



Digital Commissioning of Large-Scale Equipment

Decarbonising Network Operations



The National Transmission System (NTS)

The role of gas:



23m
gas customers
across the UK

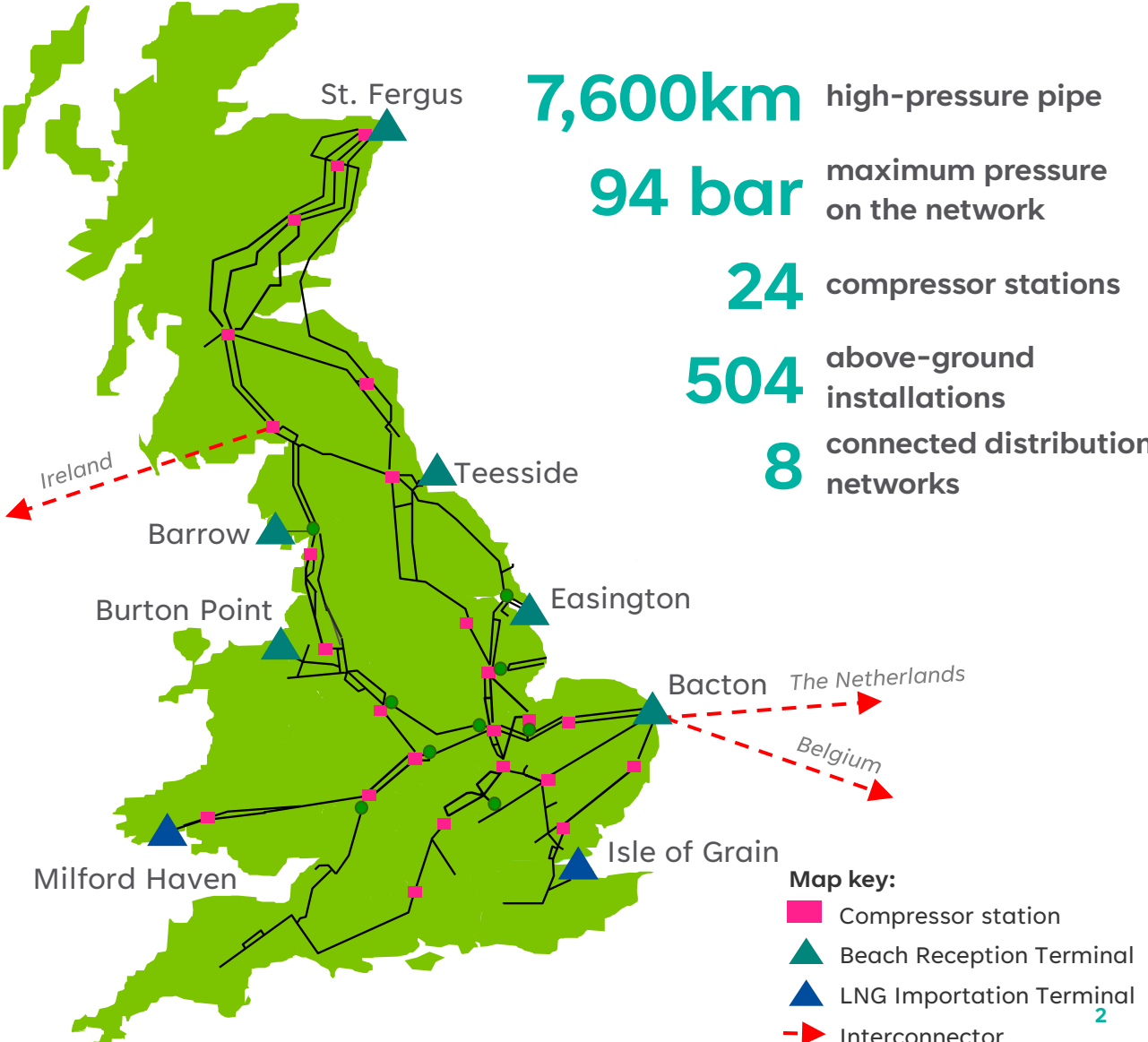


85%
households using
gas for heat



881 TWh
of energy is
delivered by NTS

UK gas demand:





Greening Natural Gas

Renewable Bio-gas or synthetic fuels for hard to electrify options could be used in the transition



CCUS

Alongside the use of Natural Gas and its derivatives this could enable us to be Net Zero



Continued Use of Natural Gas

Some users in the UK are hard to electrify, natural gas with carbon capture could support



Hydrogen

Green and Blue hydrogen along with Pink, Yellow etc... will have a role in the future decarbonisation



Electrification

Power generation using gas (natural gas or hydrogen) is required to fill the gap when renewables are not available

Net Zero Opportunities for the NTS

Pathways to Net Zero are expected to require a combination of approaches and technologies



**Large Scale
Equipment
on the National
Transmission
System**

**such as
Compressor units**

The Problem

Enter your subhead line here



Digital Construction



Timescale of Validation



Automation & Cyber Security

Limited simulation of Commissioning

Today we use our Building Information Models (BIM) to support construction. This however cannot extend to commissioning the equipment on sites or the digital communication elements. We are looking for a solution that will focus on the digital commissioning elements but also support the wider asset commission.

