

ENERGY ALBERTA PEACE RIVER NUCLEAR POWER PROJECT

IAAC Registry File No. 89430

March 2026

SHOW STOPPER 33

THERE IS NO SUCH ELECTRICITY NEED

ENERGY ALBERTA'S CLAIM THAT IT WILL SUPPLY 25 PER CENT OF ALBERTA'S ELECTRICITY IS ARITHMETICALLY INVALID: IT IMPLIES A BASELINE THAT DOES NOT EXIST.

THIS FOUNDATIONAL ERROR CORRUPTS THE ENTIRE NEED JUSTIFICATION.

THE CAPACITY GAP ENERGY ALBERTA ALLEGES AND PROPOSES TO FILL DOES NOT EXIST ON AESO'S OWN DATA.

THE ONLY IDENTIFIABLE FUTURE GAP BEFORE AND AFTER 2038 — A 3,078 MW COAL-TO-GAS RETIREMENT RISK IN 2038 — ARRIVES BEFORE ENERGY ALBERTA CAN PRODUCE ELECTRICITY AND PROVISION FOR THIS IS ALREADY MADE BY THE PROJECTS ALREADY IN THE PIPELINE.

THE IAAC TISG FALLS SHORT BECAUSE IT DOES NOT REQUIRE ENERGY ALBERTA TO CONDUCT A VERIFIED NEEDS ASSESSMENT OR THE MANDATORY REGDOC 2.5.2 §2.2.2 SOCIETAL RISK COMPARISON. BOTH THESE ARE REQUIRED AND PROVISION MUST BE MADE BY IAAC IN THE TSIG.

EXECUTIVE SUMMARY — WHAT THIS SUBMISSION SHOWS

1. Energy Alberta's need justification rests on a claim that the project will supply approximately 25 per cent of Alberta's electricity, implying a total provincial capacity of approximately 19,200 MW. AESO's actual published installed capacity as of April 2025 is 23,164 MW — more than 20 per cent higher than EA's implied baseline. This arithmetic error is not a minor discrepancy. It is the foundation of the entire need argument, and it is wrong.

2. The foundational arithmetic error invalidates every downstream conclusion that depends on it: the sizing of the project, the urgency of the need, and the claim that no alternative can fill the gap. A regulatory process that proceeds to Impact Statement on the basis of a demonstrably incorrect baseline cannot produce a valid section 63 public interest determination under Vavilov.
3. On AESO's actual data, Alberta already has a massive surplus of generating capacity over demand — 23,164 MW installed against 10,316 MW average demand and a record peak of 12,384 MW. Even stripping out all wind and solar and counting only firm dispatchable generation, Alberta has approximately 18,678 MW of firm capacity against that same 12,384 MW record peak — a firm surplus of approximately 6,294 MW.
4. The only identifiable future firm capacity gap in AESO's planning data is the retirement of approximately 3,078 MW of coal-to-gas converted assets around 2038. That gap is structurally incompatible with EA's project on three grounds: it is smaller than EA's 4,800 MW output by 1,722 MW; it arrives before EA can possibly be online given any comparable nuclear construction precedent; and it is already addressed by faster and cheaper projects already in the AESO pipeline.
5. REGDOC-2.5.2 §2.2.2 requires a mandatory societal risk comparison between the proposed reactor and flexible gas generation with CCS as a viable competing technology. The TISG does not require EA to conduct this comparison. Three independent participant submissions on the IAAC registry (IDs 62983, 63056, 63138) have raised this deficiency. IAAC has not acted on any of them.
6. This submission requires two TISG amendments: a verified Needs Assessment grounded in AESO published data; and the mandatory REGDOC §2.2.2 societal risk comparison against flex gas CCS and long-duration battery storage. Neither is currently required. Both are mandatory under existing law.

33.1 The Legal Framework: Two Independent Mandatory Requirements

33.1.1 IAA Section 22(1)(i) — Need for the Designated Project

Section 22(1)(i) of the Impact Assessment Act requires that an impact assessment consider 'the need for the designated project.' This is not a discretionary factor. It is one of the mandatory considerations the Review Panel must address in its report and that IAAC must address in its section 63 public interest determination. A project that lacks a demonstrated need cannot satisfy the public interest test regardless of how its environmental impacts are mitigated.

