

NOVA SCOTIA ENERGY BOARD

IN THE MATTER OF THE PUBLIC UTILITIES ACT

- and -

IN THE MATTER OF an application by **NOVA SCOTIA POWER INCORPORATED** for approval of capital projects CI C0068655 – LM6000 191-332 Life Extension, in the amount of \$18,948,560 and CI C0073491 – LM6000 191-443 Engine Replacement, in the amount of \$24,217,289, for a total amount of \$43,165,849

BEFORE: Steven M. Murphy, MBA, P.Eng., Panel Chair
Jennifer L. Nicholson, CPA, CA, Member
Darlene Willcott, LL.B., Member

APPLICANT: **NOVA SCOTIA POWER INCORPORATED**
Lana Myatt

INTERVENORS: **CONSUMER ADVOCATE**
David J. Roberts, Counsel
Michael Murphy, Counsel

SMALL BUSINESS ADVOCATE
Melissa MacAdam, Counsel
Rebekah Powell, Counsel

INDUSTRIAL GROUP
Nancy G. Rubin, K.C.
Brienne Rudderham, Counsel

**NOVA SCOTIA INDEPENDENT ENERGY SYSTEM
OPERATOR**
Jason T. Cooke, K.C.
Danielle J. Keating

PORT HAWKESBURY PAPER LP
David MacDougall, Counsel
James MacDuff, Counsel

BOARD COUNSEL: William L. Mahody, K.C.

FINAL SUBMISSIONS: February 9, 2026

DECISION DATE: April 16, 2026

DECISION: The applications are approved with directives as noted in the decision.

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1.0 INTRODUCTION

[1] On August 5, 2025, Nova Scotia Power Incorporated (NS Power) applied to the Nova Scotia Energy Board for approval of capital projects CI C0068655 – LM6000 191-332 Life Extension, in the amount of \$18,948,560 and CI C0073491 – LM6000 191-443 Engine Replacement, in the amount of \$24,217,289, for a total amount of \$43,165,849. A request for confidentiality following *Rule 12* of the *Board Regulatory Rules* was submitted by NS Power on August 5, 2025. The Board approved NS Power's request for confidentiality.

[2] The Board determined that this matter would be conducted by way of a paper hearing and issued a Hearing Order on September 12, 2025, setting out a timeline for Information Requests (IRs), filing of evidence and written submissions. Notices of Intervention were received from the Industrial Group; the Small Business Advocate (SBA); the Nova Scotia Independent Energy System Operator; Port Hawkesbury Paper LP; and the Consumer Advocate (CA).

[3] On October 29, 2025, NS Power responded to Information Requests (IRs) from the CA, SBA, Board staff, and Board Counsel consultants, Midgard Consulting Inc. (Midgard). Evidence was filed by Midgard on November 14, 2025. NS Power submitted its rebuttal evidence on January 12, 2026. Written closing submissions were filed on January 26, 2026, and NS Power filed its reply submissions on February 9, 2026.

[4] Midgard reviewed both applications and all supporting documentation, considering issues such as an Assessment of Engine Condition and Maintenance Practices, Evaluation of Alternatives Considered, Procurement Strategy and Original Equipment Manufacturer Involvement, and Overall Project Prudence and Ratepayer

Interest. Midgard provided conclusions and recommendations applicable to each application.

[5] The Board approves both projects but remains concerned about several issues. These include the effectiveness of the utility's comprehensive asset management program for the LM6000 engines, turbine efficiency, the level of erosion and corrosion observed, and the engine operating environment. The Board issues a number of directives to address and resolve its concerns.

2.0 PROJECT BACKGROUND

[6] In the applications, NS Power stated that its Tufts Cove generating station currently operates three General Electric (GE) LM6000 engines equipped with Spray Intercooling (SPRINT) capability. The three engines are labeled as Engine 191-332, Engine 191-443 and Engine 191-253. The net nominal capacity of each LM6000 PC SPRINT unit is 51.1 MW. The SPRINT capability boosts power by spraying water to cool air between the low-pressure compressor (LPC) and high-pressure compressor (HPC) of the engine. NS Power stated that its LM6000 operational strategy relies on maintaining two in-service LM6000 engines and one rotatable spare engine to ensure system reliability and minimize downtime during planned and unplanned outages.

[7] As of the filing date of these capital work orders, NS Power noted that Engines 191-443 and 191-253 are in operation. After the refurbishment of Engine 191-332, the plan is to remove Engine 191-443 and replace it with the refurbished Engine 191-332. Engine 191-443 will then be stored as the spare until its new replacement engine is delivered, pending the Board's approval of the replacement engine application. NS

Power noted that once the new LM6000 engine is installed and operational, Engine 191-443 will be sold. NS Power stated that continued long-term operation of Engine 191-443 would pose a significant risk of catastrophic failure and collateral damage, based on inspection results and the unit's operating history, which exceeds the Original Equipment Manufacturer's (OEM) recommended service intervals of 25,000 fired hours for the hot section and 50,000 fired hours for the cold section.

