



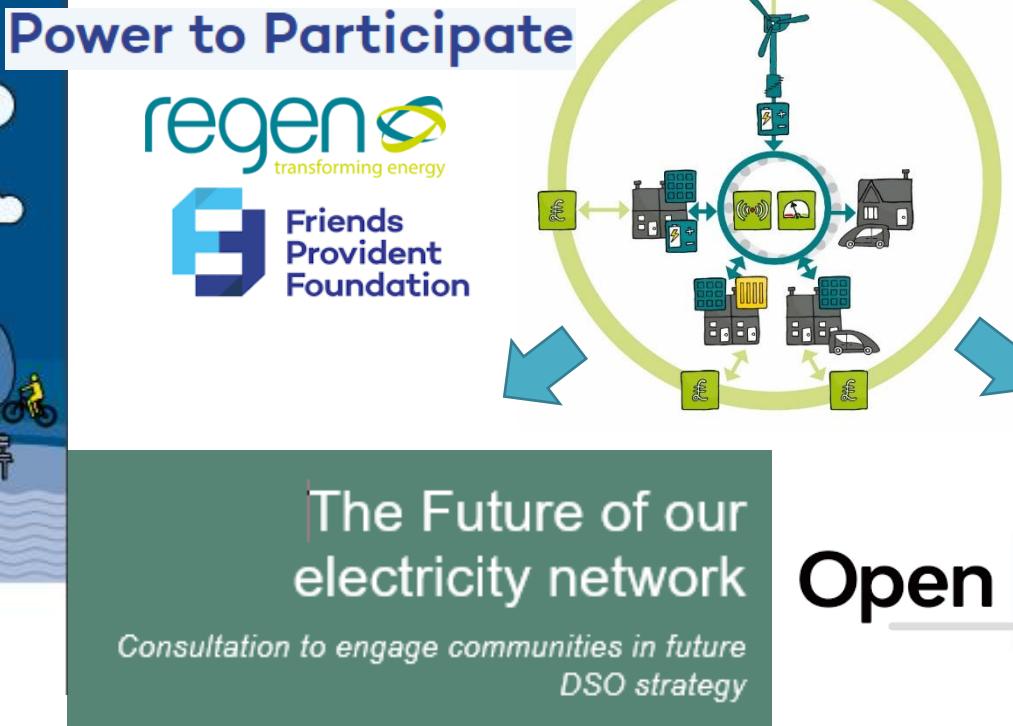
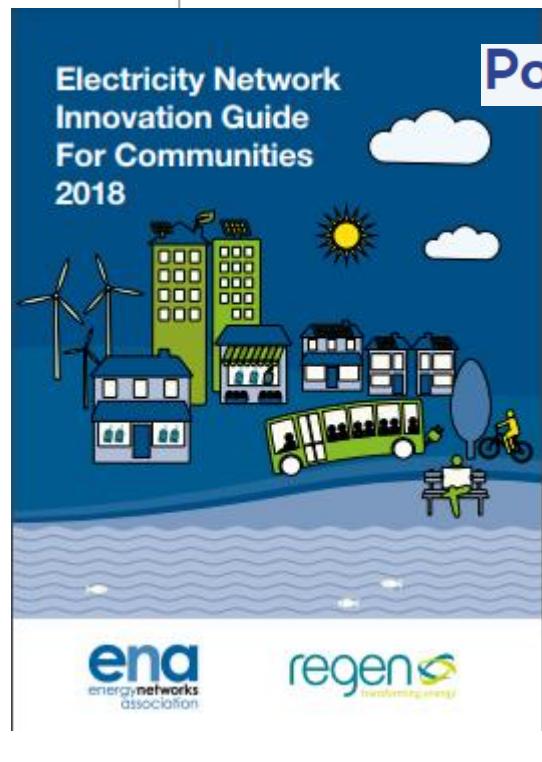
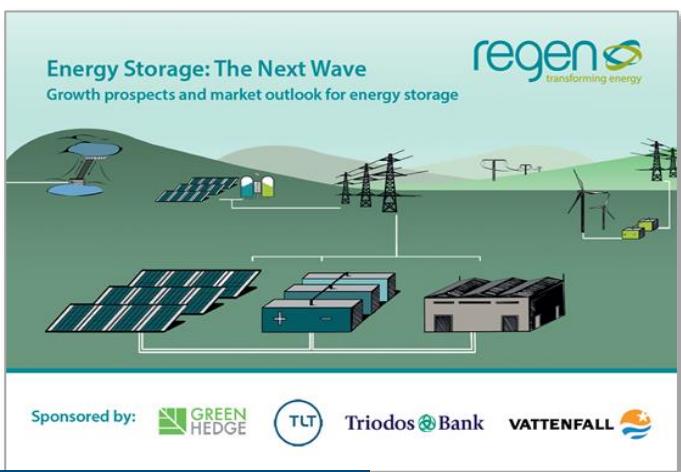
Beginner's guide to flexibility markets

