9	4.9	117.0
Oct-16	2.0	2.9	4.9	122.0
Nov-16	2.1	3.0	5.1	127.1
Dec-16	2.3	3.0	5.3	132.4
Annual Total:	**20.9**	**33.5**	**54.4**	
2011-2016:	**53.6**	**78.8**	**132.4**	

Actual AFUDC ($M)

	AFUDC Equity	AFUDC Debt	Total AFUDC	Cumulative AFUDC
2011-13	9.0	0.0	9.0	9.0
2011 to 2013 Total:	**9.0**	**0.0**	**9.0**	
Jan-14	1.0	0.4	1.5	10.5
Feb-14	1.0	0.5	1.5	12.0
Mar-14	1.0	0.5	1.5	13.5
Apr-14	1.0	0.6	1.6	15.1
May-14	1.0	0.6	1.6	16.8
Jun-14	1.0	0.7	1.7	18.5
Jul-14	1.1	0.8	1.8	20.3
Aug-14	1.1	0.8	1.9	22.2
Sep-14	1.1	0.9	2.0	24.2
Oct-14	1.1	1.0	2.1	26.3
Nov-14	1.1	1.1	2.2	28.5
Dec-14	1.1	1.2	2.3	30.8
Annual Total:	**12.7**	**9.0**	**21.8**	
Jan-15	1.3	1.2	2.5	33.3
Feb-15	1.4	1.3	2.7	35.9
Mar-15	1.5	1.4	2.8	38.8
Apr-15	1.6	1.4	3.0	41.8
May-15	1.7	1.5	3.2	45.0
Jun-15	1.8	1.7	3.5	48.5
Jul-15	2.0	1.8	3.8	52.3
Aug-15	2.1	1.9	4.0	56.3
Sep-15	2.1	2.0	4.1	60.4
Oct-15	2.2	2.1	4.3	64.7
Nov-15	2.3	2.1	4.4	69.1
Dec-15	2.4	2.3	4.6	73.7
Annual Total:	**22.2**	**20.7**	**43.0**	
Jan-16	2.6	2.3	5.0	78.7
Feb-16	2.8	2.4	5.2	83.9
Mar-16	2.9	2.5	5.4	89.3
Apr-16	3.1	2.7	5.8	95.0
May-16	3.3	2.9	6.2	101.3
Jun-16	3.5	3.2	6.7	107.9
Jul-16	3.8	3.3	7.1	115.1
Aug-16	4.0	3.5	7.5	122.5
Sep-16	4.1	3.6	7.7	130.2
Oct-16	4.1	3.7	7.8	138.0
Nov-16	4.2	3.7	7.9	145.9
Dec-16	4.2	3.8	8.0	154.0
Annual Total:	**42.5**	**37.8**	**80.2**	
Jan-17	4.5	3.8	8.3	162.3
Feb-17	4.5	3.9	8.3	170.6
Mar-17	4.5	3.9	8.4	179.0
Apr-17	4.5	3.9	8.4	187.4

Actual AFUDC ($M)

	AFUDC Equity	AFUDC Debt	Total AFUDC	Cumulative AFUDC
2011-13	9.0	0.0	9.0	9.0
May-17	4.3	4.0	8.3	195.6
Jun-17	4.3	4.0	8.3	203.9
Jul-17	4.5	4.0	8.6	212.5
Aug-17	4.5	4.0	8.6	221.1
Sep-17	4.5	4.1	8.6	229.7
Oct-17	0.0	0.0	0.0	229.7
Nov-17	0.0	0.0	0.0	229.7
Dec-17	0.0	0.0	0.0	229.7
Annual Total:	**40.1**	**35.6**	**75.7**	
Total 2011-2017:	**126.6**	**103.1**	**229.7**	

Request IR-8:

Reference: NSPML Interim Cost Assessment Application. December 16, 2016. Page 21, lines 4-6.

(a) Has NSPML calculated the increase in "financing costs" associated with delaying the Project? If so, please provide supporting spreadsheets (with original excel formulas intact) and other documents supporting this claim.

Response IR-8:

(a) Please refer to NSUARB IR-053.

Request IR-9:

Reference: NSPML Interim Cost Assessment Application. December 16, 2016. Page 22, Figure 2.

(a) Please provide all supporting spreadsheets (with original excel formulas intact), other documents, and all source workpapers underlying the summarization provided in Figure 2.

(b) Please provide the data in Figure 2 for every year of the Project's useful life—including all supporting spreadsheets (with original excel formulas intact).

(c) Given the 20 for 20 principle noted in footnote 15 of the Application, please provide a breakdown for each of the listed items in Figure 2 indicating the proportions that are tied to each component of the ML Project: the energy and capacity transactions for power from Muskrat Falls, and each of the major transmission components required to complete delivery of ML Project energy to Nova Scotia.

Response IR-9:

(a) Please refer to NSUARB IR-32(e).

(b) Please refer to NSUARB IR-32(e).

(c) The 20 for 20 Principle is a means of determining the total cost for which Nova Scotia customers will pay. As is illustrated in the response to NSUARB IR-41, the 20 for 20 Principle results in only Maritime Link costs being the responsibility of Nova Scotia customers. The costs of Muskrat Falls and associated transmission projects were locked in at the time of project sanction. The costs included in this interim assessment relate to

the Maritime Link only and do not include any specific costs relating to Muskrat Falls nor the associated transmission projects being developed by Nalcor.

Request IR-10:

Reference: NSPML Interim Cost Assessment Application. December 16, 2016. Pages 23-26.

(a) Please provide the following costs by year: depreciation, operating costs, debt financing costs, interest costs, deferred financing costs, and equity financing costs.

(b) Please provide the NS Power's current capital structure, including costs of short-term debt, long-term debt, common equity and preferred equity.

(c) Please provide the Emera's current capital structure, including costs of short-term debt, long-term debt, common equity and preferred equity.

(d) Please provide all supporting spreadsheets (with original excel formulas intact) and other documents underlying these costs.

Response IR-10:

(a) See NSUARB IR-32(e).

(b) NS Power sets rates based on a capital structure of 62.5 percent debt and 37.5 percent equity. NS Power's current WACC is 6.96 percent. Also, see response to NSUARB IR-17(d).

(c) Emera Inc.'s audited consolidated financial statements are available publicly and can be found on its website http://investors.emera.com

(d) See (a-c) above.

Request IR-11:

Reference: NSPML Interim Cost Assessment Application. December 16, 2016. Page 28, lines 20-21.

(a) Has NSPML conducted any analyses of the impacts of any potential further delays in full power operation past Q2 of 2020? If so, please provide all such analyses.

(b) To the extent that delay of the Muskrat Falls generation project leads to reductions in energy deliveries in 2020 and potentially future years, please describe how NSPI will meet the 40% renewable energy requirements that will be in place. Provide supporting quantitative analysis.

Response IR-11:

(a) NS Power and NSPML have not performed analysis of the impact of a delay in the delivery of the NS Block past Q2 of 2020. Based upon the most recent monthly report (December 2016), Q2 2020 remains Nalcor's target and Nalcor has reached agreement with Astaldi to continue and complete the powerhouse in line with that schedule. Nalcor Energy's CEO Stan Marshall commented on the agreement:

> This agreement will provide certainty for the completion of the construction of the powerhouse and intake civil works by Astaldi and will ensure the continued progress by Astaldi in fulfilling their full contract.[1]

[1] http://muskratfalls.nalcorenergy.com/wp-content/uploads/2016/12/NR-Nalcor-and-Astaldi-Reach-Terms-for-Completion-Agreement.pdf

(b) Through the Maritime Link and Energy and Capacity Agreement, NS Power has provided a reasonable, cost effective means to achieve long-term RES compliance for customers. Section 7(2) of the Nova Scotia Renewable Electricity Standard describes remedies available to load serving entities that may not meet their RES Targets:

> A load-serving entity that will be unable to meet a renewable electricity standard for longer than 12 months must apply to the Minister, who, if satisfied that the entity will be unable to meet the standard as described in subsection (1) for longer than 12 months, may permit the entity to supply enough renewable electricity from other sources to make up the shortfall on the terms and conditions determined by the Minister.[2]

Under this provision, NS Power would have a number of options, including full use of the Port Hawkesbury biomass facility or a term import with associated Renewable Energy Certificates.

[2] NS Renewable Electricity Standards

Request IR-12:

Reference: NSPML Interim Cost Assessment Application. December 16, 2016. Page 32, lines 5-9.

(a) Please provide the net present value of benefits for the "two-year extension"—using the same dollar year as in the analysis supporting the Project's application.

(b) Please provide the net present value of benefits that were foregone due to the "two-year delay" in the availability of the NS Block—using the same dollar year as in the analysis supporting the Project's application.

Response IR-12:

(a-b) The referenced lines of the Application state:

> Although the timing of the NS Block has shifted, it is still contractually guaranteed for a 35 year term for the benefit of customers, and the two-year delay in the commencement of the benefits provided by the NS Block will be accompanied by a two-year extension in the duration of those benefits to a time when such energy will be valuable to customers.

NSPML has not undertaken the quantitative analyses requested by this IR. Please refer to Synapse IR-1.

NSPML does not agree that benefits have been forgone due to the delay; the renewable energy regulations require the energy in 2020 and beyond. Therefore, the Renewable Energy Standards (RES) benefit was of minimal, if any, value in the years prior to 2020 and customers are receiving the benefit during the compliance period.

Request IR-13:

Reference: NSPML Interim Cost Assessment Application. December 16, 2016. Page 32, line 13.

(a) What is the anticipated cost, by month and by on-peak and off-peak periods, to NSP of providing capacity and energy that would have been provided by the NS Block, Supplemental Energy, and Surplus energy amounts in 2017, 2018, 2019 and 2020 as considered in the valuation of the Maritime Link compared to other alternatives in the original 2013 application analysis?

Response IR-13:

(a) NS Power has not performed the requested analysis for the purpose of this Application. In NS Power's Fuel Stability Plan Application, the Company estimated that a one-year delay in commencement of the NS Block would cost approximately $58 million.

Request IR-14:

Reference: NSPML Interim Cost Assessment Application. December 16, 2016. Figure 2 – Breakdown of Maritime Link Assessment, page 22. And Appendix B. Direct Evidence of John J. Reed. Page 5, lines 19-20, "…design, construction, operation and maintenance of the Maritime Link, together with the related transactions involving the delivery of energy, the provision of transmission services over the Maritime Link and the enabling of transmission service through the Province…" and Page 15, line 9, "Nonetheless, as of January 1, 2018, the ML Project will be used and useful" and page 13 lines 21-22, "…when the project will meet the established standard for the commencement of depreciation".

(a) Is Mr. Reed claiming (at page 15, line 9 of Appendix B) that the ML Project as defined in the Maritime Link Act to include "related transactions involving the delivery of energy" is fully used and useful, such that all of the components of the Maritime Link Assessment noted in Figure 2, page 22 of the December 16, 2016 Application should be recovered in full starting at January 1, 2018?

(b) If so, please explain how it can be fully used and useful on January 1, 2018 if a portion of the direct components of the "ML Link Project" as defined in the Maritime Link Act, i.e., the ability to transmit NS Block, Supplemental Block, and surplus energy from Muskrat Falls is not available?

(c) If not, what quantitative proportion of the total ML Link Project is projected to be used and useful on January 2, 2018?

(d) When Mr. Reed refers to "commencement of depreciation, is he referring to commencement of depreciation of the entire ML Project, or commencement of depreciation of just the transmission assets portion of the entire ML Project? Please explain.

Response IR-14:

(a) When the Board provided its original approval of the Maritime Link Project, it approved the Maritime Link transmission facilities that are the subject of this Application and the related Commercial Agreements with Nalcor. The Board did not approve or assert jurisdiction over the Muskrat Falls generating station and the associated Labrador Transmission Assets (LTA) and Labrador-Island Link (LIL). As evidenced in this Application and by NS Power in its 2016 Fuel Stability Plan application, the Maritime Link transmission assets will be used and useful and Nova Scotia electricity customers will realize immediate benefits from the use and availability of the Maritime Link when it is forecast to be put into service on January 1, 2018. A delay in Muskrat Falls and consequently the NS Block, while not planned, was contemplated by the Commercial Agreements and should not change that determination.

As explained in NSPML's response to MPA IR-2, the costs incurred and to be incurred by NSPML in respect of the Maritime Link Project all relate to the construction, commissioning and operation of the Maritime Link (that is, the transmission assets defined in sub-section 2(b) of the ML Act). Thus, as applicant under section 8 of the Regulations, NSPML's "approved Project costs" (as the phrase is used in that section 8 of the Regulations) are all costs associated with the Maritime Link (as that term is defined in the ML Act).

All of the components of the Maritime Link Assessment noted in Figure 2, page 22 of the December 16, 2016 Application relate to the Maritime Link (that is, the transmission assets defined in sub-section 2(b) of the ML Act).

(b) Please refer to (a). On January 1, 2018, the Maritime Link will be available to transmit electricity, and thus will have the "ability" to transmit energy.

(c) The entire Maritime Link (as that term is defined in sub-section 2(b) of the ML Act) will be in-service, able to transmit energy, and used and useful commencing on January 1, 2018.

(d) Mr. Reed is referring to commencement of depreciation of the transmission assets which are collectively defined as the "Maritime Link" in sub-section 2(b) of the ML Act. These are the "Maritime Link Project" assets which will be constructed, commissioned and operated by NSPML, and the costs of which are the "Maritime Link Project" costs for which NSPML is responsible and for which NSPML is seeking recovery in this Application.

Request IR-15:

Reference: NSPML Interim Cost Assessment Application. December 16, 2016. Appendix B. Direct Evidence of John J. Reed. Page 18, line 16.

(a) Please provide Exhibit JJR-1, the data underlying Figure 1 of Mr. Reed's testimony, in original Excel or equivalent format with all formulas intact.

Response IR-15:

(a) Please refer to Attachment 1 for the Excel version of Exhibit JJR-1.

