Beginners' guide to flexibility

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Regen's work on local energy

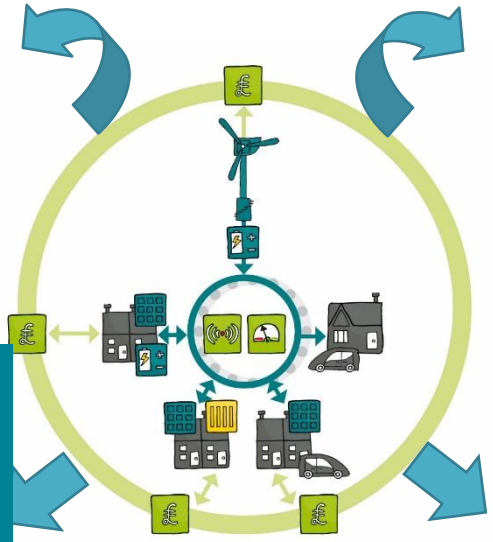
OpenDSR Market Research Report

Work Package 7: Business Model Development

October 2019

Department for Business, Energy & Industrial Strategy

Open LV — Your local electricity data



Power to Participate

A specification for community energy to participate in a flexible energy system

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Friends Provident Foundation

The Future of our electricity network

Consultation to engage communities in future DSO strategy

Carbon Co-op regen transforming energy — Community Energy Scotland

Local flexibility markets

What are they and how can community energy organisations get involved?

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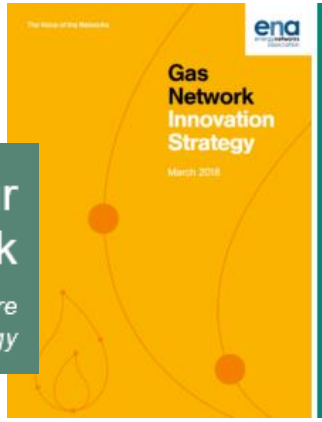
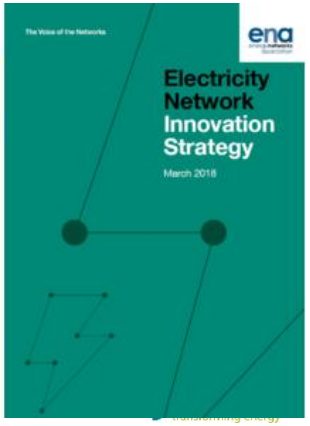
Sponsored by: Stephens Scown — Cornwall Council





Our electricity system is changing

National net zero by 2050 target

65% of councils in the UK have declared climate emergencies

National Grid's Future Energy Scenarios for net zero include the electricity system running only on zero carbon generation

