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Australian Government  
Department of Climate Change,  
Energy, the Environment and Water

Submitted via online form

## ICANZ Submission to the National Energy Performance Strategy (NEPS)

This submission demonstrates the urgent need for a national energy performance strategy and details data from international and Australian programs and research. At the end of each section we have provided an outline of ICANZ recommendations.

### Overview

The 2021 Industry-led roadmap for quality control and insulation installation, states that: *adequate insulation can increase thermal comfort, lower heating and cooling bills, and reduce the prevalence of illness and death. Insulation reduces pollution, greenhouse gas emission and reliance on the electricity grid.*<sup>1</sup>

Insulation is an integral component of a whole of system approach required for a well performing building envelope seal and airtightness, coupled with vapour management and appropriate ventilation. The correct specification and installation of materials is a significant factor in achieving the best result for a thermally efficient building envelope and a healthy home. The inclusion of condensation management coupled with increased star rating in the 2022 National Construction Code (NCC) can be achieved by considering the interaction of all building elements forming the building envelope, and this requires appropriate material selection, installation training and inspections.

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<sup>1</sup> <https://www.eec.org.au/uploads/Projects/Industry-led%20insulation%20roadmap%20final%20web.pdf>

Nationally residential buildings are responsible for around 24% of overall electricity use and 12% of total carbon emissions in Australia. Whilst the commercial building sector is responsible for around 25% of overall electricity use and 10% of total greenhouse gas emissions in Australia. For Australia to achieve the carbon emission reduction targets set federally at 43% by 2030 and zero carbon emissions by 2050 the energy efficiency of buildings has to be a cornerstone feature of the National Energy Performance Strategy.

Insulation has been required in residential construction nationally under the building codes since 2003, although Victoria introduced basic insulation regulations in 1991, followed by the ACT in 1994. Therefore, homes built prior to regulation of insulation will have a poorly performing building envelope, which highlights the significant opportunity to raise the performance of poorly or uninsulated homes to progress towards the decarbonisation of existing housing stock.

The CSIRO has undertaken research to evaluate the air-tightness of new Australian residential buildings found large ranges of air-tightness from best practice to substandard performance against NatHERS ratings. The research found that whilst there was not a single factor that contributed to these results the quality of workmanship resulted in poor sealing and insulation installation of the home, whilst in contrast there were examples of well performing homes and good workmanship. Therefore, training and certification of trades in the building industry will need to play a key role in improving the thermal performance of homes.<sup>2</sup>

A 2018 report by the Australian Sustainability Built Environment Council (ASBEC) and Climate Works Australia *Built to Perform Zero Carbon Ready Building Code* estimated that 1.1 million homes and 42 million square metres of non-residential floor space are expected to be built between 2022 and 2025. These buildings will remain standing for decades to come, and without expensive retrofits, they will be using more energy than they should. Just three years' delay in the implementation of the energy efficiency targets recommended in this report could lock in, between now and 2030, \$2 billion in residential energy bills, \$620 million in non-residential energy bills and \$720 million of additional network investments. However, it is

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<sup>2</sup> International High- Performance Built Environment Conference – A Sustainable Built Environment Conference 2016 Series (SBE16), iHBE 2016 Air tightness of new Australian residential buildings Michael Ambrose\*, Mike Syme

anticipated that in light of the most recent NCC 2022 regulatory changes these figures should deliver a better result. <sup>3</sup>

## ENERGY GOVERNANCE

### ***How can demand considerations be better integrated into Australian energy governance and what are the priorities for change?***

To deliver the projected thermal performance of new homes requires a coordinated performance framework that spans State, Territory and Local Governments. It is essential that the statutory level of performance, where the design is certified, be correlated against the as-built outcome. This level of thermal efficiency auditing is absent in the regulatory framework and has resulted in the housing envelopes of new homes underperforming, which can lead to more energy consumption by occupants. There are numerous factors, which can contribute to homes underperforming, these include:

- absence of a formalised national certification scheme for testing thermal performance of existing homes to ensure accountability and quality control;
- lack of skills or requirements for private and municipal building inspectors;
- potential for conflict of interest of building surveyors, which could be addressed by the builder paying into a fund and independent allocation of surveyors to projects;
- lack of understanding in trade skills on the cumulative impact of failing to comply with the building requirements;
- limited inspection stages that exclude building envelope performance and lack of clear accountability;
- lack of understanding in the licensed areas of inspection and design on their role in the home's performance; and
- absence of consumer knowledge of the thermal building fabric of their home and the impact this has on their ongoing energy costs, comfort and health.

Trade training in the area of insulation installation is important in any delivery models that serve to improve the thermal efficiency of the buildings and build consumer confidence. Currently the installation of insulation is not required to be certified in the new build or renovation market. The insulation material can only go so far in providing a good thermal barrier, where the training and certification of installers can help to ensure the insulation is installed as per the manufacturer's instructions to achieve the best thermal outcome.

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<sup>3</sup> <https://www.asbec.asn.au/wordpress/wp-content/uploads/2018/10/180703-ASBEC-CWA-Built-to-Perform-Zero-Carbon-Ready-Building-Code-web.pdf>

There are some different skills required in new building and deep retrofit programs that if not developed by workers, have the potential to negatively influence the energy efficiency of the building, and training will need to reflect these differences. ICANZ has developed online installer training modules for the new build and retrofit market and participated in the National Energy Efficiency Building Project (NEEBP) developing online training for maintaining the thermal performance of buildings. ICANZ also works with the Energy Efficiency Council (EEC) through the Affiliated Insulation Industry Coalition (AIIC) to develop a certified insulation program, which should be used in future industry training.

### Certified insulation program resources and certificate



***What new or modified coordination mechanisms or institutional responsibilities would be appropriate to better drive energy performance action in the future?***

The formation of a new body that has the full power and responsibility to implement the NEPS will help to deliver a coordinated national approach that includes insulation as a key element in the building envelope. The Australian Building Codes Board (ABCB) will be instrumental in driving improved energy efficiency in new and renovated buildings and the installation requirements of products and systems across each state and territory.

The Nationwide House Energy Rating Scheme (NatHERS) could be expanded to capture and assess measures undertaken in the assessment of as built thermal performance and the deep retrofit of homes, which generally includes: sealing of the home, installation of insulation, high performing glazing, energy efficient lighting, and efficient heating/cooling and hot water systems, whilst managing air-tightness and condensation. Buildings involved in deep retrofit programs could be issued with a digital certificate upon completion and then made available to a Residential Energy Efficiency Disclosure Initiative. There should also be scope to broaden the existing NatHERS database of assessment data and use it for comparisons with actual data and engagement with occupants

The European program [EnerPHit Retrofit Plan](#) draws on the lessons of demonstration projects implementing deep energy retrofits in a step-by step manner across 11 EU Member States. An Energy Efficiency program initiated through NEPS would benefit from developing Case Studies across building types in the early phase of a program rollout to record findings and communicate learnings. Long-term and well-resourced education and awareness campaigns should be developed to explain what the star ratings of buildings means, and what it can deliver to the occupant, and this would be further supported in mandatory disclosure programs.

