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# The Trajectory to a Net Zero Emissions Built Environment: The Role of Policy and Regulation

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## Introduction

The transition to a zero-carbon built environment is underway in Australia, but for the most part, the process is occurring in an unplanned and inconsistent manner, and despite rather than because of effective policy signals.

Households are leading the transition process primarily by investing in photovoltaic systems—one in five households, or more than 2 million households, now have rooftop PV.[1,2] More recently, but at an increasing rate, businesses are making similar investments, either in rooftop PV systems, or else making use of the recent contractual innovation known as power purchase agreements (PPAs) to secure long-term

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contracts from remote, utility-scale renewable facilities, often on favourable terms relative to the normal or 'black power' market. The duration of PPAs (up to 15 years) significantly exceeds contract terms available in the National Energy Market, offering a valuable source of price certainty for businesses that is not available through normal electricity contracts.

The strong drivers for this development have been the dramatic rises in energy prices in Australia since 2007. Depending upon the state and user class, electricity and gas prices have approximately doubled over the last decade (ACCC 2017, p. 10; Oakley Greenwood 2018). In addition, there have been equally dramatic falls in PV panel (and, to a lesser extent, system) costs over the same period (IRENA 2018). This has significantly increased the affordability and the value of these systems to households and businesses. From the consumer's perspective—and for those able to access the benefits of PV—this option is effective in reducing costs to a degree not rivalled by alternative approaches, which no doubt accounts for its popularity. There is policy support for such investments through the Small Technology Certificates scheme and through local subsidies in some states and local government areas.[3]

There are significant risks associated with the unplanned nature of the transition, however, including:

- unequal access to the financial benefits of solar systems
- little attention to energy efficiency improvement
- a lack of planning for electricity (or energy) system transition
- uncertain greenhouse gas emission outcomes.

These are considered briefly in turn.

First, the ability to access the financial benefits of PV systems is limited to those with a suitable housing type, tenure and solar access; and with sufficient income to finance the investment. A growing concern is that those energy users with access to PV will be largely insulated from policy and energy price fluctuations, while those without—which may include many low-income and disadvantaged Australians—will have no such protections.

Second, energy efficiency policy in Australia has stalled over the last 5–10 years, at least at the national level. There have been no changes to new building energy performance regulation since 2010, and no new standards for appliances and equipment for 5 years. Many programs have been terminated, including the successful Energy Efficiency Opportunities program, the Low-Income Energy Efficiency Program and others. Some jurisdictions choose to opt out of nationally agreed housing and building standards, often substituting them with less effective alternatives. In NSW, Australia's largest housing market, BASIX has delivered housing that, on average, rates 1.5 stars less than the 6 star national standard,[4] while in Queensland and the Northern Territory, apartments as low as 3.5 Stars can legally be built in 2018, due to the combined effect of the Queensland Development Code and special provisions in the National Construction Code providing for star ratings to be reduced by 1 star where outdoor living areas are provided.

For housing, no new national standards will be entertained until at least 2022, while for non-residential buildings, the 2019 National Construction Code will lift energy performance standards, but only to a degree marked by modest stringency (ABCB 2018). The National Energy Productivity Plan, launched in 2015, is yet to deliver any new efficiency policies, despite a work program covering 38 policy areas.

Despite this, energy efficiency is contributing to the transition in a modest way through market-led transitions to LED lighting, most importantly, and to steadily more efficient heat pumps, OLED televisions and computer monitors. In certain sectors, such as premium offices, the combination of the NABERS rating system, Commercial Building Disclosure and state/territory efficiency schemes—and property institutions motivated by sustainability rating systems such as the Global Real Estate Sustainability Benchmark (GRESB), Green Star and others—is proving very effective in lifting average efficiency. However, we estimate this sector to represent around 7.5% of all office space in Australia and 1.7% of all non-residential building space. Also, four states and territories operate energy efficiency targets and schemes—Victoria, New South Wales, South Australia and the Australian Capital Territory, and these continue to expand annually. Overall though, the inconsistent nature of efficiency programs from

state to state means that households' and businesses' exposure to energy costs varies as a function of their location and the relevant state government's policy practices. In the presence of climate change, the thermal performance of buildings will need to be considered independently of the nature of their energy supply, due to health and mortality risks associated with heatwaves.

