public interest
ADVOCACY CENTRE

Submission to National Hydrogen Strategy – Hydrogen in the gas network

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About the Public Interest Advocacy Centre

The Public Interest Advocacy Centre (PIAC) is an independent, non-profit legal centre based in Sydney.

Established in 1982, PIAC tackles barriers to justice and fairness experienced by people who are vulnerable or facing disadvantage. We ensure basic rights are enjoyed across the community through legal assistance and strategic litigation, public policy development, communication and training.

Energy and Water Consumers' Advocacy Program

The Energy and Water Consumers' Advocacy Program (EWCAP) represents the interests of low-income and other residential consumers of electricity, gas and water in New South Wales. The program develops policy and advocates in the interests of low-income and other residential consumers in the NSW energy and water markets. PIAC receives input from a community-based reference group whose members include:

- NSW Council of Social Service;
- Combined Pensioners and Superannuants Association of NSW;
- Ethnic Communities Council NSW;
- Salvation Army;
- Physical Disability Council NSW;
- St Vincent de Paul NSW;
- Good Shepherd Microfinance;
- Affiliated Residential Park Residents Association NSW;
- Tenants Union;
- Solar Citizens; and
- The Sydney Alliance.

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 Public Interest Advocacy Centre

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The Public Interest Advocacy Centre office is located on the land of the Gadigal of the Eora Nation.

Contents

Who pays for any move to hydrogen?

PIAC welcomes the opportunity to respond to the National Hydrogen Strategy Issues Paper.

PIAC notes that issues paper 6, Hydrogen in the gas network, focusses on the policy and technological barriers to the use of hydrogen in gas networks. Just as important to the discussion is the question "Who pays?"

Inherent to any transformation is the costs, including for the necessary infrastructure to build, transport, store hydrogen as well as consequential costs at the end-use stage where burners or other appliances may require conversion. These are discussed in further detail in the next section.

There are potentially other costs in the form of missed opportunities. In the case of hydrogen, this is primarily the costs to consumers and the environment from continuing to use gas (with or without hydrogen blending) rather than switching to electricity where it is more economical to do so.

We refer the Taskforce to two reports produced by the Alternative Technology Association (now Renew) assessing the economic trade-off between electricity and gas for consumers in different situations.[1] Amongst other findings the report found that, for many households, gas was no longer the cheap all-rounder for heating and cooking. The key findings from the 2014 report are reproduced in Attachment A.

PIAC recommends the use of a beneficiary-pays framework in the first instance for recovering costs and allocating risks:

- Those who benefit from a given investment should also pay for that investment.
- Where there are multiple beneficiaries, the costs should be recovered proportionally to their share of the benefits.
- Where it is not practical and transparent to identify the beneficiaries, a causer-pays principle should be used.
- Cost recovery should also include the risk, to the extent it exists, of the underutilisation of assets and hence asset stranding.
- Cross-subsidies should only be permitted where they are accepted by informed consumer feedback (such as retaining postage stamp pricing for distribution network tariffs) or immaterially small.

We do not consider that household consumers will be net beneficiaries of blending hydrogen in the gas network. Therefore, we consider it inappropriate that household consumers should bear the costs and risks of it.

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1 Alternative Technology Association, *Are we still cooking with gas*, 2014.
Alternative Technology Association, *Household fuel choice in the National Energy Market*, 2018.

Recommendation 1

PIAC recommends that the National Hydrogen Taskforce consider the issues of appropriate risk allocation and cost recovery as part of its investigation of hydrogen as a fuel source.

Recommendation 2

PIAC recommends that the National Hydrogen Taskforce apply a beneficiary-pays principle in creating frameworks for risk allocation and cost recovery for any move towards hydrogen in the energy system.

The benefit case for hydrogen is not straightforward

The economic case for hydrogen in the gas network, at any amount, is not strong. It is also unlikely to ever become a realistic proposition for households in Australia. We also note that many cost benefit analyses to date have externalised or ignored many significant costs involved in converting to a pure hydrogen or even blended supply in the gas networks.

Absent the full consideration of all the costs involved, any plans for transitioning to hydrogen becomes divorced from the intent of providing more affordable and sustainable energy and instead risks becoming an end in itself.

While the cost of electricity needed to create hydrogen may come down and even in an extreme case may become "too cheap to meter" with high penetrations of zero-fuel cost generation like wind and solar, the cost of electricity is just a single factor in determining the total cost to create, transport and ultimately use hydrogen as a fuel.

In particular we highlight the following:

- The intermittency of renewable generation means that any hydrogen converter powered by them may have low utilisation or require fossil fuel generation back up. Either option would push up the cost of producing each unit of hydrogen. This is exacerbated if the hydrogen converter is relying on surplus renewable generation (i.e.: more generation than the electricity grid can safely contain and use at a point in time).

