GETTING TO ENERGY EFFICIENCY IN THE ACT

FOR: THE CONSERVATION COUNCIL ACT

Purpose:

A discussion piece on energy efficiency ideas and innovations. Prepared by Complex Environmental Problems in Action students from the Australian National University.

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EXECUTIVE SUMMARY:

This report provides seven proposed areas in which household energy efficiency in the ACT can be improved through legislative change. The intent is for it to be used as a "Recipe book" where activists and lobbyists can select changes based on what they want to and are able to achieve and can see our suggestions for implementing them.

The ideas are divided into two areas;

Modifications to the Energy Efficiency Improvement Scheme (EEIS)

EEIS 1. Creation of an implementation manual for the scheme; The implementation manual is about creation of a clear and freely accessible manual to increase the ease and speed of compliance. It will reduce administrative and legislative burden for retailers and contractors, and empower ACT residents through access to information.

EEIS 2. Reallocation of contribution funds; The reallocation of contribution funds is to use a percentage of energy savings contributions (a facet of the EEIS) to provide the remaining capital investment (for targeted households) necessary for higher value energy efficiency activities. It ensures that benefit accrues to vulnerable communities.

EEIS 3. New abatement method; The new abatement method aims to allow Tier 2 energy retailers to partly meet abatement requirements by sponsoring third party bodies that offer activities. It will result in competition and the provision of market benefits to smaller electricity retailers.

Changes to the ACT building codes

BC 1. Implementation of WERS star rating; The implementation of WERS star rating for windows attempts to create a minimum standard for low-lying buildings to have windows rated at least 5.4 stars, where high-rise apartments need a minimum of 6 stars.

BC 2. Energy efficient housing density: Housing density has an enormous impact on energy usage. Changes to the multi-unit housing code can reduce energy requirements and house prices by encouraging construction to low carbon urban densities; primarily medium density terraces.

BC 3. Energy sensitive urban design: The energy sensitive urban design rules emulate the pre-existing water sensitive urban design rules in the Territory Plan to encourage new buildings to be designed to complement the ACT's energy infrastructure.

BC 4. Urban Cooling Mechanisms: This section explores methods of countering the urban heat island effect with the incentivisation of passive urban cooling mechanisms; mechanisms include green roofs, urban forests and reflective colours.

DISCLAIMER:

The methodology used to derive the scores is informed by a logical but ultimately subjective process. It is based on our experience and broader reading and is not backed up by research, as such it is intended to be used as a communication tool only. Further research should be conducted before these scores are used to inform decision making.

Submission intended as a suggestion of ideas and innovations that might be deployed. We do not take responsibility for the outcomes of resulting from the implementation of our suggestions.

INTRODUCTION:

Scope

The intention of this report is to provide ideas to guide the Australian Capital Territory towards improved household energy efficiency. Conducted on behalf of the Conservation Council; the ideas presented deal primarily with legislative change, and outline the lobbying and activist steps that can be taken in order to implement them.

Retrofits and new buildings, as well as owned properties and rental properties are considered in the research. The ideas presented were prepared in respect to, and then evaluated against three indicators: feasibility, cost and fairness. Another important objective of this report was to uncover the status quo and suggest relationships that needed to be formed between broad stakeholders.

Interpretation

This report is designed to work as a recipe book of legislative change needed to improve household energy efficiency in the ACT. Provided with the ideas for change is their justification, potential barriers to their implementation and solutions to overcome those barriers. Multiple forms of communication comprising tables, graphics and videos have been deployed make our information more accessible. In order to formalise and communicate our evaluation, a logical scoring methodology has been created in context of the three indicators mentioned above [see appendix: methodology].

Content

The report mainly focuses on two areas; **The retrofitting of existing houses;** primarily through the Energy Efficiency Improvement Scheme (EEIS) under the *Energy Efficiency Improvement Act (2012)*. This scheme requires energy retailers to supply energy saving contributions to households and small-to-medium sized businesses. Smaller energy retailers have the option of making a financial contribution instead for improvements to priority (disadvantaged) households. So far it has largely succeeded in providing many low-cost benefits to residents; however, there is still room for improvement.

The second area involves **improving the energy efficiency of dwellings yet to be built;** focusing on variations to the ACT and Australian building codes, primarily the multi-unit housing code. Due to growing population and aging housing stock, there is, and will continue to be, enormous demand for new housing in the ACT. Energy efficiency for new buildings is currently regulated mainly by the Australian Building Code Council (ABCC), but these national codes are often poorly tailored to the situations in which they are applied, and do not necessarily complement local rules and conditions. It may be possible to improve outcomes by implementing and tweaking certain rules at the local level; the aim had been to strike a balance between changes that increased regulatory burden, and those that release it.

The list of ideas provided is far from exhaustive, and the outlines for improvement are far from complete, but it is hoped that by providing a variety of approaches and exploring a range of options we have been able to provide polices suggestions that have a good chance of being implemented while achieving equitable outcomes.

RECOMMENDATIONS:

EEIS1: IMPLEMENTATION MANUAL

IDEA AND JUSTIFICATION:

The EEIS would benefit from the creation and distribution of an Implementation Manual. This manual is intended to simplify processes and reduce transaction costs. It is concerned with communicating the eligible activities in an accessible and clear way, reducing confusion and combatting administrative and legislative burden. It is in line with It would also serve as a resource for the ACT Government.

The activities retailers are allowed to offer require interpreting. Energy retailers and many of the ACT's residents are not builders, architects, technicians etc. As a result, interpretation is an issue as the recent EEIS documentation (2016) does not provide clarity on relevant codes, legislations and requirements. The impact of this can be seen by updates to disallowable instruments to provide clarification on requirements (licensing, reporting) and the desire to reduce ambiguity.

STAKEHOLDERS/ STATUS QUO:

Create Relationships Among: Builders, Energy Retailers, ACT Residents, ACT Government and Contractors.

