



Professor Peter Rayner

EU-Australia Knowledge Network: Wrap-up Day 1



TOPIC	SPEAKER
5:30: Welcome & introduction	Scott Wyatt & Peter Rayner
5:40: Highlights from EU-Australia Knowledge Network	Peter Rayner
6:00: Short break	Angela Bruckner
6:15: Building and Appliance Energy Efficiency (including discussion & Q&A)	Alan Pears & Rosalinda Bustamante

Supported by:



This event has been organised with the financial support of the European Union's Partnership Instrument. The opinions expressed are the sole responsibility of the speakers and do not necessarily reflect the views of the European Union.

Pricing

- Stronger Emissions Trading System including in aviation
- Extending Emissions Trading to maritime, road transport, and buildings
- Updated Energy taxation Directive
- New Carbon Border Adjustment Mechanism

Targets

- Updated Effort Sharing Regulation
- Updated Land Use Land Use Change and Forestry Regulation
- Updated Renewable Energy Directive
- Updated Energy Efficiency Directive

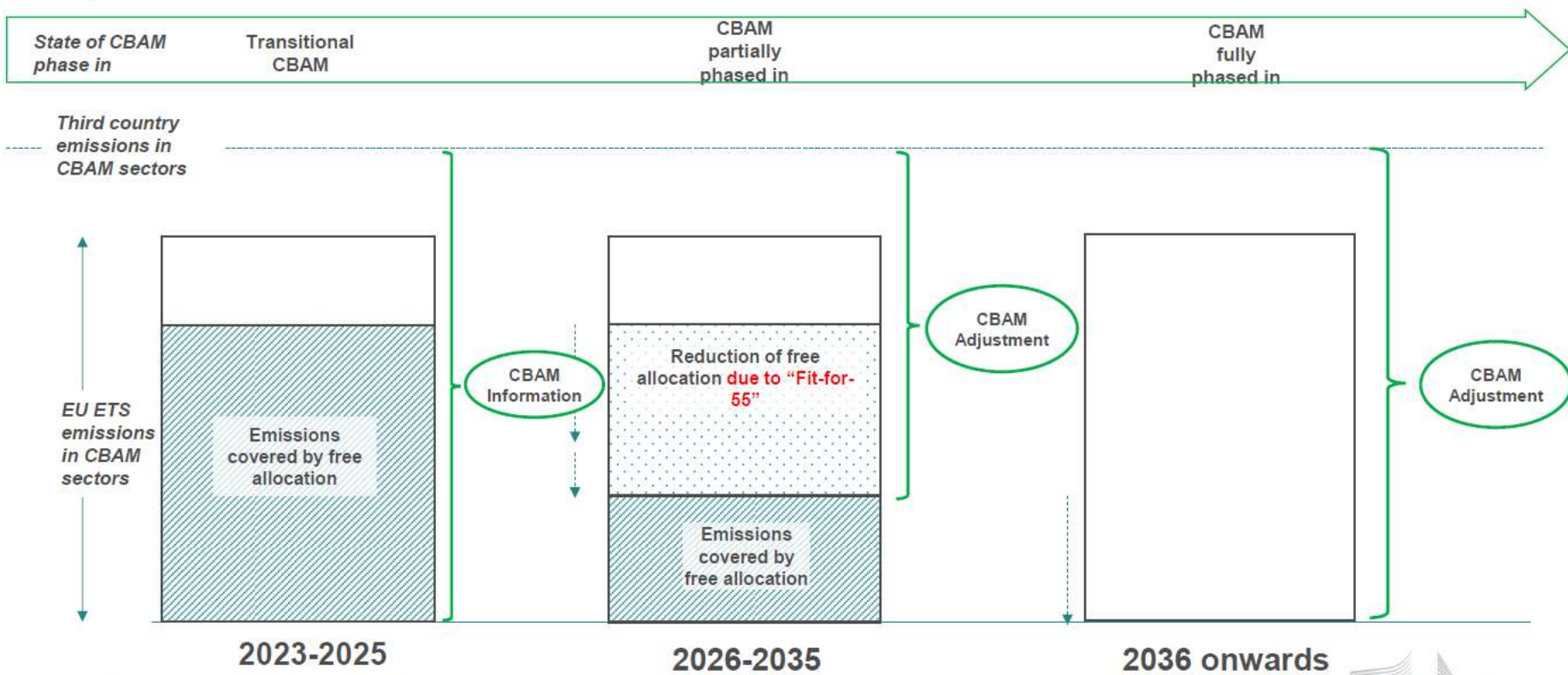
Rules

- Stricter CO₂ performance for cars & vans
- New infrastructure for alternative fuels
- ReFuelEU: More sustainable aviation fuels
- FuelEU: Cleaner maritime fuels

Support measures

- Using revenues and regulations to promote innovation, build solidarity and mitigate impacts for the vulnerable, notably through the new **Social Climate Fund and enhanced Modernisation and Innovation Funds.**

Phase in-phase out of CBAM and EU ETS emissions/free allocation proposal





- Purpose of the Knowledge Network
- Components of the Knowledge Network
- The seminar series
- Main themes
- SPIPA's after-life



- To promote the exchange of information and networking between Australian and European think-tanks, universities, research institutions, NGOs, and foundations
- To create an ongoing structure to support this knowledge exchange network to remain active and influential when the SPIPA-funded activities cease
- To provide an expert knowledge base in Australia to engage with the EU
- To facilitate research and studies between the EU and Australia on some chosen topics
- To identify thematic gaps for climate action in Australia that could be prioritized for future research, for example:
 - Green shipping
 - Biomass and biofuel
 - Carbon dioxide removal (e.g. afforestation / reforestation, improved soil carbon management, and carbon capture and utilization)
 - Just transitions to a low-carbon economy



- The seminar series
- Round-tables and consultation on research activities
- Links to other SPIPA activities



Date	Topic	Presenters
27 Jul 2021	Potential and risks of hydrogen-based e-fuels in climate change mitigation	Falko Ueckerdt
10 Aug 2021	Scenarios, carbon budgets and temperature projections in the new IPCC WG1 AR6 report	Malte Meinshausen & Zebedee Nichols
24 Aug 2021	A detailed look at future warming and remaining carbon budgets in the IPCC WG1 AR6 report	Malte Meinshausen & Zebedee Nichols
7 Sep 2021	Developments in physical understanding and how to use it to improve climate policies - Insights from IPCC AR6	Piers Forster & Joeri Rogelj
12 Oct 2021	The Age of Climate Structural Adjustment Programs	Kennedy Mbeva
26 Oct 2021	Human well-being within planetary boundaries: Integrating climate policies with the UN 2030 Agenda	Bjoern Soergel
3 Nov 2021	Nature-based solutions for sustainable agricultural land management	Rachelle Meyer & Natalie Doran-Browne
9 Nov 2021	Forest strategies for climate mitigation in Australia and the EU	Kelsey Perlman, Kate Dooley & Bonnie Mappin
16 Nov 2021	Beyond disclosure: Managing sovereign climate risk	Arjuna Dibley & Zoe Whitton