[8] Engine 191-332 was first installed at the Tufts Cove generating station in 2004. The scope of work for CI C0068655 – LM6000 191-332 Life Extension, in the amount of \$18,948,560, includes engine removal, shipment to the vendor's depot, disassembly of the engine, replacement and refurbishment of required components based on condition, engine testing, return shipment, and re-installation at Tufts Cove.

[9] The project was included in NS Power's 2025 Annual Capital Expenditure (ACE) Plan as a subsequent submittal item. The estimated cost for the project has increased by approximately \$12.9 million compared to the 2025 ACE Plan estimate of \$6 million. NS Power noted that the ACE Plan estimate was prepared before full disassembly and inspection of the unit. After a third-party vendor completed that work, the project scope changed significantly, primarily due to a shift from an initial hot section refurbishment to a major engine refurbishment covering both the hot and cold sections.

[10] Engine 191-443 was originally commissioned in 2003. NS Power noted that this LM6000 unit has reached the end of its effective service life, as indicated by its accumulated operating hours and its forward-looking operational risk. The utility has performed on-site rehabilitation of select components over time, which has preserved the engine for continued operation, but it now requires replacement. It will be removed from

service upon the return of Engine 191-332 from its refurbishment work. Further, in June 2025, NS Power conducted a routine borescope inspection on Engine 191-443, which revealed multiple critical defects. These defects were reviewed and validated by two independent third-party experts.

[11] NS Power prepared an Economic Analysis Model (EAM) comparing a major overhaul of the existing engine with the purchase of a new engine. The EAM determined that a new engine is more cost-effective. The scope of work for CI C0068655 – LM6000 191-443 Engine Replacement includes the procurement of a new LM6000 engine, factory and site testing of the new engine, installation and commissioning of the new engine at Tufts Cove, and the removal of Engine 191-443. The estimated cost for this work is \$24,217,289.

[12] As part of both applications, NS Power provided third-party documentation to support the required work and related cost estimate used in the respective capital applications.

3.0 LM6000 191-332 LIFE EXTENSION (CI C0068655)

3.1 Evidence and Submissions

[13] Midgard noted that during a 2015 major overhaul on the unit, the vendor, TransCanada Turbine (TCT), made multiple comments about excessive corrosion caused by the engine's operating environment. Midgard stated that despite these warnings, NS Power did not take proactive steps to mitigate recurrence. Midgard also noted that inspection findings and expert technical reports indicate that although NS Power's maintenance program aligns with OEM recommended practices, recurring

corrosion and wear issues identified in earlier overhauls remain unaddressed, and NS Power's decisions followed a defined process, but its execution remained reactive.

[14] Midgard noted that NS Power uses the SPRINT injection system from April to October on units TUC4 and TUC5 to boost power and thermal efficiency. Although the SPRINT system provides operational benefits, the water injection can cause leading-edge erosion on LPC blades, which was observed during the inspection by TCT.

[15] Midgard reported that Engine 191-332 has accumulated 23,532 hot section hours and 47,500 hours on the cold section since its last major overhaul in 2015. This is close to the OEM's recommended limits of 25,000 fired hours for the hot section and 50,000 fired hours for the cold section. Midgard also concluded that the engine has reached its end-of-life based on total operating hours, OEM maintenance intervals, and the presence of unserviceable components.

[16] Midgard noted that a July 2024 report indicated that borescope inspections conducted in March, April, and June 2024, identified several concerns with Engine 191-332, but the engine was not removed from service until June 18, 2024. Midgard opined that the delay in removal increased outage exposure and reliability risk and potentially resulted in additional unit wear that may have increased the current project's total cost.

[17] Midgard also identified that Engine 191-332 arrived at the vendor depot on September 9, 2024, and remained there until October 2025, a repair duration of more than a year. Midgard believes that the extended depot time likely contributed to the total project cost.

[18] Midgard further noted that NS Power chose the life extension (refurbishment) option from three alternatives. The other two options included deferral of

overhaul and continued out-of-service status, and replacement of the engine with either a new or refurbished engine. Midgard supported the life extension approach, stating that it was both cost effective and technically prudent, shortening the delivery timeline and having a cost \$3-\$5 million USD lower than the engine replacement option. However, Midgard opined that the decision to proceed with refurbishment was also driven by the urgency created by the operational risk posed by Engine 191-443 (as discussed later in this decision), rather than any cost benefits.

[19] While Midgard noted that the estimated cost of a new engine would be more than the refurbishment option, it indicated that a new engine would have a useful life of up to 25 years compared to 8-10 years expected from the refurbishment project.

[20] Midgard also noted that NS Power has not used GE, the OEM for its LM6000 units for depot-level refurbishment since 2015. NS Power reported that previous quality concerns at GE's United States facility were a key factor in its decision to sole-source refurbishment work to TCT. Between 2012 and 2015, three quality issues occurred at GE, including two affecting Engine 191-253 and one affecting Engine 191-443. Midgard indicated that in each instance, GE acknowledged responsibility, negotiated settlements, and absorbed the associated costs.

