SUBMISSION

Submission to the Department of Climate Change, Energy, the Environment and Water

Submission to the National Energy Performance Strategy

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Australian Academy of Technological Sciences & Engineering

The Australian Academy of Technological Sciences and Engineering (ATSE) is a Learned Academy of independent, non-political experts helping Australians understand and use technology to solve complex problems. Bringing together Australia's leading thinkers in applied science, technology, and engineering, ATSE provides impartial, practical, and evidence-based advice on how to achieve sustainable solutions and advance prosperity.

ATSE welcomes the opportunity to provide a submission into the National Energy Performance Strategy. One of ATSE's key policy priorities is climate change adaptation and mitigation. This strategy provides an opportunity for the Australian Government to embrace a technology-led transition to net zero greenhouse gas emissions. ATSE believes that, by prioritising the immediate deployment of mature, low carbon, technologies, Australia will be able to make deep cuts to our emissions by 2030 (Australian Academy of Technological Science and Engineering, 2021) This submission argues that stronger building standards are needed to ensure high levels of energy efficiency in, and reduce carbon emissions from, Australian residential properties, particularly in the areas of insulation, water heating, and rooftop solar and battery deployment. For existing households, incentives are needed to increase investment in energy efficiency measures, for both owner-occupiers and landlords. The government has the greatest scope to implement direct changes to the public housing sector, which will provide energy cost saving benefits to those who need them most.

Recommendations

Recommendation 1: The Australian Government implements stronger energy efficiency requirements as part of national building standards, mandating the installation of energy efficient water heating systems, better insulation via double glazing and rooftop solar with battery storage.

Recommendation 2: The Australian Government develop a national gas substitution roadmap in collaboration with the state governments.

Recommendation 3: The Australian Government develops incentives, targeted at lower-income households and regional areas, to reduce the upfront costs of installing energy efficient upgrades, including secondary glazing and battery storage.

Recommendation 4: The Australian Government establishes a national solar leasing program for low-income households.

Recommendation 5: The Australian Government develops a program, in collaboration with the states, to retrofit all public housing with more efficient insulation, double-glazed windows and rooftop solar systems, in line with updated national building standards.

Recommendation 6: The Australian Government develops a targeted tax credit for rental property owners who invest in energy saving technologies in their properties.

Mandating improved energy efficiency in new housing stock

The simplest method by which energy efficiency of housing can be improved is by strengthening the mandated building standards. Such changes will have an immediate impact on all new building construction, resulting in greater energy efficiency of these dwellings. There are three main areas in which these standards can be tightened to improve energy efficiency: power generation, insulation, water heating, and phasing out natural gas.

The single most effective method of reducing the amount of energy that needs to be supplied to a household is to deploy on-premises energy generation. Household rooftop solar is a well-established, mature method of achieving this, with Australia having one of the highest rates of rooftop solar in the world (Best et al., 2019). Mandating rooftop solar panels on new residential construction would act to largely eliminate the demand on the grid during periods of high solar power generation. Additionally, combining this with battery technology, as it becomes more efficient and cost effective, can allow for energy generated during peak production periods to be utilised during times of high demand, reducing overall peak demand on the power grid. Furthermore, if connected to a virtual power station network, this kind of battery storage

network can work to smooth demand peaks and troughs for energy generators, resulting in a more reliable and sustainable energy network.

Home heating and cooling can account for up to 50% of a household's energy usage (Department of Climate Change Energy the Environment and Water, n.d.). Thus, a major factor in the energy efficiency of a home is how well insulated the premises is. Despite the well-documented insulative effect of double-glazed windows, and the subsequent reduction in energy required for heating and cooling, it is estimated that 85% of buildings in Australia still rely on single-glazed windows (Bulut et al., 2021). Mandating more stringent home insulation standards, including the use of double glazing on windows, would play a large part in reducing the energy consumption of new residential properties.

Hot water systems account for approximately 27% of total household energy use and therefore improving the efficiency of these systems is crucial in improving the overall energy efficiency of households (Kenway et al., 2008). Presently, water heating in most homes in Australia's five largest cities is powered by either natural gas or mains power (Kenway et al., 2008). Heat-pump based systems have been demonstrated to use about 70% less energy than electric hot water heaters (Willem et al., 2017). Alternatively, solar based systems only draw energy from the grid when booster systems are active, making these systems the most energy-efficient option, from a grid and ongoing cost perspective. By mandating that new premises install either heat pump or solar powered systems, energy demand from central power supplies would be greatly reduced, resulting in significant customer savings and carbon emissions reductions.

