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Connecting consumers

RGI / OSGP Civil Society Training Series

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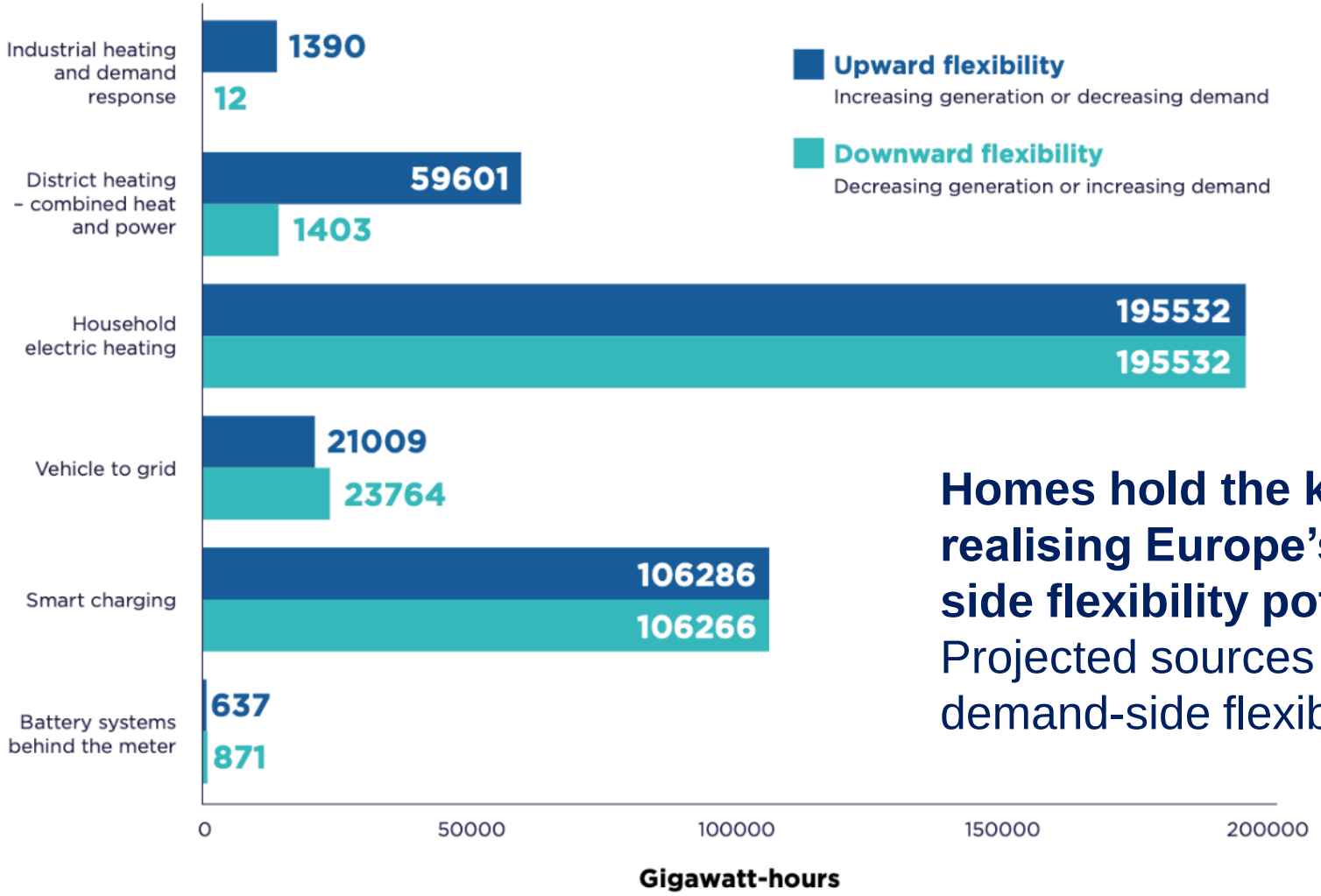
Power sector investment, mitigated by flexibility

The share of electricity in consumption must **double by 2040** to meet EU goals.

Estimated **half a trillion euro investment** in electricity network development by 2030.