[21] Midgard confirmed that TCT is an authorized service provider for GE's LM6000 units, with access to OEM components, engineering resources, and proprietary technical information, but does not provide full OEM engineering support. It noted that NS Power's sole-sourcing to TCT was convenient given its proven good performance track record, logistical advantages, and status as the only other authorized Level 4 LM6000 depot in North America. However, by excluding GE based on decade-old quality issues,

during a period of elevated risk, Midgard opined that this reduced vendor choice and competitive pressure, and increased NS Power's operational and financial exposure. However, Midgard did not provide an opinion regarding the impact, if any, this had on the project cost.

[22] Midgard believes that NS Power's decision not to consider GE's proposal for the overhaul of Engine 191-332, especially given that Engine 191-443 was considered high-risk (as described elsewhere in this decision), was poorly reasoned. This is particularly relevant given that NS Power continues to be reliant on GE for parts, technical support, and refurbishment oversight. Midgard noted that the GE quality issues in question occurred more than a decade ago, and that GE had absorbed the associated costs. Midgard opined that NS Power could have instead adjusted GE's proposal through a scoring system and taken a more proactive approach to managing historical OEM quality concerns.

[23] Midgard did not recommend any disallowances for the project. However, Midgard recommended several actions for NS Power moving forward. These include:

- a. Proactively addressing recurring corrosion and wear to mitigate reliability and cost risks;
- b. Considering earlier removal and corrective action to reduce operational risks;
- c. Evaluating alternatives that consider long-term cost, performance, and operational constraints, not only short-term operational availability; and

- d. Including GE in procurement evaluations to enhance competition, oversight, and risk mitigation, and use of a scoring system or other method to account for historical quality concerns when evaluating vendor proposals.

[24] In its rebuttal evidence, NS Power acknowledged Midgard's observation regarding unit corrosion and wear but stated that there is no evidence indicating the wear and corrosion observed on Engine 191-332 during its overhaul at TCT were considered abnormal. NS Power stated that its preventive maintenance activities are performed in accordance with OEM guidance. However, it noted that certain degradation mechanisms, such as exposure to coastal air and thermal cycling, cannot be fully mitigated despite proactive inspections and component replacements. NS Power also referenced a study conducted by Entrust Solutions Group/TG Advisors (TGA) prior to the teardown at TCT, and noted that the related findings provide further evidence that the corrosion and wear were not abnormal and did not require any significant additional work scope. NS Power provided the study's findings in a confidential attachment to its rebuttal, labeled Appendix A.

[25] NS Power also noted that SPRINT capability is critical for meeting peak demand and maintaining Northeast Power Coordinating Council, Inc. reserve margins, helping the utility avoid costly emergency imports. It stated that although SPRINT operation adds thermal and moisture stresses, OEM-approved procedures and monitoring mitigate these effects. Water injection from the SPRINT system is also necessary to control nitrogen oxide emissions and meet environmental requirements. NS Power said that fully eliminating environmental impacts would require relocating or enclosing the facility, which is not practical or economically viable.

[26] NS Power disagreed with Midgard's opinion that the utility's decision-making for Engine 191-332 was reactive and that earlier removal would have reduced outage duration and project costs. The Company maintains that it acted proactively, with funding and refurbishment planning in place well before the June 2024 borescope inspection. It also noted that earlier removal of the unit was constrained by reliability considerations, as Engine 191-443 and 191-332 were in operation at the time, while Engine 191-253 was out for refurbishment. Doing so would have resulted in simultaneous outages of two Tufts Cove LM6000 engines and increased reliability risks during peak-demand periods. NS Power stated that refurbishment of Engine 191-253 was completed and the unit reinstalled in March 2024. NS Power said this ensured that two LM6000 units were available before removing 191-332 from service, thereby avoiding simultaneous outages and reduced reliability risks during peak-demand periods.

[27] NS Power also stated that it deliberately initiated a detailed disassembly and scoping process at the vendor depot for Engine 191-332 prior to finalizing the overhaul plan and submitting the project to the Board. While NS Power agreed that this process resulted in a delay in completing the refurbishment work, it said this step was taken to improve cost accuracy and ensure OEM compliance, reflecting a structured and risk-informed approach rather than a reactive one.

[28] NS Power also noted that global demand for LM6000 units has increased lead times for both new engines and major refurbishments. It referenced its 10-year LM6000 investment plan, which reflects evolving conditions, including system reliability needs and market dynamics. The utility noted that an economic analysis comparing refurbishment of Engine 191-332 with a full replacement was not completed because a

replacement could not meet the timelines required to align with NS Power's capacity needs.