Jodie Giles

27/6/19

regen 
transforming energy

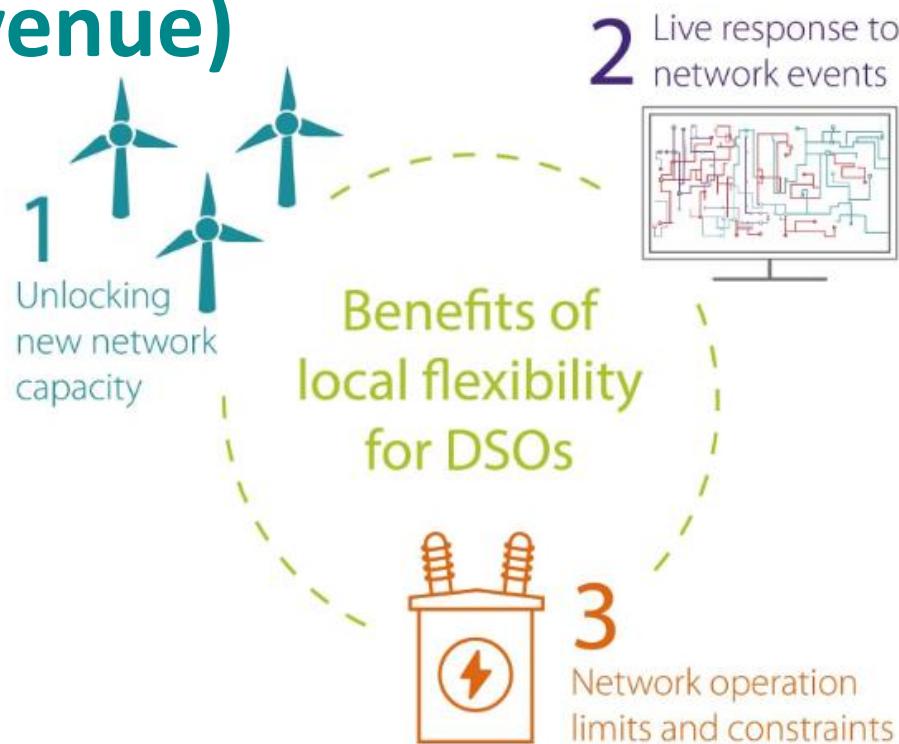
The future of community and local energy



Open LV
Your local electricity data

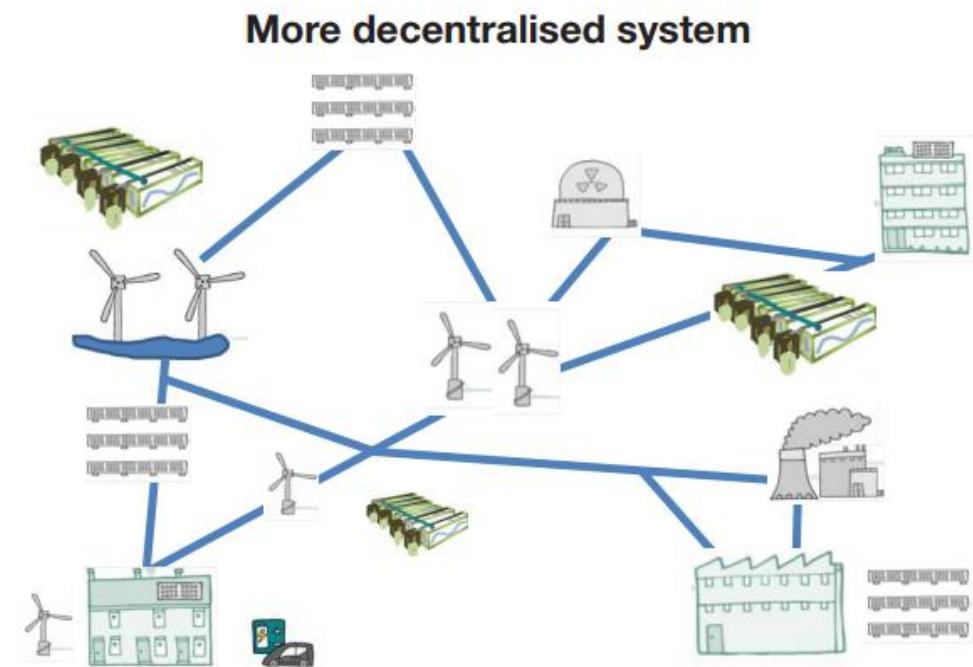
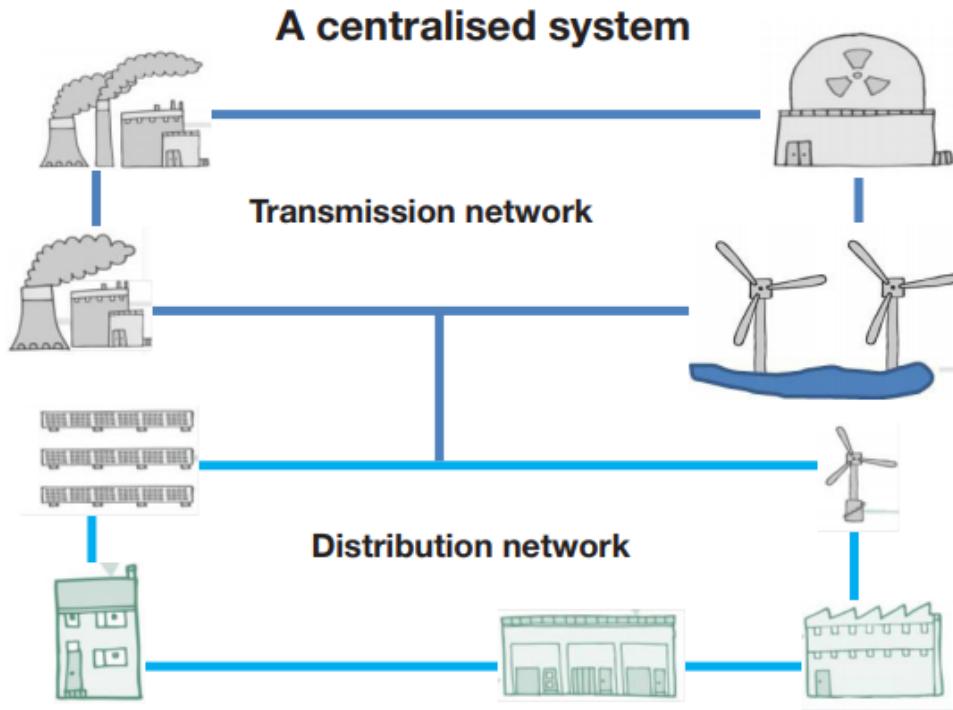
► What is flexibility?

