

Meeting Date: 16 March 2023

FONTERRA CO-OPERATIVE GROUP LTD PRESENTATION ON DEMAND RESPONSE

SECURITY AND RELIABILITY COUNCIL

This paper introduces a presentation from Fonterra Co-operative Group Ltd, on their views and experience of Demand Response, as a major electricity consumer in the New Zealand power system, with aspirations for a sustainable energy future.

Note: This paper has been prepared for the purpose of the Security and Reliability Council (SRC). Content should not be interpreted as representing the views or policy of the Electricity Authority except where specifically noted.

Demand Response – a major user's view

- 1.1.1 As requested by the SRC, the secretariat has arranged for Fonterra Co-operative Group Ltd (Fonterra) to present at this meeting on the theme of demand response. Fonterra was chosen as it is a major electricity user in its industrial processes.
- 1.1.2 Fonterra is a publicly traded dairy co-operative owned by New Zealand farmers. It is New Zealand's largest company and the largest dairy company in the southern hemisphere. As well as producing milk and milk products, Fonterra is New Zealand's largest producer of biofuel (bio-ethanol), with its environmental benefits of renewability and biodegradability.
- 1.1.3 Fonterra is targeting emissions reduction of 30% by 2030 through energy efficiency initiatives and switching to low emissions fuels. By 2037 it aims to stop using coal at the remaining nine manufacturing plants that still do. Fonterra is also transitioning other manufacturing sites from gas to biomass, biogas and electricity from renewable sources. These changes will be of particular interest to members, given the scale of the task and the impact this may have on security and reliability, and network resilience through increased electricity consumption.
- 1.1.4 Fonterra is well placed to give its view on demand response from the experience working with Meridian and Orion on initiatives to support its aspirations to be carbon neutral by 2050. Fonterra seeks to invest around \$1 billion in sustainability initiatives over the next decade. This includes upgrades of core manufacturing assets and improvements in water use and quality.
- 1.1.5 Two key points from Fonterra's presentation are the dairy sector's limited ability to stop using electricity, due to the nature of dairy processing, and the need for high levels of certainty, as to potential duration of reduced demand scenarios, and the potential financial benefits.
- 1.1.6 The presentation also raises questions about the current spot market compensation model, with the view its continuation may impact industry's in large scale demand side flexibility (DSF).
- 1.1.7 The presentation poses potential opportunities to support market development of DSF and financially incentivise the dairy sector.
- 1.1.8 The secretariat has posed the same series of questions to Fonterra, as it has with other presenters. While it is not expected presenters will run through their answers, members should feel free to raise any additional questions at the meeting.
- 1.1.9 Representatives from Fonterra will present and be available for questions.

Questions for the SRC to consider

The SRC is asked to consider the following general questions.

- Q1. What further information, if any, does the SRC wish to have provided to it?**
- Q2. What advice, if any, does the SRC wish to provide to the Authority?**

Appendix A: Fonterra paper – Demand Response

Overview of Demand Side Flexibility for EA Security & Reliability Council (SRC)

March 2023

Questions from EA email

- 1
Our Experience To Date

- Fonterra’s experience and aspirations regarding demand side flexibility, including potential use of aggregated service providers
 - Existing Demand Response technologies and future options being considered
 - The role and expectations of the consumer in Demand Response and Fonterra’s experiences engaging with them
 - Whether the current market settings are right for encouraging DR investment
 - What, if any, are the roadblocks or hurdles Fonterra has experienced?
- 2
What We Are Considering For Demand Side Flexibility

- To what extent can Demand Response support our capacity/peaking challenge?
 - Learnings you can share from recent initiatives
 - What is the potential for DER to provide longer term energy management, for example a participant offering to manage their international portfolio to allow medium term energy restraint in a given country?
- 3
What We See as Challenges & Opportunities