Currently, there is no implementation manual. Information on procedure/compliance is available in the Eligible Activities Determinations. This documentation has ambiguity. This creates transaction costs (for example by seeking external consultation to ensure compliance) for retailers. It does not allow for all ACT residents to critically engage with the activities. We expect ambiguity manifests as follows:

Residents: Residents face information asymmetry and are insufficiently equipped to understand eligibility, correct procedure and to fill out applications to landlords for necessary permissions.

For Tier 1: The transaction costs surrounding the codes encourage a 'low-hanging fruit' approach to offering energy efficiency activities.

For Tier 2: The burden associated with the process makes offering activities unattractive relative compared to the contribution fee option.

BARRIERS TO UPTAKE:

Administrative challenges prevent this solution being from being realised. Much of the information the implementation manual is interested in disseminating is already available/determined. However, translating codes into accessible language, as well as, providing more specific detail will require an investment of the ACT Government's time and money. The upfront cost of the solution is expected to be relatively minimal with even lower maintenance costs. The opportunity cost presented is that of redirecting human capital from other ACT Government agendas. Therefore, time and the committing of resources, namely, people is a barrier to uptake.

GUIDANCE/SOLUTIONS:

- The Implementation Manual should complement the *Energy Efficiency (Cost of Living) Improvement (Eligible Activities) Determination 2016 (No 2)* (or future equivalent). It should distinguish what activities need to be audited/inspected/investigated and who pays for these processes. This would increase the consistency in terminology (see appendix: 1, for examples of this inconsistency).
- The Implementation Manual should also provide information on what specific codes, legislation and requirements apply for each specific activity. The 2016 Determination (No 2) defines "relevant legislation" in a manner that implies the listed Acts are inconclusive. In addition, The 2016 Determination (No 2) refers to standards (e.g. AS 1288, AS/NZS 2442 etc.) and refers in all cases to "relevant parts" of such standards. It does nothing to outline what parts are considered relevant, nor specify what legislation is relevant to each specific activity. Addressing this would streamline the process, lower information barriers and make compliance easier.
- The Implementation Manual should be a compilation of fact sheets (see Logan City Council for an example) available online through a specific EEIS website. This would reduce costs, allow for quick updates and increase accessibility. Additionally, creating a unique EEIS website would further harmonise with the Victorian Energy Efficiency Scheme (VEET).

SCORE: 57/60

EEIS2: REALLOCATION OF TIER 2 RETAILER CONTRIBUTION FUNDS

IDEA AND JUSTIFICATION:

The EEIS scheme could be altered to ensure that activities are facilitated from multiple angles. We propose that an appropriate percentage of this fund (~3.8 million AUD a year from 2015 to 2020) should be used to address the barrier of access to capital. High value activities have remaining upfront investment/higher cost (e.g. ActewAGL ducted heating), making them less accessible. This provision of capital could be targeted at priority households/disadvantaged communities to provide them with the same level of access as richer ACT residents. This reallocation of funds is intended to increase the uptake of high value energy efficiency activities. It communicates to retailers that there is guaranteed uptake from priority households. This would help the ACT meet its 2020 Renewable Energy Target, as well as provide many of the multifaceted benefits of energy efficiency (health, comfort, reduced costs etc.) to the most vulnerable in our community. This is important as the costs of the scheme are borne by all residents, regardless of participation. Higher value activities (rather than the cost-effective, free activities that have already been offered and are becoming saturated) are the next important step for the EEIS. As outlined in the UnionsACT energy efficiency discussion paper, higher value retrofits provide a much more valuable contribution to the most vulnerable members of our community, as well as many co-benefits and reduced long-term costs. Following this, the EEIS can be used as a mechanism to facilitate the installation of these higher value activities and retrofits. This solution does not require energy retailers to change their behaviour significantly. They will continue to pay and offer activities as they see fit. The innovation has its main influence on the behaviour of the ACT Government. However, using funds in this way is consistent with purpose of EEIS revenue. This is because reallocating funds to provide the remaining upfront investment on energy efficiency products/retrofits does increase the opportunities of priority/low income households and will reduce energy consumption.

STAKEHOLDERS/STATUS QUO:

Create Relationships Among: ACT Government, Tier 1 Retailers, Tier 2 Retailers and Disadvantaged ACT Residents

Vulnerable communities in the ACT current suffer from a lack of access to capital.

Currently, higher value energy efficiency activities are being offered with graduated subsidies that provide marginally more savings to priority households. This approach is insufficient in providing all members of vulnerable communities access to these activities as it does not solve the access to capital problem. This is problematic as EEIS documentation acknowledges that these communities would likely benefit the most from having such activities undertaken in their premises. Further, higher abatement is achieved from higher cost activities. The ACT community is interested in higher value activities being offered, notably insulation activities, yet this process is moving very slowly due to lack of incentive.

BARRIERS TO UPTAKE:

A trade-off exists regarding reallocation. The Energy Saving Contributions are a finite source of funding, therefore, depending on the size of this fund and the percentage of the fund set to be reallocated significant opportunity costs may arise.

This solution also incorporates an element of administrative burden. This is because for the system to work it would require tracking where many (relatively) small packets of money are going. Vulnerable communities getting access to grants is likely to involve a lot of red-tape and be a slow process. Documenting this new distribution of funds will also result in transaction costs. The Government may be interested in growing this fund, as a result, may be hesitant to draw from it significantly.

GUIDANCE/SOLUTIONS:

- Eligible communities can apply for the benefits of a grant out of this fund, rather than the money itself. The grant can be tied to an activity that is being offered by a Tier 1 retailer in the ACT region. The exchange of money can be externalised from the resident, and be between the government and the Tier 1 retailer only.
- A review procedure could be installed into the reallocation mechanisms. This would concern both the percentage of funds being allocated and to whom the funds are allocated. This way, opportunity costs can be justified, as well as, specific populations of people can be selected to ensure that the most benefit is received where it is most important. We propose the first target population could be residents in public housing / residents with extremely low income.
- The Government can consider replenishing this fund through interest-free repayments that are taken from the savings that will accrue from undertaking the high-value energy efficiency activities.

