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Dr Marisa Paterson MLA (Chair), Mr Andrew Braddock MLA (Deputy Chair),

Ms Leanne Castley MLA

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in the Australian Capital Territory

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Harvest Hot Water

ABN 29 182 579 512

www.harvesthotwater.com.au

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Submission to the ACT Legislative Assembly Inquiry into Renewable Energy Innovation in the ACT

**For the Standing Committee on Environment, Climate Change and
Biodiversity**

Erik Olbrei
Director
Harvest Hot Water
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Executive summary

In this submission our main focus is on energy efficiency. While energy efficiency is not explicitly referenced in the TORs for the current Inquiry, it is in fact an integral component of the climate action / emission reductions / renewable energy nexus. As a meeting of the G7 Energy Ministers stated in 2016: *“We affirm that improving energy efficiency is key to decarbonisation of our economies ... and should be regarded as the ‘first fuel’ ”.*

We cover two broad topic areas:

- We firstly propose that the ACT positions itself to become a national leader in energy efficiency, just as it took on a national leadership role in achieving 100% renewable electricity.
- Secondly, we provide an assessment of the ACT’s Energy Efficiency Improvement Scheme (**EEIS** or **the Scheme**), which we find wanting in many ways. We propose a number of measures to ramp up its effectiveness.

Much of the discussion centres on heat pumps. The two types that we will discuss are:

- **Reverse cycle air conditioners**, which we refer to as **RCACs**. These are heat pump space conditioners, where **space** refers to the area to be heated, such as the interior of a residential home, while **conditioning** refers to heating or cooling, or both.
- **Heat pump water heaters**, which we will refer to as **HPWHs**.

Establishing the ACT as a national leader in energy efficiency

While many major economies such as China, Germany, India, Japan and the United States are making major strides to improve their energy efficiency, Australia is falling far behind, and it shows up on international league tables. A 2018 analysis of the world’s 25 largest energy-using countries ranked Australia as the worst developed country on energy efficiency. In 2020 then Chief Scientist, Alan Finkel, called for Australia to dramatically boost its energy efficiency.

ACT households are the second-highest energy users in Australia after Victoria. Home heating is by far the greatest energy use in the ACT, with water heating coming second. Both space heating and water heating are overwhelmingly dominated by inefficient gas appliances. Heat pump alternatives, viz. RCACs and HPWHs, are 3-6 times as efficient as gas appliances. It follows that the ACT could very substantially increase energy efficiency by transitioning to energy efficient RCACs and HPWHs. This would deliver major cost reductions for ACT households and businesses, as well as reducing emissions from fossil gas.

However, the task is substantial. It has been estimated that around 100,000 gas space heaters and around 130,000 water heaters (including 30,000 inefficient electric hot water systems) need to be replaced. Many of these would be old in any case, and the economically rational way forward would be to ensure that every inefficient end-of-life appliance is replaced by an efficient heat pump. A rate of around 10,000 a year should be the minimum level of ambition.

In this context, there are a number of compelling reasons why the ACT should position itself as a national leader in energy efficiency:

- We need to become far more energy efficient in any case: we currently perform poorly, and we have excellent opportunities to lift our game;
- Current trends have the ACT falling well behind on the Climate Strategy's 2025 target of 50-60% emission reductions against 1990 levels. An ambitious energy efficiency target will get the ACT back on track, as many of the best opportunities lie in replacing inefficient fossil gas appliances with efficient electric heat pump alternatives.
- We can significantly lower energy bills by phasing out inefficient gas appliances, both for home heating and water heating.
- Currently Australia is located close to the bottom of all international energy efficiency league tables. By demonstrating what can be done in the ACT, we can provide a model for other jurisdictions across the country to lift their game.
- Being a leader in energy efficiency would support the ACT's aspiration to become a national hub for renewable energy innovation. For the ACT to credibly be seen as a leader, we need to be at the forefront in all elements of an overall climate action / emission reductions / renewable energy nexus, and that includes energy efficiency.

To achieve national leadership status, the ACT should adopt an ambitious 10-year energy efficiency target (say for 2030), along the lines of slashing energy use for space heating and hot water by 50% by 2030 against a 2020 baseline. This would need to be supported by a coherent plan to achieve the target, through the EEIS. It would also entail developing a local research capacity in relation to energy efficiency, focusing on the best strategies for improving efficiency in the ACT region.

Effectiveness of the Energy Efficiency Improvement Scheme (EEIS)

The EEIS commenced in 2013 and has been in operation for over 8 years. It aims to encourage the efficient use of energy; reduce greenhouse gas emissions; and reduce household and business energy use and costs. It is funded through contributions from ACT electricity consumers, who provide around \$11-12 million a year.

Following an evaluation of the EEIS, and as part of the planning process leading up to the ACT Climate Change Strategy 2019-25, a clear role was identified for the EEIS in delivering the climate strategy. Some measurable indicators were also developed for the Strategy, and the Strategy stated that "*The Energy Efficiency Improvement Scheme is a key mechanism for delivering on the ACT's emission reduction targets.*"

The Climate Strategy targets that the EEIS was expected to contribute to included

- Emission reductions of 50-60% by 2025 against 1990 levels, 65-75% by 2030, and net zero emissions by 2045; and
- 60,000 households disconnected from gas by 2025 and 90,000 disconnected by 2030.

Accordingly, under the 'second phase' of the EEIS from January 2018, the EEIS began to target space conditioning and water heating, by replacing gas and traditional electric appliances with RCACs and HPWHs.

Based on the ACT currently having 150,000 household gas connections, phasing out fossil gas by 2045 would require 6,000 disconnections a year. Alternatively, if we read the Climate Strategy to mean that 90,000 households should be actively disconnected from gas by 2030, in 10 years' time, then 9,000 disconnections would be needed annually.

However the performance of the EEIS has been modest to say the least. In 2018-19, the Scheme delivered 770 replacements of gas appliances with heat pumps, increasing to around 2,560 replacements in 2019-20. This might result very optimistically, at 2,000 disconnections from gas.

A simple calculus suggests that the EEIS could deliver far better value for money than that. If the annual household contribution of around \$11 million were devoted entirely to replacements of inefficient end-of-life gas and electric appliances, and if each household received a discount of \$1000 off the installed price of a new appliance, a total of 11,000 replacements could happen each year. The EEIS's tally of 2,560 replacements in 2019-20 pales into insignificance.

Forward projections to 2025 prepared for Evoenergy, the ACT's gas (and electricity) distributor, show that gas connections are predicted to drop by just over 3,000 a year, or half the minimum rate that is needed to achieve a phase-out by 2045. This leads to the disturbing conclusion that on these numbers, the ACT will fail to meet its 2025 emissions reduction target.

This was confirmed in the study for Evoenergy by Core Energy and Resources, which concluded that the 2025 emissions reduction target *'will be highly challenging, and likely to require further incentives or mandated disconnections to ensure the target is achieved'*. Minister for Emission Reductions, Shane Rattenbury, admitted as much, advising an ACT estimates hearing in March 2021 that this target would be difficult to achieve.

Why is the EEIS under-performing?

A wide range of reasons can be seen for the under-performance of the EEIS:

- *No performance measures or targets have been established for the Scheme:* It drifts along rudderless, without going anywhere in particular;
- *As a retailer obligation rather than a certificate scheme, the EEIS places the fox in charge of the chickens:* The operation of the scheme is left in the hands of electricity retailers to implement the scheme as they see fit. But they have little interest in ensuring the success of the Scheme, as it can only lead to reduced energy sales for them;
- *Market competition non-existent in the EEIS:* The sole Tier 1 (large) retailer, ActewAGL, has appointed just three firms to deliver RCAC and HPWH replacements in the ACT. But the ACT market comprises hundreds of air conditioner businesses and hundreds of water heater businesses, and all of these firms have missed out.
- *Competition stifled as ActewAGL establishes a non-level playing field:* Having contracted just three firms to install EEIS-supported RCACs and HPWHs, ActewAGL has tilted the playing field in favour of these three firms (and no others) by given them access to the substantial EEIS rebates.
- *ActewAGL uses one third of the rebates not to promote energy efficiency but to lock customers in to ActewAGL:* Instead of providing the full rebates to customers upfront, ActewAGL siphons out part of the rebate in the form of quarterly electricity bill reductions over a 3-year period.
- *Despite EEIS rebates, prices of energy efficient appliances remain high:* After the rebate, the purchase and installation price of RCACs and HPWHs is not much reduced, and so the market failure problem of high upfront costs, particularly in the HPWH market, persists even after the EEIS rebate.
- *ActewAGL and the ACT Government (as 50% owner) are almost certainly in breach of national competition law:* The ACCC has set out two tests for misuse of market power: Does the

business have a substantial degree of power in a market? And: Is it engaging in conduct that has the purpose, effect or likely effect of substantially lessening competition in a market? It is clear that ActewAGL has a substantial degree of power in the two markets in question – the ACT RCAC and HPWH markets, in that it has the power to decide which firms will be given access to substantial EEIS rebates. It also appears evident that ActewAGL’s conduct, in giving just three of the hundreds of ACT installation businesses access to the substantial EEIS rebates, must certainly have the effect of lessening competition in those markets, as the other firms simply cannot compete when the three firms can offer discounts of \$500 - \$2000 per appliance.

- *The ACT’s competition regulator not in favour of competition:* The ACT’s Independent Competition and Regulatory Commission (ICRC), whose first objective is to promote effective competition in the interests of consumers, has waved through these practices.
- *Environment and Planning has not accredited a single abatement / energy savings provider to the EEIS in 8 years:* For the EEIS to operate as a vibrant and competitive scheme driving down prices, it needs as many qualified energy savings providers (aka installers of energy efficient appliances) as possible, all competing to deliver installations at the best quality and lowest price.
- *Not a single Tier 2 (smaller electricity) retailer has participated in the Scheme in eight years:* Tier 2 retailers have declined to participate, opting instead to pay a financial penalty to the ACT Government. The 2018 evaluation of the EEIS found that this resulted in 30% of the Scheme’s modelled energy efficiency savings not eventuating.

How can the EEIS be transformed into a high-achieving energy efficiency scheme?

