



# Decarbonizing the grid

British Market Council - Japan visit

20 November 2023



# Challenge #1: the electric grid is the biggest bottleneck to net zero

70%

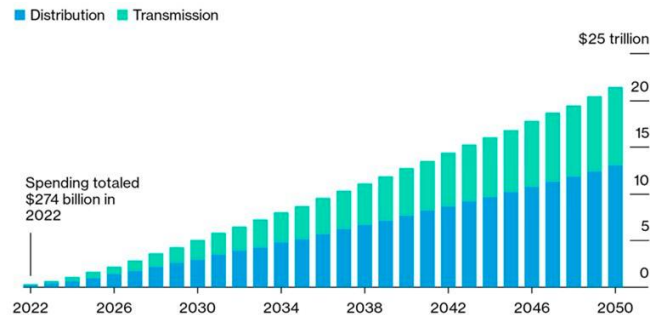
Of new renewable capacity connected to distribution grids

99%

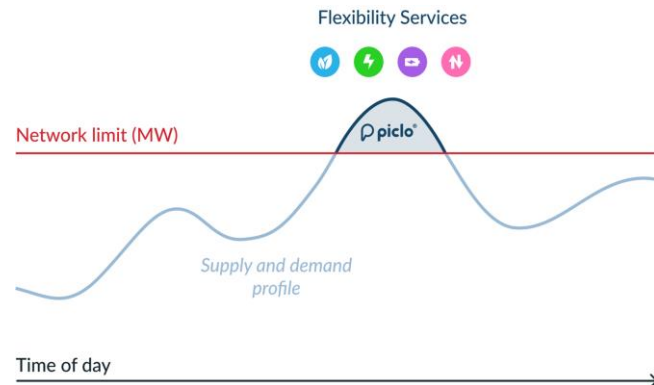
Of electric vehicles charging will occur on distribution grids

- Reaching net-zero emissions could cost more than **\$21 trillion** in building bigger grids worldwide
- Not only is this expensive (30% of cost of the transition!) but is proving difficult and very slow
- Grids need to transform into smart System Operators that access “flexibility” from distributed energy resources (DER)

Source: Deloitte: “Connecting the dots: Distribution grid investment to power the energy transition”



Source: BloombergNEF  
Note: Depicts the Net Zero Scenario in BNEF's New Energy Outlook, which maps a pathway to achieve net-zero emissions by 2050.  
BloombergNEF



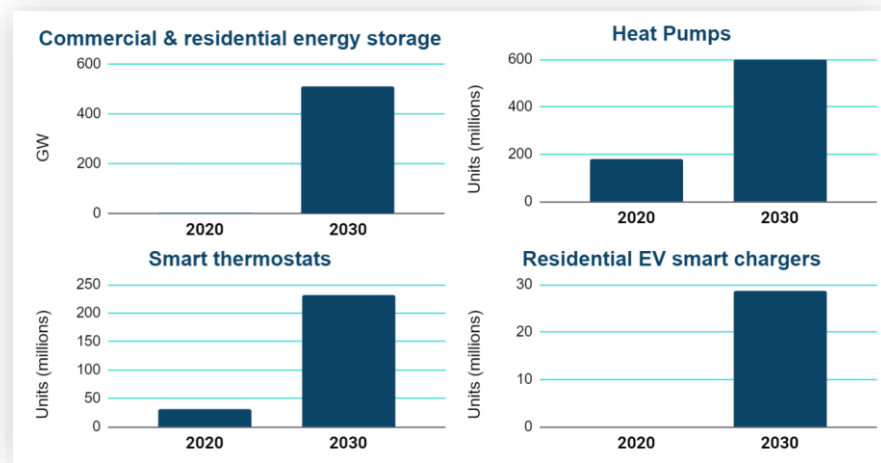
Source: Guidehouse Insights



## Challenge #2: DER need easier access to national markets & new flex markets

- Distributed Energy Resources (DER) are exploding in number worldwide.
- DER create a giant pool of flexibility, which can lucratively stabilise the grid.
- Their full potential is being held back due to inability to easily stack revenues from local and national flexibility markets