[29] NS Power acknowledged Midgard's opinion related to vendor options but believes that sole-sourcing to TCT was a prudent and cost-effective choice because TCT operates under the same OEM parts pricing structure as GE. Also, the utility indicated that completing the overhaul in Canada avoided cross-border logistics and lowered transportation costs. NS Power further noted that a new Master Services Agreement will support GE's involvement in future refurbishment work. Furthermore, NS Power stated that it maintained ongoing discussions with GE regarding future refurbishment projects to preserve competitive tension and strategic flexibility. While GE was not engaged for this specific project due to prior quality concerns and risk considerations, NS Power said its procurement approach incorporated robust oversight and quality assurance measures with TCT.

[30] NS Power also agreed with Midgard on the importance of proactive measures to mitigate LM6000 reliability and cost risks. It noted that it will continue to maintain rigorous inspection protocols and implement targeted component replacements to address corrosion and wear issues. NS Power also committed to expanding vendor engagement with GE in future procurement processes and stated that GE will be considered for the next phase of hot section refurbishment projects for LM6000 engines, beginning with the upcoming planned refurbishment of Engine 191-253.

[31] The CA raised the issue that the LM6000 engines are operating at a lower efficiency than their OEM ratings. The CA also submitted that NS Power's operational practices likely contributed to refurbishment of Engine 191-332 becoming preferable over

replacement, even though the costs of each option are comparable, especially when refurbishment only extends the life of the unit by 8-10 years, while a new engine would provide an additional life of 25 years. In this context, the CA raised concerns that NS Power could have reasonably anticipated the need to replace both Engine 191-332 and Engine 191-443 in a more proactive manner and could have planned for replacements more appropriately. Nonetheless, the CA did not recommend a disallowance, stating that there is no evidence of imprudence.

[32] In its submissions, the SBA requested an update on the return-to-service status of Engine 191-332 and Engine 191-443, as well as confirmation that NS Power will meet its target planning reserve margin once the units are back in operation. It also suggested that the Board could direct these updates be incorporated into the ongoing 2026 ACE Plan proceeding (M12619) or another related proceeding. In addition, the SBA noted that the benefits of investing in LM6000 units for spares or replacement have not been confirmed. As such, the SBA recommended that NS Power provide an analysis of the prudence of continuing to maintain these units beyond the end of this decade, given that the next planned service dates for Engines 191-332 and 191-443 are expected to occur in March 2030 and March 2031, respectively.

[33] In its reply submissions, NS Power reiterated its response to CA IR-10(d), that it does not anticipate any material improvements in the unit's efficiency following refurbishment or replacement, as the LM6000 units are already operating within the normal efficiency range for engines of this type. In addition, the Company will continue to review LM6000 performance as part of its ongoing operational programs and will address

any efficiency-related matters through the Fuel Adjustment Mechanism (FAM) process as required.

[34] NS Power also acknowledged the CA's observations regarding operational practices and LM6000 fleet planning. However, it emphasized that its ability to manage lifecycle condition, anticipate risk, and support refurbishment or replacement decisions is strengthened by its comprehensive asset-management program for the LM6000 engines. NS Power noted that its practices are aligned with OEM guidance and supported by regular consultation with TGA, which provides independent engineering assessments and risk evaluation.

[35] NS Power further stated that while the costs of refurbishment and replacement were comparable, the timing constraints associated with Engine 191-443 meant that a replacement for Engine 191-332 could not have been secured without leaving a unit unavailable for an extended period. NS Power therefore asserted that it proceeded with the most prudent and operationally feasible option under the conditions at the time.

[36] With regard to the SBA's suggestion that it may not be prudent to continue to invest in these units beyond the end of the decade, NS Power submitted that this is not applicable, as neither the Integrated Resource Plan (IRP) nor the 10-Year System Outlook identifies any plan to retire Tufts Cove Units 4 and 5 before the end of the decade. The Company stated that ongoing operation of the LM6000 units is supported by system needs, including planning reserve margin requirements and the flexibility required to integrate increasing levels of renewable generation. The IRP and the 10-Year System Outlook identify these units as core operating assets, continuing in service well beyond

2030, and remaining part of the system through at least 2050. Accordingly, NS Power submitted that continued maintenance of these assets on defined intervals is required, and additional reporting is not necessary.

3.2 Analysis and Findings

[37] The Board agrees with NS Power that the additional reporting requested by the SBA regarding return-to-service status of the LM6000 engines and the obligation to meet its target planning reserve margin is not necessary. The Board acknowledges that any issues related to the continued use of the LM6000 units should be appropriately addressed in the 10-Year System Outlook report filed annually by NS Power and in the IRP process.

[38] No Intervenor opposed the current capital application, and Midgard's evidence confirms the necessity of the project, acknowledging that the decision to refurbish Engine 191-332 was logical and well-supported. While Midgard identified areas for improvement, NS Power maintains it has addressed those concerns and is committed to continuous enhancements in maintenance practices, vendor engagement, and planning processes.

[39] Midgard commented that a new engine would provide a unit life of up to 25 years, compared with the 8–10 years expected from the refurbishment project. The Board notes, though, that a new engine with a 25-year-asset life would, in practice, undergo multiple major refurbishments during that period. These would include 25,000 hour hot section refurbishments and 50,000 hour major overhauls, as recommended by the OEM.