Date	Topic	Presenters
1 Feb 2022	Climate change social science: how communication can help us solve climate change	Nic Badullovich & Linden Ashcroft
8 Feb 2022	Urban greening and climate change	Judy Bush
10 Feb 2022	Achieving an Equitable and Sustainable Energy Transition: Social Data, Best Practices for Intergenerational Collaboration, and Supporting Youth-led Action	Alison Fong & Paola Flores Carvajal
15 Feb 2022	Using an Improved Database of City-level Mitigation Actions to Drive Improved Practice	Matthew Sullivan-Kilgour
17 Feb 2022	Evolution of the Global Research Action Agenda for Cities (GRAA)	Brenna Walsh & Cathy Oke
1 Mar 2022	National climate policy after the 2022 Australian national election: What might we expect?	Robyn Eckersley & Peter Christoff
10 Mar 2022	Digitalisation and cities (exact title TBC)	Pourya Salehi



Science is maturing

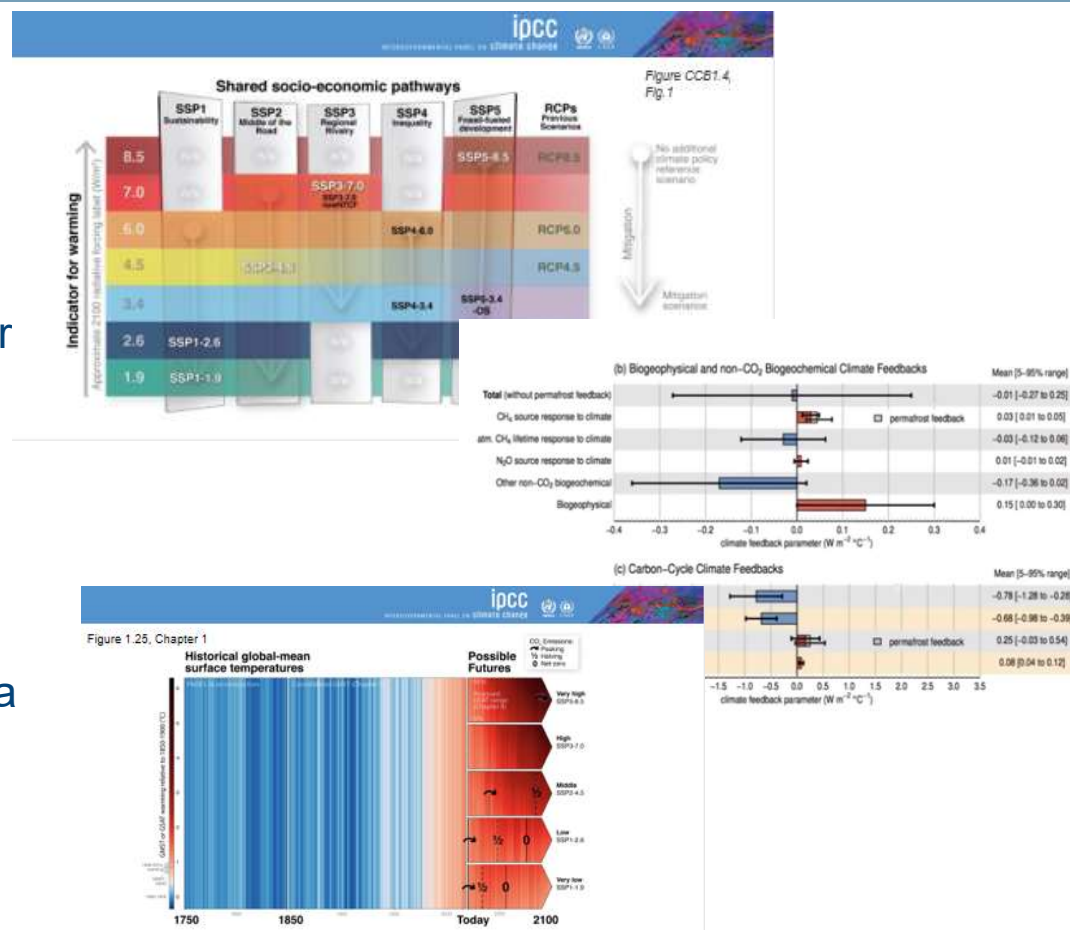
Beware the 'quick fix'

Governance isn't boring

Information might be the secret weapon

Cities have a particularly important role

- One of the earliest seminars on IPCC AR6 launch
- Change from AR5 was less than earlier
- Uncertainties reduced more
- Some 'nasty surprises' were including things we were too uncertain about earlier (e.g. icesheet contribution to sea level rise)



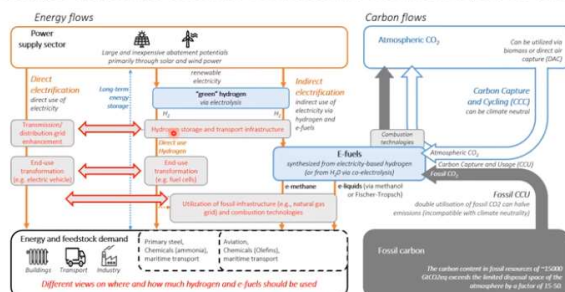


Co-benefits of mitigation options

What are the best emission-reduction opportunities for farmers?



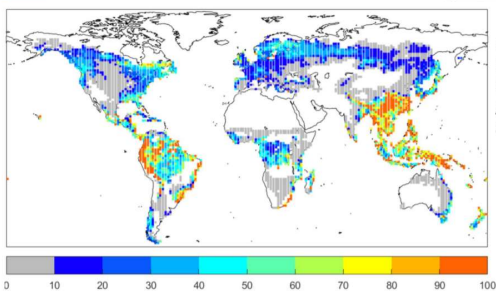
German/EU debate: New consensus "renewables and electrification", and old conflicts



- Most technical solutions are either partial or carry their own problems
- There are many other planetary boundaries to worry about
- Many solutions do bring co-benefits



Ecosystem restoration

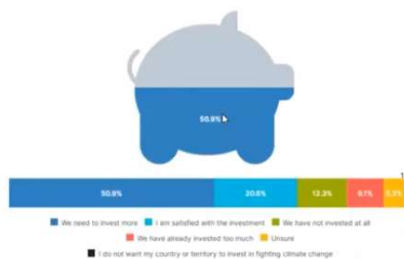


Forest Restoration (541 Mha)
Reforestation (344 Mha)
Reduced Harvest (1047 Mha)
Agroforestry (849 Mha)
Silvopasture (478 Mha)

- Sharing risks and burdens equitably requires local control; top-down solutions will not stick
- The intersection of climate finance and sovereignty is a sleeper issue
- There is plenty of capacity for bottom-up leadership

YOUTH VISION IN GOVERNMENT INVESTMENTS

Do youth believe their country or territory's government is investing enough in fighting climate change?
As a global average, 50% of youth believe their country has not invested enough.



