Energy options study reaffirms gas' competitive role

Gas continues to provide a competitive energy choice for home energy and industrial heat applications, according to an updated review of consumer energy options.

The report, *Consumer Energy Options in New Zealand – 2016 Update*, by Concept Consulting was commissioned by Gas Industry Co and is aimed at providing updated and authoritative information that can be used by a range of private and public sector players in guiding consumer energy decision-making. It covers both households and industrial heating, and reflects on issues for gas and LPG as carbon fuels.

It is important that the positioning of gas in the energy supply mix is updated in the context of increasingly competitive energy markets, a resulting array of energy options for consumers, climate change concerns, the move towards greater use of renewable energy, and fuel and technology developments.

Households

Choosing the best form of energy for a household was often complex as there are many variables that differ from household to household. These included the size of the home and family, the number and type of appliances, and how energy is used.

Apart from the fundamentals of upfront capital expense and ongoing running costs, there's the more intangible non-price quality attributes that consumers look to as a lifestyle choice.

The report finds:

Water heating

- For a home requiring a new water heater, instant, or continuous, gas water heating is the most cost-effective in the majority of cases even if a home doesn't already have a gas connection. This is because of its lower up-front purchase and installation cost, and cheaper energy price compared to standard electric hot water cylinders.

- Much higher up-front purchase and installation costs for options such as solar water heating and heat pump water heating more than outweigh benefits from their lower running costs. It generally isn't cost-effective to spend money on replacing an existing functional hot water cylinder – although if a lot of hot water is used consumers may make savings, particularly in parts of the country with higher-than-average electricity prices.

- Instant gas water heating delivers significant additional value to consumers by never running out of hot water, and freeing up interior house space used for the cylinder.

Space heating

- The economics of space heating options can vary significantly between consumers, reflecting such factors as house size, how well it is insulated, its geographic location, and occupants' heating preferences.

- Free-standing resistance electric heaters are generally the best option for smaller heating requirements as their higher running costs are offset by very low capital costs.

- For larger heating requirements the most cost-effective options are log burners, gas heaters, and heat pumps, as the benefits of their lower running costs will start to outweigh their higher capital costs. The best option will vary according to house design and situation, and whether it already has gas for water heating or cooking. If it does have gas for these uses, gas space heating can in many cases be cheaper than equivalent heat pump options.

- This is in direct contrast with current consumer perceptions as reflected in the heavy weighting of space heating appliance sales towards heat pumps in recent times. Careful analysis shows that gas appliances are competitive with heat pumps, and as this becomes more widely understood we should expect to see higher uptake of the gas space heating option as a cost-effective complement to gas-fired water heating.

  As with hot water systems, it is generally not cost-effective to switch out an existing heater to the cheapest new option, except where households have very large heating requirements and are currently using a high running cost option, such as an electric resistance heater.

Industrial heating

For new industrial boiler requirements, gas units are currently significantly cheaper than coal and biomass options. If an industrial consumer has an existing coal-fired boiler, it is unlikely to be cost-effective to switch away to a new gas unit except for very large industrial heat loads.

The report notes that an investment in gas boilers today is unlikely to become uneconomic unless there is a substantial shift in relative coal and gas prices, and carbon dioxide prices remain low. Drawing on analysis developed for the 'Gas Supply and Demand' study for Gas Industry Co, this prospect appears unlikely in the near-to-medium future.

Pricing

Current electricity network pricing approaches are generally under-stating the electricity system cost imposed by electric space-heating options. A move to more cost-reflective electricity pricing structures would further improve the economics of gas space heating compared with electric space heating – particularly for medium to large space heating requirements.

Similarly, some gas network pricing approaches may be inefficiently disadvantaging gas – particularly for smaller consumers.

The report also highlights the importance of getting the pricing structure of electricity and gas network and retail prices correct, so that consumers are better able to make energy choices which are not only best for them, but best for New Zealand as a whole. Gas

Industry Co has been working with the Commerce Commission to ensure that the combined regulatory framework for gas network companies supports the adoption of pricing approaches which are best for New Zealand. The Electricity Authority also has a current initiative aimed at ensuring that electricity network pricing transitions to structures which deliver similar good outcomes for New Zealand.

LPG

While the conclusions relate predominantly to reticulated natural gas, liquefied petroleum gas (LPG) provides the same quality advantages as natural gas. Although generally not as cost-effective as natural gas in many North Island centres, it offers a competitive alternative – particularly for water heating - in the South Island and parts of the North Island where there is no natural gas reticulation.

Gas as a carbon fuel

Though a fossil fuel, gas is playing a significant role globally in helping countries to reduce their reliance on more harmful fossil fuels, and reduce their carbon footprint.

New Zealand is fortunate to be already well down the road of renewables development, but an important fact highlighted in this study is that the carbon footprint of gas-fired space and water heaters can be less than standard resistance electric heating, and very similar to heat pumps, because the power stations used to meet increased electricity demand for heating during winter are predominantly fossil-fuelled. The gas-fired stations use gas less efficiently than direct-use applications, and coal-fired stations are even more carbon-intensive.

The *Consumer Energy Options* report updates and expands on a 2012 Concept Consulting study, *Consumer Energy Options: An Evaluation of the Different Fuels and Technologies for providing Water, Space and Process Heat*.