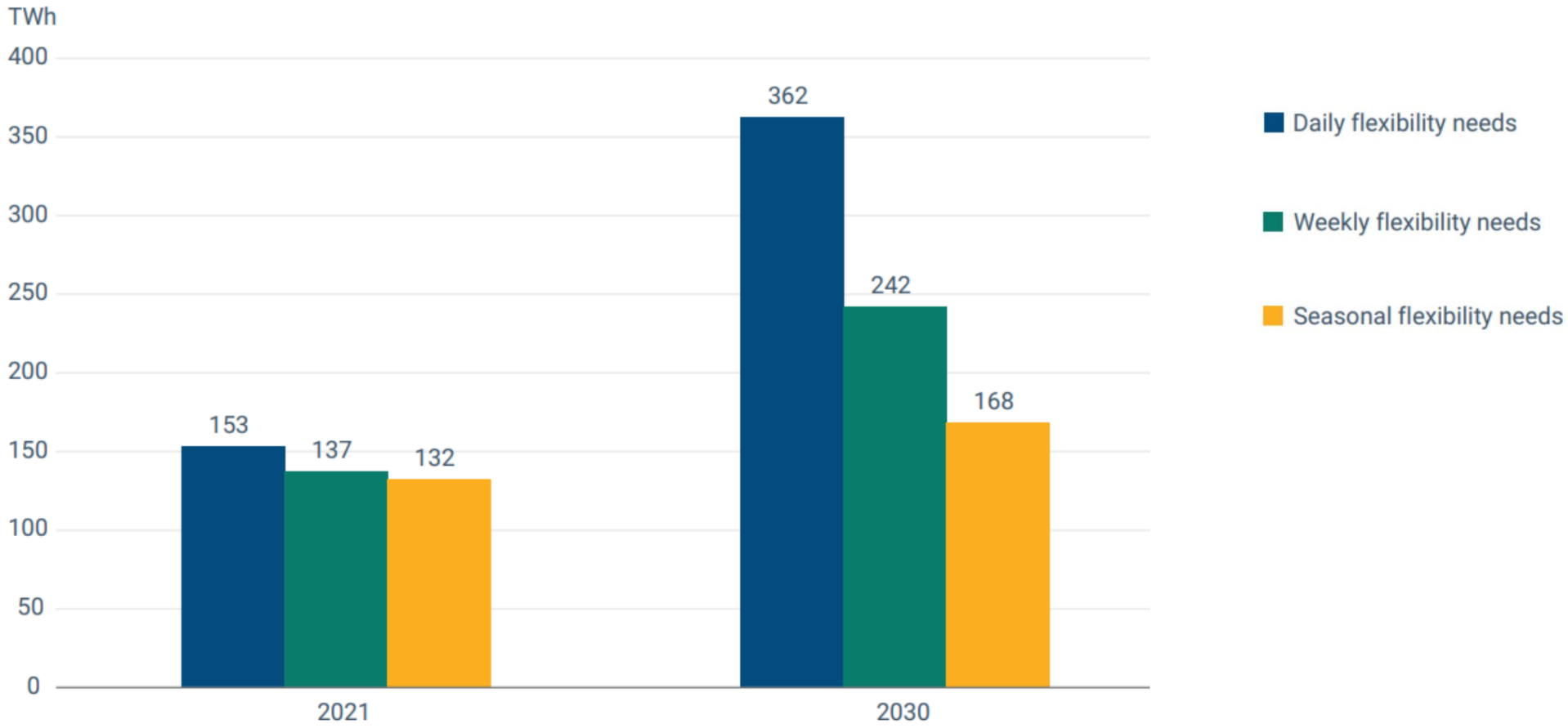


Homes hold the key to realising Europe's demand-side flexibility potential: Projected sources of activated demand-side flexibility in 2030

Source: smartEn and DNV, (2022). Calculations based on a 2030 electricity wholesale market simulation.

Flexibility needs

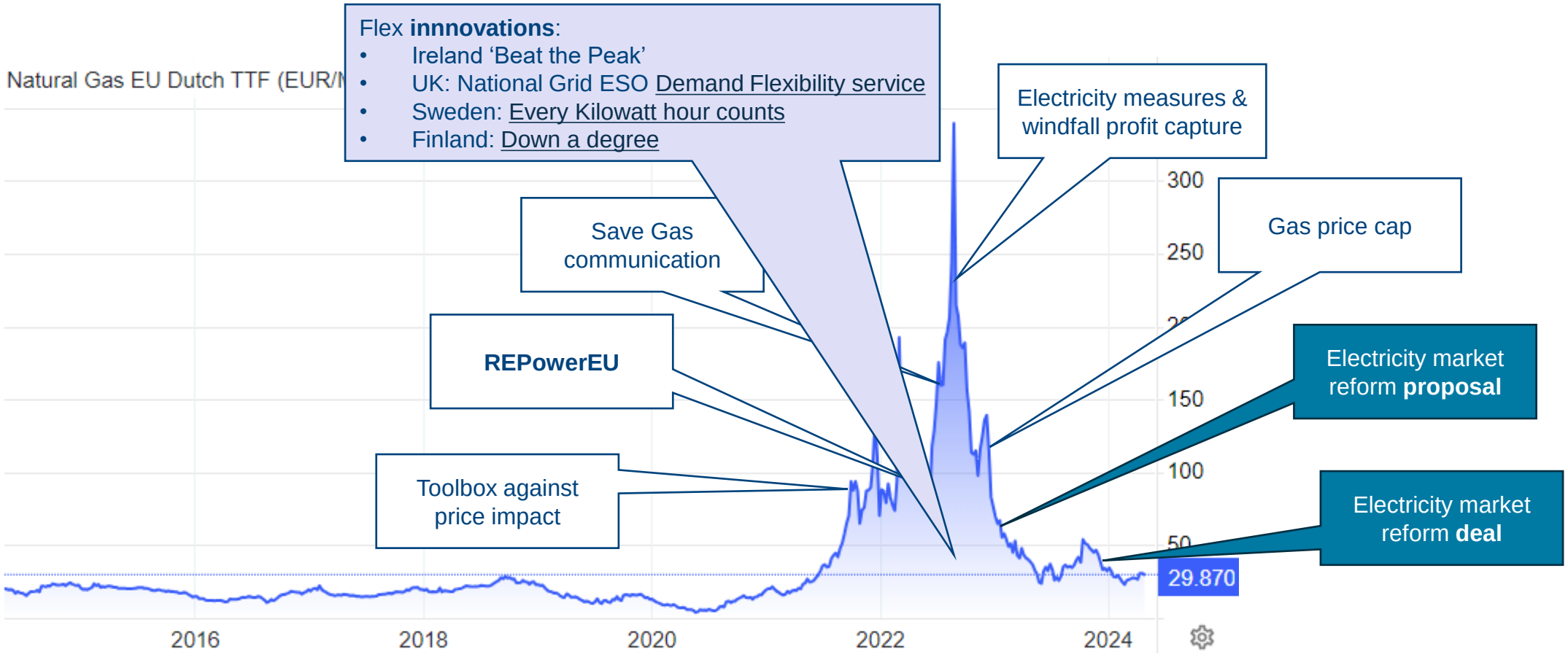
Daily, weekly and annual flexibility needs in 2021 and 2030 in Europe



LEFT: European Commission. (2024a). Securing our future Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2024%3A63%3AFIN and European Commission. (2022). REPowerEU Plan. RIGHT: European Environment Agency (EEA) and EU Agency for the Cooperation of Energy Regulators (ACER) (2023) Flexibility solutions to support a decarbonised and secure EU electricity system.

