

Flexibility in homes and communities



Local Energy, a Flexible Future

Lincoln

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@CarbonCoop

CarbonCo-op



About Carbon Co-op

- Created by a group of householders in 2008 in Greater Manchester, UK.
- Aim was to achieve **2050 emissions reductions today** through **deep energy efficiency retrofit** of houses.
- Still the aim!
- Now over **180 members** and **10 staff** working together to **reduce** their collective **CO₂/GHG emissions**.
- A proto-domestic-aggregator/ESCO-op ??





Retrofit



Energy Systems

Home energy training programme

September 2017 - December 2018



Education



Policy
(Manchester/N
W/UK)



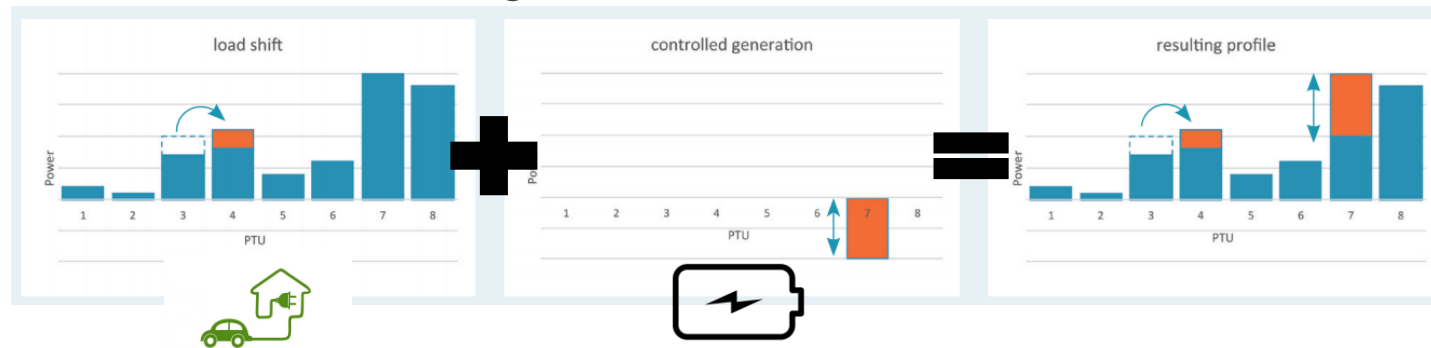
Renewable
Generation



Consultancy

What is flexibility?

- ▶ Flexibility is the commoditised ability to increase or decrease 'demand' dynamically in response to pre-defined criteria or external signals.



- ▶ Flexibility has a range of uses within the energy system.
- ▶ Different actors in the energy system can benefit from purchasing flexibility - DNOs, National Grid ESO, suppliers.

Flexibility plays a crucial role in grid decarbonisation

Many studies have shown:

