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Supporting the Trajectory for Low Energy Buildings

Discussion Paper | 2022

Prepared by

Western Australian Local Government Association (WALGA) in collaboration with the ESD for Buildings Reference Group.

Acknowledgement

WALGA acknowledges the Traditional Owners of the lands of Western Australia and pays respects to Elders past, present and emerging.

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Executive Summary

The purpose of this paper is to identify a set of actions that WALGA and Local Governments can take to help ensure that the Trajectory for Low Energy Buildings (the Trajectory) is effectively implemented in Western Australia.

The Trajectory is a national plan prepared by the Australian Building Codes Board that provides a forecast of regular changes to the energy efficiency provisions of the National Construction Code (NCC) to achieve net zero carbon (and energy) residential and commercial buildings. It also provides recommendations to improve energy efficiency in existing buildings.

The Trajectory was endorsed by all Australian State and Territory Governments in 2019. WALGA's State Council endorsed its support of the Trajectory in 2021.

Successful implementation of the Trajectory and associated changes to the NCC will help the State Government and Local Governments meet a range of strategic objectives related to:

- Lowering energy bills for households and businesses
- Creating jobs
- Improving the comfort and safety of buildings in a warming climate
- Reducing fossil fuel dependence, lowering carbon emissions and achieving net zero carbon goals, and
- Streamlining planning and building regulation.

The discussion paper identifies 14 opportunities to support the Trajectory's effective implementation in Western Australia. Six opportunities are identified where the the Local Government Sector can **lead by example** and **support market transition**, including:

1. Adopt higher energy efficiency standards for Local Government owned and operated buildings
2. Develop and promote local case studies that demonstrate the costs and benefits of energy efficient public buildings
3. Advocate for a market transition support program
4. Advocate for mandatory disclosure of residential ratings at point of sale or lease
5. Offer development incentives, and
6. Provide fact sheets and case studies for new homebuyers, renovators and developers

The paper also identifies five opportunities for the State Government to minimise regulation complexity and establish an effective and **efficient statewide regulation** system, including:

7. Implement NCC 2022 (Volume 2) by September 2023
8. Elevate energy efficiency into planning
9. Strengthen lot and building orientation requirements in liveable neighbourhoods and residential design codes
10. Mandate accredited energy efficiency assessments, and
11. Require mandatory compliance inspections during and post construction

Finally, the paper proposes **alternative approaches** that could be pursued in lieu of an adequate statewide, regulatory approach, including:

12. Seek legal advice to identify provisions that raise minimum standards
13. Seek legal advice to identify provisions that require compliance at planning, and
14. Provide energy efficiency assessment training for local government compliance officers

WALGA is seeking feedback from members on the opportunities identified in this paper by **COB Friday, 22 April 2022**. This feedback will be used by WALGA to inform its advocacy and priority actions to support the Trajectory's implementation in Western Australia.

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Figure 1: The Terraces in Claremont, by Iris Residential, will be one of the highest performing residential complexes in Western Australia once constructed, designed to meet an average 8-star (NatHERS) rating, with 30 per cent achieving a 9-star or higher rating.

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1. Introduction

Purpose

The purpose of this paper is to identify a set of actions that WALGA and Local Governments can take to help ensure that the Trajectory for Low Energy Buildings (the Trajectory) is effectively implemented in Western Australia.

The Trajectory is a national plan prepared by the Australian Building Codes Board (ABCB) that provides a forecast of regular changes to the energy efficiency provisions of the National Construction Code (NCC) to achieve net zero carbon (and energy) residential and commercial buildings.[1] The Trajectory also includes an addendum that provides recommendations to improve energy efficiency in existing buildings. In 2019, the Trajectory was endorsed by Energy Ministers in all Australian States and Territories.

In 2021, WALGA's State Council endorsed its support of the Trajectory by adopting the following policy position:

"WALGA supports the Australian Building Codes Board's Trajectory for Low Energy Buildings, by supporting Local Governments to meet community strategic objectives of a net zero carbon future by 2050, through work with members, state agencies and industry groups".[2]

WALGA adopted this position following requests from Local Governments to assist the sector to achieve energy efficiency related strategic objectives and identifying that 80 per cent of Local Governments have adopted similar objectives in Council endorsed strategies.[3]

Structure

The discussion paper sets out 14 opportunities for WALGA and Local Governments to support the Trajectory's implementation in Western Australia and help achieve Local Government strategic objectives. These opportunities are categorised into four sections, including:

- Opportunities for Local Governments to **lead by example**
- Opportunities that incentivise and **support market transition**
- Opportunities to minimise regulation complexity and establish an effective and **efficient statewide regulation** system, and
- Opportunities that for Local Governments to work together on **alternative approaches** in lieu of effective statewide regulation.

1 Australian Government (2019) Trajectory for Low Energy Buildings, accessed online here on 7 January 2021

2 WALGA (2021) State Council Full Minutes 1 December 2021, p.33, accessed online here on 11 March 2022. This policy position aligns with WALGA's Climate Change Policy Statement 2018, available online here.

3 WALGA reviewed 50 per cent of community strategic plans and local planning strategies that represented a mix of metropolitan, regional and rural Local Governments and found that 80 per cent of Local Governments adopted objectives to reduce emissions from buildings and/or improve building energy efficiency.

Approach

This paper was prepared by WALGA and a reference group of officers from several Local Governments across Western Australia. To prepare the paper, WALGA held workshops and meetings with Local Governments, State Agencies, Ministerial Offices and industry associations to identify key challenges and opportunities for implementing the Trajectory in Western Australia.

WALGA would like to thank all those involved in these workshops and meetings. In particular WALGA thanks representatives from the officer's reference group and members of the National Australian Built Environment Rating System (NABERS) for their important contributions. These acknowledgements do not signify endorsement by these contributors of the discussion paper's findings.

Providing Feedback

WALGA is seeking feedback from Local Government planners, building surveyors, sustainability officers, asset managers and other staff with responsibilities in improving building energy efficiency. Feedback should respond to each opportunity and/or offer alternative opportunities. Feedback can be provided as comments within this document or using a separate document.

Feedback will be used by WALGA to develop priority actions that can be progressed to support implementation of the Trajectory in Western Australia. These actions, which are dependent on resourcing and approvals, may include:

- Actions that can be progressed by Local Governments **individually**, such as adopting incentive based policies and setting higher than minimum standards for Local Government owned and managed buildings
- Actions that can be implemented by Local Governments **collaboratively**, such as seeking legal advice to identify provisions that require compliance with energy efficiency provisions at planning, and
- Actions that can be implemented by **WALGA**, such as advocating for an effective and efficient statewide regulatory system and providing energy efficiency assessment training for compliance officers.