Modifying generation and/or consumption patterns in reaction to an external signal for a financial reward (revenue)



Deferring network upgrades by turning to flexibility instead – Saving customers money

► Our electricity system is changing



► More flexibility needed

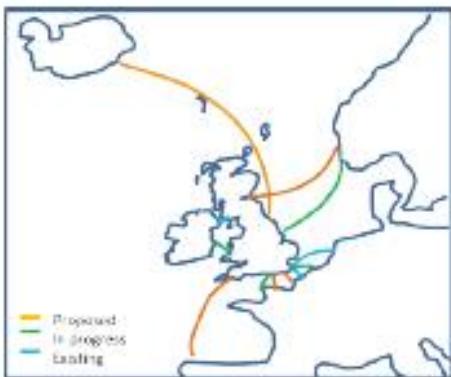
Flexible technology	By 2020 (GW)			By 2025 (GW)			By 2030 (GW)		
	Low	Central	High	Low	Central	High	Low	Central	High
New flexible generation	1	3	5	2	6	10	3	9	15
Storage	0.8	2.9	5	3.2	11.6	20	5.6	20.3	35
DSR	2.1	6.3	10.5	2.76	8.28	13.8	3.42	10.26	17.1
Interconnection	3.4	3.4	3.4	4.45	5.825	7.2	5.5	8.25	11

Source: Roadmap for Flexibility Services to 2030, Poyry and Imperial College London, 2017

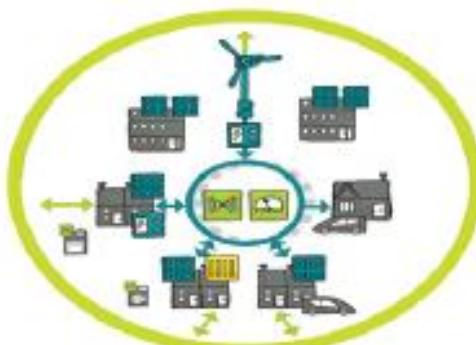
3-15 GW of additional of flexible technology needs to come onto the network for the UK to meet 2030 carbon intensity targets

Domestic and community flexibility could be a key area of growth

► Flexibility in our system

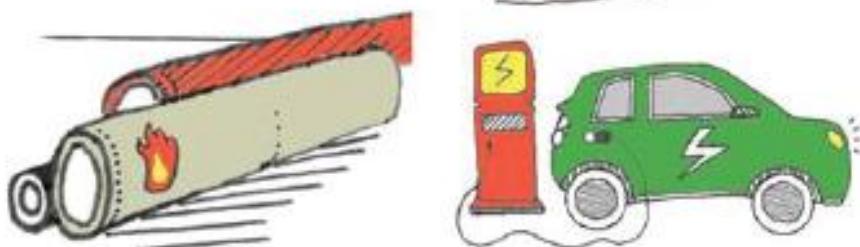
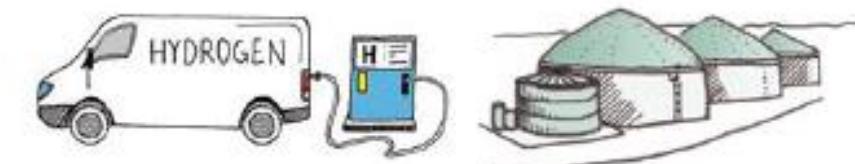