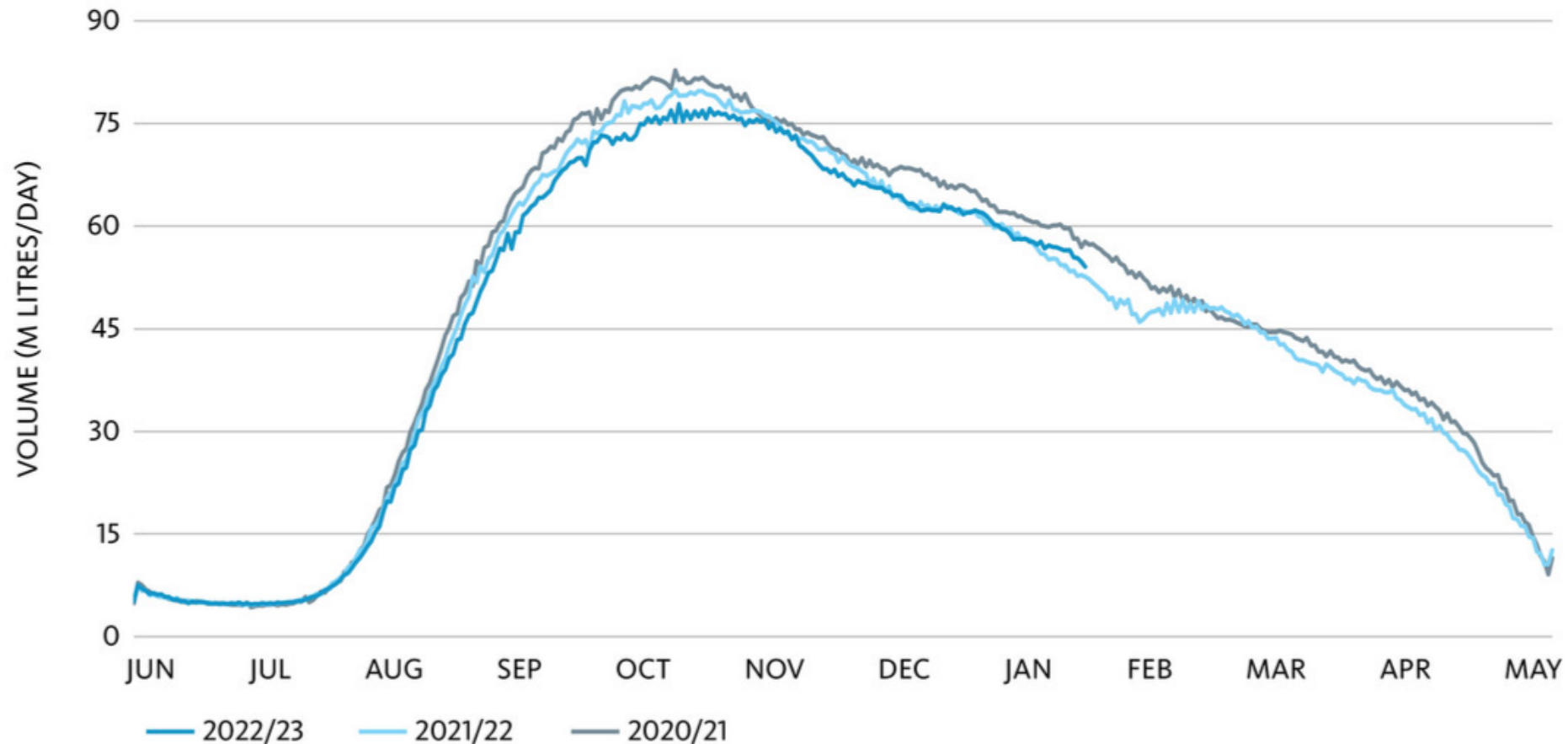
- Any thoughts about what the Authority can do to further the role of Demand Response (and DER)
 - From Fonterra’s perspective, areas of risk the SRC should focus on to support its advice to the Authority on security of supply and system operator performance?
 - What, if any, Code changes do you consider are needed to best support Demand Response?
 - What is the impact if Code changes are not made or no workaround available?
 - Are the current regulatory arrangements suitable to incentivise continued investment in ripple or other load management technologies?
 - If the same DER is captured by two different purposes, how do you reconcile the potential conflict?
 - Overseas experiences, learnings from them, how they apply in New Zealand

Our Experience to Date

Dairy Season

Due to nature of dairy processing, limited ability to stop using electricity – especially at peak of season

New Zealand Milk Collections



We have some limited demand response participation

Managed via third party

- There is some electricity load within Fonterra that can manage these outages without impacting on production or the operation of the business.
- In the past we did run chilled water icebanks and frozen stores as TOU load shifting (we no longer run those facilities/programs).
- Several of Fonterra's coolstores and wastewater aerators have these meters installed and participate in the market