Regulation

Market reform in the wake of gas crisis



https://tradingeconomics.com/commodity/eu-natural-gas

Dedicated measurement devices

Reg. Art. 7b

When there is no smart meter installed, system operator to accept data from **dedicated measurement devices** for settlement of system services.

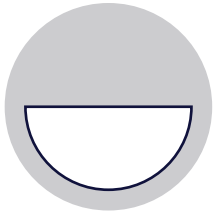
- Consent final customer needed.

Definitions

Dir Art. 2

Definitions of active customer, energy sharing, SoLR, energy poverty, flexible connection agreement.

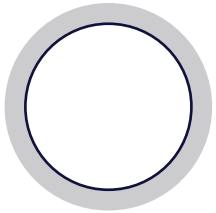
- “fixed term, fixed price electricity supply contract’ […] may, within a fixed price, **include a flexible element** with for example peak and off-peak price variations…”



Multiple contracts per connection

Dir. Art. 4

Free choice of supplier: **several supply contracts or energy sharing agreement per connection point** to be made possible.



Fixe term, fixed price and dynamic

Dir. Art. 11

Entitlement to a **fixed term, fixed price electricity supply contract** and **dynamic electricity** price contract.

- Exemption for suppliers <200k customers, and suppliers that offer only dynamic contracts.
- Prior **information** requirement, incl. on risks.

Customers on fixed contract not to be excluded from **participation in demand response** and energy sharing.

Right to energy sharing

Dir. Art. 15a

Right to energy sharing: for households, small enterprises or public bodies, within same bidding zone, or a more limited area (tbd by MS).

- Active customers may appoint **energy sharing organiser** (ESO) for coordination, maintenance, billing (ESO may own 6MW storage/RES)
- Deduction from metered consumption within time interval no longer than **imbalance settlement period** (=15min), without prejudice to **non-discriminatory taxes, levies** and cost-reflective network **charges**
- Not required to comply with supplier obligations if <10,8kW for households or 50kW in apartment blocks (but can change)
- MS to ensure **energy poor & vulnerable HH** can access energy sharing schemes. Energy sharing projects owned by

Making flexibility work for households

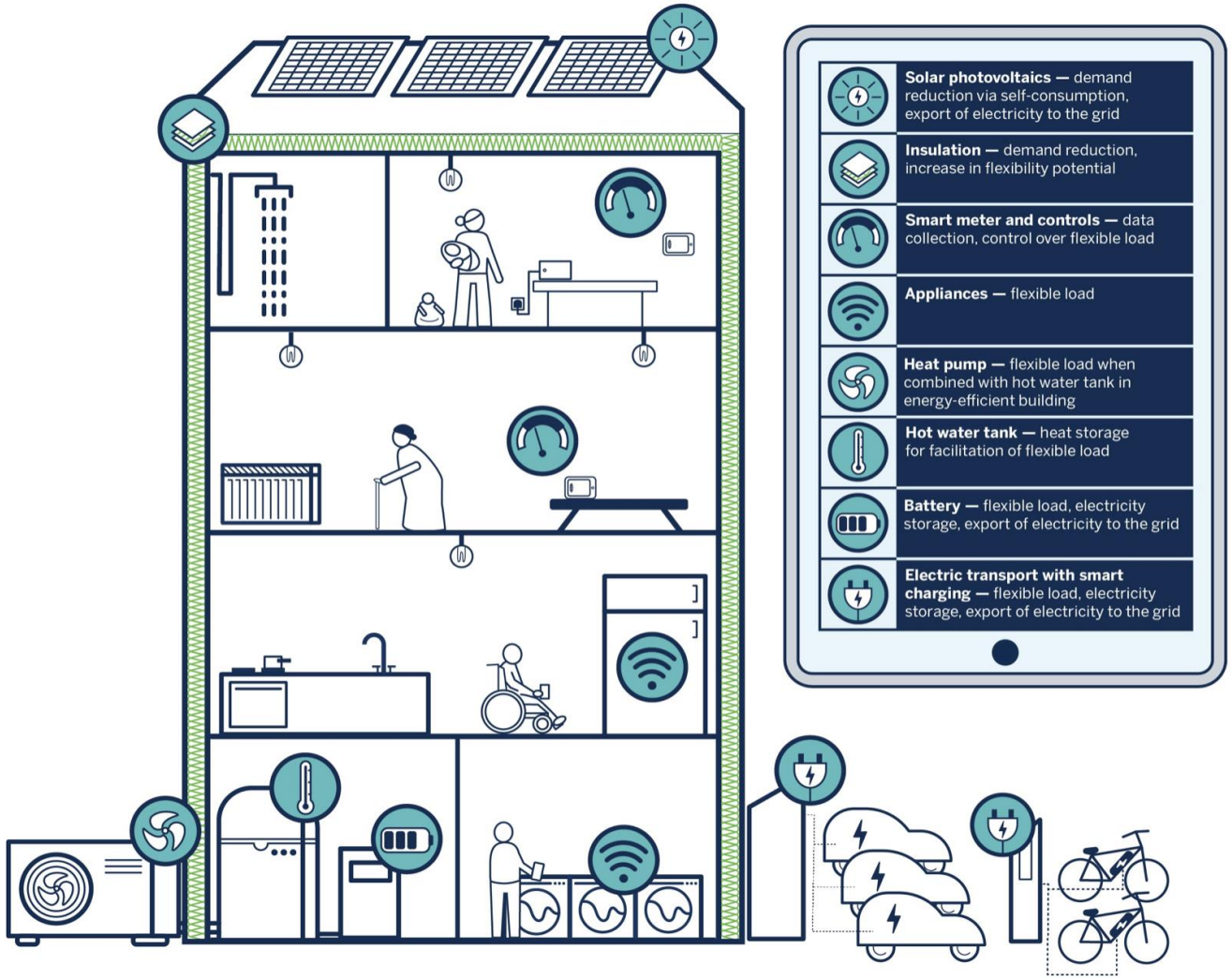
Home is where the smart is

Demand-side flexibility = customers responding to electricity market signals by:

- shifting controllable energy uses
- utilising onsite generation (rooftop PV), storage, imlcudig themal qualities.