Interconnection

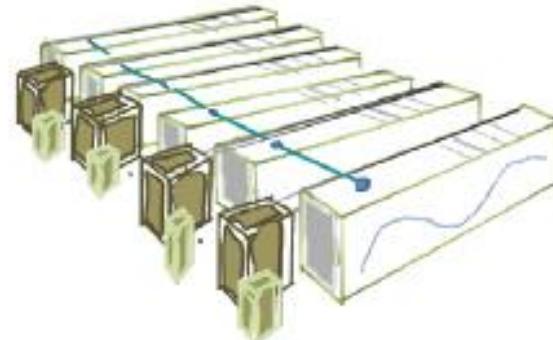


Local supply network balancing

Sources of flexibility



Multi-vector energy integration



Energy storage



Demand side response

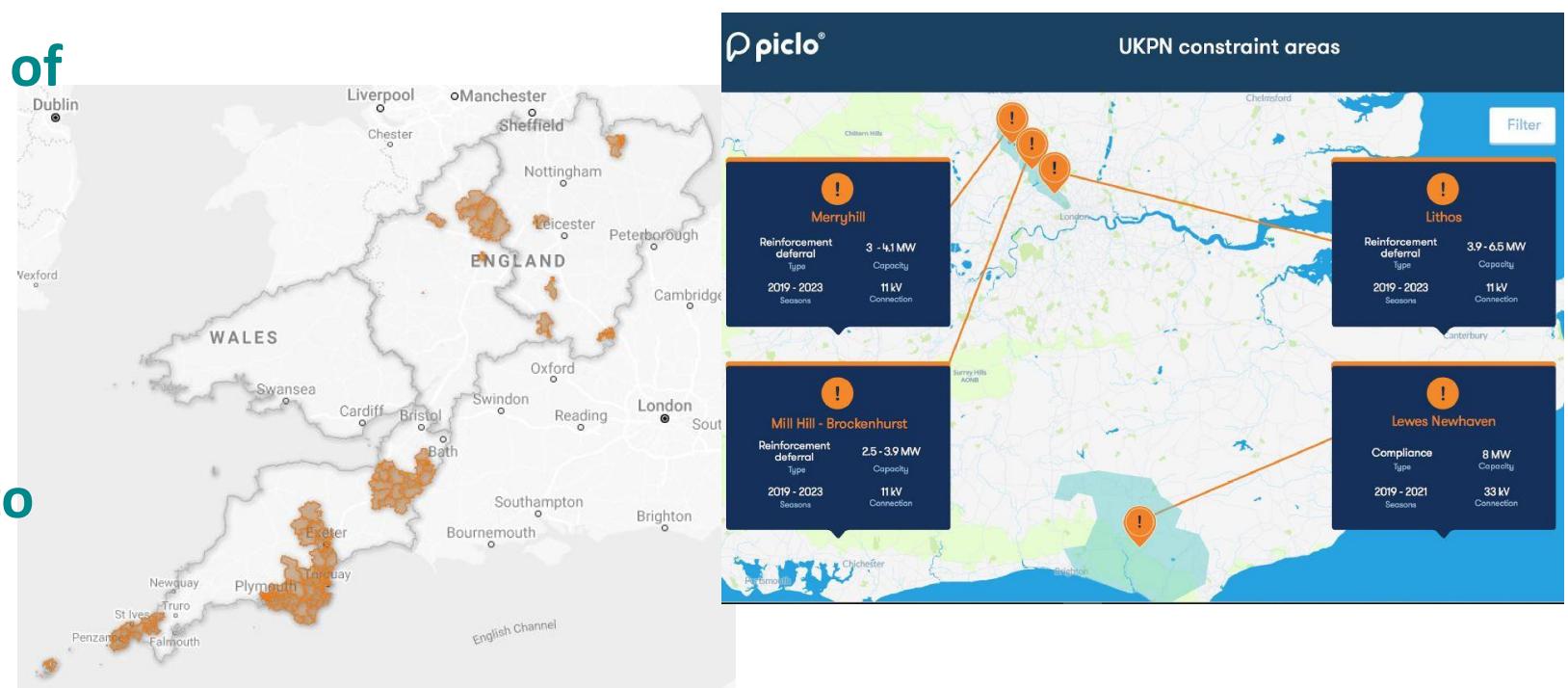
Deferring network upgrades by turning to flexibility instead

- Mitigate peak energy demand constraints (*currently not generation, yet...*)
- Reduce the network impact of planned maintenance downtime
- Support the network during unplanned outages/network events

