Submission to the Open Energy Networks consultation paper

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About the Public Interest Advocacy Centre

The Public Interest Advocacy Centre (PIAC) is an independent, non-profit legal centre based in Sydney.

Established in 1982, PIAC tackles barriers to justice and fairness experienced by people who are vulnerable or facing disadvantage. We ensure basic rights are enjoyed across the community through legal assistance and strategic litigation, public policy development, communication and training.

Energy and Water Consumers' Advocacy Program

The Energy and Water Consumers' Advocacy Program (EWCAP) represents the interests of low-income and other residential consumers of electricity, gas and water in New South Wales. The program develops policy and advocates in the interests of low-income and other residential consumers in the NSW energy and water markets. PIAC receives input from a community-based reference group whose members include:

- NSW Council of Social Service;
- Combined Pensioners and Superannuants Association of NSW;
- Ethnic Communities Council NSW;
- Salvation Army;
- Physical Disability Council NSW;
- Anglicare;
- Good Shepherd Microfinance;
- Financial Rights Legal Centre;
- Affiliated Residential Park Residents Association NSW;
- Tenants Union;
- The Sydney Alliance;
- Mission Australia; and
- Solar Citizens.

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The Public Interest Advocacy Centre office is located on the land of the Gadigal of the Eora Nation.

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The rise of decentralised supply

The National Energy Market (NEM) is in the middle of a transformation from an energy system relying primarily on fossil-fuel with passive demand to one with a low- or zero-emission generation fleet with more sophisticated and active demand-side behaviour. An important part of this is, as the Open Networks consultation paper points out, is a growing amount of energy being generated at or close to the customers' premises compared to being delivered from centralised generators. In particular, we note the forecast from Bloomberg New Energy Finance in Figure 1 which shows the rapid growth of decentralised capacity not only in MW terms but also as a proportion of total installed capacity.[1]

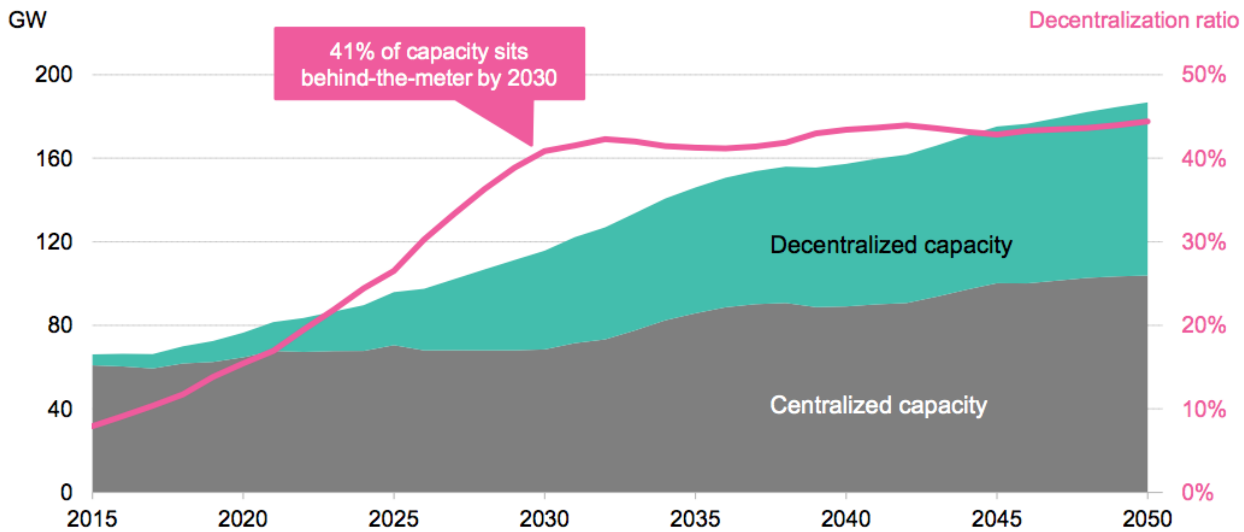

Figure 1 Decentralised sources will constitute a growing proportion of total installed capacity in Australia (Source: BNEF presentation at Australian Clean Energy Summit 2018)

It is essential to manage this transition in a way that maximises the systemic benefits, shares them equitably and does not exacerbate the current affordability crisis facing many consumers. We appreciate that this is no small feat. Therefore, PIAC considers there is merit in creating a set of overarching principles to help guide the various design decisions involved.

