Cost benefit analysis of information disclosure in the gas industry

Evaluating GIC's statement of proposal

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Contents

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Executive summary

A voluntary Gas Outage Information Disclosure Code[1] has been in effect since June 2020. This code follows the industry notifications webpage, which GIC set up in August 2019. These initiatives were taken once the implications of limited disclosure became better understood following outages occurring in late 2018 and early 2019. The Gas Industry Company (GIC) in its problem assessment paper on information disclosure states that "[l]imited production outage information has efficiency implications for most parts of the gas industry value chain, as well as other related sectors."[2] It follows that any issues of comprehensiveness of the information, consistency or timeliness have the potential to compromise the regime.

The impacts of gas production outage information disclosure are not confined to gas consumers and the working of the gas market. The electricity market also bears the impact of there not being a gas outage disclosure scheme.

However, there are points of vulnerability with the mechanism in place:

- It is voluntary.
- Posts made under the voluntary code are not consistent.
- There is no compliance regime.
- Incentives for compliance are weak.
- Scheme reviewers have limited ability to access underlying data.

GIC has asked us to produce a cost benefit analysis (CBA) of a regulated specified information disclosure. We are to demonstrate which one of two options – a regulated approach versus the existing voluntary scheme – has the highest net economic benefit (lowest net cost). Because of perceived vulnerabilities around the voluntary disclosure regime, we have had to consider the strong possibility that the voluntary regime might fail at the time that it is most needed. The likelihood of failure means we are comparing a reliable, enforceable regime of information disclosure with a counterfactual of no information disclosure.

We have relied on literature around information disclosure in markets to identify cost and benefits for analysis. We have also interviewed market participants, focusing on feedback around the workings of the voluntary regime. We provide a qualitative analysis because data is limited and too many assumptions would have to be made, rendering any quantitative attempt potentially meaningless.

For this work we have focused on the downstream impacts of gas outage information. We commend the upstream companies for supporting the voluntary scheme. From an economic perspective, we do not want our enthusiasm for a regulated regime to be interpreted as a criticism of the upstream parties. Our position is simply that for the benefits of disclosure to be fully realised, a regime should be comprehensive, consistent and enforceable. The way to ensure that is to take the step to regulate the regime.

Our conclusions for each cost and benefit category are set out in Table 1 below.

[1] Upstream Gas Outage Information Disclosure Code, 2020
[2] GIC, Information Disclosure: Problem Assessment (Consultation Paper), December 2019

Table 1: Conclusions

	Category	Conclusion
Costs	Increased costs of supplying information	Compared to the status quo, the additional costs of compliance are small, given that compliance with the disclosure code is already happening.
	Regulator costs – proposal development, monitoring and enforcement	The regulator will incur some costs to develop and operate the information disclosure. These costs are not significant.
	Private cost of disclosure	Wealth transfers are ignored in an economic cost benefit analysis.
	Reduction of incentives to innovate	The costs are very unlikely to arise.
	Facilitation of collusion and exercise of market power	The costs are very unlikely to arise.
Benefits	More efficient decision-making	Better coordination of gas production, electricity generation, gas transmission, electricity transmission and major plant outages will be substantially more efficient even than the voluntary gas outage disclosure regime. One key benefit is better security of supply outcomes in both markets.
	More efficient prices	Prices impacted by the quality of gas disclosure include wholesale gas, wholesale electricity, bilateral contracts in both markets. Price volatility, especially in wholesale prices, will be lower than would otherwise be the case with a regulated gas outage regime. Risk premiums in fixed price contracts will also be lower than would otherwise be the case.
	Effectiveness of regulation	The proposed regulated gas outage regime will be more effective than the voluntary scheme because gas and electricity participants and end consumers will be able to rely on the quality of the information.
	Greater market participation	The additional confidence that comes from a more reliable gas outage regime will encourage and not discourage new market participants in either gas or electricity markets.
	Signalling of a mature market	The regulated gas disclosure regime is consistent with a mature market to the benefit of gas and electricity market participants and end consumers.

On balance, while we have not quantified the benefits, we see significant net benefits in both the gas and electricity markets from the move to the regulated regime compared to the counterfactual. We find that the net benefits of the regulated regime would be greater than the net benefits of the voluntary scheme.

Decision-making around outages for physical assets in the energy sector and fuel utilisation (renewable and fossil fuels) is, to us, clearly most efficient with a regulated gas outage regime. We are

convinced that this efficiency effect will be greater under the regulated scheme compared with the current voluntary scheme.

Wholesale prices, contract prices and retail prices in gas and electricity markets will be more efficient than would otherwise be the case.

1. Introduction

An Industry Notifications webpage went live in August 2019, and in June 2020 the Upstream Disclosure Code came into effect, which covers disclosure of supplier outages, including gas storage facilities. Participation in this scheme is voluntary; however, while compliance with the code is required, the possibility of parties withdrawing from the scheme remains. We get confidence from the voluntary Code that the value of information disclosure is not in dispute. However, there are points of vulnerability with this mechanism:

- It is voluntary.
- Posts made under the voluntary code are not consistent.
- There is no compliance regime.
- Incentives for compliance are weak.
- Scheme reviewers have limited ability to access underlying data.

GIC proposed that these concerns be addressed by developing a regulated specific information disclosure mechanism as an alternative set of arrangements for achieving its regulatory objective, rendered in GIC's Statement of Proposal[3] (SOP) as:

> That arrangements are in place that ensure the effective and timely availability of gas production and storage outage information for all gas and related market participants.

The SOP assesses the merits of both the Upstream Disclosure Code and the regulatory option related to achieving this objective. The SOP follows an options for information disclosure consultation paper,[4] which canvassed information disclosure by gas market participants.

There are some problems that have become evident since the introduction of voluntary disclosure. These include the visibility of the outage definitions and the unplanned producer outage benchmark. We understand that these issues will be dealt with in the final version of the proposed regulations.