A third risk category from the unplanned transition is the consequences for efficient electricity and energy network planning and investment. The collective effect is such that new network investments—to correct for voltage fluctuations, or to provide distributed storage and ancillary services—are now required. That said, growth in demand (for example, for heat pumps) is equally unplanned and can have similar consequences for networks. Also, some households are investing in batteries, as well as PV systems, and this trend is likely to increase in future, and also to spread to businesses, as battery prices fall. To an extent, households and consumers are making upstream (generation and storage) investments that would previously have been made by electricity businesses, because doing so shelters them from rising and otherwise poorly controllable costs. In future, intelligent networks are expected to emerge—and indeed are required—to better deal with the variable nature of both supply and demand, and this may offer new opportunities for network businesses to create value for their customers.

From a national policy perspective, it is unclear what the net outcome of this bottom-up process will be in terms of future greenhouse gas emissions. Some households—that have sufficient North-facing and unshaded roof area, and the financial means to invest in large PV systems—are already likely to be at or beyond net zero at the building level, exporting more electricity over a year than they import from the grid. However, the potential to achieve similar outcomes elsewhere, or systematically, is not the target of any national policy, although some states, territories and cities are aiming much higher than Australia's national targets (CRCLCL 2017a). Many businesses operate from rented premises and may not be able to access the benefits PV systems except with the co-operation of the building owner. PPAs may be able to be accessed by smaller businesses if they operate in a building with an embedded network supplied by a PPA. The national renewable energy

target remains in place until 2020, but the policy landscape after that date is undefined.

Against this backdrop, what is the role and opportunity for governments to use best practice policies and regulations to accelerate and better manage the transition to a zero emissions future?

## Policy and Regulatory Opportunities—And Opportunity Costs

CRCLCL (2017b) maps best practice policy and regulatory models internationally and in Australia. If utilised to the maximum extent, these policies could reduce energy costs for households and businesses and accelerate the transition to a net zero emissions built environment.

Numerous studies indicate that there are excellent opportunities for using policy to move the built environment towards net zero energy and emissions. A recent study by the Australian Sustainable Built Environment Council and ClimateWorks indicates that it would be cost effective to lift energy performance requirements for housing by between 1 and 2.5 stars (depending upon the climate zone) or by over 50%. Three years delay in delivering this outcome would add $1.1 billion in unnecessary energy bills for the half-million homes built in that period (ASBEC 2018a). For non-residential buildings, ASBEC finds that even 'conservative' Code improvements would save up to 34% of commercial building energy use and up to 56% of public buildings energy use (ASBEC 2018b). Similarly, a new study finds that if Code standards were set to take advantage of cost-effective energy efficiency improvement and solar energy opportunities from 2022, this—along with modest enhancements of existing energy efficiency policy measures nationally and by states and territories—could see the non-residential building sector as a whole achieve net zero energy and emissions before 2050. Delaying cost-effective Code energy performance increases by 3 years (from 2022 to 2025) would forego $4.2 billion in lost economic welfare, while also leading to higher greenhouse gas emissions, future abatement costs, energy costs for businesses, and peak demands and associated infrastructure costs (EA/SPR 2018, p. 7).

Despite this potential, CRCLCL (2017b) also documents the increasing reticence on the part of governments, and particularly the national government, to use policy—and regulatory policy in particular—to influence outcomes in the domain of climate policy. It notes factors such as the significantly higher standards of evidence and process required of regulatory proposals when compared, for example, very large spending programs and subsidies. All major regulatory proposals by the Australian Government and COAG are required to comply with regulation impact assessment and regulatory burden processes, while Budget proposals and non-regulatory policy models face no such requirements.

Second, there appears to be a lack of agreement at the national level about how to manage the changing nature of electricity system security requirements as the grid decarbonises, as evidenced by the COAG Energy Council's inability to agree a new national energy policy in 2018. However, the private sector and market bodies such as AEMO appear to be getting on with the necessary investments and provisions despite this.[5] Australia's national government and most states and territories (with the notable exception of the ACT) appear to continue to harbour doubts about the need for genuine and urgent action to address climate change. This is despite surveys of the Australian population consistently showing strong majority support for action on climate change (The Australia Institute 2018). Also, there is a lack of agreement at the national level on how best to reduce emissions, with the two major policy levers—carbon pricing and regulation—largely dismissed.

