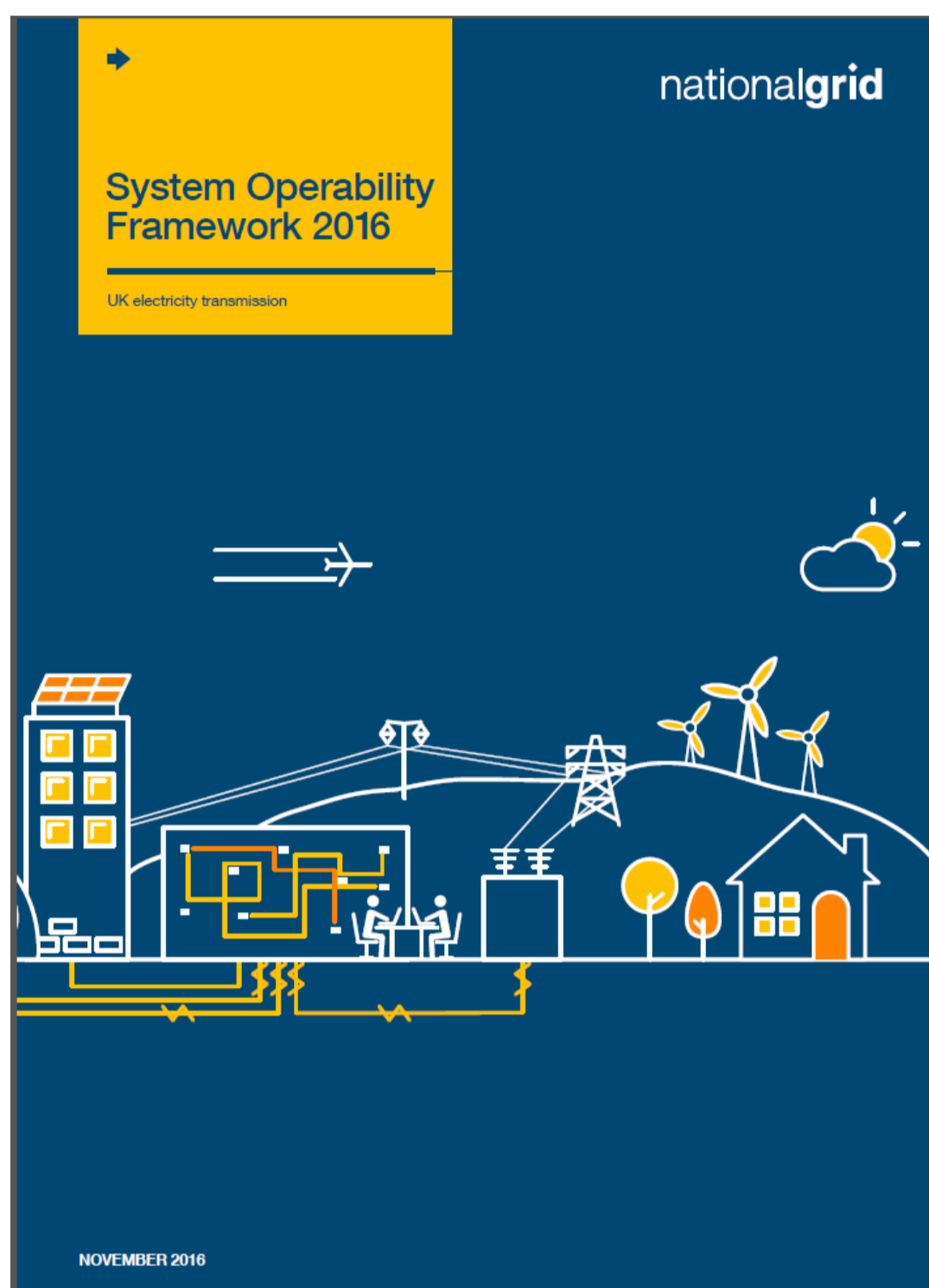


System Operability Framework

System Operability Framework

At National Grid we regularly assess trends on the transmission network to see how they will affect future operability of the system. In this poster we outline some of our recent analysis published under the System Operability Framework. Our aim is to understand the risks the whole system may experience and develop solution to mitigate the risks.