We recommend the following measures:

- 1 Adopt ambitious and measurable performance targets for the EEIS.*
- 2 Open the Scheme to full and open market participation*
- 3 End ActewAGL’s anti-competitive practices in relation to the EEIS as a matter of urgency*
- 4 Ensure full participation in the EEIS by Tier 2 electricity retailers*

We recommend the following performance targets:

- a. Climate action: disconnect 90,000 ACT households from fossil gas by 2030;
- b. Energy efficiency: slash energy use for space heating and hot water by 50% by 2030 against a 2020 baseline; and
- c. Household energy bills: slash space heating and hot water costs by 50% in real terms by 2030 against a 2020 baseline.

We propose that the EEIS should aim to replace around 10,000 end-of-life gas or inefficient electric appliances (especially traditional electric hot water systems) a year. The Environment and Planning Directorate should take urgent steps to ensure that the great majority of the hundreds of RCAC and HPWH installers in the ACT are able to participate in the Scheme.

1. Introduction

Harvest Hot Water is an energy efficiency business established in 2016 and based in the ACT. Our goal is to contribute to action on climate change by encouraging Canberra home-owners to replace inefficient electrical and gas appliances with efficient renewables-based electrical appliances. As a close observer of the ACT Government's efforts to achieve net zero emissions by 2045 and to meet the Paris climate targets, we welcome the current Legislative Assembly Inquiry as an opportunity to enhance the ACT's already strong record on emission reductions and promotion of efficient renewables-based technologies.

In this submission our main focus is on energy efficiency. While energy efficiency is not explicitly referenced in the TORs, it is in fact an integral component of the climate action / emission reductions / renewable energy nexus. As a meeting of the G7 Energy Ministers stated in 2016: "We affirm that improving energy efficiency is key to decarbonisation of our economies ... and should be regarded as the 'first fuel' ".¹ That is to say, the cleanest energy source is the energy we don't even use. Before we start looking at how to de-carbonise our energy sources, we should be looking at how to dramatically slash energy use. And since (as we shall see) gas appliances are woefully inefficient compared to heat pump appliances, energy efficiency measures that target gas appliances also reduce carbon emissions. That is to say, energy efficiency and emission reductions are two sides of the same coin.

This submission covers two broad topic areas. The first section proposes that the ACT positions itself as a national leader in energy efficiency, and the second provides an assessment of the ACT's Energy Efficiency Improvement Scheme (EEIS or the Scheme), which we find wanting in many ways, and so we propose a number of measures to ramp up its effectiveness. The table below shows how this submission responds to the Inquiry TORs:

TORs	Input sought	This submission	Explanation
b.	Opportunities to establish the ACT as a national hub for renewable energy	Section 2. Establishing ACT as a national leader on energy efficiency	The ACT's status as a hub for renewable energy would be enhanced if the ACT were in the forefront on energy efficiency.
e.	Effectiveness of ACT Govt policy relating to renewable energy, climate action and emission reductions	Section 3. Effectiveness of EEIS	Demonstrates that EEIS could be vastly improved to reduce energy use and costs, and meet ACT emission reduction targets.
Also:			
a.	Opportunities to boost renewable energy research	Section 2. Establishing ACT as a national leader on energy efficiency	Sub-section on 'What would be involved ...' includes a proposal to establish a local research capacity on energy efficiency.

¹ G7/G8 2016, G7 Kitakyushu Energy Ministerial Meeting, Kitakyushu Initiative on Energy Security for Global Growth, Joint Statement, Ministry of Economy, Trade and Industry of Japan. Cited in Murray-Leach, 2019, *The world's first fuel: How energy efficiency is reshaping global energy systems*, Energy Efficiency Council Melbourne, p. 8.

Much of the following discussion centres on heat pumps, so a brief explanation may be warranted at the outset. Heat pumps, whether for hot water or home heating, operate by capturing heat from the ambient air. Thus the energy used to heat the air or water comes free, out of thin air as it were. This is solar energy, powered by the sun. Heat pumps only require electricity to run a fan to draw the air in, and for the heat pump compressor mechanism. Because electricity is only used to power these requirements, leaving the actual heat to be captured from the surrounding air, the magic of efficiency multipliers (coefficient of performance) sets in. An input of 1 kWh of electricity can deliver 4 or 5 kWh of heating energy. By contrast, the energy in gas or traditional electrical appliances is used not only to run the appliance but also to heat either air or water. This means that 1 MJ of energy used in a gas appliance can never generate more than 1 MJ of heating energy. Therefore heat pump appliances can achieve 3-6 times the efficiency of gas appliances.

The two types of heat pumps that we will discuss are:

- **Reverse cycle air conditioners**, which we refer to as **RCACs**. These are heat pump space conditioners, where **space** refers to the area to be heated (such as the interior of a residential home) while **conditioning** refers to heating or cooling, or both.
- **Heat pump water heaters**, which we refer to as **HPWHs**.

In the section on the effectiveness of the EEIS, one of the issues we will dwell upon is the extent or otherwise of market competition in the Scheme. To set the context for that discussion, it is worth noting that competition is an essential pre-requisite for the efficient and cost-effective delivery of schemes such as the EEIS, and national competition law is designed to protect the interests of consumers.² In relation to energy efficiency measures in particular, where the challenge often lies in overcoming the key market failure of high upfront costs of energy efficient appliances, every available tool needs to be deployed to drive down prices.

The ACT Government has long regarded open competition as the means to ensure that energy efficiency activities are delivered in a cost-effective manner. As early as November 2013, the Minister at the time, Simon Corbell, highlighted the need to ensure that energy efficiency scheme costs were efficient, pointing to the scope for abatement to be purchased from third party providers in an open-market setting.³ Similarly, in December 2016, the current Minister, Shane Rattenbury, said that

*“... it is critical that energy efficiency activities delivered under the scheme are cost effective. This will ensure that scheme costs passed through to consumers are minimised.... Further scrutiny will ensure that the scheme is being delivered competitively and at least cost to ACT energy consumers”.*⁴

Finally, our motivation in putting forward this submission is to encourage climate action in the ACT through a sharply enhanced focus on energy efficiency. Our view is that the ACT could become a national leader in energy efficiency innovation, and that a re-calibrated EEIS could deliver large energy savings, and emission reductions, by replacing the current stock of inefficient gas and electric space and water heating appliances with efficient heat pumps.

² <https://www.australiancompetitionlaw.info/law/policy>

³ Simon Corbell, Minister for the Environment and Sustainable Development to Malcolm Gray, Senior Commissioner, ICRC, 26 November 2013.

⁴ Shane Rattenbury MLA to Mr Joe Dimasi, Senior Commissioner of ICRC, 14 December 2016.

2. Establishing the ACT as a national leader in energy efficiency

A key message of this submission is that the ACT should position itself to become the national leader in energy efficiency, just as we provided national leadership by achieving 100% renewable electricity. There are compelling reasons why the ACT should do this:

- We need to become far more energy efficient in any case: we currently perform poorly on energy efficiency, and we have excellent opportunities to lift our game;
- Current trends have the ACT falling well behind on the Climate Strategy's 2025 target of 50-60% emission reductions against 1990 levels. An ambitious energy efficiency target will get the ACT back on track, as many of the best opportunities lie in replacing inefficient fossil gas appliances with efficient electric heat pump alternatives.
- We can significantly lower energy bills by phasing out inefficient gas appliances, both for home heating and water heating.
- Currently Australia is located close to the bottom of all international energy efficiency league tables. By demonstrating what can be done in the ACT, we can provide a model for other jurisdictions across the country to lift their game.
- Being a leader in energy efficiency would support the ACT's aspiration to become a national hub for renewable energy innovation. For the ACT to credibly be seen as a leader, we need to be at the forefront in all elements of an overall climate action / emission reductions / renewable energy nexus, and that includes energy efficiency.

We turn next to an overview of energy efficiency globally and Australia's performance, followed by an assessment of energy efficiency in the ACT and the opportunities for major gains. Finally we consider what becoming a national leader in energy efficiency would entail.

Energy efficiency is taken seriously in the global context

The International Energy Agency (IEA) has long been a leading advocate for energy efficiency, highlighting its central role in tackling climate change, particularly given the need to limit global warming to 1.5C. Its modelling shows that energy efficiency could deliver 40% of the abatement needed for the world to meet the Paris Agreement targets.⁵

Internationally, energy efficiency is widely seen in positive terms, as an integral part of overall energy system management.⁶ Major economies such as China, Germany, India, Japan and the United States are making major strides to improve their energy efficiency.⁷ Indeed, energy efficiency has been the most significant source of emission reductions globally this century.⁸ The IEA has observed that *'both energy efficiency and renewable energy are key drivers of the energy transition'*.⁹ And as we previously noted, in 2016 the G7 Energy Ministers said: *"We affirm that improving energy efficiency is key to decarbonisation of our economies ... and should be regarded as the 'first fuel' "*.¹⁰

⁵ <https://www.iea.org/reports/multiple-benefits-of-energy-efficiency/emissions-savings>

⁶ Murray-Leach, 2019, pp. 12-19.

⁷ <https://www.eec.org.au/policy-advocacy/handbook>

⁸ Edenhofer, O., Pichs-Madruga, R., Sokona et al. 2014, *Mitigation of Climate Change. Working Group III Contribution to the IPCC Fifth Assessment Report*, International Panel on Climate Change, cited in Murray-Leach, 2019, p. 12.

⁹ Quoted in Saddler 23 June 2020. See Note 17 below.