PV Benefit of Maritime Link vs Indigenous Wind (Low Load)

Operating Costs:

Year	Maritime Link ($K)	Indigenous Wind ($K)	Benefit Nominal $ ($K)
2015	585,164	$585,164	0
2016	609,145	$609,145	0
2017	613,994	$637,893	23,900
2018	557,858	$651,539	93,681
2019	568,403	$640,729	72,326
2020	514,593	$577,413	62,820
2021	520,808	$584,542	63,734
2022	533,691	$590,506	56,815
2023	523,976	$572,482	48,506
2024	527,771	$579,144	51,373
2025	535,734	$588,961	53,227
2026	538,910	$592,596	53,686
2027	543,351	$598,143	54,791
2028	547,453	$611,422	63,968
2029	548,581	$632,453	83,872
2030	556,704	$628,190	71,486
2031	559,674	$641,840	82,166
2032	564,420	$638,442	74,021
2033	574,028	$661,255	87,227
2034	584,106	$669,741	85,635
2035	596,459	$688,832	92,372
2036	606,571	$704,346	97,775
2037	616,467	$720,671	104,204
2038	626,094	$734,604	108,510
2039	635,855	$750,659	114,804
2040	645,399	$764,464	119,065
2041	744,066	888,593	144,527
2042	857,818	1,032,877	175,059
2043	988,959	1,200,589	211,630
2044	1,140,150	1,395,534	255,384
2045	1,314,453	1,622,132	307,679
2046	1,515,405	1,885,524	370,119
2047	1,747,077	2,191,684	444,607
2048	2,014,167	2,547,556	533,389
2049	2,322,088	2,961,212	639,124
2050	2,677,085	3,442,036	764,951
2051	3,086,353	4,000,933	914,580
2052	3,558,188	4,650,579	1,092,391
NPV (2015 k$)	**10,153,498**	**11,632,401**	**1,478,902**

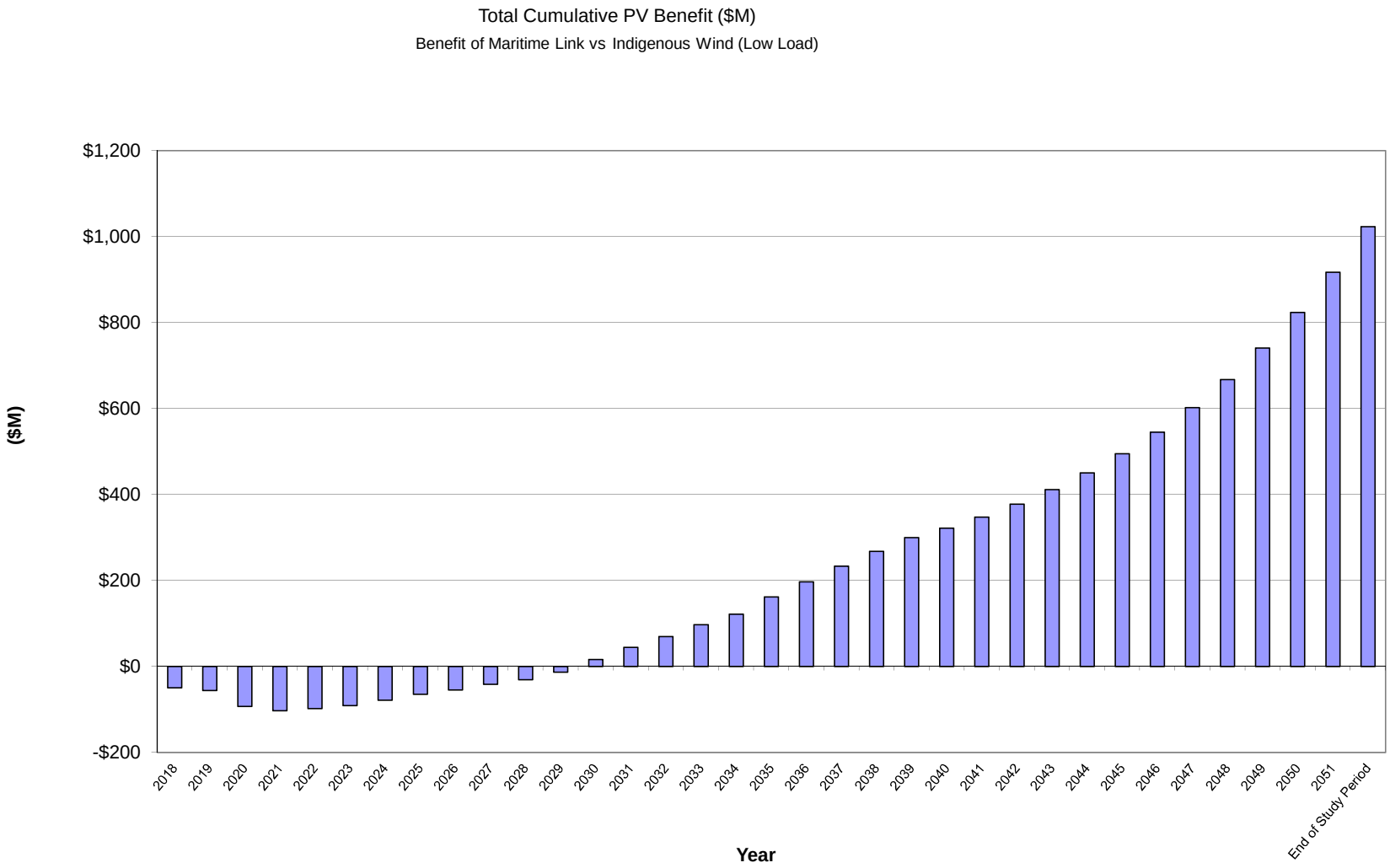
Capital Costs:

Year	Maritime Link ($K)	Indigenous Wind ($K)	Benefit Nominal $ ($K)	Total Cumulative PV Benefit ($2015) ($M)
2015	0	0	0	0
2016	0	0	0	0
2017	22,033	0	-22,033	2
2018	155,703	0	-155,703	-50
2019	160,477	80,003	-80,475	-56
2020	151,105	37,297	-113,809	-93
2021	155,948	77,174	-78,773	-103
2022	146,514	97,612	-48,902	-98
2023	143,824	107,479	-36,345	-91
2024	141,413	111,585	-29,829	-79
2025	139,011	112,540	-26,472	-65
2026	146,145	111,760	-34,386	-55
2027	135,823	110,015	-25,808	-41
2028	147,261	107,725	-39,536	-31
2029	146,988	105,118	-41,869	-14
2030	145,738	151,915	6,177	16
2031	153,641	148,099	-5,542	44
2032	142,802	144,202	1,400	70
2033	141,185	140,245	-940	97
2034	139,471	136,243	-3,228	122
2035	137,673	186,958	49,285	162
2036	146,337	181,896	35,559	197
2037	133,855	176,806	42,951	233
2038	131,858	171,690	39,832	268
2039	129,802	162,323	32,521	300
2040	127,698	118,152	-9,546	322
2041	147,220	137,337	-9,883	348
2042	169,727	159,636	-10,090	377
2043	195,674	185,557	-10,117	411
2044	225,588	215,687	-9,901	450
2045	260,076	250,709	-9,367	495
2046	299,836	291,417	-8,418	545
2047	345,674	338,736	-6,938	602
2048	398,520	393,738	-4,782	667
2049	459,445	457,670	-1,775	741
2050	529,684	531,984	2,300	824
2051	610,661	618,365	7,703	918
End of Study Period	704,018	718,771	14,753	1,023
	2,067,502	**1,611,599**	**-455,902**	

	Growth Rate ML	Growth Rate IW
	0.867	**1.162**

Maritime Link NPV Planning Period Costs (M$) **12,221**
Indigenous Wind NPV Planning Period Costs (M$) **13,244**

Total Cumulative PV Benefit 2015-2052 **1,023 $M**
(Discount Rate is 6.56%)


Total Cumulative PV Benefit ($M)
Benefit of Maritime Link vs Indigenous Wind (Low Load)
$1,200
$1,000
$800
$600
$400
$200
$0
-$200
($M)
2018
2019
2020
2021
2022
2023
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2048
2049
2050
2051
End of Study Period
Year

Request IR-16:

Reference: NSPML Interim Cost Assessment Application. December 16, 2016. Appendix B. Direct Evidence of John J. Reed. Page 20, lines 1-16.

(a) Mr. Reed cites NSPML's response to Synapse IR-11 in the ML Project approval case when discussing the economics of the Maritime Link. Please provide NSPML's response to Synapse IR-11 in the ML Project approval case in its entirety, including all attachments.

(b) Please provide all supporting spreadsheets (with original excel formulas intact) and other documents underlying the computation of the net present value of the Maritime Link and the alternatives analyzed, to the extent that they are not already provided in Part a).

(c) How would the streams of values calculated by NSPML (and provided in response to Synapse IR-11) change due to the fact that the benefits of the NS Block will begin later than originally anticipated?

(d) Please provide revised calculations that reflect the new date on which the benefits of the energy and capacity associated with the NS Block, the Supplemental Block, and the surplus energy will begin to accrue.

Response IR-16:

(a) Please refer to Attachment 1.

(b) The requested materials are provided in response to part (a).

(c) Such an analysis has not been prepared. Please refer to Synapse IR-12.

(d) Please refer to part (a).

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Request IR-11:

Reference: Section 6.3 and 6.4 Application, Alternatives Analysis and Results of the Analysis, and Slides 15 and 16 from "Alternatives Analysis", Technical Conference 2/14/2013.

(a) Please provide all supporting spreadsheets (with original excel formulas intact) and other documents underlying the computation of the net present value of the Maritime Link and the alternatives analyzed.

(b) Include all data on the annual, monthly, and/or on-peak periods over which NS Block energy will flow, including the block energy and the supplemental energy.

(c) Include all data on the annual, monthly, and/or on-peak periods over which surplus energy assumed purchased by NSP will flow.

(d) Include all data on the annual, monthly, and/or on-peak periods over which Nalcor surplus energy will flow across the NSP system and be exported at the NS-NB border.

(e) Include in the request in a) above the specific information about the parameters used for the NPV results presented on slide 15 and 16 referenced above, and in Figure 6-6 through Figure 6-14 of Section 6.4 of the application. These parameters include but are not limited to the life of the asset, end effects, discount rate, inflation rate, additional capital requirements over the planning period or study horizon, etc.

(f) If not included in a) above, provide the source spreadsheet documents with all formulas intact used to create Figures 6-7, 6-8, 6-10, and 6-11.

(g) If not included in a) above, provide the source spreadsheet documents with all formulas intact used to create the tables labeled as Figures 6-6, 6-9,6-12, 6-13, 6-14.

(h) Please provide the annual values used to calculate each NPV.

(i) Please provide the specific components that make up each annual value used in the NPV calculation. e.g. all cost and income components that combine to result in the annual values.

(j) Please identify how each of those components is constructed and the underlying assumptions that are used.

Response IR-11:

(a) Please refer to Electronic Attachment 1 for the Excel spreadsheets showing the calculation of the NPV of planning period costs (2015-2040) for the Base Load, Low Load, High Power and Gas Price Sensitivity, and the Low Power and Gas Price Sensitivity.

The study period costs include the planning period costs plus end effects. Strategist calculates the end effects as a single net present value to represent the operating and capital costs beyond 2040. Attachment 2 shows the planning and study period costs for each case and compares the costs of the Maritime Link Project to the other two alternatives.

The study period costs of the Maritime Link cases shown in Attachment 2 have been adjusted to account for the 35 year depreciation life of the Project versus the 50 year operating life. For years 36-50 the energy from the NS Block is assumed to be priced based on market forecasts. This is repeated every 50 years in the study period. The NPV

of this stream of costs converges to the following values which were added to the Study period costs:

Base Load and Low Load = $134 M
High Power and Gas Price Sensitivity = $170 M
Low Power and Gas Price Sensitivity = $111 M

(b) Please refer to Attachment 3.

(c) Please refer to Attachment 4.

(d) The Stratgeist model assumed that there was no flow through of energy across Nova Scotia to the NS-NB border. If flow through energy had been modeled, Strategist would assume this energy would be purchased by NS Power and re-sold across the NS-NB border resulting in a revenue for NS Power. No flow-through energy was modeled to avoid creating this revenue stream.

(e) The Parameters used for the NPV results include:

Discount rate 6.56 percent

Inflation rate 2 percent

End effects – infinite

- Resource plans for each alternative under the Base Load and Low Load are shown in Appendix 6.06, page 1 and 4. They include additional capital requirements in the planning period for each case.

- In the study period no additonal capital investments are assumed. Capital costs beyond the planning period include the remaining initial lifetime of each asset added in the planning period plus replacements-in-kind beyond 2040.

- Life of the assets:

  Maritime Link – 35 year depreciation, 50 years operating

  Other import – 45 years

  Incremental Wind – 20 years

  Combustion turbine and Combined cycle options – 40 years

(f-h) Refer to Part a.

(i) Refer to Attachment 5 for a breakdown of the annual operating and capital costs used in the NPV calculations.

(j) Please refer to part e and Appendix 6.03 for the underlying assumptions of these components.

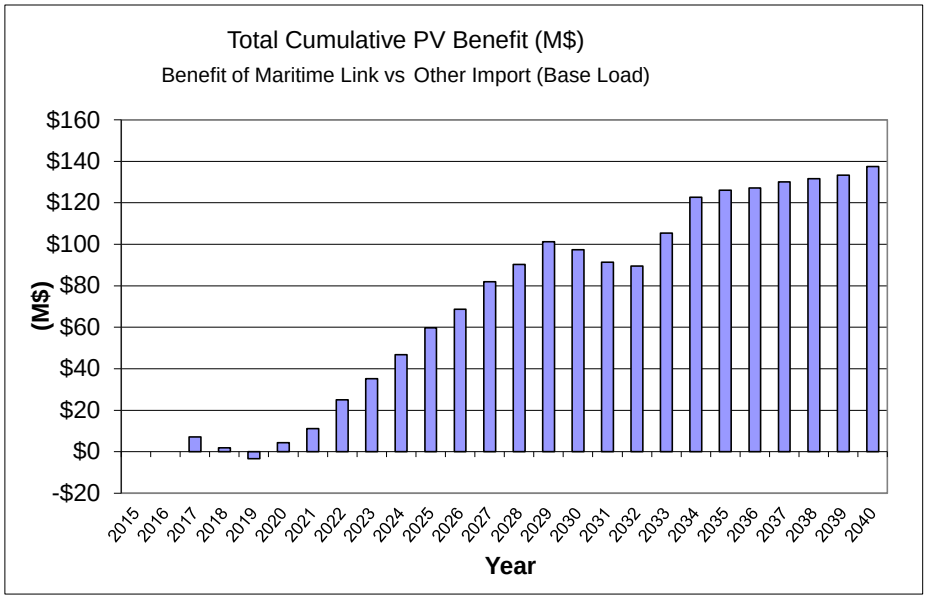
PV Benefit of Maritime Link vs Other Import (Base Load)

Operating Costs:				Capital Costs:				Total Cumulative
Year	Maritime Link (k$)	Other Import (k$)	Benefit Nominal $ (k$)	Year	Maritime Link (k$)	Other Import (k$)	Benefit Nominal $ (k$)	PV Benefit ($2015) (M$)
2015	592,093	$592,093	0	**2015**	0	0	0	0
2016	618,246	$618,246	0	**2016**	0	0	0	0
2017	623,768	$645,760	21,991	**2017**	22,033	8,118	-13,916	7
2018	567,959	$660,372	92,413	**2018**	155,703	56,906	-98,797	2
2019	580,464	$676,751	96,288	**2019**	160,477	57,450	-103,027	-3
2020	602,893	$706,689	103,796	**2020**	151,105	57,845	-93,260	4
2021	616,539	$724,522	107,983	**2021**	155,948	58,103	-97,845	11
2022	636,912	$746,867	109,955	**2022**	146,514	58,234	-88,279	25
2023	639,517	$741,854	102,337	**2023**	143,824	58,249	-85,574	35
2024	653,166	$756,879	103,713	**2024**	141,413	58,158	-83,255	47
2025	671,805	$777,306	105,501	**2025**	139,011	57,968	-81,043	60
2026	685,881	$792,307	106,426	**2026**	146,145	57,687	-88,458	69
2027	701,543	$808,642	107,099	**2027**	135,823	57,324	-78,499	82
2028	715,436	$824,921	109,485	**2028**	147,261	56,883	-90,377	90
2029	732,727	$843,046	110,318	**2029**	146,988	63,369	-83,618	101
2030	754,145	$869,519	115,374	**2030**	195,331	69,804	-125,527	97
2031	768,010	$884,807	116,797	**2031**	202,337	68,913	-133,424	91
2032	787,646	$905,020	117,375	**2032**	190,600	67,967	-122,633	90
2033	815,803	$934,136	118,333	**2033**	188,085	119,599	-68,486	105
2034	847,127	$972,718	125,591	**2034**	185,473	117,604	-67,869	123
2035	877,362	$1,011,246	133,884	**2035**	237,533	115,565	-121,968	126
2036	905,919	$1,040,881	134,962	**2036**	244,308	113,488	-130,820	127
2037	939,506	$1,069,710	130,204	**2037**	229,937	111,374	-118,563	130
2038	975,696	$1,099,057	123,362	**2038**	226,051	109,227	-116,824	132
2039	1,014,363	$1,137,667	123,304	**2039**	222,107	107,050	-115,057	133
2040	1,057,688	$1,191,452	133,764	**2040**	218,113	104,844	-113,269	138
NPV (2015 k$)	**9,030,492**	**10,182,719**	**1,152,227**		**1,745,566**	**730,867**	**-1,014,700**	

