GAS INDUSTRY COMPANY LIMITED

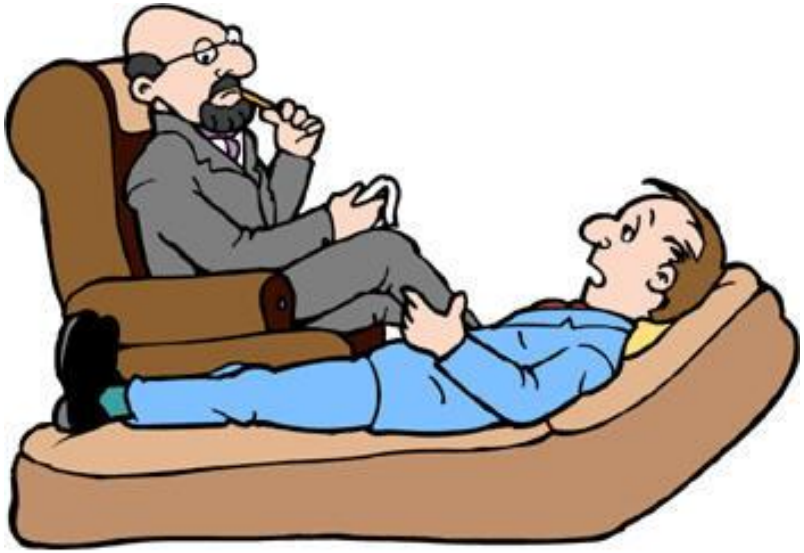
DAWG meeting 10
9 March 2016

Agenda

1. D+1/daily BPP experience to date
2. Review of D+1 statistical models
3. Manually constraining TOU sites to zero
4. A simple estimate process for missing gate injections?
5. Notification of TSA/contract updates
6. D+1 communications
7. Next steps for D+1
8. Other issues?

D+1/daily BPP experience to date

How's it going?



Review of D+1 statistical models

- NZIER has reviewed the individual models:
  - 433 TOU models (120 AG1 and 313 AG2 models)
  - 39 non-TOU models (4 pools and up to 10 shippers per pool)
  - UFG models for G1M gates

- Used a variety of statistical tests to assess performance and where improvements could be made

Review of D+1 statistical models: TOU models

- Most of the models had at least one insignificant parameter, with half of the models having at least 3 insignificant parameters (15 parameters in many of the models).
- Goodness of fit tests highlighted serial correlation in many of the equations suggesting explanatory variables were missing. However, the models performed better than a naïve model benchmark.
- There was some bias in the forecasts (though this is resolved through the wash-up process).
- The models are OK at forecasting TOU volume, but not great

➡ Separate TOU models into 'seasonal' and 'non-seasonal', remove seasonal variables from latter group. Re-estimate equations and test performance.

Review of D+1 statistical models: non-TOU models

- 75% of the models had at least one insignificant parameter, with 35% of the models having at least 3 insignificant parameters (14 parameters in many of the models).
- Significant serial correlation in all of the equations indicating explanatory variables were missing. 21 of the models (54%) performed better than a naïve forecast; 18 did not.
- There was bias in the forecasts (again, this is resolved through the wash-up process).
- On average, the models explained around a half of the variability in 'shipper share' of non-TOU volumes

➡ Check whether rearranging and simplifying the specification improves the performance of the models

Review of D+1 statistical models: UFG models

- The UFG models performed poorly, with 80% of the models having at least 10 (out of 14) insignificant parameters.
- The models did not outperform a simple, naïve forecast (UFG is a function of previous UFG). Explanatory power was poor. In contrast, the explanatory power of the naïve model was high.

➡ Re-specify the UFG models, with UFG modelled as a function of previous UFG.

Manually constraining TOU sites to zero

- AG2 (and sometimes AG1) allocations are estimated using regression models.
- The nature of these models is that estimates are usually not equal to actual values (once published).
- It has been highlighted that this may be a problem for ICPs that have a shutdown period – estimates may be non-zero even though consumption is zero, possibly leading to overrun charges.
- A pragmatic solution maybe to manually set consumption to zero for known shutdown periods.
- Retailers would advise Gas Industry Co of shutdown periods ahead of time and when consumption is to resume.
- Gas Industry Co would check that constraint requests matched actual meter reads by reviewing GAS050 submissions.

A simple estimate process for missing gate injections?

