EIP123 - Maximising Utilisation of the Transmission Network

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How can we use our existing infrastructure to transmit more power (and avoid reinforcement)?

Problem

The existing transmission network is increasingly curtailed due to a limited amount of electrical energy that can be transferred by existing circuits. **The cost of curtailment is expected to peak between £1-2.5bn a year by 2025.** The majority of curtailed generation from renewable sources is due to positioning at network extremities combined with variable generation.

Opportunity

Project ideas related to the holistic assessment of integrated system capacity and potential for transmitting more power:

- Assessment of the impact of increased ratings of lines on the connected equipment
- Cost-effective methods for uprating existing equipment
- Methods of modifying substations and switchgear to allow more power to be transmitted
- New overhead line designs
- Methods for validating novel overhead line materials
- Novel ideas that contribute to our existing projects in DLR, ANM, and revised line rating

Increased power over the existing transmission infrastructure could avoid costly reinforcement of the network.

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Previous/Ongoing Projects

Line clearance

Cost effective removal of conductor crossing clearance constraints

Dynamic Sag Monitor

Overhead Line Sagging Monitoring Using 5G Signals

Temperature/Thermal

Implementation of Real-Time Thermal Ratings

Temperature Monitoring Windfarm Cable Circuits

Analysis of the Thermal Influence of Cable Surroundings (AnTICs)

Dynamic Line Rating

Enhanced Weather Modelling for Dynamic Line rating (DLR)

Dynamic Line Rating CAT1

Dynamic Ratings for improved Operational Performance (DROP)

System operability

Advanced Line Rating Analysis (ALiRA)

Unlocking Transmission Transfer Capacity

Increasing Transmission Boundary Power Flows using an Active Power Control Unit

Flexible rating options for DC operation

REVISE

Hydrogen

The Role for Hydrogen as an Electricity System Asset

Hydrogen Production for Thermal Electricity Constraints Management

Alternative designs/components

New Suite of Transmission Structures

SCOHL

UltraWire

275kV Alternative Conductor

Aluminium Carbon Core Conductor (ACCC)

Retrofit Insulated Cross Arms (RICA)

*Projects marked in bold are led by SSEN-T

We invite ideas for:

- Smarter management of power flow through the network with connections on a non-firm basis
- Methodologies for the modification of substations and switchgear
- Efficient methods for assessing integrated system performance if power transmission is increased
- Impact on asset performance and reliability over the lifetime of the asset if the power rating is increased
- Complimentary technologies for current ongoing projects such as:
  - Dynamic Line Rating monitoring equipment, particularly cost-efficient technology and methods.
  - Active Network Management to better utilize the capacity more of the time, including whole system schemes for managing and diverting power flow.

Constraints

- Existing ongoing projects (DLR, ANM and Revised Static Line Rating Methodology)

- Awareness of ongoing work to complement or build on previous work or options to remove barriers that prevent solutions from becoming BaU

Key Stakeholders

- Transmission network operators
- ESO/FSO
- Equipment manufacturers
- Ofgem
  - Regulation and codes

Questions…

- What are other countries doing? Are there learnings we can build on?

- How do we link these innovations together to maximise the benefits?

- What are the issues/barriers to solving this problem?

- Is there resource/funding available to support maximising the existing network over building new infrastructure?

- What does maximising the existing network look like? Where is the endpoint?

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