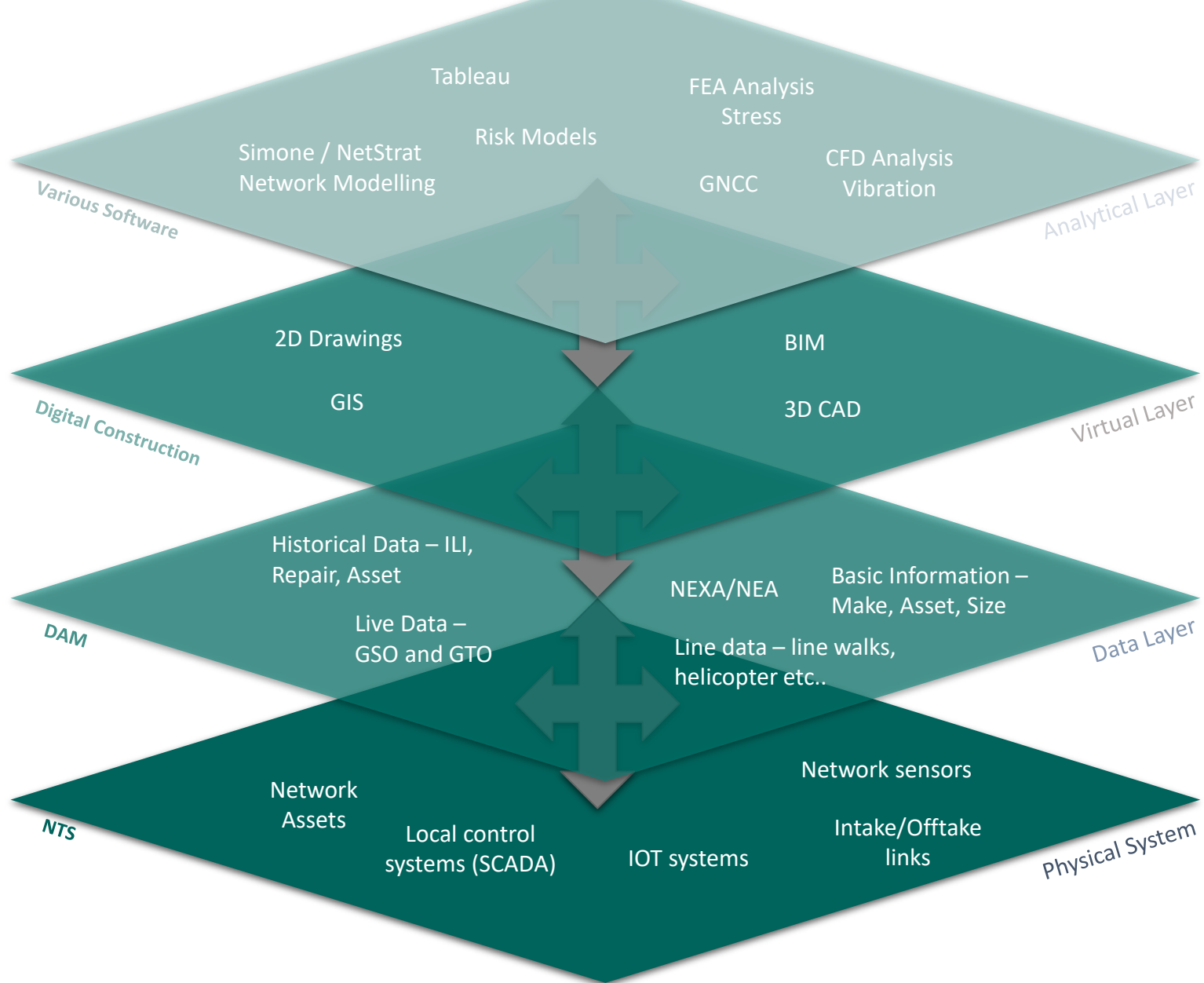
Safety, Quality and Functionality

During design and validation studies for future net-zero transition infrastructure projects, a significant amount of time is spent on completing multiple investigations both desktop studies and physical tests to understand large scale equipment safety, quality assessments and functionality of the system. This adds significant cost and duplication of effort. e.g. compressor design and upgrades.

OT & IT Capability

The UK energy and utility networks heavily rely on automation to operate their networks safely and securely to deliver essential services to the consumer. The resilience of the energy systems, that all industrial customers and consumers rely upon depends on robustly designed, operated, and secured automation systems. These systems have been installed over several decades and need modernisations to enable secure operation.