The electrification of transport – 35 million electric vehicles in 2050

The electrification of heat – 2.5 million domestic heat pumps by 2030

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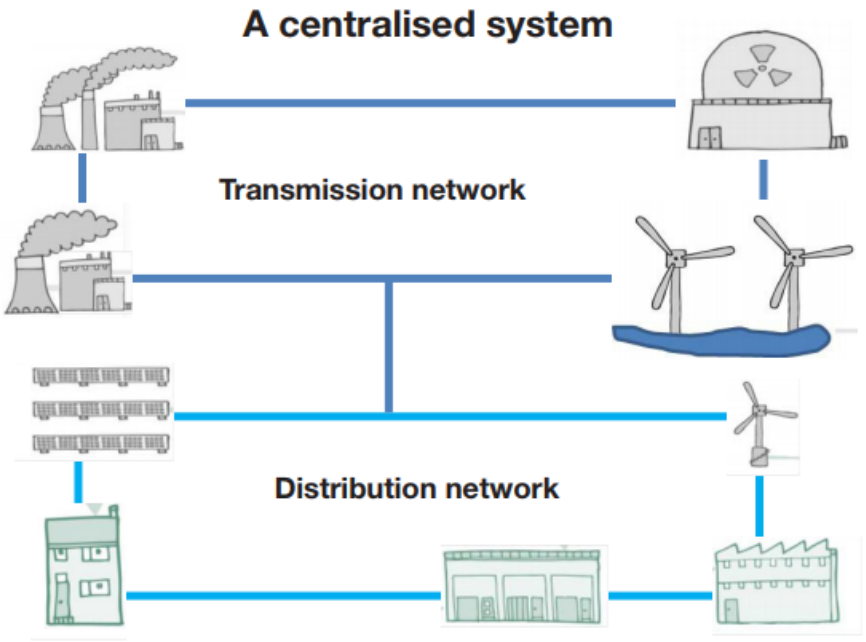
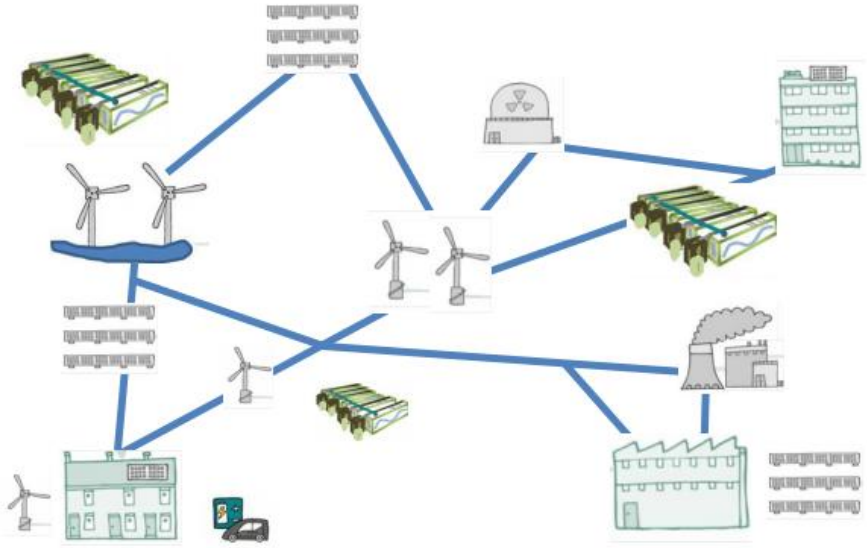
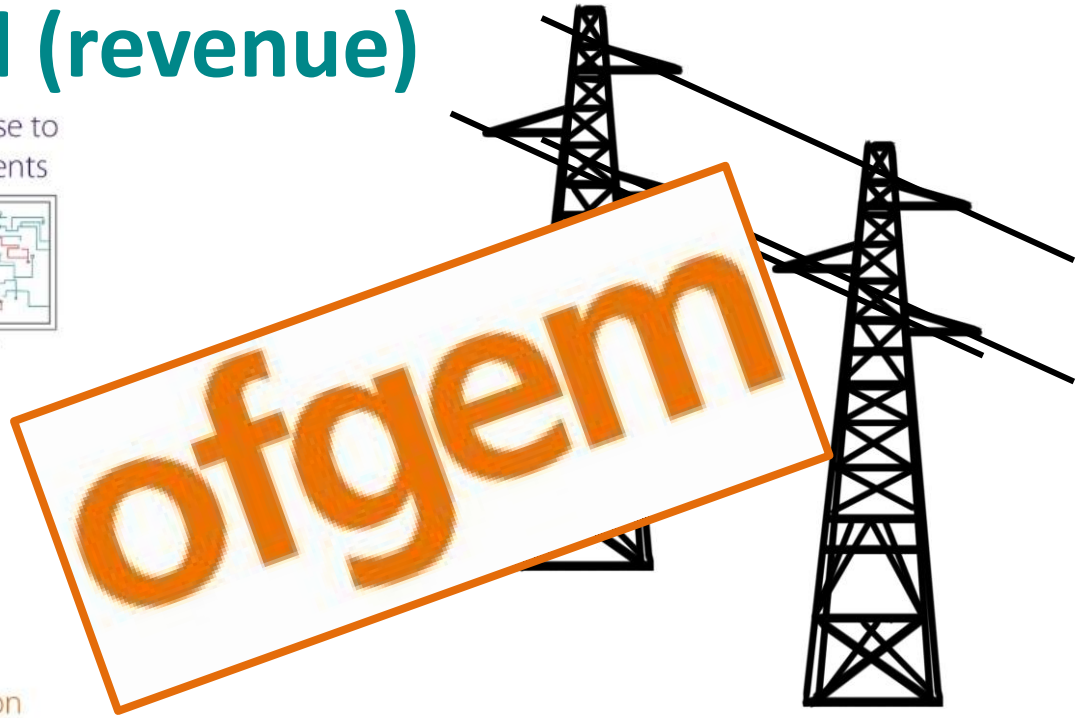
Becoming increasingly decentralised





