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Synapse Energy Economics, Inc.

Synapse Energy Economics Supplemental Submission – August 24, 2026

UE20742 – Supplemental Capital Budget Request for MECL's On-Island Capacity for Security of Supply Project

Introduction

On April 9, 2026, Synapse submitted its Final Report on the On-Island Capacity Supply for Maritime Electric Company, Ltd. (MECL) on Prince Edward Island. The report addressed MECL's December 18, 2024 Application for on-island capacity supply, related Sargent and Lundy (S&L) reports which were appended to the Application, and interrogatory response material provided by MECL and other parties in this docket.

The report analyzed the materials submitted by MECL and recommended to the Island Regulatory and Appeals Commission that MECL's request for capital cost approval of the ProEnergy CT project be denied, pending a more comprehensive analysis of cost of a battery alternative to the CT project. The summary findings of our Final Report recognized the importance of on-island wind energy and the ability for a battery energy storage system (BESS) to reduce the effective cost of energy through "time shifting" of procurement or utilization of on-island wind energy. The underlying basis for our recommendation was the likely lower cost of a capacity alternative to the 100 MW CT project.

On July 24, 2026, MECL filed an updated set of net present value (NPV) analyses of five portfolio options to address on-island capacity concerns, and a reliability report authored by E3,[1] as part of its response to Commission Staff interrogatories. MECL supports a change to the overall framework of system capacity and resource adequacy accounting,[2] and its July 2026 submittal reflects a major refinement to its previous underlying analyses.

The updated NPV analyses contain five new portfolios, three of which are inclusive of the ProEnergy 100 MW CT alternative. Of the remaining two portfolios analyzed, one contains a 50 MW CT and 300 MW of batteries, and one contains solely 540 MW of batteries.

None of the newly analyzed portfolios contain any on-island incremental wind, solar PV, or demand response; and MECL's portfolios composition are based on an overall capacity need which also excludes the effect of an incremental 15 MW of firm capacity (i.e., roughly 14.5 MW of "perfect" capacity considering loss effects) now available from New Brunswick

[1] Energy and Environmental Economics (E3), *Maritime Electric Resource Adequacy Study, Determining 2030 System Needs and Evaluating Effective Load Carrying Capability*. July 2026.
[2] MECL submission, August 5, 2026, e.g., page 2, page 4.

and directly considered in MECL's updated Capacity Resource Adequacy Assessment table.[3] With reported marginal ELCCs[4] for resource options that range from less than 10% to 86%, a reduction in firm capacity need because of the increased New Brunswick import has a substantive and material effect on the makeup of resource combinations in portfolio options to meet the capacity need.[5]

MECL has updated various input assumptions and has considered the results from E3's report in its revised NPV analysis.

This abbreviated supplemental filing addresses the essential effect of MECL's July 2026 filings and August 2026 IR response submittals on the analyses, conclusions and recommendations in our April 2026 Final Report. It contains an initial assessment of the updated NPV analyses and the reported change in the reliability and capacity accounting framework from that reflected in MECL's December 2024 Application (i.e., installed capacity (ICAP) accounting and a 15% planning reserve margin above peak load) to the "Critical Periods" and "perfect capacity (PCAP)" framework contained in the E3 report.[6]

The scope of this supplement to Synapse's April 2026 Final Report is necessarily limited given the time available prior to the August 25-27, 2026 hearing.

Summary Comments

MECL's updated NPV analysis is not sufficiently comprehensive to support its claim that the ProEnergy 100 MW CT project is part of a least cost resource portfolio to meet capacity needs. It omits analysis of potential least-cost combinations of on-island capacity resources with relatively higher initial marginal ELCC values, does not consider final interactive effects from a full portfolio, and relies on ELCC modeling results that still require further, final iterative assessment to ensure that any given portfolio is "comparable" to other portfolios in respect of total "portfolio ELCC" or system reliability. For that reason,

