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Subject: Submission to the consultation – Unlocking the Potential of Demand Flexibility

Dear Members of the Submission Committee,

This submission is made on behalf of Black Diamond Technologies Ltd. and responds to EECA's Green Paper on demand flexibility seting a clear position on how New Zealand should enable flexible demand while protecting consumers. It introduces a practical path that favours standards, measurable performance, and equity, and it explains why residential efforts must be paired with real market signals and a credible grid investment plan.

The document answers the twelve consultation questions across residential, commercial, and industrial uses. It defines the core capability set for flexible products as communications, product response, and operational information, and it identifies barriers such as weak price signals, poor interoperability, privacy concerns, and skills gaps. It argues for alignment with Australia through AS/NZS 4755, the use of smart meters for simple DRED control, and a voluntary approved list that specifies minimum device capability.

Key recommendations are to adopt a minimum end use standard with consumer control and safety, pair any approved list with defined tariffs and live pilots, prioritise commercial and industrial flexibility over household flexibility as these are areas where the largest controllable loads exist, and maintain alignment with Australian standards to avoid cost and fragmentation. Demand response should also begin in the commercial and industrial sector under transparent rules and fair tariffs. Residential only schemes risk regressivity and complexity and will likely fail without strong consumer protections and a credible generation and transmission investment roadmap.

Sincerely,

Rudolf Zettler

Appendix one:

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?
- What other use cases are there?

Response: Yes, managing peak demand, optimising renewable use, and optimising home energy use are those strategic focus areas stated by EECA. However, if EECA wish to load shift through changing consumer behaviour, this will undoubtedly require some adjustment to consumption patterns e.g., consumer forgoing consumption at a given moment, as well transparency around enabling capabilities. The consumer will clearly want assurance that by switching to more efficient demand flexible appliances their levels of upfront investment/payback are demonstrable through transparent billing (lower energy bills) coupled with mobile apps, and personalized reports to verify savings. In short: **visibility + choice + automation, under the user's control**, to cut bills and support a reliable, renewable grid. Hence EECA's statement of intent should acknowledge challenges that must be met and include key enabling capability requirements such as:

- **Hardware and upgrades:** Smart meters to provide data on electricity flows/consumption levels. Dedicated asset metering to enable accurate monitoring, control, and optimization of individual assets e.g., EV, heat pumps, batteries; Specific hardware required to enable active management of electricity consumption, (e.g. via smart thermostats, smart plugs, smart substations distant-controlled, wall boxes for EV smart charging, energy storage including thermal energy storage and home battery); If significant electricity flows back into grid (e.g. from V2G, batteries) this would require physical grid upgrades.
- **Software:** Grid communication and market software required to enable interaction between grid operators and participants, managing price and bid signals for active market engagement, while asset control software required for consumers/VPPs automates energy usage of assets (e.g., appliances, EVs) based on price signals and logic algorithms to optimize flexibility; Industrial EMS (Energy Management Systems) software tailored for automating factory processes, optimizing energy use, and leveraging flexibility based on dynamic pricing; AI and advanced modelling capabilities required to enable real-time optimization, predictive analytics, and smarter decision-making.

- **Data exchange:** Improved data exchange and interoperability standards, such as open access and common formats, to ensure seamless communication between diverse energy assets and systems (e.g. EMS, dynamic operating envelopes), enabling efficient, scalable, & coordinated DSF (Demand Side Flexibility).
- **Pricing structures:** Differentiated pricing structures (time of use tariffs) are important to provide incentives for flexibility; Supplier exposure to granular wholesale prices (to reflect what the system needs) i.e., incentive for retailers/aggregators who buy from wholesalers to **build and reward** flexibility—because avoiding peaks directly lowers their cost and risk.
- **Cost:** Financial considerations and levels of savings will vary. These may be relatively small for consumers but larger for industry players. Consequently, the key enabler for consumers will be bundling with other benefits e.g. efficiency, levels of upfront investments/paybacks, transparent billing, mobile apps, and personalised reports.
- **Market reform:** DSO (Demand Side Operator) reform needed both in terms of expanding flexibility procurement on their part, as **simplifying rules and processes** so rooftop **PV** and **V2G** (vehicle-to-grid) can connect, register, and participate easily—common technical standards, one-stop approvals, and simple settlement for exported kWh/kW; DSF participation needs to be **risk-free** for renters and lower-income homes: default timers pre-set, **keep cheap controlled-load**, and a **year-1 "no bill increase" guarantee**.
  Why it matters: Ensures benefits aren't just for tech-savvy or high-income households; builds public trust and real savings for those who need it most.
- **Behaviour change:** Requires trust in supplier/flex provider to automate flexibility (e.g. data security concerns) and provide best tariff.