1.1 Scope of information disclosure

Whether information disclosure is regulated or not, it is not a simple, homogeneous product. Information required to be disclosed requires calibration of:

- definition of content
- materiality thresholds
- level of detail to be disclosed
- timelines for disclosure, especially the period of time from when the disclosing party becomes aware of the information or confirms a decision
- undertakings for updates as information changes
- equal access to information that is disclosed

[3] GIC, Statement of Proposal (Gas Production and Storage Facility Outage Information, December 2020
[4] GIC, Options for Information Disclosure in the Wholesale Gas Sector (Consultation paper), April 2019

- a requirement for all information captured by the regime to be treated (released) to the market in the same way.

1.2 Relevant markets

For our purposes, the relevant markets are natural gas produced in New Zealand and the electricity market in New Zealand.

It is clear from discussions with downstream gas participants and electricity market participants that information about gas production and gas outages has as much of an impact on the electricity market as on the gas market. The cost associated with thermal generators' contracted gas essentially sets the marginal price for electricity under the current arrangements. Furthermore, information on gas outages is essential for scheduling outages of electricity generation and for deciding how much water to dispatch through hydro generators. Looking further out, information about gas outages is used to determine positions in the hedge market for electricity.

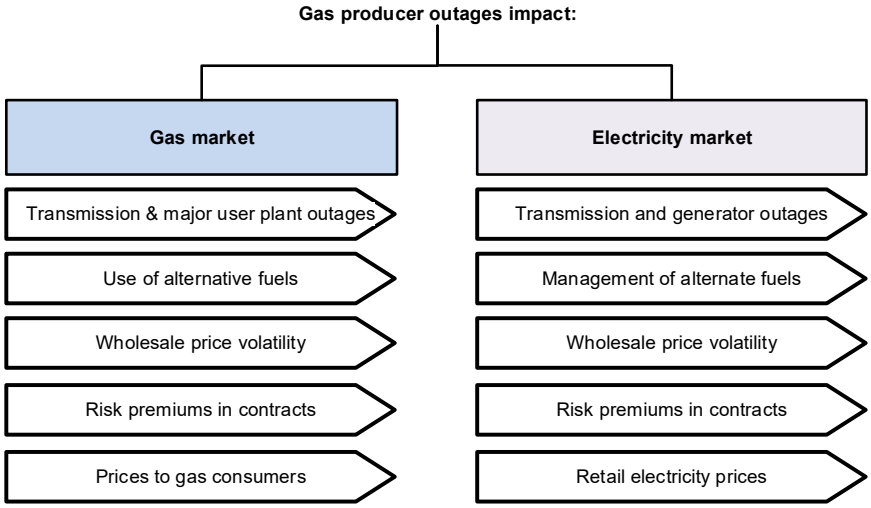
Gas outages are also a matter of interest by Transpower as System Operator and Grid Operator. We note the way System Operator refers to gas matters as being integral to managing its responsibility for security of supply. In its most recent Market Summary for the week ended 29 November 2020, Transpower includes a Gas Outlook for Electricity Generation and Security of Supply 2021 in which it is observed that:[5]

> Gas is New Zealand's third largest fuel [...] electricity generation fuel behind hydro and geothermal and therefore the largest source of thermal generation. Due to the controllability of thermal generation compared to that of geothermal and wind, it plays a key role in maintaining security of supply when hydro inflows and storage levels are low. As an indication of its importance, in 2017, a relatively dry year, thermal generation output was 25% (1,207GWh) higher than in 2016, a relatively wet year. Recently there has been a clear downward trend of gas production from Pohokura, New Zealand's largest gas field. OMV, the operator and part owner of this field, recently indicated output may be as low as 39PJ during 2021, a 40% decrease compared to 2019. This decline has caused concern amongst stakeholders for the upcoming winter, when electricity demand peaks.

In Figure 1 we show the impact of gas outgas on the electricity market and gas market. We take this breadth of impact into account in our discussion of costs and benefits on the proposal to regulate the gas outage regime.

[5] Transpower, Gas Outlook for Electricity Generation and Security of Supply 2021. See https://www.transpower.co.nz/sites/default/files/bulk-upload/documents/Gas%20Outlook%20for%20Electricity%20Generation%20and%20Security%20of%20Supply%202021.pdf

Figure 1: Areas of discernible impact of the quality of the gas outage disclosure regime



We estimate annual value of the New Zealand gas market at $1.51 billion. This value includes distribution, transmission and retailer margin but excludes GST.

Table 2: Gas market in New Zealand in 2019

Sector	Volume (PJ)	Price ($/PJ)	Value ($m)
Residential	6.83	$34.91*10^6$	238.6
Commercial	8.51	$14.26*10^6$	121.3
Industrial	120.00	$6.80*10^6$	816.1
Electricity generation	49.59	$6.80*10^6$	337.2
Total	**184.94**	**$8.18*10^6$**	**1,513.2**
Total excluding electricity generation	135.34	$8.69*10^6$	1,176.0

MBIE statistics, Sapere workings

We estimate the value of the New Zealand electricity at $7.2 billion. This value includes costs of energy, transmission, distribution and margins but excludes GST.

Table 3: Electricity market in New Zealand in 2019

Sector	Volume (PJ)	Price ($/PJ)	Value ($m)
Residential	45.4	$70.3*10^6$	3,193.9
Commercial	34.4	$47.8*10^6$	1,646.7
Industrial	63.5	$37.8*10^6$	2,399.2
Total	**143.4**	**$50.5*10^6$**	**7,239.8**

MBIE statistics, Sapere workings

The combined value of the final sales of these combined markets is $8.4 billion per annum, which is the sum of both markets less the value of gas as input to the electricity market.

1.3 Assessment framework

A cost benefit analysis (CBA) is an economic assessment of a proposal. The CBA considers the value to society from an incremental change between the status quo and a set of alternative options. It considers which option has the highest net benefits (lowest net costs).

The CBA ignores wealth transfers. If a proposal causes costs to one party where those costs become a benefit to another party, then that wealth transfer is set aside. An example of a wealth transfer is a cost recovery mechanism which sees a change in price structure but no change to the total cost recovered. In such cases, at least in the short term, there has been no change to the economy as a whole.

We note, however, that even a cost recovery review can result in some forms of economic efficiency when we move beyond the static effects. If costs charged to participants are better reflective of the true economic cost, then we should expect to see some efficiency gains.