- The basis of the D+1 allocation model is to apportion injection volumes among retailers
- Missing injection data prevents the model from being able to run to completion. 2/3 of days this year have had missing data.
- Rather than no results, may be better to use zero or a simple estimate for missing data
- One approach would be to use the same day of the previous week
  - Likely to be a good proxy for today's value
  - Automatically compensates for week/weekend fluctuations
  - Any error in the estimate will generally be a small proportion of TP welded point volumes

Missing gate injection – top 10 worst offenders

Gate	Code	No of fails	Average injection
Pukekohe	PUK04201	18	4.0TJ/month
Patea	PTA20901	12	1.5TJ/month
Stratford	STR10201	11	4.5TJ/month
Te Puke	TPK33301	5	2.5TJ/month
Waitara	WTR12001	4	5.5TJ/month
Oakura	OKU16701	3	0.5TJ/month
Marton	MTN23801	3	16.0TJ/month
Kakariki	KKI23701	2	6.0TJ/month
Horotiu	HRU16101	2	10.0TJ/month
Belmont	BEL24510	2	110TJ/month

Notification of TSA/contract updates

- Errors in contract IDs can cause overrun charges (even if volumes are allocated to correct shipper)
- Example: in December an ICP's consumption was allocated to a shipper's default TSA instead of a supplementary contract ID, resulting in a six figure penalty charge
- Updated contract info (ICP, contract ID, shipper ID, start & end date) can come from three sources:
  - Shipper
  - Allocation Agent
  - Vector Transmission (OATIS)
- We suggest that shippers notify GIC directly of changes as they have greatest incentive to keep information up to date

D+1 communications

- D+1 participants are communicating with GIC and Concept Consulting regularly on D+1 issues, including
  - New ICPs, ICPs to be decommissioned, ICPs being switched (both the gaining and losing retailer can notify Gas Industry Co of the switch a minimum of 2 Business Days in advance)
  - Manually constraining ICPs to zero

- Use allocations@gasindustry.co.nz for D+1 communications

Next steps for D+1

- Cautious of pushing ahead with rule changes prematurely, as the landscape could change following approval of Vector sale
- Planning an interim options paper which will cover:
  - analysis of other options for improvement of the reconciliation arrangements that had been completed prior to D+1 kicking off
  - the reasons for pursuing D+1 over the other alternatives
  - a description of the current pilot operation in order to get some formal feedback
- A more detailed Statement of Proposal for a long-term solution will have to come a bit later

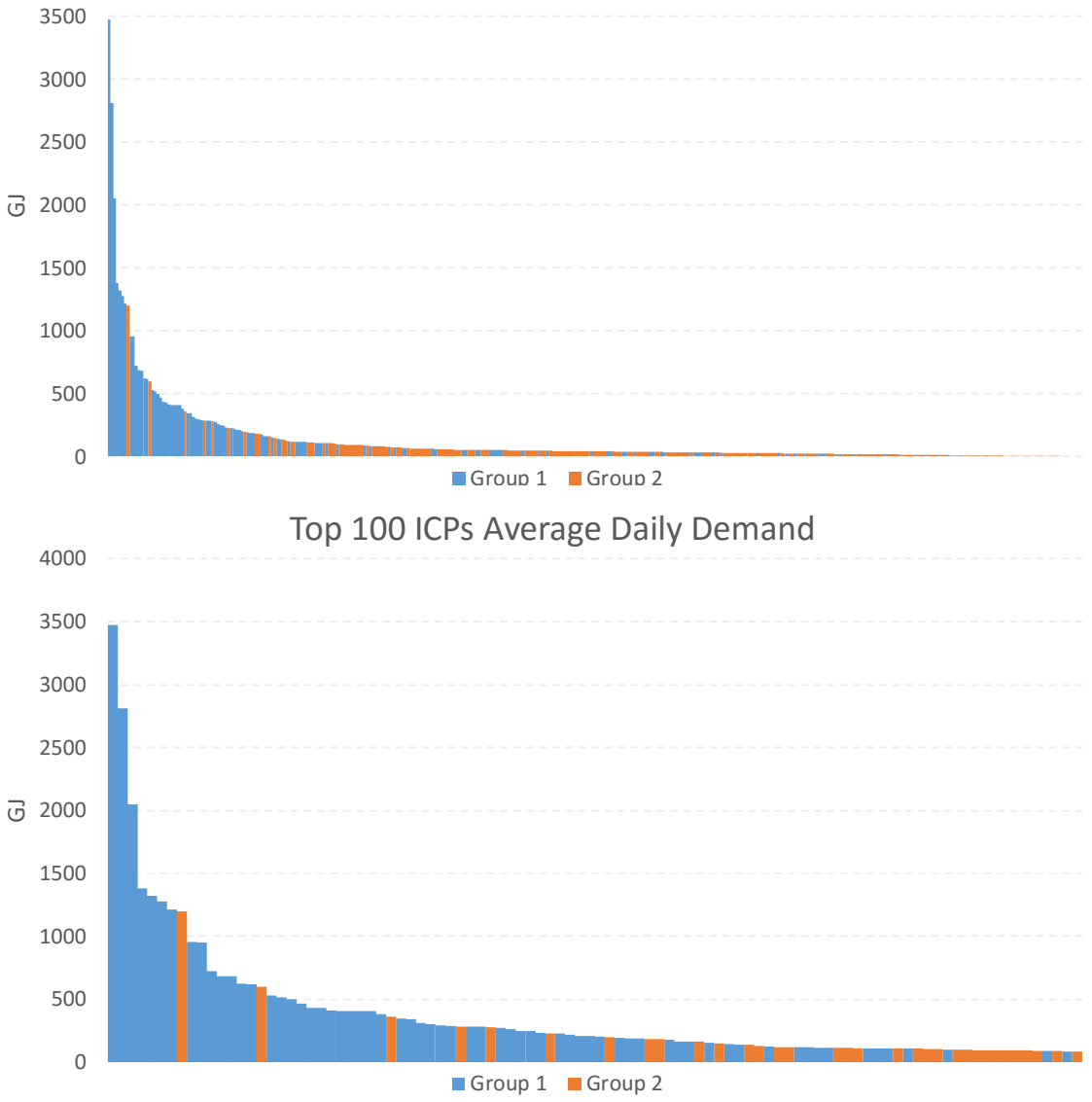
Current arrangements likely to continue for some time