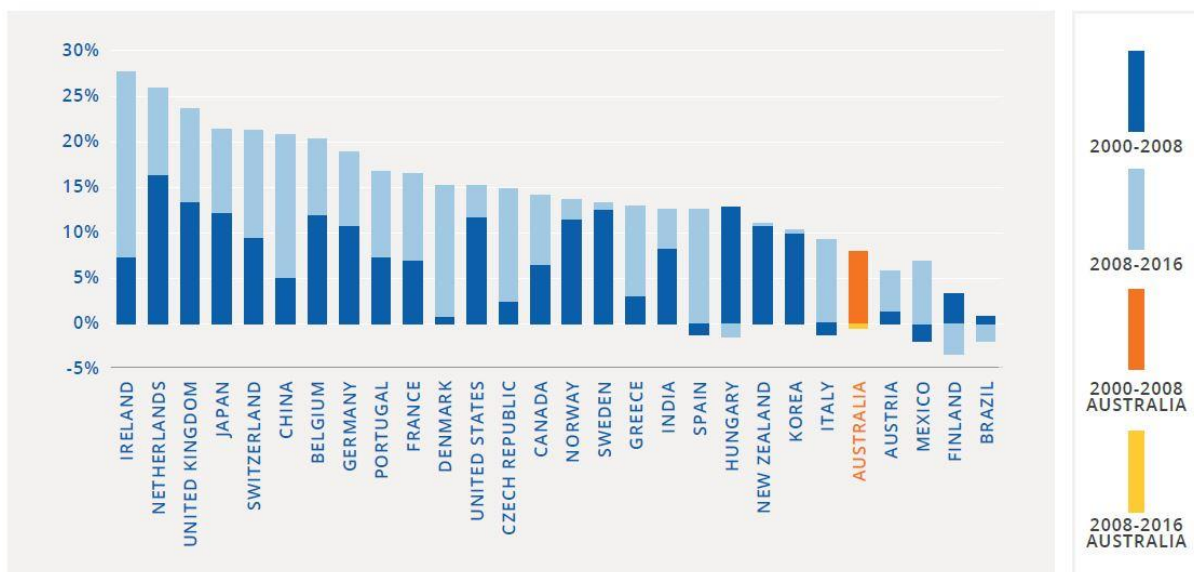
¹⁰ G7/G8 2016, *G7 Kitakyushu Energy Ministerial Meeting, Kitakyushu Initiative on Energy Security for Global Growth, Joint Statement*, Ministry of Economy, Trade and Industry of Japan. Cited in Murray-Leach 2019, p. 8.

But energy efficiency is greatly neglected in Australia

In Australia, however, energy efficiency is a much-neglected Cinderella. We have made only modest efforts to tap into the opportunity that energy efficiency offers. In 2015 the Australian Government adopted the *National Energy Productivity Plan 2015-2030* with an anaemic target of a 40% improvement in energy productivity between 2015 and 2030.¹¹ But we are falling short of even this modest target. Energy productivity improved by just 0.9% in 2016-17 after flat-lining in 2015-16.¹²

A 2018 analysis of the world’s 25 largest energy-using countries ranked Australia as the worst developed country on energy efficiency.¹³ Similarly an IEA analysis of 28 countries ranked Australia as the fifth-worst for energy efficiency improvement from 2000-2016. Alarmingly, nearly all of Australia’s modest improvements were gained from 2000-2008, with almost no further improvement from 2008-2016, as can be seen in the following chart.¹⁴

Figure 1: IEA analysis: Percentage improvement in energy efficiency 2000-2016¹⁵



In July 2020, former Chief Scientist Alan Finkel called on Australia to do far more on energy efficiency, saying ‘a gigawatt of power not needed because you’ve done an efficiency measure is the best form of energy generation that you could possibly ever hope to have’.¹⁶ Energy analyst Hugh Saddler followed up days later in an article entitled ‘Australia has failed miserably on energy

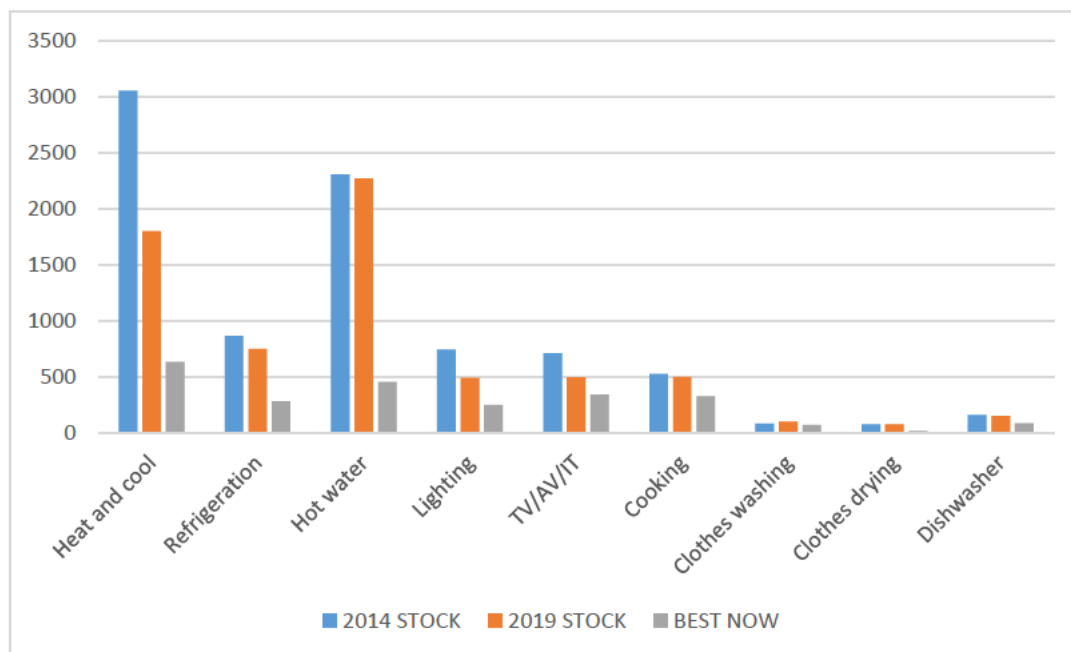
¹¹ <https://www.energy.gov.au/government-priorities/energy-productivity-and-energy-efficiency/national-energy-productivity-plan>. Shortfall noted by Murray-Leach, 2019, p. 20.
¹² *National Energy Productivity Plan Annual Report 2018*, p. 9.
<https://energyministers.gov.au/sites/prod.energycouncil/files/publications/documents/NEPP%202018%20Annual%20Report.pdf>
¹³ Report for American Council for an Energy Efficient Economy, cited in Murray-Leach, 2019, pp. 12-13.
¹⁴ Murray-Leach, 2019, pp. 12.
¹⁵ Source: *International Energy Agency 2017, Energy Efficiency Market Report*, IEA, Paris. Cited in Murray-Leach, 2019, p. 13.
¹⁶ Alan Morton 21 June 2020, Chief scientist joins calls for Australia to dramatically boost energy efficiency. The Guardian. <https://www.theguardian.com/australia-news/2020/jun/21/chief-scientist-joins-calls-for-australia-to-dramatically-boost-energy-efficiency>

efficiency', noting the disconnect between Australia's modest 2030 aspiration to increase energy productivity by 40%, and our actual improvement of barely 1% from 2014-15 to 2017-18.¹⁷

Energy efficiency opportunities for Australia

The upside of our dismal performance on energy efficiency to date is that extraordinary opportunities to lift our game lie before us. Just how inefficient our energy use is in Australia – and therefore the opportunity to make substantial gains – is illustrated in this table from Alan Pears, which illustrates energy use in a typical Australian home:

Figure 2: Indicative annual electricity use in a 2-3 person Australian home: Comparison of 2014 stock, 2019 stock, and most efficient available appliances¹⁸



What is striking is the vast gap in energy required by the current stock (in 2019) and the best available technologies. The table shows that by far the greatest opportunities for energy efficiency improvement are in space conditioning (listed as heat and cool), and water heating, where a massive reduction in energy use is achievable. These are the areas where Australia – and the ACT - needs to focus its efforts.

Interestingly, the data shows a significant improvement nationally since 2014 in space conditioning. This is undoubtedly the result of efficient RCACs becoming increasingly affordable, resulting in householders acting to claim the financial benefits to be gained from sharply reduced heating costs. By contrast, hot water has barely budged. Again, this is undoubtedly due to the upfront cost of efficient HPWHs remaining stubbornly high.

Also worth noting is the fact the energy efficiency gains available from the key areas of focus for the EEIS from 2013-2017 – viz. lighting and replacement of old fridges - while worthwhile, pale in comparison to space conditioning and water heating as opportunities for energy efficiency gains.

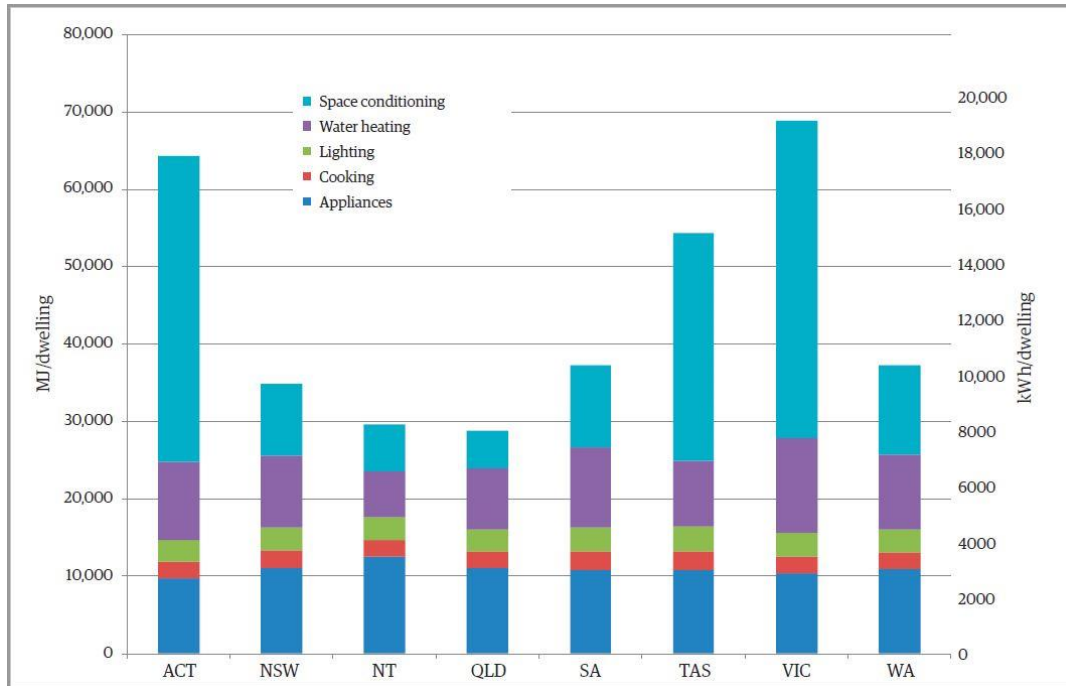
¹⁷ Hugh Saddler 23 June 2020, Australia has failed miserably on energy efficiency – and government figures hide the truth. The Conversation. <https://theconversation.com/australia-has-failed-miserably-on-energy-efficiency-and-government-figures-hide-the-truth-123176>

¹⁸ Alan Pears 2020, Looking back, and forward. Pears Report, *Renew* Issue 150, pp. 90-91.

