



CREDO+

Extension to new climate risks

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CReDo (Climate Resilience Demonstrator)

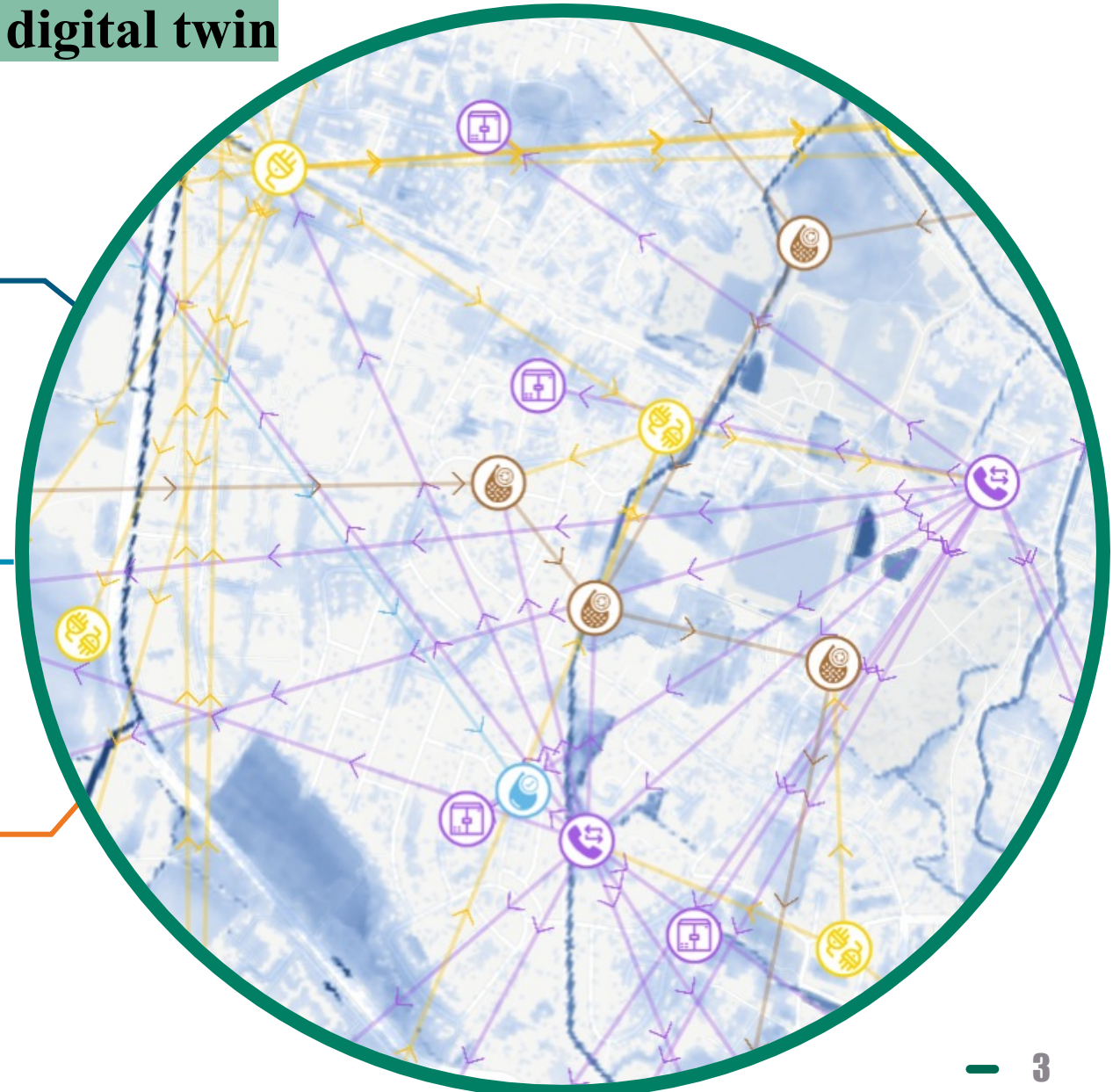


CreDo is a climate change adaptation digital twin

Connect across sectors to understand infrastructure interdependencies. Adapt to increasingly extreme weather events from climate change.

Model asset failures and how they cascade through the network. Decision intelligence to better prepare, respond & improve system resilience.

