REVIEW OF PROENERGY SERVICES PROPOSAL TO MARITIME ELECTRIC

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ABOUT ENERGY FUTURES GROUP

EFG is a clean-energy consulting firm headquartered in Hinesburg, Vermont. EFG specializes in the design, implementation, and evaluation of programs and policies that promote efficiency, renewable and distributed resource investment, affordability, and strategic electrification. Over the past 15 years, EFG staff have worked on behalf of energy regulators, government agencies, utilities, and advocacy organizations in the U.S., Canada, and in several European countries.

EFG brings deep expertise in the assessment and modeling of utility systems and resource plans, including integrated resource planning (IRP) and resource adequacy assessments. EFG also brings a wealth of experience evaluating the prudence of proposals to construct many types of new generators.

EFG has provided expert witness testimony on these and many other topics related to utility regulation in proceedings across 45 states and eight Canadian provinces. Our work has informed utility filings, shaped regulatory decisions, and contributed to the success of clean and affordable energy programs, helping advance the future of energy deployment across North America.

SUMMARY

Maritime Electric Company Limited (MECL) seeks approval to contract with ProEnergy Services to install approximately 100 MW of refurbished aeroderivative turbines at the Charlottetown diesel plant to address winter reliability and system stability risks on Prince Edward Island (PEI). A similar refurbished aeroderivative project is being pursued by NB Power in New Brunswick.[1] While the reliability challenge identified by MECL appears to be real, particularly under winter islanding conditions, this report identifies technical, contractual, and policy risks associated with the proposal that warrant closer scrutiny by regulators.

ProEnergy's offering differs materially from traditional gas turbine development, relies on refurbished aircraft-derived engine cores, depends heavily on long-term service arrangements, and raises unresolved questions regarding cold-climate operability, diesel fuel reliability, and whether alternative non-emitting technologies could address the same system needs more effectively.

I. PROENERGY SERVICES' EXPERIENCE AND RELEVANCE TO THE PEI PROJECT

A. Company Profile

ProEnergy Services is the original equipment manufacturer (OEM) of the PE6000 combustion turbine and specializes exclusively in refurbished aeroderivative turbine technology. Unlike traditional utility-scale turbine developers, ProEnergy's business model is vertically integrated and relies on repurposing of retired aircraft engines: the company performs turbine refurbishment, engineering, procurement, and construction (EPC) services, commissioning[2],

[1] Exhibit-M-12-Dispatchable-Generation-Application-Supplemental-Filing-August-14-2025 (https://irac.pe.ca/wp-content/uploads/Exhibit-M-12-Dispatchable-Generation-Application-Supplemental-Filing-August-14-2025-redacted.pdf)
[2] https://www.proenergyservices.com/aero-advantage/overhaul-services/depot-process/

and provides total care service agreement.[3] This structure hypothetically allows ProEnergy to act as a single point of responsibility across the full project lifecycle, however it's not clear if all these services will be provided. Documents provided by Maritime, for example, do not mention whether ProEnergy will provide long-term maintenance of the project or any performance guarantees.

B. Nature of ProEnergy's Refurbishment Model

ProEnergy's PE6000 turbines are not newly manufactured assets. They are derived from retired GE CF6-80C2 aircraft engine cores that are refurbished and modified for stationary power generation.[4] This refurbishment-based approach differs fundamentally from conventional combustion turbines sourced directly from traditional OEMs[5] like Siemens, GE, or Mitsubishi who sell newly manufactured turbines.

This model can offer advantages, including shorter procurement timelines and potentially lower upfront capital costs. However, it also introduces condition-based and lifecycle risks tied to the prior operating history of the engine cores, the rigor of refurbishment processes, and the structure of long-term service agreements. Since it is difficult to gain visibility into any manufacturing or refurbishment process, it is important to understand what post-commissioning guarantees would be in place. These are not fully described in Maritime's August 2025 application to the Commission. The only guarantee of this sort is a mention of twelve months of warranty coverage following substantial completion (which occurs prior to full commissioning) or from 24 months after turbine delivery, whichever is sooner.[6]

For a small, island utility such as Maritime Electric, these considerations carry heightened importance because system redundancy is limited, access to specialized labor is constrained, and replacement parts and supply chain disruptions can have outsized reliability impacts.

