AUSTRALIAN SUSTAINABLE BUILT ENVIRONMENT COUNCIL

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To Whom It May Concern

INQUIRY INTO MODERNISING AUSTRALIA'S ELECTRICITY GRID

The Australian Sustainable Built Environment Council (ASBEC) welcomes the Inquiry into modernising Australia's electricity grid by the Standing Committee on the Environment and Energy.

ASBEC is a body of peak organisations committed to a sustainable built environment in Australia, with membership consisting of industry and professional associations, non-government organisations and government observers who are involved in the planning, design, delivery and operation of our built environment. Collectively, ASBEC's membership has direct reach to more 350,000 professionals in the built environment sector and represents an industry worth more than $700 billion in value.

Buildings contribute to nearly half of Australia's electricity consumption and almost a quarter of our country's emissions. The building sector presents a profound and cost-effective opportunity for energy productivity and emissions reductions. *Low Carbon, High Performance*, authored for ASBEC by ClimateWorks, provides a clear policy roadmap for realising this opportunity.

Our report shows how Australia's built environment sector is uniquely placed to become a global market leader in energy and sustainability, with buildings presenting low cost opportunities to deliver almost $20 billion in energy savings as well as significant emissions reduction and other benefits.

Strong policies are critical to address existing barriers and accelerate actions. ASBEC has identified five key policy solutions which could support a transition to high performance buildings:

Establish national plan towards zero carbon buildings by 2050 - This includes supporting policy frameworks, governance arrangements with interim and long-term targets, clear responsibility at Ministerial level, co-ordination across different spheres of government and public reporting requirements.

Set strong mandatory minimum standards - Creation of strong minimum standards for buildings, equipment and appliances, and establishment of a forward trajectory for future standards.

Create targeted incentives and programs - Support higher performance in the short-to-medium term through incentives and programs including the use of government market power and a range of financial incentives for building owners and tenants.

Reform the energy market - Support the implementation of cost-effective energy efficiency and distributed energy improvements by removing energy market barriers and distortions.

Resource appropriate energy data, information, research and education measures - Enable informed consumer choice and support the innovation, commercialisation and deployment of new technologies and business models for delivery of energy efficiency and distributed energy solutions.

Our response to the questions laid out in the *Inquiry into modernising Australia's electricity grid – Discussion paper* are provided below, informed by the findings of *Low Carbon, High Performance* and ASBEC's *National Framework for Residential Ratings.* For references and supporting material, please refer to the *Low Carbon, High Performance Full Report.*

The means by which a modern electricity transmission and distribution network can be expected to ensure a secure and sustainable supply of electricity at the lowest possible cost.

Balanced policy framework

A secure and sustainable supply of electricity at the lowest cost is dependent on an appropriate balance of supply and demand policy. Supply and demand must be recognised as two sides of the same story within the energy policy framework.

The current energy system dialogue focuses heavily on supply-side technologies (including onsite generation and energy storage). Demand-based strategies such as smart energy use offer the fastest and cheapest ways to cut energy bills and reduce emissions, as well as reduce the burden on Australia's energy infrastructure.

A better balance of supply and demand-based policies will allow for more flexible, adaptable and future-proof energy systems that are not overly-reliant on one-way transmission via the grid. Additionally, renewables and energy efficiency policy must be integrated, to ensure an appropriate transition to a low-carbon future.

The built environment clearly demonstrates the transformative effect of technology and innovation, through the uptake of energy efficiency and onsite generation; saving billions of dollars in energy bills and blurring the line between energy supplier and energy consumer.

Question 1.1 How are the objectives of security, reliability, sustainability, and affordability interrelated?

Best practice energy management in the built environment illustrates how affordability, sustainability and reliability can be mutually reinforcing, through energy efficiency, distributed generation and onsite energy storage:

- Energy efficiency can deliver reductions in peak demand and associated costs of peak generation and transmission infrastructure.
- Electricity generated locally is usually consumed nearby, imposing less of a burden on the electricity distribution network than electricity sourced from a centralised generator.
- Distributed energy paired with battery storage can be used to store energy from distributed solar systems at periods when demand is low and release this back into the system when demand is high.

Right now, there is a great opportunity to more broadly transform the built environment, using current technology, and deliver almost $20 billion in financial savings by 2030, in addition to productivity benefits and improvements in quality of life for Australian businesses and households.

