

Summary of Submissions on Proposed Modifications to D+1 Business Rules

1. Introduction and purpose

Gas Industry Co distributed a consultation paper on proposed modifications to the D+1 business rules on 1 September.

This report summarises submitters’ responses to the consultation paper together with Gas Industry Co comments and revised processes (where appropriate).

The four proposals are included in separate sections together with tables that summarise the submissions for each proposal. There were four responses to the consultation.

A summary of the consultation paper and feedback from submissions was presented to DAWG on 13 October. Feedback from DAWG is also included in this paper.

2. Process to address anomalous telemetry meter readings

2.1 Overview

Gas Industry Co proposed adding a process that would address anomalous telemetry meter readings. The proposal had the following components:

- On business days:
 - Meter readings from all AG1 ICPs would be checked against their maximum historical demand. If the reading of any ICP’s meter was 5 times this demand the algorithm would report the test result and stop. Gas Industry Co would contact the retailer to determine whether the reading was anomalous or not. If the reading was anomalous, it would be replaced by an estimate provided by the retailer. If it was not possible to get an estimate in sufficient time consumption would be estimated by the algorithm.
- On non-business days:
 - The same check would be used, with an anomalous reading replaced with an estimate.

2.2 Submissions

Submitters had the following feedback on this proposal.

Submitter	
Mercury	<p>Supports the continual improvement of D+1 accuracy with the addition of new processes to the D+1 business rules.</p> <p>Questions whether the test would have picked up any occasions other than the one described if run against D+1’s history. Suggests that the</p>

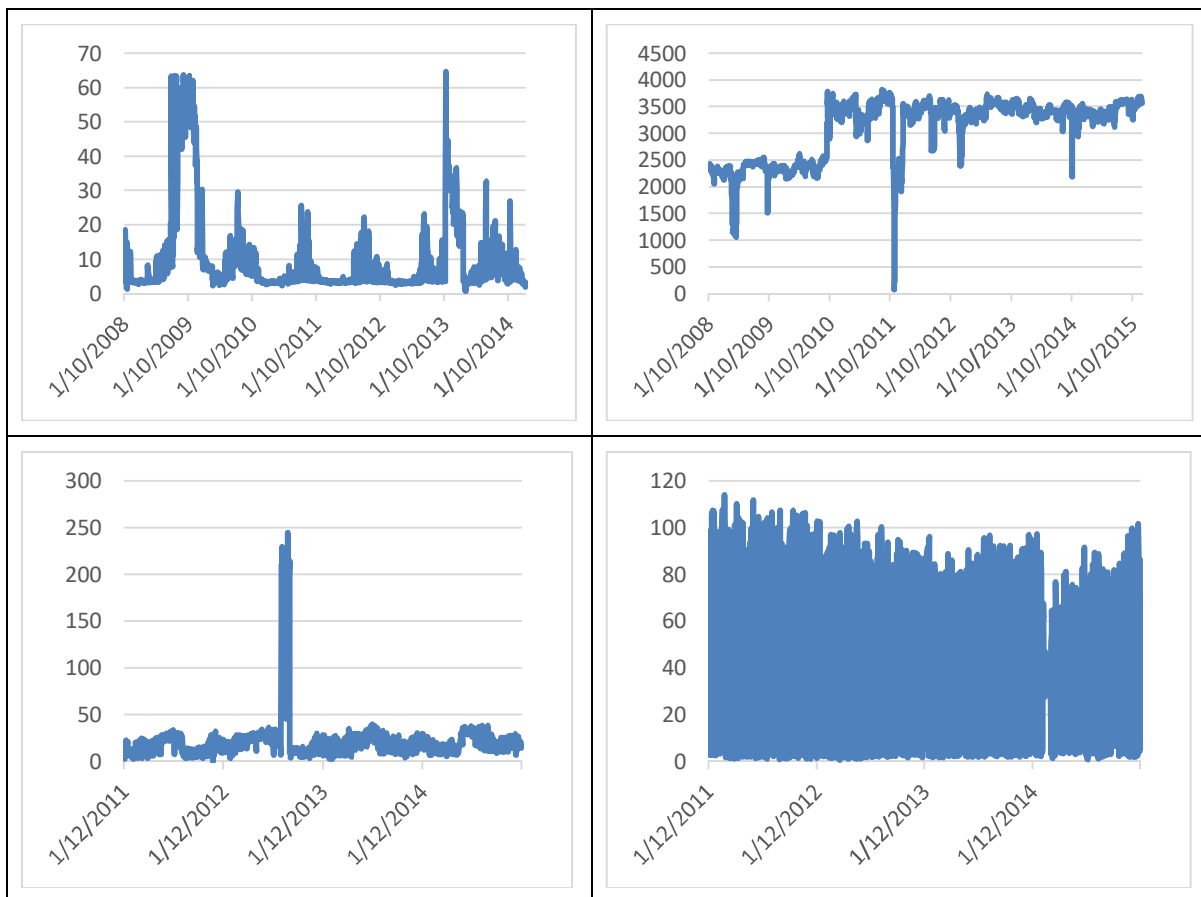
Submitter	
	test could be altered with a lower multiplier, paired with a materiality threshold, say 200GJ or 10% of gate volume.
Greymouth Petroleum	<p>Agrees with the proposal although notes that the test is a 'big risk'. Suggests that the test could be improved by:</p> <p>Also having a low-low check (i.e. that demand isn't <0),</p> <p>If a retailer advises that the actual reading is wrong, replacing this with the model's estimate (rather than the retailer's estimate) to minimise the potential for data manipulation, and</p> <p>Using a multiplier of 2x.</p>
Genesis Energy	<p>Agrees with the proposal.</p> <p>Notes that five times historical demand seems very high, particularly if the TOU site is large. This would only resolve very high errors. If historical data is available for the past three years, a factor of 1.5 on the highest peak would be realistic. For new sites the installed capacity for the site running 24 hours per day period could be used as the basis for the sites maximum usage in a day (this is the theoretical maximum a site can consume).</p>
Nova Energy	<p>Agrees with the proposal.</p> <p>Proposes using statistical tests rather than setting arbitrary trigger levels. Data errors should be flagged if they are higher than three standard deviations from the mean. For small readings a 5x test may be adequate, but for large demands a 2x or 3x test could be more appropriate.</p>