C. Project Scale and Dependence on Concurrent Development

Maritime has stated that this 100 MW project with ProEnergy is feasible because it is being executed simultaneously with a much larger 500 MW project for New Brunswick Power using the same PE6000 combustion turbine platform. Maritime states that ProEnergy typically avoids projects smaller than approximately 200 MW; however, it agreed to undertake the Maritime Electric project because the schedule, workforce, and supply chain could be aligned with the concurrent New Brunswick development.[1]

This linkage provides potential efficiencies but also creates interdependencies. The Maritime Electric project's timeline and execution are implicitly tied to the successful delivery of the larger New Brunswick project, and delays or complications in that project could affect resource availability or scheduling for PEI.

D. Operational Track Record in Other Jurisdictions

ProEnergy has delivered multiple aeroderivative peaking units in Texas. A frequently cited example is the 288 MW "Brotman" project in Texas, consisting of six LM6000 units designed to

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[3] https://www.proenergyservices.com/aero-advantage/total-care-services/
[4] https://www.proenergyservices.com/aero-advantage/parts-equipment/pe6000/
[5] https://eepower.com/news/can-repurposed-jet-engines-solve-ai-data-center-power-problems/#
[6] https://irac.pe.ca/wp-content/uploads/Exhibit-M-12-Dispatchable-Generation-Application-Supplemental-Filing-August-14-2025-redacted.pdf at page 22.

provide fast-start capacity during peak demand conditions.[7] Much of ProEnergy Services' business appears to be related to construction and maintenance of power plants rather than supplying its turbine design. Outside of Texas, we could not find other, specific refurbished units that have been constructed in the U.S. or Canada. In the course of its work, EFG has viewed several ProEnergy proposals to sell and construct its turbines, often in response to RFPs for new supply, but we have not yet encountered a project by ProEnergy that was selected and subsequently constructed so we unaware of any other projects for which performance data might be available.

E. Experience in Cold Climates and Winterization Considerations

A central question for Prince Edward Island is whether ProEnergy has demonstrated experience operating refurbished aeroderivative turbines in sustained cold-weather environments comparable to Atlantic Canada. In its tolling agreement with New Brunswick for similar machines, ProEnergy states that its turbines are designed to operate down to a temperature of negative 32°C.[8] While the turbines may be asserted to have been designed to operate at low temperatures, given that such operation is the justification for their construction, understanding who bears the risks of outage is very important to evaluating the merits of this project. Cold climates introduce specific operational risks for aeroderivative units, including inlet icing.[9] In addition, the modular architecture of refurbished aeroderivative turbines, combined with their reliance on complex, multi-sensor diagnostic systems, introduces mechanical, electrical, environmental, and diagnostic risks that can complicate fault detection and reliability management. These risks are particularly consequential in critical or demanding operating environments, where units may be called upon infrequently but must perform reliably under severe conditions.[10]

Importantly, there is typically a correlation between cold temperatures and thermal generator outages. For example, a study of the PJM region in the Northeastern U.S. found that approximately 20% of combustion turbine capacity would be expected to be offline when temperatures dip to negative 20°C.[11] Such outages can be a product of insufficient or faulty winterization, fuel supply challenges, environmental factors such as icing and so on. Given that the critical need to be filled by these turbines is in the wintertime, more information about the guarantees for cold-weather performance by ProEnergy would be useful to understand the full implications of the proposal.

