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By e-mail: submissions@ea.govt.nz

Criteria for departing from the methodology for determining non-conforming grid exit points (GXPs)

Transpower welcomes the opportunity to submit on the Electricity Authority's (**Authority**) 10 April 2012 consultation paper *Criteria for departing from the methodology for determining non-conforming GXPs*.

The Authority is consulting on three criteria that it proposes to use for determining whether a GXP should be reclassified from "conforming" to "non-conforming". As System Operator, Transpower has a role in the application of the proposed criteria and an interest in the implications for system operations and security.

Our responses to the Authority's consultation questions are attached as Appendix A. We have also attached a letter from the System Operator that provides more background on concerns around the omission of certain key industrial GXPs (KIN0111, KIN0112, KIN0113 and KAW0111) from the draft list of non-conforming GXPs. We expect that this information may be helpful for market participants.

Below we provide further comments on a number of matters relevant to Authority's deliberations.

The System Operator has its own definitions of 'conforming' and 'non-conforming'

The consultation paper states that, when developing the demand-side bidding and forecasting Code amendment, the Authority "...intended that GXPs with a predictable demand pattern will be called 'conforming GXPs', while those that do not follow a predictable pattern will be called 'non-conforming GXPs'". As such, the methodology applied by the Authority is based on statistical predictability of uncertain future demand given known past demand.

The System Operator also uses the terms 'conforming' and 'non-conforming' to describe the ability of the System Operator's load forecasting to determine the consumption at a GXP in each trading period.

The Authority's methodology can only base its assessment of predictability on historical consumption information. Similarly, the System Operator's load forecasting relies on historical consumption information supplemented by historical weather information and weather forecasts. Neither party can predict shutdowns or changes in the output of industrial plant because these are a function of factors such as price responsiveness, industrial production schedules, maintenance requirements and other factors not visible to the Authority or the System Operator. Only the industrial plant operators themselves are in a position to predict how such factors will influence future demand. Because it is important for security and market performance to have accurate forecasts, the System Operator requires industrial purchasers to provide bids for each trading period. To achieve this, the System Operator requires these purchasers to be classified as 'non-conforming'.

The difference in the Authority and the System Operator definitions of 'conforming' and 'non-conforming' means that it is important for the System Operator to clearly define the criteria for departing from the Authority's methodology for determining non-conforming GXP's.

The second criterion is unnecessary

Transpower considers that the proposed second criterion duplicates the first criterion and is unnecessary. If a GXP has primarily industrial demand and the System Operator considers that the purchaser rather than the System Operator will be better able to predict demand (as per part (a) and (b) of the second criterion) then this GXP will be identified under the first criterion (which focuses on system security).

We note that, if the Authority decides to retain the second criterion, then a definition of "industrial load" will be required.

Pricing accuracy and certainty should also be a consideration

We recommend that there should be an additional criterion based on schedule accuracy. Security and pricing are both fundamental to market design and should be reflected in the criterion. The proposed criterion for system operator-initiated reclassification both focus exclusively on security. However, there may be scenarios where the impact of poor predictability is more severe in terms of undermining price certainty than in terms of causing a security concern.

The third criterion is sufficiently broad to enable price-based justifications to be made, but this criterion is limited to parties that are already a purchaser at the relevant GXP. It would be desirable to allow a wider range of parties (or the Authority itself) to initiate consideration of whether to reclassify a GXP due to pricing accuracy concerns.

The methodology should use a longer time period where appropriate

We recommend that the Authority should consider running the methodology over a longer time period. In some cases, twelve months is not a sufficient record to determine GXP status. In other cases, a GXP may have atypical consumption patterns for a twelve-month period.

We understand that the Authority has trialled an assessment of the KIN GXPs using a four-year dataset and that this resulted in a classification of 'non-conforming'. We consider that this classification would be appropriate and that the Authority should have flexibility to use datasets of more than twelve-months where this will provide a more robust categorisation.

Please feel free to contact me directly if you have any queries regarding the matters raised in our submission.

Yours sincerely

A handwritten signature in black ink that reads "R Parry". The letters are stylized and connected, with a large 'R' and 'P'.