2.3 Gas Industry Co response

Gas Industry Co agrees that the proposed test, which was built around a simple multiple of an ICP's historical maximum consumption, would not achieve the intended outcomes. For some ICPs (particularly ICPs that consume a lot of gas) the multiple is far too high. For example, for an ICP with a maximum demand of 4 TJ/day, a meter error leading to a 15 TJ reading for a particular day would not be picked up as anomalous under the proposed rule. However, the absolute magnitude would be high, leading to the retailer incurring substantial charges (albeit this cost would be addressed through the wash-up process).

Nova's proposal of using a standard deviation threshold has intuitive appeal. However, there are a couple of issues with this approach. First, assuming the distribution of consumption readings is normal, three standard deviations on the upper tail of the distribution is still within the distribution of possible readings, albeit at the very end. In contrast, an anomalous meter reading is *outside* the distribution; that is, greater than the maximum value. Secondly, this approach relies on an assumption that the underlying distribution of each ICP's consumption

pattern is the same. Unfortunately, this is not the case. Some ICPs have a relatively uniform consumption distribution, with others having a normal-shaped distribution. Others are skewed and still others are bi-modal (e.g. multiple peaks following seasonal profiles). Examples of consumption distributions are shown below. With such an array of consumption patterns, a simple statistical measure cannot be used to identify anomalous meter readings.



The issue was discussed further in the 13 October DAWG meeting. The meeting noted that the focus of the test should be on large ICPs, because the absolute size of a meter error for these ICPs is the major problem. It was agreed that the following approach should be used for testing for anomalous TOU telemetry meter readings:

- For 'large' AG1 ICPs nominated by shippers, a reading of 2x maximum consumption
- For other AG1 ICPs, a reading of 5x maximum consumption.

Gas Industry Co will include this test in the D+1 business rules and model.

We agree that that the D+1 algorithm should include a test for negative telemetry meter readings.