System Operability Framework



The aim of our assessments is to inform and influence the energy industry, such that the right decision can be made now on; technical codes, investments and research to improve the operability of the power system.

Recent and future SOF topics include:

- Distributed Black Start
- Low frequency demand disconnection
- Solar Eclipse 2026
- Performance of Phase-Locked Loop based convertors
- Future System Balancing
- Voltage and Frequency Dependency

What is SOF:

System – ‘Whole System’

- Electricity supply supported by the transmission system which includes issues at and across the T-D boundary.

Operability – ‘Can it work?’

- Will existing planning and operational approaches be safe, reliable and efficient?
- What are the technical merits and limitations of potential modifications to codes, services or infrastructure?

Framework – ‘Supporting structure’

- Freely published assessments, discussion and projections with open channels for discussion.



Solar Eclipse 2026

As solar generation capacity increases, so does the potential impact of a solar eclipse. We look at how the next significant eclipse in the UK might affect system operation.

Low Frequency Demand Disconnection

LFDD is a resilience scheme to support the system frequency during rare events. We investigate how the scheme's capability is reduced by the growth in distributed generation.

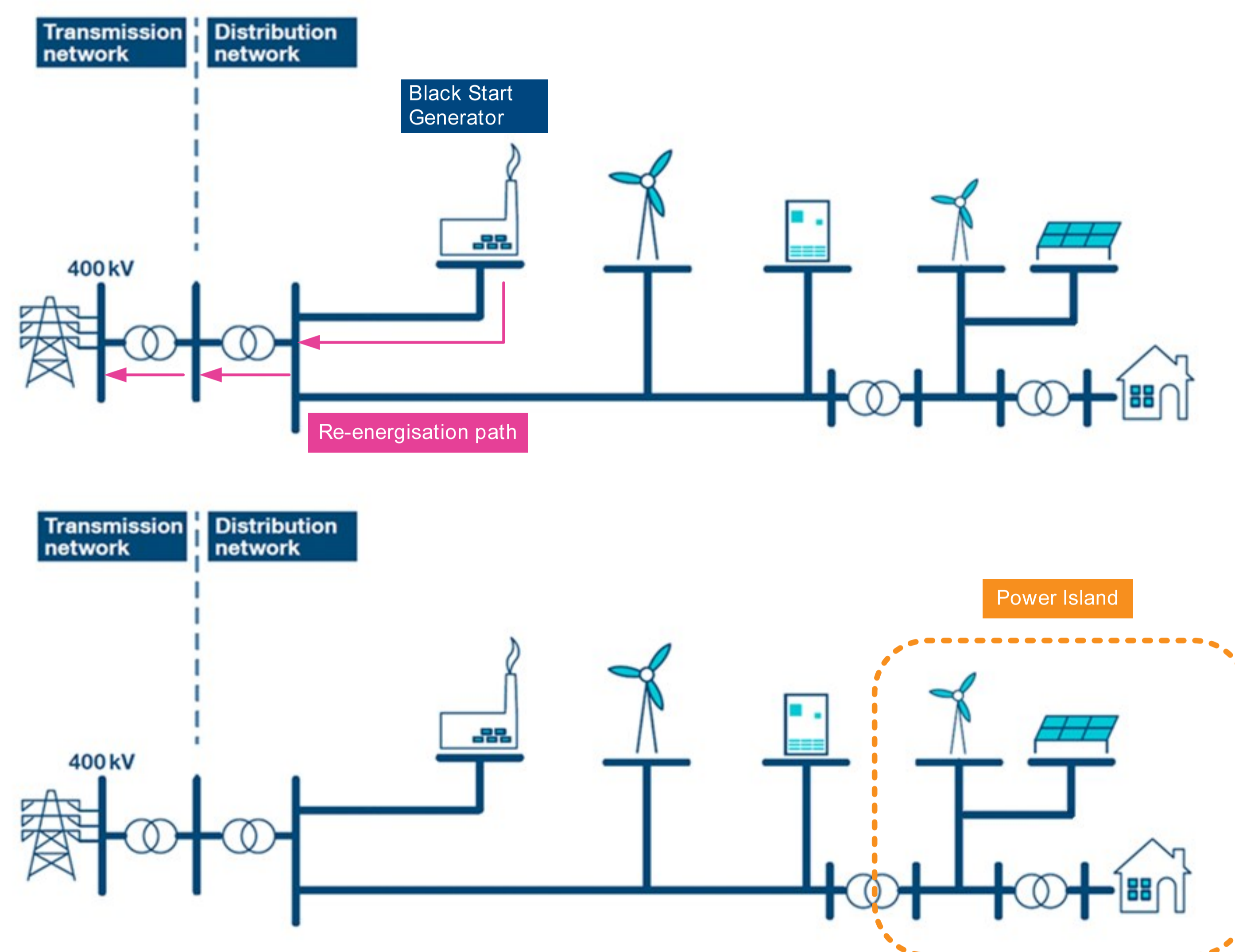
Distributed Black Start

Black Start is the method for re-energising the power system in the event of a full system collapse (Blackout).

In this project we looked at the possibility of using generators on the distribution network to provide Black Start.

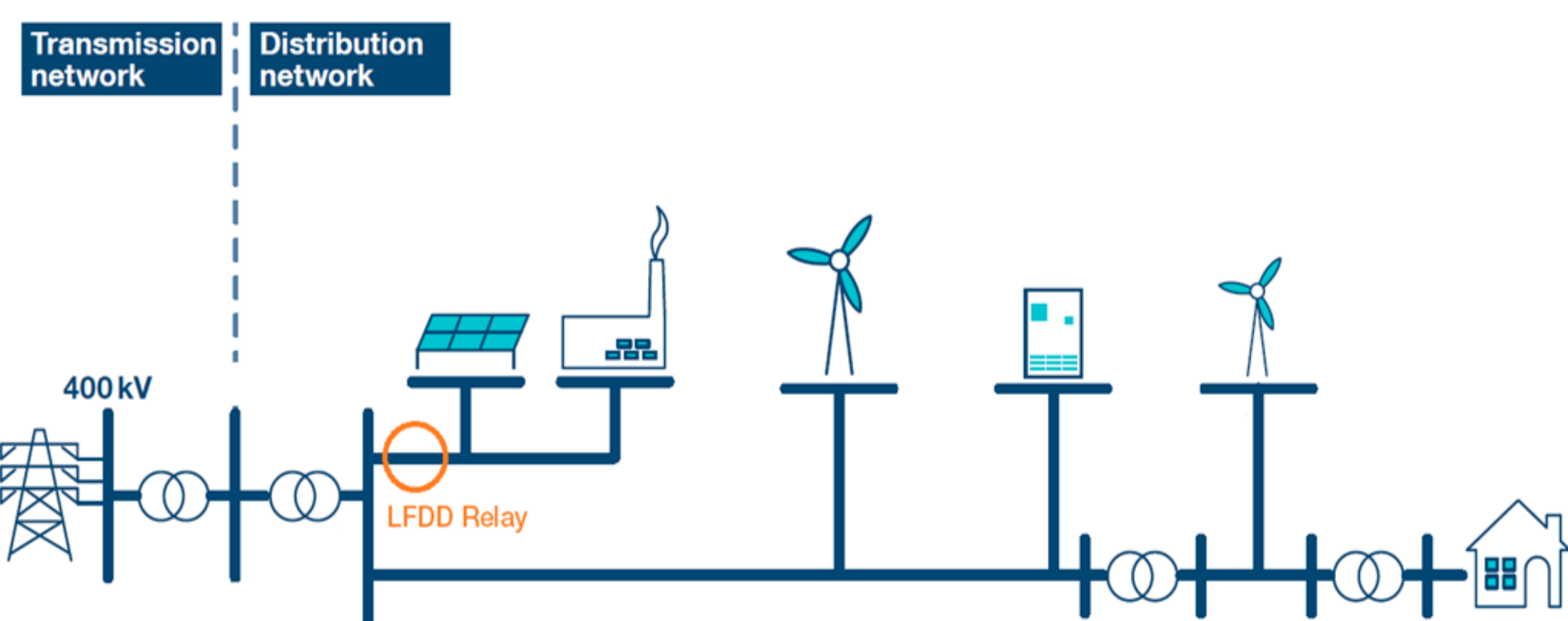
We looked at two methods firstly using large embedded generators in a similar manner to current Black Start providers. Secondly we looked at establishing power island.