Enabled by energy efficiency in the building fabric, smart meters and digital services. Increasingly automated.

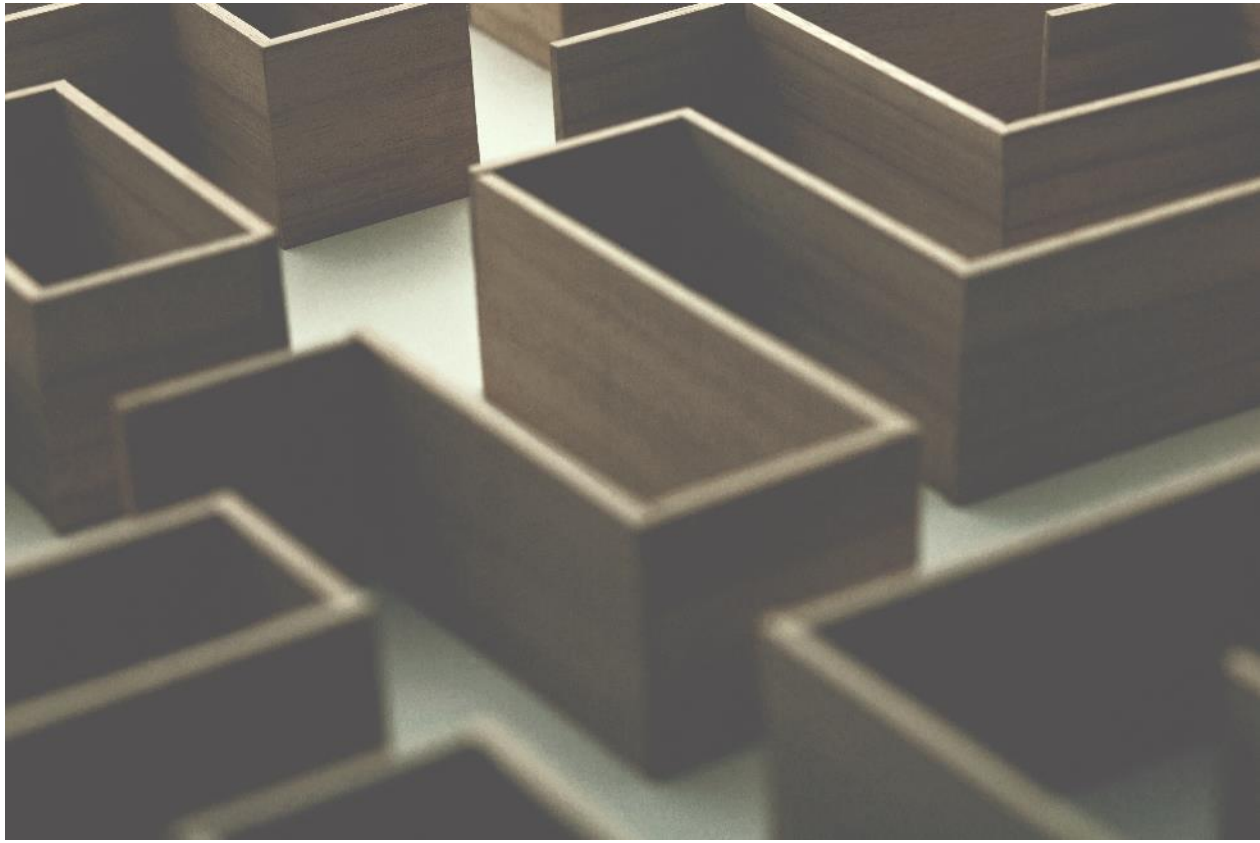
When and **where** we use energy will determine cost, not just how much we use.



Source: RAP

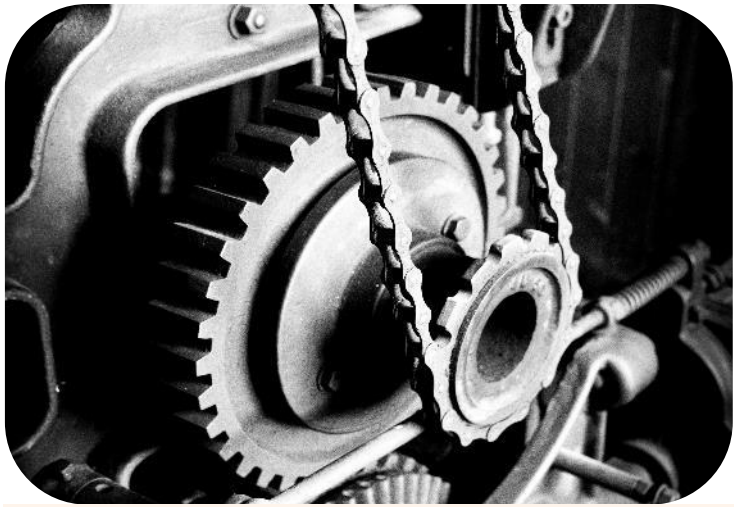
Challenges to households accessing the value of ‘when’ we use electricity

- Risk: tariffs offered usually share risk with households, providing a disincentive
- Hassle: if not automated, moving electricity demand adds to household chores
- Technologies and enabling assets: are not available or activated
- Energy markets are blind to the source of flexibility



What shouldn’t it look like?