Ross Parry
Regulatory Strategy and Pricing Manager

Appendix 1: Responses to the consultation questions

Question No.	Question	Response
Q1	<p>Do you agree with criteria 1 for system security? If not, please provide your reasons.</p> <p>Criterion 1: System security The Authority may determine that a GXP is a non-conforming GXP if:</p> <ul style="list-style-type: none"> (a) the system operator has advised it is unable to forecast the demand at the GXP at all times to a level of accuracy that will ensure system security; and (b) taking the system operator's advice into account, the Authority is satisfied that the GXP should be non-conforming to ensure system security. 	<p>Yes</p>
Q2	<p>Do you agree with the criteria 2 for industrial demand at a GXP? If not, please provide your reasons.</p> <p>Criterion 2: Industrial demand at a GXP The Authority may determine that a GXP is a non-conforming GXP if:</p> <ul style="list-style-type: none"> (a) the demand at the GXP is primarily an industrial load; and (b) the system operator has advised that in its opinion the purchaser, rather than the system operator, will be better able to predict the demand at the GXP to a level that will ensure system security; and (c) taking the system operator's advice into account, the Authority is satisfied that the GXP should be considered as non-conforming to ensure system security. 	<p>Yes.</p> <p>However, we consider that this criterion is unnecessary and does not add to the first criterion.</p>
Q3	<p>Do you agree with the criteria 3 for purchaser request? If not, please provide your reasons.</p> <p>Criterion 3: Purchaser request The Authority may determine that a GXP is a non-conforming GXP if:</p> <ul style="list-style-type: none"> (a) a purchaser at a conforming GXP has requested that the GXP be changed from conforming to non-conforming, and has given reasons; and (b) the Authority has requested the views of all other purchasers at the GXP; and (c) the Authority has requested the views of the system operator; and (d) taking the purchasers' and system operator's views into account, the Authority is satisfied that changing the GXP from conforming to non-conforming will be for the long term benefit of consumers at the GXP. 	<p>Yes</p>

Q4	Do you think there are any other criteria that should be considered?	<p>Yes.</p> <p>The objectives of the market are to enable the effective and cost-efficient implementation of security, <i>and</i> to deliver pricing information that enables participants to make decisions regarding supply and demand.</p> <p>If the System Operator's stochastic demand forecasting cannot deliver a good level of accuracy for a given GXP, then this can undermine the second objective above. At such GXPs, there is a case for requiring participants to contribute to accurate demand forecasting by providing accurate bids. This would enhance price certainty at such GXPs.</p> <p>The Authority should therefore consider if it requires a criterion based on schedule accuracy and the impact of poor demand predictability on prices.</p>
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Appendix 2: SO advice regarding non-conforming GxPs

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Dear Lori

System Operator advice regarding the Authority's indicative list of non-conforming GXPs

The process for determining conforming and non-conforming grid exit points (GXPs) in 13.27A to 13.27K of the Electricity Industry Participation (Demand-Side Bidding and Forecasting) Code Amendment 2011 will come into effect on 28 March 2012.

We note that, in making a determination, the Authority is required under clause 13.27C(1)(b) to request and take into account advice from the System Operator.

The following advice is provided based on the indicative list of non-conforming GXPs provided by the Authority on 2 March 2012. It is acknowledged that this is not the Authority's final determination, however we consider that the information set out below is relevant and should be taken into account when making a final determination.

Non-conforming GXPs in production

The following GXPs are currently defined by the System Operator as non-conforming GXPs in the market system:

- GLN0331
- KAW0111
- KAW0112
- KAW0113
- KIN0111
- KIN0112
- KIN0113
- TNG0111
- TWI2201
- WHI0111

The nature of the load at these GXPs is such that the users (primarily industrial users) have a better understanding of their planned industrial processing, and hence their expected load, than the System Operator's load forecast application. The System Operator is not in a position to be able to predict planned shutdowns of industrial plant, or predict any periods where processing is likely to deviate from normal output. Therefore, while the load patterns at these locations may be predictable, it is appropriate that the purchasers at these locations submit a bid and that this bid is used to determine the load at the GXP.

Difference in definition of conforming GXP

While *conforming GXP* is not currently a defined term in the Policy Statement or the Code, the System Operator has long understood this to mean conforming to the traditional domestic load pattern of a morning and an afternoon peak.

Under the DSBF Code amendment, *conforming GXP* means a GXP that has been determined as a conforming GXP according to the methodology defined in Schedule 13.7 and the process defined in 13.27C. The methodology is based around predictability of the load pattern which may be *any* pattern, including a flat load pattern.

This difference is noted as we believe it helps to explain some of the notable differences in the System Operator's definition of non-conforming GXPs, and the Authority's indicative list of non-conforming GXPs.