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[3] MECL response to Commission Staff IR-47 identifies "NB firm capacity purchases" of 205 MW beginning in 2029 and extending through 2035. Notably, MECL's updated table contains just a single category of NB Power firm capacity purchases. In the original December 2024 Application (Table 10, page 45) MECL includes a separate row for short-term capacity purchases. In Table 17 (page 77) of that Application, MECL lists additional short-term purchase amounts under a "maximizing interconnection transfer capacity of 270 MW" of 51 MW through 2033.
[4] E3 report page 10.
[5] For example, an increase of 15 MW in firm capacity import from New Brunswick implies a reduction of (15/.75) = 20 MW if allocated to the CT project, or a reduction of roughly 32 MW (15/.047) if allocated to a 4-hour BESS project of 85 MW. This illustrates the importance of marginally increased firm capacity import availability to the analysis of portfolio options for remaining on-island capacity needs.
[6] E3 report, Appendix B, page 66.

Synapse continues to recommend denial of MECL's request for approval of the ProEnergy project.

While a number of the underlying assumptions used in both MECL's initial analyses and Synapse's analysis in our April 2026 Final Report require revisiting in part due to the E3 ELCC analysis and in part due to ongoing market changes, the overall thrust of Synapse's recommendations and the rationale behind them remains the same.

While E3 did not conduct an economic analysis of portfolio options,[7] in response to IR-1e E3 directly stated that any economic analysis of potential portfolios to meet a capacity need

> "...should consider an appropriate range of realistically available resource options, along with their costs and performance characteristics, to ensure that the least-cost portfolio is identified".

A reasonable set of resources to include (in different combinations) when identifying least-cost portfolio options to meet a capacity need are:

- increments of battery storage,
- increments of new wind (and potentially solar PV) resources,
- increments of demand response resources,
- additional New Brunswick firm import capacity,
- increments of the 50 MW CT (unit size) alternative, and
- increments of smaller-scale fossil-fueled capacity (such as RICE units).

New wind resources must be explicitly included because they provide effective capacity increases (however small) and, critically, can provide lower-cost energy for battery charging compared to the alternative of solely additional New Brunswick import energy. The presence of new on-island wind complements the presence and hourly availability of New Brunswick non-firm energy as a charging source for the battery. It is the combination of energy and battery energy storage capacity that provides effective capacity, not the battery alone.

MECL has excluded any new wind, demand response, and New Brunswick firm import capacity in its NPV cost analyses of portfolios (1 through 10) to meet the overall need. The on-island capacity need, which is a subset of this overall need, is comprised of all but the additional firm New Brunswick import capacity, but the availability of the New Brunswick increment must first be factored into the overall need seen in the E3 study.

[7] E3 response to IR-1a.

MECL did not attempt to "optimize" or seek a least-cost combination considering resource mixes beyond its self-selected set of 10 portfolios.

At a minimum, MECL should have considered the first increments of battery energy storage (which contain relatively high ELCC values), wind energy options, and how both incremental NB imports and incremental demand response would help to lower the residual capacity need required from a combination of new fossil, BESS and wind resources.

Considering the ELCC capacity cost per kW for the initial tranches of battery energy storage systems illuminates this point. MECL provides an ELCC capacity cost per unit comparison across BESS resources,[8] though they omit RICE and CT options in the table and use a higher multiplier for the cost for 8-hour battery resources than that used by Synapse. Below is a revision to that table.

Table 1. Per Unit ELCC Capacity Cost Comparison

	ProEnergy CT 100 MW	RICE 40 MW	50 MW 4-Hr BESS first tranche	50 MW 8-Hr BESS (MECL cost estimate*) first tranche	50 MW 8-Hr BESS (Synapse cost estimate)** first tranche
Installed Cost	$353 million	$172 million	$117 million	$201 million	$187 million
ELCC (E3)	75 MW (75%)	34 MW (86%)	29 MW (58%)	39 MW (78%)	39 MW (78%)
$/kW ELCC	$4,712/kW	$5,009/kW	$4,024/kW	$5,147/kW	$4,787/kW

Notes:
** Ratio of 8-hr to 4-hr battery cost of 1.72 from MECL, Table 3, page 10, IR-54 Attachment 1*
***Ratio of 8-hr to 4-hr battery cost of 1.6 from NS IRP current cost assumptions, see Attachment 1 to this supplemental filing.*

A full comparison across BESS, CT, and RICE resources, including alternative estimations of the relative cost between a 4-hour and an 8-hour BESS resource indicates that all of these capacity options are relatively close in dollar-per-effective capacity costs. This implies that a more careful analysis of combinations is necessary to identify a least-cost combination. Additional reliability modeling would also be necessary to fully gauge the relative reliability for any given combination, including existing and new resources.

