"The power to shift the energy system"

Speech to the 3rd State of Energy Research Conference, 31 January 2023

Thank you for inviting me here today, to speak at what will be my second State of Energy Research Conference. I salute those of you who are organisers, contributors and participants at these Conferences, and many of you will have been part of all three.

First to introduce my organisation.

Energy Consumers Australia plays a unique role in the energy eco-system in that we speak to and for Australian households and small businesses about their expectations of the role energy and the energy system plays in their lives and livelihoods. This informs all of our research, our policy work and our advocacy.

So, you shouldn't be surprised when I say "people power" is at the heart of the transformation of our energy system that is underway, from one that is carbon-based to one that is net zero by 2050, based on renewables and storage.

Yet it is the area that is the least researched - the area where we have the least knowledge.

Research has been described as formalised curiosity, the act of poking and prying with a purpose.[1] Yet, collectively there is insufficient curiosity about how Australia's 11 million households and 2.6 million small businesses – alongside the commercial and industrial businesses that are the powerhouse of our economy and our international trade – will successfully navigate the energy transformation over coming decades.

Compare this with the countless numbers of dedicated researchers, policy makers, engineers, economists and people in industry working to ensure that the power system safely and reliably delivers electricity, today and tomorrow.

My Catholic mother would say this is God's work and she would be right.

What is yet to receive the same attention is a plan for reshaping demand so that we have a least cost electricity system as well as one in which the energy bills of households and small businesses are affordable. A plan that reflects the role we are asking consumers to play and creates opportunity for all households and small businesses, rather than deepening inequity.

Reshaping demand means consumers changing some long-established social practices, building new norms for using electricity when it is abundant and at times being adaptive and responsive to match a fluctuating electricity supply.

It also means new knowledge and practices that will be built up around using electricity instead of gas appliances in our homes and our means of transport.

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[1] Author and anthropologist, Zora Neale Hurston, Dust Tracks on a Road (New York: Harper Perennial, 1996), p143

But this has not been done before. It is new. We can't lay it out in exquisite and prescriptive detail now. We need to invent it.

I don't mean to appear as if I discount the complexity of rebuilding the system and creating new markets to accommodate large-scale renewables and at the same time build resilience to climate extremes and maintain system security.

But reshaping demand is qualitatively different because people – whether that is in their homes or businesses – have diverse motivations, abilities and opportunities for participation in the future energy system, that may or may not align with system interests.

If our plan for the future of the energy system and market design requires giving equal weight to unlocking the potential of the so-called "demand side" as it does to the "supply side" we need to get our hands dirty by engaging with this 'messiness'. In our design thinking we need to anticipate and support markets and business models that create authentic value propositions for consumers, that are simple to understand, easy to action and where consumers have agency.

And that design thinking needs evidence and social science knowledge of people, place and practices as its foundation.

Without this evidence and knowledge we are doing our community and consumers a disservice because our system and market design will embed consumer archetypes, stereotypes and old tropes which I describe as "imaginary friends". The consequences could be the difference between nailing and failing the energy transformation.

To work together we need a shared vision for a sustainable future

The theme for this year's conference is "working together for a sustainable future'. But to commit to working together – across disciplines and differing responsibilities – we need a shared vision of that sustainable future.

You may be surprised when I say that I don't believe we have that shared vision. The reason I say this is because we have not yet imagined a better, preferred energy future that places people and their needs, and their resources at the centre of the system and considered the pathways for how we might get there.

Our shared vision needs to give households and small businesses assurance that the renewable energy system of the future will meet their aspirations.

Our research shows strong support for urgent action towards a renewable energy future, though parts of the community remain to be persuaded.

While 30% of people in our recent Energy Consumer Sentiment Survey, either believe it is impossible (23%) or there is no need (7%) to transition to a renewable energy system, more people support a swift transition to happen by 2030 (43%) to avoid the catastrophic consequences of climate change.[2]

They are also concerned that the system won't be resilient enough to prevent future scarcity in the form of blackouts and outages (90%).

It is vital that the in the future electricity is affordable as well as abundant and clean. Consumers do not expect to trade these things off against each other; they expect all three.

