

# Automatic Under-Frequency Load Shedding (AUFLS)

Stage II Review - Industry Submissions Summary Paper

System Operator

2/12/2011



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SYSTEM OPERATOR

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# 1 Background and Purpose

Following the completion of the ‘Automatic Under-Frequency Load Shedding (AUFLS) Scheme Options Economic and Provision Review’ the System Operator requested industry feedback on the findings and proposals in the report.

This paper provides a high level overview of the feedback received and the System Operator’s response to the feedback. Given a number of participants made the same or similar feedback in respect of particular areas of the report, we have cumulated this feedback and provided one response to each.

Submissions were received from the following ten parties:

Category	Submitter
Consumers	NZ Steel Norske Skog Pan Pac Rio Tinto Alcan
Consumer Advocates	MEUG
Generators /Retailers	Genesis
Grid Owner	Transpower
Other (Load Aggregators /Adv Measurement)	EnerNOC & Energy Intellect
Network Companies	Vector WEL Networks

# 2 Overview of Submissions

## 2.1 Cost-Benefit Analysis

Summary of Submissions	System Operator’s Response
<p>There seemed to be a general support of the cost-benefit analysis. Norkse-Skog, Energy Intellect, and EnerNOC did question the assumption of IL reduction during times of scarcity. EnerNOC and Energy Intellect desired more thought into the impact of removing IL from the reserve market to meet AUFLS provision.</p>	<p>The cost-benefit analysis considered what was the most likely marginal source of extra IR capability at times of scarcity, and thus what should be considered to be the cost of extra IR resource if altered AUFLS arrangements gave rise to an altered requirement for IR at such times.</p> <p>The analysis presented in the consultation suggested that it was not appropriate to consider that IL should be considered the marginal source of IR capability at such times, due to the observation that some (but not necessarily all) IL which may be offered into the IR market at normal times tends to be withdrawn at times of scarcity in order to avoid peak generation or network costs. This situation of some, but not all, IL withdrawing at such times</p>

Summary of Submissions	System Operator's Response
	<p>was substantiated by information provided by one of the submitters (see Pan Pac's submission).</p> <p>Accordingly, the System Operator concludes that the assumption that marginal changes in the requirement for IR at times of scarcity should be valued at the cost of peaking generation (being the most likely marginal source of capacity at such times) is appropriate.</p>
<p>Vector suggested that the installation cost of the df/dt option seemed low and neglected to include technology changes that may be required to manage any new relays.</p>	<p>The System Operator is currently engaging in conversations with the various asset owners, including distributors, to better understand the implementation requirements and foreseen costs of installing a new AUFLS scheme.</p> <p>The System Operator will attempt to better capture cost and cost allocation information during these discussions.</p>

## 2.2 Modelling Assumptions

Summary of Submissions	System Operator's Response
<p>Transpower Grid Owner suggested that further simulation work be carried out to better model the capabilities of Pole 2 and Pole 3, as the controls of Pole 3 are currently being designed.</p> <p>The Grid Owner expressed concern that a commutation failure during high HVDC transfer could trigger df/dt relays and believes this need to be taken into account when designing the df/dt settings.</p> <p>The Grid Owner also suggested that relays were installed near the HVDC and monitored to observe local frequency characteristics.</p>	<p>The System Operator agrees that accurate modelling of the HVDC capabilities with Pole 3 is crucial to ensuring the df/dt relays perform appropriately on New Zealand power system, especially noting the effect of a commutation failure during high transfer.</p> <p>In light of the Grid Owner's suggestions the System Operator has included additional modelling of the HVDC capabilities in a scope of work to further verify the use of rate-of-change-of-frequency relays.</p> <p>The System Operator is in conversation with the Grid Owner and other Asset Owners to ensure the required testing is completed and the use of df/dt relays is verified as feasible for New Zealand.</p>