Feedback should be provided by **COB, Friday 22 April 2022** via email to WALGA's Planning and Building Team at planning@walga.asn.au For more information, please contact WALGA's Planning and Building Team on 9213 2000 or at planning@walga.asn.au

Figure 2: Walyalup Koort, the City of Fremantle's new civic centre, designed and built to achieve a 5-star Green Star rating.

2. Energy Efficiency

Components of Energy Efficiency

Energy efficiency encompasses two main components that provide opportunities for improving building performance.

Energy use - describes how a building uses energy to heat and cool spaces, produce hot water in kitchens and bathrooms, run cooking appliances, light rooms, heat swimming pools and energise other building functions.

Thermal performance - describes how well a building's structure (or shell) maintains air temperature. The thermal performance of a building is determined by many factors, including thermal mass (such as floors and walls), insulation, building orientation, solar exposure, shading, cross ventilation and glazing.

The energy embodied in construction materials is also an important component. For instance, approximately 25 per cent of a building's total energy consumption is attributable to embodied energy used during construction (75 per cent is attributable to operation).[4] However, reducing embodied energy is a relatively new and complex policy area, demonstrated by its current absence in the Trajectory and NCC.

A number of advocacy groups and agencies in other states are currently investigating opportunities to address embodied energy through incentives and codified standards.[5] WALGA is following these developments closely and will identify opportunities for application in Western Australia as these pilot projects and trials progress.

Why Support the Trajectory for Low Energy Buildings?

The Trajectory and supporting documents outline that coordinated action on energy efficiency is needed because:

- Households and businesses have higher than necessary energy bills
- Market failures and barriers prevent change without government action
- Modelling indicates that current energy efficiency requirements in the NCC are not set at an optimal level to address market failures and barriers
- Changes in building energy usage has a significant impact on the reliability of energy grids
- Buildings are long-lived and the impact of sub-optimal buildings built now will last for a long time, and
- Industry is seeking certainty in order to drive innovation and remain

4 Rock, et al (2020) Embodied GHG emissions of buildings – The hidden challenge for effective climate change mitigation, accessed online here on 22 February 2022.

5 WWF Australia (2020) 7 ways to tackle embodied carbon in the building and construction industry, accessed online here on 14 March 2022. GBCA (2021) Embodied Carbon & Embodied Energy in Australia's Buildings, accessed online here on 14 March 2022. NSW Department of Planning, Industry and Environment (2021) "draft State Environmental Planning Policy (Design and Place) 2021", accessed online here on 24 January 2021.

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competitive.[6]

Successful implementation of the Trajectory in Western Australia will help the State Government and Local Governments meet a range of strategic objectives related to:

- Lowering energy bills for households and businesses[7]
- Creating jobs[8]
- Improving the comfort and safety of buildings in a warming climate[9]
- Reducing fossil fuel dependence, lowering carbon emissions and achieving net zero carbon goals,[10] and
- Streamlining planning and building regulation.

Challenges to Implementation in Western Australia

Several key challenges will need to be overcome to ensure successful implementation of the Trajectory in Western Australia. These challenges include:

- Energy efficiency is highly technical and collecting and understanding investment pay back information to make informed decisions is difficult and time consuming for consumers
- Energy efficiency investments require up-front capital (or financing) while the benefits of lower energy use accrue over time
- Split incentives, which occur when one party accrues the up-front costs (investor) while the other party receives the benefits such as lower energy bills (lessee)
- Energy efficiency is considered late in the development and compliance process after key factors that affect energy efficiency, such as lot and building orientation, have been fixed in place
- Limited capacity of compliance authorities to assess highly technical, energy efficiency certificates, and
- Absence of mandatory inspections during construction to ensure compliance with approved designs.

More information on the benefits and challenges of effective Trajectory implementation is available in the suite of Trajectory reference documents.[11]

The following sections outline 14 opportunities for WALGA and Local Governments to support the Trajectory's effective implementation in Western Australia, starting with opportunities for Local Governments to lead by example.

6 Commonwealth of Australia (2019) Trajectory for Low Energy Buildings, accessed online here on 7 January 2021, from p.2. See also, Commonwealth of Australia (2018) Report for Achieving Low Energy Homes, accessed online here on 14 March 2022.

7 Renew Australia (2021) Households Better Off: Lowering energy bills with the 2022 National Construction Code, accessed online here 19 October 2021. See also, AECOM (2018) Class 1 dwelling modelling results and Class 2 dwelling modelling results, both accessed online here 9 March 2022. WALGA is currently seeking additional information related to costs from accredited energy assessors.

8 Climate Council (2021) Clean Jobs Plan, accessed online here on 4 November 2021. See also ASBEC and Low Carbon Living CRC (ND) accessed online here on 8 November 2021.

9 Climate Council (2021) From glorified tents to renewable powerhouses: Australia's opportunity for home energy efficiency, accessed online here on 28 October 2021.

10 Buildings contribute nearly half of Australia's electricity consumption and almost a quarter of the country's greenhouse gas emissions. ASBEC (2018) Built to Perform, accessed online here on 22 February 2022. See also, Renew (2021) "Households Better Off: Lowering energy bills with the 2022 National Construction Code" accessed online here on 15 February 2022. In Perth, an average household living in a 6-star dual fuel house produces approximately 4.2 tonne of carbon emissions per year. The same household living in a 7-star house with efficient fixed appliances and small photovoltaic system but no battery, will emit 75 to 100 per cent less carbon emissions.

11 Commonwealth of Australia (2019) Trajectory for Low Energy Buildings, accessed online on 7 January 2021

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3. Lead by Example

Opportunity 1 – Adopt higher energy efficiency standards for local government owned and operated buildings

Local Governments can adopt and implement energy efficiency standards beyond minimums set in the NCC for current and new, Local Government owned and managed buildings. This approach would:

- Demonstrate the benefits of higher standards to the community and industry
- Legitimise policies that encourage applicants of new development to meet higher energy efficiency standards
- Demonstrate to the community and industry how energy efficiency standards that go beyond NCC minimums can be beneficial and achieved
- Stimulate demand for new construction materials and practices, helping to transition local supply chains, and
- Reduce corporate emissions and help meet emission reduction targets.

To support this approach, Local Governments may consider:

- Internal, cross-departmental working groups that oversee policy implementation and regular revision, chaired by a director or manager with ultimate responsibility for the policy
- Linking outcomes to team and individual key performance indicators, and
- Ensuring accountability and transparency by communicating cost benefit analyses that show net project benefits over a building's lifecycle.