In summary, the listed extras provide transparency i.e., **visible benefits**, and would ensure fewer outages, lower household bills, smarter investment, and fairer access, giving credence that flexibility helps *consumers* as much as it helps the grid.

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** (**Home Energy Management Systems**).

- Do you think these are the key demand flexible end-use products in the residential sector?
- If not, what are the key products and why?

Response: The list consisting of 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 identify the big, flexible household loads that matter for bills and the grid. However, key NZ products with high impact that should also be included (and why) comprise:

- **Home batteries (behind-the-meter)** – not just the inverter: the battery itself is a powerful flexible load/source. It can soak up cheap/solar and cover evening peaks.
- **Pool/spa pumps & heaters (where present)** – chunky, very shiftable loads; little comfort impact if scheduled smartly.
- **Towel rails / under-floor heating** – modest loads but highly schedulable; better run in off-peak blocks.
- **Dehumidifiers (common in NZ homes)** – medium load; easy to time-shift to mid-day or overnight.
- **Hot-water heat pumps (HPWH):** Flex them, but do not kill efficiency or hygiene i.e., schedule pasteurisation off-peak and avoid cold hours in winter if this forces the element on.
- **Space-heat pumps:** Pre-heat before the evening peak; use short, shallow pauses (minutes) rather than long outages in cold snaps.
- **Fridges/freezers:** Useful for second-by-second grid support (very short pauses), but **not** big bill-savers, so don't over-promise here.
- **Wet appliances:** Great for off-peak, but savings are smaller than EV/HPWH; make them "set-and-forget" via HEMS.

EECA's list is broadly right but needs to **add battery storage**, **pool/spa loads, dehumidifiers, and common resistive heaters (towel rails/under floor electric heaters)** typical for NZ households. The focus should be on programmes where **load is big and consumer comfort protected** e.g., hot water, space heat, EV and batteries, and then use HEMS to automate the rest.

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?

Response: Use a **standardised, product/application-based approach** for common commercial loads (so it's plug-and-play and low-cost), but include a bespoke layer for sites with complex plants or critical processes. Think "core standards plus site customisation."

Standardisation benefits include:

- **Lower cost and faster scale:** Common capability sets (for HVAC, HPWH/boilers, packaged RTUs, VRF, EV chargers, refrigeration cases) which allow vendors to ship “ready and standards compliant products” (IEC 62746-10-1, AS/NZS4755 series), meaning less engineering per site. Note: **there are recognised certification programs for DR/DER communications**, but they **do not by themselves equal NZ Regulatory or Building Code compliance**. They could, however, be cited as **supporting evidence** (e.g., if accepted via MBIE’s new **Approved Products Certified Overseas / Building Product Specifications (BPS)** pathway) where these are relevant to a building product’s performance or interoperability.
- **Interoperability:** Shared communications/telemetry (e.g., open protocols, standard point lists) means easier integration with BMS/aggregators.
- **Measurable, financeable:** Standard signals and **M&V** (**Measurement and Verification**) make savings reliable, enabling rebates/ESPCs (Energy Saving Performance Contracts).
- **Portable skills:** Contractors learn one playbook; commissioning is repeatable.

Bespoke will be required for:

- **Complex plants:** Chilled-water/heat-recovery loops, hospitals, labs, data centres—flex must respect process constraints and redundancies.
- **Critical SLAs (Service Level Agreements):** Temperature/humidity, pressurisation, hygiene (e.g., theatres, pharma) demand **site-specific logic** and tighter alarms/fallbacks.
- **Local network constraints:** Feeder-specific limits may require tailored dispatch windows and device prioritisation.
- **Asset diversity/legacy:** Mixed vintages/protocols often need custom gateways and control strategies.