[40] Although NS Power stated that it had considered lifecycle optimization, it did not provide any documentary evidence to support this claim. The Board is concerned that the utility may not have effectively managed the removal of this unit from service,

potentially contributing to the overall refurbishment cost for the project. As Midgard opined, the delay in removing Engine 191-332, despite early 2024 borescope inspections indicating significant damage, increased outage exposure and reliability risk, and potentially resulted in additional wear that may have increased total project costs. However, the Board notes Midgard did not provide any evidence to support its opinion related to potentially higher costs. The Board acknowledges NS Power's response, noting that earlier removal of the unit was constrained by reliability considerations and that simultaneous outages of two engines would be inconsistent with NS Power's operational strategy. While the utility provided third-party findings to support its claim about no abnormal corrosion or wear, the Board notes that the consultant's scope was specific and limited. Further, neither the consultant's report nor NS Power provided any evidence that they reviewed or addressed the engine issues identified by Midgard. Therefore, contrary to the utility's comment, the Board is uncertain whether the utility's comprehensive asset-management program for the LM6000 engines remains effective. Accordingly, the Board will refer this issue to an independent engineering review as outlined below. In addition, for future LM6000 capital applications submitted for approval, the Board directs NS Power to provide documentary evidence of a lifecycle cost benefit analysis and to ensure that refurbishment/replacement decisions are made well in advance of critical timelines.

[41] The application stated that Engine 191-332 underwent a full overhaul in 2015 and a hot section replacement in 2019. The data provided in response to NSEB IR-1(b), indicates that, prior to this life-extension project, Engine 191-332 had 23,532 operating hours since its last hot section refurbishment and had operated for a total of

93,258 hours since it had been originally placed in service. In response to NSEB IR-14(a), NS Power stated that an EAM comparing the refurbishment of Engine 191-332 to a full engine replacement was not completed because the replacement option could not meet the timelines required to align with NS Power's capacity needs. NS Power also noted that the decision to refurbish the engine was part of a long-term investment strategy that had already identified refurbishment as the most practical option to maintain system reliability and optimize lifecycle value. NS Power explained that refurbishing the unit aligned with its strategy of maintaining two operational units and one spare. It also noted the difference in lead times between refurbishment and purchasing a new unit. Because a refurbished unit could be delivered within a year, compared to nearly 24 months for a new one, and given the risks in the long-term operation of Engine 191-443, the company decided to proceed with refurbishing Engine 191-332.

[42] The Board understands the utility's capacity constraints to meet peak load demands, particularly given the faster ramping and on demand availability of a LM6000 unit compared to its other power reserves. However, the Board notes that prior to its last hot section refurbishment in 2019, the engine had accumulated 69,726 total operating hours. The refurbishment history indicates that following this work, the unit would again be due for a major overhaul along a similar timeline and might potentially require replacement based on operating conditions and performance.

[43] The Board accepts NS Power's position that an EAM was not conducted because the replacement option could not meet the timelines required to align with NS Power's capacity needs. However, the Board notes that the utility had sufficient time to plan for this situation, given the last hot section refurbishment was performed in 2019.

Therefore, the Board remains concerned whether any benefit was lost had the utility chosen replacement rather than refurbishment. In addition, the Board remains uncertain whether the refurbishment cost was excessive due to the operational issues described above. Nevertheless, no evidence has been presented to suggest imprudence, and no parties recommended a disallowance. Moreover, no party presented evidence indicating that replacement would be a less costly alternative. The Board, therefore, approves the project. Nonetheless, the Board believes that further performance data is required, as outlined below.

3.2.1 Engine Operating Condition and Efficiency

[44] In response to NSEB IR-1, NS Power provided performance data for Engine 191-332. The standard net electrical efficiency was 41%, while the estimated actual Lower Heating Value efficiency was 35% for the period from 2016 to 2019, and 34% for the period from 2021 to 2023. A variation of approximately 150% between the minimum and maximum cost per kWh is also evident during the engine's operation.

[45] In response to NSEB IR-1(i), which requested a list of all investments and tasks aimed at improving the performance of gas turbine engines, NS Power stated that it applies GE service bulletins, monitors performance through operational reliability analysis programs, and conducts condition monitoring activities such as routine borescope inspections, oil analysis, and vibration analysis. However, the Board notes that the utility did not mention any projects aimed at improving intake air quality or mitigating air-quality-related corrosion, even though it has undertaken similar initiatives in the past, such as the project in Matter M08781: LM6000 TUC4 Airhouse Upgrade.

[46] The Board understands that the impacts of coastal air conditions and thermal cycling cannot be fully mitigated, and that the addition of SPRINT requirements

further increases thermal and moisture stresses. However, the Board notes that the engine is operating 6-7% below its rated efficiency of 41%. The OEM recommends operating the turbines close to their rated efficiency, as this is the point at which they deliver the best balance between fuel burn, emissions, output, and minimizing of refurbishment costs. The Board understands that operating at lower turbine efficiency results in higher fuel burn for the same MW output, and this often coincides with excessive blade erosion, corrosion, and other airflow losses that negatively impact turbine performance.