The concepts of economic efficiency normally accounted for in a cost benefit analysis are as follows:

1. **Allocative efficiency.** We would expect that gas is available to those who place the highest value on it within production and transmission constraints. For example, if a residential customer places a higher value of gas than an industrial customer, in the event of an outage we would expect that the industrial customer will curtail consumption first.

2. **Productive efficiency.** Productive efficiency means an optimal combination of inputs for which economic output is maximised. An example of how this is achieved in the gas market could be that electricity generators coordinate hydro storage in light of gas outages for a co-optimised solution.

3. **Dynamic efficiency.** Dynamic efficiency is concerned with productive efficiency over time. We would expect that costs for a firm to produce a given unit of output reduce from one period to the next. Dynamic efficiency would be expected to comprise the greatest share of the benefit of a given intervention to improve competition. As new firms enter the market because of more efficient prices, for example, there are positive feedback loops that develop, involving more efficient pricing and more competition.

For any CBA, incremental change to arrangements is challenging to quantify, and that has proven to be the case here. While the benefits from locking in a regulated gas outage disclosure scheme are sufficiently large that they should be able to be quantified to some degree, this is not what we are trying to assess. What we are looking to assess in this case is the change in 'control' between a strictly voluntary regime that could fail when it is most needed and a mandatory regime.

As a result, we have relied on core CBA principles, literature on the merits of information disclosure on the workings of markets and a clear view expressed by the parties we interviewed for this case.

We also note the stated purpose of, and objectives for, the Gas Industry Company.

Gas Industry Company Limited (Gas Industry Co) was established in 2004 to provide for the governance of the gas industry under Part 4A of the Gas Act 1992 (Gas Act). [6] The Gas Act details a number of objectives to be considered when recommending regulation:

[6] Gas Act 1992

43ZN Objectives of industry body in recommending regulations for wholesale market, processing facilities, transmission, and distribution of gas

The objectives of the industry body, in recommending gas governance regulations under section 43F, are as follows:

(a) the principal objective is to ensure that gas is delivered to existing and new customers in a safe, efficient, and reliable manner; and

(b) the other objectives are—

(i) the facilitation and promotion of the ongoing supply of gas to meet New Zealand's energy needs, by providing access to essential infrastructure and competitive market arrangements:

(ii) barriers to competition in the gas industry are minimised:

(iii) incentives for investment in gas processing facilities, transmission, and distribution are maintained or enhanced:

(iv) delivered gas costs and prices are subject to sustained downward pressure:

(v) risks relating to security of supply, including transport arrangements, are properly and efficiently managed by all parties:

(vi) consistency with the Government's gas safety regime is maintained.

The gas sector is also guided by the 2008 Government Policy Statement (GPS) on Gas Governance in which the Government's objective for the entire gas industry is stated as:

> To ensure that gas is delivered to existing and new customers in a safe, efficient, fair, reliable and environmentally sustainable manner.

Section 12 of the GPS specifies that all the policy objectives in the GPS should apply to all GIC recommendations for rules, regulations or non-regulatory arrangements for all parts of the gas industry. Section 12 lists a number of specific objectives:

a) Energy and other resources used to deliver gas to consumers are used efficiently;

b) Competition is facilitated in upstream and downstream gas markets by minimising barriers to access to essential infrastructure to the long-term benefit of end users;

c) The full costs of producing and transporting gas are signalled to consumers;

d) The quality of gas services where those services include a trade-off between quality and price, as far as possible, reflect customers' preferences; and

e) The gas sector contributes to achieving the Government's climate change objectives as set out in the New Zealand Energy Strategy, or any other document the Minister of Energy may specify from time to time, by minimising gas losses and promoting demand-side management and energy efficiency.

Section 13 lists in detail the outcomes Government expects Gas Industry Co to pursue and report against to the Minister of Energy under the following categories:

- Consumer benefit
- Efficient retail market
- Efficient wholesale market
- Access to key infrastructure
- Critical contingency management
- Other outcomes

2. Options identification

In a CBA a comparison is made between a base case (where nothing changes), which we call the status quo, and a series of alternative options. Doing nothing is always an option.

2.1 A voluntary disclosure regime is operating currently

The status quo is that there is a voluntary framework for reporting planned and unplanned outages. This is supported by the Upstream Gas Outage Information Disclosure Code (the Code),[7] which came into effect on 22 June 2020. The notifications are publicly available on a website: https://industrynotifications.gasindustry.co.nz/.

The relevant features of this arrangement are summarised in Table 4.

Table 4: Features of disclosure code

Feature	Detail
Upstream participants	Gas producers (including storage)
Demand participants	Not envisaged
Type of disclosure	Planned and unplanned outages
Threshold	20TJ/day (50TJ/day in some circumstances)
Compliance and enforcement	Not applicable: voluntary arrangement only
Other	No price disclosure
Remedies	Directive to withdraw from code

2.1.1 There is a risk that participants withhold information on a future occasion

The current arrangement in the New Zealand gas market has neither an explicit – positive – incentive regime nor a compliance regime to investigate and ensure compliance with disclosure rules.

It could be argued that there are means for implied incentives to be meaningful:

- There are reputational consequences for failing to comply with voluntary disclosure.
- There is a threat of subsequent regulation if voluntary disclosure does not work.

Taking each of these points in turn, we would contend, first, that while the reputational incentives are real, they are not sufficient to ensure continued compliance. Gas producers have well established, bilateral, legally enforceable contracts with gas users, the terms of which are subject to price and availability pressures primarily and overwhelmingly rather than with reference to the brand reputation of a supplier.

[7] Upstream Gas Outage Information Disclosure Code 2020 https://industrynotifications.gasindustry.co.nz/assets/Upstream-Gas-Outage-Information-Disclosure-Code-March-2020-Copy.pdf

Second, we would also contend that regulation of what is currently provided is not in and of itself a strong disincentive.

Despite the upstream participants' behaviour under the voluntary regime to date, we note that an incentive does exist to gain from non-disclosure of information. Each producer will be aware that this same incentive also exists for its competitors. The equilibrium outcome of this sort of dynamic will be not to disclose information if the immediate gains exceed the discounted (for risk and time) gains of a subsequent non-disclosure of information. This calculation would have to factor in the probability that a competitor will also choose not to disclose information at some future point in time.