Any incentive programs are suggested to be introduced in a staged rollout to ensure industry can match demand, whilst maintaining quality and compliance and managing workforce and material shortages. Targeting to high consumers and vulnerable households first, captures important segments and likely more cost-effective opportunities. For higher income households, long term flexible loans may work, while grants will be needed for others.

The Sunderland et. al report *Filling the Policy Gap: Minimum energy performance of European buildings*<sup>4</sup> reported that whilst introducing energy efficiency measures is recognised as having positive impacts on economic and social development by reducing energy demand and greenhouse emissions, there are additional benefits. These additional benefits should also be incorporated into policy cost-benefit analysis and promoted more widely to consumers and include:

- Overall energy savings

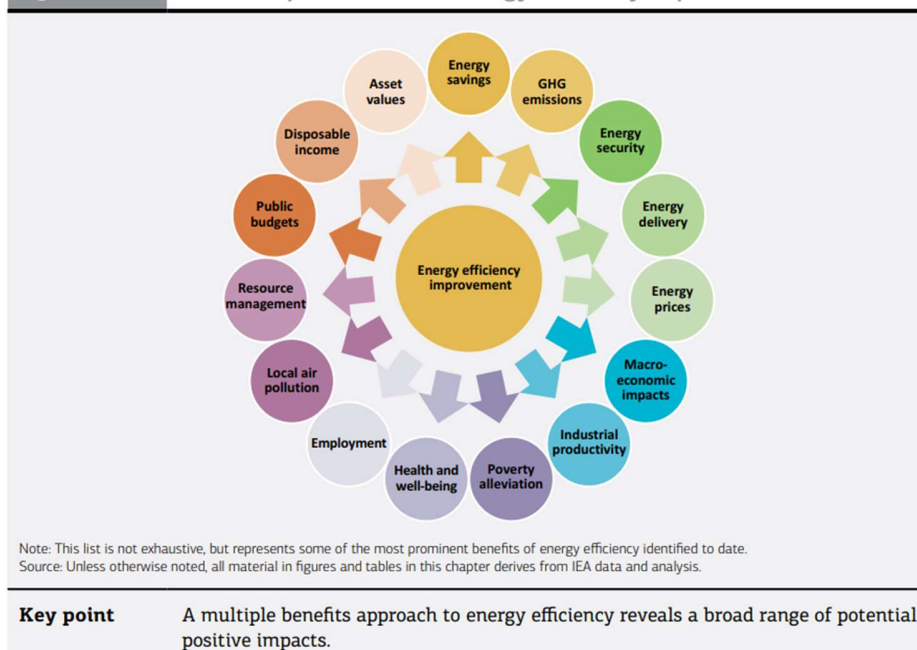
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<sup>4</sup> <https://www.raonline.org/wp-content/uploads/2020/06/rap-sunderland-santini-mini6mum-energy-performance-standards-june-2020-final.pdf>

- Improved energy security and resilience to energy supply interruptions
- More efficient energy delivery
- Energy pricing that reflects contribution of renewable energy
- Improved industrial productivity when unused energy is diverted to industry
- Reduction in household poverty
- Improved health and well-being of society
- Increased employment opportunities across manufacturing and trades
- Improvement of local air quality
- Increased disposable income
- Improved building asset value
- Improved education and satisfaction of trade workforce
- Improved bill payments to energy providers

The recognition of multiple benefits, whilst undertaking energy efficiency improvements has also been reported by the International Energy Agency as shown in Fig ES.2 p.20 in *IEA report on Capturing the Multiple Benefits of Energy Efficiency 2014*<sup>5</sup>

Figure ES.2 The multiple benefits of energy efficiency improvements



<sup>5</sup> [https://iea.blob.core.windows.net/assets/28f84ed8-4101-4e95-ae51-9536b6436f14/Multiple\\_Benefits\\_of\\_Energy\\_Efficiency-148x199.pdf](https://iea.blob.core.windows.net/assets/28f84ed8-4101-4e95-ae51-9536b6436f14/Multiple_Benefits_of_Energy_Efficiency-148x199.pdf)

The Green Building Council of Australia state that developing and retrofitting commercial buildings to achieve Green Star certification could result in:

- Lower operating costs and increase asset value
- Use 66% less electricity than average Australian buildings
- Use 51% less potable water than the average Australian building built to meet minimum industry requirements
- Boost productivity due to better indoor environments
- Produce 55% fewer greenhouse gas emissions than average Australian buildings
- Improve the health and wellbeing of occupants
- Increase student learning and engagement
- Speed up recovery times of hospital patients
- Reduce risk and 'future proof' investments
- Deliver a competitive edge in a crowded marketplace

Further consideration of these benefits will determine their contribution in capacity building programs that will be required to bring society along with a focus on national energy efficiency targets.

The NEEBP undertook a deep dive workshop and survey of the PHASE 3 part of the project in 2017<sup>6</sup>. This work reported on the list of actions that will provide the best opportunity to support a regulatory system to improve energy efficiency compliance in Class 1 housing in Australia.

1. Mandate that energy efficiency rating documentation is a part of all building designs and plans, prior to building approval.
2. Regulate to ensure that there is an energy efficiency compliance sign off prior to handover and occupancy.
3. Regulate for mandatory and appropriate energy efficiency knowledge and skill training across all professions and trades involved in the building process.
4. Develop a national product verification system to ensure EE of products supplied to builders meet Australian or appropriate standards and that those products are installed correctly.
5. Develop a national audit/inspection system that can be applied across all states, territories and climate zones.
6. Increase consumer awareness of the value of energy efficiency compliance in reducing heating and cooling loads, improving comfort and quality of life and reducing power bills.