Other issues?

Suggestions for next meeting date?

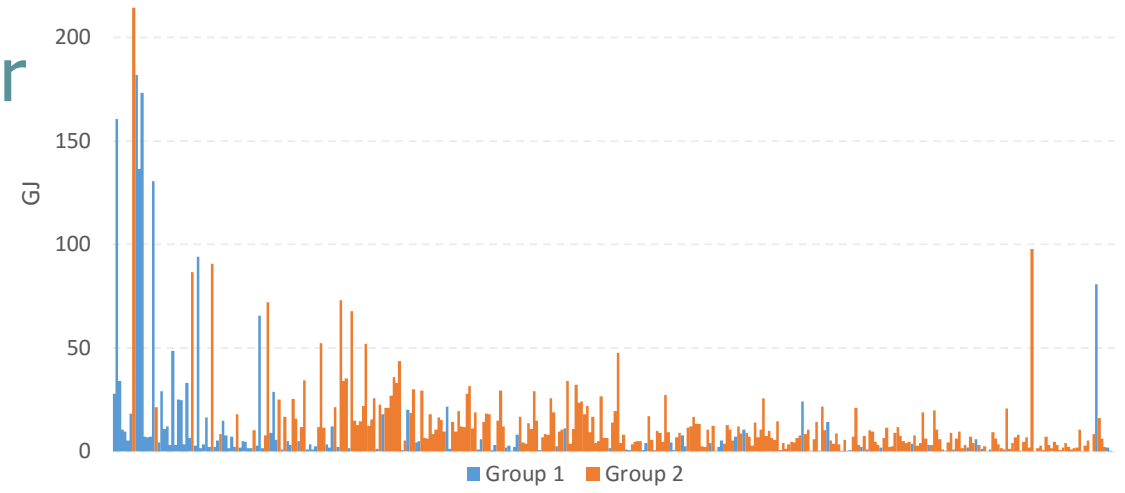
TOU ICP demand

- Large number of TOU ICPs
- But >80% of demand in top 100
- Comparison is for January and February 2016