Useful resources include:

- Eastern Alliance for Greenhouse Action (Victoria) has prepared a template policy and guidelines that could be used as a baseline for preparing a version for Local Governments in WA
- Smart energy management in government operations prepared by the GBCA, Energy Efficiency Council, Australian Sustainable Built Environment Council (ASBEC) and Property Council of Australia, and
- Government Resource Efficiency Policy (GREP), NSW Government (2014).

Opportunity 2 - Develop and promote local case studies that demonstrate the costs and benefits of energy efficient public buildings

Prepare case studies that communicate the benefits of setting higher energy efficiency standards for new Local Government owned and operated buildings and how implementation barriers can be addressed. Short and long-term benefits to communicate should include:

- How to minimise higher up-front construction costs through appropriate orientation and floor plan design
- Benefits such as lower energy bills, higher levels of comfort for staff and other users, lower carbon emissions, and
- Different building types including administration buildings, libraries and recreational centres.

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4. Support Market Transition

Opportunity 3 – Advocate for a market transition support program

The energy efficiency of a building is affected by different design elements including lot and building orientation, floor plan, window position and size, shadowing, ventilation, insulation and appliances. Many of these design elements can be implemented with little to no cost, such as building orientation, floor plan design and window positioning. In other instances, additional costs for materials such as high-grade insulation and glazing will be unavoidable, particularly in cooler climates.

Despite the fact that lower energy bills and higher resale prices will help offset, and are likely to nullify, additional construction costs within a mortgage or finance payback period,[12] additional up-front costs are a barrier to finance for some purchasers and developers.

Furthermore, shifting to higher energy efficiency standards requires a building and construction industry with the skills, knowledge, materials and practices to meet higher standards; however, some construction industry supply chains operate under structures that can act to limit the support and growth of new markets.[13]

A market transition support program that includes incentives for homeowners and training for industry could help to overcome these challenges while creating jobs.[14]

As an example, the Victorian Government has established the 7 Star Homes Program. The program provides training so that industry has the skills and capabilities required to deliver 7-star construction in advance of changes to the NCC. The program also offers financial rebates of $4,000 for each dwelling that

12 Renew Australia (2021) Households Better Off: Lowering energy bills with the 2022 National Construction Code, accessed online here 19 October 2021. Renew modelled the costs and benefits of six energy efficiency scenarios for a medium sized home in four major Australia cities. See also, AECOM (2018) Class 1 dwelling modelling results and Class 2 dwelling modelling results, both accessed online here 9 March 2022. WALGA is currently seeking additional information related to additional costs from accredited energy assessors.

13 ASBEC and CRC for Low Carbon Living (ND) Growing the market for sustainable homes: Industry roadmap, accessed online here on 10 November 2021. See also, DMIRS (2019) Reforms to the building approval process for single residential buildings in Western Australia, accessed online here 9 March 2022. "In WA, the residential building sector is a highly concentrated market, dominated by a number of large-volume home builders. These businesses are able to enjoy economies of scale in the purchase of supplies and materials by offering a set of standardised plans that are built over and over again. Approximately 70 per cent of the total number of single residential builds each year in WA are completed by volume home builders. This differs markedly from other Australian jurisdictions…" (p.8).

14 Climate Council (2021) Clean Jobs Plan, accessed online here on 4 November 2021. Recent modelling showed that energy efficiency is one of the largest job creation opportunities in Australia following COVID. See also ASBEC and Low Carbon Living CRC (ND) accessed online here on 8 November 2021. Preliminary economic modelling undertaken by ASBEC and CSIRO has found that investing in voluntary measures to accelerate Australia's transition to sustainable homes by 2030 would: deliver more than half a billion dollars of extra investment in the construction industry; create over 7,000 new jobs; and, save Australians more than $600 million on their energy bills (p.4).

achieves 7-star construction in advance of changes to the NCC.[15]

A similar approach could be taken in Western Australia. Household incentives could be used to encourage homeowners to meet upcoming NCC changes prior to their formal adoption, by incrementally lifting the minimum standard for accessing an incentive in advance of NCC changes. This approach would encourage continued market and supply chain adjustment in accordance with the Trajectory.

Similar incentive programs could be made available to support upgrades to existing buildings.[16] The Clean Energy Finance Corporation (CEFC) administers a sustainable cities program that provides discounted finance to help establish such programs.[17]

Opportunity 4 – Advocate for mandatory disclosure of residential ratings at point of sale or lease

In Western Australia, sellers and lessors of commercial property are required to disclose the building's energy efficiency rating, for buildings >1,000sqm;[18] however, disclosure is not required for residential buildings.

The mandatory disclosure of energy efficiency ratings and average energy consumption for residential buildings would provide clear information to potential purchasers and lessees. These disclosures are likely to improve market knowledge and encourage the construction of buildings with higher energy efficiency standards to improve sale potential and rentability.

Western Australian households have expressed a strong appetite for the introduction of mandatory energy efficiency disclosures. Approximately 57 per cent of interview participants supported their introduction, 33 per cent were neutral or unsure, and only 10 per cent opposed.[19]

Research has also found that combining minimum building standards with disclosure regulation pulls the market toward higher performance outcomes than where building regulations alone are used.[20]

A national framework for energy efficiency disclosure has been drafted by the Australian Government's Department of Industry, Science, Energy and Resources (DISER) and is currently in review with industry stakeholders. A final draft is expected to be released in 2022. The framework will propose the option of making disclosure mandatory at point of sale or lease, similar to the approach taken by the Australian Capital Territory, which has the longest running mandatory disclosure program in Australia.[21] Adoption will ultimately be a decision for individual state and territory governments.[22]

15 Sustainability Victoria (2021) 7 Star Homes Program, accessed online 18 October 2021 here. In 2021 the program was fully subscribed. Rebates are provided following compliance verification through an as-built compliance check.

16 Australian Council of Social Service (ACOSS) recently advocated for a similar program, see ACOSS (2020) Joint Proposal for Economic Stimulus Healthy & affordable homes: national low-income energy productivity program, accessed online here on 4 November 2021. Also, in 2021, the Victorian Government announced a household energy savings package, including $335 million to deliver new high efficiency heating and cooling systems for low income households and $112 million for energy upgrades to social housing properties. In Canada, the Greener Homes Grant provides funds for home evaluations and retrofits such as home insulation, windows, doors and air sealing, to a total of $5,600. Government of Canada (2021) Canada Greener Homes Grant, accessed online here on 4 November 2021.