More generally, the study notes that regulation, in particular, is increasingly regarded with suspicion by governments in Australia. The Australian Government's Guide to Regulation (Australian Government 2014, p. 16) offers the following advice[6]:

As policy makers, we must balance the desired outcomes of regulation against the burden imposed on potentially large numbers of businesses, community organisations and individuals to achieve that outcome. Remember that regulatory action is not risk free; how confident are you that your proposed solution will work? What are the genuine consequences of no action? Analyse how the problem has been dealt with

in the past or is currently regulated by Commonwealth, state, territory or local government regulations or by governments overseas. Are there deficiencies in the existing approach? Why does current regulation not properly address the identified problem? Is it a problem of design or implementation, or both? How can you be sure your policy options will succeed where others have failed?

While none of these or the Guide's other 39 pages of requirements and questions are individually unreasonable, the combined effect is to discourage and delay regulatory proposals. Indeed, they have the explicit aim of ensuring that regulation is 'introduced as a means of last resort' (p. 3), regardless of potential to increase net social welfare that often exists, at the same time as emissions are reduced. The requirement to measure 'regulatory burden'—that is, regulatory costs considered in the absence of the associated regulatory benefits—represents a significant deviation from evidence-based policy and encourages distorted public policy outcomes. This is particularly concerning when—ironically thanks to regulation impact statement and evaluation requirements—we have very considerable evidence of the effectiveness and cost-effectiveness of regulatory policy, but very little evidence of the effectiveness or cost-effectiveness of non-regulatory policy models, which can be introduced without a transparent process.

In part, because many policy and regulatory settings have fallen behind the pace of change in underlying market realities, the scope for cost-effective policy interventions to lift energy performance in Australia is currently greater than it would otherwise be. For example, non-residential building energy performance standards are proposed to be lifted by an average of 30% in 2019, but this outcome has an expected social benefit cost ratio of 9.5, strongly indicative of low stringency (ABCB 2018, p. 69). The large gap between policy potentials and outcomes reflects the long delay since the last stringency change in 2010 (and a lack of regular review processes in-between), the significant increase in energy prices during this period, and finally the practice of setting low rather than economically optimal standards.

While the balance of this chapter explores the potential for low-carbon policy innovation in the built environment, a prior requirement

is that Australia pays greater attention to basic regulatory house-keeping: ensuring that standards at least keep pace with market realities; and undertaking regular and fully transparent review processes that are rules-based, and which therefore minimise the scope for discretion and special interests to take precedence over the public good.

# Best Practice Policy and Regulatory Models

The CRC's *Best practice policy and regulation* project (CRCLCL 2017b) examines the key features of the policy and regulatory environments for the built environment in parts of Europe, North America and the Asia Pacific, and presents a series of case studies from particular countries and regions.

Europe represents best practice in mandating the core requirements of its member nations' policy packages at the supranational level through EU law. This includes mandating the policy approaches, setting standards and targets those policies are required to meet, setting out a rules-based approaches to updating/increasing stringency of policies, and providing a wide range of supporting mechanisms and an enabling environment. With this overarching structure member nations have developed ambitious individualised policies and policy packages to best suit their conditions/situations.

North America represents best practice in its institutional arrangements, enabling continuous, professional and expert policy and code development at a national level, which is then adopted by the states and cities, as mandated in some instances and voluntary in others. The system of national 'laboratories' is central to the development and maintenance of expertise and the performance of policy-relevant research. National programs include model codes, stretch codes, equipment minimum and high-performance standards and labelling, for which the federal government plays a central support role, providing technical assistance to state and local governments to help facilitate the adoption, implementation and compliance processes. Many North American states and cities are independently setting high targets and providing

comprehensive financial and non-financial support to enable a transformation of building performance.

While it is hard to generalise given the sheer diversity of countries in the Asia Pacific region and their varying political, social, cultural and economic environments, it is notable that there are a number of countries in this region that are widely considered to be at the forefront of development and implementation of policies and policy packages designed to drive energy efficiency and decarbonisation of the built environment. What these countries seem to share is a political and societal willingness for decisive national action, and in many cases far-reaching regulation, which is not common in other areas.

## Individual Policies

Through the review of regional policies and policy packages, best practice elements of each of the individual measures were drawn out.