3. Modification to shut down rule

3.1 Overview

Gas Industry Co proposed modifying the shutdown rule so that it better reflects the nature of TOU ICP shutdowns:

- Change the shutdown consumption threshold to be a maximum of 0.1 percent of the ICP’s annual consumption on each day, capped at 100 GJ/day
- Gas Industry Co uses its discretion for including amounts reflecting ICP shutdown/restart phases in the manually entered profile

3.2 Submissions

Submitters had the following feedback on this proposal.

Submitter	
Mercury	Comments that it may be reasonable to create more tools beyond the zero constraint if it is not covering all scenarios. What if a retailer notified the GIC that a consumer is in a maintenance period with 30% of their usual consumption? Mercury favours a system that would accept this good faith estimate to improve accuracy for all.
Greymouth Petroleum	<p>Agrees with the approach, but notes that the proposal is a compromise and only a small incremental improvement. The risk that still remains is if AG1 or AG2 demand has to be estimated and the customer is at ½ rates, say, taking a 4 TJ customer example, this would still leave a potential 2 TJ/d suboptimal allocation during the maintenance period if there is also a problem with the meter. The proposed change to the D+1 business rules does not really address this. A more robust future-state D+1 embedded in the supply chain should automate these risks and a nominations regime could potentially be the answer.</p> <p>Suggested improvement: if the risk discussed above does occur, then, for the pilot scheme, the D+1 business rules should provide for the option for:</p> <ul style="list-style-type: none"> • Retailer to raise the issue with the GIC, with supporting information from its customer, • GIC to manually amend value for that day (if time still permits) and future days in the maintenance period (but only if there is no meter data), and retailer to advise GIC of changes to information already supplied; • Retailer to advise GIC of changes to information already supplied.
Genesis Energy	Considers that the proposed approach reasonable and offers greater scope of the existing rule. The parameters are acceptable.

Submitter

Nova Energy

Considers that a shutdown is just another form of non-standard profile and should be treated as such. Setting these parameters may assist, but may also complicate the issue.

Proposes that changed consumption profiles should be subject to shippers submitting a non-standard profile for a specific period of time. Suggests that 'non-standard' can be defined in terms of confidence intervals for application in statistical models.

3.3 Gas Industry Co response

Submitters generally agreed with the proposal of improving the approach to addressing ICP shutdown periods.

Mercury suggested that other 'atypical' periods apart from shutdown periods should also be included. The problem with broadening the scope in this manner is that many of the 433 AG1 and AG2 ICPs are likely to have periods of consumption that differ from the norm over the course of a year. Dealing with a handful of ICPs is manageable; however, manually entering and verifying profiles for tens of ICPs would be administratively burdensome. In addition, estimation discrepancies are washed up at the interim allocation so any cost is temporary. For these reasons, Gas Industry Co proposes to keep the test confined to shutdown periods.

Greymouth proposed that retailers provide supporting evidence from the customer on the shutdown. A review process is already included in the business rules (i.e. ex-post review of the hard-entered profile against actual consumption using the GAR190) to minimise the likelihood that retailers will take undue advantage of the process. We agree with Greymouth that retailers should advise Gas Industry Co if there are changes to the consumption profile provided.

Nova commented that changed consumption patterns should be assessed using statistical techniques including confidence intervals. As noted previously, this approach would work if the distribution of consumption over time was a known distribution (e.g. normal). However, because these profiles vary considerably and may well be non-normal (for instance) a simple confidence interval measure is unlikely to work.

4. Process to deal with new TOU ICPs

4.1 Overview

Gas Industry Co proposed including a new process to the business rules that would deal with new TOU ICPs:

- The current business rules requires retailers to provide Gas Industry Co an estimated profile of consumption over the first month for these ICPs. We propose that this 'estimated profile period' is extended to two months.
- We suggest that this forecast profile has at most two parts: a daily average estimate for business days and a further average estimate for non-business days. A simple average for each week may also be appropriate.

4.2 Submissions

Submitters had the following feedback on this proposal.