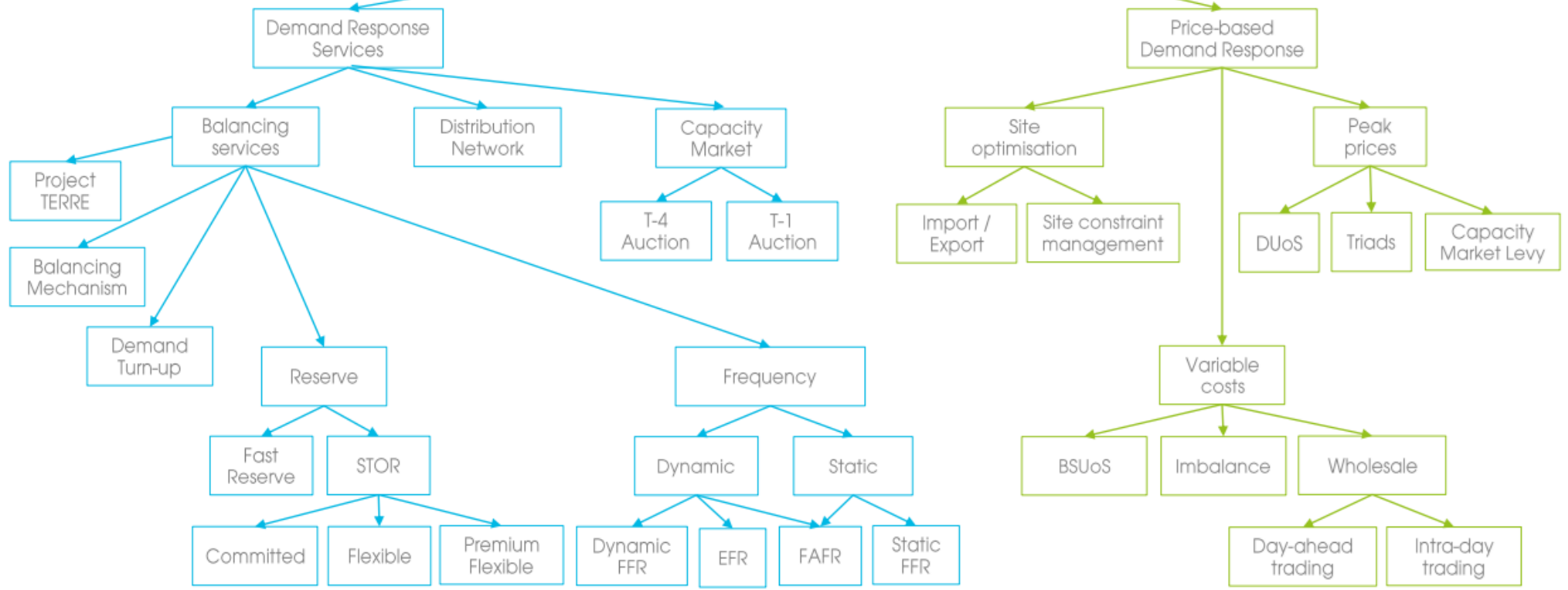
In the current system increasing flexibility would reduce costs (even if nothing else changed).

It enables higher levels of renewable penetration at lower cost.

In particular, it enables a highly decarbonised