Question 1.2 What should be the highest priority objectives of a modern grid in Australia?

The highest priority objectives of a modern grid in Australia should be to balance the priorities of energy security and reliability, affordability and emissions reduction.

Emissions reduction

The electricity sector should play a central role in meeting Australia's emissions targets, through a better balance of supply and demand-side policy.

Vitally, decarbonisation targets should be included in the National Electricity Objective (NEO).

Buildings account for almost a quarter of Australia's emissions and without further action to reduce emissions and improve energy efficiency, buildings could consume almost half of Australia's total national carbon budget. This sector must be a strong focus if Australia is to meet its international obligations under the Paris Climate Change Agreement.

Australia's building sector can deliver up to 28% of Australia's 2030 emissions reduction target, save $20 billion in energy costs and create healthier, more productive cities if a suite of targeted policies are introduced.

Prioritise energy efficiency and built environment

To support this effort, the Australian Government should establish a National Plan Towards 2050 Zero Carbon Buildings, with supportive governance arrangements, including:

- Targets for emissions and energy in the built environment;
- Coordination of activity across levels of government and government entities;
- Regular public reporting of progress;
- Public and industry engagement;
- Coordination and planning of research, education and training; and
- Clear responsibility for implementation, review and updating over time.

The establishment of an independent Energy Efficiency Authority should be investigated. Such an Authority could coordinate energy efficiency policy development and implementation, and evaluation and reporting of the effectiveness of energy efficiency policies. This would provide greater regulatory certainty and stability in the context of impacts, influences and limitations of new demand-side technologies on the energy system.

<u>Consumer empowerment</u>

Consumer empowerment should also be prioritised and the built environment should not be overlooked in terms of its potential to inform and empower consumers in the energy market.

The processes through which electricity tariffs, ‘feed-in tariffs’ for exported electricity and costs of connection to the electricity grid and retailer licensing requirements are set are extremely complex, limiting the ability of non-technical experts (including built environment stakeholders) to participate and effectively prioritise consumer interests.

There is a largely untapped opportunity to improve energy efficiency – through higher minimum standards for buildings, bettering the way energy performance of our buildings is disclosed, and targeted incentives – resulting in energy cost savings for households and businesses, improved energy productivity, emissions reduction, more efficient use of energy infrastructure through reduced demand from new buildings, and improved health and comfort for building occupants.

▾ The current technological, economic, community and regulatory impediments and opportunities to achieving a modern electricity transmission and distribution network across all of Australia, and how these might be addressed and explored.

Question 2.1 What are the costs associated with an ‘outdated’ grid?

Delay in overcoming obstacles to improved building energy performance risks locking in higher than necessary energy consumption and high levels of emissions for decades to come.

The cost of inaction in the built environment could lead to over $24 billion in wasted energy and over 170 megatonnes of lost emission reduction opportunities, through lock-in of emissions intensive assets and equipment.

Question 2.2 What might be the role of new technologies in improving system security, reliability, sustainability, and affordability? What is the potential for new technologies to alter the inter-relationships between these objectives?

Low Carbon, High Performance found that, by 2030, the energy savings from energy efficiency and fuel switching improvements could deliver cumulative net financial savings of almost $20 billion to the households, businesses and government entities that invest in them.

<u>Broader benefits</u>

Improved energy efficiency can deliver a broad range of powerful benefits to households and commercial building owners and occupants, as well as public economic, productivity and energy system benefits, including:

- Increases in asset value and returns for owners of buildings
- Health and productivity improvements for tenants in commercial buildings
- Comfort and wellbeing for households, particularly low income households, which are susceptible to fuel poverty
- Improved resilience for building occupants, in particular resilience in the face of thermal fluctuations, and to changes in energy prices.

Improving the energy efficiency of Australia’s building stock also has the effect of reducing the need for additional infrastructure to cope with peak energy demand.

Innovation in consumption and generation – case studies

Across all building types, there are now examples of both new and existing buildings which have achieved very high energy performance and very low or 'positive' emissions.

Case Study 1: The first zero net emissions office building in Australia

In 2010 Grocon completed the Pixel building, located in Carlton, Melbourne. Features of the building include high efficiency lighting with daylight control and solar PV and wind turbines, generating more electricity than is required by the building. A new structural concrete was developed for the building, significantly reducing embodied carbon. A large proportion of the building envelope is able to be removed and re-used in order to reduce the future footprint of the building when it is demolished.

