

## Consultation on manually constraining D+1 allocations

1 February 2015

### 1.0 Introduction

Gas Industry Co is currently trialling D+1 allocation, a process that allocates gas to retailers on the day following gas flow. In December 2015, Gas Industry Co published the D+1 business rules<sup>1</sup>, which outline the process and rules for D+1 allocation. The business rules include a change process which requires that Gas Industry Co consult with allocation participants on any proposed change to the D+1 allocation methodology.

The purpose of this paper is to obtain feedback from allocation participants on the merits of manually constraining D+1 allocations to zero for an AG1 or AG2 consumer when it is known that the consumer will not be using gas volumes for a period (for example, a consumer may have an annual shutdown period with no gas consumption over that time).

### 2.0 Issue

#### 2.1 Overview of D+1 Approach for AG1 and AG2 Consumers

As noted in the D+1 Allocation business rules, daily allocations for AG1 and AG2 consumers are based on:

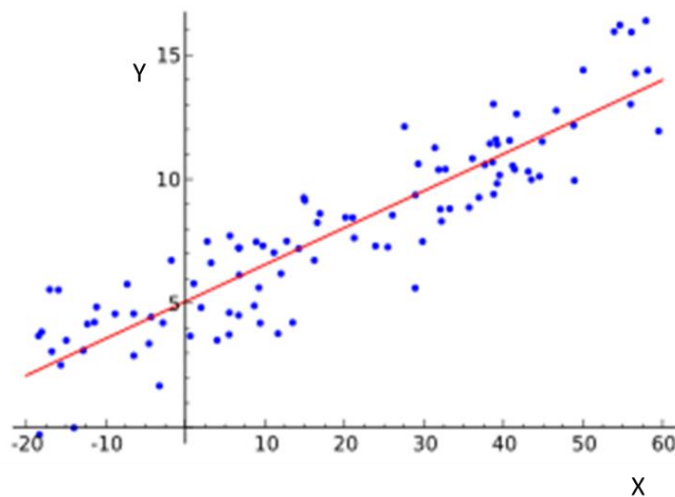
- Actual consumption for AG1 consumers where there is telemetry data
- Estimated daily consumption for AG1 and AG2 consumers. Estimates are used for all AG2 consumers and for instances where daily metered consumption data are not available for AG1 consumers.

The AG1 and AG2 daily consumption estimates are calculated using a statistical technique known as regression analysis. Essentially, regression analysis involves the estimation of a relationship between a 'dependent variable' (the variable you're interested in explaining or estimating – in our case, gas consumption volume for a consumer) and a set of 'explanatory variables' (factors that 'explain' the dependent variable). Various weights for the explanatory variables are estimated that, when combined with actual data, provide an estimate of the dependent variable.

The diagram below shows a simple example of a regression equation or relationship where there is one explanatory variable (X).

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<sup>1</sup> Available on the Gas Industry Co website: <http://www.gasindustry.co.nz/work-programmes/downstream-reconciliation/daily-allocation/>



In this example, the blue dots represent actual data points, i.e. various (X,Y) combinations. Using regression analysis, a 'line of best fit' (the estimated relationship) is calculated. This line can be used to estimate Y (the dependent variable) for a given level of X. For example, an X of 20 implies an estimated Y of 18. Note that many of the actual data points do not fall on the line; the difference between a dot and the line is known as the estimation error.

In the D+1 approach a regression relationship is estimated for every AG2 consumer and AG1 consumers where there is no telemetry data. The relationship is weighted so that relatively recent values have a greater impact on the estimated relationship.<sup>2</sup> The explanatory variables used for each consumer include:

- Previous month's consumption (not used for ICPs less than one year old)
- Month of year
- Injection at the gate
- Whether the day is a business day or non-business day.

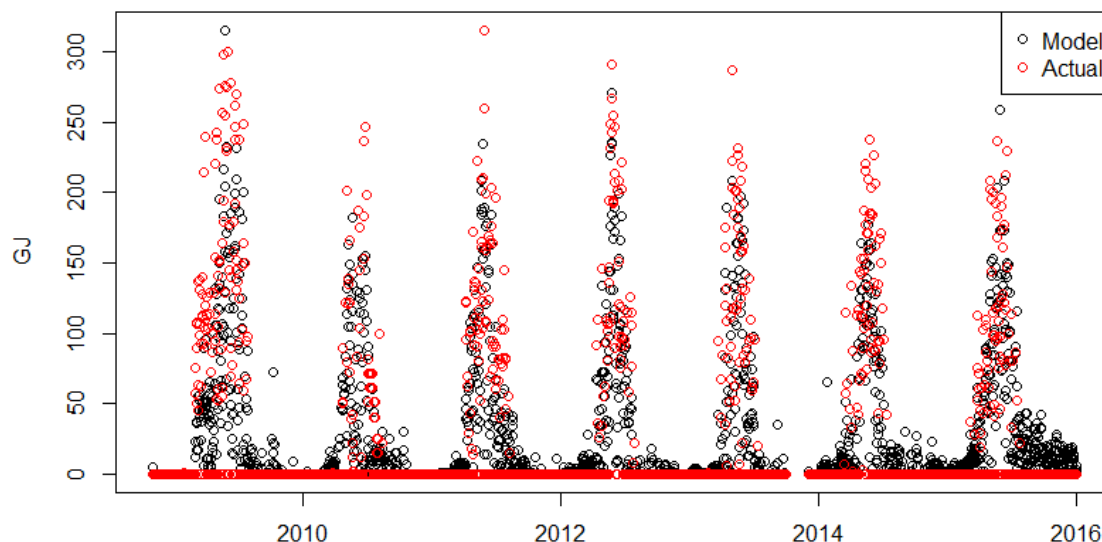
## 2.2 Issue with AG1 or AG2 Consumers that have Periods of Zero Consumption