[47] The Board believes that operating at this reduced efficiency not only increases the cost per kWh but can also potentially create conditions that may accelerate corrosion and erosion. As a result, the Board finds that the level of erosion and corrosion observed in the turbine may not have been in line with what would be expected had the unit operated at its rated efficiency.

[48] Given that the unit operated for an extended period at substantially less than its rated efficiency, potentially leading to unnecessarily higher fuel costs for ratepayers, the Board will refer this matter to the FAM auditor for review during the current FAM audit.

[49] The referral to the FAM audit will address fuel cost impacts. However, it does not address concerns that inefficient operation of Engine 191-332 may have resulted in increased refurbishment costs for Engine 191-332, or that proactive planning and earlier management of previously identified issues could have positioned replacement as the preferred option, as Midgard suggested.

[50] Therefore, in addition to the referral of this matter to the FAM auditor, the Board directs NS Power to submit a third-party engineering report from a qualified expert with experience in LM6000 units to evaluate NS Power's LM6000 operating practices. This report shall identify any gaps in current operational and maintenance practices, review the utility's comprehensive asset-management program for the LM6000, and provide recommendations to ensure that LM6000 units operate as close as possible to their rated efficiency, as well as improve and optimize the operating environment to reduce refurbishment or major overhaul costs as a percentage of the cost of a new unit. This report shall also include an engineering assessment to reduce variability and establish the most effective procedures and detergent for its operating environment. The Board directs that this report be filed within one year of the issuance of this decision. Along with the report, the utility must provide a timeline for implementing any recommendations it contains. Further, the Board directs the utility to preserve all performance data from the third-party engineering review for any future reviews.

4.0 LM6000 ENGINE 191-443 REPLACEMENT (CI C0073491)

4.1 Evidence and Submissions

[51] Based on its review of the evidence submitted in this proceeding for Engine 191-443, Midgard found that several inspection issues were not adequately addressed by NS Power. Midgard reviewed borescope inspection reports from 2022, 2023, 2024 and 2025 and stated that the LPC was repeatedly reported as dirty. The April 2023 and May 2024 inspections noted that the LPC remained dirty even after water washing. Water washing is required by the OEM of the LM6000 unit to maintain its efficiency and prevent

deposits that can obscure defects during borescope inspection. Midgard also pointed out that during the June 2025 borescope inspection, detergent required for the water wash was not available on site, and the inspection was performed without washing.

[52] Midgard stated that NS Power should exercise greater diligence in reviewing and analyzing borescope images and provided examples where borescope findings were not included in the inspection summary findings. Further, Midgard noted that NS Power did not provide any documentation to show that it reviewed or addressed several significant findings identified in the 2024 borescope inspection which could increase the risk of damage and pose a serious reliability concern for the turbine.

[53] Midgard reported that Engine 191-443 has accumulated 27,000 hot section hours and approximately 56,000 hours on the cold section since its last major overhaul, both beyond the OEM's recommended limits of 25,000 fired hours for the hot section and 50,000 fired hours for the cold section. Midgard also noted that, based on the borescope inspection findings and subsequent expert reviews, Engine 191-443 was clearly no longer in serviceable condition and had exceeded OEM maintenance thresholds at the time of assessment.

[54] Midgard believes that NS Power broadly followed OEM guidance in operating and maintaining Engine 191-443, but gaps in follow-up and issue resolution reduced effectiveness. It further stated that the evidence shows turbine deterioration consistent with end-of-life, supported by exceeded OEM service intervals and unserviceability findings. Midgard noted that NS Power only partially incorporated guidance from TGA and other experts.

[55] NS Power considered two primary alternatives for Engine 191-443: the major overhaul (refurbishment) option, or new engine replacement. It ultimately selected to replace the engine with a new one. NS Power did not consider purchasing a refurbished engine from GE because of its unreliable service history and prior negative experiences, including unplanned outages, rework, supplier disputes, and legal involvement. Midgard noted that NS Power's EAM for the project showed a lower net present value of revenue requirement for replacement at \$43.4 million compared with \$54.3 million for refurbishment. Midgard agreed that limiting NS Power's evaluation to two alternatives was appropriate, and noted that the EAM's comparison of costs, component fallout risk, reliability, and revenue requirements demonstrated that replacement with a new engine was a logical and well-supported choice.

[56] Midgard noted that GE is the sole supplier of new LM6000 engines and NS Power's procurement decisions and selection of the service shop for Engine 191-443 are logical and prudent. As such, Midgard recommended approving the project. Midgard also noted that based on available information, the quoted price and associated contingency appear reasonable given current market conditions, where LM6000 units are in high demand.