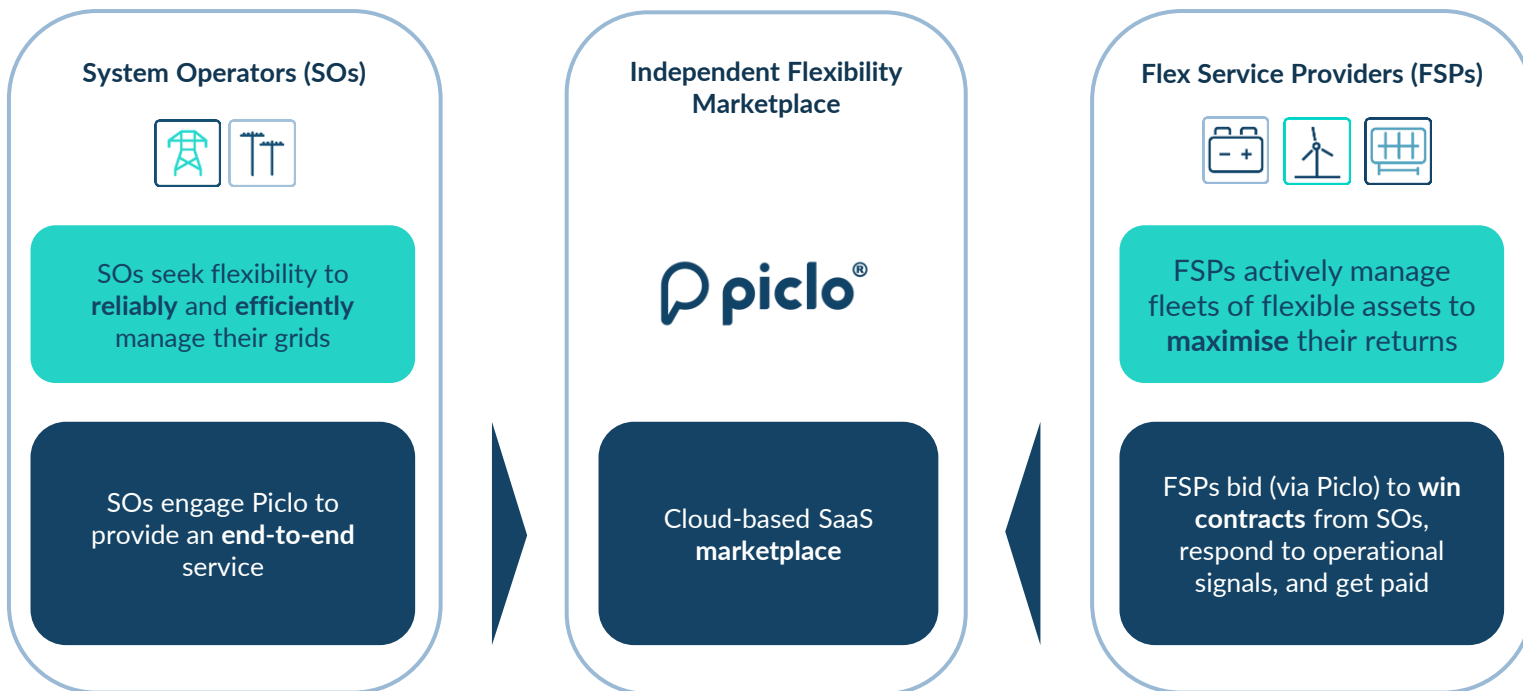
### Potential for DER deployment if revenue stacking is unlocked