- National targets, both long and short term, are ambitious and have underlying sector specific contributions established, and pathways to achieving targets set out.
- Building codes use rules-based processes and timelines to deliver ambitious but predictable changes, with coverage extended to require existing elements of a building meet minimum requirements when a renovation triggers the code and to include minimum requirements for onsite renewables or solar readiness.
- Mandatory disclosure is applicable to all building types, is triggered on an ongoing basis (rather than just point of sale or lease), capable of rating both asset and operational performance, leveraged by other complementary programs, and utilised for data collection to allow measurement, monitoring and reporting on energy performance of the building stock as a whole.
- Energy auditing is a requirement for mandatory disclosure and can be linked to a requirement to undertake certain upgrades where the building does not meet minimum requirements.

- High-energy performance assessment tools/labels are used to rate comparative building performance and acknowledge outstanding achievement, are integrated with rating tools required to establish code compliance and mandatory disclosure, and with complimentary incentive schemes as a requirement for eligibility.
- High-performance stretch codes, developed federally, for easy reference/uptake by state and local governments, that can be aligned with future updates to building codes, allowing buildings to be certified to future codes.
- Dedicated market transformation programs that use a combination of information, incentives and regulation to drive market change.
- Tax incentive programs used widely.
- Energy retailer/utility obligation schemes utilised broadly internationally, with mandated targets set at central level, specific targets set for low income and social housing sectors, and are linked to trading schemes targeting other sectors of the economy or carbon pricing schemes more generally.
- Minimum energy performance standards (MEPS) set for a broad range of products, equipment, building materials and systems, with methodology set for future increases to stringency over time, and extended to include high-energy performance (HEPS) labelling which can be leveraged by complementary programs/policies.
- Support for high performing technologies and practices through dedicated research institutions financed by federal governments but sufficiently independent to ensure stability and provision of independent expert analysis, demonstration projects and program trials used to test and demonstrate best practice and to test market capability to meet future requirements, and government sponsored competitions and award programs to incentivise development of high performing technologies.
- Innovative financing mechanisms designed and supported centrally, including on-bill and property-assessed financing, energy efficient mortgages/loans and public–private partnerships that encourage investment in energy performance of buildings and support investor recognition of high performing buildings as an investment asset class.

# Policy Packages

In Europe, in particular, we see combinations of deliberately ambitious targets, Codes, mandatory disclosure (still an emerging policy approach), energy retailer obligations, energy audit programs and incentives for high/above-minimum performance including financial incentives, and high-performance standards and labelling. In both the United States and Europe, we see a willingness for governments to intervene in product and service markets with the explicit aim of changing existing market outcomes, in order to shift the balance in favour of high-efficiency and low-carbon solutions. This approach, known as market transformation, was pioneered by the United States in the 1980s and 1990s, with the Environmental Protection Agency running consumer-focused initiatives such as EnergyStar, while the Department of Energy placed (and continues to place) a strong emphasis on technical research. US DOE's funding is invariably linked to co-funding or other support by universities and companies, in order to facilitate commercialisation of research success. This approach is largely responsible for the commercial development of LED lighting, for example, and the commercialisation of sub-compact fluorescent lighting before that, among the many technologies targeted and supported for market transformation.[7]

We find that the *interaction* between complementary policies was a key feature of best practice policy packages:

- Policies were designed in combination to complement, leverage, strengthen and streamline.
- Common combinations included building codes, building rating/disclosure, beyond-Code incentives.
- Supporting tools designed for multiple functions, for example a rating tool that provides an asset rating used to evidence meeting code requirements, can also be used for purposes of mandatory disclosure and beyond code initiatives.
- Targeted market transformation initiatives use a combination of information, incentives and regulation to drive market change. This is done using labels, information, minimum standards, procurement, grants and rebates.

# Conclusions

While the countries and regions surveyed have diverse political, social, cultural and economic environments and histories, what leading nations have in common includes:

- Setting high but achievable targets, short- and long-term, with 'trajectories' or pathways for their achievement.
- Clarity and transparency of objectives—reducing greenhouse gas emissions is commonly cited as a primary concern.
- The use of comprehensive and integrated policy packages, comprising a broad palette of complementary individual measures, rather than over-reliance on single instruments (or prohibitions on certain policy choices, such as regulation).
- Sustained and progressive efforts over long periods of time, including professional and transparent management of policy change over time.

CRCLCL (2017b) calls for a renewed focus in Australia on the use of evidence- and rules-based processes to determine the most effective and efficient policy instruments, while setting aside preconceived ideas about policy instrument choice. It argues that the distinction between 'market based' or 'economic' measures on the one hand, and regulatory measures on the other, is entirely false: policies known as economic measures, such as carbon trading/pricing schemes, make extensive use of regulation, while regulation can be used to create markets and to achieve market transformations.

