

RACE for
2030



Scenarios for
Future Living



**SCENARIOS FOR
FUTURE LIVING:
EMERGING TECHNOLOGY
INNOVATION AND DEVELOPMENT**

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SCENARIOS FOR FUTURE LIVING

Putting people at the centre of the energy transition

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Industry Report

Scenarios for Future Living: Emerging technology innovation and development

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Project team

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- University of Technology Sydney
- Commonwealth Scientific and Industrial Research Organisation (CSIRO)

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Acknowledgement of Country

The authors of this report would like to respectfully acknowledge the Traditional Owners of the ancestral lands throughout Australia and their connection to land, sea and community. We recognise their continuing connection to the land, waters and culture and pay our respects to them, their cultures and to their Elders past, present, and emerging.

Use of AI Acknowledgement

AI tools were used in the development of this report to assist with the creation of scenario visualisations. All conceptual framing, analysis, interpretation, and conclusions remain the responsibility of the authors.

What is RACE for 2030?

RACE for 2030 CRC is a 10-year cooperative research program with AUD350 million of resources to fund research towards a reliable, affordable, and clean energy future.

Disclaimer

The authors have taken all reasonable care to ensure that the information in this report was accurate at the time of publication. However, they accept no responsibility for any loss or damage that may result from reliance on its content.

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GLOSSARY OF TERMS

AD (autonomous driving)

The capability of a vehicle to sense its environment and operate without human input using a combination of sensors, artificial intelligence, and advanced control systems.

AI (artificial intelligence)

Systems capable of mimicking human cognition, enabling machines to perform tasks, optimise systems, or respond to data autonomously.

AR (augmented reality)

Technology that overlays digital images or information onto a real-world view via devices like phones or smart glasses.

BioTech

Technologies that apply biological systems for health, agriculture, and energy applications, including wearables and genetic analysis.

Biomarkers

Biological indicators (like heart rate or blood glucose) used for health monitoring, often captured through wearables or sensors.

Blockchain

A decentralised, secure digital ledger technology enabling peer-to-peer energy trading and transparent transactions.

Cobots (collaborative robots)

Robots designed to work safely alongside humans, sharing tasks in collaborative environments like factories or care settings.

Decarbonisation

Reducing greenhouse gas emissions, especially from the energy sector, by shifting to renewables and electrifying systems.

CER (consumer energy resources)

Small-scale energy technologies that generate, store, or manage electricity, such as rooftop solar, batteries, or smart water systems.

Digital voice assistant

An artificial intelligence powered system (for example, Alexa and Siri) that enables voice interaction with smart home devices and services.

eVTOL (electric vertical takeoff and landing)

An aircraft that uses electric power for vertical takeoff, landing, and hover.

EV (electric vehicle)

A vehicle that is powered only by electricity. See PHEVs (Plug-in Hybrid Electric Vehicles) for alternative electric vehicles.

Exoskeletons

Wearable robotic devices that support or enhance human movement, strength, or endurance, often used in rehabilitation, manual labour, or mobility assistance.

GenAI (generative artificial intelligence)

Artificial intelligence systems that can create new content, such as text, images, or code, used in automation and design applications.

Haptics

Technologies that simulate touch or physical feedback in digital environments, especially used in virtual reality or remote care.

GLOSSARY OF TERMS

Heat pumps

Electric heat pumps are high-efficiency electrification technologies that transfer ambient heat for space and water heating.

Hustle economy

An economic system where individuals earn income through flexible, short-term, or multiple gigs, often via digital platforms.

HVAC (Heating, Ventilation, and Air Conditioning)

Systems concerned with the regulation of indoor temperature, air quality, and airflow, including the design, production, installation, and maintenance of technologies used across residential, commercial, and industrial buildings.

IoT (internet of things)

A system of connected devices embedded with sensors and software to collect and exchange data in real time.

Microgrid

A localised grid system that can function independently or alongside the main grid, often incorporating consumer energy resources.

On-device AI

Also referred to as Edge AI, refers to running artificial intelligence locally on a device, rather than on remote cloud servers.

Peer-to-peer energy trading

Systems allowing energy users to buy, sell, or exchange electricity directly with each other, often using blockchain.

PHEVs (plug-in hybrid electric vehicles)

Vehicles with both electric and combustion engines, capable of running in electric-only mode for limited distances.

Recommerce

The buying and selling of pre-owned goods to extend product lifecycles and reduce waste.

Smart appliance

A device connected to a network that can be monitored and controlled remotely, such as fridges, ovens, or washing machines.

Smart home assistive technology

Technologies designed to support independent living, especially for elderly or disabled individuals, often integrated with artificial intelligence or internet of things.

Smart meter

A device that provides real-time energy consumption data to both consumers and energy providers, enabling dynamic pricing.

Smart thermostat

A programmable thermostat that automatically adjusts heating and cooling based on data, schedules, or price signals.

Synthetic media

Artificial intelligence generated or manipulated audio, video, or text content, used in applications ranging from entertainment to scams.

VPP (virtual power plant)

A coordinated network of consumer energy resources managed to act like a single power plant, balancing energy supply and demand.

GLOSSARY OF TERMS

VR (virtual reality)

A fully immersive digital environment, typically accessed via headsets, used in gaming, remote work, training, and healthcare.

Wearables

Devices worn on the body that track biometric or behavioural data, including smartwatches, fitness trackers, and health monitors.

WFH (Work from home)

A flexible working arrangement in which employees perform their job duties remotely from their residence, rather than commuting to a traditional office or workplace.

XR (extended reality)

An umbrella term that encompasses immersive technologies such as virtual reality (VR), augmented reality (AR), and mixed reality (MR), which blend or extend the physical and digital worlds.

EXECUTIVE SUMMARY

Identifying emerging consumer-facing technology trends likely to impact the future energy system and residential sector.

This report represents the key output of work package 2 (WP2) of the Scenarios for Future Living (SFL) project.

Drawing on a review of 93 reports, interviews with 20 experts, and ethnographic qualitative research conducted at nine conferences and expos, this report identifies emerging trends across sectors including health technology, disability advocacy, construction, HVAC, and digital and energy technologies. It catalogues and analyses trends likely to shape the future energy system, with a particular focus on implications for residential energy demand.

The trends are organised into large-scale **macro-trends** with cross-sectoral impacts, alongside more specific **everyday practice trends** linked to everyday household life. These are then presented as **synthesised industry visions**, which bring macro-trends and everyday practices together in a speculative form to illustrate how these dynamics may play out in everyday life, presented through AI-generated images.

It is important to emphasise that this report presents the future visions, trends and expectations of major consultancies, planning bodies, and industry experts, and does not reflect data from research with everyday households.

As researchers, we have gathered together these industry expectations, in order to bring attention to potentially significant trends likely to shape household energy demand. We also point out some potential limitations and oversights of such trends, including that they often assume a bias towards economically privileged and technology-interested households. However, the report does not draw on the specific research findings with everyday households, who will ultimately shape how these possible futures play out.

Research with Australian households will be reported on in other SFL outputs. Reports will be available here: monash.edu/scenarios-for-future-living

SUMMARY OF KEY FINDINGS

Macro-trends

Large-scale trends considered most pertinent to and potentially disruptive for digital energy futures and patterns of residential electricity demand. The following summarise key predictions of various sectors:

LARGE-SCALE TECHNOLOGY DEVELOPMENTS

- **AI** is positioned as a ‘paradigm-changing’ technology, predicted to fundamentally reshape how people work, shop, create, and interact in everyday life
- **BioTech** is unlocking new applications in food, health, and materials in and around the home
- **IoT** is expected to transform homes into dense data generating environments
- **6G** is expected to mark a transition from ‘connected things’ to ‘connected intelligence’, enabling a programmable, data-rich physical world
- **Quantum computing** is described as a disruptive leap, introducing fundamentally new approaches to computation, particularly for tasks involving massive complexity, optimisation, and simulation
- **Digital twins** increasingly being used to simulate, optimise, and automate everything from buildings, transport, health infrastructure, urban systems and even people
- **Robotics** is rapidly evolving beyond industrial applications, expanding into homes, healthcare and everyday environments
- **Energy technology** breakthroughs, such as those in solar materials, battery technology and wind turbine design are pushing the boundaries of where and how energy can be produced and stored.

ENERGY AND THE ENVIRONMENT

- **Decarbonisation** is no longer a technological challenge but one of scale, integration and speed
- **Electrification of the home** is reshaping the vision for future homes in Australia
- **Consumer energy resources** use is growing rapidly and is expected to continue
- **Energy efficient households** are expected to be widespread in the future, with emerging technologies promising precise, predictive and personalised energy optimisation
- **Widening disparities** are emerging given the high upfront costs and digital complexities associated with technologies and services that leverage the energy transition benefits
- **Climate change** is accelerating in severity and frequency. In addition to being mentioned in this section, there is a detailed analysis of Australia’s National Climate Risk Assessment report and its relevance to key trends identified in this report in Part 6.

SUMMARY OF KEY FINDINGS

DEMOGRAPHIC

- **Declining fertility** is expected to continue into the coming decades, as people pursue life paths that do not centre around having children
- **Ageing** is increasing the share of people aged 65 and over
- **Health consumerism** is on the rise, with more personalised, preventative, and data-driven care solutions entering the market
- **Immigration** is increasingly central to Australia's population growth, especially as fertility rates remain low and the population ages
- **Housing and homeownership** is declining, and housing patterns are diversifying in response to economic, demographic, and cultural pressures
- **Dense cities** are being reimagined through green urban transformation and smart infrastructure, using emerging technologies and real-time data to optimise services and improve liveability.

ECONOMIC AND WORK

- **AI in work** is expected to fundamentally reshape the nature of work, consumption, infrastructure and daily life
- **Automation of jobs and services** in response to labour shortages, especially in sectors such as aged care, hospitality, and logistics is also expected to improve efficiency
- **Flexible work arrangements** are driven by advances in digital technology, shifting worker preferences and the rise of remote, hybrid, and decentralised work models
- **Working age** population is expected to grow older and remain economically active for longer
- **Climate change costs** are sector- and region-specific, with outdoor and energy-intensive industries facing the greatest disruption.

SOCIAL AND POLITICAL

- **Digital economy** is accelerating with digital payments increasingly replacing cash, offering convenience and efficiency
- **Digital exclusion** remains a persistent issue for lower-income groups and those with limited access to education
- **Geopolitical instability and supply chain fragility** is expected, especially for critical materials like lithium, cobalt and semiconductors
- **Declining trust in institutions and technology** is being exacerbated by data misuse, misinformation, automated-decision making processes and privacy breaches
- **Waste, circularity, and resource strain** is raising concern for the environmental impact of digital technology, including battery waste, e-waste and embedded carbon
- **Gender and care inequities** emerging from digital technologies continue to be disproportionately impacting women, especially given their underrepresentation in tech-adjacent roles
- **Cybercrime** is rapidly evolving through the use of GenAI, synthetic media and hyper-personalisation techniques.

SUMMARY OF KEY FINDINGS

Everyday practice trends

Industry visions and trends applied to everyday life in the home

For each domain, we first report on the expected trends from the analysed reports, interviews and ethnography, before outlining some key oversights and limitations of these visions. Then we present insights on the potential implications of these trends for the energy sector.

HEATING, COOLING AND COMFORT

Heating and cooling demand is set to rise significantly with climate change and household electrification, which is expected to drive the need for integrated, smart, and energy-efficient solutions across building design, materials, and technologies.

Emerging technology trends and predictions

- Climate-driven demand for cooling
- Adaptive and dynamic building materials
- Efficiency in building design
- Smart energy technologies
- Electrification of heating
- Smarter HVAC systems.

CHANGING WORK PATTERNS

Reports predict that the future of work will be shaped by longer working lives, shorter working weeks, changing skill demands, and greater flexibility enabled by emerging technologies.

Emerging technology trends and predictions

- Energy consciousness increasing with WFH
- Cobots, exoskeletons, AR and AI in the workplace
- The 'hotelisation' of the office
- Personalised work experiences
- A decline in working hours.

CARING AND WELL-BEING FROM HOME

Advances in technology are predicted to enable ageing at home and other health and well-being services to be delivered to the home. These trends are expected to increase independence, offer hyper-personalised and tailored health management products and systems, and create new models of remote care delivery.

Emerging technology trends and predictions

- Daily engagement with smart robots
- Virtual wards
- Home diagnostics
- Predictive and hyper-personalised well-being services and products
- Digital care models
- Expansion of smart home assistive technology.

SUMMARY OF KEY FINDINGS

ENTERTAINMENT AND CONVENIENCE

Reports predict that the future of home entertainment will be defined by the convergence of hyper-personalisation, immersive media, and intelligent automation enabled by advances in AI, smart connectivity, and biometrics.

Emerging technology trends and predictions

- Fully immersive entertainment
- AI-driven hyper-personalisation
- Smart home monitoring and responsiveness
- Smart kitchen technologies
- Social rewilding
- Online shopping.

DRIVING, FLYING, AND CHARGING

Future transportation systems are predicted to be electrified, connected, and multimodal, driven by advances in automated vehicle technologies, electrification, and aircraft. New business and service models are expected to reflect these changes. However, emerging privacy and security challenges and significant practical and ethical concerns remain.

Emerging technology trends and predictions

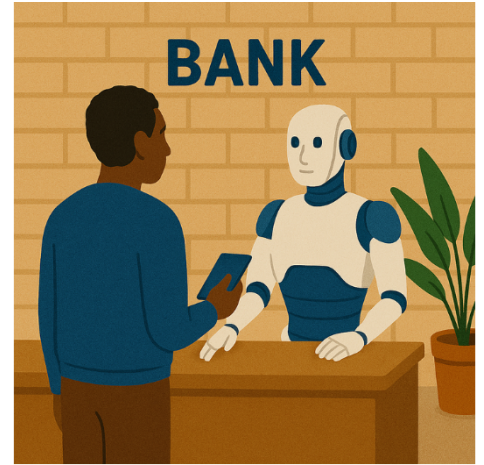
- Vehicles as mobile entertainment hubs
- Widespread AV use
- Car and ride sharing
- Accelerated EV adoption
- Integrated, bidirectional, and fast EV charging
- Micro-mobility
- eVTOLs
- Drones.

Synthesised industry visions

The Synthesised industry visions are speculative future contexts developed by combining identified trends in intentionally provocative ways. They draw on the trends, expectations, and visions of the reports and expertise of sector leaders, but in bringing them together in this way, the visions are designed to stimulate critical thinking about how these trends might converge and the consequences such convergences could have for everyday life and residential energy demand.

Below are summaries of each synthesised industry vision.

Vision 1: Home as the socially rewilded sanctuary (while luxury is at the office)



In response to digital fatigue, homes have become analogue sanctuaries. People reclaim physical, sensory-rich experiences at home, seek purpose and growth in their workplaces, and demand accountability from the products and institutions they engage with.

With constant connectivity and AI-generated content driving people to seek tactile experiences, non-essential devices are minimised or removed entirely. Similarly, advancements in AI have reduced staffing costs, giving traditional service providers the opportunity to maintain a bricks and mortar presence.

Instead, households embrace hands-on activities like pottery, gardening, reading physical books and consciously manage energy (for example, timing chores to daylight rather than relying on automated systems).

Meanwhile, offices have 'hotelised' into luxury wellbeing hubs that justify the commute. Employers compete for talent by offering energy-intensive amenities such as infrared saunas, VR relaxation pods, float tanks and massage robots that will drive up electricity consumption, especially during working hours.

Work now aligns closely with individual values, emphasising sustainability, ethics and community. Emerging technologies continually reshape job requirements and employees expect continuous learning opportunities and on-demand upskilling.

Vision 2: Ageing at home, working for longer



Australia's ageing population drives rapid adoption of technologies that enable older adults to remain healthy and independent at home, and participate in the workforce for longer, reshaping everyday life, care, and work.

Healthcare shifts from detect and treat to predict and prevent, supported by remote monitoring, home-based diagnostics, personalised wellbeing plans, and 'hospital-at-home' models. Smart homes integrate assistive technologies such as companion robots, automated safety systems, energy-optimised heating and cooling, smart furnishings, and AI-driven reminders.

Hyperpersonalised wellbeing services, wearable biometric devices, and cognitive enhancement routines help older adults manage their health, while nutrition, entertainment, and care experiences become increasingly tailored to individual needs and preferences. However, virtual

healthcare is only as reliable as the power and communication networks it runs on. In extreme heat or storms, electricity demand surges and outages become more frequent, which could knock out home medical devices or internet links when patients need them most.

At the same time, labour markets adapt to later retirement and shortages of experienced workers. Exoskeletons, cobots, AR smartglasses, AI dashboards, and teleoperated systems reduce physical strain and cognitive load, enabling older workers to remain productive across a wider range of occupations, while upskilling programs ensure skills stay current in a rapidly changing technological environment. Employers provide hyperpersonalised health services tied to biometric monitoring to retain older staff, offering financial incentives for healthy behaviours, but also punitive measures for unhealthy practices.

Vision 3: Extended reality residence



As remote and hybrid work become deeply embedded in everyday life, the home evolves into a fully integrated hub for work, leisure, and immersive digital engagement.

Cities are designed around 15-minute nodes that bring essential services closer. Physical space becomes fluid as augmented, virtual, and mixed-reality overlays transform rooms into workstations, entertainment venues, or travel simulations. AI has become embedded in all aspects of the home – including children’s toys.

Families enjoy 'theme park-in-a-box' experiences that combine XR devices, haptics, smart kitchens, 3D printers, and connected appliances to create multi-reality adventures. AI tailors lighting, music, appliances, and entertainment to residents’ emotions and habits, generating personalised, dynamic content, including movies and shows that adapt in real time to physiological responses.

High-tech consumer expectations grow, with specialised climate control, XR-optimised lighting, and scent-based haptics enhancing long sessions in immersive environments. Power demand shifts as homes rely on high-resolution displays, edge computing, and robust network infrastructure to support continuous virtual experiences.

However, high-tech appliances open new avenues for exploitation, and cybercrime has evolved through the use of GenAI, with scams becoming increasingly sophisticated and hyper-personalised.

Vision 4: Modular and mobile



As climate pressures, mobility needs, and shifting lifestyle preferences reshape how people live, homes evolve into highly modular, portable, and adaptable spaces and vehicles become personalised residences.

Living arrangements become increasingly flexible. Housing is built using circular economy principles, with recyclable materials, 3D-printed components, and modular construction that allows units to be added, removed, or reconfigured across life stages. Energy systems are decentralised and renewable, adaptive building envelopes made from metamaterials automatically respond to changing weather conditions, while modular extensions enable multigenerational living or in-home care.

In parallel, mobility transforms into a seamless extension of the home. Vehicles become fully personalised living and working environments equipped with AI voice assistants, immersive entertainment systems, gaming capabilities, augmented-reality overlays, and on-board 3D printers for food or medical supplies.

Autonomous RVs travel continuously, functioning as mobile dwellings, while electric roads enable passive charging for a growing population of 'smart charging travellers.' Cobot assistants manage mechanical issues and healthcare services are delivered both at home and on the move.

Vision 5: The smart, sustainable community



In this future, the smart home becomes an unobtrusive yet deeply intelligent environment designed to maximise sustainability, comfort, and energy efficiency.

Seamlessly embedded AI systems, IoT devices, and ubiquitous sensors operate quietly in the background, making households passive energy consumers whose routines are optimised automatically and, at times, even financially rewarded.

Robots and autonomous agents handle the majority of domestic tasks such as cleaning, maintenance, repairs, gardening, and monitoring. Smart appliances anticipate residents' needs, personalise comfort settings, and coordinate with grid conditions and weather forecasts to optimise energy use.

Smart homes blend into emerging living models, including co-operative and communal housing. Food is grown in digitally monitored indoor vertical farms powered by locally generated renewable energy, and healthcare is supported through wearables and virtual health coaches.

Daily life unfolds with minimal human intervention, as the AI gently guides routines toward energy-efficient behaviours suggesting optimal times for cooking, laundry, or EV charging while curating personalised entertainment and social interactions that minimise energy footprints.

However, energy hardship will increase the impacts of climate risks. As bushfire smoke and extreme heat events intensify, access to clean, cooled air will become a marker of inequality. Those most vulnerable to climate impacts may struggle to afford air purifiers, efficient HVAC systems and their energy costs.

SUMMARY OF KEY FINDINGS

Australia's national climate risk assessment and its potential implications for future trends

In [Australia's National Climate Risk Assessment](#) report, current and future climate risks are characterised to enable planning and preparation for impact areas across society. We summarise these climate risks and their impact areas, and *we speculatively explore how a changing climate could influence several trends we consider most vulnerable to its impacts.*

CLIMATE RISKS INCLUDE:

- Drought
- Riverine floods
- Tropical cyclones
- Extreme heat
- Sea level rise
- Storms
- Oceans
- Bushfires

Key impact areas

Communities exposed to climate risks face escalating pressures across health, infrastructure, and social systems, as heatwaves strain energy supplies, disrupt transport networks, and burden health services, while extreme weather increases demands on disaster response, heightens risks of displacement, and threatens social cohesion and personnel safety. These disruptions extend to government budgets, household finances, and broader economic stability, affecting production, consumption, and markets.

Vulnerable groups face intensified risks from deteriorating air quality, communicable diseases, mental health impacts, reduced workforce capacity, and threats to food and water security, alongside damage to buildings, transport, telecommunications, health and emergency services, water systems, energy infrastructure, supply chains, waste management, and urban green spaces. Climate impacts also degrade landscapes, ecosystems, and natural resources, increasing species loss and undermining ecosystem services, agricultural productivity, community wellbeing, and trade and export markets.

For Aboriginal and Torres Strait Islander peoples, these challenges compound existing inequities and pose significant threats to self-determination, land and sea Country, cultural knowledge and heritage, health and identity, economic and social development, and the resilience of remote and rural communities.

SUMMARY OF KEY FINDINGS

KEY VULNERABILITIES AND IMPLICATIONS FOR RELEVANT TRENDS

Increasing demand on health services

(e.g. GP clinics, hospitals, aged care services)

- **Virtual wards:** Disruptions to digital infrastructure could compromise care, delay interventions, and increase reliance on overstretched hospitals and ancillary services.
- **Ageing at home:** Regional communities' energy systems are thinly spread and more vulnerable to disruption, but they also have larger populations of older people. This gap means the benefits of virtual healthcare could bypass the very people who need it most during climate emergencies.
- **Care roles involving remote monitoring, communication and coordination across platforms:** As women continue to dominate care roles, they will likely bear a disproportionate burden of adapting to technology-mediated systems amid disruptions to health and social infrastructure.

Disruptions to transportation network and modes of transport

- **Vehicles as mobile entertainment hubs:** Rather than vehicles as mobile entertainment hubs, vehicles may be reimagined as disaster-resilient and able to provide refuge, emergency power, and even support rescue efforts.
- **Electric vehicles:** EVs in areas highly vulnerable to climate shocks mean critical infrastructure may need to support high demand during times of climate emergency. However, EVs could also become integral components of adaptive infrastructure, serving as mobile energy storage units that stabilise local grids.
- **Micro-mobility:** As micro-mobility options like e-scooters and e-bikes expand, they may leave users increasingly exposed to extreme heat, storms, and poor air quality.

Loss of trust in government

- **Declining trust in institutions and technology:** Eroding trust, coupled with the spread of mis/disinformation and AI-generated false content, may reduce public compliance with government and corporate directives, weakening disaster and security responses.
- **Cybercrime:** Cyberattacks on critical services like energy, transport, and emergency networks could disrupt disaster response and recovery, further undermining trust, community cohesion and community resilience.

Disruption to critical infrastructure

- **6G:** Reliance on connected intelligence heightens risks of cascading failures during climate-induced disasters, making network resilience and redundancy vital for public safety.
- **Digital economy:** Digital payments expose vulnerabilities during climate-related disruptions, especially for vulnerable groups, underscoring the need for resilient, inclusive, and offline-capable payment systems.
- **IoT:** A loss of connectivity will impact ecosystems of constantly connected and communicating tools, appliances, and wearables.

SUMMARY OF KEY FINDINGS

Strain on government budgets

- **Immigration:** Migrants may help offset labour shortages in climate-affected industries such as agriculture, construction, and renewable energy, while also supporting regional communities adapting to shifting economic and environmental conditions. However, tighter budgets and mounting pressures on housing, jobs, and public services may fuel social tension, with immigrants increasingly demonised and scapegoated for systemic shortfalls.
- **Working age:** Reduced public services and retirement support may push older adults to remain in or re-enter the workforce.
- **Modular homes:** Prefabricated and climate-resilient designs may become a key part of disaster recovery, enabling adaptation to extreme weather and supporting both housing affordability and community resilience.

Geopolitical instability

- **Supply chain fragility:** As climate change amplifies economic strain and resource scarcity, geopolitical tensions and protectionist policies may further destabilise global supply chains.
- **Kitchen technologies:** Food insecurity may shift focus to scarcity, growing own food, preserving foods due to out-of-season and less predictable crop yields.

Strain on household finances

- **Declining fertility:** Rising living costs, insecure housing, and reduced government support may further delay or deter parenthood, with young adults prioritising stability and personal goals over starting families.
- **Home entertainment:** Demand may shift from premium immersive experiences to affordable, energy-efficient, and subscription-flexible entertainment options.
- **Smarter HVAC system:** As bushfire smoke and extreme heat events intensify, access to clean, cooled air will become a marker of inequality. Those most vulnerable to climate impacts may struggle to afford air purifiers, efficient HVAC systems and their energy costs.

Reduced workforce capacity

- **Robots and automation:** Reliance on robots and automation may deepen inequalities for those needing human care, as overburdened systems may struggle to maintain personal, empathetic, and culturally sensitive support. Further, their integration into daily life could create new complexities during climate disasters, as people may mourn the loss of their companion robots or endanger themselves and rescue workers by trying to save them.

PART 1: BACKGROUND AND REPORT OVERVIEW

[View other SFL reports online](#)

The Scenarios for Future Living project

The Scenarios for Future Living (SFL) project is developing a people-centred approach to understanding Australia's energy future. Building on the earlier Digital Energy Futures (DEF) project, SFL advances this work by expanding and updating scenario frameworks, enhancing modelling tools, and exploring speculative products and services.

The SFL project is part of the RACE (Reliable Affordable Clean Energy) for 2030 Cooperative Research Centre. SFL is a collaborative project across four research partners: Monash University, University of New South Wales (UNSW), University of Technology Sydney (UTS), and Commonwealth Scientific and Industrial Research Organisation (CSIRO), and key industry partners Ausgrid, CitiPower, Powercor, United Energy, Red Energy, The New South Wales Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) and the Victorian Department of Energy, Environment and Climate Action (VIC DEECA).

SFL consists of seven interconnected work packages (WPs) (figure 1.). This report presents the findings of WP2.