Investors are looking at risk exposure, and for what we might call competent climate risk and opportunity management on behalf of governments

READINESS FOR CLIMATE CHANGE BY COUNTRY

NO-GAIN Readiness scores by region

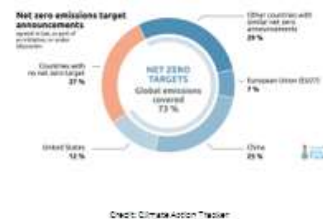


CLIMATE CHANGE MANAGEMENT APPROACHES

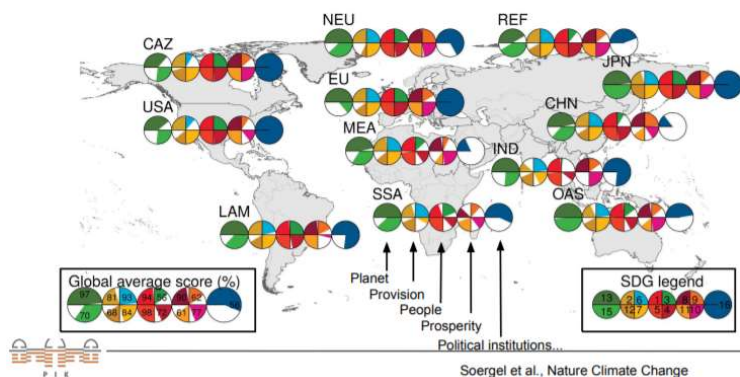
Categories of climate risk management among national and state governments

MITIGATION	RESILIENCE AND ADAPTATION
<p>Policies capable of mitigating climate change by reducing emissions and managing industrial output.</p> <p>Policy measures which reduce domestic emissions in line with a 1.5 degree trajectory</p> <p>Measures which utilise influence with other countries to drive emissions reductions beyond national borders</p>	<p>Analysis and policies which identify climate risk and establish resilience to these risks across public and private assets.</p> <p>Adaptation policies and financing sufficient to address major sources of physical risk.</p> <p>Establishment of transfer mechanisms sufficient to capture residual risks.</p>
TRANSITION	IMPLEMENTATION
<p>Policies, incentives and industrial plans sufficient to drive economic transition, including efforts to capture opportunities.</p> <p>Economy-wide transition and technology plans, including missions and policy to boost spillover of national economy.</p> <p>Place to enable 'just transition' of need sectors</p>	<p>Requirements to spread implementation across government agencies, sectors and organisations, and the private sector.</p> <p>Proactive climate risk management SOEs and SFIs, including their use to drive spill-over impacts into the economy more broadly, e.g. procurement.</p> <p>Use of regulators to drive transition in private markets and sectors.</p>

(i) Convergent climate targets



Regional SDG achievement and gaps (SDP 2030)



4. Think about the long-term outcomes

“the outcomes [of CC communication] can be apparently nothing [...] But, if what you’ve done is got people together to think about doing things differently, and brought together cohorts of people who previously weren’t engaged with each other [...] you actually do build social capital anyway for the next campaign.”

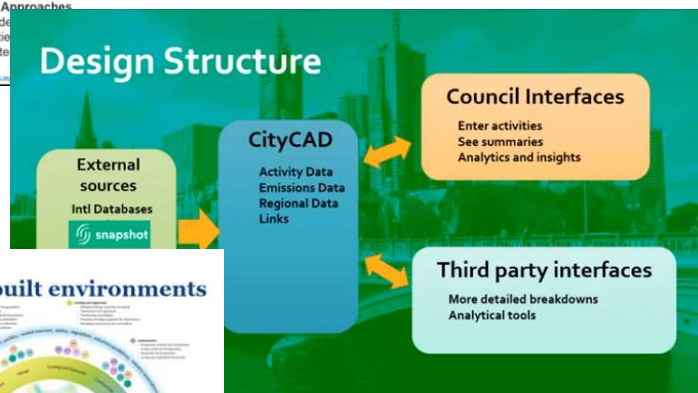
- We have unprecedented capacity to share solutions
- Horizontal sharing (e.g. between cities) can work around government impediments
- Needs structures and tools

- Large and growing populations with disproportionate emissions
- Good options around liveability, mitigation, and health
- City governance complicates things but allows diversity of approach



- Gaps by Topical areas**
- Informality
 - Urban Planning and design
 - Built and blue/green infrastructure
 - Sustainable production and consumption
 - Finance
 - Uncertainty
- Gaps in Cross Cutting issues and Knowledge Gaps**
- Systems approach
 - Governance and Institutions
 - Scale
 - Observation, data, modelling, scenarios – city scale
- Gaps in Delivery Approaches**
- Knowledge co-de
 - Empowering cities
 - Fostering long-te

Graphic design by Anamul Haque V (copied from WCRP report 2019 with appropriate permission)
World Climate Research Programme (2019), Global Research and Action Agenda on Cities and Climate Change Science. <https://www.wcrp.org/cities>



Climate change integration in built environments

Stages:

- Change initiation
- Strategic planning
- Project consideration/initiation
- Design
- Costings and approvals
- Construction
- Use and ongoing management
- Renewal/recovery/decommission

Hörlmann, A. C., Warren-Myers, G., Nielsen, J., Moosavi, S., Bush, J. & March, A. 2021. Towards the transformation of cities: a built environment process map to identify the role of key sectors and actors in producing the built environment across life stages. *Cities*, **103454**.
This research funded by Australian Research Council Discovery Grant DP200101378

**A GUIDEBOOK TO
EUROPEAN BUILDING POLICY**
KEY LEGISLATION AND INITIATIVES



Building and Appliance Energy Efficiency Research: Opportunities for EU-Australian Collaboration

Alan Pears and Rosalinda Bustamante

Paper for Strategic Partnerships for the
Implementation of the Paris Agreement (SPIPA)

24 February 2022



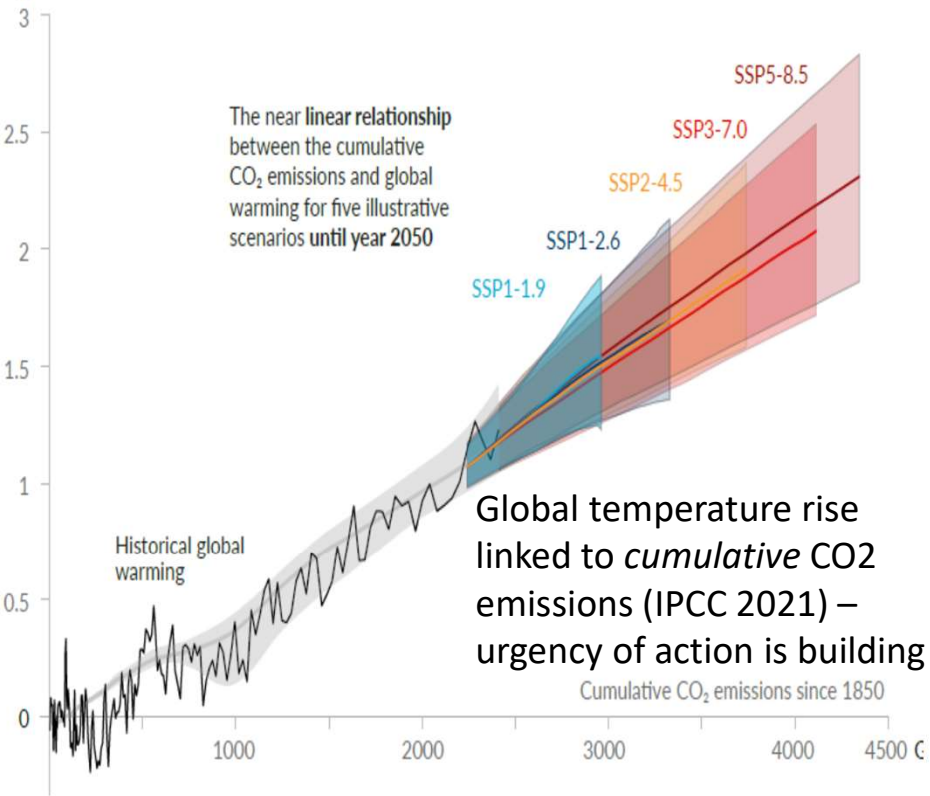
**EU document that guided
Australian project**