Load inputs into the System Operator's schedules

The conforming or non-conforming status of a GXP determines how the load is derived in each of the System Operator's schedules. It is important to understand how the load is derived in order to understand how the load can, under certain scenarios, have a significant impact on price signals and system security.

Under the new DSBF system, the WDS, NRS and RTD schedules will use the sum of the nominated bids from all purchasers to determine the load at a non-conforming GXP. The PRS will clear the nominated bids (based on price and quantity) submitted by all purchasers at a non-conforming GXP. At conforming GXPs, the WDS and NRS will use the load estimated by the load forecast application. The PRS will also use this information at conforming GXPs, but will also take into account cleared difference bids to determine the load.

Indicative list of non-conforming GXPs provided by the Authority

In your email of 2 March 2012, you provided the following indicative list of nine non-conforming GXPs for the System Operator's consideration:

- ASB0661
- EDG0331
- GLN0331
- KAW0112
- KAW0113
- MNG1101
- TNG0111
- TWI2201
- WHI011

Our response for each GXP is set out below.

GLN0331, KAW0112, KAW0113, TNG0111, TWI2201 and WHI0111

We note that the GXPs listed above are currently defined as non-conforming GXPs, and are likely to remain non-conforming based on the Authority's indicative list of non-conforming GXPs. The System Operator agrees that these GXPs should remain non-conforming due to the nature of the load at these GXPs.

ASB0661, EDG0331 and MNG1101

We note that ASB0661, EDG0331 and MNG1101 are comprised of a mixture of residential and industrial load. These GXPs are currently defined by the System Operator as conforming GXPs, but are likely to become new non-conforming GXPs based on the methodology applied by the Authority.

As noted earlier, there is a direct link between bid quality and load accuracy at non-conforming GXPs. Given the importance of the bid quality at non-conforming GXPs, the System Operator would like to emphasise the need for purchasers at ASB0661, EDG0331 and MNG1101 to submit accurate bids at these GXPs and the Authority's role in monitoring the bid quality. Provided participants submit accurate nominated bids at these new non-conforming GXPs, the System Operator is not concerned about the change in GXP status.

KAW0111, KIN0111, KIN0112 and KIN0113

The System Operator is concerned by the omission of KAW011, KIN0111, KIN0112 and KIN0113 from the Authority's indicative list of non-conforming GXPs. These GXPs are all part of the 110 kV transmission system in the Bay of Plenty region, a highly constrained part of the transmission network. It is important that the load at these GXPs is as accurate as possible as it has the potential to have a significant impact on system security. Any constraints in this area are also likely to be very sensitive, therefore it is also important to get the load as accurate as possible from a pricing and market perspective.

While the load forecast prepared by the System Operator would do a good job of predicting the load at these locations most of the time, the System Operator has no ability to predict or take into account any planned or unplanned shutdowns of plant. As these GXPs are currently defined as non-conforming, the purchasers at these locations can signal planned shutdowns or deviations from their normal processing patterns via their bid.

We believe that if these GXPs are determined to be conforming GXPs, there will be a number of occasions where schedule accuracy will be significantly reduced. The likely impact on system security and the market is provided in the examples below.

Example 1 – Kinleith

The System Operator's Simultaneous Feasibility Test (SFT) tool may create constraints to protect Kinleith-Tarukenga circuit 1 from overloading following the loss of Kinleith-Tarukenga circuit 2 when the Arapuni 110 kV bus is solid¹.

To illustrate, let's assume that the load at KIN0111 is normally 40 MW, and this is the value that is forecast by the load forecast application. A value of 40 MW at KIN0111 will be used by SPD in the WDS, NRS and PRS².

Now let's assume that there is a planned shutdown of the plant connected at KIN0111. This means that the forecast schedules will show a value of 40 MW, when in reality the load will be zero. The System Operator and the market will have no indication or forewarning of this until the shutdown occurs in real time.

Consequently, forecast schedules may be unnecessarily constrained and may indicate high prices and the need for Arapuni generation to be constrained on in real time (depending on the grid configuration at the time), when in reality, the extra generation at Arapuni is not required.

As the load forecast "learns" and adjusts itself based on a number of factors, this has the following implications:

- The load will not self-correct immediately in real time. Each iteration of the load forecast will self-adjust to *gradually* take the load to zero. While the System Operator may take action to

¹ The normal grid configuration is a split Arapuni bus, but it may be closed when insufficient generation is offered on the Arapuni South bus, when there are circuit outages, or when there is a lightning storm close to Arapuni.

