Social Licence for Control of Distributed Energy Resources

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CutlerMerz Pty Ltd
ABN 16 607 833 590
201 Sussex Street
Sydney NSW 2000 Australia
T +61 2 9006 1024
www.cutlermerz.com

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Executive summary

As Australian energy consumers continue to invest in Distributed Energy Resources (DER) at record levels, there are fast emerging risks and opportunities for our energy system. To both mitigate risks and give rise to opportunities, DER must operate in a way that responds to market and system signals. That is, DER needs to be controlled.

Control of DER, however, often comes at a private cost for owners or lessees of DER systems. These costs may be direct financial costs, whereby the control may limit access to markets and revenue streams, or non-financial costs, whereby the control may limit the use of an appliance (which may otherwise have utility value). Some consumers also report a range of perceived costs such as lack of control, privacy concerns and potentially health-based concerns.

In this study we propose that wherever DER control imparts private costs on the DER owner/lessee, regardless as to whether they are real or perceived, a social licence to control must be obtained by or on behalf of the party undertaking the control.

What is a social licence to control DER?

For the purposes of this study, a social licence to control DER refers to:

The informal permissions granted by stakeholders for government or institutions to undertake decision making on behalf of energy consumers as to how they operate their DER systems, above and beyond what is required by law.

A social licence to control DER, where gained and maintained, results in individual consumers perceiving the private benefits of DER control to be greater than the private costs or, at least, accepting the private costs in exchange for the public benefits.

Where a social licence is obtained it is likely to increase participation in voluntary DER control programs and potentially uptake of DER more broadly. Further, where a social licence for mandatory programs is obtained, it is likely to increase compliance and therefore decrease the cost of compliance and enforcement activities.

Who needs a social licence for control of DER?

We propose that the government or institution enabling the DER control (through policy, regulation or via a program) requires the social licence. This body may not ultimately be directly doing the control, however, it will generally regulate the way in which the third party must undertake the control, communicate with and reward consumers, and provide data and information to monitor the effectiveness of the DER control program.

How does the need for a social licence for control of DER vary by program type?

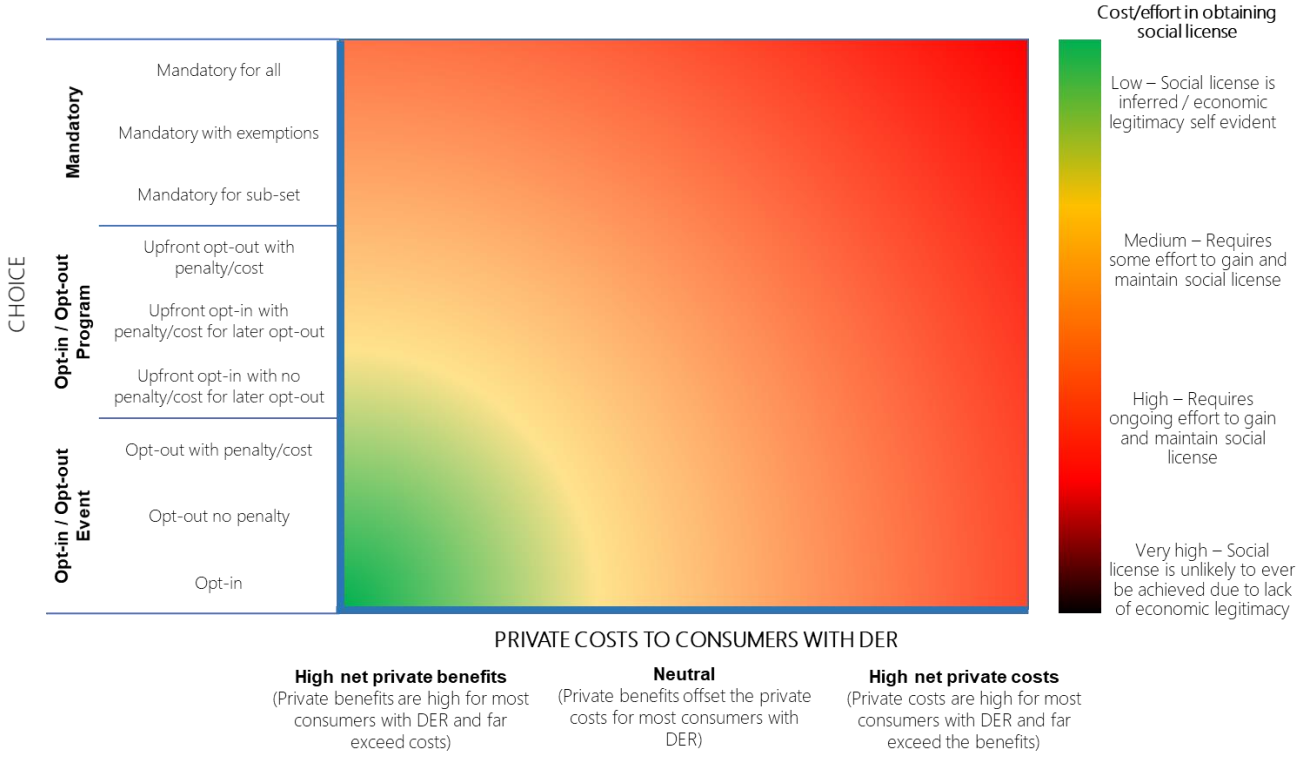
We propose that the cost/effort required to gain and maintain a social licence for control of DER is directly related to the:

1. Consumer's choice (in terms of the mandatory/voluntary nature of the program)

2. The extent to which the private costs are outweighed by private benefits for all consumers with DER subject to control.

The more mandatory and the higher the private costs, the more difficult it is to achieve a social licence as shown in Figure 1 below.

Figure 1 – Proposed framework for identifying the level of cost/effort in obtaining a social licence for control of DER

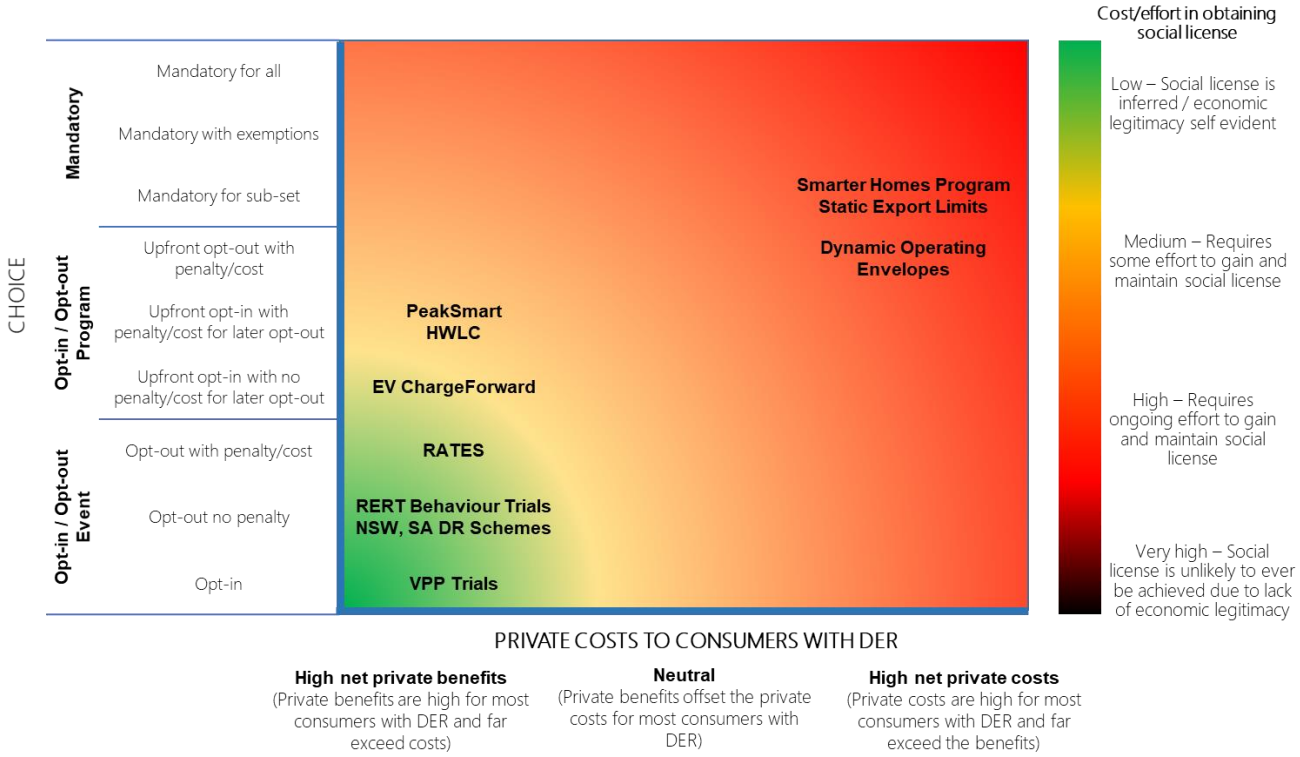


To what extent has a social licence been achieved for existing DER control programs?

We have assessed a range of existing DER control programs, both in Australia and in the United States, against the framework in Figure 1 with the outcomes shown in Figure 2. DER control programs tend to fall into three main categories:

- Mandated programs seeking to mitigate system security / safety risks, with little direct benefit to the consumer with DER, requiring the greatest level of cost/effort to achieve a social licence
- Voluntary programs offering once off rebates or incentives directly from government or the institution developing the program, requiring some effort to maintain a social licence to ensure that consumers continue to benefit over the life of the program
- Voluntary programs which operate via a market mechanism and are heavily automated such that benefits tend to be optimised for the consumer via an algorithm, requiring the lowest level of social licence assuming that the consumer continues to benefit over the life of the program (and is able to quickly opt-out if they perceive to not be benefitting).

Figure 2 – Costs/efforts of maintaining a social licence for existing DER control programs



What do energy institutions need to do to gain and maintain a social licence?

Firstly, energy institutions need to, to the extent practicable, ensure that the private benefits of the DER control exceed the private costs for all consumers with DER subject to control.

For voluntary programs, this may be achieved by:

- Establishing a market for DER services such that the consumer can choose to respond to price signals (or not) depending on whether they perceive a benefit at that time
- Removing any barriers to opting-out, including attributes of technical standards which may prevent opt-out or make opt-out more difficult.

For mandatory programs, this can be achieved by:

- Provision of compensation for any private costs
- Consideration of exemptions for certain sub-sets of consumers who may have high private costs
- Reconsidering the need for a mandatory program to achieve objectives (e.g., whether a voluntary program open to all consumers is more cost-effective than a mandatory program for a sub-set of DER consumers).

For all programs, this can be achieved via:

- Consumer engagement to understand and reduce the perception of private costs (where that perception has the potential to be overcome by data and information)
- Consumer engagement to explain how any public benefit to be delivered by the program will personally benefit consumers (e.g., a black out affecting the consumer is less likely to occur).

These measures all seek to increase the net private benefits for consumers with DER subject to control and provide for higher acceptance of programs.

Secondly, energy institutions need to establish trust with and ensure that program benefits are distributed in a fair way.

For the purpose of DER control this may include expressing and delivering on a commitment to:

- Ensuring that the control is only ever undertaken for the purposes of delivering the program's expressed objectives
- Transparency at the program level in the form of public reporting and communication of performance metrics (including some measure of consumer experience/consumer satisfaction)
- Transparency at the consumer level as to the DER control activities undertaken (advanced notification and feedback on impact) and costs and benefits accrued.
- Avoid surprises where consumers are unexpectedly:
    - Unable to opt-out or have a high cost of opting out due to lack of understanding of contractual arrangements
    - Unable to opt-out or have a high cost of opting out due to technological arrangements (e.g., lack of interoperability, no manual over-ride capability)
- Ongoing evaluation of the program including via engagement with consumers to identify any changes in perceived or actual costs, and views of "fairness" over the duration of the program
- Addressing equity issues either via program design or complementary measures.