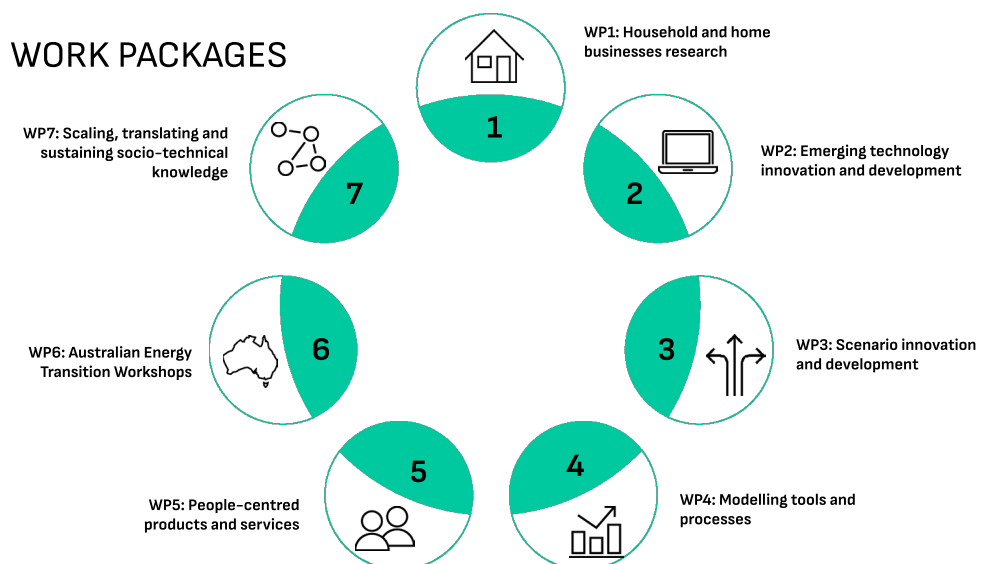


Figure 1. The Scenarios for Future Living work packages

WP2 investigates how emerging technologies are expected to integrate into daily life and how these innovations align with energy sector and household expectations. It includes:

- **Technology trends analysis:** Reviewing national and international technology reports and industry insights to understand future innovation priorities and their potential impact on energy demand
- **Macro-trend analysis:** Examining environmental, social, and economic trends that could enable or constrain technology adoption
- **Industry expert interviews:** Engaging with 20 technology innovators to understand their assumptions, priorities, and expectations for the future of their industries
- **Ethnographic research at industry events:** Attending key industry conferences and innovation expos to track emerging trends and industry ambitions.

The insights will inform energy industry planning, contribute to scenario building in WP3, and help to inform products and services in WP5.

PART 1: BACKGROUND AND REPORT OVERVIEW

Previous Research

In 2020, the research team completed a review of industry and policy reports, similar to this one, as part of the Digital Energy Futures Project¹. In the last five years, the landscape of how digital technologies are envisioned to interact with residential energy systems has evolved in several notable ways, particularly the influence of the Covid-19 pandemic, and the widespread public use of AI. Despite these significant social, political, economic and technological disruptions, many of the core assumptions remain. In particular, the widespread belief that technology can address pressing social and environmental challenges remains dominant.

The most recent reports, however, reveal some shifting priorities, growing scepticism, and emergent tensions between technology providers, energy stakeholders and 'end-users'. In particular, we see that the acceleration of digital technologies, especially through AI, is generating increased opportunities for personalised technologies to be integrated across care, entertainment, energy and many aspects of household life. However, with this acceleration are increased concerns around consumer trust, data security, privacy and system reliability, all of which are compounded by various macro-trends like geopolitical instability and climate change. Taken together, technology as the catalyst for participation and technology as a cause of distrust signals that simply deploying new digital solutions will not be enough. Households will no longer accept technology as a neutral fix and will instead demand transparency around data governance, clear evidence of reliability, and assurances that their personal and financial interests will be safeguarded.

Throughout the reports reviewed, we see:

- Persistent 'techno-solutionist' framing where digital solutions, particularly AI, IoT devices and cloud-based analytics, are viewed as central to enabling participation
- People are portrayed primarily as 'consumers', not agents of co-design
- Consumer trust is increasingly acknowledged as fragile and eroding, with respect to organisational motives, data security, privacy and system reliability
- Equity and affordability are the greatest barriers to broad and inclusive participation in the energy transition
- New technology and behavioural change are viewed as key to achieving an equitable energy transition. As such, all households must have the ability to electrify in order to achieve an equitable energy transition because electrification will reduce costs
- Interest and knowledge in energy products and services have increased while trust has eroded
- Price-based incentives and future automation are no longer assumed to be universal, but are still considered the most efficient means for managing the future grid.

1 Dahlgren, K., Strengers, Y., Pink, S., Nicholls, L., & Sadowski, J. (2020). Digital Energy Futures: Review of industry trends, visions and scenarios for the home. Monash University. https://www.monash.edu/_data/assets/pdf_file/0008/2242754/Digital-Energy-Futures-Report.pdf

PART 1: BACKGROUND AND REPORT OVERVIEW

Structure of the report

This report will first provide details on the research methodology which informs the report (**Part 2**), before presenting the research findings organised into four key sections.

Part 3. Macro-Trends: Large-scale trends considered most pertinent to and potentially disruptive for digital energy futures and patterns of residential electricity demand.

Part 4. Everyday Practice Trends: Industry visions and trends applied to everyday life in the home.

Part 5. Synthesised industry visions: Speculative future contexts developed by combining identified trends to stimulate critical thinking about how trends might converge and the consequences such convergences could have for everyday life and residential energy demand.

Part 5. Australia's National Climate Risk Assessment and its potential implications for trends: We summarise the National Climate Risk Assessment report and explore how a changing climate could influence several trends we consider most vulnerable to its impacts.

Throughout the report, data is presented in three ways:

- Quotes from analysed reports are used to directly support identified trends. They are presented with the referenced report named from which it is a direct quote.
- Findings from interviews are presented in **orange** break out boxes, and include the sector and position of the interviewees – anonymised where requested.
- Vignettes from Conference Ethnography are presented in **green** break out boxes, and include detail on the observations and relevant insights.

PART 2: METHODOLOGY

This research draws on three interrelated research methods to gather a diverse and up-to-date survey of emerging trends, visions and expectations likely to affect Australian households.

1. Content analysis of 93 reports
2. Conference ethnography (qualitative, observational research) at nine industry conferences and expos
3. Interviews with 20 cross-sector expert stakeholders.

1. Content analysis

Our analysis brings together a diverse collection of 93 reports, evenly split between Australian-focused (47) and global/multi-region (46), across multiple domains that have implications for how people may live in the future with digital and energy technologies.

As figure 2 shows, while the reports span a wide landscape of government agencies, industry associations, research institutes, think tanks, corporations and international organisations, covering both Australian and global contexts, consultancies make up the largest category at 44 per cent.

The reports include trend analyses, technology and innovation outlooks, climate and energy system modelling, economic and labour market forecasts, consumer behaviour insights, digital and health system transformations, infrastructure and mobility futures, and sector-specific examinations such as EVs, ageing, housing and critical technologies.

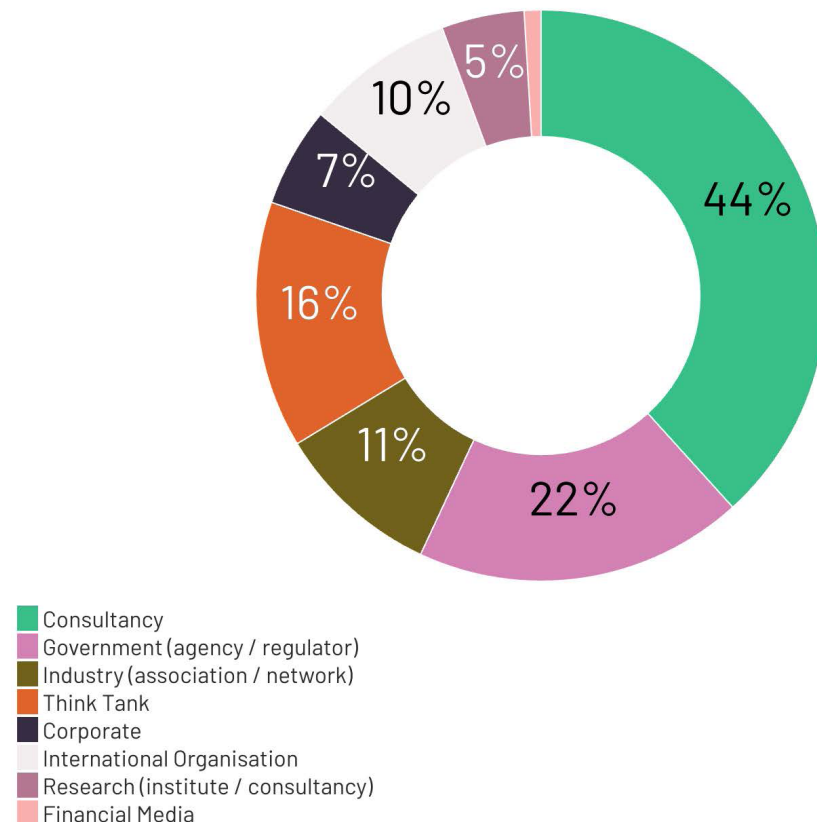


Figure 2. The types of reports included in the content analysis.

PART 2: METHODOLOGY

To ensure the content analysis reflected current trends, we focused on reports published from 2020 onwards, with most drawn from the past two years. Where earlier reviews (such as the Digital Energy Futures report) had included certain reports, we checked for and used their latest versions.

Our search process combined several approaches. We conducted targeted Google searches using terms related to energy such as EVs, and broader searches related to the home and technology – for example, digital home life, digitising home life, digital homes future, digital technology trends, and home technology trends. These searches were guided by thematic domains of interest – for example, transport, care, heating, and cooling.

We also scanned government websites (such as the European Commission) and major consultancy firms (for example, Deloitte and Gartner) for foresight, technology, and sectoral reports. We also reviewed technology-focused media outlets (for example, WIRED) to identify emerging trends. Finally, we followed up on references cited within key reports and incorporated sector-specific reports and plans already familiar to the authors of this current report.

We only reviewed reports that were freely available to the public. We did not pay to access any reports. Further, we only read and coded reports written in English.

Reports were then coded for analysis into Nvivo qualitative analysis software, utilising a codebook established for the 2020 Digital Energy Futures research, analysis of industry reports.

2. Conference ethnography

We conducted conference ethnography² across nine industry and public-facing conferences and expos to gain insight into emerging developments across a range of sectors.

Conferences

Smart Energy Expo 2025

Sydney Build 2025

Home Show Sydney 2025

ATSA Independent Living Expo 2025

Indoor Air Quality Conference (AIRAH) 2025

FutureAg (Agriculture) Expo 2025

Hi-Fi Show Melbourne 2025

iREX International Robot Exhibition 2025 (Tokyo)

All Energy Conference 2025

Total Conferences: 9

At each conference, we attended presentations with a particular focus on emerging trends, new technologies, and future-oriented narratives, and spent time on the exhibition floor engaging with companies showcasing new products, systems, and innovations. Through short, informal conversations with exhibitors and attendees, we explored how people working in different sectors understand their work, the role of energy within it, and the extent to which energy implications were actively considered or overlooked.

² Ethnography is a qualitative research method that involves observing, listening, and engaging with people in real-world settings to understand how ideas, practices, and priorities are taking shape as they happen.

PART 2: METHODOLOGY

This approach is especially valuable for identifying early-stage trends and assumptions that may not yet appear in formal reports or policy documents, providing grounded insight into how future energy-relevant practices are being imagined, marketed, and materialised in the present. These were also helpful events for recruiting participants to take part in longer interviews.

3. Interviews

We conducted in-depth interviews with 20 industry experts and innovators across diverse sectors.

Sector	Interviews
Built Environment	4
Energy Sector Innovation	4
Future Trends	3
Health Technology	3
Energy Technology	2
Information Technology	2
Disability Advocacy	1
HVAC	1
Marketing and Strategy	2
Total Interviews: 20*	

*Note: one participant fell into two categories

Interviews were conducted via Zoom or Microsoft Teams, typically lasting between one and two hours, and were recorded, transcribed, and systematically analysed by the research team. The interviews explored participants' perspectives on emerging trends within their sectors, with particular attention to how these developments may shape everyday practices and energy use.

They also provided an opportunity to follow up on insights emerging from the conference ethnography and report analysis, enabling deeper discussion of the practicality, timelines, and likely relevance of identified trends for Australian households. These participants were recruited in a number of ways. Some were recruited through attendance at relevant conferences, others via the contacts of SFL partners and researchers.

Some interviewees were open to being named, and others preferred to speak to us confidentially, enabling openness, and allowing many participants to speak freely rather than as representatives of the business or organisation for which they work. When participants' full name is used, this is their real name, when only a first name is used, this is a pseudonym. Participants who chose to remain anonymous, were also given the opportunity to choose how they wanted to identify their position. They represent a variety of leadership positions, but all hold an insider perspective on their relevant industry. It was important that interview participants were able to speak anonymously so that they could speak openly about their insider perspectives. While often supporting the trends identified in the reports, they also often discussed important challenges within their sectors.

Interviewees' insights help to balance the public-facing narratives and visions that are presented in the analysed reports, with insider perspectives on technological feasibility and challenges within their specific sectors.

PART 2: METHODOLOGY

Production of synthesised industry visions

The synthesised industry visions were developed by integrating the macro-trends identified in Part 3 with emerging technology trends and everyday life implications outlined in Part 4, building on previous methods we developed for generating future visions from industry report data³.

This analysis revealed several key cross-cutting themes, within which related technologies and social shifts were grouped to form internally coherent visions of everyday life. Rather than extending single trend lines, the method combined developments that could plausibly coexist, including those that may seem contradictory in isolation.

For example, the first theme centred on the intentional reorientation of life in response to digital and environmental disruption, alongside growing distrust in institutions and technologies. Social trends such as digital fatigue, ethical consumerism and values-driven work were brought together with technological responses aimed at rebuilding trust and responding to people's needs, including AI-enabled bricks-and-mortar banking, blockchain-based traceability, and tools that make environmental impact visible. Grouping these developments captured both how people seek authenticity and control, and how organisations embed new technologies into familiar settings to restore credibility and connection.

Vision 1 trends

Technology trends	Social trends
AI-enabled service provision in physical spaces (e.g. robotic tellers in bricks-and-mortar banks) <i>(Tech-augmented nostalgia; ensuring people without technologies still have access to essential services)</i>	Expectation of lifelong learning and continuous skills development <i>(Flexible skills in response to emerging AI at work)</i>
Blockchain-enabled product traceability and carbon accounting <i>(Digitally verified trust)</i>	Digital fatigue; Resurgence of tactile, craft-based and analogue practices <i>(Response to perceived lack of authenticity with growing digitalisation of life)</i>
Digital interfaces for tracking environmental impact (QR codes, real-time carbon data) <i>(Visible environmental accountability)</i>	Preference for physical, place-based services despite digital alternatives <i>(Re-embedding in place; social rewilding)</i>
Hotelisation of the office <i>(Performed corporate care)</i>	Growing environmental consciousness shaping consumption and investment choices; Reconnection with materiality, maintenance and repair over disposability <i>(Ethical consumerism)</i>
	Desire for work aligned with personal values <i>(Values-driven employment; intentionality)</i>

³ Kaviani, F., Selwyn, N., Strengers, Y., Dahlgren, K., Cumbo, B., & Wagner, M. (2025). Future schools and the energy implications of AI in education: A review of scenarios and method for engaging young people in futures thinking. Policy Futures in Education. <https://doi.org/10.1177/14782103251322271>

PART 2: METHODOLOGY

In Vision 2, the theme of healthcare at home was paired with labour shortages, an ageing population and extended working lives. Remote monitoring, predictive diagnostics and assistive robotics support ageing in place but also increase dependence on reliable electricity and communications infrastructure. At the same time, assistive technologies such as exoskeletons, cobots and AI dashboards migrate into workplaces, raising questions about productivity expectations, surveillance, and the normalisation of longer working lives.

In Vision 3, AI-enabled hyper-personalisation, immersive extended reality systems and deeply embedded hybrid work converge to transform the home into a high-tech digital environment. While these systems promise comfort and convenience, they also introduce new vulnerabilities, including hyper-personalised scams and cybercrime that exploit the same data infrastructures enabling customisation.

Vision 4 extends the theme of adaptability by combining modular housing, circular construction and adaptive building materials with autonomous vehicles and electric roads, positioning mobility itself as an extension of the home.

Finally, Vision 5 integrates decentralised renewables, automated demand management and communal living models to illustrate the promise of 'smart sustainability', while juxtaposing seamless optimisation with intensifying climate risks. In this context, access to cooled, filtered air, efficient HVAC systems and backup power becomes a marker of inequality, underscoring how technological optimisation does not resolve underlying affordability constraints.

The purpose of the visions was to translate these themes into coherent, tangible future contexts. In doing so, they place technological developments in dialogue with broader social, economic and environmental pressures, making visible the tensions and trade-offs embedded across the reports. By synthesising themes into cohesive visions, the method makes trend narratives concrete, reveals interdependencies (for example, that more healthcare at home requires resilient energy systems), and surfaces tensions often obscured when trends are considered separately.

The visions are not predictions, but analytical devices to explore how technological, social, economic and infrastructural trends may converge and shape everyday life, residential electricity demand, and patterns of equity and exclusion.

For each vision, we crafted detailed text prompts entered into ChatGPT summarising key elements of the industry vision. In order to maintain the aesthetic similarity, we also specified the size, a flat graphic style with bold colours, and the inclusion of Monash Blue. We then applied the Monash brand-approved palette and stylisation guidelines (toned-down backgrounds, simplified yet storytelling-rich foregrounds, and diverse, feature-minimal characters) to ensure consistency across all images. Finally, we iterated on each prompt, refining composition and details.

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

In this section, we outline the key anticipated large-scale trends considered most pertinent to and potentially disruptive for digital energy futures and patterns of residential electricity demand.

These trends are not anticipated to unfold uniformly, but will instead be shaped by existing, and future, socio-economic and geographic differences.

Where these differences are acknowledged in the analysed reports, and by expert stakeholders, they have been included. However, it is beyond the scope of this report to fully interrogate the potential differentiated impacts across diverse households. This will be explored further through research with everyday households in work package 1 of the Scenarios for Future Living research project.

The trends are categorised to include:

- **Large-scale technology developments:** AI, BioTech, IoT, 6G, quantum computing, digital twins, robotics, energy technologies
- **Energy and the environment:** decarbonisation, electrification of the home, CER, energy efficient households, widening disparities, climate change
- **Demographic:** declining fertility, ageing, health, immigration, housing and homeownership, dense cities
- **Economic:** AI and work, automation of jobs and services, flexible work arrangements, working age, climate change costs
- **Social and political:** digital economy, digital exclusion, geopolitical instability and supply chain fragility, declining trust in institutions and technology, waste, circularity, and resource strain, gender and care inequities, cybercrime.



PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

LARGE-SCALE TECHNOLOGY DEVELOPMENTS

AI

Key claim of reports reviewed

In the 2020 Digital Energy Futures report⁴, AI was primarily described as the underlying system, or back-end enabler, powering 'smart' technologies like smart home appliances, digital voice assistants, and AVs. By 2025, AI has emerged to become the driver of technological transformation.

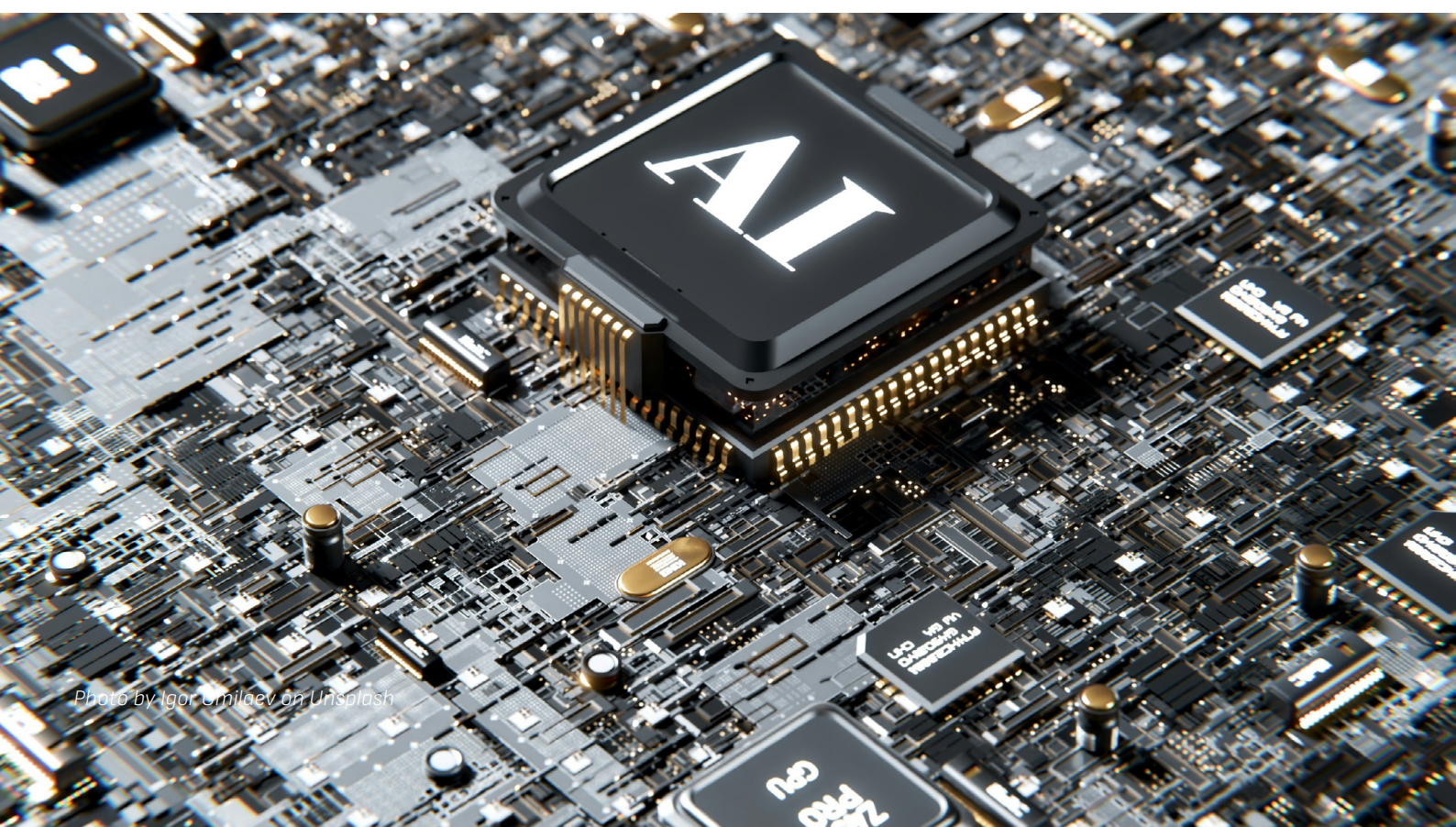
Major advances and public awareness and use of Generative AI (GenAI), a type of AI specifically designed to create new content by analysing patterns, such as large language models, has positioned AI as a 'paradigm-changing' technology, with industry reports predicting it will fundamentally reshape how people work, shop, create, and interact in everyday life.

AI is seen as unlocking new capabilities at scale and driving innovation across sectors from energy to education. While often conflated, there are numerous types of AI, and among the most relevant developments for everyday life are embodied AI⁵ and autonomous agents. In parallel, AI agents and chatbots are being developed to resemble lifelike personas, capable of engaging in nuanced conversation, mimicking emotional tone and adopting recognisable speech patterns.

Yet despite the rapid technical advancements, the primary barrier to widespread AI use remains social rather than technical, with building and maintaining trust in how these systems behave, interact, and use personal data emerging as a key concern.

4 Dahlgren, K., Strengers, Y., Pink, S., Nicholls, L., & Sadowski, J. (2020). Digital Energy Futures: Review of industry trends, visions and scenarios for the home. Monash University. https://www.monash.edu/_data/assets/pdf_file/0008/2242754/Digital-Energy-Futures-Report.pdf

5 Embodied AI refers to systems designed to interact with the real world through a physical form - that is, combining generative intelligence with sensors, mobility, and real-time responsiveness.



Energy-hungry AI everywhere

AI was discussed in-depth by a number of our expert interviewees, who noted its growing presence across an expanding range of everyday tasks and devices. More broadly, interviewees observed that AI is becoming embedded in routine business and industry practices. As marketing strategist Annette⁶ explained, “the promise and premise of AI is about simplifying or making complexity easy and fast... [so] people have gravitated towards [AI] quickly for everything”. However, this increasing ubiquity was also identified as a concern. For example, interviewees noted that widely used, general-purpose AI tools do not necessarily reflect diverse forms of knowledge and ways of thinking. As IT and ethics expert Mustafa Akyol explained, AI systems are predominantly developed in Western contexts and trained largely on Western data. Consequently, “AI reflects their cultures, their views of life, and others... They create biases, [around] gender, demography, age”. Another emerging problem recognised by our expert interviewees concerned the growing water and energy demand associated with the data centres that train and run AI. In another example Rosie, an energy innovations specialist, noted, “you have cumulative impacts around the co-location of these data centres and what they're competing with, including energy”. As energy costs rise and water becomes more scarce in a warming global climate, Rosie anticipated growing societal discussions about the resource-intensity of using AI.

Relatedly, digital futures consultant, Melissa Gregg, discussed the existence of an “energy-hungry design fetish” in the technology sector, and a “quest to put AI in everything as soon as possible”. Importantly, the rush towards technologies integrating AI was seen primarily as a desire of the tech sector, rather than necessarily a reflection of genuine consumer needs. But as Melissa explained, the push for devices powered by more advanced computer chips, and which are constantly connected to the Cloud and AI via the internet, would have implications for users who could find it “very difficult... opting out of a very energy-intensive default mode of using a computing device”.

David Ireland, a digital health researcher, explained that widely used AI models like ChatGPT – often referred to as Large Language Models because they are trained on vast datasets – tend to require increasing amounts of data and computing power with each successive iteration. “But as you go bigger in size, you need more hardware and that hardware needs much more power...The question is who pays for that”? David suggested that rising hardware and energy costs, as well as the simple impact of energy-intensive AI on things like smartphone or laptop batteries, may challenge the dominance of ubiquitous, one-size-fits-all AI models. He argued that these pressures could drive a shift towards smaller, bespoke AI systems that, among other potential benefits, may reduce energy consumption. Overall, these views illustrate how the future direction of AI development and use may be increasingly shaped by energy constraints, rather than only by a demand for greater performance.

⁶ Where requested, research participants have been given a first name only pseudonym. When participants are referred to including their surname, it is their real-name.

