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.
Previous/Ongoing Projects

**Line clearance**
- Dynamic Sag Monitor
- Overhead Line Sagging Monitoring Using 5G Signals

**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*

**Temperature/Thermal**
- Implementation of Real-Time Thermal Ratings
- Temperature Monitoring Windfarm Cable Circuits
- Analysis of the Thermal Influence of Cable Surroundings (AnTICs)

**Hydrogen**
- The Role for Hydrogen as an Electricity System Asset
- Hydrogen Production for Thermal Electricity Constraints Management

**Dynamic Line Rating**
- Enhanced Weather Modelling for Dynamic Line rating (DLR)
- Dynamic Line Rating CAT1
- Dynamic Ratings for improved Operational Performance (DROP)

**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 SSN-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.

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?

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