For more information visit: www.pixelbuilding.com.au/

Case Study 2: First Australian property fund B Corp demonstrates the power of sustainable returns

Impact Investment Group (IIG) is a leading Australian impact investment funds manager and Australia's first funds manager to obtain B Corporation certification . IIG's vision is to advance a new model of business that intentionally promotes economic, social and environmental prosperity. IIG sources and develops investments that generate social and environmental value throughout the investment's life, as well as delivering strong financial returns for investors.

IIG is already delivering on this goal. In 2015 it increased property assets under management by 64 per cent, launched two new funds and has almost 100 per cent occupancy across its real estate portfolio. The company has recorded impressive sustainability achievements, including:

- Achieving net zero grid electricity consumption for its Byron Bay Quicksilver property by focusing on operational efficiency and sustainable procurement / operation of rooftop solar installation;
- Committing to install a 230 MWh/yr solar system and Tesla storage batteries at its Dream Factory startup hub in Footscray, Melbourne and upgrading the property's energy rating from an estimated zero to 6 Star NABERS rating.
- Committing to become zero net emissions across its portfolio (off-set by wind and solar assets), obtain Green Star - Performance certifications across the portfolio, deploy on-site rooftop solar and green roof/urban farming installations across its portfolio where feasible and invest further in renewable energy .

For more information visit: http://www.impact-group.com.au/

Case Study 3: 160kW solar array produces more power than the building uses

The Sustainable Buildings Research Centre at the University of Wollongong New South Wales is a 6 Star Green Star - Education Certified rated building, which produces 62 per cent fewer greenhouse gas emissions and uses 51 per cent less water than the average Australian building. The design and build focused on technological capability and financial viability. Electrical Engineer for the project, Dr Duane Robinson, said "There are a number of systems that don't require a lot of expense, like insulation...for a couple of thousand dollars you can achieve some large savings in your energy bill." Features include natural ventilation, indoor environmental quality features and extensive monitoring and building control systems for operating efficiency. It is built from locally sourced materials, which contribute to the regional economy.

For more information visit: sbrc.uow.edu.au

Case Study 4: The greenest public building in Western Australia

The Green Skills Training Centre at Perth's Central Institute of Technology is a 6 Star Green Star - Education certified vocational education and training building. The $17 million centre is used by CIT students studying sustainable building and construction, it aims to show students best practice sustainability measures including best available technology and construction methodology.

A 50 inch LED TV screen provides continuous data on the building's energy and environmental status. The building operates at net zero energy as the building's solar power is generated both by roof panels mounted on sawtooth roofing, and facade-integrated panels. The system has been designed to have the capacity to generate all the energy needs of the centre, making it feasible for it to operate off-grid. The building includes an ISO 14001 certified steel frame that can be taken apart and reused at the end of the building's life, and timber used is sourced from forest certification schemes or re-used.

For more information visit: central.wa.edu.au

Case Study 5: Over 6 per cent productivity increase, equal to $300,000 per year in salary costs

Australian Ethical Investment used accepted conventional and low-technology design principles to retrofit Trevor Pearcey House in the ACT. Warren Overton who was, at the time, Managing Director of the company that performed sustainability services, said "Trevor Pearcey House showed that exemplar environmental performance can be achieved on a conventional budget." A 6 Star Green Star rating was achieved.

Energy use has reduced by 52 per cent compared to pre-retrofit, saving approximately $20,000 per year. The bulk of the reduction was achieved through double-glazed windows, lighting upgrades, and new insulation. An internal survey of staff perceptions found they felt healthier and more comfortable in the building, and have reported a 6.2 per cent increase in productivity. The estimated productivity improvement adds up to a benefit of around $1.5 million of extra value over five years.

For more information visit: www.gbca.org.au/green-star/green-building-case-studies/trevor-pearcey-house/

Case study 6: Reduction in energy usage has seen annual energy cost saving of almost $233,000 for tenants

Mirvac and Investa's retrofit of 10-20 Bond Street, Sydney, saw the building achieve a 4 star Green Star rating and a 5 star NABERS Energy rating. Measures such as upgrading the lifts, updating the air conditioning and installing a tri-generation plant, significantly reduced demand for heating and cooling while supplying low-carbon electricity.

