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Distributed Energy Resources & Grid Integration

Post-Forum Report



pathways to net zero precincts

Curtin University

RACE for 2030

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ACKNOWLEDGEMENT OF COUNTRY

We acknowledge all First Nations of this place we call Australia and pay our respects to Elders past and present as Custodians and Owners of these lands. We recognise their deep knowledge and their cultural, spiritual and educational practices, and aspire to learn and share knowledge through partnerships and collaboration.

WHAT IS RACE FOR 2030?

Reliable, Affordable Clean Energy for 2030 (RACE for 2030) is an innovative cooperative research centre for energy and carbon transition. We were funded with $68.5 million of Commonwealth funds and commitments of $280 million of cash and in-kind contributions from our partners. Our aim is to deliver $3.8 billion of cumulative energy productivity benefits and 20 megatons of cumulative carbon emission savings by 2030. racefor2030.com.au

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Executive Summary

The Distributed Energy Resources (DER) Integration Forum led by the Consumer Energy Resources (CER) and Grid Integration Pathway brought together design and construction professionals, government, industry and academics to reflect on some of the key opportunities and challenges emerging for this important cross-section of urban developments.

As investment grows in these decentralised energy sources, managing their integration into the grid and our communities is critical to ensure energy reliability and continuity of supply, while at the same time maximising benefits for customers.

A number of key themes emerged from participant discussions. However, consistent across all four sessions was a focus on regulation, policy and governance. Participants emphasised the importance of good governance and policy to enable the development of and efficient and reliable functioning of energy resources in the context of precincts both new and retrofitted.

The importance of considered and thoughtful planning of infrastructure and investment, precinct design and performance were also noted. This requires both forethought and a robust business case to ensure that all precinct developments are economically viable. Additionally, that any necessary adaptations have been adequately costed for retrofits. Participants also discussed the potential of multi-objective modelling to improve both decision-making and transparency. Identifying which factors are prioritised in a precinct development (such as costs, environmental outcomes, or grid support).

Consumer trust, benefits and protection were highlighted across the sessions, particularly in relation to Virtual Power Plants (VPPs) and embedded networks. Engagement and participation were also seen as being important. At the same time, clarifying the roles and responsibilities of various energy market actors was also seen to be important.

Overall, the forum clarified that integrating CER into precincts requires careful consideration from a range of perspectives. However, it was agreed that precincts that are well planned, designed with CER assets have the potential to reduce energy consumption and costs while delivering benefits to both householders, businesses and developers.

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1. Introduction

The Pathways to Net Zero Precincts (NZPs) is a collaborative research initiative between Curtin University, the RACE for 2030 Cooperative Research Centre (RACE CRC) and a consortium of industry and research partners from across Australia. The project aims to identify, develop and implement innovative strategies for transitioning urban precincts towards net zero emissions and draws upon a range of case studies as a testing ground for real-world interventions. With urban centres responsible for a significant portion of the world's greenhouse gas (GHG) emissions, precincts are important places for innovation to achieve net zero outcomes. The NZP project has initially focused on six Western Australian (WA) residential, mixed-use and light industrial case studies across the Perth-Peel region: the Knutsford Urban Regeneration Precinct; Rivermark; Curtin Bentley Campus; Alkimos Central; Roe Highway Logistics Park; and Peel Business Park- Nambelup-Kaadadjan.

The project uses both the terms consumer energy resources (CER) and distributed energy resources (DER). CER are described as "consumers' resources that generate or store electricity and includes flexible loads that can alter demand in response to external signals."1 CER includes household solar, batteries, electric vehicles and controlled loads such as heat pump hot water heaters and air conditioners. DER is also used to describe household assets, but it also includes larger assets such as neighbourhood batteries installed in the distribution network. These terms are used interchangeably across this report. However, we use CER as the default term to be consistent with the NZP overarching theme

This DER Grid Integration online forum, held in September 2025, brought together architects, developers, builders, government, industry and academics to reflect on the key opportunities and challenges emerging for this important cross-section of urban developments. As investment grows in these decentralised energy sources, managing their integration into our communities is critical.

