

Carbon Co-op

How can community energy groups get involved in flexibility?

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www.carbon.coop / @carboncoop

How can community energy groups get involved in flexibility?

- Intro to Carbon Co-op and our PowerShaper service.
- Brief overview of flexibility from a community energy perspective. What is it and how would you get involved?
- Results from OpenDSR and plans for REScoopVPP projects.

About Carbon Co-op

- A non-profit energy services and advocacy cooperative based in Greater Manchester, UK that exists to fight climate change.
- Over 350 householder members and 21 staff.
- Our key areas of work:
 - Domestic retrofit
 - **Energy systems**
 - Energy communities (engagement and policy)



Energy Systems at Carbon Co-op

Service



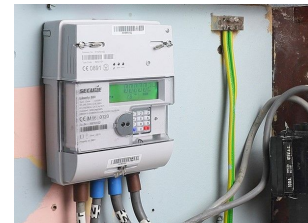
Projects



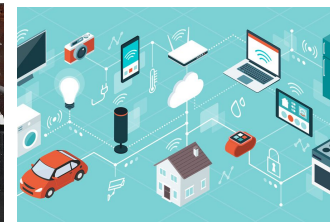
Heat pump project funded by:



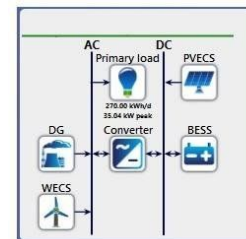
Expertise/consulting



Energy and environmental sensing/data



Software solutions (IoT/Data)



Community energy system analysis/modelling



Local/regional/national energy policy / regulation

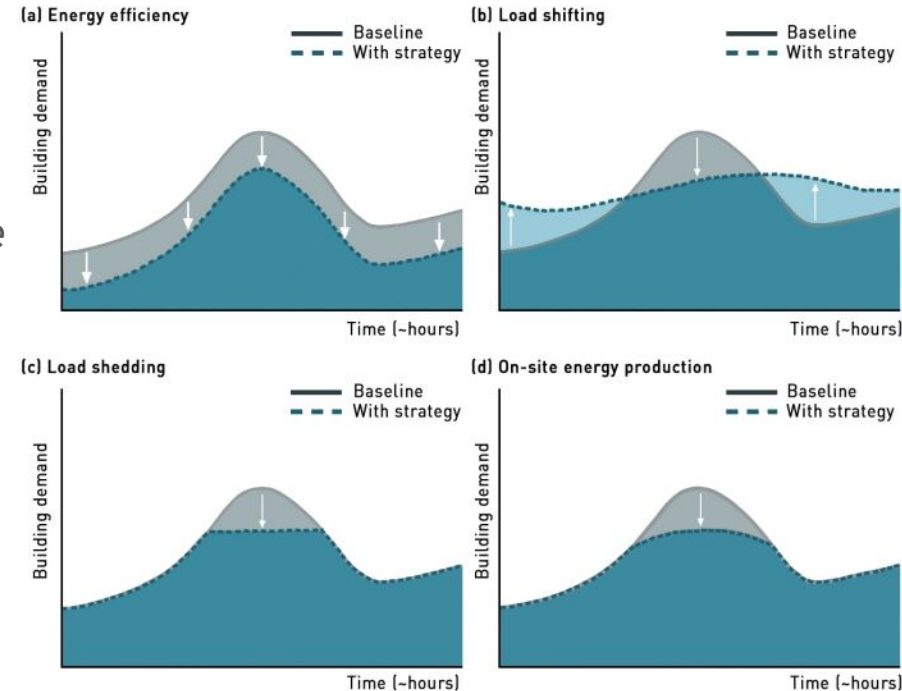
What is flexibility?

The valorisation/realisation of the commoditised ability to reduce or increase demand from the perspective of system operators.

OR

Getting paid to turn things on/off/up/down.