SCORE: 47/60

EEIS3: NEW ABATEMENT METHOD - SPONSORSHIP

IDEA AND JUSTIFICATION:

The EEIS could be improved allowing Tier 2 retailers to sponsor/fund a third party actor that provides activities. Allowing Tier 2 retailers to comply with the scheme in this way would allow for the brand/corporate image of the Tier 2 retailers to be associated with the energy efficiency activity. This is intended to increase the attractiveness of offering activities (for Tier 2 retailers), as well as share both risks and costs (as the third party body would take on responsibility). Tier 2 retailers are less likely to have sufficient resources to manage installers, transaction costs and compliance risk and often do not opt to offer activities due to high risk. This results in few or no Tier 2 retailers offering activities. Allowing Tier 2 retailers to offer activities as a collective (by sponsorship) distributes risk and moves responsibility off one retailer and would allow them to access early buy-in and market benefits. Making offering activities more popular would also benefit ACT residents as they would have a greater range of activities available to them. As the ACT only has one Tier 1 retailer, this idea is worth implementing as it forces competition in activities. This would increase harmonization with the Victorian Energy Efficiency Scheme, which has been an aim of prior amendments to EEIS. Facilitating competition on low-cost activities might act as an incentive for the Tier 1 retailer (ActewAGL) to offer higher value activities.

STAKEHOLDERS/UPTAKE/STATUS QUO:

Create Relationships Among: Tier 2 Retailers, ACT Residents, ACT Government, Third Party Organisations and Contractors

Tier 2 retailer contributions are used for good causes but are separated from the retailers that provide the money. They are not directly represented in the energy efficiency improvement processes, thus they do not benefit as much (in terms of reputation, brand image etc.) as their counterpart (Tier 1) does. This puts Tier 2 retailers at a disadvantage. Tier 2 retailers are expected to take on all the costs and risks of offering activities singularly. This is a disincentive as due to their smaller nature, this is not a risk these businesses are often willing to take. In 2017, only 1 Tier 2 retailer, EnergyAustralia, has offered activities. The current system provides the Tier 1 retailer, ActewAGL, many benefits (early buy in etc.) solidifying their position in the energy market. This is not ideal for efficient markets due to a lack of competition (see appendix 2). Stakeholders have often expressed uncertainty about activity effectiveness due to a lack of retailer competition (e.g. stand-alone commercial lighting) and desire an increase in competition. Additionally, making EEIS similar to schemes present in other states (p. 11)is a goal. It worth noting that ActewAGL is not a completely private company, it is partly owned by Icon Water Limited which is an unlisted public company owned by the ACT Government.

Under the Energy Efficiency (Cost of Living) Improvement Amendment Bill (2015) in section 17A, a person other than a NERL retailer or contractor can apply to get approval to undertake abatement activities.

BARRIERS TO UPTAKE:

The monopoly status of ActewAGL in the ACT region (while currently is not at the detriment of residents) might be hard to address. The Government is unlikely to perceive the current state as a disadvantage due to their involvement in the process. Furthermore, Tier 2 retailers are in competition with each other. They may not be willing to have their brand and reputation linked together in the provision of an activity. Most of the expected benefits of such an approach will accrue to private industry, if they volunteer to engage in sponsorship. This is not as likely to be supported by the ACT Government as it indirectly benefits the populations the Government values (residents). As a result, the investment required to facilitate the method (administrative, regulation) is unlikely to be something the ACT Government is willing to pay. Additionally, willing third parties might not have to exist, providing further investment to facilitate such parties.

GUIDANCE/SOLUTIONS:

- The sponsorship could be facilitated by the government (i.e. approving third parties to offer activities) creating an element of responsibility and accountability. It may be worth investigating a co-management approach, looking at both horizontal and vertical integration. The ACT Government might benefit from using educational methods to promote horizontal integration.
- The system could be designed to allow multiple Tier 2 retailers to sponsor 1 third party body. This may make the process more feasible, however, rrespecting Tier 2 sovereignty will be paramount. Collaboration should be restricted to just the activity being offered and abatement delegated to each retailer in response to the amount of investment.
- This method should be allowed to be used in addition to the energy savings contribution. Tier 2 retailers should be able to meet their abatement requirements using a mix of both as to not be unfairly penalized. This would allow Tier 1 to continue to provide the most activities and receive the majority of the reputational benefits.

SCORE: 45/60

BC1: MINIMUM WERS STAR RATING FOR WINDOWS

IDEA AND JUSTIFICATION:

Broad ideas

The WERS is managed by the Australian Window Association (AWA) which is made up of over 500 window manufacturers and industry suppliers throughout Australia. As a voluntary organisation, it is independent of any one manufacturer and acts as a fair, rigorous and credible system for testing performance claims. It is an accredited member of the Australian Fenestration Rating Council.

The optimal star rating varies by house and location. The weighted average for new houses by location is between 4.4 and 5.5 stars. Based on this, the broad suggestion is that the optimal level of energy efficiency could be around 5.4 stars which means to choose one of the things in specific suggestion is 5.4 stars showed in appendix 3. The Australian standard is set at 4 stars. For high level apartments, there should be higher level of stars because they experience a higher level of UV light. The suggestion for high level buildings is 6 stars.

Specific suggestions

1. Weather sealing/draught proofing:

Energy saving technologies achieve different energy savings in different locations. Weather sealing may achieve substantial energy savings in a cooler climate, but less energy savings in more temperate climates. It saves up to 25% on your heating and cooling bills and it is easy and affordable to implement (even for renters)

2. Double glazed window:

Windows have severely impact on the heating and cooling loads of a building. Up to 40% of a home's heating energy can be lost and up to 87% of its heat gained through windows.

3. External shading:

It is estimated that one in five Australians will get skin cancer at some point in their lives. They can reduce the amount of energy required for heating or cooling by keeping the excessive heat of the sun out and avoiding overheating.

Justification

Fairness: Mandate would result in higher costs that would unfairly impact the poor. Also, if it was a mandate, renters of new properties would get the benefit. The landlord would face a higher cost, the possible fairness issue could be the temptation to charge premium rent as a result.

Cost: The cost for these three methods are not too expensive. If people do not have much money, people could choose the cheapest one, which is the weather seals, to implement. There are some costs that could be subsidised by the government, the government will need to provide more money for the housing.