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

LARGE-SCALE TECHNOLOGY DEVELOPMENTS

Anticipated impact of AI on digital energy futures

- AI agents are expected to take on tasks such as optimising appliance use, trading energy, and managing services on behalf of households or businesses, enabling more autonomous and responsive energy systems
- The rise of GenAI is driving major growth in data centre energy and water use, alongside increased carbon and mineral impacts
- To meet rising energy demand, tech companies may invest directly in cleaner energy options, accelerating decarbonisation outside of regulatory frameworks
- AI is being applied to reduce its own footprint by improving data centre efficiency, tracking emissions, and supporting climate monitoring and environmental management at scale.

Report quotes:

Embodied AI is AI specifically designed to interact with the real world through a physical body. The technical advances driving the generative AI revolution have sparked new interest in embodied AI, with some researchers believing it is the key to achieving the next leap in AI capability (Technology Vision 2025, Accenture, 2025, p.40)

Generative AI is a revelatory tool both for honest enterprises and bad actors. It's ushering in a new era of confusion and concern, challenging people's trust in digital in deeply personal ways (Accenture Life Trends, 2025, p.7)

As AI continues to advance, it will not only automate tasks, but also create new capabilities, experiences, and growth trajectories that will redefine what humans are capable of at work and in daily life. This is a transformative technology at every level. Whole industries will change (Futures Report: From disruption to business value, KPMG, 2024, p.10)

While building AI consumes a lot of energy, applying AI can, in many cases, offset some of these carbon costs. AI is already being used to map and track deforestation, melting icebergs, and severe weather patterns. It can also help companies track their emissions and be more efficient in using data centres (Tech Trends 2025, Deloitte, p.31)

AI is proving useful in a broad range of domains. Examples include the use of machine learning to simulate wildfire movement and support effective and efficient fire suppression activities (Our Future World, CSIRO, 2022, p.36)

On-Device AI (Edge AI)

The embedding of generative AI into small household technologies and consumer electronics (referred to as On-Device AI or Edge AI), will increase their energy needs, as well as decrease their ability to have inbuilt backup storage. For example, an integrated at home health care monitoring system on display at the ATSA Independent Living Expo 2025, called MiiCare, that utilises in-built AI, in a smart speaker and various health monitoring technologies, such as heart rate monitors and blood pressure readers, has considerable energy needs for a similarly sized appliance. So much so that it makes having an in-built battery in case of outages obsolete. Therefore, for this critical medical device, the sales representative stated that if the power goes out, 'it stops working'. Should such technologies be adopted widely, this would increase the significance of reliability and the potential dangers of even short outages. The MiiCare system is currently in use in the UK and being considered for adoption in Australia.

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

LARGE-SCALE TECHNOLOGY DEVELOPMENTS

BioTech

Key claim of reports reviewed

BioTech is expected to emerge as a transformative domain, driven by the convergence of biology, computing, and AI. The reports highlight how synthetic biology, gene editing, and generative biology are unlocking new applications in food, health, and materials in and around the home.

Anticipated impact of BioTech on digital energy futures

- BioTech is forecast to shift key resource-intensive activities such as personalised health products and services, lab-grown food production, and 3D-printed medicine, into residential settings
- Synthetic biology offers the potential for reduced environmental footprints such as foods that use less water and energy or bioengineered materials designed for circular reuse
- Nature-integrated technologies like rewilding sensors and bio-restoration tools suggest a future in which residential environments include not only more technology but also more digitally mediated interactions with local ecosystems.

BioTech in the home

Biophilic design, which describes approaches to building that bring people in closer contact with the natural world, is becoming increasingly popular in home design and inspiring home gardening. Ideas such as indoor potted plants, green walls, and hydroponic systems are not novel. However, with the support of new technologies the opportunities for people to cultivate both ornamental and edible plants are expanding. This was apparent when speaking with two garden system suppliers at the 2025 Sydney Build Expo. One, the manufacturer of a raised garden pod system designed for high-yield production in small spaces (like apartment balconies or shrinking backyards), explained how they saw a future for automated smart systems to help novice gardeners improve their harvests. Noting that garden watering is already often automated, the salesperson expected that in future plant selection, fertilising, and composting would also benefit from smart systems, "Gardening in general could be completely automated". Similarly, a salesperson for vertical garden systems explained that AI was already playing a role in helping their clients pick appropriate plants and to diagnose problems (such as overwatering or nutrient deficiencies) as they arose. While this salesperson recognised that some experience was required to learn how to properly prompt AI, the point was reiterated that technology could make home gardening accessible to those who might not otherwise be interested or capable.

Report quotes:

The combination of biological and computing advancements has led to a range of innovations in products and services for industries such as healthcare, food and agriculture, consumer products, sustainability, and energy and materials (Technology Trends Outlook, McKinsey & Company, 2024, p.77)

A term coined more than 30 years ago, 'rewilding' has gained renewed attention in the past few years as the climate crisis has grown more dire and new technologies have promised to protect and rehabilitate ecosystems (Tech Trends Report: Bioengineering, Future Today Institute, 2024, p.58)

The rapid integration of artificial intelligence into bioengineering is catalyzing unprecedented innovation. The near future will see significant changes to traditional industries such as meat, dairy, textiles and pharmaceuticals, while advancements should pave the way for sustainable solutions in carbon capture, plastics recycling, and biodiversity enhancement. Near-term breakthroughs in healthcare will lead to cataclysmic, long term disruption (Tech Trends Report: Bioengineering, Future Today Institute, 2024, p.9)

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

LARGE-SCALE TECHNOLOGY DEVELOPMENTS

IoT

Key claim of reports reviewed

The continued expansion of IoT is expected to transform homes into dense data generating environments. Reports highlight the shift from isolated smart devices to integrated ecosystems of constantly connected and communicating tools, appliances, and wearables embedding sensors and connectivity into everyday objects.

Anticipated impact of IoT on digital energy futures

- IoT is expected to significantly increase residential electricity demand by introducing more always-on devices that monitor, automate, and optimise daily routines. 'Smartification' of previously analogue systems and appliances will not only add new load profiles but also enable real-time responsiveness to pricing and grid signals, shifting consumption across the day. This has implications for demand-side flexibility, and has potential to create more complex, data-intensive energy use patterns
- The rise of health-focused IoT, particularly wearables and at-home medical imaging, further embeds digital devices into everyday life, especially in ageing populations and households engaged in remote care, highlighting the importance of energy reliability and security
- As smart devices increasingly monitor bodies, spaces, and behaviour, trust in the secure operation and governance of these systems, particularly in relation to children and vulnerable users' privacy and data protection, will be critical to uptake, mirroring concerns raised around AI
- Concerns around data privacy may translate into the increased preference for On-device or Edge AI rather than cloud-based AI, increasing household energy demand through a greater share of AI processing happening in the home.

Integrated technology ecosystems

Observations and discussions with CER and smart technology manufacturers at multiple trade expos, such as the Smart Energy Expo 2025 and Home Show Sydney 2025, revealed a change in product design and marketing. Companies appeared to be moving from producing and selling individual products, such as solar panels or smart locks that consumers would add piecemeal to their homes, towards interoperable 'ecosystems' of technologies, whereby one company would design, sell, and even install an entire CER or smart home system – often using their own proprietary technologies, which may only work fully within their own ecosystem. In talking with manufacturers, such systems were framed as easier for consumers to understand, install, and operate. Off-the-shelf packages were seen as particularly appealing for those in newbuild homes, or for consumers beginning (rather than continuing) the process of installing smart or energy technologies. This suggests a shift in target consumers. Easier product selection, installation, and use may help expand the market beyond traditional users like the energy-conscious, tech-savvy, and DIY enthusiasts.

Report quote:

Being connected has become a basic human need for large parts of the world's population and this is reflected in the average number of devices and connections per person globally, which is expected to grow from 2.9 in 2022 to 5.4 in 2028. By the end of 2024, there are projected to be more than 207 billion 'things' connected to the worldwide network of tools, assets, devices, and appliances that make up the Internet of Things (IoT) (Logistics Trend Radar 7.0, DHL, 2024, p.74)

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

LARGE-SCALE TECHNOLOGY DEVELOPMENTS

6G

Key claim of reports reviewed

6G is expected to mark a transition from 'connected things' to 'connected intelligence,' enabling a programmable, data-rich physical world. Reports describe it as a foundational infrastructure for ubiquitous computing, immersive communication, and ultra-low-latency interaction across digital and physical domains.

Anticipated impact of 6G on digital energy futures

- 6G is forecast to dramatically increase the speed, precision and responsiveness of device-to-device communication. This will support more efficient coordination of residential energy systems including real-time demand management, peer-to-peer energy trading and AI-led optimisation across smart appliances and distributed energy resources
- Unlike previous network upgrades, 6G is being designed with sustainability as a core principle. Some stakeholders describe it as the 'green G,' with policy frameworks emphasising spectral and energy efficiency. Technologies such as edge computing promise to reduce latency and minimise transmission costs while scaling up connectivity
- By enabling millions of connected sensors to operate intelligently and simultaneously, 6G may accelerate the rise of autonomous home ecosystems. However, this hyper-connectivity also raises concerns around energy-intensive infrastructure through increasing the number of devices, although potentially enabling improved latency for cloud AI computing, thus reducing the need for on-device AI.

Report quotes:

By the 2030s there will be 6G laboratory tests and early introduction. This newest technology brings the potential to move from the current ecosystem of 'Connected Things' to a new ecosystem of 'Connected Intelligence' (Logistics Trend Radar 7.0, DHL, 2024, p.150)

The integration of sensing information and time synchronisation may enable new applications for interactive and multiparty connectivity, within and between virtual and physical worlds (Digital Economy Outlook (Volume 1), OECD, 2024, p.73)

Policy makers are considering environmental sustainability as a key value for 6G technologies and use cases for the next decade. Some stakeholders even call it the 'green G' (Digital Economy Outlook (Volume 2), OECD, 2024, p.101)

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

LARGE-SCALE TECHNOLOGY DEVELOPMENTS

Quantum computing

Key claim of reports reviewed

- Quantum computing is described as a disruptive leap, introducing fundamentally new approaches to computation, particularly for tasks involving massive complexity, optimisation, and simulation. Forecasts suggest quantum computing could reach a global market value of \$1 trillion by 2035, with governments and industry treating it as a national technology priority (Tech Trends Report: Computing, Future Today Institute, 2024).

Anticipated impact of quantum computing on digital energy futures

- Quantum computing is expected to accelerate breakthroughs in materials science, climate modelling, grid optimisation, and battery chemistry, applications with direct relevance for energy systems and emissions reduction. Reports highlight its potential to radically improve energy forecasting, simulate renewable integration scenarios, and enhance the design of energy-efficient materials for buildings and storage
- While quantum computing itself is not expected to operate in households, its indirect impact on residential energy systems may be significant. For instance, it may enable the discovery of new materials for low-energy appliances, better algorithms for home energy management systems, or simulation-driven insights that optimise distributed generation and storage
- At the same time, quantum computing introduces substantial cybersecurity risks. 'Q-Day', the anticipated moment when quantum computers break current encryption standards, is said to pose a threat to data infrastructure, potentially impacting energy and smart home devices reliant on public-key cryptography.

Report quotes:

Tech that eats complexity for breakfast (Futures Report: From Disruption To Business Value, KPMG, 2024, p.12)

Quantum computing is a fundamentally different technology, not a next step from AI. It will lead to breakthroughs in medicine, climate change, agriculture and countless other industries (Rita Gatt, quoted in Tech Trends 2024: An Australian Perspective, Deloitte, p.6)

By 2029, advances in quantum computing will make most conventional asymmetric cryptography unsafe to use (Top Strategic Technology Trends, Gartner, 2025, p.12)

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

LARGE-SCALE TECHNOLOGY DEVELOPMENTS

Digital twins

Key claim of reports reviewed

Fueled by advances in AI, IoT, and cloud computing, digital twins are increasingly used to simulate, optimise, and automate everything from buildings, transport, health infrastructure, urban systems and even people.

Anticipated impact of digital twins on digital energy futures

- Digital twins are forecast to play a major role in improving the efficiency, coordination, and resilience of energy systems at both local and household scales. Cities such as Los Angeles are already using urban-scale digital twins to test decarbonisation strategies and model emissions impacts before implementation (Tech Trends Report: Built Environment, Future Today Institute, 2024)
- In homes, digital twins may underpin next-generation smart energy systems, modelling occupant behaviours, appliance usage and microgeneration patterns to optimise household energy flows.

Report quotes:

People will have digital twins to attend meetings and make decisions on their behalf (Accenture Life Trends 2025, p.63)

While digital twin technology has existed since the start of the 21st century, it is now approaching a tipping point where widespread adoption is likely within the next 5-10 years (Logistics Trend Radar 7.0, DHL, 2024, p.120)

Robotics

Key claim of reports reviewed

Robotics is rapidly evolving beyond industrial applications, expanding into homes, healthcare and everyday environments. Advances in AI, sensor systems and embodied intelligence are predicted to produce robots that can reason, adapt to unstructured environments and act autonomously. Cobots, humanoid robots and service bots are expected to become increasingly common across sectors, including education and domestic life.

Anticipated impact of robotics on digital energy futures

- Robots are set to become active participants in the home energy landscape. As robotic vacuums, lawnmowers, pool cleaners and assistive care bots grow more autonomous and connected, they will contribute to household energy loads. These devices often require frequent charging, always-on connectivity and integration with smart home systems, changing the underlying assumptions in load forecasting
- Outside of the home, drones and robotics are being deployed for traffic monitoring, last-mile delivery and even disaster response
- As robotic autonomy increases, energy systems will need to support both mobility (for mobile robots and drones) and reliability (for home-based devices), requiring smarter coordination between device scheduling, charging cycles and energy management platforms
- As the market and roles for companion and care robots increases, people may expect more reliable power, or they may pursue self-reliance and ways to become more resilient to power outages (e.g. installing a large battery) to ensure their robots remain continuously 'alive'.

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

LARGE-SCALE TECHNOLOGY DEVELOPMENTS

Report quotes:

In the decade ahead, expect to see drones increasingly integrated with artificial intelligence (AI) and machine learning (ML) for advanced autonomous operations (A Robotics Roadmap For Australia 2025, Robotics Australia, p.322)

We stand on the brink of revolutionary advances in robotics, with more autonomous, more dexterous and more mobile machines emerging [at scale]. These advances promise a future where robots enhance our capabilities and expand the operational domains of automation, from intricate tasks on manufacturing floors to dynamic service environments. Thoughtful adoption of these technologies could unlock productivity while elevating the nature of labor (Ani Kelkar, partner, Boston, in Technology Trends Outlook, McKinsey & Company 2024, p.67)

Cute companions in the home

An emerging market for cute pet-like companions, originating in Japan and other East Asian nations, has grand ambitions to scale to billions of homes. These devices are often considered part of the broader smart technology ecosystem, originating from companies who have dominated in the smart home market (such as Panasonic, who has launched a cute robot called Nicobo). While many emerging robots intended for the factory and home are primarily task-based, such as leading humanoids Neo (1X) and Optimus (Tesla), these are still largely speculative. In contrast, cute home robots already have an expanding market in countries like Japan. Many cute companion robots are functionally 'useless', presenting as pets or another species in need of our care and attention rather than providing any direct utility to people. Leading brands like the Lovot (Grove X) are designed to 'stir your instinct for love', creating an emotional attachment and positioning people in a caring role with and for the robot.

While home robots like Lovot use a relatively small amount of electricity (requiring charging every 45 minutes for approximately 20 minutes, with a power consumption of approximately 65W), they are likely to result in unpredictable interactions between people, 'real' pets and the home itself that may have energy system implications. For instance, not wanting a cute robot pet to go offline during a power outage or blackout may encourage people to set up a backup system during these times. Alternatively, ensuring cute robots don't overheat may contribute to the need for more regulated temperature control in homes. While the potential uptake of companion robots in Australia is in its infancy, many companies are aggressively pursuing this market and anticipate widespread adoption and use in the future⁷.

⁷ This excerpt is drawn from a conference ethnography conducted by Yolande Strengers at the International Robot Exhibition (iREX) in Japan as part of the Cute Home Helper Robot project. This research is supported by the Australian Research Council's Future Fellowship funding scheme (FT230100021).

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

LARGE-SCALE TECHNOLOGY DEVELOPMENTS

Energy technology

Key claim of reports reviewed

Energy innovation is shifting from deploying renewables to scaling up the technologies that enable the transition, especially energy storage, grid modernisation, and electrification of transport and buildings. Reports stress that clean energy alone is not sufficient; enabling technologies must scale rapidly to meet net-zero goals, support growing electricity demand, and ensure flexibility and resilience across distributed energy systems.

Anticipated impact of energy technologies on digital energy futures

- While solar, wind and batteries continue to see falling costs and strong growth, other critical technologies such as hydrogen and sustainable fuels face cost and policy hurdles. Breakthroughs in solar materials, battery technology and wind turbine design are pushing the boundaries of where and how energy can be produced and stored
- Organic and transparent solar materials will expand where solar can be installed such as across windows and facades
- Innovations such as fast charging, electric roads, and solid-state batteries could accelerate EVs as mobile storage units
- Carbon management tools and energy-efficient materials are becoming smaller, smarter and more integrated into homes and urban environments, with future households expected to contribute directly to carbon tracking and offsetting.

Report quotes:

Those technologies for which the levelized cost of energy (LCOE) is already low at the point of production, such as solar, wind, and energy storage systems, are projected to continue to grow, while those with higher cost – including hydrogen and other sustainable fuels, and carbon capture, utilization, and storage (CCUS) – lack sufficient demand and policy support for strong growth (Global Energy Perspective, McKinsey & Company, 2024, p.9)

The technologies that enable the transition to clean energy are critical to delivering approximately 50 percent of the required solution for net zero. Acceleration of these technologies is critically important (Mark Patel, senior partner, Bay Area in Technology Trends Outlook, McKinsey & Company, 2024, p.92)

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

ENERGY AND THE ENVIRONMENT

Decarbonisation

Key claim of reports reviewed

Decarbonisation is no longer a technological challenge but reports frame it as one of scale, integration and speed. The technologies to eliminate emissions from electricity generation, especially renewables and storage, are available and commercially viable. However, deployment remains uneven, and systemic transformation across all sectors and industries – not just electricity – is required to achieve net zero.

Anticipated impact of decarbonisation on digital energy futures

- Decarbonisation is expected to dramatically reshape energy demand at the residential level by facilitating the electrification of the home.

Report quotes:

In electricity, zero-emissions technologies are readily available although not yet deployed at sufficient scale (Decarbonisation Futures, ClimateWorks Australia, 2020, p.10)

The NEM must almost triple its capacity to supply energy by 2050 to replace retiring coal capacity and to meet increased electricity consumption as other sectors decarbonise through electrification (Integrated System Plan, AMEO, 2024, p.7)

Encouragingly, Australia is on track to pass 300,000 EVs in the national vehicle fleet in early 2025, however, sustained policy support will be required to continue on this current trajectory. Australia has over 19 million light vehicles to decarbonise so we still remain only at the very beginning of this journey. In total, about 1.5% of Australia's light vehicle fleet are now EVs (State of Electric Vehicles, Electric Vehicle Council, 2024, p.12)

Decarbonisation Futures scenarios show that Australia can still reduce emissions in line with limiting the temperature rise to 2 degrees – and if governments, businesses and individuals go 'all-in', a 1.5 degree limit could be within reach (Decarbonisation Futures, ClimateWorks Australia, 2020, p.12)

Electrification of the home

Key claim of reports reviewed

Reports consistently highlight the trend towards fully electric households equipped with rooftop solar, home batteries, smart appliances and EVs as reshaping the vision for future homes in Australia. The technologies to support this shift already exist, what remains is expanding access and adoption.

Anticipated impact of electrification on digital energy futures

- Electrification will significantly increase residential electricity demand as households replace gas with electric heating, cooking and vehicles. However, this demand is expected to become more controllable and efficient, enabled by digital tools, smart appliances and orchestrated CER
- Smart meters, dynamic pricing and AI-led energy management will allow households to optimise when they consume or store energy
- Renters, apartment dwellers and lower-income households face higher energy costs if they cannot afford or install solar, batteries or EV infrastructure.

Hydrogen Blending and Domestic Gas Networks

Despite widespread expectations for the electrification of the home, there are ongoing developments that may slow or divert this transition. The Australian Gas Infrastructure Group (AGIG), for example, is developing several renewable hydrogen projects across Australia. While these are largely small-scale pilot initiatives, they form part of a broader strategy to extend the life of natural gas in domestic energy systems. These efforts acknowledge both the existing infrastructure built around natural gas and household reluctance to transition away from it, while also promoting lower-carbon alternatives. This aligns with a wider push to develop 'renewable gas', including both biomethane and hydrogen, as alternatives to full electrification. AGIG currently operates hydrogen electrolysis in South Australia, where its Hydrogen Park SA is blending 5–10% hydrogen into the existing gas network for nearly 4,000 customers. Hydrogen Park Gladstone serves another 700 customers, with further expansions planned in the Murray Valley and Wagga Wagga⁸.

Report quotes

More homes in the future will be electrified – with solar on the roof, a home battery to store unused solar energy, and an EV in the garage that will also act as a battery on wheels (The Australian Home Energy Report 2024, Origin, p.21)

Electrification is projected to reduce average household energy costs by nearly \$1,000 per year... [even as electricity use rises.] (Residential Electricity Price Trends, AEMC, 2024, p.8)

A household who fully electrifies could reduce their annual energy expenditure by 70% (Residential Electricity Price Trends, AEMC, 2024, p.8)

Households will be more energy efficient and draw considerably from batteries and rooftop solar, and will also need more electricity for appliances and especially for electric vehicles (Integrated System Plan, AMEO, 2024, p.7)

The households who cannot electrify are likely to face higher energy costs... Addressing the inequities and barriers to electrification may become increasingly important (Residential Electricity Price Trends, AEMC, 2024, p.9)

Consumer energy resources

Key claim of reports reviewed

There is rapid growth in CER use, which is expected to continue. However, to fully realise their benefits, CER technologies need to be sufficiently integrated.

Anticipated impact of consumer energy resources:

- Rooftop solar and batteries are expected to help owners cut retail energy costs; widespread solar use is also expected to reduce daytime wholesale prices
- Well-integrated CER is expected to reduce network costs, lowering bills even for those without solar or batteries
- CER coordinated through VPPs is expected to shift usage to cheaper or grid-friendly times
- Consumers are expected to potentially earn money by supporting grid services through VPP participation.

Report quote:

Consumers can benefit from high CER integration as it can help manage minimum demand and reduce peak demand, provide essential system services, and reduce the need for costly network upgrades, grid scale generation and storage investments (National consumer energy resources roadmap, Energy and Climate Change Ministerial Council, 2024, p.8)

⁸ These findings come from research at the Smart Energy Expo 2025, and All Energy Conference 2025.

Aesthetics of energy tech

An emerging trend observed during trade shows concerned the apparent importance of aesthetics for CERs; compared with the CER of just a few years ago, energy technologies including inverters, home batteries, energy monitors, and their associated interfaces, were increasingly slick, featuring minimalist, uncluttered design, high-quality materials, and gently curved forms, in glossy white, reminiscent of Apple products. While functionality remains paramount, the apparent aesthetic trend in CER transforms these products, once intended to be discreetly placed in a garage or utility closet, into potential showpieces. The move towards more aesthetically pleasing energy technologies suggests a change in thinking about who the products are designed for and their intended purpose, with CER designers perhaps seeking to broaden the appeal of their products beyond the energy-conscious or tech-savvy, and aligning them with other smart home marketing, while also recognising that the technology is not only important in terms of what it does but also in what it represents to both users and visitors to the home⁹.

Energy efficient households

Key claim of reports reviewed

In the future, households are predicted to be more energy efficient. The widespread collection of digital data, combined with applied AI and machine learning, promises increasingly precise, predictive and personalised energy optimisation. Efficiency is no longer a one-size-fits-all model. Rather, it is anticipated to be real-time, automated, and tailored to individual consumption behaviours.

Anticipated impact of efficiency on digital energy futures

- Efficient behaviour is expected to partially offset the growth in residential electricity consumption driven by EVs, electrified appliances, and smart systems
- AI will be central to supporting dynamic energy pricing, seamless scheduling of appliance use, and efficient EV charging. Smart appliances, AI-enhanced grid management and photonic chips will enable systems that both consume and compute more efficiently
- Energy-efficient homes are now seen not just as environmentally responsible but as a practical response to cost-of-living pressures.

Report quotes:

Households are forecast to draw about as much from the grid across a year in 2050 as they do now... [offset by the] uptake of energy-efficient buildings, appliances and behaviour (Integrated System Plan, AMEO, 2024, p.26)

Energy-efficient technologies continue to become cheaper and more effective (Decarbonisation Futures, ClimateWorks Australia, 2020, p.41)

Real-time smart-grid monitoring enables dynamic energy pricing models and more efficient charging (Technology Trends Outlook 2024, McKinsey & Company, p.92)

⁹ These findings come from research at the Smart Energy Expo 2025, and All Energy Conference 2025.

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

ENERGY AND THE ENVIRONMENT

Widening disparities

Key claim of reports reviewed

Although there is a strong focus on making the energy transition inclusive through simplified systems, support measures, and trust-building, the implementation of these goals in policy and practice is under-reported. As a result, while property owners may benefit from energy-efficient features and CER, the high upfront costs and digital complexity remain significant barriers, especially for low-income households.

Anticipated impact of widening disparities on digital energy futures

- If unaddressed, these disparities are likely to lessen support for the energy transition, as many households are left out of the opportunities it presents
- Exclusion of renters and low-income households also risks undermining trust in energy systems and institutions
- Exclusion from smart technologies and platforms limits the scale and diversity of participation in demand response programs
- Disparities are likely to map unevenly across housing types, rental markets and regions, producing patchy and fragmented responses.

Report quotes:

Lower-income consumers are currently at a disadvantage in investing in some of the solutions, as there can be costs associated with reducing carbon emissions at home (Untapped: The Home Tech Evolution, Samsung, 2023, p.10)

[Households who can install rooftop solar are projected to see significantly lower energy costs] highlights the importance of supporting the broadest spectrum of households to take advantage of solar (Residential Electricity Price Trends, AEMC, 2024, p.22)

Energy-efficient homes are no longer just for the environmentally-conscious, with the latest research showing the significant value Australians place on sustainable properties. The impact of this growing demand will reshape the market in years to come, with both buyers and renters searching (and paying) for energy-efficient features like solar panels and window glazing. This will impact how we value properties. The majority of people now believe energy-efficient features add value to the price of a property, and about three quarters of people would pay more for a home with solar panels (The Australian Home Energy Report, Origin, 2024, p.3)

Structural constraints to an equitable energy transition

The energy transition will need to more specifically address the circumstances and needs of apartment-dwellers, renters and other groups that have so far been less supported by household energy transition efforts. According to an innovation enabler in the Victorian public service, Alex, the government's household energy transition efforts have largely focused on addressing the 'low hanging fruit' through initiatives like rebates for homeowners installing solar PV and hot water heat pumps. As Alex acknowledged, however, "They're the easy things. We're increasingly going to find that we need future, new interventions for... apartment dwellers or more vulnerable communities that maybe find it hard to engage with the privatised energy market". Similar challenges were highlighted by Marcella Palma, an executive at a home electrification company that supports households to transition away from gas. Marcella pointed to barriers associated with shared infrastructure, communal property, and strata regulations, all of which could make electrification in apartment buildings more complex than in freestanding or semi-detached homes. As she explained, "Space will become a problem as we push into more dense areas. We're already finding those problems in New South Wales, it's really hard to electrify. [We] kind of realised that the houses that we were working on there... even terrace houses are a bit smaller and more compact and kind of taller which has made it difficult".