Overview of selected demand side management strategies and their influence on the final energy demand



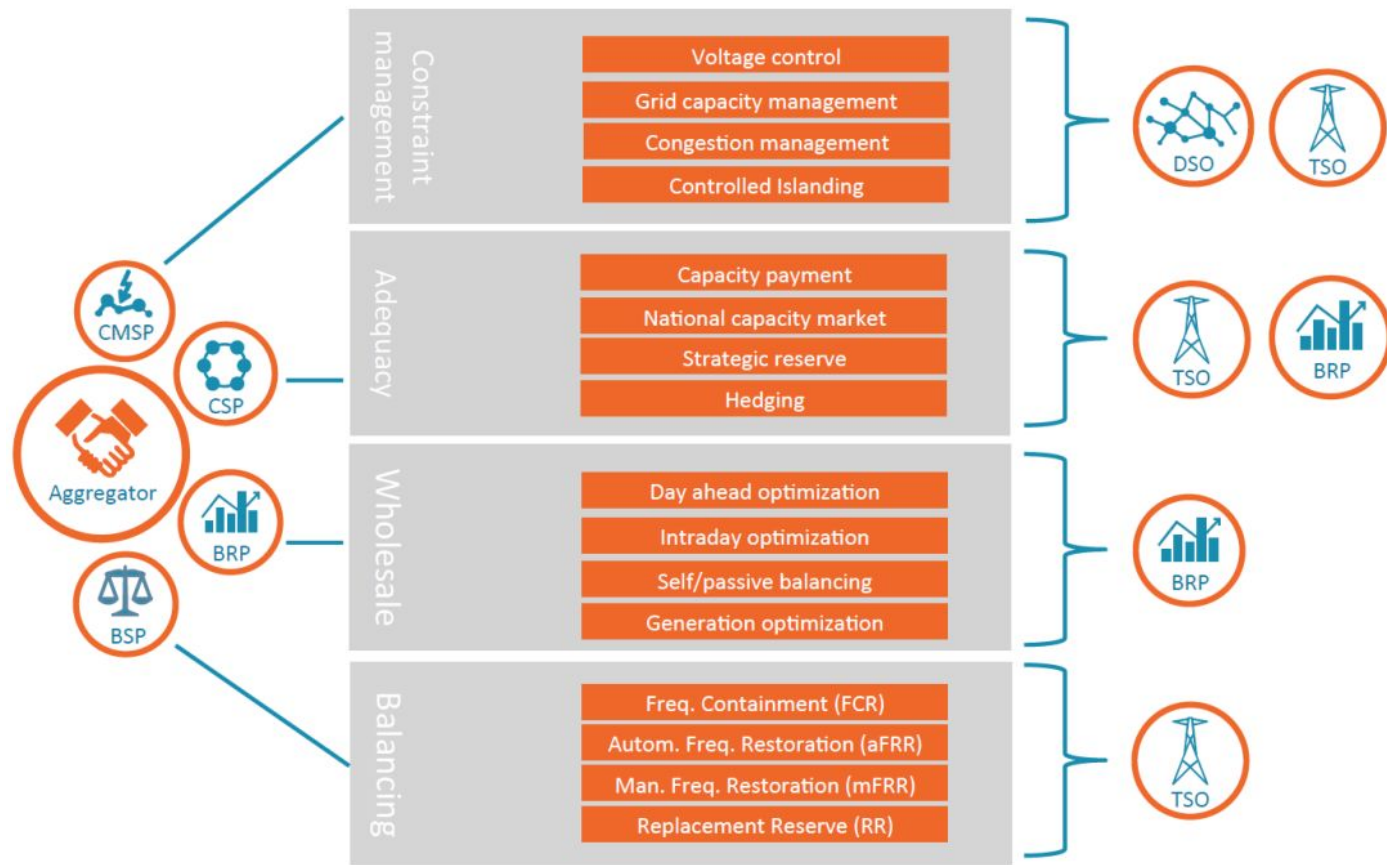
Source: Fosas et al: Towards active buildings: Rating grid-servicing buildings

Why flexibility?