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

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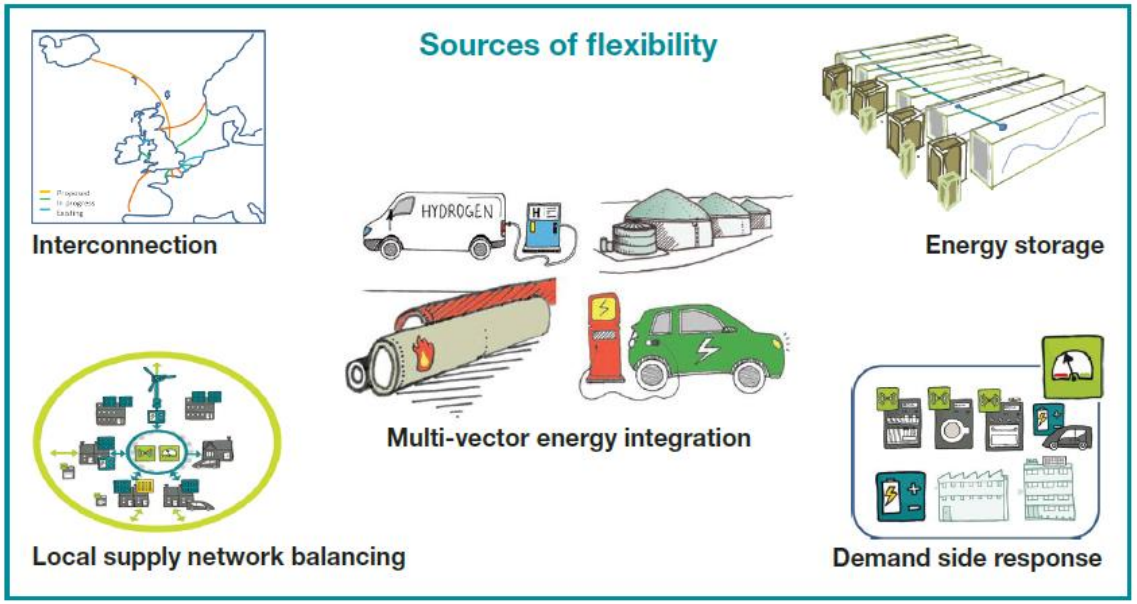
More flexibility is needed

Today most flexibility in the electricity system comes from interconnectors to Europe and commercial/industrial flexibility in national markets

3-15 GW of additional of flexible technology needed for the UK to meet 2030 carbon intensity targets

Domestic and community flexibility could be a key area of growth

Community energy groups are trusted, have Local knowledge and can help build consent



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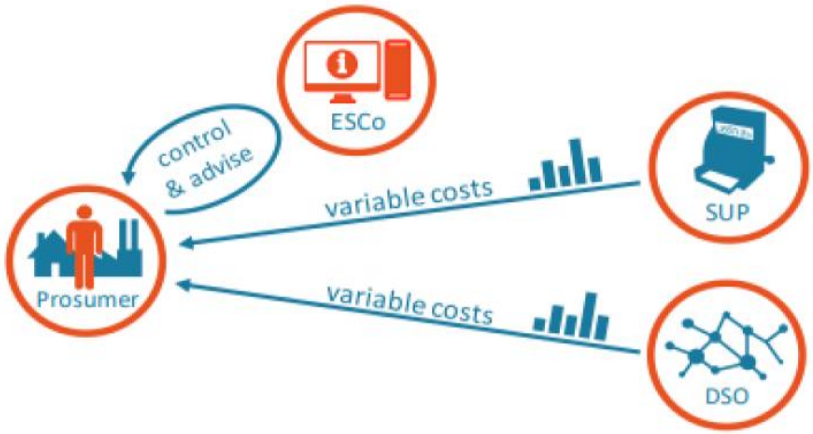
What are the types of flexibility?