grid (below 50g/kWh) at a significantly lower cost than if there is low utilisation of flexibility.

It is a 'least regrets' option.

Demand Response Markets 2018

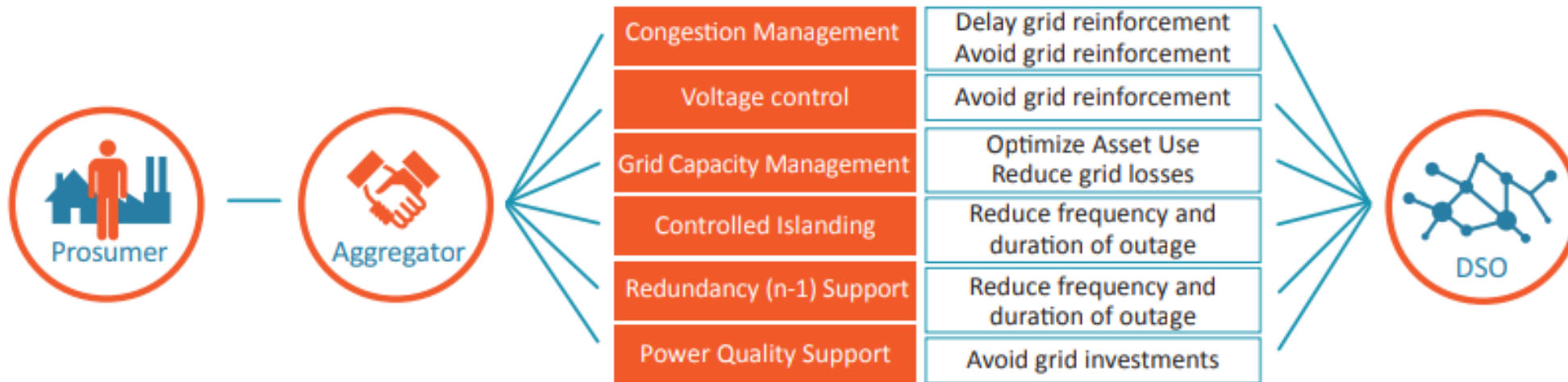
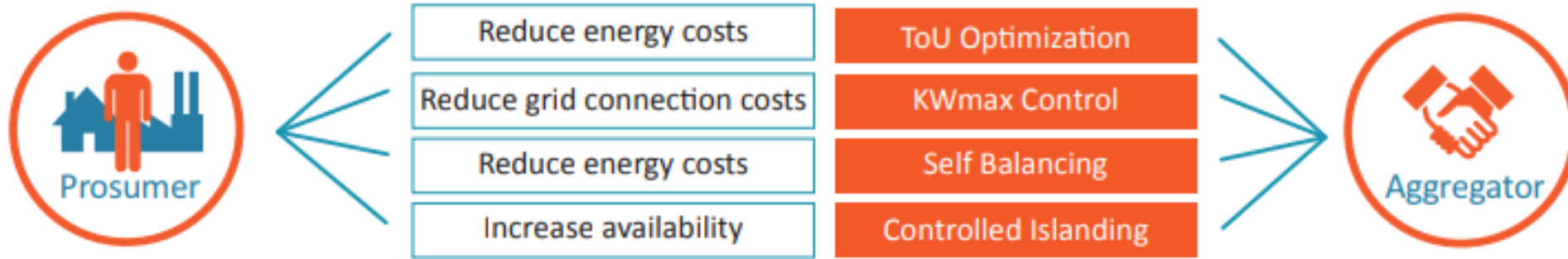