Maritime Link NPV Planning Period Costs (M$)	**10,776**
Other Import NPV Planning Period Costs (M$)	**10,914**

Total Cumulative PV Benefit 2015-2040	**138**	**M$**

(Discount Rate is 6.56%)



PV Benefit of Maritime Link vs Indigenous Wind (Base Load)

Operating Costs:

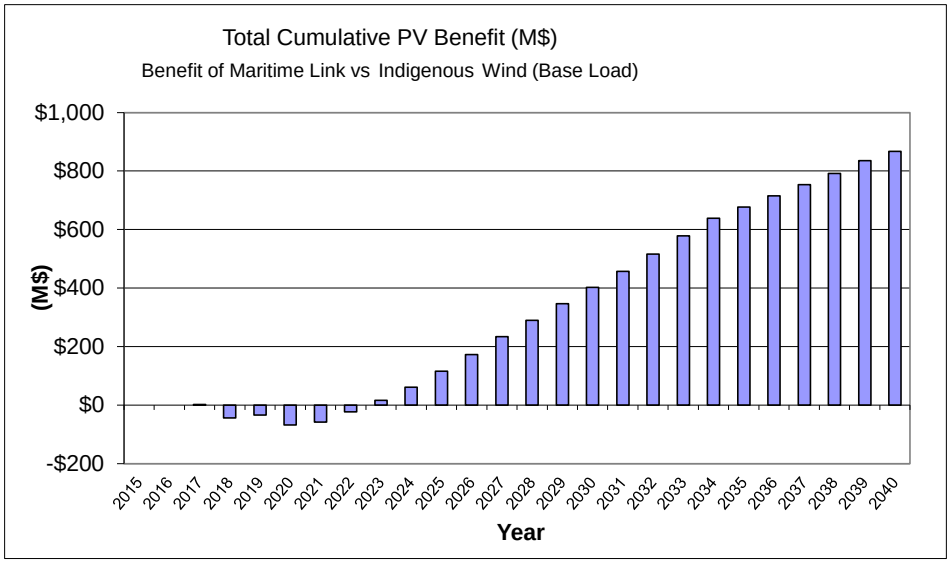
Year	Maritime Link (k$)	Indigenous Wind (k$)	Benefit Nominal $ (k$)
2015	592,093	$592,093	0
2016	618,246	$618,246	0
2017	623,768	$648,316	24,548
2018	567,959	$667,782	99,823
2019	580,464	$615,666	35,202
2020	602,893	$643,191	40,298
2021	616,539	$656,292	39,753
2022	636,912	$670,889	33,977
2023	639,517	$665,411	25,894
2024	653,166	$684,497	31,331
2025	671,805	$721,058	49,254
2026	685,881	$711,220	25,339
2027	701,543	$735,533	33,990
2028	715,436	$755,619	40,183
2029	732,727	$796,986	64,259
2030	754,145	$840,967	86,823
2031	768,010	$867,857	99,848
2032	787,646	$902,692	115,047
2033	815,803	$958,081	142,278
2034	847,127	$986,584	139,457
2035	877,362	$969,644	92,283
2036	905,919	$1,009,030	103,111
2037	939,506	$1,033,312	93,806
2038	975,696	$1,086,344	110,649
2039	1,014,363	$1,127,646	113,283
2040	1,057,688	$1,186,765	129,077
NPV (2015 k$)	**9,030,492**	**9,720,584**	**690,092**

Capital Costs:

Year	Maritime Link (k$)	Indigenous Wind (k$)	Benefit Nominal $ (k$)	Total Cumulative PV Benefit ($2015) (M$)
2015	0	0	0	0
2016	0	0	0	0
2017	22,033	0	-22,033	2
2018	155,703	0	-155,703	-44
2019	160,477	137,315	-23,163	-35
2020	151,105	64,285	-86,820	-68
2021	155,948	131,907	-24,041	-58
2022	146,514	166,528	20,015	-23
2023	143,824	183,203	39,379	16
2024	141,413	190,096	48,683	61
2025	139,011	191,635	52,624	115
2026	146,145	236,043	89,898	173
2027	135,823	232,164	96,341	233
2028	147,261	235,091	87,830	289
2029	146,988	221,421	74,433	346
2030	195,331	254,479	59,148	403
2031	202,337	252,898	50,562	457
2032	190,600	248,683	58,083	516
2033	188,085	243,014	54,929	579
2034	185,473	245,244	59,771	638
2035	237,533	283,683	46,150	677
2036	244,308	286,101	41,792	715
2037	229,937	292,415	62,479	754
2038	226,051	276,625	50,574	791
2039	222,107	311,265	89,159	835
2040	218,113	242,405	24,292	867
	1,745,566	**1,922,137**	**176,571**	

Maritime Link NPV Planning Period Costs (M$) **10,776**
Indigenous Wind NPV Planning Period Costs (M$) **11,643**

Total Cumulative PV Benefit 2015-2040 **867 M$**
(Discount Rate is 6.56%)



PV Benefit of Maritime Link vs Other Import (Low Load)

Operating Costs:

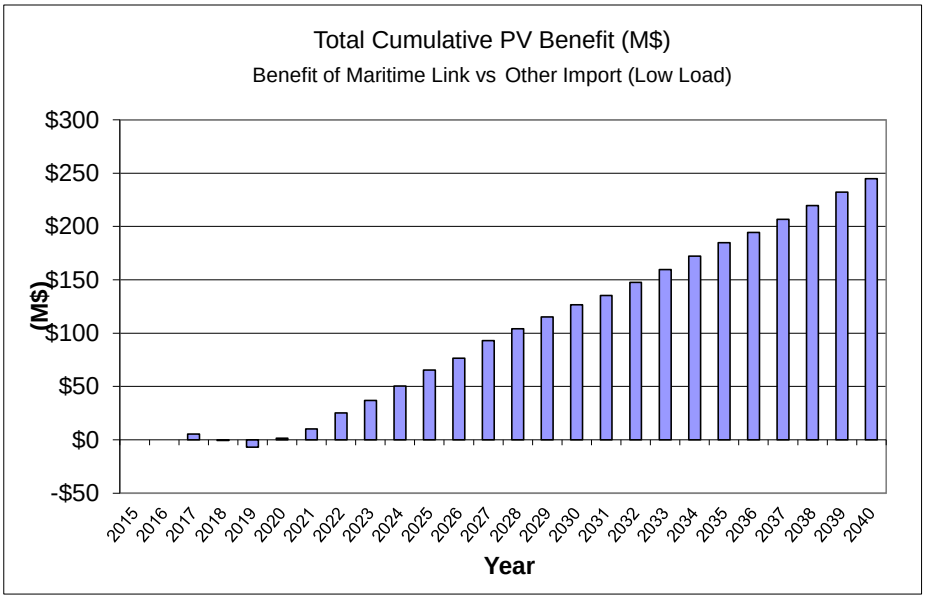
Year	Maritime Link (k$)	Other Import (k$)	Benefit Nominal $ (k$)
2015	585,164	$585,164	0
2016	609,145	$609,145	0
2017	613,994	$634,032	20,038
2018	557,858	$649,416	91,558
2019	568,403	$663,492	95,089
2020	514,593	$619,254	104,661
2021	520,808	$631,260	110,452
2022	533,691	$645,415	111,725
2023	523,976	$628,963	104,987
2024	527,771	$634,975	107,204
2025	535,734	$645,011	109,277
2026	538,910	$650,148	111,238
2027	543,351	$656,798	113,447
2028	547,453	$663,385	115,932
2029	548,581	$666,315	117,734
2030	556,704	$676,022	119,317
2031	559,674	$682,196	122,522
2032	564,420	$688,796	124,375
2033	574,028	$699,368	125,340
2034	584,106	$712,656	128,550
2035	596,459	$727,408	130,948
2036	606,571	$737,793	131,222
2037	616,467	$750,246	133,779
2038	626,094	$763,298	137,204
2039	635,855	$775,314	139,458
2040	645,399	$787,663	142,264
NPV (2015 k$)	**7,416,325**	**8,602,058**	**1,185,732**

Capital Costs:

Year	Maritime Link (k$)	Other Import (k$)	Benefit Nominal $ (k$)	Total Cumulative PV Benefit ($2015) (M$)
2015	0	0	0	0
2016	0	0	0	0
2017	22,033	8,118	-13,916	5
2018	155,703	56,906	-98,797	-1
2019	160,477	57,450	-103,027	-7
2020	151,105	57,845	-93,260	2
2021	155,948	58,103	-97,845	10
2022	146,514	58,234	-88,279	25
2023	143,824	58,249	-85,574	37
2024	141,413	58,158	-83,255	50
2025	139,011	57,968	-81,043	65
2026	146,145	57,687	-88,458	77
2027	135,823	57,324	-78,499	93
2028	147,261	56,883	-90,377	104
2029	146,988	56,373	-90,615	115
2030	145,738	55,797	-89,941	127
2031	153,641	55,162	-98,479	135
2032	142,802	54,471	-88,331	148
2033	141,185	53,731	-87,454	160
2034	139,471	52,944	-86,527	172
2035	137,673	52,114	-85,559	185
2036	146,337	51,245	-95,092	194
2037	133,855	50,340	-83,515	207
2038	131,858	49,401	-82,457	220
2039	129,802	48,432	-81,370	232
2040	127,698	47,435	-80,263	245
	1,525,928	**585,072**	**-940,856**	

Maritime Link NPV Planning Period Costs (M$) **8,942**
Other Import NPV Planning Period Costs (M$) **9,187**

Total Cumulative PV Benefit 2015-2040 **245 M$**
(Discount Rate is 6.56%)



PV Benefit of Maritime Link vs Indigenous Wind (Low Load)

Operating Costs:

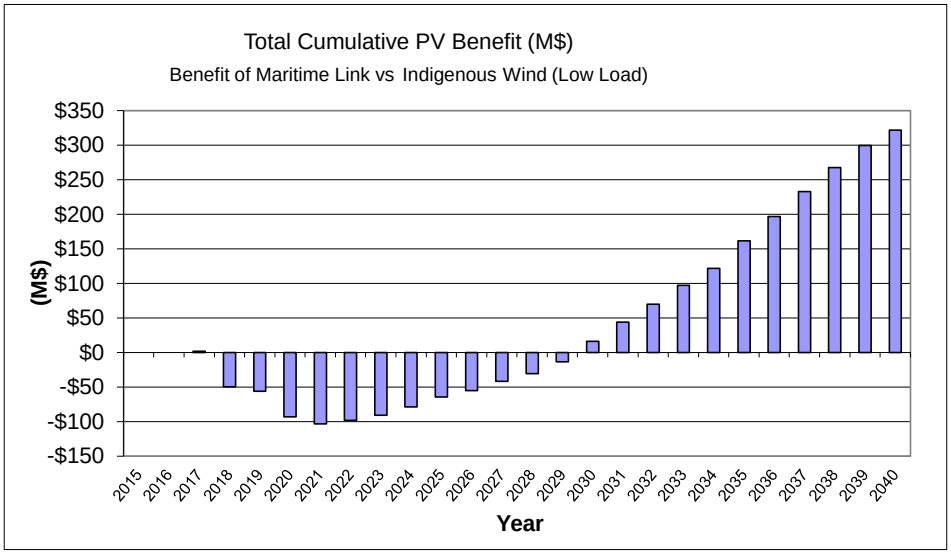
Year	Maritime Link (k$)	Indigenous Wind (k$)	Benefit Nominal $ (k$)
2015	585,164	$585,164	0
2016	609,145	$609,145	0
2017	613,994	$637,893	23,900
2018	557,858	$651,539	93,681
2019	568,403	$640,729	72,326
2020	514,593	$577,413	62,820
2021	520,808	$584,542	63,734
2022	533,691	$590,506	56,815
2023	523,976	$572,482	48,506
2024	527,771	$579,144	51,373
2025	535,734	$588,961	53,227
2026	538,910	$592,596	53,686
2027	543,351	$598,143	54,791
2028	547,453	$611,422	63,968
2029	548,581	$632,453	83,872
2030	556,704	$628,190	71,486
2031	559,674	$641,840	82,166
2032	564,420	$638,442	74,021
2033	574,028	$661,255	87,227
2034	584,106	$669,741	85,635
2035	596,459	$688,832	92,372
2036	606,571	$704,346	97,775
2037	616,467	$720,671	104,204
2038	626,094	$734,604	108,510
2039	635,855	$750,659	114,804
2040	645,399	$764,464	119,065
NPV (2015 k$)	**7,416,325**	**8,185,364**	**769,038**

Capital Costs:

Year	Maritime Link (k$)	Indigenous Wind (k$)	Benefit Nominal $ (k$)	Total Cumulative PV Benefit ($2015) (M$)
2015	0	0	0	0
2016	0	0	0	0
2017	22,033	0	-22,033	2
2018	155,703	0	-155,703	-50
2019	160,477	80,003	-80,475	-56
2020	151,105	37,297	-113,809	-93
2021	155,948	77,174	-78,773	-103
2022	146,514	97,612	-48,902	-98
2023	143,824	107,479	-36,345	-91
2024	141,413	111,585	-29,829	-79
2025	139,011	112,540	-26,472	-65
2026	146,145	111,760	-34,386	-55
2027	135,823	110,015	-25,808	-41
2028	147,261	107,725	-39,536	-31
2029	146,988	105,118	-41,869	-14
2030	145,738	151,915	6,177	16
2031	153,641	148,099	-5,542	44
2032	142,802	144,202	1,400	70
2033	141,185	140,245	-940	97
2034	139,471	136,243	-3,228	122
2035	137,673	186,958	49,285	162
2036	146,337	181,896	35,559	197
2037	133,855	176,806	42,951	233
2038	131,858	171,690	39,832	268
2039	129,802	162,323	32,521	300
2040	127,698	118,152	-9,546	322
	1,525,928	**1,078,842**	**-447,086**	

Maritime Link NPV Planning Period Costs (M$) **8,942**
Indigenous Wind NPV Planning Period Costs (M$) **9,264**

Total Cumulative PV Benefit 2015-2040 **322 M$**
(Discount Rate is 6.56%)

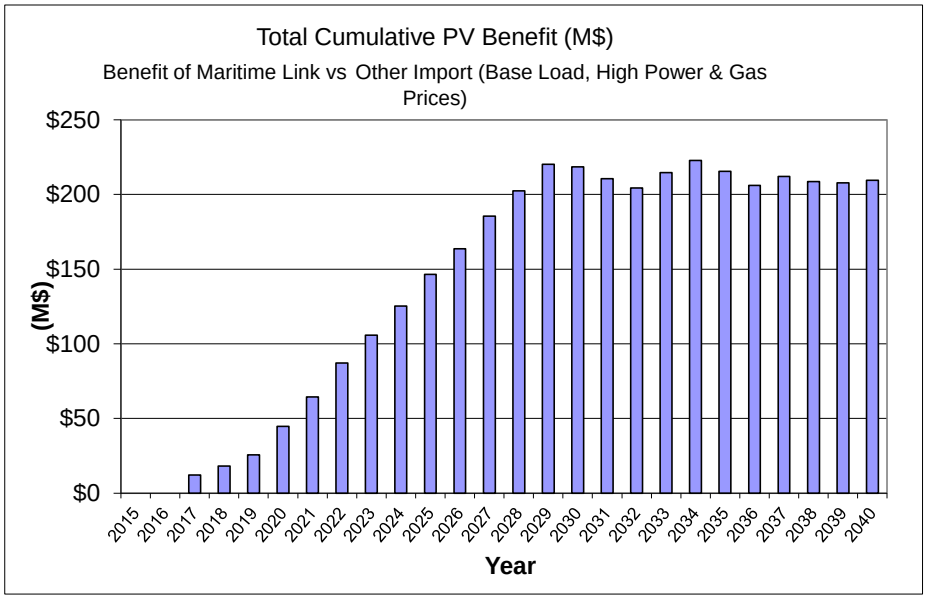


PV Benefit of Maritime Link vs Other Import (Base Load, High Power and Gas Prices)