The risk of all standard and no bespoke is that this may harm comfort/process, or simply under-deliver because the generic strategy ignores site realities. All bespoke and no standards however, will likely generate high engineering cost, slow roll-out, lock-ins to a single integrator, and hard to verify savings.

In summary, stansardise the **building blocks** so participation is cheap and scalable; customize the **control strategy** where the operation is complex or critical. This will effectively ensure reliable savings without risking comfort, safety, or core business.

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

Response: EECA's own paper does not list commercial assets exclusively. The following therefore identifies key end-use commercial products/applications fit for NZ and provides reasons why these matter.

1. **HVAC – packaged RTUs, VRF/VRV, AHUs with VSD fans**
   Why: Biggest electric load in most buildings; can **pre-cool/pre-heat**, do **small set-point nudges**, and **fan speed trims** for peak shaving with minimal comfort impact.
2. **Central plant – chillers (air/water-cooled), heat-recovery heat pumps, cooling towers, and condenser-water pumps**
   Why: Large, controllable loads with **thermal inertia**; can shift production to off-peak, exploit **cool storage**, and provide **fast DR** via short kW trims.
3. **Hot-water systems (incl. commercial HPWH, boilers with electric stages), thermal storage (water/phase-change)**
   Why: Tanks let you **make heat off-peak** and serve peak demand later; **pasteurisation cycles** can be scheduled off-peak.
4. **Commercial refrigeration (supermarkets, cold-rooms, display cases)**
   Why: Big, steady loads; **defrost and set-point windows** can be shifted; short, closely bounded **temperature-band control** supports fast DR (with food-safety limits).
5. **EV charging – workplace and fleet depots**
   Why: Highly shiftable; smart staggering, kW caps per feeder, and **renewables-aligned charging** reduce demand charges and local transformer stress.
6. **Pumps and fans with Variable Speed Drives e.g., HVAC, water, wastewater, irrigation**
   Why: **Affinity laws** make small speed reductions deliver big kW cuts; easy to automate with minimal process impact.
7. **Compressed air systems**
   Why: Often oversized and leaky; **pressure band widening**, **sequencing**, and **storage receivers** enable short load sheds without affecting production.
8. **On-site PV plus battery/inverter systems**
   Why: Orchestrated charging/discharging gives **peak shaving**, **PV self-consumption**, and **backup**; can deliver **ancillary services** at sites with suitable inverters.
9. **Lighting (LED with dimming)**
   Why: Limited energy vs HVAC, but useful for **short, shallow trims** in corridors/parking/common areas without affecting task lighting.
10. **Building Management System (BMS) / EMS orchestration layer**
    Why: The **enabler**—standardises telemetry, safety limits, overrides, and **M&V** across mixed assets; integrates retailer/aggregator signals.

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Specific sector additions include:

- **Hospitals/labs/data centres:** stricter SLAs; focus on **plant-side measures** (chilled/hot-water storage, condenser-water, limited set-point shifts) and **generator/battery orchestration**.
- **Cold-chain logistics:** rich refrigeration flexibility with **tight temperature governance** and continuous monitoring.
- **Education/retail/offices:** broad applicability of **HVAC, hot-water, lighting, and EV**.

The reason the above identified items are key is because of:

- **Material load** (they move the needle on kW/kWh i.e., small, safe adjustments on these loads produce time-targeted kW/kWh reductions).
- **Controllability** (native timers/VSDs/BMS points).
- **Low service risk** when guardrails are used (set-point bands, temperature limits, overrides).
- **Stackable value** (peak shaving, renewable alignment, local-constraint relief, and sometimes ancillary services).

Although the EECA paper does not list commercial assets exhaustively; the identified set reflects where NZ buildings can deliver **real, low-risk flexibility** at scale, using equipment that is already common to NZ and controllable.

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?

Response: Industry requires a **hybrid** approach, so **standardise** all common building blocks, but **custom-engineer** anything that touches core product quality, safety, or is regulatory/compliance related.

