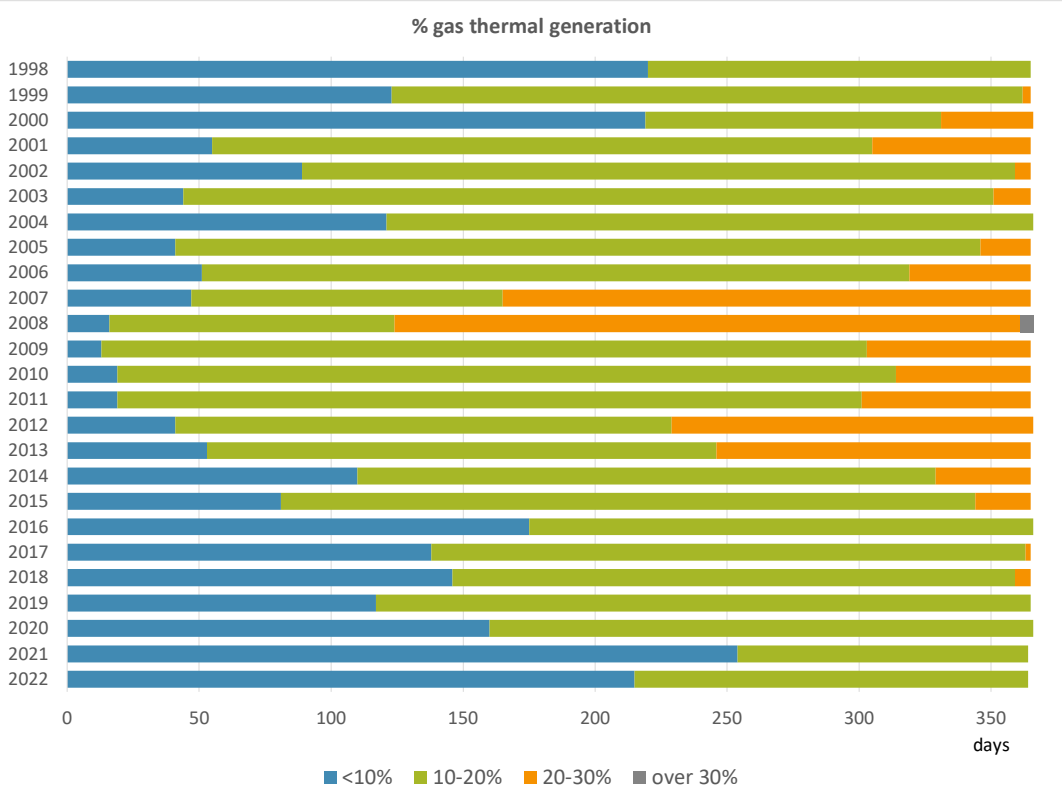
Proposed Changes to Critical Contingency Pressure Threshold Ranges

Cost Benefit Analysis

Background & Purpose of Presentation

- Firstgas held an online webinar for stakeholders in November 2022 that explored the key reasons why Firstgas considered change to the pressure threshold ranges in Schedule 1 of the CCM Regulations was necessary.
- In March 2023 GIC requested that Firstgas compile an assessment of costs and benefits (**CBA**) associated with the proposed changes to Schedule 1 of the CCM Regulations.
- We recently circulated our CBA that is designed to:
  - Provide more detailed information on Firstgas' proposed changes to Schedule 1;
  - Identify and, where possible, quantify the costs and benefits;
  - Discuss some of the perceived risks and opportunities.
- This presentation will cover key points from the CBA in anticipation of customers and stakeholders providing any written feedback to gasrec@firstgas.co.nz by **COB Wednesday 19 July**

CCM Regulations 2008 – A lot has changed….