Improving energy efficiency and using electricity from low carbon sources reduced base building electricity consumption by 766,117 KWh, resulting in annual energy savings of more than 60 per cent. From financial year 2013 to 2015 there was a 37 per cent reduction in carbon emission intensity, equating to reduced carbon emissions of 1,138 tons CO_2, achieved through energy efficiency and cogeneration. The result was Mirvac exceeding its company carbon intensity target three years ahead of schedule.

For more information visit: office.mirvac.com/office/10-20-bond-street,-sydney/

Case Study 7: Lochiel Park Green Village

Lochiel Park is arguably Australia's most environmentally sustainable high performance residential estate. Started in 2005 from a vision to create the nation's model green village, Lochiel Park has been a showcase of environmentally sustainable technologies and practices which has proven the viability of low carbon living. This living laboratory located in suburban Adelaide, comprising 100 dwellings has helped create a detailed understanding of low carbon homes and their impact, informing sustainable housing decisions nationally and throughout the world.

Through a detailed monitoring program since the estate's inception, the University of South Australia has documented key social, economic and environmental impacts. The Lochiel Park resident's value improved thermal comfort and wellbeing as well as the associated economic and environmental impacts. Living in a minimum 7.5 star homes with high efficiency appliances, equipment, smart controls and displays and roof top solar electricity and hot water has enabled over 60 per cent reduction in energy consumption and associated greenhouse gas emissions in comparison with the Australian average with substantial cost savings. Associated research has demonstrated a positive economic value proposition and documented the impact and learnings for industry and policy implications.

For more information visit: http://unisa.edu.au/lochiel-park

Case Study 8: Affordable blueprint for retrofitting existing homes

The University of Wollongong and TAFE Illawarra Institute (Team UOW Australia) have developed the Illawarra Flame House to show how a typical Australian 'fibro' home can be retrofitted to become zero net emissions. The project aimed to provide an affordable and achievable blueprint to inspire Australian homeowners and the local and national building industry. It also aims to inspire accelerated development and adoption of advanced building energy technology in new and existing homes.

Features of the Illawarra Flame House include 9.4KW PV system, natural ventilation and extensive insulation. Building material was selected for low embodied energy and local production. A line for non-essential appliances and equipment was added allowing all standby items to be switched off at one point. Prefabricated pods are added to the original building and are cheaply and efficiently manufactured off-site.

The design beat 20 finalists to win the 2013 Solar Decathlon in Datong, China. Students were required to build and operate a house that is advanced, appealing, energy efficient and cost effective. The team finished with score of 957.6 out of a possible 1000 points as well as receiving first place awards in categories such as engineering, architecture and solar application.

For more information please visit: illawarraflame.com.au/house.php

Case Study 9: Turning shopping centres into power stations

In 2015, Stockland installed one of the largest single rooftop solar PV system in Australia at the Shellharbour Shopping Centre. Stockland set a 1.35 MW renewable energy target for their retail portfolio, equivalent to 321 average residential systems. Between Shellharbour (1.22MW) and three smaller projects, Stockland has reached 1.36 MW of renewable energy and achieved its renewable energy target. This project achieved a 4 Star Green Star - Retail certification.

Before building they completed technical and financial feasibility assessments, which determined that the best return on investment from solar PV is achieved through creating a new business model. The model involves Stockland selling electricity directly to retail businesses in their centre. The success of this model is achieved by selling most of the electricity to retailers in the centre at a reasonable price and avoiding exporting electricity to the grid, which returns a lower price. The system generates on average 4,789 kWh per day, the equivalent of more than a quarter of the centre's daily base building power requirements. The system will offset 1,700 tonnes of CO_2 annually.

The cost of the system was $2.1 million and payback is estimated to be seven years.

For more information please visit: shoppingcentres.stockland.com.au

Case Study 10: Panels in the sky

101 Collins owners and management team have a strong focus on sustainability, looking to continually improve on their 4 star NABERS building rating for energy. Following a tenant sustainability survey carried out in 2008 a number of energy efficiency initiatives were undertaken, including extensive energy efficiency lighting upgrades and replacement of the primary heating and cooling chillers.