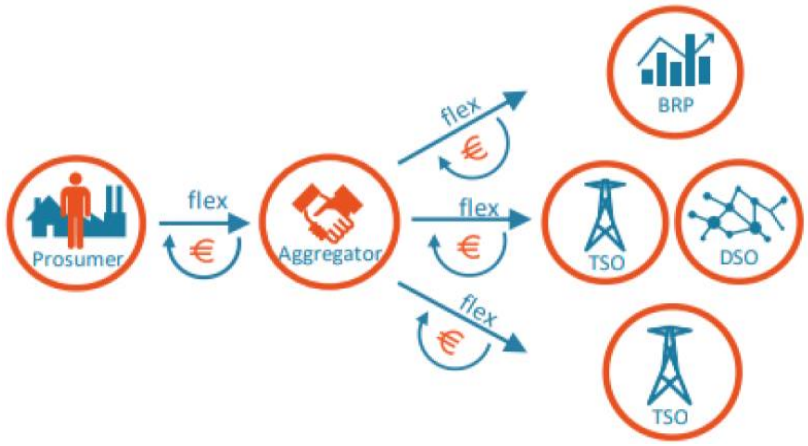
Implicit

- **Price incentives**
- **Time of use tariffs**
- **Not location specific**
- **Cost savings**



Explicit

- **Contracted with DSO/ESO**
- **Call and response**
- **Often location specific**
- **Revenue stream**



Other types of flexibility which can be needed are voltage control, system restart, frequency response and peak load management

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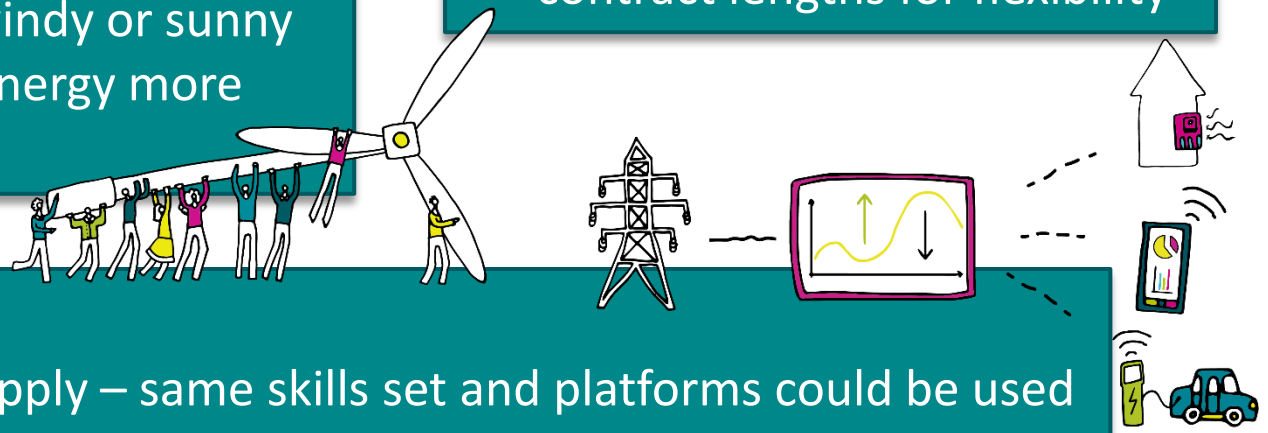
Why is flexibility relevant for communities?

Carbon reduction

- In future, it could enable more low carbon generation to connect
- Provides the capability to turn up demand or using storage to accommodate the clean electricity generated when it's windy or sunny
- It can help us to use energy more efficiently

Money

- New revenue streams – payments are marginal but support new business models and revenue stacking
- We're starting to see longer contract lengths for flexibility



The future

- Step towards local supply – same skills set and platforms could be used for local energy trading
- By participating, communities can influence market design
- Heat pumps and EVs will give homes and communities much more flexible load to play with

