Jemena Electricity Networks (Vic) Ltd

Response to the Annual Regulatory Information Notice for the 2018 Regulatory Year

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6. DEMAND MANAGEMENT INNOVATION ALLOWANCE

In this section, JEN responds to section 6 of Schedule 1 to the RIN, which relates to the Demand Management Innovation Allowance (**DMIA**).

6.1 IDENTIFICATION OF DEMAND MANAGEMENT PROJECTS OR PROGRAMS

Paragraph 6.1 of Schedule 1 to the RIN requires JEN to identify each demand management project or program for which JEN seeks approval.

JEN seeks approval for *one* project for the Relevant Regulatory Year, which is outlined below.

JEN Residential Demand Response

In the 2016 Regulatory Year Jemena engaged a consultant to develop the scope for a residential demand response trial. The consultant expense was claimed in the 2016 DMIA report. The residential demand response trial project was initiated by Jemena in 2017 and was completed in 2018. The program was publicly branded as 'Power Changers'.

6.2 DETAILED INFORMATION – JEN RESIDENTIAL DEMAND RESPONSE

Paragraph 6.2 of Schedule 1 to the RIN requires JEN to provide detailed information for each demand management project or program identified in response to paragraph 6.1 of Schedule 1 to the RIN.

6.2.1 COMPLIANCE

Paragraph 6.2(a)(i) of Schedule 1 to the RIN requires JEN to explain how JEN's initiative complies with the DMIA criteria set out in section 3.1.3 of the Demand Management Incentive Scheme (**DMIS**).

The behavioural residential demand response trial was proposed in response to emerging capacity constraints on the network and enable deferral or avoidance of augmentation capex in predominantly residential areas. The trial was developed in 2017 and has been running over the 2017-18 summer period in constrained areas of the network (Fairfield, Alphington, Ivanhoe, East Ivanhoe, Eaglemont and Craigieburn). The trial targeted recruitment of at least 600 households. The trial has been designed to test the hypothesis that if customers are provided with easily actionable tips to reduce energy consumption, especially during times of network constraint, a fundamental shift in customer behaviour to the benefit of the network can be achieved.

The project also has the potential to improve the efficiency of Jemena's future network investments through the deferral or avoidance of network augmentation capex and to mitigate supply risks on capacity constrained feeders.

JEN considers that works to engage and sign up residential customers for an actual demand response trial in the 2017 and 2018 Regulatory Years complies with DMIA criteria, set out in section 3.1.3 of the DMIS, in the following ways:

- Section 3.1.3-1 – The project is aimed at developing Jemena's capabilities to reduce peak demand through customer controlled demand response, rather than increasing supply capacity through network augmentation.
- Section 3.1.3-2 – The project is a peak demand management initiative which aims to address specific network constraints areas by reducing demand on the network at the location and time of the constraint.

- Section 3.1.3-3 – The project deliverables are to prepare Jemena for various elements of customer controlled demand response programs as an effective and efficient demand management solution.
- Section 3.1.3-4 – The project is a non-tariff based project and the claimed costs are not recovered under any other incentive scheme.
- Section 3.1.3-5 – The project cost has not been recovered under other schemes.
- Section 3.1.3-6 – The nature of expenditure is operating expenditure.

6.2.2 NATURE AND SCOPE

Paragraph 6.2(a)(ii) of Schedule 1 to the RIN requires JEN to explain the nature and scope of the initiative.

The scope of work for the JEN Residential Demand Response Trial in 2018 included the following key deliverables:

Demand Response capability

- To conduct demand response (**DR**) Challenges in the 2018 summer
- Finalise method to calculate individual baseline and performance for a demand response event, including criterion for setting up the control group and methodology to estimate demand reduction attributable to the incentive provided
- Provide energy usage tips, insights and live data feeds during DR Challenges
- Survey participants to know the type of air conditions they have and their willingness to participate in the direct load control (**DLC**) of air conditioners during DR Challenges.

Security and System requirements

- To interact with Jemena AMI data and systems

User Experience

- Meet modern day user experience expectations to understand limitations of the technology platform in scaling up—including through seamless registration, 'remember me' log on, no lag time in solution, live data feeds during DR Challenges and operation on all devices and operating systems
- Ability to provide and test both community and individual financial incentives
- Ability to run marketing campaigns and A/B testing (controlled experiment with two variants, A and B)
- Post DR Challenge surveys to understand customers' experiences, actions taken and improvement opportunities.

