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DIGITAL ENERGY FUTURES

**SCENARIOS FOR
FUTURE LIVING
2030/2050**

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Professor Yolande Strengers
Dr Fareed Kaviani
Dr Kari Dahlgren
Dr Hannah Korsmeyer
Professor Sarah Pink
Dr Larissa Nicholls
Dr Rex Martin

**EMERGING
TECHNOLOGIES
RESEARCH LAB**

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EXECUTIVE SUMMARY

A RESOURCE PACK FOR: ENERGY FORECASTERS, INDUSTRY STAKEHOLDERS AND CURIOUS FUTURISTS

BACKGROUND

This report presents four scenarios for future living to guide energy industry planning. The scenarios provide forecasters, policy makers and demand response specialists new foresights to anticipate plausible outcomes of emerging trends in the years 2030 and 2050. They have been specifically designed to highlight a component of energy industry scenarios that often lacks detail and data: how people will live in the future.

The scenarios draw on evidence from all six stages of the Digital Energy Futures (DEF) project:

- 1. Analysis of industry reports identifying trends, visions and scenarios for the home**
- 2. Ethnographic research with 72 households identifying 45 trends**
- 3. Energy Consumers Australia's Energy Consumer Behaviour Survey (ECBS) to quantify household trends**
- 4. Analysis of project evidence identifying key foundations for demand management**
- 5. Future-focused workshops to generate 14 foresighting concepts**
- 6. Analysis of project evidence to develop scenarios for future living**

The research was used to centre people in response to industry scenario assumptions and expectations, and to deliver alternative scenarios using evidence-based foresight with Australian households.

This report has interactive elements. They are available in the online version of the full report, **that can be viewed here.**

PROCESS

From an analysis of 46 industry scenarios across 14 reports, the research team identified three dominant types of industry scenarios:

- **Disruptive Technology**
- **Prosumer Participation**
- **Automated Futures**

Taking these as the starting point, the DEF scenarios draw on qualitative and ethnographic research to foreground everyday life in these energy futures.

This approach generated four distinct scenarios for 2030 and 2050, two of which respond to industry speculations of an automated future (2050). Three diverse households inspired from DEF research illustrate the lived experiences in each scenario: The Johnson Family, Xinyi and Mimi the Cat, and Ruth and Robert. These households' lives change to portray what everyday life could look like in each scenario, highlighting both inequities and opportunities.

DIVERSIFYING THE SYSTEM

In industry scenarios and roadmaps, more automation is assumed to achieve higher levels of certainty concerning future demand and grid stability (material certainty). In DEF scenarios, greater consumer engagement and autonomy achieves higher certainty. This is because the DEF evidence shows that:

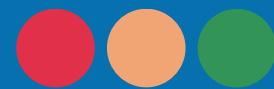
- People don't only use automation for energy purposes
- People override **Consumer Energy Resources (CER)** to maintain control
- People match CER use to their everyday priorities and values
- There are significant inequities in access to and knowledge of CER

The DEF scenarios reveal that industry needs to prepare for more diverse forms of participation and engagement to maintain high levels of material certainty.

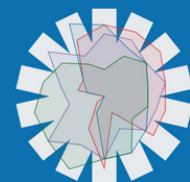
The report illustrates the lives of three diverse households as they move through the DEF scenarios



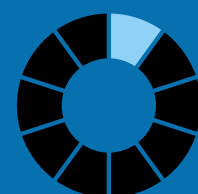
The report uses a **traffic light system** to indicate whether the outcomes of the DEF scenarios correspond to those represented in industry scenarios



The scenarios draw on **foresighting concepts** from the DEF research to shape outcomes and lived experiences



The report provides a **roadmap** to enable or disrupt the outcomes of the DEF scenarios and support the DEF **vision** for desirable, plausible and equitable futures.



Scenarios

CREATURE COMFORTS (2030)

Imagine a future where consumer electronics, appliances and devices increase energy demand and disrupt load management objectives.

In response to industry scenarios that foreground the disruptive nature of energy technologies and assumed desire of consumers to be self-sufficient.

In response to rising costs of living, meeting a household's needs at home becomes a key priority. People enthusiastically pursue lifestyle ambitions, including via smart home technologies promoted by Big Tech. Homes are expanded and enhanced to accommodate more devices, people and activities. Automation settings do not respond to energy system requirements as households prioritise pleasure, convenience, entertainment, health, safety and home comfort. People invest in their homes rather than on outside activities or holidays, allowing homes to serve a wider variety of needs, and making homes more luxurious by people's own standards.



