



**NATIONAL  
DIGITAL TWIN  
PROGRAMME**



HM Government

# National Digital Twin Programme



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## Introduction to National Digital Twin Programme (NDTP)

A key purpose of the NDTP is to develop the standards, frameworks, guidelines, methodologies, and tools that will be critical for building the foundation of a functioning market in digital twins and creating a springboard for growth.

# Introduction to National Digital Twin Programme (NDTP)

## Delivery principles

### The Programme will:

- 1 Deliver value demonstrated through measurable, tangible benefit
- 2 Develop and promote open, reusable assets, released incrementally
- 3 Promote a culture of honesty and transparency
- 4 Prioritise accessibility and inclusivity
- 5 Bridge the digital skills and cultural gap
- 6 Establish the rules of the road
- 7 Establish strategic ownership and governance

# Introduction to National Digital Twin Programme (NDTP)

Development attributes

## Digital twins, individually and when connected, must be

- 1 Safe
- 2 Secure
- 3 Trustworthy [ Transparency | Accessibility | Control ]
- 4 Ethical [ Individual rights | Privacy | Non-discrimination | Non-manipulation ]
- 5 Sustainable [ Economically | Socially | Environmentally ]
- 6 Adaptable [ Robust | Resilient | Extendable | Extant ]
- 7 Interoperable