2.1.2 Market stress can impact on voluntary arrangements

We do not have to look much further than the New Zealand electricity market's market making scheme to see an example of what happens when a voluntary scheme fails. When the sequence of gas production outages unfolded in late 2018 and early 2019, electricity prices were extremely volatile, aided in no small part by the market makers withdrawing from the voluntary activity in the New Zealand electricity futures market. As a result, participants caught unaware faced enormous costs to regain control over their risk positions. The Electricity Authority was concerned about the volatility in the electricity market and focused, in the first instance, on steps that would shore up the market making regime. Two passages from its November 2019 consultation paper are included below to explain the exposure to a voluntary scheme and, coincidently, the link back to the gas outage regime:

> Some stakeholders have questioned whether current arrangements are fit for purpose
>
> 3.1 During periods of wholesale market stress participants' views of future spot prices become less certain and this is reflected in wider bid-ask spreads for futures. Voluntary market-making arrangements have not prevented bid-ask spreads widening during such events, and it is an expected outcome of increased uncertainty. For example, during the market stress period in spring 2018 future spot prices became highly uncertain as low lake levels were compounded by the extent and duration of the Pohokura gas outage being unclear.[8]
>
> 3.2 The uncertain and volatile trading conditions increased the cost and risk of providing market making services, and market makers relied on a provision in their agreements that released them from the obligation to market make when they experience financial stress. These provisions are often referred to as the 'portfolio stress' provisions. The criteria used by each market maker when they relied on the portfolio stress provisions was opaque, both to other market makers and the wider wholesale market. That two of the market makers had direct involvement in the gas market and two did not added very significantly to the perceived risk of market making for the two without gas involvement as they feared parties with better gas related information could use this to their disadvantage. The outcome was wide spreads for most market made futures contracts, but particularly for near-term contracts.[9]

[8] To be clear, regarding the last sent4ence of this passage, there was a period of time while the operator assessed the situation before they could release reliable information and that would also be the case with the current and proposed gas disclosure regimes.

[9] Electricity Authority, *Hedge Market Enhancements (market making): Ensuring market making arrangements are fit for-purpose over time*, Discussion paper, November 2019.

2.1.3 The counterfactual is the failure of the voluntary scheme, i.e. reversion to a non-disclosure situation

For the purpose of an economic cost benefit analysis, care must be taken as to what the proposed regime is compared with. That state is referred to as the counterfactual. Treasury advice states:[10]

> The 'counterfactual' is the situation that would exist if the intervention does not go ahead. The counterfactual needs to be realistic. In many situations, a status quo of 'Doing nothing' is not a realistic counterfactual. You should consider questions like:
>
> - What is the status quo? What are the current impacts of 'business as usual'?
> - Would an intervention for the same problem be provided by someone else?
> - Would other factors already affect the impacts?
> - What would you actually do, if you did not undertake the proposed intervention? What is the next best alternative?
> - Are there other things that might influence the situation? If we weren't to fund the proposal, would the problem remain the same, or decline over time, or get better?

We have heard (unsubstantiated) claims that even under the voluntary regime, some parties do not strictly follow the Code. Further, the examples of market making in the electricity futures market in late 2018 early 2019 illustrate that when a scheme relied upon urgently for efficient price discovery fails, the consequences are significant for all participants and consumers. We also know, with respect to the New Zealand gas market, that outages have a direct impact on the electricity market and some parties have a very weak feed of information from the gas market. Finally, when gas outages do occur, the impact on the electricity market can vary widely and, as we have seen, significantly. If the current arrangement is voluntary, the risk remains that it is not there at some future date when it is really needed for energy security, including the gas and electricity markets. On that basis, the counterfactual scenario is no gas disclosure regime.

2.2 The alternative is a regulated disclosure regime

The alternative option on the table is for regulated information disclosure along substantially the same lines as the existing voluntary regime with a compliance and enforcement regime. This arrangement is set out in the table below.

Feature	Detail
Upstream participants	Gas producers (including storage)
Demand participants	Not envisaged
Type of disclosure	Planned and unplanned outages
Threshold	20TJ/day (50TJ/day in some circumstances)
Compliance and enforcement	Yes
Other	No price disclosure

[10] NZ Treasury, *CBAx Tool User Guidance, Guide for departments and agencies using Treasury's CBAx tool for cost benefit analysis,* September 2018

Feature	Detail
Remedies	Compliance directions, compensation orders and civil pecuniary penalties

3. Developing the cost benefit framework

3.1 Literature review

We commissioned a literature review to look at two questions:

1. Economic costs and benefits of information disclosure in energy markets, specifically upcoming outages in gas production facilities that impact on the gas and electricity markets.
2. Economic costs and benefits of regulated versus voluntary schemes; in this case the scheme is information disclosure in a gas market.

In addition, we reviewed the feedback provided by energy market participants to GIC consultation on information disclosure and undertook interviews with market participants. The categories of costs and benefits we developed are set out below.

Costs

Category	Specific sources	Description
Increased cost of supplying information (planning and implementation)	GIC, Options paper for Information Disclosure in the Wholesale Gas Sector, 2019	Personnel costs (FTE) required to set up systems, legal fees, systems costs to manage interface and automation.
Increased cost of supplying information (operational)	Ibid	Ongoing personnel and other related costs to maintain operational requirements.
Regulator costs: monitoring and enforcement	Ibid	Additional costs of monitoring compliance and enforcement actions in the event of non-compliance.
Regulator costs: developing regulatory proposal	Ibid	Costs of undertaking consultation and implementing proposal.
Private cost of disclosure	Kieran Murray, Preston Davies - Cost-benefit analysis of Gas Bulletin Board and Gas Statement of Opportunities – December 2012	*"Competitive responses among domestic opponents would largely be a wealth transfer between the parties, which may end up as an economic benefit if it results in continuous lower prices to consumers that better reflect the efficient costs, than otherwise would have been the case."*

Reduction of incentives to innovate	Independent Market Operator Concept Paper - 2011 Outage Planning Review Recommendations – Information Transparency – June 2012	*"For a business to innovate (technically, operationally, or administratively) some types of information may need to remain private in order that the firm may earn an adequate return on that investment in innovation."* Also: *"Exposure to public scrutiny could in fact result in increased innovation."*
Facilitation of collusion and exercise of market power	Hooper, Twomey and Newbery – Transparency and confidentiality in competitive electricity markets – USAID June 2009	*"Information openness may facilitate overt or tacit collusion, particularly in oligopolistic market structures."* Noted that collusion would more likely to occur around price setting rather than in outage scheduling.