17 Clean Energy Finance Corporation (2021) CEFC investments forge path to net zero, accessed online here on 29 October 2021.

18 A NABERS energy rating is required for sale or lease. This is a result of the Federal BEED Act, available here.

19 Essential Research (2019) Energy consumers Australia: Energy Consumer Sentiment Survey, accessed online here on 4 November 2021.

20 Berry S, Moore T and Ambrose M (2022) Australia's Experience of Combining Building Energy Standards and Disclosure Regulation. Front. Sustain. Cities 4:801460. doi: 10.3389/frsc.2022.801460

21 ACT Government (2019) Energy Efficiency Standards, Ratings and Disclosure, accessed online here on 2 March 2022.

22 Department of Industry, Science, Energy and Resources (2021) NatHERS overview and changes to regulation webinar, accessed online here on 21 December 2021. The framework includes a residential energy ratings tool that builds on Victoria's Residential Efficiency Scorecard Program, a voluntary thermal performance and energy efficiency assessment for existing homes.

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Opportunity 5 – Offer development incentives

Incentive based policies have the potential to play an important role in creating market demand for better performing buildings and stimulating the transition of industry supply chains. Local Governments can offer applicants incentives such as height, setbacks and bonus plot ratio to meet standards beyond those set in the NCC, using local planning scheme and policy provisions.

The City of Fremantle and the City of Canning have both adopted such policies. The City of Fremantle's policy applies in split density coded areas and allows applicants of subdivision and development in these areas to achieve a higher density code if energy efficiency standards above the NCC are met.[23]

Opportunity 6 – Provide fact sheets and case studies for homebuyers, renovators and developers

Homebuyers, renovators and developers may be unaware of the benefits of energy efficient buildings and how energy efficiency standards can be achieved. WALGA and Local Governments could prepare fact sheets and case studies relevant to different climate zones across Western Australia, for residents and businesses seeking to build, renovate or upgrade existing assets. These fact sheets and case studies could be made available at front counters and online, and include the following information:

- Benefits such as lower energy bills and shorter finance payback periods,[24] improved comfort and safety in a warming climate,[25] higher selling prices and faster sales,[26] [27] and lower carbon emissions
- The availability of discounted finance for meeting higher standards,[28] [29] and
- The benefits of engaging accredited energy assessors early in the design process and examples that show how design and construction can be low-cost or cost neutral.[30] [31]

23 City of Fremantle (2014) Local Planning Policy 2.2: Split Density Codes and Energy Efficiency And Sustainability Schedule, accessed online here on 2 March 2022.

24 Renew Australia (2021) Households Better Off: Lowering energy bills with the 2022 National Construction Code, accessed online here 19 October 2021. See also, AECOM (2018) Class 1 dwelling modelling results and Class 2 dwelling modelling results, both accessed online here 9 March 2022. WALGA is currently seeking additional information related to costs from accredited energy assessors.

25 Climate Council (2021) From glorified tents to renewable powerhouses: Australia's opportunity for home energy efficiency, accessed online here on 28 October 2021.

26 ABC News (2021) A green home can not only save you money but even turn a profit, accessed online here on 28 October 2021. Domain (2020) Energy-efficient homes can sell for as much as 10 per cent more, research shows, accessed online here on 4 November 2021.

27 The Fifth Estate (2021) The higher the rating, the higher the price: green ratings significantly boost building values, accessed online here on 29 October 2021. "Office buildings in Australia's two largest cities with a NABERS Energy rating of up to 4.5 stars benefited from an eight per cent premium on sales price compared to unrated buildings, while those with higher ratings of 5, 5.5 or 6 stars saw a massive 18 per cent increase".

28 Bank Australia (2021) Clean Energy Home Loan, accessed online here on 26 October 2021. Bank Australia offers a clean energy home loan that includes a 0.2 per cent interest rate discount for five years. The property must be constructed to meet a NatHERS rating of 7-stars and certified by an accredited NatHERS assessor.

29 CEFC (2021) CEFC backs new green home loan as Firstmac lifts focus on environmentally friendly housing, accessed online here on 4 November 2021. Homes that achieve a 7-star or higher NatHERS rating qualify for loans that enable borrowers to benefit from a 0.4 per cent interest rate discount for up to five years on loans up to $1.5 million. Construction loans are also available for developers to receive an interest rate discount up to 1.58 per cent.

30 Josh's House accessed online here on 21/01/2022, demonstrates that resource efficient homes can be built at a comparable cost and timeframe to regular houses while achieving a 9-star NatHERS energy efficiency rating using conventional building materials and construction methods.

31 Free plans and technical specification for Perth are available on the Federal Government's Your Home website, accessed online here on 27 October 2021.

5. Efficient Regulation

Opportunity 7 – Implement NCC 2022 (Volume 2) by September 2023

The National Construction Code (NCC) is the main instrument used to set and regulate minimum energy efficiency standards across Australia. In Western Australia, the NCC is administered through the *Building Act 2011* and *Building Regulations 2012*. Compliance with the NCC is generally assessed at the building permit stage.

The NCC consists of two volumes. Volume 1 covers class 2 to 9 buildings (commercial buildings). Volume 2 covers class 1 and 10 buildings (residential).

As discussed in Section 1, the Trajectory for Low Energy Buildings, adopted by all State and Territory Governments in 2019, forecasts thermal performance and energy use changes that will be made to the NCC to achieve net zero carbon (and energy) commercial and residential buildings across Australia. It is a key initiative to address Australia's 40 per cent energy productivity improvement target by 2030 under the National Energy Productivity Plan.[32]

In May 2021, Western Australia adopted NCC 2019 Vol 1 and 2. This change lifted minimum energy efficiency standards for all commercial buildings and made some changes to strengthen the requirements around performance assessments for residential buildings (strengthening the Verification Using a Reference Building or VURB method). Included in the national changes for residential buildings were specific heating and cooling load limits that address the issue of buildings overperforming in the dominant season.[33] Heating and cooling load limits have been disapplied in Western Australia but may come into effect with the adoption of NCC 2022.

Proposed energy efficiency changes to the NCC 2022 include:

- Increasing the minimum thermal performance standard for residential dwellings (detached and attached) from a 6-star NatHERS rating equivalent to a 7-star rating
- Introducing a whole-of-home energy use budget that sets an annual maximum energy use amount for fixed-appliances such as heating and cooling systems, hot water systems, lighting and swimming pool heaters. The budget can be achieved by using a mix of efficient fixed-appliances and installing rooftop solar panels,[34] and

32 Australian Government (2019) Trajectory for Low Energy Buildings, accessed online here on 7 January 2021

33 For more information see ABCB (2018) Inclusion of Heating and Cooling Energy Load Limits in NatHERS assessments - Final Regulation Impact Statement for Decision accessed online here 18 March 2022.