In 2015, a study into solar PV viability resulted in the installation of a 59.4kW system made up of 180 vertically oriented solar panels, positioned 191 metres above street level. At a cost of $230,000, the system will produce around 47,000 kilowatt hours of energy each year (equal to the annual energy use of about 12 homes), and avoid 59 tonnes of CO_2 annually. Since 2008, base building energy use at 101 Collins Street has reduced by 44 per cent. The solar system is expected to produce annual energy savings of $7,000 per annum.

For more information visit: https://www.melbourne.vic.gov.au/SiteCollectionDocuments/case-study-101-collins.pdf

Emerging technologies

The table below outlines further emerging but market-ready and cost-effective efficiency measures that could result in substantial future energy savings.

TECHNOLOGY	DESCRIPTION	KEY FACTS	STATUS
Low-cost sensors	Monitoring, controlling, optimising lighting and heating and cooling systems and fault detection.	Could reduce building energy consumption by 20-30%.	Costs reducing rapidly, US Department of Energy working on $1-10 prototype.
Building-integrated Photovoltaics	PV modules integrate directly into a building, in place of ordinary building materials.	Improves climate performance and reduces operational cost and embodied energy.	Not yet price-competitive on the retail scale with conventional panels.
Smart thermometers	Control residential heating and cooling systems and can sense, communicate and respond automatically.	React to price signals to change temperature set points, or to cycle heating and cooling to reduce peak demand.	New technology, already some evidence showing they reduce home energy use.
Geothermal heating and cooling	Natural heat from shallow earth is transferred into building, and the reverse process cools.	Can reduce annual household energy expenditure by 75%.	Rebate schemes exist in the US, Canada and UK. Gaining interest in Australia.
Smart glass (SageGlass®)	Can switch between clear and tinted glass using a small electric charge, depending on heat and light conditions.	Takes advantage of natural light, which can reduce a building's energy consumption, enabling cost savings.	US Department of Energy provided $72 million loan guarantee to support construction and operation.
Real-time feedback on energy use	Technologies provide customers and utilities real-time data on electricity use.	Energy savings result from greater understanding and control of energy use.	Being deployed at a large scale. Primary drivers are improved reliability and control.
Prefabrication	Off-site factory construction of building elements.	Reduced costs and construction time, high level of customisation.	Widely used in Europe, gaining interest in Australia.

Battery storage

The largest opportunity for zero emissions electricity production in buildings is through distributed solar PV with integrated battery storage.

The cost of solar PV has dropped rapidly, and is expected to continue to drop by more than half by 2050. This is expected to drive continued growth in distributed solar deployment.

Battery storage can unlock enormous additional potential for distributed solar PV, by overcoming the fundamental issue of variability of electricity production. With battery storage, building owners can install larger solar systems and instead of exporting excess electricity to the grid and receiving a low price for it, they can store energy for later use on-site, offsetting the need to purchase electricity from the grid. Batteries also offer the potential to address concerns from electricity network operators about the impact of large amounts of variable distributed electricity on their ability to manage the network.

The cost of battery storage systems has been declining rapidly in recent years as a result of scaling up of production by companies including Tesla. Costs have dropped by 14 per cent on average every year, from around $1,000 per kWh in 2007 to around $410 per kWh in 2014, and are projected to continue dropping into the future. It is predicted that integrated solar PV and battery storage systems could be viable for households in 2022 under current tariff structures.

Question 2.3 How can the grid better accommodate the rapid pace of technological change, including an increasing level of variable electricity generation?

The most cost-effective first step in better accommodating the rapid pace of technological change is to maximise energy efficiency. As outlined above, the built environment offers the greatest potential for energy efficiency increases.

Supporting the roll-out of emerging technologies that reduce the energy infrastructure burden is also vital. Several technologies outlined above in our response to Question 2.2 have the potential to improve energy security and reliability outcomes.

Question 2.4 What possibilities are there for alternative pricing models (for example, cost-reflective pricing) to better reflect the true cost of services provided by a modern grid?

Electricity tariffs

Electricity tariff structures should provide an appropriate incentive for distributed energy and energy efficiency, including through the current shift to 'cost-reflective pricing'.

Electricity distribution network service providers are currently implementing a shift towards more cost-reflective pricing for electricity. This may result in an increase in fixed charges - generally daily charges that are imposed regardless of how much electricity is purchased from the grid. If fixed charges become a higher proportion of electricity bills, this could create a strong disincentive for the installation of distributed solar PV, as well as a disincentive to improving energy efficiency. This is because fixed charges remain the same regardless of how much electricity is consumed on-site.