Further, where the program enables third parties to undertake control (other than the energy institutions responsible for the program), it is critical that the third parties are also committed to the above as appropriate. This may be via the use of robust procedures including for accreditation and for reporting/monitoring as well as via direct contractual obligations.

Glossary

ARENA	Australian Renewable Energy Agency
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AS	Australian Standard
API	Application Programming Interface
COAG	Council of Australian Governments
CSG	Corporate Social Governance
DEIP	Distributed Energy Integration Program
DER	Distributed Energy Resource
DNSP	Distribution Network Service Provider
DOE	Dynamic Operating Envelopes
DR	Demand response
DRED	Demand response enabling device
ECA	Energy Consumers Australia
ESS	Essential System Services
FCAS	Frequency Control Auxiliary Services
IEE	Institute of Electrical and Electronics Engineers
PG&E	Pacific Gas and Electric Company
RERT	Reliability and Emergency Reserve Trader
VPP	Virtual Power Plant

1 Introduction

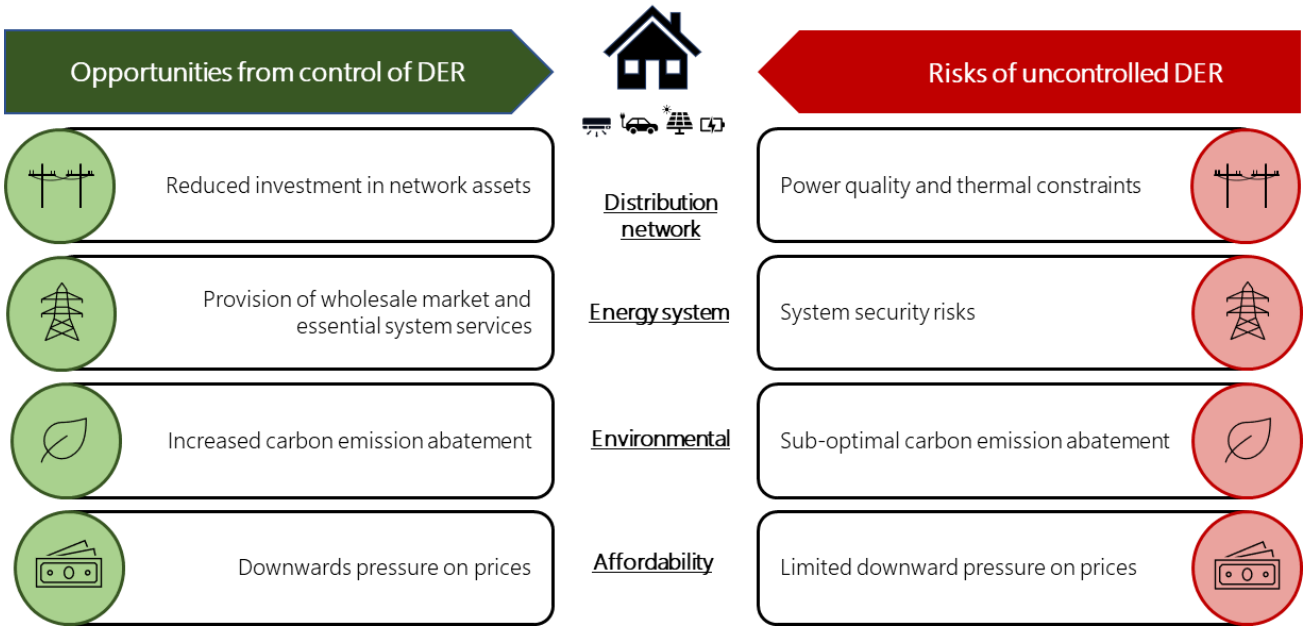
As Australian energy consumers continue to invest in Distributed Energy Resources (DER) at record levels, there are fast emerging risks and opportunities for our energy system.

High penetration of DER, operating in an uncoordinated way, can lead to local network constraints and energy system security impacts. Such impacts can result in significant investment costs to manage the risks, or, if left unmanaged, can result in direct impacts to consumers in terms of quality and security of supply.

Conversely, high penetration of DER can also give rise to opportunities. Where DER is able to participate in energy markets, it may provide network, wholesale market and essential system services more cost effectively than centralised alternatives, improving returns for DER owners and putting downward pressures on prices for all consumers.

To both mitigate risks and give rise to these opportunities, DER must operate in a way that responds to market and system signals. That is, DER needs to be controlled.

Figure 3 – Risks and Opportunities of DER control



Control of DER, however, often comes at a private cost for owners or lessees of DER systems. These costs may be direct financial costs, whereby the control may limit access to markets and revenue streams, or non-financial costs, whereby the control may limit the use of an appliance (which may otherwise have utility value). Some consumers also report a range of perceived costs such as lack of control, privacy concerns and potentially health-based concerns.

In this study we propose that wherever DER control imparts private costs on the DER owner/lessee, regardless as to whether they are real or perceived, a social licence must be obtained by or on behalf of the party undertaking the control.

1.1 Objectives

The overall objective of this study is to set out:

- When a social licence is required for DER control
- How a social licence may be gained and maintained (and the risks of losing a social licence)
- How a DER control program may be designed to minimise the cost/effort involved in gaining and maintaining a social licence
- How technical standards, including for both hardware and software, can influence the cost/effort involved in gaining and maintaining a social licence

1.2 Approach

We address the above objectives using a framework developed via the application of social licence theory to a DER control context. We apply this framework to various existing DER control programs, both in Australia and internationally, to consider the cost/effort required in gaining and maintaining a social licence licence, and how this may contribute to the success of the programs.

1.3 Scope

We include consideration of a broad range of behind the meter DER systems including energy generation systems, energy storage systems and demand response appliances. We consider DER that is either owned or leased by households, small commercial businesses, or communities. We are less concerned with DER systems which are owned and operated by larger businesses.[1]

We consider control of DER as any decision made by a third party (not the DER owner, nor the DER lessee) as to how the DER system operates. This includes, on one end of the spectrum, decisions which are made in real time via algorithms which dictate how DER responds to market or operator signals. On the other end of the spectrum reside once off decisions, such as policy/regulatory or contractual decisions, which may impact how the DER operates over its lifespan (e.g., applying static export limits).

1.4 Report structure

Section 1 – Introduction: Provides the background to the study, the objectives, scope and approach

Section 2 – Social Licence: Sets out what we mean by a social licence and applies social licence theory to a DER control context

Section 3 – Consideration of social licence in design of DER control programs : Proposes a framework that assesses the cost/effort required in gaining a social licence given the attributes of a DER control program

Section 4 – Assessment of existing DER control programs: Describes various DER control programs in Australia and internationally, and, using the proposed framework, assesses how the design of the program may impact the cost/effort required in gaining a social licence

Section 5 – Summary and discussion: Presents a summary and discussion as to how the findings may be used in the design and implementation of DER control programs.

[1] Operation of these systems tends to be optimised for direct financial benefits only, such that any control that would impact commercial returns would likely be accepted or approved based on financial considerations rather than via the concept of a social licence.

2 Social licence

2.1 What is a social licence?

What is a social licence?

A social licence refers to the informal permissions granted by stakeholders for government or institutions to carry out certain activities, above and beyond what is required by law.[2]

2.1.1 Social licence to operate

The term social licence, or social licence to operate, was developed in the late 1990s and early 2000s by consultants to the mining industry under the emerging practice area of corporate social governance (CSG). The term was originally applied to mining corporations as a method via which informal permissions to undertake mining activities could be achieved from impacted stakeholders. By achieving a social licence, it was proposed that mining corporations could mitigate the risk of community, employee or shareholder opposition to a project which could block or delay the project from proceeding. Obtaining a social licence was therefore of direct benefit to the mining corporations.

Since this time, the use of the term social licence has expanded in both academic literature and media[3] and has been applied across a diverse range of activities undertaken by both the private and public sector.

A social licence to operate in the CSG sense requires private corporations to seek permission to undertake activities with public costs or risks (typically environment or social impacts) for the purposes of delivering a private benefit. Conversely, a social licence to operate for the public sector requires governments or institutions to seek permission to undertake activities or require others to undertake activities (via a policy, regulation or program) which may have private costs on individuals for the purposes of delivering a public benefit.

These two different applications of the social licence to operate are demonstrated in Figure 4 below.

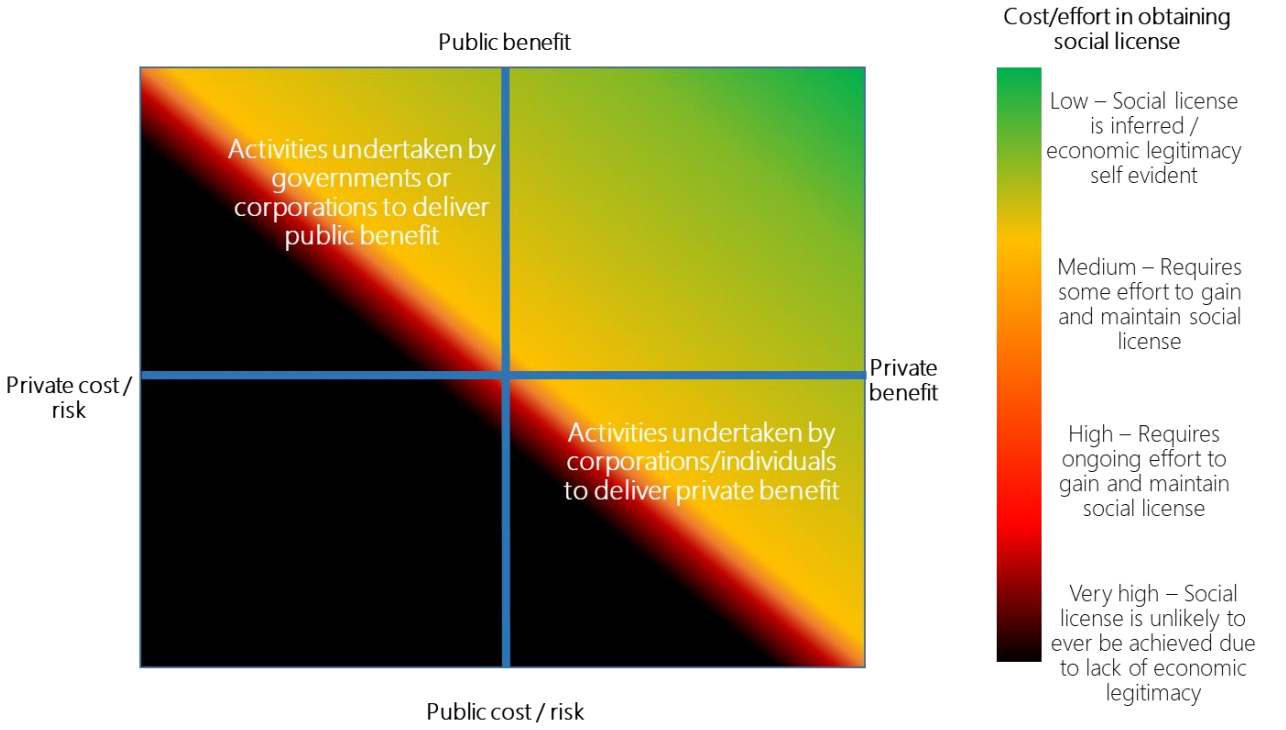
Private corporations tend to operate in the bottom right quadrant and seek to gain a social licence (by moving up towards the top right). This can be achieved by minimising public costs/risks (or the perception of public costs/risks), and/or by sharing with the public where possible (e.g., compensation, investing in local communities, job creation, eco offsets, etc.).