ProEnergy states that its PowerFLX packages include standard anti-icing and cold-weather readiness features. However, publicly available documentation primarily references weatherization measures implemented for extreme cold events in jurisdictions such as

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[7] https://www.proenergyservices.com/proenergy-awarded-288-mw-brotman-project-project-by-wattbridge/
[8] EL-002-2025 - Renewables Integration and Grid Security (RIGS) Project / Projet d'intégration des énergies renouvelables et de sécurité du réseau (« RIGS ») - Electricity
[9] https://www.gevernova.com/gas-power/services/gas-turbines/upgrades/anti-icing
[10] Aeroderivative gas turbines fault diagnosis via IKOA-optimized CNN-BiLSTM with multi-source sensor data - https://doi.org/10.1016/j.measurement.2025.118978
[11] A time-dependent model of generator failures and recoveries captures correlated events - https://doi.org/10.1016/j.apenergy.2019.113513

Texas.[12,13] PEI's climate, characterized by prolonged sub-freezing temperatures, frequent winter storms, and icing conditions, presents a materially different reliability risk profile.

At present, there is limited public evidence demonstrating ProEnergy's track record operating refurbished aeroderivative turbines through sustained winter conditions similar to those faced by PEI.[14] This gap does not imply technical incapacity, but it does underscore the need for heightened scrutiny of winterization design standards, site-specific cold-weather assumptions, testing protocols, and performance guarantees.

F. Implications for Regulatory Review

Given that PEI's most acute reliability risks occur during winter isolation events, the value of the proposed project is concentrated in a limited number of high-risk winter hours. As a result, regulators should evaluate ProEnergy's offering not as a conventional generation addition, but as a specialized reliability asset whose value depends heavily on refurbishment quality, winterization execution, and contractual risk allocation.

Prior to project approval, key areas requiring verification include detailed maintenance histories of the specific engine cores to be used, certification of refurbishment work, documented cold-start and winter performance testing, and clearly defined spare-parts and local support strategies suitable for Atlantic Canada as well as clearly stated performance guarantees to ensure these turbines are available during the events they are intended to help address.

II. PROS AND CONS OF USING REFURBISHED AERODERIVATIVE TURBINES

A. Overview of the Proposed Technology

The proposed PE6000 units are intended to provide fast-start, dispatchable capacity to address PEI's reliability risks during islanding and winter peak conditions. Unlike newly manufactured turbines procured directly from OEMs, these units rely on a refurbishment process, referred to as "zero-houring" that restores previously used aviation-derived engine cores for stationary power generation[1].

This procurement approach offers potential advantages in cost and delivery speed but also introduces specific technical, lifecycle, and contracting considerations that warrant careful evaluation.

B. Advantages of Refurbished PE6000 Turbines

Lower Upfront Capital Cost

Refurbished turbines represent a lower upfront capital cost relative to new-build alternatives. Maritime Electric's proposal gives a per unit and total installed cost estimate. The total estimate cost of the project is reported to be $334 million but rather than a per unit cost of $3,340 per kW the per unit cost is reported to be $3,240/kW. Given the rated capacity for the project is 100 MW, it's not clear why this discrepancy would exist. Sargent & Lundy (S&L) reports that newly manufactured aeroderivative turbines (GE LM6000s) would cost an estimated CAD

[12] https://proenergyservices.com/wp-content/uploads/2024/03/PowerFLX-Building-Success-Case-Study.pdf

[13] https://proenergyservices.com/wp-content/uploads/2024/04/Southern-US_2020_LM6000-OM-Services_Uri.pdf

[14] https://proenergyservices.com/wp-content/uploads/2024/07/Anti-icing-Cut-Sheet.pdf

$3,400/kW.[1] However, in its report attached to Maritime's letter to the IRAC dated August 14, 2025, S&L stated that "there is a risk of escalating and uncertain costs over the duration of the procurement process, due to recent very high demand and resulting increasing prices for combustion turbines across the industry."[15] We see these dynamics in our work in other jurisdictions as well. This is a very challenging time to construct new generators, but the cost of the ProEnergy Services proposal is not immaterial and should be vetted to ensure that these generators can perform during the hours in which they will be needed.