Principles for the need for a DSO and DER optimisation

A Distribution System Operator (DSO) could assist in driving the most efficient investment in and use of Distributed Energy Resources (DER). However, we note that there is no clear definition of what a DSO is intended to achieve – and just as importantly, what is beyond scope of a DSO. We would welcome this question being explicitly consulted on to arrive at broad agreement. In simple terms, it is impossible to determine whether a particular platform design is optimal without clarity on what a DSO is intended to achieve.

PIAC considers that a set of high-level principles is will assist guide the design of any DSO. Some aspects to consider are outlined below.

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1 BNEF, *Australia's distributed energy future*, presentation at the Australian Clean Energy Summit, 2018.

A more nuanced understanding of consumers and DER

PIAC notes that the consultation paper primarily considers the potential impact on consumers with DER. This can lead to a simplistic view of consumers in terms of those with and those without DER. PIAC suggests a more nuanced assessment is required to reflect the underlying reasons why consumers may or may not be able to access DER. This would allow a framework which not only covers how to make best use of existing DER, but also how to best facilitate new DER by addressing the barriers to otherwise efficient uptake. This is essential to assessing the potential benefits to the entire supply chain from greater orchestration and facilitation of DER.

There are a number of different factors which may prevent a consumer from being able to access DER. For instance, consumers may be prevented from pursuing otherwise economically efficient DER options due to:

- a lack of upfront capital to install DER despite it making economic sense in the long term to do so;
- physical restrictions limiting their ability to install DER on their premises (such as a lack of suitable roof space for rooftop PV);
- tenancy status preventing them from installing DER or other building energy efficiency upgrades;
- the benefit to the broader energy system from DER not being passed through or effectively communicated to consumers; or
- a lack of engagement with the energy market borne of a lack of time, understanding or trust.

To this end, PIAC has developed a framework of four cohorts of consumers based on the two independent axes of their level of 'social advantage' and level of engagement with the energy market. This framework is outlined in Attachment 1.

This is important to consider as the efficient use of DER has the potential to benefit all stages of the supply chain and hence reduce energy costs to all consumers – not just those with DER.

Principles-based hierarchy of services

Given the variety of different value streams possible from DER, it is essential there be a principles-based hierarchy to underpin how potential conflicts between these services are resolved. Such a conflict could occur if it is only possible to provide one out of a number of possible services in a given instant due to technical limitations of the DER (such as its current charge state or inverter rating) or due to binding constraints in the distribution network.

Questions to consider in such a hierarchy must include consideration of:

- To whom the benefits and costs of the service would accrue – whether they are system-wide benefits or whether they accrue to a single party such as the operator of the DER system. PIAC considers that, in the first instance, the DSO preference system-wide benefits over individual benefits.

- The potential competing interests of different parties and stakeholders such as the DSO itself, the network business, AEMO and the operator of the DER.

- The different relationships between the potential value streams – where some may be complementary while others may be conflicting. To this end, it may be useful to develop a matrix of these services and what factors may affect their complementary/conflicting relationships as noted in our response to Chapter 2, Question 1.

These principles must then inform a clear and well-articulated definition of the role of a DSO and the subsequent decisions regarding the platform decision and design.