Operating Costs:				Capital Costs:				Total Cumulative
Year	Maritime Link (k$)	Other Import (k$)	Benefit Nominal $ (k$)	Year	Maritime Link (k$)	Other Import (k$)	Benefit Nominal $ (k$)	PV Benefit ($2015) (M$)
2015	615,269	$615,269	0	**2015**	0	0	0	0
2016	649,337	$649,337	0	**2016**	0	0	0	0
2017	659,449	$687,307	27,858	**2017**	22,033	8,118	-13,916	12
2018	612,024	$718,009	105,985	**2018**	155,703	56,906	-98,797	18
2019	627,404	$739,985	112,581	**2019**	160,477	57,450	-103,027	26
2020	651,174	$770,643	119,469	**2020**	151,105	57,845	-93,260	45
2021	663,122	$790,039	126,917	**2021**	155,948	58,103	-97,845	65
2022	687,539	$810,956	123,418	**2022**	146,514	58,234	-88,279	87
2023	694,211	$810,816	116,605	**2023**	143,824	58,249	-85,574	106
2024	709,390	$827,387	117,997	**2024**	141,413	58,158	-83,255	125
2025	730,151	$851,158	121,008	**2025**	139,011	57,968	-81,043	147
2026	749,375	$872,398	123,023	**2026**	146,145	57,687	-88,458	164
2027	767,116	$892,441	125,326	**2027**	135,823	57,324	-78,499	186
2028	781,127	$910,269	129,142	**2028**	147,261	56,883	-90,377	203
2029	803,356	$929,804	126,448	**2029**	146,988	63,369	-83,618	220
2030	840,821	$962,219	121,399	**2030**	195,331	69,804	-125,527	219
2031	870,366	$982,003	111,637	**2031**	202,337	68,913	-133,424	211
2032	898,813	$1,002,899	104,086	**2032**	190,600	67,967	-122,633	204
2033	940,392	$1,040,966	100,574	**2033**	188,085	119,599	-68,486	215
2034	983,848	$1,078,995	95,147	**2034**	185,473	117,604	-67,869	223
2035	1,031,667	$1,127,714	96,047	**2035**	237,533	115,565	-121,968	215
2036	1,076,504	$1,171,983	95,479	**2036**	244,308	113,488	-130,820	206
2037	1,120,879	$1,263,464	142,585	**2037**	229,937	111,374	-118,563	212
2038	1,165,195	$1,267,140	101,945	**2038**	226,051	109,227	-116,824	209
2039	1,222,866	$1,333,948	111,082	**2039**	222,107	107,050	-115,057	208
2040	1,290,486	$1,412,796	122,310	**2040**	218,113	104,844	-113,269	210
NPV (2015 k$)	**9,960,676**	**11,184,998**	**1,224,322**		**1,745,566**	**730,867**	**-1,014,700**	

Maritime Link NPV Planning Period Costs (M$) **11,706**
Other Import NPV Planning Period Costs (M$) **11,916**

Total Cumulative PV Benefit 2015-2040 **210 M$**
(Discount Rate is 6.56%)

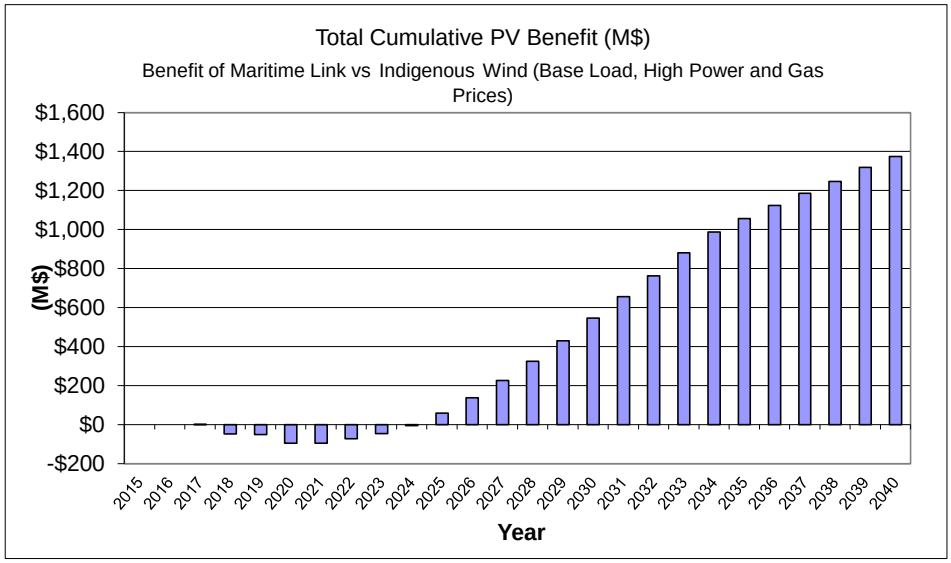


PV Benefit of Maritime Link vs Indigenous Wind (Base Load, High Power and Gas Prices)

Operating Costs:				Capital Costs:				
Year	Maritime Link (k$)	Indigenous Wind (k$)	Benefit Nominal $ (k$)	Year	Maritime Link (k$)	Indigenous Wind (k$)	Benefit Nominal $ (k$)	Total Cumulative PV Benefit ($2015) (M$)
2015	615,269	$615,269	0	**2015**	0	0	0	0
2016	649,337	$649,337	0	**2016**	0	0	0	0
2017	659,449	$682,086	22,638	**2017**	22,033	0	-22,033	1
2018	612,024	$708,775	96,751	**2018**	155,703	0	-155,703	-48
2019	627,404	$647,140	19,736	**2019**	160,477	137,315	-23,163	-51
2020	651,174	$676,047	24,872	**2020**	151,105	64,285	-86,820	-96
2021	663,122	$687,830	24,708	**2021**	155,948	131,907	-24,041	-95
2022	687,539	$702,392	14,853	**2022**	146,514	166,528	20,015	-73
2023	694,211	$700,541	6,330	**2023**	143,824	183,203	39,379	-46
2024	709,390	$732,338	22,948	**2024**	141,413	190,096	48,683	-5
2025	730,151	$799,008	68,857	**2025**	139,011	191,635	52,624	59
2026	749,375	$815,715	66,340	**2026**	146,145	236,043	89,898	137
2027	767,116	$863,333	96,217	**2027**	135,823	232,164	96,341	227
2028	781,127	$915,451	134,324	**2028**	147,261	235,091	87,830	324
2029	803,356	$986,491	183,135	**2029**	146,988	221,421	74,433	430
2030	840,821	$1,083,810	242,989	**2030**	195,331	254,479	59,148	546
2031	870,366	$1,122,291	251,925	**2031**	202,337	252,898	50,562	656
2032	898,813	$1,157,131	258,318	**2032**	190,600	248,683	58,083	763
2033	940,392	$1,256,401	316,009	**2033**	188,085	243,014	54,929	881
2034	983,848	$1,278,372	294,524	**2034**	185,473	245,244	59,771	987
2035	1,031,667	$1,232,538	200,871	**2035**	237,533	283,683	46,150	1,057
2036	1,076,504	$1,288,135	211,631	**2036**	244,308	286,101	41,792	1,123
2037	1,120,879	$1,309,582	188,703	**2037**	229,937	292,415	62,479	1,185
2038	1,165,195	$1,378,852	213,657	**2038**	226,051	276,625	50,574	1,247
2039	1,222,866	$1,461,489	238,623	**2039**	222,107	311,265	89,159	1,318
2040	1,290,486	$1,542,661	252,175	**2040**	218,113	242,405	24,292	1,374
NPV (2015 k$)	**9,960,676**	**11,158,566**	**1,197,890**		**1,745,566**	**1,922,137**	**176,571**	

Maritime Link NPV Planning Period Costs (M$) **11,706**
Indigenous Wind NPV Planning Period Costs (M$) **13,081**

Total Cumulative PV Benefit 2015-2040 **1,374 M$**
(Discount Rate is 6.56%)



PV Benefit of Maritime Link vs Other Import (Base Load, Low Power and Gas Prices)

Operating Costs:

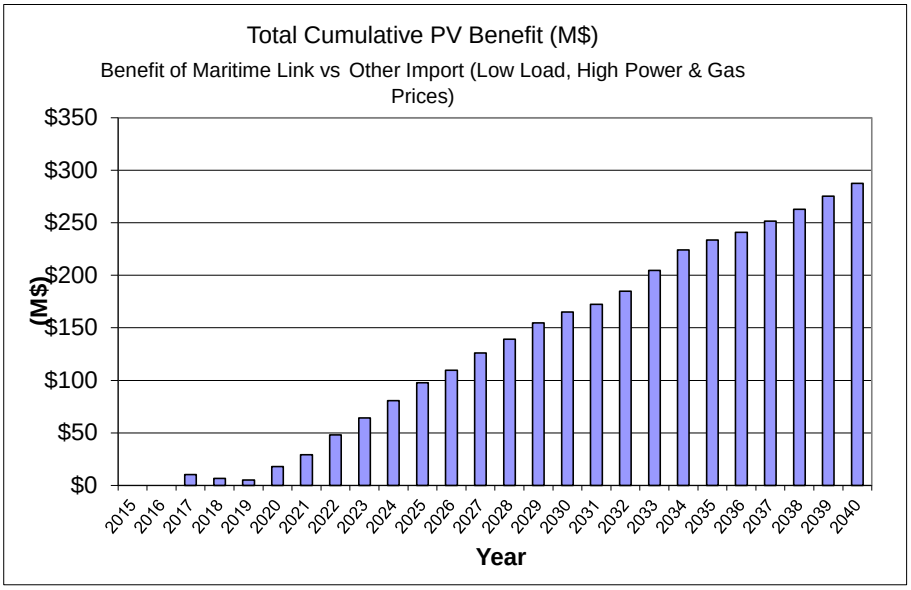
Year	Maritime Link (k$)	Other Import (k$)	Benefit Nominal $ (k$)
2015	527,116	$527,116	0
2016	552,843	$552,843	0
2017	603,169	$628,912	25,743
2018	547,689	$642,120	94,431
2019	556,340	$657,416	101,075
2020	574,572	$685,312	110,741
2021	590,024	$704,397	114,373
2022	607,035	$724,759	117,724
2023	607,791	$719,939	112,149
2024	620,383	$732,729	112,346
2025	638,550	$751,758	113,208
2026	651,807	$764,276	112,469
2027	665,841	$779,871	114,030
2028	678,539	$798,446	119,907
2029	693,880	$815,320	121,440
2030	687,134	$839,451	152,318
2031	701,698	$855,846	154,148
2032	717,592	$876,563	158,971
2033	740,053	$871,130	131,077
2034	762,996	$896,183	133,187
2035	769,485	$924,322	154,837
2036	792,197	$950,853	158,657
2037	816,365	$978,224	161,859
2038	839,762	$1,005,405	165,643
2039	864,813	$1,036,544	171,731
2040	894,247	$1,067,495	173,248
NPV (2015 k$)	**8,360,729**	**9,662,832**	**1,302,103**

Capital Costs:

Year	Maritime Link (k$)	Other Import (k$)	Benefit Nominal $ (k$)	Cumulative PV Benefit ($2015) (M$)
2015	0	0	0	0
2016	0	0	0	0
2017	22,033	8,118	-13,916	10
2018	155,703	56,906	-98,797	7
2019	160,477	57,450	-103,027	5
2020	151,105	57,845	-93,260	18
2021	155,948	58,103	-97,845	29
2022	146,514	58,234	-88,279	48
2023	143,824	58,249	-85,574	64
2024	141,413	58,158	-83,255	81
2025	139,011	57,968	-81,043	98
2026	146,145	57,687	-88,458	110
2027	135,823	57,324	-78,499	126
2028	147,261	56,883	-90,377	139
2029	146,988	63,369	-83,618	155
2030	195,331	69,804	-125,527	165
2031	202,337	68,913	-133,424	172
2032	190,600	67,967	-122,633	185
2033	188,085	119,599	-68,486	205
2034	185,473	117,604	-67,869	224
2035	237,533	115,565	-121,968	233
2036	244,308	113,488	-130,820	241
2037	229,937	111,374	-118,563	251
2038	226,051	109,227	-116,824	263
2039	222,107	107,050	-115,057	275
2040	218,113	104,844	-113,269	287
	1,745,566	**730,867**	**-1,014,700**	

Maritime Link NPV Planning Period Costs (M$) **10,106**
Other Import NPV Planning Period Costs (M$) **10,394**

Total Cumulative PV Benefit 2015-2040 **287 M$**
(Discount Rate is 6.56%)



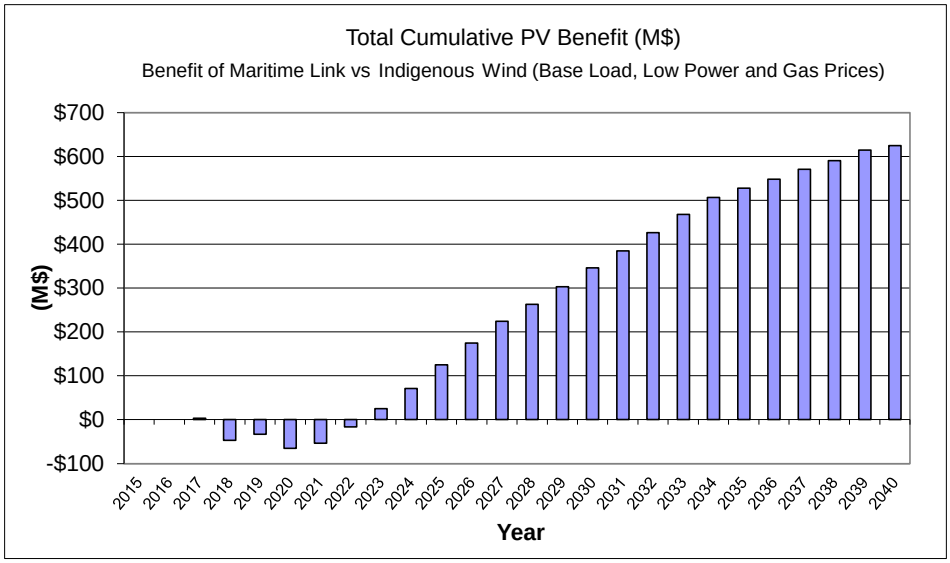
PV Benefit of Maritime Link vs Indigenous Wind (Base Load, Low Power and Gas Prices)