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<sup>6</sup> [https://www.energymining.sa.gov.au/\\_\\_data/assets/pdf\\_file/0007/659455/NEEBP-Regulator-Compliance-Needs-Report.pdf](https://www.energymining.sa.gov.au/__data/assets/pdf_file/0007/659455/NEEBP-Regulator-Compliance-Needs-Report.pdf)

To better integrate Energy Governance ICANZ recommends:

- *Include all the recommendations of the NEEBP deep diver project identified earlier.*
- *Form a dedicated national agency for the collation of energy demand data and program deliverables and communication with State and Territory Governments.*
- *Establish the Energy and Climate Change Ministerial Council, which could oversee the initiatives outlined in the final NEPS. But a conscious allocation of appropriate resources and leadership for demand side action will be necessary. At high level 'Energy Efficiency first' principle as done by EU.*
- *Expand the Nationwide House Energy Rating Scheme (NatHERS) to deep retrofit initiatives of homes that include: insulation in ceilings, walls and floors; sealing for air leakage; high performance double glazing; efficient heating, cooling, ventilation and hot water systems; and photovoltaic panels.*
- *Introduce regulatory pathway that enables thermal assessment of new homes as built and confirms thermal performance is achieved.*
- *Require training, certification and auditing of insulation installers for all government funded projects to ensure the product can perform at the intended manufacturing level. Extend this requirement to trades involved with the building fitout that can affect insulation efficiency.*
- *Request energy retailers to provide energy data on energy bills presented in a manner that enables comparison of actual bills against baseline data. This information will serve to monitor energy performance and provide timely feedback to users. This information should be coupled with tips on energy savings and access to energy saving incentives.*
- *Support the creation of content that addresses knowledge gaps for builders, designers, building inspectors, and the real estate industry regarding the benefits of thermal efficiency.*

## TARGETS

### ***Would an energy efficiency target or targets be suitable for Australia?***

Australia needs an energy efficiency target that drives decarbonisation, supports new governance structures and drives community action. Regular reporting and assessment of performance against targets will identify the need for adjustments where performance is not on track. Setting long term and mid-term targets are an important strategy to demonstrate to Australians that we are collectively working towards meeting our international decarbonisation commitments. National collaboration and agreement to the setting of targets should be

established across national, state and territory governments to maximise participation and benefits. In addition, working with local government associations will help to communicate the targets at a local level, to ensure that local government and their constituents understand how they can contribute to energy efficiency. Promotion of local and regional targets will also help to drive local action.

Discussions on the setting of targets should be undertaken with CSIRO to include NatHERS modelling for hourly temperatures in each room/zone over a hot and cold week, which can provide valuable insights during the building design process.

Any Government policy and programs requiring consumer action will need simple, and repetitive communication clearly demonstrating the benefits of taking action and the losses of not taking action. Australians are familiar with environmental targets as in the case of water conservation. As an example, the Target 155 campaign by Melbourne Water encourages households to conserve water by targeting consumption to be no more than 155 litres per household member. As usage per person increased above average so did the cost per litre of water increase.

Whilst an energy rating is often an add-on task in new builds it needs to be integrated into the design process so that consumers become familiar with how design and materials influence the star system for houses. Estimation of peak heating and cooling demands would also help sizing of HVAC equipment to limit costs. Visible labels/plaques like NABERS and a significant budget to educate home buyers and renters is essential. The NABERS framework could be expanded to capture all building types and occupier data that goes beyond common areas/shared services of apartments. Requiring multi residential buildings to have separate energy meters will serve to inform occupants of their energy use along with building benchmarks and energy savings tips.

Target setting should also review energy patterns based on annual use, seasonal use and periods of peak demand. The information gained from this review would help to ensure that targets reflect patterns of behaviour and overcome any masking from renewable energy generation offsetting seasonal periods.

***What is the most appropriate methodology for designing and implementing a target that effectively drives demand side action towards Australia's overall net zero target?***

Buildings provide some of the lowest cost options to meet zero carbon targets and we need to develop a national framework for the residential rating systems. ASBEC's policy platform for National Framework for Residential Ratings <sup>7</sup>states:

- Set **minimum regulatory performance standards** in new buildings for each of building energy, thermal comfort, water and other sustainability issues
- Provide **benchmarks** for market comparison of best practice sustainability performance; and
- Deliver **communication** messages explaining the value of sustainability features to renovators and homebuyers, including at point of sale and lease.

To support and communicate energy efficiency targets in housing, the community should be shown exemplar projects for new homes and the renovation market. Case studies on a home's energy performance coupled with the simple messaging on measures included will serve to maximise benefits. For instance achieving significant energy savings with a small household investment could be realised by increasing levels of insulation in existing homes. Such a measure will provide a substantial step change in the occupant's need for heating and cooling to reduce energy demand and increase occupier comfort.

There is also an increasingly strong case to report embodied emissions and phase in a nationally consistent standards for the reporting of embodied energy. However, this process needs to be coupled with operating energy use, ongoing maintenance, product durability and recyclability.

### ***How should progress towards an energy efficiency target be measured?***

The United Nations Environment Program *2022 Global Status Report for Buildings and Construction*<sup>8</sup> states that in 2021, the buildings and construction sector accounted for around 37% of energy and over 34% of energy demand globally. Furthermore, these figures indicate that we are not on track to achieve decarbonisation by 2050. It recommends that Political and organizational leadership must prioritize actions that support the decarbonization and sustainability transition of the built environment. Hence the decarbonisation of the Australian economy has to include focusing on the energy efficiency of existing buildings as well as increased energy efficiency of new buildings. Deep renovation using streamlined products and service delivery approaches will be vital. Several indicators should be applied to reflect key aspects of performance. For buildings, a simple rating tool should be developed and applied, with real time tracking of performance against targets and contingency strategies to be automatically introduced if progress falls short of targets.

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<sup>7</sup> <https://www.asbec.asn.au/wordpress/wp-content/uploads/2016/01/160119-ASBEC-National-Framework-for-Residential-Ratings-Policy-Platform.pdf>

<sup>8</sup> <https://www.unep.org/resources/publication/2022-global-status-report-buildings-and-construction>

Governments must seek a nationally consistent framework to assess the sustainability of residential and commercial buildings, set minimum standards, benchmark building performance, and communicate value to occupiers. The NABERS rating framework could be expanded to offer a nationally accepted measurement tool for all buildings to record and report on progress towards energy efficiency.

Reducing residential and commercial energy demand will provide a direct response to the grid power network with less demand occurring along the supply network, opening up opportunities for other electricity users. We should refer to the winter and summer peak demand as important indicators, as these drive demand for energy at times when variable renewable energy may be scarce or expensive. We need to focus on building fabric before investment in HVAC, as improved building fabric can significantly reduce cost, capacity and space required for HVAC equipment and infrastructure.

The creation of an appropriately funded national reporting system that presents the information in an accountable, useful and transferrable manner, will be required to communicate our progress towards the targets.