National Gas Digital Twin



The Digital Twin enables movement of data across all layers whilst providing an interface that can provide contextual direction to key datasets

Analytical Layer

This layer consists of network modelling, Stress analysis and vibration monitoring alongside ML/AI data analytics which are fed into the digital twin to provide insights into the network system.

Virtual Layer

National Gas utilise BIM models and 2D drawings in construction and engineering applications, alongside this a GIS system has been developed. The virtual models have limited data sets associated and a consideration for the digital twin is in enabling access to key datasets through these visual models.

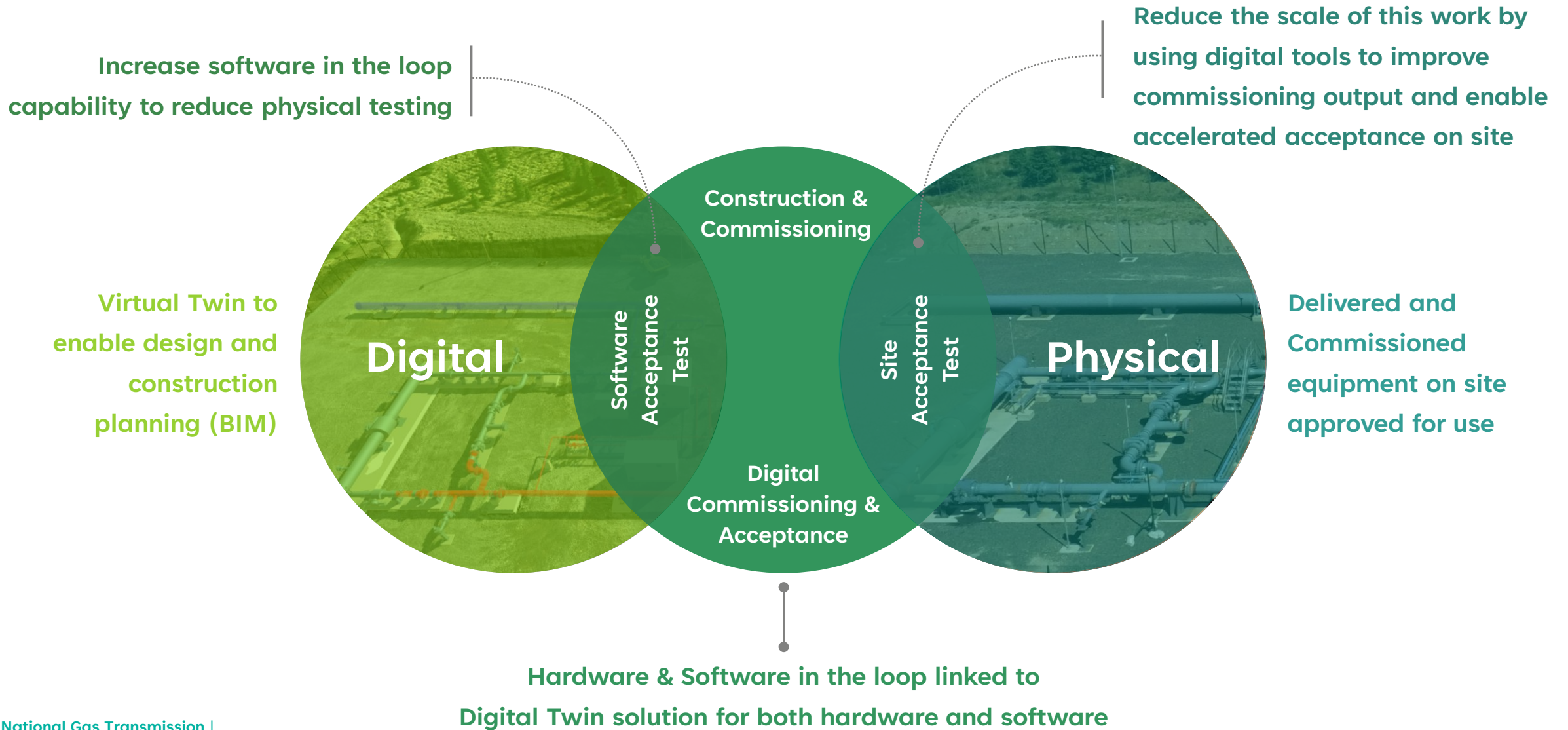
Data Layer

National Gas utilise an azure cloud based data lake to store their network information, data is currently being collated from across the business into this system to ensure a consistent approach.

Physical System

These are our assets, equipment and people. These exist today but may be bolstered by additional sensing and IOT equipment required to manage the network of the future.

The Required Solution



Thank you



**national gas
transmission**

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