34 ABCB (2021) The Consultation Regulation Impact Statement (CRIS) explained: Proposed NCC 2022 residential energy efficiency provisions, accessed online here on 1 November 2021. A similar approach may be introduced for commercial buildings in 2025 (see Victorian Government (2019) Environmentally sustainable development of buildings and subdivisions Roadmap paper (p.17), accessed online here on 2 November 2021). Additional information regarding the NatHERS revisions is available in NatHERS 2022 Whole of Home Energy Overview, accessed online here on 12 November 2021 and NatHERS overview and changes to regulation webinar video, accessed online here on 21 December 2021.

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- Introducing switchboard and conduit requirements to accommodate future retrofitting for electric vehicle charging and energy storage equipment.

The NCC 2022 (Volume 2 – Residential Buildings) is scheduled to be implemented from September 2022;[35] however, it seems likely that a transition period will be applied by the State Government, which may range from 12 to 36 months. There is also a risk that certain NCC provisions may be disapplied as occurred with the NCC 2019.

Each year that the NCC 2022 is delayed in Western Australia will result in higher household energy bills and millions of tonnes of avoidable carbon emissions:

- Approximately 20,000 new homes will be built that do not meet national energy efficiency standards
- Approximately 84,000 tonnes of avoidable greenhouse gas emissions will be emitted, the equivalent of average emissions from over 18,200 cars
- New homeowners in Perth will pay on average, an additional $934 each in energy bills, the equivalent of approximately $16.8 million in avoidable household energy bills, and
- New homeowners in Perth will be on average $348 worse off.[36]

Delaying implementation of the NCC 2022 may also see the emergence of different regulatory approaches across the State as Local Governments seek alternative avenues to meet community expectations.

The most efficient and effective way to achieve higher energy efficiency performance in Western Australia is to ensure that the NCC 2022 is adopted in full with a maximum 12-month transition period from date of adoption by the ABCB in September 2022.

Opportunity 8 - Elevate energy efficiency into planning

In Western Australia, thermal performance and energy use are building regulation requirements, which are generally assessed at the building permit stage. This process means that critical factors that affect a building's energy efficiency, such as floor plans, and window sizing and positioning, are fixed in place during the development approval or deemed-to-comply check, prior to considering compliance with energy efficiency at the building permit stage.

Consequently, meeting energy efficiency requirements at the building permit stage, once floor plans, window sizes and window positions are fixed in place, may require expensive modifications, such as high-grade insulation or glazing. Alternatively, an applicant may seek to amend the building's floor plan and windows, which would require a second development assessment or deemed-to-comply check, adding administrative costs and processing time. These additional costs and time could be avoided if energy efficiency is considered earlier in the design and compliance process, i.e., prior to lodging a development application or deemed-to-comply checks.

An efficient solution adopted in other states is to introduce energy efficiency requirements earlier in the compliance process by elevating NCC requirements into a state-wide planning instrument. In NSW, applicants of residential buildings are required to demonstrate compliance with energy efficiency when submitting a development application or a complying development certificate

35 Australian Government (2021) Building Minister's Meeting: Communiqué November 2021, accessed online here on 16 December 2021.

36 In 2021, Renew modelled the costs and benefits to households of transitioning to the proposed NCC 2022. The report compared a business-as-usual 6-Star home with no energy budget (basic appliances and no solar) with various scenarios, including a 7-Star home with a basic energy budget. This scenario was used in these calculations. Renew used construction costs provided by the ABCB. Housing construction projections as per Western Australia's Housing Industry Forecasting Group (HIFG) of up to 20,000 new dwellings in FY 2022/2023. Report accessed online here on 11 February 2022. Calculations - Energy bill savings forgone in Perth: $934 per household x 18,000 homes = $16,812,000. Avoidable household expenditure (slightly higher mortgage repayment resulting from additional up-front costs minus energy bill saving) = $29 per month x 12 months = $348 per household. Months saved off 25 year mortgage (where energy bill savings are used to pay mortgage): 6 months. Avoidable carbon emissions: 4.2 ton per household x 20,000 homes = 84,000 ton, equivalent to ~18,261 cars (149,000 / ~4.6 ton per car per year). For more information see Renew (2021) Households Better Off: Lowering energy bills with the 2022 National Construction Code, accessed online here on 11 February 2022.

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application.[37] The NSW Government is proposing similar changes for commercial and retail buildings.[38] This approach ensures that applicants consider critical factors that affect energy efficiency, such as building orientation and window sizes, early in the design and compliance process. The Victorian Government is currently considering similar state-wide planning changes.[39]

When elevating energy efficiency requirements into planning, three main options exist:

Option 1 – Elevate Specific Design Elements

Specific design elements that are known to positively contribute to a building's thermal performance could be prescribed in a state planning instrument and assessed at development assessment or deemed to comply check. Potential design elements include north facing living areas, concrete floors, high-grade insulation and glazing, and eaves and window awnings for shading.[40] Prescribing design elements means that proposals would be more likely to meet thermal performance ratings when seeking a building permit;[41] however, requiring specific design elements constrains design flexibility and does not ensure that a building will comply with NCC requirements.

Option 2 – Elevate Performance Measures

Elevating performance measures from the NCC into a state planning instrument means that applicants are not limited by prescriptive design elements and instead, have the flexibility to choose their own combination of design elements to suit the characteristics of different locations and blocks. Bringing forward the requirement to measure energy efficiency performance into the planning phase means that applicants will need to pay for this assessment cost earlier in the compliance process but will avoid expensive modification solutions, additional deemed-to-comply checks and development approval amendments.[42]

NatHERS is the most commonly applied residential building performance measure in Australia.[43] It is embedded in the NCC, is informed by 30 years of CSIRO research, is administered by the Commonwealth Government, is regularly updated to ensure validity and relevancy, is guided by a forward work plan that supports the Trajectory and is a familiar measure to industry.[44] Also, NatHERS energy assessors are audited, meaning that certificates provided by accredited NatHERS energy assessors are generally a reputable source of compliance information.[45]

The NSW Government's building sustainability index (BASIX) is an alternative residential building measure. The thermal performance component of BASIX

37 NSW Government (2021) BASIX, accessed online here on 23 December 2021. The Environmental Planning and Assessment Regulation 2000 (EP&A Regulation) (NSW) requires applicants to submit a BASIX certificate for most types of new residential development.