Shorter Lead Time for Commissioning

We also agree with S&L that the ProEnergy Services option is likely to reach an earlier commissioning date, targeted for 2028 compared to construction with newly manufactured turbines. We would expect a longer lead time for manufacturing and delivery of new turbines, though we would not expect commercial operation to be achieved much after 2030 as Maritime suggests. If this were the case, it means a much more significant turbine backlog because it implies that the turbines could not be delivered until mid-2028 or later since it takes about a year and a half to reach commercial operation after turbine delivery. [1]

C. Risks and Limitations

Risk Mitigation via Low Utilization Assumptions

S&L's assessment that refurbished units do not represent a significant risk appears to be heavily predicated on their intended role as backup/emergency generators with "relatively low" anticipated utilization. The assessment does not appear to account for their suitability for operation in Atlantic Canada's climate nor does it specify the particulars of ProEnergy Services' refurbishment process.[1] If system deficits or mainland disconnection events occur more frequently than forecasted, the mechanical stress on refurbished components could potentially exceed the assumptions used in the initial risk assessment.

Additionally, since ProEnergy's turbines are built around refurbished aircraft engine cores, understanding the information ProEnergy has about these cores, i.e., how many starts and run hours they experienced during their lives, and how ProEnergy assessed the condition of the engine cores would be important to understand.

Financial Commitments

The proposed "Accelerated On-Island Capacity Solution" requires Maritime Electric to make significant non-refundable financial commitments well in advance of receiving final regulatory approvals. In particular, Maritime Electric must submit a substantial downpayment to reserve a manufacturing slot, with limited or no ability to recover these funds if the project is delayed or ultimately cancelled. If regulatory approval is denied after these commitments are made, the costs would nonetheless be recorded in the proposed deferral account, resulting in direct ratepayer exposure to sunk development expenses for a project that was never placed into service.

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[15] https://irac.pe.ca/wp-content/uploads/Exhibit-M-12-Dispatchable-Generation-Application-Supplemental-Filing-August-14-2025-redacted.pdf at page 47.

III. DIESEL FUEL OPERATION AND RELIABILITY IMPLICATIONS

A. Diesel Operation During Islanding Events

The project entails substantial fuel-infrastructure requirements that must be managed locally by Maritime Electric to support reliable operation during islanding conditions. Specifically, the proposal calls for installation of two additional two-million-litre ultra-low-sulfur diesel storage tanks, along with associated pumps, piping, and offloading facilities, to ensure that all three combustion turbines (including the existing combustion turbine at the site) can operate at full load for a minimum of seven days without resupply. The turbines are expected to operate primarily on ultra-low-sulfur diesel during islanding events, reflecting Prince Edward Island's limited ability to meet demand during full disconnection from the mainland, particularly under winter peak conditions, as identified in the Sargent & Lundy Capacity Resource Study. In this context, the proposed units are intended to mitigate dispatchable capacity shortfalls during extreme or prolonged outage scenarios.

B. Maintenance and Lifecycle Impacts of Diesel Operation

Operating aeroderivative turbines on diesel can increase maintenance requirements and accelerate corrosion of the turbine compared to natural gas operation due to impurities present in fuel oil. For a small utility such as Maritime Electric, this increases the importance of enforceable long-term maintenance agreements, spare-parts availability, and rapid-response service commitments.

IV. SYSTEM STABILITY CONSIDERATIONS AND THE ROLE OF ALTERNATIVES

A. Stability Challenges Identified for PEI

The Sargent & Lundy study identifies system-stability challenges associated with high wind penetration specifically during islanded operation, not under normal interconnected conditions. Wind curtailment is required only when Prince Edward Island is electrically isolated from the mainland and the variable output of wind generation exceeds the real-time balancing and ramping capability of available on-Island dispatchable resources. The extent of required curtailment depends on several factors including wind production and dispatchable unit availability. Sargent & Lundy estimates that up to approximately 37 percent of installed wind capacity can be accommodated during islanding when all dispatchable units are operational, whereas the loss of a major unit such as Charlottetown CT3 significantly reduces balancing capability and may necessitate near-total wind curtailment to avoid frequency instability or system collapse.[7] In this context, ProEnergy Services' proposed fast-start aeroderivative turbines are presented as a mitigation measure because their rapid start and fast ramping characteristics would expand available balancing capacity during islanding events and reduce the need for deep wind curtailment. While these attributes contribute to system stability, they do not address all requirements. Inertia, frequency response, and instantaneous balancing depend on turbine operating mode and whether units are synchronized at the time of disturbance.