Feasibility: Those methods are all easy to install.

STAKEHOLDERS/UPTAKE/STATUS QUO:

Residents: the current star rating for the new building is 4 stars

Industrial suppliers and window manufacturers: most of the suppliers are able to do the Weather sealing, double glazed window and external shading for both new and retrofit housing.

Government: for the Energy Rating scheme, it focuses on the new buildings.

BARRIERS TO UPTAKE:

- The scheme is a voluntary programme which means not all of the building are following this regulations.
- The cost is different for the three methods and some of it are expensive.
- People are not aware of how effective these method to save energy.
- Some of the people who want to rent the house to others are not caring about the housing energy efficient.

GUIDANCE/SOLUTIONS:

- It should be mandatory law for weather sealing, double glazed window or external for every households, especially for the apartment. Apartment are higher than the housing, which has more sunlight than low levels.
- The government can provide some subsidies for the house owner to build these things for the house and the apartment.

- Workshops can be held monthly for ACT residents to share knowledge and incentivise community members to install one of the window modifications.
- There price for renting can be increased for the higher level of energy efficiency housing. With this, the landlord will also willing to change the feature for the housing by tenant. There should be some regulations to protect the tenant of getting high renting fee. There should be a maximum renting fee for house owner.

SCORE: 42/60

BC2: CONSTRUCTION: LOW CARBON URBAN DENSITIES

IDEA AND JUSTIFICATION:

Move towards low emissions housing densities

Aside from the obvious reduction in transport emissions brought about by increasing population density (and therefore the amount of housing available with close proximity to work, shopping and other services) different types of housing have different environmental impacts based on how buildings are built and how effectively passive heating and cooling can be utilised. (appendix 4)

In general, detached dwellings, by far the most common type of dwelling in Canberra, are among the least energy efficient. High rise apartments, which are increasingly common, are no better. Therefore, it is desirable to direct new housing development towards townhouses and other medium density options. This will also have a positive impact on the pertinent issue of housing affordability, as these forms of housing tend to be the cheapest to build without sacrificing too much density.

STAKEHOLDERS/UPTAKE/STATUS QUO:

The decline in detached housing expansion is already well under way, only 20% of building approvals in the ACT in 2015-16 financial year were of detached dwellings; more than half were apartments and around 25% were Townhouses. (appendix 5)

This is driven by economics, a sharp rise in land prices has meant detached houses are unaffordable for many, and developers can get a higher yield by selling more dwellings on less land. It is also driven by the intent of the ACT planning strategy, which aims for over 50% of new dwellings in the city to be produced by infill and intensification, rather than sprawl.

BARRIERS TO UPTAKE:

The issue therefore is not the obvious one, the battle against detached housing is largely won. It is the equally emissions intensive high-rise blocks that are the problem; 92% of new apartments in the ACT are in buildings 4 stories or taller.

The main cause for this, as mentioned in the uptake section, is economics. But there are also a number of regulations that incentivise high-rise development over terraces and lower rise multi unit housing.

- Apartments do not have the same solar access requirements as housing (this also contributes to energy consumption as there is less passive heating and lighting)
- Ground floor dwellings of any type require 36m2 of private open space, Apartments that have no contact with the ground floor require only 6m2
- Most zoning types require large gaps between neighbouring buildings on different leases, preventing Melbourne or Sydney style terrace rows.
- Culture; a detached house is the Australian dream, an apartment means a high-flying city lifestyle, a terrace is a compromise.

GUIDANCE/SOLUTIONS:

Change rules to bring solar access and open space requirements for terraces and apartments into line.

Fairness; Option 1: If rules are relaxed on Terraces, it would make them cheaper, though it may significantly lower the amenity of these dwellings. It may also improve housing choices. Option 2: If rules are tightened on apartments it might make them more expensive, though nicer, worsening the housing affordability crisis.

Cost; Option 1, would be cheaper for developers, and would improve terrace yields. Option 2 would be expensive for developers, and would pour cold water on the apartment boom.
Feasibility; All of these changes would be legislative and would involve challenging powerful interest groups, developers on one side, and homeowner's groups on the other. Housing is a hot button issue at the moment.
-Culture; Encouraging the use of terraces in cultural imagery, from conservation council educational materials to TV, making terraces the default could re-direct choices.
Fairness; Everyone wins, the environment and people, our emotional choices will now align with logic.
Cost; As mentioned above, terraces are amongst the cheapest forms of housing to build and maintain.
Feasibility; entirely un measurable, small steps are easy, big steps hard, and impact will be hard to see.

SCORE: **43/60**

BC3: ENERGY SENSITIVE URBAN DESIGN CODE

IDEA AND JUSTIFICATION:

Enshrine energy use reductions in the building code.

Many aspects of building design in the ACT are governed by the ACT building codes, primarily the Residential Development Code, the Multi Unit Housing Code and the Single Dwelling Code.
The principals of water sensitive urban design mandate new buildings minimise their hydrological impact. The principals of this idea are;

- to reduce the demand for potable (fit for drinking) water by using alternative sources of water such as rainwater and treated wastewater and encouraging water efficient appliances
- to minimise the generation of wastewater and to treat wastewater to a suitable standard for re-use and/or release to receiving waters
- to treat urban stormwater to a quality where it can be reused and/or discharged to surface waters
- to use stormwater in the urban landscape to improve the visual and recreational amenity of developments.

Re-worded for electricity, they could look something like this.

- **to reduce dependence on centralised mains electricity by using dispersed generation methods, such as solar and battery storage.** (this would take pressure off communal infrastructure and would help smooth out electricity demand to cope with a switch to renewables all over)
- **to improve current power utilization by minimising waste caused by factors such as poor insulation and inefficient appliances and devices; and by deploying smart grid technologies**
- (smart grid technology allows the same infrastructure to do more)
- **to reduce peak electricity demand through design that allows better utilisation of natural heating and lighting.** (The key focus of this would be heat waves, this is when demand peaks and power outs are most likely to occur)

Currently, the Australian building codes board regulates power use in new construction; these regulations relate to the energy efficiency of the house itself. The purpose of this change would be to control the impact a structure has on the entire grid.