# Introduction to National Digital Twin Programme (NDTP)

Four focus areas

## Operating frameworks

Legal Sustainability Ethics

Technical Safety Security

Commercial Governance

Delivery principles

Development attributes

X-Government alignment

## Data and technology

Integration architecture

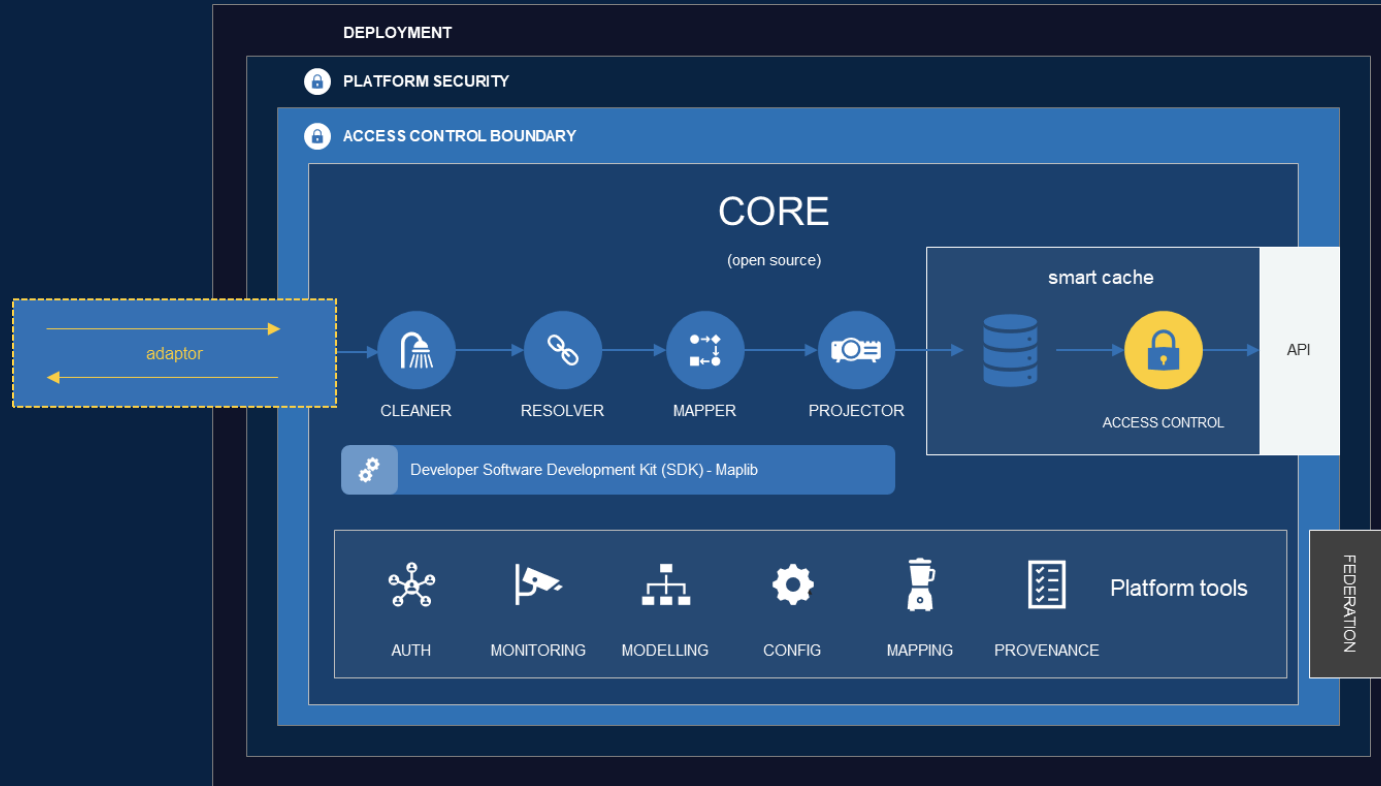
Ontology Data visualisation

Data sources, quality,  
interoperability

Model interoperability

Open source repository

# The Integration Architecture



# Introduction to National Digital Twin Programme (NDTP)

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Ontology   Data visualisation

Data sources, quality, interoperability

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## Skills, culture and engagement

Skills gap – current & next gen

Communication and outreach

Stakeholder engagement

## Demonstrator programme

Retrofitting in housing

Energy system

Asset resilience, emergency planning and response

Vulnerable people

# Introduction to National Digital Twin Programme (NDTP)

Joining up thinking and driving alignment through collaboration with national stakeholders

## Operating frameworks

- Legal
- Sustainability
- Ethics
- Technical
- Safety
- Security
- Commercial
- Governance
- Delivery principles
- Development attributes
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## Data and technology

- Integration architecture
- Ontology
- Data visualisation
- Data sources, quality, interoperability
- Model interoperability
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## Skills, culture and engagement

- Skills gap – current & next gen
- Communication and outreach
- Stakeholder engagement

## Demonstrator programme

- Retrofitting in housing
- Energy system
- Asset resilience, emergency planning and response
- Vulnerable people



Department for Transport

Department for Transport



Department for Energy Security & Net Zero

Department for Energy Security & Net Zero



Department for Science, Innovation & Technology

Department for Science, Innovation & Technology



Strategic Command

Ministry of Defence  
Defence Intelligence



Ministry of Defence  
The Royal Engineers



Ministry of Defence  
Royal Air Force



Defence Science and Technology Laboratory



Home Office

Home Office



Infrastructure and Projects Authority

Infrastructure and Projects Authority



UK Research and Innovation

Innovate UK



Global Centre of Rail Excellence



National Grid ESO



Ofgem



NATO



Met Office

Meteorological Office



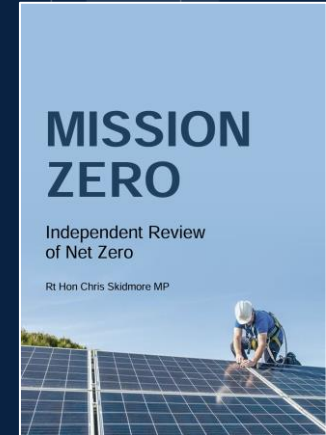
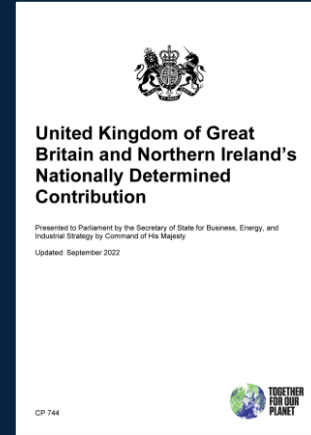
Engineering and Physical Sciences Research Council