[57] Nonetheless, Midgard recommended the following actions for the replacement project:

- a. Adhere strictly to OEM maintenance practices and act promptly on recurring issues and inspection findings;
- b. Incorporate guidance from TGA and other experts fully to reduce operational and reliability risks;

- c. Base decisions on thorough evaluation of cost, reliability, and operational risk, rather than procedural comparison alone;
- d. Ensure procurement contracts are secure and manage price risk while maintaining operational continuity; and
- e. Monitor and consider contingency provisions to address variability in component fallout and uncertainties prior to final teardown and replacement.

[58] In its rebuttal evidence, NS Power stated that it continually evaluates new detergents and washing methods as they become available from vendors and that its discussions within the LM6000 user community confirm that wash effectiveness varies significantly across the fleet, including NS Power units. To further address this issue, NS Power plans to conduct a formal engineering assessment in 2026 in collaboration with a third-party expert to reduce variability and establish the most effective procedures and detergent for its operating environment.

[59] NS Power also noted that engine conditions and findings are reviewed internally, and that any abnormal findings are referred to third parties, such as GE, TCT, and TGA, as required. It stated that repairs completed in June 2025 were within GE's serviceability limits and were reviewed by both TCT and TGA, and that these repairs ensured the unit did not fail in service. It further noted that the remaining issues requiring corrective action can only be addressed during a depot-level overhaul.

[60] NS Power further stated that its inspection approach begins with OEM standards as outlined in GE-issued manuals and is further enhanced through third-party expertise and detailed condition assessments to extend the life of engines and

components when prudent. For Engine 191-443, NS Power submitted that there is no evidence to suggest that acting earlier would have reduced costs, as the engine was removed from service at approximately 25,785 operating hours when condition assessments confirmed this was appropriate.

[61] NS Power stated that many of Midgard's recommendations related to NS Power's practices are already embedded in the Company's maintenance and procurement processes. Moving forward, NS Power said it will continue to strengthen its current practices as part of its continuous improvement program for LM6000 engine refurbishments and replacements.

[62] In its submissions, the CA argued that the project contingency amount of the application should be rejected, given that the pricing included in the application has now been confirmed, and NS Power has secured a production slot for the new LM6000 with GE.

[63] In its reply submissions, NS Power stated that although the production slot and purchase price of the new engine have been secured, the price is in USD, and therefore remains subject to foreign exchange fluctuations, which can significantly impact the final cost in CAD. Due to this remaining uncertainty, NS Power argued that it remains appropriate to maintain a contingency on the project. In addition, it noted that only actual costs incurred are added to the rate base, and the utility must obtain approval if costs exceed the Authorization to Overspend thresholds as outlined in the Capital Planning & Capital Expenditure Justification Criteria guideline.

4.2 Analysis and Findings

[64] No Intervenor has opposed the current capital application, and Midgard's evidence confirms the necessity of the project, acknowledging that the decision to replace

Engine 191-443 was logical and well-supported. While Midgard identified areas for improvement, NS Power maintains it has addressed these concerns and is committed to continuous enhancements in maintenance practices, vendor engagement, and planning processes.

[65] The Board acknowledges the concern raised by the CA regarding the project contingency but is satisfied with NS Power's explanation for the continued project contingency requirement, along with the existing monitoring and control measures in place under the Capital Planning & Capital Expenditure Justification Criteria.

[66] Midgard opined that better adherence to OEM maintenance practices, timely resolution of recurring issues, and full integration of TCT and third-party guidance by NS Power could have mitigated reliability risks and potentially lowered replacement costs. However, the Board finds that addressing the issues Midgard identified would not have necessarily lowered replacement costs, as the cost of a new replacement engine is fixed by the supplier. Instead, such mitigation may have made refurbishment a more viable option, potentially delaying the need for replacement by another 25,000 to 50,000 operating hours. The Board further notes that Engine 191-443 has accumulated 87,153 total operating hours over its life and is being replaced, while the Engine 191-332 has accumulated 93,258 total operating hours over its life and is being refurbished. The replacement cost is \$5,268,729 more than the refurbishment cost. NS Power did not provide any justification, other than citing operational constraints, as to why Engine 191-443, with 87,153 total operating hours, is being replaced while Engine 191-332, with 93,258 total operating hours, is being refurbished, given that both units are located at the same site.

[67] The evidence before the Board from Midgard indicated that engine replacement was a logical and well-supported choice. No other evidence was submitted to the Board suggesting that replacement was inappropriate or that refurbishment would provide better value to ratepayers. Further, no evidence has been presented to suggest imprudence, and no parties recommended a disallowance. The Board also accepts NS Power's explanation about operational constraints to maintain two operating LM6000 units and one spare. The Board, therefore, approves the project. Nonetheless, the Board believes that further performance data is required, as outlined below.

[68] The Board is concerned about the operating environment practices that resulted in different outcomes for Engine 191-332 and Engine 191-443. Therefore, the Board directs NS Power to submit a third-party engineering report from a qualified expert with experience in LM6000 units to evaluate NS Power's LM6000 operating practices. This report shall identify any gaps in current operational and maintenance practices, review the utility's comprehensive asset management program for the LM6000, and provide recommendations to ensure that LM6000 units operate as close as possible to their rated efficiency, as well as improve and optimize the operating environment to reduce refurbishment or major overhaul costs as a percentage of the cost of a new unit. The Board directs that this report be filed within one year of the issuance of this decision. In addition, the utility must provide a timeline for implementing the report's recommendations. The Board also directs the utility to preserve all performance data from the third-party engineering review for any future reviews.