The methods were explored for technical feasibility as well as regulatory and roles and responsibilities.

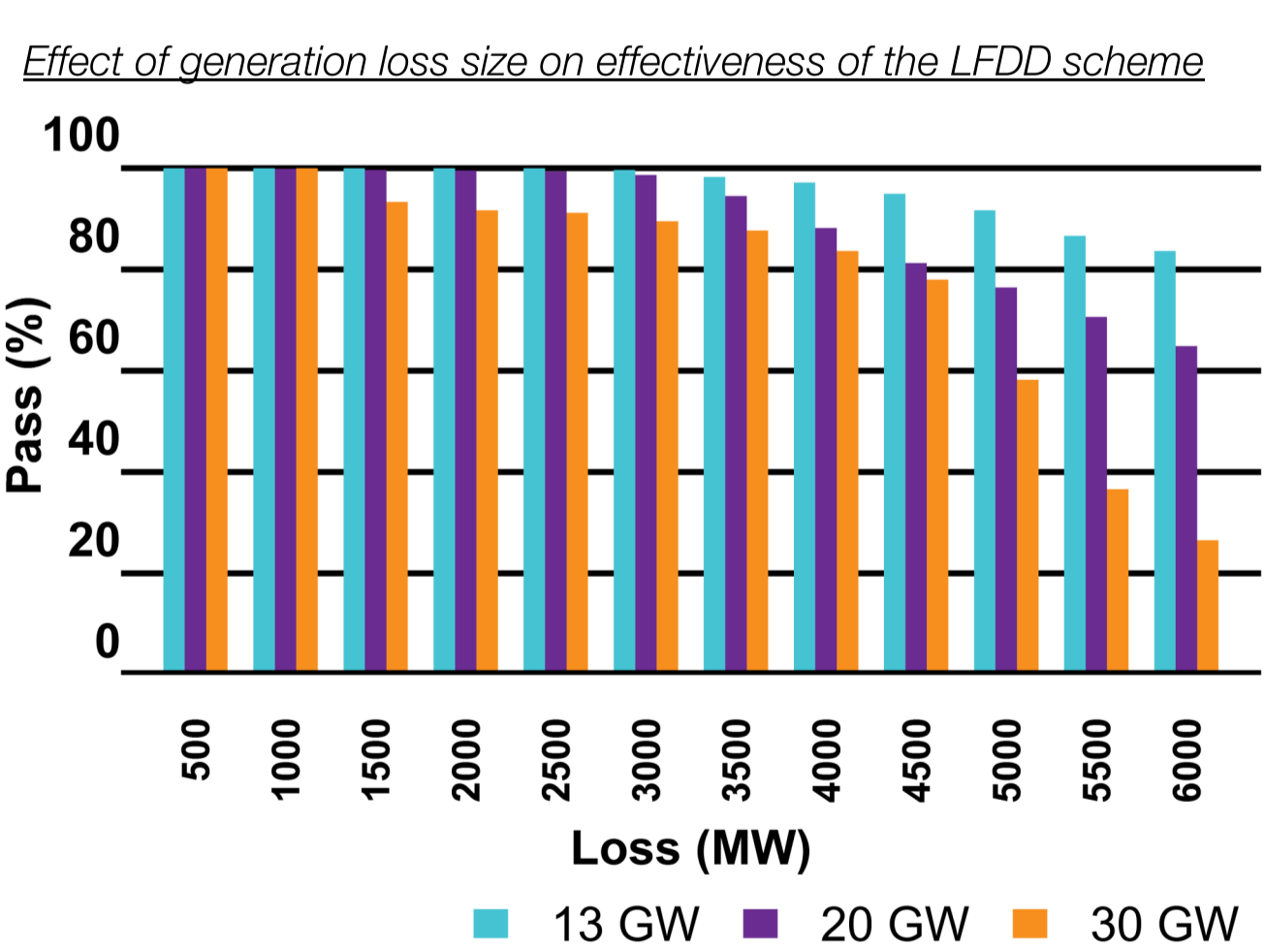


LFDD