STAKEHOLDERS/UPTAKE/STATUS QUO:

As mentioned above, the model legislation is the ACT Government's water sensitive urban design. This approach to regulation, as a mandatory requirement in the building code has been found to be both impactful and cost effective; **(ref)** achieving their goals while raising costs only negligible amounts; if well designed, these codes can be set up in a way to encourage innovation and new cheaper solutions.

BARRIERS TO UPTAKE:

Implementing a code like this is a significant legislative challenge; it requires buy in from varied stakeholders across government and industry. The potential for energy regulation that may conflict at the federal level is also a challenge.

The code also has the potential to marginally raise costs for builders in the short term. In an environment where housing prices are already extremely inflated this may put further pressure on low income home buyers.

GUIDANCE/SOLUTIONS:

The Turnbull Government's proposed Reliable Energy Guarantee (REG) will not hinder and may in fact help implementation of change at the ACT level. The REG mandates the mix of energy, renewable or otherwise, energy retailers must provide; moving more people onto personal supplies would a way circumvent the legislation to increase renewable energy uptake. Removal of regulation at the federal level could also make room, both politically and economically for more stringent standards locally.

The standards also have the potential to reduce costs not only for the city, but homeowners too, by reducing peak demand and overall use; buildings built to these standards may increase in value.

SCORE: 37/60

BC4: URBAN COOLING MECHANISMS

IDEA AND JUSTIFICATION:

Measures to tackle the urban heat island effect.

The urban heat island effect is one of the great downsides of the transition towards higher population densities, water sensitive gardens and native plantings. As dark paved and roofed area increases, and transpiration decreases, and urban areas begin to record higher temperatures than the rural areas that surround (appendix 6). This increases demand for air conditioning, stresses the natural communities that remain, and it can pose a variety of health risks to humans, aside from just being unpleasant. This effect is also far more pronounced in the summer, when the sun is stronger; this means additional cooling is not offset by reduced heating.

There is currently little mandatory legislation governing many of the factors that affect this, The aim of this section will be to evaluate ideas to reduce the urban heat island effect; This includes.

- Landscape regulation
- Green Roof incentivisation
- Colour schemes

STAKEHOLDERS/STATUS QUO:

The benefits of green roofs are well understood, though they have been tried successfully in a variety of settings they are yet to be implemented in a concentrated manner.

The value of urban forests are well recognised; currently all trees of sufficient size in the ACT are protected, meaning approval is needed to do works on or around the tree. However replantings and regenerations are not as well protected.

BARRIERS TO UPTAKE:

Cost; **Green Roofs;** Green roofs are expensive to install, this is because they are heavy and require the building beneath to be more substantial than standard. **Landscaping;** Deep rooted trees are also expensive to install. Their presence also precludes the existence of basements underneath, basement car parking that takes up the entire block is increasingly common, especially in dense urban areas where land is scarce, and the heat island effect is more pronounced.

Education;

Many landscaping, and design decisions do not take the heat island effect into consideration; the proliferation of colour bond roofing has darkened the roofs of new construction areas. The large European shade trees are also falling out of use in private gardens, there are good reasons for this, they use more water, grow slowly and are less hardy; but they cool their surroundings more effectively than other trees.

GUIDANCE/SOLUTIONS:

Green Roofs; It is difficult to make green roofs cheaper, and subsidies are fraught because they are only possible

in certain situations. But there are some options to incentivise them; especially in the multi-unit housing code.
-Accessible Housing is currently incentivised by allowing higher plot ratios for accessible buildings, this increases the floor area allowance on a given area of land. It might also be possible to consider green roofs as "Permeable area" in the water sensitive urban design code, and considering them private open space (provided they can be accessed).
Landscaping; Landscaping in the ACT is currently completely unregulated outside limited areas in the National Capital Area which require planting of deep rooted trees. The spirit of these requirements could be expanded to the rest of the territory, requiring space for deep rooted trees on most if not all residential blocks; this would also have a positive impact on the amenity and beauty of the city. A 1:1 replacement ratio for lost trees (with options to offset) could help preserve the small trees not currently protected without overly burdening developers.
Colouration; Style is beyond the control of any activist, and it is likely the dark colour bond roof is here to stay, but educational materials about the money saving effects of simply painting a roof white could sway a number of people. Many regions require developers to stick to colour palettes, and including and emphasising lighter colours in those could have a cooling effect at a very low cost to builders.

SCORE: 37/60

COMMENTARY:

TENANCY LAW/SPLIT INCENTIVE: POSITION

Solutions to Split Incentives

Proposals	Barriers stopping it from happening
Replicating PHT on renting sector (if possible) – Priority dwellings including: Renting houses Public housing properties Not-for-profit housing facilities – Tenants experiencing financial hardship	Tenants not having the right to engage in activities without landlord permissions. Landlord with lack of incentive.
Subsidies for improvement (cheaper for tenants)	Increase cost on government
Grants for landlords	Not incentivised
Social pressure (lobbying landlords)	Ineffective
Facilitate tenants' ability to apply for permission to make alternatives relevant to EE.	Landlord autonomy
Set minimum standards	Increase cost on landlords
Premium on rent for higher star	Higher rent impact on the vulnerable

PRIORITY HOUSEHOLD TARGET: POSITION

The ACT Government has proposed to expand the definition of priority household under the EEIS. We are in support of this proposal, as reducing the target fraction of incentives assigned to priority households should be avoided. In addition, low-income households should also receive a greater focus under the target. This is because the scheme can be a tool to address ACT income inequality problem (see Goldie et al., 2014; Tanton et al., 2015). We also encourage the trend of ensuring options are available for public housing (claimed in the 2016 ACT Government Submission to the Climate Change Authority).

