Getting gas on the agenda – a shift in competitive balance

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New technologies are coming

- Electric vehicles
- Computing
- Heat pumps
- Advanced metering
- Sensors
- Communications
- Photovoltaics
- Smart appliances
- Batteries
These technologies represent a huge opportunity...

- Cheaper, cleaner transport
- Cheaper, more reliable networks
- Cheaper, cleaner energy
- Lower retail cost-to-serve
However, tomorrow’s technologies are emerging within yesterday’s market arrangements

- Predominantly flat consumption-based ($/kWh) tariffs
  - Legacy of old metering & billing technology
- Little or no price signals reflecting cost of consumption at different times
A lot of focus is on potential poor outcomes in the electricity sector

• For example, NZIER analysis for EA suggests inefficient PV uptake could result in
  – $2.5-5bn excess costs, and
  – retail price rises to non-PV customers of approximately 10%.
However, new technologies may have just as much of an impact on the gas sector…

• … and the battle is being waged in your living room and bathroom
For consumers to make the right choices, they need to be given the right prices

- Low-user or Standard?
- Fixed charges
- Appliance costs
- Maintenance
- CO2 emissions
- Connection fees

• But are they?
Huge variation across New Zealand in electricity network pricing signals for space and water heating

- Generally not reflective of cost of service, but more reflective of legacy decisions and artificial distortions (e.g. LUFC)
Gas network pricing too has variation

- Also variation in whether network company or consumer pays for connection to the gas network
Variations likely affecting consumer choices

Annual water-heating-related network bill to consumer

- Are the right choices being made for NZ?

- Electricity:
  - Wellington: $80
  - Auckland: $350

- Gas:
  - Wellington: $220
  - Auckland: $225

Source: Network_prices_v3.xlsm
If the current pricing arrangements are wrong...

• What should be the right price signals?

• Are there regulatory impediments to achieving this?
What might be an efficient electricity distribution price structure?

• Electricity Authority would like to see ‘service-based’ pricing:
  – Signals the cost of capacity via some measure of LRMC at peak
    • But only for networks which face capacity constraint...
    • … which could be all of them if EVs take off
  – Recovers remaining network costs via least-distortionary approach
    • i.e. fixed charge (or similar, subject to interpretation of LUFC regulations!)

• AEMC in Australia has gone some way towards requiring such an approach
  – However, not full mandate of prescribed approach. Principles-based foundation.
LRMC-based electricity pricing could significantly change the costs of space & water heating

Demand-weighted electricity network costs for heating

- Uncertainty over future LRMC-based pricing:
  - Differences between networks for cost and extent of spare capacity
  - Approach to deriving LRMC estimates
An efficient price structure for gas networks could be very different

- No foreseeable capacity issue
  - Spare capacity + linepack
  - No equivalent game-changing technology like EV on horizon

- If no need to signal capacity costs, least-distortionary cost-recovery should be same as for electricity
  - i.e. via fixed charges.
  - Right?

- Wrong!

- Gas is discretionary fuel
Who faces real risk of stranding?

The gas-killing utility is here

The current gas business model is about to break

Australian grid demand in free-fall

Electricity networks facing ‘death spiral’

Electricity! Vs Gaaaaas
What is a network death spiral?

- Ever-accelerating rate of consumers disconnecting from the network
- Requires consumers to have alternatives
Solar PV is not considered a threat for mass electricity grid defection

Seasonal & daily variation costly to manage
- ≈ 70% of PV generation would be wasted
- Batteries or diesel back-up

Plus:
- Consumers would forego the opportunity to buy EVs
- Many consumers (including commercial & industrial) don’t have roofspace required
Although some electricity assets will likely prove to be over-built....
... which raises some interesting public policy questions
Gas faces real competition from realistic alternatives

North Island delivered fuel energy

- Water heat
- Space heat
- Cooking
- Process
- Iron & Steel

**Fuel Sources**:
- Electricity
- Diesel
- Black Liquor
- Natural Gas
- LPG
- Wood
- Coal
- Fuel Oil
- Biogas
- Geothermal
- Solar
For process heat, gas appears to be a strong contender.
But for space & water heating, gas and electricity are fierce competitors