SHARING THE LOAD (2030)

Imagine a future where the grid becomes more than just an enabler of the market; it enables participation in a decarbonised, reliable and affordable energy system that supports community wellbeing.

In response to industry scenarios that depict a future where a high uptake of CER and associated technologies allow "prosumers" to manage their own electricity supply and demand.

Participation in the energy system exceeds expectations, as people embrace opportunities to use renewable energy in ways that make sense for their own lives, priorities and values. People are resourceful and generous with their CER; they share energy with others and participate in community-oriented services and initiatives. Monetary and market-based incentives are most engaging when they connect with people's desire to contribute to the common good. People participate in many ways based on whether they have access to CER at home; their lifestyles, technology interests and capacities; their health and wellbeing; the frequency of and their exposure to extreme weather events; and their trust or distrust of systems and providers.



HUNKERING DOWN (2050)

Imagine a future where everyday life is increasingly defined by automated technologies but people retain control, overriding demand response and industry objectives during extreme weather events.

In response to industry scenarios that foreground automated and active CER as solutions to future grid stability.



Homes are optimised to provide a safe, productive and comfortable haven, particularly during seasonally variable extreme weather. Institutions routinely close or are inaccessible during more frequent extreme weather events, placing emphasis on the home. People who can afford housing and technology upgrades and live in lower risk areas stay home to avoid extreme weather events. Additional spaces, new configurations, and advanced equipment enable most work, school, exercise and entertainment activities in reasonable comfort at home. CER uptake is high and works with home appliances to respond to energy price signals and availability. However, people retain ultimate control and can override automation, creating new challenges for the grid.

SUNRISES & SIESTAS (2050)

Imagine a future where society adapts to a changing climate and energy system, allowing the availability of renewable resources to align with everyday life.

In response to industry scenarios that prioritise techno-fixes, where everyday life must shift to system-efficient behaviour.



High global demand for CER and lithium batteries, combined with heightened extreme weather and intensifying global geopolitics, contributes to supply issues with solar, battery storage and EVs. This has required people to make the most resourceful use of limited renewable generation and storage, and strengthened the role of societal change in decarbonisation efforts. There is a strong focus on local community resilience and support. The timing of institutional and household routines have shifted to accommodate sustained hotter weather in summer, longer summers, and more frequent extreme weather events including seasonally and regionally diversified floods and droughts. Policy, private, and community investments in infrastructure and initiatives mean that daily activities can easily take place beyond the home.

RESOURCES

The DEF approach to scenario building represents a bold agenda for what it means to put people at the centre of energy futures.

The DEF scenarios are intended to support energy planning and forecasting by:

- Reframing or revising the assumptions about people that are embedded into established energy scenarios
- Providing alternative narratives that can be modelled (locally or nationally) to identify plausible future outcomes
- Guiding demand response programs, energy system design and technology development to achieve outcomes that meet the needs and expectations of consumers
- Establishing realistic expectations about how people are likely to engage with energy automation and technology, and the limits of emerging technology to solve energy challenges
- Providing a set of considerations about anticipated social changes that currently sit outside the purview of energy scenarios, but are highly relevant for energy outcomes

The report provides additional resources for forecasters and planners, including:

- Opportunities to support or intervene in the scenarios through demand response initiatives (included in the DEF Roadmap) to realise the DEF vision for desirable, plausible and equitable futures
- Indicative quantitative datasets on demographic, health and social trends, consumer electronics and technology uptake and use, and environmental shifts and climate change, to test, track and model scenario trends and outcomes
- Details of our transferable and scalable approach for people-focused forecasting that responds to anticipated technological, environmental and social change

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Authors

Professor Yolande Strengers
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Dr Larissa Nicholls
Dr Rex Martin

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Acknowledgement of Country

We wish to acknowledge the people of the Kulin Nations, on whose land we work. We pay our respects to their Elders, past and present.

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Scenario illustrations by [Steve](#)
Layout and animations (made in [Flourish](#)) by Fareed Kaviani

Author contributions statement

The first four authors of this report are lead authors - they engaged in a deep and sustained collaboration to develop the scenario building process, scenarios and household stories, and forecasting resources contained within this report. This involved engaging directly with the DEF evidence base, which all authors of this report developed over four years of research with Australian households. Author five contributed to the conceptual and methodological development of the scenarios, and report writing and editing. Author six contributed to scenario and household story drafts. Author seven contributed to report editing and compiling resources.

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