Responses to consultation questions

Chapter 2 – Pathways for DER to provide value

Question 1 – *Are these sources of value comprehensive and do they represent a suitable set of key use-cases to test potential value release mechanisms?*

PIAC agrees with the four potential sources of value from active and passive DER listed in the consultation paper. However, we note that those listed all focus on the potential value derived to the consumer owning the DER itself. It does not consider the potential value of DER to others.

It is important to remember that the efficient use of DER can provide benefits throughout the supply chain so all consumers – not just those with DER – can benefit through a more efficient energy supply system. Efficiently orchestrated and optimised use of DER has the potential to provide benefits across the electricity supply chain:

- Wholesale and system operation
    - Provide an alternative to expensive generation to meet demand (both the operation of existing generation assets and the need to invest in new generation assets)
    - Provide system security such as through ancillary services
- Transmission
    - Avoid or defer capital investment (both augmentation and replacement expenditure)
    - Provide cost-effective alternatives to expensive interconnection investment
- Distribution
    - Avoid or defer capital investment (both augmentation and replacement expenditure)
    - Provide power quality support at the feeder and zone-substation level (e.g.: through residential inverter settings and dynamic responses to events)
- Retail
    - Manage wholesale and retail market exposure
- Customer (behind the meter)
    - Reduce consumers' electricity consumption from the grid (i.e.: self-consumption)
    - Provide supplementary power to a customer if their connection to the grid is constrained and limits their peak usage
    - Provide backup supply to a customer during outage (i.e.: operating in islanded mode).

In particular, the quantum of any DER impacts and whether it poses a net cost or benefit to distribution and transmission networks (and hence the potential value it may offer to networks) is not homogenous. It instead depends on various factors. As shown in Figure 2, the impact of any DER system will vary based on the geographical location. This depends on whether the DER is connected to a densely meshed, inner urban network or a weaker, more radial, remote area of the network. As shown in Figure 3, the same DER system will pose different costs and benefits at different levels of the electricity network – from impacts at the street-level through to the high-voltage transmission network.

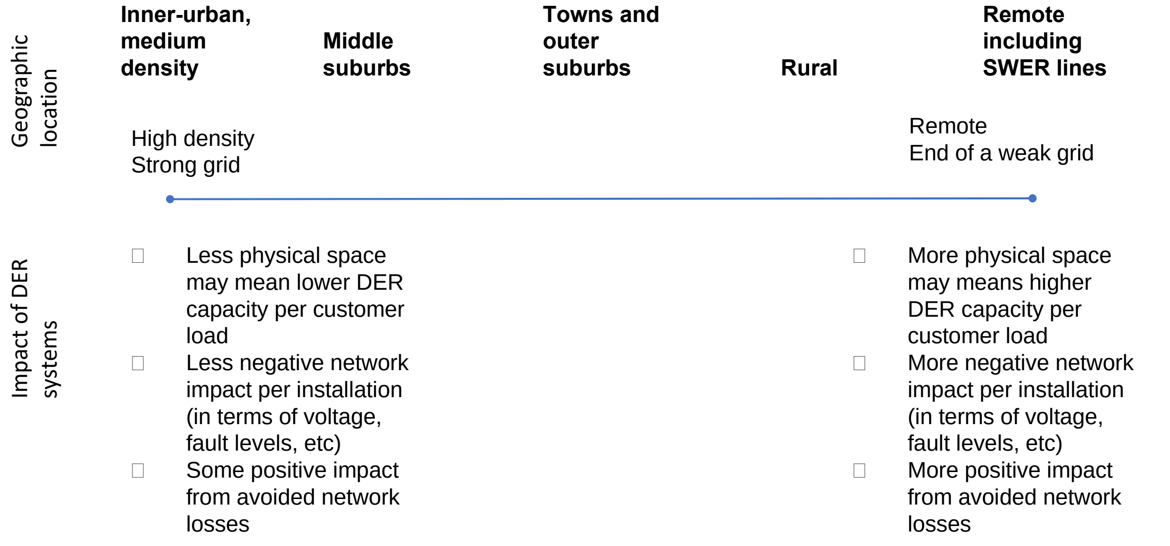

Figure 2 Typical impacts and benefits of DER systems on the electricity network by geographic location