Similar perspectives were offered by Terry, founder of an energy technology start-up focused on installing solar and battery storage on tenanted commercial properties. Drawing parallels with the residential sector, Terry described a persistent 'split incentive' between tenants and landlords, whereby "landlords don't want to pay for the systems because they don't accrue any of the benefits... and from a tenant perspective they don't really want to pay for these things". He noted that ongoing questions about the equitable distribution of benefits between residential tenants and landlords (already complex in residential settings) could become even more salient in a commercial setting, where financial returns are likely to outweigh other motivators for change, such as environmental considerations. Together with the insights from other experts, Terry's comments reinforce the importance of context in shaping effective energy transition policies and technologies. Factors such as tenure arrangements, building type, local geography, and the wider built environment all play an important role, underscoring the need for responses tailored to specific settings. More broadly, as Australian cities continue to densify, these insights point to the need for energy transition policies and technologies that more effectively address the circumstances of renters, apartment-dwellers and other groups that have been less well served by household energy transition efforts.

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

ENERGY AND THE ENVIRONMENT

Climate change

Key claim of reports reviewed

Climate change is accelerating in severity and frequency. Extreme heat, floods, drought, and sea-level rise are transforming society, with far-reaching implications for housing, health, energy infrastructure and economic systems. A detailed analysis of Australia's National Climate Risk Assessment report and its relevance to key trends identified in this report is available in Part 6.

Anticipated impact of climate change on digital energy futures

- The 2020s are widely described as a decisive decade for action
- Climate change is expected to disrupt energy infrastructure, reshape household energy needs, and increase the urgency of adaptation and resilience
- Higher temperatures will increase residential cooling demand, affect grid reliability, and require more flexible energy use systems
- Increased extreme weather events will likely create new demand peaks, and may shift typical operating patterns of CER, such as precharging batteries and EVs in advance of storms
- Homes will need to be resilient to both physical climate shocks (e.g. extreme heat and flooding) and insurance-related risks. By 2030, one in 25 Australian homes could be uninsurable due to climate risk (Futuresphere: Annual Foresight 2024, KPMG)
- Homes and livelihoods will increasingly be relocated in response to climate change due to:
 - Collapse of housing markets in towns with predominantly 'brown jobs'¹⁰
 - Loss of tax revenue for local services funded by carbon intensive industries
 - Direct physical impacts of weather events on housing
- Digital technologies will play a dual role both contributing to energy demand and enabling smarter climate responses. AI, IoT, and predictive analytics will be crucial in helping households, grids and emergency services adapt to worsening climate conditions.

Report quotes:

This is the transformational decade for climate (Decarbonisation Futures, ClimateWorks Australia, 2020, p.14)

Extreme and unprecedented weather events are increasing in their frequency and scale of impact (Our Future World, CSIRO, 2022, p.4)

By 2050, climate change could lead to an additional 14.5 million deaths and US\$12.5 trillion in economic losses worldwide (Accelerating The Future: Climate Resilience And Sustainable Healthcare Systems, Deloitte, 2024, p.6)

Natural disasters cost the global economy an estimated \$390.5 billion in 2020. The cost to Australia alone was \$13.2 billion in 2017 and this is projected to reach \$39.3 billion per year by 2050 (Our Future World, CSIRO, 2022, p.10)

Weather extremes are expected to drive greater variability in operational demand peaks... technological and economic mechanisms could encourage CER device owners to improve grid flexibility (Electricity Statement of Opportunities, AEMO, 2023, p.28)

The future lies in humanity's ability to promote innovation that aligns the digital and green twin transitions... where digital technologies not only bring economic gains but also preserve and protect the planet (Digital Economy Outlook (Volume 2), OECD, 2024, p.108)

¹⁰ Brown jobs are those in high pollution and carbon producing occupations, such as fossil fuel extraction.

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

DEMOGRAPHIC

Declining fertility

Key claim of reports reviewed

Australia's fertility rate has been below the replacement level of 2.1 babies per woman since the 1970s and is expected to remain low in coming decades (Intergenerational Report 2023, Australian Government). Declining fertility is driven by a mix of economic, social, and cultural factors – that is, delayed parenthood, increasing financial pressures, higher female labour force participation and changing norms around family formation, with young adults prioritising self-fulfilment, autonomy and personal goals before considering parenthood.

At the same time, parenting has become more demanding, with rising expectations for intensive involvement and investment, with more individuals pursuing alternative life paths that do not centre around having children.

Anticipated impact of fertility on digital energy futures

- More single-person or dual-adult households may lead to less predictable and more individualised energy use patterns, with energy demand becoming less tied to routines structured around children – for example, meal times and school drop-offs
- The effects may be flattened with smaller families offsetting the energy demand of larger family homes.

Report quote:

People are becoming parents at a later age, having fewer children when they do, and an increasing number of people forgo having children altogether (either by choice or involuntarily) (Fertility Decline In Australia, Australian Government, 2024, p.1)

Ageing

Key claim of reports reviewed

Australia is undergoing a demographic shift towards an ageing population. Life expectancy continues to increase, and the share of people aged 65 and over is projected to grow significantly – that is, from 16% in 2020 to over 23% by 2060–61 (Our Future World, CSIRO, 2022). By 2063, the number of people aged 85 and older will more than triple (Intergenerational Report 2023, Australian Government). While people are living longer and spending more years in full health, this is accompanied by increased demand for aged care services, health infrastructure, and supportive housing models.

Anticipated impact of ageing on digital energy futures

- As aged care shifts towards home-based support and 'hospitals without walls', there will be growing demand for energy to support digital health services, monitoring technologies, assistive devices and emergency response systems
- While some older Australians are increasingly tech-savvy, digital exclusion remains a risk, making equitable access to energy-efficient and smart technologies a policy priority.

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

DEMOGRAPHIC

Report quotes:

Australia's population is ageing as a result of longer life expectancies and low fertility rates (Intergenerational Report 2023, Australian Government, p.6)

Longer life expectancies and declining birth rates, particularly in advanced economies, are pushing the global population of people older than 65 to increase at a quicker rate than the population of people younger than that age (State of the Consumer, McKinsey & Company, 2024, p.2)

Health

Key claim of reports reviewed

Health is becoming more central to how people live, work, and design their homes. In parallel, health consumerism is on the rise, with more personalised, preventative, and data-driven care solutions entering the market. In response, care models are anticipated to shift from hospitals to homes, with telehealth, remote diagnostics and AI-enabled monitoring systems expected to become mainstream.

Health products everywhere

The expos we attended as part of our fieldwork for this report – including those not explicitly focused on health or related issues, such as the Sydney Build Expo and Smart Energy Expo – nonetheless all included a variety of stalls and products designed to improve people's general health and wellbeing at home. This is suggestive of the growing importance of home healthcare to a variety of forums and products. The products on offer generally fell into two categories. The first involved products explicitly targeted towards those with disabilities or seeking to age-in-place (either improving their quality of life at home or enabling people to stay at home longer later in life); these products included home lifts, mobility chairs, reclining beds, electric massage chairs and raised garden pods for accessible at-home gardening. Many of these products could be subsidised through Australia's National Disability Insurance Scheme (NDIS). The second set of products were designed to bring health products and experiences once associated with wellness retreats or high-end gyms directly into the home. In addition to jacuzzis and steam saunas, such products included swim spas, cold plunge pools, magnesium baths and infrared saunas. Such products were often promoted on the basis of entertainment or luxury. However, as one vendor explained during a brief interview, when wellness was a consideration customers were generally willing to spend more. Crucially, most of the health items seen at these expos were electrically powered, raising the baseline consumption of households and making them more reliant on electricity for basic needs and services. Several products, including the spas and saunas, were also energy-intensive by nature. Given the observation that people tend to be less frugal when health is a consideration, it seems possible that the day-to-day operation of such products could also contribute to higher energy use as people prioritise their wellbeing over energy efficiency.

Anticipated impact of health on digital energy futures

- Growth in home-based healthcare devices and services
- Increased demand for thermal comfort
- As digital health becomes more embedded, disparities in energy access, affordability, and digital infrastructure may impact health outcomes – especially for renters, low-income households and those in remote areas
- As more technology is involved in home health care, the impact of even short outages may be increasingly problematic. There may be significant growth in life support customers as a result.

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

DEMOGRAPHIC

Report quote:

Western societies are facing an ongoing health crisis...alongside a shortage in the number of healthcare workers that is only going to worsen in the coming decade. In Australia, just under half (47%) of Australians had one or more chronic conditions in 2017–18, an increase from 42% of people in 2007–08... At the same time, technologies are emerging that are helping people improve their health and extend their lifespan, which is likely to increase patient expectations over the coming decade (Futuresphere: Annual Foresight 2024, KPMG, p.10)

Immigration

Key claim of reports reviewed

Immigration is increasingly central to Australia's population growth, especially as fertility rates remain low and the population ages. Migrants replenish the working-age population and help to offset regional demographic imbalances.

Anticipated impact of immigration on digital energy futures

- Migrants often settle in major cities, driving demand for high-density housing and increasing the load on existing energy infrastructure
- Immigrants may also become increasingly blamed and scapegoated for systemic shortfalls in infrastructure and services, as well as rising housing and other costs.
- Immigrants may have different patterns and expectations for energy, deriving from different experiences and cultural practices. This may significantly shape energy usage patterns.

Report quotes:

Overseas migration is expected to continue to support population growth, offsetting demographic challenges to some extent (Intergenerational Report 2023, Australian Government, p.37)

The demand for skilled people directly employed to build and maintain energy infrastructure is forecast to increase from approximately 36,000 in 2025 to over 60,000 across the horizon to 2050 (Integrated System Plan, AMEO, 2024, p.84)

Australia's population is projected to reach 40.5 million in 2062–63 (Intergenerational Report 2023, Australian Government, p.37)

Culturally diverse energy practices

Several of our experts noted that migrants to Australia may bring different cultural norms, needs, and lifestyle expectations, which in turn can influence patterns of energy demand that differ from historical Australian norms. National Sales Manager in the HVAC sector, Mark Jones, described how demographic change is shaping residential heating and cooling design. He noted that young migrants from Asia tend to be “much more accepting of compact apartment living than... my generation of Anglo-Saxon Australians ...[who] all want the quarter acre block, the backyard and everything... So the type of air conditioning systems are more compact. The construction of those apartments mean that there's very little space in the roof space, ceiling space. So compact type ducting is being developed for low noise type applications, multi-headed units”.

Interior designer Robyn Hawke also reflected on shifts in kitchen and home design associated with increased migration from Asia. She noted that second, often outdoor, kitchens are becoming more commonplace, allowing the preparation of strongly aromatic foods that might otherwise permeate indoor furnishings. Additionally, the growing prevalence of extended and intergenerational families living under one roof is shaping residential layouts, with features like a butler's pantries and separate living areas enabling shared living alongside greater household privacy. Taken together, these changing lifestyles and norms will continue to shift the scale, timing, and end uses of energy consumption in Australian homes.

Housing and homeownership

Key claim of reports reviewed

Home ownership is declining, and housing patterns are diversifying in response to economic, demographic, and cultural pressures. In advanced economies like Australia, rising property prices and social shifts are contributing to a sharp increase in one-person households, particularly among older adults. At the same time, driven by affordability constraints and a desire to reduce social isolation, new models of communal living are emerging such as co-housing and co-living.

Anticipated impact of housing and homeownership on digital energy futures

- Communal and multi-occupancy living arrangements can create complex energy needs, requiring building-level energy management systems, shared EV charging infrastructure and equitable cost-sharing models
- Smart and efficient housing is viewed as an asset – that is, sustainable features like solar, insulation, and smart appliances are becoming key drivers of housing value.

Report quotes:

Younger people are also increasingly likely to live alone, however. Among the 27 OECD countries with data available over the past decade, the share of the population living in one-person households rose across the entire age distribution in many countries (Megatrends And The Future Of Social Protection, OECD, 2024, p.50)

High housing costs, the cost of living and the desire for greater social connection in our increasingly atomised society are some of the drivers of this trend. There are also practical drivers towards sharing more, particularly in later life. For example buying in care and support may be more affordable if this can be spread across multiple families. Communal living arrangements can also be more environmentally sustainable (The Future Of Ageing In An Uncertain World, Brightwell, 2024, p.36)

Australia and New Zealand have amongst the highest projected population growth in the coming decade. This is likely to drive significant demand for real estate (Pacific Real Estate Market Outlook, CBRE, 2025, p.5)

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

DEMOGRAPHIC

Dense cities

Key claim of reports reviewed

Urbanisation is accelerating globally and, in Australia, driving the rise of more dense and vertical cities. Population growth is expected to be concentrated in major metropolitan areas, which are expanding through infill, vertical development and urban sprawl. At the same time, cities are being reimagined through green urban transformation and smart infrastructure, using emerging technologies and real-time data to optimise services and improve liveability.

Anticipated impact of dense cities on digital energy futures

- Australia's population is expected to grow significantly, particularly in cities like Melbourne, Brisbane, and Sydney. This growth brings intensified pressure on infrastructure, housing, and services
- While increasing housing density will decrease per-dwelling electricity demand, CER will be more constrained given rooftop solar is harder to install on apartments and high-rises, reinforcing the need for building-scale or shared energy systems.

Report quotes:

In 2018, 55.3% of the global population lived in urban areas and this is forecast to grow to 60.4% by 2030 and 68.4% by 2050 (Our Future World, CSIRO, 2022, p.32)

Over the next decade, construction of around 1.7 million new dwellings is forecast to increase consumption by around 12 TWh a year alone, with further growth in consumption of nearly 5 TWh a year from electrification of space heating, hot water heating, and to a lesser extent from a switch from gas cooking appliances to electric induction (Electricity Statement of Opportunities, AEMO, 2023, p.32)

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

ECONOMIC AND WORK

AI in work

Key claim of reports reviewed

Artificial intelligence is expected to fundamentally reshape the nature of work, consumption, infrastructure and daily life. While concerns about job losses are acknowledged, most reports highlight that AI is more likely to change the structure of work than eliminate it.

AI is seen as a key economic and productivity driver, enabling new industries, forms of work and higher-value outputs – provided workers and systems can adapt. Human-AI collaboration is expected to grow, shifting roles towards oversight, creativity and care. From decision-making to creative production, AI is being integrated into core processes across industries, transforming everything from logistics and finance to energy and education.

Report quotes:

There is no doubt that work will be profoundly different a decade from now – radically reshaped by generative AI (Technology Vision, Accenture, 2025, p.49)

Broadening digital access is expected to be the most transformative trend... fueling demand for skills in AI, big data, and technological literacy (Future of Jobs, World Economic Forum, 2025, p.73)

Automation of jobs and services

Key claim of reports reviewed

Automation powered by AI, robotics, and autonomous systems is rapidly transforming jobs across diverse sectors. Reports frame automation as not just as a tool for efficiency but as a response to labour shortages, especially in sectors such as aged care, hospitality, and logistics.

Rather than replacing all jobs, automation is expected to reshape them, which will require workers to continuously reskill and adapt. Automation is expected to shift roles from task execution to oversight, giving workers more strategic and creative responsibilities. Continuous learning and upskilling will be an essential proactive strategy for organisations to attract workers and ensure skills remain relevant in a rapidly changing environment.

Anticipated impact on digital energy futures and residential electricity demand

- Households without access to reliable digital and energy infrastructure may be excluded from benefits of automated services (e.g., telehealth, AI financial tools or energy-saving automation), reinforcing socioeconomic inequalities unless addressed by policy.

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

ECONOMIC AND WORK

Report quotes:

Globally, the expected reduction in the proportion of work tasks performed by humans is driven primarily by increased automation (Future of Jobs, World Economic Forum, 2025, p.26)

Amid persistent labor shortages... AI is happening for dynamic pricing, robotic cleaning staff, and automated concierge services (Tech Trends Report: Hospitality and Restaurants, Future Today Institute, 2024, p.13)

Funding for – and provision of – reskilling and upskilling are seen as the two most welcomed public policies to boost talent availability (Future of Jobs, World Economic Forum, 2025, p.6)

Automation is more likely to change tasks within jobs rather than replace entire jobs, requiring workers to develop new skills (Preparing For The Future Of Work Across Australia, OECD, 2021, p.12)

Flexible work arrangements

Key claim of reports reviewed

The structure of work is becoming increasingly flexible, driven by advances in digital technology, shifting worker preferences and the rise of remote, hybrid, and decentralised work models. Reports claim that new models like the gig economy, sharing economy and decentralised work ecosystems are challenging traditional employment.

Workers increasingly participate in multiple roles, often across digital platforms and satellite hubs, rather than anchoring themselves to a single employer or physical location. These shifts are especially significant for younger generations, who increasingly prioritise purpose-driven, values-aligned and life-balanced work.

Anticipated impact of flexible work arrangements on digital energy futures

- More flexible and remote work models means energy consumption is shifting from commercial buildings to homes
- Flexible scheduling spreads electricity demand more evenly throughout the day rather than spiking around the traditional 9–5 workday. This opens opportunities for demand response programs and dynamic pricing models to manage load flexibly.

Report quotes:

Given how productive we will all be with the help of our new AI digital colleagues, companies may continue to look at more flexibility for their employees. Australian firms are increasingly exploring the idea of a fourday workweek, aiming to enhance employee wellbeing, productivity, and work-life balance. This will impact on office utilisation, although peak day utilisation, typically from Tuesday to Thursday may not be impacted as significantly (AI's Impact On Australian Office, CBRE, 2024, p.6)

Technology, automation and hybrid working models are forcing us to think differently about what the workforce needs to do and when (Future of Work, KPMG, 2023, p.12)

Without defined roles anchoring them together, employees perform their individual tasks remotely. Workers split time between truly remote work and convening in smaller satellite workspaces when they want a sense of community. Employees enjoy the flexibility to simultaneously hold multiple 'careers,' contributing varied tasks to an ecosystem of employers rather than being siloed at any single organization (Tech Trends Report: Future Today Institute, 2024, p.36)

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

ECONOMIC AND WORK

Working age

Key claim of reports reviewed

The working-age population is expected to grow older and remain economically active for longer. Organisations are increasingly seeking ways to extend working lives through inclusive workforce policies, technology-assisted roles and reskilling opportunities. Digital and assistive technologies are seen as key enablers for older adults to remain in the workforce, especially in physically or cognitively demanding roles.

Anticipated impact of working age on digital energy futures

- The use of AR headsets, AI support systems, and ergonomically adaptive equipment will grow, not only in workplaces but perhaps also in domestic settings for those working remotely.

Report quote:

As increases in life expectancy continue to put pressure on public finances, we will need to work for longer (The Future Of Ageing In An Uncertain World, Brightwell, 2024, p.25)

Two demographic shifts are increasingly seen to be transforming global economies and labour markets: aging and declining working age populations, predominantly in higher income economies, and expanding working age populations, predominantly in lower-income economies (Future of Jobs, World Economic Forum, 2025, p.5)

Technologies such as exoskeletons and teleoperated driving can reduce the risk of physical injury, while other digital support systems like augmented reality (AR) smartglasses, and artificial intelligence (AI)managed dashboards can reduce memory and cognitive demands. By supporting older employees in their tasks, supply chain organizations can retain long-tenured talent (Logistics Trend Radar 7.0, DHL, 2024, p.70)

It is estimated that the [AgeTech] market will reach US\$2tn by 2025. The AgeTech revolution is a testament to innovation's transformative power on the aging experience, representing a bold reimagining of senior living and all that it entails (examples include, Caregiving, FinTech, Smart Homes and AI-enabled personalised tech) (Accelerating The Future: The Convergence Of Health, Wealth, And Longevity Services, Deloitte, 2024, p.6)

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

ECONOMIC AND WORK

Climate change costs

Key claim of reports reviewed

Rising temperatures, more frequent extreme weather events and sea level rise are expected to have major impacts on labour productivity, infrastructure resilience, and economic output. These impacts are sector- and region-specific, with outdoor and energy-intensive industries facing the greatest disruption.

Anticipated impact of climate change on digital energy futures

- The integration of adaptation technologies such as cooling wearables, personal air purification, and heat-stress monitoring devices may increase baseline household electricity consumption, especially for vulnerable populations and older workers ageing in place
- As physical work becomes more difficult in high temperatures, there will be a greater reliance on digital, remote, and climate-controlled environments, shifting energy use to more insulated and sensor-rich indoor settings.

Report quotes:

Higher temperatures will impact labour productivity and require us to work differently. As temperatures rise, workers in exposed industries may need to reduce their exposure to heat or the physical intensity of their work. Higher temperatures will also increase some occupational safety risks such as heat stress (Intergenerational Report 2023, Australian Government, p.96)

This is a significant economic cost, reducing economic output over this period by between \$135 billion and \$423 billion in today's dollars, through the direct impacts of higher temperatures on labour productivity (Intergenerational Report 2023, Australian Government, p.99)

Intersecting costs and challenges of climate change

Dr. Cynthia Sear, a researcher specialising in social and climate trends, highlighted that the risks and responsibilities associated with climate change are "unfairly borne by parents, carers, and children". Through her work, Dr. Sear and her collaborator Associate Professor Holly High found that women and young people are especially affected by the rapid closure of schools on extreme fire days, which are becoming increasingly common under climate change, particularly in rural and regional areas, which tend to be more vulnerable to the effects of climate change while also having less access to essential services. On these extreme fire days, children are often sent home from school and childcare centres close, placing additional pressure on families and the productivity of working parents. It also potentially places additional strain on the energy grid as daytime activities shift into the home. Dr. Sear and her colleagues's work underscores how the overlapping themes identified through this analysis may have wide-ranging implications not only for the energy grid, but for society at large.

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

SOCIAL AND POLITICAL

Digital economy

Key claim of reports reviewed

The shift towards a cashless economy is accelerating. Reports claim that digital payments are increasingly replacing cash, offering convenience and efficiency but raising inclusion risks.

Anticipated impact on digital energy futures and residential electricity demand

- There is expected to be greater dependence on digital infrastructure for paying energy bills and managing services
- There is increased risk of energy exclusion for those without digital access or literacy (e.g. unbanked or elderly populations).
- A cashless economy may increase resilience risks through reduced access to basic goods and services (food, fuel, etc) during grid or telecommunications outages.

Report quote:

Cash will become obsolete (The Future Of Ageing In An Uncertain World, Brightwell, 2024, p.22)

Digital exclusion

Key claim of reports reviewed

Digital exclusion remains a persistent issue. Lower-income groups and those with limited access to education often lack the digital skills and access needed to participate in digital services, which is expected to continue and accelerate.

Anticipated impact on digital energy futures and residential electricity demand

- There is a risk of inequitable access to smart energy technologies like solar, batteries, and smart meters, highlighting the need for accessible design and community education programs to enable participation in the energy transition
- Rural areas with poor internet connectivity may also be limited in their access to digital technologies
- These households will be less able to participate in technology-led demand-side participation programs.

Report quote:

Lower-income groups have persistently recorded lower digital inclusion scores than higher-income groups and the digital gap between employed and unemployed Australians has widened over the past seven years (Our Future World, CSIRO, 2022, p.33)

In rural and regional areas, accessing smart home AT is constrained by several factors including internet reliability and the availability of both technical and professional support (Impacts Of New And Emerging Assistive Technologies For Ageing And Disabled Housing, AHURI, 2021, p.78)

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

SOCIAL AND POLITICAL

Geopolitical instability and supply chain fragility

Key claim of reports reviewed

Conflict, protectionism and realignments in global trade are predicted to threaten the stability of supply chains, especially for critical materials like lithium, cobalt and semiconductors.

Anticipated impact on digital energy futures and residential electricity demand

- Supply chain instability may slow the deployment of household and grid-scale renewable energy systems and energy hardware such as batteries, solar panels, EVs and microchips
- Increased demand for domestically produced energy technology and materials recycling to ensure supply stability
- Potential rise in costs for residential energy systems due to constrained global access.

Report quote:

According to KPMG's global survey on supply trends, more than 60% of global organisations expect that geopolitical instability may have a detrimental impact on their supply chains in the next three years (Futuresphere: Annual Foresight 2024, KPMG, p.16)

Declining trust in institutions and technology

Key claim of reports reviewed

Public trust in governments, media and technology companies is eroding. Reports predict this will be exacerbated by data misuse, misinformation, automated-decision making processes and privacy breaches.

Anticipated impact on digital energy futures and residential electricity demand

- Unless trust is rebuilt, this may manifest into community pushback on large-scale digital services and infrastructure projects (e.g. smart metre rollouts¹¹)
- Anticipated widespread uptake of AI-driven or automated energy systems may be hindered by trust issues, especially around data sharing and decision-making transparency
- Transparency and consumer control over personal energy data will become essential.

Report quotes:

Emerging social trends have heightened the influence of human perspectives and experiences on future community, business, technology and policy decisions. Consumers are demanding increased transparency from organisations, governments and scientists to maintain their trust... the rapid rate of change is also driving new considerations around ethical design (Our Future World, CSIRO, 2022, p.5)

Emerging technologies offer many benefits to consumers but data security and privacy are key concerns (Digital Lives of Australians, AUDA, 2023, p.11)

The risk of data privacy, security and abuse of vulnerable groups is a big concern when it comes to smart home IoT devices with always-on monitoring features (Impacts Of New And Emerging Assistive Technologies For Ageing And Disabled Housing, AHURI, 2021, p.26)

¹¹ For instance, it has recently been reported that the NSW Energy & Water Ombudsman has warned the rollout of smart electricity meters is causing growing consumer confusion and mistrust, with complaints rising about estimated bills, unexplained charges and sudden switches to complex tariffs like time-of-use pricing. See: NSW energy watchdog bemoans 'confusion, broken trust' as smart meter rollout sputters (ABC news)

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

SOCIAL AND POLITICAL

The innate trustworthiness of digital technology is under threat, and its additive value for people's daily lives has become diluted by authenticity and trust issues (Accenture Life Trends 2025, p.7)

Waste, circularity, and resource strain

Key claim of reports reviewed

The environmental impact of digital technology, including battery waste, e-waste and embedded carbon is expected to become a growing concern.

Anticipated impact on digital energy futures and residential electricity demand

- Growth of circular product design may shift consumer preferences towards modular or upgradable energy devices.

Report quote:

Lithium-ion battery waste in Australia is projected to grow from 3,300 tonnes in 2016 to up to 187,984 tonnes by 2036 (Our Future World, CSIRO, 2022, p.16)

Gender and care inequities

Key claim of reports reviewed

Women are expected to continue to face disadvantage in several key areas: they continue to carry a disproportionate share of unpaid care work, they are underrepresented in tech-adjacent roles, and they are more vulnerable to online harms.