The forum offered an opportunity to gather insights from the range of stakeholders on how to create the conditions needed to accelerate the integration of DER into both residential and commercial urban precincts. This report is based on the notes and recorded sessions of the presentations and participant discussions.

[1] DCCEEW (2024) Consumer Energy Resources Working Group. https://www.energy.gov.au/energy-and-climate-change-ministerial-council/working-groups/consumer-energy-resources-working-group

2. Lessons Learnt from Peel Business Park

EXPERT PRESENTATION: DAVE MORGAN (DEVELOPMENTWA)

The Peel Business Park–Nambelup-Kaadadjan is situated in the Peel Region, 70km south of Perth and 10km northeast of Mandurah, in WA. It is anticipated to deliver 1000ha of industrial land at completion.

DevelopmentWA designed and installed a distribution network for the site to connect a private microgrid, which is owned and operated by Peel Renewable Energy which is a key feature of the site. The installation of the distribution network avoided approximately $50M in network augmentation costs due to constraints on the network. The microgrid is comprised of a 1.2MW ground mounted solar photovoltaic array and a 2.5 MWh battery storage system connected to the distribution network.

Future generation is expected to be delivered by the microgrid operator primarily through rooftop solar. The project provides the Peel Business Park with a minimum of 50% renewable energy at approximately 30% below the regulated business tariffs.

PARTICIPANT DISCUSSIONS

Participants were asked the following questions in their breakout groups:

- What are your key reflections from Peel that can help to inform ongoing NZP opportunities for householders, developers and policy makers?
- What needs to change to ensure these opportunities are not missed?

The key themes that emerged from participant discussions included the need for regulations, policy and governance; the importance of consumer trust and engagement; as well as adequate planning for both infrastructure and investment. Participants felt that Peel Business Park succeeded due to the developers' openness to trying new business models in collaboration with partners. The provision of clear communication to business tenants was also seen to be important Most of the groups discussed the important role that government has to play in supporting the development of NZPs, particularly in relation to their priorities around funding. However, some participants suggested that improving the regulatory environment was also necessary to enable and support the deployment of private energy solutions.

REGULATION, POLICY AND GOVERNANCE

Participants felt that the current policy and regulatory environment in WA limits progress towards NZPs. The potential solutions suggested were a coordinated governance vision and a government led planning process to reduce complexity in the approvals process.

Participants also noted that the current governance and approvals system is designed for incumbent entities (like Western Power), creating disadvantages for smaller private operators who may not have the capacity to achieve the same requirements as Western Power in terms of providing 24/7 customer support, as this was seen as being not always practical for smaller operators. Private energy solutions providers such as microgrids, are

also required to comply with sections of the Australian Standard (AS/NZS3000) for electrical installations. However, Western Power are not subject to the same standards for equipment and installations on their network. Reducing the regulatory burdens on smaller operators, while ensuring safety standards was seen as one way to address this imbalance.

CONSUMER TRUST, COMMUNICATION AND ENGAGEMENT

Peel Business Park was seen as an example of the role that trust and effective communication play in the management of energy assets and ultimately precinct success. That is, consumers need to know how the system works, the benefits, and the potential for risks (e.g. cost blowouts or failures), especially at the trial stage. This information should be provided to all so that expectations can be managed and trust can be built.

Participants believed that trust and transparency around sustainability were important for the success of NZPs. It was suggested that gaining more information on consumer perceptions of the Peel Business Park and the success of its microgrid deployment would be useful to inform ongoing NZP opportunities. For example, greater engagement with business owners could provide more information on how much of an influence sustainability credentials had on their energy related decisions making, or whether they were primarily motivated by cost or the availability of renewables on site for environmental reasons.

Embedded networks, which can lock customers into single providers with little governance accountability or transparency was also raised. This is particularly relevant for individuals in apartments or other strata managed properties. It was noted that strata companies often lack the skills or knowledge to manage shared DER assets, which creates a need to ensure there is greater consumer protection in this space. Community title was also suggested as a way to improve precinct DER management thereby avoiding the use of strata managers, who often have limited knowledge or skills in managing DER.