Supported by



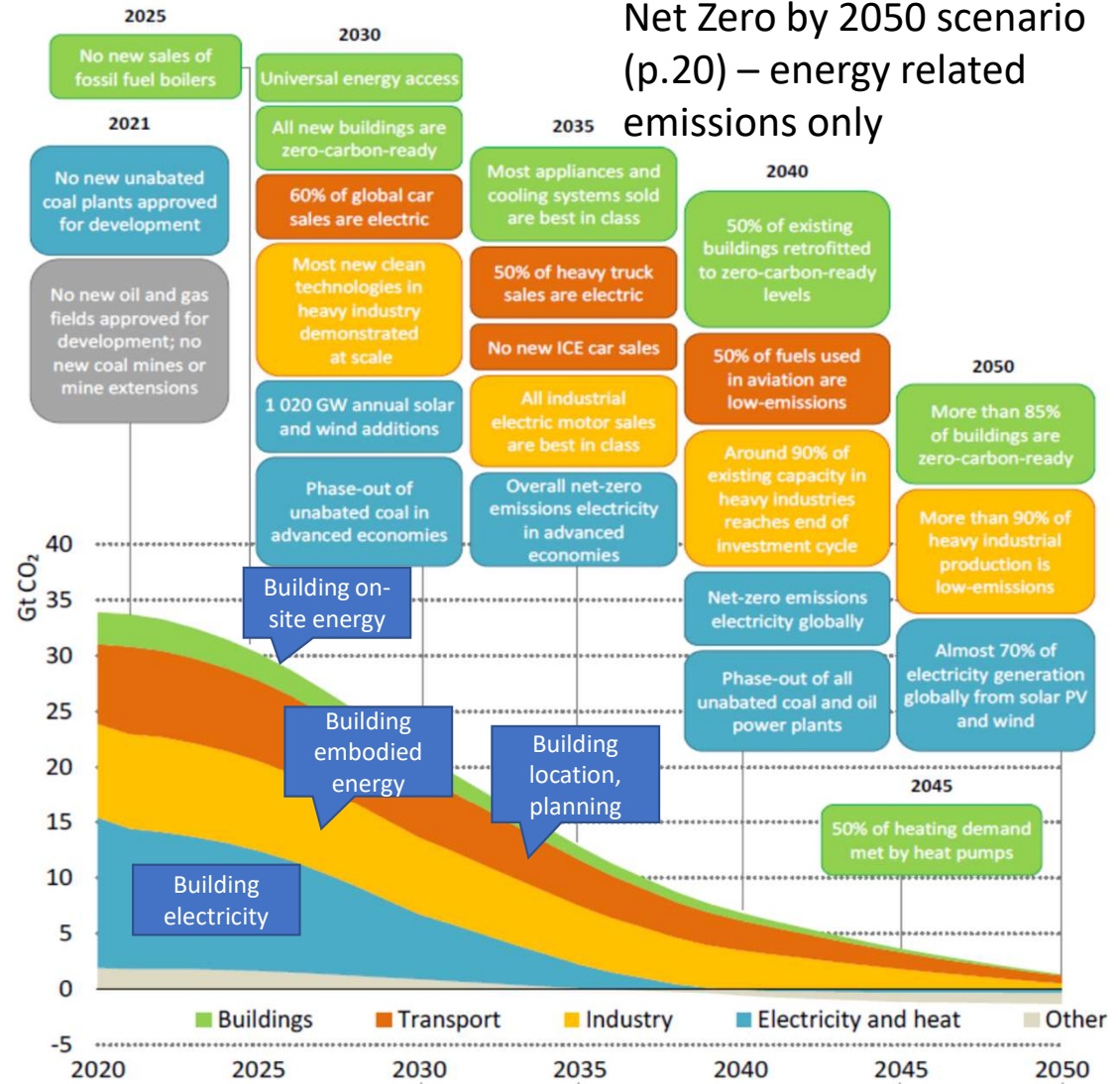
This event has been organised with the financial support of the European Union's Partnership Instrument. The opinions expressed are the sole responsibility of the speakers and do not necessarily reflect the views of the European Union.

Buildings, appliances and equipment use most electricity and large amounts of heat – for operation, materials etc



Key milestones in the pathway to net zero

International Energy Agency
Net Zero by 2050 scenario
(p.20) – energy related emissions only



The *Raw Materials to Shelter* Value Chain applies simplified lifecycle, 'Systems and Services' thinking

(from Aust Alliance for Energy Productivity major report

<http://2xep.org.au/innovation-next-wave.html>

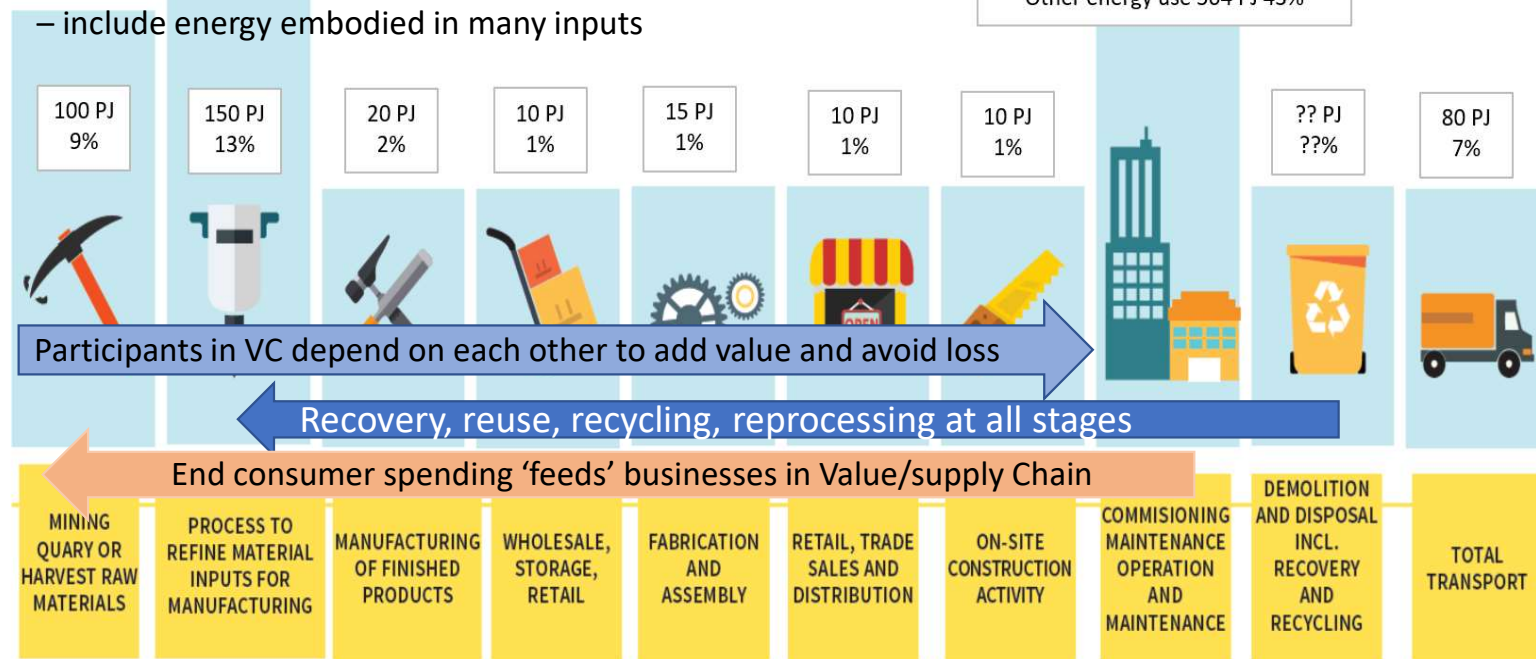
'Circular economy' perspective, blockchain, BIM are gaining momentum