- Pressure threshold ranges contained in Schedule 1 were developed during the demand and operational context of 2008 (and earlier)
- 2008 was the peak year for thermal generation and has declined markedly
- 1,400 MW of baseload thermal generation capacity withdrawn since then

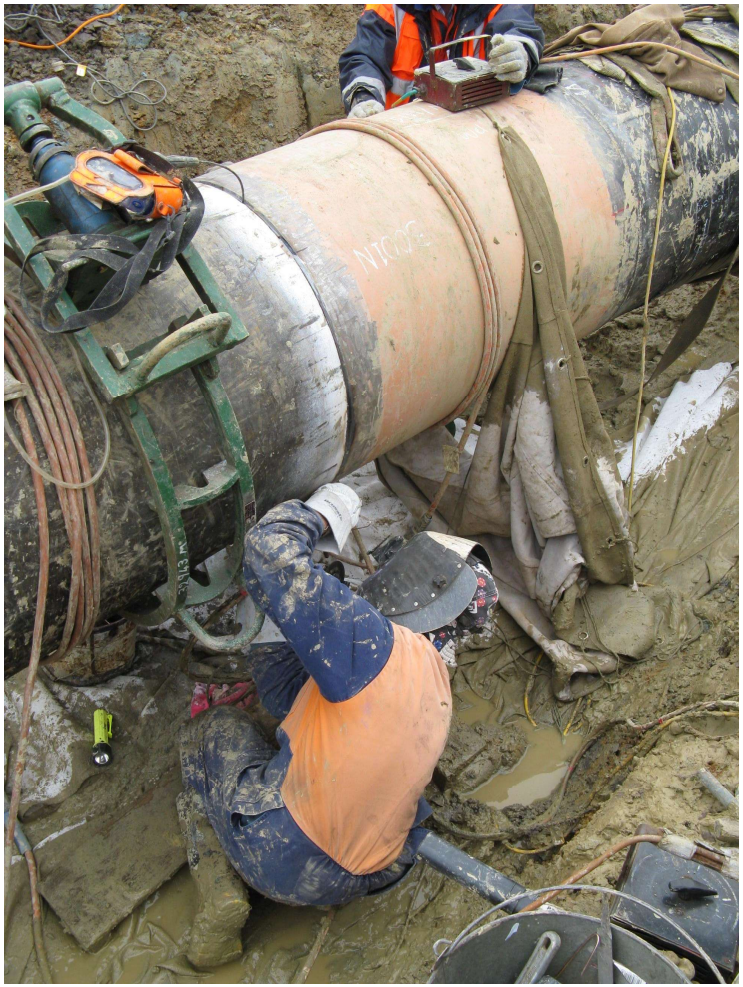
- Changes are required to better reflect current operating conditions and enable the industry to adapt to future circumstances more readily.
- Historically there appears to be limited reasoning as to the nominated critical contingency threshold level

Costs associated with CC Declaration & Curtailment

- Setting CC thresholds too high could result in CC declarations and consumer curtailment occurring earlier than required or even unnecessarily.

CBA Assessment & Conclusions

- Three out of five CC declarations since 2008 have not required curtailment action by the CCO – and might have been avoided if CC thresholds had been lower
- CCs involve considerable resource, time and effort, including the mobilisation of emergency response teams across multiple organisations
- There is significant additional cost and disruption to customers and their operations during a CC event
- Where a non-regional CC event occurs the CC Imbalance provisions apply (irrespective of whether curtailment occurs)
- CC events caused by a failed transmission pipeline (such as the 2011 Maui Pipeline outage) are likely to result in curtailment irrespective of CC pressure ranges as the CCO will determine that a breach of the CC pressure threshold is inevitable.



What changes is Firstgas recommending?

Pipeline Name	Where Measured?	P_{min} (barg) Range (Current)	P_{min} (barg) Range (Proposed)
Maui	Rotowaro	32.0 +/- 2.5	30.0 +/- 5
Firstgas & Maui Pipeline	Any other gas gate*	30.0 +/- 2.5	25.0 +/- 5
South	Waitangirua	35.0 +/- 2.5	27.5 +/- 7.5
Hawkes Bay Lateral	Hastings	30.0 +/- 2.5	25.0 +/- 5
Frankley Road to KGTP	KGTP	35.0 +/- 2.5	35.0 +/- 2.5
Bay Of Plenty	Gisborne	30.0 +/- 2.5	25.0 +/- 5
Bay Of Plenty	Taupo	30.0 +/- 2.5	Removed
Bay Of Plenty	Tauranga	30.0 +/- 2.5	25.0 +/- 5
Bay Of Plenty	Whakatane	30.0 +/- 2.5	25.0 +/- 5
Morrinsville Lateral	Cambridge	30.0 +/- 2.5	25.0 +/- 5
Central (North)	Westfield	40.0 +/- 2.5	27.5 +/- 7.5
North	Whangarei	25.0 +/- 2.5	25 +/- 5

* Excluding gas gates supplied by pipelines operated at pressures <20barg

- No proposed changes to time to Pmin thresholds
- The proposed ranges in the table above have been developed with reference to the failure pressure of the existing equipment and system demand characteristics.