The need requirement is not satisfied by the proponent asserting that electricity demand will grow. It requires a quantified, evidence-based demonstration that: (a) a specific capacity gap will exist within the project's operational horizon; (b) that gap cannot be filled by alternatives that are faster, cheaper, or lower-risk; and (c) the project's output is correctly sized to fill the gap. Energy Alberta's need argument fails all three limbs, for the reasons set out below.

33.1.2 REGDOC-2.5.2 §2.2.2 — The Mandatory Societal Risk Comparator

CNSC REGDOC-2.5.2, Design of Reactor Facilities, Version 2.1, section 2.2.2 states that the societal risks from reactor facility operation shall be compared against the risks of generating electricity by viable competing technologies. The mandatory comparator technology for a baseload nuclear facility in Alberta is flexible natural gas generation with carbon capture and storage — the only other technology capable of providing firm, schedulable, 24-hour-a-day baseload power in the Alberta grid context.

The word 'shall' in CNSC regulatory documents expresses a mandatory requirement. This comparison must be conducted before a licence can be issued. If the comparison is not required in the TISG, it will not be in the Impact Statement. If it is not in the Impact Statement, the CNSC will be asked to issue a licence without the comparison that its own regulatory document requires. IAAC's silence on this requirement pre-commits the CNSC to a structurally incomplete licensing record.

The REGDOC §2.2.2 comparator requirement applies at licensing — not only at the EA stage. But if the IS does not address it, the proponent has no incentive to conduct the analysis, and the gap will persist through every licensing stage. The time to require it is now, in the TISG, before the IS is filed.

33.2 EA's Arithmetic Failure: The 25 Per Cent Claim Is Structurally Invalid

THE PROBLEM:

Energy Alberta has stated publicly and in its project documentation that the Peace River Nuclear Power Project will supply approximately 25 per cent of Alberta's electricity. At 4,800 MW of projected output, a 25 per cent share implies that total Alberta electricity capacity is approximately 19,200 MW.

AESO's published installed generating capacity as of April 2025 is 23,164 MW. EA's implied baseline is 3,964 MW — 17 per cent — below AESO's actual figure. The implied baseline does not exist.

This is not a rounding error or a difference of methodology. The discrepancy between EA's implied baseline of approximately 19,200 MW and AESO's actual 23,164 MW is 3,964 MW — roughly the output of four large gas-fired generating stations. EA's own project output of 4,800 MW is 83 per cent of the size of the discrepancy.

The baseline error is of the same order of magnitude as the project itself.

33.2.1 The Arithmetic

Element	Figure	Source
EA's projected output	4,800 MW	EA project documentation
EA's claimed electricity share	~25%	EA public statements
EA's implied total Alberta capacity	~19,200 MW	Derived: $4,800 \div 0.25$
AESO actual installed capacity	23,164 MW	AESO Installed Capacity report, April 2025
Discrepancy	3,964 MW (17% understatement)	Derived
EA's actual share of real baseline	~20.7%	Derived: $4,800 \div 23,164$

Sources: AESO Installed Capacity report April 2025; Energy Alberta project documentation.

INVALIDITY FINDING:

EA's 25 per cent need claim rests on a baseline that is 3,964 MW — 17 per cent — below AESO's actual published installed capacity. The implied baseline of approximately 19,200 MW does not correspond to any AESO planning document, any AESO historical data point, or any year in which Alberta's installed capacity was at that level.

A need justification built on a demonstrably incorrect baseline is not a valid needs assessment. It is an arithmetic error that corrupts every downstream conclusion: the claimed urgency of the need, the sizing of the project relative to the gap, and the claim that alternatives cannot fill the identified gap. IAAC cannot proceed to Impact Statement without requiring EA to refile a Needs Assessment grounded in AESO-verified data.

33.2.2 Why This Matters Beyond the Numbers

The 25 per cent claim is not merely a statistics error. It is the load-bearing premise of EA's entire public interest case. EA has represented to regulators, to the public, to Treaty 8 Nations, and to the IAAC record that Alberta needs this project to meet a quarter of its electricity demand. If that quarter is calculated against a baseline that is 17 per cent too low, then the project's claimed necessity is proportionately overstated. The urgency that justifies accepting nuclear risks — radiological contamination of the Peace-Athabasca watershed, perpetual radioactive waste, Treaty 8 EPZ obligations — is premised on a need figure that has never been reconciled against AESO's own public data.

Under Vavilov, a public interest determination by the Review Panel that accepts EA's need argument without requiring this reconciliation cannot meet the requirements of justification, transparency, and intelligibility.

The arithmetic discrepancy is on the public record. Ignoring it is not a defensible choice.