With technology costs for solar PV and battery storage likely to reduce to such low levels, some analysts have predicted that disconnection from the electricity grid will become an attractive proposition for a significant number of building owners, particularly households. Disadvantageous tariff structures could accelerate this process, and lead to what many commentators have described as a 'death spiral' where disconnections force distribution network service providers to increase charges on remaining customers, which drives more customers to disconnect.

Additionally, a 'model tariff structure' should be developed, as outlined in our response to Question 2.4, to help guide decision making by networks and the Australian Energy Regulator.

Model tariff structures

Electricity network companies currently develop their own proposals for tariffs, which can make it extremely difficult for non-technical experts in energy market regulations to monitor these and participate in reform processes such as the shift to cost-reflective tariffs.

A better process may be to establish a national process similar to the CSIRO Future Grid Forum to develop 'model tariff structures' in consultation with a range of industry and consumer groups that would encourage economically efficient investment in the energy market including in energy efficiency and distributed energy. It is not expected that these model tariff structures would be mandatory, but could help guide decision-making by networks and the Australian Energy Regulator.

Value of exported electricity

A mechanism should be established to identify and pass on to distributed generators for the fair value of distributed electricity exported to the electricity grid.

Excess electricity generated on a building and exported to the grid currently receives a very low rate (between 5 and 8 cents per kWh depending on the jurisdiction) when compared to the value for use on-site. However, there may be benefits provided by distributed generators that are not currently recognised or rewarded, including:

- Lower burden on grid infrastructure: Electricity generated locally is usually consumed nearby, imposing less of a burden on the electricity distribution network than electricity sourced from a centralised generator (e.g. a coal-fired power plant located outside a city). For this reason, the City of Sydney, Property Council of Australia and Total Environment Centre proposed a rule change to the AEMC which would require distribution network service providers to calculate the value of distributed generators operating in their network and pass on this value to them. This change was not supported by the AEMC.
- Reduced peak demand: Distributed energy paired with battery storage could be used to store energy from distributed solar systems at periods when demand is low and release this back into the system when demand is high. This can reduce the costs across the electricity network of meeting demand at peak periods, by reducing the need for higher cost 'peaking' plants that only operate at peak times, and by reducing the load on electricity transmission and distribution infrastructure. Again, the electricity market currently does not provide a mechanism for the value of this potential benefit to be passed on to the distributed generator.

While it appears clear that a mechanism should be in place to facilitate distributed generators to receive the full benefits that their system provides into the electricity system, there is not yet agreement on the precise mechanism for doing so. Identifying an appropriate mechanism should be a priority.

Cost of connection

Standards for connection of embedded generators should be established and the recommendation of the Harper Review of Competition Policy to improve access to the electricity network should be implemented. Connection of distributed generators to the electricity network presents a strong barrier to further uptake of medium-scale solar PV and other distributed energy, as a result of:

- A lack of standardisation
- Non-transparent costs and delays
- A lack of an effective access regime

Two existing reforms could help address these issues and should be supported:

- Recently, the Clean Energy Council undertook a project to investigate the development of consistent standards for distributed generators of between 10 kW to 5 MW, to address the transaction costs associated with multiple different processes and standards for grid connection in place across the different electricity network companies. The study found that standards would address inefficiencies, reduce opportunity costs and save hundreds of millions of dollars over the next decade.
- The Harper Review of Competition Policy recommended that the Australian Energy Regulator's role be divided between the ACCC (for consumer issues) and a new national access and pricing regulator, responsible for infrastructure regulation and access across a number of different industries. Shifting the role of regulating network access to a new access and pricing regulator could help reduce barriers to entry for distributed generators in the same way as has occurred with telecommunications.

Implementing the Harper Review recommendation will require significant work and should be commenced immediately.

Question 2.5 What opportunities are there to improve governance and regulation in the grid?

Governance

There must be a whole of system governance, with a balanced focus on supply and demand, in the context of Australia's energy and emissions priorities.

There is a strong need for whole-of-system advice and planning in Australia's energy markets. As outlined above, supply and demand must be recognised as equally important parts of the energy market and policy framework, in the broader context of energy production and emissions reduction. Renewables and energy efficiency policy must also be integrated.