Being too cold or too hot



Cogs in the machine

Flex vs inflex customers

Three no-regrets steps

Target inclusive flex not just kilowatts

Focus: Flexibility policies and schemes

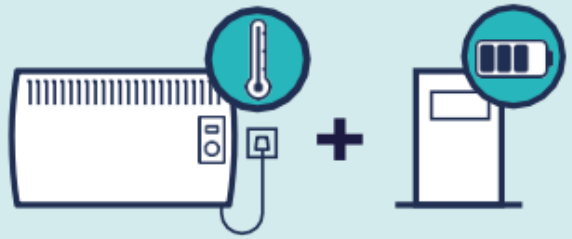
- Policy mechanisms to drive flex must not be blind to household experience and impact.
- Language and visibility around social qualities of flex. Common indicators of home flex potential.
- Better integration of flex and other schemes and incentives (e.g., energy efficiency *plus flex*)

Priority access to flex-enabling assets

Focus: Building upgrades/tech deployment

- Get flex enabling renovations, techs and controls into homes, focusing on homes of low-income/vulnerable people first. Landing points:
  - Renovation programmes
  - Heat pump subsidy programmes
  - One-stop-shops and home assessments
- Utilise winning tech combinations:
  - E.g., Ireland: EnergyCloud – existing hot water tanks, smart controls.
  - E.g., Scotland: electric heating plus battery or ASHP, PV and battery.

Warmworks and housing associations



Electric heaters plus batteries

Example: Warmworks and Dumfries and Galloway Housing Partnership installed batteries and supported tenants to move to optimal tariffs, enabling the use of existing electric heaters to serve heating needs for the whole day with electricity bought at lower prices.

Source: Warmworks. (n.d.). *Domestic battery storage.* https://www.warmworks.co.uk/our-work/domestic-battery-storage/

Air-source heat pump plus solar plus batteries

Example: Warmworks and Angus Housing Association installed solar panels and batteries alongside newly electrified heating so more solar energy could be used on-site, providing heat after sunset and reducing tenants' bills.

Source: Warmworks. (n.d.). *Renewable heat project with Angus Housing Association.* https://www.warmworks.co.uk/our-work/renewable-heat-project-with-angus-housing-association/

Build a safe retail runway to flex

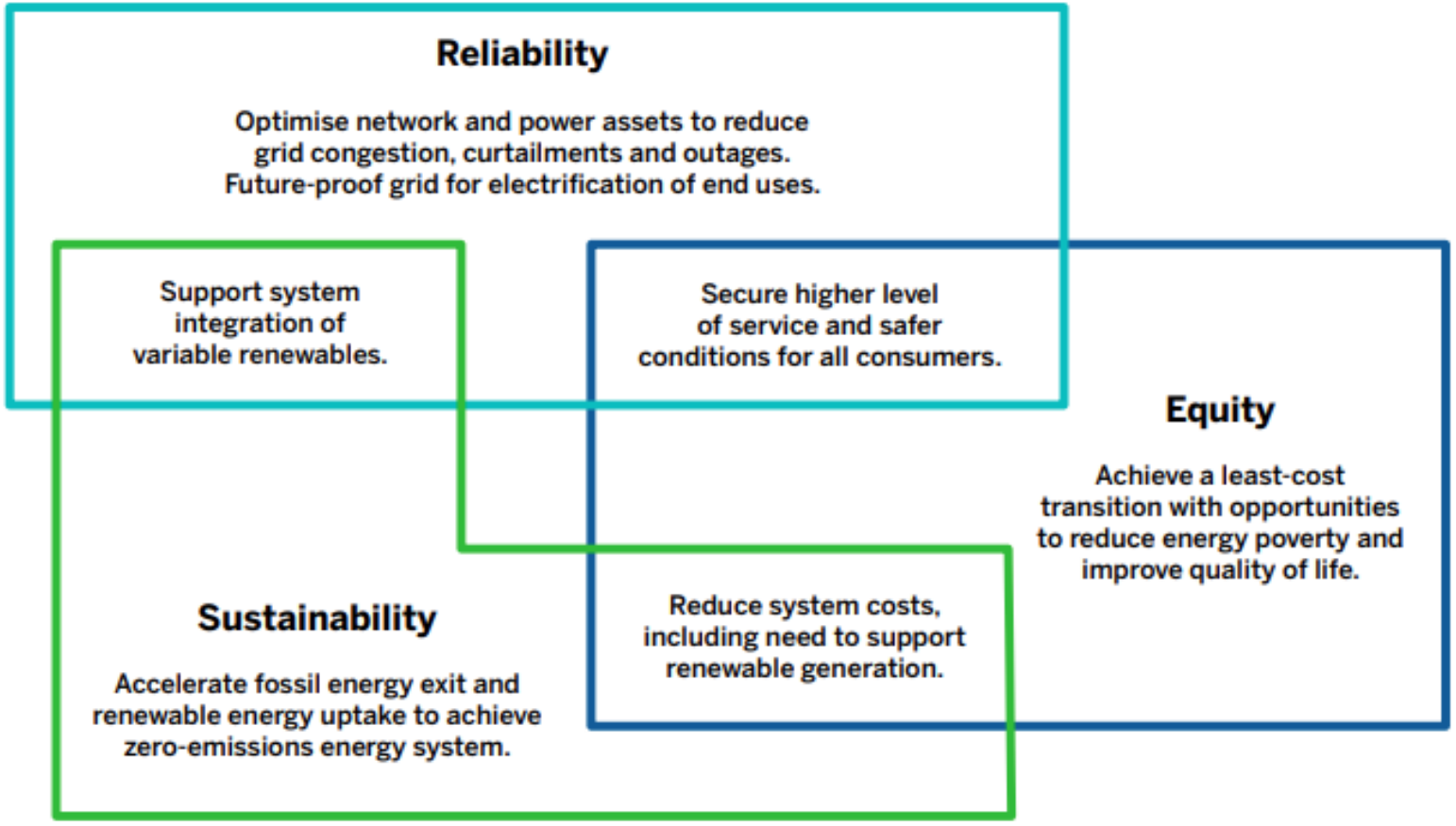
Focus: Electricity retail market and services

Ensure households can access direct flex benefits, with protections against financial risk and uncertainty.