33.3 The Current Position: A Massive Surplus Already Exists

Even setting aside EA's arithmetic error and accepting AESO's actual figures, Alberta does not have a capacity shortage. It has a capacity surplus of historic proportions.

33.3.1 The 2026 Baseline from AESO's Own Data

Metric	Figure	Source / Note
Installed generating capacity	23,164 MW	AESO Installed Capacity report, April 2025
Average Alberta Internal Load (AIL)	10,316 MW	AESO 2025 Annual Statistics
Record peak demand	12,384 MW	January 2024 cold snap
Average pool price (2025)	\$43.68/MWh	AESO 2025 Annual Statistics — 8-year low
Surplus over average demand	12,848 MW	Derived
Surplus over record peak	10,780 MW	Derived

Sources: AESO Installed Capacity report April 2025; AESO 2025 Annual Market Statistics.

Alberta's pool price in 2025 — \$43.68/MWh — was the lowest in eight years, driven by new highly efficient gas-fired generation and additional wind and solar output arriving faster than demand is growing. A market in which the average pool price is at an eight-year low is not a market that is signalling a need for 4,800 MW of new generation at a cost that no private investor will underwrite without public subsidy.

33.3.2 What the Surplus Means for the Need Argument

A capacity surplus of 10,780 MW over record peak demand is not consistent with a demonstrated need for any new baseload generation in the near term. EA's project would add 4,800 MW to a system that already has 10,780 MW more than it needs at peak. Even under the AESO High Electrification scenario — which projects peak demand reaching 20,000 MW by 2043 — the surplus is not eliminated by demand growth alone before the mid-2030s.

The surplus also means that the AESO pool price signal — the market mechanism specifically designed to indicate when new generation investment is required — is not sending a 'build nuclear' signal. It is sending the opposite signal. The 2025 pool price of \$43.68/MWh does not support the economics of new nuclear generation, which requires a guaranteed revenue floor well above market price to attract financing.

That is a further indicator that the need is not currently demonstrated on market terms.

33.4 Firm Capacity Analysis: The Grid Is Secure Even Without Wind and Solar

EA and its supporters will argue that installed capacity overstates reliability because wind and solar are intermittent — they cannot be counted as firm capacity equivalent to nuclear. This objection is addressed directly. The answer is that Alberta's firm dispatchable capacity — with zero contribution from wind or solar — already exceeds its record peak demand by approximately 6,300 MW.

33.4.1 Firm Dispatchable Capacity — Wind and Solar Stripped Out

Generation Type	Approximate Installed MW	Firm? (Available on Demand)
Natural gas (CCGT + SCGT)	~8,500 MW	Yes — firm, schedulable
Cogeneration (industrial)	~6,000 MW	Yes — firm, continuous
Coal-to-gas converted assets	~3,078 MW	Yes — at retirement risk ~2038
Hydroelectric	~900 MW	Yes — firm, dispatchable
Biomass / other dispatchable	~200 MW	Yes — firm
Wind	~5,700 MW	No — variable, weather-dependent
Solar	~4,500 MW	No — variable, zero at night
Total firm dispatchable (ex-wind/solar)	~18,678 MW	Firm
Record peak demand	12,384 MW	January 2024
Firm surplus over peak	~6,294 MW	Even with zero wind/solar

The firm dispatchable surplus of approximately 6,294 MW means that Alberta can lose every wind turbine and solar panel in the province simultaneously — at the worst recorded demand moment — and still have approximately 6,300 MW of firm power available above what the grid requires. The intermittency objection does not establish a need for nuclear generation. It establishes that wind and solar require backup — which already exists in Alberta's gas and cogeneration fleet, with substantial room to spare.

It is also worth noting that on the January 2024 cold snap — the event that produced the record 12,384 MW peak — the Alberta grid did not fail. It was managed through existing firm generation and approximately 350 MW of demand reduction from a public appeal. No new baseload was required. No nuclear was required. The existing system, even under maximum stress, had sufficient firm capacity.

33.4.2 The Implication for the Need Argument

EA's need argument requires the Review Panel to accept that Alberta's existing firm capacity is inadequate. AESO's own data shows the opposite. The firm dispatchable surplus is not declining rapidly. Gas and cogeneration additions have been running ahead of retirement rates. The only identified near-term retirement event — the coal-to-gas fleet in 2038 — reduces the firm surplus to approximately 3,200 MW above peak demand on AESO Reference Case projections. That is still a surplus, not a gap, before any new generation is counted.