Decisions made at each stage influence and 'lock-in' upstream and downstream impacts

Blue bars show relative primary energy consumption in each stage (~20% of Aust)

Very approximate values do not:

- include imported materials & products!
- consider (much smaller) fundamental energy requirements of services provided
- include energy embodied in many inputs



As building energy efficiency improves, other aspects of lifecycle become more significant – BUT building fabric is long-lived, and impacts on health, amenity, productivity, energy costs and replacement costs of equipment

Similarities and Differences: building and appliance efficiency

- EU
- 3 levels of government
 - European Council, European Parliament, European Commission
 - Member States
 - Local governments/cities
- EU strong climate, building, energy leadership: Targets, Directives, funding, Standards, etc
- Member States determine their own approaches, influenced by EU policies and funding, tools
- Variable renewable energy resources, interconnected systems
- Australia
- 3 levels of government
 - National Parliament, National Cabinet, various ministerial groups, joint bodies (eg ABCB)
 - State and Territory governments
 - Local governments/cities
- State/territory climate targets stronger than national
- States manage much legislation and delivery
- National government often a 'follower' on climate and energy efficiency policy – diverse range of 'leaders'
- Recent cooperation on buildings trajectory work
- Complex, rapidly changing energy markets and systems spread over long distances with rapid adoption of renewable and distributed energy solutions

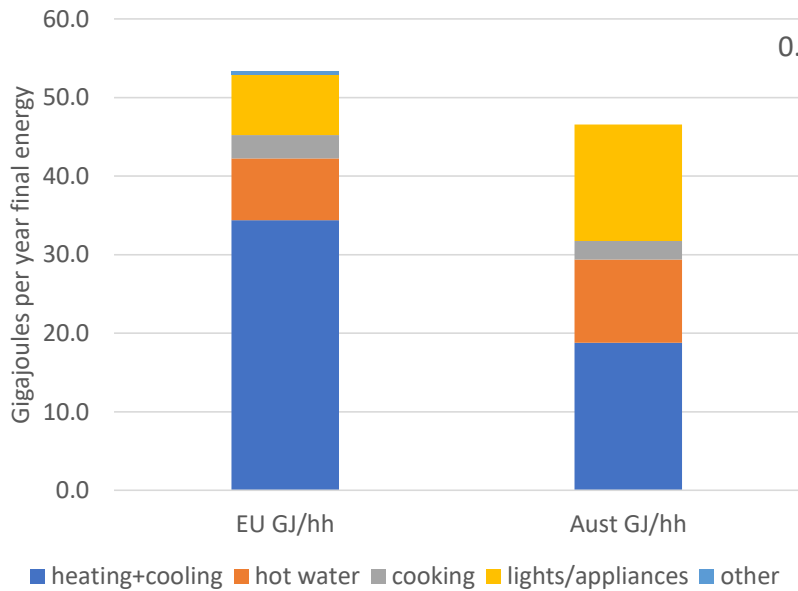
Similarities

- Need for dramatic scaling up of climate action and adaptation
- Large stocks of inefficient existing buildings and appliances
- Varying climates across regions
- Mismatch between speed of change in community/ investor attitudes and capacity of governments, building infrastructure and supply chains to respond
- Limited evidence base to guide new policy: rapid change, limited data, limited capability and status – supply side, short term cultures dominate, though EU has ‘efficiency first’ principle

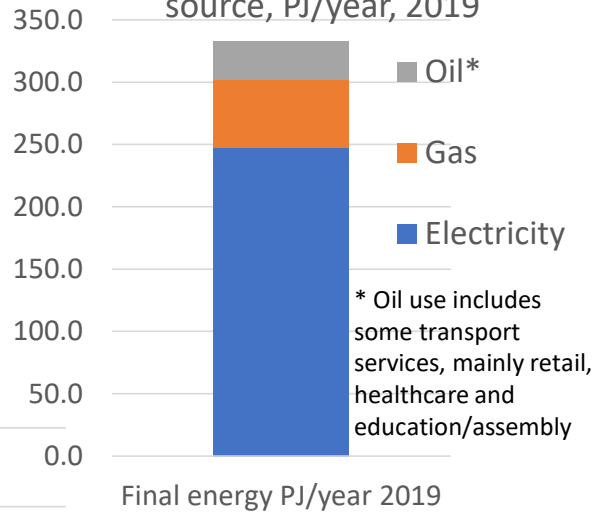
- NOTE: a lot of valuable Australian research and analysis is carried out, but often never makes it to policy implementation or gains much publicity: so a lot of the potential for research collaboration with Australia is invisible

Residential and commercial services final energy use in EU and Australia (from Appendix 1)

Comparison of final energy use per household, EU (2019) and Australia (2014)



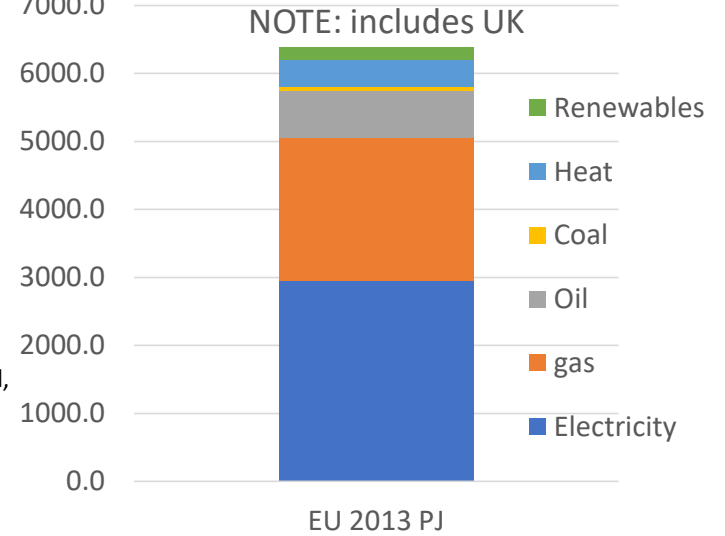
Final energy, Australian Commercial sector by energy source, PJ/year, 2019



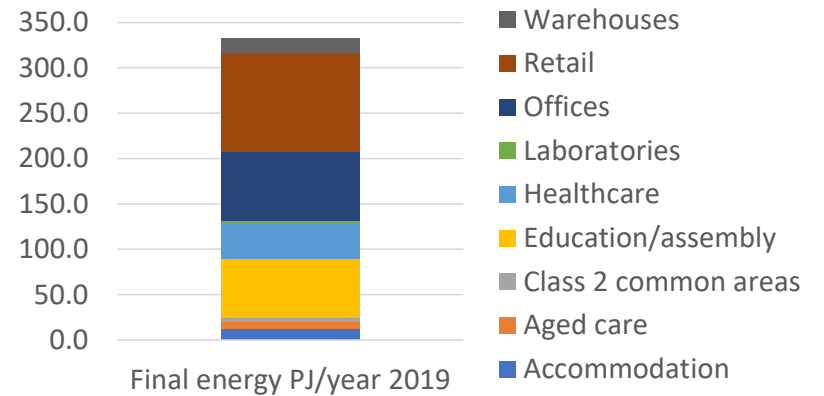
* Oil use includes some transport services, mainly retail, healthcare and education/assembly

Highest Australian commercial sector intensities are healthcare, retail and offices

EU final energy non-residential buildings 2013 (PJ) (equiv 152.4 MToe)