Submitter	
Mercury	<p>Extending the forecast period is reasonable, perhaps even more than two months. The multiplier test might otherwise require an age threshold as well?</p> <p>Looking to the future new connections and shutdowns could be put into a more formalised process. Standard estimation templates with good faith legal obligations and breach thresholds.</p>
Greymouth Petroleum	<p>Agrees with the proposal. Comments that ideally GIC should also require the retailer to provide some confirmation / discussion with the end user to whom the nominations relate.</p>
Genesis Energy	<p>Agrees with the proposal. Comments that the estimation period should commence once commissioning has been completed and the ICP moves into an operational mode.</p> <p>Suggests that an improvement to the proposed approach would be to remove the AG2 option for new connections requiring them to be AG1.</p>
Nova Energy	<p>Agrees with the proposal. Notes that it is consistent with Nova's suggested statistical approach discussed previously.</p> <p>Suggests that new AG1 & AG2 ICPs should be subject to shippers submitting a non-standard profile for a start-up period in the case of new meters. Statistical checks can still be applied to the revised profiles.</p>

4.3 Gas Industry Co response

Submitters generally agreed with the proposal. The rationale for the proposed approach is to build a sufficient consumption history for a new ICP so that a regression model can be used to estimate consumption.

5. Process to deal with ICPs that have a marked change in consumption

5.1 Overview

Gas Industry Co proposed including a new process that would deal with TOU ICPs that have a marked, permanent change in gas consumption:

- The retailer would provide GIC with an estimated profile for two months following the step-change in consumption.

- This profile would have at most two parts: a daily average estimate for business days and a further average estimate for non-business days. This hard-entered profile would replace the D+1 model estimation over this period.
- Following this two month period, the estimation period start date would be reset so that it begins at the start of the new mode of operation.

5.2 Submissions

Submitters had the following feedback on this proposal.

Submitter	
Mercury	Agrees with the proposal. Mercury questions whether it was possible hard entered numbers to exceed injection at gate under this proposal.
Greymouth Petroleum	Agrees with the proposal. Comments that ideally GIC should also require the retailer to provide some confirmation / discussion with the end user to whom the nominations relate.
Genesis Energy	Agrees with the proposal. Suggests that Gas Industry Co defines a material change which would trigger a manual review. For example, a change of 20% or more than 50 GJ per day.
Nova Energy	Agrees with the proposal. Suggests that changed consumption profiles should be subject to shippers submitting a non-standard profile for a specific period of time. Statistical checks can still be applied to the revised profiles.

5.3 Gas Industry Co response

Submitters generally agreed to the proposed approach. There was some comment that the 'marked change' concept should be formally defined. For the meantime, Gas Industry Co's preferred approach is to review each proposal on its merits. At a future point, once we have an understanding of what constitutes a 'marked change' it may be appropriate to define the term formally.

6. Adjustment to the threshold where estimation of gates is stopped

6.1 Overview

Gas Industry Co proposed increasing the threshold where estimation of gate volumes is stopped:

- Weekend threshold set at 5,000 GJ
- Weekday threshold set at 2,000 GJ subject to a check that none of the pools are entirely estimated.

6.2 Submissions

Submitters had the following feedback on this proposal.

Submitter	
Mercury	<p>Agrees with the proposal. Suggests that morning and weekend runs with gate estimates could be flagged and a warning message included instead of cancelling the run.</p> <p>Notes that the D+1 formulas allow shippers to absorb one bad run without punishment. Missing runs combined with bad estimates are where the issue is. Supports plan to raise thresholds and get a run out.</p> <p>How accurate have the estimates been? A difficult to estimate 1,000 GJ gate may be more important than a stable 3,000 GJ gate. Maybe worth classifying gates by size, reason for missing data, accuracy of estimates.</p>
Greymouth Petroleum	<p>Does not support this proposal. The issue is essentially the same as the multiplier issue in the TOU anomalous meter read proposal. Just because it might be a gas gate doesn't rule out that it might be an AG1 direct connect customer.</p> <p>Also, the morning and weekend runs are not relevant to afternoon run outputs – so focus should be placed on the afternoon runs.</p> <p>Suggests adopting the same principles as for the TOU anomalous meter read proposal, and run with a compromise for the purposes of the pilot arrangement: a flat 2 TJ/d.</p>
Genesis Energy	<p>Supports the approach.</p> <p>Notes that it would be useful for an email to be automatically generated and sent to shippers informing them of a failure of the D+1 run should this occur; particularly over the weekend period.</p>
Nova Energy	<p>Does not agree with proposed approach - the intent is to improve run accuracy rather than minimise manual intervention. It would be more effective to apply statistical tests and correction factors for missing data.</p>

6.3 Gas Industry Co response

Gas gate information is a fundamental component of the D+1 algorithm; if a single gas gate has missing data, the model run will terminate and no allocation results will be produced. Gas gate data is frequently missing. As the consultation paper noted, over the period reviewed in the paper, there was missing gate information in over 80 percent of the afternoon runs.