The reasons why a standardised product/application approach makes sense include:

- **Big shared loads**: motors with VSDs, **compressed air**, **industrial refrigeration/cold stores**, HVAC, **pumps/fans**, water/wastewater are present on most sites and respond well to standard kW caps, set-point nudges, short trims, schedule shifts.
- **Lower cost/fast scale**: common **control primitives** (enable/disable, set-point bounds, ramp rates), standard telemetry (kW, kWh, temperatures, pressures), and open protocols (e.g., Modbus/BACnet/OPC UA) cut integration time.
- **Bankable savings**: common **M&V** methods (baselines, persistence tests) let retailers and networks pay reliably for DR/peak shaving.
- **Portability**: contractors and OEMs learn one kit, leading to easier commissioning and support.

Where a bespoke/custom approach is essential:

- **Process-critical assets**: kilns, smelters, continuous lines, pharma/food; **Clean In Place (CIP)/sterilisation**, pasteurisers, high-spec drying where **product quality and safety** trump DR every time.
- **Regulatory/QA constraints**: Good Manufacturing Practice/Hazard Analysis and Critical control Point, temperature/humidity bands, hazard zones, or where the need arises for **site-specific interlocks**, alarms, and SOPs.
- **Thermal/mechanical inertia**: what looks flexible on paper may break sequences (e.g., batch timings), so you need **process-aware models** (digital twins/Advanced Process Control) and negotiated (Service Level Agreement) windows.
- **Local network constraints**: feeder-specific issues with their own limits (thermal rating, voltage drop, fault levels) might require **tailored dispatch windows** and staging across multiple assets. Because those limits vary **by feeder, time, and season**, flexibility must be **custom-scheduled** for location and not just a generic, nationwide timetable.

Risks identified with each path if not hybrid include:

- **All-standard, no bespoke** → comfort/process hits, QA failures, operator backlash, DR cancelled at the first incident.
- **All-bespoke, no standard** → high engineering cost, slow rollout, vendor lock-in, hard-to-verify results.

In summary, it is recommended to capture the **90%** that is common, cheap, and safe to control utilising **standardization**. However, use **bespoke engineering** where **product quality, safety or compliance** could be affected. This ensures industrial flexibility can be effectively unlocked **without** risking the thing industry cares about most: **reliable, spec-compliant, and community safe output at lowest total cost**.

Q6. What do you think the key end-use products/applications are in the industrial sector?

Response: The following lists relevant **industrial end-use loads** that deliver real, low-risk demand flexibility, plus why they matter, how they are typically controlled and what guardrails should be put in place.

1. **Industrial refrigeration and cold stores (food/beverage, seafood, dairy)**
    - **Why key:** Big steady kW with **thermal inertia**; nation-critical cold food chain.
    - **What to flex:** Shift defrost windows; nudge setpoints within safe bands; pre-cool before peaks; stage condensers/evaporators.
    - **Guardrails:** Food safety (temperature/time limits), continuous logging, alarms, and automatic rollback.

2. **Central plant heat/cool (chillers, heat-recovery heat pumps, boilers)**
   - **Why key:** Large blocks of controllable load with thermal storage potential.
   - **What to flex:** Pre-chill/pre-heat thermal mass or tanks; stage compressors/burners; shift pasteurisation/sterilisation cycles off-peak where process allows.
   - **Guardrails:** Respect process temperature profiles, CIP/sterilisation standards, recovery times i.e., **automated cleaning of product-contact equipment** (tanks, heat exchangers, lines, fillers) **without disassembly.**
3. **Pumps and fans with VSDs (HVAC/process water, irrigation, dust extraction)**
   - **Why key:** Ubiquitous; **affinity laws** make small speed drops give large kW cuts.
   - **What to flex:** Short kW trims, flow/pressure setpoint nudges, schedule non-critical pumping off-peak.
   - **Guardrails:** Maintain minimum flows/pressures for equipment protection and product quality.
4. **Water and wastewater treatment on industrial sites**
   - **Why key:** Significant, schedulable aeration and pumping loads.
   - **What to flex:** Move non-urgent pumping/aeration; set Dissolved Oxygen (DO)/level bands; run blowers at lower speeds briefly.
   - **Guardrails:** Compliance with discharge/consent limits; maintain DO to protect biology.
5. **Batch/thermal processes with buffer capacity (ovens, dryers, kilns with storage or queueing)**
   - **Why key:** Some batch steps can shift start times without affecting output.
   - **What to flex:** Delay non-critical batches, align heat-up/soak with off-peak, shallow trims during soak phases.
   - **Guardrails:** Product quality specs (moisture, cure), ramp-rate limits, sequencing interlocks.
6. **Commercial/industrial EV charging (fleet depots, forklifts, yard vehicles)**
   - **Why key:** Fast-growing load; highly schedulable.
   - **What to flex:** Stagger chargers, cap kW per feeder, align with PV/wind windows; smart "charge by departure time."
   - **Guardrails:** Guaranteed state-of-charge by shift start; safety lockouts.
7. **On-site PV plus battery/inverter systems (behind-the-meter)**
   - **Why key:** Provide **peak shaving**, renewable self-consumption, and short-duration DR.
   - **What to flex:** Dispatch battery at peaks; absorb midday PV; offer fast frequency support if inverter-capable.
   - **Guardrails:** Cycle-life limits, outage backup priorities.