Australian Commercial Sector final energy PJ/year 2019 (Source EY & SPR 2019)

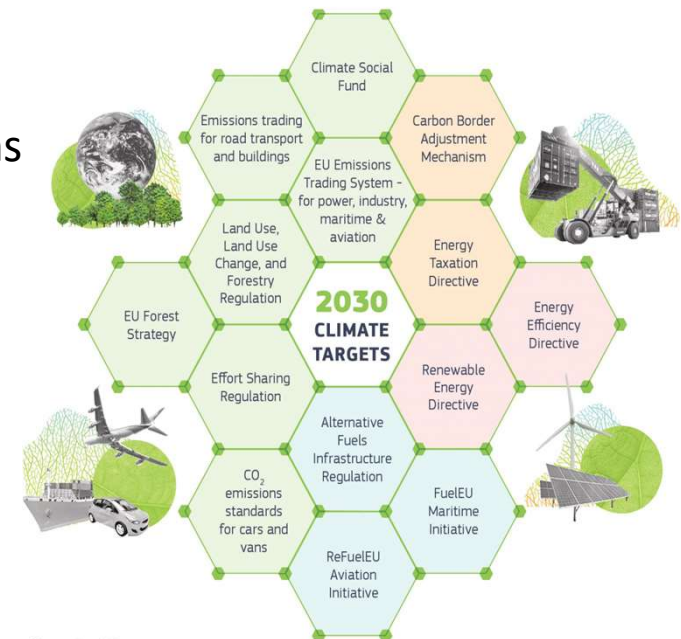


Broad topic used in our paper	Examples of specific issues/opportunities for collaboration
Overarching leadership, institutional, governance structures and resourcing	Clear institutional structures, relationships, governance mechanisms (reporting, accountability, targets) Removal of historical regulatory barriers/distortions/structural inefficiencies, inertia
Regulation and standards	Design to facilitate change, adapt to changing circumstances, contribute to ‘packages’ of policies Identify and overcome barriers to acceptance, improve compliance
Financing investments in building upgrades, expansion of supply chain infrastructure	Facilitating ‘deep’ upgrades, avoiding ‘lock-in’ of future emissions, costs and impacts; innovation in materials, products and services, maintenance and optimal operation, investment in production capacity and skilled workers
Motivating policy-makers and decision-makers to factor in long term and whole ‘value chain’ benefits	Addressing split incentives and short-term thinking Multiple benefits assessed and valued in economic analysis and decisions
Information	Provision of ‘right information at right time, in right form, to right place/person’ – ‘actionable insights’ Data acquisition and management, monitoring technologies/techniques, data security/privacy, data analytics, consumer rights to data and integration of multiple data streams to maximise value and action Understand user/operator/consumer experience, perspectives, values, priorities, ways of reshaping them
Just, rapid transition	Transformation of energy systems and sectors, eg distributed energy solutions, efficient electrification, motivate consumers Equity for vulnerable consumers and impacted regions, access to capital, adaptation, resilience Target measures, eg high consumers, fringe of grid, piggy-back projects being implemented for other reasons
Development of lifecycle, value chain, circular economy models	Improve data quality, confidence; build secure, reliable data systems across value chains so that impacts and benefits can be fairly allocated and there is transparency; encourage consideration of Scope 3 emissions in carbon footprints and strategies
Integration of buildings into energy systems	On-site electricity generation and storage, distributed intelligence; demand response, demand management; interactions with electricity and gas grids; business models and consumer issues

EUROPEAN UNION

Overarching leadership, institutional and governance structures and resourcing – EU

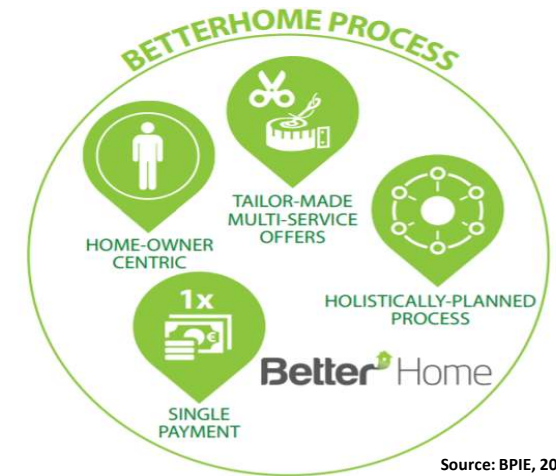
- Well-structured and organised national policies with clear goals at both EU and national levels. Clean Energy for all Europeans package/ NECPs, LTS & LTRS.
- Solidarity mechanisms: a crucial part of every energy EU policy.
- Optimistic estimates of energy policy outcomes vs reality.
- Rigid existing/legacy regulation at the national level. E.g. Regulations that protect tenants' rights on multifamily buildings
- EU focuses on deep renovations vs shallow renovations covering most energy renovations at the national level.
- Renovation Wave targets deep renovations.
- Fit for 55 package introduced important measures to achieve a reduction of at least 55% in emission by 2030.



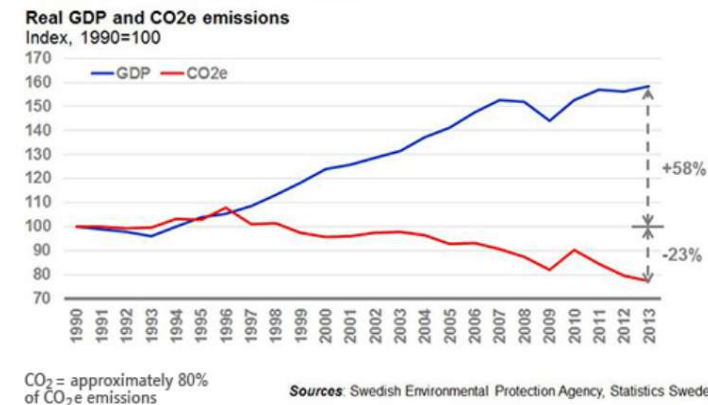
Source: European Union, 2021

Regulation & Standards - EU

- EU regulatory framework is an important driver for policy implementation among EU member states.
- Energy efficiency first principle. EPBD/EED/RED
- Phase out inefficient buildings is at core of both EU and EU Members States. EPCs policies are viewed as insufficient.
- Ongoing assessment of introduction of Building Renovation Passports and best practices among EU members. E.g. iSFP and Better Home programs in Germany and Denmark respectively.
- Some EU Member States have created clear market signals to considerably reduce emissions from buildings. E.g. **Swedish carbon tax.**
- There are ambitious goals and clear paths to reduce GHG emissions from buildings but many efforts are yet to be implemented or fully implemented.