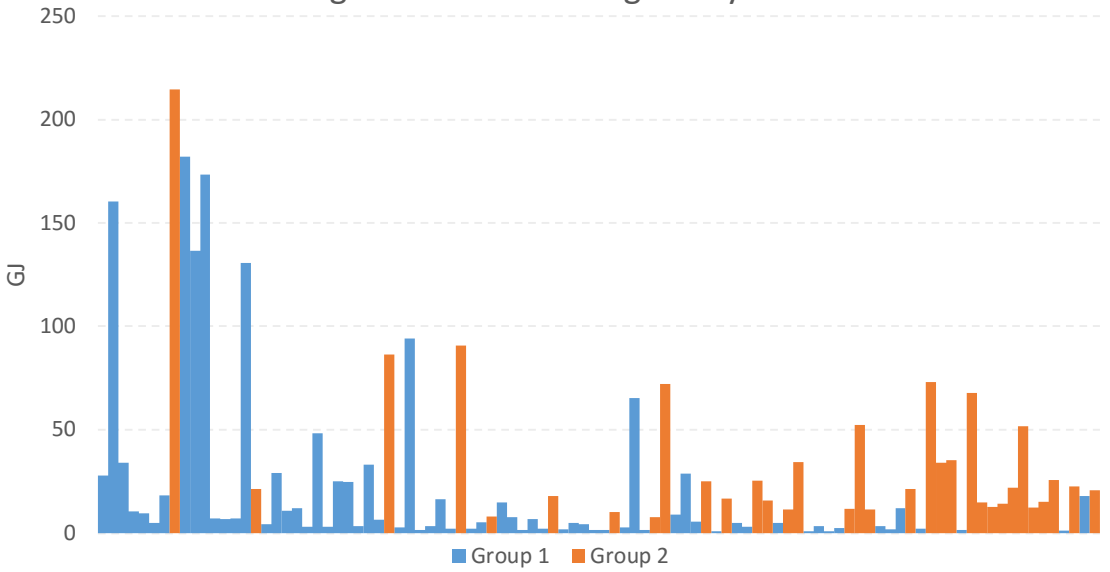


TOU ICP D+1 error - largest ICPs

- Same ICPs as above, in the same order
- Most group 1 error very small
  - UFG at G1M gates
- Error not just concentrated in 100 largest ICPs. ~50%

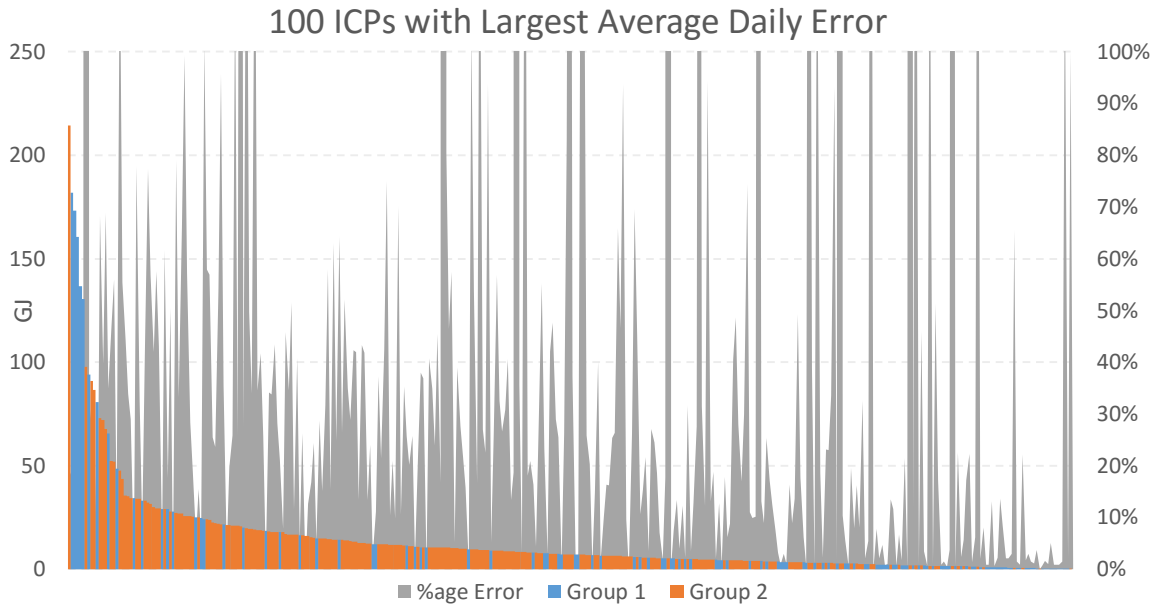


Largest 100 ICPs Average Daily Error



TOU ICP D+1 error - largest ICP error

- As above, but ranked in descending order of error and percentage error included
- The highest errors are caused by:
- A new very large group 2
- Telemetry issues (mostly fixed)
- Telemetry issues (fixed)
- Gate meter override
- Gate meter override
- Ongoing telemetry issues



Additional Sources of Error for Group 1

- Non-supply of data.
  - Rightmost point due to unexpected decommissioning
- Correction of data at end of month
- Upgrade of site during period. Classification is based on current status.
- Mismatch between gate meter and supplied data. Gate meter has precedence. Typically occurs at "TOU-only" gates.
  - Leftmost G1 error due to this.