Benefits

Category	Specific sources	Description
More efficient decision making: on scheduling plant outages and fuel coordination	Electricity Authority – Wholesale Market Information Disclosure/ Review of Thermal Fuel Information Disclosure – July 2020	*"Market participants need information to make decisions about the future. Poor information can lead to increased risk and uncertainty. Potential consequences may include mistaken decisions and increased costs. For example, if parties had poor information about the effect of planned gas outages on thermal generation, this could lead to less reliable supply and/or unnecessarily high costs to maintain stand-by resources."*
More efficient decision making: on scheduling plant outages and fuel coordination (2)	Kieran Murray, Preston Davies – Cost-benefit analysis of Gas Bulletin Board and Gas Statement of Opportunities – December 2012	*"Costs associated with outages/curtailment could be reduced as a result of improvements to gas supply capability."*
More efficient decision making on scheduling plant outages and fuel coordination (3)	NZ Steel's submission on the Options paper	*"What is most frustrating is we had just completed a major plant shutdown that could have been scheduled to coincide with Pohokura outage had information been available in a timely manner. Equally the interaction of gas supply to the electricity market resulted in a significant increase in the cost of electricity. The result was inefficiencies relating to production and several million dollars in increased costs and negative impact on steel supply to the NZ construction industry."*
More efficient prices (reduction in volatility)	Kieran Murray, Preston Davies - Cost-benefit analysis of Gas Bulletin Board and Gas Statement of	*"More regular (and possibly more accurate) data provision could lead to a reduction in volatility as participants are able to react to data in a more timely fashion."*

	Opportunities – December 2012	
More efficient prices (reduction in risk premium)	Electricity Authority	*"Reduce[s] the scale and persistence of unexpected price spikes.* *Reduce[s] the risk premium to market participants and narrow the bid-ask spreads in the futures market."*
More efficient prices (reduction in distortions)	Kieran Murray, Preston Davies	*"Information provided by the [proposal] may promote more efficient pricing decisions. The economic effect is captured by a reduction in distortions/deadweight loss."*
Effectiveness of regulation: regulatory certainty	Ibid	*"With more information available, more (and more informed) debate around regulation and decision-making could result, reducing the resources dedicated to the regulatory process."*
Effectiveness of regulation: better monitoring of participants' behaviour	Ibid	*"Market monitoring can assist in the uncovering of problematic short run behaviours. Improved market monitoring can therefore provide increased assurance to consumers and their representatives about market outcomes and reduce the risk of ad hoc intervention."*
Greater market participation (confidence to invest and transact)	Ibid	*"The more stakeholders (both actual and potential) know about the market, the more likely they are to feel confident to invest and transact. Secrecy may mean stakeholders perceive they are not able to detect anti-competitive behaviour, a high level of uncertainty about how the market functions, and how stakeholders should interpret the signals the market sends."*
Signalling	Ibid	*"Signals a form of maturation in the gas industry and an evolution towards a competitive and efficient market."*

For each type of cost and benefit we discussed with energy market participants its relevance of materiality and reviewed established positions based on feedback to consultation.

3.2 Discussion of costs of introducing a regulated scheme

3.2.1 Increased costs of supplying information

We recognise that there are compliance costs for market participants. Participants need to set up systems, and monitor and review compliance. Although suppliers are already providing similar information, it is possible that, with regulation, participants may want to provide disclosure at a higher standard because of the penalties of non-compliance and will reprioritise their compliance activities as a result.

There may also be an additional cost associated with the requirement of a director's certification.

Conclusion:
Compared to the status quo, the additional costs of compliance are small given that compliance with the disclosure code is already happening.

3.2.2 Regulator costs – proposal development, monitoring and enforcement

We would expect the following costs to be relevant in our determination:

- developing the information disclosure proposal
- monitoring and enforcing the information disclosure regime
- further development of the disclosure platform.

Conclusion:

The regulator will incur some costs to develop and operate the information disclosure. These costs are not significant.

3.2.3 Private cost of disclosure

We are interested in economic costs, not wealth transfers (which are a cost to one party but a corresponding benefit to another). In economic studies of information disclosure, some participants have advanced the argument that a possible cost that should be taken into consideration is the "loss of competitive advantage". By that we understand that suppliers may lose the opportunity to benefit from non-disclosure of information.

We treat this in our cost benefit assessment as a wealth transfer from suppliers to other parties which, if it stays in the hands of those other parties, is simply a wealth transfer.

Conclusion:

Wealth transfers are ignored in an economic cost benefit analysis.

3.2.4 Reduction of incentives to innovate

The argument goes that forced disclosure of information will reduce the return that upstream participants make from innovation and therefore discourage further investment. However, because outage information is currently disclosed voluntarily, we consider that this is not an active consideration for participants.

We would also contend that if there is a higher rate of return that is needed to attract investors, then that would be better signalled through the underlying contract price rather than through short-term and uncertain gains made from non-disclosure of information. The market will price scarcity when necessary to signal investment.

Conclusion:

The costs are very unlikely to arise

3.2.5 Facilitation of collusion and exercise of market power

We are of the view that the likelihood of collusion because of information disclosure is low. First, collusion is far more likely to take place around a price than in the scheduling of an outage, which this proposal is concerned with. Second, the transparency of information disclosure will provide the visibility for all participants to see what is happening in the market which does not facilitate collusion.