The public sector tends to operate in the top left quadrant and can seek to gain a social licence by moving across to the top right quadrant. This can be achieved by minimising private costs/risks (or the perception of private costs/risks) and by transferring public benefits to private households or communities (e.g., incentives, rebates, or communication strategies which attempt to personalise the public benefit achieved).

Any activities (by the public sector or private sector) defined by the bottom left quadrant, would tend to be either illegal, immoral or the result of very bad policy design (incompetence!).

[2] Moffat, K., Lacey, J., Zhang, A. & Leipold, S. *The social licence to operate: a critical review*. Int. J. Res. 89, 477–488 (2016).
[3] Gehman, J., Lefsrud, L.M. and Fast, S. (2017), *Social licence to operate: Legitimacy by another name?*. Can Public Admin, 60: 293-317

Figure 4 – Social Licence to operate for private benefit vs for public benefit



The application of the social licence to operate to the public sector is particularly relevant for this study, given that DER control is often enabled by governments to deliver benefits to the energy system and all consumers.

2.1.2 Social licence to control

In this study, we define a social licence to control, building upon the definition of a social licence to operate.

What is a social licence to control?

The informal permissions granted by stakeholders for governments or institutions **to undertake decision making on behalf of individuals, households or communities as to how they use their resources (time, assets, money),** above and beyond what is required by law.

The concept of the social licence to control is relatively new and the literature is scarce on this particular application. Notwithstanding, there are a number of relevant case studies related to the need for governments or institutions to obtain a social licence in the health sector, particularly relating to controlling health data[4], and in

[4] Carter, P., Laurie, G. T. & Dixon-Woods, M. *The social licence for research: why care. data ran into trouble*. J. Med. Ethics 41, 404–409 (2015).

recent times the need for a social licence for enacting public health measures (including lockdowns) during Covid-19[5]. We use some of these examples throughout this report as useful analogies.

2.1.3 Social licence to control DER

In this study we define social licence to control DER as a specific type of social licence to control.

What is a social licence to control DER?

The informal permissions granted by stakeholders for government or institutions ***to undertake decision making on behalf of energy consumers as to how they operate their DER systems,*** above and beyond what is required by law.

2.2 Why is a social licence to control DER needed?

Control of DER often imparts private costs on energy consumers, to achieve broader energy system benefits for all consumers. The concept of a social licence is therefore considered a good fit.

A social licence to control DER, where gained and maintained, results in individual consumers perceiving the private benefits of DER control to be greater than the private costs or, at least, accepting the private costs in exchange for the public benefits.

Where a social licence is obtained, it is likely to increase participation in voluntary DER control programs and potentially the uptake of DER more broadly. Further, where a social licence for mandatory programs is obtained, it is likely to increase compliance and therefore decrease compliance and enforcement costs.

Anecdotally, for example, there are reports of solar installers deliberately over-riding power quality response mode settings in inverters in order to reduce the extent to which a system is curtailed during voltage constraints, exacerbating voltage issues and further increasing energy system costs.

Further, the failure to achieve a social licence, or the loss of a social licence, can have lasting impacts on consumers, impacting the success of any future DER control programs. A useful example in this context is the Victorian AMI roll out, labelled as a policy failure due to at least a perception of there being "*more detriments to consumers, or costs to consumers as the result of the project as a whole, compared to the benefits".*[6] The failure to achieve, or the loss of a social licence in this context, has had lasting impacts on smart meter deployment policy in Australia.

2.3 Who needs a social licence to control DER?

For the purposes of this study, we propose that the government or institution enabling the DER control (through policy, regulation or via programs) requires the licence. This body may not ultimately be directly doing the control, however, it will generally regulate the way in which the third party must undertake the control, communicate with and reward consumers and provide data and information to monitor the effectiveness of the DER control program.

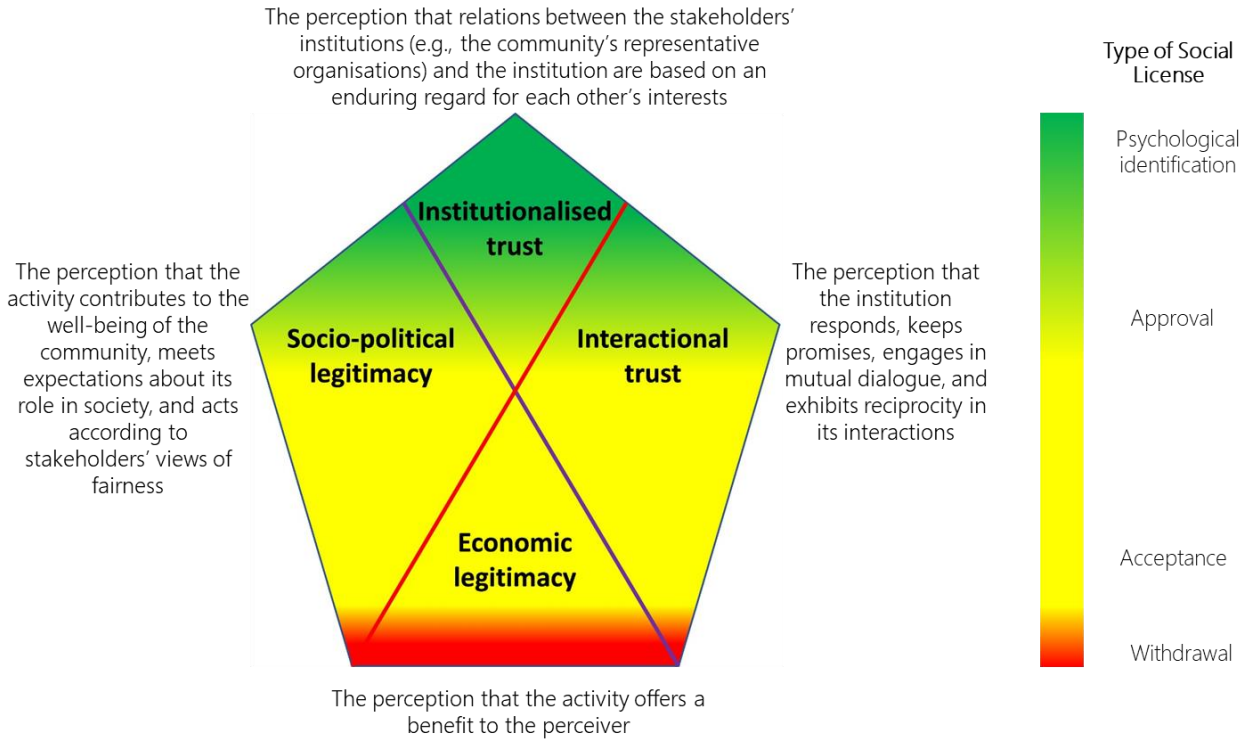
[5] See for example:
Shaw, J.A., Sethi, N.V., Cassel, C.K. Social licence for the use of big data in the COVID-19 era Digital Medicine volume 3, Article number: 128 (2020)

[6] Incoming Victorian Energy Minister Michael O'Brien, 2011 <https://www.abc.net.au/news/2011-12-14/smart-meter-roll-out-continues-despite-cost-blow-out/3730522>

2.4 How to gain and maintain a social licence?

In this study we use the framework proposed by Thomson and Boutlier[7] in terms of the pre-requisites required to achieve the various levels a social licence, as shown in Figure 5.

Figure 5 – Framework for the pre-requisites to achieve a social licence



Source: Thomson and Boutlier (2011)

Adopting this framework, we propose three different levels of social licence for control of DER include:

1. **Acceptance:** Whereby the consumers subject to DER control perceive that the private benefits of the control outweigh the private costs of the control.

2. **Approval:** Whereby to the extent practicable, consumers and consumer representatives perceive that:

    a. The benefits of the DER control are allocated according to their views of fairness

    b. The institution enabling the DER control program engages in two-way dialogue with consumers (both those subject to control and those receiving the broader system benefits of the control).

3. **Psychological Identification:** Whereby consumer representatives and the institution enabling the DER control program develop enduring regard for each other over the course of DER control program design, implementation, evaluation and modification.

[7] Thomson, I. & Boutilier, R. G. (2011). *Social license to operate*. In P.Darling (Ed.), SME Mining Engineering Handbook (pp. 1779-1796). Littleton, CO: Society for Mining, Metallurgy and Exploration.

3 Consideration of social licence in design of DER control programs

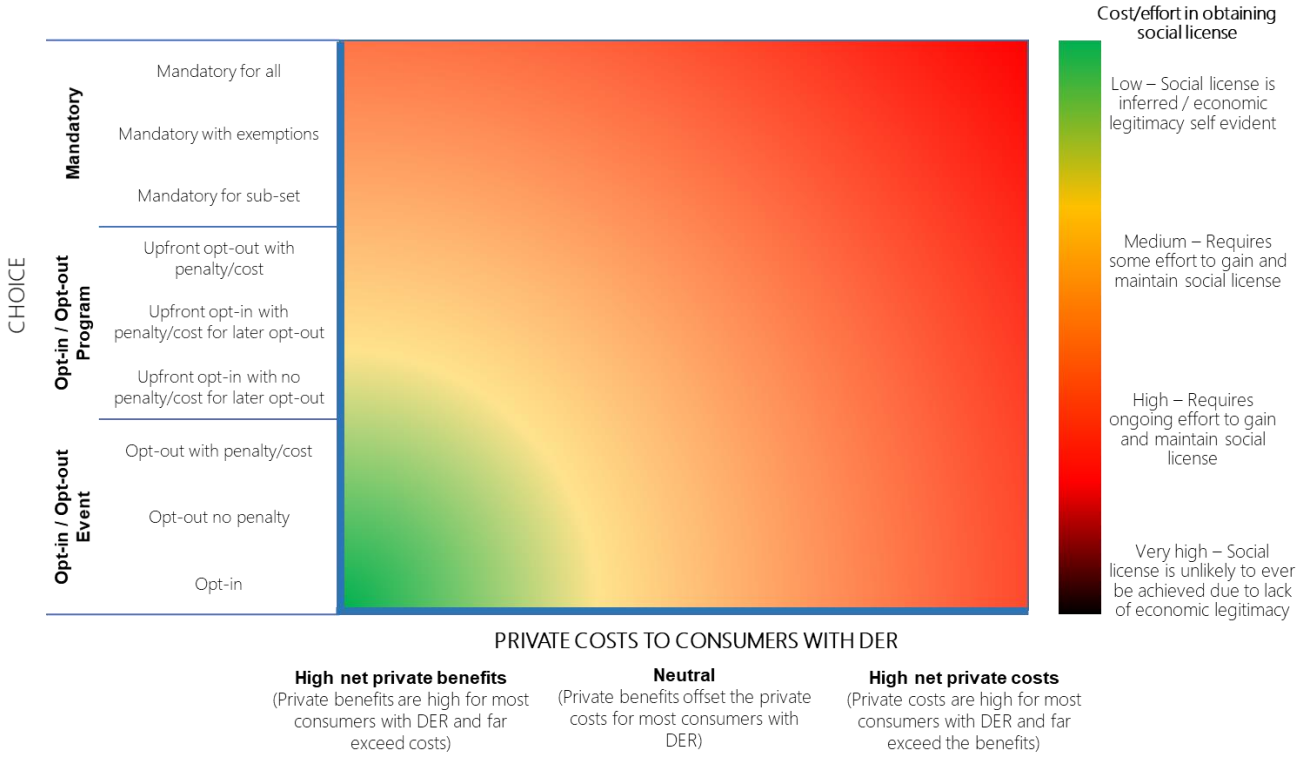
3.1 Proposed framework

We proposed in Section 2 that all DER control programs which impart a private cost on consumers (whether direct, indirect, perceived or actual) require a social licence. In this section, we propose that the cost/effort involved in gaining and maintaining a social licence depends on the program attributes.