*To develop target to meet Australia's decarbonisation, ICANZ recommends:*

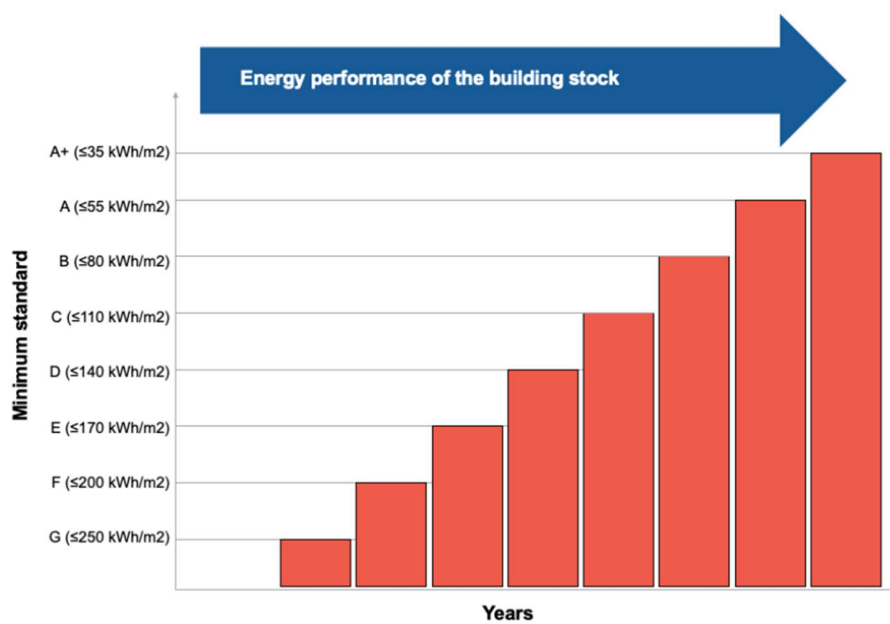
- *Work with CSIRO on the development of target setting parameters for thermal building performance.*
- *Support the expansion of NatHERS and NABERS frameworks for modelling real time data for increased consumer knowledge and target reporting.*
- *Include insulation, building seal and vapour management products by integrating trade skills as key measures in deep retrofit programs and record and verify the projected thermal performance of the building.*
- *Provide consistent and clear messaging to inform consumers on progress towards meeting the target.*

## RESIDENTIAL – GENERAL

The demand for more energy efficient housing has been growing over the last two decades, since the setting of thermal performance star ratings of new homes in 2006. However, existing buildings represent a far greater proportion of Australia's building stock that are not covered by the National Construction Code. Any significant action to improve energy efficiency in this sector will require the strong assistance of Government programs, as has been demonstrated in other countries. The *Filling the policy gap: Minimum energy performance standards for*

*European buildings 202* by Sunderlands *et.al*<sup>9</sup> report on the minimum energy performance that has been regulated across European and Great Britain, the United States, Australia and New Zealand. The MEPS requires buildings to reach a certain performance, expressed as an energy performance certificate (EPC) class or as energy consumption per square metre. The level of required performance rises over time, bringing the building stock to the best class by 2050. Figure 1 of the report illustrates the incremental increase of MEPS based on classes by 2050 and Table 1 shows the current status of MEPS on the reported regions.

**Figure 1. Illustration of an incrementally increasing minimum energy performance standard, based on energy performance certificate class**



<sup>9</sup> <https://www.raponline.org/wp-content/uploads/2020/06/rap-sunderland-santini-mini6mum-energy-performance-standards-june-2020-final.pdf>

**Table 1. Regulated minimum energy performance standards in European Member States and Great Britain**

Where	Introduced	Enforced	Building stock sector, tenure, building type	Metric	Minimum standard
<b>England and Wales</b>	2011 (Legislation) 2016 (Regulation)	2018, 2019, 2020	Privately rented buildings (domestic and nondomestic)	EPC	EPC E
<b>Scotland</b>	2011 (Legislation) 2020 (Regulation)	2020, 2022, 2025	Domestic privately rented buildings	EPC	EPC E, 2020 and 2022 D, 2022 and 2025
<b>The Netherlands</b>	2018	2023	Office buildings	EPC	EPC C
<b>France</b>	2019	2028	Private residential	EPC	EPC E
<b>France</b>	2019	2030, 2040, 2050	Large commercial buildings	Energy consumption /performance	40% in 2030, 50% in 2040, 60% in 2050
<b>Flanders, Belgium</b>	2015	2020	All homes, but only enforced for privately rented homes	Technical measures	Minimum roof insulation
<b>Flanders, Belgium</b>	2019	2023	All homes, but only enforced for privately rented homes	Technical measures	Double glazing
<b>Brussels-Capital, Belgium</b>	2019 (Announced) 2021 (Regulation expected)	2030, five yearly to 2050	All domestic and nondomestic buildings	Technical measures	Measures specified by EPC

The setting of higher energy performance standards for all Australian homes was the main focus of the 2018 Housing Summit hosted by Energy Consumers Australia. The summit was attended by energy consumer groups, industry and government who called for:

1. Improved energy performance standards for new homes and major renovations.
2. Improved energy performance standards for existing homes, including fixed appliances.
3. Targeted measures to overcome the barriers to improved energy performance in low-income households.

These actions were outlined in the ASBEC and ClimateWorks Australia 2018 report *Built to Perform – an industry led pathway to a zero ready building code*<sup>10</sup>, which stated that improving the energy performance standard of our homes is an opportunity to benefit people and the community through:

- lower energy bills – improvements in energy efficiency requirements of the National Construction Code could reduce average energy costs by up to \$900 per household annually improved health and well-being - reduce social isolation, illness, stress, and

<sup>10</sup> <https://www.asbec.asn.au/wordpress/wp-content/uploads/2018/10/180703-ASBEC-CWA-Built-to-Perform-Zero-Carbon-Ready-Building-Code-web.pdf>

mortality rates, resulting in economic and social benefits including lower spending on health care and services;

- improved resilience of the electricity system – reduced burden on the electricity grid, reducing the need for network investment for peak demand, and resulting in lower prices for all, and
- reduced emissions – actions to reduce emissions from the building sector could deliver 28 per cent of Australia’s 2030 emissions reduction target, reducing the economic, environmental and health risks of climate change people face.”

### ***What are the key opportunities to improve the energy performance of new and existing residential buildings?***

Government programs requiring energy efficiency improvements will drive innovation when coupled with capacity building programs, incentives and regulatory reform. Presenting the improvement in liveability as well as the benefit/cost rewards to consumers through case studies, bill comparisons and energy efficiency tips will encourage them to participate in collective social and community benefits as well receiving significant household financial and health benefits.

The creation of a national mandatory disclosure framework, where properties are sold or leased can record real efficiency against similar homes and buildings and potentially increase property values as experienced in the ACT mandatory disclosure program. The ACT program showed that buildings with higher energy rating were able to achieve higher property sales values. Also benefits for the occupiers will include reduced energy bills and medical bills and improved health. For existing homes, there is a need to extend present home energy assessment models to relate to actual energy bills and building resilience (eg at times of energy supply outages) to make energy issues more tangible.

The auditing of retrofitted homes will confirm the home’s energy performance and will help to identify inconsistencies between the construction of new homes and the renovation market. For example new homes require the installation of self-closing exhaust fans, yet standard exhaust fans are sold freely in large hardware chains for the DIY and the renovation market. This practice results in heat escaping in cooler months and heat entry in warmer months.