Engineering and Physical Sciences Research Council



# Demonstrator programme

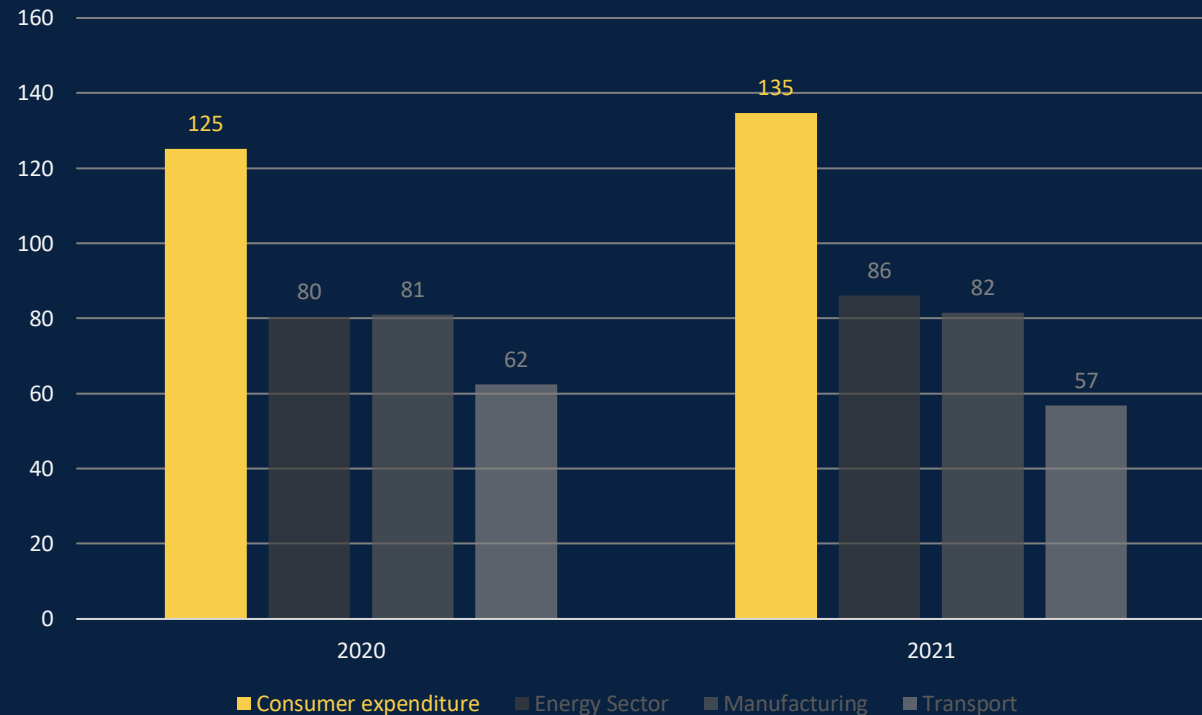
Net Zero – the scale of the challenge



## Demonstrator programme

Net Zero – the scale of the challenge

Metric tonnes of carbon dioxide equivalent ('000)