Conclusion:
The costs are very unlikely to arise

3.3 Discussion of benefits of introducing a regulated scheme

Common themes that arose from our research and discussions with market participants were:

- The existence and quality of a gas outage regime impacts significantly on the gas market and the electricity market.
- The voluntary regime has helped both markets to become more efficient.
- Some participants have reservations about the voluntary scheme because they don't feel they can rely fully on the information being comprehensive, consistent and timely under all future conditions.
- The proposal to regulate the scheme should focus on the equivalent specifications as the voluntary scheme in the first instance.

Below we consider each of the benefit categories and include anonymous quotes from interviewees.

3.3.1 More efficient decision-making

Planned outages amongst gas and electricity transmission grids, gas production facilities, electricity generators and major gas users are an essential part of the workings of the energy sector. The more outages can be synchronised across the sector, the lower the risk to security of supply and the lower the disruption to the market (which is discussed in the next section.)

We heard through interviews many parties' frustration that their organisation was caught by planned outages not having been signalled in the past. Interviewees were also consistent in the view that they could not have complete confidence that the voluntary regime would consistently deliver efficient decisions on scheduling.

Gas and electricity market participants

This was a recurring theme amongst interviewees for both the electricity and gas markets. It is clear that a regulated scheme would lead to more efficient decision making around the scheduling of gas use for industrial demand and electricity generation. We heard:

> Three things are important for the gas outage regime:
>
> - Timeliness and common receipt

- Fulsomeness
- Understanding impact

Some gas purchasers were not so worried about this because they were privy to advice under contracts with the key suppliers. Even so, two such participants said:

> [x] were party to a [y] contract at the time of the original Pohokura outage. Even so [x] didn't feel as though they had a lot of information. [x] felt it was in the dark as much as anybody else.
>
> Were unsure whether could go out and purchase additional gas.

Other gas purchasers were clear that they needed confidence that gas outage information is comprehensive and there is greater consistency in gas outage information (plus updates) than they currently perceive is the case under the voluntary scheme. This would lead to better decision-making around industrial production scheduling and financial risk management in the gas market. Some of the comments we heard were:

> Certainly, [the voluntary scheme is] a good step forward comparing to receiving no information. Some of it arrives late.
>
> A voluntary scheme would work if everyone complied.
>
> The big difference is that in a regulated market you know that [the producers] will get pinged.

In the electricity market a number of parties are quite removed from the gas market and now know they need comprehensive, consistent and timely information on gas outages so they can schedule their generation, manage their fuel (notably stored hydro) and manage their financial risk in the electricity market. We heard:

> The impact on the electricity market is critical. The two are inextricably linked.
>
> The gas industry is a bit of a black box for us. Understood a lot more recently. [x] do feel the effects and struggle to understand what has happened. Even under the voluntary scheme not as informed as others.

It is evident that if all parties in the gas market have more clear information on gas outages, they will better organise their own production and outages so the overall disruption from the whole sequence of outages is less. This will be more the case with a regulated outage regime than a voluntary scheme because participants are less able to rely on the efficiency of the posted outage plans.

The case is amplified when the coordination of outages in the electricity market are considered. As one party said, if everyone can rely on the gas outage information there would be:

> Better decision-making by consumers of electricity and gas e.g. DSM or substitution. More gas available to others.

Substitution was mentioned several times during interviews. Buyers of gas for production or electricity generation were forced to utilise coal and/or diesel.

In summary, we would expect that information about gas supplier outages would lead to more efficient decisions in the following areas:

- Generator outages could be scheduled more effectively with, for example, gas generators choosing to coincide generator outage with a gas outage, thereby releasing gas to other users; other types of electricity generation would schedule outages for periods outside periods of gas supply outage.
- Gas customers will have additional time to schedule plant closures, to procure another supply of gas or another source of fuel.
- Gas consumers and electricity generators and industrial users would be less likely to have to resort to additional coal and or diesel use.
- In the case of Genesis, knowledge of an impending gas supply outage may assist it with coal procurement.
- Major electricity users could schedule outages to coincide with gas supply outages.
- Hydro generators would look to retain hydro storage in the short term if there is an impending gas outage.

The effect of these decisions would be to lower the cost of electricity supply and reduce the risk of shortages of thermal fuel and hydro storage for electricity generation.

Electricity transmission

Several interviewees focused on gas and electricity transmission and distribution decision-making which is a security of supply issue:

> Electricity market and SO get all of the information they require to keep the lights on.
>
> The electricity sector has done a lot of work getting information from market participants and the gas limb undermines it.
>
> When the market was struggling with the Pohokura outage, the an HVDC outage was also ongoing, which caused problems for the system operator.

Conclusion:

Better coordination of gas production, electricity generation, gas transmission, electricity transmission and major plant outages will be substantially more efficient even than the voluntary gas outage disclosure regime. One key benefit is better security of supply outcomes in both markets.

3.3.2 More efficient prices

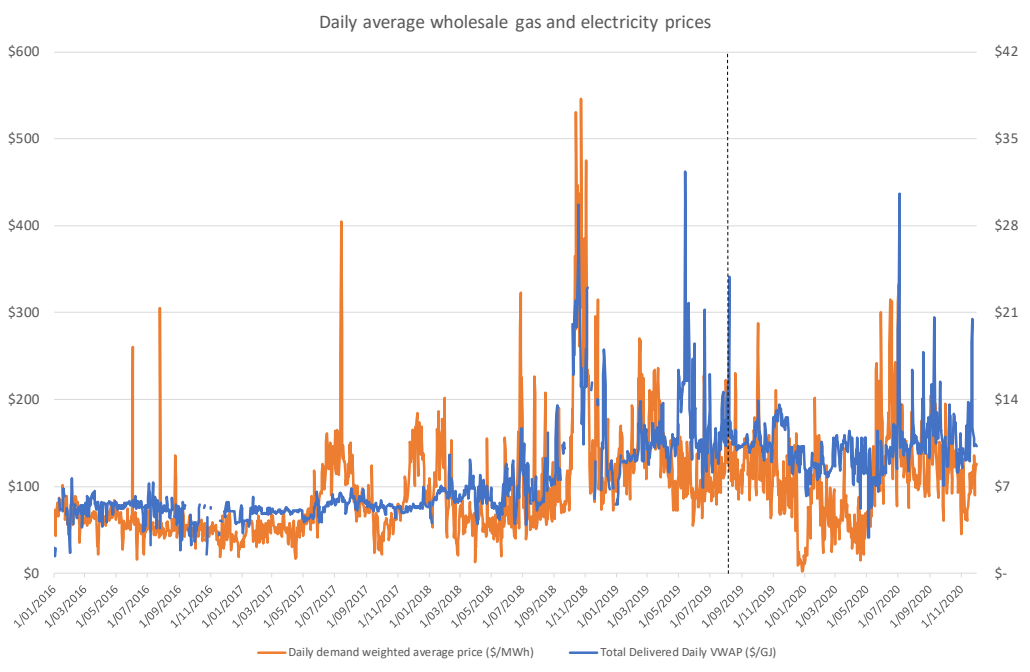
Prices will be less volatile and risk premiums in fixed-term contracts for gas and electricity (wholesale and retail) would be lower than would otherwise be the case with no gas production outage information or even the voluntary scheme. This is very difficult to quantify because the required data in both markets is limited and many assumptions must be taken to filter out all of the other influences on price even if good data was available.