More Specifically….

The specific changes to Schedule 1 that Firstgas is proposing can be summarised as:

1. **Widen and align the CC pressure ranges at extremities of the transmission system:** enable more efficient and reliable operation of the transmission system as well as future-proof for uncertainties and opportunities.
2. **Remove Taupō as a specific point of measurement:** Taupō is not considered a critical failure point on the transmission system.
3. **Exclude any Delivery Point supplied by a pipeline not operating at transmission system pressure (below 20 barg):** two existing anomalies to be excluded and will enable future opportunities and initiatives where practical and safe.
4. **Lower range at Westfield:** reflects closure of the Otahuhu B and Southdown gas-fired power stations and reduced load from Marsden Point
5. **Lower range at Waitangirua:** current minimum operating pressure range is out of line with other points and could lead to a CC event being declared sooner than may be required.
6. **Any other gas gate:** encompasses the status quo, and allows for specific delivery points to potentially be lowered over time where it is safe and practical to do so.

Costs associated with Inefficient System Operation

CBA Assessment & Conclusions

- Transmission System compressors are nominally operated solely to maintain pressure pipeline above Pmin CC threshold points
- Firstgas considers some of these points as unnecessarily high (see Rotowaro Compressor and Cambridge Delivery Point example). In some locations Pmin set-points could be ~10 bar g lower with no impact to the objective of the CCM Regulations.
- A product of this inefficiency is increased expense to consumers as higher transmission operating costs are ultimately borne by customers.
- There are also the environmental impacts of increased emissions, which are estimated at more than 5,000 tCO2 per year (100 TJ fuel gas consumption) related to operating at these current setpoints.

Enable Sensible Investment Decisions

CBA Assessment & Conclusions

- The current pressure threshold limits may distort investment decisions and drive additional capital investment and operational expense
- Up to approximately $1.1 – 1.3 million per annum could be saved in fuel costs by optimising the power output at key existing compressor stations to support lower operating pressures.
- Replacing end-of-life compressors with modern, right-sized units may require up to $9.1m in capex for the purchase of the larger compressors that would be needed to maintain higher than required transmission pressures.
- To optimise the capital expenditure of compression replacement decisions, Firstgas needs the flexibility to change how the system is operated and invest based on future scenarios.