B. Batteries and Other Grid-Forming Technologies

The S&L study also notes that battery energy storage systems (BESS) are well suited to provide fast frequency response, voltage support, and system stabilization. Although BESS have limitations related to energy duration during extended outages, they can materially reduce wind curtailment by absorbing excess energy and enhance system stability when deployed as part of a portfolio. The major tradeoffs to weigh are cost and duration of performance relative to the needed grid services. There was not sufficient information in Maritime's application or the S&L study to understand how those tradeoffs might be weighed.

This suggests that refurbished aeroderivative turbines should not be presumed to be the only viable solution. A services-based comparison of alternatives, including grid-forming BESS, synchronous condensers, targeted transmission upgrades, and demand-side resources, would provide a more complete assessment of how best to address PEI's reliability and stability needs.

IV. CONCLUSIONS AND RECOMMENDATIONS

This is a difficult time to construct new generation with significant demands on critical path equipment needed for new power plants such as turbines, transformers, etc. These demands have led to unusually long lead times, demands for reservation fees to hold manufacturing slots, and escalating prices. Nevertheless, these circumstances do not mean that caution and care is not warranted. Policymakers and regulators may want to ask the following questions of Maritime Electric to better understand its proposal and ProEnergy Services' track record:

1. What specific refurbished PE6000 projects has ProEnergy successfully constructed and where are they located?
2. Which of those projects, if any, have operated through sustained cold-weather conditions comparable to Atlantic Canada?
3. Can ProEnergy offer any references from other customers who have installed ProEnergy's turbines in regions with sustained cold weather?
4. Can ProEnergy provide operating performance data (availability, forced outage rates, cold-start success) from comparable installations?
5. What is the full operating and maintenance history of the specific aircraft engine cores proposed for the PEI project?
6. How many starts and operating hours did each engine core experience prior to refurbishment?
7. What inspections, testing, and certifications are performed as part of ProEnergy's refurbishment ("zero-houring") process?
8. How does ProEnergy manage variability in condition and remaining life across different refurbished engine cores?
9. What long-term performance guarantees (availability, reliability, cold-start capability) will apply once the units are fully commissioned?
10. Why is the warranty period limited to 12 months after substantial completion or 24 months after delivery, and what risks remain beyond that period?
11. Will ProEnergy provide long-term service agreements, and if so, what response times, spare-parts commitments, and penalties apply?
12. How will maintenance obligations and risks be shared between Maritime Electric and ProEnergy over the project life?
13. What specific winterization features are included in the package?
14. How do ProEnergy's winterization assumptions differ between jurisdictions like Texas and Atlantic Canada?
15. To what extent is the PEI project dependent on the concurrent 500 MW New Brunswick project for staffing, supply chain access, and scheduling?
16. What risks would delays or complications in the New Brunswick project pose to the PEI project?

17. What non-refundable payments must Maritime Electric make before final regulatory approval? What guarantees regarding delivery and start of construction do reservation fees provide?
18. What modifications are necessary to operate the turbines on diesel fuel? What risks associated with diesel fuel operation are Maritime and ProEnergy anticipating?
19. ProEnergy's Environmental Impact Assessment for the sister New Brunswick project states that the project is expected to demand 4,900 litres per minute (L/min) (7,000 m^3/day) of water.[16] What is the expected demand on fresh water for the proposed units and from where will water for the turbines be sourced?
20. Will regulators be able to review the contract between Maritime and ProEnergy along with any associated exhibits and amendments prior to approval?

[16] "Centre Village Renewables Integration and Grid Security Synchronous Condensing/Generation Facility Project – Initial Project Description and Environmental Impact Assessment Registration." July 4, 2025