Energy efficiency in the ACT

If Australia as a whole is performing poorly, how are we doing in the ACT? A good starting point is to examine how much energy ACT residential homes use in total (combining gas and electricity) compared to other jurisdictions. It is also useful to see how our patterns of energy use compare with those of other jurisdictions. In this chart, from a 2015 study by Energy Consult combining electricity and gas consumption, we can see that in that year ACT households were the second-highest energy users in Australia after Victoria, averaging 18,000 kWh per residence.

Figure 3: Total residential energy use per dwelling by jurisdiction and end use, 2014¹⁹



As is the case with Victoria and Tasmania (the other cool climate jurisdictions), space conditioning (mostly home heating, but also cooling) dominated energy use. In the ACT it made up about 60% of all residential energy use, while water heating was next highest with 15% of all energy use. However, we are conscious that this chart is somewhat dated, and we have seen that energy use for space heating has improved between 2014 and 2019. Data compiled by the Grattan Institute also reflects this improvement. It shows that in the ACT in 2017-18, gas for space heating comprised about 40% of total residential energy use.²⁰ Nevertheless 40% remains a huge proportion of ACT energy use, and it is nearly all fossil gas, so space conditioning remains the key target for achieving reductions in energy use and emissions.

The same Energy Consult data provided a breakdown of appliances used to heat and cool ACT homes.²¹ It showed that 85% of Canberra homes used highly inefficient appliances for heating and cooling: overwhelmingly ducted gas heaters, but to a lesser extent non-ducted and LPG gas heaters, and to a small extent electric and wood heaters. Barely 15% of homes used the most efficient option, RCACs, whether ducted or non-ducted.

¹⁹ Paul Ryan and Alan Pears 2019, 'Unravelling home energy use across Australia', *Renew*, Issue 147, based on Energy Consult 2015, *Residential Energy Baseline Study: Australia*. Prepared for Dept of Industry and Science.

²⁰ Grattan Institute November 2020, *Flame out: The future of natural gas*, p. 42.

²¹ Paul Ryan and Alan Pears 2019. As above.

The Energy Consult data shows much the same picture in relation to water heating. Once again, the least efficient technologies dominate. About 25% of ACT hot water systems are traditional electric, while another two thirds of water heating is provided by gas (either storage or instantaneous). The most efficient technologies, heat pump water heaters (HPWHs) and solar hot water, which use at least 60% less energy than traditional electric hot water systems, make up barely 7% of the water heating stock in the ACT.²²

Since gas appliances dominate space conditioning and water heating, and these two uses dominate residential energy use, we need to ask how efficient gas appliances are compared to the best available alternative, heat pump appliances. A 2018 study by the Alternative Technology Association compared energy use by gas appliances versus RCACs and HPWHs. The data for the ACT which is summarised below shows that heat pumps are vastly more efficient than gas appliances:

Figure 4: Annual energy use for space heating in Canberra: Gas vs RCACs

Energy source	Unit of measurement	Large home	Stay-at-home family	Working family	Small home	New-build
Gas	kWh *	22,793	16,754	15,465	10,637	8,992
RCACs	kWh	2,908	2,323	2,077	1,454	2,005

Figure 5: Annual energy use for water heating in Canberra: Gas vs HPWHs

Energy source	Unit of measurement	Large home	Stay-at-home family	Working family	Small home	New-build
Gas	kWh *	5,017	3,026	2,029	3,026	3,062
HPWHs	kWh	879	648	648	548	879

* Gas converted from MJ to kWh @ 1 MJ = 0.2778 kWh.

Source: Alternative Technology Association May 2018²³

While these figures seem extraordinary even to this author, the fact is that heat pumps appliances are at least 3-6 times as efficient as gas appliances, as explained previously. The fact that the energy used to heat the air or water comes for free, out of thin air, means that heat pumps can deliver far more efficiently.

The ACT's energy efficiency opportunity

It follows that, with space and water heating dominating ACT residential energy use, and overwhelmingly using inefficient gas appliances, the ACT has a very substantial opportunity to increase energy efficiency by transitioning to energy efficient RCACs and HPWHs. The scale of the challenge, and the opportunity, can be seen from Energy Consult's 2015 estimate of what the size and components of the ACT stock of space and water heaters would be in 2020:

²² *Ibid.*

²³ Alternative Technology Association 2018, *Household fuel choice in the National Energy Market*, pp. 41, 47,48.

Figure 6: Estimated ACT stock of space heaters and water heaters in 2020²⁴

Category	Number
Heating equipment	212,066
Electric resistive	105,935
LPG gas non-ducted	5,187
Mains gas ducted	70,337
Mains gas non-ducted	25,960
Wood heaters	4,648
Water heating	164,604
Electric water – Medium / large	30,977
Electric water – Small	21,098
Gas instant (LPG)	348
Gas instant (mains)	56,926
Gas storage (LPG)	234
Gas storage (mains)	43,450
Heat pump	1,030
Solar HWS – electric boost	9,055
Solar HWS – gas boosted	1,453
Wood	34

This data shows that around 100,000 gas space heaters and around 130,000 water heaters (including 30,000 inefficient electric hot water systems) need to be replaced. While these figures are dated, and in all likelihood the figures for ducted and non-ducted gas heaters would be somewhat lower, nevertheless it is clear that a major task lies ahead to transition space and water heating to heat pump appliances. Many of the existing stock would be old in any case, and the economically rational path forward would be to ensure that every inefficient end-of-life appliance is replaced by an efficient heat pump. A rate of around 10,000 a year should be the minimum level of ambition.

As we shall see, the ACT's Energy Efficiency Improvement Scheme, since the beginning of 2018, has been re-directed to focus on this opportunity. But as we will also see, the performance of the EEIS in delivering on this opportunity has been far from impressive, and major changes to the Scheme are needed if it is to deliver ambitious outcomes.

What would be involved in becoming a national leader in energy efficiency?

Finally, we return to the potential for the ACT to become a national leader in energy efficiency, as part of the Territory's aspiration to become a national hub for renewable energy innovation. What

²⁴ Data compiled from Energy Consult 2015, *Residential energy baseline study: Australia* by Core Energy and Resources 2021, *Independent assessment of the impact of Government climate change initiatives on Evoenergy ACT Gas Network, Residential Tariff demand – 2021-2026*, p. 14.

might this entail? In our view becoming the national leader in energy efficiency would involve at least three elements:

1 Declaring an ambitious 10-year energy efficiency target for 2030

In our view, the energy efficiency target we propose for the EEIS (next section) reflects an appropriate level of ambition, viz.:

To slash energy use for space heating and hot water by 50% by 2030 against a 2020 baseline.

Since space and water heating are the dominant energy uses in the ACT, it may be possible to extend this to a more comprehensive target of a 50% reduction in total energy use (gas and grid electricity) by 2030. This would need to be constrained to exclude electricity for electric vehicles, the demand for which is expected to grow substantially.

Achieving such a would also make a major contribution to achievement of the ACT's climate strategy target of enabling 90,000 ACT households to disconnect from fossil gas by 2030, and by the same token it would help to achieve the ACT's emission reduction targets for 2025 and 2030.

2 Developing a coherent plan to reach the target

This would essentially involve re-vamping the EEIS to transform it into a far more dynamic and ambitious scheme by introducing market competition, enabling large numbers of ACT installers to participate in the Scheme, ending anti-competitive practices by ActewAGL, and by ensuring that all ACT electricity retailers actively participate in the Scheme (as detailed in the next section).

3 Developing a local research capacity in relation to energy efficiency

If we are to mainstream heat pump appliances both for space conditioning and water heating, we need to expand our knowledge of what works best and what are the most appropriate interventions in the ACT's cool climate setting. Two areas for investigation present themselves:

a) Research into options for reverse space heating and cooling in the ACT

One area of research need relates to heating and cooling in Canberra homes. Ducted gas home heating dominates the Canberra residential home heating sector. While the ready answer may be to replace these with ducted RCACs, this is an expensive option, costing around \$12-15,000, and relatively inefficient compared to replacement of ducted gas with non-ducted (wall-mounted) RCACs, while at the same time upgrading insulation and draught-proofing.

- A research program could investigate energy efficiency outcomes of these alternative options. Various approaches could be tested in selected households, to study the cost-benefit and energy efficiency outcomes of ducted RCACs vs two or more wall RCACs; the impact of undertaking draught-proofing and roof or wall insulation at the same time. The outcomes of such research would be invaluable in informing the comprehensive replacement of the current ducted gas heating stock in the ACT.
- Studies are needed to establish which house profiles are amenable to individual wall air-conditioners, and to establish the energy savings that can be achieved through this option. It is important to undertake this research, as achievement of the ACT's emission reduction targets, and its climate change strategy, depends very much on transitioning the ACT's 100,000 or so gas heaters (most of which are ducted systems) to reverse cycle space conditioners.

- Such research would be of great value to Victoria, which is currently exploring ways to overhaul its stock of gas heaters and replacing them with RCACs. It may be possible to embark on a joint research program.

b) Research on HPWH performance in the ACT

One area of research deficit in Australia relates to heat pump technology, particular relating to HPWHs. The demand for such research is currently low, given that the uptake of heat pump water heaters HPWH is dismally low, at around 2-3% of all water heaters. This is particularly disappointing as HPWHs are the most efficient technology available for domestic and commercial water heating. They have a number of advantages over solar water heaters, which compete with solar PV for valuable roof-space, they require more complex and costly installation, and they are technologically more complex, involving issues such as extremely high water temperatures in the rooftop components during summer.

For HPWHs to become mainstreamed, more research is needed. We need to know more about HPWH energy use under varying conditions (household size and water usage patterns, efficiency in a range of temperatures, etc). We also need to know more about the longevity of heat pump appliances (particularly components such as the compressors), and how to achieve lifespans of 20 years or more for HPWHs. A third area for exploration – as preparation for much greater uptake of HPWHs across Australia – is the scope for local manufacturing or assembly as a means to reduce the upfront cost of HPWHs.