Operating Costs:				Capital Costs:				Total Cumulative
Year	Maritime Link (k$)	Indigenous Wind (k$)	Benefit Nominal $ (k$)	Year	Maritime Link (k$)	Indigenous Wind (k$)	Benefit Nominal $ (k$)	PV Benefit ($2015) (M$)
2015	527,116	$527,116	0	**2015**	0	0	0	0
2016	552,843	$552,843	0	**2016**	0	0	0	0
2017	603,169	$629,158	25,988	**2017**	22,033	0	-22,033	3
2018	547,689	$642,485	94,796	**2018**	155,703	0	-155,703	-47
2019	556,340	$597,169	40,829	**2019**	160,477	137,315	-23,163	-33
2020	574,572	$617,061	42,490	**2020**	151,105	64,285	-86,820	-65
2021	590,024	$631,546	41,522	**2021**	155,948	131,907	-24,041	-53
2022	607,035	$644,349	37,314	**2022**	146,514	166,528	20,015	-17
2023	607,791	$638,444	30,654	**2023**	143,824	183,203	39,379	25
2024	620,383	$652,128	31,745	**2024**	141,413	190,096	48,683	71
2025	638,550	$688,744	50,194	**2025**	139,011	191,635	52,624	125
2026	651,807	$661,304	9,497	**2026**	146,145	236,043	89,898	175
2027	665,841	$675,217	9,376	**2027**	135,823	232,164	96,341	224
2028	678,539	$680,002	1,463	**2028**	147,261	235,091	87,830	263
2029	693,880	$715,668	21,788	**2029**	146,988	221,421	74,433	303
2030	687,134	$739,958	52,825	**2030**	195,331	254,479	59,148	346
2031	701,698	$757,554	55,856	**2031**	202,337	252,898	50,562	384
2032	717,592	$783,435	65,843	**2032**	190,600	248,683	58,083	426
2033	740,053	$815,747	75,694	**2033**	188,085	243,014	54,929	468
2034	762,996	$830,797	67,801	**2034**	185,473	245,244	59,771	506
2035	769,485	$800,897	31,412	**2035**	237,533	283,683	46,150	528
2036	792,197	$827,454	35,258	**2036**	244,308	286,101	41,792	548
2037	816,365	$845,205	28,840	**2037**	229,937	292,415	62,479	571
2038	839,762	$873,192	33,430	**2038**	226,051	276,625	50,574	590
2039	864,813	$886,007	21,194	**2039**	222,107	311,265	89,159	614
2040	894,247	$921,831	27,584	**2040**	218,113	242,405	24,292	625
NPV (2015 k$)	**8,360,729**	**8,809,017**	**448,288**		**1,745,566**	**1,922,137**	**176,571**	

Maritime Link NPV Planning Period Costs (M$)	**10,106**
Indigenous Wind NPV Planning Period Costs (M$)	**10,731**

Total Cumulative PV Benefit 2015-2040	**625 M$**

(Discount Rate is 6.56%)



Synapse IR-011 Att 2

Base Load Cases	Maritime Link (ML)	Other Import	Additional Cost versus ML Alternative	Indigenous Wind	Additional Cost versus ML Alternative
Planning Period NPV $M	10,776	10,914	138	11,643	867
Study Period NPV $M	16,209	16,496	287	18,182	1,973

Low Load Cases	Maritime Link (ML)	Other Import	Additional Cost versus ML Alternative	Indigenous Wind	Additional Cost versus ML Alternative
Planning Period NPV $M	8,942	9,187	245	9,264	322
Study Period NPV $M	12,221	12,753	532	13,244	1,023

Base Load, High Power and Gas Prices	Maritime Link (ML)	Other Import	Additional Cost versus ML Alternative	Indigenous Wind	Additional Cost versus ML Alternative
Planning Period NPV $M	11,706	11,916	210	13,081	1,375
Study Period NPV $M	18,238	18,491	253	21,296	3,058

Base Load, Low Power and Gas Prices	Maritime Link (ML)	Other Import	Additional Cost versus ML Alternative	Indigenous Wind	Additional Cost versus ML Alternative
Planning Period NPV $M	10,106	10,394	287	10,731	625
Study Period NPV $M	14,767	15,394	627	16,059	1,292

Synapse IR-011 Att 3

Maritime Link - NS Block (On-peak)

(Same for all ML cases - Base Load, Low Load, High and Low Sensitivities)

GWh	2017	2018-2040
Jan	0	76
Feb	0	69
Mar	0	76
Apr	0	74
May	0	76
Jun	0	74
Jul	0	76
Aug	0	76
Sep	0	74
Oct	76	76
Nov	74	74
Dec	76	76
Total	**226**	**895**

Maritime Link - Supplemental Energy (Off-peak)

(Same for all ML cases - Base Load, Low Load, High and Low Sensitivities)

GWh	2017	2018	2019	2020	2021	2022	2023-2040
Jan	0	49	49	49	49	49	0
Feb	0	45	45	46	45	45	0
Mar	0	49	49	49	49	49	0
Apr	0	0	0	0	0	0	0
May	0	0	0	0	0	0	0
Jun	0	0	0	0	0	0	0
Jul	0	0	0	0	0	0	0
Aug	0	0	0	0	0	0	0
Sep	0	0	0	0	0	0	0
Oct	0	0	0	0	0	0	0
Nov	48	48	48	48	48	0	0
Dec	49	49	49	49	49	0	0
Total	**97**	**240**	**240**	**242**	**240**	**143**	**0**

Synapse IR-011 Attachment 4

Maritime Link Base Load - Maritime Link Economy Energy

GWh	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Jan	0	0	0	26	28	28	29	30	67	71	86	78	82	82	110	84	88	91	100	133	112	123	130	136	143	146
Feb	0	0	0	62	69	55	71	70	109	105	115	116	118	116	125	130	131	135	133	133	133	137	133	133	133	138
Mar	0	0	0	97	97	97	97	97	145	145	145	145	145	145	146	147	147	147	147	147	147	147	147	147	147	147
Apr	0	0	0	142	142	142	142	142	142	142	142	142	142	142	142	141	141	142	142	142	142	142	142	142	142	142
May	0	0	0	146	146	146	146	146	146	146	146	146	146	146	146	147	147	147	147	146	147	147	147	147	147	147
Jun	0	0	0	140	140	140	140	140	140	140	140	140	140	141	141	142	142	142	141	141	142	142	142	142	142	142
Jul	0	0	0	105	103	110	115	114	119	127	136	138	143	142	146	122	127	133	147	147	130	147	147	147	147	147
Aug	0	0	0	147	147	147	147	147	147	147	147	147	147	147	146	147	147	147	147	147	147	147	147	147	147	147
Sep	0	0	0	142	135	135	135	135	136	136	136	136	137	137	138	142	142	142	142	142	142	142	142	142	142	142
Oct	0	0	146	146	146	146	146	146	146	146	146	146	146	146	146	146	147	146	146	146	146	147	146	146	147	147
Nov	0	0	92	89	88	88	89	134	133	134	134	134	134	134	135	139	139	139	139	140	139	139	140	140	140	140
Dec	0	0	44	47	47	48	50	91	97	102	110	113	117	118	132	121	126	131	142	146	136	145	146	147	147	147
Total	**0**	**0**	**282**	**1288**	**1289**	**1281**	**1307**	**1392**	**1529**	**1541**	**1583**	**1583**	**1598**	**1598**	**1653**	**1608**	**1625**	**1641**	**1672**	**1710**	**1664**	**1706**	**1709**	**1717**	**1724**	**1732**

Maritime Link Low Load -Maritime Link Economy Energy

GWh	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Jan	0	0	0	19	22	3	2	1	4	3	1	1	0	0	28	25	20	18	18	19	19	20	20	20	20	20
Feb	0	0	0	53	62	5	10	8	21	10	37	33	29	16	69	65	56	31	54	55	57	39	59	59	59	39
Mar	0	0	0	98	98	95	95	94	143	146	145	145	145	145	145	144	144	144	144	144	144	144	144	144	144	144
Apr	0	0	0	142	142	133	140	141	140	139	138	138	137	136	136	134	132	131	132	130	132	131	131	131	132	132
May	0	0	0	147	147	146	146	145	145	144	144	144	144	141	140	138	127	127	132	137	136	136	136	136	136	136
Jun	0	0	0	141	133	84	80	78	77	111	108	105	104	101	101	99	90	89	91	93	95	96	97	97	97	97
Jul	0	0	0	96	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Aug	0	0	0	147	147	145	145	145	144	143	147	147	147	147	147	147	146	146	146	146	146	146	146	146	146	146
Sep	0	0	0	142	142	127	127	126	125	124	122	120	119	117	117	133	132	131	131	131	132	131	131	131	131	132
Oct	0	0	147	147	147	140	139	139	138	145	144	144	144	143	143	143	142	142	142	142	142	142	142	142	142	142
Nov	0	0	94	92	92	85	84	126	126	125	123	121	119	118	116	114	128	127	127	128	128	128	128	127	127	128
Dec	0	0	40	39	39	24	22	41	41	41	40	37	35	33	45	44	55	55	58	60	64	67	68	68	68	68
Total	**0**	**0**	**281**	**1264**	**1268**	**1081**	**1085**	**1138**	**1197**	**1224**	**1245**	**1230**	**1217**	**1192**	**1282**	**1280**	**1269**	**1237**	**1271**	**1278**	**1290**	**1275**	**1296**	**1296**	**1297**	**1278**

Maritime Link Base Load, High Power and Gas Price Sensitivity - Maritime Link Economy Energy

GWh	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Jan	0	0	0	48	50	50	50	51	85	88	91	97	100	104	119	145	147	147	147	147	145	145	146	146	147	147
Feb	0	0	0	62	65	50	65	65	98	88	100	103	105	101	120	133	133	138	133	133	133	138	133	133	133	138
Mar	0	0	0	93	93	94	93	85	132	135	136	137	138	143	146	146	147	147	147	147	147	147	147	147	147	147
Apr	0	0	0	142	141	142	141	141	141	141	141	141	142	142	142	142	142	142	142	142	142	142	142	142	142	142
May	0	0	0	146	145	145	141	117	121	124	125	130	135	146	146	146	146	147	147	147	147	147	147	147	147	147
Jun	0	0	0	97	93	91	92	89	93	95	97	103	109	129	141	141	141	141	140	140	142	142	142	142	141	141
Jul	0	0	0	105	106	108	106	102	107	113	118	120	122	131	147	147	147	147	147	147	147	147	147	147	147	147
Aug	0	0	0	144	145	145	145	143	142	143	143	144	144	147	146	147	147	147	147	147	147	147	147	147	147	147
Sep	0	0	0	130	129	127	127	124	125	126	127	127	128	136	138	142	142	142	142	142	142	142	142	142	142	142
Oct	0	0	146	146	146	145	145	144	144	144	144	145	145	146	146	147	146	145	145	145	147	147	146	146	147	147
Nov	0	0	77	74	71	71	69	97	102	107	110	112	115	127	134	135	139	139	139	140	140	140	140	140	140	140
Dec	0	0	26	33	36	37	37	64	70	74	77	83	87	95	130	146	146	146	146	146	147	147	147	147	147	147
Total	**0**	**0**	**250**	**1219**	**1220**	**1204**	**1212**	**1222**	**1362**	**1378**	**1407**	**1442**	**1469**	**1546**	**1655**	**1717**	**1723**	**1727**	**1723**	**1724**	**1726**	**1730**	**1726**	**1727**	**1727**	**1732**

Maritime Link Base Load, Low Power and Gas Price Sensitivity - Maritime Link Economy Energy

GWh	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Jan	0	0	0	41	46	45	46	46	100	102	104	106	107	109	110	84	82	84	89	96	86	94	88	106	119	133
Feb	0	0	0	84	85	85	84	84	129	108	133	133	133	137	133	133	133	137	133	133	132	136	132	132	133	138
Mar	0	0	0	98	98	97	98	98	146	146	146	146	146	146	146	147	147	147	147	147	147	147	147	147	147	147
Apr	0	0	0	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142
May	0	0	0	147	147	147	103	143	143	143	143	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147
Jun	0	0	0	101	101	137	99	99	98	99	142	142	142	142	141	142	142	142	142	142	141	142	142	142	142	142
Jul	0	0	0	98	106	147	111	110	112	145	97	97	97	98	99	147	147	147	147	147	126	147	144	133	147	147
Aug	0	0	0	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147
Sep	0	0	0	141	141	141	141	141	141	141	141	142	142	140	141	142	142	142	142	142	142	142	142	142	142	142
Oct	0	0	147	147	147	146	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147
Nov	0	0	92	92	92	88	88	133	134	139	139	139	139	139	139	139	139	139	139	139	140	140	140	140	140	140
Dec	0	0	96	96	96	95	96	145	146	146	146	146	146	146	146	141	139	141	145	146	130	137	142	144	146	147
Total	**0**	**0**	**335**	**1333**	**1348**	**1418**	**1302**	**1436**	**1585**	**1605**	**1627**	**1633**	**1635**	**1640**	**1638**	**1659**	**1655**	**1663**	**1668**	**1675**	**1629**	**1669**	**1660**	**1670**	**1700**	**1719**

Maritime Link Base Load	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Total Unit Cost	472,514	487,564	430,930	327,121	336,969	355,925	364,973	378,815	389,038	398,912	408,722	419,724	430,481	442,141	445,828	468,286	477,171	491,604	508,413	527,666	564,516	580,312	607,756	638,207	663,395	696,755
Renewables IPPs	119,579	130,682	140,588	150,760	150,804	151,178	150,896	150,943	129,842	130,219	129,941	129,992	130,044	130,425	130,151	130,207	130,263	130,649	130,379	130,439	130,500	130,890	130,626	130,690	130,756	131,152
Maritime Link (Base Block and Supplemental)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports *	0	0	52,251	90,078	92,690	95,791	100,670	107,154	120,638	124,036	133,142	136,165	141,018	142,870	156,748	155,652	160,576	165,393	177,011	189,022	182,346	194,718	201,125	206,799	220,212	229,781
Total Operating Cost (k$)	**592,093**	**618,246**	**623,768**	**567,959**	**580,464**	**602,893**	**616,539**	**636,912**	**639,517**	**653,166**	**671,805**	**685,881**	**701,543**	**715,436**	**732,727**	**754,145**	**768,010**	**787,646**	**815,803**	**847,127**	**877,362**	**905,919**	**939,506**	**975,696**	**1,014,363**	**1,057,688**
Capital Costs																										
Maritime Link	0	0	22,033	155,703	160,477	151,105	155,948	146,514	143,824	141,413	139,011	146,145	135,823	147,261	146,988	145,738	153,641	142,802	141,185	139,471	137,673	146,337	133,855	131,858	129,802	127,698
Combined Cycles Units	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49,593	48,696	47,798	46,900	46,002	99,860	97,971	96,082	94,193	92,304	90,415
Total Capital Costs (k$)	**0**	**0**	**22,033**	**155,703**	**160,477**	**151,105**	**155,948**	**146,514**	**143,824**	**141,413**	**139,011**	**146,145**	**135,823**	**147,261**	**146,988**	**195,331**	**202,337**	**190,600**	**188,085**	**185,473**	**237,533**	**244,308**	**229,937**	**226,051**	**222,107**	**218,113**

Total Operating Cost NPV (k$)	$9,030,492
Total Capital Cost NPV (k$)	$1,745,566
Total Planning Period NPV (k$)	$10,776,058

* Imports over the NS-NB Tieline and surplus energy from Maritime Link

Other Import Base Load	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Total Unit Cost	472,514	487,564	423,295	298,639	308,079	326,077	332,129	343,824	351,144	360,981	371,389	378,763	389,687	400,357	408,952	408,744	417,277	424,861	442,262	463,253	484,035	502,656	524,877	544,349	573,281	606,500
Renewables IPPs	119,579	130,682	146,119	173,106	173,374	173,975	173,923	174,201	153,334	153,948	153,908	154,200	154,496	155,123	155,097	155,404	155,714	156,356	156,344	156,665	156,990	157,647	157,652	157,988	158,328	159,002
Other Import (Contract Energy)	0	0	15,955	65,988	70,830	76,639	81,298	86,975	89,650	91,710	93,300	95,178	97,094	99,319	101,041	103,074	105,148	107,557	109,421	111,622	113,867	116,476	118,492	120,875	123,306	126,129
Imports *	0	0	60,390	122,639	124,468	129,998	137,174	141,867	147,726	150,241	158,709	164,167	167,366	170,122	177,956	202,297	206,667	216,247	226,109	241,177	256,354	264,102	268,689	275,845	282,751	299,822
Total Operating Cost (k$)	**592,093**	**618,246**	**645,760**	**660,372**	**676,751**	**706,689**	**724,522**	**746,867**	**741,854**	**756,879**	**777,306**	**792,307**	**808,642**	**824,921**	**843,046**	**869,519**	**884,807**	**905,021**	**934,136**	**972,718**	**1,011,246**	**1,040,881**	**1,069,710**	**1,099,057**	**1,137,666**	**1,191,452**
Capital Costs																										
Other Import (Contract Energy)	0	0	8,118	56,906	57,450	57,845	58,103	58,234	58,249	58,158	57,968	57,687	57,324	56,883	56,373	55,797	55,162	54,471	53,731	52,944	52,114	51,245	50,340	49,401	48,432	47,435
Combustion Turbines & Combined Cycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,997	14,007	13,751	13,495	65,868	64,660	63,451	62,243	61,034	59,826	58,617	57,409
Total Capital Costs (k$)	**0**	**0**	**8,118**	**56,906**	**57,450**	**57,845**	**58,103**	**58,234**	**58,249**	**58,158**	**57,968**	**57,687**	**57,324**	**56,883**	**63,369**	**69,804**	**68,913**	**67,967**	**119,599**	**117,604**	**115,565**	**113,488**	**111,374**	**109,227**	**107,050**	**104,844**

Total Operating Cost NPV (k$)	$10,182,719
Total Capital Cost NPV (k$)	$730,867
Total Planning Period NPV (k$)	$10,913,585

* Imports over the upgraded NS-NB Tieline.