Source: IEA Demand Response, Net Zero



## Independent flexibility marketplace



# The leading independent grid flexibility marketplace

6 countries

With active clients and projects

2.4 GW

Flexible capacity procured

\$90m+

Total transaction value to date

16 GW

Flexible capacity registered

60,000

Flexible assets registered

nationalgrid

nationalgridESO

electricity  
north west

SP ENERGY  
NETWORKS

UK  
Power  
Networks

ESB

E-REDES

eso

enel

NORTHERN  
POWERGRID

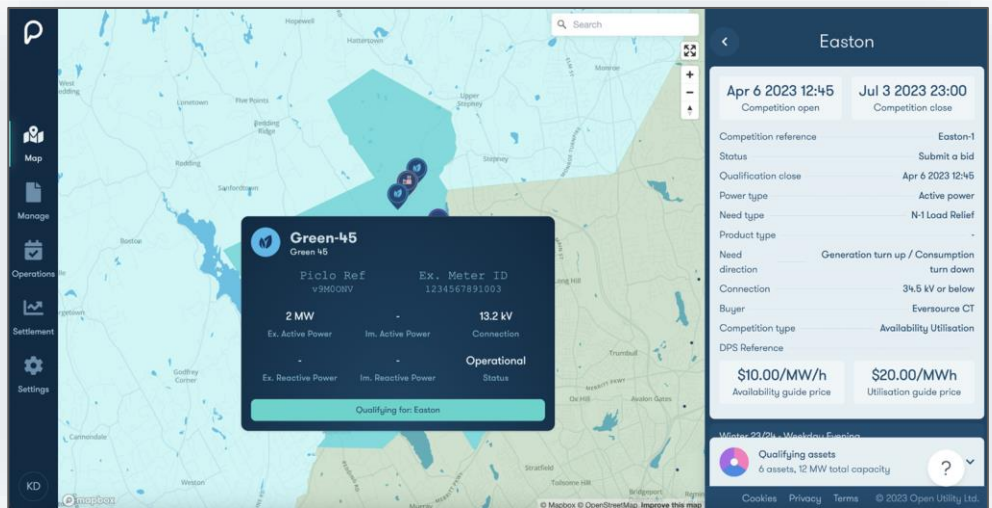


## Flexibility markets are key tool for efficiently resolving grid issues

	Traditional solutions	Flexibility markets	Tariffs
Forecast issues <i>(months/years in advance)</i>	Network reinforcement / build peaking plants	Scheduled flexibility +	Peak pricing
Forecast issues <i>(days/hours in advance)</i>	Smart grid +	Pre-fault flexibility	Dynamic pricing?
Realtime issues	Curtailment +	Post-Fault flexibility	Pay-per-uptime?
Fault restoration	Reconnection	Restoration flexibility	



# Independent flexibility marketplace



- **Competition-based approach** to connecting utilities and Flex Service Providers (FSPs)\* to source flexibility at lowest \$ / MW
- **Transparently** signals where and when there is value for investment and ops
- **End-to-end process:** Advertisement, auction, dispatch, settlement & payment
- **Streamlined digital processes** that reduces procurement costs for utilities & FSPs

\*FSP = Any flexible energy provider - DER aggregators, project developers and owners, EVSE operators, smart tstat OEMs, etc.

Market-driven approach

Local & inclusive

Transparent



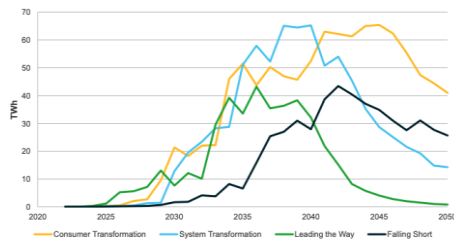
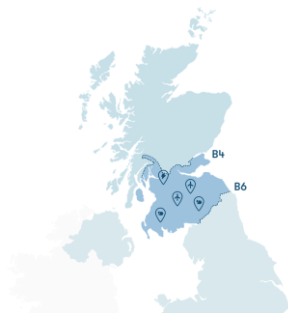
# Case study: Running NGENO's market to reduce transmission network curtailment

## Problem

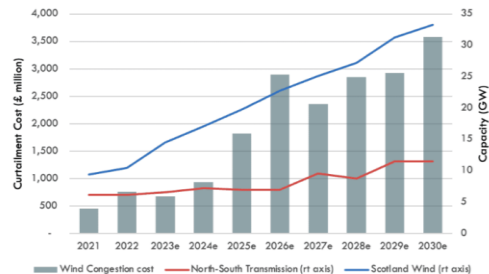
- Paying renewables to “curtail” (switch off) generation as existing transmission lines do not have enough capacity

## Solution

- Piclo delivered a new Market for National Grid ESO (Independent System Operator for GB) in 3 months
- A new locational market for the ESO to buy flexibility from **distribution connected flexibility** to manage **constraints on the transmission network**
- High frequency market - auctions twice a day
- First time external SaaS platform used in national control room



GB Annual curtailment (TWh) scenarios to 2050 Source: ESO Future Energy Scenarios 2023