An issue that has surfaced is the appropriateness of an AG1 or AG2 allocation estimate when the consumer has zero consumption for a period. For instance, there are a number of AG1 or AG2 consumers in the agricultural sector that have annual shutdown periods where there is no gas consumption for several weeks or even months. Despite the fact that there may be zero consumption, the statistical nature of the D+1 approach (particularly estimation errors) means that estimated consumption volumes could be non-zero. The D+1 algorithm automatically constrains negative estimates to zero, but positive estimates will be used in D+1 allocations even though the actual (but as yet unknown to the model) value is zero.

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<sup>2</sup> This is to allow for the situation where a gas consumer's load changes over time, e.g. growing or declining business, so as to avoid overly slow incorporation of such changes in the estimation formula.

The graph below illustrates this issue for a particular gas consumer.



The red circles in the graph represent actual values while the black circles are the estimated values. This consumer has a seasonal consumption profile, with no gas consumption for a few months each year. The black circles that sit above the red line during zero consumption periods are examples of the issue described previously: positive gas consumption estimates when actual values are zero.

An implication of non-zero volume estimates during shut down periods is that retailers will be allocated gas volumes for some customers that are not consuming any gas, potentially leading to transmission overrun charges for capacity that is not being used. For example, some retailers may have Supplementary Transmission Agreements for customers that have a very seasonal gas consumption pattern. These retailers may be charged for overruns when consumption is zero but estimated D+1 allocations are positive.

There will be D+1 estimation errors for all estimated AG1 and AG2 consumers. This is a consequence of the D+1 approach and similar in concept to the estimation errors that occur in the Initial Allocation process where actual consumption is not known. Concept Consulting's initial review of the D+1 model found that estimation errors are larger for AG1 and AG2 consumers. This result is due to the fact that a relatively generic modelling approach (the general form of regression equation is the same for all consumers) is used for these consumers which does not pick up their varied characteristics. It is not practical to develop and maintain bespoke regression relationships for every individual AG1 and AG2 consumer. Instead the approach recognises that there are limitations with the D+1 allocations. These limitations are addressed through the wash-up process (migrating AG2 sites onto telemetry would also improve D+1 allocations). Currently, incorrect allocations for consumers that have no consumption for a period are addressed in this manner.

Notwithstanding this overall approach, it may be reasonable to modify the D+1 allocation approach for some AG1 and AG2 consumers where errors are readily identifiable and there is a

pragmatic, simple solution for demonstrably improving estimated allocations. Consumers that have periods of zero consumption is a category where a modification to the D+1 approach may be appropriate.

### **3.0 Possible Approach**

The proposed approach for addressing the D+1 allocation issues that arise when an estimated AG1 or AG2 consumer is known to have a period of zero gas consumption is to manually constrain the volume that is allocated for that consumer to zero.

This would involve:

- Retailers formally notifying Gas Industry Co of the period when an estimated AG1 or AG2 consumer will have zero gas consumption. The notification should include some level of supporting evidence such as:
  - reference to similar shutdowns in the past (that can be verified with GAS050 data); or
  - dialogue between the retailer and consumer confirming the shutdown period.
- Retailers informing Gas Industry Co if this period changes and before consumption is to begin again.
- Gas Industry Co reviewing GAS050 submissions to check that constraint requests matched actual meter reads. While this review would be 'after the fact' we consider that it would provide sufficient discipline on retailers to use the mechanism appropriately.

This modification to the D+1 would have the following benefits:

- Gas allocations for AG1 and AG2 consumers during shutdown periods could be improved significantly, benefiting associated retailers and also the accuracy of D+1 allocations for other consumers (particularly non-TOU consumers, since allocations for these consumers are calculated residually using TOU consumption estimates).
- Limiting the arrangement only to periods of zero consumption (and not other cyclical consumption patterns) should make the proposed modification easy to administer and to check it is being used appropriately.

### **4.0 Consultation**

Gas Industry Co welcomes feedback on this paper by Wednesday, 24 February 2016. Please forward your submission to Paul Cruse, [paul.cruse@gasindustry.co.nz](mailto:paul.cruse@gasindustry.co.nz)

Without limiting your feedback, we are interested in your comments on the following:

- Do you consider this proposal to be a reasonable modification to the current D+1 process? What, if any, do you consider to be the proposal's strengths and limitations?

- Do you have any suggestions how the proposed approach could be improved?
- At a practical level, broadly how many of your AG1 and AG2 customers do you think you would use this arrangement for?
- Is your organisation able to put in place the arrangements necessary to ensure that GIC is notified in advance of a constraint needing to be removed?

Once we have considered submissions, if appropriate, we will publish revised D+1 Business Rules on the Gas Industry Co website and email a copy to retailers and other interested parties.