INFRASTRUCTURE, INVESTMENT PLANNING AND DESIGN

Participants reflected that developers and network planners should ensure that co-location of assets with loads is implemented to improve overall system efficiency. Participants emphasised that forward planning for infrastructure could enable more cost-effective non-network solutions (like batteries) can be identified via the Regulatory Investment Test for Transmission (RIT-T) on the National Electricity Market (NEM).

It was noted that DER decisions are often driven by economics rather than sustainability, and that net zero framing in the case of the Peel Business Park was viable because it was cheaper than available alternatives to augment the network. It was discussed that the return on investment for developers evaluating DER options is not always clear and the business case for being an embedded network operator is marginal. Participants suggested innovative business models such as a joint venture between tenants could be a way to support and grow DER investment.

Additionally, projects are often dependent on land value and availability, as well as other physical constraints. Participants reflected that Peel Business Park's construction on lower cost former farmland assisted the business case. Consideration of the maintenance and connection costs for energy assets compared to traditional network connections was also seen to be important. That is, the cost of network upgrades and other capital expenditure may outweigh spending on DER

solutions. Participants also reflected that well managed DER assets can result in distribution network benefits external to precincts. However, this is often not accounted for as it occurs outside precinct boundaries. System design was also noted as important for future precincts. For example, matching generation to load and including diverse generation assets (such as wind for loads at night) were identified as potential additional opportunities for enhancing the efficiency of NZPs.



Peel Business Park (DevelopmentWA) and surrounds. Image by J Wyld.

3. Reflections on Climate Adaptation for NZPs

EXPERT PRESENTATION: EMERITUS PROFESSOR MARK HOWDEN (ANU)

Adapting to current and future changes was identified as being key to managing the escalating risks of global temperature increases and climate related disasters. It was noted that considerations of climate change in the built environment often focus on GHG emissions and lifecycle assessments. However, it was stressed that there is also a need to consider adaptation in NZPs given we are already experiencing the impacts of climate change. To do this effectively, focusing on some core goals for NZPs was seen to be important. Appropriate goals were thought to include health, wellbeing and comfort for people mitigating against climate extremes, along with developments that enhance biodiversity and increase overall visual amenity.

There is a range of possible climate adaptations for NZPs, many of which can address multiple needs. For example, good building siting, orientation along with design and construction. That is, passive design with good insulation can lead to reduced electricity consumption. Thereby reducing the impact of increasing heatwaves, exposure to smoke (from fires), reduced operating costs and mitigating against risks from storms, cyclones and intense rainfall. Similarly, judicious vegetation planting can moderate building temperatures in both summer and winter, improve the environment for active travel and enhance biodiversity. Water management is also a key climate adaptation strategy that can include improved water efficiency, storage and infiltration to reduce water consumption, reduce costs, manage drought periods and reduce the potential impacts of floods.

This can be achieved by working through a matrix of goals, using a systematic approach to understand climate impacts for the site and region, the options available for adaptation, identification of potential co-benefits and finally, understanding the trade-offs that occur with the other goals.

PARTICIPANT DISCUSSIONS

Participants were asked to discuss the following questions in their breakout groups:

- What examples have you seen of adaptation considerations in NZPs already?
- What are your reflections on adaptation and co-benefit considerations
- What needs to be done to ensure that they are included as part of NZPs?

The key themes that emerged from discussions with participants were governance, policy and regulatory reform, precinct planning, design and performance, community participation and engagement, economic viability and investment barriers. Participants noted that there is a need for careful and thoughtful forward planning of NZPs with a need to incorporate net zero goals from the beginning of any new development or for the retrofit of existing buildings. Community engagement, participation and consideration of economic factors were also considered important, with adaptation features being both a key costing consideration and potential drawcard for investors.

GOVERNANCE, POLICY AND REGULATORY REFORM

Participants emphasised a need for foresight and a comprehensive vision, with many precinct-level developments felt to be still nascent in Australia. It was also noted that Australia was not very good at considering complex land uses that can be required for new precincts. However, participants also

noted a lack of impetus for state agencies to take charge in this area, despite the fact that climate change and necessary adaptations will influence a range of professional and government sectors.

