

How Demand-Side Flexibility Can Transform Energy Systems

Insights from the World Energy Café on Unlocking Flexibility for Market Evolution

Key Insights

- Flexibility is now a critical enabler – not a nice-to-have – in the energy transitions.
- Demand-side flexibility (DSF) remains underdeveloped despite strong technical potential.
- Shared pain points exist across diverse markets: unclear value, regulatory gaps, low engagement.
- AI, digitalisation, and co-created market mechanisms are key to scaling.
- Behavioural change and energy literacy are as important as tech innovation.

What We Heard at the World Energy Café

Hosted by the **Japan Energy Association** and **Conseil Français de l'Énergie**, this World Energy Café (WE Café) brought together cross-sector and -regional experts to explore the real-world application of DSF. The conversation revealed not only shared ambition but also common barriers.

Bright spots

Australia: High Distribution Energy Resources penetration; value stacking across multiple markets remains complex.

China: Digitalisation and AI-enabled approaches emerging in pilot zones like Zhejiang.

France: Longstanding experience with demand response, time of use tariff; shifting to mid-day solar optimisation.

Japan: Industrial Demand Response is established; residential flexibility likely to grow post-2026.

UK: Local flexibility markets maturing; focus on integration challenges across governance levels.

Blind spots

Unclear Market Roles and Value

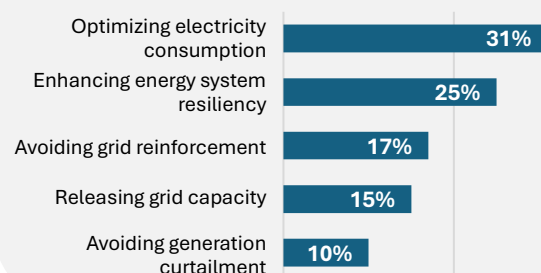
Propositions

Many countries have technical capabilities to enable DSF, but business models remain underdeveloped. Without clear value propositions for every actors, adoption remain limited – especially in the residential sectors.

Regulatory and Market Design Gaps

Regulation on how DSF assets can participate in multiple markets (e.g. Wholesale Market - Balancing Market) are unclear. In some cases, regulatory barriers prevent earning revenue for multiple services. Clarifying value-stacking frameworks is a shared priority.

WE Café participants response on flexibility's contribution varied widely, reflecting the range of views and priorities across different regions and sectors:



Low Consumer Awareness and Engagement

Even with enabling technologies and markets, end-user participation remains low. Flexible energy utilisation is still a foreign concept for most households. Energy literacy, simplified

modes of engagement, and value transparency were identified as key to increasing adoption.

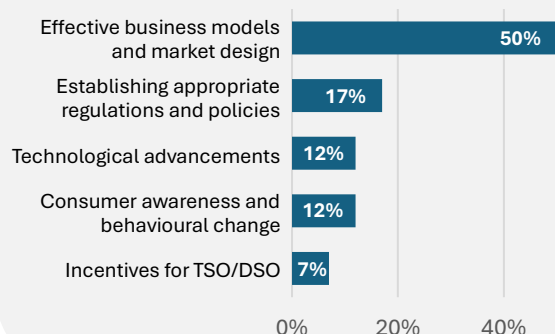
✿ Misaligned Market Incentives

Incentive structures for grid operators and retailers do not always encourage flexibility. Regulated returns on capital investments can disincentivize the use of DSF to defer grid upgrades. Aligning financial motivations across all actors – including aggregators and consumers is essential.

✿ Data Access and Digital Readiness

DSF relies on real-time data and smart systems. However, many systems lack interoperability, and have restrictive data rules. Coordinating DSF at scale requires advanced digital and AI-driven capabilities which are still developing.

WE Café participants identified unclear market roles and value propositions as key barrier to scaling DSF



Signals & Opportunities

- There is strong international appetite to share lessons learned and co-develop effective models.
- AI, Digitalisation, and Virtual Power Plants are seen as powerful scaling tools.
- Market mechanisms must evolve to reflect the value of flexibility and support fair participation – not added later.

- Behavioural change is as critical as technology – consumers need to be empowered, not just equipped.

The session also affirmed the need to break silos – between sectors, stakeholders, and across regions.

Bridging Spaces

A more integrated, flexible energy system will not happen by chance. Continued collaboration will be essential.

While this session highlighted shared challenges and promising pathways, several important questions remain open:

- What does a fair and scalable business model for flexibility look like? How can market and regulatory frameworks better support value-stacking?
- What does it take to bring consumers – especially households – into the equation in a meaningful way?

The conversation touched on several of these important topics, but the opportunity for deeper exchange and strategic learning – particularly on concrete, on-the-ground initiatives in different countries – remains open. We look forward to taking this forward at World Energy Congress, World Energy Week, and other upcoming gatherings.

World Energy Café

Our World Energy Café series of member-only events address pressing energy issues of particular relevance to a country or region in the World Energy Community, connecting geographies to engage on and address common issues.

Please contact your country's Member Committee if you are interested in joining.