- It makes running the electricity system and transitioning it to net zero **cheaper**.
- Instead of generating or storing electricity you can modify demand dynamically.
- How much cheaper? Reports have placed the total savings at between 10 - 40 £billion depending on the decarbonisation pathway.
- Thinking more simply, it is obvious that both EV and heat pumps have huge scope to modify their operation in a way that reduces the burden on the electricity system at certain times and saves consumers money.



Value of flex



How to sell flexibility?

- Probably you need to contract with aggregator.
- Aggregators will sell flex into multiple places depending on market.
- More scope to sell direct to DNO (WPD/SSEN) via Flexible Power (but this is only one source of value). Can apply through Piclo as well.
- Need to 'stack' (combine) flexibility value from multiple schemes to work.
- Value to customers/clients isn't automatically aligned e.g. self-consumption.
- For small scale requires smart meters and internet-based systems to work.



<https://www.flexiblepower.co.uk/>



<https://piclo.energy/>



PowerShaper

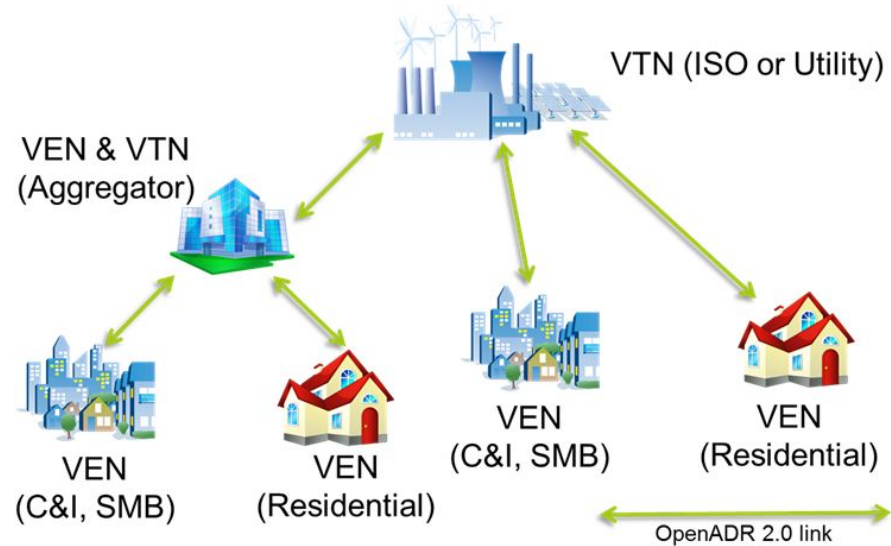
<https://powershaper.io>

- The **consumer-facing** service for our domestic flexibility work.
- Initially targeting DNO flexibility schemes.
- Currently adding support for time of use tariffs and community balancing.
- Also looking to access other UK flexibility markets in future.