- The conversion from electricity to hydrogen is not cheap. Despite decades of development, there is not yet a cheap, reliable method available.

- The distribution, transportation and storage of hydrogen (including any conversion upgrade, replacement or brand-new builds required to insert hydrogen into the gas network) all add costs.

- End-use appliance (such as burners) may require conversion, upgrade or replacement which also add costs. It must be noted that, even though many end use appliances may be rated for up to 13% hydrogen blend, this rating is for a momentary mixture of hydrogen and natural gas rather than for a continuous hydrogen blended fuel. Further, we note that the costs of any necessary end-use conversions, upgrades or replacements are often left out of the cost-benefit analyses for hydrogen.

- In addition to converting end-use appliances such as burners, replacement or conversion of related systems such as exhaust systems and sensors may also be required. Exhaust system upgrades may be required to handle the water vapour formed through hydrogen combustion to avoid rusting or condensation build up within the system. Further, hydrogen sensors may be required for safety.

Recommendation 3

PIAC recommends that the National Hydrogen Taskforce conduct robust cost-benefit analyses in assessing the case for hydrogen. This must include costs incurred at the customers' premises such the conversion, upgrade or replacement of end-use appliances (such as burners) and associated systems (such as exhausts and sensors).

Comparing hydrogen to its alternatives

The benefit of hydrogen, and indeed any energy source or device, is in relation to its alternatives to achieve the same end.

As noted above, it is essential that the full range of consequential costs are included in any assessment. Equally, it is important that the resultant economic case for hydrogen is compared against an appropriate counterfactual without hydrogen use.

Using a counterfactual that 100% of current natural gas use is substituted with electricity is neither appropriate nor realistic. This artificially inflates the cost of the counterfactual case and does not reflect what would likely happen in the real world. It would be more appropriate to use a case where, for instance, 80% or 90% of current natural gas is substituted with electricity. This would be a more accurate reflection of real-world responses as the individual cost to convert different customers or uses may differ based on a number of factors. In many cases, the cost of converting the last 5 or 10% of uses may increase exponentially and converting these to electricity may be uneconomic under any conditions.

Recommendation 4

PIAC recommends the National Hydrogen Taskforce, in conducting robust cost-benefit analyses, include a realistic counterfactual case without hydrogen use rather than a case where 100% of current natural gas use is converted to electricity.

Attachment A: Summary of findings from 'Are We Still Cooking With Gas'

The following are the findings from the report 'Are We Still Cooking With Gas' by the Alternative Technology Association (now Renew).[2]

Findings: New Homes & Existing All-Electric Homes

Whether newly built or existing all-electric homes should connect to the gas network and install any number of gas appliances for economic reasons is dependent on one main factor; whilst a second factor may apply to a limited number of consumers:

- whether the household is able to install efficient electric appliances; and secondly
- whether the cost of gas appliances is heavily subsidised.

Finding 1: It is not cost effective to connect a new home to mains gas when efficient electric appliances are an option.

Finding 2: Connecting a new home to mains gas is cost effective when efficient electric appliances are not an option.

Finding 3: It is not cost effective to connect an existing all-electric home to mains gas when efficient electric appliances are an option.

Finding 4: Connecting an existing all-electric home to mains gas is cost effective when efficient electric appliances are not options.

Finding 5: Connecting an existing all-electric home to mains gas may be more cost effective when the cost of new appliances is heavily subsidised.

Findings: Existing Dual Fuel Homes

Whether dual-fuel homes should replace some or all of their gas appliances with efficient electric appliances for economic reasons is dependent on multiple factors. The main determinants are:

- the age or condition of the existing gas appliance;
- whether the replacement allows the customer to disconnect from the gas network;
- whether the household is able to install efficient electric appliances;
- whether the existing gas supply is mains or bottled gas;
- the marginal cost of gas on a declining block tariff;
- climate conditions; and
- the ratio of gas to electricity price.

Finding 6: It is significantly more cost effective to replace gas heaters with multiple reverse cycle air conditioners (RCACs) for space heating than with gas.

[2] Alternative Technology Association, *Are we still cooking with gas*, 2014, p5.

Finding 7: In warmer climate regions (including SA, QLD and some parts of NSW) switching all gas appliances to efficient electric and disconnecting from the gas network offers better economic returns than in cooler climates.

Finding 8: Heat pump hot water systems are more cost effective than gas hot water systems where the relative price of gas as compared with electricity is higher and/or where the climate is relatively warmer. Gas hot water systems remain more cost effective in most other locations.