Innovation Basecamp 2026

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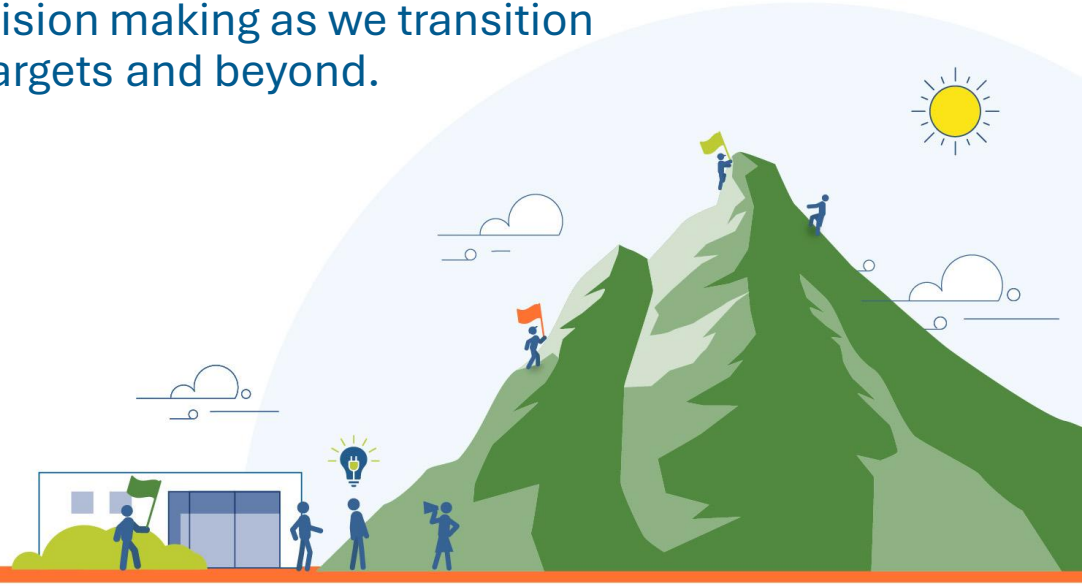
EIP162 – NTO Stability

Anna Blackwell / Ian Dytham

Introduction

National Energy System Operator (NESO)

- NESO is responsible for planning and delivering the energy of today and the future.
- We operates the GB electricity system and have a gas planning role.
- Within this, the Network Control Programme is working to enhance the Electricity National Control Centre (ENCC) situational awareness tooling, supporting decision making as we transition towards a zero-carbon grid meeting the Governments CP30 targets and beyond.



Background Information

- Integration of renewable energy sources is increasing network constraints, driving up balancing costs.
- Network topology changes offers a cost-effective solution to reduce congestion.
- Currently operators use experience and knowledge to identify topology changes.
- The GB electricity network is highly complex, with increasing dynamic stability constraint management requirements.
- A recent NIA project has shown that existing stability algorithms are complex and unsuitable to use in optimisation algorithms.
- How can we develop scalable voltage and stability optimisation algorithms to enable future automation of NTO processes?

What are the Problems?

- The transition from traditional synchronous generation to inverter-based renewables has decreased the inertia and short-circuit levels, increasing the occurrence of dynamic stability constraints.
- Network topology changes are increasing needing to consider dynamic stability.
- Any Network Topology Optimisation (NTO) solution will need to run algorithms for voltage and stability alongside traditional power flow.
- Stability and voltage optimisation tools are not as mature as DC power flow tools for solving multiple scenarios accurately and rapidly.
- How can we develop scalable voltage and stability optimisation algorithms to enable future automation of NTO processes?

Our Expectations

What are we looking for?

- **Solution Expectations:**
- We are looking for new methods and techniques that improve optimisation algorithms that can be used for determining voltage and stability power system limitations on the transmission network.
- Techniques should be scalable to work in near real-time and consider significant number of scenarios to optimise the network
- This can be delivered either as research, or as a tested product.

- **Non-negotiables:**
- The solution must have the potential to work with network planning tools (e.g. Powerfactory), either in their existing format, or through future development to those tools.

IMPORTANT

It is important for all innovators to note that we are looking for plans rather than just ideas as solutions.

Key Contacts:

- **For further information / Clarity:**
- **This builds on the NIA funded report into Network Topology Optimisation (NIA2_NESO087) which highlights the speed of AC Load Flow Solvers as a key area to advance in order to achieve automation of NTO.**
- Please email innovation@neso.energy if you require further clarifications including Basecamp – EIP162 in the subject line

- **ANY QUESTIONS?**

Energy Networks Association
4 More London Riverside
London SE1 2AU
t. +44 (0)20 4599 7700

@EnergyNetworks
energynetworks.org

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