Participants suggested that current development norms were not fit for purpose with precincts needing to be able to adapt to climate-induced changes. With global temperatures already exceeding 1.5° C, it was agreed that current conventional development practices would be ineffective and that there needed to be recognition that there is no business-as-usual scenario when making cost or impact comparisons. Participants acknowledged the enormous demand for new housing and suggested that trade-offs are not being properly considered. For example, with significant water demands and the loss of mature trees to infill developments, there is a need to strengthen national building standards.

Some key areas of concern around governance and regulations included water provision, data centres and artificial intelligence (AI) resource use. The growing energy needs associated with AI and data centres was also discussed with an example of the Hume City Council in Victoria considering 19 applications for data centres, but they only have enough water available to sustain around five of them. With a significant increase in data centres' investment globally, the need to develop governance frameworks around AI related energy use was flagged as a key area for reform.

Another example discussed, was the colocation of a data centre, to capture heat for use in horticulture, aquaculture, of for pool heating. Participants felt that incorporating systems thinking and exploring ways to look at adjacent land uses to have complementary uses was needed. In WA, and Australia, we are not looking at the whole system with developments and where there are synergies to enable more efficient resource use.

PRECINCT PLANNING, DESIGN AND PERFORMANCE

To enable decarbonisation, participants felt that design and planning needed to consider the scale of change needed. They also noted that a socially responsive model of design that would influence people's behaviour would also be useful for precinct developments. Participants emphasised that new precincts planned to meet 2030 or 2035 targets would require more comprehensive planning in relation to building materials, energy efficiency and other key factors at the outset. Both new and existing precincts would need to improve adaptation factors like airtightness and indoor air quality so that buildings would be able to withstand increased temperatures, rain events and instances of bushfire smoke.

Reduction in energy demand was also seen to be key to a net zero future. While globally we are installing more renewable energy, we are also increasing overall energy use, including fossil fuels. Thus, there is an urgent need for more energy efficient buildings. Existing infrastructure may not cope well with climate change and simply bringing on new precincts was not seen as a solution. Participants suggested that forward planning and a systematic approach to building audits could be a solution. Other proposed planning considerations to cope with higher temperatures included assessing the thermal performance of developments, improving insulation requirements, and modelling Heating, Ventilation and Air Conditioning (HVAC) loads to ensure developments can meet increased energy demand. Ensuring sufficient shading is included in building or retrofit designs is also needed to improve the thermal performance of the built environment.

Nature-based solutions were also a key topic of discussion, with participants acknowledging the potential of urban greening to increase cooling, improve drainage and boost biodiversity. While urban

greening can be controlled down to the plot level, it was felt to provide the most benefits at the whole of city scale.

COMMUNITY PARTICIPATION AND ENGAGEMENT

Participants noted that engaging with the community to increase their participation is key to the success of precincts. While NZPs can offer communities energy and disaster resilience; to be effective there needs to be people willing to live and work in them. Participants suggested that clear communication of the value and benefits for people living and working in NZPs was needed, as there is an unfamiliarity with new technology and some community polarisation. There was a sense that while there was often willingness to be part of a precinct, communities often lacked the tools or opportunities to be involved. Participants noted that structural change within net zero infrastructure tended to be more effective than behaviour-oriented programs for driving net zero outcomes.

Community mindsets towards the energy transition and reaching net zero was also a focus of discussion. Participants discussed a number of positive changes in the field of renewables, for example, citing Saul Griffith's 'Electrify Everything' campaign. Participants also emphasised that there was a need to overcome public pessimism about the energy transition to avoid scapegoating and division.

ECONOMIC VIABILITY AND INVESTMENT BARRIERS

Participants stated that precincts need to be commercially viable before seeking financing. Lessons could be learnt from the mitigation and adaptation aspects of the Curtin campus case study, pointing to the importance of including adaptation as part of the initial business case. Participants felt that by including mitigation and adaptation in financial decision making, investors would be able to see the costs and benefits of these actions, noting that these factors are often inadequately costed (for example, tree planting). There were also concerns raised that scalability is possibly in tension with the requirements for designing climate-adaptive precincts, with site specific needs of each individual precinct would make them ineffective and uneconomic for broader implementation.