At this point in the energy transformation, consumers are experiencing more challenges than opportunities or benefits.

Retail electricity and gas prices are again rising at double digit rates annually after remaining at high levels in real terms for most of the past decade.

Unsurprisingly, our surveys show that consumers care the most about affordability and they are deeply pessimistic about their future ability to meet their electricity bills.

Almost all of the people we surveyed are concerned that energy will become unaffordable for themselves in the next three years (88%) and also worry that it will be unaffordable for others (95%).

Further, the energy divide is stark. Our surveys show that today households above median income pay between 2-3% of their household income on electricity, while the remaining low to middle income households are paying as much as 3-12%.

Energy intensive small businesses are also feeling the strain, and the dilemma for them is whether to reduce staff, to pass on the costs to their customers if they can or to reduce their profits.

The verdict is clear. What people have seen in the past 12 months is not just the energy market failing; they have seen it failing them.

Trust remains low, with around 3 in 10 consumers in our survey saying that the energy market is working in their interests, rather than participants self-interest.

Why does this matter? When consumers lose trust in the energy system, they are inclined to disengage from it. If we are going to have a successful energy transformation, we need consumers to play an active and constructive part.

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[2] Energy Consumers Australia, Energy Consumer Sentiment Surveys, https://ecss.energyconsumersaustralia.com.au/. Note that our results are similar to those findings of the Climate Compass undertaken by the Sunrise Project – where 30% of people were disengaged, dismissive or doubtful about taking action on climate change. The 2022 report is available from https://sunriseproject.org/compass/

No net zero, without willing consumer heroes

A shared vision for a preferred energy future is something we spend a lot of time thinking about at Energy Consumers Australia and asking consumers about. It can be boiled down to four words – **least cost, most participation**.

This is a desirable, plausible and equitable vision of the energy system that empowers consumers to be heroes, which in a recent paper with my co-authors we defined as consumers with the motivation, means and opportunity to be *"responsive and responsible managers of their energy use and consumer energy resources to benefit themselves and others".*[3]

To explain, **least cost** is a principle that needs to be an article of faith at every point – where assets are located, how they are built and how they are efficiently operated. Least cost stands as the necessary bulwark against the transformation to net zero at any cost (after allowing for the pricing of carbon).

We need to ensure that we are fully utilising the capacity of the expected investment of $320 billion in system assets that will be passed onto consumers in their bills.[4]

Least cost also means unlocking the potential of the demand side to do some of the "heavy lifting" rather than investing in large-scale, long-lived, grid-side assets. This requires investment to be made in producing ubiquitous data that is needed to efficiently operate the grid, including completing the digital meter roll out to every site connected to a grid by 2030.

And **most participation**?

By this we mean that consumers are willing and able to do what they can, in their own circumstances, to better manage their use.

The options for consumer participation are to change their reliance on grid-supplied electricity through investing in rooftop solar and on-site batteries, and to adapt their use of electricity in their homes and in their businesses through being more efficient or shifting the times when household and business tasks are done.

But if and how will they navigate these "choices" and what are they being offered in return?

And what has been done to earn their trust that the system asking so much of them is one that has their best interests at heart?

But there's another side to this too.

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[3] Paul De Martini; Lynne Gallagher; Erik Takayesu; Ryan Hanley; ; Pierre Henneaux: *Unlocking Consumer DER Potential: Consumer-Centric Approaches for Grid Services, Published in: IEEE Power and Energy Magazine (Volume: 20, Issue: 4, July-Aug. 2022); https://ieeexplore.ieee.org/document/9804185*

[4] Rewiring the Nation funding alongside some state government investment that will be paid for by taxpayers is relatively small compared to the private sector investment in assets, estimated by the Australian Energy Market Operator (AEMO) in its Integrated System Plan. https://aemo.com.au/en/energy-systems/major-publications/integrated-system-plan-isp/2022-integrated-system-plan-isp

Most participation also means most people participating. Nobody left behind.

Let me also be clear. Committing to most participation isn't the easiest way to create a future energy system, but it is the only way to create an equitable one.