Indigenous Wind Base Load	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Total Unit Cost	472,514	487,564	468,799	475,766	455,986	484,207	495,206	509,050	523,439	538,292	572,792	570,193	586,775	603,565	644,613	688,063	714,460	748,422	803,592	829,003	811,816	850,067	871,289	923,540	964,092	1,022,131
Renewables IPPs	119,579	130,682	140,588	150,760	165,759	166,431	166,454	166,813	146,029	146,730	146,782	147,170	147,566	150,398	150,523	150,986	151,458	152,268	152,430	155,296	155,856	156,753	159,515	160,157	160,814	161,810
Incremental Wind	0	0	0	0	1,527	1,563	1,588	1,620	1,653	1,692	1,719	1,754	1,789	2,028	2,061	2,102	2,145	2,196	2,231	2,497	2,547	2,607	2,884	2,942	3,001	3,072
Imports *	0	0	42,012	43,339	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Less Exports *	0	0	3,082	2,083	7,606	9,011	6,956	6,594	5,710	2,217	235	7,896	597	372	212	184	206	193	172	212	575	397	375	294	261	249
Total Operating Cost (k$)	**592,093**	**618,246**	**648,316**	**667,782**	**615,666**	**643,191**	**656,292**	**670,889**	**665,411**	**684,497**	**721,058**	**711,220**	**735,532**	**755,619**	**796,986**	**840,967**	**867,857**	**902,692**	**958,081**	**986,584**	**969,644**	**1,009,030**	**1,033,312**	**1,086,344**	**1,127,646**	**1,186,764**
Capital Costs																										
Incremental Wind	0	0	0	0	55,217	-4,185	63,150	97,643	114,337	121,382	123,199	122,182	119,629	123,978	111,819	117,171	117,789	115,841	112,503	117,123	103,251	109,153	118,998	106,780	110,015	45,435
Combustion Turbine & Combined Cycles	0	0	0	0	82,098	68,470	68,757	68,885	68,867	68,713	68,436	113,861	112,535	111,113	109,602	137,308	135,110	132,842	130,511	128,121	180,432	176,947	173,417	169,845	201,250	196,970
Total Capital Costs (k$)	**0**	**0**	**0**	**0**	**137,315**	**64,285**	**131,907**	**166,528**	**183,203**	**190,096**	**191,635**	**236,043**	**232,164**	**235,091**	**221,421**	**254,479**	**252,898**	**248,683**	**243,014**	**245,244**	**283,683**	**286,101**	**292,415**	**276,625**	**311,265**	**242,405**

Total Operating Cost NPV (k$)	$9,720,584
Total Capital Cost NPV (k$)	$1,922,137
Total Planning Period NPV (k$)	$11,642,720

* Imports and Exports over the NS-NB Tieline.

ML Low Load	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Total Unit Cost	465,585	478,463	427,406	324,389	332,917	293,935	297,627	306,947	317,612	314,454	319,166	321,966	325,755	330,611	321,299	327,016	330,440	336,988	341,432	348,439	355,891	364,989	370,581	377,904	385,269	393,530
Renewables IPPs	119,579	130,682	140,588	150,760	150,804	155,203	154,931	154,988	130,376	130,763	130,496	130,558	130,622	131,015	130,752	130,820	130,888	131,287	131,030	131,103	131,177	131,581	131,330	131,409	131,489	131,899
Maritime Link (Base Block and Supplemental)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports *	0	0	46,000	82,710	84,682	65,456	68,250	71,755	75,988	82,553	86,072	86,386	86,974	85,827	96,529	98,868	98,346	96,146	101,566	104,565	109,391	110,001	114,556	116,781	119,097	119,969
Total Operating Cost (k$)	**585,164**	**609,145**	**613,993**	**557,858**	**568,403**	**514,593**	**520,808**	**533,691**	**523,976**	**527,771**	**535,734**	**538,910**	**543,351**	**547,453**	**548,581**	**556,704**	**559,674**	**564,420**	**574,028**	**584,106**	**596,459**	**606,571**	**616,467**	**626,094**	**635,855**	**645,399**
Capital Costs																										
Maritime Link	0	0	22,033	155,703	160,477	151,105	155,948	146,514	143,824	141,413	139,011	146,145	135,823	147,261	146,988	145,738	153,641	142,802	141,185	139,471	137,673	146,337	133,855	131,858	129,802	127,698
Total Capital Costs (k$)	**0**	**0**	**22,033**	**155,703**	**160,477**	**151,105**	**155,948**	**146,514**	**143,824**	**141,413**	**139,011**	**146,145**	**135,823**	**147,261**	**146,988**	**145,738**	**153,641**	**142,802**	**141,185**	**139,471**	**137,673**	**146,337**	**133,855**	**131,858**	**129,802**	**127,698**

Total Operating Cost NPV (k$)	$7,416,326
Total Capital Cost NPV (k$)	$1,525,928
Total Planning Period NPV (k$)	$8,942,254

* Imports over the NS-NB Tieline and surplus energy from Maritime Link

OI Low Load	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Total Unit Cost	465,585	478,463	414,028	297,408	300,266	277,454	282,132	292,900	292,124	292,740	294,991	299,153	304,474	310,603	301,365	303,769	306,094	313,756	315,341	324,971	330,972	331,123	339,695	350,750	356,086	364,498
Renewables IPPs	119,579	130,682	146,119	173,106	173,374	178,000	177,958	178,246	153,868	154,492	154,463	154,766	155,074	155,713	155,699	156,017	156,339	156,994	156,995	157,329	157,667	158,338	158,356	158,707	159,061	159,749
Other Import (Contract Energy)	0	0	15,955	65,988	70,830	76,639	81,298	86,975	89,650	91,710	93,300	95,178	97,094	99,319	101,041	103,074	105,148	107,557	109,421	111,622	113,867	116,476	118,492	120,875	123,306	126,129
Imports *	0	0	57,930	112,915	119,022	87,161	89,872	87,294	93,321	96,033	102,257	101,051	100,157	97,751	108,211	113,162	114,615	110,489	117,611	118,734	124,902	131,857	133,703	132,966	136,860	137,287
Total Operating Cost (k$)	**585,164**	**609,145**	**634,032**	**649,416**	**663,492**	**619,254**	**631,260**	**645,415**	**628,963**	**634,975**	**645,011**	**650,148**	**656,798**	**663,385**	**666,315**	**676,022**	**682,196**	**688,796**	**699,368**	**712,656**	**727,408**	**737,793**	**750,246**	**763,297**	**775,314**	**787,663**
Capital Costs																										
Other Import (Contract Energy)	0	0	8,118	56,906	57,450	57,845	58,103	58,234	58,249	58,158	57,968	57,687	57,324	56,883	56,373	55,797	55,162	54,471	53,731	52,944	52,114	51,245	50,340	49,401	48,432	47,435
Total Capital Costs (k$)	**0**	**0**	**8,118**	**56,906**	**57,450**	**57,845**	**58,103**	**58,234**	**58,249**	**58,158**	**57,968**	**57,687**	**57,324**	**56,883**	**56,373**	**55,797**	**55,162**	**54,471**	**53,731**	**52,944**	**52,114**	**51,245**	**50,340**	**49,401**	**48,432**	**47,435**

Total Operating Cost NPV (k$)	$8,602,058
Total Capital Cost NPV (k$)	$585,072
Total Planning Period NPV (k$)	$9,187,130

* Imports over the upgraded NS-NB Tieline.

Indigenous Wind Low Load	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Total Unit Cost	465,585	478,463	466,288	463,134	484,285	427,635	437,783	445,314	451,845	460,072	468,917	473,060	480,069	472,709	490,174	520,516	515,603	525,186	533,993	545,105	595,852	613,418	628,324	641,568	653,254	659,609
Renewables IPPs	119,579	130,682	140,588	150,760	159,599	164,174	164,081	164,322	139,896	140,474	140,401	140,662	140,927	141,526	141,474	141,756	142,044	142,664	142,636	142,941	143,251	143,897	143,893	144,223	144,559	145,231
Incremental Wind	0	0	0	0	770	788	801	817	833	853	867	884	902	923	938	957	976	1,000	1,016	1,036	1,056	1,082	1,099	1,121	1,144	1,171
Imports *	0	0	35,975	41,563	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Less Exports *	0	0	4,957	3,917	3,926	15,185	18,123	19,947	20,092	22,256	21,224	22,010	23,755	3,737	133	35,039	16,783	30,409	16,389	19,341	51,328	54,051	52,645	52,308	48,298	41,547
Total Operating Cost (k$)	**585,164**	**609,145**	**637,893**	**651,539**	**640,729**	**577,413**	**584,541**	**590,506**	**572,482**	**579,144**	**588,961**	**592,596**	**598,143**	**611,421**	**632,453**	**628,190**	**641,840**	**638,442**	**661,255**	**669,741**	**688,832**	**704,346**	**720,671**	**734,604**	**750,659**	**764,464**
Capital Costs																										
Incremental Wind	0	0	0	0	30,838	-4,073	35,686	56,095	66,018	70,256	71,413	70,901	69,483	67,575	65,401	63,083	60,687	58,249	55,788	53,314	50,833	48,349	45,863	43,376	36,659	-4,842
Combustion Turbine & Combined Cycles	0	0	0	0	49,165	41,370	41,488	41,516	41,461	41,329	41,126	40,859	40,532	40,150	39,717	88,831	87,412	85,953	84,458	82,929	136,125	133,547	130,943	128,314	125,664	122,994
Total Capital Costs (k$)	**0**	**0**	**0**	**0**	**80,003**	**37,297**	**77,174**	**97,612**	**107,479**	**111,585**	**112,540**	**111,760**	**110,015**	**107,725**	**105,118**	**151,915**	**148,099**	**144,202**	**140,245**	**136,243**	**186,958**	**181,896**	**176,806**	**171,690**	**162,323**	**118,152**

Total Operating Cost NPV (k$)	$8,185,364
Total Capital Cost NPV (k$)	$1,078,842
Total Planning Period NPV (k$)	$9,264,206

* Imports and Exports over the NS-NB Tieline.

ML Base Load, High Power & Gas Prices	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Total Unit Cost	495,689	518,655	460,678	372,775	385,226	405,362	412,811	434,269	445,419	455,849	469,103	479,802	490,225	487,181	474,768	476,338	497,979	519,969	557,267	594,195	639,384	677,334	717,226	754,467	804,687	861,882
Renewables IPPs	119,579	130,682	140,588	150,760	150,804	151,178	150,896	150,943	129,842	130,219	129,941	129,992	130,044	130,425	130,151	130,207	130,263	130,649	130,379	130,439	130,500	130,890	130,626	130,690	130,756	131,152
Maritime Link (Base Block and Supplemental)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports *	0	0	58,183	88,489	91,374	94,635	99,415	102,327	118,951	123,322	131,107	139,582	146,846	163,521	198,437	234,276	242,124	248,195	252,746	259,214	261,783	268,280	273,027	280,037	287,423	297,452
Total Operating Cost (k$)	**615,269**	**649,337**	**659,449**	**612,024**	**627,404**	**651,174**	**663,122**	**687,538**	**694,211**	**709,390**	**730,151**	**749,375**	**767,116**	**781,127**	**803,356**	**840,821**	**870,366**	**898,813**	**940,392**	**983,848**	**1,031,667**	**1,076,503**	**1,120,879**	**1,165,195**	**1,222,866**	**1,290,486**
Capital Costs																										
Maritime Link	0	0	22,033	155,703	160,477	151,105	155,948	146,514	143,824	141,413	139,011	146,145	135,823	147,261	146,988	145,738	153,641	142,802	141,185	139,471	137,673	146,337	133,855	131,858	129,802	127,698
Combined Cycles Units			0	0	0	0	0	0	0	0	0	0	0	0	0	49,593	48,696	47,798	46,900	46,002	99,860	97,971	96,082	94,193	92,304	90,415
Total Capital Costs (k$)	**0**	**0**	**22,033**	**155,703**	**160,477**	**151,105**	**155,948**	**146,514**	**143,824**	**141,413**	**139,011**	**146,145**	**135,823**	**147,261**	**146,988**	**195,331**	**202,337**	**190,600**	**188,085**	**185,473**	**237,533**	**244,308**	**229,937**	**226,051**	**222,107**	**218,113**

Total Operating Cost NPV (k$)	$9,960,675
Total Capital Cost NPV (k$)	$1,745,566
Total Planning Period NPV (k$)	$11,706,242

* Imports over the NS-NB Tieline and surplus energy from Maritime Link

OI Base Load, High Power & Gas Prices	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Total Unit Cost	495,689	518,655	464,910	386,348	396,382	414,484	426,325	443,199	453,291	463,192	478,196	489,101	499,629	492,587	476,533	462,952	460,119	462,085	465,961	471,036	503,618	535,634	616,609	611,368	662,531	721,884
Renewables IPPs	119,579	130,682	146,119	173,106	173,374	173,975	173,923	174,201	153,334	153,948	153,908	154,200	154,496	155,123	155,097	155,404	155,714	156,356	156,344	156,665	156,990	157,647	157,652	157,988	158,328	159,002
Other Import (Contract Energy)	0	0	15,955	65,988	70,830	76,639	81,298	86,975	89,650	91,710	93,300	95,178	97,094	99,319	101,041	103,074	105,148	107,557	109,421	111,622	113,867	116,476	118,492	120,875	123,306	126,129
Imports *	0	0	60,322	92,568	99,400	105,545	108,493	106,581	114,542	118,538	125,754	133,920	141,223	163,240	197,132	240,790	261,022	276,902	309,240	339,671	353,240	362,226	370,711	376,909	389,782	405,782
Total Operating Cost (k$)	**615,269**	**649,337**	**687,307**	**718,009**	**739,985**	**770,643**	**790,038**	**810,956**	**810,816**	**827,387**	**851,158**	**872,398**	**892,441**	**910,269**	**929,804**	**962,219**	**982,003**	**1,002,899**	**1,040,966**	**1,078,995**	**1,127,714**	**1,171,983**	**1,263,464**	**1,267,140**	**1,333,947**	**1,412,796**
Capital Costs																										
Other Import (Contract Energy)	0	0	8,118	56,906	57,450	57,845	58,103	58,234	58,249	58,158	57,968	57,687	57,324	56,883	56,373	55,797	55,162	54,471	53,731	52,944	52,114	51,245	50,340	49,401	48,432	47,435
Combustion Turbines & Combined Cycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,997	14,007	13,751	13,495	65,868	64,660	63,451	62,243	61,034	59,826	58,617	57,409
Total Capital Costs (k$)	**0**	**0**	**8,118**	**56,906**	**57,450**	**57,845**	**58,103**	**58,234**	**58,249**	**58,158**	**57,968**	**57,687**	**57,324**	**56,883**	**63,369**	**69,804**	**68,913**	**67,967**	**119,599**	**117,604**	**115,565**	**113,488**	**111,374**	**109,227**	**107,050**	**104,844**
Total Operating Cost NPV (k$)	$11,184,998																									
Total Capital Cost NPV (k$)	$730,867																									
Total Planning Period NPV (k$)	$11,915,865																									

* Imports over the upgraded NS-NB Tieline.