In Figure 6 we propose a framework to enable the concept of a social licence for DER control to be factored into the design or evaluation of DER control programs.

We propose that the cost/effort required to gain and maintain a social licence for control of DER is directly related to the consumer's choice (in terms of the mandatory/voluntary nature of the program) and the extent to which the private costs are outweighed by private benefits for all consumers with DER subject to control. The more mandatory and the higher the private costs, the more difficult it is to achieve a social licence.

Figure 6 – Proposed framework for identifying the level of cost/effort in obtaining a social licence for control of DER



3.2 Impact of private costs

To reach acceptance level of a social licence, close to 100% of consumers with DER subject to control must perceive the benefits of the control to outweigh the private costs. This can be achieved where the program enables the energy system (public) benefits to be directly transferred to the DER consumer via an incentive payment, rebate or bill reduction or by personalising the public value to infer an indirect or perceived benefit. Both actions have the effect of shifting the program from right to left in Figure 6.

3.3 Impact of choice

In consideration of the role of choice, the level of participation/uptake required to deliver the benefits must be taken into account. Clearly, mandatory participation has the potential to drive the greatest uptake and therefore deliver the greatest benefit. However, where a DER control program is made mandatory, we propose that a social licence must be obtained from close to 100% of consumers with DER subject to control. This is very difficult to achieve in practice, especially where the private costs are high or highly heterogeneous (See section 3.4).

A mandatory program may only be fit for purpose where a very high level of uptake (close to 100%) is required to deliver the benefit. Limiting the mandate to a subset of consumers may alleviate the effort required (by targeting a subset with lower costs) but requires further care, as the concept of a lack of fairness, may undermine the social licence. Where the mandate is limited to a subset, it must be clearly articulated why this is "fair" in accordance with stakeholders' views as to what "fair" means.

If the DER control program is voluntary (shifting from top to bottom in Figure 6) then it is much easier to both obtain and monitor the social licence. This is because acceptance is revealed by the consumer opting-in (or choosing not to opt-out) of a program or particular event.

Where a high level of participation is not required to deliver benefits, consideration should be given to opt-out mechanisms for consumers for whom the costs are particularly high.

3.4 Impact of consumer heterogeneity

Improving the net benefits for all consumers with DER subject to control is particularly challenging. For mandatory programs, all consumers with DER must be convinced that private benefits exceed private costs to obtain a social licence. For voluntary programs, this is less critical, but can impact on the effectiveness of the program in terms of limiting uptake.

DER consumers tend to fall into four main categories[8] when it comes to the perceived private cost and benefits of DER:

1. Derives personal satisfaction in adopting modern technology and automation and perceives little to no disbenefit of control

2. Willing to absorb any private costs where the DER control provides for financial benefits and/or solves a practical problem

3. Places a high value on social/environmental outcomes, perceives DER control as in alignment with these values, and is therefore willing to absorb reasonable costs

4. Place a high value on social/environmental outcomes but perceives DER control (and often technology generally) as in conflict with these values and is therefore unlikely to adopt DER control.

Consideration of these four groups, in terms of the make up of each for any given DER control program, is therefore critical to obtaining a social licence and/or increasing uptake and effectiveness.

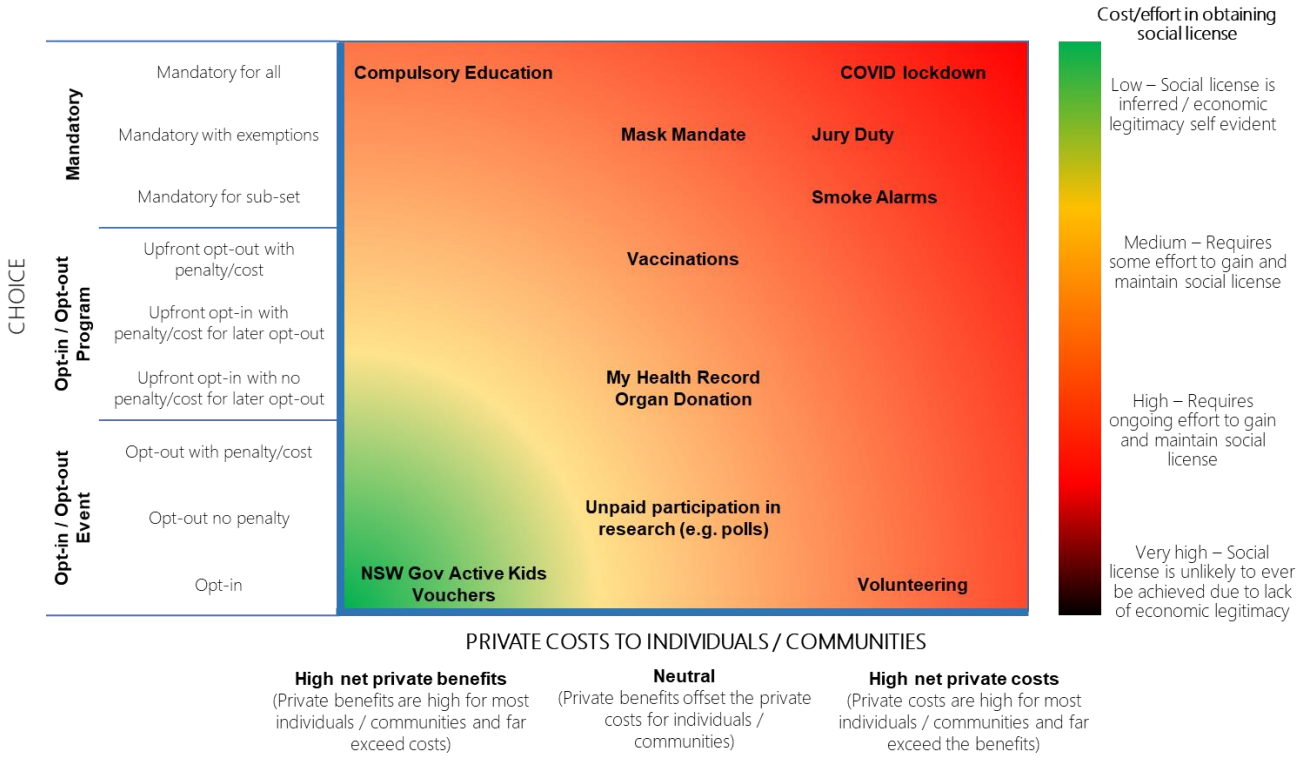
[8] Adapted from *Socialising the automation of flexible residential energy use Conference session report,* specifically the conference paper 'Smart charging infrastructures and the different types of end-user',by Ida MarieHenriksen, Marianne Ryghaug and Tomas Moe Skjølsvold, NTNU < https://userstcp.org/wp-content/uploads/2020/09/EASST-4S_2020_Socialising-the-automation-of-flexible-energy-use_Conference-session-report.pdf>

3.5 Application to other sectors

To better understand the proposed framework, it is useful to consider its application more generally for a social licence for any form of control (of time, money, or assets).

Figure 7 below sets out, theoretically, how the need for a social licence could be considered for other programs developed by governments or institutions which exert control on individuals, households, or communities.

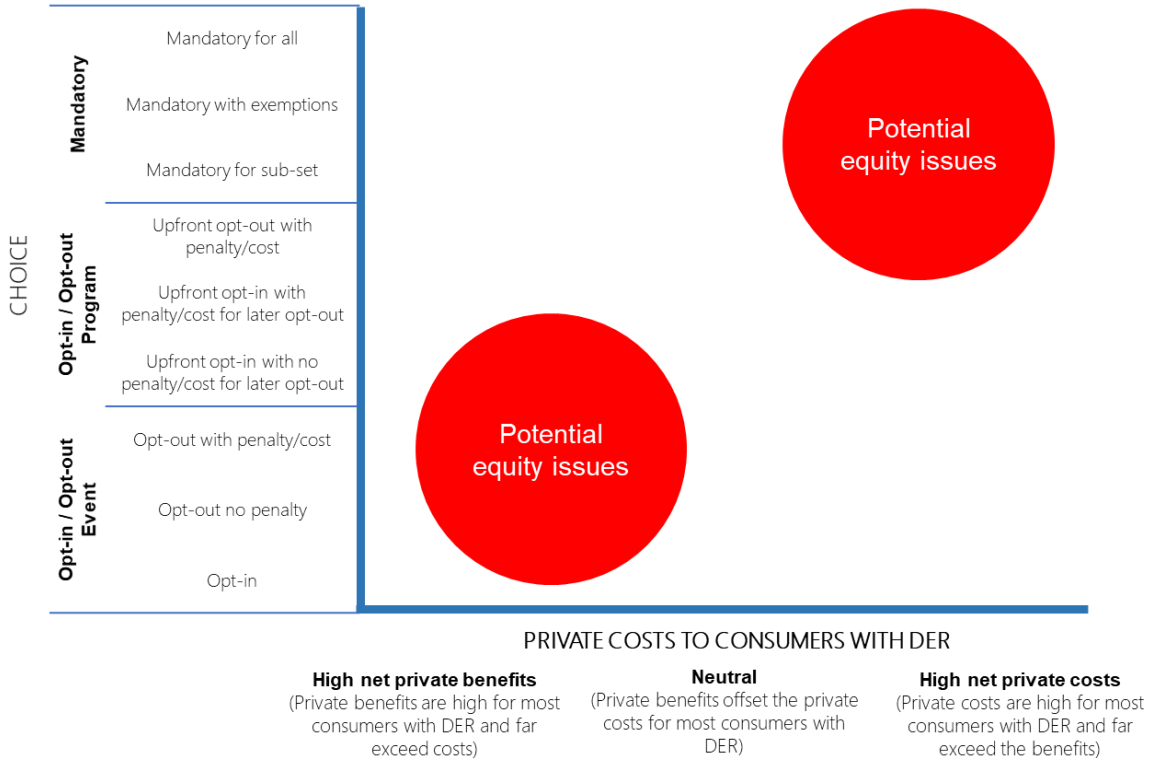
Figure 7 – Theoretical consideration of social licence for other programs



3.6 Consideration of equity issues

Although not explicit in the above, the design of any control program needs to also consider how equity issues can be managed, either by program design or complementary measures. We propose that equity issues may arise for DER control programs that are either mandated (top right-hand corner) or have a high net private benefit (typically bottom left-hand corner of framework), as shown in Figure 8.

Figure 8 – Equity considerations for control programs



We propose that any DER control programs which are largely mandatory need to consider equity issues which may exist where costs are highly heterogeneous and may impact vulnerable consumers disproportionately. A design response may be to include exemptions for vulnerable consumers. Where any such exemption has an impact on the overall effectiveness of the program, an alternative complementary measure such as compensation, could be considered for particular subsets of impacted consumers.

Further, DER control programs that offer high net private benefits are typically only available to consumers with the ability to install DER. Accessing these benefits is likely to be challenging for renters or for households living in dwellings without access to adequate roof space. This particular issue is difficult to overcome via program design, other than ensuring that the benefits delivered do not exceed the overall system benefit. Complementary measures may include consideration as to how these households may be able to access the benefits via leasing or community DER schemes.

3.7 Role of technical standards for hardware and software

For DER control programs, technical standards have a key role to play to ensure that hardware and software limitations do not restrict the ability for consumers to opt-out or increase the costs of opting-in.

3.7.1 Interoperability

Of particular importance is where DER control is undertaken via the exclusive use of proprietary communications between the party undertaking the control and the DER system, such that the DER system is not interoperable.

What is DER interoperability

DER interoperability refers to the capability of the software within DER products to interact (i.e., communicate) with the software of other DER products or service providers (such as a retailer, distribution network, or third-party aggregator). Interoperability can be provided via use of an open, published communications protocol and the provision of physical communications interface (such as an RJ45 port for Ethernet) within the DER product.