Conclusion: The energy efficiency opportunity for the ACT

In summary, there are many reasons why it makes sense for the ACT to position itself as a nation leader in energy efficiency.

We turn next to an assessment of the effectiveness of the ACT's energy efficiency scheme.

3. Effectiveness of the Energy Efficiency Improvement Scheme (EEIS)

Introduction

The EEIS commenced in January 2013 and has been in operation for over 8 years. Its objectives are to encourage the efficient use of energy; reduce greenhouse gas emissions; reduce household and business energy use and costs; and increase opportunities for priority households (pensioners or other concession card holders) to reduce energy use and costs.²⁵ Energy efficiency schemes typically operate by targeting the key market failure surrounding energy efficient appliances - high upfront costs - by offering rebates to bring those costs within reach of households.

The EEIS has been designed as a *retailer obligation* rather than a *certificate* scheme. ACT electricity (but not gas) retailers are required to achieve abatement or energy savings equivalent to 8.6% of their electricity sales. It is left to the retailers to choose how they wish to achieve this target, from a range of activities set out by the ACT Government. The Scheme distinguishes between large retailers (Tier 1, with annual sales over 500,000 MWh/yr) and small retailers (designated Tier 2). ActewAGL, with about 80% market share, is the sole Tier 1 retailer and as such is the only retailer required to achieve abatement or energy savings. Tier 2 retailers are allowed to pay a penalty to the ACT Government in lieu of participating in the Scheme.

The Scheme is funded through contributions by ACT electricity consumers. The ACT's Independent Competition and Regulatory Commission (ICRC) undertakes an electricity price investigation every 3 or 4 years to set the retail price for the coming years. Of the approximate retail price of \$250/MWh, the ICRC allows c. \$4 per MWh to electricity retailers to cover their costs of compliance with the EEIS.²⁶ Close to \$12 million a year is collected in this way; some \$9 million by ActewAGL, while c. \$2.6 million is collected by all other electricity retailers combined.²⁷

To meet its obligations under the Scheme, ActewAGL offers rebates to encourage ACT households to replace inefficient appliances with efficient alternatives. It has contracted local businesses to install appliances on its behalf. None of the smaller retailers participate in the Scheme, opting instead to pay a financial penalty for non-participation.

The EEIS can be understood in terms of two distinct phases: a successful initial phase from 2013 – 2017, and a problematic second phase from 2018 to the present time.

Phase 1: 2013-2017

The initial phase of the EEIS focused on large numbers of small activities which targeted some of the low-hanging fruit of ACT energy consumption with residential lighting upgrades, draught-proofing activities, de-commissioning of old fridges, and also standby power controllers. The EEIS delivered energy efficiency activities to over 70,000 households and businesses across the ACT. Some 915,000 energy efficient lights were provided, as well as 45,000 draught-proofing items, and thousands of old fridges were de-commissioned (for details see [Annex 1](#)).²⁸ Although lighting is a relatively small

²⁵ ACT Government, *Energy Efficiency (Cost of Living) Improvement Act 2012*, Clause 6.

²⁶ ICRC June 2020, *Retail electricity price investigation 2020–24. Final report*. Report 9 of 2020, p. 3.

²⁷ For example, in 2019-20, total electricity supply by all electricity retailers to the ACT came to 2,855,000 MWh. At \$4/MWh, this implies the retailers collected a total of \$11,420,000. From ActewAGL Distribution / Evoenergy Economic benchmarking RIN - Template reports to AER. They can be found here: <https://www.aer.gov.au/networks-pipelines/performance-reporting/evoenergy-actewagl-network-information-rin-responses>

²⁸ This data is compiled from the annual reports of the EEIS Administrator, which form part of the EPSDD annual reports. See for example, EEIS Administrator, Report on the operation and administration of the Energy

component of overall residential energy use (see *Figure 3* on p. 11), nevertheless the Phase 1 activities delivered strong energy efficiency benefits. An evaluation of the Scheme over this 5-year period rated it a success (except for the standby power controllers), finding it had delivered a substantial return on investment, with a benefit-cost ratio approaching 4 to 1.²⁹

Phase 2, 2018 – present

The focus of the EEIS changed markedly from the beginning of 2018. The Phase 1 evaluation recommended that the EEIS should continue beyond 2020, with amendments to support ACT policies, including the next Climate Change Strategy.³⁰ Reports prepared for the next iteration of the ACT climate change strategy (see below) also proposed an active role for the EEIS in supporting the climate change strategy, and they highlighted the need to shift the EEIS focus to what are by far the two largest areas of ACT energy use and inefficiency, space conditioning (home heating and cooling) and water heating.

Thus, under the second phase of the EEIS, from January 2018, the focus shifted to lifting the energy efficiency of space conditioning and water heating, by replacing gas and traditional electric appliances with highly efficient renewables-based electric heat pump alternatives, viz reverse cycle air conditioners and heat pump water heaters. These offer potential for very substantial energy savings. However, as noted above, this second phase has been far more problematic than the first phase, and is therefore the focus of this submission.

Goals and objectives of the EEIS

While the legislated objectives of the EEIS are admirable (encourage energy efficiency, reduce emissions etc), they lack any quantified element. What level of energy efficiency should the ACT aspire to? By how much should emissions be reduced? What should be achieved by a particular date? Fortunately, several key planning documents commissioned by EPSDD in 2017 and 2018 as part of the preparatory process for the next iteration of the ACT Climate Change Strategy, and the Climate Strategy itself, came to the rescue, providing much better definition of the role the EEIS should play in delivering the climate strategy, and providing some measurable indicators that can be used to assess the EEIS.

The first of these reports, the Stationary Energy report of September 2017, pointed out that future ACT energy demand would depend on the extent to which the ACT pursues ambitious energy efficiency policies; that inefficient gas space and hot water heaters needed to be replaced by efficient heat pumps; that fossil gas could be phased out altogether by 2030; that accelerated energy efficiency improvements were needed to help maintain the ACT's renewable electricity at 100% once that target was reached (that is, by moderating growth in energy demand in the ACT); that energy efficiency can potentially reduce building energy use by between 30 - 90%; that incentives would be needed to hasten the transition from gas to efficient electric heat pump appliances; and that the EEIS should be strengthened to achieve these objectives.³¹

Efficiency (Cost of Living) Improvement Act 2012, in ACT Government EPSDD, *Annual Report 2018-19*, pp. 270-275, and Report on the operation and administration of the Energy Efficiency (Cost of Living) Improvement Act 2012, in ACT Government EPSDD, *Annual Report 2019-20*, pp. 397-407.

²⁹ Compiled from annual EEIS reports; Point Advisory 2018, *Review of the Energy Efficiency Improvement Scheme – Final Report. Part 2 – Report overview*, p. 14.

³⁰ ACT Government 2018, *Consultation Report for an Energy Efficiency Improvement Scheme Extension*, p. 4.

³¹ Strategy.Policy.Research 2017, *ACT Transition to Net Zero Emission – Stationary Energy/ Buildings*. Prepared for EPSDD September 2017, pp. vi, vii, ix, xii, xiii, 2-3.

Similarly the 2018 Climate Mitigation and Adaptation report called for replacement of gas space and water heaters with efficient heat pump appliances through measures that could be promoted through the EEIS, and it modelled incentives to replace gas space heaters with heat pumps.³²

In response to the emerging thinking, the list of eligible EEIS activities was expanded in January 2018 to include ducted and non-ducted RCACs and HPWHs.³³ Subsequently the *ACT Climate Change Strategy 2019-25* set out two measurable targets that are directly relevant to the EEIS:

- It set a 2025 emissions reduction target of 50-60% compared to 1990 levels, a 2030 target of a 65-75% reduction on 1990 levels, and net zero emissions by 2045.³⁴
- It also called for 60,000 existing households to be unconnected to gas by 2025, increasing to 90,000 disconnected households by 2030.³⁵ And of course, all households would need to be disconnected from gas in order to achieve the full phase-out of gas by 2045.

The ACT Climate Strategy is explicit in setting out an enhanced role for the EEIS in achieving these targets, calling for an expansion of the EEIS to further encourage a shift from gas to high efficiency electrical appliances, and stating that: "*The Energy Efficiency Improvement Scheme is a key mechanism for delivering on the ACT's emission reduction targets.*"³⁶ That is not to say that it is entirely up to the EEIS to achieve these targets. The ACT Government's Parliamentary and Governing Agreement sets out a number of measures which do not involve the EEIS, notably that new developments should be all-electric (and therefore gas-free), such as the Molonglo Commercial Centre, new residential suburbs, new ACT Government buildings, and infill developments.³⁷

But these measures do not address the issue of gas in existing households and suburbs. This is where the EEIS is clearly expected to play a central role, by encouraging existing households to switch from inefficient gas and electric home heating and hot water appliances to efficient renewables-based electrical appliances.

The upshot is that the objectives of the EEIS can be seen as:

- To encourage energy efficiency (still no specified performance measures)
- To reduce greenhouse gas emissions, by contributing to
 - Emission reductions of 50-60% by 2025 against 1990 levels, 65-75% by 2030, and net zero emissions by 2045; and
 - 60,000 households disconnected from gas by 2025 and 90,000 disconnected by 2030.
- To reduce household and business energy use and costs (no performance measures); and
- To increase opportunities for priority households to reduce energy use and costs (no performance measures).

³² Energetics 2018, *Climate mitigation and adaptation in the ACT: costs, benefits and implications. Final report.* For EPSDD February 2018, pp. 9, 12, 13.

³³ EPSDD Jan 2018, *Summary of eligible activities and abatement in the Energy Efficiency (Cost of Living) Improvement (Eligible Activities) Determination 2017.*

³⁴ *ACT Climate Change Strategy 2019-25*, p. 4.

³⁵ *Ibid*, p. 39.

³⁶ *Ibid*, p. 26.

³⁷ <https://greens.org.au/sites/default/files/2020-11/Parliamentary-Agreement-for-the-10th-Legislative-Assembly.pdf>. The PGA is also summarised in Evoenergy Jan 2021, *Revised GN21 plan*, p. 4.