Local flexibility markets part of DSO's remit from Ofgem

Tenders go through the Piclo Flex platform and WPD's Flexible Power website

Important for communities to participate now so they can influence market design



The transition to a DSO

The future of our
electricity network

Consultation to engage communities
in future DSO strategy

Key themes:

Communities want to participate in future system,
including flexibility services

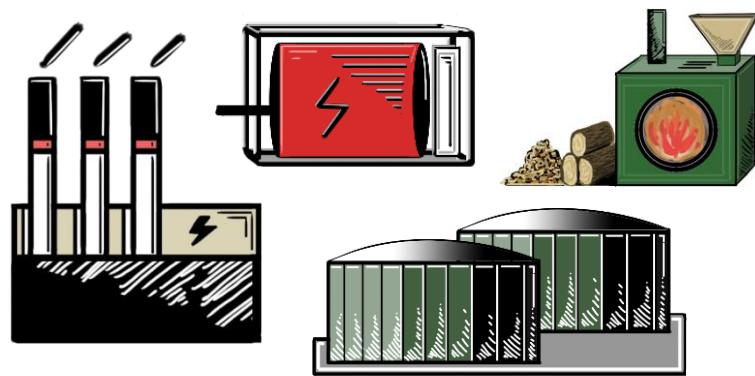
Communities want carbon reduction to be a higher
priority for DSOs

Easier low-carbon connections

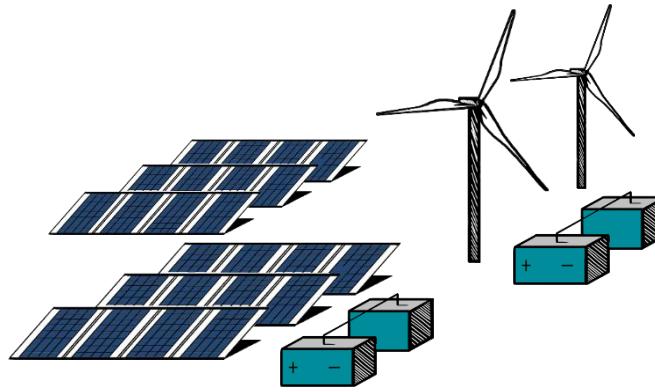
Plain English information

More face-to-face engagement

Who is ready to participate?



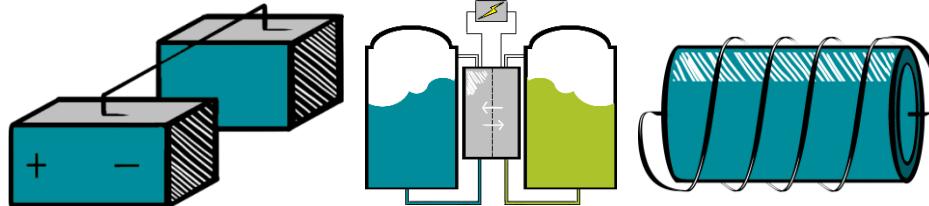
'Dispatchable' (thermal?) generation



variable generation with storage



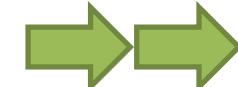
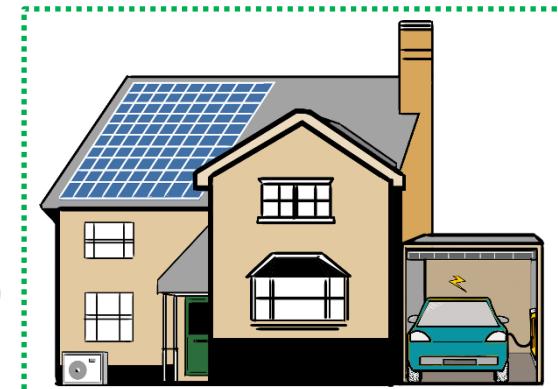
Generation
Turn-Up



Quick response standalone storage (various techs)



Commercial & industrial equipment switch
off or process ramp down



Storage
'discharge'