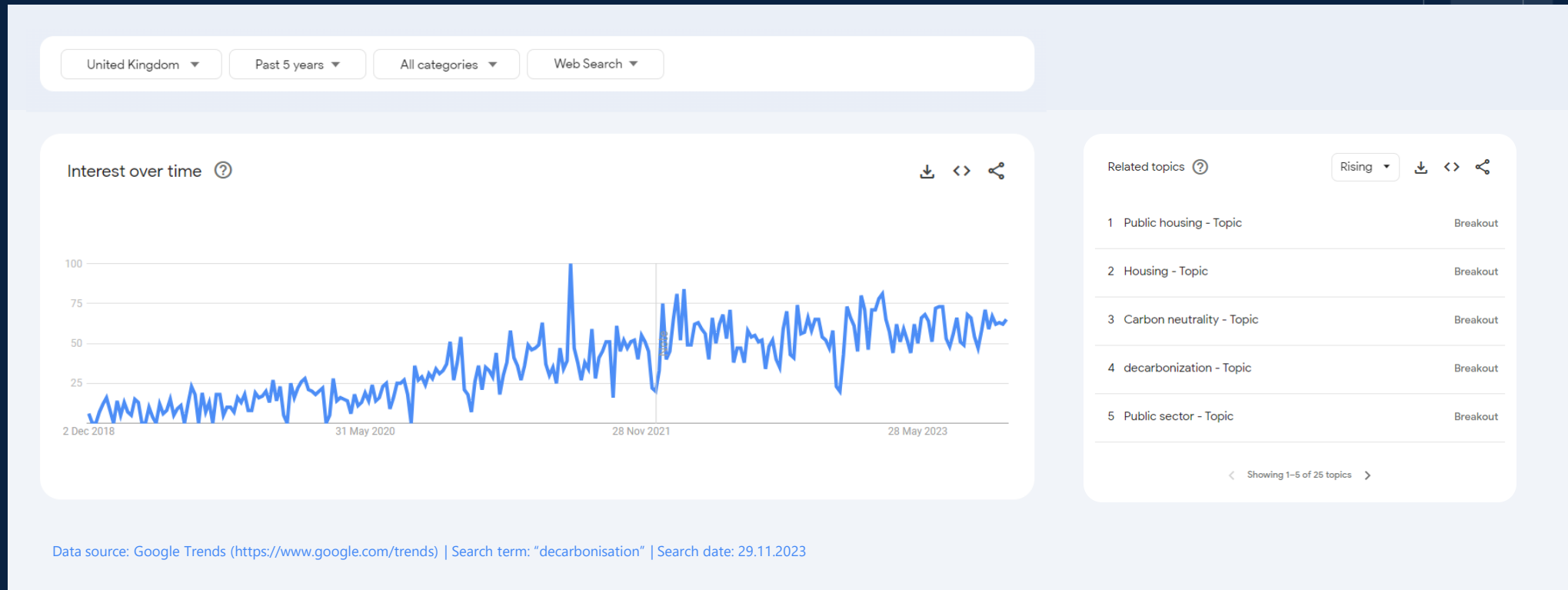
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*Emissions from households, accounted for through consumer expenditure, are the largest single contributor to UK emissions.*

ONS, 2023

# Demonstrator programme

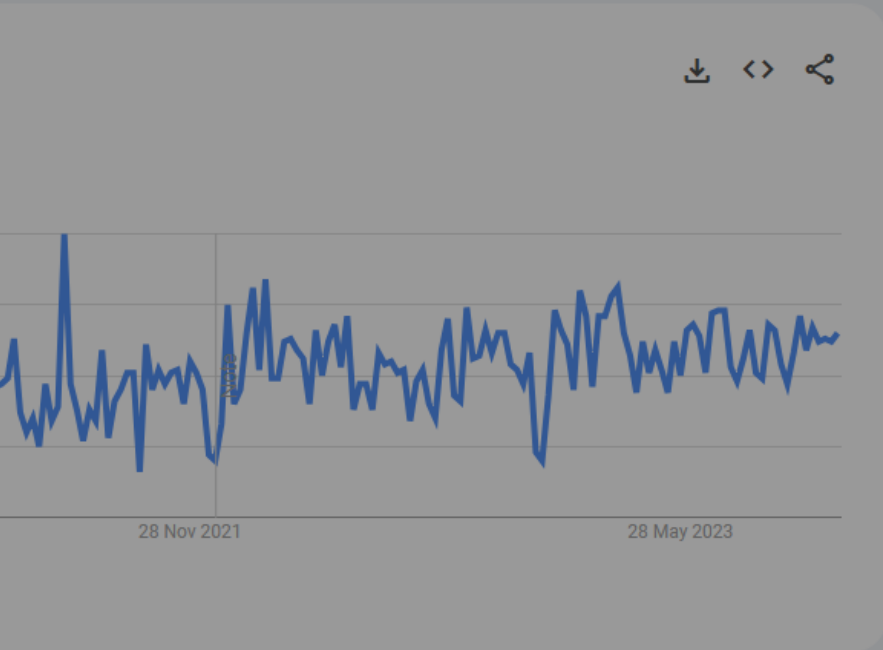
Net Zero – the scale of the challenge



# Demonstrator programme

Net Zero – the scale of the challenge

Web Search ▾



Related topics ? Rising ▾

1	Public housing - Topic	Breakout
2	Housing - Topic	Breakout
3	Carbon neutrality - Topic	Breakout
4	decarbonization - Topic	Breakout
5	Public sector - Topic	Breakout