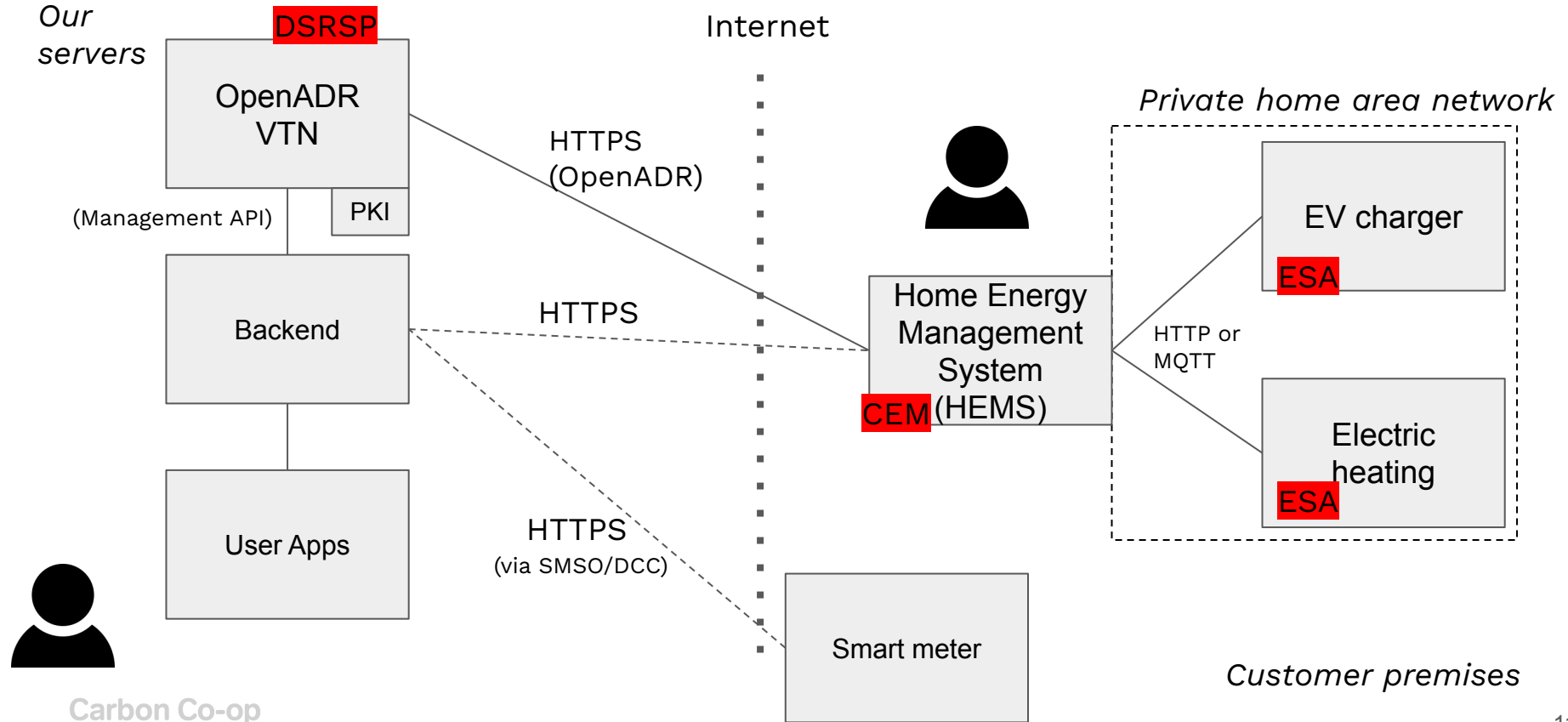


Innovative features of PowerShaper system

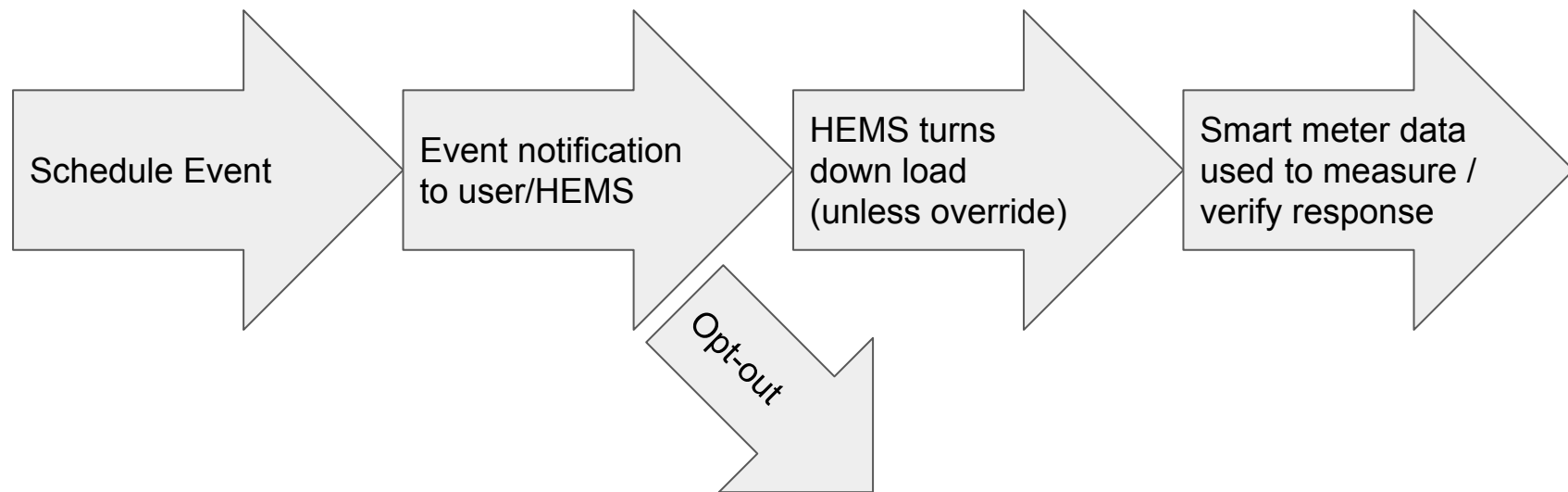
- An OpenADR-based system for dispatching flexibility assets.
- Assurance/verification of delivered flexibility provided by UK smart meters.