[8] MECL response to IR-54 – Attachment 1, Portfolio NPV Study, page 10.

E3 Study and MECL Application

E3's ELCC study usefully analyzes the reliability contribution of new resource types on PEI. The underlying "critical period" framework for reliability assessment is reasonable, and as noted by E3 in Appendix A to its report and elsewhere,[9] has been or is in the process of being used in many jurisdictions in North America.

However, as E3 notes, "...the same qualities that make ELCC the most robust method for measuring capacity contribution also make it a complex method to apply".[10] We agree, in respect of applying this information to modeling exercises; and we would add that it is also complex to use the modeling results appropriately when considering resource procurements.

For example, in combination,

i) the distinctions between "marginal ELCC" for individual resources, and cumulative ELCC for the total group of resources;

ii) the differences between an overall portfolio ELCC,[11] and the cumulative ELCC of combinations of a subset of overall resources;

iii) the nature of "interactive effects";[12] and

iv) the need to check the overall reliability of a final portfolio, to ensure that it meets (but does not fall short or exceed) the target reliability value after combining the existing and new capacity in the portfolio[13]

can lead to misapplication of modeling results when defining procurement needs.

Based on our review thus far, it is our opinion that MECL has misapplied the results of the ELCC modeling by not addressing any additional interactive effects that would arise from a total portfolio including additional new capacity, and also by excluding the effect that increased NB import capacity would have on the residual or resulting on-island need. MECL also does not include any incremental benefit from demand response resources. E3's "perfect shortall" analysis includes only the effect of 14 MW of interruptible load in reducing the peak load.[14]

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[9] E3, https://www.esig.energy/attachment/serve/2026-03-18-olson-esig-elcc-surface. Slide 9.
[10] E3 report, page 73.
[11] Such as the 306 MW seen in Table 5-2 representing MELC's existing "perfect" capacity resources, which is inclusive of both off-island and on-island resources.
[12] E3 report, Appendix B, Figure B-2 and the text on page 72.
[13] This was not a part of the modeling work for MECL. See response to IR-2e.
[14] E3 report page 9.

These concerns about how MECL has applied the E3 modeling results are separate from our main concern with MECL's Portfolio NPV analysis that the set of portfolio options considered by MECL does not include reasonable combinations of resources to form an alternative portfolio.

The specific modeling conducted by E3 for MECL is not a comprehensive assessment of the reliability of the limited set of portfolios selected for review by MECL. E3 confirms that it did not calculate the overall reliability, or level of loss-of-load expectation (LOLE) of the ten considered portfolios.[15] It assessed the overall ELCC of the existing resources of MECL (306 MW of perfect capacity),[16] and it assessed the marginal ELCC value for different combinations of resources that could meet the reported shortfall of 115 MW of "perfect capacity".

However, E3 did not conduct any final iterative processes to check the relative reliability of total MECL portfolios,[17] and to ascertain the final "interactive effects" that would be present in any given portfolio. A final iterative step would serve as a crucial step on the overall accuracy of the marginal ELCC estimates which resulted from the E3 runs of the RECAP model that gave rise to the estimates seen in Section 5 of the E3 report. It would reveal the extent to which the portfolios are comparable (i.e., exhibit similar or the same level of reliability as expressed in an LOLE value or a portfolio ELCC), or if they require adjustment to ensure they don't overshoot or undershoot the reliability target – or if they do, it is by the same amounts - to ensure a comparable economic (cost) assessment across the portfolios.