Enable Future Energy Initiatives

CBA Assessment & Conclusions

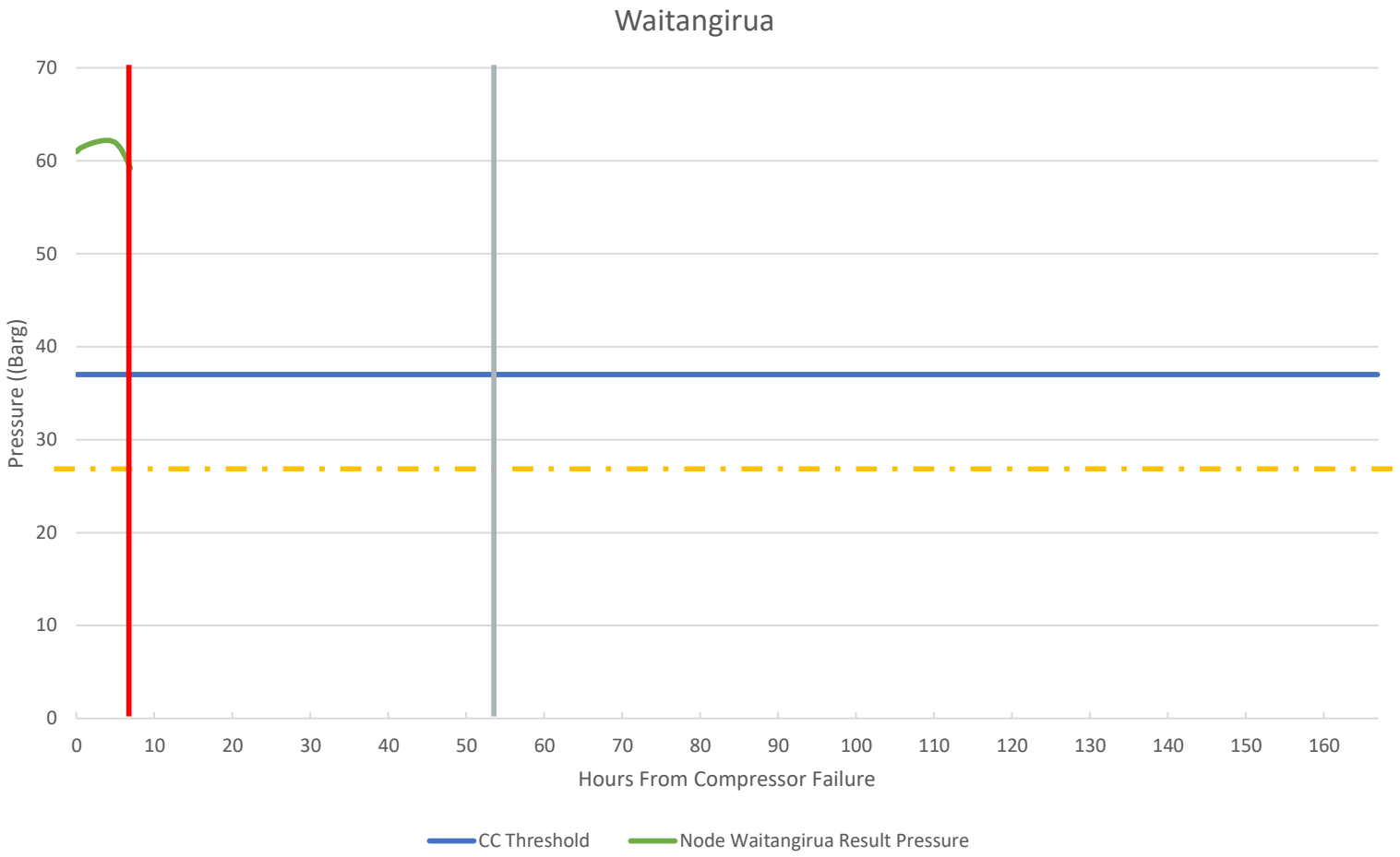
- The efficiency of hydrogen and biomethane production – and the economics of these projects – can be influenced by transmission pipeline pressure, mainly relating to the need for additional compression, the cost of which can be upwards of $1m.
- Initial production estimates from the proposed Biomethane facility at Reporoa are that it will supply enough renewable gas equivalent to supplying up to 7,200 homes avoiding about 11,000 tonnes of CO2 emissions per year.
- The existing CC pressure threshold ranges are impediments to parties progressing these important “future fuels” initiatives (which could be located throughout the transmission system) and achieving NZ’s decarbonisation goals.

FAQ's

- Do lower potential CC pressure thresholds mean:
  - There is less time for Firstgas and consumers to respond to CC circumstances and take corrective actions?
  - There is less gas to act as an emergency "buffer" before a CC is triggered?
  - CC events will be more frequent?
  - Distribution systems are at increased risk of failure and being unable to provide services to customers?
- Why remove Taupō as a measurement point?
- Why exclude any gas gates supplied by pipelines operated at pressures below 20 barg?

Example 1 – Waitangirua (Wellington)

Example shows a CC Declaration occurring significantly before it is required



Graph shows the decline of pressure at Waitangirua in the event of a complete compression failure

Blue line is the current threshold, yellow is a conservative assumption of regulator failure pressure.