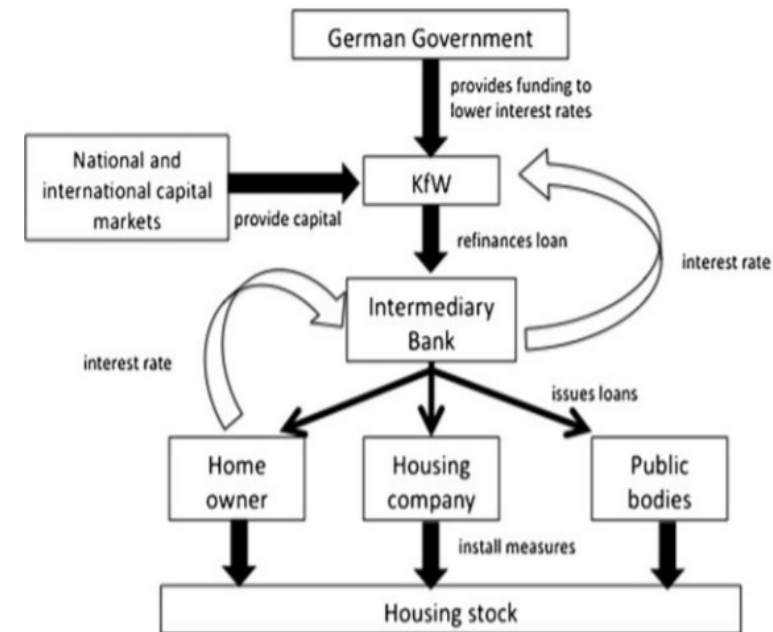
Real GDP and CO₂e Emissions in Sweden, 1990-2013



Ministry of Finance, Sweden

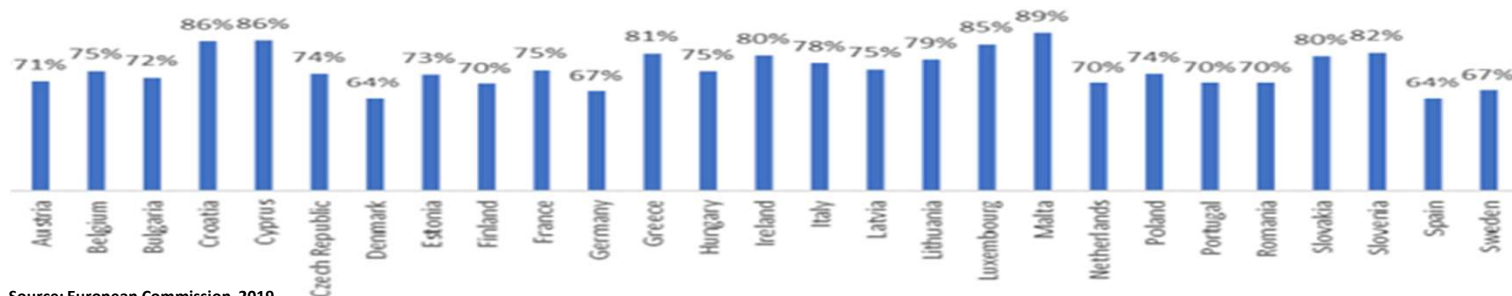
Financing of investments in building upgrades, expansion of supply chains - EU

- Horizon Europe is a key funding programme for innovation and research in Europe. 95.5 billion euros budget for the period 2021-2027.
- Several funding programs for energy renovation: Invest EU, Modernisation Fund, Just Transition Fund, React EU, Recovery and Resilience Facility, Multi-Annual Financial Framework, Cohesion Fund, and European Regional Development Fund.
- Fit for 55 package introduced the Social Climate Fund. 72.2 billion euros for 2025-2031
- In 2019, more than 200 billion euros -invested in energy renovations in residential buildings over 2012-2016. Renovation Wave's goal is to renovate 35 million inefficient buildings by 2030.
- EU Members States have implemented a variety of programs to improve the energy performance of buildings. E.g. **KfW Energy Efficiency programme**.



Source: Rosenow, 2013

Percentage of available subsidies, grants, low-interest loans, or tax rebates policies out of the total policies in energy renovation in each EU Member State



Source: European Commission, 2019.

Australia

Policy and governance of Energy Efficiency in Australia 2010

Source: Report of the Prime Minister's Task Group on Energy Efficiency, 2010

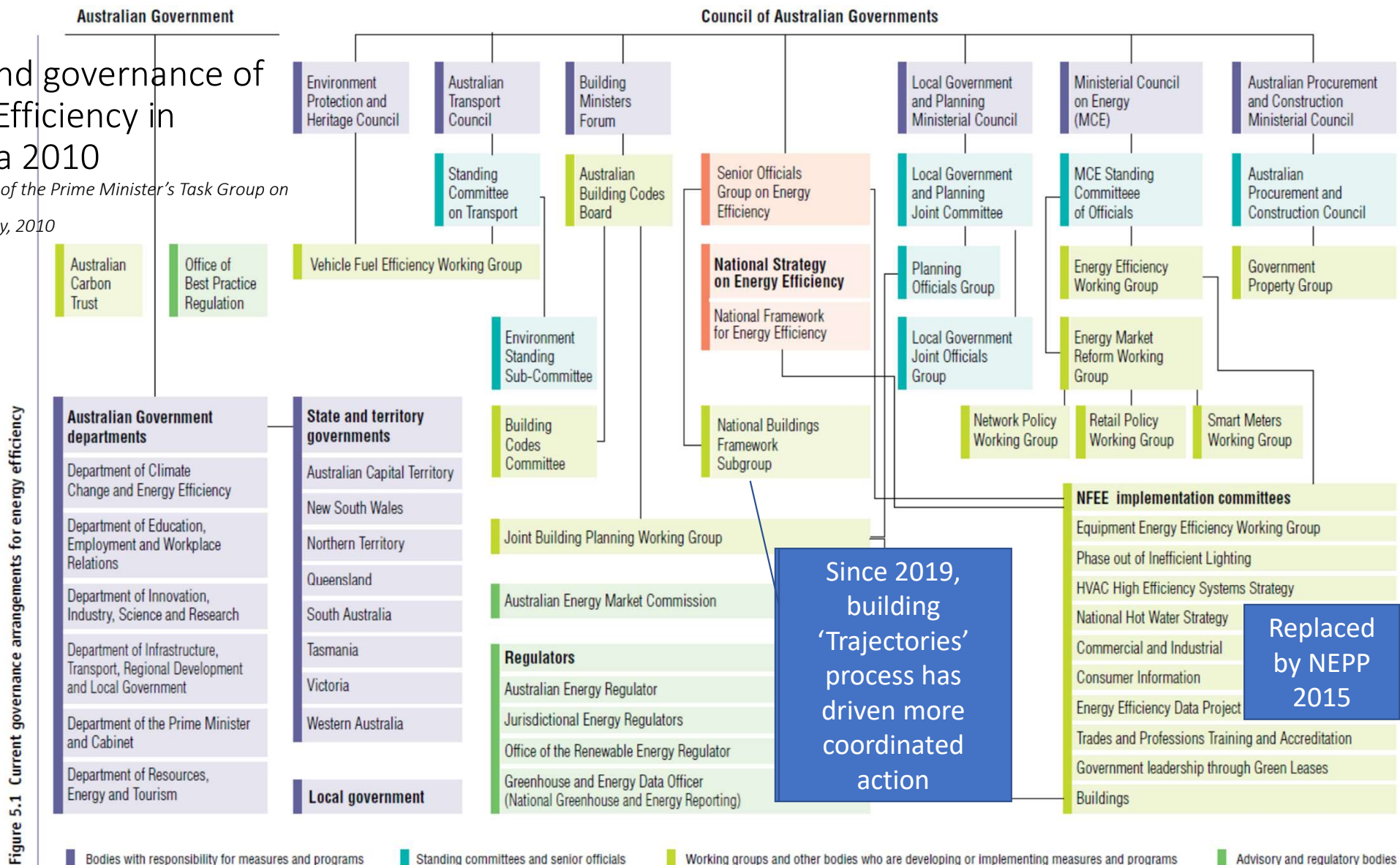


Figure 5.1 Current governance arrangements for energy efficiency



An example of policy/program evolution: NABERS

(National Australian Built Environment Rating Scheme)