- Acronyms**
- BSUoS: Balancing Service Use of System
 - DUoS: Distribution Use of System
 - EFR: Enhanced Frequency Response
 - FAFR: Faster Acting Frequency Response
 - FFR: Firm Frequency Response
 - STOR: Short Term Operating Reserve
 - TERRE: Trans-European Replacement Reserve Exchange

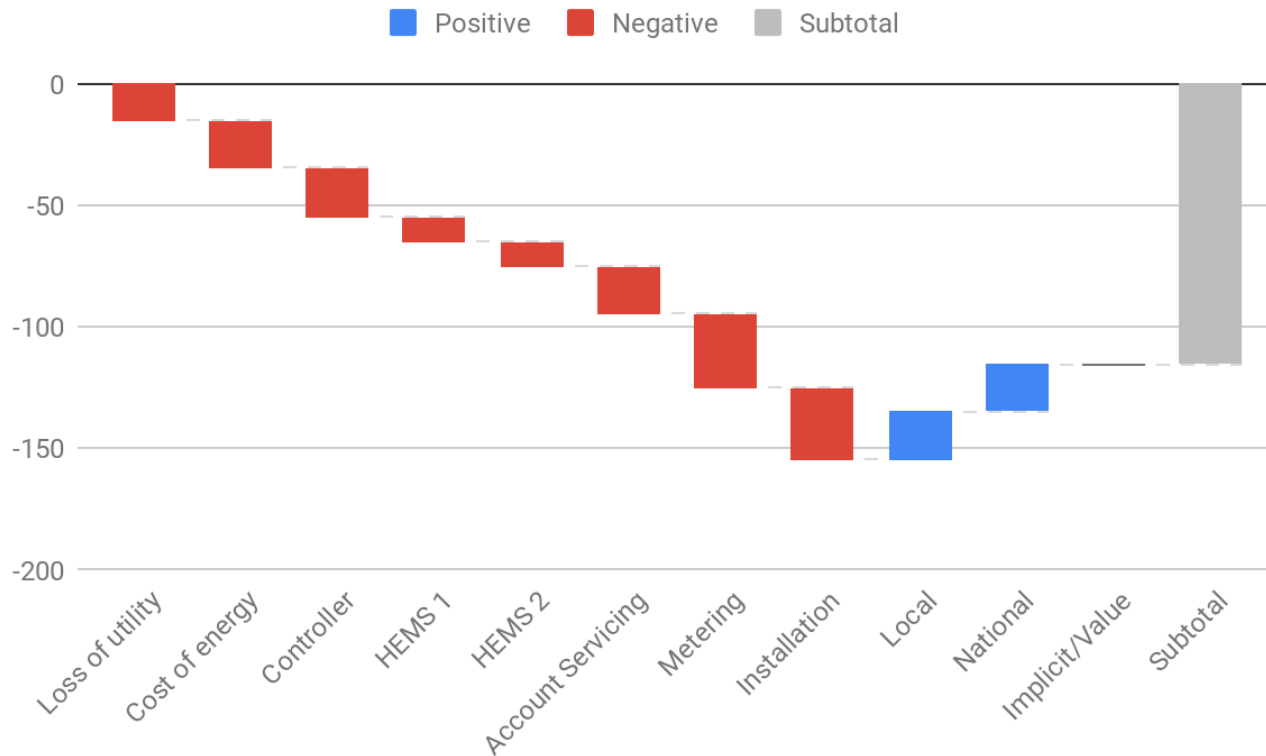
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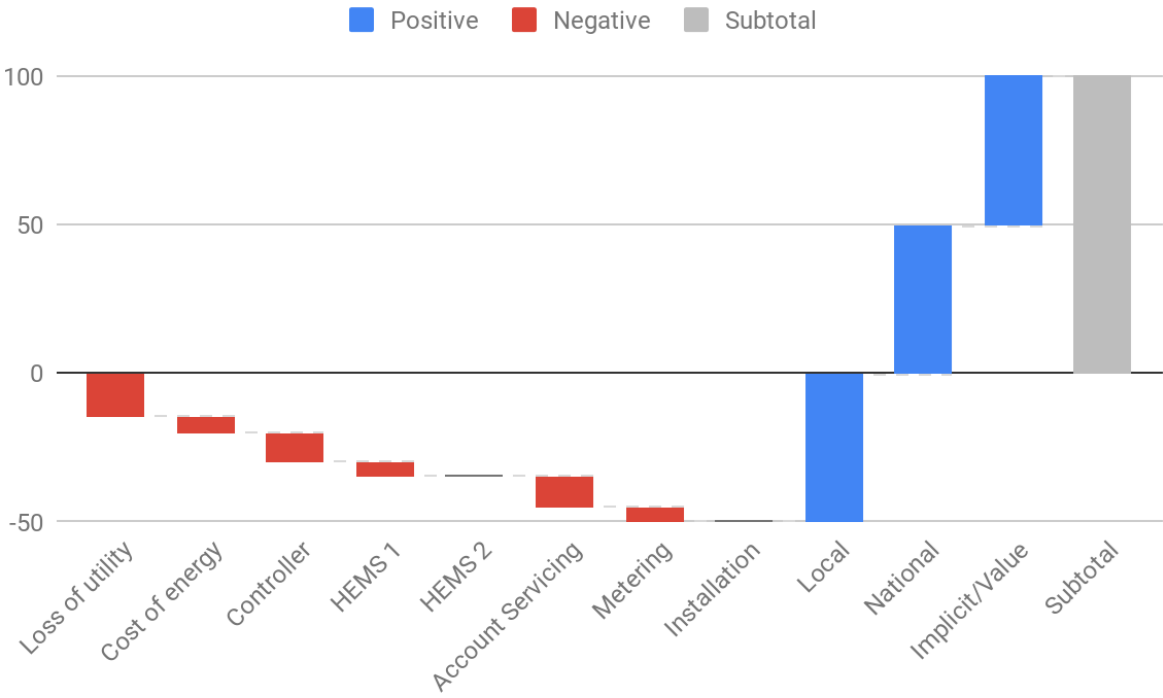
Value of flexibility not fully realised



Current costs vs. benefits (10kW flex over 5 years)



Future costs vs. benefits (10kW flex over 5 years)