Red vertical line is the point a CC declaration would be made based on current threshold settings, The grey is the proposed point in the future

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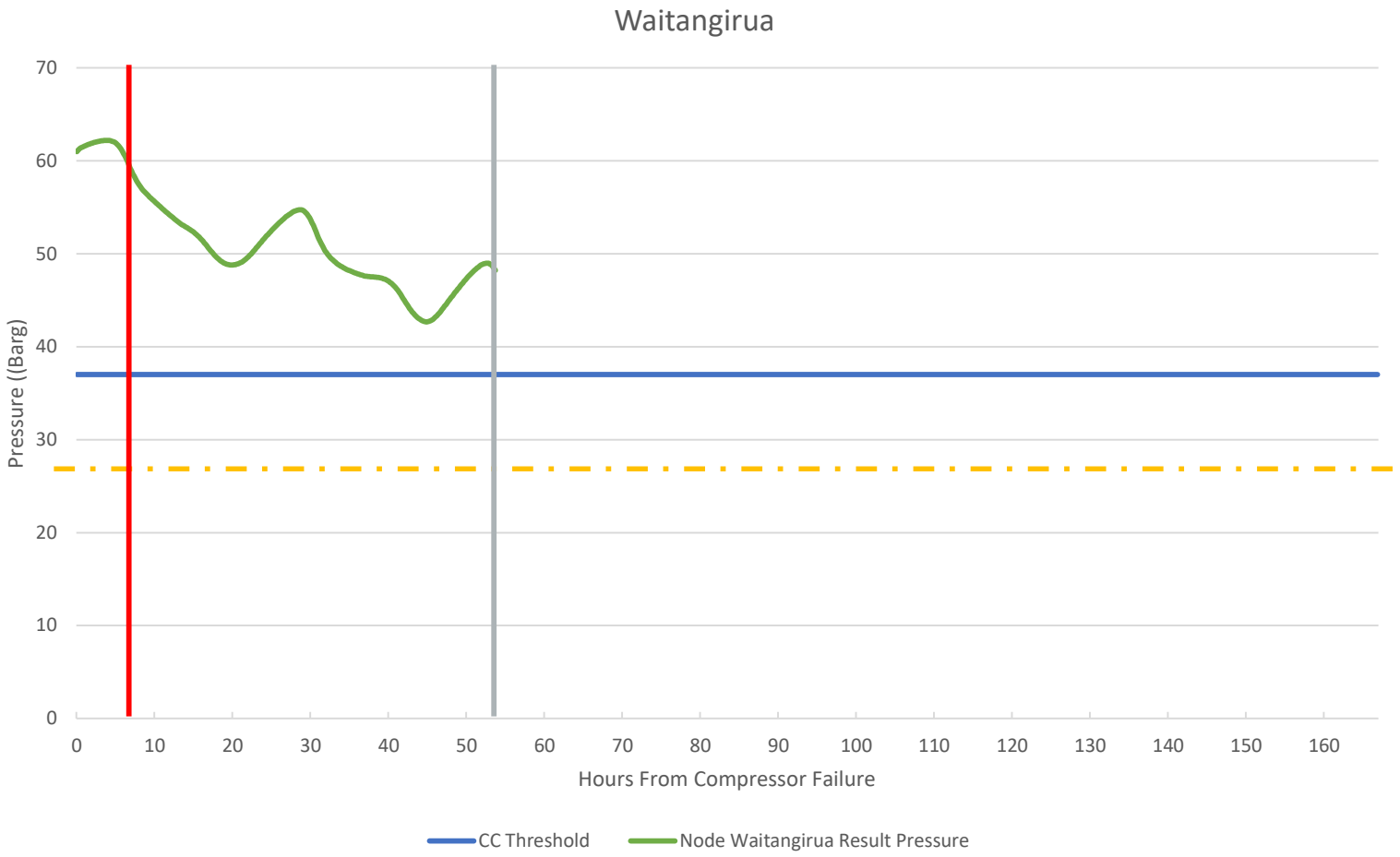