4. Regulations for DER Grid Integration

EXPERT PRESENTATION: PROFESSOR PENELOPE CROSSLEY (UNIVERSITY OF SYDNEY)

Australia's energy system is undergoing a fundamental transformation, with DERs projected to supply over 45% of electricity demand on the NEM by 2050. This has meant that the challenge of DER integration is no longer purely technical, but increasingly also a social and regulatory challenge. The question then becomes, how do we best ensure that DER evolves from being passive exporters in the electricity system to orchestrated, system wide participants that are responsive to market demand?

Professor Crossley worked on a comparative analysis of the regulatory frameworks in nine jurisdictions around the world, aiming to identify international best practice across five core dimensions. These dimensions included: the legal definition of DER and its implications for market access and planning; technical standards; transparency and visibility of DER data; regulatory frameworks for DER connection to distribution networks; and the rules governing DER exports, including tariffs, thresholds, and conditions.

This research provides insight into how Australian DER regulation should evolve, highlighting potential reforms that could better embed transparency, connection, and innovation into regulations. Thereby, enabling greater participation, system efficiency, and resilience in a decarbonising grid. To achieve this, Australia must adopt statutory definitions, real-time data infrastructure, and a forward-looking market design to deliver a decentralised, resilient, and consumer-centred energy system.

PARTICIPANT DISCUSSIONS

Participants were asked to discuss the following questions in their breakout groups:

- What are the necessary laws and regulations that need attention? (Or: How can electricity market regulations be redesigned to reduce complexity and meet the challenges of increasing CER?)
- How best to prioritise regulations for DER grid integration in the current landscape?

Key themes that emerged in the discussions was a need for alignment of regulatory frameworks and governance across Australia, consumer rights, participation and equity and data and forecasting.

It was agreed that CER is growing rapidly on the grid in Australia, with an urgent need to create standardised regulations that integrate household solar, batteries and EVs.

In particular, data use, customer privacy, consumer protection, and market design were highlighted as areas requiring regulatory attention. However, participants also stressed that introducing too much regulatory complexity could slow down the growth of DER. It was felt that enabling and encouraging participation of consumers through regulatory reform was crucial to ensuring the successful management of DER. Participants also suggested that there were opportunities to learn from successful developments both around Australia and internationally, citing Project Jupiter, the National CER Roadmap and Germany's central data repository as examples of progress.

ALIGNMENT OF REGULATORY FRAMEWORKS AND GOVERNANCE

While agreeing on the importance of aligning DER regulation around the country, participants noted several obstacles for practical implementation of a standardised approach. For example, issues in one jurisdiction may slow down progress for all states and territories with different networks and different market designs. Suggested solutions to improve coordination included proactive, clear and transparent procurement processes, approaches to management that are transferrable across markets and identifying gaps by collaborating with industry practitioners and overseas networks.

Participants highlighted that learnings from different regulatory environments can be shared for more effective CER governance nationally. Examples included the learnings from the CER Roadmap in the NEM as well as Project Jupiter in the Wholesale Electricity Market (WEM). Having national alignment was thought to make it easier to work across the NEM and the WEM with data sharing, governance processes and rulebooks as areas needing greater consistency.

Participants noted that South Australia (SA) was an early leader in allowing greater amounts of CER and increased customer autonomy, while still ensuring grid stability through import and export limits. Building on the learnings from SA, WA is now beginning to adopt similar measures, based on learnings from Project Symphony and Project Jupiter (currently underway). Participants also felt that WA was ahead in terms of regulations and data for connections, citing the extra complexity in the NEM due to the greater number of players. However, they also suggested that the NEM was ahead of WA in relation to policies for market participation for VPPs. In this regard, participants expected that the WEM would follow the lead of the NEM.

CONSUMER RIGHTS, PARTICIPATION AND EQUITY

Participants agreed that a clear pathway to market participation is necessary to provide value for consumers, aggregators and retailers. However, one group also noted that full participation in VPPs cannot be expected and there was a need to understand what partial participation may mean for the effectiveness of VPP schemes and for the network. There also needed to be a testing of assumptions in the VPP model (for example around consumer knowledge and pricing) as these factors may inhibit participation.