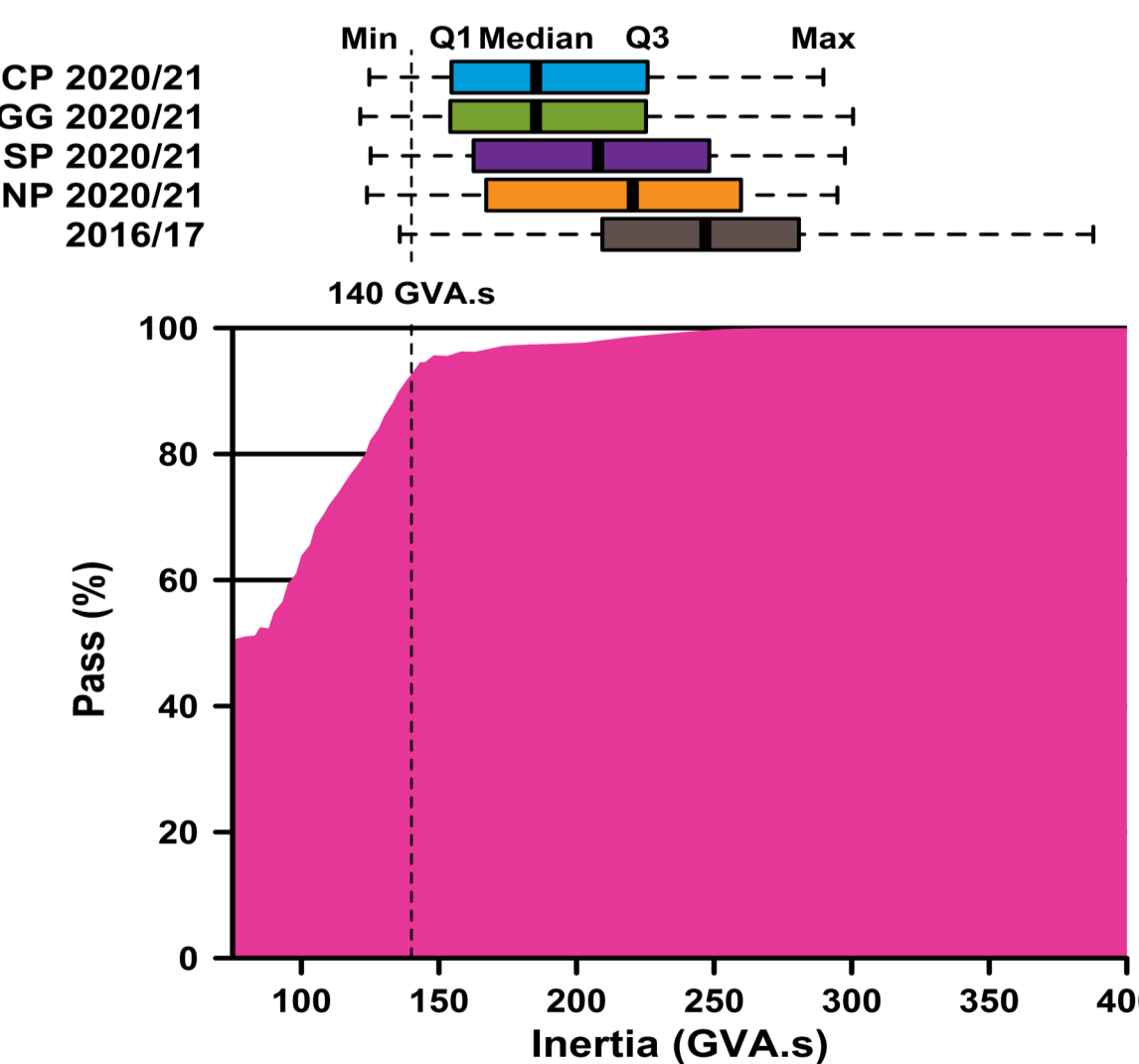
The LFDD scheme manages large frequency events by automatically disconnecting demand when frequency falls below predefined thresholds.