The emerging transition away from residential gas use provides an opportunity, indeed a necessity, to improve the thermal performance of housing, especially at times when heating/cooling loads are high and variable renewables may be limited, such as during winter. Alan Pears’ article “*South Australia may lead world in wind and solar, but leaky buildings will cause problems*” published in Renew of 16<sup>th</sup> January 2023<sup>11</sup> discusses the OpenNEM weekly

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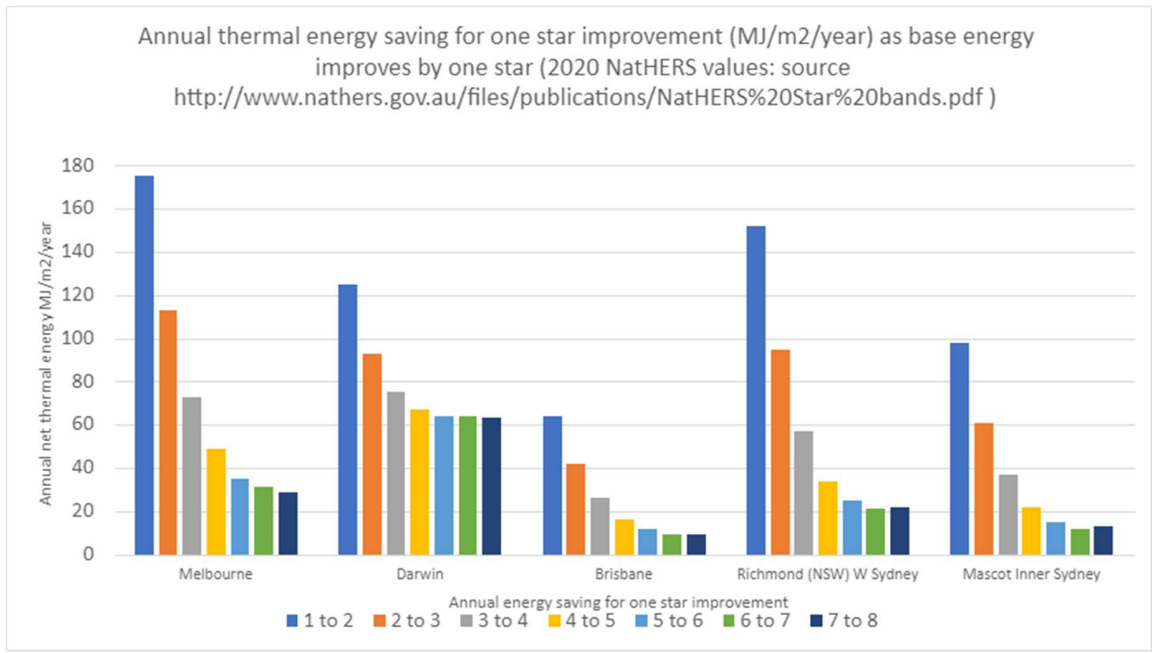
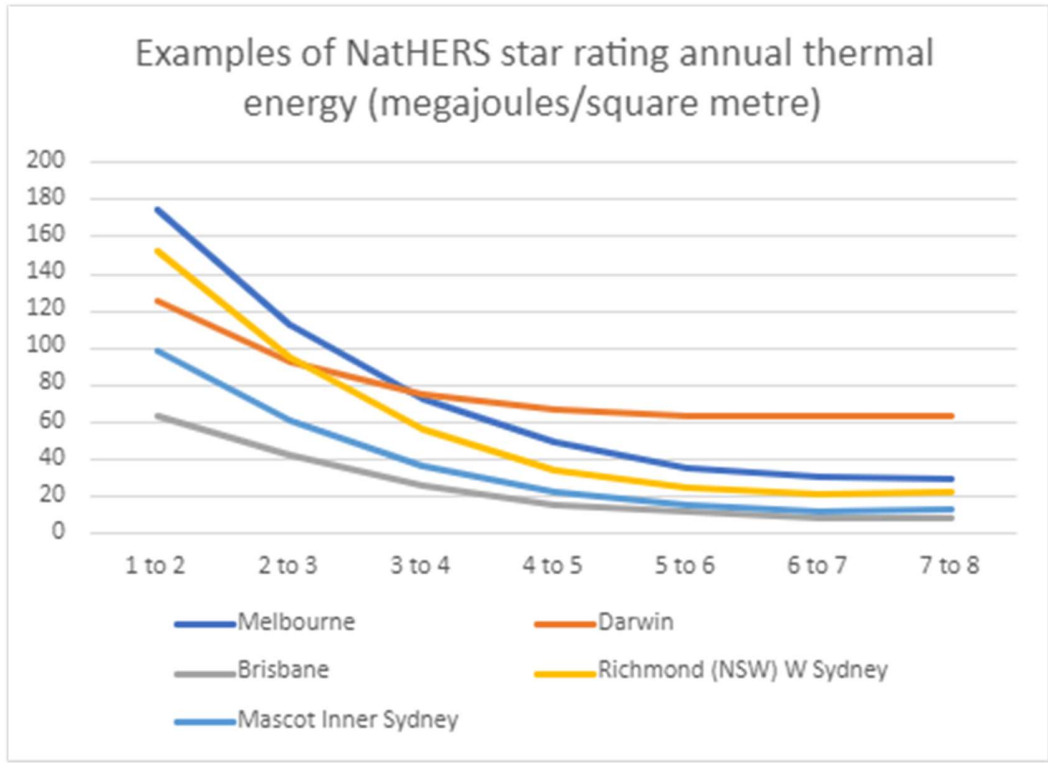
<sup>11</sup> <https://reneweconomy.com.au/south-australia-may-lead-world-in-wind-and-solar-but-leaky-buildings-will-cause-problems/>

data, which shows that high weekly wholesale electricity prices are sustained through winter when solar output is low and non-solar generation peaks are lower.

Continuing to increase the star rating of the building fabric and energy efficient services of new residential buildings will help to ensure that the generation of future residential buildings will be energy efficient and comfortable for decades to come. NatHERS modelling, which has the capability in providing separate summer and winter ratings and hourly performance room, should be taught to building designers to design for greater energy efficiency. This will require training, certification and incentives for building designers to focus more on using these features. To drive higher ratings we need financial incentives for voluntary shift to reduce the cost of improvement measures, which will incorporate the value of multiple benefits, and we need to use lower discount rates of 2-3% in cost-benefit analysis for regulatory change.

A significant opportunity exists to improve higher compliance and projected thermal performance of new and existing housing stock by requiring certification and auditing of insulation installers, to create an efficient building envelope across ceilings, walls and floors. Training and auditing should be extended trades affecting the building envelope with their trade such as plumbers and electricians, and HVAC installers and guaranteeing their work has not compromised the home's thermal performance. The use of Australian Standard compliant and fit for purpose products need to be part of all trade training programs.