Anticipated impact on digital energy futures and residential electricity demand

- Structural inequalities will continue to shape who benefits from technological advances
- When care practices are traditionally performed by women, and CER technology managed by men, there are likely challenges in aligning energy knowledge and management with the practices of household care.

Report quotes:

Women continue to provide the bulk of unpaid childcare, a barrier to paid employment contributing to lower labour force participation, wages, and women's higher poverty risks throughout the life course. At the same time, in the absence of significant investments in public provision, the impending surge in demand for longterm care for older people is likely to fall on unpaid caregivers – mostly women (Megatrends And The Future Of Social Protection, OECD, 2024, p.15)

According to The World Bank, women currently make up less than a third of the world's workforce in technology-related fields. So, these disparities may be due to the fact that women are less likely to work in industries and/or jobs which are quick to implement emerging technologies. However, it's cause for concern as GenAI is likely to transform jobs and industries well beyond technology-related fields, and if women are not comfortable working with GenAI, it has the potential to deepen gender inequality in the workplace (Gen Z And Millennial Survey, Deloitte, 2024, p.21)

Evidence suggests that negative behaviours in digital environments are on the rise and they disproportionately affect girls (Digital Economy Outlook (Volume 1), OECD, 2024, p.145)

PART 3: MACRO TRENDS AND LARGE-SCALE DISRUPTIONS

SOCIAL AND POLITICAL

Cybercrime

Key claim of reports reviewed

Cybercrime is rapidly evolving through the use of GenAI, synthetic media and hyper-personalisation techniques. While new sources of data are expected to improve decision-making processes, they also open new avenues for exploitation. Scams are becoming harder to detect, more targeted, and more emotionally manipulative, enabled by deepfake audio and video, real-time impersonation and AI-enhanced social engineering.

Anticipated impact of energy technologies on digital energy futures

- Digital energy systems, especially smart homes and connected devices, are becoming new domains for cybercrime. As energy platforms integrate real-time data, voice controls, biometric security and automated transactions, they are increasingly exposed to impersonation, deepfake manipulation, and synthetic identity fraud
- Hyper-personalised scams targeting households may exploit data from connected appliances, EVs and energy dashboards to deceive users or gain unauthorised access. AI-driven attacks could automate password cracking, exploit weak home security protocols, or manipulate household demand profiles for financial gain or system disruption
- Trust in digital interfaces and energy automation will be critical to ensure household uptake.

Report quotes:

Malicious actions against CER have the potential to cause harm and concerns about security could slow the adoption of CER. Governments, industry, academia and other stakeholders are progressing work aimed at securing the CER ecosystem (National consumer energy resources roadmap, Energy and Climate Change Ministerial Council, 2024)

Voice duplication, or vishing, is an emerging AI-powered threat where scammers take audio shared online to clone a person's voice and use it to deceive others. Other cybersecurity challenges include the use of AI to automate attacks, deliver personalised scams en masse, create more evasive malware, mine valuable data and accelerate password cracking (Tech Trends 2024: An Australian Perspective, Deloitte, 2024, p.10)

As with the adoption of any new technology, AI can present some risks. Attackers are using this technology to refine their phishing messages and develop enhanced malware, with Australia the equal 5th most targeted nation in the APAC region across June 2022-23 (Inside Australian Online Shopping, AusPost, 2024, p.27)

AI can now generate hyper-realistic deepfake media that now passes the uncanny valley. This tech could let bad actors impersonate people or spread misinformation. AI can also be used for cheating, fraud, and hacking (Tech Trends Report: Future Trends, Future Today Institute, 2024, p.83)

Developments in generative Artificial Intelligence (AI) will democratise access to financial information and advice, but will also lead to increasingly sophisticated financial scams (The Future Of Ageing In An Uncertain World, Brightwell, 2024, p.21)

PART 4: EVERYDAY PRACTICE TRENDS

In this section, we present industry visions, emerging technologies, and trends of direct relevance to everyday life in the home. The findings are organised into the following domains:

- Heating, cooling and comfort
- Working from home
- Caring and well-being from home
- Entertainment and convenience
- Driving, flying, and charging

We also include **key oversights and limitations** for each domain, through which we suggest potential areas being overlooked by current dominant industry visions.

While it is beyond the scope of this report to fully evidence how these trends will unfold across diverse households and contexts, we draw attention to some limitations and oversights that previous research suggests are likely to shape how these trends unfold in households.

For each domain, we also describe potential **implications for the energy sector**, particularly in relation to future electricity demand, load profiles, and opportunities for demand response and flexibility.



PART 4: EVERYDAY PRACTICE TRENDS

HEATING, COOLING AND COMFORT

Climate change, rising energy costs and the electrification of the home are intensifying demand for more efficient heating and cooling. In response, the combined uptake of heat pumps, energy-efficient building designs and retrofits, and real-time optimisation through smart technologies is forecast to play a central role in managing dynamic heating and cooling needs and delivering indoor thermal comfort.

Key claim of reports reviewed

Heating and cooling demand is expected to rise significantly with climate change and household electrification, driving the need for integrated, smart and energy-efficient solutions across building design, materials and technologies.

- Rising global temperatures are driving a surge in demand for residential and commercial cooling, placing increasing pressure on electricity systems
- The adoption of energy-efficient buildings and intelligent, adaptive materials is expected to improve the thermal performance of homes and reduce peak demand
- The widespread electrification of heating and cooling, particularly through the uptake of heat pumps, is expected to be most effectively managed through integrated smart energy technologies.

Emerging technology trends and predictions

Climate-driven demand for cooling

Rising temperatures and more frequent heat events are predicted to accelerate globally the need for residential and commercial cooling. The International Energy Agency (IEA) projects that global electricity demand for space cooling in buildings will rise up to 40% by 2030¹². Australia is especially vulnerable to extreme heat events and heatwaves, underscoring the need and expectations for energy-efficient cooling technologies to manage increased demand and associated emissions and future-proofing infrastructure.

Report quotes:

Heating and cooling load is a small proportion of overall annual electricity consumption but, on particularly extreme hot or cold days, it can contribute to half the demand in some instances, causing a much higher impact on maximum demand. Relevant drivers include uptake of air-conditioners, electrification of households currently using gas heating, and building energy efficiency initiatives affecting heating/cooling requirements (Electricity Statement of Opportunities, AEMO, 2023, p.34)

Heat-related deaths are predicted to grow by 60.5% or more across major Australian capital cities from 2020–50, but this is likely to be a conservative estimate (Our Future World, CSIRO, 2022, p.10)

12 Source: <https://www.iea.org/energy-system/buildings/space-cooling>

PART 4: EVERYDAY PRACTICE TRENDS

HEATING, COOLING AND COMFORT

Adaptive and dynamic building materials

The development and use of these materials are expected to increase, as they enable responsiveness and reflect energy demands and indoor comfort as not fixed but shifting throughout the day, across seasons and with occupancy patterns. They are being designed to adjust in real time, optimise energy efficiency, comfort and indoor environmental quality more intelligently than traditional static designs.

- Technologies such as electrochromic windows, which automatically tint to control heat and light, are rapidly scaling, with the global market projected to grow from US\$1.5 billion to up to US\$10 billion by 2025 (Decarbonisation Futures, ClimateWorks Australia, 2020)
- Novel materials like mycelium-based fire retardants highlight the emergence of bio-based components in next-generation building design (Tech Trends Report: Bioengineering, Future Today Institute, 2024)
- Synthetic biology will be applied to 'grow lower-emissions building materials.' (Our Future World, CSIRO, 2022).

Report quote:

Materials are becoming smarter and more capable of self-management... These metamaterials promise to create adaptable structures that respond to their environment, such as self-healing concrete for autonomous repairs and smart windows and building facades that adjust to weather conditions, enhancing energy efficiency (Tech Trends Report: Built Environment, Future Today Institute, 2024, p.12)

Efficiency in building design

Retrofitting existing homes and designing new ones as fully electric is expected to become more viable, supporting a move beyond zero emissions towards net negative outcomes and offsetting increased demand from heating, cooling and EVs. This includes passive housing design, where globally more than 60,000 buildings have been certified to passive house standards. While fewer than 100 exist in Australia, this number is expected to increase in line with global trends (Decarbonisation Futures, ClimateWorks Australia, 2020). AI is also expected to significantly improve energy efficiency through building analytics and energy use optimisation.

Efficiency and volume builders

Steve, a senior advisor working in the construction sector, explained that although the volume builders he works with – meaning those constructing between 100 and 1,000 homes per year – comply with all regulations, the need to deliver affordable housing at scale encourages simplified design and construction practices that aim only to meet minimum energy efficiency standards. As he noted, "They're building at that affordability end of the scale and they see [energy efficiency standards] as an issue because every time something changes, the price goes up, less people can afford the houses, they don't sell as many houses". At the same time Steve observed that with time and experience more builders were exceeding basic expectations around issues like the airtight construction, "It's not a compliance requirement. It's just that some of these companies are now recognising that, 'Oh, okay, look, if we just do this and do this while we're building, it actually, you know, makes a big difference to air tightness and therefore to the comfort of people living in those houses'". Accordingly, as familiarity with new building codes, technologies, and building practices grows, minimum energy efficiency standards are more likely to be consistently met.

PART 4: EVERYDAY PRACTICE TRENDS

HEATING, COOLING AND COMFORT

Report quotes:

As households charge EVs and use more electricity for heating, cooling and cooking, their total consumption increases to 150 TWh by 2050. However, uptake of energy efficient buildings, appliances and behaviour offsets this increase (Integrated System Plan, AMEO, 2024, p.26)

AI will accelerate smart office buildings by enabling real-time building analytics, optimising energy consumption and enhancing security. Machine learning algorithms will analyse occupancy patterns, predict maintenance needs and adjust lighting and HVAC systems for improved environmental impacts. Additionally, AI-powered surveillance systems can enhance security by detecting anomalies and ensuring a safe workplace (AI's Impact On Australian Office, CBRE, 2024, p.6)

The all-electric eco homes of the future will use electric heating sources to power homes and electric vehicles (Untapped: The Home Tech Evolution, Samsung, 2023, p.10)

Smart energy technologies

Smart meters, energy monitors, connected appliances and smartphone-integrated platforms and systems are expected to allow consumers to manage energy and heating and cooling technologies more efficiently. Smart meters are viewed as a key component of effective CER integration and coordination, facilitating the shift to 'homes as energy hubs'. Smart home devices are expected to create new opportunities for third parties to deliver demand management solutions. Reports viewed rising energy bills and climate concerns as prompting consumers to adopt these devices. However, questions remain about who will have ultimate control (i.e. users via apps or third parties via coordinated use).

Report quotes:

Ensuring the new demand from electrification is managed well requires the coordinated use of Consumer Energy Resources (CER) such as electric heat pumps and EVs (Residential Electricity Price Trends, AEMC, 2024)

In the future, the most efficient way for consumers to contribute to balancing the grid is by using smart home management systems that will control hot water systems and other appliances to take advantage of cheaper daylight electricity and avoid the more expensive peaks (Integrated System Plan, AMEO, 2024)

The future is exciting as our homes increasingly move towards fully electric solutions powered by renewable energy. The all-electric eco homes of the future will use electric heating sources to power homes and electric vehicles, all will be manageable via smartphones helping consumers to run their homes more efficiently (Untapped: The Home Tech Evolution, Samsung, 2023, p.10)

All systems are connected to a central management platform, home occupants can turn off water and electricity and close doors and windows remotely at will via mobile apps. Better still, more advanced solutions include sensors to conveniently close windows in response to real-time changes in weather (Smart home of the future, PWC, 2021, p.29)

PART 4: EVERYDAY PRACTICE TRENDS

HEATING, COOLING AND COMFORT

Electrification of heating

Reports widely cited [heat pumps](#) as critical to meeting decarbonisation targets and reducing household emissions for both space heating and hot water. Government initiatives, rising energy costs, and growing environmental awareness was accelerating efforts to phase out gas heating in favour of electric alternatives. Experts predicted heat pumps will become commonplace in homes by 2025–2030. However, the high upfront cost of installation and challenges in accessing subsidies posed barriers to adoption, particularly for lower-income households, as some reports recognised.

Report quotes:

Government funding and initiatives are helping drive consumer replacement of fossil fuel heating systems with heat pumps, reducing barriers to the rollout of low carbon technology in homes and businesses across the UK. This is accelerated by smart meter installation by cost-conscious consumers looking to technology to help them better monitor and regulate fuel consumption (Untapped: The Home Tech Evolution, Samsung, 2023, p.7)

Electrification is a key lever for increasing energy efficiency, but the uptake of electrification technologies, including heat pumps and EVs, has slowed despite ongoing investment (Global Energy Perspective, McKinsey & Company, 2024, p.12)

Electric heat pumps – such as split system air conditioning – can replace gas heating and deliver a five- to seven-fold improvement in the energy efficiency of space heating (ASBEC, 2016). When coupled with smart technologies, these appliances can increase the energy efficiency of buildings and reduce peak demand (Decarbonisation Futures, ClimateWorks Australia, 2020, p.41)

Smarter heating ventilation and air conditioning (HVAC) systems

In Australia, the average energy efficiency of residential air conditioning units improved by 74% between 2001 and 2015 (Decarbonisation Futures, ClimateWorks Australia, 2020). These systems learn to dynamically adjust temperature, humidity and airflow based on real-time data, occupancy patterns and user preferences. Smart HVAC systems use advanced sensors and automation to deliver personalised comfort across different zones of the home. Thermal comfort is improved and energy consumption reduced, contributing to more sustainable and cost-effective building operations.

HVAC automation and convenience

At the Sydney Build Expo, a representative of an HVAC system manufacturer, suggested that the convenience offered by automated smart HVAC systems might “make people lazier,” but that meant that consumers’ time could be spent elsewhere. The potential for time-saving was seen as a key consumer expectation. Given this, the HVAC manufacturer therefore saw the coordination of energy-intensive appliances – including those beyond heating and cooling – across the home as a chief driver of technological innovation in the coming years.

EXPERT INTERVIEW

Increased indoor air quality

Mark Jones, National Sales Manager in the HVAC sector, explained that since the Covid-19 pandemic there has been growing societal recognition of the role of indoor air quality on human health. As a result, the role of residential air conditioning has gradually expanded beyond temperature control alone to also encompass broader air quality management, including humidity control, air filtration (e.g. of particulates and pathogens) and monitoring CO2 levels. As he explained, “Everyone thinks air conditioning, oh, that's temperature control and maybe a bit of filtration of dust in the air. But from COVID, there was a big leap in knowledge and understanding of ventilation requirements”.

Capabilities like managing humidity and CO2 levels – previously confined primarily to commercial or civil settings, such as in hospitals or museums – are slowly moving into high end residential settings. However, Mark suggested that, until costs decline, uptake is likely to remain concentrated among “early adopters that are very keen on improving their indoor air quality. People that have suffered through COVID, people that have got other health issues”. Nevertheless, in an increasingly health-conscious society this group will comprise a growing portion of the population. Importantly for energy consumption, effective indoor air quality management requires smart control systems to finely monitor parameters such as CO2 concentrations which are not sensed by the human body, and to adjust the system's performance accordingly.

PART 4: EVERYDAY PRACTICE TRENDS

HEATING, COOLING AND COMFORT

Key oversights and limitations about heating, cooling and comfort

- **Affordability and equity.** Concerns were acknowledged but underdeveloped
- **Social and cultural dimensions of heating.** Reports assumed that heat pump adoption was a rational, environmentally motivated choice. They neglected emotional, habitual, and comfort-related practices tied to existing heating systems – for example, preference for instant gas heat
- **Over-optimistic timeline for uptake.** Industry confidence that heat pumps will be 'commonplace by 2025–2030' underestimated slow infrastructure rollout, skilled labour shortages, and variability in consumer readiness across different household types (i.e. investors' reluctance to install heat pumps in their rental properties) (Household Energy Preferences, JWS Research, 2021)
- **Energy savings were assumed, not evidenced.** The promise of efficiency and cost reduction was treated as inevitable, but little evidence was provided to show smart technology reliably delivered these benefits
- **Digital fluency.** The vision of smartphone-managed all-electric homes assumed universal access to devices, reliable connectivity, and digital fluency and did not fully consider consumer concerns about data collection, surveillance and third-party access to household energy usage
- **Air Quality.** There was limited recognition of the growing importance of indoor air quality for household health and comfort.

Key implications of heating, cooling and comfort for the energy sector

- Rising temperatures and increased reliance on air conditioning, especially during extreme weather events, will create sharper peaks in electricity demand, requiring enhanced forecasting and grid resilience planning
- The effectiveness of smart technologies rests on consumer trust, affordability, and digital literacy
- With climate-driven air quality challenges (e.g. bushfires, pollen, viruses, allergens and mold), the use of purifiers is expected to grow, especially when integrated into HVAC systems. This could lead to more regular and sustained use of HVAC systems in households.

PART 4: EVERYDAY PRACTICE TRENDS

CHANGING WORK PATTERNS

Emerging technologies are reshaping how we think about the role of work in our lives. According to the reports, remote work has made people more energy conscious, increasing awareness of electricity usage and greater interest in sustainable living and energy-efficient appliances. We are expected to work for longer throughout our lives due to demographic shifts and economic pressures, but the nature of work will be fundamentally changed by emerging technologies. In response, reports predict that employees will expect tailored work experiences and more flexible work options that align with their values, and employers will continue transforming physical workspaces to accommodate trends.

However, many of the optimistic projections such as reduced working hours, seamless human-robot collaboration, or widespread acceptance of AI-led role changes, were under-examined.

Key claim of reports reviewed

The future of work is predicted to be shaped by longer working lives, shorter working weeks, changing skill demands, and greater flexibility enabled by emerging technologies.

- While exoskeletons are expected to lower barriers to employment and help reduce age and other forms of discrimination in the workplace, it is unclear how accepted these technologies will be or how they will fit into the everyday lives of older workers and their workplaces
- Reports suggest that emerging technologies are prompting a rethinking of the role of work in people's lives, leading to new expectations of employers and a greater focus on the overall employee experience
- Reports predict that office and home spaces will continue evolving in response to the persistence of hybrid models.

Report quote:

As increases in life expectancy continue to put pressure on public finances, we will need to work for longer. However, technology will make work more flexible, changing when we work, where we work and how we work. Fewer of us will need to travel to our workplace; more of us will work from home or even from abroad. This will open up more time for us to provide care and other unpaid work, but also for exploring our interests and hobbies (The Future Of Ageing In An Uncertain World, Brightwell, 2024, p.25)

Emerging technology trends and predictions

Working from home increasing energy consciousness

Working from home is expected to increase the visibility of household energy use by shifting the costs of powering devices and maintaining comfort onto workers, heightening awareness of consumption. It is predicted to also enable greater daytime use of household solar, potentially improving the value of rooftop systems and encouraging further investment in energy-efficient appliances, home upgrades, and sustainable practices. These shifts may also be reinforced through digital demand-response programs that use gamified incentives.

Report quote:

Time spent working remotely has made us more aware of the cost of the energy required to charge our devices and for lighting, heating and cooling. The broader benefit of heightened energy awareness is that more people who work from home are now interested in buying energy-efficient appliances (62 per cent), improving the energy efficiency of their home (61 per cent) and living sustainably (57 per cent) (Future Energy Report, Origin, 2021, p.16)

The challenge is getting customers to respond to these market signals and change their behaviour. According to Gavin Freeman, behaviour and performance psychologist and director of The Business Olympian, there's one clear solution – gamification, which is the creation of a game-like experience in a non-game environment (Future Energy Report, Origin, 2024, p.27)

Cobots, exoskeletons, AR and AI in the workplace

These technologies are expected to contribute to reducing the physical and cognitive demands of work, workplace injuries and sick leave and allow greater participation among ageing workforces. However, key uncertainties remain about the practical implications of these technologies.

Report quote:

Each year, cobots become smarter, more autonomous, and more prolific, and this year is no exception... These robots that work alongside human workers are being trained on more data that allows them to adapt and work around their human counterparts... These cobots mitigate potentially harmful work for humans by either augmenting the human body or replicating repetitive tasks that could cause future injuries. Some of the augmented wearables can also offer predictive pathways through the warehouse to ensure worker safety. As autonomy continues to grow in robots and transportation, this trend will create newfound efficiencies and productivity, particularly during peak demand seasons (Tech Trends Report: Future Trends, Future Today Institute, 2024, p.176)

PART 4: EVERYDAY PRACTICE TRENDS

CHANGING WORK PATTERNS

The 'hotelisation' of the office

In response to the rise of gig work and the resulting talent drain, reports suggest that employers and property owners are reimagining office spaces as curated, experience-driven environments to entice workers back into the office.

Report quotes:

Well-connected buildings with good public transport links, excellent onsite amenity and a variety of choice in popular bars, cafes and restaurants are the pick for switched-on corporates. Furthermore, building owners are taking a leaf out of the hospitality playbook by creating curated experiences for occupants from Monday to Friday. Full concierge services that collect and deliver your drycleaning, VIP meet and greets, morning yoga, evening wine tastings, mid-week puppy playtime and Friday BBQ's, anything goes (Key Office Trends 2022, CBRE, p.12)

With the role of the office evolving and organisations looking for ways to entice people to co-locate, connect, socialise and collaborate, there has been a corresponding increase in demand for premium and A-grade assets that provide appealing and versatile spaces to use for these activities (Future of Work Outlook, PWC, 2021, p.8)

Personalised work experiences

Gen Z and Millennials are anticipated to increasingly turn to vocational training, microcredentials, and on-the-job upskilling instead of university degrees, driven by cost, relevance, and flexibility. To attract workers, employers are predicted to become cognisant of the need to offer more flexibility in terms of WFH and tailoring work to their personal needs.

Report quotes:

Work is key to Gen Zs' and millennials' identities... Nearly all Gen Zs and millennials want purpose-driven work, and they're not afraid to turn down work that doesn't align with their values (Gen Z And Millennial Survey, Deloitte, 2024, p.24)

Employee centricity will continue to grow in importance in the coming years, driven by societal and demographic changes, changing employee values and needs, and technological developments (Logistics Trend Radar 7.0, DHL, 2024, p.87)

The ability to work remotely, at least some of the time, has now become a leading factor in whether people choose to join or stay with a company (Future of Work, KPMG, 2023, p.11)

PART 4: EVERYDAY PRACTICE TRENDS

CHANGING WORK PATTERNS

A decline in working hours

Several key factors identified in the reports were contributing to an expectation of a reduction in average hours worked per employee. These include: more older-aged Australians, a demographic that typically participated less in the labour force; productivity gains from AI; and rising anti-work attitudes, reflecting resistance to overwork and surveillance-heavy productivity monitoring.

Report quotes:

[Anti-Work Movement] does reflect a sentiment whereby people are turning their backs on long hours, poor job quality, discretionary effort, and seeking greater purpose and impact with the work that they do (Future of Work Outlook, PWC, 2021, p.10)

An emotional distancing between workers and work is becoming clear. Evolving attitudes to work have employees demanding more flexibility, better balance and higher salaries (Accenture Life Trends 2025, p.58)

Key oversights and limitations about WFH

- **Structural inequalities across global labour markets.** While higher-income countries grapple with ageing and shrinking workforces, lower-income countries face expanding working-age populations, illustrating how many industry trends obscure regional differences
- **Conflicting expectations for technology use.** The expectation of lower workforce participation from older Australians, the growing need for elderly care, and technologies aimed at increasing the workforce participation of older Australians highlight divergent visions for an ageing population
- **Examination of technology's benefits to nature of labour often went unexamined.** It was assumed that the introduction of new technologies will reduce working hours, create four-day workweeks, increase productivity and the focus on strategic and creative tasks, with broad employee acceptance of shifting from execution to oversight, and seamless cooperation between workers and robots.

Key Implications of WFH for the energy sector

- An increase in remote work will likely shift residential energy use to daytime hours, challenging energy forecasting and load management strategies. This opens opportunities for increased daytime solar energy use, as well as increased participation in demand response programs and dynamic pricing models to manage load flexibly.

PART 4: EVERYDAY PRACTICE TRENDS

CARING AND WELL-BEING FROM HOME

Australia's care and support sector is expected to almost double as a per cent of GDP by 2062, with demand for care and support workers doubling by 2050 (Intergenerational Report 2023, Australian Government).

The reports outlined how emerging technologies will transform the delivery of care: advances in smart home assistive technologies, domestic robotics, AI-powered monitoring and health sensing technologies, telehealth, and at-home diagnostics enabled ageing at home and reduced reliance on institutional care. However, living spaces were assumed to adapt with better digital infrastructure and accessible design, leaving issues of accessibility, privacy, data security, and energy demands unexamined.

Key claim of reports reviewed

Advances in technology are predicted to enable ageing at home and other health and well-being services to be delivered to the home. These trends were expected to increase independence, offer hyper-personalised and tailored health management products and systems, and create new models of remote care delivery.

- Models of care are increasingly shifting towards the home, with concepts like 'hospital at home', 'hospitals without walls', and 'home as sanctuary' increasingly prominent. Several key unknowns were highlighted, such as the changing role and skillset of care professionals and digital and financial barriers to accessibility
- Smart assistive technologies are already and expected to continue, enhancing safety and quality of life
- Emerging health and well-being technologies are predicted to give consumers unprecedented access to detailed biometric information, empowering them to take a more active role in managing their health and well-being. Ethical and social concerns were not explored in commensurate detail.

Report quotes:

More of our health and care will be provided at home or in the community (The Future Of Ageing In An Uncertain World, Brightwell, 2024, p.16)

Digital healthcare is moving services into homes and out of hospitals (Emerging Trends in Infrastructure, KPMG, 2024, p.13)

Demand for technology that enhances health and wellbeing in the home will grow in the coming decade (Untapped: The Home Tech Evolution, Samsung, 2023, p.11)

New models of care delivery, including specialist acute hospitals and 'hospitals without walls', telehealth, virtual consultations and health coaching, have improved patient triaging, reducing the demand on higher carbon intensive hospitals, and reducing staff and patient travel (Accelerating The Future: Climate Resilience And Sustainable Healthcare Systems, Deloitte, 2024, p.4)

EXPERT INTERVIEW

Increase in wearable technologies and at-home fitness

Artem, a personal trainer with expertise in the use of advanced wearable technologies to support people with movement disorders, described how in addition to specialised technologies such as lower limb assistive devices—robotic exoskeletons that attach at the hip to support standing and walking—the growing adoption of wearable health and fitness technologies has driven a rapid increase in remote health and fitness coaching. While he expects larger lower limb assistive devices to not be particularly feasible for use outside of clinical spaces in the near term because “its energy output is pretty high and then the battery only lasts for like a single session”, smaller single limb devices which attach at the knee, or elbow, are likely to enter into the domestic sphere, with trials already occurring. Artem also explained that personal trainers are now increasingly trained to deliver online coaching, supported by technologies that enable clients to record and share videos of their activities, log workouts, and share health data collected via wearables. These insights reinforce our findings that healthcare and wellbeing services, including fitness-related support, are increasingly situated within the home, enabled by a range of technologies that support ongoing coaching and health data monitoring, which is likely to expand as wearable technologies expand.