Independent Ombudsman

There has been strong interest in distributed energy within the built environment. However the current rules and regulations governing the operation of the National Energy Market (NEM) affect uptake of distributed energy and energy efficiency in a variety of ways:

- Electricity tariff structures can incentivise or disincentivise distributed energy and energy efficiency, with high fixed tariffs providing a disincentive and tariffs based more on the level of consumption providing a greater incentive;
- Value for electricity exported determines to a large degree the attractiveness of distributed energy installations;
- Costs of connection of distributed energy systems to the grid can affect the case for new distributed energy installations
- Retailer licensing requirements for distributed energy power purchasing agreements (PPAs)

The processes through which electricity tariffs, 'feed-in tariffs' for exported electricity and costs of connection to the electricity grid and retailer licensing requirements are set are extremely complex, limiting the ability of non-technical experts including built environment stakeholders to participate and ensure that these parameters do not unduly disincentivise distributed energy and energy efficiency improvements.

Indeed, a number of reform processes are currently in progress that could have a major impact on energy efficiency and distributed energy, including the shift to 'cost-reflective pricing' and new standards for small-scale connections to the grid. The establishment of an independent ombudsman or other independent authority to investigate and recommend solutions to address energy market barriers experienced by distributed energy, energy efficiency and built environment stakeholders, would help ensure that these processes support and do not disincentivise cost-effective uptake of energy efficiency and distributed energy.

Retailer licensing requirements

The Australian Energy Regulator (AER) should provide exemptions for Power Purchasing Agreement (PPA) providers as has been provided already in Victoria to facilitate local sharing of distributed solar and other distributed energy.

The AER undertook its consultation on innovative product offers in the national electricity market between 2014 and 2016. This resulted in a clarification of exemptions but it is our understanding from solar industry participants that this did not add value in negotiating or creating PPAs.

Exemptions for PPA providers would significantly reduce transaction costs and barriers to entry for businesses seeking to install distributed energy systems including solar PV and sell the electricity to the occupants of the building or nearby buildings. This model could apply to building owners seeking to install solar PV and on-sell the electricity to tenants, or to energy companies that install solar PV on others' roofs and sell the electricity to the tenants.

Further enabling measures

Energy use is highly variable across the building sector, efficiency projects are often technically complex, and the opportunities to improve energy performance are fragmented across numerous small projects and decision makers. In order to achieve large-scale improvements in the energy performance of buildings, this complexity must be both reduced, so that consumers can understand the choices available to them, and outsourced to third party service providers. This requires improvements in energy data, information, research, education and training, including:

- The development of a national built environment energy data and information strategy in partnership with relevant industry and research organisations.
- Improvement of access to energy consumption data.
- A national built environment energy efficiency and emissions research agenda, and establish a permanent energy efficiency and distributed energy research institution.
- A national built environment energy efficiency and emissions education and training agenda.

Question 2.6 What opportunities are there for consumers to benefit from the modernisation of the grid? How can we ensure that these benefits are able to be shared equitably by all consumers?

Independent Ombudsman

An independent ombudsman or other independent authority should be established to investigate and recommend solutions to address energy market barriers, and allow consumers to more easily voice their concerns in the context of energy market processes and reforms. This authority should help to ensure that these processes support and do not disincentivise cost-effective uptake of energy efficiency and distributed energy.

Minimum standards and a trajectory for increased stringency for building energy provisions

The National Construction Code – which sets the minimum necessary requirements for new buildings and new building work in existing buildings – is updated every three years. The minimum energy performance standards are not necessarily adjusted at these points. In fact the energy provisions in the Code have not been updated since 2010.

The next update is due in 2019. It is likely that that stringency for energy performance will only be reviewed for commercial buildings in the 2019 Code, meaning that residential buildings will have effectively waited for 12 years before a stringency review is undertaken. Minimum standards for Australia's buildings currently lag far behind best practice, and need to be updated urgently.

Additionally, a trajectory should be established for future upgrades of the energy provisions in the Code, providing a clear opportunity to catalyse innovation, investment and market transformation in the sector by providing a strong regulatory signal of the direction for future standards, and deliver higher performing buildings.

Disclosure of building energy performance

Disclosure of building energy performance should be improved and expanded.

The Commercial Building Disclosure (CBD) scheme requires commercial office buildings above 1,000m^2 to disclose their energy performance rating (NABERS) at the point of sale or lease. In combination with government and large corporate tenant leasing requirements, this scheme has been instrumental in driving improvements in the large office sector. The needs of other building types outside the office sector may be different; however the potential expansion of disclosure policies to other building types should be investigated.