33.5 The Only Identified Gap — And Why EA Cannot Fill It

AESO's planning data identifies one future firm capacity risk within a planning horizon that is relevant to this assessment: the retirement of approximately 3,078 MW of coal-to-gas converted generating assets concentrated around 2038. This section shows that EA's project is structurally incompatible with that gap on three independent grounds.

33.5.1 The 2038 Gap: Size, Timing, and Source

Parameter	Figure	Source
Coal-to-gas capacity at retirement risk	~3,078 MW	AESO capacity planning data
Expected retirement concentration	~2038	AESO Long-Term Adequacy Report
EA's Peace River project output	4,800 MW	EA project documentation
Size mismatch (EA oversized by)	1,722 MW (56% excess)	Derived
AESO Reference Case firm surplus after 2038 retirements (before new build)	~3,200 MW above peak	Derived from AESO data
AESO High Electrification surplus after retirements	~1,500 MW above peak	Derived — still a surplus

THE PROBLEM:

The only firm capacity gap AESO's data supports is approximately 3,078 MW emerging around 2038 from coal-to-gas retirements. EA's project output is 4,800 MW — 56 per cent larger than the gap it proposes to fill. Adding 4,800 MW to fill a 3,078 MW gap produces 1,722 MW of excess generation in a market whose pool price is already at an eight-year low. There is no economic or reliability case for this oversizing.

33.5.2 Ground 1: EA Cannot Be Online by 2038 — Timeline Impossibility

Every large nuclear project completed in the Western world in the past twenty years has taken substantially longer than its initial schedule from regulatory approval to commercial operation. The relevant comparison class is new large reactor construction at greenfield sites in OECD jurisdictions.

Project	Country	Approval / FID Year	Commercial Operation	Years Construction
Vogtle Unit 3	USA	2012	2023	11 years
Vogtle Unit 4	USA	2012	2024	12 years
Hinkley Point C	UK	2016	2029 (est.)	13+ years
Flamanville EPR	France	2007	2024	17 years
Olkiluoto 3	Finland	2005	2023	18 years
EA Peace River (AP1000)	Canada	2026 EA filing (est.)	2038? (impossible)	Would require <12 years — no Canadian precedent

Sources: US NRC; EDF; TVO; EA project documentation. EA's October 2025 technology pivot to AP1000 means no Canadian site licensing, design approval, or construction experience exists for this reactor type.

EA's October 2025 pivot from the MONARK SMR to the Westinghouse AP1000 means there is no existing Canadian regulatory framework, no completed design approval, no site licensing experience, and no construction workforce trained on the AP1000 in Canada. The CNSC will need to conduct a vendor design review for the AP1000 in the Canadian context before a Licence to Prepare Site can be issued. Each of these steps adds years to the timeline. A 2038 online date for an AP1000 at a greenfield site in northern Alberta that has not yet begun detailed site characterisation is not a planning scenario — it is an impossibility.

33.5.3 Ground 2: The Gap Is Already Being Filled by the Pipeline

The AESO connection queue and confirmed project announcements already contain more than sufficient firm generation to replace the 2038 coal-to-gas retirements without nuclear. The following are named, announced projects — not queue applications — with confirmed or near-confirmed timelines.

Project	Capacity	Type	Status / Timeline
Greenlight Electricity Centre	1,864 MW	Gas CCGT — firm dispatchable	IAAC early decision 2025 — no further assessment required
New CCGT additions (2024 online)	~2,700 MW	Gas CCGT — firm dispatchable	Commissioned 2024 — already online
Jurassic Solar + BESS (Northland)	220 MW solar + 80 MW BESS	Hybrid — firm dispatch	2028 target
Killarney Lake Solar + BESS	22.5 MW solar + 100 MW BESS	Hybrid — firm dispatch	2026 target

AESO Phase 1 data centre BYOG	1,200 MW	Mixed — demand-coupled generation	AESO-allocated 2024–2025
Demand response programs (structured)	500–1,000 MW	Dispatchable reduction	Deployable <2 years
Interprovincial inertia expansion (BC)	TBD — AESO FFR+ program	Firm import	AESO planning horizon 2030–2035
Total identified pipeline (firm)	>6,000 MW	Firm or firm-capable	All deployable well before 2038

Sources: IAAC registry; AESO connection project list 2025; CER Alberta electricity data September 2025.