- Tariff options:
  - Risk reducing peak price caps
  - ‘Upside only’ or fixed rate offers, turn up schemes.
  - Transitional safeguards: Shadow billing, money back guarantees.
  - Smart + social tariff combinations.
- Service offers:
  - Value offers/tariffs with controls and/or technologies
  - Heat as a service

Capturing the value of flexibility

Demand-side flexibility & energy trilemma

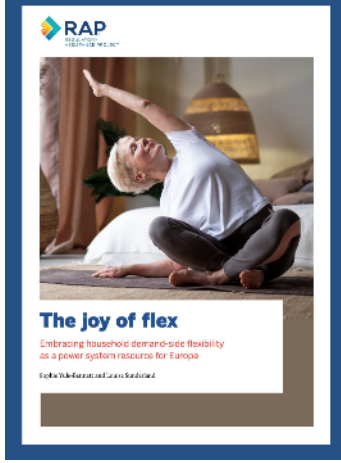


Source: RAP (2022), Joy of Flex.

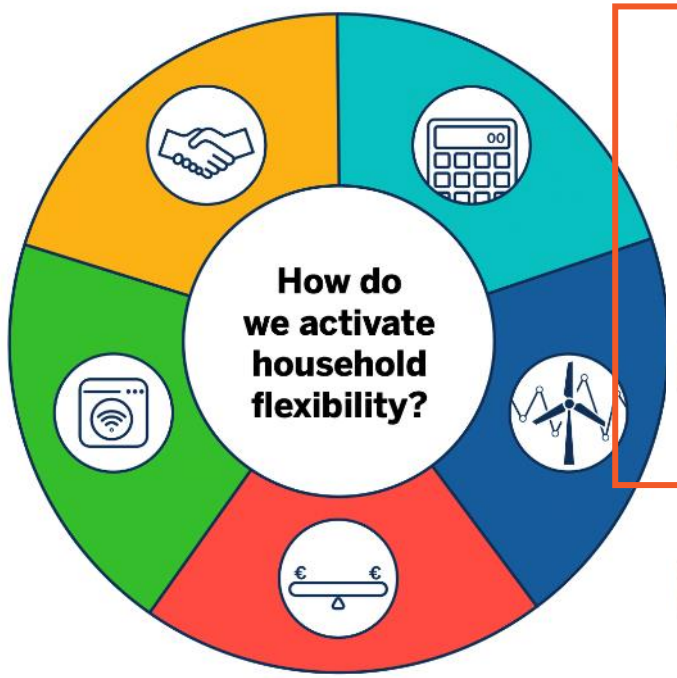
Joy of Flex (2022)

How to align household and system needs to scale up flex as an energy system resource.

Five-point action plan.



Demand-side flexibility is more than an individual customer right; it's a vital, cost-effective system resource that should be valued as such.



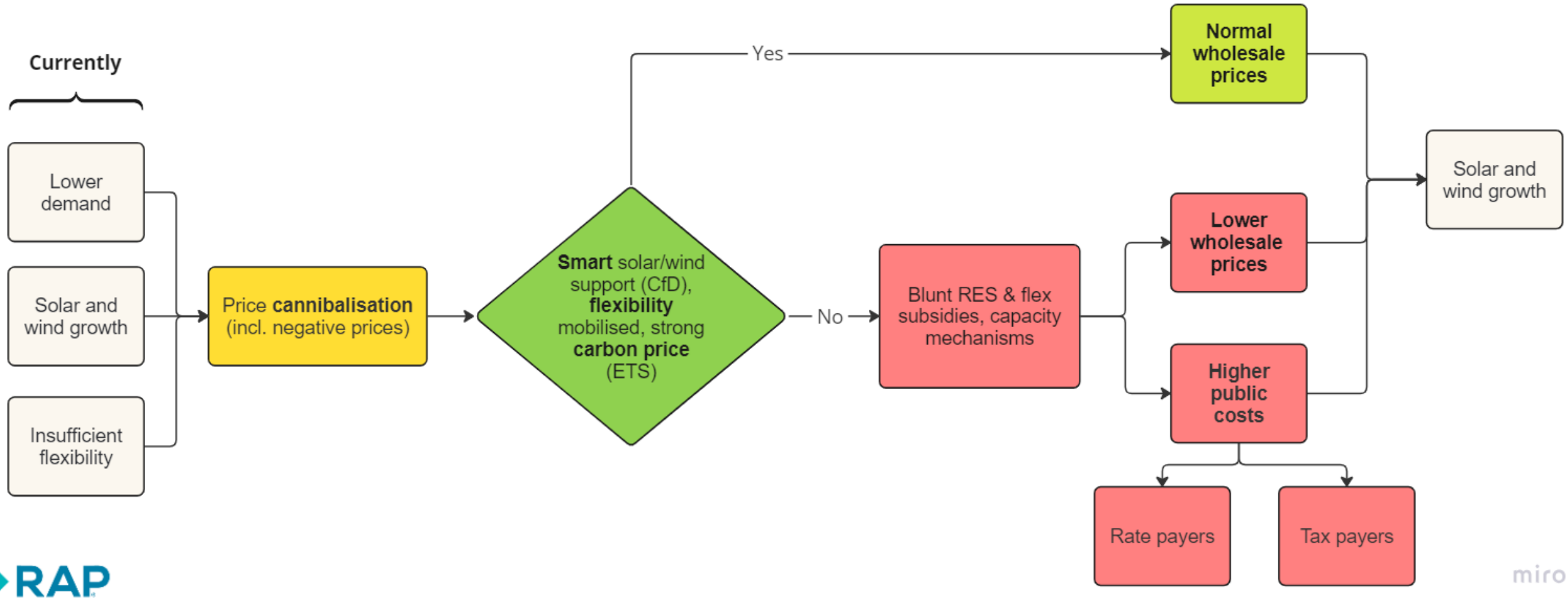
Create robust tools for measuring and valuing customer flexibility