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Emerging technology trends and predictions

Daily engagement with smart robots

By 2030, robots performing various domestic tasks, offering companionship, safety, and personalised interaction is expected to become the norm, reshaping the social and functional dynamics of home life.

Report quotes:

By 2030, 80% of humans will engage with smart robots on a daily basis, up from less than 10% today (Top Strategic Technology Trends, Gartner, 2025, p.22)

The landscape of domestic robotics is transforming homes into hubs of automation, easing daily chores and offering companionship. For instance, robotic vacuum cleaners have become household staples, tirelessly navigating living spaces to keep them dirt-free. Similarly, robotic lawn mowers now keep lawns well-trimmed without the sweat, while robotic pool cleaners keep swimming areas sparkling day or night. As artificial intelligence has permeated these robotic devices, their ability to recognize voice commands, integrate with smart home ecosystems, and operate with minimal human intervention has made a significant stride for at-home robotics and automation. More recently, however, robots at home are becoming hubs for companionship. For instance, ElliQ, an AI-powered companion robot, is bridging the emotional gap for seniors, offering friendly interaction and ensuring their safety. ... The fusion of AI with robotics is blurring the lines between the mechanical and the emotional, pushing the boundaries of what robots can offer in the home. As technology continues to evolve, the role of robots is set to expand, heralding a future where our domestic companions are not just helpers but friends who share in our daily lives (Tech Trends Report: Mobility, robotics, drones, Future Today Institute, 2024, p.36)

AI is expected to streamline cleaning and maintenance by enabling robots to learn and perform tasks autonomously, adapting to new environments and improving efficiency without human intervention (AI's Impact On Australian Office, CBRE, 2024, p.5)

Virtual wards

Health systems are shifting towards hospital-level care delivered in homes via remote monitoring and telehealth. The reports anticipated that this trend will continue and reduce strain on traditional hospitals and increase digital infrastructure needs in the home. However, the benefits can only be distributed by acknowledging that access to digital technologies is not universal.

Report quotes:

There is a risk that technology could perpetuate social silos if it is not developed in a holistic and inclusive way (The Future Of Ageing In An Uncertain World, Brightwell, 2024, p.38)

The NHS has already introduced virtual wards (called 'Hospital at Home'), which allow patients to receive the care they need safely and conveniently at home, rather than having to be in hospital. These programmes will expand in the future (The Future Of Ageing In An Uncertain World, Brightwell, 2024, p.16)

Now that technology has developed to a point where high-quality medical care is available at home, patients have begun to demand it (Health X Digital Transformation Report 2024-2025, National Industry Innovation Network, 2024, p.48)

Rather than forcing everyone to come to the big hospital, we'll work out how to bring tailored healthcare to the patient (Converging Trends 2033, KPMG, 2023, p.6)

Energy reliability and health technologies

One potential challenge arising from the growing presence of health technologies and systems in people's homes is their vulnerability to power and internet outages during disasters. Julie, a digital health researcher with project management experience in home-based sensor technologies, mobile health platforms, and virtual care systems, explained how e-health relies on a range of sensors, such as those monitoring home environments or a person's daily activities, in order to enable remote virtual care. She noted, however, that dependable access to the internet and electricity could prove to be a challenge. During a project that extended through the Covid-19 lockdowns, Julie found that the disposable batteries the sensors used could not be replaced, causing major disruptions: "the biggest problem was around... batteries running out because of course... the sensors are triggering all the time". Although she noted this issue could be addressed by plug-in sensors, this solution would not mitigate problems arising from major disruptions such as natural disasters. Relatedly, issues including geography, service provision, and housing construction meant that the internet was not necessarily as available or reliable as one might expect. According to her, "people just assume that everywhere has internet connectivity. And that is not the case even in some of the most populated areas". Julie's experience underscores the critical role of energy and internet in maintaining healthcare technologies, particularly during prolonged periods of disruption.

As healthcare technologies continue to move into the home, their energy requirements and particularly energy reliability must be a central consideration – not only for everyday operation, but also for the heightened demand that may arise as people charge equipment (or potentially larger home batteries) in advance of disasters.

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CARING AND WELL- BEING FROM HOME

Home diagnostics

As part of emerging models of healthcare in the home, self-testing kits (e.g. electrocardiogram, gut health and infectious diseases) and wearable health monitors are expected to be increasingly integrated with telemedicine platforms.

Report quotes:

Although COVID-19 testing was an acute necessity, consumers now expect home diagnostic testing (Accelerating The Future: Consumers Are Ceos Of Own Health, Deloitte, 2024, p.6)

Self-diagnosis is on the rise, driven in some cases by the cost of seeking medical advice and in others, by long delays in investigations (Accenture Life Trends 2025, p.42)

Predictive and hyper-personalised well-being services and products

The reports outlined several key technologies supporting this trend, such as GenAI apps and chatbots, wearables with biometric data integration, and VR-assisted therapy. Emerging markets are already particularly targeting women's wellness products and services.

Report quotes:

Generative AI also opens up the possibility of providing more personalised health messages and information, which are tailored to an individual's needs and circumstances. It could be used for lifestyle monitoring to trigger action, services, or links to care, encouraging individuals to engage more with their health and how they might improve it. However, it is vital to ensure that personal data is handled securely and ethically, to minimise risk of misuse (The Future Of Ageing In An Uncertain World, Brightwell, 2024, p.16)

As software and analytical dashboards improve, VR appears poised to mainstream into mental health – blending digital solutions with clinical wisdom for more agile, quantified, and personalized interventions (Tech Trends Report: Future Today Institute, 2024 Metaverse, p.29)

While wearable devices such as watches have been popular for years, new modalities powered by breakthrough technologies have ushered in a new era for biomonitoring and wearable devices. Wearable biometric rings, for example, are now equipped with sensors that provide consumers with insights about their sleep quality through paired mobile apps. Continuous glucose monitors, which can be applied to the back of the user's arm, provide insights about the user's blood sugar levels, which may then be interpreted by a nutritionist who can offer personalized health guidance (The Trends Defining The \$1.8 Trillion Global Wellness Market In 2024, McKinsey & Company, 2024, p.4)

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CARING AND WELL- BEING FROM HOME

Digital care models

Care roles are expected to increasingly involve remote monitoring, communication and coordination across platforms. The reports highlight demand for digitally literate care workers and repositioning care work as a hybrid digital-emotional profession.

Report quotes:

Digital transformation in healthcare is not just a future aspiration – it is an urgent and immediate necessity. For example, the sensible, clear-eyed adoption of AI will change the way health systems operate. But all of its potential hinges on underlying digital infrastructure, secure data collection, and having the right skills available (Health X Digital Transformation Report 2024–2025, National Industry Innovation Network, 2024, p.4)

Care economy jobs, such as nursing professionals, social work and counselling professionals, and personal care aides, are also expected to grow significantly over the next five years (Future of Jobs, World Economic Forum, 2025, p.6)

Expansion of smart home assistive technology

It has been estimated that, on average, households host around 37 connected devices (Impacts Of New And Emerging Assistive Technologies For Ageing And Disabled Housing, AHURI, 2021). Assistive technologies have contributed to the smart home IoT market's rapid growth, and are expected to continue to expand and support functions like medication reminders, fall detection, environmental controls and mental health check-ins.

Report quotes:

The home is fast becoming a personal sanctuary, a space offering respite from a sometimes overwhelming world outside. Smart devices that enhance security, aid relaxation or holistically improve health are increasingly important due to these factors (Untapped: The Home Tech Evolution, Samsung, 2023, p.11)

With on-the-go health analysis already the norm, consumers will expect that their home environment also seamlessly monitors and helps improve their mental and physical health (Untapped: The Home Tech Evolution, Samsung, 2023, p.12)

The increased availability and variety of smart home devices at more affordable prices is beneficial for older Australians and those living with disabilities (Impacts Of New And Emerging Assistive Technologies For Ageing And Disabled Housing, AHURI, 2021, p.11)

EXPERT INTERVIEW

Homes designed for ageing

According to the interior design leaders we interviewed, changes in building regulations and home designs both support and reflect a broader shift towards increased caregiving taking place at home. In terms of building regulation, interior designer Robyn Hawke noted the introduction of “new [planning] laws about basically designing homes to cope with all stages of the family lifestyle”, such as facilitating wheelchair access via wider hallways and doors, and level surfaces throughout a building. These changes would enable people to stay at home for longer. Similarly, both experts noted a growing demand for homes designed with intergenerational living and home care in mind, such as adult children caring for older parents, or grandparents caring for young children. Interior designer Angela Chang explained this trend: “I’m finding that the developers would come to me and say, can you make that guest bedroom accessible... because it could provision for [the] future if the buyers want to have their elderly family living with them”. As distinct from a granny flat, such designs typically added a bedroom, ensuite, small living space, and kitchenette to the main structure; this space could be thermally and acoustically separated from the main house with a well-sealed door to create privacy. The pursuit of privacy also shaped heating and cooling: zoning allowed the whole house to be served by a central system, while the spaces within the home could be separately managed to suit the individual needs of its occupants. As Angela Chang described, “the living, kitchen, dining, it’ll have its own main unit, but then all the little ones branching out to the smaller spaces, they have their own control”.

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CARING AND WELL- BEING FROM HOME

Key oversights and limitations about caring from home

- **Data privacy.** The wealth of sensitive health and biometric data opens new avenues for sophisticated scams
- **Health authority.** Technology-assisted self-diagnosis hands over authority to technology companies rather than healthcare professionals
- **Human and robot coexistence in everyday settings.** It was assumed that people, particularly isolated and older populations, will live in harmony with robots, relying on them for collaboration, emotional support, and companionship in homes, schools, and public spaces. These assumptions rest on broad public acceptance of high levels of machine autonomy and the evolution of urban and architectural design to accommodate robotic movement and integration
- **Gender inequity.** There is a lack of critical consideration on the implications of digitalising care work for women's workforce participation
- **Digital inclusion.** In Australia, people over 65 are among the least digitally included, meaning the benefits of virtual healthcare could bypass the very people who need it most.

Diverse perspective

Older Australians are especially vulnerable to exploitation and systemic failings such as abuses occurring in aged care centres, underscoring the need for stronger protections in areas such as user safety and the training of care workers.

While many reports acknowledged the opportunities of emerging technologies, the AHURI report engaged in a detailed examination of their risks, particularly when introduced into settings involving vulnerable users. It raised concerns around costs, ethics, accessibility, privacy, data security and the rapid pace of software and hardware obsolescence, which can create barriers in consumer-directed care models.

Similarly, an OECD report highlighted how, as connected devices become a more integral part of daily life, security and privacy concerns are growing, especially regarding the safety of children. Unlike phones or computers, IoT devices are continuously connected and constantly transmitting data, often without the knowledge or consent of children or their parents. The risks are heightened with technologies like VR, which regularly collect detailed information about users' bodies, behaviours and surroundings. While these tools can benefit children's health, education, and safety, they also pose serious risks to their privacy and autonomy.

Key implications of caring from home for the energy sector

- Energy reliability is predicted to become a matter of life and death. If more critical health services shift into the home (e.g. telehealth, remote monitoring and virtual wards), energy providers will need to plan for resilience
- The anticipated rise of smart assistive devices, home diagnostics, robotic companions, and 24/7 health monitoring systems will increase the need for continuous electricity demand in residential settings – especially in households with elderly, disabled, or chronically ill residents
- Access to care technologies assumes robust digital and energy infrastructure. Digital inequality may exacerbate energy inequality, and vice versa
- Although costs of new technology and their energy usage may be high, they may seem minor compared to the personal health costs and the broader public expenses of institutional healthcare, potentially contributing to rapid uptake and low sensitivity to price.

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ENTERTAINMENT AND CONVENIENCE

The reports envisioned the home as transformed into a centre of personalised, automated and interactive experiences. From hyper-personalised content powered by biometrics and AI to fully immersive entertainment using AR, VR and haptics – the future of home life is predicted to be tailored to the individual.

At the same time, reports suggest that the home is adapting to new economic realities with growing side hustles and circular economies. These trends bring new challenges relating to cybercrime, deepfakes, and data vulnerabilities and accessibility, alongside counter-trends pointing to growing fatigue with digital lifestyles.

Key claim of reports reviewed

The future of home entertainment is expected to be defined by the convergence of hyper-personalisation, immersive media and intelligent automation enabled by advances in AI, smart connectivity and biometrics.

- Emerging technologies promise enhanced comfort, convenience and tailored experiences, but also are raising concerns about cybersecurity, energy demand, digital fatigue and the unequal distribution of risks and benefits
- As homes become sites of both enhanced pleasure and emerging vulnerability, they are expected to also reflect broader tensions between digital convenience and the need for real-world connection, trust and resilience.

Emerging technology trends and predictions

Fully immersive entertainment

VR, AR and haptics are predicted to enable fully immersive, multisensory digital experiences using voice, gesture and neural interfaces. These technologies are expected to reshape how we work, learn, play, interact and shop. However, uncertainty remains about the benefit of their outcomes.

Report quotes:

The end goal is ambitious yet attainable: to produce a metaverse experience that fully engages users across visual, auditory and, critically, tactile domains to enable suspension of disbelief and flow state immersion (Tech Trends Report: Metaverse, Future Today Institute, 2024, p.20)

There are any number of threatening and harmful uses of XR: These experts noted a number of problems that may worsen or arise in metaverse spaces, including reductions in autonomy and people's ability to control their lives; worsening digital divides; amplified discrimination; new forms of harassment, bullying and hate; new menaces to public safety, especially around sexual violence and exploitation; more avenues for misinformation (especially tied to clever fakes); deeper levels of addiction to metaverse activities; distractions that dissociate people from real life and induce loneliness (or worse); new threats to users' personal data; and further commercialization and further monetization of basic human activities (The Metaverse In 2040, PEW, 2022, p.8)

There will be sensory experiences that change the way people experience or create a story that are going to feel very different from the theater experience of today... Haptics and augmented reality are allowing people to experience the same things and occupy the same space. If there's an explosion blast in the video, everyone feels the force of the explosion or even the wind on their face (Jonathan Dunn quoted in The Future Of Video Entertainment, McKinsey & Company, 2022, p.2)

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AI-driven hyper-personalisation

Curated and dynamic experiences tailored to data-driven insights into our biological needs, behaviours and preferences are predicted to change how we experience the world. Entertainment is expected to become more interactive, gamified and personalised, driven by AI and biometric feedback. Reports anticipate that viewers will experience content tailored in real-time to their emotional and physiological responses. Home-based 'live' experiences are expected to become commonplace, such as high-fidelity VR concerts, sporting events, holographic performances, virtual wellness retreats, and 'theme park-in-a-box.' This also means more highly sophisticated, personalised and targeted scams.

Report quotes:

Generative AI is upgrading the internet from informative to intelligent, and the experience of using it from transactional to personal. Benefits are on both sides of a key relationship: customers will be more deeply understood than ever, while brands will use that understanding to shape hyper-relevant products, services and experiences (Accenture Life Trends 2024, p.18)

The future points to AI-enabled metaverse experiences that feel increasingly personalized by learning user preferences (Tech Trends Report: Metaverse, Future Today Institute, 2024, p.6)

Increasingly sophisticated sensors in our smart devices can measure our biomarkers and AI can detect our mental and emotional states based on that data – in real time. Eventually, a more streamlined version of personalized content won't require conscious interaction with the viewer but will instead be synthesized by an AI based on our personal data (Tech Trends Report: Entertainment, Future Today Institute, 2024, p.12)

Smart home monitoring and responsiveness

Smart home systems are predicted to adapt lighting, climate, air quality and energy use in real-time to user moods, behaviours, and preferences, boosting comfort but also increasing digital energy demands.

Report quote:

Homes are continuing to become more helpful and personalized through smart technology (Tech Trends Report: Built Environment, Future Today Institute, 2024, p.36)

Smart kitchen technologies

Smart ovens, fridges and AI-driven meal planning are expected to help users cook more efficiently and stay connected. Devices like air fryers and dual-temperature ovens are already, and expected to continue to appeal for both health and energy savings, responding to cost-of-living pressures and sustainability concerns.

Report quotes:

Samsung's latest fridge, the Bespoke Family Hub Plus, features a 32-inch screen that lets consumers watch TikTok videos, place grocery orders via Amazon and stream music (Untapped: The Home Tech Evolution, Samsung, 2023, p.15)

Smart appliances, such as internet-connected refrigerators, ovens, and dishwashers that allow remote control, capture the attention of renters seeking both convenience and energy efficiency in their living spaces (The Australian Home Energy Report, Origin, 2024, p.12)

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Social rewilding

Digital detox reflects a potential plateau in home tech consumption, especially for entertainment, as some people are expected to be shifted to real-world alternatives. Driven by fatigue from constant connectivity, AI content and increased scams and threats to privacy, reports highlighted a significant trend towards reducing screen time and rediscovering physical, sensory-rich experiences. People may intentionally rebalance their lifestyles to focus on offline hobbies (e.g. crafting, pottery, nature walks and reading physical books) and in-person social activities.

Report quote:

We're seeing signals of social rewilding, revealing a growing appreciation for the physical world and human connection – often both at once. Inspired by a similar concept around regenerating the natural world, social rewilding offers hope by restoring people's natural rhythms and reestablishing connections to life, including the great outdoors, healthy routines and reviving lost hobbies and habits (Accenture Life Trends 2025, p.72)

Online shopping

Firmly entrenched as the 'new normal', in 2023, 8 in 10 Australian households shopped online. This equated to 9.5 million households that received a parcel in 2023. On average, there were 5.6 million households that made an online purchase each month (Inside Australian Online Shopping, AusPost, 2024). Underlying this growth are several other key trends expected to continue:

Hustle Economy: More people are taking on 'side gigs', increasing demand for multifunctional home spaces and sustained use of digital tools and devices

Recommerce: Second-hand selling, buying, and refurbishing from home. This supports circular consumption and helps reduce manufacturing emissions but requires space for storage, packaging, and online logistics. Increased deliveries and returns may offset some environmental gains unless managed efficiently

Social acceptance of dupes and counterfeits: Growing use of low-cost alternatives purchased online leads to shorter product life cycles and frequent home deliveries, contributing to packaging waste and energy use in last-mile logistics.

Report quotes:

People's security is deeply tied up in their access to the money needed to fund the essentials of life. Easy access to technology is empowering a new, never-ending financial hustle, breeding more options to earn, spend and invest than ever before. More than half of Gen Z and Millennial Americans have a side hustle, earning an average of \$1,253 per month in extra income (Accenture Life Trends 2025, p.43)

The rise of recommerce impacts logistics in several ways... return shipments [are] redirected to in-market repair, recycle, and/or resell channels, leading to more localized, yet complex supply chains (Logistics Trend Radar 7.0, DHL, 2024, p.14)

Pharma and medtech companies have embraced the concept of circularity by creating sustainable, closed-loop product life cycles – ensuring that products and materials are reused or recycled, thereby reducing the use of raw materials and emissions (Accelerating The Future: Climate Resilience And Sustainable Healthcare Systems, Deloitte, 2024, p.4)

EXPERT INTERVIEW

Online retail and emerging technologies

Margitta, an innovation leader at a home furniture retailer, reinforced findings from our reviewed reports that point to a global shift away from physical retail and towards online shopping, describing how “people don't spend as much time shopping as they used to and [they] spend much more time online and shopping online”. She explained that shopping journeys increasingly begin online, with customers often arriving at a store already well-informed: “people don't always come to the store to discover. They already come to the store with a lot of knowledge of what they want, what they want to look at”. As a result, features that enhance the online shopping experience, such as curated product offerings and virtual or AR tools, are becoming increasingly influential. Nonetheless, Margitta emphasised the continued importance of physical stores for “multi-sensorial experiences of items, whether it's the colour, whether it's the fabric, understanding durability, understanding like what the item looks like and feels like”. As online retail continues to grow, tools that enrich and support these in-store experiences are also likely to become increasingly significant.

PART 4: EVERYDAY PRACTICE TRENDS

ENTERTAINMENT AND CONVENIENCE

Key oversights and limitations about entertainment and convenience

- **Unequal impacts and stratified harms.** Digital risks are not evenly distributed. Certain groups particularly young women and girls face disproportionate exposure to harmful behaviours in online spaces
- **Data privacy and ethical concerns.** While emerging technologies promise personalised services and smarter systems, concerns remain about privacy, ethical deployment and data security
- **Reduced trust in online experiences and services.** The ease of creating digital content has led to a surge in scams, making it increasingly difficult for people to distinguish between real and fake content, undermining authentic online experiences.

Diverse perspective

While most reports focused on technological capabilities or market growth, the PwC Smart Home Of The Future (2021) report took a nuanced approach to exploring the underlying values shaping how people use and relate to smart technologies in the home. Rather than viewing smart devices as purely functional tools, the report recognised it as closely tied to the emotional, social and cultural needs of consumers, and identified nine key value propositions (safety, health, convenience, quality, comfort, sociability, care, sense of belonging, and novelty) and six key themes of household needs that underpin their use of space (well-defined space functions, life stage companion, child-friendly, innovative experience, natural interaction, from product to service) that influence how smart home products are perceived and prioritised. The report emphasised that providers need to align their offerings with these values, tailoring solutions to resonate with users and build lasting trust and engagement.

Key implications of entertainment and convenience for the energy sector

- Extended periods spent in virtual environments is expected to increase demand for climate control and other specialised digital infrastructures within the physical home
- As immersive tech and smart systems become more common, those without reliable energy access or digital infrastructure risk being excluded from key services and cultural life. Ensuring equitable access to energy will be crucial to prevent deeper social divides
- With homes doubling as entertainment hubs, offices and digital commerce spaces, the energy sector must anticipate a greater reliance on uninterrupted power
- Increased exposure to scams and deepfakes highlights the need for secure and resilient systems, underscoring energy's role in enabling digital trust and continuity.

PART 4: EVERYDAY PRACTICE TRENDS

DRIVING, FLYING, AND CHARGING

In the analysed reports, the future of mobility is deeply interconnected with environmental and population density concerns. Although public transport is expected to play a crucial role in reducing congestion given the anticipated uptake of electric and autonomous vehicles, there is considerable uncertainty about how emerging transport technologies, such as automated vehicle technologies, electrification and aircraft, will influence overall use.

The reports shared a view that there is a need for better urban design and integrated transport systems, especially those that link last-mile travel with public transport alongside inclusive and accessible micromobility options.

Yet, with increased levels of data collection, cars and other transport systems are becoming increasingly vulnerable to cyberattacks – posing significant risks for manufacturers, third-party providers, system operators and consumers alike.

Key claim of reports reviewed

Reports claim that technology is shaping expectations for future travel and transportation systems as electrified, networked, connected and multimodal. However, emerging privacy and security challenges and significant practical and ethical concerns remain.

- In the future, reports predict that the most efficient way for consumers to contribute to balancing the grid will be by charging and discharging their EVs at optimal times
- Cities are expected to become densely populated, and business, service and retail models will adapt to expectations of a future of 15-minute nodes, reducing commutes to work and service and delivery times.

Report quote:

Autonomous vehicles, hyperloops, last-mile pods, flying taxis and EV charging infrastructure will be considered a normal part of the public transport ecosystem (Future of Public Transport, KPMG, 2022, p.27)

Emerging technology trends and predictions

Vehicles as mobile entertainment hubs

Cars are expected to become smarter and offer more immersive experiences. AI assistants, enhanced connectivity and integrated streaming services are predicted to give vehicles a greater ability to monitor and interact with passengers – introducing new challenges around privacy and data security.

Report quotes:

BMW is also reimagining the in-car experience. The company is enhancing its vehicles with streaming video, gaming options, and augmented reality, powered by AI-driven voice assistants, using Amazon's Alexa technology as a base. This assistant is designed to interact in a more human-like, conversational manner, offering both information about vehicle functions and control over some of these functions. These advancements signal a paradigm shift in vehicle interfaces, aligning them more closely with digital lifestyles. As people grow accustomed to constant access to entertainment and information, car manufacturers are acknowledging the transformation of cars into multifunctional personal devices. These vehicles are now platforms for productivity, social connectivity, and leisure, marking a pivotal evolution in the automotive industry and fundamentally changing how we interact with our vehicles (Tech Trends Report: Computing, Future Today Institute, 2024, p.30)

Rather than a car solely serving as an uninspired vessel to get us from one location to another, manufacturers are emphasizing enhancing cabin environments. Now, they're not just for driving but also for riding, relaxing, working, and playing (Tech Trends Report: Mobility, robotics, drones, Future Today Institute, 2024, p.26)

Widespread AV use

Autonomous vehicles are anticipated to improve mobility, especially for older drivers, enhance safety, reduce traffic, serious injuries and deaths, and increase comfort and convenience in transport services. Autonomous vehicles are also seen as a solution to the growing costs associated with the last-mile segment of supply chains.

While ethical, legal and insurance-related concerns remain significant barriers to widespread adoption, uncertainty about their broader impact on transport systems exists, with concerns that poor management could lead to reduced public transport use and increased road congestion.

Report quotes:

If managed poorly, autonomous vehicles may lead to a reduction in public transport usage, increasing rather than reducing overall road congestion (Decarbonisation Futures, Climateworks, 2020, p.48)

This technology provokes fascinating ethical, legal and insurance-related discussions. For example, if a truly autonomous car was in a calamitous situation where it had to choose between hitting a pedestrian – one a child and one elderly – what would it do? (Welcome To The Future, Innovate UK, 2023, p.35)

AD systems may make driving safer, more convenient, and more enjoyable. Hours on the road previously spent driving could be used to video call a friend, watch a funny movie, or even work (Autonomous Driving's Future, McKinsey & Company, 2023, p.2)

For the first time in five years, consumers are less willing to consider driving a fully autonomous vehicle (Autonomous Driving's Future, McKinsey & Company's 2023, p.7)

PART 4: EVERYDAY PRACTICE TRENDS

DRIVING, FLYING, AND CHARGING

Car and ride sharing

The widespread adoption of shared vehicles and AVs, supported by efficient public transit, is expected to transform mobility systems by enhancing sustainability, safety, and accessibility. This expected shift towards more intelligent and connected vehicle networks depends on equitable access to digital infrastructure, sufficient data literacy and the inclusive deployment of enabling technologies.