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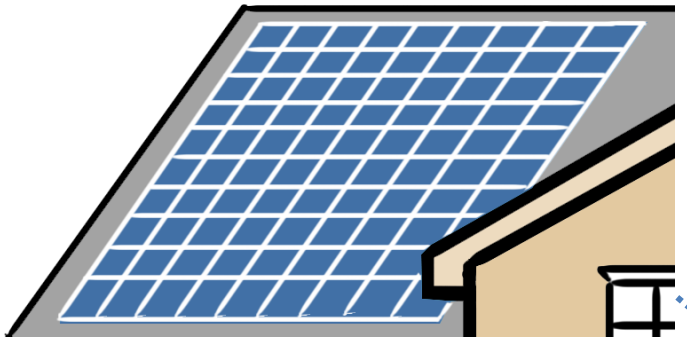
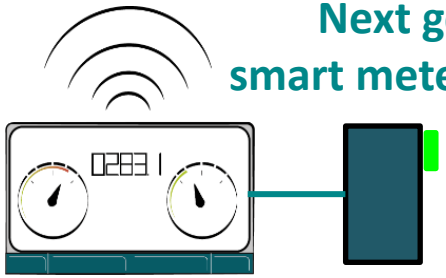
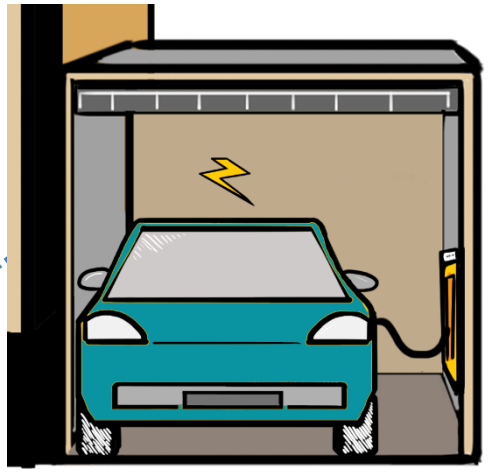
What could be used in the home?



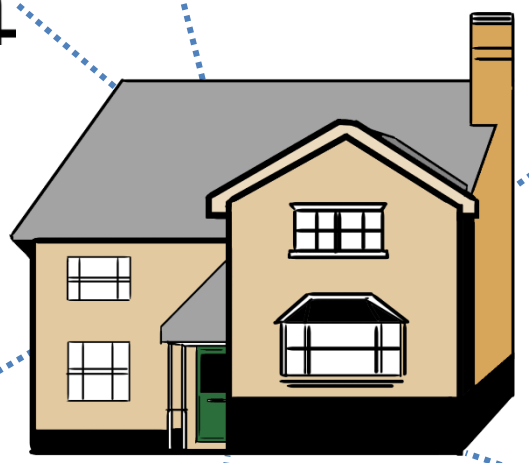
Rooftop PV + storage



Next gen smart meters

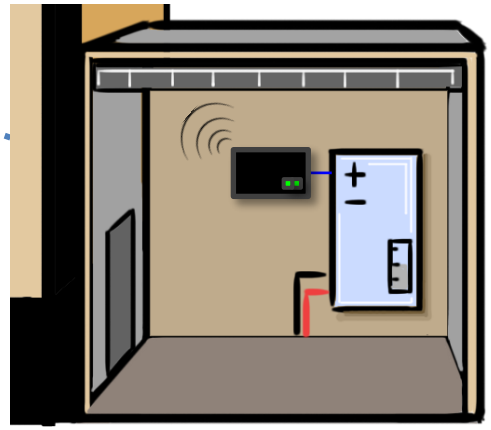


EVs with smart chargers



Heat pumps with smart controllers
Immersion heaters
New storage heaters

Smart appliances



Home batteries

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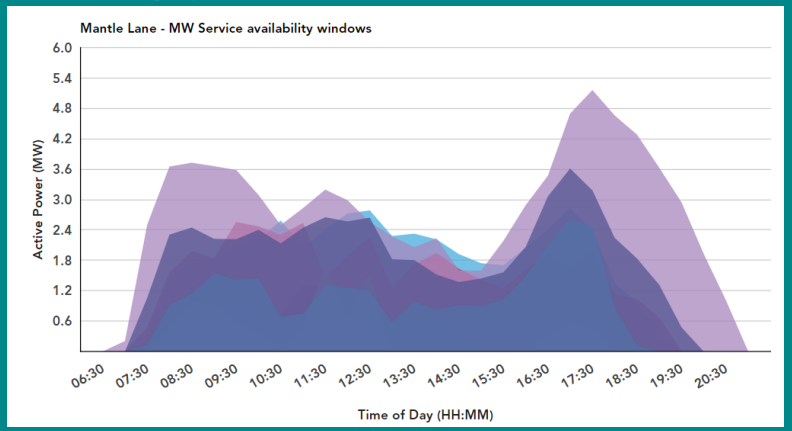
What would you need to do?