A lack of interoperability has the potential to lock a consumer with DER into a particular service arrangement. Should the consumer wish to change service provider, or integrate multiple DER systems from different brands, they may find that this is not technically possible without completely replacing one or all of their DER systems.

A lack of interoperability has the potential to increase the costs of the DER control program by effectively forcing a consumer to stay with a higher cost or lower value provider. For example, a consumer with a non-interoperable solar and battery system who is receiving unacceptable service from the party undertaking the control, may have no option but to opt-out completely from the DER control program (or buy a new solar and battery system). In this case, the social licence for control from this consumer is lost when they opt-out due to unacceptable costs.

A further impact of lack of interoperability is in the inability to co-optimise multiple DER systems on the same premise. Where multiple DER systems cannot effectively communicate with each other, then the benefits to the DER consumer may be reduced. If the benefits are reduced substantially, this can undermine the social licence for some consumers.

Hardware standards

Technical standards for hardware are particularly important in terms of enabling consumer choice. Hardware standards can dictate the way in which consumers interact with their DER systems in terms of provision of information and manual over-rides to enable permanent or event-based opt-in or opt-out. Hardware standards that increase choice reduce the effort/costs of gaining and maintaining a social licence.

Hardware standards can also reduce consumer choice. Some hardware standards can, by default, result in an automated level of DER control without necessarily achieving consumer permissions. For example, all new inverters are required under AS 4777.2 to have power quality response mode settings enabled. These response modes can reduce solar system output where local network constraints are present. Where these standards are legislated, they automatically result in a level of DER control.

4 Assessment of existing DER control programs

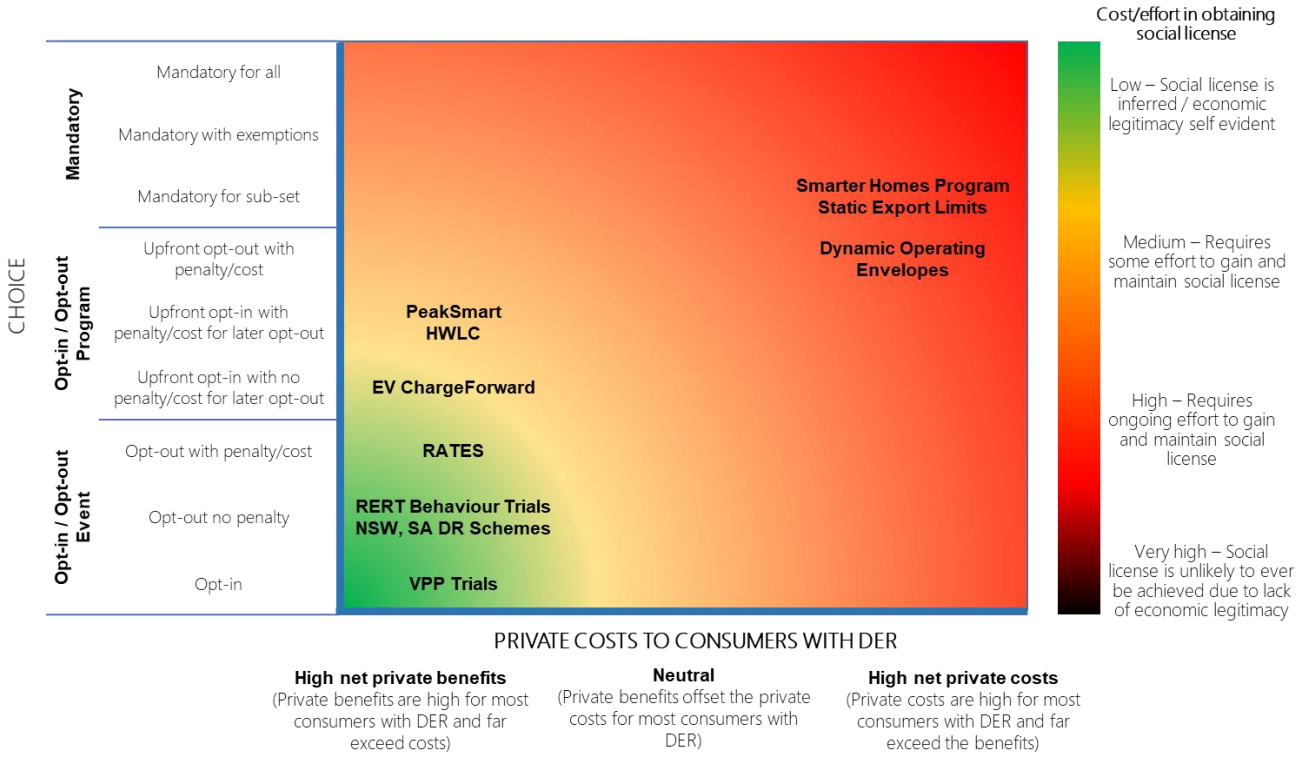
4.1 Overview

We have assessed a range of existing DER control programs, both in Australia and in the United States, against the framework, as shown in Figure 9. These include programs which are in design, trial and operational stages.

The programs tend to fall into three main categories:

- Mandated programs seeking to mitigate system security/safety risks, with little direct benefit to the consumer with DER
- Voluntary programs offering once off rebates or incentives directly from government or the institution developing the program, requiring some social licence to ensure that consumer continues to benefit over the life of the program
- Voluntary programs which operate via a market mechanism and are heavily automated such that benefits tend to be optimised for the consumer.

Figure 9 – DER control programs assessed against framework

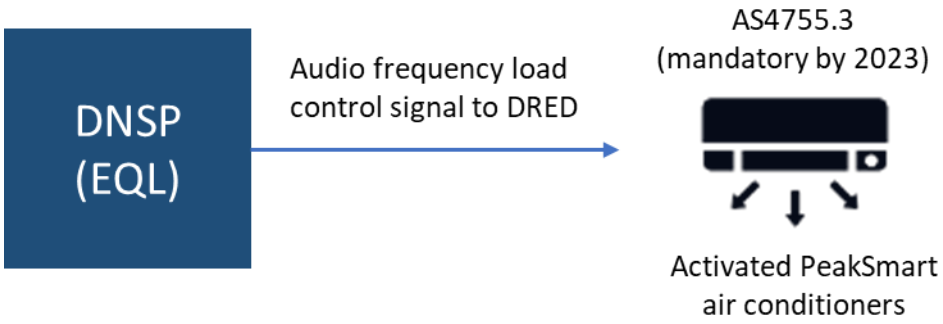


A description of each of these programs is set out in sections 4.2 to 4.10 below.

4.2 PeakSmart air conditioning

The PeakSmart program was introduced ten years ago by Energex and Ergon Energy to control activated PeakSmart-capable air conditioners by temporarily reducing the electricity consumption of the compressor[9]. The PeakSmart program reduces peak demand on the network and allows Energex and Ergon Energy to defer capital expenditure required to ensure enough capacity exists in the network to accommodate for peak demand.

Figure 10 – PeakSmart overview figure



4.2.1 Level of choice

PeakSmart works as an opt-in program with an upfront reward for consumers depending on the cooling capacity of the PeakSmart air conditioner[10]:

- $200 reward for air conditioners with a capacity greater than 4kW or less than 10kW
- $400 reward for air conditioners with a capacity of 10kW or more.

Retailer / installer cashbacks for carrying out the installation or conversion once approved amount to:

- $50 for each new PeakSmart air conditioner installed
- $50 for each previously installed PeakSmartReady air conditioner fitted with a signal receiver and converted to PeakSmart Active.

As is the case for businesses, households can also claim a reward for multiple PeakSmart enabled air conditioners where a signal receiver is installed. However, if claim numbers are greater than five, the networks review and approve the reward amount at their discretion.

Consumers wanting to opt-out, need to cover the cost of an electrician to remove the signal receiver. The networks arrange for a pre-paid return post bag to be sent so consumers can return the signal receiver.

4.2.2 Cost/benefit

Based on the success of the program in terms of uptake, with 80,000 customers across Energex and Ergon Energy having PeakSmart air conditioners[11], it can be inferred that the PeakSmart reward outweighs the costs of the air conditioner control for many consumers.

[9] Ergon Energy, *PeakSmart Factsheet,* 1 July 2019.
[10] Idem.
[11] Energex, *Demand Management Plan,* April 2020

In fact, even some of the initial perceived costs are likely to have been diminished for participants with a survey revealing that most (73%) of respondents did not notice any change in comfort level during heatwave conditions and over 80% of respondents saying they would recommend the program to others and would participate in similar programs.[12]

4.2.3 Role of technical standards

The PeakSmart program adopts the AS4755 series of technical standards to enable demand response. PeakSmart Ready air conditioners are compliant with the AS4755.3.1 and connected to a PeakSmart signal receiver compliant with AS/NZS 4755.1.[13] The AS4755 standards have been criticised due to their inability to support payments to the consumer (which is not an issue for PeakSmart due to the upfront nature of the rebate), and the lack of a manual over-ride for consumers[14].

AS4755 is not currently mandated for air-conditioners but a November 2019 decision by the COAG Energy Council[15] means that it (or an equivalent international standard if available) will become mandatory nationally by 30 June 2023[16].

4.2.4 Social licence

The PeakSmart program requires some effort to gain and maintain a social licence given that consumers are not able to opt-out of individual events and because there is some cost/effort involved in opting-out of the program. Consumers that forgo control of their air conditioners must have the necessary level of confidence that the network's use of the control capability will not mean the costs of the program exceed the benefits from the consumers' point of view.

Energy Queensland (i.e., Ergon Energy and Energex) has actively and effectively promoted the PeakSmart program. Alongside high consumer awareness, Energy Queensland has achieved buy-in from retailers and installers by offering cashbacks and training programs. Retailers and installers have, in turn, themselves become advocates of the program.

Consumer surveys have, in general, shown high levels of satisfaction with the program. Although some issues were identified with the application process to claim rewards[17], the program has received overwhelming support from the community.

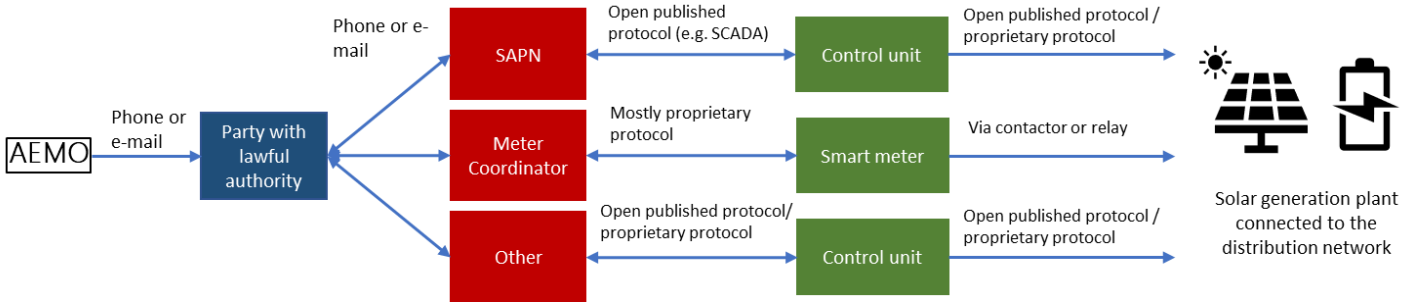
It is reasonable to assume that Energy Queensland has managed to both gain and maintain this licence. Notwithstanding, there are some risks associated with the opt-out process that mean this licence could be lost from the perception of some consumers. For example, new tenants to a property that has PeakSmart activated air conditioners but that do not wish to participate in the program are left with the task of opting out of the program and paying for an electrician to uninstall the DRED receiver.