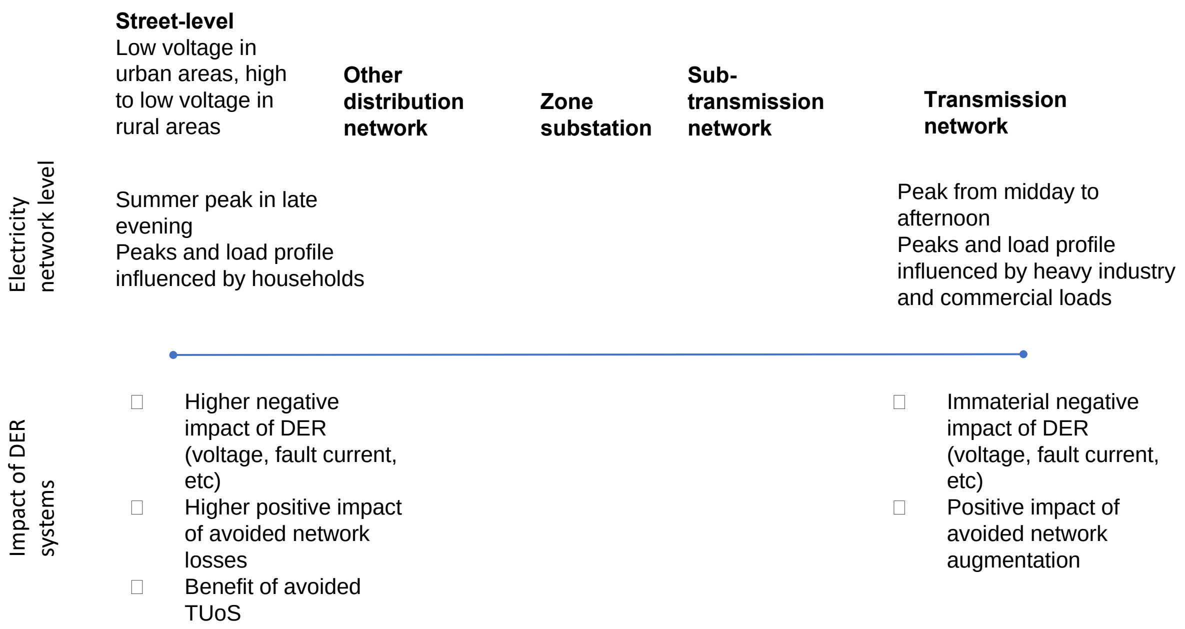

Figure 3 Typical impacts and benefits of DER systems on different levels of the electricity network

As work progresses on the Open Networks project, PIAC suggests developing a more granular and nuanced assessment of the potential DER value streams.

Question 2 – *Are stakeholders willing to share work they have undertaken, and may not yet be in the public domain, which would help to quantify and prioritise these value streams now and into the future?*

PIAC refers the ENA and AEMO to the submission from the UNSW Centre for Energy and Environmental Markets (CEEM) which outlines a number of relevant projects.

Chapter 3 – Maximising passive DER potential

Question 1 – *Are there additional key challenges presented by passive DER beyond those identified here?*

PIAC refers to the submission from CEEM outlining its analysis of inverter responses from rooftop PV systems to non-credible contingency events.

Question 2 – *Is this an appropriate list of new capabilities and actions required to maximise network hosting potential for passive DER?*

See response to next question.

Question 3 – *What other actions might need to be taken to maximise passive DER potential?*

In addition to the actions listed, PIAC considers that consideration of network connection and planning practices is required in order to maximise the potential of both passive and active DER. Presently, much of the network is designed for an energy supply industry where DER was not an option and power flows were unidirectional – clearly the sector has changed and planning practices must reflect this.