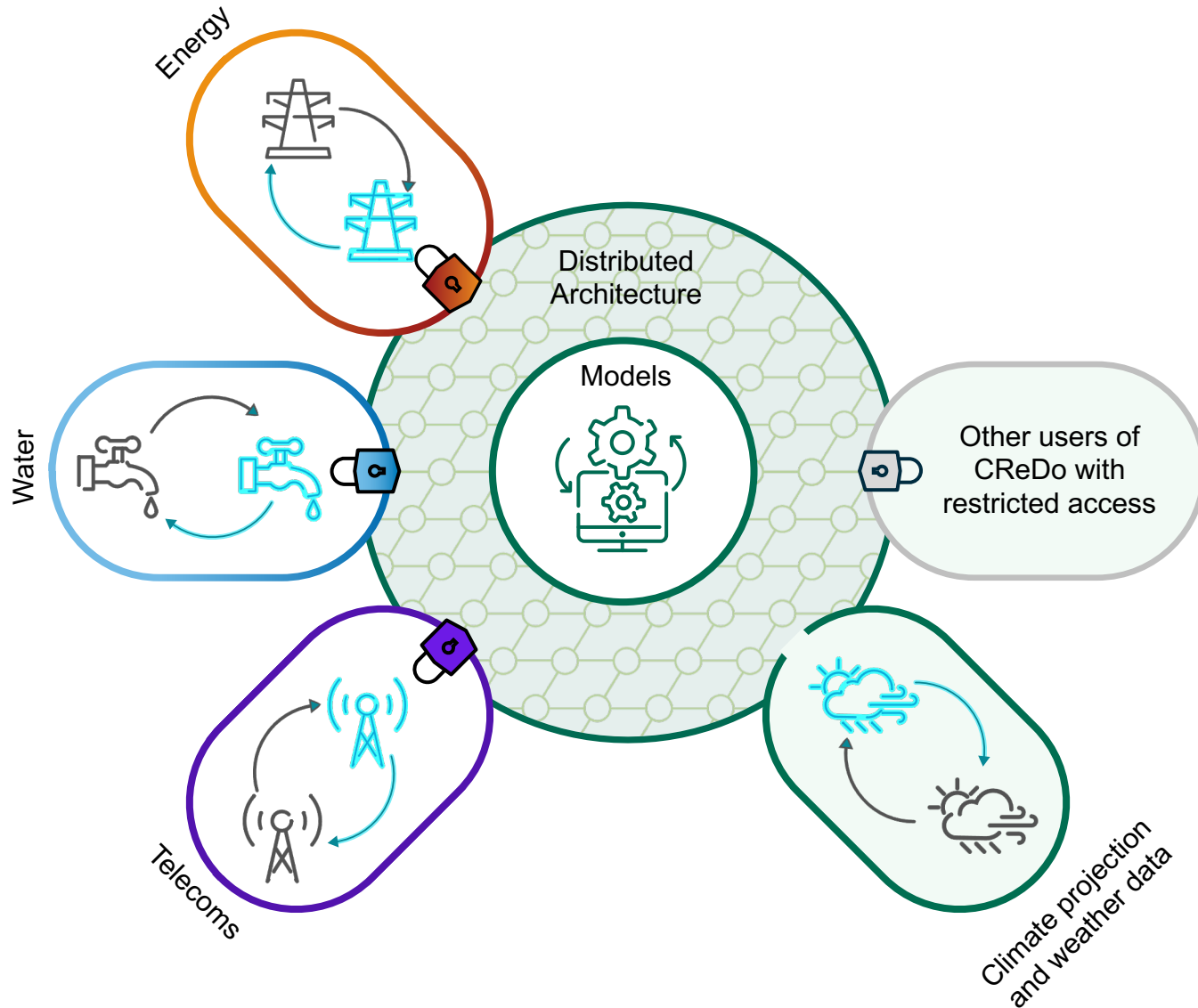
Data sharing architecture to ensure scalable approach across all sectors whilst maintaining security and data confidentiality.