- An open source and flexible home energy management system which can integrate with 1000s of existing products/services.



Our system architecture



PowerShaper DSR event

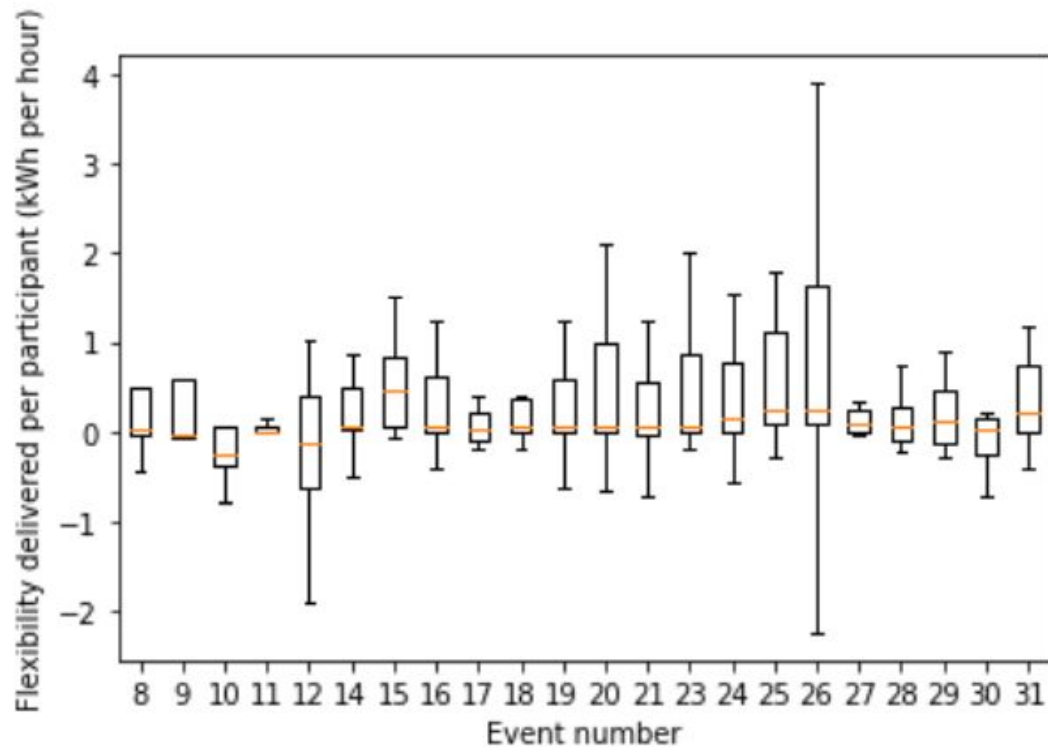


The OpenDSR project - the first PowerShaper trial - what happened?