Performance of the EEIS since 2018

The performance of the EEIS since 2018 against the objectives set out in the previous section can be assessed quite easily. It is sufficient to ask whether the EEIS is on track to deliver the required number of household disconnections from gas which result from switching from gas appliances to heat pump space and water heaters. If sufficient disconnections were being achieved, it follows that the emission reductions required by 2025 would be on track, and we would know that energy efficiency is being sharply enhanced (because we know that heat pumps are far more efficient than gas appliances³⁸). We would also know that household and business energy costs would be reduced since efficient appliances use less energy, and so long as the required number of priority households receive efficient appliances, we would know that that objective is also being met.

So, how many disconnections are needed annually to meet the climate strategy targets? A simple calculation gives us a plausible answer. Given that approximately 150,000 households were connected to gas in 2020,³⁹ and given that the Government has targeted a complete phase-out of fossil gas by 2045 (thus zero connections), a straight-line projection implies that 6,000 disconnections will be needed annually over the next 25 years to disconnect 150,000 households. The EEIS fell far short in 2019-20. Alternatively, if we read the Climate Strategy to mean that 90,000 households should be disconnected from gas by 2030, in around 10 years' time, then annual disconnections of 9,000 would be needed.

The table below from the ACT's Environment, Planning and Sustainable Development Directorate (EPSDD or the Directorate) shows what was achieved over the last two years:

Figure 7: EEIS performance 2018-19 and 2019-20⁴⁰

Activity	2018-19	2019-20	Totals
Install ducted gas heaters	677		677
Install ducted RCACs		651	651
Room RCACs	672	1,469	2,141
Electric HWS to gas HWS			-
Install HPWHs	98	462	560
Lighting - commercial upgrade	83,840	46,095	129,935
Decommissioning old fridges	2,041	1,521	3,562

Apart from commercial lighting upgrades, the key activities for the Phase 2 EEIS were space and water heating activities. In that regard the main points to note are that in 2018-19 the Scheme

³⁸ Heat pump appliances can be 4-5 times as efficient as gas appliances. Because energy is only used to power the heat pump, and heat is captured from the ambient air, an input of 1 kWh of electricity can result in 4 or more kWh of heating energy. By contrast, 1 MJ of energy from fossil gas can never generate more than 1 MJ of heating energy.

³⁹ Evoenergy Jan 2021, *Revised GN21 plan. Response to the draft decision. ACT and Queanbeyan-Palerang gas network 2021-26*, Table 8.4, p. 45.

⁴⁰ Compiled from annual EEIS reports (see Note 59). As an aside, commercial lighting is prominent among EEIS activities, but surely little justification remains for supporting lighting upgrades as the economic case for efficient LED lighting is self-evident. In any case it appears that point has been recognised, and ActewAGL has now closed its commercial lighting program. <https://www.actewagl.com.au/en/support-and-advice/save-energy/appliance-upgrade-offers/big-business-light-switch>.

delivered a modest 770 heat pumps (combining RCACs and HPWHs). It built up to around 2100 RCACs in 2019-20 (650 ducted and 1470 wall RCACs), and around 460 HPWHs, thus 2,560 heat pump replacements in total. This might result very optimistically, at 2,000 disconnections from gas.

Concerningly, this is nowhere near the number of annual disconnections that are required to meet a phase-out of gas by 2045, and it follows that emission reduction targets, energy efficiency savings, and reduced household and business costs would also fall short at this rate.

We should also ask whether 2,560 heat pump installations represents good value for money for the ACT electricity consumers who have paid over \$11 million a year for the Scheme. A simple calculus suggests that we could get far better value for money than we are getting at the moment. If the \$11 million were devoted entirely to replacements of inefficient end-of-life gas and electric appliances, and if each household received a discount of \$1000 off the installed price of a new appliance, then 11,000 inefficient appliances could be replaced by efficient heat pumps each year.

What do forward projections tell us about the likely future rate of disconnections? Several studies commissioned by Evoenergy, the ACT's gas (and electricity) distributor, provide projections out to 2025. These studies assessed future demand for fossil gas in the ACT and Palerang area, taking careful account of the impact of the ACT Government's climate policies following the election of October 2020, as well as the impact of the enhanced EEIS. But their findings offer little comfort. We can see from *Figure 8* that gas connections are predicted to drop from around 150,000 in 2020-21 to 134,000 by 2025-26. A drop of 16,000 over a 5-year period implies that disconnections are expected to proceed at just over 3,000 a year, or half the minimum rate that is needed to achieve a phase-out by 2045.

*Figure 8: Evoenergy gas demand forecasts for 2021-2026, ACT and Palerang*⁴¹

Financial year	Number of gas connections	Gas consumption ACT/Palerang (PJ/yr)
2020-21	150,442	6.2
2021-22	145,872	6.1
2022-23	143,621	5.9
2023-24	140,719	5.7
2024-25	137,351	5.4
2025-26	133,975	5.1

As for overall gas consumption trends in the ACT, *Figure 8* predicts that consumption will drop by about 1 Petajoule over the same 5-year period. This rate – if achieved - is just sufficient to achieve a gas phase-out by 2045, and thus is consistent with ACT government policy. But it only barely meets that requirement at a time of rapidly accelerating climate ambition. The ACT's target of net zero emissions and a gas-free ACT by 2045 may look reasonable today, but how will it look in a year or two? It may look decidedly unambitious. It would therefore be much better at this point to target a faster rate of disconnections from gas, and a faster decline in gas consumption, not only to future-

⁴¹ Evoenergy Jan 2021, *Revised GN21 plan. Response to the draft decision. ACT and Queanbeyan-Palerang gas network 2021-26*, Table 8.4, p. 45. Core Energy and Resources 2021, *Independent assessment of the impact of Government climate change initiatives on Evoenergy ACT Gas Network, Residential Tariff demand – 2021-2026*, p. 17.

proof against increasing climate mitigation ambition, but also because the existing stock is highly inefficient, polluting, and costly to ACT householders.

This anticipated under-performance in terms of disconnections from gas is all the more concerning when we take account of a key observation made in one of the studies, which highlights that gas is the sector that must deliver on emission reductions to 2025. The Core Energy report notes that although transport (at 62%) is the largest remaining source of emissions following the removal of electricity, it is fossil gas (at 22%) that is critical for achieving the 2025 target. The reason is that anticipated emission reductions from the transport sector will only eventuate after 2025, so gas must do the heavy lifting until then.⁴²

In light of this evidence, the study for Evoenergy by Core Energy and Resources concluded that the 2025 emissions reduction target *'will be highly challenging, and likely to require further incentives or mandated disconnections to ensure the target is achieved'*.⁴³ That is to say, achievement of the 2025 emission reduction target is now seriously in doubt. Minister for Emission Reductions, Shane Rattenbury, admitted as much, advising an ACT estimates hearing in March 2021 that this target would be difficult to achieve.⁴⁴

Our view is that the EEIS is absolutely capable of delivering the energy efficiency that ACT residents should demand, the disconnections from gas that the climate strategy calls for, and the reductions in fossil gas usage that are required. But a large number of shortcomings exist in the Scheme as currently implemented, with the result that the Scheme is severely under-performing. If these shortcomings could be addressed, the Scheme could flourish.

Why is the EEIS under-performing?

A wide range of reasons exist for the under-performance of the EEIS, which we now explore in turn.

No performance measures or targets have been established for the Scheme

Notwithstanding our highlighting of the Climate Strategy targets that are applicable to the EEIS, the fact is that no measurable performance indicators or targets appear to have been developed for the Scheme in the last 8 years. So long as the EEIS objectives as set out in the Act ('to encourage the efficient use of energy' etc) are left unquantified, there is no way to assess whether progress is being made; or whether whatever progress is being made is sufficient or not. Accordingly, the annual reports on the EEIS are largely silent on the extent to which the objectives of the Act are being achieved. Instead, they mainly provide output-level detail on the numbers of appliances installed, and so on.

But the Directorate is surely responsible for ensuring that the objectives and the intentions of the Scheme are being achieved. It should not be a matter of passively standing by and leaving it to the electricity retailers to undertake activities as they see fit. If the Minister were to set ambitious and measurable 10-year performance targets, the Scheme would have a clear goal to work towards. Our concern is that in the absence of clear targets, accompanied by measurable performance indicators, the EEIS will drift along rudderless, without going anywhere in particular.

⁴² Core Energy and Resources 2021, *Independent assessment of the impact of Government climate change initiatives on Evoenergy ACT Gas Network, Residential Tariff demand – 2021-2026*, p. 14.

⁴³ Core Energy and Resources 2021, *Independent assessment of the impact of Government climate change initiatives on Evoenergy ACT Gas Network, Residential Tariff demand – 2021-2026*, p. 5.

⁴⁴ Canberra Times 6 March 2021, ACT 2025 emissions reduction target 'hard to achieve': Greens leader Shane Rattenbury. <https://www.canberratimes.com.au/story/7155089/acts-2025-emissions-target-hard-to-achieve-rattenbury/>

As a retailer obligation scheme, the EEIS places the fox in charge of the chickens

A fundamental problem with the EEIS is that it was designed as a *retailer obligation scheme* rather than as a certificate scheme. As such, the operation of the scheme is left in the hands of electricity retailers to implement the scheme as they see fit. Accordingly, the Directorate appears to have taken a hands-off, disengaged approach to the Scheme. It says that retailers may use internal resources or engage third party contractors as they see fit; they are not required to offer discounts or rebates (which means the market failure of high upfront costs may not remain unaddressed); they may choose the products they offer; and it is up to them to determine the terms, conditions, and fees they charge based on their own business decisions.⁴⁵

The two scheme design options were discussed extensively in the Point Advisory evaluation of 2018. In Part 2, *Report overview*, Point Advisory raises the main problem with retailer obligation schemes, saying these schemes *create a fundamental tension for obligated retailers, as they are meant to undertake activities that ultimately will reduce the volume of the product they are selling (electricity)*.⁴⁶ In other words, they have no interest in ensuring the success of such schemes; in fact, their interests are better served if the schemes fail. Unsurprisingly, most comments by Point Advisory are in favour of certificate schemes. In Part 3 of the report, *Comparative analysis*, they note on page 8 that certificate schemes are intended to encourage competition among providers and to thereby achieve energy savings at least cost.

The consequences of *‘just leaving it to the retailer’* are severe. In the case of the EEIS, market competition is non-existent, prices of energy efficient appliances remain high (and so the fundamental market failure of high upfront costs remains unaddressed), and it is entirely possible that the EEIS achieves few additional installations of energy efficient appliances over and above what would have occurred in the absence of the Scheme.