4.3 South Australia Smarter Homes

The SA Smarter Homes program was launched in September 2020 as an AEMO initiative to control solar generation plant connected to the South Australia's distribution network. The primary goal of the program is to maintain the required supply and demand balance and avoid a potential black out if South Australia is separated from the rest of the NEM, by effectively switching off solar systems should this occur during periods of low demand.[18]

[12] Ergon Energy and Energex, *Demand Management Plan 2018-2019*, 2019.
[13] Refer to footnote 10.
[14] Submissions (various) to Regulation Impact Statement for Decision: 'Smart' Demand Response Capabilities for Selected Appliances
[15] https://www.energyrating.gov.au/document/regulation-impact-statement-decision-smart-demand-response-capabilities-selected-appliances
[16] E3,Regulation Impact Statement for Decision: 'Smart' Demand Response Capabilities for Selected Appliances, October 2019
[17] Idem.
[18] Department for Energy and Mining | Information for customers and owners (energymining.sa.gov.au)

Figure 11 – SA Smarter Homes overview figure



4.3.1 Level of choice

The SA Smarter Homes program is mandated for all new solar systems being installed as well as existing solar systems if any declared part of the existing system, for example the inverter, is being replaced (excluding warranty repairs).[19]

4.3.2 Cost/benefit

Given that the program has only recently come into effect and due to the fact that it is mandated, little is known as to how consumers see the costs and benefits of their solar systems being controlled for the purposes specified in the program. Although the program has received some high-profile push back from solar advocates[20].

Submissions to the consultation on regulatory changes for Smarter Homes[21] were generally supportive of the need for such control, but sought reassurance that the mechanism would only be used infrequently for emergency situations. Questions were raised by stakeholders nonetheless regarding the tight timeframe provided for consultation and program implementation. Further technical detail was also sought by some stakeholders as to how the mechanism would actually work.

4.3.3 Role of technical standards

The program relies on an update to South Australia's minimum specification for smart meters to ensure that all new solar systems have the capability required. This inherently links the program to retailer involvement (given that meters are the responsibility of retailers). Most often the actual control will be undertaken by the metering coordinator with communication with the consumer occurring with the retailer. This has the potential to link the solar curtailment with a range of other services provided by the retailer, making it difficult to tell whether the consumer is being charged for this service or not.

The program also enables the capability to be delivered by inverters where the inverter can be remotely controlled. The inverter-based capability is not governed by any particular standards with the communication being undertaken by various protocols including both open published protocols and proprietary protocols.

[19] Refer to footnote 13.
[20] See for example:
https://www.abc.net.au/news/2020-05-20/concerns-over-plan-to-switch-off-household-solar-panels/12267162
https://www.solarcitizens.org.au/solar_must_only_be_switched_off_in_emergencies
[21] https://www.energymining.sa.gov.au/energy_and_technical_regulation/energy_resources_and_supply/regulatory_changes_for_smarter_homes/consultation_on_regulatory_changes_for_smarter_homes

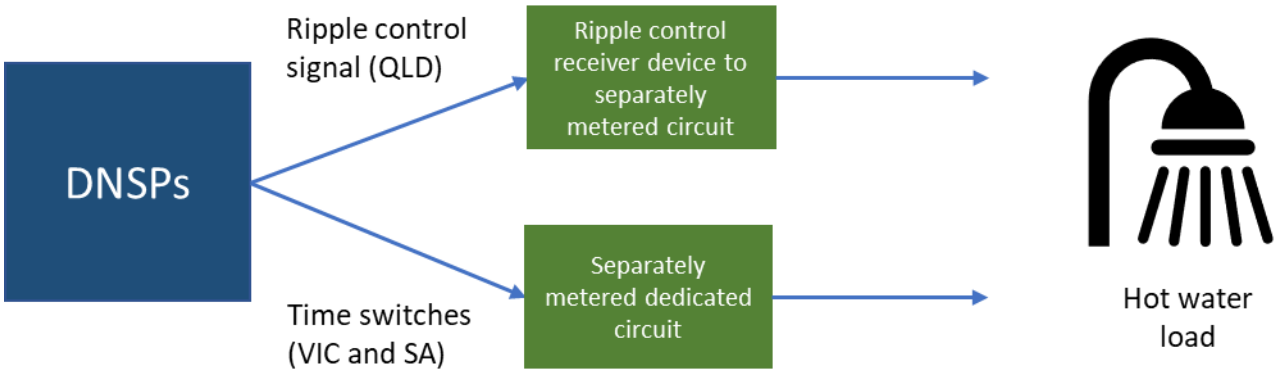
4.3.4 Social licence

The SA Smarter Homes program requires a high level of cost/effort in obtaining a social licence given that it is both mandated for new solar installations and has the potential to apportion high costs on consumers without any form of direct compensation.

4.4 Hot water load control

Most, if not all, DNSPs have offered controlled load tariffs for hot water systems for many years. Control of the hot water load is sought to reduce peak demand on the network and so defer capital expenditure to accommodate for such peaks resulting in lower network costs for all consumers.

Figure 12 – Hot water load control overview figure



4.4.1 Level of choice

Consumers sign up to a hot water tariff (minimum tank sizes usually apply) with some DNSPs providing an upfront monetary reward for doing so. Consumers can opt out at any time but forgo the reduced electricity tariff and potentially with an electrician's fee to cover the cost of any rewiring.

There have been cases where DNSPs have not allowed consumers to receive solar feed-in tariffs at the same time as running a controlled load. For example, United Energy's customers on residential flat or business flat tariff categories who want to sign up to a dedicated circuit connected to a controlled electric hot water service and/or storage space heating are precluded from doing so if they have embedded generation.[22]

4.4.2 Cost/benefit

Hot water load control has been a popular tariff amongst residential and small businesses (the tariff's target consumer groups) with over 1 million consumers on load control tariffs in Queensland alone.[23] The widespread uptake denotes that, for many consumers, the benefits of a reduced electricity bill outweigh the costs (including the "hassle" of signing up, and perceived costs of not having hot water available at all times)[24].

Notwithstanding, analysis undertaken by Ergon Energy shows a slow decline of around 1-2% each year in take up of residential load control tariffs. The predominant reason for residential consumers switching away from controlled load tariffs is the addition of a solar PV system and connection of hot water system to their primary

[22] United Energy, *2019 Pricing Proposal,* 2019."
[23] Energex, *Demand Management Plan,* April 2020..
[24] See for example Ausgrid Demand Management | Hot water load control trials which did not record any complaints with respect to insufficient hot water supply (despite "*being afraid of running out of water supply"* nominated as the top reason for customers not participating)

tariff (with a timer). This allows these consumers to use their solar PV to heat their hot water system in the middle of the day.[25]

4.4.3 Role of technical standards

Technical standards have not played a significant role in this program which is largely run by network service providers utilising their own technologies (e.g., ripple control).

4.4.4 Social licence

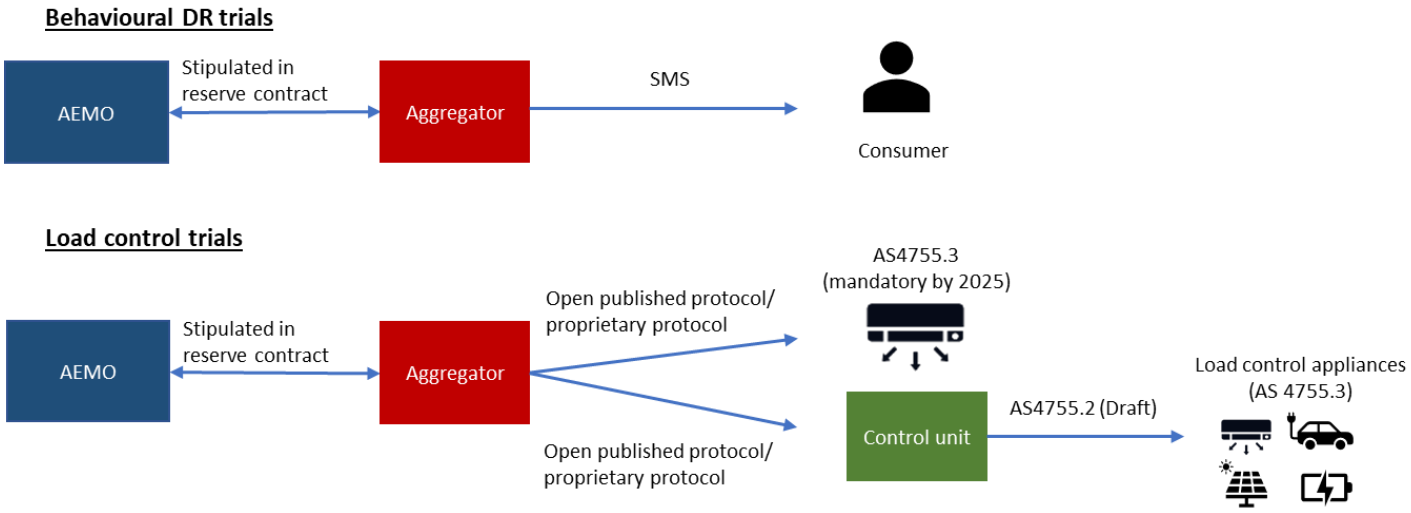
Hot water load control requires some effort to gain and maintain a social licence given the potential barriers to opting out. Additional care is required to ensure that the consumer's hot water system is sufficiently sized to accommodate load control, to avoid imparting additional costs on consumers in terms of insufficient hot water supply Ergon Energy, for example, provide guidance to consumers on recommended hot water system sizes suitable for their load control tariffs[26].

Generally, most consumers tend to have positive experiences of the program, once signed up[27].

4.5 ARENA RERT Trials

In 2017, ARENA and AEMO entered into a Memorandum of Understanding to jointly develop 'proof of concept' projects that support the integration of renewable energy into the energy market, while maintaining system reliability and security. As part of this initiative, a three-year DR Short Notice RERT Trial was developed.[28]

Figure 13 – ARENA RERT Trials overview figure



4.5.1 Level of choice

Proponents that offered residential programs employed sign-up, participation and performance-based incentives. The mix and level of the incentives varied by proponent, but tended to be significantly higher for load control programs.

[25] Ergon Energy, *Ergon Energy TSS Explanatory Notes 2020 – 2025*, December 2019.
[26] https://www.ergon.com.au/retail/residential/home-energy-tips/appliances/hot-water/hot-water-tank-sizes
[27] Ausgrid, *Hot Water Load Control Trials*, August 2016.
[28] ARENA, *Demand Response RERT Trial Year 1 Report*, March 2019.

In all cases, the behavioural programs enjoyed a much higher level of participation than the controlled load programs. This was not surprising given that:

- No customer-side equipment needed to be installed for participation in the BDR programs that were offered
- Virtually any consumer was eligible to participate
- The consumer retained sole and complete control over their energy use, including the decision as to whether to participate in any particular event
- The consumer retained the ability to use their appliances and equipment as and when they pleased.[29]

4.5.2 Cost/benefit

Only a relatively small amount of the DR capacity that was contracted and recruited (12.8 per cent and 8.7 per cent respectively) came from the residential sector in Year 1, though residential consumers comprised over 90 per cent of all end users within the portfolios. Over-recruitment in the commercial and industrial sectors approximated usual DR industry practice.

The notable exception was the residential sector where recruitment did not achieve the level that was expected to be contracted. These results are reflective of the short timeframe proponents had to contract their first-year portfolios, in addition to the greater familiarity that large consumers have with DR and the level of engagement a number of the proponents already had with industrial and commercial consumers.

Proponents that were not the consumers' retailers reported several issues regarding access to metering data. Privacy issues meant proponents lacked a means to provide feedback to consumers on an individual basis which could result in consumers losing interest in the program.[30]

4.5.3 Role of technical standards

The load control trials were pursuant to AS 4577.3 and AS 4577.2 (draft). A proponent noted that the primary barrier to participation in its air conditioner program was the lack of compatibility of some customers' air conditioner make and model with AS 4755, making it impossible for it to be remotely controlled. Approximately 40 per cent of the customers that signed up for the program had air conditioners that were compatible with AS4755.[31]

4.5.4 Social licence

Minimal effort is required to obtain a social licence for the behavioural demand response trials as customers retain discretion as to whether they want to participate in any given event.