FUTURE ACTIVITIES/ FURTHER RESEARCH:

This report focuses primarily on residential properties. This is primarily due to the time constraints of the project, making it beyond our scope. However, achieving energy efficiency in the ACT requires the consideration of both residential and non-residential premises. As such, further research/investigation should be undertaken in respect to:

- Building sealing of commercial buildings (currently not provided under the EEIS) – could be implemented into SMEs for positive impact. Facilitating building sealing activities for small business owners in Canberra could provide this community with a lot of benefits.
- Eligible businesses premises under EEIS must NOT have an energy consumption reporting obligation under the National Greenhouse and Energy Reporting Act 2007 OR Australian Government's Energy Efficiency in Government Operations Act, Or the Carbon Neutral ACT [Possibly unnecessarily restrictive – recommend reviewing to continue – may need to be expanded (~5+ years into the future as they may run out of premises to upgrade)] – excluding NGERs reporters is justified and important at the current stage, however, depending on the longevity of the scheme, it may need to be loosened in the future.
- Ensuring that an insulation activity is incorporated into the scheme (overcoming the barrier of lack of comparable standards in VEET/SAREES – potential to adopt and modify an international one.
- Possible additional mechanism for the future of the scheme (beyond 2020) that could replace the priority household target while still being true to the social equity and assistance to vulnerable communities that the scheme engages in. Further research into other comparable schemes elsewhere in the world would be required.
- The priority household target (PHT) is unlikely to indefinitely be met by offering low-cost, small activities. This is already becoming apparent as the PHT was only met in recent years as a result of a flow through on surpluses from recent years and ActewAGL's previous submission to reduce the target to 10% due to difficulties. The PHT may need to allow for dwellings to be counted multiple times in the case of higher value installations.
- Rapid population growth and urban development mean many inner-city buildings serve multiple uses across their lifespans. May be worth investigating adaptable building designs (like the student accommodation at Weeden Lodge in Belconnen, which was designed to change to become a hotel in future) and how cores and shells could better be designed to accommodate this so resources (emissions) are not wasted on demolition and refurb of otherwise well designed buildings.
- Review of national energy standards, are they up to scratch? They seem to be on the lenient end, which is why there was so much scope for change at the local level.
- Construction savings and lifecycle savings are not linked, this means poorer people are pushed into the houses that are more expensive to live in (more heating and cooling) worsening inequality. Something like a tax (god forbid) or credit system that makes more efficient homes cheaper.
- There is also no tie between the savings of a tenant (from lower power bills) and the landlord, who would need to initiate and pay for upgrades to a property. Or on the flip side, there is no incentive for the tenant to invest in improving someone else's asset, even if it would save them money in the long run. Some sort of co-contribution model may be possible.

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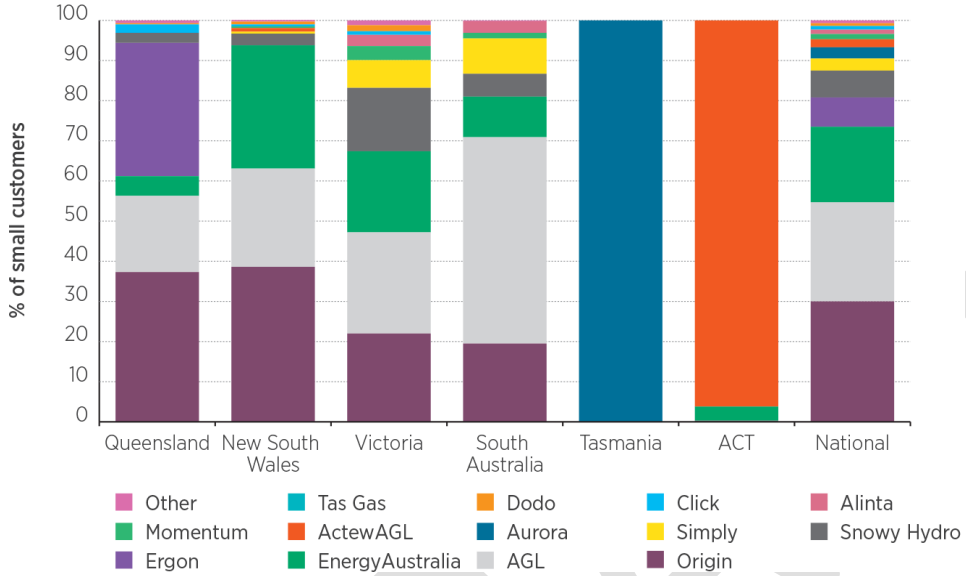
APPENDIX:

1: Eligible Activities

There is irregularity in the use of the word "may" in the Eligible Activities Determination (No 2) from 2016. Contrasting the *Note* under Part 1.1 to the *Note* under Part 1.2 where "may" is removed.

See also, the *ACT Energy Efficiency Improvement Scheme (EEIS) Stakeholder Consultation on 2016 Activities Update*, where, under section 6.4 it outlines that: "ACT qualified electrician required for some lighting upgrades" (p. 31). However, in Part 4.1 "Residential Lighting Activities" of the Eligible Activities Determination, there is no indication of which of the activities of do/do not require this.

2: National Electricity Market retail competition



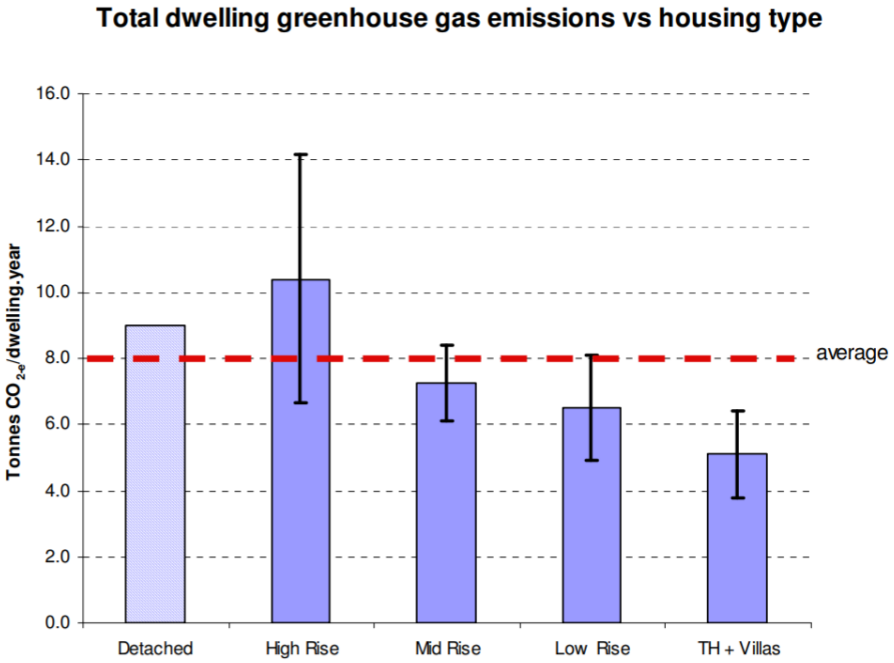
(Department of Industry, Innovation and Science, 2015)