< Showing 1–5 of 25 topics >

ate: 29.11.2023

## Demonstrator programme

Retrofitting in housing – development so far



### Use Case Development Playbook

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- Stakeholder analysis
- Opportunity identification
- Benefits realisation
- Capturing MVP



### Data Discovery Playbook

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- Key processes and roles
- Data zoning & quality
- IAR creation
- Sustainability and ethics



### Demonstrator (Minimum Viable Product)

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- 3D visualisation
- Static data set

## Demonstrator programme

Retrofitting in housing – development so far



### Data pipeline and data cleansers

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- Data quality
- Data cleansing
- Fuzzy match algorithm



### Ontology extensions

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- Modelling energy performance of residential properties
- Generalised pattern for other similar use cases



### What does this all look like?

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- ....?

# Demonstrator programme

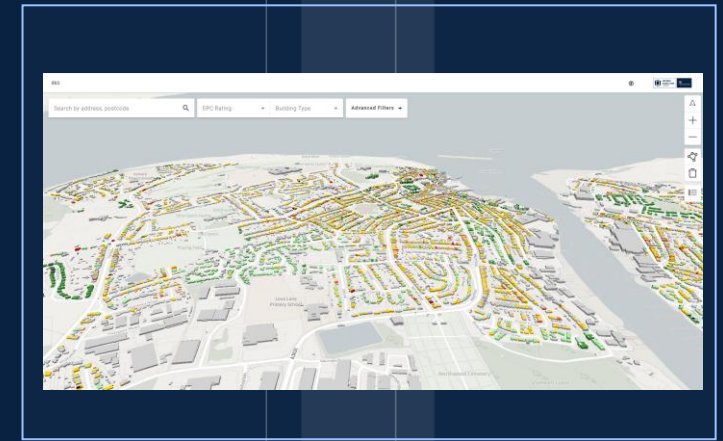
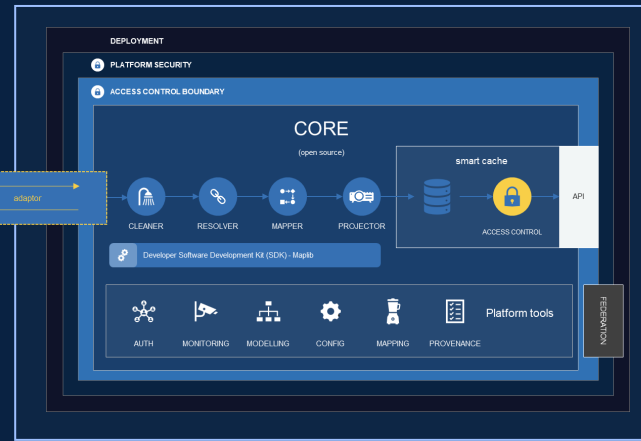
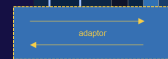
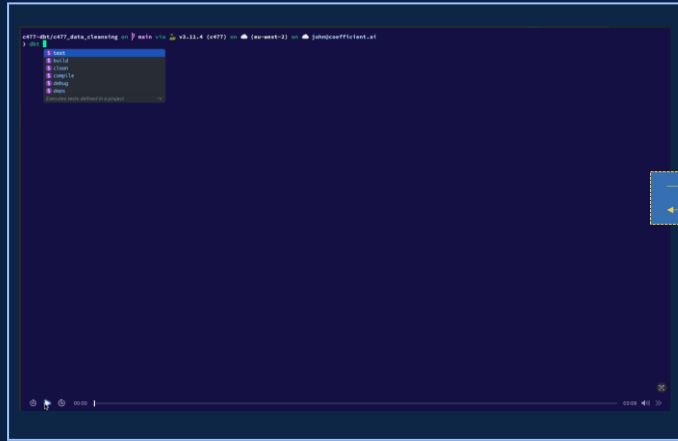
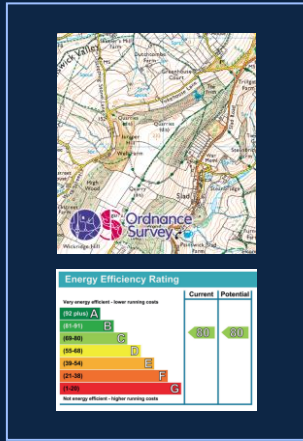
Retrofitting in housing – end-to-end Pilot solution (IRIS)