We modelled the future effectiveness of the scheme as the amount of embedded generation increases and as the amount of inertia decreases. This showed that the LFDD scheme is becoming less effective. We are currently working with other parties to improve the LFDD scheme.

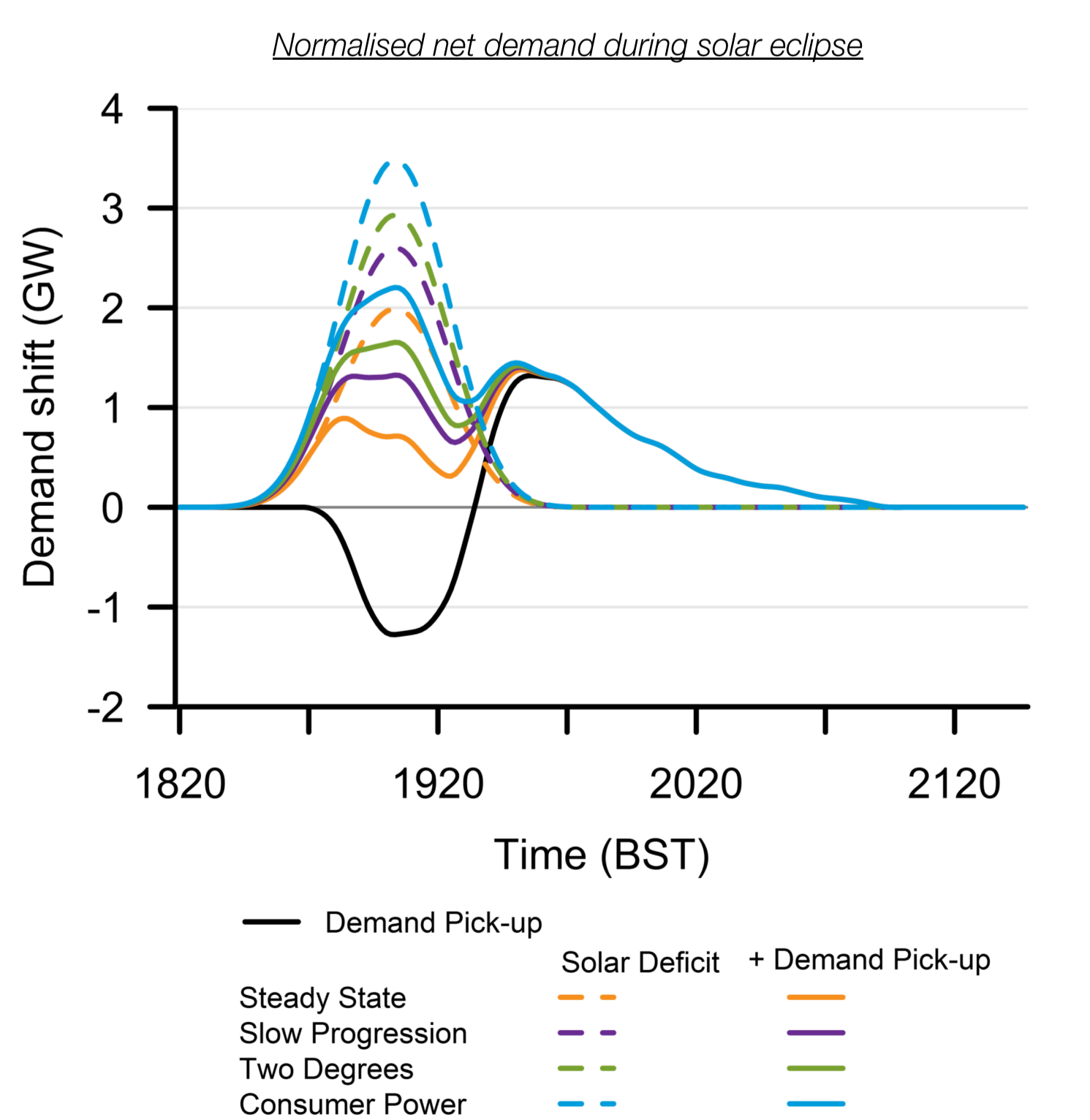
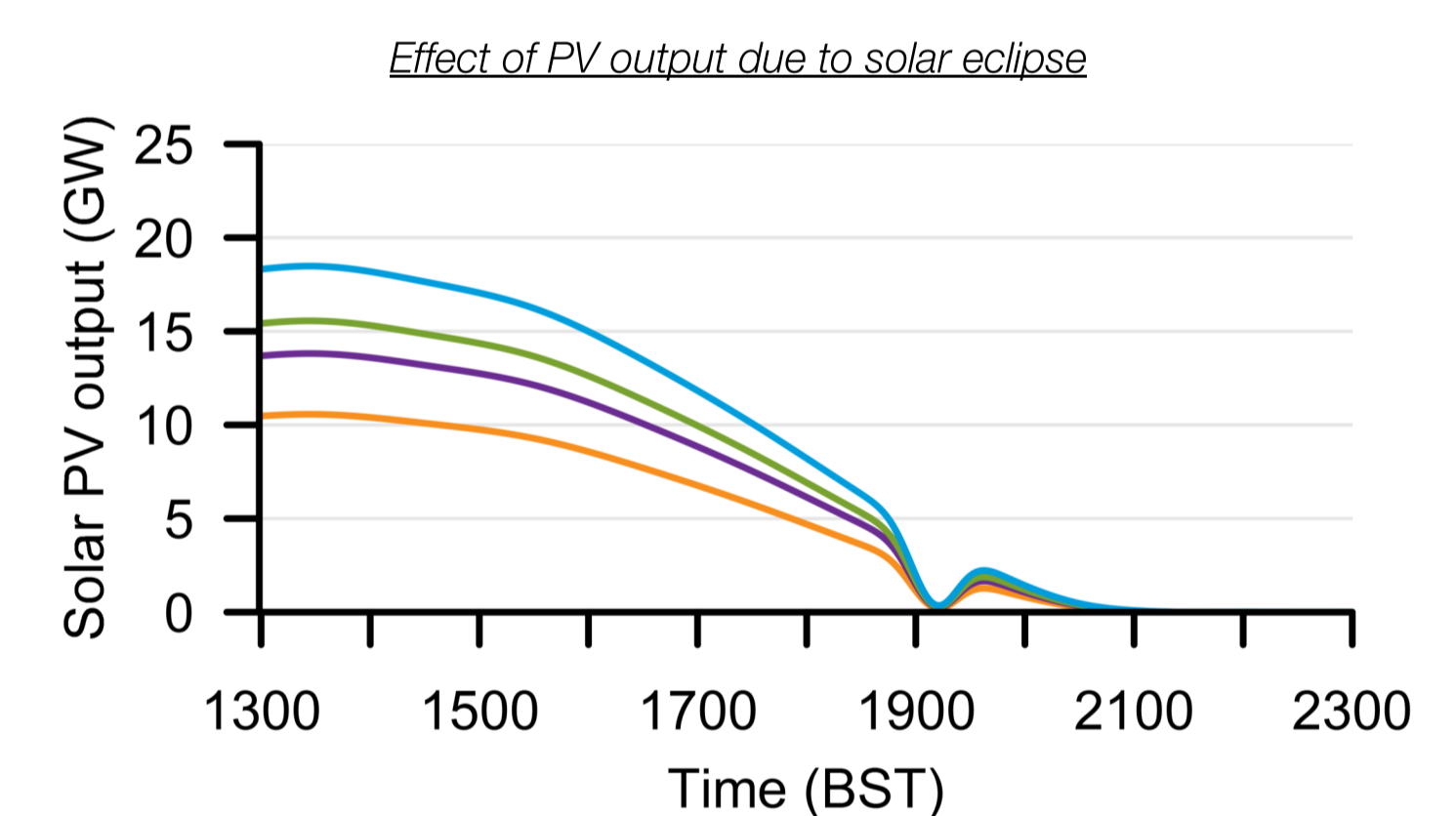
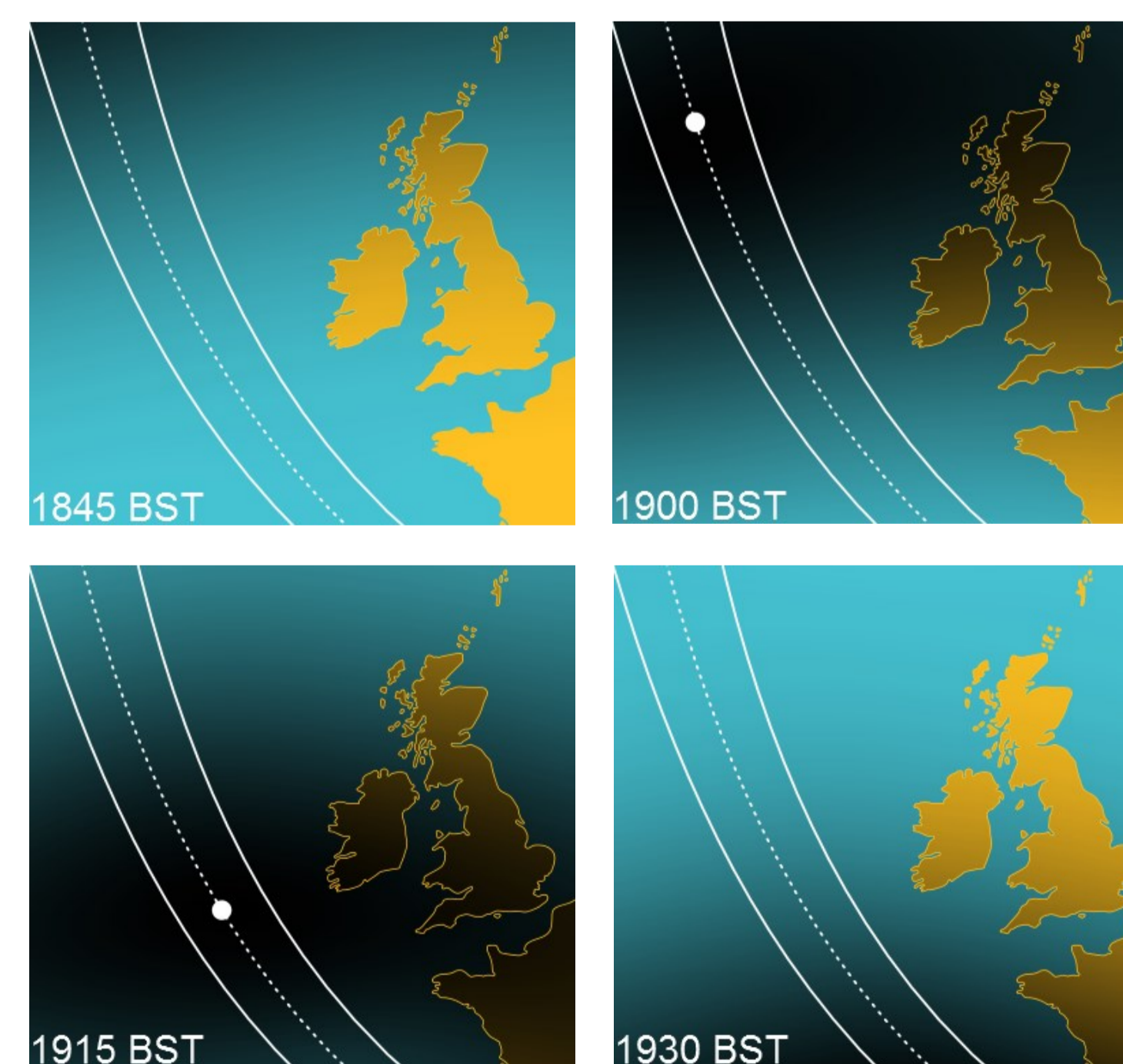


Effect of system inertia on effectiveness of the LFDD scheme



Solar Eclipse 2026

The next eclipse in the UK is due to occur on 12 August 2026. With the increase in solar generation we looked at the impact this would have on the system and how we would operate it.



We modelled the reduction in generation due to the eclipse and the expected demand. We showed that system on the day would be manageable with appropriate planning.