In addition to water heating and climate control, another use of gas in households is cooking. Switching from gas to electricity-based cooking has a lower overall emissions profile and can save the average household $270 per annum, as estimated by the Victorian Government (Victorian Government Department of Environment Land Water and Planning, 2022). Over 38% of Australian households use natural gas for cooktop stoves (Knibbs et al., 2018). There are state-led initiatives for the transition from gas to electricity: the ACT Government is banning the installation of gas cooktops in new properties (Mannheim, 2022), and the Victorian Government has developed a roadmap for the substitution of gas with electricity. A coordinated, national approach to reduce household gas consumption would be more effective. The Government should adopt a nationwide policy to phase out the use of gas appliances, in conjunction with measures to increase the uptake of rooftop solar.

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Incentivising energy efficient upgrades in existing housing stock

It is important to note that only 1-3% of Australia's existing building stock is replaced by new construction each year (Aghdaei et al., 2017), and thus to achieve rapid decline in grid energy usage across the nation, existing premises need to be retrofitted to achieve improved energy efficiency. As outlined above, key measures include improved insulation and the deployment of rooftop solar with battery storage. However, despite energy savings most benefiting lower income and regional households, retrofitting these kinds of energy efficiency measures is often financially out of reach for many of these households.

The retroactive installation of solar power (both general power and hot water heating) and battery storage should be encouraged. The current Small-scale Renewable Energy Scheme (SRES) run by the Clean Energy Regulator essentially provides discounts to homeowners who install solar panels, solar water heaters or heat pumps. Expanding this scheme to include battery storage systems connected to solar panels would help to increase the efficacy of solar systems. Furthermore, increasing the size of the available subsidy would help to make these systems more attainable for lower income households. Increasing the SRES subsidies would provide a cheap form of carbon abatement (Best et al., 2019). Similarly, developing incentives to support the installation of better insulation, including double glazing or secondary glazing (a cheaper alternative to double glazing (Bulut et al., 2021)), will assist to reducing the

energy load required to heat and cool properties. As such, homeowners should be incentivised to invest in double glazing or secondary glazing through government run subsidies or tax credits.

These subsidies are unlikely to eliminate some amount of upfront expenditure, which will necessarily result in energy efficient investments being unaffordable for the lowest income households. For low-income households, a government supported solar leasing program may be required to overcome these upfront capital requirements.

Recommendation 3: The Australian Government develops incentives, targeted at lower-income households and regional areas, to reduce the upfront costs of installing energy efficient upgrades, including secondary glazing and battery storage.

Recommendation 4: The Australian Government establishes a national solar leasing program for low-income households.

Improving energy efficiency in rental and public housing properties

The above discussion has primarily focused on owner-occupiers, which account for approximately 66% of households (Australian Bureau of Statistics, 2021). For the approximately 31% of household that are rented (Australian Bureau of Statistics, 2021), either through private landlords or local housing authorities, investment is impacted by a split in the incentives between tenants, who reap the economic benefits through lower bills, and landlords, who must provide the upfront capital investment. It is estimated that energy efficient retrofits in rental properties could save around $1.5 billion to tenants annually (Dignam, 2022). Publicly owned rental properties, where a government agency or department is the landlord and the property is not intended as a financial investment, therefore provide the greatest immediate opportunity to invest in energy efficiency. The Australian Government should work with the states and territories to develop a program to retrofit all public housing to meet the improved building standards recommended above. Such a program would act to provide immediate and targeted energy bill relief to those Australian who need it most.

For those in the private rental market, the introduction of tax credits or accelerated depreciation may help to encourage owners who receive little benefit otherwise from investment in these systems to adopt more efficient systems. Currently, only landlords in Victoria are eligible for rebates for rooftop solar, via the Solar for Rentals program (Canstar Blue, 2022). This program helps to reduce the upfront financial burden for landlords, minimising the split incentive problem. Furthermore, by including a property value cap on such a credit would enable the benefits to be directed towards lower income housing, where the impacts of reduced power bills would be most keenly felt.

Recommendation 5: The Australian Government develops a program, in collaboration with the states, to retrofit all public housing with more efficient insulation, double-glazed windows and rooftop solar systems, in line with update national building standards.

Recommendation 6: The Australian Government develops a targeted tax credit for rental property owners who invest in energy saving technologies in their properties.

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