Incentivise flexibility through energy market price signals

Ensure a level playing field for demand-side resources

Accelerate installation of flexible assets in homes

Make flexible actions easy and safe for customers


Currently
Lower demand
Solar and wind growth
Insufficient flexibility
Price **cannibalisation** (incl. negative prices)
Smart solar/wind support (CfD), **flexibility** mobilised, strong **carbon price** (ETS)
Yes
No
Normal wholesale prices
Blunt RES & flex subsidies, capacity mechanisms
Lower wholesale prices
Higher public costs
Rate payers
Tax payers
Solar and wind growth

Assessment of enablers to limit price cannibalisation (in Europe)

- Emissions trading scheme

Very positive

- *Smart* design renewables support
- Efficient price formation
- Digitalisation infrastructure

Mixed but improving

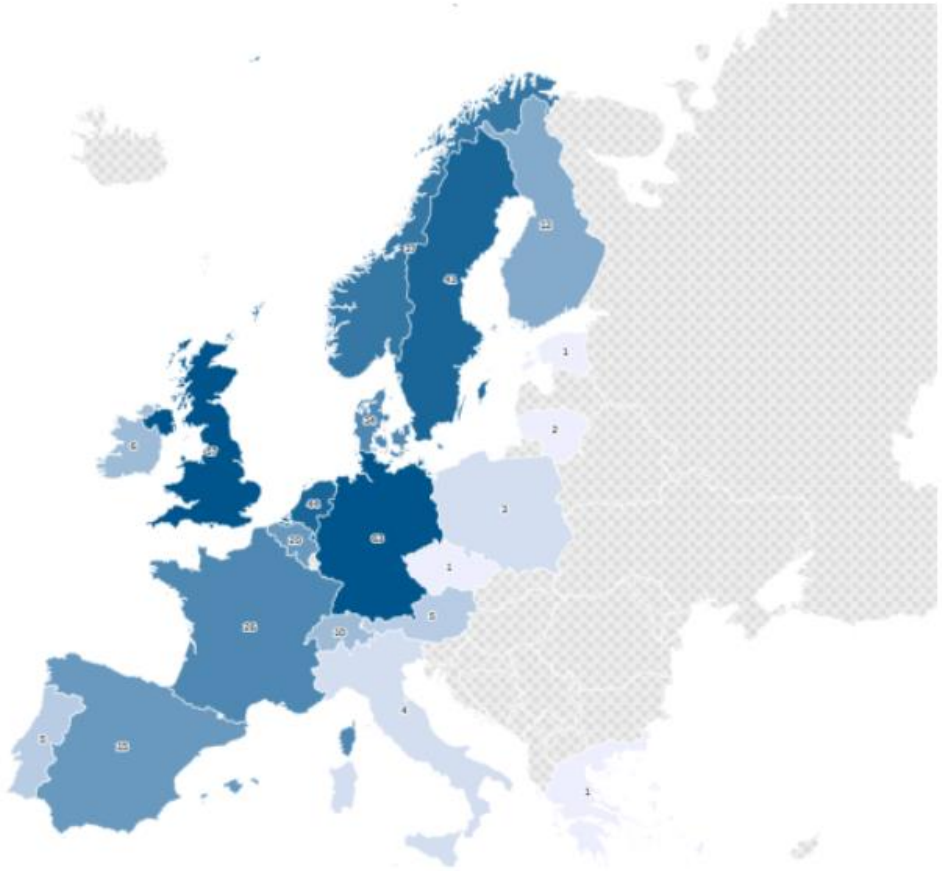
- Market access demand-side flexibility
- Market coupling and interconnection
- Cross-sectoral coupling