A higher level of effort is required to obtain and maintain social licence is required for the load control trials as, although participation in the program is optional, customers do not have freedom of choice to opt out of individual events.

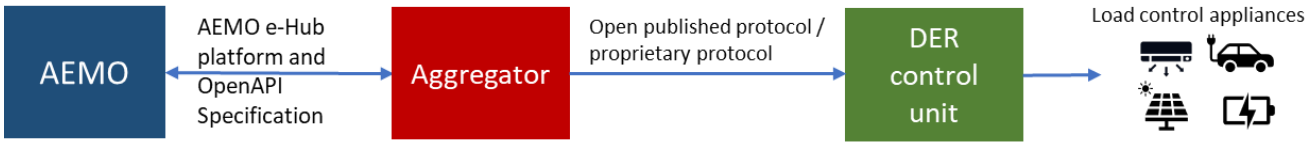
[29] Refer to footnote 21.
[30] Idem.
[31] Idem.

4.6 VPP demonstrations

AEMO in collaboration with ARENA, AER, AEMC and members of the Distributed Energy Integration Program (DEIP) are undertaking VPP demonstrations to trial the participation of DER in FCAS markets. Currently, there are five different participants (retailers and aggregators) operating VPPs as part of the demonstrations.

The VPP Demonstration allows retailers and aggregators to participate in FCAS markets on behalf of consumers with DER utilising AEMO's VPP Application Programming Interface (API).

Figure 14 – VPP Demonstrations overview figure



4.6.1 Level of choice

Consumers with DER voluntarily opt-in to the demonstration programs with the expectation of financial returns in exchange for control. It is unclear the extent to which each of the five participants in the VPP Demonstrations allow for customer over-ride in participation. In theory, the VPP operator should only be enabling FCAS market participation where a clear benefit to the consumer is present.

4.6.2 Cost/benefit

DER participation in FCAS markets via a VPP will enable consumers with DER to realise an additional value stream. The private cost of the control will depend upon the technology used to participate in the VPP. For battery systems, there is likely very little cost as the battery would only participate in the FCAS market where this was its best and highest value use according to the consumer. For other appliances, there may be some loss of utility in exchange for participation, but this would only be with the consumer's express permission.

Customer insights from the Demonstrations, set to be published in early 2021, will set out the extent to which consumers were willing to give up a level of control of their assets in return for value gained.[32]

4.6.3 Role of technical standards

The VPP Demonstrations utilise the AEMO e-Hub platform and OpenAPI Specification, meaning that any aggregator or retailer is able to access the platform and receive market information.

Communications between the aggregator/retailer and DER systems may be via a range of protocols, such that issues with interoperability may be present which may increase the cost of participation or lead to opt-out as set in Section 3.7.1.

4.6.4 Social licence

Some effort is likely to be required in gaining and maintaining a social licence for VPPs, given that the consumer may not necessarily have the ability to opt-in or out of any given market event. Whether the consumer participates or not will likely depend upon an algorithm dictating the DER response. Where the algorithm is underpinned by an understanding of the consumer's individual preferences then a social licence is easier to

[32] AEMO Virtual Power Plant Demonstrations Knowledge Sharing Report #2, July 2020

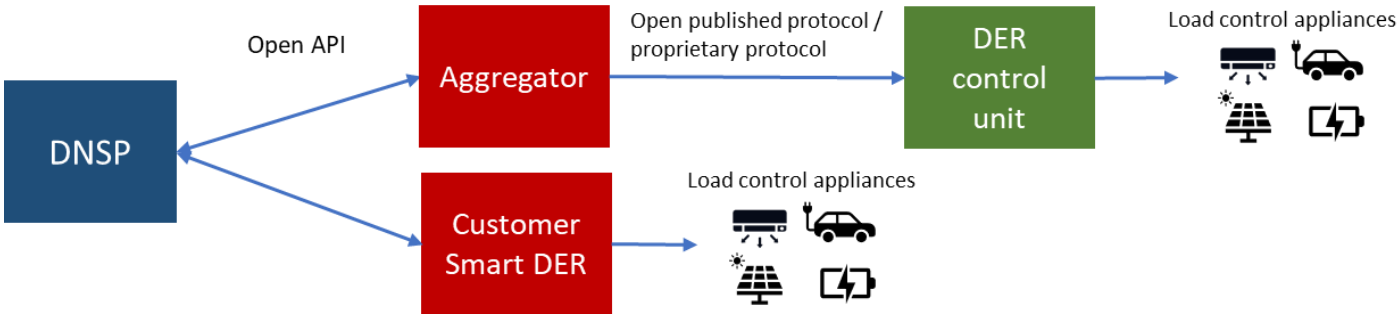
obtain. However, there is a risk that any VPP program's social licence could be undermined where any such algorithm makes assumptions about consumer preferences without ground truthing.

To gain and maintain a social licence, the consumer must have trust that the algorithm is likely to operate in their best interests. This will require a commitment from the party undertaking the control to understand the consumer's values and be able to adjust to accommodate for changes in these values over time

4.7 Dynamic operating envelopes

Dynamic operating envelopes (DOE) have been proposed by various networks as a mechanism to ensure that DER systems do not export or import at a rate that would result in network constraints. DOEs are proposed as an alternative to networks stipulating static export limits based on worse case conditions. DOEs allow consumers to export or import at a higher rate during times when there are no constraints.

Figure 15 – Dynamic Operating Envelopes overview figure



4.7.1 Level of choice

While there are still various models being discussed, it is likely that DOEs will be introduced on an opt-in basis for existing consumers with DER and an opt-out with penalty basis for consumers with new DER, whereby the penalty is having to adopt a low (or potentially zero) static export limit.

It could potentially be argued that DOEs are effectively mandatory for consumers with new DER as there is no option to completely opt-out and revert to the higher export limits permitted for existing DER systems.

4.7.2 Cost/benefit

The cost/benefit of DOEs to existing consumers with DER is unlikely to be positive, especially where those consumers do not perceive to have any existing constraints on export/import currently. However, for certain existing consumers with DER, who may already be being constrained off as a result of voltage constraints, DOEs may be valuable in providing greater transparency and predictability of potential curtailment.

The cost/benefit for consumers installing new DER is complex. If the consumer has already accepted that it will be subject to a low (or zero) static export limit, then the DOE has a large potential benefit. However, the concept of low or zero static export limits is yet to be fully adopted or communicated by network businesses, and where it has, has received significant pushback.[33] Consumers may therefore perceive that there is a net cost of adopting a DOE especially compared to, say, a neighbour who may have been benefitting from unconstrained exports for years.

[33] See for example https://www.solarquotes.com.au/blog/zero-kw-export-solar/

4.7.3 Role of technical standards

The use of an open published protocol (IEE 2030.5) has been proposed to enable the communications between the DNSP and the aggregator and/or the DER control unit directly[34] by various parties. This will give rise to greater interoperability of DER systems. There is some concern from industry however, that the development of an Australian implementation guide for 2030.5 needs to occur prior to the widespread implementation of DOEs in order to avoid a 'rail gauge' issue between jurisdictions.[35]

4.7.4 Social licence

A social licence is clearly required to implement DOEs. There is a risk that consumers, for the most part ,will perceive there to be a net cost where their network seeks to impose DOEs with opt-out to static export limits. There is therefore significant cost/effort required to establish a social licence.

Further, the principles for allocation of capacity under the DOE framework are yet to be fully developed (although ARENA via its DEIP program are exploring these issues) and have significant potential to undermine any social licence where allocation does not align with stakeholders' views of fairness.

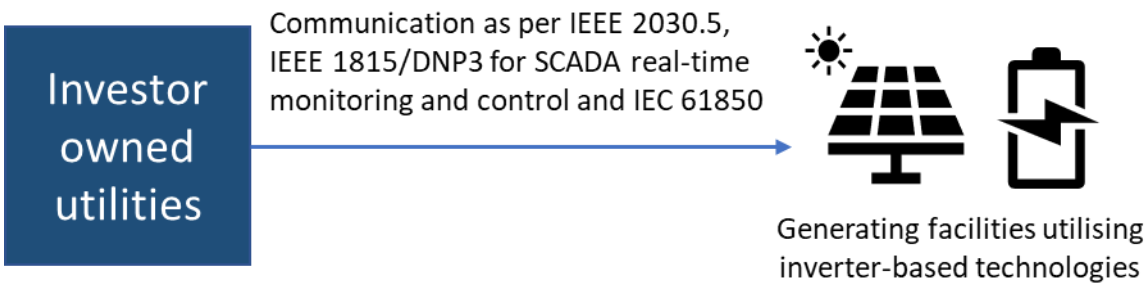
4.8 California Rule 21

The first iteration of Rule 21 was adopted in 1982 by the California Public Utilities Commission.[36]

Electric Rule 21 is a tariff that describes the interconnection, operating and metering requirements for generation facilities to be connected to a utility's distribution system. The tariff provides customers wishing to install generating or storage facilities on their premises with access to the electric grid while protecting the safety and reliability of the distribution and transmission systems at the local and system levels.

Each investor-owned utility is responsible for administration of Rule 21 in its service territory and maintains its own version of the rule.[37] For this study, we reviewed Rule 21 as applied by Pacific Gas and Electric Company (PG&E).

Figure 16 – California Rule 21 overview figure



4.8.1 Level of Choice

Electric Rule 21 is mandatory for generating facilities utilising inverter-based technologies.[38]

[34] Blackall, L., On the calculation and use of dynamic operating envelopes, evolve Project M4 Knowledge Sharing Report
[35] Clean Energy Council, Submission to Clean Energy Council submission to the SA Government consultation on the proposed export limit requirements for distributed solar generating plants in SA
[36] https://www.cpuc.ca.gov/Rule21/#:~:text=Rule%2021%20governs%20CPUC%2Djurisdictional,cost%20to%20the%20host%20utility.
[37] Idem.
[38] Pacific Gas and Electric Company, *Electric Rule No. 21 – Generation Facility Interconnections,* 30 June 2018.

4.8.2 Cost/benefit

Given that the rule is mandatory, owners of generation facilities utilising inverter-based technologies need to consider the costs and benefits of connecting to the utility distribution system prior to submitting an interconnection request. Rule 21 contains provisions governing many aspects of interconnection, including fee schedules to process applications and perform impact studies as well as allocation of interconnection costs.

4.8.3 Role of technical standards

In PG&E's jurisdiction, the default application-level protocol is IEEE 2030.5 (i.e., Smart Energy Profile 2.0) as defined in the California IEEE 2030.5 Implementation Guide, but other application-level protocols may be used by mutual agreement of the parties including IEEE 1815/DNP3 for SCADA real-time monitoring and control and IEC 61850.[39]

4.8.4 Social licence

Electric Rule 21 requires the highest level of social licence given that it is both mandated and has the potential to apportion high costs on consumers without any form of direct compensation. Given the recency of this Rule, the level of consumer acceptance is not yet clear.