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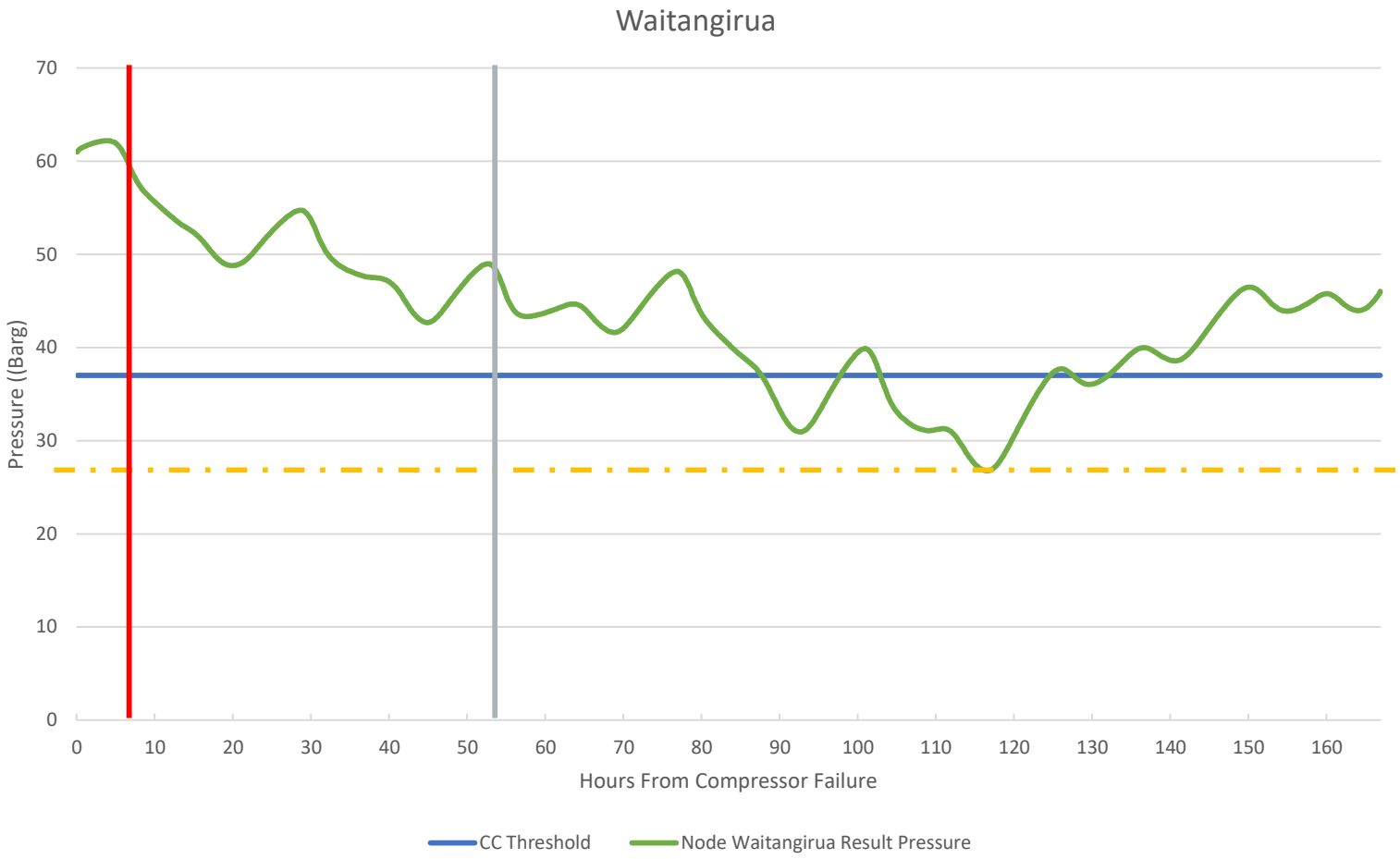