Obstacles to viability of domestic/community aggregation

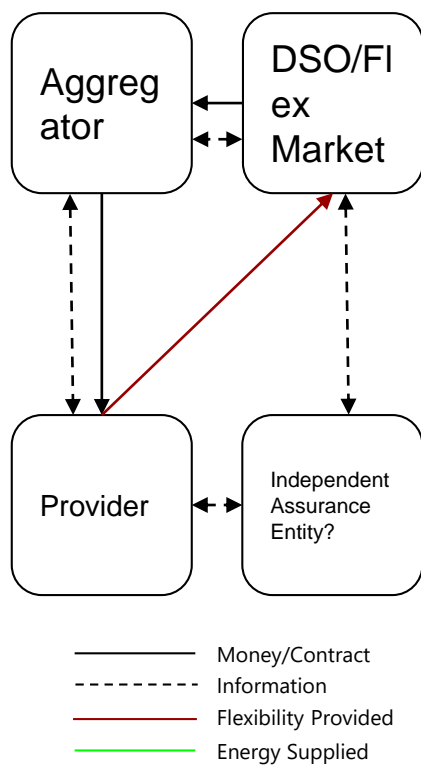
- In practice for it to be viable there are several things missing:
 - Harmonisation/unification of flexibility tenders/markets. Equal access.
 - Standardisation of flexibility products.
 - Lower costs for qualification, monitoring, metering, validation of flexibility assets – requires UK smart meter system and market-wide half-hourly settlement
 - Creation of appropriate and proportional regulatory framework for domestic aggregators.
 - Lower costs for achieving control of systems – needs mandated standards-based approach like internet (e.g. OpenADR). Better smart product standards.
 - A smart grid! Visibility and situational awareness in distribution network.
- What is customer offer? Are consumers ready? Will they want to participate?

What is OpenDSR?

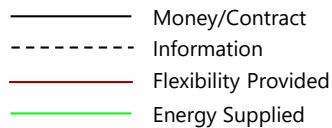
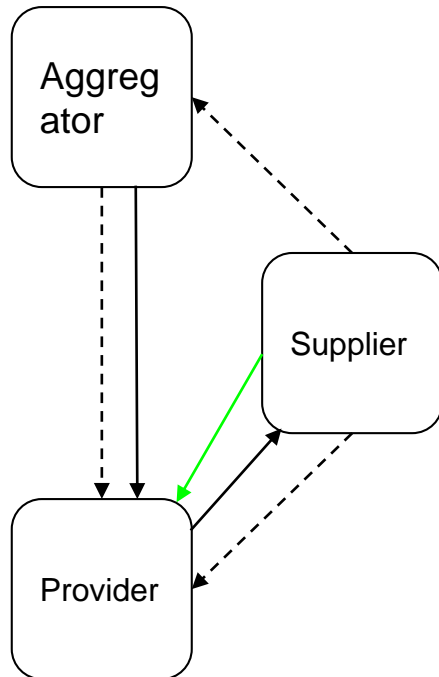
- A BEIS funded innovation project led by Carbon Co-op building on our previous trials in smart energy and grids.
- A technology demonstrator.
 - Testing the efficacy of a standards based approach to demand side response - OpenADR - which has been proven commercially in the US and Canada.
 - Integrating with the UK smart metering system.
- A policy intervention.
 - Promoting open standards, interoperability, and open source in demand side response.
 - Against 'walled gardens' in smart energy.
- A capacity building initiative.
 - Developing technical expertise and knowledge within the CE sector instead of outsourcing it or buying it in.

Developing new services and viable business models.

OpenDSR: Direct Control



- The aggregator dispatches flexibility in response to requests from DSO/flex market (explicit demand side response).
 - Flexibility is measured and verified using smart metering system according to defined baseline methodology.
 - Providers are compensated under pre-agreed bilateral contracts.
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OpenDSR: Behind the meter Optimisation

- Operation of flexibility assets is optimised for cost reduction under time-of-use tariffs using information provided by supplier/aggregator or obtained directly from smart metering system as well as situational/environmental/weather data.
- Aggregators role is providing equipment (or financing for), and value-added services; intelligence, monitoring etc.

Ways to get involved?

- If other community/local energy groups want to try to contribute to development and/or make use of our system please get in touch.
- The project is open source and the technical outputs will be available in some form very soon.

Thanks for listening

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