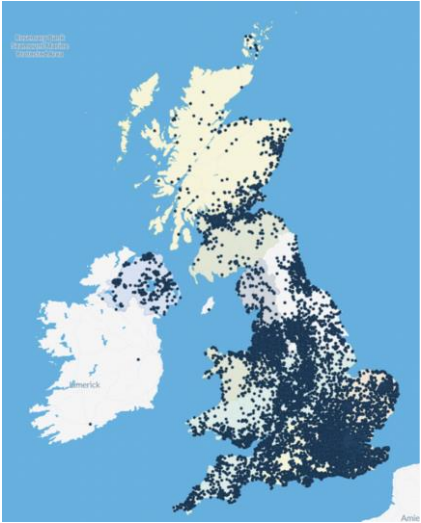
Source: Carbon Tracker Initiative 2023





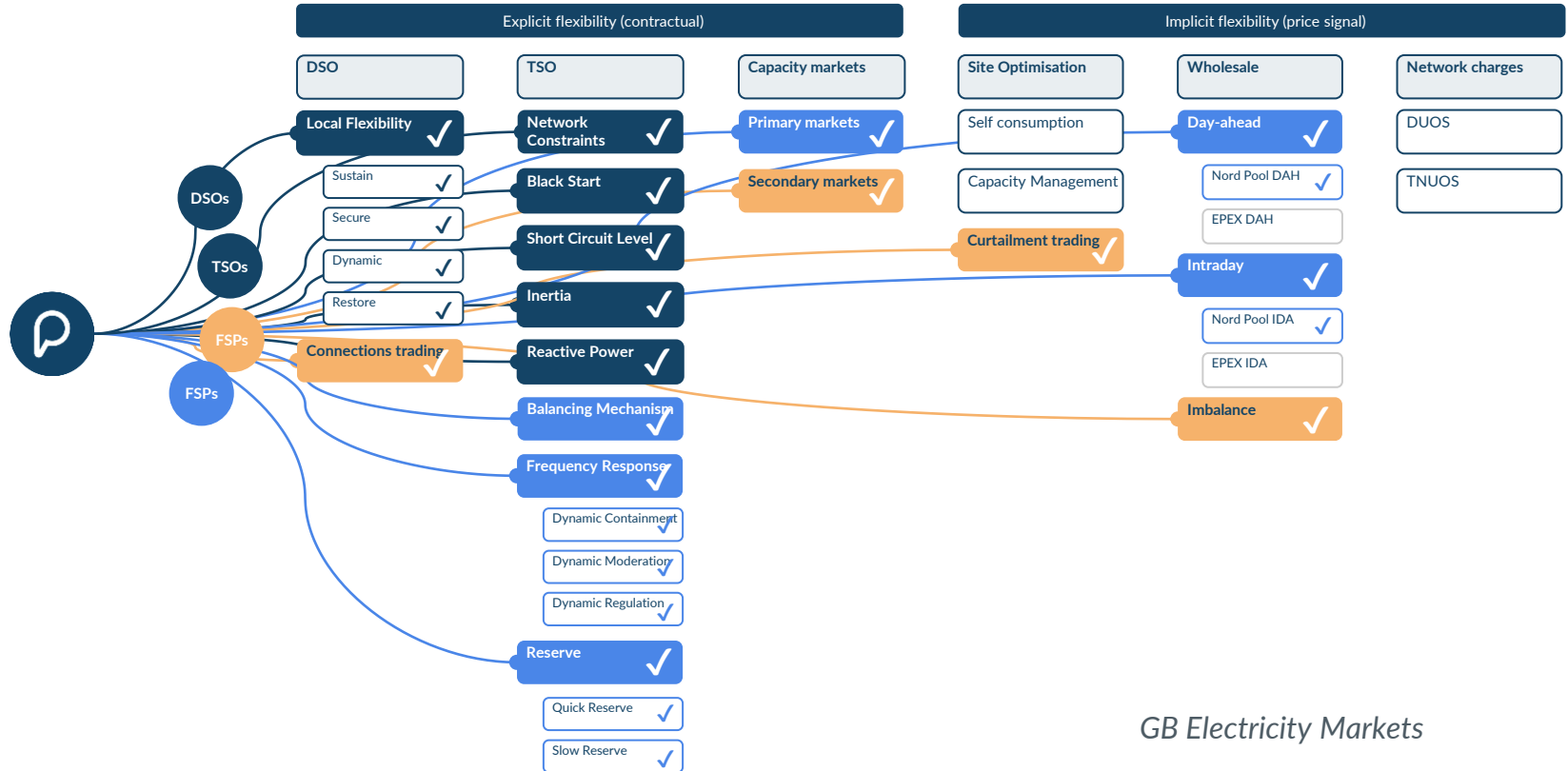
# Building a market: onboarding providers and registering assets

Energy retailers	VPP / aggregators	Large end customers	Smart home / storage innovators
EV charging	Project developers		





# Going forward: Helping asset owners access more markets



GB Electricity Markets

# Decarbonizing the grid

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