- Gas space heating competition from heat pumps exacerbated by lack of peak electricity prices
- Gas water heating generally competitive, but
  - affected by loss of gas space heating
  - increased burden of gas fixed charges
Relative ICP growth rates seem to suggest gas is a discretionary fuel.
Gas distribution networks seem most exposed to demand risk

≈ 75% of gas distribution revenue relates to space and water heating

Majority of gas transmission revenue relates to process heat
Queensland is an example of how discretionary gas is

• Queensland Gas Distribution Network no longer subject to price control because of:
  – “the ability for end users to substitute other forms of energy...[and] ... the precarious competitive position of gas”

• Queensland climate and wholesale gas prices are different to New Zealand → we are a long-way from reaching this situation

• However, every customer who switches away from gas may be lost for at least 15-20 years
The least-distortionary gas distribution price structure could be a simple volume-based tariff

Zero fixed charge would help competitiveness of gas relative to electricity – particularly for smaller users

- Would shift cost-recovery away from more price-elastic (residential space & water) to less price-elastic (process heat) consumers

Potentially non-zero fixed charge for larger residential users
However, reverse outcomes have been occurring

<table>
<thead>
<tr>
<th>Year</th>
<th>Vector</th>
<th>Powerco</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012 to 14</td>
<td>16%</td>
<td>4%</td>
</tr>
</tbody>
</table>

**2012 to 14 increase in relative proportion of gas Dx revenue recovered from residential consumers**

**Vector gas Tx price for consumers with different load factors**

<table>
<thead>
<tr>
<th>Load Factor</th>
<th>FY 12</th>
<th>FY 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>40% LF</td>
<td>1.5</td>
<td>2.5</td>
</tr>
<tr>
<td>80% LF</td>
<td>1.0</td>
<td>1.5</td>
</tr>
</tbody>
</table>

- Increasing proportion of fixed / capacity-based charges
  → cost-allocation shifted from industrial to residential
Gas network incentives under Part 4 may explain some pricing behaviour

- Volume-based pricing under current form of price control $\rightarrow$ considerable year-on-year weather-related revenue volatility

- Increasing proportion of fixed / capacity-based charges reduces such volatility

- Cannibalisation effect for overlapping gas and electricity networks may explain some differences in approach between Powerco and Vector
How much regulatory prescription may be needed on pricing approaches?

1) For gas

• Gas distribution.
  – Probably not much
  – If no adverse Part 4 incentives (including across electricity regulation)

• Gas transmission:
  – Some?
  – Harmonisation issues across Vector & Maui pipelines
  – Transmission pricing can impact operation of wholesale market
How much regulatory prescription may be needed on pricing approaches?

2) For electricity distribution

- In submissions to EA, some community/trust-owned networks and Transpower thought networks are inherently incentivised to implement efficient pricing

- Others highlighted potential barriers
  - Part 4 regime:
    - Lack of pure revenue cap increases risk of a major change in tariff structure
    - Conversely, a revenue cap coupled with no real stranding risk → no real commercial incentive to re-structure tariffs, so why incur the political pain
      - Concern in Australia about this incentive effect
      - Some networks selling consumer technology (PV and batteries) whose value proposition relies on a continuation of current pricing structures
  - Different ownership could affect incentives
  - Other regulatory constraints: Low-user fixed charge, and Rural/Urban regulations
And will retailers pass through network price signals in a pure and unsullied form?

- Retail competition
  - Retailers face arbitrage risk
- Retail competition
  - Retailers need to offer simple tariffs to win customers

- Retail prices mirror distribution prices
- Retailers re-package distribution prices

• If retailers don’t pass on network price signals, would direct network billing deliver net benefits?
Summary

• Gas and electricity network pricing is affecting consumer’s technology & fuel decisions – including for space & water heating

• Range of current approaches is resulting in higher cost outcomes to NZ in many cases

• Network incentives under current Part 4 form of control may be inhibiting move to efficient pricing

• However change to form of control may create further unintended incentive issues

• How much regulatory prescription is required for network pricing may vary between – gas and electricity; and – transmission and distribution

• The longer we leave it, the harder it will be to change
Thank you
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