The Report notes that many Australian policy practices relating to the carbon performance of the built environment lag behind international best practice by a large measure. While the factors noted above that distort the choice of policy instruments certainly contribute to this outcome, greater attention needs to be paid to the role of specific practices that contribute to sub-optimal outcomes. In particular, the timing of policy and regulatory reviews appear to be largely discretionary. This is leading to outdated standards being left in place long after economic conditions have changed, warranting review and (generally)

updating to contemporary standards. Further, current review processes lack transparency and accountability. For example, regulation impact assessments require consultation, but if no RIS is triggered following an internal policy review, then the nature of that review and its outcomes may never be known, and the reasons for failing to proceed with policy or regulatory reforms will equally remain hidden, with no opportunity for stakeholder input into the process. We call for a renewed commitment to objective, rules-based and transparent processes for reviewing and renewing policies and regulations.

Finally, the CRC Report demonstrates that there are policy models and practices in use around the world that could be drawn upon in Australia to accelerate the transition to a net zero emissions built environment, and to do so in a managed, equitable and cost-effective manner. To this end, Australian policymakers would do well to recommit to:

- Setting ambitious but achievable targets, for both the short and longer terms, and identifying detailed and least-cost policy pathways for ensuring that those targets are met
- Taking urgent, effective but also cost-effective action to reduce greenhouse gas emissions
- Making use of the full palette of policy and regulatory policy models, in complementary and effective packages, with policy instrument choice being made on the basis of evidence rather than ideology
- Policy and regulatory practices, including review processes, that are objective, rules-based, transparent and accountable.

## Notes

1. http://www.esdnews.com.au/one-in-five-australian-homes-powered-by-rooftop-solar/, viewed 11 December 2018.
2. https://reneweconomy.com.au/two-million-australian-households-now-have-rooftop-solar-and-they-vote-90424/, viewed 11 December 2018.

3. http://www.cleanenergyregulator.gov.au/RET/About-the-Renewable-Energy-Target/How-the-scheme-works/Small-scale-Renewable-Energy-Scheme, viewed 11 December 2018.
4. http://www.nathers.gov.au/newsletters/issue-4-june-2017/nathers-numbers, viewed 11 December 2018.
5. https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Planning-and-forecasting/Integrated-System-Plan, viewed 11 December 2018.
6. http://www.cuttingredtape.gov.au/, viewed 11 December 2018.
7. The key services provided by the US Office of Energy Efficiency and Renewable Energy are noted here: https://www.energy.gov/eere/services, viewed 11 December 2018.

# References

ABCB 2018, *NCC 2019 Consultation regulation impact statement: energy efficiency of commercial buildings*, Australian Building Codes Board, Canberra, ACT.

ACCC 2017, *Retail electricity pricing inquiry: preliminary report*, 22 September 2017, Australian Competition and Consumer Council.

ASBEC/ClimateWorks 2018a, *The bottom line: the household impacts of delaying improved energy performance requirements in the building code*, February 2018, Australian Sustainable Built Environment Council and ClimateWorks, Surrey Hills, NSW.

ASBEC/ClimateWorks 2018b, *Built to perform: an industry led pathway to a zero carbon ready building code*, July 2018, Australian Sustainable Built Environment Council/ClimateWorks, Surrey Hills, NSW.

Australian Government 2014, *The Australian Government guide to regulation*, Canberra.

The Australia Institute 2018, *Climate of the Nation 2018: tracking Australia's attitudes towards climate change and energy*, September 2018, Canberra.

CRCLCL 2017a, *Leading the way: low carbon policies and measures in Australia's capital cities*, November 2017, Co-operative Research Centre for Low Carbon Living, Sydney.

CRCLCL 2017b, *Best practice policy and regulation for low carbon outcomes in the built environment*, April 2017, Co-operative Research Centre for Low Carbon Living, Sydney.

EA/SPR 2018, *Cost-effective energy performance requirements for non-residential buildings, 2022–2034, final report*, 5 September 2018, Energy Action/ Strategy. Policy. Research.

Greenwood, Oakley 2018, *Gas price trends review 2017*, March 2018, Margate Beach, Queensland.

IRENA 2018, *Renewable power generation costs in 2017*, January 2018, International Renewable Energy Agency, Abu Dhabi.