An energy efficiency retrofit program should focus on homes built before the entry of energy efficiency regulations in 2006. This focus will upgrade low star-rated homes, which will deliver much greater energy savings. For example the graphs below produced by Alan Pears extracted from NatHERS star bands shows retrofitting a 2-star home to 3 stars saves over 3 times as much energy as improving from 6-7 stars. This means a focus on upgrading low star-rated homes delivers the biggest benefits.



We should explore affordable and proven technologies that reduce energy demand management such as insulation in the building fabric, and couple works with envelope sealing,

high performing glazing, energy efficiency lighting, energy efficient heating/cooling and hot water systems. Together these can drive increased household comfort levels, reduced energy demand, reduced health costs, expansion of the manufacturing industry and additional workforce. We should also be embracing new technology and innovative systems and materials that can demonstrate significant step change for energy efficiency. As new technology is manufactured, and processes become more efficient than it is anticipated that material pricing would reduce accordingly. Where the use of new technology occurs then funding will be required for appropriate trade training to include such technology and materials, and possibly to help fund certifications for fire resistance and other criteria.

The Governments will need to develop financial incentives that work towards electrification of established and new housing for the homeowner to access and realise the benefits of transitioning to energy efficient energy housing. Incentives should also be coupled with messaging in culturally diverse ways.

Streamlined delivery of deep retrofit programs to focus on neighborhoods to reduce travel time of tradespersons and provide easy access to trades for small tasks that are often needed in retrofitting. This can involve local councils and community groups and high energy users.

Professionals and trades involved in the designing, building and selling of homes should have access to consistent messaging and information on the benefits of a home's thermal performance. Purchasers of new and existing homes could be provided with estimates of their likely energy bills, which assume clearly stated appliances and occupancy scenarios over an estimated 10 year period, which aligns with appliance replacement and mobility of households.

***What opportunities are there to improve or streamline existing policies aimed at empowering consumers to undertake energy performance improvements in their homes?***

The energy efficient targets and decarbonisation goals announced by federal and state governments represent a significant escalation on commitments and more immediate action is needed to meet these commitments. The formation of the *National Framework for Disclosure of Residential Energy Efficiency Information* established to nationally harmonize settings for schemes by state and territory governments is a significant step towards reporting on energy efficiency levels of housing stock to be sold or leased. Information of this type is important to prospective house purchasers in the ACT to make informed decisions that can affect their daily expenditure. The implementation of mandatory disclosure of residential energy efficiency programs by all States and Territories would help to ensure that all home purchasers and renters have access to the same valuable information.

We suggest the Federal Government work with state and territory governments to harmonize existing white certificate schemes and promote the expansion of the schemes to all States and Territories or explore the creation of an Australian Government Energy Saving Initiative. This

will result in greater equity across Australian consumers and using the collected data for national reporting on energy efficiencies realised. Greater economies of scale for delivery should also be achieved.

***What are key financial and non-financial barriers to the uptake of energy performance improvement opportunities? How can these barriers be overcome?***

Households are currently challenged with the rising price of living, increased mortgage rates and stagnant wages and therefore are less inclined to make decisions and take actions that require some capital costs. While many low-income households will require grants, better-off households often also have limited disposable income due to higher commitments, so they need access to support. However, they may be able to repay part or all of a loan over time. It is important that the repayment rate is flexible, to adjust to possible changes in circumstances, whilst fixed repayments may discourage adoption.

The cost to upgrade the building fabric of the home with insulation in the ceiling and walls and appropriate shading would deliver a more thermally comfortable home, improve health of occupants, reduce the heating and cooling demand of the home and in turn the associated energy bills. Deep retrofit programs need to be supported by communication strategies that outline the differences between energy reduction and energy costs, which are subject to price increases over time and may mask energy savings. For example, a 10% reduction in energy consumption would be masked by an annual increase in energy prices of 10%. The consumer is unlikely to realise what their bill would have been without the energy improvement. Not understanding these differences may result in delays in consumers taking action. Incentives to help fund energy efficiency measures by households will effectively reduce the number of carbon offsets government may need to buy to meet international commitments – saving government money. Health benefits also reduce pressure on health care services and associated public costs.

The *CSIRO Liveability initiative* details 17 Features that offer the potential for reduced running costs and increased comfort if used correctly by the occupant. They were developed in collaboration with the real estate, design, construction and assessment industries. Consider the engagement of this initiative with the education providers and professional associations involved in building design, architecture, real estate and facilities management.

***How can demand management and electrification support lower energy bills and emissions?***

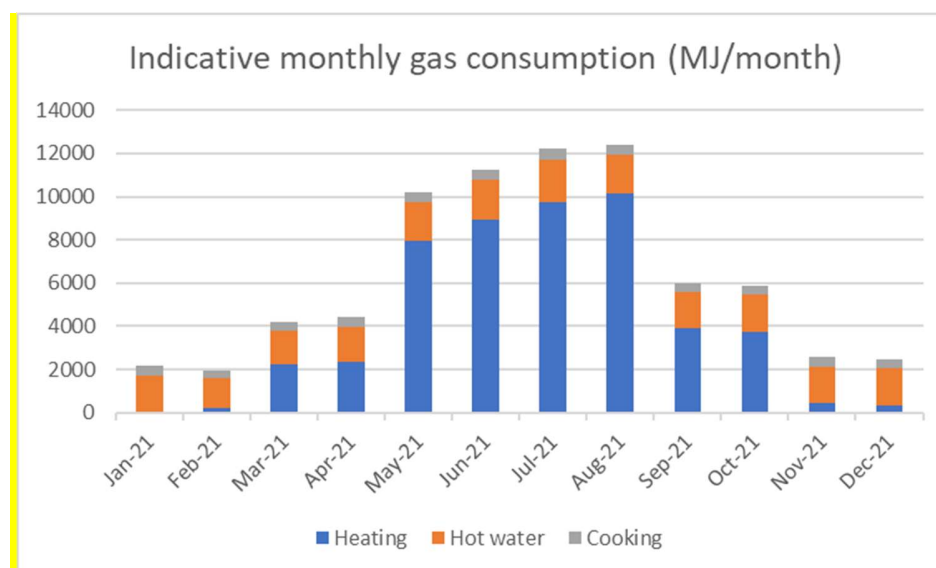
A successful energy efficiency program will lower the daily energy usage and reduce peak demand in periods of extreme heat and cold, including when variable renewable energy sources may be limited. This in turn will free up energy for other uses without triggering peak demand generation. Any reduction in energy usage generated by fossil fuel will reduce carbon

emissions. The scale of carbon emission reductions depends on the relative carbon intensities of the energy sources, which is shifting in favour of the electric option. The combination of a thermally superior building and flexible electric technologies increases the potential to shift electricity use away from critical or expensive periods.

Demand management can be delivered in many ways and a key method to reduce the energy demand is by improving the thermal efficiency of the building fabric of a home and use of efficient appliances. Installing materials that provide a good thermal barrier is paramount to this, with the insulation of roofs, ceilings, walls and subfloors providing significant benefits.