3: Energy efficiency: building code star-ratings

	Star rating	Energy usage	Efficiency benefit	Marginal cost	Benefit cost ratio
Weather sealed	5.6	55.9	2.7	2.5	0.6:1
Double glazing	6.7	41.6	11.7	26.3	0.3:1
External shading	8	24.3	6.9	49.8	0.1:1

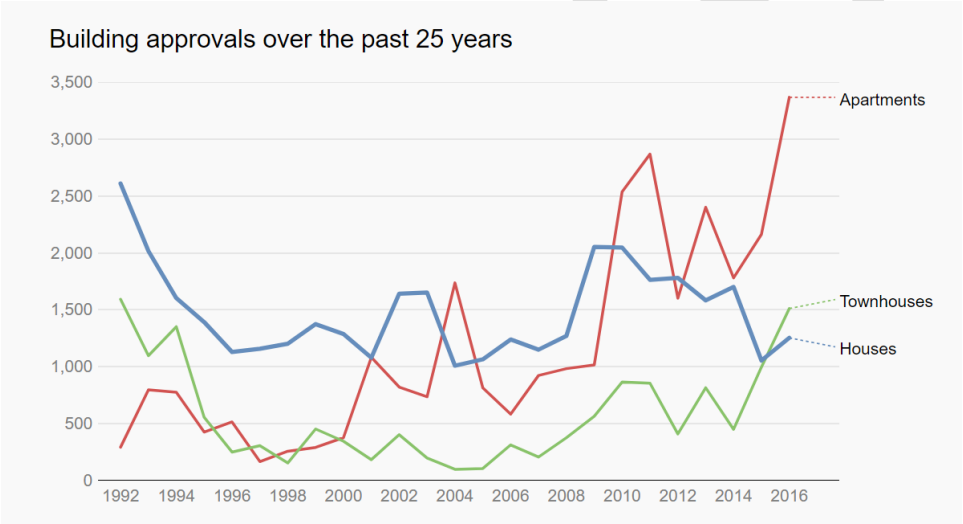
Table: Energy-efficiency: building code star-ratings

4: Dwelling greenhouse emissions vs housing type



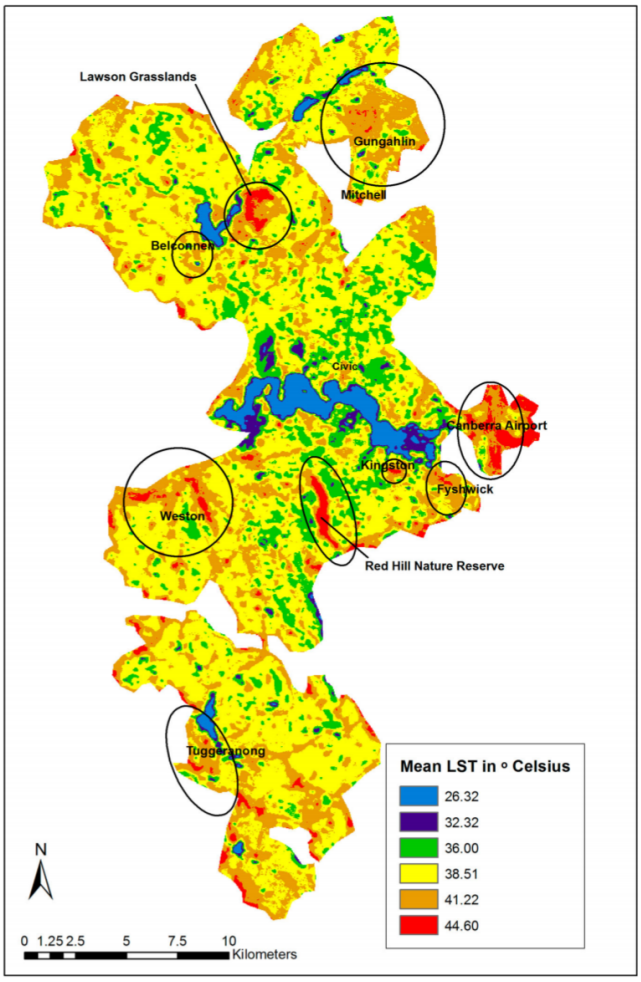
Graph: (Myors, O'Leary and Helstroom, 2005)

5: ACT building approvals over the last 25 years



(Fettes, 2017)

6: Mean land surface temperature in degrees Celsius



(Sirat Mahmuda and Robert Webb, Climate adaptation and urban planning for heat islands: a case study of the Australian Capital Territory, 2016)

FEASIBILITY (20 POINTS)