38 NSW Department of Planning, Industry and Environment (2021) "draft State Environmental Planning Policy (Design and Place) 2021", accessed online here on 24 January 2021. The draft policy proposes to elevate Green Star and NABERS from the NCC into the development assessment / planning system.

39 Victorian Government (2020) Environmentally sustainable development of buildings, accessed online here on 21 February 2022.

40 The House Energy Raters Association (HERA) provides a list of design elements that can be included to improve thermal performance at little or no extra cost. Accessed online here on 4 January 2021.

41 NatHERS (residential), Green Star (commercial) and NABERS (commercial) are performance ratings included codified in the National Construction Code.

42 The cost of a NatHERS assessment is approximately $250 for detached dwellings.

43 Across Australia, NatHERS is "the most popular pathway to meet the NCC energy efficiency requirements with a long-term average of over 90 per cent of all building approvals, according to the Australian Bureau of Statistics (ABS)." NatHERS Star Issue 13 – December 2021, accessed online here on 23 December 2021.

44 2021 proposed updates include (1) integration of CSIRO climate files and recalibration of star ratings (2) changes to heating and cooling load limits (3) thermal bridging capabilities and (4) certificate information updates. For more information is available here.

45 Department of Industry, Science, Energy and Resources (2021) NatHERS overview and changes to regulation webinar, accessed online here on 21 December 2021. The revised NatHERS certificates will include two sets of information (1) assessment of thermal performance (NatHERS rating) and (2) assessment of whole of home energy budget (fixed appliances and PV systems). The thermal performance component can be completed first, to allow planning approval, followed by the energy budget at a later date, when an applicant will have a clearer understanding of their desired fixed-appliances, meaning that the energy budget could be completed and assessed later in the process at building permit stage.

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uses NatHERS accredited software and modelling. The BASIX certificate must be submitted with development application or complying development certificate application.[46] Other credentialed residential performance measures include Green Star Homes and Passivhaus; however, these measures are not codified in the NCC. For commercial buildings, Green Star and NABERS are the most commonly applied measures and are both nominated compliance pathways in the NCC.

Opportunity 9 – Strengthen lot and building orientation requirements in liveable neighbourhoods and residential design codes

Constructing an energy efficient dwelling on a poorly orientated, narrow lot can be extremely challenging without substantial modifications such as high-grade glazing and insulation.[47] [48] These lots generally have narrow frontages under 10m and are orientated east-west. Discouraging or restricting the creation of these types of lots in Liveable Neighbourhoods (LN) and the Residential Design Codes would help applicants achieve energy efficiency requirements at lower cost.[49]

The State Government has indicated that LN will be reviewed and potentially elevated from an operational policy into a state planning policy,[50] providing an opportunity to encourage appropriate lot orientations.[51]

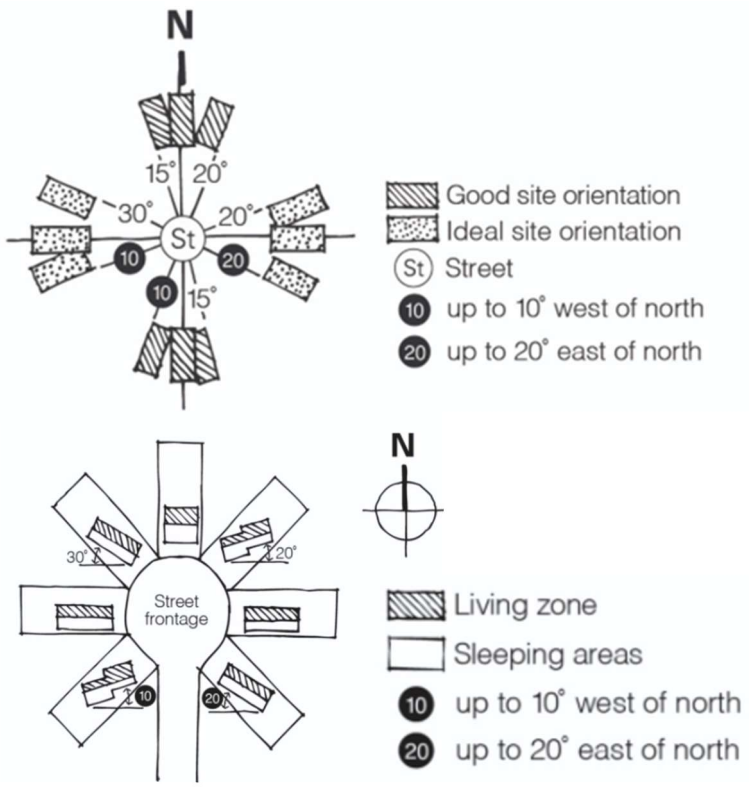

Figure 3: Building orientation possibilities on different blocks. AMCORD at Your Home (2020) accessed online here on 21 February 2022

46 NSW Government (2021) BASIX, accessed online here on 23 December 2021. The Environmental Planning and Assessment Regulation 2000 (NSW) requires development applicants to submit a BASIX certificate with a development application, or with a complying development certificate for any BASIX affected building or development as outlined in the regulation. For more information on the BASIX and planning approvals process, visit this link.

47 Australian Government (2020) Your Home – Orientation, accessed online here on 20 October 2021.

48 Conversations with accredited NatHERS energy assessor in December 2021.

49 "…achieving good solar access on smaller sites is more likely on north–south blocks because they receive good access to northern sun with minimum potential for overshadowing by neighbouring houses. In summer, neighbouring houses can provide protection from low east and west sun." Your Home (2020) Orientation, accessed online here on 21 February 2022.

50 Government of Western Australia (2021) Proposed Phase 2 Reforms Summary, accessed online here on 21 October 2021. "Develop and consult on a new Neighbourhood Design Policy to modernise and replace existing policy guidance"

51 Requiring reserves and easements to accommodate subdivision scale battery storage should also be considered, for discussion in later discussion papers.

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Opportunity 10 - Mandate accredited energy efficiency assessments

Energy efficiency assessments are prepared by energy assessors and used by applicants to demonstrate compliance with the NCC. Energy efficiency assessments are complex; however, in Western Australia, energy efficiency assessments do not need to be prepared by an accredited or registered energy assessor,[52] meaning that the quality of the assessment may be questionable but difficult for permit authorities to identify during compliance checks.