The Greenlight Electricity Centre alone — 1,864 MW of firm dispatchable gas — covers 60 per cent of the 2038 retirement gap. Combined with the 2,700 MW of gas CCGT already online in 2024, the structured BESS pipeline, and demand response, the 3,078 MW retirement gap is fully addressable without nuclear, at a fraction of the cost and timeline, and well before EA could be operational.

33.5.4 Ground 3: Size Mismatch — EA's Project Is the Wrong Solution Even if the Gap Were Real

Even if the 2038 gap were not already addressed by the pipeline — which it is — EA's 4,800 MW project is structurally the wrong response. Adding 4,800 MW to fill a 3,078 MW gap produces 1,722 MW of generation surplus in a market that is already oversupplied. The capital cost of 1,722 MW of unneeded nuclear capacity would be borne by Albertans through rate support, public financing, or federal subsidies, with no corresponding reliability benefit. No private investor will underwrite this without a public revenue guarantee that amounts to a permanent subsidy — a subsidy that is not justified when the gap is already being filled by competitive market participants at lower cost and risk.

33.6 Timeline Impossibility Across Scenarios

Section 33.5.2 showed that EA cannot be online before 2038 by reference to comparable project precedents. This section shows that the timeline impossibility holds across all AESO demand scenarios — not merely for the 2038 retirement gap.

AESO Demand Scenario	Peak Demand 2038 (est.)	Firm Capacity 2038 (after retirements, ex-nuclear)	Residual gap after pipeline	EA online (earliest realistic)	Assessment
Reference Case (1.2%/yr growth)	~14,100 MW	~18,000 MW (pipeline adds ~3,000 MW net)	No gap — ~3,900 MW surplus	2039–2042 (optimistic)	EA is surplus capacity — unneeded
High Electrification (1.9%/yr growth)	~15,300 MW	~17,500 MW net after pipeline	No gap — ~2,200 MW surplus	2039–2042 (optimistic)	EA is surplus capacity — unneeded
Accelerated Electrification (data centres max)	~17,000 MW	~17,500 MW net	Marginal surplus ~500 MW	2042–2045 (realistic)	EA online after any real gap emerges; gap addressable by gas/BESS faster

Sources: AESO 2024 Long-Term Adequacy Report; AESO 2025 Annual Statistics; derived projections.

Across all three AESO demand scenarios, the Peace River Nuclear Power Project cannot be online before any firm capacity gap materialises in Alberta's grid. In the Reference Case and High Electrification Case, no firm gap materialises at all — the pipeline addresses all retirements with surplus remaining. Only in an accelerated data centre electrification scenario does a marginal gap appear — and even in that scenario, EA would arrive online years after the gap, and the gap itself is addressable by gas or long-duration storage that can be deployed in three to five years rather than the fifteen-plus years EA requires.

33.7 Price Uncompetitiveness — The Market Has Already Decided

Need is not established by demonstrating that electricity demand will grow. It requires demonstrating that the proposed technology is the most appropriate means of meeting that demand. Alberta's electricity market provides a direct, objective signal on this question: the pool price.

Technology / Benchmark	Estimated LCOE (2025)	Alberta 2025 Pool Price	Competitive without subsidy?
New nuclear (AP1000, greenfield)	\$120–200/MWh	\$43.68/MWh	No — gap of \$76–156/MWh
Gas CCGT (new build)	\$50–75/MWh	\$43.68/MWh	Marginal — near competitive
Gas CCGT with CCS	\$65–95/MWh	\$43.68/MWh	Close — competitive at carbon price >\$65
Utility solar (Alberta)	\$30–45/MWh	\$43.68/MWh	Yes — at or below pool price
VRFB storage (4-hour, 2025)	~\$78/MWh LCOS	\$43.68/MWh	Competitive for arbitrage + services
Wind (Alberta, merchant)	\$35–50/MWh	\$43.68/MWh	Yes — competitive at median

Sources: Lazard LCOE+ v17.0; BloombergNEF 2025; AESO 2025 Annual Market Statistics.

New nuclear at a greenfield site in northern Alberta requires a revenue floor of approximately \$120–200/MWh to be financeable. Alberta's average pool price in 2025 was \$43.68/MWh. The gap between nuclear's required revenue and the prevailing market price is \$76–156/MWh — a gap that can only be filled by permanent public subsidy. No private investor has committed capital to EA's project. No provincial or federal revenue guarantee has been publicly announced. A project that requires a subsidy of this magnitude to be financeable has not demonstrated commercial need — it has demonstrated commercial unviability.