² The PRS will clear the nominated bid price, so the load may be less than 40 MW subject to the bid price.

correct the load, any constraints and other initial conditions will be carried through to final pricing.

- The effect of the shutdown will be reflected in the load forecast at the same day and time for the following two weeks, although the magnitude of the effect will decrease over time. This is because the load forecast takes the previous two weeks' load data and applies a weighting factor. Older data has a lower weighting factor than more recent data.

The reverse is true when the plant at KIN0111 comes back online. The forecast schedules may show a value of 0 MW or close to 0 MW, when in reality the load will be 40 MW. The System Operator and the market will have no indication or forewarning of this until the plant turns its processing back on in real time.

In this case, SFT may not generate a constraint in the forecast schedules that is in fact required in real time. Forecast schedules may indicate low or "normal" prices, when in reality, the lack of the necessary constraints may cause violations in real time and the need for Arapuni generation to be constrained on. The System Operator may need to resort to using discretion to bring on more Arapuni generation to resolve the issue. The System Operator may also need to use discretion to potentially bring on Huntly, Otahuhu C and Southdown generation until the load forecast has improved and an SFT constraint is produced.

Example 2 - Kawerau

This is a particularly difficult part of the grid to model and manage given the significant amount of load and generation in such a constrained part of the transmission network. The issues are similar to those provided in the Kinleith example above, however, constraints are more likely to be required at Kawerau for low load and high generation scenarios.

The load at KAW0111 is comprised of the Kawerau township load and the Caxton paper mill. The following example assumes that the total load at KAW0111 is expected to be 13 MW, with the paper mill comprising 9 MW of the load, and the remaining 4 MW of residential load from the township. This split is typical of the expected load at KAW0111.

With all equipment in service, there is the potential for the Edgecumbe-Owhata circuit to overload following the loss of Edgecumbe-Kawerau circuit 3 if the actual load is lower than the forecast load (by approximately 9 MW) due to a planned shutdown of the mill. In this scenario, there may be no SFT constraint produced in real time to manage the violation. As a result, the System Operator may resort to discretion to pull back generation at Aniwhenua, Matahina and Kawerau Geothermal by approximately 9 MW to resolve the violation.

Conversely, when the paper mill resumes its processing, Aniwhenua, Matahina and Kawerau Geothermal generation may be constrained off by approximately 9 MW. The System Operator would have to relax the right hand side of the SFT constraint to prevent the constraint from binding and restricting generation unnecessarily.

The example provided above highlights the importance of the load accuracy at KAW0111. The key considerations are the location and impact on system security, not the size of the load. The constraints in the Kawerau region have been of significant concern to industry participants for some time, and changing the GXP status of KAW0111 to conforming is likely to exacerbate the situation.

It should also be noted that while purchasers will have the ability to signal a planned shutdown via difference bids³, this information will only be used in the PRS. As nominated bids are used in all forecast schedules (WDS, NRS, PRS and RTD), they are a more transparent way to signal planned shutdowns as the information will be visible in all schedules. The PRS is intended to signal changes in demand in response to price, not planned shutdowns of plant that are unrelated to price. Furthermore, the NRS is the schedule that the System Operator will use to make security assessments, and the constraints applied in the real time dispatch (RTD) schedule will be those SFT

³ Difference bids may only be submitted at conforming GXPs.

constraints created from the NRS, not the PRS. Therefore, it is important that KIN0111, KIN0112, KIN0113 and KAW0111 remain non-conforming GXP's to provide the necessary price and security signals to the market.

Summary

The System Operator believes that KAW0111, KIN0111, KIN0112 and KIN0113 should remain non-conforming GXP's because the nature of the load at these GXP's means that the System Operator believes it will not be able to forecast the demand to a level of accuracy that will ensure system security under all circumstances. Due to the highly constrained nature of the transmission system in the Bay of Plenty region, insufficient accuracy of the load at these GXP's could have a serious detrimental effect on system security, market prices and schedule accuracy.

We also note that these GXP's are already defined as non-conforming, therefore if the Authority determines these GXP's to be non-conforming there will be no additional obligations on the participants who trade at these nodes over and above what already happens now.

Please call me if you have any questions or concerns regarding the matters set out in this letter.

Yours sincerely

Natalie Bartos
DSBF Project Manager

CC: Laurie Counsell