6.2.3 AIMS AND EXPECTATIONS

Paragraph 6.2(a)(iii) of Schedule 1 to the RIN requires JEN to explain the aims and expectations of the initiative.

The aims and expectations of the JEN Residential Demand Response Trial are to:

1. **Build Capability:** Develop JEN's capability in leveraging Residential Demand Response to manage future network sustainability and to build evidence and learnings to influence any rule changes proposed in this regard.

2. **Build Customer Knowledge:** Test an innovative product for its potential to improve value extraction from existing infrastructure whilst also collecting insights on what customers value to shape future initiatives.
3. **Build Customer Satisfaction:** Understand whether there is an opportunity for customers armed with the right information to feel empowered to take action in controlling their bills.
4. **Defer Capex:** Potentially defer a network upgrade.
5. **Support regulatory price submissions:** Engage effectively with consumers and build evidence to support the need for network tariff reform, and demonstrate alignment with regulatory trends towards non-network solutions.
6. **Build brand and employee engagement:** Provide positive employee and media engagement in taking action that embraces new technology to save customers money.

6.2.4 SELECTION PROCESS

Paragraph 6.2(a)(iv) of Schedule 1 to the RIN requires JEN to explain the process by which the project was selected, including its business case and consideration of any alternatives.

Augmentation is driven directly by forecast 'peak' load on an underlying network asset, be it zone substation, feeder or distribution substation. It is generally accepted that cutting augmentation capex would increase the risk of outages, impacting network reliability metrics and as a result impact adversely on customer satisfaction levels. However, this conclusion inherently assumes that customer behaviour cannot be influenced to reduce or move the peak. Demand Response (**DR**) is an increasingly popular non-network solution that aims to achieve this. Essentially it involves engaging either directly or indirectly with end use consumers to reduce their networked electricity consumption during 'peak events'. In addition, Demand Response also has the potential to extend asset life and reduce replacement capex of assets by avoiding overloading and extreme thermal ageing through load shifting.

Demand Response has traditionally been via bilateral contracts with commercial and industrial (**C&I**) customers to curtail their load during peak events. Because of the volume of flexible load that can be recruited via several C&I customers and the simplicity of the arrangement, C&I Demand Response remains the dominant and most developed solution, particularly at a zone substation level. Jemena is pursuing this option separately on a case by case basis.

However, approximately 70% of the feeders in JEN are predominantly residential (>80% of connections) and, as a result, peak times occur out of business hours on weekdays i.e. when Commercial facilities are not contributing and therefore cannot be called upon to provide Demand Response. This situation is even more likely with the increasing penetration of solar PV, which shifts the peak to later in the day.

Direct load control of appliances such as air-conditioners and pool pumps has been successful in other states and was investigated further especially using smart meter infrastructure for communications.

Before launching a wider DR solution to strategically target a larger number of JEN customers who are in constrained areas of the network, this project proposes a trial with a limited number of residential customers (613 recruited from a pool of ~30,000 population base) for the summer of 2017/18 in the Fairfield, Alphington, Ivanhoe, East Ivanhoe, Eaglemont and Craigieburn areas. The objective of the trial is to develop JEN's capability in residential demand response whilst providing feedback not only as to whether or not behavioural residential DR is a reliable option to reduce Jemena's peak demand in constrained areas in the future, but to how it could be scaled across the network through alternative recruitment and incentive programs.

Amongst the various options considered, the recommended option was to procure a smart app with visual usage data, easily actionable tips and feedback on performance to participants. Rather than offering only individual incentives/rewards, the trial will compare various methods of recruitment, engagement and reward to maximise

learnings and test some of the latest theories around behavioural economics to improve the effectiveness and longevity of the solution versus other trials.

6.2.5 IMPLEMENTATION

Paragraph 6.2(a)(v) of Schedule 1 to the RIN requires JEN to explain how JEN's initiative was implemented.