In addition to testing other resource combinations, additional modeling of the ten portfolios selected by MECL is necessary to confirm the extent to which those full portfolios, consisting of both the new resources and the existing set of MECL resources (and planned NB imports), meet the reliability targets that underly the overall computation of capacity need (E3's "Total Reliability Need").

Further Discussion: MECL NPV Economic Analyses Exclude Key Portfolio Combinations, Exclude Critical Energy Effects

The portfolio options (1 through 10) ultimately listed by E3 (Table 5-6) and addressed by MECL in its NPV analyses are limited to a subset of alternatives which unreasonably

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[15] See response to IR-2e.
[16] E3 report, pages 9, 42-43.
[17] See response to IR-2e.

exclude on-island energy alternatives in combination with BESS. BESS works only in combination with energy resources, and any consideration of BESS as a capacity alternative, or as part of a portfolio of resources providing capacity should include energy considerations in an economic analysis. This especially includes incremental wind energy (but also includes incremental solar PV) on PEI.

The portfolio options in MECL's NPV analyses do not directly address the way in which any new demand response initiatives able to be in place by 2030 affect capacity need considerations.

Any new on-island wind energy that is less expensive than non-firm (or firm) energy otherwise imported from New Brunswick would not only provide lower cost energy but would synergistically improve the effectiveness of BESS resources that require charging energy. It would also support PEI sustainability objectives over the longer term. The anticipated updated MECL Integrated System Plan would address this and should be a critical complement to the capacity analyses MECL has supported in this docket.

MECL excludes further analysis of 8-hour BESS options (portfolio # 6-10 from E3) because its per-unit costs are higher,[18] without addressing the 8-hour resource's increased ability to address reliability considerations and work in concert with any new wind energy on PEI.

Examining incremental BESS in isolation from incremental on-island energy is concerning. One of the core reasons to consider BESS is that it enables energy – either existing wind, existing non-firm NB imports,[19] or new wind - to be provided during times of need. The energy sufficiency issues – saturation, wind droughts, availability of non-firm from NB, the need for new energy resources as load increases – are intrinsic to any assessment of BESS as part of a capacity addition. MECL has not treated new energy resources as intrinsic to its capacity need assessment.

Specifically, increased wind energy reduces the amount of energy imported through New Brunswick Energy Marketing, likely reducing costs;[20] improves the overall ELCC otherwise associated with battery energy storage systems, and contributes incremental ELCC value itself. None of the portfolios analyzed by MECL evaluated these synergies.

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[18] MECL, response to Commission Staff IR-54, Attachment 1, pages 10-11.

[19] In theory, especially if New Brunswick re-considers the full firm interconnection capacity of the existing tie, the non-firm energy import constraint used in E3's modeling (48 MW maximum as long as MECL load is below 304 MW, E3 report page 37) could also be updated, potentially allowing for more non-firm energy import and affecting the marginal ELCC computations for the BESS if energy insufficiency was the constraining factor.

[20] A critical aspect of the forthcoming Integrated System Plan update should be a clear assessment of the relative costs of energy from on-island vs. off-island resources; and how the presence of a BESS system that changes the profile of needed procurement influences comparative source costs.

While E3 evaluated the marginal ELCC of a 4-hour system BESS system with 100 MW of wind (Table 5-5 and Figure 5-8, E3 report pages 50-51), E3 did not evaluate a 6-hour or 8-hour BESS system with wind and did not report ELCC information for these combinations. Given the ongoing declining cost trends for 8-hour BESS resources and the notably improved ELCC effects of 8-hour BESS resources vs. 4-hour BESS resources, this is a notable shortcoming of the E3 work. Crucially, MECL did not conduct an NPV evaluation of any alternatives consisting of both BESS and wind.

Market Costs for BESS Resources

MECL updated its cost projection for the ProEnergy 100 MW CT project in April of 2026. MECL has not further updated the estimates for battery energy storage cost alternatives. While the results of the PEIEC battery energy storage resource RFP are not publicly available, there are two pieces of recent evidence that demonstrate battery energy storage costs continue to decline and could be lower than the values used in MECL's (and Synapse's) analyses.