In the residential sector, disclosure is already required for homes at the point of sale or lease in the ACT, with good results. There is a strong case to extend residential disclosure to other jurisdictions. NSW and Victoria are currently exploring such schemes and the National Energy Productivity Plan identifies the opportunity to implement a national approach to residential building energy ratings and disclosure.

ASBEC's *National Framework for Residential Ratings* calls for a nationally consistent rating framework for housing sustainability, consisting of three key elements: minimum regulatory performance standards for new buildings; benchmarks for market comparison of best practice sustainability performance; and communication messages explaining the value of sustainability features to renovators and homebuyers.

Energy Efficiency Obligation schemes

Energy Efficiency Obligation schemes are in place in New South Wales, Victoria, South Australia and the ACT. These schemes reward energy consumers who reduce energy consumption (e.g. through replacement of light globes) by requiring energy retailers to fund a set amount of energy efficient improvements each year. Energy Efficiency Obligation schemes have successfully incentivised third party aggregators to seek out and implement energy efficiency improvements in households and businesses.

Improvements could be made to existing Energy Efficiency Obligation Schemes to increase their impact:

- Harmonise and integrate schemes: Schemes are reviewed regularly to consider the inclusion of new technologies, products and methods. Harmonisation or integration of these processes between the different state schemes would reduce transaction costs, reduce the cost of expanding to other states and territories, reduce administrative costs particularly for smaller jurisdictions and reduce the cost of reviews and updates. Harmonisation could extend to reporting to ensure consistent data on the energy, emissions and cost savings achieved.
- Include incentives for replacement of non-electric appliances: As discussed above, gas and other non-electric appliances will need to be phased out, and Energy Efficiency Obligation schemes can begin to incentivise this switch, and need to avoid incentivising the replacement of inefficient electric appliances with more efficient non-electric appliances (e.g. replacement of electric resistance water heaters with gas water heaters).
- Incentivise deeper retrofits: A widespread concern with Energy Efficiency Obligation schemes is their ability to deliver deep retrofits, and indeed the risk that they can remove all of the 'low hanging fruit' in existing buildings, undermining the business case for returning to capture the harder or higher cost measures. Introducing project-based methodologies could encourage deeper retrofits, for example the NSW scheme rewards projects that demonstrate an overall NABERS rating improvement.

Those jurisdictions which do not have schemes (Queensland, WA, Tasmania and the Northern Territory) should introduce schemes.

Vulnerable consumers

Low income and vulnerable households in rental properties face much stronger barriers to improving the energy performance of their homes than other households, particularly split incentives and power imbalances with landlords.

This provides a strong consumer protection rationale for introducing mandatory minimum energy performance standards for public housing and funding mechanisms to facilitate public housing retrofits.

The Commonwealth, States and Territories should also develop end-to-end support programs for low income households, building on the lessons learned from the Low Income Energy Efficiency Program.

Improving the performance of rental properties would reduce the burden on state and territory budgets of providing financial assistance to households unable to pay energy bills.

CONCLUSION

The role of the built environment in ensuring a secure, sustainable and affordable electricity grid should not be underestimated.

Implementation of an appropriate suite of policy measures could deliver almost $20 billion in financial savings by 2030, in addition to productivity benefits and improvements in quality of life for Australian businesses and households. Buildings could also meet over half of the national energy productivity target, and more than one quarter of the national emissions target.

The cost of inaction in the built environment could lead to over $24 billion in wasted energy and over 170 megatonnes of lost emission reduction opportunities, through lock-in of emissions intensive assets and equipment.

Effective collaboration with all stakeholders – including the built environment – will be fundamental to the improvement of the grid.

ASBEC recommends establishing regular consultation with key organisations to ensure policy reform reflects industry expertise and maximises opportunities early.

ASBEC's membership consists of twenty-five industry and professional associations, along with government and academic observers, involved in planning, design, delivery and operation of our built environment. As such, we are uniquely placed to facilitate this type of consultation.

We would be pleased to meet with you to discuss further all those recommendations developed by ASBEC, as summarised above, that will help to support the delivery of a productive agenda, and to discuss how best ASBEC and our member organisations can assist with ongoing consultation on these important issues.

Yours Sincerely

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