The importance of regulations for consumer protection was highlighted across discussions. In that regard, it was suggested that the roles and responsibilities of the various energy market actors needed to be clarified, as well as ensuring that there are no hidden product terms and conditions for VPPs. The opportunity for consumers to opt in or out of VPPs was also noted as important. To build the trust required for consumers to sign their energy assets up to a VPP, consultation and a participatory approach to developing the associated regulatory model was also identified as being worthwhile. Participants also suggested that regulations should be used to achieve greater equity through improving access to the benefits of CER.

It was believed that it is important to ensure that participation in the market is simplified for aggregators and kept cost effective, to enhance the opportunities for VPPs to offer tangible network solutions. This could be through offering the right price signals, either through tariffs or time-based pricing, that provided end value to the consumer without adding extra complexity. Embedded generation on a precinct scale was also discussed as an equitable and sustainable solution. For example, shared roof space can be an opportunity for benefits to be shared among residents of a precinct, with all residents receiving a reduced bill. However, participants also noted that the current

Strata Titles Act makes governance and management of CER in a strata context difficult, with one participant noting that community title may be the more optimal way forward.

DATA AND FORECASTING

The need to understand how to improve the collation of data was also identified as an important component of effectively regulating for CER. This is because more granular data (for example EVs) can improve the forecasting capability of the market operator and help them to manage variable consumption. The example of Germany's central repository of data was raised, with participants questioning whether this could be a functional template for a centralised system in Australia. However, participants stressed the importance of scenario planning, accessing only the data that is needed to manage the system, while also respecting data privacy rules. As well as consideration of how many actors really will need to have access to asset data from individual customers.



Peel Business Park (DevelopmentWA) solar panels and battery. Image by J Wyld.

5. Multi-Objective Trade-Offs for NZPs

EXPERT PRESENTATION: DR BILL LILLEY (RACE FOR 2030 CRC)

Designing market and grid operations that not only ensure reliable and affordable power but also maximise environmental benefits is critical for Australia's decarbonisation. To achieve this, robust frameworks and indicators are essential to navigate the interplay of co-benefits and trade-offs when integrating CER. There is a need to provide a multi-faceted approach to integrating CER into complex energy systems, to manage the competing and at times, conflicting objectives and priorities.

In his presentation, Dr Bill Lilley discussed a number of different frameworks – including Multi-Criteria Decision Analysis, Integrated Assessment Models or Energy System Modelling, Multi-Objective Multi-Verse Optimisation algorithms, Cost-Benefit Analysis with externalities, Life-Cycle Analysis and Sustainability Indicator Frameworks. Bill suggested that a multi-faceted approach that integrates various analytical methods with a comprehensive suite of indicators is best suited for effective CER grid integration.

PARTICIPANT DISCUSSIONS

Participants were asked to discuss the following questions:

- What frameworks/priority indicators can best enable facilitation of NZPs?
- What pricing mechanisms are needed and are workable for consumers/businesses?

The key themes discussed from participants in this session included, governance and frameworks, modelling and trade-offs in decision making, and what the ultimate business case(s) for precincts might be.

Participants again emphasised the role of governance in managing expectations and shaping successful outcomes for individual precincts in line with their unique needs and priorities. Discussion also focused on how decision-making models themselves are shaped by the assumptions underpinning them and recommended robust feedback models that ensured that such frameworks provide the best guidance for governance and development. It was reinforced that decision-making needs to be based on high-quality, transparent information to ensure planning for both new build and retrofits could be future-proofed as much as possible. Finally, finance emerged as another common theme, with participants discussing the requirements for fair and functional pricing mechanisms.

DEVELOPING FACILITATION FRAMEWORKS

Participants suggested that the outcomes of modelling are dependent on who is using the models, what kind of decisions are being made, where the precinct is located and who is making the final decisions. They also felt that the governing values of an organisation can impact both the selection and outcomes of a decision-making model.