The evidence in support of considering lower battery energy storage prices in the NPV calculations for combinations of resources including BESS are the results of the recent Ontario capacity auctions, and (relatedly) the change in BESS costs currently under consideration in the Nova Scotia 2026 IRP process. While the direct costs for BESS on PEI are not likely to be the same as the costs in either of those jurisdictions, these recent developments indicate that storage cost decline trends, which are market based, are material. Attachment 1 to these supplemental comments is a publicly available slide deck from the Nova Scotia Independent System Operator that contains the planned BESS cost assumptions to be used in the current IRP proceeding in Nova Scotia. It illustrates the recent continuing cost declines in this market space.

Illustration of Alternative Portfolios

Table 2 below provides an illustration of how consideration of other portfolios affects one aspect (new build cost) of the overall cost comparison across options.

Table 2. Illustration of First Cost of Alternative Portfolio Combinations

Incremental Nameplate MW	Project P2	Project CT only	P11	P12	P13	P14	P15	P16
Project CT	100	100						
On-island wind			100	100	100	100	100	100
8-Hour BESS					50	50	100	100
4-Hour bess	9		50	100				
RICE	40		40	40	40	40	20	20
DR	3	3	3	3	3	3	3	3
NB firm	15	15	15	15	15	15	15	15
Total Nameplate Excl DR, NB	149	100	190	240	190	190	220	220
Marginal ELCC for Amount Listed Above								
Project CT	75.0%	75.0%						
Wind			6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
8-Hour BESS			77.4%		77.4%	77.4%	64.4%	64.4%
4-hour BESS	67.2%		56.3%	45.6%				
RICE	86.0%	86.0%	86.0%	86.0%	86.0%	86.0%	86.0%	86.0%
DR	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
NB firm	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%
Perfect Capacity MW								
Project CT	75.0	75.0						
Wind			6.0	6.0	6.0	6.0	6.0	6.0
8-Hour BESS			0.0	0.0	38.7	38.7	64.4	64.4
4 hr bess	6.0		28.2	56.3	0.0	0.0	0.0	0.0
RICE	34.4		34.4	34.4	34.4	34.4	17.2	17.2
DR	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
NB firm	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6
Total Marginal	132.8	92.4	86.0	114.1	96.5	96.5	105.0	105.0
Interactive %	0%	0%	5%	5%	5%	5%	5%	5%
Interactive MW	0.0	0.0	4.3	5.7	4.8	4.8	5.3	5.3
Total ELCC MW	132.8	92.4	90.3	119.8	101.3	101.3	110.3	110.3
Cost per unit - $MM/MW								
Project CT	3.53	3.53	3.53	3.53	3.53	3.53	3.53	3.53
Wind								
8-Hour BESS	3.84	3.84	3.84	3.84	3.84	3.84	3.84	3.84
4 hr bess	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
RICE	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Cost, $ Millions								
Project CT	353.0	353.0	0.0	0.0	0.0	0.0	0.0	0.0
Wind	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8-Hour BESS	0.0	0.0	0.0	0.0	192.0	192.0	384.0	384.0
4 hr bess	21.6	0.0	120.0	240.0	0.0	0.0	0.0	0.0
RICE	160.0	0.0	160.0	160.0	160.0	160.0	80.0	80.0
Total Build Cost Excl NB and DR	534.6	353.0	280.0	400.0	352.0	352.0	464.0	464.0
Total build cost per ELCC capacity	4.02	3.82	3.10	3.34	3.47	3.47	4.21	4.21

Table 2 is an illustration, and it is provided in these supplemental comments only to illustrate how considering the best, first tranches of effective capacity effects the cost comparison relative to the self-selected set of scenarios MECL provided in its July 2026 submittal. It is not offered here as a specific set of inclusive options, but instead demonstrates that when a first pass at determining a truly optimal or least cost capacity portfolio, it involves a mix of resources. Table 2 uses E3 marginal ELCC values and cost estimates from MECL and Synapse for the portfolios shown.

Two observations are notable.