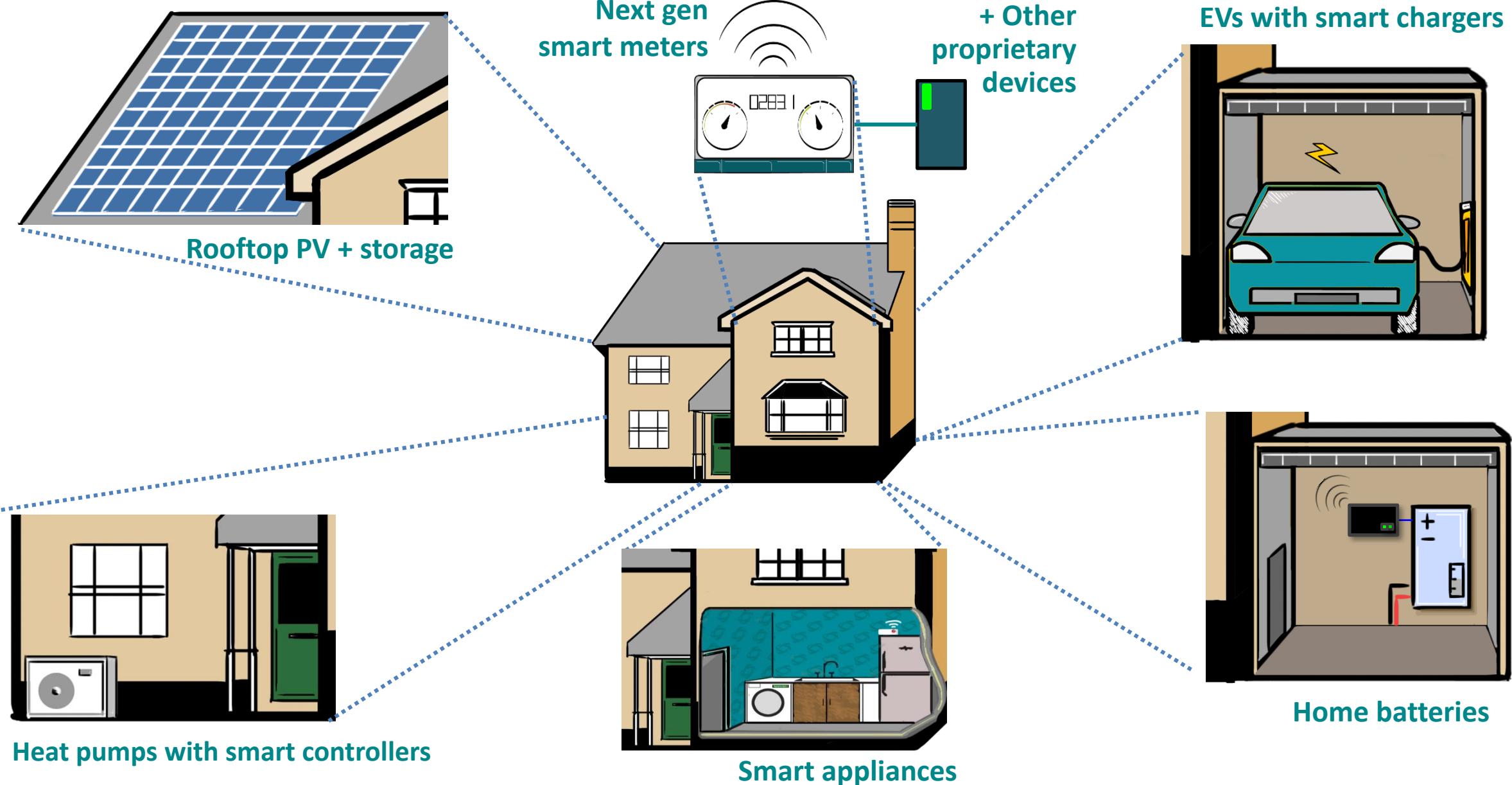


Tangible domestic flexible loads



Demand
reduction

What could be used in the home?



► Why is flexibility important for communities?

- New revenue streams - Payments are marginal but support new business models and revenue stacking
- In future, could enable more low carbon electricity generation to connect
- Step towards local supply – same skills set and platforms could be used for local energy trading
- Community energy groups are trusted, have local knowledge and can help build consent

Manage demand on the network to avoid peaks

Customers will be asked to:

- reduce their demand for electricity (a bit like Economy 7 but more dynamic)
- turn up their energy generation
- discharge power they have stored

Demand is the driver: These services are about managing demand (i.e. gen turn-up, demand-down, storage discharge)

Entry thresholds: notably lower than that of national balancing services potentially 100kW - aggregation is also permitted

Non-response: unlikely to pay a penalty, reduction or removal of payments for reduced or non performance