Curtin's Bentley Campus was provided as a unique example in precinct development as Curtin both built and uses the precinct. Other precincts are often created by developers and then used by tenants who may have different values to what was originally proposed by the developer. Participants proposed that when values align, the outcomes of precinct developments are improved and magnified.

Participants also raised considerations around the development of frameworks to facilitate precincts, focused on managing expectations and future uncertainties. For example, they discussed the possibility of integrating operator expectations into guidelines or regulations to avoid future complications if a new operator takes over a precinct. It was proposed that a precinct facilitation framework should include net zero performance as a key overarching element, in addition to other elements such as consumer engagement and protection.

MODELLING AND TRADE-OFFS IN DECISION-MAKING

Participants noted that modelling has the potential to support improved decision-making. However, instead of seeking an "optimal" outcome, modelling can improve decision making to be more consistent and transparent. It can be used as a design improvement tool by revealing weaknesses in existing options and identifying improved options, through clarifying what is important in decision making processes.

Participants also indicated that transparency around the models used will be critical to ensure responsible and trustworthy modelling. Recognising that models are generally underpinned by assumptions and values, participants suggested that making this information visible, revealing the choices and trade-offs made, would improve the quality of decisions. Participants also emphasised the need for a robust feedback system to test assumptions in models, noting that models based on older theoretical assumptions may need to be updated to reflect current realities (such as climate change impacts). For example, life cycle assessments were conducted for the Roe Industrial Park because the main priority at that site was carbon reduction.

Participants also discussed how grid planning needs to incorporate several time horizons (one year, ten years and thirty years into the future), as well as consider the benefit of non-network solutions, to potentially avoid unnecessary distribution and transmission upgrades. The assumption that future precinct developments will always be new builds was also challenged.

BUSINESS CASE FOR PRECINCTS

Developing the business case for precincts was also emphasised as being important. Participants noted that firming up the grid is not necessarily monetised, so ways to offer financial benefits to precincts that share CER assets for broader grid support is needed. It was agreed that precincts need to first be financially viable before considering how to contribute to grid stability. For example, the Peel Business Park is driven as much by commercial success as achieving ‘green’ credentials.

Conclusion

Across all four sessions there was a strong focus on regulation, policy and governance. Participants emphasising the importance of good governance and policy to enable the development and functioning of energy resources in the context of precincts, for both new and retrofitted precincts. For example, the governance arrangements for CER in a strata context is felt to be challenged by a lack of knowledge from strata management companies.

Participants also discussed the lack of consistency and increasing complexity of energy regulations nationally, highlighting the need for standardised regulations across Australia. However, it was also recognised that there are limitations with a standardised approach for jurisdictions if some are lagging. National alignment work that is already occurring, for example sharing the lessons from Project Jupiter in WA nationally, was considered important to address the lack of consistency.

Planning also emerged as a common theme, with participants discussing the importance of considered and thoughtful planning of infrastructure, investment, precinct design and performance. It was emphasised that there was a need to ensure precincts are adequately prepared for the changing climate of the future – both to withstand increases in temperature and natural disasters, as well as to contribute to the decarbonisation of society through smarter and more efficient energy use. This was felt to require both foresight and a robust business case to ensure that precinct developments and retrofits are economically viable.

Consumer trust, benefits and protection was also highlighted as important. This was particularly in relation to VPPs and embedded networks. Participants also raised the importance of early and appropriate consumer engagement and participation to build trust. Clarifying the roles and responsibilities of various energy market actors for consumers was also highlighted as a way to build trust. The importance of including consumer protection provisions in legislation was seen as equally important.

Finally, the use of multi-objective modelling in NZPs can provide perspectives on the trade-offs and decisions that need to be made in relation to CER integration. Ultimately, this improves the decision-making and transparency, by making known which factors are prioritised in a precinct development (such as environmental outcomes, cost or grid support).

Overall, the forum clarified that integrating CER and DER into precincts requires careful consideration from various perspectives. Precincts that are well planned, designed and include CER assets effectively, have the potential to reduce energy consumption, costs and deliver benefits for both householders, businesses and developers.



pathways to net zero precincts

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