## 2.3 Alternate AUFLS Procurement Methods

Summary of Submissions	System Operator's Response
<p>Many submitters expressed interest in further investigation of alternative AUFLS procurement methods. Directly connected consumers, load aggregators, and Genesis Energy suggested that further consideration be given to market-based AUFLS arrangements before the System Operator proposes a new AUFLS scheme design. These parties considered that the responsibility of the market investigation should ultimately be in the hands of the Electricity Authority.</p> <p>EnerNOC and Energy Intellect believe that as a part of the current review the market investigation should be carried out by the System Operator and the findings recommended to the EA.</p> <p>Some advocates for market-based AUFLS procurement supported the idea with a desire for greater consumer clarity and choice and for the most economically efficient procurement method. Norske-Skog and MEUG supported a 'causer-pay' approach to an AUFLS market design.</p> <p>Submitters also proposed or sought opportunities to propose potential AUFLS procurement options. Norske-Skog proposed an inclusion of AUFLS load into the SPD solver and EnerNOC and Energy Intellect expressed interest to propose alternative procurement methods to the System Operator.</p>	<p>The System Operator remains neutral in regard to the mechanisms used for the procurement of AUFLS provided the procurement method ensures the guaranteed availability of the required AUFLS load.</p> <p>The System Operator remains concerned that a full market based procurement method for AUFLS would not achieve this. Some feedback received suggests that a full market based procurement method would be more efficient from an economic perspective. Unless, however, market based procurement is able to achieve guaranteed load then the scheme will not achieve its purpose.</p> <p>In light of the number of responses on this issue, the System Operator will discuss how to proceed on this issue with the Electricity Authority.</p> <p>However this type of change would take many years to work into reality. The System Operator's view is that the current scheme should be improved while a market is being developed to ensure consumers are appropriately protected.</p>
<p>Vector stated support for the use of a mandatory scheme that applies to all parties equally and is used a last resort safety mechanism.</p>	<p>Noted.</p>

## 2.4 Purpose of AUFLS

Summary of Submissions	System Operator's Response
<p>Rio Tinto Alcan and Pan Pac expressed concern whether the purpose of the AUFLS scheme was clear and as a result if the</p>	<p>The purpose of the AUFLS scheme is set out the technical report and further explanation of the scheme can be found in Appendix A of economic report.</p>

Summary of Submissions	System Operator's Response
problems with accomplishing this purpose were understood. Pan Pac suggested further that the current AUFLS scheme appears to be functioning appropriately and not in need of development.	Based on the studies set out in the technical report (see section 6 of the report), the System Operator has concluded that current AUFLS arrangements are not sufficient to cover this purpose. We therefore disagree with Panpac that the AUFLS scheme is not in need of development.

## 2.5 Exemptions and Equivalence

Summary of Submissions	System Operator's Response
<p>Major users had concern with the approaching exemptions expiry date of September 30, 2012. They suggested that delays in the Under-Frequency Management review do not allow enough time for exempted parties to make the necessary arrangements.</p> <p>Rio Tinto and EnerNOC both suggested that major users embedded inside distribution networks are effectively granted <u>de facto</u> exemptions and this should be considered in any review of the existing exemptions.</p> <p>Genesis and Vector both expressed that the current exemptions regime results in an unequal sharing of AUFLS which places the burden on non-exempt parties.</p>	<p>We will pass these concerns/comments onto the Electricity Authority (being the party who may issue exemptions from AUFLS obligations.)</p>
<p>NZ Steel and Pan Pac both expressed concern over the ability of direct connects to meet the 'at all times' requirement for AUFLS provision which ignores factors such as the demand response of industrial participants. They also suggested that these factors make it difficult to arrange for equivalence arrangements since they believe equivalence assumes continuation of consumption which is not true of direct connected parties. Rio Tinto went on to suggest that the lack of diversity of load available to direct connect impairs them from being able to meet the AUFLS block requirements.</p>	<p>The System Operator is interested in continued discussion with direct connects to understand the individual issues they face in meeting AUFLS provision obligations.</p> <p>There are a number of options available within the current codes to accommodate provision issues (such as equivalence arrangements or dispensations (with conditions attached)). We encourage direct connects to contact the System Operator to arrange a discussion in this regard.</p>
<p>In light of the upcoming exemption deadline the Major Users Group requested a more detailed timeline and</p>	<p>The System Operator is in the process of scoping out the remaining work required before submitting a code</p>

Summary of Submissions	System Operator's Response
critical path to prepare for any changes ahead.	change proposal to the Electricity Authority. The scope will be published to industry which will include a proposed timeline of the remainder of the System Operator's work. The Electricity Authority will then determine the timeline of events once a code change proposal has been submitted. If the proposal recommends a change to AUFLS relay technology (i.e., using df/dt relays) then it is expected that a significant implementation period will need to be provided for.

## 2.6 Other Comments

Summary of Submissions	System Operator's Response
<p>WEL Networks expressed concern over the current and future testing requirements for AUFLS relays and the additional risk to customers due to the utilisation of df/dt triggering.</p> <p>WEL suggested that they may have difficulty meeting the four block requirement without including some high priority load.</p> <p>WEL also requested further information on the international use of df/dt relays for load shedding.</p>	<p>The System Operator is in conversations with North Island Asset Owners to ensure the df/dt testing completed is robust and the provision challenges faced by distributors are understood and mitigation options are available.</p> <p>The System Operator agrees that robust testing of the df/dt relays is critical to ensuring the relays perform appropriately on New Zealand power system.</p> <p>The System Operator is conducting an international review of df/dt as part of the next stage of work.</p>