Significant challenge

Imagine all the people

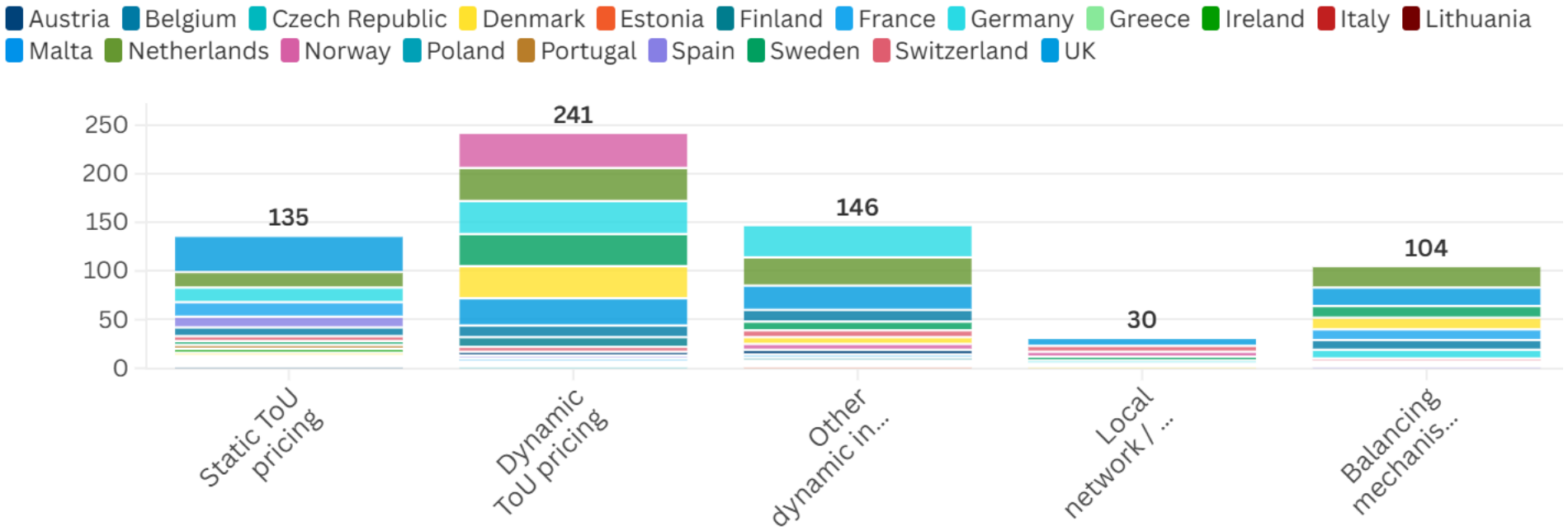
"In a new survey we found **447 tariffs and services** that allow Europeans to adapt their EV or heat pump to (static or dynamic) time-varying energy and grid tariffs, their own rooftop solar generation, the current grid mix and local or national grid situations. This almost threefold increase shows that flexible electricity use is gaining traction. There is a market for this, and an increasing choice for users."

Jaap Burger, RAP, 4/11/2024



https://www.raponline.org/toolkit/strong-growth-in-tariffs-and-services-for-demand-side-flexibility-in-europe/

Input types for smart tariffs and services



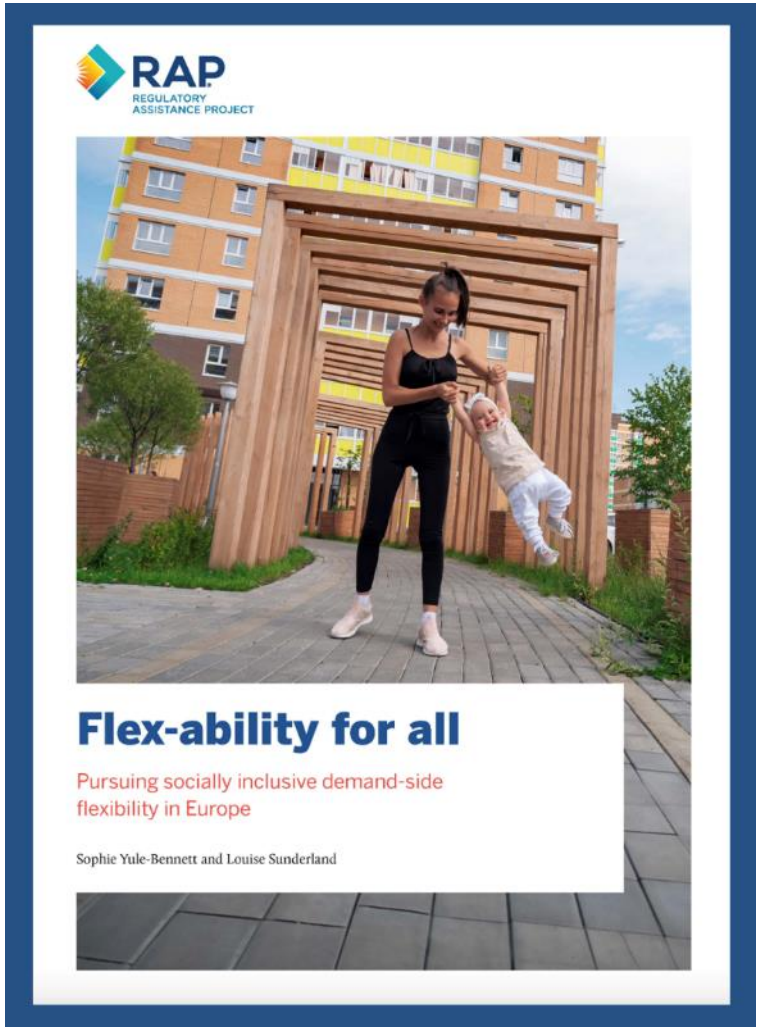
- High proportion of smart meters, electric vehicles and heat pumps => most tariffs and services.
- Basis of smart tariffs and services
  - **Dynamic time-of-use pricing** (hourly pricing, fixed kWh prices in return for smart control).
  - Local solar generation, carbon intensity of grid, or dynamic signals to balance the grid.
- Untapped potential to use local flex to resolve grid congestion.

https://www.raponline.org/toolkit/strong-growth-in-tariffs-and-services-for-demand-side-flexibility-in-europe/

References

Joy of Flex (2022): How to align household and system needs to scale up flex as an energy system resource.

Flex-ability for All (2024): Deeper dive into risks, barriers and opportunities for low income and vulnerable households. Human perspective rather than just energy system.



Imagine all the people

Survey of smart tariffs and services in Europe (2024)

https://www.raponline.org/toolkit/strong-growth-in-tariffs-and-services-for-demand-side-flexibility-in-europe/

About RAP

Regulatory Assistance Project (RAP)® is an independent, global NGO advancing policy innovation and thought leadership within the energy community.

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