This is not a novel objection. Every nuclear project built in the last twenty years in a liberalised electricity market has required a government strike price or long-term contract substantially above market price: Hinkley Point C in the UK received a strike price of £92.50/MWh (2012 pounds) in a market where wholesale prices were approximately £40–50/MWh. The EA project will require an equivalent arrangement in Alberta. The TISG does not require EA to disclose its revenue model or demonstrate that its project is commercially viable without permanent subsidy. It should.

This is further detailed in Show Stopper 34.

33.8 The Mandatory REGDOC §2.2.2 Comparator: Flex Gas CCS Has Never Been Assessed

REGDOC-2.5.2 §2.2.2 is not optional and it is not satisfied by a general discussion of alternatives in the Environmental Impact Statement. It requires a specific, quantitative societal risk comparison between the proposed reactor and viable competing technologies. For a baseload facility in Alberta, the mandatory competing technology is flexible natural gas generation with carbon capture and storage.

33.8.1 Why Flex Gas Is the Mandatory Comparator — Not Baseload Gas

The critical point — which EA's supporters and some IAAC staff have misunderstood — is that the mandatory comparator is not a baseload gas plant running 24/7. It is a flexible peak-only gas plant that fires only during demand peaks. In a high-renewable Alberta grid, that means approximately 1,000–2,000 operating hours per year, not 8,760.

The difference matters enormously for the comparison. A flex gas plant running 2,000 hours per year produces roughly one-quarter of the annual CO₂ of the same plant running continuously. It requires a CCS system sized for that fraction of the exhaust volume — making CCS dramatically cheaper per unit of capacity than on a baseload plant. Shell Quest at Fort Saskatchewan already demonstrates 80–90 per cent capture in Alberta industrial conditions. Pilot systems are targeting 98–99 per cent capture for commercial deployment in the 2030s. If those targets are met, a peak-only flex gas plant with CCS running 2,000 hours per year has a net annual CO₂ footprint that is comparable to nuclear's lifecycle greenhouse gas intensity of approximately 6–15 gCO₂e/kWh.

33.8.2 The Comparison EA Has Never Conducted

Comparison Dimension	Nuclear (Peace River AP1000)	Flex Gas + CCS (peak-only)	Assessment
Capital cost per MW	\$5,000–9,000/kW (est.)	\$800–1,200/kW	Nuclear 4–10x higher
Construction lead time	15+ years (greenfield)	3–5 years	Gas 3–5x faster
Annual operating hours	8,760 (must run baseload)	1,000–2,000 (peak only)	Gas has lower fixed cost per MWh of need served
Net annual CO ₂ (peak-only CCS)	6–15 gCO ₂ e/kWh (lifecycle)	~6–15 gCO ₂ e/kWh (if 99% CCS achieved)	Comparable — at targeted capture rates
Radioactive waste	Hazardous 10,000–100,000+ years	None	Nuclear uniquely harmful
Emergency Planning Zone	Required — Treaty 8 territory	Not required	Nuclear EPZ over Treaty 8 land
NLCA liability cap	\$1B cap — public bears excess	Standard commercial liability — no cap	Nuclear imposes public liability
Revenue model in Alberta	Requires \$120–200/MWh strike price	Competitive at \$65–95/MWh with carbon price	Gas far closer to market parity

Alberta-specific precedent	No AP1000 built in Canada	Shell Quest CCS operating 400 km from site	Gas CCS proven in Alberta
----------------------------	---------------------------	--	---------------------------

Sources: OECD NEA; Lazard LCOE+ v17.0; IPCC AR6 lifecycle GHG; Shell Quest CCS annual reports; AESO data.

EA has never conducted this comparison. The TISG does not require it. That omission is the core defect this stopper addresses. The comparison above demonstrates — at a level of detail already sufficient to identify a likely outcome — that flex gas with CCS is faster to deploy, cheaper to build, produces equivalent or lower lifecycle emissions at peak-only operating hours, and imposes none of nuclear's four aggravated risk characteristics: no perpetual radioactive waste, no Emergency Planning Zone over Treaty 8 land, no statutory liability cap, and no requirement for a permanent revenue guarantee above market price.

33.8.3 Long-Duration Battery Storage as Second Mandatory Comparator

VRFB technology — as addressed in Show Stopper 32 — is the second mandatory comparator under REGDOC §2.2.2. Phase I of the Dalian VRFB is commercially operating at 100 MW / 400 MWh. AESO has approved grid-scale battery storage in its adequacy planning. BloombergNEF's 2025 benchmark LCOS for a four-hour battery system is approximately 78 USD/MWh. For multi-hour and long-duration systems, NREL ATB mid-case projections are directionally consistent with continued LCOS reductions through 2040.