The field component of the trial has been running since 1 December 2017 and concluded by 31 March 2018, followed by rigorous analysis and reports. Total 613 residential customers registered their interest through the demand response portal (mobile app and web link). Jemena called six DR Challenges (events) including one on Sunday 28 January 2018, when an extreme heat wave was experienced across the state. This has provided Jemena several learnings on:

- Customer recruitment (marketing strategies)
- Setting baselines and targets
- Customer participation
- Load reduction achieved
- Customer insights (through post event surveys and interviews)
- Limitations of the technology platform
- The potential for scaling up in the future.

Six DR Challenges were called across the summer with 48 hours' notice. Participants could choose to sign up to each DR Challenge, whereupon they would be allocated a target for their energy consumption for a three hour period, with the objective of reducing their expected consumption. If they met their target, they earned points. In addition, they could participate in multiple "Learn and Earn" Challenges (such as responding to quizzes and watching videos) designed to encourage participants to learn more about the electricity market and how to manage their electricity usage and bill, and obtain vital feedback on their engagement with the trial.

The trial was originally intended to incorporate a direct load control component. Participants would be offered the opportunity for Jemena to assist with the management of their smart air conditioners and swimming pool pumps during times of peak demand. While a number of households volunteered for this component, not many of these customers had the required smart air conditioners installed in their homes, which is a pre-requisite to achieve direct control using demand response enabling devices as per Australian standards.

JEN conducted a proof of concept study to use smart meter (AMI) wi-fi (using Zigbee) involving an IOT device and AMI RF Mesh to communicate with the peak smart units.

Results from the end of trial survey identified that:

- When asked about their potential interest in using DLC, 22% either did not respond or advised that they do not have an air conditioner. Of the 78% that did respond:
  - 58% said they felt uncomfortable about the idea or expressed concerns about it;
  - 25% said they would consider accepting DLC depending on the size if the reward for doing so; and
  - 17% said they felt comfortable with the idea, indicating a possible level of interest of about 13% of the 'End of Trial' survey sample.

Participants that said they might be interested in the use of DLC and had air conditioners generally did not have 'smart' air conditioners that comply with AS4755. These results indicate that a significant amount of market development is likely to be needed before DLC is able to be implemented at any material level of scale.

6.2.6 IMPLEMENTATION COSTS

Paragraph 6.2(a)(vi) of Schedule 1 to the RIN requires JEN to explain the implementation costs of JEN's project.

The actual expenditure for the JEN Residential Demand Response Trial Project in the Relevant Regulatory Year was $410,286, only $238,279 is claimed under the DMIA for 2018 against this project.

6.2.7 BENEFITS

Paragraph 6.2(a)(vii) of Schedule 1 to the RIN requires JEN to explain any identifiable benefits that have arisen from JEN's project, including any off peak or peak demand reduction.

On average households were able to reduce their peak electricity consumption by between 26 and 35 per cent across the two optimal DR Challenges, that took place on hot days.

6.2.8 ASSOCIATED COSTS

Paragraph 6.2(b) of Schedule 1 to the RIN requires JEN to state whether the costs associated with JEN's initiative have been recovered under other schemes.

The associated costs claimed under DMIA for the JEN Residential Demand Response Trial have not been:

- Recovered under any other jurisdictional incentive scheme,
- recovered under any other Commonwealth or State Government scheme
- included in the forecast capital or operating expenditure approved in the 2016-20 Distribution Determination or recovered under any other incentive scheme in that determination.

6.2.9 TOTAL AMOUNT OF DMIA SPENT AND HOW THIS AMOUNT WAS CALCULATED

Paragraph 6.2(c) of Schedule 1 to the RIN requires JEN to state the total amount of the DMIA spent in the Relevant Regulatory Year and how it was calculated.

The total expenditure for the JEN Residential Demand Response Trial Project in the Relevant Regulatory Year was $410,286.

Only $239,279 of JEN's expenditure in Relevant Regulatory Year is claimed under the DMIA. This amount has not been funded by the Victorian Government and has not been claimed from any other sources.

There are number of new demand management initiatives taking place during the current regulatory reset period. Considering the total DMIA availability of only $1M over the five years, not all costs incurred against an initiative are claimed under DMIA in order to accommodate other initiatives and to maximise learnings.