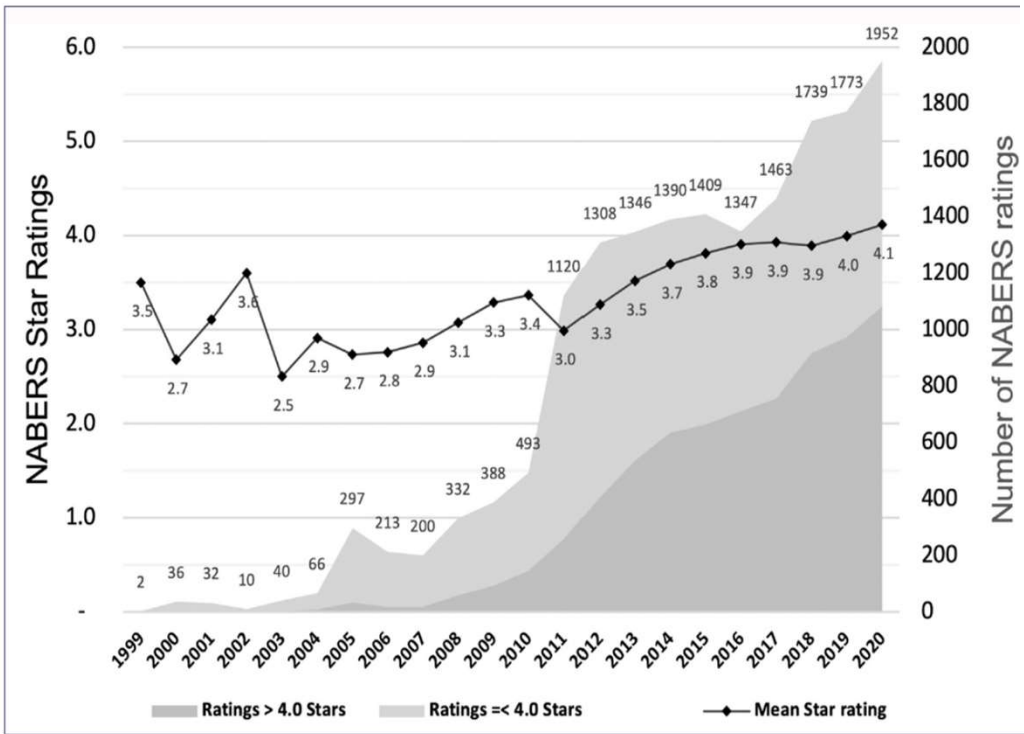
- Developed and implemented by NSW state government 'specialist' agency Sustainable Energy Development Authority (SEDA) 1998-99 – initially called Australian Building Greenhouse Rating (ABGR)
 - Initially voluntary with 3 ratings: whole building, base building, tenant
 - Simple star rating – leveraged off awareness of appliance label, non-technical
 - Involved 'progressive' building owners and managers in design/development/pilots
 - Rating tool freely available for 'own use' but required certification for public use – allowed internal priority setting and familiarisation without public exposure
 - Option of using certified Green Power in rating created 'virtuous cycle' – higher marginal cost made all energy efficiency measures more cost-effective and allowed CEO/CFO on 5-year contracts to look good
 - For existing buildings, based on actual performance; for new buildings, used 'Commitment Agreement' obligation to demonstrate performance linked to building ownership from initial design – drives accountability for designers, builders, developers, maintenance and building managers, and encourages 'project team' approach
 - High visibility – displayed in building foyer
 - Initial focus on empowering buyers and building owners with portfolios of premium buildings – valued credible, visible 'point of difference' – also valued 'actual performance' not 'design intent'



Evolution: NABERS

(National Australian Built Environment Rating Scheme)

<https://www.nabers.gov.au/>



- Mandated for government buildings (2004 NSW, 2006 national)
- Property Council of Australia included in 'A rated' building features – linked to asset value
- Expanded to water, waste, indoor environment - separate ratings not as widely used as energy/ghgs
- Ongoing expansion to wider range of buildings beyond offices
- Basis for mandatory Commercial Building Disclosure at time of sale or lease (2010 for areas over 2,000 m², then 1,000 m² from 2018)
- Proposed as option for part compliance with NCC 2022
- Adapting to changing gh intensity factors, DR etc

Figure 2: Total number of certified NABERS office energy ratings (pale grey) and <4 stars (dark grey), and the mean star rating over time across all buildings.

Mallaburn, P., Azhari, R., Fawcett, T., & Topouzi, M. (2021). Australian non-domestic buildings policy as an international exemplar. *Buildings and Cities*, 2(1), pp. 318–335. DOI: <https://doi.org/10.5334/bc.114>

Broad topic used in our paper	Comments on Australian status and activities
Overarching leadership, institutional, governance structures and resourcing	‘Supply side’ culture dominates; need well-resourced, independent institutions and policy drivers
Regulation and standards	‘Deregulatory’ culture but some success with market-based approaches – Energy Retailer Obligation schemes. Limited promotional \$ and complementary incentives.
Financing investments in building upgrades, expansion of supply chain infrastructure	Some successes: Clean Energy Finance Corporation, state level schemes – Victorian Environmental Upgrade Finance, etc. Training schemes for building raters, home energy assessors, Plumbing Industry Climate Action Centre, etc
Motivating policy-makers and decision-makers to factor in long term and whole ‘value chain’ benefits	Limited progress – eg ‘reduce regulatory burden’ requirements. Increasing community pressure – eg ACOSS, Energy Consumers Aust. RACE for 2030 CRC interest in ‘multiple benefits’
Information	<p>‘Smart’ electricity meters in Vic, new homes. Increasing range of add-on analytics (PV, PowerPal etc)</p> <p>Demand Response is energy market driver. Issues with consumer access/rights to data</p> <p>Many resources – <i>Your Home</i>, community groups, but small budgets</p> <p>Confusing, misleading information issues – eg 6-star homes, heat pump HWS claims</p>
Just, rapid transition	<p>Action-research activity in fossil fuel regions; governments allocating \$</p> <p>After long-term decline, increasing focus on social housing, public housing upgrades</p> <p>Research into impacts of transition from gas/electrification on vulnerable households</p>
Development of lifecycle, value chain, circular economy models	<p>Long-term R&D interest in LCA – ALCAS, ISA etc; recent MECLA buyer alliance</p> <p>CE – interest increasing but focus on waste mgt/recycling. Value Chains – A2EP, RACE</p>
Integration of buildings into energy systems	Strong growth in rooftop PV, emerging batteries, VPPs, community batteries – response to bushfires etc

Opportunity Areas for Collaboration Identified (Table 3)

- Understand and optimise **overarching governance** structures and mechanisms involving multi-level government institutional systems to deliver zero net emissions ASAP
- Understand and implement policies to drive **rapid expansion of deep renovation**, including appliances
- Utilise **broader policies** (eg welfare, business innovation, taxation) to incorporate climate outcomes
- Develop and implement **lifecycle, 'services and systems', value chain and circular economy models**, beginning with public buildings and infrastructure and data/communications systems
- Develop and implement approaches that drive **comprehensive cost-benefit assessment** incorporating multiple benefits including carbon costs
- Develop and implement **zero carbon technologies, business models and value chains** (eg heat pumps)
- Develop and roll-out meter adaptors that **convert existing 'dumb' electricity, gas, heat and water meters** into smart, connected devices that deliver 'actionable insights'
- Improve understanding of **fundamentals of energy flows** in delivery of services and operation of processes to underpin radical innovation

DISCUSSION If you want a consultation version of report, email alan.pears@rmit.edu.au