VRFB storage combined with Alberta's existing solar and wind fleet provides firm dispatchable capacity for the overnight and shoulder periods that constitute Alberta's reliability challenge. It does so without radioactive waste, without an Emergency Planning Zone, without the NLCA liability cap, and at a capital cost that is commercially financeable without public subsidy. EA has not compared its project against this technology. The TISG does not require it to do so.

33.9 Registry Evidence: Three Independent Convergent Submissions

The deficiencies identified in this submission are not novel arguments raised for the first time here. Three independent participants filed submissions on the IAAC registry during the 2025 comment periods that independently raised the absence of a demonstrated need and the mandatory REGDOC §2.2.2 comparator deficiency. Under Vavilov, the Review Panel must address these convergent submissions in its reasons or its decision is unreasonable on its face.

33.9.1 Submission ID 62983 — C.G. Nel — Filed June 28, 2025

Title: 'Obsolete Objective.' Filed under the TISG comment period by the present intervenor. This submission identified that EA's need justification was based on a baseline capacity figure that did not correspond to any AESO-published data, and argued that the TISG must require EA to conduct a verified needs assessment using AESO data before the IS is filed. It also raised the REGDOC §2.2.2 mandatory comparator deficiency as an independent ground requiring TISG amendment.

33.9.2 Submission ID 63056 and ID 63138 — Independent Participants

Two further independent participant submissions filed during the same comment period raised overlapping concerns about need justification and alternatives assessment. Submission ID 63056 raised the AESO pipeline sufficiency argument — that projects already planned or in the queue are sufficient to address Alberta's reliability needs without nuclear. Submission ID 63138 raised the REGDOC §2.2.2 comparator requirement independently and identified flex gas CCS as the mandatory comparator technology that EA had not assessed.

The convergence of three independent submissions on the same two deficiencies — verified needs assessment and REGDOC §2.2.2 mandatory comparator — is not coincidence. It reflects the fact that both deficiencies are facially apparent from AESO's published data and from CNSC's own regulatory document. IAAC has not amended the TISG in response to any of these submissions. That unexplained failure to act is itself a ground of review under Vavilov's requirement of justification and transparency.

33.10 Remedy: The Required TISG Amendments

Two TISG amendments are required. They are set out below. Neither is a novel or burdensome requirement — both flow directly from existing mandatory legal obligations that the current TISG fails to implement.

REQUIRED TISG AMENDMENTS — NEEDS ASSESSMENT AND MANDATORY COMPARATOR

Amendment A — Verified Needs Assessment

(a) The proponent must file a Needs Assessment grounded exclusively in AESO-published planning data, including: (i) current installed capacity as reported in AESO's most recent Installed Capacity report; (ii) current and projected Alberta Internal Load under AESO Reference, High Electrification, and Low Growth scenarios from the most recent AESO Long-Term Adequacy Report; and (iii) firm dispatchable capacity calculated by stripping all variable renewable generation (wind, solar) from installed capacity and identifying only generation sources available on demand regardless of weather conditions.

(b) The proponent must identify the specific capacity gap — in megawatts, in each AESO scenario, and in each year from 2026 to 2060 — that the Peace River Nuclear Power Project proposes to fill. This gap must be expressed as the difference between projected peak demand and projected firm dispatchable capacity from all sources already planned, contracted, or in the AESO connection queue with a firm interconnection agreement.

(c) The Needs Assessment must demonstrate that the identified gap cannot be filled by faster-to-deploy and lower-cost firm dispatchable technologies — specifically flexible gas generation with carbon capture and storage, long-duration battery energy storage (including vanadium redox flow battery systems), demand response programs, and interprovincial intertie expansion — within the same planning horizon. This comparison

must use AESO's own adequacy planning data as the baseline and must not rely on a baseline installed-capacity figure that has not been verified against AESO's published records.

(d) Any baseline capacity figure used in the Needs Assessment must be cross-referenced to a specific AESO published document, table, and date. A baseline that implies total Alberta installed capacity materially different from AESO's most recently published figure must be explained and justified on the record.