Figure 2 plots daily average gas prices on emsTradepoint and daily average wholesale electricity prices. The dotted line at August 2019 indicates when the Gas Industry Co's interim gas outage information webpage went live.

In the period May 2017 to May 2018, we see gas prices slightly elevated compared with the previous year. Electricity prices were more volatile this year than the previous year because of the hydrological conditions.

In the period May 2018 to October 2018, gas and electricity prices were firmer and more volatile.

Figure 2: Daily average gas and electricity prices January 2016 – November 2020



Source: Sapere, data sourced from emsTradepoint and the Authority's Electricity Market Information website (EMI)

From November 2018 to February, gas prices on emsTradepoint and wholesale electricity prices in the spot market reflected the Pohokura outages (planned and unplanned) during the period. From there though to August 2019, electricity prices remained volatile but settled compared with the gas market. From August 2019 to May 2020, electricity prices regained their composure, although they were still more volatile than had been the case in 2016. Electricity prices were lower on average through the pandemic lockdown period but recovered in May at the same time as low rainfall, generator outages and ongoing uncertainty about fuel availability combined with demand rising going into winter.

Gas prices became more volatile again in mid-2020 as some unplanned outages occurred and uncertainty about the future of Pohokura was factored into decision-making.

We have plotted these two series to illustrate the degree to which daily spot prices in the two markets interact. In truth, the bulk of the gas used to accommodate hydro storage and peaking requirements is supplied under longer-term contracts. The spot gas prices reflect a combination of short-term gas for electricity generation, industrial requirements and balancing gas. A lot of the volatility in electricity prices is explained by factors other than gas such as hydrology. However, in the absence of statistically separating those effects, we note that the rise and fall in absolute prices and the rise and fall in volatility are common to both markets and those ultimately flow into contract prices.

The literature points to the expectation that gas and electricity prices are less volatile than would have been the case with no outgas outage disclosure after August 2019. The level of prices and the level of volatility feed into wholesale prices in both markets. A risk premium is built in to term fixed-price wholesale and retail prices in both markets.

It would be very challenging to unpick the effects of the gas outage disclosure from hydrology. It would be challenging to isolate the effects of the gas outage disclosure on contract prices. It is even more challenging to do that in the absence of any bilateral gas contracting information.

The material benefit in this category is reduced volatility, lower prices overall and a lower risk premium in gas and electricity being built into fixed price wholesale contracts and retail prices.

Volatility in gas and electricity prices is said to have been lower than it would have been in the absence of the voluntary outage information. Some interviewees said that it would be lower again if the voluntary regime were regulated. i.e. that information was comprehensive, consistent, timely and available to all parties simultaneously. For example:

> As soon as information disclosed it should be available

A consequential benefit arising from the two points above, better decision making and reduced-price volatility in both the gas market and electricity market would lead to lower risk premiums for to consumers (large and small) than would otherwise be the case. Two comments on this point:

> Would have all the benefits and some if the scheme was regulated.

> The voluntary information feeds into risk management and trading parameters

Critically, in the electricity market half hourly spot prices are subject to all of the market information up to the minute. The futures market also trades in response to information available on any given day. Further, four electricity generators (some of whom are also gas market participants) are obliged to make markets in New Zealand electricity futures traded on the ASX.

Gas outage information is material and has been shown to have a significant effect on wholesale spot electricity prices and forward electricity prices, especially futures prices.

We would expect to see more efficient prices emerge via several mechanisms:

- Participants reacting in a timelier fashion to information will moderate demand and increase supply (as per the previous section) thereby reducing price volatility.
- Earlier reactions to impending events will mean that companies can make physical changes in demand and supply (in both the gas and electricity markets).
- For market makers in the electricity hedge market, especially those who are not gas customers, there will be greater certainty on availability of plant, which will potentially reduce the risk premium.

Ultimately the proposed mechanisms will lead to prices better reflecting the true costs of supply, and volatility in prices reducing.

Conclusion:

Prices impacted by the quality of gas disclosure include wholesale gas, wholesale electricity, bilateral contracts in both markets. Price volatility, especially in wholesale prices, will be lower than would

otherwise be the case with a regulated gas outage regime. Risk premiums in fixed price contracts will also be lower than would otherwise be the case.

3.3.3 Effectiveness of regulation

The regulated market is more effective as a result of the gas outage regime being regulated. All participants can better rely on the quality of the outage information because the release of information will be monitored for consistency and timeliness. Participants will also be able to have confidence in the outage information because it will be backed up by an enforcement regime.

The material benefit in this category is as stated in the title, a better-informed market produces more efficient outcomes.

The question of whether regulation is the correct approach has several dimensions. We can think of these dimensions as quality of information, confidence and flexibility.

It is possible that a voluntary approach will result in the same quality of information being provided as a mandatory regime, but there are some reservations about this, as the GIC has noted:

> However, we note that some parties have not always followed the strict requirements of the Code. For instance, the notification templates have not been used in some cases, and notifications have not always followed the schedule outlined in the Code.[11]

Participants we talked to indicated that information submitted under the code sometimes arrives late and expressed concerns that there was still a potential asymmetry problem. One participant expressed the view that "information is being made available when parties see fit" but we have not tested this.