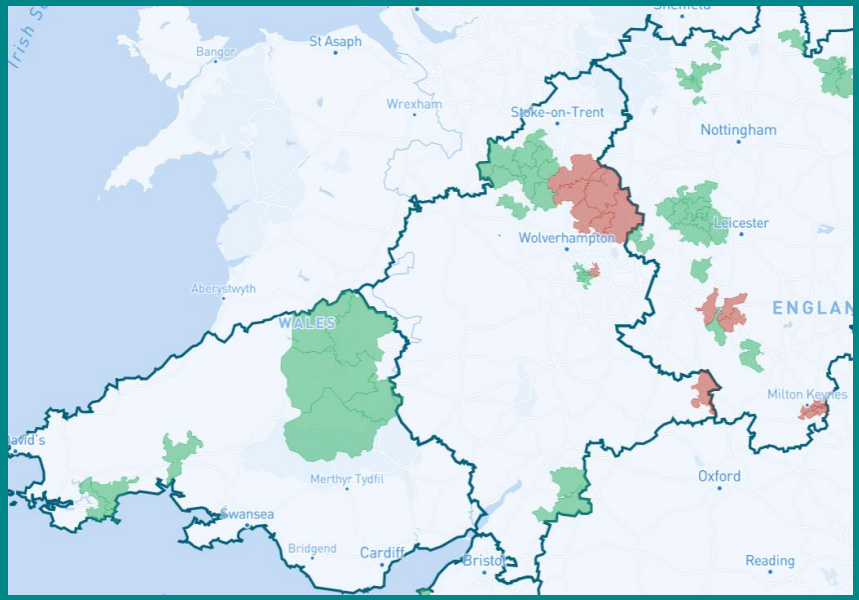
Sign up to an aggregator, have a smart meter and smart controls fitted to:

- **Reduce** demand for electricity (like Economy 7 but more dynamic)
- **Turn up** energy generation
- **Discharge** power that's stored

During peak times



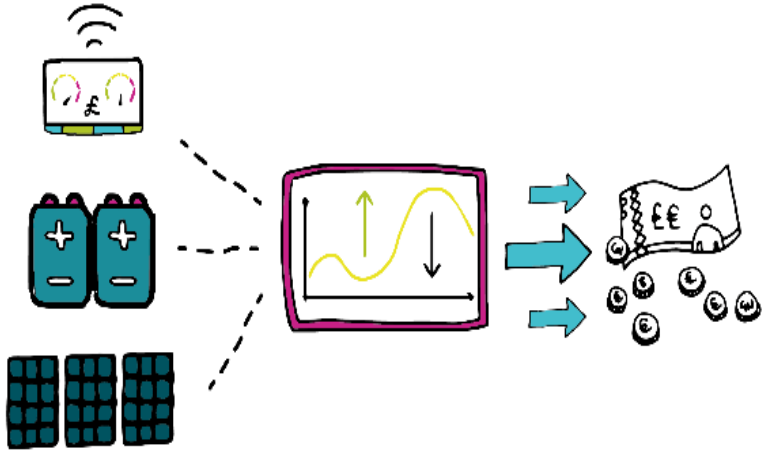
In certain places



Are any community energy groups doing this?

