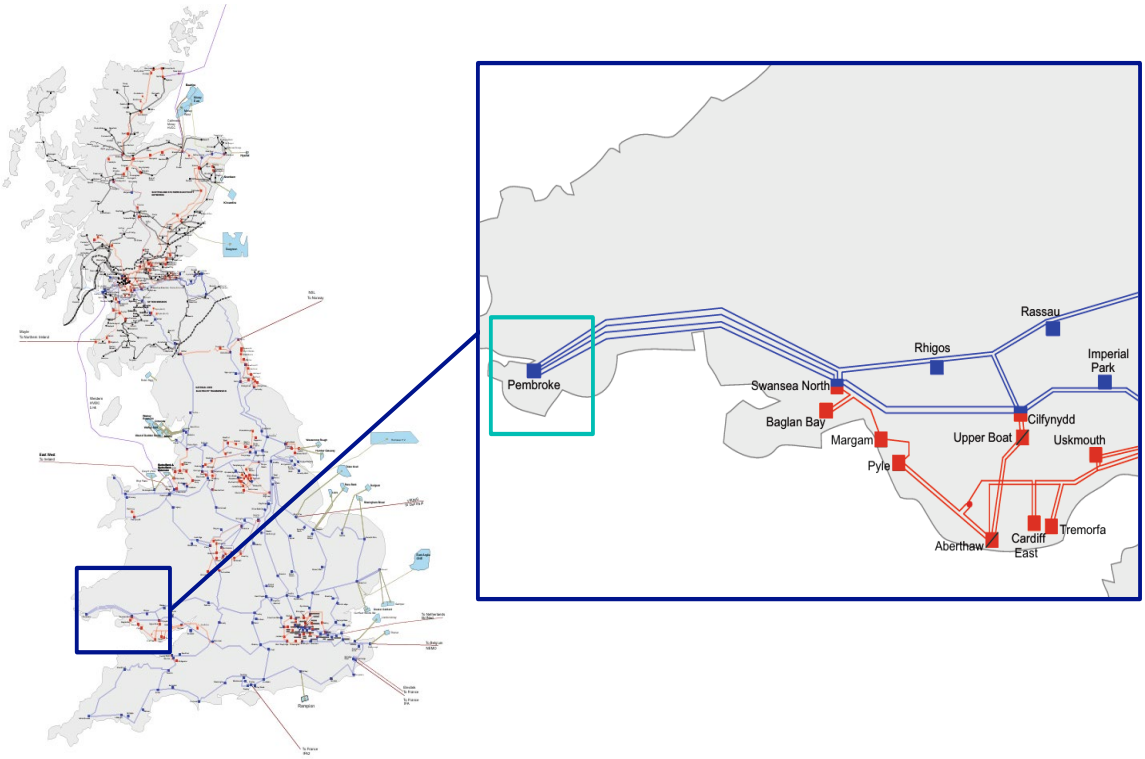
Pembroke 400kV substation expansion: Project Assessment

Executive summary

Background

The Pembroke 400kV substation expansion project involves a South Wales substation (see figure below) extending within its existing footprint to increase local capacity and facilitate customer connections.

Figure 1: Transmission route map



*Key: **Red** = 275kV assets, **Blue** = 400kV assets. Investment location shown in **green** box.*

The project involves:

- An indoor SF_6-free 400kV Gas Insulated Switchgear (GIS) expansion, which has been designed to allow for further expansion.
- New 400kV customer connection bays.
- Modifications to two gantries and associated overhead lines.

By allowing more customers to connect, the project will also help with the UK's transition to renewable energy and net-zero commitments.

We are seeking Ofgem's Project Assessment decision for this project which is being submitted under Special Licence Condition 3.18 (Load Re-Opener and Price Control Deliverable).

Investment drivers

Customer connections:

The primary driver for this project is to enable the connection of customers at the Pembroke 400kV substation.

Future proofing:

The Pembroke 400kV substation expansion project has been designed with the future in mind as it will enable further customer and network infrastructure connections.

Options

Two options were shortlisted at the Engineering Justification Paper stage and re-assessed through an updated cost benefit analysis (CBA) as part of our Project Assessment:

- **Option 1**: Existing substation expansion (**Preferred option**).
- **Option 2**: New 400kV substation.[1]

Preferred solution

The preferred solution is the option we are proposing – expansion of the existing 400kV substation at Pembroke (Option 1).

Key benefits of this solution include:

- Faster delivery relative to the other option.
- Lower cost and shortest and most certain route to customer connections (fewer consenting and land challenges as it is maximising existing infrastructure and brownfield land).
- Highest consumer value – it has the highest Net Present Value of the shortlisted options.
- Use of a future-proofed design.
- Use of SF_6-free technology, meaning we are proposing a solution that aligns with net-zero objectives.
- Benchmarked efficiency – costs are comparable to similar projects of equivalent scope and complexity.

[1] Under either shortlisted option, the ability to connect contracted customers and accommodate future customers was possible.