Security of Supply Forecasting and Information Policy (SOSFIP) Review

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4 November 2025

Executive Summary

This submission supports Transpower's proposed amendments to SOSFIP and recommends a phased adoption of probabilistic, climate-linked forecasting. Integrating meteorological data partnerships, transparent adequacy metrics, and scenario-based stress testing will enhance confidence in security-of-supply decisions while keeping implementation practical and cost-proportionate.

Introduction

As an independent consultant working across New Zealand's energy operations, forecasting, and market analytics, I support Transpower's review of the Security of Supply Forecasting and Information Policy (SOSFIP). New Zealand's electricity system is increasingly shaped by intermittent renewables, constrained gas supply, and climate variability. The proposed amendments strengthen transparency, realism, and integration between energy adequacy, capacity adequacy, and climate risk. This feedback reflects both local operational experience and insights from international best practice, including AEMO's ESOO 2023, ISO-NE Fuel Security 2019, PJM Reliability 2024, and UK ESO 2024.

Responses to Consultation Questions

Q1 – Support for the Amendment

Yes. The proposed amendments address key weaknesses exposed by recent winters, including overestimation of thermal availability and volatile ERC signals. Dual-fuel and clearer threshold approaches will enhance accuracy. Implementation costs are modest compared to the benefits of avoided emergency events.

Q2 – Alternative Options

Integrate meteorological and fuel-security data directly within SOSFIP. A formal collaboration between the System Operator, MetService, and NIWA could strengthen climate-risk visibility. Publishing ERC percentile bands (P10/P50/P90) and a 'probability of Alert within eight weeks' would improve transparency.

Q3 – Improving ESO/QSSO Communications

The ESO and QSSO are comprehensive but difficult to act on. Introduce a concise one-page dashboard summarising ERC status, NZGB margin, inflows, fuel, and CSRB status alongside a short climate commentary.

Q4 – Contracted Fuel Scenario
Yes. Publishing both physical and contracted-fuel ERC scenarios would reflect deliverability risk and align with ISO-NE and PJM approaches, encouraging early mitigation.

Q5 – Forecast Horizon for Contracted Fuel
Model 12 months by default and up to 24 months where data permits. This mirrors typical maintenance and gas contracting horizons and AEMO's two-year outlook.

Q6 – Replacing the Worst-Case SST
Agree. Using a 'time-to SST' method prevents premature Alerts and improves predictive reliability. A 12-month post-implementation review is recommended.

Q7 – Revised Watch Curve Definition
Support Option 1, ensuring the Watch curve always remains above the Alert curve. This hierarchy improves communication consistency and mirrors EirGrid and CAISO.

Q8 – Minimum Alert Duration
Agree. Maintaining a minimum four-week Alert period promotes stable communication and contracting certainty. Early exit could occur only when storage exceeds Watch plus buffer.

Q9 – Three-Hour Model Resolution
Support. Moving to a 3-hour model captures evening peak flexibility issues better than the day/night split, aligning SOSFIP with AEMO ESOO and CAISO frameworks.

Q10 – Enhancing NZGB and Alignment with ESO
Support. Extend NZGB horizon to 12 months, include hydro-constrained capacity scenarios, and embed NZGB commentary within ESO/QSSO publications for unified adequacy reporting.

Q11 – Expanded System Risk Scenarios
Agree. Include quarterly stress-test scenarios for HVDC outages, generation derating, and fuel-supply disruptions combined with weather stressors.

Q12 – CSRB Buffer Update
A transparent, seasonal CSRB profile would provide consistency and reduce ad-hoc adjustments. This should reflect actual consented hydro storage.

Q13 – SO Discretion for CSRB Buffer
Support retaining discretion, but recommend publishing decision triggers and outcomes within 24 hours to maintain stakeholder confidence.

Q14 – Objectives of the Amendment
Agree. The objectives—timeliness, clarity, and information quality—are appropriate and support efficient market operation. Recommend annual tracking of ERC forecast accuracy and Alert frequency.

Q15 – Qualitative Cost–Benefit Assessment
Agree. Behavioural and coordination benefits are significant, though initially qualitative. A quantitative assessment can follow after one year of operation.

Q16 – Benefits vs Costs
Yes. Analytical costs are low and outweighed by avoided reliability events. Similar international models achieved major reliability gains at negligible market cost (<0.1% of turnover).

Q17 – Compliance with Section 32(1)
Agree. Transparent and evidence-based forecasting enhances efficient market outcomes and consumer welfare, consistent with section 32(1) of the Act.

Section V – Forecasting & Climate-Risk Integration

Extreme weather conditions in recent years have highlighted that static assumptions understate real security risk. SOSFIP should embed probabilistic and climate-linked forecasting to maintain relevance under increasing variability.

1. Probabilistic Adequacy Modelling
Adopt a Monte Carlo-based adequacy framework capturing joint uncertainty in hydro inflows, renewables, demand, outages, fuel, and HVDC constraints. This produces probabilistic metrics such as LOLE and ERC percentiles, providing a more realistic risk picture.

2. Weather-Conditioned Scenarios
Integrate ensemble forecasts from NIWA and MetService to produce conditional ERC scenarios for major climate regimes (El Niño, La Niña, blocking highs). This helps anticipate inflow and demand shifts and enhances interpretability for stakeholders.

3. Fuel–Hydro Deliverability Index (FDI)
Define an index combining contracted fuel, expected hydro energy, and transmission constraints. Tracking FDI percentiles provides early warning of adequacy concerns.

4. Model Verification & Transparency
Introduce an annual model validation cycle with clear performance metrics and public reporting of forecast reliability improvements.

5. Compound-Event Stress Tests
Run quarterly simulations for combined conditions (e.g., dry + cold, calm + hot, atmospheric-river storm, or fuel-supply shock) and publish qualitative probabilities and mitigation actions.

Event	Combined Drivers	Expected impact
Dry + Cold	low inflows + heating load	Storage depletion + peak stress

Calm + Hot	wind lull + AC demand	Energy shortfall + line derating
AR Storm	heavy rain + landslide	Transmission constraint + spill
Fuel Shock	gas limit + port delay	Reduced thermal availability

6. Forecast-Based Early Warning
Monitor climate indices (ENSO, MJO, SAM). When thresholds are breached, activate a Forecast Watch and convene SO–MetService–NIWA briefings, issuing concise public updates.

7. Implementation and Transition
Introduce new probabilistic features gradually, allowing deterministic and probabilistic systems to operate in parallel. Engage industry participants to build an understanding of probabilistic outputs. Costs are expected to be modest and primarily analytical.

Implementation Priorities (Summary)

Theme	Priority	Implementation Horizon
Probabilistic adequacy model	High	2026–27 (pilot phase)
MetService/NIWA integration	Medium	Within 12 months
Fuel–Hydro Deliverability Index	Medium	2026
Stress-testing scenarios	High	Immediate
Public dashboards	Medium	Next ESO release

Conclusion
The 2025 SOSFIP reforms are technically sound, proportionate, and internationally aligned. Embedding probabilistic, climate-linked forecasting and transparent governance will transform SOSFIP into a living risk-forecasting framework. These improvements will enhance system resilience, strengthen market confidence, and better safeguard consumers.

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