Consumer voices and needs are diverse. Listening and responding to them with an inclusive system design takes work.

System and market design needs evidence and strong research foundations, into the values, intentions and lived experiences of households and small businesses in managing their energy needs, now and in the future.

Access to the potential value of consumer energy resources – those assets in people's homes and businesses that can respond by producing more or using less – must be earned, not assumed.

And behaviour change where the existing behaviour is ingrained, and some might say dates back to when Edison was a boy, is more or less the hardest kind of change to bring about.

Which means securing and maintaining a system where consumer participation is a cornerstone requires commitment and adaptation, from all of us.

Relying on our imaginary friends

We have started down the wrong path, by setting up a dichotomy in our market design between consumer interests as they themselves might determine them and the system's interests.

Our current approach assumes that all consumers can be co-opted into participating, with a mix of controls over their assets and pricing that punishes the "wrong choices" without being given the "Why?"

One by one, process by process, we design standards, rules and regulations with the intention to stop or stimulate consumers into action. The result is that we have multiple and competing "signals" for "do's" and "don't".

Here are a few examples.

We have limits in connection agreements on what people can consume or generate, with the latest being flexible export limits. We now intend that those limits are ones that consumers will bump up against – if for example they should choose to use multiple appliances or charge their electric vehicle at the same time.

We also have rules for when the system can override people's use of their assets, in "emergency" circumstances that consumers have no awareness of, while at the same time not allowing an override by them.

Our regulation of default network charging results in time varying retail pricing that rarely rewards them for off-peak use and charges most of their use at peak rates and adds insult to injury with high and rising fixed charges.

Even under optimistic scenarios, we are in a transitional period, possibly decades long, where we will control and switch-off instead of reward, in dealing with system constraints.

Rather than empowering consumers to make choices, in their interests and for the benefit of the system, we are treating consumers as conscripts.

The result of this is unintended consequences, where some or many consumers are inconvenienced and even harmed in ways that are not understood or recognised by those imposing these controls from the viewpoint of the system needs.

We over-estimate the control that can be exercised over households and small businesses at our peril, in how we plan for a future energy system. Technology – that after all is in consumers hands – creates the means, the opportunity and the power to by-pass controls when it conflicts with their values and needs in how they use, generate or store electricity in their homes or businesses.

Unlocking "people power"

We need to shift our thinking from designing controls to a plan for what has been described as unlocking the power to act in concert, with consumers.[5]

To me unlocking people power means this.

Taking consumers into our confidence, to explain how the system is physically constrained in its ability to handle renewable energy – particularly the electricity they are generating themselves. They need to know that curtailment is a "feature" not a "bug".

Nor do consumers know that in substituting sun, wind and water for fossil fuel generation, that the availability of electricity will be weather driven and reflect limits on storage.

Consumers understand and broadly consent to how their assets (including smart appliances) will be used and why. They have a sense of participation set at a level they choose and with a sense of control they feel comfortable with.

For some that will practically be expressed as a high level of automation. For some it will be control that is willingly delegated to a third party. For some it may be a simple 'set and forget' and for others it might be a more complex series of actions designed to maximise their self- sufficiency, efficiency or reduce costs.

Just as some people trade on the stock market every day, others trust an investment manager to do it for them and many of us just check in on our superannuation every now and then and don't think too much about it.

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[5] Hannah Arendt (1972) cited by Charles Leadbeater and Jennie Winhall in their paper, *The Power to Shift a System*, November 2021. I am indebted to these authors and the System Innovation Initiative of the Rockwool Foundation, for the framing of my ideas in this speech on energy systems change. https://www.systeminnovation.org/

The overriding principle should be settings and a market that provide consumers with the most agency tailored to their individual needs and preferences.

That means allowing them a sense of control in a way that is intuitive, easy and transparent. They are able to see what is being asked of them and what is offered in return.

Not all households and small businesses have the same means and opportunity to manage their energy use, which if left unaddressed could worsen the energy divide.