For instance, new developments and network augmentations could be designed to cater to higher levels of DER 'out of the box' by including the necessary power system and communication equipment as standard. Equipment to facilitate higher levels of DER could also be rolled out to existing areas of the network as part of normal scheduled upgrade, refurbishment or replacement projects.

Including these as part of business-as-usual practice will not only minimise or avoid the current technical issues associated with high levels of DER, but also minimise the additional cost of facilitating it.

Additional information of network status and DER behaviour will be required to unlock many of the potential value streams. This will require not only gathering this information (such as through the roll-out of digital metering infrastructure) but also sharing it with others in a timely and usable way. This would benefit from standardised data formats and protocols for data access and sharing.

Additional comment – *The additional cost to develop necessary capabilities*

The consultation paper states that “implementing dynamic control would require new capabilities to be developed within the distribution sector, DER vendors and AEMO” and that this “would require material investment, which will need to be weighed up carefully against the increased value released from customer DER”.[2] While PIAC certainly supports using robust and transparent cost-benefit analyses, the previous statement misses the point.

The relevant cost here is not the total investment required in upskilling and system upgrades but how much of this would be additional to the natural evolution of technology and developments in good business and industry practice. For instance, many skills and knowledge will naturally develop as technologies evolve and become more ubiquitous rather than requiring specific expense (for example, having word processing skills is now generally assumed knowledge for most office-based roles).

The uptake of DER is already occurring and the system is being upgraded to respond to this – therefore the question to consider here is what costs would be above and beyond these costs being incurred currently as business as usual. This is an important point, as the costs to set up a DSO to organise and orchestrate DER, while it may be significant, may actually be less costly than the current ad-hoc and uncoordinated responses to increasing levels of DER.

In addition, overhauls and replacement of business IT and other systems occur periodically when systems reach the end of their useful lives or become obsolete and no longer supported. These are costs which businesses would incur anyway as part of business-as-usual. Therefore, the additional cost of system upgrades required to implement a DSO can be greatly reduced by aligning with regular business as usual work. This can be further assisted through appropriate transition periods where particular obligations are deferred and by using short-term alternatives in order to align multiple system upgrades or investments.

Chapter 4 – Maximising active DER potential

Question 1 – *Are these the key challenges presented by active DER?*

PIAC agrees with the challenges outlined in the consultation paper but wishes to comment on particular aspects of them.

Forecast errors
The paper states that “escalating forecast errors would need to be managed by greater use of Frequency Control Ancillary Services (FCAS). The cost of which is borne by consumers and market participants.”[3] PIAC agrees that escalating forecast errors are a potential challenge in the NEM for both centralised and decentralised energy. While FCAS is one of the current mechanisms for responding to errors between forecast supply and demand, we question whether FCAS is necessarily the best way of managing this into the future.

PIAC understands there is a range of projects and research underway in Australia and overseas to improve forecasting and dispatch processes to minimise the impact of short-term discrepancies between supply and demand.

[2] AEMO and ENA, *Open Energy Networks consultation paper*, 2018, 18.
[3] Ibid, 21.

Large and sudden movements in VPP output
Regarding Virtual Power Plants (VPP), the paper states that "large, sudden VPP movements could exceed the capability of regulation reserves to respond, and would trigger the use of contingency FCAS" and that "very large VPP movements could exceed the capabilities of FCAS reserves to respond, and threaten system security".[4]

This is true of any supply or demand option. What is relevant is the probability of such as sudden movement and the magnitude should it occur (both in terms of raw MW/sec and ability for the system to absorb it). PIAC stresses that, while the issue of large and sudden movements in output is certainly a security challenge, it is not unique to VPPs or indeed to DER. A VPP will simply have a different profile for the spread of both probability and magnitude than, say, a more 'traditional' generator such as a gas turbine or hydro plant.

