General Feedback

A few general comments on the paper that do not fit into the prescribed questions. Apologies if they seem pedantic but as an educator I proofread documents regularly.

1. Figure 10 is mislabelled, it should presumably be winter.
2. Table 1 seems misleading or at least confusing. You acknowledge in the footnote that winter peak demand is higher especially for space heating, then why present summer data? Managing peak winter demand has much more impact across the stack although I suppose you're trying to show how useful some of the other appliances are.
3. Regarding the Hot water system example on p17. You mention the external party needing to know the available useable hot water. This is not something that is available even with current models. There are systems including measuring skin temperatures but the variance in standing losses means that determining how 'charged' a hot water tank is just based on the energy supplied is quite difficult. This is also an issue with usage patterns as if the charging of the system is controlled separately there is very little you can do to determine usage without a flowmeter.
4. A more general comment is around the lack of DIY solutions, I think in NZ this would be a sizable portion of the market than this document implies, especially regarding hot water systems which are replaced infrequently and can easily be retrofitted to have remote control as well as capacity sensors and other functions.
5. Finally on hot water the impact of tempering valves (now required in all new builds) and increasing the temperature setpoint is not presented. This is the most effective method of converting hot water tanks into an energy storage device. See this post for more information:

https://www.energynews.co.nz/blog/john-hancock/823719/electrifying-water-heating

6. My final comment is from a consumers perspective. This documents purpose is to "unlock the potential of demand flexibility through residential end-use products.". Many existing appliances will need to be replaced to achieve this clearly. What is not clear is how the consumer benefits from this or why they would buy a 'flexibility capable product' without a clear financial benefit, especially when they typically cost more and in some cases can be more prone to faults due to increased complexity.

Consultation questions

Key end-use products and approach to commercial and industrial

Q1. The main uses cases for demand flexibility presented in this paper are: managing peak demand (generation and line capacity) constraints, optimising renewable energy use, and optimising home energy use.
• Do you think these are the main use cases? Yes
• What other use cases are there? Reducing consumer energy costs

Q2. In the residential sector, the following products have been identified as key end-use products for demand flexibility: EV chargers, heat pumps, electric hot water systems which use a storage tank, fridges/freezer, clothes washers, dishwashers, clothes dryers, inverters for solar and battery systems, and HEMS.
• Do you think these are the key demand flexible end-use products in the residential sector? Yes
• If not, what are the key products and why?

Q3. Do you think a standardised end-use product/application-based approach is relevant for the commercial sector, or is a bespoke/customised approach needed? N/A

Q4. What do you think the key end-use products/applications are in the commercial sector? N/A

Q5. Do you think a standardised end-use product/application-based approach is relevant for the industrial sector, or is a bespoke/customised approach needed? The vast majority of the products will be largely the same. Although they are used in varied ways so are unlikely to be made available for flexibility. The financial benefit to the consumer would have to be more substantial for an industrial user to make flexibility available.

Q6. What do you think the key end-use products/applications are in the industrial sector? Pumps, electric heaters, compressors, electric/electrode boilers. Often combined into heat pumps, refrigeration cycles that should ideally be controlled as one.

Q7. What are the barriers to the uptake of demand flexible technology? Standardisation, Understanding, Simplicity of implementation, Capital cost and perceived or real value to consumer

End-use product level components for demand flexible capability

Q8. The paper describes the three main end-use product components for demand flexible capability as: communication protocol, product response, and operational information.
• Do you agree that these are the main components for demand flexible end-use products? Yes
• What other components or considerations are important for end-use products?

Q9. Do you think to support the development and uptake of demand flexibility there is a need to create a minimum level of standardisation at an end-use product level (covering communication protocol, product response, and operational information)? Yes

Development of demand flexible end-use products

Q10. Would you support EECA creating a voluntary approved list of residential demand flexible end-use products, similar to EV Smart Charger Approved List N/A

Q11. Would you participate in working groups on the key end-use products to develop voluntary demand flexibility requirements (covering communication protocol, product response, and operational information)?
- If so, what product based working groups would you like to be part of? N/A

Q12. If you are an end-use product supplier, would you manufacture/import/supply end-use products that meet the voluntary specification? N/A