Carbon Co-op

- OpenDSR trial looking to demonstrate concept for domestic DSR and an Energy Community Aggregator Service (ECAS)
- Testing remote control of smart EV chargers and immersion heaters



Bath & West Community Energy
Generating local energy

- 'Flex Community' project testing app to shift demand away from peak times
- Pilot project focusing on testing the app with hot water heating
- Also did demand shifting campaign as part of the OpenLV project

REPOWERING

- One of the partners in the Home Response trial
- Aiming to help households take more flexible approaches to generating, using and storing electricity

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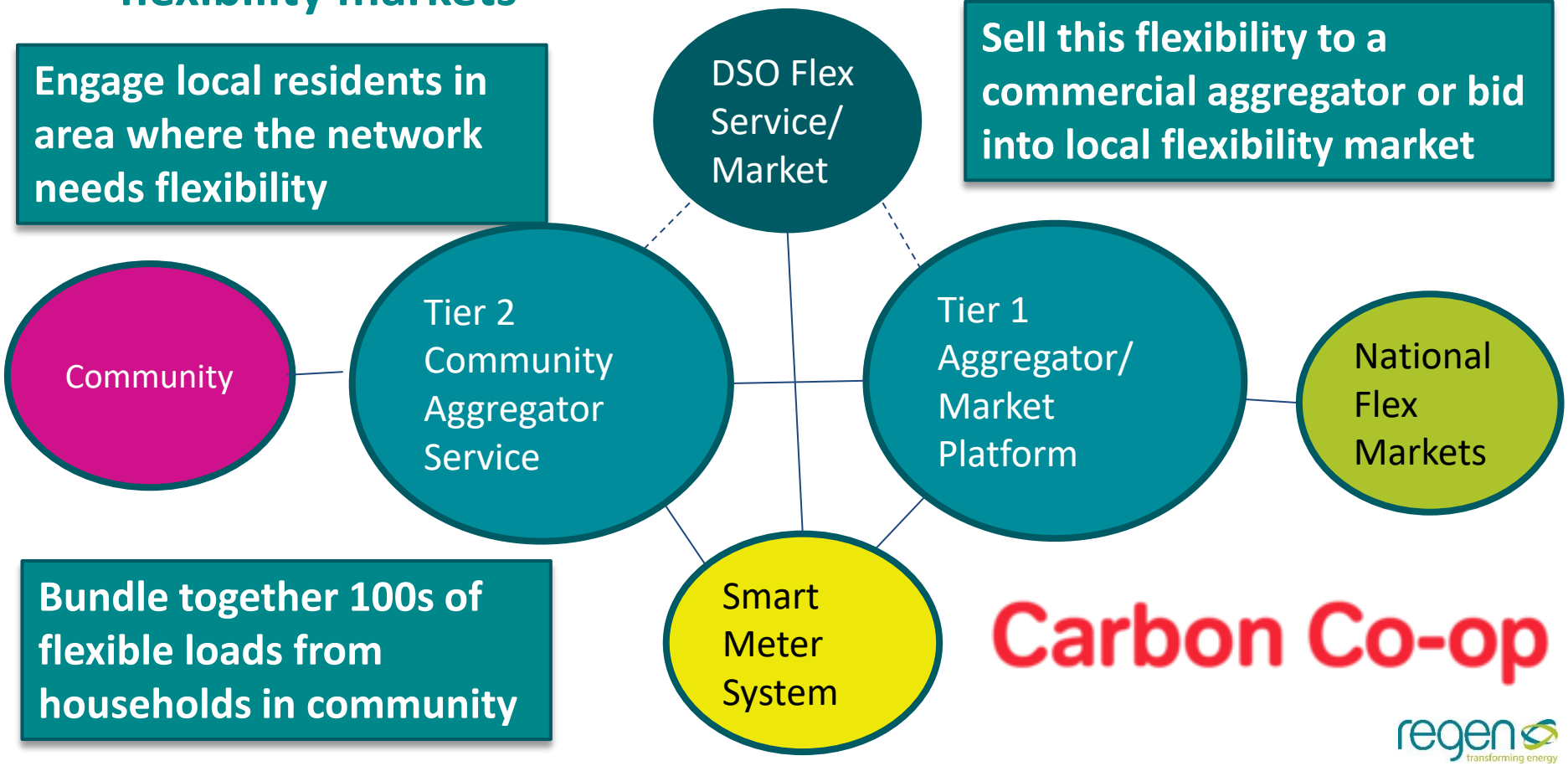
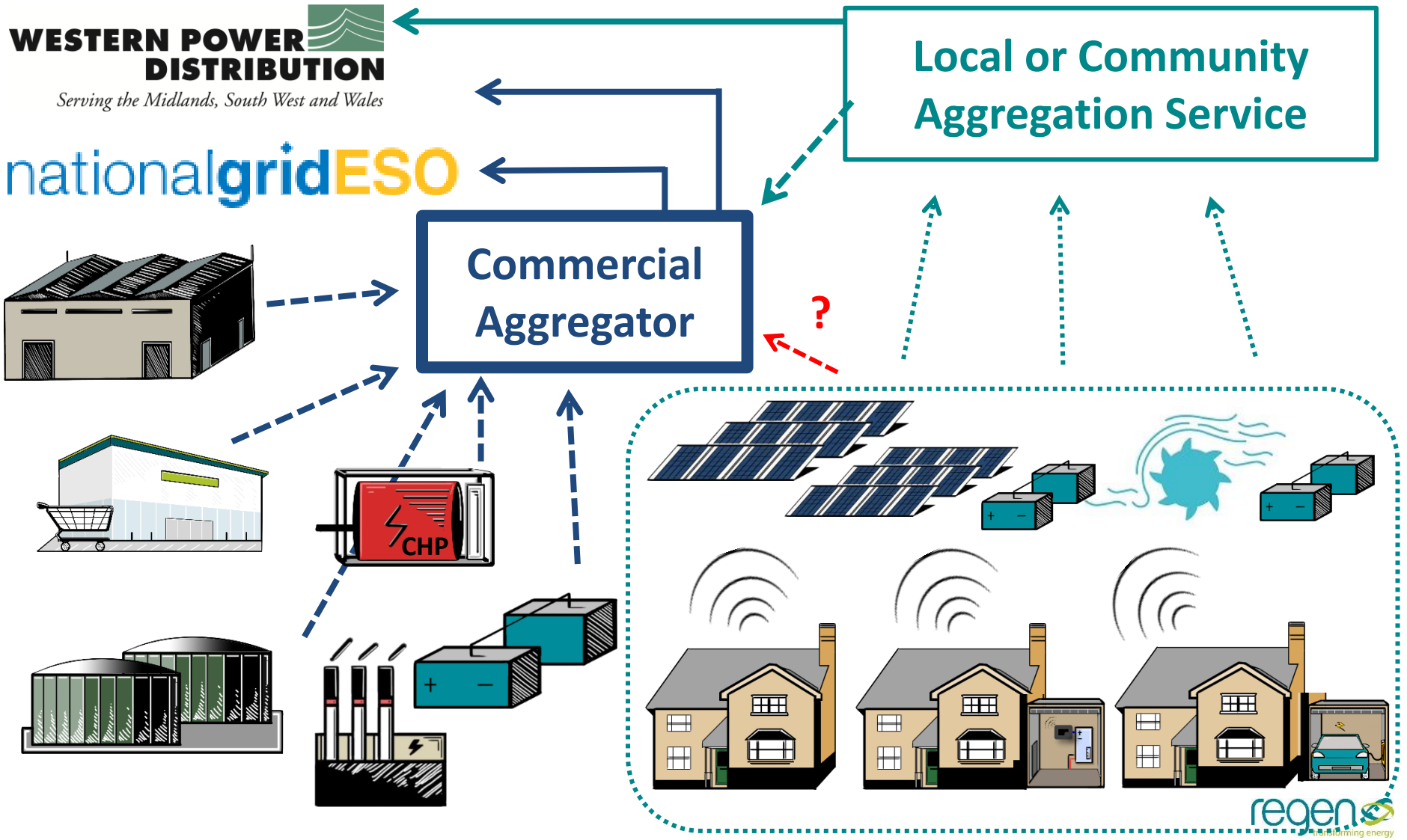
Energy Community Aggregator Service (ECAS)

- **Concept of a community owned DSR aggregator and energy service provider**
- **Could be a way for community energy groups to participate in flexibility markets**



Potential for two levels of aggregation?

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



What are the challenges?

- The value of flexibility is too low to invest in new assets
- Contract lengths are too short for many
- The link to decarbonisation is unclear
- Understanding revenue stacks is complex
- Minute by minute data is required
- Baselining household energy use is difficult
- Cyber security concerns around controlling household energy
- Engagement amongst general consumers is low

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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**
- **Flexibility can be implicit and price driven or explicit and coordinated**
- **It's easier for some technologies to participate, but communities are beginning to explore this area**
- **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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