Furthermore, the absence of a mandatory accreditation and registration system for energy assessors means that any potential disciplinary complaints from permit authorities regarding an energy efficiency assessment need to be made against the certifying building surveyor rather than the energy assessor, limiting the accountability of energy assessors.

Mandating that energy assessments must be prepared by NatHERS accredited energy assessors would make compliance checks faster for compliance authorities and applicants and are likely to result in buildings that are more energy efficient.[53] The decision to mandate accreditation rests with State Governments.[54] NSW and the ACT both require NatHERS accredited energy efficiency assessments for residential buildings.[55]

This opportunity aligns with WALGA's current policy advocacy position to require the registration of building professionals, including energy assessors.

Opportunity 11 – Require mandatory compliance inspections during and post construction

Figure 4: Element 27 build-to-rent apartments in Subiaco is the first carbon neutral certified apartment building in Australia under the Climate Active Carbon Neutral Standards for Buildings; an Australian Government initiative.

All buildings in Western Australia require an occupation certificate to demonstrate compliance with approved plans prior to the building being occupied, except for single and grouped residential dwellings. This exception means that single and grouped residential dwellings in Western Australia have not been checked by an independent building surveyor for compliance with the

52 The only requirement being that an energy assessment is prepared using accredited software programs.

53 Accredited energy assessors are required to complete professional development (CPD) training, have professional indemnity insurance, and are regularly audited.

54 Department of Industry, Science, Energy and Resources (2021) NatHERS Technical Overview Regulation Webinar, accessed online here on 21 December 2021.

55 Renew (2020) 8 Star Homes – How to design a home that achieves a high NatHERS rating, accessed online here on 23 December 2021, at 1:04:00.

approved plans and specifications prior to their occupation, and therefore, may not comply with energy efficiency requirements. In most other states, compliance inspections are required for these buildings prior to occupation. For example, in NSW, the certifying authority is required to issue a BASIX completion receipt following final inspection and prior to issuing an occupation certificate, proving compliance with energy efficiency standards before the building is occupied.[56]

In 2019, a Consultation Regulatory Impact Statement released by the Department of Mines, Industry Regulation and Safety (DMIRS) outlined potential reforms to the building approvals process for single residential dwellings in Western Australia. These reforms proposed staged inspections during construction and a final inspection prior to occupancy. These reforms were a response to audit data collected by the Building Commissioner which indicated that "the current building approvals process in WA may not be effective in ensuring adequate levels of compliance with the NCC... in constructed single residential dwellings". In fact, audits showed that that nearly one in three energy efficiency elements did not comply with NCC requirements.[57]

The proposal to introduce mandatory compliance inspections during and post construction is a current WALGA policy advocacy position. If implemented effectively, mandatory inspections have the potential to instill consumer confidence that constructed buildings comply with applicable energy efficiency standards and ensure that increased standards deliver expected outcomes such as higher comfort and safey, and lower energy bills and emissions.

Figure 5: The Roe Highway Logistics Park has been recognised as Perth's most sustainable industrial site. Accessed online here on 22 February 2022.

56 NSW Government (2021) About BASIX legislation, accessed online here on 23 December 2021.

57 DMIRS (2019) Reforms to the building approval process for single residential buildings in Western Australia, accessed online here 9 March 2022, p.32. For more information see s.4.2.2 Findings of audits by the Building Commissioner – single residential dwellings.

6. Working Together on Alternative Approaches

In lieu of an effective state-wide regulatory approach, the Local Government sector can collaborate to identify effective planning scheme and policy provisions, and internal processes, that can be applied locally to meet community objectives.

WALGA has successfully facilitated collaborative approaches to address complex policy areas in the past, for example by partnering with multiple Local Governments through collaborative funding models to seek professional advice. These approaches provide qualified and accredited information that can be applied in multiple jurisdictions to achieve objectives while improving consistency in the way these matters are dealt with across the State.

Opportunity 12 – Seek legal advice to identify provisions that raise minimum standards

If energy efficiency standards are not adopted in Western Australia in accordance with the Trajectory and NCC (see Opportunity 7 – Implement NCC 2022 (Volume 2) by September 2023), Local Governments may need to identify alternative mechanisms to set local standards that meet community objectives.

Current legislation, regulation and state policy, outlined in Appendix 1, provide the basis for including local planning scheme and policy provisions related to energy efficiency; however, it is currently unclear if Local Governments can set standards in local planning instruments beyond minimums adopted by the State without offering development incentives.

In Victoria, a group of Local Governments is preparing a standard scheme amendment that would introduce energy efficiency provisions into multiple Local Government planning schemes across Victoria to achieve outcomes beyond NCC minimum standards.[58] A collaborative funding approach facilitated through WALGA could be used to seek legal advice for Local Governments in Western Australia that identifies appropriate planning instruments and terminology.

Opportunity 13 – Seek legal advice to identify provisions that require compliance at planning

As discussed, building orientation and glazing are major contributing factors influencing energy efficiency and are both fixed in place at planning. Consequently, incremental increases to energy efficiency standards, as proposed in the Trajectory, means that meeting these standards at building permit stage will become increasingly difficult to meet if energy efficiency is not elevated as a state-level planning requirement.

58 CASBE (2021) Elevating ESD Targets Planning Policy Amendment, accessed online here on 2 November 2021.

If unaddressed by the State Government (see Opportunity 8 - Elevate Energy Efficiency into Planning), Local Governments will be left to support applicants by introducing their own local planning scheme provisions and/or policies. Different approaches across the State may leave the sector exposed to criticisms from industry and the State Government about regulation complexity and inconsistency.

Standard local planning scheme provisions that elevate energy efficiency as a key consideration of the planning process and require applicants to consider energy efficiency earlier in the design phase, provide an alternative to using a state-level instrument. Standard scheme provisions should require applicants to demonstrate compliance with the NCC's energy efficiency standards at planning, for instance, by requiring an accredited NatHERS certificate with a deemed-to-comply check or development application for residential development.

Legal advice should be sought to clarify the most appropriate instruments and terminology through a collaborative funding approach facilitated by WALGA.

Opportunity 14 - Provide energy efficiency assessment training for local government compliance officers

If the State Government chooses not to mandate accredited energy efficiency assessments (see Opportunity 10 - Mandate accredited energy efficiency assessments), Local Governments may be able to require that applicants provide accredited energy efficiency assessments when submitting planning or building applications.

Accredited assessments are easily identifiable and are prepared by assessors who have been accredited and trained by registered organisations, meaning that the integrity and quality of these assessments can generally be relied upon during compliance, streamlining the compliance assessment process.