Indigenous Wind Base Load, High Power & Gas Prices	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Total Unit Cost	495,689	518,655	494,520	506,005	488,977	518,879	531,002	546,223	564,309	584,213	650,754	667,107	714,274	763,381	834,243	930,940	968,903	1,002,881	1,101,929	1,120,821	1,074,469	1,129,090	1,147,555	1,216,114	1,297,988	1,378,074
Renewables IPPs	119,579	130,682	140,588	150,760	165,759	166,431	166,454	166,813	146,029	146,730	146,782	147,170	147,566	150,398	150,523	150,986	151,458	152,268	152,430	155,296	155,856	156,753	159,515	160,157	160,814	161,810
Incremental Wind	0	0	0	0	1,527	1,563	1,588	1,620	1,653	1,692	1,719	1,754	1,789	2,028	2,061	2,102	2,145	2,196	2,231	2,497	2,547	2,607	2,884	2,942	3,001	3,072
Imports *	0	0	51,910	56,392	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Less Exports *	0	0	4,931	4,382	9,123	10,827	11,215	12,264	11,449	297	247	316	296	357	336	218	215	214	189	242	334	316	372	361	315	296
Total Operating Cost (k$)	**615,269**	**649,337**	**682,086**	**708,775**	**647,140**	**676,047**	**687,830**	**702,392**	**700,541**	**732,338**	**799,008**	**815,716**	**863,332**	**915,451**	**986,491**	**1,083,810**	**1,122,291**	**1,157,131**	**1,256,401**	**1,278,372**	**1,232,538**	**1,288,135**	**1,309,582**	**1,378,852**	**1,461,489**	**1,542,661**
Capital Costs																										
Incremental Wind	0	0	0	0	55,217	-4,185	63,150	97,643	114,337	121,382	123,199	122,182	119,629	123,978	111,819	117,171	117,789	115,841	112,503	117,123	103,251	109,153	118,998	106,780	110,015	45,435
Combustion Turbine & Combined Cycles	0	0	0	0	82,098	68,470	68,757	68,885	68,867	68,713	68,436	113,861	112,535	111,113	109,602	137,308	135,110	132,842	130,511	128,121	180,432	176,947	173,417	169,845	201,250	196,970
Total Capital Costs (k$)	**0**	**0**	**0**	**0**	**137,315**	**64,285**	**131,907**	**166,528**	**183,203**	**190,096**	**191,635**	**236,043**	**232,164**	**235,091**	**221,421**	**254,479**	**252,898**	**248,683**	**243,014**	**245,244**	**283,683**	**286,101**	**292,415**	**276,625**	**311,265**	**242,405**

Total Operating Cost NPV (k$)	$11,158,565
Total Capital Cost NPV (k$)	$1,922,137
Total Planning Period NPV (k$)	$13,080,702

* Imports and Exports over the NS-NB Tieline.

ML Base Load, Low Power & Gas Prices	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Total Unit Cost	407,536	422,161	411,907	313,973	320,138	330,892	351,767	356,680	367,376	376,342	386,610	396,431	407,285	417,485	429,504	420,208	432,469	445,236	462,681	482,531	492,580	507,745	528,789	546,969	563,144	577,933
Renewables IPPs	119,579	130,682	140,588	150,760	150,804	151,178	150,896	150,943	129,842	130,219	129,941	129,992	130,044	130,425	130,151	130,207	130,263	130,649	130,379	130,439	130,500	130,890	130,626	130,690	130,756	131,152
Maritime Link (Base Block and Supplemental)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports *	0	0	50,675	82,957	85,398	92,503	87,361	99,412	110,573	113,822	121,999	125,384	128,512	130,629	134,225	136,719	138,966	141,707	146,993	150,026	146,405	153,561	156,950	162,103	170,913	185,162
Total Operating Cost (k$)	**527,116**	**552,843**	**603,169**	**547,689**	**556,340**	**574,572**	**590,024**	**607,035**	**607,791**	**620,383**	**638,550**	**651,807**	**665,841**	**678,539**	**693,880**	**687,134**	**701,698**	**717,592**	**740,053**	**762,996**	**769,485**	**792,197**	**816,365**	**839,762**	**864,813**	**894,247**
Capital Costs																										
Maritime Link	0	0	22,033	155,703	160,477	151,105	155,948	146,514	143,824	141,413	139,011	146,145	135,823	147,261	146,988	145,738	153,641	142,802	141,185	139,471	137,673	146,337	133,855	131,858	129,802	127,698
Combined Cycles Units	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49,593	48,696	47,798	46,900	46,002	99,860	97,971	96,082	94,193	92,304	90,415
Total Capital Costs (k$)	**0**	**0**	**22,033**	**155,703**	**160,477**	**151,105**	**155,948**	**146,514**	**143,824**	**141,413**	**139,011**	**146,145**	**135,823**	**147,261**	**146,988**	**195,331**	**202,337**	**190,600**	**188,085**	**185,473**	**237,533**	**244,308**	**229,937**	**226,051**	**222,107**	**218,113**

Total Operating Cost NPV (k$)	$8,360,729
Total Capital Cost NPV (k$)	$1,745,566
Total Planning Period NPV (k$)	$10,106,295

* Imports over the NS-NB Tieline and surplus energy from Maritime Link

OI Base Load, Low Power & Gas Prices	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Total Unit Cost	407,536	422,161	407,417	286,254	294,017	308,258	324,548	334,340	337,590	353,167	352,629	354,178	362,626	380,062	386,933	413,333	419,363	441,137	423,480	441,285	459,805	477,782	495,302	503,591	510,707	525,894
Renewables IPPs	119,579	130,682	146,119	173,106	173,374	173,975	173,923	174,201	153,334	153,948	153,908	154,200	154,496	155,123	155,097	155,404	155,714	156,356	156,344	156,665	156,990	157,647	157,652	157,988	158,328	159,002
Other Import (Contract Energy)	0	0	15,955	65,988	70,830	76,639	81,298	86,975	89,650	91,710	93,300	95,178	97,094	99,319	101,041	103,074	105,148	107,557	109,421	111,622	113,867	116,476	118,492	120,875	123,306	126,129
Imports *	0	0	59,421	116,772	119,195	126,440	124,628	129,242	139,365	133,904	151,921	160,720	165,656	163,942	172,249	167,641	175,621	171,514	181,885	186,611	193,660	198,948	206,778	222,951	244,203	256,470
Total Operating Cost (k$)	**527,116**	**552,843**	**628,912**	**642,120**	**657,416**	**685,312**	**704,397**	**724,758**	**719,939**	**732,729**	**751,758**	**764,276**	**779,871**	**798,446**	**815,320**	**839,451**	**855,846**	**876,563**	**871,130**	**896,183**	**924,322**	**950,853**	**978,224**	**1,005,405**	**1,036,544**	**1,067,495**
Capital Costs																										
Other Import (Contract Energy)	0	0	8,118	56,906	57,450	57,845	58,103	58,234	58,249	58,158	57,968	57,687	57,324	56,883	56,373	55,797	55,162	54,471	53,731	52,944	52,114	51,245	50,340	49,401	48,432	47,435
Combustion Turbines & Combined Cycle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,997	14,007	13,751	13,495	65,868	64,660	63,451	62,243	61,034	59,826	58,617	57,409
Total Capital Costs (k$)	**0**	**0**	**8,118**	**56,906**	**57,450**	**57,845**	**58,103**	**58,234**	**58,249**	**58,158**	**57,968**	**57,687**	**57,324**	**56,883**	**63,369**	**69,804**	**68,913**	**67,967**	**119,599**	**117,604**	**115,565**	**113,488**	**111,374**	**109,227**	**107,050**	**104,844**

Total Operating Cost NPV (k$)	$9,662,832
Total Capital Cost NPV (k$)	$730,867
Total Planning Period NPV (k$)	$10,393,699

* Imports over the upgraded NS-NB Tieline.

Indigenous Wind Base Load, Low Power & Gas Prices	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Total Unit Cost	407,536	422,161	450,572	452,951	437,166	455,712	470,752	483,702	497,478	510,362	541,241	522,434	535,208	532,930	563,785	588,145	604,934	629,593	661,388	673,281	645,100	669,914	684,644	710,968	723,901	757,396
Renewables IPPs	119,579	130,682	140,588	150,760	165,759	166,431	166,454	166,813	146,029	146,730	146,782	147,170	147,566	150,398	150,523	150,986	151,458	152,268	152,430	155,296	155,856	156,753	159,515	160,157	160,814	161,810
Incremental Wind	0	0	0	0	1,527	1,563	1,588	1,620	1,653	1,692	1,719	1,754	1,789	2,028	2,061	2,102	2,145	2,196	2,231	2,497	2,547	2,607	2,884	2,942	3,001	3,072
Imports *	0	0	38,482	39,293	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Less Exports *	0	0	484	519	7,282	6,644	7,248	7,786	6,716	6,656	998	10,054	9,346	5,354	701	1,275	983	622	303	276	2,606	1,820	1,838	875	1,710	448
Total Operating Cost (k$)	**527,116**	**552,843**	**629,157**	**642,485**	**597,169**	**617,061**	**631,546**	**644,349**	**638,444**	**652,128**	**688,744**	**661,304**	**675,217**	**680,002**	**715,668**	**739,958**	**757,554**	**783,435**	**815,747**	**830,797**	**800,897**	**827,454**	**845,205**	**873,192**	**886,007**	**921,831**
Capital Costs																										
Incremental Wind	0	0	0	0	55,217	-4,185	63,150	97,643	114,337	121,382	123,199	122,182	119,629	123,978	111,819	117,171	117,789	115,841	112,503	117,123	103,251	109,153	118,998	106,780	110,015	45,435
Combustion Turbine & Combined Cycles	0	0	0	0	82,098	68,470	68,757	68,885	68,867	68,713	68,436	113,861	112,535	111,113	109,602	137,308	135,110	132,842	130,511	128,121	180,432	176,947	173,417	169,845	201,250	196,970
Total Capital Costs (k$)	**0**	**0**	**0**	**0**	**137,315**	**64,285**	**131,907**	**166,528**	**183,203**	**190,096**	**191,635**	**236,043**	**232,164**	**235,091**	**221,421**	**254,479**	**252,898**	**248,683**	**243,014**	**245,244**	**283,683**	**286,101**	**292,415**	**276,625**	**311,265**	**242,405**

Total Operating Cost NPV (k$)	$8,809,017
Total Capital Cost NPV (k$)	$1,922,137
Total Planning Period NPV (k$)	$10,731,153

* Imports and Exports over the NS-NB Tieline.

Request IR-17:

Reference: NSPML Interim Cost Assessment Application, Appendix B, Direct Evidence of John J. Reed, December 16, 2016. Page 20, lines 18-20.

(a) Mr. Reed states that "The benefits will be deferred and elongated, but the benefits, and the ML Project costs, should be at least as favorable as they ever were." The benefits of the ML Project and the NS Block are represented as cost streams into the future, which are discounted to present value. Did Mr. Reed attempt to calculate a new NPV that reflects the new start date for the NS Block?

(b) If so, please provide the supporting spreadsheets (with original formulas intact) associated with that calculation.

(c) Does Mr. Reed agree that benefits accruing in the present day should not have the same value as benefits that would accrue at some date in the future?

(d) If yes, what is the basis for Mr. Reed's statement that "the benefits…should be at least as favorable as they ever were"?

Response IR-17:

(a) No. That analysis has not been undertaken by Mr. Reed.

(b) Not applicable.

(c) No, not necessarily. That is dependent upon the discount rate used, and the rate at which the value of the output increases. If the discount rate matches the escalation rate for the value of the power, then the present value of the benefits does not increase or decrease as a result of a delay in the availability of the output.

(d) Not applicable.

Request IR-18:

Reference: NSPML Interim Cost Assessment Application, Appendix B, Direct Evidence of John J. Reed, December 16, 2016. Page 21, lines 15-20. Mr. Reed states "For the reasons outlined above, a two-year deferral of the delivery of the Nova Scotia Block power can reasonably be expected to move these deliveries to a period when they are more needed and more valuable. While this does cause a modest increase in the level of front-end cost loading for the ML Project, it is not that large, and is not harmful when the ML Project is viewed over its entire life".

(a) What is the quantitative value of the "modest increase"?

(b) If the delay in the delivery of the Nova Scotia Block power was greater than two years but less than four years, would Mr. Reed be of the same opinion?

(c) If the delay in the delivery of the Nova Scotia Block power was five years or greater, would Mr. Reed be of the same opinion?

(d) Does Mr. Reed's answer to any of the above questions (a through c) depend at all on the delay that might be associated with the Supplemental Block, and the surplus energy, in addition to the NS Block itself?

Response IR-18:

(a) Neither Mr. Reed nor NSPML has quantified this amount beyond the representations of costs included in this filing.

(b) Mr. Reed has not undertaken an analysis of this hypothetical scenario. It is impossible to know whether future energy prices will make the deferred power available under the

NS Block more valuable, or less valuable, than its value would have been under the original delivery schedule. It is possible that the deferral could make the power available in a timeframe when the alternatives are significantly more expensive than they are today, making the relative value of the NS Block power higher. Whether the value in present value terms is higher or lower than originally expected is dependent upon the discount rate used, and the rate at which the value of the output increases. For example, if the discount rate matches the escalation rate for the value of the power, then the present value of the benefits does not increase or decrease as a result of a delay in the availability of the output. If the discount rate is significantly higher than the escalation rate, the deferral reduces the present value of the benefits, and vice versa.

(c) See the response to part (b).

(d) Yes, since these other elements of the Project also affect the magnitude of the benefits of the Project.

Request IR-19:

Reference: NSPML Interim Cost Assessment Application Supplementary Evidence, February 15, 2017. Page 4, lines 30-31

(a) Please explain how NSPML defined "benefits" for the 2018-2019 period and for other periods, as they relate to the Maritime Link project in the 2013 original Maritime Link docket.

(b) Is that different from the way that "benefits" are being defined in this docket, for either the 2018-2019 period or any other period?

(c) If so, how?

(d) Are the benefits claimed in the Supplementary Evidence Application of February 15, 2017 (page 4, line 31) considered as additional benefits to those benefits associated with NS Block, Supplemental Energy, and Surplus energy from the original Maritime Link approval? Please explain.