The installation of an energy use digital reader for internal use to display real time energy use and linked to retailer costs can help households to monitor and manage their energy use. Providing information on a comparison of electricity use with historical gas consumption in user-friendly ways to reinforce recognition of benefits. Even past quarterly gas bills can be used to roughly estimate gas use and cost for heating for comparison with electricity data after fuel switching.

The following graph presents an assessment of a Melbourne household's actual data on gas consumption for a household in Croydon undertaken by Alan Pears and presented to the Eltham Living & Learning Centre in Feb-March 2022. The results demonstrate that the highest proportion of gas use in the home was for heating over the cooler months.



The expansion and support of personal use electric vehicles and home-based charging stations can help to reduce the grid energy demand, whereby the battery storage of the EV could assist in times of peak demand in the evening and morning periods.

Transitioning to hot water heat pumps, or solar evacuated tube, efficient appliances and lighting, heat pump clothes dryers and air conditioners will move towards more efficient use of energy in the home.

*To improve the thermal performance of housing, ICANZ recommends:*

- *Accept the recommendations outlined in the Built to Perform An Industry led pathway to a zero carbon ready building code:*

*Commit to a Zero Carbon Ready Building Code*

*Delivery a step change in 2022 – in progress*

*Expand the scope of the Code and progress complementary measures*

- *Support affordable and proven technologies that reduce energy demand management such as insulation in the building fabric as part of deep retrofit program.*
- *Streamline delivery of retrofit programs by neighbourhood to reduce travel time of tradesperson.*
- *Support the formation of a national mandatory disclosure framework, to report on the thermal performance of properties sold or leased.*
- *Provide financial incentives to low and high income (high energy use) households to implement measures from a suite of energy performance measures outline in a deep retrofit program.*
- *Develop capacity building programs for communities that demonstrate the financial and health benefits of energy efficient buildings through case studies and neighbourhood roll out programs.*
- *Treasury to use lower discount rates of 2-3% in cost benefit analysis for regulatory change.*
- *Provide professionals and trades involved in the designing, building, and selling of homes with consistent messaging and information on the benefits of a building's thermal performance.*
- *Federal Government work with State and Territory Governments to harmonise existing white certificate schemes and explore the creation of an Australian Government Energy Saving Initiative.*

## RESIDENTIAL – LOW INCOME HOUSEHOLDS

We recognise that these areas will be aptly addressed by organisations working with low-income households.

We would however suggest that multi-lingual information packs about energy conservation tips, interpretation of energy bills, and real time monitoring devices should be part of packages

offered to low-income households and these could be delivered through local councils and community groups

## RESIDENTIAL – APARTMENTS

### ***How can governments support better energy performance in apartments and similar dwellings?***

The construction of Class 2 multi-residential buildings provides an opportunity for higher energy performance in the building fabric than low rise dwellings, therefore with this in mind the Class 2 buildings could have an increased energy rating delivered through the NCC for greater thermal rating.

With energy efficient apartments in mind we should include: a greater need to manage summer performance to manage 'solar oven' issues; shading and insulation of exposed walls (possibly on inside of external walls for existing apartments); and to ensure safe exits and refuge spaces if power supply fails. Central heating/hot water/cooling systems can be inefficient and expensive for users, which may result in a disconnection between occupants and energy use. Where central systems are being installed, highly efficient systems should be selected.

## RESIDENTIAL - Regional, Remote and First Nations

Whilst we recognise that these areas will be aptly addressed by organisations working with remote and first nations peoples, we refer to the Bushlight program in central Australia, which found that renewable energy/high efficiency stand-alone packages offered social benefits. For example, it meant the young men went to the town to get diesel fuel less often, so were less exposed to alcohol and other social issues. Not running a generator meant it was quiet, so the community could engage with nature. Most remote community energy supply is heavily subsidised at present, and provides limited services, so governments can reduce subsidies and health issues can be better managed with more reliable refrigeration and communications and improved comfort.

In addition, remote, regional and first nations communities demonstrate similar characteristics with:

- Lack of trade workforce to undertake required work
- Lack of training facilities to appropriately train product installers
- Demand for workers is competitive across multiple industries
- Language and cultural barriers in first nations communities

We propose that the Federal, State and Territory Government support the rollout of an insulation installation in a deep retrofit program coupled with a fully funded certified training and audit program that is culturally inclusive. This initiative will assist communities to achieve greater resilience during temperature extremes, a more comfortable home, reduced energy bills, reduced power disruptions and improved health.

Governments should support the creation of a program that upskills new workers and trade aligned workers to provide advice on actions that can be taken to switch to electric appliances when suitable. Eg when appliances no longer operate. The Western Australian Government has a program to provide energy services off-grid, and energy efficiency should be incorporated into such programs.

*To provide benefits to remote and first nations people, ICANZ recommends:*

- *Provide support for a deep retrofit program in remote communities in collaboration with first nations people.*
- *Create a fully funded certified training and audit program that is culturally inclusive.*

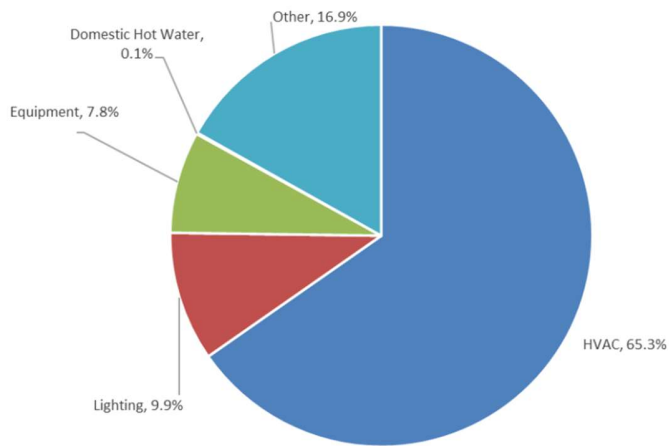
## COMMERCIAL

### ***What are the key opportunities to improve the energy performance of new and existing commercial buildings and operations?***

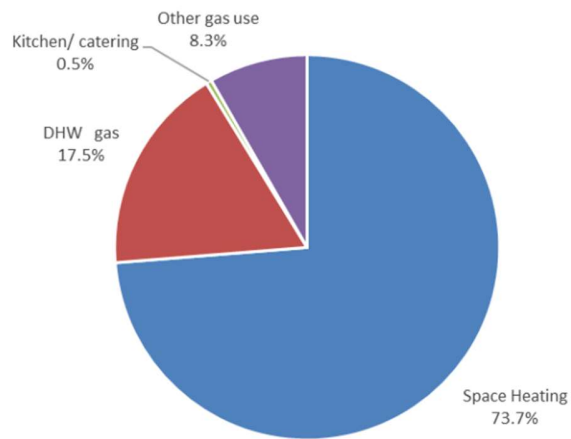
Commercial buildings had no building thermal energy regulations until 2006, which affects the buildings thermal performance and placing greater pressure on HVAC systems to heat and cool the building. The recently released Commercial Buildings Base Line Study 2022<sup>12</sup> puts HVAC as the largest contributor to non-residential building energy use, with heating and cooling as the major drivers. For a sample of offices, HVAC was 65% of electricity and 74% of gas use shown in Figures 72 and 74 of the study. Insulation is also important for pipes, ducts, and refrigeration equipment. This study also emphasised the poor quality of energy data across the commercial sector – this makes development and implementation of effective policies difficult.