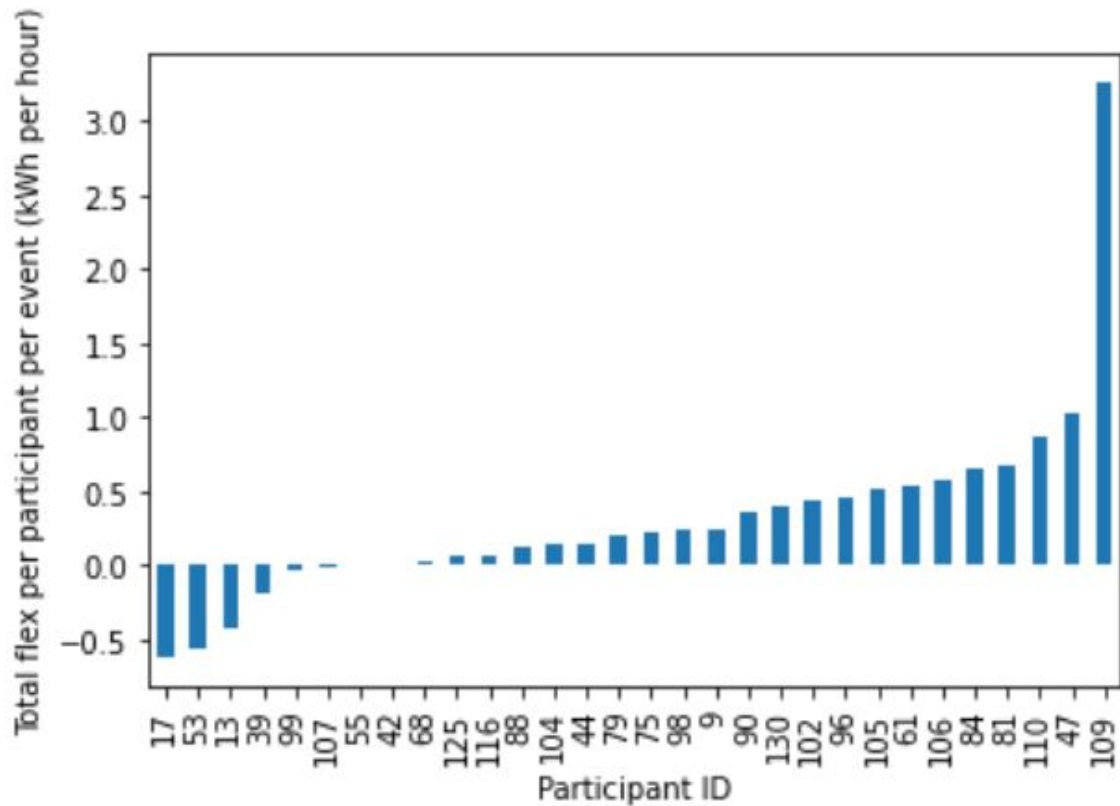
- July 2018 - July 2021 in 2 phases - feasibility and demonstration. Phase 2 began January 2019.
- Main technical development process completed on time by April 2020. COVID then led to 3 month delay to demonstrator (and ongoing issues).
- Demonstrator activity took place in 41 homes between July 2020 and April 2021 (during the pandemic!).
- 22 simulated explicit DSR events completed between November 2020 and March 2021 modelled on DNO flex requirements.
- Project now completed. Work continues under the REScoopVPP project and elsewhere.