Amendment B — Mandatory REGDOC 2.5.2 §2.2.2 Societal Risk Comparator

(e) The proponent must conduct the societal risk comparison required by REGDOC-2.5.2 §2.2.2 against flexible peak-only natural gas generation with carbon capture and storage as the mandatory viable competing technology. This comparison must: (i) model the flex gas plant as operating only during peak demand hours (approximately 1,000–2,000 hours per year), not as a baseload plant; (ii) apply the same Alberta-specific AESO demand and generation data used in the Needs Assessment; and (iii) compare lifecycle greenhouse gas intensity, emergency planning zone requirements, radioactive and hazardous waste profiles, and capital cost and lead time.

(f) The proponent must conduct the same societal risk comparison against long-duration battery energy storage — specifically vanadium redox flow battery technology — as a second mandatory viable competing technology, using the same methodology. The comparison must address the vanadium electrolyte's non-degrading characteristics, its scalability to multi-GWh capacity, and its Alberta-specific supply chain advantages.

(g) The mandatory comparator assessment must be updated at each subsequent licensing stage — Licence to Prepare Site, Licence to Construct, Licence to Operate — using the most recent AESO, NREL ATB, and IEA WEO data available at the time of the application. A mandatory update is also triggered if any competing technology reaches 100 MW of commercial deployment in Canada or a directly interconnected US jurisdiction, or if AESO issues a long-term adequacy contract for it.

(h) Consequence. If the updated Needs Assessment demonstrates that the identified capacity gap is already addressed by competing technologies in the AESO pipeline, or if the mandatory societal risk comparison places the Peace River Nuclear Power Project in a higher-cost and higher-risk position relative to both mandatory comparators under any plausible scenario, the proponent must file a supplementary public interest justification explaining how section 63 of the IAA is satisfied before the next licensing stage is authorised.

FINDING:

Energy Alberta's need justification is built on an arithmetic error. The 25 per cent claim implies a total Alberta installed capacity of approximately 19,200 MW. AESO's actual figure is 23,164 MW. The implied baseline does not exist. Every downstream conclusion that depends on it — the urgency of need, the sizing of the project, the claim that no alternative can fill the gap — is correspondingly invalid.

On AESO's actual data, Alberta has no firm capacity gap today and will not have one in the 2038 retirement scenario. Firm dispatchable generation already exceeds record peak demand by approximately 6,294 MW with zero contribution from wind or solar. After the 2038 coal-to-gas retirements, the AESO Reference Case still shows approximately 3,200 MW of firm surplus before any new generation is counted. The pipeline — led by the 1,864 MW Greenlight Electricity Centre and 2,700 MW of gas CCGT already online — addresses the 3,078 MW retirement gap in full, without nuclear, at a fraction of the cost and in a fraction of the time.

EA cannot be online before any gap materialises. On every comparable nuclear construction precedent in the OECD, a greenfield AP1000 at a site in northern Alberta that has not begun detailed site characterisation will not reach commercial operation before 2039 at the earliest and 2042–2045 on a realistic schedule. The only identifiable gap — 2038 — closes before EA arrives. The gap is also 1,722 MW smaller than EA's project, and it is already being filled.

The mandatory REGDOC 2.5.2 §2.2.2 societal risk comparison against flex gas CCS has never been conducted. The Alberta-specific reference for that technology is Shell Quest CCS at Fort Saskatchewan — operating 80–90 per cent capture at 8+ million tonnes stored, 400 kilometres from the Peace River site, in the same regulatory and geological environment. Three independent participant submissions on the IAAC registry have raised these deficiencies. IAAC has not acted. The TISG must be amended before the IS proceeds.

IAAC TRAP:

IAAC faces a binary choice on the need question. Require EA to file a Needs Assessment grounded in AESO's actual published data — acknowledging that the 25 per cent / 19,200 MW baseline implies a capacity figure that AESO has never reported — and require the mandatory REGDOC §2.2.2 societal risk comparison against flex gas CCS and VRFB storage. Or accept EA's unverified arithmetic and proceed to Impact Statement on a foundation that will be demolished the moment anyone compares EA's implied baseline against AESO's April 2025 Installed Capacity report.

The trap is this: if IAAC proceeds without requiring the TISG amendments in section 33.10, the Review Panel's section 63 determination will rest on a need argument built on a number that does not exist. The Vavilov requirements of justification, transparency, and intelligibility cannot be met by a decision that accepts, without scrutiny, a baseline capacity figure that is 17 per cent below the figure published by the Alberta grid operator in the same month EA

filed its Initial Project Description. The discrepancy is on the public record. Ignoring it is a reviewable error.