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<sup>12</sup> <https://www.energy.gov.au/publications/commercial-buildings-energy-consumption-baseline-study-2022#:~:text=The%202022%20Commercial%20Buildings%20Energy,by%20type%20and%20energy%20consumption.>



**Figure 72: Electrical End-Use Shares by Major System, Offices, Australia (FY2014 – FY2017)**



**Figure 74: Gas End-Use Shares, Offices, Australia (FY2008 – FY2017)**

The Study also confirmed that data on energy use and efficiency in commercial buildings is very poor: if you don't measure it you can't manage it, so we need to have a nationally consistent framework to collate and analyse building performance data. Improving the thermal building fabric of existing and new buildings can be a focus through the National Construction Code. Efficient services and delivery systems for heating, cooling, ventilation, and hot water supply need to be part of an overall package. We need to explore new design principles and materials to enhance the performance of buildings.

*To improve the performance of commercial buildings, ICANZ recommends:*

- *Explore the expansion of the Commercial Building Disclosure program to include commercial premises below 1000sqm.*
- *Support training that targets the upskilling of existing trades such as ventilation, heating, cooling and plumbing services.*
- *Support the expansion of the NABERS disclosure tool for reporting on commercial new builds and upgrades.*
- *Improve monitoring and diagnostic analytics that utilise multiple data streams to deliver user friendly actionable insights to building managers.*
- *Target high energy intensity categories (eg food retail, healthcare, aquatic centres) and high energy intensity sites (eg high energy per square metre or per occupant).*
- *Identify high energy use in cold and hot weather: improving the building envelope at these times drives smaller capacity HVAC requirements and reduces stress on energy supply infrastructure.*

## SUPPLY CHAINS AND WORKFORCE

***What support is needed for Australian manufacturing or other supply focused businesses to improve energy performance?***

Commitment to the training and upskilling of a spectrum of workers in relevant skills is needed. These include mobilising universities and Vocational Education providers across a range of skills, not just STEM, as many jobs in energy efficiency and productivity are NOT technical. Sales, logistics, finance, and many more roles must be filled. Expansion of the building and construction workforce and trades is critical to the transition toward low carbon and energy efficient buildings. Many roles could be filled with limited training based on existing skills and experience.

***What are the most critical supply issues hindering energy efficiency action?***

Availability of large product volumes and trained service providers and installers. To overcome this issue energy efficiency programs, need to work with industry groups to recognize capacity constraints and opportunities and support a staged sustainable rollout of product and workforce. Business manufacturers and potential workers need to be confident that there will be a pipeline of material orders at volume and that working conditions and pay will meet expectations.

Governments must provide financial support in R&D for new building technology, products, services and materials that contribute to increased energy efficiency buildings and reduce their installed costs. We need facilities to test and develop products and conduct field research. We need market data, detailed end use energy data, and a deep understanding of consumer expectations regarding product and service features. We need flexible design and manufacturing capability that can produce disruptive products and solutions. Digitalisation and data analytics will play a key role across value chains and be integrated into products and services.

***What is needed in the finance sector to help accelerate the uptake of energy performance investments?***

The finance sector is not well-informed about the characteristics of energy efficiency and productivity. It can build on experience in the distributed renewable energy industry to deliver new services. The service providers in state level energy retailer obligation schemes have developed some capabilities that can be expanded. The Climate Energy Finance Corporation has provided substantial finance for energy efficiency and productivity projects and has educated financiers and its experience should be referred to.

A key factor is that financiers must learn to consider the multiple benefits energy efficiency and productivity deliver, and to help decisionmakers to recognize and capture them.

Evidence is needed to prove that effective energy efficiency measures reduce Cost of Living and improve ability to repay loans. Also homes with higher energy efficiency have been proven to sell for higher prices in the ACT and overseas, where mandatory disclosure occurs in the resale market. This reflects the reality that tangible communication tools that are effectively promoted can make a difference.

The finance sector requires guidance on energy efficient buildings and largely relies on rating tools and disclosure programs including but not limited to NatHERS, Green Star and NABERS. These initiatives can be expanded to include more building types and smaller footprint buildings in the commercial sector and a national mandatory disclosure scheme in the residential sector.

*To support supply chains and workforce in their role of decarbonisation, ICANZ recommends:*

- *Train and certify installers installation procedures.*
- *Support the national register of certified insulation installers on the EEC website will help achieve quality installation.*
- *Train and upskill the trades that interact with the thermal building envelope in maintaining the building envelope will be instrumental in the building envelope in maintaining the building envelope will be instrumental in the building's performance.*
- *Provide information on attaining a building's thermal performance to Designers and Architects drafting details and contracts, which includes addressing sealing and thermal bridging of the building.*

## Conclusion

We need a multi-pronged approach to drive improved energy performance to achieve decarbonisation and other objectives. This includes:

Improved thermal performance of buildings – introduce energy efficiency packages to existing dwellings through insulation of ceilings and walls, high performing glazing, shading of external walls and sealing around doors and windows. Focusing on the building fabric will realise multiple benefits including: healthier buildings; more stable internal temperatures; reduced energy demand; reduced size of heating and cooling systems; reduced morbidity and health stressors; improved local air quality; improved property value; and increased manufacturing, business and employment opportunities.

Innovative and targeted messaging and communication campaigns – introduce multi-lingual and culturally diverse capacity building programs at the local and state level; deliver retrofit programs at a local level; clear energy savings information and data on energy bills; and consistent and clear information on energy efficiency delivered by building designers, building trades and real estate industry.

Improved education of trades and professionals – creation of clear and consistent national training and certification of trades involved with the thermal performance of the building envelope; and audits of building works involved in the building envelope in new and existing building.

Regulatory reform – mandatory disclosure expanded nationally across real estate sales and property leasing; increased NatHERS star rating of the National Construction Code across residential buildings; and expansion of NABERS across commercial buildings; and when budgeting for Energy Efficiency and long-term benefit programs Treasury should be using benefit /cost payback of 2-3% per annum in line with other countries.

ICANZ appreciates the opportunity to make a submission on the National Energy Performance Strategy and we would welcome an opportunity to continue to be consulted on further development of the Strategy.

Yours sincerely

A handwritten signature in cursive script that reads "J. Strachan".

Janine Strachan

CEO