We turn to each of these consequences next, while noting that these all relate to implementation of the Scheme by the sole Tier 1 retailer (ActewAGL), as none of the Tier 2 retailers participate in the Scheme (another problem that we cover below).

Market competition non-existent in the EEIS

The problems with competition relate to Tier 1 (ActewAGL) implementation of the Scheme since 2018, when the EEIS shifted focus from small-scale energy efficiency initiatives (lighting etc) to higher-impact and much more expensive space and water heating activities.

To meet its obligations under the EEIS, ActewAGL has conducted tenders for *‘abatement providers’*, that is, ACT businesses to install appliances on ActewAGL’s behalf.⁴⁷ Up to March 2020, after conducting a tender for installation of HPWHs in April 2019 (and we assume a previous tender in 2018),⁴⁸ ActewAGL had appointed just one third-party abatement provider, the ActewAGL Energy Shop.⁴⁹ In this sole-supplier situation, zero competitive pressure existed, neither to reduce prices nor to diversify HPWH offerings. Following a second HPWH tender for EEIS-supported HPWHs and RCACs in October 2019, ActewAGL again appointed the ActewAGL Energy Shop as the sole successful

⁴⁵ EEIS Administrator to Erik Olbrei 28 April 2020, and Shane Rattenbury to Erik Olbrei 16 August 2020.

⁴⁶ Point Advisory, *Part 2, Report overview*, p. 10.

⁴⁷ By way of disclosure we note that Harvest Hot Water placed bids for two ActewAGL tenders in 2019, and was unsuccessful in both of them.

⁴⁸ We assume there must have been a tender early in 2018, following the inclusion of HPWHs among eligible EEIS activities in January 2018, and logically the ActewAGL Energy Shop must have won that tender, as they were ActewAGL’s sole *‘approved retailer’*, implementing HPWH installations during 2018 and 2019, as reflected in the 2018/19 EEIS report.

⁴⁹ <https://www.actewagl.com.au/save-energy/upgrade-appliances/retailers.aspx>, accessed on 20 March 2020.

tenderer. However in 2020 it added a second firm, and later a third firm. The same three firms were approved to install both RCACs and HPWHs.

But the ACT market comprises hundreds of air conditioner businesses and hundreds of water heater businesses, as the following tables show. Installation of RCACs and HPWHs are part of the routine activities of these businesses:

Figure 9: The ACT reverse cycle air conditioner market

Category	Number
Licensed ACT 'electrical contractors' listed by Access Canberra ⁵⁰	455
Local air conditioner installers in Yellow Pages for Greater Canberra ⁵¹	190
Firms contracted by ActewAGL to install energy efficient air conditioners	3

Figure 10: The ACT water heater market

Category	Number
Licensed ACT 'water supply' plumbers listed by Access Canberra ⁵²	821
Local plumbing businesses listed in Yellow Pages for Greater Canberra ⁵³	118
Installation firms in ACT with websites offering hot water systems ⁵⁴	40 +
Firms contracted by ActewAGL to install solar or heat pump HWSs	3

How is it possible that just three Canberra firms are suitable to undertake air conditioner and water heater installations for ActewAGL?

Competition stifled: ActewAGL establishes a non-level playing field

Having contracted just three firms to install EEIS-supported RCACs and HPWHs, ActewAGL then tilted the playing field in favour of these three firms (and no others) by given them access to the substantial EEIS rebates.

ActewAGL's rebates for RCACs are as follows: ⁵⁵

- **Wall air conditioners:** a rebate of \$1000 when they replace an old home heater with an efficient new wall RCAC. This comprises \$500 off the price of the new appliance, plus \$500 paid out over a 3-year period as discounts off the customer's ActewAGL electricity bills (in other words, a loyalty lock-in). For vulnerable households the rebate is \$1500, of which \$1000 is paid up front.
- **Ducted air conditioners:** a rebate of \$1500 when they replace an old home heater with an efficient new ducted RCAC. This comprises \$1000 off the price of the new appliance, plus \$500 paid out over a 3-year period as discounts off the customer's ActewAGL electricity bill

⁵⁰ <https://www.accesscanberra.act.gov.au/app/services/licence/#/electrician>

⁵¹ <https://www.yellowpages.com.au/search/listings?clue=Air+Conditioning+Installation+%26+Service&locationClue=Greater+Canberra%2C+ACT&mappable=true&selectedViewMode=list>

⁵² <https://www.accesscanberra.act.gov.au/app/services/licence/#/plumber>

⁵³ <https://www.yellowpages.com.au/search/listings?clue=Plumbers+%26+Gas+Fitters&locationClue=Greater+Canberra%2C+ACT&mappable=true&selectedViewMode=list>

⁵⁴ Website search undertaken by Harvest Hot Water

⁵⁵ <https://www.actewagl.com.au/en/support-and-advice/save-energy/appliance-upgrade-offers/heating-and-cooling-upgrade>. Accessed 3 May 2021.

(again a loyalty discount, locking customers in to ActewAGL). For vulnerable households the rebate is \$3000, of which \$2000 is paid up front.

- Ducted air conditioners (for vulnerable ACT households): a rebate of \$3000 when they replace an old home heater with an efficient new ducted RCAC. This comprises a \$2000 discount off the price of the new appliance, and quarterly discounts of \$83 off the customer's electricity bill (so long as they remain with ActewAGL) over the following 3 years, amounting to \$1000.

ActewAGL's rebates for HPWHs are as follows:⁵⁶

- For most ACT households: a rebate of \$750 when they replace an old hot water system with an efficient new HPWH. This comprises a \$500 discount off the price of the new appliance, and quarterly discounts of \$21 off the customer's ActewAGL electricity bill over the following 3 years, amounting to \$250.
- For vulnerable (generally low-income) households: a rebate of \$1200 when they replace an old hot water system with an efficient new HPWH. This comprises an \$800 discount off the price of the new appliance, and quarterly discounts of \$33 off the customer's ActewAGL electricity bill over the following 3 years, amounting to \$400.

Thus the three firms selected by ActewAGL are able to undercut all other ACT businesses by offering discounts ranging from \$500 - \$2000 per appliance that no other RCAC or HPWH businesses can offer.

ActewAGL uses one third of the rebates to lock customers in to ActewAGL

It gets worse. Not only is the tilted playing field a major concern, but it is equally concerning that ActewAGL deploys only part of the rebates (which are after all funded by ACT electricity consumers) to promote energy efficiency in the form of reductions in upfront appliance costs.

ActewAGL uses about one-third of the rebates to lock in its customers for a 3-year period, by siphoning out that part of the rebate in the form of quarterly electricity bill reductions. Not only does this distort the ACT retail electricity market, but it undermines the energy efficiency objectives of the EEIS. Sadly, this is not a concern for the Directorate, which has stated that the way ActewAGL administers the Scheme is entirely a matter for ActewAGL.

Despite EEIS rebates, prices of energy efficient appliances remain high

What happens to the prices of EEIS-supported energy efficient appliances under these arrangements? Let's take the example of a typical energy efficient room or wall air-conditioner, for which RCAC installers outside the EEIS scheme charge around \$2,600-2,700. We saw above that the total rebate offered by ActewAGL is \$1000 for standard ACT households. Taking into account the \$500 EEIS rebate allowed by ActewAGL, the three contracted businesses lower their prices somewhat, sufficient to overcome competition from non-EEIS businesses, but ACT households receive only a small part of the \$1000 in the form of a reduced upfront price:

⁵⁶ <https://www.actewagl.com.au/en/support-and-advice/save-energy/appliance-upgrade-offers/hot-water-heat-pump> Accessed 15 April 2021.

Figure 11: Pricing in the ACT market: Standard room air conditioner, non-priority household

Installer	Amount
Typical non EEIS-supported installers: Market rate for a standard room RCAC, supply and install	\$2600 - \$2700
The upfront discount component of the EEIS rebate provided by ActewAGL to 3 firms	\$500
EEIS price offered by Energy Shop, Climate Master, Aust Hot Water	\$2300 - \$2400

In the case of vulnerable households, the three firms can offer a discount of \$1000 off the upfront cost, making it impossible for any other ACT firms to compete.

Turning to HPWHs, the cost of a Stiebel Eltron HPWH (the model favoured by ActewAGL) installed outside the EEIS scheme is around \$4,000-\$4,400. The total rebate offered by ActewAGL is \$750 for standard ACT households, of which \$500 is provided upfront. Taking into account this rebate, the three contracted businesses again lower their prices somewhat, sufficient to overcome competition from non-EEIS businesses, but ACT households receive only part of the \$750 in the form of a reduced upfront price:

Figure 12: Pricing in the ACT market: Stiebel Eltron heat pump water heater, non-priority household

Installer	Amount
Typical non EEIS-supported ACT installers: Market rate for a Stiebel Eltron, supply and install	\$4000 - \$4400
The upfront discount component of the EEIS rebate provided by ActewAGL to 3 firms	\$500
EEIS price offered by Energy Shop, Climate Master, and Australian Hot Water	\$3700 - \$4000

The result is that the market failure problem of high upfront cost, which is more severe in the HPWH market than in the RCAC market, remains severe even after the EEIS rebate. HPWHs costing \$4000 or more upfront must compete with gas or traditional electric heaters at a cost of \$1300-\$1500 installed. As the table shows, the price after the EEIS rebate remains far too high. Oddly, once again the Directorate takes the view that it is up to ActewAGL whether to offer rebates or not, and not a concern for the Directorate.

ActewAGL and the ACT Government almost certainly in breach of national competition law

The above practices – restricting access to the EEIS to just three firms, giving those firms access to substantial rebates that no other firms can enjoy, siphoning out part of the rebates to electricity customers over 3 years with the effect of ensuring that they remain loyal ActewAGL customers for that period, all the while using money derived from ACT households to do it - raise an important question. Can they possibly be consistent with Australian competition law?