Question 2 – *Would resolution of the key impediments listed be sufficient to release the additional value available from active DER?*

PIAC agrees with the impediments identified. In particular we note that an assessment of consumer fairness is required both in developing the retail offers which unlock the value of DER and developing in the framework for constraining DER in the event of a network constraint.

Question 3 – *What other actions might need to be taken to maximise active DER potential?*

See response to Chapter 3 Question 3.

Question 4 – *What are the challenges in managing the new and emerging markets for DER?*

PIAC considers there are three key challenges in creating and operating markets for DER:

- Consumer protections – ensuring fair and equitable outcomes not only for those already with or getting new DER but also for those who want to but currently cannot get DER and those who don't want DER.
- Managing conflicts – there are a range of potential conflicting incentives or priorities between customers, retailers, DER aggregators and network businesses.
- Transparency – as with any market it is essential to maintain transparency of the market to prevent gaming and perverse outcomes.

Question 5 – *At what point is coordination of the Wholesale, FCAS and new markets for DER required?*

No comment.

[4] Ibid, 21.

Additional comment – *The additional cost to develop necessary capabilities*

As noted in our response to Chapter 3, the relevant cost is not the total investment required in upskilling and system upgrades but how much of this would be additional to the natural evolution of technology and developments in good business and industry practice.

In addition, overhauls and replacement of business IT and other systems occur periodically when systems reach the end of their useful lives or become obsolete and no longer supported. These are costs which businesses would incur anyway as part of business-as-usual. Therefore, the additional cost of system upgrades required to implement a DSO can be greatly reduced by aligning with regular business as usual work. This can be further assisted through appropriate transition periods where particular obligations are deferred and by using short-term alternatives in order to align multiple system upgrades or investments.

Chapter 5 – Frameworks for DER optimisation

Question 1 – *How do aggregators best see themselves interfacing with the market?*

No comment.

Question 2 – *Have the advantages and disadvantages of each model been appropriately described?*

PIAC considers that the ability to meaningfully comment on specific design options for a DSO would benefit greatly from first developing a clear outline of what a DSO is intended to achieve and the principles to underpin it. As such, we have not made detailed comments on the three specific platforms proposed in the consultation paper.

However, we note that while the principles for framework design listed in section 5.3 of the consultation paper are a good start, they would benefit from greater consultation and discussion – for instance reflecting a more nuanced understanding of consumers and incorporating principles for dealing with conflicts between potential value streams.

If an existing entity were to take on the role of DSO, it would also be important to consider the alignment of the roles and obligations of a DSO against the existing governance, regulatory structure and culture of that entity. For example, a distribution business may have a conflict of interest between their regulated revenue and effective DSO operation, while it may be a challenge for AEMO to simultaneously reconcile its obligations at a whole-of-system-level with the more granular focus of a DSO.

Question 3 – *Are there other reasons why any of these (or alternative) models should be preferred?*

See response to previous question.

Chapter 6 – Immediate actions

Question 1 – *Are these the right actions for the AEMO and Energy Networks Australia to consider to improve the coordination of DER?*

See response to next question.

Question 2 – *Are there other immediate actions that could be undertaken to aid the coordination of DER?*

PIAC notes there are a number of immediate actions which should be taken:

- Increase visibility into the distribution network including through the roll-out of digital metering infrastructure;
- Network businesses should provide stronger and clearer price signals to retailers by accelerating the transition to cost-reflective network tariffs;
- Retailers should provide more innovative retail offers to consumers which package the different price signals into a simple offer which consumers can understand and respond to; and
- Investigate the potential of implementing a full DSO in a defined area to test the application of the whole system together rather than testing only independent portions in isolation.

PIAC also supports suggestions outlined in the submission from CEEM which include reviewing the relevant Australian Standards and making use of currently available datasets.

Concurrent to these, PIAC stresses that the findings and insights developed in this workstream must also consider other network regulatory review and reform processes such as by the AEMC and COAG Energy Council.[5]

[5] For instance, the report commissioned for the COAG Energy Council: *Optimising network incentives*, 2018.