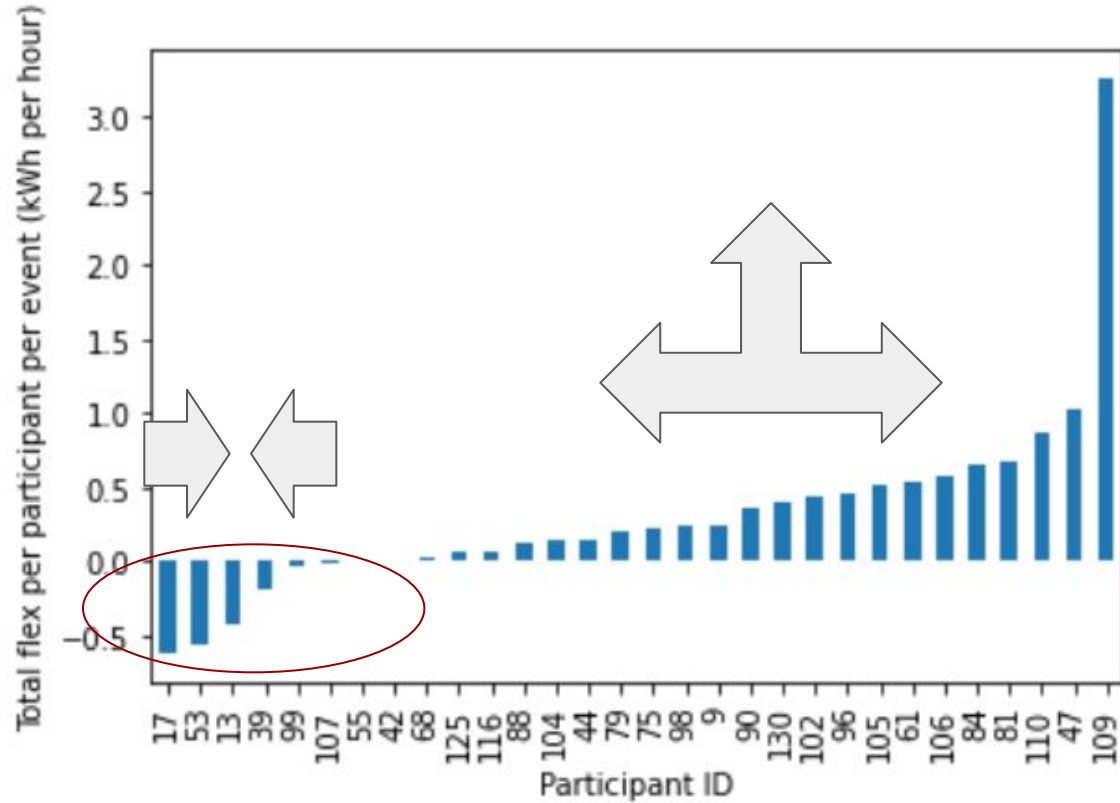
Technical evaluation



Technical evaluation



Technical evaluation



Interoperability: the missing piece of the smart energy puzzle

- Our members/customers constantly requesting ways to integrate different systems. Most of the time we have to say it isn't possible!
- Different problems with different appliances (batteries, EV chargers, heat pumps).
- Various efforts underway in UK to change this situation (e.g. PAS 1878/1879, OLEV requirements).

So how can community/municipal energy get involved in flex?

- Flex on its own usually does not work except for those with assets sitting around doing nothing.
- Technical expertise and capacity is required.
- Different relationship with clients/customers/participants compared to generation etc.
- The real and largely unexplored value to the customer is in synthesis between this and other energy / smart home services.
- There is huge potential here.

More info? Who can help?

CEE compiled resources:

<https://communityenergyengland.org/how-to-pages/flexibility-demand-side-services>

Us (maybe)! Contact me on ben@carbon.coop /
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Regen - contact khoare@regen.co.uk



Carbon Co-op

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