Under Australian law (the *Competition and Consumer Act 2010*), it is illegal for a business with a substantial degree of power in a market to engage in conduct that has the purpose, effect or likely effect of substantially lessening competition in a market. This is referred to as misuse of market power.⁵⁷ Is ActewAGL (and the ACT Government as a 50% owner of ActewAGL) in breach of

⁵⁷ <https://www.accc.gov.au/business/anti-competitive-behaviour/misuse-of-market-power#substantial-lessening-of-competition>. It is also illegal to engage in cartel conduct, where businesses make agreements with

competition law? It would certainly appear so. The ACCC has set out two tests that have been established by the courts, viz

- Does the business with a substantial degree of power in a market? and
- Is it engaging in conduct that has the purpose, effect or likely effect of substantially lessening competition in a market?⁵⁸

In our view, ActewAGL undoubtedly has a substantial degree of power in the two markets in question – the ACT RCAC and HPWH markets - in that it has the power to decide which firms will be given access to substantial EEIS rebates. It also appears evident that ActewAGL’s conduct, in giving just three of the hundreds of ACT installation businesses access to the substantial EEIS rebates, must certainly have the effect of lessening competition in those markets, as the other firms simply cannot compete when the three firms can offer discounts of \$500 - \$2000 per appliance.

These practices are of concern not only because ActewAGL (and the ACT Government as part-owner) may be in breach of the *Competition and Consumer Act 2010*, but also because they undermine the integrity and the outcomes of the EEIS.

The ACT’s competition regulator not in favour of competition

The ACT’s Independent Competition and Regulatory Commission (ICRC), whose first objective is to *promote effective competition in the interests of consumers*,⁵⁹ is required, in the course of undertaking its periodic ACT retail electricity price investigations, to assess the efficient costs of complying with the EEIS Act. In the course of this, the Commission ‘*assesses the robustness of the processes and practices that ActewAGL undertook when delivering EEIS related activities. This includes an assessment of tender processes.*’⁶⁰ It did just this in 2020 during its electricity price investigation for 2020-2024.

In response to a submission from Harvest Hot Water which argued that ActewAGL’s EEIS tender processes had failed to establish a competitive third-party abatement market for the installation of EEIS-supported heat pump hot water heaters,⁶¹ the Commission found that ‘*ActewAGL’s costs of delivering the HPWH EEIS activity satisfy the prudence and efficiency requirements. The Commission found that ActewAGL followed a competitive tender process to find providers to replace old hot water systems with HPWHs.*’⁶²

In subsequent correspondence, the ICRC confirmed that it considered ActewAGL’s tender processes to be competitive, explaining that it ‘*tests ActewAGL’s actual costs of delivering EEIS to see if they are deemed to be prudent and efficient. To establish efficiency, the Commission assessed whether the tender process was competitive.*’⁶³

More recently we raised the question of whether ActewAGL, as a part-government owned entity, may be in breach of competitive neutrality principles. Again, the Commission considered there was

their competitors to fix prices, inflate prices or reduce consumer choice.

<https://www.accc.gov.au/business/anti-competitive-behaviour/cartels>.

⁵⁸ <https://www.accc.gov.au/business/anti-competitive-behaviour/misuse-of-market-power#misuse-of-market-power-test>

⁵⁹ *Independent Competition and Regulatory Commission Act 1997*, Clause 7a.

⁶⁰ ICRC, *Retail electricity price investigation 2020–24. Draft report*. Report 2 of 2020, February 2020, p. 36.

⁶¹ Erik Olbrei, Harvest Hot Water March 2020, *Submission to the ICRC Retail Electricity Price Investigation 2020-2024 regarding the Energy Efficiency Improvement Scheme (EEIS)*.

⁶² ICRC June 2020, *Retail electricity price investigation 2020–24. Final report. Report 9 of 2020*, p. 44.

⁶³ ICRC Senior Commissioner to Erik Olbrei, 25 June 2020.

nothing here for them to investigate, taking the position that any advantage ActewAGL may have had did not arise by virtue of its government ownership.⁶⁴

It seems that, in the Commission's view, market competition in the EEIS is alive and well.

EPSDD has not accredited a single abatement / energy savings provider to the EEIS in 8 years

For the EEIS to operate as a vibrant and competitive scheme driving down prices, it needs as many qualified energy savings providers (aka installers of energy efficient appliances) as possible, all competing to deliver installations at the best quality and lowest price. Electricity retailers would then be able to purchase abatement / energy savings from them in order to meet their obligations under the Scheme.

The EEIS Act has allowed the Directorate to accredit abatement / energy savings providers to the Scheme since 2012, but to this day the Directorate has not accredited a single provider. The absence of such providers has made it all the more difficult for Tier 2 retailers to participate in the Scheme.

We hasten to add that the Directorate has recently decided that installers registered as Registered Agents with the Clean Energy Regulator can be accredited to the EEIS. It has kindly advised Harvest Hot Water that our application for accreditation to the Scheme, which was lodged with the Directorate in May 2020, will be approved once EPSDD's arrangements with the CER are in place.

While this is a useful step forward, and greatly appreciated by Harvest Hot Water, its impact is likely to be limited, as few ACT installers are registered with the CER. The question remains as to whether any accreditation mechanism is needed at all. So long as installation businesses employ trades who are licenced to practice in the ACT, and so long as they have all relevant cards and meet all relevant ACT regulations, they should be able to participate in the EEIS without any further need for paperwork.

Not a single Tier 2 retailer has participated in the Scheme in eight years

In the eight years that the EEIS has been in operation, Tier 2 retailers have declined to participate, opting instead to pay a financial penalty to the ACT Government (the 'Energy Savings Contribution'). This has had severe consequences for the outcomes of the Scheme. The 2018 Point Advisory review of the EEIS found that because of Tier 2 non-participation in the Scheme, 30% of the Scheme's modelled energy efficiency savings did not eventuate.⁶⁵

The Directorate has sought ways to achieve Tier 2 participation through stakeholder forums but to no avail. One retailer – Energy Australia – briefly looked at participation in March 2017, but dropped the idea. This is most likely due to the administrative complexity of the arrangements EPSDD has put in place.⁶⁶

How can the EEIS be transformed into a high-achieving energy efficiency scheme?

What measures could be taken to address the above issues and transform the EEIS into a high-performing energy efficiency scheme, one that delivers its share of the ACT Climate Strategy targets, and provides a nation-leading demonstration of what can be achieved through a truly ambitious energy efficiency scheme? We recommend the following measures:

⁶⁴ ICRC to Erik Olbrei, 29 March 2021.

⁶⁵ Point Advisory 2018, *Review of the Energy Efficiency Improvement Scheme – Final report. Part 2 – Report Overview*, p. 13)

⁶⁶ EEIS Annual Report for 2016-17.

1 Adopt ambitious and measurable performance targets for the EEIS

- a. Climate action: disconnect 90,000 ACT households from fossil gas by 2030;
- b. Energy efficiency: slash energy use for space heating and hot water by 50% by 2030 against a 2020 baseline; and
- c. Household energy bills: slash space heating and hot water costs by 50% in real terms by 2030 against a 2020 baseline.

Drawing on previous discussion, we propose that the EEIS should aim to replace around 10,000 end-of-life (i.e. 20 years old) gas or inefficient electric appliances (especially traditional electric hot water systems) a year. This would generate a substantial momentum towards disconnections from gas. As each appliance is withdrawn, it creates an incentive to replace any remaining gas appliances as the opportunity to disconnect from gas altogether and thereby eliminate the annual supply charge of c. \$320 a year becomes increasingly attractive.

2 Open the Scheme to full and open market participation

The Directorate should take urgent steps to ensure that the great majority of the hundreds of RCAC and HPWH installers in the ACT are able to participate in the Scheme.

3 End ActewAGL's anti-competitive practices in relation to the EEIS as a matter of urgency

As a matter of urgency, remove the option for Tier 1 retailers to undertake eligible activities themselves, by deleting Clause 14 (2) (a) (i) of the EEIS Act.

4 Ensure full participation in the EEIS by Tier 2 electricity retailers

In the first instance, EPSDD should meet with Tier 2 retailers to highlight the importance of their participation forthwith. If this fails to get the necessary results, then the EEIS Act should be amended by

- i. Deleting Clause 14 (3)(a)(i) so that Tier 2 retailers cannot undertake activities themselves, and must therefore purchase them from approved energy savings providers;
- ii. Deleting Clause 14 (3)(a)(iii) so that Tier 2 retailers can no longer simply pay and Energy Savings Contribution; and
- iii. Adding a clause to provide that if a Tier 2 retailer fails to meet its energy savings obligation, the penalties for non-compliance set out in Clause 22 of the Act will apply.

Alternatively, with the establishment of a strong and competitive energy savings market is established in the ACT, the distinction between Tier 1 and Tier 2 retailers could be dispensed with altogether. This could be achieved by

- i. In Clause 14 (2) Deleting the term 'tier 1' so that the clause applies to all retailers, and
- ii. deleting 14 (3) altogether so that Tier 2 retailers are included in (2)
- iii. (and of course deleting Clause 14 (2)(a)(i) as noted above.

Annex 1: EEIS activities reported by EPSDD

The following table shows the activities reported by the Directorate over the life of the Scheme up to June 2020:⁶⁷

Activity	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	Totals
Building sealing	15,445	21,765	5,074	3,307				45,591
Install ducted gas heaters				329	844	677		1,850
Install ducted RCACs							651	651
Room RCACs					169	672	1,469	2,310
Electric HWS to gas HWS			67					67
Install HPWHs						98	462	560
Lighting - 1	208,484	167,977	59,985	36,141				472,587
Lighting - 2		4,890	108,145	4,729				117,764
Lighting - 3		20,904	212,783	68,738				302,425
Lighting - 4				11,286				11,286
Lighting - 5				11,721				11,721
Lighting - commercial upgrade				41,248	120,886	83,840	46,095	292,069
Standby power controllers	42,513	27,451	3,774					73,738
Decommissioning old fridges	351	1,131	1,502	1,303	1,327	2,041	1,521	9,176

Source: EEIS annual reports 2013-14 to 2019-20. Lighting 1-5 is presumed to be residential, totalling 915,783.

⁶⁷ This data is drawn from the annual reports from the EEIS Administrator from 2013-14 through to 2019-20. These are annexed to the EPSDD annual reports. See for example, EEIS Administrator, Report on the operation and administration of the Energy Efficiency (Cost of Living) Improvement Act 2012, in ACT Government EPSDD, *Annual Report 2018-19*, pp. 270-275, and Report on the operation and administration of the Energy Efficiency (Cost of Living) Improvement Act 2012, in ACT Government EPSDD, *Annual Report 2019-20*, pp. 397-407.