First, the relatively higher effectiveness of the RICE alternative is a valuable result from the E3 analysis, and use of the smaller unit is a reasonable conclusion. While its per-unit costs are marginally higher than the CT project, its availability in a less lumpy increment (20 MW, vs. 100 MW) renders it a valuable resource to consider. In particular, when considered with incremental wind and BESS resources, its use as an energy provider is likely to be more limited than what would otherwise be necessary if the larger, 50 MW CT unit was the only incremental resource available. The RICE unit is also a more efficient generator of electricity from diesel fuel, as its heat rate is noticeably higher.

Second, any addition of wind energy that comes at an average energy cost that is less expensive than energy imports from New Brunswick will afford capacity benefits effectively at zero or negative cost. This table presumes an equivalent energy cost for PEI on-island wind resources relative to energy imported from New Brunswick during times when the wind is generating. This is part of the reason we stated the importance of MECL finalizing its Integrated System Plan in our Final Report. The other reason is the assistance on-island wind provides to support Prince Edward Island meeting sustainability targets.

The table above provides a first step for MECL to consider what immediate steps would, or should, be taken if the CT project is not approved.

Final Observations on the MECL and E3 Materials Submitted in July 2026

Lastly, we note the following concerns or suggestions for further consideration.

<u>MECL Procurement and Portfolio NPV Analysis</u>

- We recommend MECL consider two stages for procuring needed resources, with the first stage procuring most but not necessarily all of the projected requirements for 2030. While the E3 report notes a 115 MW perfect capacity shortfall in its analysis, the eventual procurement need for on-island capacity to meet 2030 needs will be lower. Besides the incremental 15 MW of import capacity from New Brunswick, new demand response resources can also support the need, and the interactive effect of any incremental procurements has yet to be quantified. Also, additional firm import capacity may be an option, depending on New Brunswick's ability to provide short-term firm capacity for at least limited periods in the near term.

To avoid the direst potential reliability outcomes for 2030, MECL should proceed to procure at least the first, best set of resources to close the gap in required capacity. However, additional modeling to firm up the work done by E3 thus far, and consideration of siting issues can be addressed over the near term, prior to finalizing the last increments of capacity required.

- MECL's BESS charging costs appear relatively high,[21] especially if additional on-island wind, and BESS systems are available to avoid procurement of New Brunswick non-firm energy during the highest cost periods.
- MECL's sensitivity analysis excludes testing the overall ELCC effects that would result from final "portfolio" modeling of selected portfolio outcomes.

<u>E3 Report and Analysis Framework and Uncertainties</u>

- E3 does not include any additional utility-scale solar resources in its modeling. While additional system solar PV by 2030 is not affirmed at this stage, and solar PV has limited direct ELCC effect, the potential presence of up to 64 MW of solar PV would affect the energy considerations in the modeling.
- As noted, Table 5-5 and Figure 5-8 exclude BESS and wind outcomes for 8-hour BESS alternatives.
- E3 uses a day-matching algorithm to consider the correlation between load and wind energy output on high-load winter days.[22] The margin of error for this methodology is unclear, and further sensitivity analysis of this key input assumption would be useful to validate the extent of correlation (between wintertime wind and load on high load days) on Prince Edward Island.

<u>Reliability paradigm</u>

- E3 notes in its response to IR-12a that the NPCC Maritimes Area review effectively "assumes the existence of an Independent System Operator that dispatched all resources across the Maritimes region optimally…". This useful analogy sheds

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[21] MECL, Response to IR-54, Attachment 1, Portfolio NPV Study, Table 11, page 22.
[22] E3 response to IR-4h.

additional light on the what the true reliability paradigm will be for PEI and the Maritimes, potentially sooner given recent actions.[23] If a greater degree of coordination is obtained for the Maritimes region, the implication is that the interconnection between New Brunswick and Prince Edward Island is likely to always be used to its fullest to ensure reliability, potentially absent consideration of the specific firm import capacity allocations currently in place.

[23] See for example, https://www.cbc.ca/news/canada/nova-scotia/maritime-provinces-energy-mou-regional-electricity-operator-9.7280914.