Response IR-19:

(a-d) NS Power performed a discrete analysis to calculate the benefits in NSPML Interim Cost Assessment Application Supplementary Evidence, Confidential Appendix B. The analysis assumed that the NS and Supplemental Blocks associated with the Maritime Link proceeding produced by the Lower Churchill Falls Project were deferred in 2018 and 2019. The modelled benefits in Appendix B are incremental to the benefits from the 2013 Application.

The initial Maritime Link Application in 2013 was a contemporaneous comparison between alternatives to meet Nova Scotia's Renewable Energy Standard. The Maritime

Link Application compared the cost of the Maritime Link to two alternatives that would also allow NS Power to meet its Renewable Energy Standard – indigenous wind and other import. In its November 29, 2013, Decision, the UARB approved the Maritime Link Project with a capital cost of $1.52 billion and a variance not to exceed $60 million. The benefits in Appendix B are incremental to the 35-year clean energy and capacity supply.

The comparison used to show the benefit of the Maritime Link in the initial Application was an alternative analysis performed in Strategist to juxtapose the Maritime Link to other RES compliance options. The analysis presented in Appendix B was performed in Plexos and shows the total achievable value of the energy sales and ancillary services described in the Appendix.

Request IR-20:

Reference: NSPML Interim Cost Assessment Application Supplementary Evidence, February 15, 2017. Page 8, lines 8-23.

(a) Are the benefits identified here the same as those detailed in Confidential Appendix B?

(b) If not:

(i) Please provide a description of the methodology used by NS Power to quantify the potential benefits identified on page 8, lines 12-18: 1) exported energy to Newfoundland and Labrador; 2) imported energy from Newfoundland and Labrador; 3) optimization of NS Power generation assets; and 4) enhanced reliability.

(ii) Please provide the assumptions used in NS Power's quantification of benefits identified on page 8, lines 12-18. This includes, but is not limited to: assumptions about the annual, monthly, and/or on-peak periods over which energy will flow, either as an import or export; life of the asset; discount rate; inflation rate; additional capital requirements, etc.

(iii) Please provide the results of any modeling analysis performed by NS Power to quantify the benefits identified on page 8, lines 12-18.

(iv) Please provide the annual output values from modeling used to calculate NPV.

(v) Please provide all supporting spreadsheets (with original excel formulas intact) and other documents underlying the computation of the net present value of the potential benefits stated above.

Response IR-20:

(a-b) Yes. The benefits described here are the same as the benefits listed in NSPML Interim Cost Assessment Application Supplementary Evidence, Confidential Appendix B. Please refer to Industrial Group IR-12.

Synapse IR-21 has been removed due to confidentiality.

Request IR-22:

Reference: NSPML Interim Cost Assessment Application Supplementary Evidence, February 15, 2017. Page 11, lines 5-8.

(a) Please provide the "estimated quantification of the potential benefits of exported energy to Newfoundland and Labrador.

(b) Please provide all supporting spreadsheets (with original excel formulas intact) and other documents underlying the computation of the benefits of exported energy.

Response IR-22:

(a-b) Please refer to CA IR-11 Confidential Attachment 1 for the details of the net benefit calculations.

Request IR-23:

Reference: NSPML Interim Cost Assessment Application Supplementary Evidence, February 15, 2017. Page 5, lines 1-3.

(a) Concerning the two-year delay in the start of the Nova Scotia Block, is it likely that the delay will also mean that reserve capacity for the winter period 2019/2020 will exclude the 153 MW capacity from the NS Block?

Response IR-23:

(a) The 153 MW of capacity to be delivered on the Maritime Link is associated with the NS Block. Delay in the NS Block will result in a delay of this 153 MW of capacity; however, with the Labrador-Island Link and the Labrador Transmission Assets to Churchill Falls in service along with the first units at Muskrat Falls, it is possible that capacity could be available in winter 2019-20.

Request IR-24:

Reference: NSPML Interim Cost Assessment Application Supplementary Evidence, Partially Confidential Appendix C, February 15, 2017, page 5, the current forecast of in-service for the Maritime Link is December 31, 2017.

(a) What is the current forecast for the timing and quantity of energy flows from the ML Project to Nova Scotia?

(b) Please provide information on the expected peak and off-peak quantities per month from the date of first energy flows to the date of full flows for the NS Block and Supplemental energy.

Response IR-24:

(a) Please refer to MPA IR-15.

(b) Please refer to Industrial Group IR-12 Confidential Attachment 4.

Request IR-25:

Reference: NSPML Interim Cost Assessment Application. December 16, 2016. Appendix B. Direct Evidence of John J. Reed. Pages 7-12.

(a) Please provide citations for all dockets reviewed by Mr. Reed in preparing his testimony.

(b) Is Mr. Reed aware of any U.S. or Canadian board or commission decision denying a utility cost recovery for an investment because it was determined to not be "used and useful" after a delayed in-service date? If so, please provide citations to such dockets and note if they were reviewed in preparation of Mr. Reed's testimony.

(c) Is Mr. Reed aware of any U.S. or Canadian board or commission decision granting a utility partial cost recovery for an investment because it was determined to not be "used and useful" after a delayed in-service date? If so, please provide citations to such dockets and note if they were reviewed in preparation of Mr. Reed's testimony.

(d) Is Mr. Reed aware of any U.S. or Canadian board or commission decision denying a utility cost recovery for an investment for other reasons (besides the "used and useful" standard) after a delayed in-service date? If so, please provide citations to such dockets and note if they were reviewed in preparation of Mr. Reed's testimony.

(e) **Is Mr. Reed aware of any U.S. or Canadian board or commission decision granting a utility partial cost recovery for an investment for other reasons (besides the "used and useful" standard) after a delayed in-service date? If so, please provide citations to such dockets and note if they were reviewed in preparation of Mr. Reed's testimony.**

Response IR-25:

(a) Please see the list of other dockets that Mr. Reed reviewed in preparing his evidence:

- Texas Administrative Code, Title 16. Economic Regulation, Part 2, Public Utility Commission of Texas, Chapter 25. Substantive Rules Applicable to Electric Service Providers, Subchapter J Costs, Rates and Tariffs, Division 1. Retail Rates.
- West's Tennessee Code Annotated, Title 56. Insurance, Chapter 3. Operation of Insurance Companies, Part 4 Investments of Other Domestic Insurance Companies.
- 220 ILCS 5/9-212, 5/9-212. New plant or facility or significant addition; inclusion in rate base.
- Minnesota Statutes Annotated, Utilities (Ch. 216-216h), Chapter 216B Public Utilities, Rate Hearings, June 2, 2016.
- 23 ILL. Adm. Code 2720.10, 2720.10 Eligibility for ISAC Loan Guarantees.
- 516 Pa. 142, Supreme Court of Pennsylvania, David M. Barasch, Consumer Advocate v. Pennsylvania Public Utility Commission, October 15, 1987.
- 1994 WL 794132 (La.P.S.C) Slip Copy, Louisiana Public Service Commission, Docket No. U-17735, Order No. U-17735-E, December 16, 1994.
- In the Matter of the Public Utilities Act and In the Matter of an Application by Nova Scotia Power Incorporated for Approval of its Annual Capital Expenditure Plan for 2013, 2013 NSUARB 106, No M05339, Decision May 27, 2013.
- In the Matter of the Public Utilities Act and In the Matter of an Application by Nova Scotia Power Incorporated for Approval of its Annual Capital Expenditure Plan for 2014, 2014 NSUARB 91, No. M05998, Decision June 3, 2014.
- 58 Ohio St. 2nd 449, Supreme Court of Ohio, Office of Consumer's Counsel, Appellant v. Public Utilities Commission of Ohio et al., Appellees, No. 78-1238, June 27, 1979.
- 153 S.W. 3d 174, Court of Appeals of Texas, Austin, Reliant Energy Incorporated v. Public Utility Commission of Texas, No. 03-02-00246-CV, December 16, 2004.

- 769 P.2d 1058, Supreme Court of Colorado, En Banc., Irma L Schaerrer, Petitioner, v. Westman Commission Company, Respondent, No. 87SC315, February 27, 1989.
- 36.051, Establishing Overall Revenues, TX UTIL 36.051.

(b) No, Mr. Reed is not aware of any case in which all cost recovery for a project was denied because the project was delayed. Notably, the Maritime Link Project has not been delayed, and will be in service and used and useful on January 1, 2018.

(c) No, Mr. Reed is not aware of any project that was granted partial cost recovery by a regulator upon a finding that the project was not used and useful due to a delay in the project. As noted above, the Maritime Link Project has not been delayed, and will be in service and used and useful on January 1, 2018.

(d) Yes, Mr. Reed is aware of many regulatory decisions in which the utility was denied cost recovery for other reasons, after the project was delayed. Most often, this result applied after a project was cancelled, making this example irrelevant so the data requested has not been compiled. The regulatory treatment of cancelled plant costs is a topic that has been extensively litigated in the U.S. and Canada over the past 40 years.

(e) Yes, as described in the response to part (d), Mr. Reed is aware of many such cases involving cancelled plants. Mr. Reed has not compiled a list of such cases, but he notes that some are cited in response to part (a), and that the Kansas Corporation Commission's decisions in the Wolf Creek prudence cases in the 1980s are also examples of such decisions.

Request IR-26:

Reference: NSPML Interim Cost Assessment Application. December 16, 2016. Appendix B. Direct Evidence of John J. Reed. Page 14, lines 21-24.

(a) Please provide supporting documentation for the claim that "the concept of used and useful should apply to the transmission project itself, not the broader undertaking of the development of Muskrat Falls or other upstream or downstream activities over which NSPML has no control."

(b) Please define the Maritime Link Project ("ML project") as Mr. Reed understands it. Does it only include "the transmission project itself" mentioned above or does it also include the development of Muskrat Falls?

(c) Does the cost recovery proposed by NSPML and supported by Mr. Reed in this proceeding only include the "transmission project itself"? If not, what other projects are included?

(d) Please provide supporting documentation for the claim that if the used and useful "principle is applied to the transmission project" then "it is reasonable to conclude that the ML Project will be used and useful at that time."

Response IR-26:

Concentric assumes that the intended reference in the question is to Page 16 of 24 of Appendix B of NSPML's Interim Cost Assessment Application (Exhibit N-1) where the quoted passage appears at lines 21-24. That passage, in full, reads as follows:

> If the Board concludes that the used and useful principle should be taken into consideration, the concept of used and useful should apply to the transmission project itself, not the broader undertaking of the development of Muskrat Falls or other upstream or downstream activities over which NSPML has no control. If that principle is applied to the transmission project as it is reasonably expected to stand in 2018, it is reasonable to conclude that the ML Project will be used and useful at that time.

(a) The cited passage is Mr. Reed's expert opinion. The principles and factors considered by Mr. Reed in support of that opinion are explained at length in his evidence as filed herein. There is also a footnote to the cited passage, which refers to Section 2.2.2 of the NS Power Reply Evidence and Fuel Refresh, May 27, 2016, for a discussion of the benefits to customers from the Maritime Link. Those benefits are further detailed and quantified in NSPML's evidence and supplementary evidence filed herein.

Please refer also to Page 12 of 24 in Appendix B to NSPML's Interim Cost Assessment Application, lines 9-13, and the regulatory decisions cited therein.

(b) Please refer to the response to Synapse IR-14(a).

(c) Please refer to the response to Synapse IR-14(a).

(d) Please refer to the response to (a) above.

Request IR-27:

Reference: NSPML Interim Cost Assessment Application, Supplemental Evidence. February 15, 2017. Page 12, lines 3-5.

(a) Please provide the date that NSPML was notified of the "expected delay in delivery."

(b) Please provide all documentation and analyses of the costs and benefits of delaying the NS Block conducted by or for NSPML—including all supporting spreadsheets (with original excel formulas intact).

Response IR-27:

(a) Please refer to NSUARB IR-55(a).

(b) Please refer to Synapse IR-1.

Request IR-28:

Reference: NSPML Interim Cost Assessment Application, Supplemental Evidence. February 15, 2017. Page 16, lines 1-3, "Cost of ML Delay" table.

(a) Please provide all supporting spreadsheets (with original excel formulas intact) and other documents underlying the data in the "costs of delay" table.

(b) Please a breakdown of the data by month.

Response IR-28:

(a-b) Please refer to NSUARB IR-53 Partially Confidential Attachment 1. Costs were forecasted on a quarterly basis.

Request IR-29:

Reference: NSPML Interim Cost Assessment Application, Supplemental Evidence. February 15, 2017. Page 23, lines 22-27.

(a) Please provide NSPML's projected cash flow, income statements and balance sheets for as many years as available.

(b) Please provide the minimum annual revenues required to maintain NSPML's DSCR covenant.

Response IR-29:

(a) Please refer to NSUARB IR-32(e).

(b) The ML Credit Agreement requires that, after the Commissioning Date, NSPML is to maintain both a Prospective and Retrospective Debt Service Reserve Account (DSRA) of at least 1.40.

As noted in the reply to NSUARB IR-69, pursuant to the ML Credit Agreement, the DSCR is calculated as: Base Cash Flow divided by Total Debt Service.

Base Cash Flow is defined as Liquidity Reserves (if any) plus Maritime Link Project Revenues less all Cash Operating Costs.

Total Debt Service is essentially defined to include all interest and scheduled principal payments.

Liquidity Reserves are effectively funds held on deposit in a segregated account which is different from the DSCR.

Maritime Link Project Revenues is defined as "revenues collected from Nova Scotia Power Inc. under the cost-recovery framework imposed by the Nova Scotia Utility and Review Board."

The total minimum to satisfy these requirements for 2018 and 2019 is calculated below:

$ Millions	**2018**	**2019**
Total Debt Service (coupon interest in 2018 and 2019)	45.5	45.5
	x 1.4	x 1.4
Minimum Base Cash Flow	63.7	63.7
Since Base Cash Flow is defined as ML Project Revenues less Cash Operating Costs, the minimum requirements would need to first cover the O&M Costs. Therefore, the minimum cash requirement would have to be no lower than the minimum Base Cash Flow plus O&M costs. <u>Minimum Cash Requirement</u> * Minimum Base Cash Flow Forecasted Cash Operating Costs	 63.7 14.0	 63.7 18.0
Minimum Cash Requirement *	77.7	81.7

NSPML's view is that the minimum cash requirements will be met through collection of Maritime Link Project Revenues and not via the Liquidity Reserve Account which is not an economic or practical means to achieve the DSCR requirement given it will be required to funded with equity and the shareholder should be able to a reasonable rate of return on its investment.

Please refer to NSUARB IR-9(e) which addresses risks of using the DSCR to set rates.

Request IR-30:

Reference: NSPML Interim Cost Assessment Application, Supplemental Evidence. February 15, 2017. Appendix C (Partially Confidential).

(a) Please provide all supporting spreadsheets (with original excel formulas intact), other documents, and all source workpapers underlying the responses provided.

(b) Please provide the data shown in tables for every year of the Project's useful life (or the most years available)—including all supporting spreadsheets (with original excel formulas intact).

(c) Given the 20 for 20 principle noted in footnote 15 of the Application, please provide a breakdown for each of the listed items in response to (a) and (b) indicating the proportions that are tied to each component of the ML Project: the energy and capacity transactions for power from Muskrat Falls, and each of the major transmission components required to complete delivery of ML Project energy to Nova Scotia.

Response IR-30:

(a) Please refer to NSUARB IR-32(e).

(b) Please refer to NSUARB IR-32(e).

(c) Please refer to Synapse IR-9(c).

Synapse IR-31 has been removed due to confidentiality.