What We Are Considering For Demand Side Flexibility

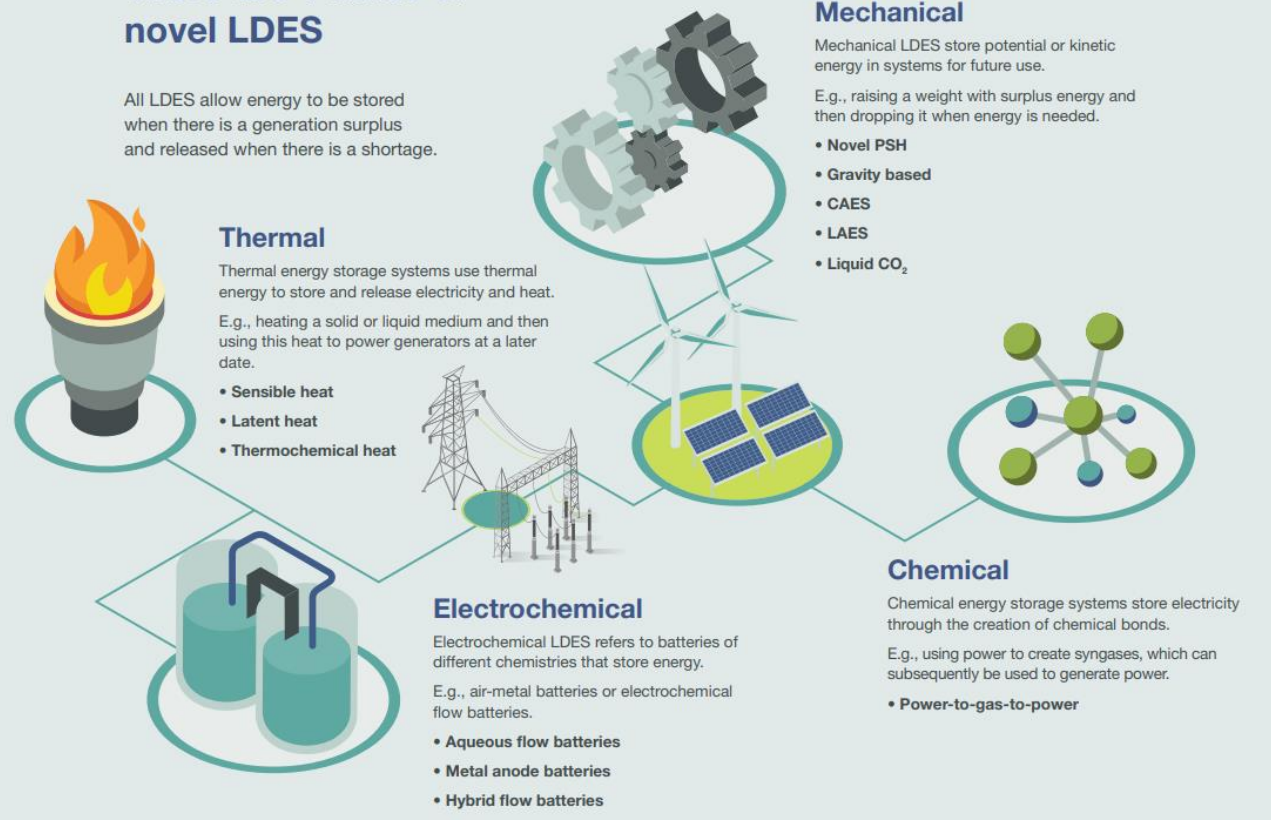
Potential Thermal Energy Storage Solutions

Numerous potential technology solutions – refer to Long Duration Energy Storage “Net Zero Heat” report

Overview of LDES categories

There are 4 kinds of novel LDES

All LDES allow energy to be stored when there is a generation surplus and released when there is a shortage.



The LDES Council is formed by 64 companies, from start-ups to large corporates

LDES Council members

Technology providers					Industry & services customers	Capital providers	Equipment manufacturers	Low-carbon energy system integrators & developers	
									
									
									
									
									
									
									
									
									

Key principles of the LDES Council

-  Executive-led
-  Global
-  Fact-based
-  For societal benefit
-  All types of energy storage, not just electrochemical



The LDES Council is an independent body with its own governance structure, with the mission to accelerate energy decarbonization through the scale-up of LDES

What We See as Challenges & Opportunities

Challenges to overcome for greater participation

Notice period and uncertainty of the duration of the reduced demand.

- This leads to uncertainty of financial benefit under the current spot market compensation model where the expectation that consumers that decrease demand will benefit from having CfD's in place and lower spot market purchases.
- If this compensation model persists, industry will not be the expected source of large scale DSF and the electricity market may miss an opportunity to be optimised.

Financial Benefits

- For industry to participate in DSF, they need confidence in the financial benefit to recover the cost of lost production, shutdown and start-up waste generation and energy use, or the capital cost for alternative supply options (i.e. storage such as batteries or alternative energy sources such as biomass) in order to provide the DSF.
- For Fonterra, to develop a business case to invest in DSF, there are several things we would need to know. For example, if we knew that we would receive an annual payment for being able to participate in the DSF market, as well as had some ability to forecast the number of expected events per year, then we could develop an internal \$/MWh revenue recovery value.

Demand Side Flexibility Opportunity

- We support Demand Response Flexibility (DSF) and believe it will deliver value to the electricity market as the percentage of Variable Renewable Electricity Generation (VREG) increases
- **Market development for DSF**
 - We believe that a solution similar to the reserves market where DSF participants bid in a volume of DSF to the System Operator (SO) thereby providing visibility to the SO which can be compensated with a fixed payment.
 - Then the DSF participant can bid into the RTP market at a \$/MWh level that compensates them for the value of the demand reduction and it's up to the SO to decide what is the lowest cost to balance the price stack be it additional generation or DSF.
- Significant opportunity to develop DSF if the financial incentives are correct to assist with business case to invest in assets to enable this