Report quotes:

Due to low running costs, EVs will be cheap to run once purchase prices reduce. However, this could encourage more car travel and further congestion. Addressing these risks and achieving a lower emissions- and space-efficient transport system requires more than just increased EV uptake. Mode shift to public and active transport, car share and other forms of shared mobility, will have an important role to play. These modes are particularly important in urban areas where most Australians live, as they can move more people using less space than EVs alone (Accelerating EV Uptake, Climateworks, 2022, p21)

The first mass adoption use cases will be in autonomous trucks, robo-taxis, and robo-shuttles, with further advances in autonomy levels for personal vehicles at the same time. Remote operating is another interesting use case that we expect to grow sizably over the next years (Kersten Heineke quoted in Technology Trends Outlook 2024, McKinsey & Company, p.73)

Accelerated EV adoption

The EV adoption rate in Australia is still relatively low but growing steadily. By 2032–33, projections estimate that between 1.9 million and 6 million EVs will be in residential use, depending on the scenario, potentially increasing household electricity demand by 8% to 21% (equivalent to 5–15 terawatt-hours annually) (Electricity Statement of Opportunities, AEMO, 2023). However, barriers to adoption are anticipated to remain, including high upfront costs, a limited second-hand market, inadequate charging infrastructure, home charging barriers, policy uncertainty and fragmentation, supply constraints, support services and skills gaps and low public awareness and misconceptions.

Report quote:

In order to meet climate targets, the EVC expects that Australia will need over 50% of all new car sales to be EVs by 2030. We continue to advocate for a national target of 1 million EVs by the end of 2027, in order to align with more than 50% of new car sales being EVs (BEVs and PHEVs) by 2030 (State of Electric Vehicles, Electric Vehicle Council, 2024, p.13)

Based on today's energy, climate and industrial policy settings, the number of EVs will grow from less than 45 million in 2023 to 250 million in 2030 and reach 525 million in 2035. As a result, more than one in four vehicles on the road will be electric by 2035 (Logistics Trend Radar 7.0, DHL, 2024, p.186)

For renters and households without access to home charging, there is a crucial role for retrofitting programs, planning schemes and building code updates to support EV readiness. Targeted financial incentives for EV uptake also need to be maintained longer for low income households, particularly until more affordable, second-hand supply enters the market (Accelerating EV Uptake, Climateworks, 2022, p.21)

**PART 4:
EVERYDAY
PRACTICE
TRENDS**

**DRIVING, FLYING,
AND CHARGING**

Integrated, bidirectional, and fast EV charging

Bidirectional charging and Home Energy Management Systems (HEMS) are expected to enable EVs to both draw and supply energy, supporting the home or grid as needed. Emerging technologies like fast charging, battery swapping, and electric roads are anticipated to reduce reliance on home charging. Despite these advances, reports also recognise that many Australians will continue to self-manage their charging rather than delegating control to third parties, typically choosing to charge overnight or during solar-rich daylight hours to avoid peak demand.

Report quotes:

From multiple independent pieces of work, it is apparent that Australian consumers with EVs are currently choosing to self-manage their EV charging to a significant degree. Most at-home EV charging currently takes place either in the middle of the night or during the middle of the day, with relatively little charging occurring during peak periods (Home EV Charging And The Grid, Electric Vehicle Council, 2024, p.1)

With bidirectional charging, owners can strategically charge their cars overnight using affordable grid energy and then utilize the EV's stored energy during high-demand daytime periods, ensuring efficient use of resources (Tech Trends Report: Mobility, robotics, drones, Future Today Institute, 2024, p.25)

EVs can contribute by being charged outside the morning and evening peaks, preferably through the peak solar daylight. Owners may also discharge their EV's stored energy back to the home, or to the broader grid when needed (Integrated System Plan, AMEO, 2024, p.27)

A significant proportion of the community is not ready to hand over management or control of EV charging, but are willing to shift their behaviour for the greater good, in exchange for a cost saving (State of Electric Vehicles, Electric Vehicle Council, 2024, p.12)

EXPERT INTERVIEW

High expectations for V2G

Director of Vehicle Charging Solutions Australia, Ross Derango, anticipated that vehicle-to-grid (V2G) technology – where V2G-enabled EVs can discharge power back into the energy grid – will emerge as the dominant form of home energy storage, surpassing stationary home batteries. He attributed this primarily to cost considerations and the fact that most households already need to own a vehicle: “There will be homes that have solar and EV but no stationary battery because the consumer said, you know what, instead of spending \$10,000 or \$15,000 on the stationary battery, I’m going to spend that money buying a nicer car because that’s where I want to commit that financial resource that’s within my grasp”. Ross also pointed to the importance of scale and relative investment, noting that “the amount of battery that is being sold under [the federal government’s Cheaper Home Batteries] program is about half of the amount of battery that is being bought in cars. So activating those batteries in cars by enabling V2G will deliver twice the benefit”.

Similar opinions were shared by another interviewee, Davood Dehestani, founder and CEO of energy storage startup Smartizer: “In reality [in] five, 10 years... the batteries are slowly [going to] disappear because... your home back-up is still your EVs”. In Davood’s view, the widespread uptake of V2G-capable EVs would shift the role of stationary home batteries towards smaller, lower-cost batteries specifically designed to power homes during peak pricing periods; given their smaller size and cost, such batteries could be especially attractive to renters and apartment-dwellers. While acknowledging that technical, commercial, and regulatory impediments to V2G remain, Ross was confident that these challenges would be resolved in the near term: “The question isn’t will people be able to do it this year or next, they absolutely will and it’s already starting to happen; the question is how long does it take to scale from a few hundred to a few hundred thousand”. From his perspective, government subsidies and other forms of support – like those that kickstarted Australia’s rooftop solar industry from the mid-2000s – will play a key role in determining the pace and scale of V2G adoption.

PART 4: EVERYDAY PRACTICE TRENDS

DRIVING, FLYING, AND CHARGING

Micro-mobility

Electric two- and three-wheelers are growing steadily, especially in emerging economies, making up a large share of recent sales. These mobility options are increasingly viewed as a legitimate part of the broader transportation network, improving mobility and providing last-mile solutions, with calls for anticipatory planning of road and charging infrastructure.

Report quote:

We need better urban design and integrated transport systems – in particular systems that integrate last-mile travel with public transport – and more inclusive and accessible micromobility options (The Future Of Ageing In An Uncertain World, Brightwell, 2024, p.30)

eVTOLs

Electric aircraft are expected to become a mainstream everyday mode of passenger transport, transforming urban mobility with cleaner, faster, and more accessible options. While electric aircraft may become an alternative to traditional taxis, gaining public acceptance for unpowered passenger drones is expected to take significantly longer.

Report quotes:

eVTOL aircraft will eventually become a standard means of transportation for our whole society. In the 2030-to-2045 time frame, using an eVTOL aircraft will be as normal as driving a car is today (Daniel Wiegand quoted in The Future of Air Mobility, McKinsey & Company, 2021, p.11)

We will have aircraft that are much smaller than today's aircraft, and they will be much more accessible. They're going to land in your neighbourhoods. You might take a short car ride or a micromobility scooter ride to get to the vertiport, and you'll go through there just like you do at a taxi stand today. You'll get on an aircraft that will take you quite rapidly across the city or to the next city or anywhere within a 100- or 150-mile radius (Robin Riedel quoted in The Future of Air Mobility, McKinsey & Company, 2021, p.2)

The realm of urban air mobility is buzzing with the promise of electric vertical takeoff and landing (eVTOL) aircrafts, often referred to as 'flying taxis' or 'air taxis.' Like helicopters, these vehicles are capable of taking off and landing vertically, but unlike their predecessors, they leverage electric power, significantly reducing their environmental footprint (Tech Trends Report: Mobility, robotics, drones, Future Today Institute, 2024, p.42)

The electric aircraft market is estimated to reach over US\$22 billion in value by 2035 (Decarbonisation Futures, Climateworks, 2020, p.50)

PART 4: EVERYDAY PRACTICE TRENDS

DRIVING, FLYING, AND CHARGING

Drones

AI-powered delivery systems that reduce human intervention, accelerate service provision, and extend critical capabilities such as transporting medical supplies or tracking climate impacts beyond the reach of traditional infrastructure, are expected to revolutionise logistics, healthcare and environmental monitoring by enabling autonomous. However, reports recognise that significant regulatory barriers to widespread use remain.

Report quotes:

Drones equipped with artificial intelligence (AI) and machine learning (ML) algorithms can autonomously navigate complex environments, avoid obstacles, and even make on-the-fly decisions (Logistics Trend Radar 7.0, DHL, 2024, p.121)

Medical drones will transport organs, blood, and critical medicines with increased reliability (A Robotics Roadmap For Australia 2025, Robotics Australia, p.322)

Drone fleets are steadily gaining traction as companies seek to enhance operational efficiency, reduce delivery times, and minimize human intervention (Tech Trends Report: Mobility, robotics, drones, Future Today Institute, 2024, p.38)

Key oversights and limitations about driving, flying, and charging

- **Climate vulnerability of infrastructure.** Transport infrastructure remains highly susceptible to the impacts of climate change, particularly extreme weather and shifting environmental conditions
- **Rising energy demands of air mobility.** Emerging electric aviation technologies, including eVTOLs and drones, are often presented as clean alternatives. However, their substantial energy requirements, charging needs, and grid implications are frequently underexplored
- **Public acceptance of automated driving.** Despite technological advancements, significant barriers remain in gaining public trust and acceptance of automated driving systems, particularly regarding safety, liability, and control
- **Overlooked infrastructure needs for autonomy.** Many reports neglect the substantial infrastructure upgrades required to support autonomous vehicle deployment
- **Risks of in-vehicle entertainment systems.** As vehicles evolve into entertainment platforms, the risk of driver distraction increases. This is especially concerning given that most automated systems still require drivers to be ready to takeover control at any moment, while car manufacturers are developing vehicles as entertainment hubs
- **Urban integration challenges: noise, airspace, and air quality.** Air mobility introduces complex demands on urban environments, including noise pollution, airspace management, and the need to regulate emissions at low altitudes, issues touched on by the Future Today Institute's 2024 Tech Trends Report: Mobility Robotics Drones, but not deeply addressed
- **Unrealistic assumptions about electrification and automation.** There is a repeated, unexamined assumption that automation and electrification will automatically reduce congestion and emissions
- **Lack of integrated urban and energy planning.** Future mobility visions often fail to account for the coordinated planning needed between transport, housing, public transit, and renewable energy systems to ensure sustainable, inclusive outcomes.

PART 4: EVERYDAY PRACTICE TRENDS

DRIVING, FLYING, AND CHARGING

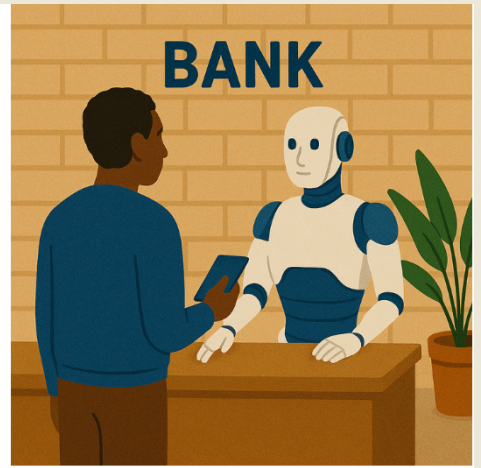
Diverse perspective

McKinsey & Company's 2023 Autonomous driving's future: Convenient and connected report provided more research-informed barriers and challenges associated with AD acceptance and uptake of systems.

The report illustrates that trust is still a major barrier to widespread adoption of automated and autonomous driving systems, with consumer confidence in the safety of fully autonomous vehicles declining. The report outlines that to rebuild trust, consumers need opportunities to test drive these systems themselves and want to see strong regulatory oversight, providing confidence in accountability and transparency regarding the safety of these systems.

Key implications of driving, flying, and charging for the energy sector

- EVs will significantly increase electricity demand, if adopted at anticipated scale, posing both challenges and opportunities for managing load and integrating EVs into the grid
- Bidirectional charging / V2X has the potential to provide grid and system benefits to help support grid decarbonisation
- If widely adopted, technologies like eVTOLs, drones and AVs will introduce substantial new energy loads that are mostly unaccounted for in current planning. These require anticipatory investment in charging infrastructure, grid upgrades and integration with renewable sources to avoid emissions trade-offs
- Without coordinated planning across energy, housing and transport systems, the rollout of electric and automated mobility may exacerbate urban congestion, emissions and inequality across mobility services.



PART 5: SYNTHESISED INDUSTRY VISIONS

VISION 1

VISION 1: HOME AS THE SOCIALLY REWILDED SANCTUARY, WHILE LUXURY IS AT THE OFFICE

In response to digital fatigue, homes have become analogue sanctuaries. People reclaim physical, sensory-rich experiences at home, seek purpose and growth in their workplaces, and demand accountability from the products and institutions they engage with.

With constant connectivity and AI-generated content driving people to seek tactile experiences, non-essential devices are minimised or removed entirely. Similarly, advancements in AI have reduced staffing costs, giving traditional service providers the opportunity to maintain a bricks and mortar presence.

Instead, households embrace hands-on activities like pottery, gardening, reading physical books and consciously manage energy (for example, timing chores to daylight rather than relying on automated systems).

Meanwhile, offices have 'hotelised' into luxury wellbeing hubs that justify the commute. Employers compete for talent by offering energy-intensive amenities such as infrared saunas, VR relaxation pods, float tanks and massage robots that will drive up electricity consumption, especially during working hours.

Work now aligns closely with individual values, emphasising sustainability, ethics and community. Emerging technologies continually reshape job requirements and employees expect continuous learning opportunities and on-demand upskilling.

PART 5: SYNTHESISED INDUSTRY VISIONS

VISION 1: PROMPT AND IMAGE DETAILS

Panel 1 prompt: Create an image of a 2050 'Home as socially rewilded sanctuary' scenario. At home, a person is doing pottery with a kiln in the background.

ChatGPT response [A person at home doing pottery in a rewilded sanctuary. It features minimal digital devices, lush greenery, earthy tones, all while celebrating diversity with a stylised character]

Panel 2 prompt: The growing threat posed by the climate crisis will increase individuals' awareness of the impact of their own consumption and investment choices on the environment. Create an image of someone fixing a watch, and someone next to them reading a book about the environment.

[On the left, a person with medium brown skin fixes a wristwatch, with blue accents on the watch strap and tools. On the right, another person reads a book titled 'Environment' with a blue cover. Simple wooden table, wall-mounted tools, potted plants, and a shelf with a globe – evoking sustainability and mindful consumption]

Panel 3 prompt: People choose to visit bricks and mortar banks. These banks are now attended by AI robotic tellers.

[A person holds a tablet as they talk with a streamlined robot teller behind a wooden counter. A warm beige brick wall bearing the word 'BANK' in blue sets the scene. A potted plant adds an analogue touch, balancing the flat colour palette and emphasizing the real-world space]

Panel 4 prompt: People work in the office as it provides wellbeing services. For example, infrared saunas, sensory deprivation float tanks, and VR relaxation pods minimise the need for such technologies in their own homes.

[Infrared sauna with glowing orange panels and blue cabin frame. Sensory deprivation float tank with a sealed capsule design and control unit. VR relaxation pod with headset-wearing employee, curved blue structure]

Panel 5 prompt: Individual consumers consider carbon footprint when making decisions. They select products where carbon is sequestered in household products and use blockchain to track the product's environmental impact.

[Two individuals choosing household products that sequester carbon, with one examining a planter labelled 'Carbon Sequestration' and the other scanning a QR code that brings up a blockchain tracking interface. Blue accents highlight product labels and the digital UI]

Panel 6 prompt: The role of work in people's lives is changing. People want work that aligns with their values. Emerging technologies also means people expect their employers to always be offering upskilling opportunities.

[A professional works on a laptop beneath a 'VALUES' poster listing sustainability, community, and ethics, each with simple icons. Another employee interacts with a touchscreen kiosk labeled 'COURSES,' holding a 'SKILLS' handbook, with blue accents on the devices, poster frame, and furniture]



PART 5: SYNTHESISED INDUSTRY VISIONS

VISION 2

VISION 2: AGEING AT HOME, WORKING FOR LONGER

Australia's ageing population drives rapid adoption of technologies that enable older adults to remain healthy and independent at home, and participate in the workforce for longer, reshaping everyday life, care, and work.

Healthcare shifts from detect and treat to predict and prevent, supported by remote monitoring, home-based diagnostics, personalised wellbeing plans, and 'hospital-at-home' models. Smart homes integrate assistive technologies such as companion robots, automated safety systems, energy-optimised heating and cooling, smart furnishings, and AI-driven reminders.

Hyperpersonalised wellbeing services, wearable biometric devices, and cognitive enhancement routines help older adults manage their health, while nutrition, entertainment, and care experiences become increasingly tailored to individual needs and preferences. However, virtual healthcare is only as reliable as the power and communication networks it runs on. In extreme heat or storms, electricity demand surges and outages become more frequent, which could knock out home medical devices or internet links when patients need them most.

At the same time, labour markets adapt to later retirement and shortages of experienced workers. Exoskeletons, cobots, AR smartglasses, AI dashboards, and teleoperated systems reduce physical strain and cognitive load, enabling older workers to remain productive across a wider range of occupations, while upskilling programs ensure skills stay current in a rapidly changing technological environment.

Employers provide hyperpersonalised health services tied to biometric monitoring to retain older staff, offering financial incentives for healthy behaviours, but also punitive measures for unhealthy practices.

PART 5: SYNTHESISED INDUSTRY VISIONS

VISION 2: PROMPT AND IMAGE DETAILS

Panel 1 prompt: Create image of a 2050 'caring at home' scenario. There is an older person in their bedroom. There is a screen for nurses to monitor and check up on the older person. There are wearable devices to track the older person's biometrics.

[An older person sitting up in bed, wearing a sleek biometric wristband and an adhesive patch sensor on their upper arm. A wall-mounted screen showing two nurses monitoring heart rate and other vitals (simple heartbeat graphs and iconography)]

Panel 2 prompt: The older person has access to hyper personalised health and wellbeing services. They have a 3d printer that prints their medications. There are smart devices throughout their house that monitor and surveil their health. Their doctor check-ins are conducted via hologram. There are robot companions to support the older person in emotional and physical capacities.

[Hyper-personalised services: A sleek 3D printer on the coffee table is dispensing tailored medication capsules curated by the resident's digital health profile. Smart monitoring: Wearable sensors and ceiling-mounted health devices feed data to a wall display of vitals and environmental metrics. Holographic check-ins: A translucent doctor's hologram floats beside the sofa, offering a remote consultation in real time. Robot companion: A friendly robot stands by, ready to assist with both physical tasks and emotional support]

Panel 3 prompt: In this scenario, people work for longer in their lives, and organisations want to retain these employees due to their knowledge. They are able to do this with the support of assistive technologies. The older person is at work. They are wearing an exoskeleton that allows them to lift heavy objects. Other older people take cognitive enhancing drugs to stay sharper for longer. People work alongside collaborative robots. The workplace offers health and wellbeing plans and services such as yoga and gym.

[Assistive exoskeleton: An older worker wears a sleek exoskeleton, effortlessly lifting a heavy crate. Cognitive enhancement: Two senior colleagues at desks use a smart pill dispenser printing nootropic capsules to maintain sharpness. Collaborative robots: A small robot hands a wrench to the exoskeleton-clad worker, highlighting teamwork between humans and machines. Wellbeing services: Colleagues practice yoga and use gym equipment in the background]

Panel 4 prompt: The trend of Silver Economy encapsulates the specialised demands and needs of the elderly, as populations around the world progressively age. An older person is sitting at home and has received a package that includes a self diagnostic medical toolkit. In the background a tv screen shows products for sale for older people.

[The illustration depicts an older person comfortably seated on a couch, examining a self-diagnostic medical kit recently unboxed. Behind them, a TV screen displays products marketed for older adults (e.g. mobility aids, supplements, adaptive footwear). The person's clothing and skin tone reflect inclusive representation – here, a light brown-skinned figure in a mustard-yellow sweater and navy trousers]

Panel 5 prompt: Financial incentives are pegged to healthy behaviours. Have a person being fired by their boss for not meeting their health targets.

[A boss in a blue suit angrily points at an older employee with a low 'Health Score' of 57, displayed prominently overhead, symbolising the financial stakes tied to health targets. The employee's slumped posture and briefcase imply imminent dismissal, while a desk worker in the background hints at the broader workplace environment]

PART 5: SYNTHESISED INDUSTRY VISIONS

VISION 2: PROMPT AND IMAGE DETAILS

Panel 6 prompt: Virtual healthcare is only as reliable as the power and communication networks it runs on. In extreme heat or storms, electricity demand surges and outages become more frequent, which could knock out home medical devices or internet links when patients need them most. Future 'hospital-at-home' setups will require backup power – that is, solar panels with batteries, and redundant communications (such as satellite links) to keep critical health monitors and telehealth services online during climate-induced disruptions.

[The illustration shows an older person in bed relying on a home medical device, while warning symbols and a monitor displaying "OFFLINE" indicate a loss of power and connectivity. Outside, storm conditions and a lightning icon suggest climate-related disruptions to the electricity grid. A nearby house with solar panels and satellite dishes hints at potential solutions, such as backup power and redundant communication systems. The scene highlights how virtual healthcare systems are vulnerable to outages during extreme weather, and underscores the need for resilient infrastructure – like batteries and alternative connections – to ensure critical health services remain available when they are needed most.]



PART 5: SYNTHESISED INDUSTRY VISIONS

VISION 3

Vision 3: Extended reality residence

As remote and hybrid work become deeply embedded in everyday life, the home evolves into a fully integrated hub for work, leisure, and immersive digital engagement. Cities are designed around 15-minute nodes that bring essential services closer. Physical space becomes fluid as augmented, virtual, and mixed-reality overlays transform rooms into workstations, entertainment venues, or travel simulations. AI has become embedded in all aspects of the home – including children’s toys.

Families enjoy 'theme park-in-a-box' experiences that combine XR devices, haptics, smart kitchens, 3D printers, and connected appliances to create multi-reality adventures. AI tailors lighting, music, appliances, and entertainment to residents’ emotions and habits, generating personalised, dynamic content, including movies and shows that adapt in real time to physiological responses.

High-tech consumer expectations grow, with specialised climate control, XR-optimised lighting, and scent-based haptics enhancing long sessions in immersive environments. Power demand shifts as homes rely on high-resolution displays, edge computing, and robust network infrastructure to support continuous virtual experiences.

However, high-tech appliances open new avenues for exploitation, and cybercrime has evolved through the use of GenAI, with scams becoming increasingly sophisticated and hyper-personalised.

PART 5: SYNTHESISED INDUSTRY VISIONS

VISION 3: PROMPT AND IMAGE DETAILS

Panel 1 prompt: Create an image of a 2050 'Entertainment at home' scenario. A family is using VR together in a futuristic lounge watching a concert. There is specialised lighting within the physical home to enhance these digital experiences. They also have haptic devices for more sensory immersive experience.

[A family of four wearing VR headsets and haptic gloves, immersed in a holographic concert within a sleek lounge. Specialized, shifting LED lighting panels heighten the sensory experience]

Panel 2 prompt: Create an image in the kitchen where Kitchen tech such as smart ovens, fridges, and AI-driven meal planning help users cook more efficiently. Devices like air fryers and dual-temperature ovens were marketed for both health and energy savings, responding to cost-of-living pressures and sustainability concerns.

[A user interacting with an AI-driven meal planner on the fridge's touchscreen, alongside an air fryer and dual-temperature oven displaying health and energy-saving icons]

Panel 3 prompt: Create an image of a young person in their lounge in the future surrounded by hi-tech entertainment technologies. they are wearing VR, and on the screen they are shopping for clothing and trying them on virtually.

[A young person in a sleek armchair, using a VR headset and haptic gloves to browse and try on virtual clothes via a holographic screen]

Panel 4 prompt: A child interacting with a tiger teddy embedded with an AI chatbot designed to be a child's friend.

[A child is warmly engaging with the teddy, complete with glowing circuitry and a speech bubble to show the AI interaction]

Panel 5 prompt: A person watching a movie that is changing in real time according to their emotions.

[A user wearing an emotion-reading headset, watching a film that shifts from serene waters to an action-packed scene in real time. Floating icons and waveforms illustrate the emotional feedback loop]

Panel 6 prompt: New technologies are enabling increasingly sophisticated scams, with AI used to mimic voices, refine phishing, and generate realistic deepfakes. Scams are hyper-personalised. Create a smart-home alert where a baby cam is hacked.

[The illustration shows a distressed person receiving a smart-home alert on their phone, where a hacked baby monitor feed displays a child in a crib alongside alarming messages like "Motion Detected" and "Security Alert." A prompt to transfer money heightens the sense of urgency and manipulation. The scene conveys how advanced technologies, including AI, enable highly convincing and personalised scams by exploiting trusted home devices. It highlights the growing risk of deepfakes, voice mimicry, and targeted phishing attacks that prey on fear and familiarity in increasingly connected households.]



PART 5: SYNTHESISED INDUSTRY VISIONS

VISION 4

VISION 4: MODULAR AND MOBILE

As climate pressures, mobility needs, and shifting lifestyle preferences reshape how people live, homes evolve into highly modular, portable, and adaptable spaces and vehicles become personalised residences.

Living arrangements become increasingly flexible. Housing is built using circular economy principles, with recyclable materials, 3D-printed components, and modular construction that allows units to be added, removed, or reconfigured across life stages. Energy systems are decentralised and renewable, adaptive building envelopes made from metamaterials automatically respond to changing weather conditions, while modular extensions enable multigenerational living or in-home care.

In parallel, mobility transforms into a seamless extension of the home. Vehicles become fully personalised living and working environments equipped with AI voice assistants, immersive entertainment systems, gaming capabilities, augmented-reality overlays, and on-board 3D printers for food or medical supplies.

Autonomous RVs travel continuously, functioning as mobile dwellings, while electric roads enable passive charging for a growing population of 'smart charging travellers'. Cobot assistants manage mechanical issues and healthcare services are delivered both at home and on the move.

PART 5: SYNTHESISED INDUSTRY VISIONS

VISION 4: PROMPT AND IMAGE DETAILS

Panel 1 prompt: In response to climate change and more extreme weather, homes are designed with circular economy principles, utilising sustainable and recyclable materials, 3D-printed and modular for easy adaptation and disassembly. Illustrate a home being 3d printed and a family standing in front watching. There are other homes being 3d printed in the background.

[A family watching a 3D printer construct a sustainable, circular-economy home, with additional homes printing in the background]

Panel 2 prompt: Modular additions can easily accommodate multigenerational living or the provision of care. Units can be customised and reconfigured to suit changing needs and life stages. Illustrate a home being customised for an additional room for grandparents to live.

[A modular home having an additional unit attached by a robotic arm. Grandparents stand at the threshold of the new space, while younger family members watch from the foreground]

Panel 3 prompt: Inside the home, smart windows and dynamic building facades enhance energy efficiency by adjusting to weather conditions. Digital platforms facilitate the tracking and management of material lifecycles and energy flows within the home, encouraging mindful consumption and waste reduction.