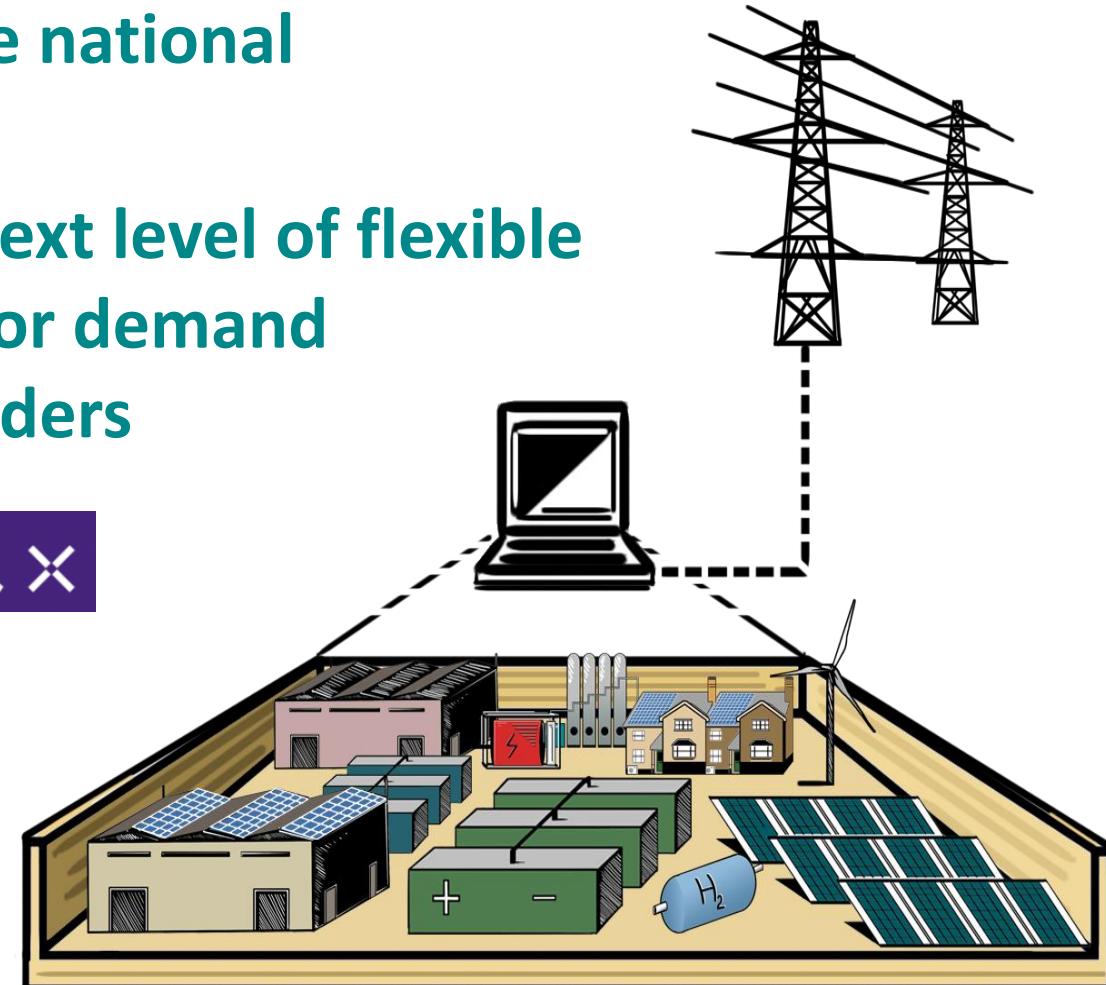
Technology: Agnostic on approach, but if you are given a 15min notice, need to sustain for 2 hours and at any time - some technologies will be better placed than others