4.9 Retail Automated Transactive Energy System (RATES)

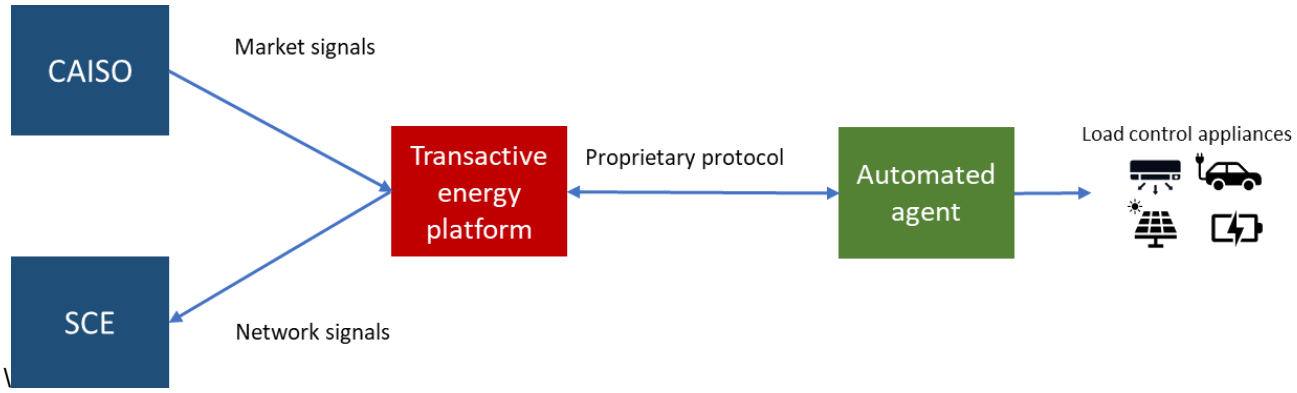
RATES is a proof-of-concept demand side pilot designed to reduce the costs to residential and small commercial electric customers of achieving the California clean energy and electrification requirements. The pilot was carried out by two technology developers between July 2016 to March 2019 with over 100 consumers who volunteered for the pilot. The project was supported by the California Public Utilities Commission, the California Independent System Operator, and Southern California Edison (SCE).

RATES uses automated agents to time-shift electricity use for electric air cooling and heating, electric water heating, electric water pumping, electric vehicle charging, and battery charging. Use shifts to when there is high solar generation and prices are low, and batteries are discharged in time intervals when prices are high because fossil generation is needed.

If a consumer uses more kW or less kW in an hour than they subscribed to for the pilot, RATES automatically sells back kW or buys more kW. The RATES tariff is called a Subscription Transactive Tariff and is designed for low-cost automation and billing.[40]

Figure 17 – RATES overview figure

[39] Idem.
[40] Universal Devices Inc. and TeMix Inc, *Retail Automated Transactive Energy System (RATES) – Project Fact Sheet,* 31 December 2019.



4.9.1 Level of choice

RATES was trialled as a pilot where consumers volunteered to take part.

The automated optimisation agents acted for each consumer to manage electric use. However, consumers could use voice assistants to inform the agents of their preferences for comfort versus cost, for example, and most used the assistants to set-and-forget.

4.9.2 Cost/benefit

Potential benefits to consumers of the RATES tariff are:[41]

- Opportunities to reduce bills through better energy management informed and automated by RATES
- Increased bill stability with electricity subscriptions
- Targeted subscriptions for low-income consumers and fairness
- Opportunities to monetize the flexibility grid services of energy management, smart appliances and controls, storage and solar technologies including heat pump space conditioning and water heating
- Opportunities to reduce the cost of electric vehicle charging for the consumer
- Increased transparency for the consumer into energy use and costs

The costs will depend on whether the consumer uses more kW or less kW in an hour than subscribed.

4.9.3 Role of technical standards

The RATES Final Project Report recommended supporting the OpenADR Alliance in its planned efforts to integrate transactive energy protocols into the OpenADR 2.0 standards.[42] OpenADR is an open, secure, two-way information exchange model and Smart Grid standard[43]. Open ADR 2.0 will enable interoperable information exchange, facilitating automated demand response.

[41] Refer to footnote 32.
[42] California Energy Commission Energy Research and Development Division, *Complete and Low-Cost Retail Automated Transactive Energy System (RATES) Final Project Report,* June 2020.
[43] https://www.openadr.org/

4.9.4 Social licence

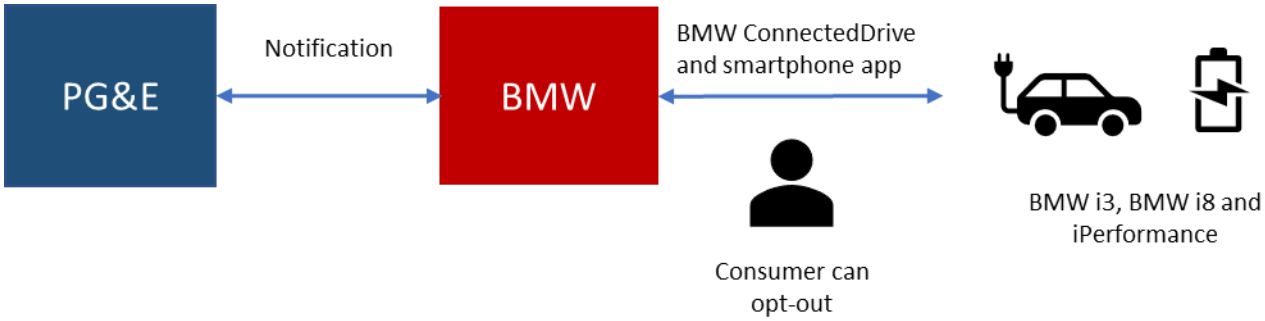
Minimal effort for a social licence would be required for the widespread deployment of the RATES tariff as consumers would be free to opt-in to the tariff as well as retaining discretion to inform the optimisation agents of their preferences for comfort versus cost.

4.10 EV ChargeForward Program

The EV ChargeForward Program was conducted by PG&E with car maker BMW over two phases, with the first taking place from July 2015 through December 2016 and the second over a 24-month period shortly after then.

BMW utilised the existing vehicle communication system to provide demand response from electric vehicle charging during high peak demand.[44]

Figure 18 – EV ChargeForward Program overview figure



4.10.1 Level of choice

BMW i3, BMW i8 and iPerformance owners in the Greater San Francisco Bay Area who were PG&E customers were eligible to opt-in to the program.

Participants had the option to opt out of a particular event as desired if they needed to begin charging their car immediately.

4.10.2 Cost/benefit

Participants could earn up to $900 for participating in the pilot, with all participants receiving a $300 initial incentive soon after program launch. The total amount earned over the program depended upon individual participation in charging events. Consumers also had the opportunity to earn additional incentives for participating in short-term charging tests, or sub-pilot projects, that could occur during the 24-month period.

4.10.3 Role of technical standards

It is unclear as to the role of technical standards but likely they have not featured given the role of BMW's existing communication system with vehicles. Given the highly proprietary nature of vehicle manufacturers communications systems there is the potential for interoperability to become an issue in similar programs where more widespread.

[44] PG&E and BMW Partner on Next Phase of Pilot Studying Advanced Electric Vehicle Charging | PG&E

4.10.4 Social licence

The program appears to require minimal effort in gaining and maintaining a social licence given that consumers are rewarded and have the ability to opt-out of any given event. This appears to be evidenced by the reported satisfaction with the program, with 92% of participants indicating they were very satisfied with the pilot and 86% indicating they would likely recommend it to family or friends.[45]

[45] Refer to footnote 38.

5 Summary and discussion

5.1 Do energy institutions really need a social licence to control DER?

Control of DER usually imparts private costs on consumers. These may be direct financial costs in terms of limiting access to markets, indirect costs associated with a loss of utility that would otherwise be provided by the DER system, or perceived costs related to security, privacy, or potential for health and safety.

Wherever there are private costs of control, then governments and institutions require a social licence to enact control programs. Without a social licence there are real risks of the program failing.

5.2 What are the risks where a social licence is never gained or is lost?

Without a social licence, DER control programs have limited chance of success. For voluntary DER control programs, the lack of a social licence will reduce uptake and/or increase opt-out such that the program is not likely to reach its objectives.

Where a social licence for mandatory programs is not obtained, it is likely to result in increased compliance issues. Compliance issues may compromise the ability of the program to achieve its objectives (the cost of which is likely to be high for mandatory programs) and/or require a high cost compliance and enforcement program.

There is further evidence to suggest that where a social licence is lost for a certain institution or program type, it may impede the ability to regain the licence or gain a new licence due to a loss of trust. The obvious example of this is in smart meter roll outs, whereby it is argued that the impact of a loss of social licence in the Victorian AMI program has resulted in impediments for other jurisdictions in terms of their ability to gain a licence for mandatory roll outs. Following the Victorian experience, other jurisdictions have replaced mandated roll-outs with competitive frameworks for the implementation of smart meters.

5.3 How do energy institutions obtain a social licence?

5.3.1 Acceptance level

Firstly, energy institutions need, to the extent practicable, to ensure that the private benefits of the DER control exceed the private costs for all consumers with DER subject to control.

Where DER control programs are highly transactional, such that the consumer is rewarded based on whether they respond to any given control direction, then an acceptance level social licence is automatically inferred. That is, the DER consumer reveals that they accept the control after evaluating that the financial reward owing to the control is greater than the private cost.

Where DER control programs restrict choice, such that the consumer must respond to any given control (either because the program is mandatory, or because they have signed up with barriers to opting-out), then effort/resources must be expended in order achieve acceptance. This may be achieved by:

- Provision of compensation
- Consideration of exemptions for certain sub-sets of consumers with high costs
- Removing the barriers to opting out

- Consumer engagement to understand and reduce the perception of private costs (where that perception is not based on reality)

- Consumer engagement to explain how any public benefit to be delivered by the program will personally benefit consumers (e.g., a black out affecting the consumer is less likely to occur).

These measures all seek to increase the net private benefits for consumers with DER subject to the control.

5.3.2 Approval level

Achieving approval level requires energy institutions to establish trust with consumers and to ensure that a program's benefits are distributed in a fair way.

For the purpose of DER control, this may include:

- Commitment to ensure that the control is only ever undertaken for the purposes of delivering the program's expressed outcomes

- Commitment to transparency at the program level in the form of public reporting and communication of performance metrics (including some measure of consumer experience/consumer satisfaction)

- Commitment to transparency at the consumer level as to the DER control activities undertaken (advanced notification and feedback on impact) and costs/benefits accrued

- Avoiding surprises where consumers are unexpectedly:

    - Unable to opt-out or have a high cost of opting out due to lack of understanding of contractual arrangements

    - Unable to opt-out or have a high cost of opting out due to technological arrangements (e.g., lack of interoperability, no manual over-ride capability)

- Commitment to ongoing evaluation of the program including via engagement with consumers to identify any changes in perceived or actual costs, and views of "fairness" over the duration of the program.

Further, where the program enables third parties to undertake the control (other than the energy institutions responsible for the program), it is critical that the third parties are also committed to the above as appropriate. This may be via the use of robust procedures, including for accreditation and for reporting and monitoring as well as direct contractual obligations.

5.3.3 Psychological identification level

Achieving the level of psychological identification requires energy institutions to commit to developing and maintaining relationships with consumer advocates to work hand in hand in the design, implementation, evaluation and modification of any DER control program. While not necessarily required, gaining and maintaining a social licence at the psychological identification level reduces the cost/effort to maintain a licence over time, reduces the chance of losing a social licence and reduces the effort required to gain social licences for additional DER control programs in the future.

5.4 How should the lessons from this study be used by industry?

This study has revealed that any energy institution, government, network, or retailer implementing a DER control program should consider the concept of a social licence in the program's design, ongoing implementation, and evaluation. This may include, for example:

- AEMC's draft determination on technical standards for DER
- Energy Security Board's proposed two-sided market
- Network businesses seeking to implement dynamic operating envelopes and/or static export limits
- State and Territory governments seeking to utilise DER control to address issues of minimum demand
- State and Territory governments seeking to develop new demand response schemes.

Further, any cost benefit analysis undertaken to support the implementation of a DER control program should also include the costs of gaining and maintaining a social licence. This will ensure that benefits of options that appear cheaper/more effective are not undermined by higher costs of maintaining a social licence.