

How can we introduce flexibility to distribution networks?

EIP040

28 February 2023

Background

- The UK electricity network is experiencing significant changes in how energy is generated and consumed due to the growing LCT integration.
- The UK government intends to electrify the transportation and heating sectors, leading to an increase in network demand despite improvements in energy efficiency.
- The growing connection of distributed generation (DG) also causes an additional strain and reliance on the distribution networks from LV (400V) up to EHV (132kV).



Background

- Additional LCT demand and generation may cause significant issues on the network including:
 - Increased voltage variation risk on the distribution networks
 - Thermal stress on assets
- Predicting timescales for these changes in demand and generation due to LCT integration is difficult.
- Conventional, passive networks are designed for the worst demand and require expensive and time-consuming network reinforcement.
- The key challenges are:
 - **Local voltage control closer to customers;**
 - **Better asset utilisation by sharing capacity;**
 - **Flexibility by customers when grid is under thermal stress;**
 - **Effect of converter connected loads/generation on power quality**
 - **Quicker system restoration following network faults**

Enablers and Constraints

Enablers

- Power electronic technologies (such as STATCOM, UPFC, Soft Open Points...) can provide grid control flexibilities in LV and HV networks
- Creating local energy and flexibility markets
- LV and HV fault location for underground cable circuits using pre-fault monitoring data.

Constraints

- Costs, service lifetime and reliabilities of power electronic technologies.
- Long term commercial interest for customers to participate in flexibility market.

Involvement and Implementation

- Key Stakeholders include:
 - Electricity customers
 - UK DNOs
 - Grid Asset Manufacturers
 - Ofgem
 - Network Service Providers, Academics and research centres
- Target Market – Electricity Networks industry is set to have over £20 billion investment plan during the ED2 price control. Market opportunity for rolling out effective solutions that can compete with conventional reinforcement is significant.
- Target Implementation Date – 2030

Energy Innovation Basecamp

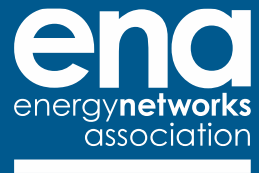
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[Slido.com](https://www.slido.com)

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