Attachment 1 – Consumers and the changing energy market

Until this decade, energy consumers could very broadly be categorised into 'haves' and 'have nots'; they could either afford energy, and the tools to limit their usage if they so desired, or they couldn't.

Since then, deregulation, emergence of competition, innovation (particularly in relation to behind-the-meter energy technology), and escalation of energy prices have created the need for consumers to be thought of differently to just these two cohorts: in addition to social advantage, a consumer's level of engagement with the energy market now has a material impact on their energy outcomes.

An engaged consumer may be able to minimise their energy bills through a combination of retail churn, behind-the-meter technologies, and ongoing engagement in the form of paying their bills on time to access discounts. Conversely, a consumer that is not engaged, or is financially disadvantaged, is likely to consume more energy from the grid, purchased from a retailer to whom they pay a higher price by not accessing the cheapest deals.

Considering that the levels of engagement and advantage are not mutually inclusive, PIAC considers that consumers should be thought of in four cohorts, for the purposes of consumer protections and promoting competition that works for all consumers.

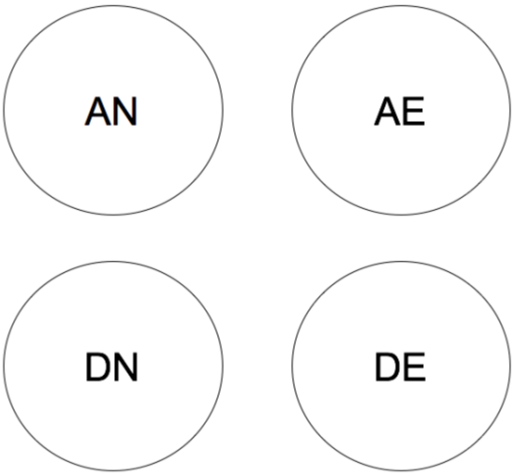

Figure 4 Current consumer cohorts

Advantaged/able, not engaged (AN)

This consumer cohort is disengaged from the energy market. While they do experience the detriment of disengagement through suboptimal retail contracts, their relative social advantage means that they are usually able to absorb the financial detriment associated with these contracts. On the other hand, while these consumers are more able to absorb the detriment associated with their lack of engagement, they are still being punished with inefficiently high bills in a way their engaged counterparts are not. Many are also at risk of falling into the DN cohort if their circumstances change, and consumer protections need to cater to this risk.

Disadvantaged/vulnerable, not engaged (DN)

This consumer cohort is likely to have the worst energy outcomes. The combination of energy market disengagement and relative social disadvantage means that these consumers are unable or unlikely to take advantage of new energy technology or beneficial market contracts from energy retailers. They may use large volumes of high-priced energy that they are unable to afford. Competition frameworks should support them having the opportunity to benefit from engagement, but it is critical that supporting frameworks, including protections and concessions, should not require them to be engaged or assume that is an option for them. The goal should be to move people from the DN cohort to the AN cohort, while giving them the opportunity to move to the AE cohort but not obliging them to do so.

Advantaged/able, engaged (AE)

This energy consumer cohort is the only one broadly getting good outcomes today. The combination of energy market engagement and relative social advantage means these consumers choose, and can afford, to be adopters of energy technology such as solar PV, energy storage and demand management systems. Furthermore, their engagement with the energy means they are likely to be on retail energy market contracts that enable them to most effectively use this technology. Competitive opportunities for these consumers should be encouraged, while recognising they are, by and large, least at risk of disadvantage.

Disadvantaged/vulnerable, engaged (DE)

While this cohort still requires similar support to the DN cohort, their willingness to engage means they are able to ameliorate some impacts of social disadvantage through engagement with the energy market. The goal for this group should be giving them the same opportunities to benefit from competition in the same way that the AE cohort have, while affording them the protections available to the DN cohort.