8. **Thermal storage (chilled/hot water tanks, phase-change)**
    - **Why key:** Turns cheap/off-peak electricity into process-use heat/cold later (virtual storage).
    - **What to flex:** Charge tanks off-peak; discharge on peak; coordinate with central plant.
    - **Guardrails:** Tank temperature limits; stratification management; hygiene requirements for hot-water systems.
9. **Compressed air systems (multi-compressor with receivers)**
    - **Why key:** Large, almost continuous load; common across factories; often oversized/leaky.
    - **What to flex:** Sequence compressors, widen pressure band (e.g., +/-0.2–0.3 bar), use receiver storage, trim kW for short intervals.
    - **Guardrails:** Maintain min. pressure for tools/process; leak remediation first (saves all day, not just at peaks).
10. **Building loads on industrial sites (HVAC/lighting in offices, amenities)**
    - **Why key:** Easy wins with minimal risk; complements process-side measures.
    - **What to flex:** Pre-condition spaces, small setpoint nudges, dim non-critical lighting.
    - **Guardrails:** Comfort/IAQ thresholds; shift only non-critical areas.

The following provides reasons why the listed industrial end-use loads are key:

- **Material load:** They move the needle on kW/kWh i.e., **small, safe adjustments** on already-large loads produce **big, time-targeted kW reductions**, especially at winter/evening peaks.
- **Controllability:** Most already have VSDs, timers, BMS/PLC points—easy to automate.
- **Inertia/buffers:** Refrigeration, thermal storage, and process queues let you shift without hurting output.
- **Low service risk (with guardrails):** Clear bands, overrides, alarms, and post-event recovery protect quality and safety.

Q7. What are the barriers to the uptake of demand flexible technology?

Response: The following are representative of evidence-based barriers to uptake of demand-flexible tech (NZ first, then international), inclusive why they matter:

1. **Interoperability and common protocols are immature –** NZ's Flextalk trials (EECA, 2025) conclude widespread adoption needs *standardised functionalities* including real-time data exchange, interoperability, security, scalability, and non-proprietary protocols. Until this is locked in, vendors and networks cannot connect devices at scale.