[69] Further, in response to NSEB IR-1, NS Power provided performance data for this engine. The standard net electrical efficiency was 41%, while the estimated actual

Lower Heating Value efficiency was 36% for the period from 2017 to 2020, and 35% for the period from 2023 to 2025. A variation of approximately 75% between the minimum and maximum cost per kWh is also evident during the engine's operation. For the same reasons for efficiency and operational issues described above for Engine 191-332, the Board also notes that this unit operated for an extended period at substantially less than its rated efficiency, potentially leading to unnecessarily higher fuel costs for ratepayers. As such, the Board will refer this matter to the Fuel Adjustment Mechanism auditor for review during the current Fuel Adjustment Mechanism audit.

[70] Finally, the Board agrees with NS Power that the additional reporting requested by the SBA regarding return-to-service status of the LM6000 engines and the obligation to meet its target planning reserve margin is not necessary. The Board acknowledges that any issues related to the continued use of the LM6000 units should be appropriately addressed in the 10-Year System Outlook report filed annually by NS Power and in the IRP process.

5.0 CONCLUSION


[71] Based on the evidence in this proceeding, the Board finds the work associated with both capital applications is necessary, and the corresponding cost is justified. Accordingly, the Board approves NS Power's request in the amount of \$18,948,560 for CI C0068655: LM6000 191-332 Life Extension and \$24,217,289 for CI C0073491: LM6000 191-443 Engine Replacement, respectively.

6.0 SUMMARY OF DIRECTIVES


[72] The Board has issued the following directives to NS Power:

- To provide documentary evidence of a lifecycle cost-benefit analysis for future LM6000 capital applications and to ensure that refurbishment/replacement decisions are made well in advance of critical timelines submitted for Board approval; and
- To submit a third-party engineering report from a qualified expert with expertise in LM6000 units to evaluate NS Power's LM6000 operating practices. This report shall identify any gaps in current operational and maintenance practices, review the utility's comprehensive asset management program for the LM6000, and provide recommendations to ensure that LM6000 units operate as close as possible to their rated efficiency, as well as improve and optimize the operating environment to reduce refurbishment or major overhaul costs as a percentage of the cost of a new unit. The Board directs that this report be filed within one year of the date of this decision.


DATED at Halifax, Nova Scotia, this 16th day of April 2026.



Steven M. Murphy



Jennifer L. Nicholson



Darlene Willcott



NSEB APPROVAL SHEET

Project Title: LM6000 191-443 Engine Replacement

CI Number: C0073491

Date: August 5, 2025

Expenditure Profile			Type of Filing	
Year	Budget Amount	Project Estimate	<input type="checkbox"/>	
2025		61,326	<input checked="" type="checkbox"/>	Capital Project Authorization
2026		4,745,151	<input type="checkbox"/>	Unforeseen and Unbudgeted (U&U)
2027		19,410,812	<input checked="" type="checkbox"/>	Planned & Advanced (P&A)
			<input type="checkbox"/>	Subsequent Approval Item
			<input type="checkbox"/>	Authorization to Overspend (ATO)
			<input type="checkbox"/>	Scope Change
			<input type="checkbox"/>	Final Cost (FIN)
Total	\$0	\$24,217,289		

COMMENTS

Submitted on behalf of NOVA SCOTIA POWER INCORPORATED

Authorized Signatory
Dave Pickles
Chief Operating Officer

DATE
August 5, 2025

Approved on behalf of NOVA SCOTIA ENERGY BOARD

DATE
April 16, 2026



NSEB APPROVAL SHEET

Project Title: LM6000 191-332 Life Extension

CI Number: C0068655

Date: August 5, 2025

Expenditure Profile			Type of Filing	
Year	Budget Amount	Project Estimate	<input type="checkbox"/>	
2024	99,869	217,556	<input checked="" type="checkbox"/>	Capital Project Authorization
2025	5,913,584	18,731,004	<input type="checkbox"/>	Unforeseen and Unbudgeted (U&U)
			<input type="checkbox"/>	Planned & Advanced (P&A)
			<input checked="" type="checkbox"/>	Subsequent Approval Item
			<input type="checkbox"/>	Authorization to Overspend (ATO)
			<input type="checkbox"/>	Scope Change
			<input type="checkbox"/>	Final Cost (FIN)
Total	\$6,013,454	\$18,948,560		

COMMENTS

Submitted on behalf of NOVA SCOTIA POWER INCORPORATED

Authorized Signatory
Dave Pickles
Chief Operating Officer

DATE

August 5, 2025

Approved on behalf of NOVA SCOTIA ENERGY BOARD

DATE

April 16, 2026