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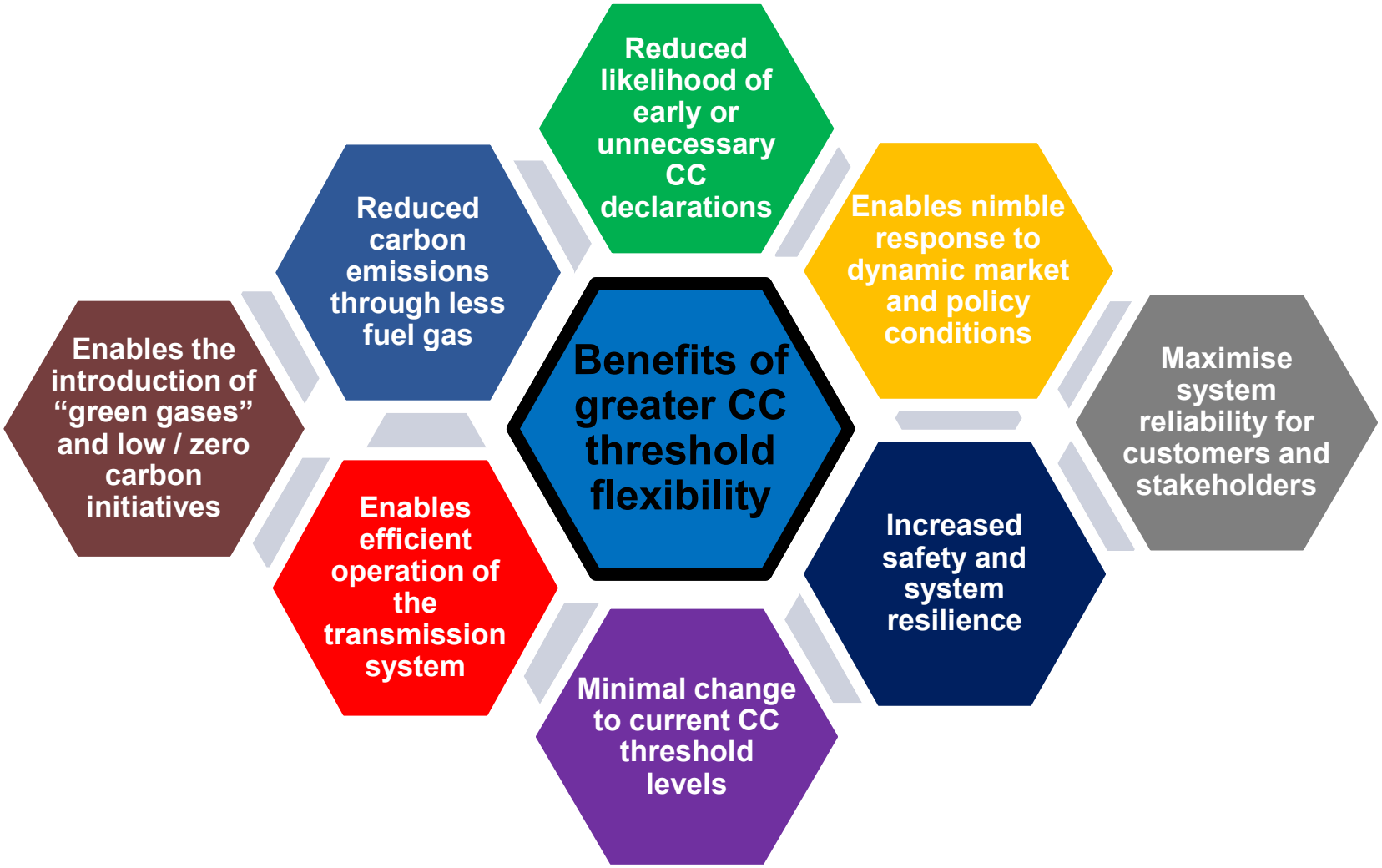
Robust CCMP Review and Approval Process

- Firstgas sets a specific CC pressure threshold (within the prescribed ranges) at various locations on the Transmission System and records them in the Firstgas CCMP
- The steps required by the CCM Regulations in updating the CCMP ensure that any threshold change is subject to robust independent scrutiny before being implemented
- All material changes to a CCMP require industry consultation and review and approval by a GIC-appointed “Expert Advisor”. CCO also reviews and provides report to Advisor
- Schedule 1 only sets the boundaries in which a CCMP value may be proposed. It does not set the failure pressures or time to failures values themselves, as this is only ever set by the CCMP process.

Recap of benefits of greater flexibility in setting Critical Contingency thresholds



Customers will benefit from reduced risk and cost


Firstgas
Questions?