2. **Weak/uncertain market signals and rules –** FlexTalk highlights the need for *clear market signals and regulatory frameworks that incentivise participation*; without them, pilots don't scale. Similar conclusions appear in UK (Ofgem) and EU (ACER) analyses.
3. **Consumer trust, control, and privacy concerns –** International research (Poulter & Brisois, 2025) identified low user trust and unclear agency deter automation ("optimised" control feels risky), raising costs and slowing adoption. Protections/overrides and transparent consent are prerequisites.
4. **Tariffs that do not reward flexibility (or loss of legacy controlled-load) –** If customers move from cheap ripple-controlled hot water to standard TOU (Time Of Use) without automation, savings can *shrink*, so uptake stalls. NZ's own demand-flex pages stress peak-reduction economics but legacy arrangements still dominate.
5. **Up-front cost and split incentives** – The Technology Collaboration Programme on Energy Efficient End-Use Equipment (4E TCP) (Kuiper, Briggs, Daly, & Langham, 2025) found where landlords or builders don't pay bills, there's little reason to buy smarter, flexible kit; international studies repeatedly flag capex and split incentives as structural barriers to DR/CER orchestration.
6. **Limited smart-metering/telemetry and data access** – EU regulators (ACER, 2025) identify *smart-meter rollout and data access* as critical barriers to consumer participation and DR verification; similar telemetry gaps exist in NZ pilots.
7. **Performance variability and operational risk if controls are naïve** – An international study (Parrish, Heptonstall, Gross, & Sovacool, 2020) demonstrated that benefits depend on **fit-for-purpose automation**; naive control can hit comfort/quality and erode savings, reducing willingness to participate. Demand response analysis by National Laboratory of the US Department of Energy (NREL, 2025) further highlights the need for **fit-for-purpose program design** and credible valuation/M&V to translate technical potential into bankable participation.
8. **Capability on the supply chain/skills/process side** – The UK Government (Department for Energy Security & Net Zero, 2025) roadmap notes practical blockers (planning, skills, "skip rates" in dispatch) **limit real-world delivery** even when tech exists

Across NZ, UK, EU and US research, the same themes recur—**interoperability**, **clear price signals and simple routes to market**, **consumer protections**, **data/M&V**, and **practical delivery capacity**. Fixing these lifts participation from **pilot-scale** to **mainstream** flexibility.

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?
- What other components or considerations are important for end-use products?

Response: Yes, we agree with EECA that the following three: (i) **communication protocol**, (ii) **product response**, and (iii) **operational information** are the main components for demand flexible end-use products, and that a weakness in any one **limits demand flexibility** i.e., can't talk to the device; device can't act; or there's no feedback to assess impact.

The following identifies what other components/considerations are important for end-use products. These include:

1. **Consumer control and opt-in / empowerment**
Why: Without clear user agency, people will not participate at scale. EECA defines demand flexibility as **two-way control with the consumer in control of how and by whom their product is controlled**. This should be explicit in device UX and program rules.

2. **Minimum capability profiles (standardisation of "what" to do)**
Why: Protocols standardise **how to talk**, but markets also need a **minimum set of device actions and data points** (e.g., start/stop, ramp up/down, report temp/state-of-charge) so different brands are interchangeable. EECA notes protocols do not mandate responses and suggests a **minimum response set** may be needed.

3. **Interoperability (avoid vendor lock-in)**
Why: Too many proprietary stacks raise costs and limit competition; EECA flags fragmentation and lock-in risk directly. The recommendation is to use open or widely adopted standards where possible.

4. **Safety/comfort guardrails and overrides**
Why: Flex must not compromise service. EECA stresses operational information to ensure devices are not controlled in ways that **impact service delivery**, and that consumers should be able to opt out if benefits do not outweigh impacts. That implies **local overrides and guardrails** (e.g., minimum temperature/pressure limits).

5. **Measurement and verification-ready telemetry**
Why: To pay for flexibility fairly and keep users engaged, programs need credible **kW/kWh baselines and event results**. EECA's "operational information" objective includes using device data to **determine flexibility and avoid adverse service impacts**—the same signals underpin M&V.

6. **Security, resilience & lifecycle (updates)**
Why: Communications that can curtail loads must be secure and maintainable. While EECA's own the paper focuses on device-level protocols, it also notes **system-level protocols** and the broader ecosystem—standardisation here should incorporate **cybersecurity and updatable firmware** to sustain trust.

7. **Program/market readiness (so capability is actually used)**
Why: Devices will not deliver value unless programs exist. EECA points to **FlexTalk pilots** (EV chargers first; adding HPWHs/HPs/HEMS) and upcoming regulatory work to **require "smartness"**—evidence that capability plus programs unlock benefits.

8. **Equity and inclusion of non-shiftable loads via storage**
Why: Some end-uses cannot shift; **batteries can stand in** so more homes can participate without lifestyle penalties. EECA explicitly calls this out.

EECA's three components are the **right core**, but successful uptake also needs **user control, minimum capability profiles, interoperability, safety/override guardrails, M&V-ready telemetry, secure lifecycle management, and live programs** that actually use and demonstrate this capability. The Green Paper itself provides the basis for each of these additions.

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)?

