

# Digital Substation

Demonstrating the next generation of distribution network substations.



## Our Vision

The PNDC digital substation RD&D activities aim to lead our industry stakeholders into rolling out the next generation of digital substation which will enable rapid and streamlined deployment of new substation functions, while reducing operational life-cycle costs.

This is underpinned by high fidelity substation data, secure and resilient communications and intelligent monitoring, control and protection functions.

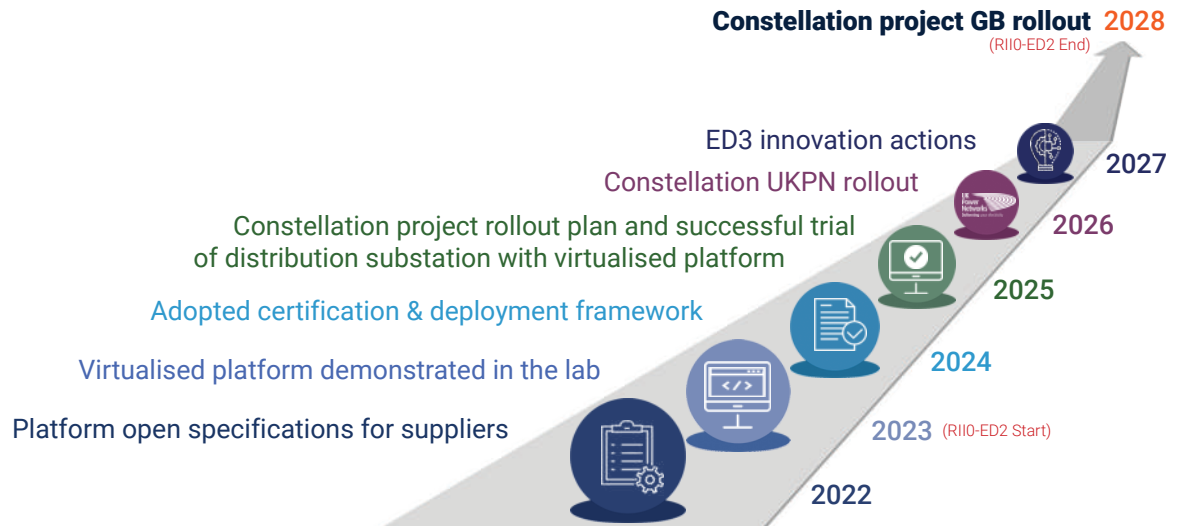
## Business Case

The distribution substation is a critical element in the modernisation of the distribution grid to ensure the resilience of customer suppliers and maximise the connectivity of flexibility resources. In order to fulfil this critical role, conventional means of integrating new and necessary functionality is costly and inflexible.

By implementing innovative data and communication architectures in the substation, a unique value proposition can be derived:

- ✦ Virtualisation and standard data models for rapid functions deployment.
- ✦ Distributed intelligence to maximise local data processing.
- ✦ Model based and automated regression testing.
- ✦ Use of open standards and architectures.
- ✦ Harmonisation of standards and tools and developing retrofit solutions.

**Digital  
Substation  
Timeline  
of Key  
Outcomes**



**Why PNDC?** ⬇



**Industry Firsts**

The roadmap emphasises the role of PNDC within a wider academic and industry effort to advance and adopt the technologies and practices related to digital substations. Such efforts focus on achieving “industry firsts” as outcomes to accelerate relevant developments and maximise impactful outcomes for key stakeholders and the wider user community.



**Collaborative Practice**

As relevant technology matures, a comprehensive and industry adopted set of testing and certification practices must be implemented to ensure low-risk transition and traceability of user requirements. PNDC’s engagement events communicate the requirements and consolidate the necessary input from suppliers, industry and standardisation bodies.



**Realistic Test Environment**

PNDC’s unique facility enables the demonstration of an integrated substation architecture with virtualised monitoring, protection and control functionality in a realistic laboratory test environment. This laboratory implementation will be delivered along with a validation strategy that reflects the innovative architecture implementation, demonstrating virtualised functions and software-oriented substation services in a live distribution network.

**Key Stakeholders:**