If accredited energy efficiency assessments are not required, training for Local Government planners and building surveyors would help compliance officers identify if unaccredited energy efficiency assessments comply with energy efficiency requirements when assessing a planning or building application.

Figure 6: Workzone East in Perth was the first commercial building in Western Australia to officially achieve carbon neutral status. accessed online here on 29 October 2021.

7. Summary

This table summarises the key challenges to implementation in Western Australia, opportunities for addressing each challenge, and indicative timeframes for actioning each opportunity subject to feedback and input from members, resourcing and internal approvals. The opportunities for Local Governments to Lead by Example, not included in the table, provide an important platform for actioning all other opportunities.

	Key Challenges	Key Opportunities	Timeframe
1	Energy efficiency is highly technical and collecting and understanding investment pay back information to make informed decisions is difficult and time consuming for consumers	4 – Advocate for mandatory disclosure of residential ratings at point of sale or lease	Medium term
		6 – Provide fact sheets and case studies for homebuyers, renovators and developers	Medium term
		7 – Implement NCC 2022 (Volume 2) by September 2023	Short term
		12 – Seek legal advice to identify provisions that raise minimum standards	Medium term
2	Energy efficiency investments require up-front capital (or financing) while the benefits of lower energy use accrue over time	3 – Advocate for a market transition support program	Short term
		5 – Offer development incentives	Medium term
3	Split incentives, which occur when one party accrues the up-front costs (investor) while the other party receives the benefits such as lower energy bills (lessee)	3 – Advocate for a market transition support program	Short term
4	Energy efficiency is considered late in the development and compliance process after key factors that affect energy efficiency, such as lot and building orientation, have been fixed in place	8 - Elevate energy efficiency into planning	Short term
		9 – Strengthen lot and building orientation requirements in liveable neighbourhoods and residential design codes	Short term
		13 – Seek legal advice to identify provisions that require compliance at planning	Short term
5	Limited capacity of compliance authorities to assess highly technical, energy efficiency certificates	10 - Mandate accredited energy efficiency assessments	Medium term
		14 - Provide energy efficiency assessment training for local government compliance officers	Short term
6	Absence of mandatory inspections during and post construction to ensure compliance with approved designs	11 – Require mandatory compliance inspections during and post construction	Short term

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Appendix 1: State Legislation & Policy

This appendix outlines the overarching legislative and policy provisions adopted by the State Government that set a clear mandate to improve building energy efficiency in Western Australia. Peak industry and professional groups have adopted advocacy positions that align with these provisions.[59]

Trajectory for Low Energy Buildings – Adopted by all State and Territory Governments, the trajectory supports the Commonwealth Government's national plan to achieve net zero carbon and energy buildings by forecasting changes to the NCC.[60]

Western Australian Climate Policy - Underscores the State's commitment to adapting to climate change and to working with all sectors of the economy to achieve net zero greenhouse gas emissions by 2050.[61]

Climate change in Western Australia: Issues Paper – September 2019 - Notes that "(t)he design and construction of our cities and towns has long-term implications for both sustainability and quality of life." The paper specifically notes that higher energy use and emissions may be locked in "for many years to come" if action is not taken today.[62]

Shaping Western Australia's low-carbon future – Sets the framework for achieving Western Australia's net zero emissions by 2050 goal and acknowledges that this objective will need to be supported by a low energy and low emission built environment.[63]

Planning and Development Act 2005 – The sustainable use and development of land is a key purpose of the Act. Schedule 7 sets out matters that may be dealt with by planning schemes, including: measures to maximise energy efficiency, development controls that preserve the public interest and "any other matter necessary or incidental to the sustainable development or use of land".[64]

State Planning Policy 7.0: Design of the Built Environment – Acknowledges the importance of energy efficient design by noting that "(s)ustainable built environments use passive environmental design measures at various scales, responding to local climate and site conditions by providing optimal orientation, shading, thermal performance and natural ventilation. Reducing reliance on technology for heating and cooling minimises energy use, resource consumption and operating costs over the life-cycle of the project".[65]

The Building Act 2011 and Building Regulations 2012 - Embed the NCC as the applicable building standards for all building work in Western Australia. The NCC is contained in two volumes: Volume 1 (Class 2-9) commercial buildings and Volume 2 (Class 1 and 10) residential buildings. Applicable energy efficiency standards are set out in each volume.[66]

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59 Planning Institute of Australia WA (2021) "A Climate-Conscious Planning System for Western Australia"; Australian Institute of Architects (nd) "The Climate Action and Sustainability Taskforce".

60 Australian Government (2019) Trajectory for Low Energy Buildings, accessed online here on 7 January 2021

61 Government of Western Australia (2020) "Western Australia Climate Policy", accessed online here on 21 February 2022.

62 Government of Western Australia (2019) "Climate change in Western Australia: Issues Paper – September 2019", accessed online here on 6 January 2022 (p.21)

63 Government of Western Australia (2021) "Shaping Western Australia's low-carbon future" accessed online here on 6 January 2021.

64 Section 3(1) states that "The purposes of this Act are to - … (c) promote the sustainable use and development of land in the State".

65 Schedule 1, section 7 (p.9).

66 The NCC is amended every three years and then adopted by states and territories under individual state legislation. State and territory governments can choose to adopt the version of the NCC from the date of its release or provide a transition period where the old version of the code can still be applied. Historically, in Western Australia a twelve-month transition has been adopted and in some instances the NCC has not been adopted in full, e.g., Industry Bulletin 128 - Dis-application of NCC 2019 heating and cooling load limits for residential energy efficiency.

Appendix 2: Further Learning

This appendix provides links to further information.

Special Briefing: energy efficiency in the National Construction Code 2022. Renew (2021). This video provides a useful and easy-to-understand summary of the proposed NCC 2022 changes to energy efficiency - presented by the ABCB from minute 8 to minute 36. Available here.

What Makes & Breaks A High-Performance Home. Builders Declare (2021). This video explains the key design elements that make or break the thermal performance of a home. Available here.

Beyond Build Quality. Builders Declare (2021). This video explains how fixed appliances and solar provision can be used to achieve a net zero energy home. Available here.

8 Star Homes – How to design a home that achieves a high NaTHERS rating. Renew (2021). This video explains the key design elements for constructing an 8-star home. Available here.

NatHERS Overview and Changes to Regulation. DISER (2021). This video by explains the proposed changes to NatHERS. Available here.

A guide to the NatHERS certificate. DISER (2021). This video shows how to determine if an energy efficiency assessment certificate has been prepared by an accredited NatHERS energy assessor. Available here.