Contract length: 1 year, markets in their 2nd year as business-as-usual



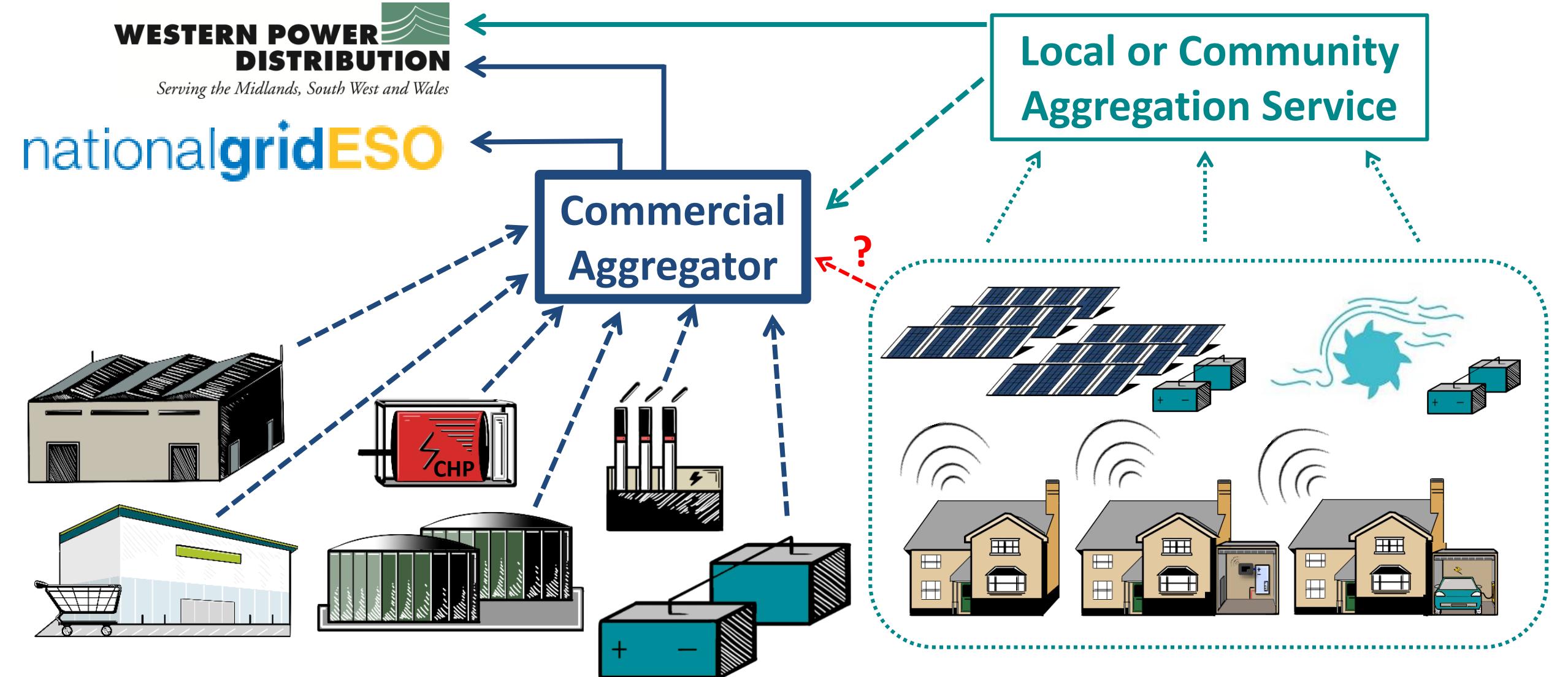
A route to market – DSR aggregation

- Ability for smaller participants to access flexibility markets
- Commercial aggregators are active in the national balancing services
- Potential to reach down further to the next level of flexible loads and aggregate smaller generators or demand customers to bid into local flexibility tenders



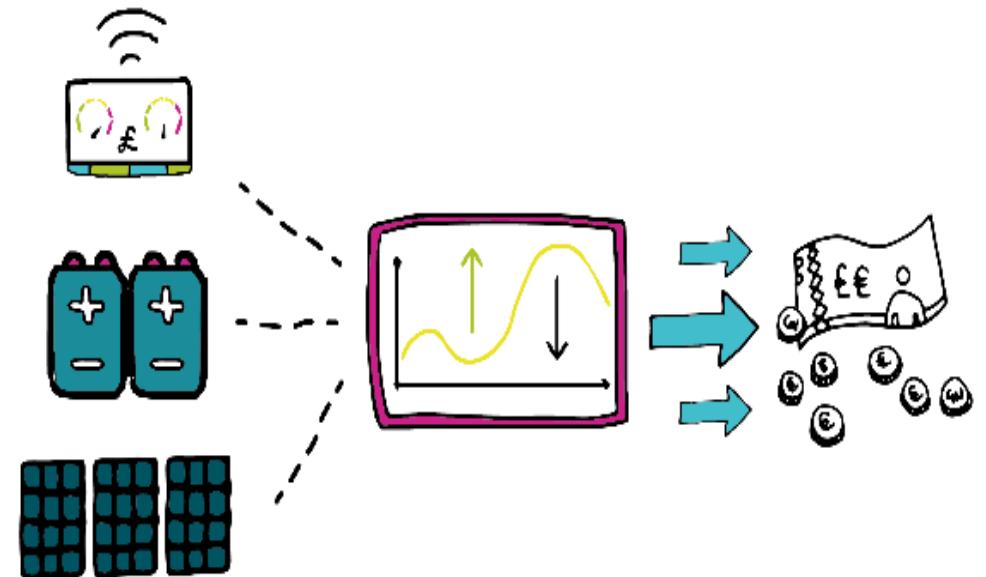
Potential for two levels of aggregation?

- Bundling of much smaller loads at a local level, to offer to an aggregator?



► Energy Community Aggregator Service (ECAS)

- The ECAS is a way for community energy groups to participate in flexibility markets
- Engage local residents in an area where the network requires flexibility
- Bundle together 100s of flexible loads from households in their community
- Sell this flexibility to a commercial aggregator or bid into local flexibility market



- BEIS Innovative Domestic DSR Competition (Phase 2) funded project
- 5-way collaboration with Carbon Co-op as the project leads
- Demonstrating a real-world potential for an open source, standards based DSR management service, akin to the ECAS that was assessed in 2018
- Developing a smart API that interfaces with smart meters, to aggregate domestic flexibility loads to offer to DSO and ESO or other aggregators
- Looking to control EV chargers, immersion heaters and domestic batteries installed in 50 homes

Carbon Co-op 

Megni
Energy Monitoring



greatplaces
HOUSING GROUP



Department for
Business, Energy
& Industrial Strategy

In conclusion

- Decentralisation + decarbonisation drives the need for a more flexible/responsive energy system
- Local flexibility is emerging as a key source of flexibility, to address local demand constraints and defer network reinforcement
- Local flexibility could enable more renewables to connect in future
- It's in DSO's remit to facilitate local flexibility markets
- Some technologies and players are more ready than others to participate in these markets
- Aggregation of smaller scale assets could play a key role, helped by smarter homes
- Chance for communities to access value of flexibility markets with the ECAS
- These platforms could lead to local supply models and peer-to-peer trading in the future



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