[The interior of a modular home, featuring large smart windows with dynamic shading adjusting to sunlight, and a wall-mounted digital platform displaying real-time energy flows, material recycling metrics, and solar production. The windows appear tinted – darker and responsive to bright sunlight – while a mother and child interact with the touchscreen to manage the home’s energy flows and resource tracking]

Panel 4 prompt: Cars are now fully autonomous. Autonomous RVs drive constantly. Passengers sit back and do work in their vehicles while AI routes their journeys. Other passengers are entertained with video, gaming options, and AR.

[The illustration shows a fully autonomous vehicle interior: a passenger works on a laptop in the front, while a child and another passenger in the back enjoy video and gaming on their devices. An AR overlay indicating autonomous driving appears on the windshield]

Panel 5 prompt: Collaborative robots assist with mechanical issues. Drone taxis deliver spare parts while on-board 3D printers print car parts.

[The illustration shows a roadside service scene where a mechanic wearing a blue exoskeleton suit oversees a robotic arm replacing a wheel on an autonomous car. The car’s side panel opens to reveal an onboard 3D printer actively fabricating a replacement part. Above, a drone taxi flies in to deliver an additional spare part. Blue accents appear on the robotic arm, drone, and mechanic’s exoskeleton, while the background features layered hills and native greenery in muted greens and grays to maintain focus on the futuristic vehicle repair process]

Panel 6 prompt: The family is in a passenger drone taxi flying away from their broken down car.

[The illustration shows the family seated inside a blue passenger drone taxi flying above their broken-down light-green autonomous car. Below, a collaborative robotic arm reaches toward the car to begin repairs, all set against rolling hills in muted greens and a clear sky, with blue accents on the drone, robotic arm, and vehicle trims]



PART 5: SYNTHESISED INDUSTRY VISIONS

VISION 5

VISION 5: THE SMART, SUSTAINABLE COMMUNITY

In this future, the smart home becomes an unobtrusive yet deeply intelligent environment designed to maximise sustainability, comfort, and energy efficiency.

Seamlessly embedded AI systems, IoT devices, and ubiquitous sensors operate quietly in the background, making households passive energy consumers whose routines are optimised automatically and, at times, even financially rewarded.

Robots and autonomous agents handle the majority of domestic tasks such as cleaning, maintenance, repairs, gardening, and monitoring. Smart appliances anticipate residents' needs, personalise comfort settings, and coordinate with grid conditions and weather forecasts to optimise energy use.

Smart homes blend into emerging living models, including co-operative and communal housing. Food is grown in digitally monitored indoor vertical farms powered by locally generated renewable energy, and healthcare is supported through wearables and virtual health coaches.

Daily life unfolds with minimal human intervention, as the AI gently guides routines toward energy-efficient behaviours suggesting optimal times for cooking, laundry, or EV charging while curating personalised entertainment and social interactions that minimise energy footprints.

However, energy hardship will increase the impacts of climate risks. As bushfire smoke and extreme heat events intensify, access to clean, cooled air will become a marker of inequality. Those most vulnerable to climate impacts may struggle to afford air purifiers, efficient HVAC systems and their energy costs.

PART 5: SYNTHESISED INDUSTRY VISIONS

VISION 5: PROMPT AND IMAGE DETAILS

Panel 1 prompt: Homes will be 'smartified'. Previously disconnected analog assets will be equipped with sensor and wireless technologies, bridging the analog-digital divide. Smart home technologies will make energy management seamless and unobtrusive, operating in the background to optimise consumption without requiring constant user intervention. Illustrate a home that aligns with this expectation and where everything is networked and smart.

[The illustration shows a modern living room where every device is networked: a blue washing machine, smart thermostat set to 22 °C with Wi-Fi icon signals, a connected fridge, and a smartphone on the side table all displaying wireless indicators. Automated blinds above the sofa have a small Wi-Fi icon, and soft lighting hints at smart bulbs. Blue appears consistently on accents like the thermostat, door, and smart devices, reinforcing a seamless, sensor-driven smart home where energy management occurs unobtrusively in the background]

Panel 2 prompt: Wearables and endpoints of all kinds will be embedded with AI, from pets' collars that report on animals' activities, to smart home devices that understand and execute complex commands from natural language.

[The illustration shows a dog walking through an open blue door into the room. Alexa, on a table nearby, emits subtle signal waves to indicate recognition of the dog's AI collar, and a lock icon appears above the door to signify the smart door unlocking. The person stands aside with their smartwatch, observing as the dog is granted entry]

Panel 3 prompt: Co-housing communities will be sustainable. Modern self-contained homes clustered around shared communal spaces, with rooftop and urban gardens growing bioengineered crops. Residents have cooperative farms, gather in a communal kitchen, and enjoy shared outdoor areas, emphasising social connection, affordability, and environmental stewardship.

[The illustration depicts a cluster of modern, self-contained homes painted in blue and warm earth tones, encircling shared rooftop and courtyard gardens brimming with bioengineered crops. Diverse residents are shown tending raised beds – watering seedlings, planting cuttings – while others gather in a communal kitchen visible through large windows. In the foreground, some people sit on benches, chatting and enjoying the shared outdoor space. The flat, bold colours emphasise community, affordability, and environmental care, with every rooftop topped by a green garden and blue accents on doors and window frames]

Panel 4 prompt: Homes are managed by a network of interconnected robots, from robotic vacuum cleaners and lawnmowers to more advanced humanoid or task-specific robot. These can be monitored and controlled remotely. Create an image of someone watching their robots from a monitor while they are walking down the street on a holotile¹³ footpath (generating energy from foot traffic).

[The illustration shows a person walking on a blue, hexagonal Holotile footpath featuring lightning bolt icons to indicate energy generation. They hold a blue tablet that displays three robots: a white humanoid in a living room, a robotic lawnmower cutting grass, and a robotic vacuum cleaning a floor. In the background, a house and greenery suggest a modern, sustainable neighbourhood]

¹³ Holotile refers to an innovative form of flooring, currently under development by Disney for VR experiences, but used here to refer to sidewalks paved with thermoelectric tiles that generate energy from foot traffic. <https://la.disneyresearch.com/holotile/>

PART 5: SYNTHESISED INDUSTRY VISIONS

VISION 5: PROMPT AND IMAGE DETAILS

Panel 5 prompt: Daily routines are subtly guided by the AI to align with energy availability and optimisation of energy usage based on factors like time of day and grid conditions, and integration with renewable energy systems. The system suggests optimal times for cooking, laundry, and EV charging.

[The illustration depicts a person loading a blue washing machine under bright midday sunlight. Behind them, a wall-mounted AI display shows solar production at 4 kW with icons and optimal times for cooking (11:00 AM), laundry (12:00 PM), and EV charging (2:30 PM). Greenery peeks in at the edge to hint at renewable integration]

Panel 6 prompt: Energy hardship will increase the impacts of climate risks. As bushfire smoke and extreme heat events intensify, access to clean, cooled air will become a marker of inequality. Those most vulnerable to climate impacts may struggle to afford air purifiers, efficient HVAC systems and their energy costs.

[The illustration contrasts two households experiencing climate impacts differently. On one side, a person sits in a hot, uncomfortable room, sweating and distressed, with minimal cooling and poor air quality, representing those facing energy hardship. On the other side, an older person relaxes in a cooled, clean environment with an air conditioner and air purifier, symbolising access to comfort and protection. The split scene emphasises how, as extreme heat and bushfire smoke intensify, access to cooled, filtered air becomes a marker of inequality, with vulnerable populations disproportionately affected by rising energy costs and climate risks.]

PART 6: AUSTRALIA'S NATIONAL CLIMATE RISK ASSESSMENT AND ITS POTENTIAL IMPLICATIONS FOR TRENDS

The release of Australia's national climate risk assessment coincided with the preparation of this report. In the National Climate Risk Assessment report, current and future climate risks are characterised to enable planning and preparation for impact areas across society. We summarise these climate risks below. A changing environment brings shifting needs and priorities, which will shape how many of the trends we identified may unfold. To illustrate potential futures, we speculatively explore how a changing climate could influence several trends we consider most vulnerable to its impacts.

Climate risks

- **Drought:** time in drought is likely to increase across much of Australia, especially in the south and east. The south-west may continue its long drying trend seen since the 1970s.
- **Riverine floods:** fewer flood events are possible overall, particularly in the south and south-west, but those that occur may be more severe. Heavy runoff events on the east coast and in the tropics could drive higher flood risks.
- **Tropical cyclones:** fewer cyclones may form overall, but a greater share could be intense category 4 or 5 events. Tracks are unlikely to shift much, though a small move southward remains possible.
- **Extreme heat:** extreme temperatures are set to rise nationwide, strongest in the north, the Great Dividing Range, and inland deserts. Severe heatwaves could become twice as common at +2.0°C warming and more than four times as common at +3.0°C.
- **Sea level rise:** seas around Australia are projected to keep rising, with around half a metre possible by century's end. Rising seas are expected to drive more frequent coastal flooding, erosion, and shoreline change, with erosion events up to ten times more common by 2090.
- **Storms:** extratropical storms may become less frequent but more damaging when they hit, with flooding risks amplified by higher seas and heavier rain. Large hailstorms could become more common in the east and spread further south.
- **Oceans:** surrounding oceans are projected to warm and acidify, with more frequent and longer marine heatwaves, especially in the Tasman Sea. Marine life will face greater stress, raising coral bleaching risks and, in Antarctic waters, threatening shell and skeleton formation.
- **Bushfires:** risks will increase as hotter, drier conditions fuel more frequent dangerous fire days, longer seasons, and the potential for megafires in southern and eastern regions. Northern savannah fire risks may rise with changing rainfall, while some forests could thin into grasslands, reducing fire intensity over time.

PART 6: AUSTRALIA'S NATIONAL CLIMATE RISK ASSESSMENT AND ITS POTENTIAL IMPLICATIONS FOR TRENDS

Key impact areas

Communities – urban, regional and remote; defence and national security; the economy, trade and finance; health and social support; infrastructure and the built environment; the natural environment; primary industries and food; Aboriginal and Torres Strait Islander Peoples.

Communities exposed to climate risks face escalating pressures across health, infrastructure, and social systems, as heatwaves strain energy supplies, disrupt transport networks, and burden health services, while extreme weather increases demands on disaster response, heightens risks of displacement, and threatens social cohesion and personnel safety. These disruptions extend to government budgets, household finances, and broader economic stability, affecting production, consumption, and markets.

Vulnerable groups face intensified risks from deteriorating air quality, communicable diseases, mental health impacts, reduced workforce capacity, and threats to food and water security, alongside damage to buildings, transport, telecommunications, health and emergency services, water systems, energy infrastructure, supply chains, waste management, and urban green spaces. Climate impacts also degrade landscapes, ecosystems, and natural resources, increasing species loss and undermining ecosystem services, agricultural productivity, community wellbeing, and trade and export markets.

For Aboriginal and Torres Strait Islander peoples, these challenges compound existing inequities and pose significant threats to self-determination, land and sea Country, cultural knowledge and heritage, health and identity, economic and social development, and the resilience of remote and rural communities. While the reports reviewed do not explicitly address these impacts, the trends identified intersect with long-standing and compounding inequities in health, economic opportunity, infrastructure, and community resilience, particularly in remote and rural areas. Without deliberate and sustained attention, existing inequalities are likely to be exacerbated.

Emerging technologies, data-driven systems, and climate-related disruptions risk deepening these divides by reinforcing structural marginalisation, excluding Indigenous perspectives from decision-making processes, and placing additional pressure on communities already navigating environmental, cultural, and socio-economic challenges. This will affect the capacity of Aboriginal and Torres Strait Islander peoples to exercise sovereignty, maintain cultural continuity, and secure sustainable futures for their communities.

Key vulnerabilities and implications for relevant trends

Increasing demand on health services (e.g. GP clinics, hospitals, aged care services)

- **Virtual wards:** Virtual healthcare is only as reliable as the power and communication networks it runs on. In extreme heat or storms, electricity demand surges and outages become more frequent, which could knock out home medical devices or internet links when patients need them most. Future 'hospital-at-home' setups will require backup power (e.g. solar panels with batteries) and redundant communications (such as satellite links) to keep critical health monitors and telehealth services online during climate-induced disruptions. Disruptions to digital infrastructure could compromise care, delay interventions, and increase reliance on overstretched hospitals and ancillary services.

PART 6: AUSTRALIA'S NATIONAL CLIMATE RISK ASSESSMENT AND ITS POTENTIAL IMPLICATIONS FOR TRENDS

- **Ageing at home:** Regional communities' energy systems are thinly spread and more vulnerable to disruption, but they also have larger populations of older people. This gap means the benefits of virtual healthcare could bypass the very people who need it most during climate emergencies.
- **Care roles involving remote monitoring, communication and coordination across platforms:** As women continue to dominate care roles, they will bear a disproportionate burden of adapting to technology-mediated systems amid disruptions to health and social infrastructure.

Disruptions to transportation network and modes of transport

- **Vehicles as mobile entertainment hubs:** Rather than vehicles as mobile entertainment hubs, vehicles may be reimagined as disaster-resilient and able to provide refuge, emergency power, and even support rescue efforts.
- **Electric vehicles:** EVs in areas highly vulnerable to climate shocks mean critical infrastructure may need to support high demand during times of climate emergency. However, EVs could also become integral components of adaptive infrastructure, serving as mobile energy storage units that stabilise local grids during heatwave-induced power outages or providing emergency power and communication during extreme weather events. In remote areas, where climate impacts threaten essential services, EV fleets could help maintain connectivity for healthcare delivery, food distribution, and evacuation support. Rising temperatures may also test battery durability and charging efficiency, driving innovation in heat-resistant materials, smart energy management, and climate-adaptive vehicle design.
- **Micro-mobility:** As micro-mobility options like e-scooters and e-bikes expand, they may leave users increasingly exposed to extreme heat, storms, and poor air quality. Without adequate shelter, cooling, or infrastructure, these systems could heighten health risks during climate events, particularly for low-income and urban populations.

Loss of trust in government

- **Declining trust in institutions and technology:** Eroding trust, coupled with the spread of mis/disinformation and AI-generated false content, may reduce public compliance with government and corporate directives, weakening disaster and security responses. Scepticism towards official information could deepen, undermining collective action during crises.
- **Cybercrime:** During climate-related crises, scams and fraud may surge as AI-driven deception and deepfakes exploit vulnerable communities. Cyberattacks on critical services like energy, transport, and emergency networks could disrupt disaster response and recovery, further undermining trust, community cohesion and community resilience.

Disruption to critical infrastructure

- **6G:** Disruptions or cyberattacks could paralyse essential systems. Reliance on connected intelligence heightens risks of cascading failures during climate-induced disasters, making network resilience and redundancy vital for public safety.
- **Digital economy:** Digital payments expose vulnerabilities during climate-related disruptions. Power outages or network failures could cut off access to essential goods and services, especially for vulnerable groups, underscoring the need for resilient, inclusive, and offline-capable payment systems.
- **IoT:** A loss of connectivity will impact ecosystems of constantly connected and communicating tools, appliances, and wearables, with potential to cause harm among those relying on devices for health monitoring and services.

PART 6: AUSTRALIA'S NATIONAL CLIMATE RISK ASSESSMENT AND ITS POTENTIAL IMPLICATIONS FOR TRENDS

Strain on government budgets

- **Immigration:** Migrants may help offset labour shortages in climate-affected industries such as agriculture, construction, and renewable energy, while also supporting regional communities adapting to shifting economic and environmental conditions. However, tighter budgets and mounting pressures on housing, jobs, and public services may fuel social tension, with immigrants increasingly demonised and scapegoated for systemic shortfalls.
- **Working age:** Reduced public services and retirement support may push older adults to remain in or re-enter the workforce. The traditional retirement age could rise further as individuals rely more on continued employment for financial stability, driving demand for flexible, technology-assisted, and age-inclusive work opportunities.
- **Modular homes:** Prefabricated and climate-resilient designs may become a key part of disaster recovery, enabling adaptation to extreme weather and supporting both housing affordability and community resilience.

Geopolitical instability

- **Supply chain fragility:** As climate change amplifies economic strain and resource scarcity, geopolitical tensions and protectionist policies may further destabilise global supply chains. Disruptions to critical materials such as lithium, cobalt, and semiconductors could hinder clean energy transitions and technological innovation, driving up costs and deepening global inequality. Nations may increasingly prioritise resource security and domestic production, reshaping trade networks and intensifying competition for strategic commodities.
- **Kitchen technologies:** Food insecurity may shift focus to scarcity, growing own food, preserving foods due to out-of-season and less predictable crop yields.

Strain on household finances

- **Declining fertility:** Rising living costs, insecure housing, and reduced government support may further delay or deter parenthood, with young adults prioritising stability and personal goals over starting families. Parenting itself is becoming more resource-intensive, reinforcing a cultural shift towards smaller families or child-free lifestyles as economic and climate stresses reshape life choices.
- **Home entertainment:** Demand may shift from premium immersive experiences to affordable, energy-efficient, and subscription-flexible entertainment options. AI-driven personalisation and smart automation may focus on maximising value and efficiency, while rising costs of living could push consumers towards shared and community-based digital experiences.
- **Smarter HVAC system:** Energy hardship will increase the impacts of climate risks. As bushfire smoke and extreme heat events intensify, access to clean, cooled air will become a marker of inequality. Those most vulnerable to climate impacts may struggle to afford air purifiers, efficient HVAC systems and their energy costs.

Reduced workforce capacity

- **Robots and automation:** Reliance on robots and automation may deepen inequalities for those needing human care, as overburdened systems may struggle to maintain personal, empathetic, and culturally sensitive support. Further, their integration into daily life could create new complexities during climate disasters, as people may mourn the loss of their companion robots or endanger themselves and rescue workers by trying to save them.

NEXT STEPS

The findings presented in this report were developed through Work Package 2 (WP2) of the Scenarios for Future Living (SFL) project. WP2 focuses on understanding how emerging technologies are expected to integrate into everyday life, and how industry assumptions, innovation trajectories and broader macro-trends may shape energy futures.

WP2 findings will be used to inform scenario development in Work Package 3, as well as the design and testing of future-oriented products and services in Work Package 5. In turn, ongoing collaboration with project partners and the Industry Reference Group will help ensure that WP2 remains responsive to emerging policy, market, and technological developments.

To support this, a short update to this report will be produced in 2027, incorporating any significant new developments in technology innovation, industry priorities, or macro-trends relevant to Australia's energy futures.



APPENDIX A. REPORTS INCLUDED IN THE CONTENT ANALYSIS

Report Name	Organisation	Year	Source Type	Country / Region of Focus
Accenture Life Trends 2024	Accenture	2024	Consultancy	Global
Accenture Life Trends 2025	Accenture	2025	Consultancy	Global
Technology Vision 2025 Ai: A Declaration Of Autonomy	Accenture	2025	Consultancy	Global
Banking: The Future Is Back	Accenture	2025	Consultancy	Global
Residential Electricity Price Trends	AEMC	2024	Government (Regulator)	Australia
2023 Electricity Statement Of Opportunities	AEMO	2023	Government (Operator)	Australia
2024 Integrated System Plan	AEMO	2024	Government (Operator)	Australia
Impacts Of New And Emerging Assistive Technologies For Ageing And Disabled Housing	AHURI	2021	Research Institute	Australia
Technology Adoption Is Australian Industry	Ai Group	2024	Industry Association	Australia
Aspi's Two-Decade Critical Technology Tracker	ASPI	2024	Think Tank	Australia
Digital Lives Of Australians: Readiness for emerging technologies 2023	auDA	2023	Regulator	Australia
2024 Inside Australian Online Shopping	AusPost	2024	Government Enterprise	Australia
Better Together: The Jobs And Skills Report 2024	Australian Government	2024	Government	Australia
Fertility Decline In Australia: Is It Here To Stay?	Australian Government	2024	Government	Australia
Intergenerational Report 2023: Australia's Future To 2063	Australian Government	2023	Government	Australia
Australia's Emissions Projections 2024	Australian Government	2024	Government	Australia
Why Australia Digital Technology	Australian Trade and Investment Commission	2023	Government Agency	Australia
Electric Vehicle Outlook 2024	Bloomberg	2024	Financial Media	Global
The Future Of Ageing In An Uncertain World	Brightwell	2024	Consultancy	Global
Key Office Trends 2022	CBRE	2022	Consultancy	Global
Ai's Impact On Australian Office	CBRE	2024	Consultancy	Australia
Pacific Real Estate Market Outlook	CBRE	2025	Consultancy	Pacific
Powering Homes, Empowering People: A national Consumer Energy Resources roadmap	Clean Energy Council	2024	Industry Association	Australia

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Decarbonisation Futures	ClimateWorks Australia	2020	Think Tank	Australia
Decarbonisation Futures: Industry	ClimateWorks Australia	2020	Think Tank	Australia
Accelerating Ev Uptake	ClimateWorks Australia	2022	Think Tank	Australia
CSIRO Our Future World	CSIRO	2022	Research Institute	Australia
2024 Gen Z And Millennial Survey: Living And Working With Purpose In A Transforming World	Deloitte	2024	Consultancy	Global
Accelerating The Future: Climate Resilience And Sustainable Healthcare Systems	Deloitte	2024	Consultancy	Global
Accelerating The Future: Consumers Are Ceos Of Own Health	Deloitte	2024	Consultancy	Global
Accelerating The Future: Interdependent Innovations In Science And Technology Are Reshaping Treatment Paradigms	Deloitte	2024	Consultancy	Global
Accelerating The Future: Realising The Potential Of The Internet Of Medical Things	Deloitte	2024	Consultancy	Global
Accelerating The Future: The Convergence Of Health, Wealth, And Longevity Services	Deloitte	2024	Consultancy	Global
Accelerating The Future: The Rise Of A Dynamic Consumer Health Market	Deloitte	2024	Consultancy	Global
Tech Trends 2024: An Australian Perspective	Deloitte	2024	Consultancy	Australia
Tech Trends 2025	Deloitte	2024	Consultancy	Global
Logistics Trend Radar 7.0	DHL	2024	Corporate	Global
Home EV Charging And The Grid: Impact To 2030 In Australia	Electric Vehicle Council	2024	Industry Association	Australia
State Of Electric Vehicles 2024	Electric Vehicle Council	2024	Industry Association	Australia
National Consumer Energy Resources Roadmap	Energy and Climate Change Ministerial Council	2024	Government	Australia
2024 Tech Trends Report: Bioengineering	Future Today Institute	2024	Think Tank	Global

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2024 Tech Trends Report: Built Environment	Future Today Institute	2024	Think Tank	Global
2024 Tech Trends Report: Computing	Future Today Institute	2024	Think Tank	Global
2024 Tech Trends Report: Energy Climate	Future Today Institute	2024	Think Tank	Global
2024 Tech Trends Report: Entertainment	Future Today Institute	2024	Think Tank	Global
2024 Tech Trends Report: Financial Services Insurance	Future Today Institute	2024	Think Tank	Global
2024 Tech Trends Report: Future Trends	Future Today Institute	2024	Think Tank	Global
2024 Tech Trends Report: Healthcare Medicine	Future Today Institute	2024	Think Tank	Global
2024 Tech Trends Report: Hospitality Restaurants	Future Today Institute	2024	Think Tank	Global
2024 Tech Trends Report: Metaverse	Future Today Institute	2024	Think Tank	Global
2024 Tech Trends Report: Mobility Robotics Drones	Future Today Institute	2024	Think Tank	Global
2024 Tech Trends Report: News	Future Today Institute	2024	Think Tank	Global
2024 Tech Trends Report: Space	Future Today Institute	2024	Think Tank	Global
2024 Tech Trends Report: Sports	Future Today Institute	2024	Think Tank	Global
2024 Tech Trends Report: Supply Chain	Future Today Institute	2024	Think Tank	Global
Top Strategic Technology Trends	Gartner	2025	Consultancy	Global
Global Ev Outlook 2024	IEA	2024	International Organisation	Global
Trends In Photovoltaic Applications 2024	IEA	2024	International Organisation	Global
Welcome To The Future: Innovate UK's 50 Emerging Technologies	Innovate UK	2023	Government Agency	United Kingdom
Household Energy Preferences: Research Report	JWS Research	2021	Research Consultancy	Australia
Future Of Public Transport	KPMG	2022	Consultancy	Global
Converging Trends 2033: The Long View	KPMG	2023	Consultancy	Global
Future Of Work	KPMG	2023	Consultancy	Global
Turning The Tide In Scaling Renewables	KPMG	2023	Consultancy	Global
Emerging Trends In Infrastructure	KPMG	2024	Consultancy	Global

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Futures Report: From Disruption To Business Value	KPMG	2024	Consultancy	Global
Futuresphere: Annual Foresight 2024	KPMG	2024	Consultancy	Global
Kpmg Global Tech Report 2024	KPMG	2024	Consultancy	Global
The Future Of Air Mobility: Electric Aircraft And Flying Taxis	McKinsey & Company	2021	Consultancy	Global
The Future Of Video Entertainment: Immersive, Gamified, And Diverse	McKinsey & Company	2022	Consultancy	Global
Autonomous Driving's Future: Convenient And Connected	McKinsey & Company	2023	Consultancy	Global
Global Energy Perspective 2024	McKinsey & Company	2024	Consultancy	Global
State Of The Consumer 2024: What's Now And What's Next	McKinsey & Company	2024	Consultancy	Global
Technology Trends Outlook 2024	McKinsey & Company	2024	Consultancy	Global
The Trends Defining The \$1.8 Trillion Global Wellness Market In 2024	McKinsey & Company	2024	Consultancy	Global
Health X Digital Transformation Report 2024-2025	National Industry Innovation Network	2024	Industry Network	Australia
Connected And Automated Vehicles Plan	NSW Government	2022	Government	Australia
Preparing For The Future Of Work Across Australia	OECD	2021	International Organisation	Australia
Megatrends And The Future Of Social Protection	OECD	2024	International Organisation	Global
OECD Digital Economy Outlook 2024 (Volume 1): Embracing The Technology Frontier	OECD	2024	International Organisation	Global
OECD Digital Economy Outlook 2024 (Volume 2): Strengthening Connectivity, Innovation And Trust	OECD Publishing	2024	International Organisation	Global
Trends Shaping Education 2025	OECD Publishing	2025	International Organisation	Global
Future Energy Report	Origin	2021	Corporate	Australia
The Australian Home Energy Report	Origin	2024	Corporate	Australia
The Future Of Digital Spaces And Their Role In Democracy	Pew Research Centre	2021	Think Tank	Global
The Metaverse In 2040	Pew Research Centre	2022	Think Tank	Global

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The Future Of Human Agency	Pew Research Centre	2023	Think Tank	Global
Smart Home Of The Future	PWC	2021	Consultancy	Global
2023 Future Of Work Outlook	PWC	2023	Consultancy	Global
A Robotics Roadmap For Australia 2025	Robotics Australia	2025	Industry Association	Australia
Untapped: The Home Tech Evolution	Samsung	2023	Corporate	Global
Top 10 Emerging Technologies Of 2024	World Economic Forum	2024	International Organisation	Global
Future Of Jobs Report 2025	World Economic Forum	2025	International Organisation	Global



Scenarios for Future Living