

Powering Net Zero | Four-Part Series: How will a net zero electricity system work?

What is demand willing and able to do? Voice of the consumer

“The consumer has the veto on net zero...”

Energy policy has historically been biased towards supply, but we cannot get to a ‘good net zero’ - a net zero that balances economic, social, and climate outcomes - without the consumer engaged and participating. We will not be able to afford the upgrades to our grids and networks, and capacity expansion of wind and solar, without consumers reducing waste, implementing energy efficiency technologies, and providing flexibility that can reduce the scale of investment and cost of systems operations. For example, in the ESOs 2021 Future Energy Scenarios, the Consumer Transformation Scenario requires 20% less energy (and therefore less capex infrastructure) compared to the System Transformation Scenario.

In this four-part ‘Powering Net Zero’ series of panel-based conversations, we will explore the consumer perspective on demand (the opportunities, barriers, and enablers), market reform (devices, innovative infrastructure, and investment) and renewables, the grid, and the associated systems (including the role of batteries, storage, and hybrid plants). Each panel will generate takeaways on their subject and, with the series objective to deliver specific outcomes, the final session will summarise our findings and answer the question: how a net zero electricity system will actually work?

In this first session on 10 May 2022, we heard from three speakers who represent the consumer:

- Adam Scorer, CEO, National Energy Action, the national fuel poverty charity
- Julian Soles, Head of Technology Development, Mining & Sustainability, Anglo American
- Eric Brown, former Chief Technology Officer of the Energy Systems Catapult

6 Takeaways from Part 1: Consumers, Demand & Net Zero:

1: A ‘Whole System’ approach

Even for new technologies, costs may go up in one part of the system but optimising the entire system can often result in cost neutral or even lower system costs. Julian Soles provided the example of the [hydrogen mining trucks](#) that Anglo American launched 1-2 weeks ago (April 2022) in South Africa – 300 tons of platinum payload (one of the largest trucks in the world) without emissions, powered by green hydrogen. The cost of haulage of these trucks will be equivalent to diesel. This was made possible by a redesign of the entire system, from consumption to production.

2: Demand is not just a transactional market/consumer challenge - there’s a huge amount of foundational work in policy, regulation, and financial support.

The number of demand-side products and services is large, growing, and incredibly diverse, increasingly with ‘bundled offers’ that are difficult to understand and compare. “Basic consumer protections are absent,” says Adam Scorer, posing some of the key challenges for consumers, including where to start – for example: *what is the route for my terrace house to get net zero compliant? And am I protected? And where do I go if I have an issue?* In trying to create a consumer market case without regulation, price, and controls, we will end up making it a million times more complex”.

3: Enabling capability – communicating clearly to stakeholders, building skills and literacy.

Consumer engagement and participation are not the same thing. Consumers can be engaged, but we need them to *participate* in a meaningful way - to be part of the system redesign. Eric Brown compares the electrification of transport vs. heat: “In transport, we see uptake because of beautifully designed vehicles vs. heat pumps where aesthetics, noise, and intrusion are challenges yet to be overcome”. Solutions such as the Energy Systems Catapult [living lab](#) – real people living in real homes can be used to gain hugely valuable insights, not just for testing the technology, but testing the business model, policies and regulatory change. Additionally, important to recognise that local interventions (vs. national) are likely to

be the most effective as local stakeholders know the people and local resources and are likely to be best placed to implement changes.

4: There is no pathway to net zero that does not travel through the homes of the poor.

Adam Scorer was clear that NEA is firmly of the belief that “the only route to eradicate fuel poverty is through the alignment with net zero”, particularly energy efficiency and the decarbonisation of heat (e.g. insulation). For this population, with no discretionary income to invest, how do you help them understand why the intrusion is worth it? It’s important to make the case for the benefits beyond emissions reduction. Powerfully, as Adam highlights that “it’s not only about carbon abatement but about thermal comfort, about a good start in life, about children being able to do their homework, about not being ashamed of to have family over to cold home, about not imposing billions of pounds of costs to the NHS... the poor do not have to be a drag anchor - they can be an accelerant.”

5: Industry cannot do this alone. All stakeholders need to drive the transition.

As Adam Scorer and Eric Brown both emphasised, consumers are a hugely diverse group, and the word “demand” falsely indicates a homogenous group that can be aggregated and will react to price signals, whereas we know this is oversimplified and not the case. Even with residential, commercial, and industrial segments, there is huge diversity of stakeholders with different motivations, all of whom need to be participate in the energy transition. For example, when asked about the impact of investors on Anglo American’s Sustainability Strategy, Julian Soles’ response was that investors are only one stakeholder group. The local communities and people who work in the mines are equally important and have an impact on the solution, particularly to address challenges such as the land requirements for solar. He gives the example of the 100MW solar farm in South Africa that requires a lot of land which will be balanced by the free carry of renewable electricity that the community will receive. The various consumer groups need to engage and participate in shared outcomes.

6: Don’t get too hung up on technology choice – we’re going to need everything.

The debate often centres around technology – “battery or hydrogen”, “green or blue hydrogen” but for net zero, we will need to reduce waste, implement energy efficiency technologies, electrify what we can, and use hydrogen. The bigger challenge, and innovation, is redesigning the consumption. In the Anglo American hydrogen truck example, Julian Soles mentioned that there are many supply-side suppliers and solutions but fewer resources available to support the consumption / demand-side redesign. The mix of technologies will differ on a case-by-case basis. The challenging part is actually not going to be the technology solution but the changes in the consumption processes and operating models.

In summary, we need all types of consumers to engage and participate to deliver a “good net zero”. We need sustainable behavioural change (e.g. somehow over the last couple of generations we have moved from 1-2 baths a week, to showers every day, to more than one shower, and longer in the shower, consuming more overall). We can reverse this (e.g. since COVID, it is now the norm to work from home at least part of the week, meaning we travel in cars less) and redesigning the consumption processes will be required. We need the different consumer groups to participate in this redesign as the best group to redesign *demand* is not *supply*.

Be part of the conversation: there are still three more events in this series that you can attend:

Part 2 | What is demand willing and able to do? Market evolutions to engage consumers. (7 July 2022)

Part 3 | The value of system services – what does it mean for a net zero system? (27 September 2022)

Part 4 | Series Outcome - a net zero electricity system in an integrated energy system. (1 December 2022)

For more information on the Powering Net Zero series and to register now (in person or online) visit: energy-inst.org/powering-net-zero