Data Sources

Data cleansing

Integration architecture

Visualisation



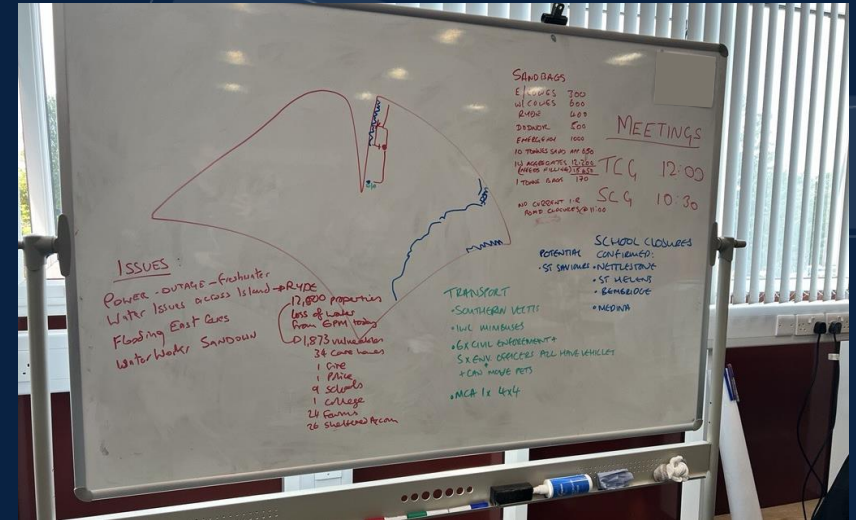


# Demonstrator programme

Asset resilience - LiveX | Isle of Wight | 3 October 2023



On the Wight, 2023



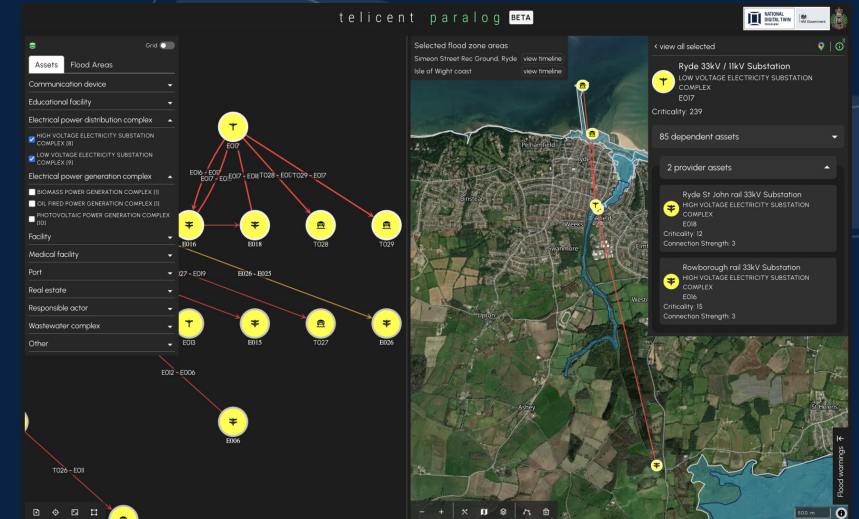






# Demonstrator programme

Asset resilience – Paralog



# Demonstrator programme

## Asset resilience – Paralog

The screenshot displays the 'telicent paralog BETA' interface. On the left, a sidebar lists various asset categories such as 'Communication device', 'Educational facility', and 'Electrical power distribution complex'. A central network diagram shows interconnected nodes representing assets, with labels like E017, E016, E018, T028, T029, E015, T027, E026, E006, and T026 - E011. On the right, a map shows a coastal area with flood zones highlighted in blue. A detailed panel for the 'Ryde 33kV / 11kV Substation' (E017) is visible, showing its criticality (239) and 85 dependent assets. Other substation assets listed include 'Ryde St John rail 33kV Substation' (E018) and 'Rowborough rail 33kV Substation' (E016). The interface also includes a 'Grid' toggle, a 'Flood Areas' filter, and a 'Flood warnings' indicator.



## Demonstrator programme

Asset resilience



# Q&A

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