Response: A **minimum level of end-use standardisation** (for communication protocol, product response, and operational information) is needed if demand flexibility is going to scale beyond pilots. Factual reasons for this include:

1. **Interoperability → lower costs and faster scale**
Without a common "language" and data fields, every retailer/network/aggregator must build custom integrations per brand. A minimum protocol/profile removes one-off engineering, so more devices can plug-and-play and more offers can reach households.

2. **Predictable, safe device behaviour (product response)**
Programs need assured actions (e.g., **start/stop, kW cap, ramp rate, set-point nudge, availability/override**) with guardrails (min. service levels). A standard response set avoids comfort/hygiene risks (e.g., keeping HPWH hot-water service) and reduces opt-outs.

3. **Operational information enables verification and payment**
Standard telemetry (e.g., real-time power, mode, set-point, state-of-charge/tank temperature, event flags) are required to **forecast flexibility**, **protect service**, and **settle** events fairly. Without common fields and formats, you cannot do credible M&V across vendors.

4. **Consumer control and trust**
Clear, consistent support for **opt-in/opt-out and local override**, exposed the same way across devices, is essential for participation. Standardising these controls and the related status signals makes programs transparent and reduces complaints.

5. **Avoid vendor lock-in; keep competition healthy**
A minimum, open profile prevents single-vendor ecosystems or proprietary hubs from dominating. That keeps device prices down and lets retailers/networks switch aggregators without stranding consumers' hardware.

6. **Program portability and equity**
If a renter moves or a retailer changes standardised devices keep working in the next program. That portability broadens access (important for rentals/low-income households) and makes public support (rebates) better value.

7. **Security and lifecycle management**
Common requirements for **secure comms** and **updateability** (firmware/security patches) reduce systemic risk when devices are controllable over networks. A baseline standard spells out these minimums so weak links do not undermine trust.

The risk of not standardising from the onset will lead to higher integration cost, slow roll-out, fragmented markets, weak consumer protections, unreliable verification, and ultimately a low uptake because benefits do not reliably show up on bills.

There is equally a risk associated with over-standardising in that this can potentially stifle innovation and or exclude legacy gear. Hence it is to employ a light touch but **mandatory baseline** at the end-use level. This is the shortest path to **reliable, safe, and verifiable** flexibility that households can trust and that retailers/networks can pay for at scale.

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.

Response: Yes, in principle. We support a voluntary Approved List by device category that defines a minimum capability set: communications profile, mandatory product responses, required telemetry, consumer override, and safety states. This only works however if New Zealand remains harmonised with Australia and continues to use AS/NZS 4755; divergence would force re-engineering and re-certification costs that will be passed to consumers.

Implementation should leverage existing smart meters. Most already communicate over cellular networks, and a practical control path is a meter-provided clean contact wired to the DRED input on air conditioners in accordance with AS/NZS 4755. This avoids proprietary hubs and lowers integration cost and complexity.

Listing alone does not deliver outcomes. The list must be paired with defined programs and tariffs, plus interoperable pilots such as FlexTalk 2.0, so participants know what services are required, how performance is measured and settled, and what value signals justify investment.

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?

Response: No. Voluntary demand-flexibility working groups are a short-term patch for decades of underinvestment in generation and transmission. They conflict with the public message to electrify heat, transport, and industry, while shifting risk and cost to households for the benefit of generators and large users.

The priority should be structural: firm baseload from geothermal and hydro, additional peaking plant and hydro storage, expanded HVDC capacity, and grid-scale storage or inertia solutions, which are currently being researched internationally. Until there is a committed plan on these, product working groups are premature.

Demand response belongs first in the commercial and industrial sector where large flexible loads exist and can participate under transparent rules and fair tariffs. Real gains come from incentivising PV and storage with export rates that reflect value, not token cents per kilowatt-hour.

Residential schemes risk being regressive and complex. High-income households with efficient connected appliances benefit; low-income households in poorly insulated homes with inflexible heating do not. We would reconsider participation if the scope centres on commercial and industrial (C&I) customer flexibility with strong consumer protections and is paired with a credible investment roadmap.

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

Response: Yes, but only where the demand response framework follows the current AS/NZS 4755 standard.

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