Note that direct connect ICPs are not included in the D+1 allocation results.

To get the model to work more often without manual intervention, a business rule was added so that if no data is available for a gas gate on a given day then the injection at the gate will be estimated by the D+1 model based on the same day from the previous week (Rule 4d).

This has had a marked impact on the D+1 algorithm, which now runs most of the time without manual intervention, ensuring that allocation results are delivered to retailers in a timely manner.

The model has a threshold on the amount of gas gate gas that can be estimated. Currently, that threshold is 1,000 GJ; if estimated gas gate volumes are greater than this amount, the model run terminates.

Our proposed modification was to raise the model termination point from 1,000 GJ to 2,000 GJ on weekdays and 5,000 GJ on the weekend. The rationale for the proposal was that the model would almost always work with these limits.

Submissions were mixed on this proposal. Gas Industry Co recognises the issues presented by submitters. We also recognise that participants would prefer that the D+1 algorithm runs on non-business days. On these days, if the estimation threshold is exceeded, there is no manual option to hard-enter data and re-initiate the run. As a consequence, allocation results will be not be produced.

The issue was discussed further in the 13 October DAWG meeting. It was proposed that the rule be changed so that the lower 1,000 GJ threshold is used for D+1 runs that are used in the BPP process and the 5,000 GJ threshold is used for runs that are not included in BPP calculation.

Following this discussion, Gas Industry Co will change the business rule on gate estimation so that the:

- 1,000 GJ estimation threshold applies for days where the D+1 run is used for BPP calculations;
- 5,000 GJ estimation threshold applies for days where the run is not used for BPP calculations.

For the days where the 5,000 GJ threshold applies, a notice will be posted on the GIEP Exchange (a file exchange interface provided by the gas registry) informing parties of the D+1 run status. This notice will confirm whether the run has completed successfully and the amount of gas that has been estimated.

7. Other feedback

7.1 Replacement of Vector with First Gas

Greymouth suggested that references to Vector should be replaced with references to First Gas. Gas Industry Co agrees with this suggestion.

7.2 Algorithm should wait for TOU telemetry data

Greymouth also commented that there is an issue regarding the number of sites that meter owners need to redial after the morning run. It suggested that wording improvements should be made:

- The business rules only reference gate injection data, but should also reference consumption data under 'General' 2.
- It should be clarified, under 'General' 2 that the afternoon run must wait for any final receipt of TOU telemetry data that was not provided in the morning run (if that data is being chased), or it can be run, but must be re-run if the TOU telemetry data does come through.

Gas Industry Co notes that the D+1 algorithm uses TOU telemetry meter data where possible and estimates TOU consumption where telemetry meter data is not available. On any given day, there are usually several ICPs with meters that have telemetry that are estimated because data is not available. It is the retailers' responsibility to ensure that telemetry meter data is available. Because the timeframes for the afternoon run are tight and the model runs without manual input

(mostly), it is not practical to manually suspend the algorithm to wait for late telemetry meter information.

ABOUT GAS INDUSTRY CO.

Gas Industry Co is the gas industry body and co-regulator under the Gas Act. Its role is to:

- develop arrangements, including regulations where appropriate, which improve:
 - the operation of gas markets;
 - access to infrastructure; and
 - consumer outcomes;
- develop these arrangements with the principal objective to ensure that gas is delivered to existing and new customers in a safe, efficient, reliable, fair and environmentally sustainable manner; and
- oversee compliance with, and review such arrangements.

Gas Industry Co is required to have regard to the Government's policy objectives for the gas sector, and to report on the achievement of those objectives and on the state of the New Zealand gas industry.

Gas Industry Co's corporate strategy is to 'optimise the contribution of gas to New Zealand'.