Based on these observations and the literature on the question of regulating information disclosure or not we land at the position that the quality of the information from the regulated option will be superior to the voluntary regime.

The second dimension is that of confidence. The quality of information will, of course, influence the confidence participants have in it, but more serious is the perception of what happens when the market is under stress. Energy market participants are well aware of voluntary market-making falling away at the time of the Pohokura outage, which has led to the proposal for the mandatory backstop. A number of participants we talked to stated that they perceived risks of non-compliance under the voluntary regime and that without regulation they would not have confidence in the information.

Finally, there is a question about whether a voluntary regime could be more flexible, that is, if it could react more quickly to the need to update rules. However, GIC notes that:

> There are some issues regarding the review process in the Code, including whether the third-party reviewer is a neutral party and the timing of the reviews.[12]

[11] GIC, Draft Statement of Proposal: Gas Production and Storage Facility Outage Information, 2020
[12] Ibid

Put simply, regulating the voluntary arrangements will give the regulator and market participants confidence that the benefits of the outage disclosure regime will be able to be relied on by members. The regulatory agency will be able to enforce them.

For GIC, a regulated scheme lends itself to better monitoring participant behaviour than no scheme or even a voluntary scheme.

A well-designed set of arrangements, which has the support of the industry, will be enduring and will need only small changes to make them work.

The regulator will be able to use the information to study disclosures and market outcomes. This monitoring can be used to fine tune and perfect the disclosure regime.

Conclusion:

The proposed regulated gas outage regime will be more effective than the voluntary scheme because gas and electricity participants and end consumers will be able to rely on the quality of the information.

3.3.4 Greater market participation

The high price volatility and uncertainty that comes with no outage regime is a barrier to entry for new participants in gas retailing. The reduction in volatility and uncertainty that a regulated gas outage scheme will lead to greater participation in the gas retail market.

An information disclosure regime will signal to interested parties (including other regulators, suppliers, downstream participants and prospective entrants) that the market is on a trajectory to a competitive and efficient market.

When more efficient and less volatile prices and transparent information become a reality, new participants will be attracted to the industry. Less concentrated markets are associated with better outcomes for consumers in the form of lower prices and more innovative products.

A particular benefit is the removal of market asymmetry. Participants we talked to noted different levels of ability to understand gas market outages. A large firm with a strong analytical capability and knowledge of the workings of the market will be a in a far better position than an electricity market purchaser which is at some distance from direct knowledge of an outage. By ensuring that all parties have access to the same information better decisions will be made by more participants.

Conclusion:

The additional confidence that comes from a more reliable gas outage regime will encourage and not discourage new market participants in either gas or electricity markets.

3.3.5 Signalling of a mature market

An information disclosure regime will signal to interested parties (including other regulators, suppliers, downstream participants and prospective entrants) that the market is on a trajectory to a competitive and efficient market. Comments from interviewees along these lines include:

> Information is being made available when parties see fit. There is nothing on them. Maybe their drivers are engineering so not sinister but, in any event, not timely.

Looking at gas disclosure it is where POCP was 5 years ago.

The gold standard is everyone gets the same information at the same time.

Conclusion:

The regulated gas disclosure regime is consistent with a mature market to the benefit of gas market participants and gas consumers.

4. Evaluation of the costs and benefits together

4.1 Methods of transmitting costs and benefits

We are satisfied that the proposal will have tangible consequences that can be observed. Participants have provided evidence of the realms of decision making that would be affected which include:

- major gas users plant scheduling (including their own outages)
- electricity generation scheduling (including their own outages)
- fuel procurement and fuel use
- wholesale price volatility
- risk premiums for fixed price contracts (electricity and gas)
- prices to gas and electricity consumers.

4.2 On balance the net benefit is positive

Our conclusions for each cost and benefit category are set out in Table 5 below.

On balance while we have not quantified the benefits, we see significant net benefits in both the gas and electricity markets from the move to the regulated regime compared to the counterfactual. We find that the net benefits of the regulated regime would be greater than the net benefits of the voluntary scheme.

Decision-making around outages for physical assets in the energy sector and fuel utilisation (renewable and fossil fuels) is, to us, clearly most efficient with a regulated gas outage regime. We are convinced that this efficiency will be better under the regulated scheme compared with the current voluntary scheme.

Wholesale prices, contract prices and retail prices in gas and electricity markets will be more efficient than would otherwise be the case.

Table 5: Conclusions

	Category	Conclusion
Costs	Increased costs of supplying information	Compared to the status quo, the additional costs of compliance are small given that compliance with the disclosure code is already happening.
	Regulator costs – proposal development, monitoring and enforcement	The regulator will incur some costs to develop and operate the information disclosure. These costs are not significant as existing processes can be utilised.
	Private cost of disclosure	Wealth transfers are ignored in an economic cost benefit analysis
	Reduction of incentives to innovate	The costs are very unlikely to arise
	Facilitation of collusion and exercise of market power	The costs are very unlikely to arise
Benefits	More efficient decision making	Better coordination of gas production, electricity generation, gas transmission, electricity transmission and major plant outages will be substantially more efficient even than the voluntary gas outage disclosure regime. One key benefit is better security of supply outcomes in both markets.
	More efficient prices	Prices impacted by the quality of gas disclosure include wholesale gas, wholesale electricity, bilateral contracts in both markets. Price volatility, especially in wholesale prices, will be lower than would otherwise be the case with a regulated gas outage regime. Risk premiums in fixed price contracts will also be lower than would otherwise be the case.
	Effectiveness of regulation	The proposed regulated gas outage regime will be more effective than the voluntary scheme because gas and electricity participants and end consumers will be able to rely on the quality of the information
	Greater market participation	The additional confidence that comes from a more reliable gas outage regime will encourage and not discourage new market participants in either gas or electricity markets.
	Signalling of a mature market	the regulated gas disclosure regime is consistent with a mature market to the benefit of gas and electricity market participants and end consumers

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