INDICATORS	CRITERIA	SCORE
LIKELIHOOD THAT THE PROPOSED IDEA WILL BE ACCEPTED BY HOUSEHOLDS (5 POINTS)	HIGH	5
	MODERATE	3
	LOW	1
EASE WITH WHICH PRIORITISED STAKEHOLDERS CAN BE BROUGHT TOGETHER (5 POINTS) EEIS: RETAILERS LANDLORDS GOVERNMENT PRIORITY HOUSEHOLDS CONTRACTORS Other: LAND DEVELOPERS GREEN TECHNOLOGY COMPANIES GOVERNMENT BUILDERS DISADVANTAGED GROUPS	ACCEPTANCE OF 5 STAKEHOLDERS	5
	ACCEPTANCE OF 4 STAKEHOLDERS	4
	ACCEPTANCE OF 3 STAKEHOLDERS	3
	ACCEPTANCE OF 2 STAKEHOLDERS	2
	ACCEPTANCE OF 1 STAKEHOLDER	1
THE EASE IN WHICH WE CAN GET PEOPLE TO CHANGE BEHAVIOUR (6 POINTS)	ALTERNATIVES PROVIDED FOR HOUSEHOLDS: HIGH: SIMILAR TO CURRENT BEHAVIOUR LOW: DIFFERENT FROM CURRENT BEHAVIOUR	3 2 1

	BENEFITS CREATED FOR HOUSEHOLDS:	3
	HIGH: CLEARLY PERCEIVED BENEFIT	2
	LOW: HIDDEN/NO BENEFIT TO RESIDENTS	1
THE EASE IN WHICH THE EXISTING POLICIES AND LEGISLATION COULD BE CHANGED (4 POINTS)	HIGH: SMALL CHANGE FROM CURRENT FORMAT	4
	LOW: LARGE CHANGE FROM CURRENT FORMAT	2
		0
COST (20 POINTS)		
COSTS TO RESIDENTS (10 POINTS)		
COSTS OF EQUIPMENT AND MATERIALS + TRANSPORTATION (FOR EACH EQUIPMENT) (5 POINTS)	LOW	5
	MODERATE	3
	HIGH	1
COST OF INSTALL/CONSTRUCTION COSTS (5 POINTS)	LOW	5
	MODERATE	3
	HIGH	1
COSTS TO THE GOVERNMENT (10 POINTS)		
EXPECTED SUBSIDIES AND GRANTS REQUIRED (10 POINTS)	80% - 100% OF THE INITIAL PRICE	2
	60% - 80% OF THE INITIAL PRICE	4
ESTIMATED AT:	40% - 60% OF THE INITIAL PRICE	6
	20% - 40% OF THE INITIAL PRICE	8

	< 20% OF THE INITIAL PRICE	10
EQUITY (20 POINTS)		
INDIVIDUALS AND FAMILIES (2 POINTS)	USEFUL FOR BOTH FAMILIES AND INDIVIDUALS	2
	USEFUL FOR EITHER FAMILIES OR INDIVIDUALS	1
	USEFUL FOR NEITHER FAMILIES NOR INDIVIDUALS	0
POOR AND RICH (5 POINTS)	AFFORDABLE FOR BOTH POOR AND RICH	5
	AFFORDABLE FOR EITHER POOR OR RICH	2
	AFFORDABLE FOR NEITHER POOR NOR RICH	0
TENANTS AND OWNERS (5 POINTS)	BENEFIT FOR BOTH TENANT AND OWNER	5
	BENEFIT FOR EITHER TENANT OR OWNER	2
	BENEFIT FOR NEITHER TENANT NOR OWNER	0
NEW AND EXISTING (5 POINTS)	SUITABILITY FOR BOTH NEW AND EXISTING BUILDINGS	5
	SUITABILITY FOR EITHER NEW OR EXISTING BUILDINGS	2
	SUITABILITY FOR NEITHER NEW NOR EXISTING BUILDINGS	0
SUITABILITY FOR DIFFERENT DWELLING TYPE (3 POINTS) POINT FOR: DETACHED UNITS APARTMENTS	SUITABLE FOR 3 TYPES OF HOUSING	3
	SUITABLE FOR 2 TYPES OF HOUSING	2
	SUITABLE FOR 1 TYPE OF HOUSING	1
	SUITABLE FOR NONE TYPE OF HOUSING	0

SCORING: ENERGY EFFICIENCY IMPROVEMENT SCHEME (EEIS) AND BUILDING CODE (BC) SUGGESTIONS

	EEIS 1	EEIS 2	EEIS 3	BC 1	BC 2	BC 3	BC 4
FEASIBILITY (20)							
LIKELIHOOD THAT PROPOSED IDEA WILL BE ACCEPTED BY HOUSEHOLDS (5 POINTS)	5	5	5	3	3	3	5
THE EASE IN WHICH PRIORITISED STAKEHOLDERS CAN BE BROUGHT TOGETHER (5 POINTS) EEIS: RETAILERS, LANDLORDS, GOVERNMENT, PRIORITY HOUSEHOLDS/ RESIDENTS, CONTRACTORS/THIRD PARTIES.	5	4	3	3	5	3	3
THE EASE IN WHICH WE CAN GET PEOPLE TO CHANGE BEHAVIOUR (6 POINTS)	5	5	3	5	5	3	3
EASE WITH WHICH EXISTING POLICIES AND LEGISLATION COULD BE CHANGED (4 POINTS)	4	2	0	2	4	2	2
TOTAL SCORE FOR FEASIBILITY	19	17	14	13	17	11	13
COST (20 POINTS)							
COSTS OF EQUIPMENT AND MATERIALS + TRANSPORTATION (FOR EACH EQUIPMENT) (5 POINTS)	5	5	5	3	3	3	1
COST OF INSTALL/CONSTRUCTION COSTS (5 POINTS)	5	5	5	3	5	3	1

EXPECTED SUBSIDIES AND GRANTS REQUIRED (10 POINTS)	8	6	4	6	10	10	10
TOTAL SCORE FOR COST	18	16	14	12	15	16	12
EQUITY (20 POINTS)							
INDIVIDUALS AND FAMILIES (2 POINTS)	2	2	2	2	1	1	1
POOR AND RICH (5 POINTS)	5	2	5	2	5	2	2
TENANTS AND OWNERS (5 POINTS)	5	5	5	5	2	2	5
NEW AND EXISTING (5 POINTS)	5	2	2	5	2	2	2
SUITABILITY FOR DIFFERENT DWELLING TYPE (3 POINTS)	3	3	3	3	1	3	2
TOTAL SCORE FOR EQUALITY	20	14	17	17	11	10	12
TOTAL SCORE	57	47	45	42	43	37	37

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