The energy divide

Those with efficient homes, solar on their roof and a battery and electric vehicle in the garage have more choices in how they meet their energy needs and interact with the system. They can to an extent "insulate" themselves from the impact of high retail electricity and gas prices.[6]

Everyone else is relying on the electricity grid to meet their needs – which is half of all households, and most small businesses.

Not everyone who owns their house has the means or opportunity to put solar on their roof, and the costs of home batteries remain high.

Those who rent – around one third of all Australians households and most small businesses – and those who live and work in shared buildings have fewer options and are likely to continue to experience the highest bills.

There are multiple barriers to participation which we need to identify, understand and systematically dismantle wherever we find them and replace them with enablers that make it easy, beneficial and desirable for consumers to make the investments and the behaviour changes that are being asked of them.

That should include things like minimum energy efficiency standards for rental properties, so that tenants don't have to live in draughty homes that are the equivalent of tents.

It should include programs to increase the energy efficiency of millions of homes through mandatory disclosure of energy performance and requiring better insulation, lowering electricity bills in the process.

It should include subsidies to help households and businesses convert from inefficient and gas-fuelled appliances to efficient electric ones.

It should also ensure equitable access to electric vehicles and inexpensive charging options, for those who need to rely on public or shared charging.

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[6] AEMO in its Integrated System Plan assumes that the number of households with rooftop solar systems could double from 3 million to 6 million by 2030 – which will be around half of all households, and is the likely saturation level. Within the Integrated System Plan (ISP) there are assumptions made about the role of flexible storage in a renewable energy system – much of it in small scale in homes and businesses. In the ISP the 31 GW of flexible generation in homes and businesses will be almost twice as big as pumped-hydro and utility-scale batteries.

We need to invest in consumer agency. Consumers should have the capability to make the decisions that benefit them when accessing energy services. Information, tools and advice to support good consumer decision making has been lacking and left to the sellers of services.

Just as we support a universal duty of care as the basis for a consumer protection framework that extends to however energy is bought, there should also be universal access to free and independent dispute resolution however energy is bought.

Australians pride ourselves on a fair go, and the energy divide must be addressed in the transition to a renewable energy system – not by handouts but by building equity and inclusion into market design.

A grand bargain for a sustainable future

At your last conference I spoke about how much we don't know about consumers, and in the time since then some important research work has been done to fill this gap. That includes the work that Energy Consumers Australia is doing in partnership with Monash University, the Australian National University and more recently with the University of Western Sydney.

But at this conference I wanted to remind us of the purpose of the system which is to power our lives, livelihoods and businesses. And in doing so support our well-being and prosperity as a society.

The energy system is itself expanding, as it extends into our access to technology, transforming our homes and buildings and the means of our mobility.

The transformation of the energy system needs to be done with consumers, not by exercising power over them, and so accomplishing change despite them.

After all, we are asking consumers to invest more than $500 billion into their homes and businesses over coming decades, to adapt to high energy prices and change ingrained social practices and habits.

Working together requires that we share a vision of the sustainable future. This vision, and the plans that will be required to achieve it need to be grounded in science, and not assumptions that consumers will play the roles assigned to them as imaginary friends.

I came across this quote, that I want to leave with you.

> *"Science means constantly walking a tightrope between blind faith and curiosity; between expertise and creativity; between bias and openness; between experience and epiphany; between ambition and passion; and between arrogance and conviction - in short, between an old today and a new tomorrow."*[7]

[7] Heinrich Rohrer, Nobel prize winning Swiss physicist, *"Walking a Tightrope, in Trust and Confidence in Scientific Research"* 2013, edited by G Hermerén, K Sahlin & N Sahlin. Stockholm: Kungl. Vitterhets Historie och Antikvitets Akademien: 11-15; and similarly in *A Plea for Science, 2012* https://onlinelibrary.wiley.com/doi/full/10.1002/adma.201103886

That new tomorrow is a better future energy system than it is today. It is one that is least cost and most participation, and where our community is not divided into consumers for whom energy is abundant, clean and affordable, and large part of the community for whom it is not.

Only then will we have a sustainable future, that we all work together to support, and that serves all of us.

Thank you.