THE GOAL: SCALE



Distributed data architecture and extensible knowledge graph technology





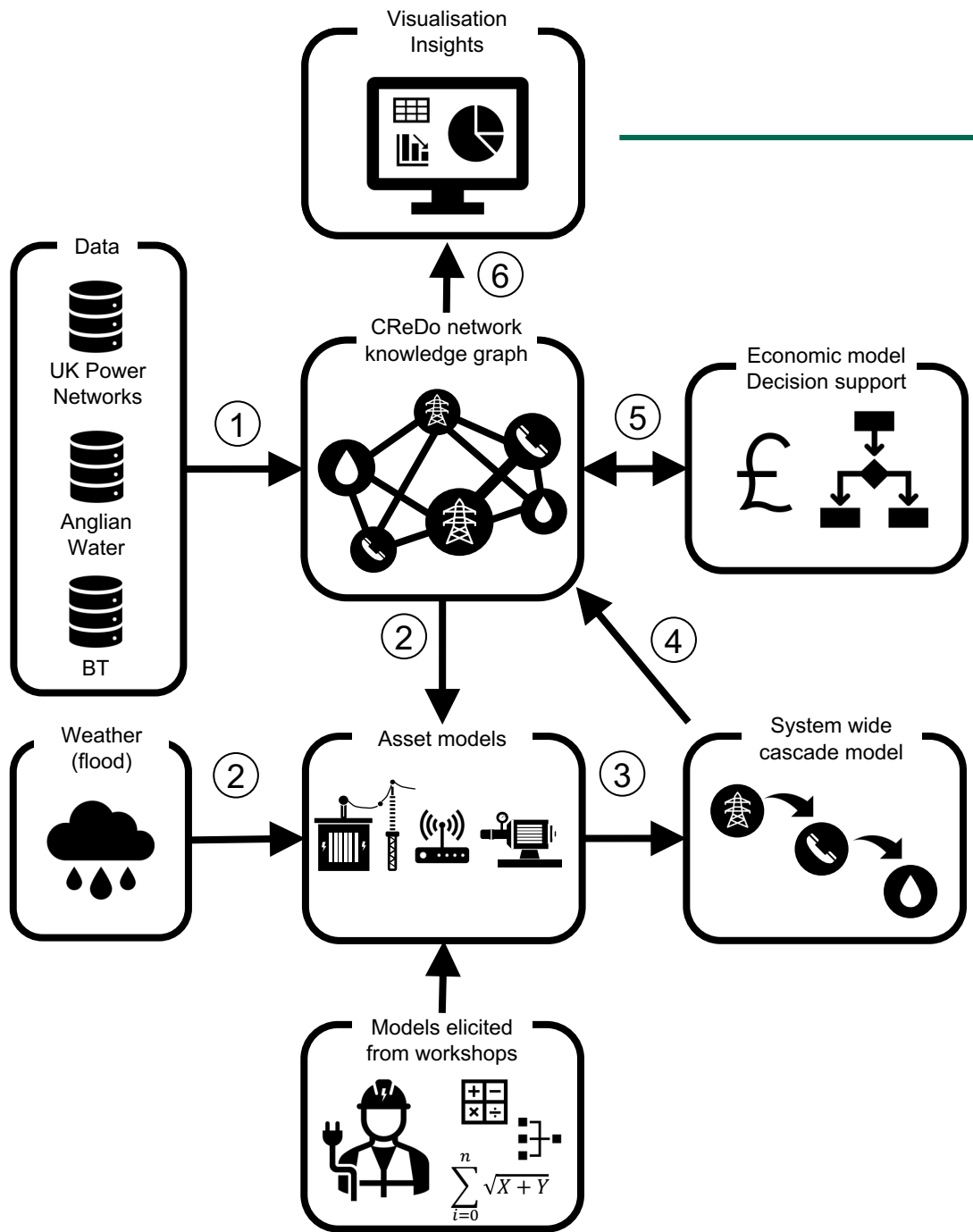
CReDo+ GOAL

Scale CReDo technology across the energy sector to:

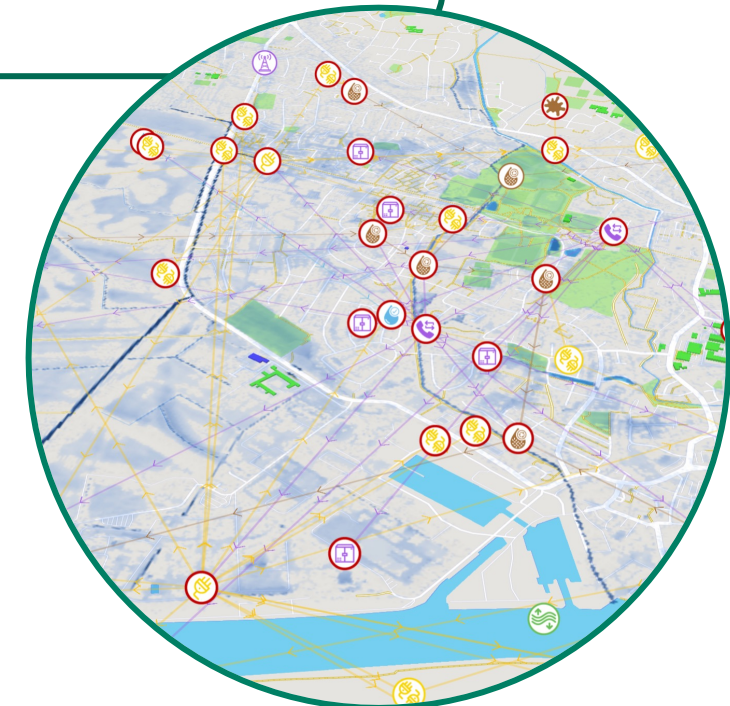
- understand interdependencies and cascading risk.
- adapt to the changing climate.
- improve overall system resilience and robustness.

CReDo

Workflow

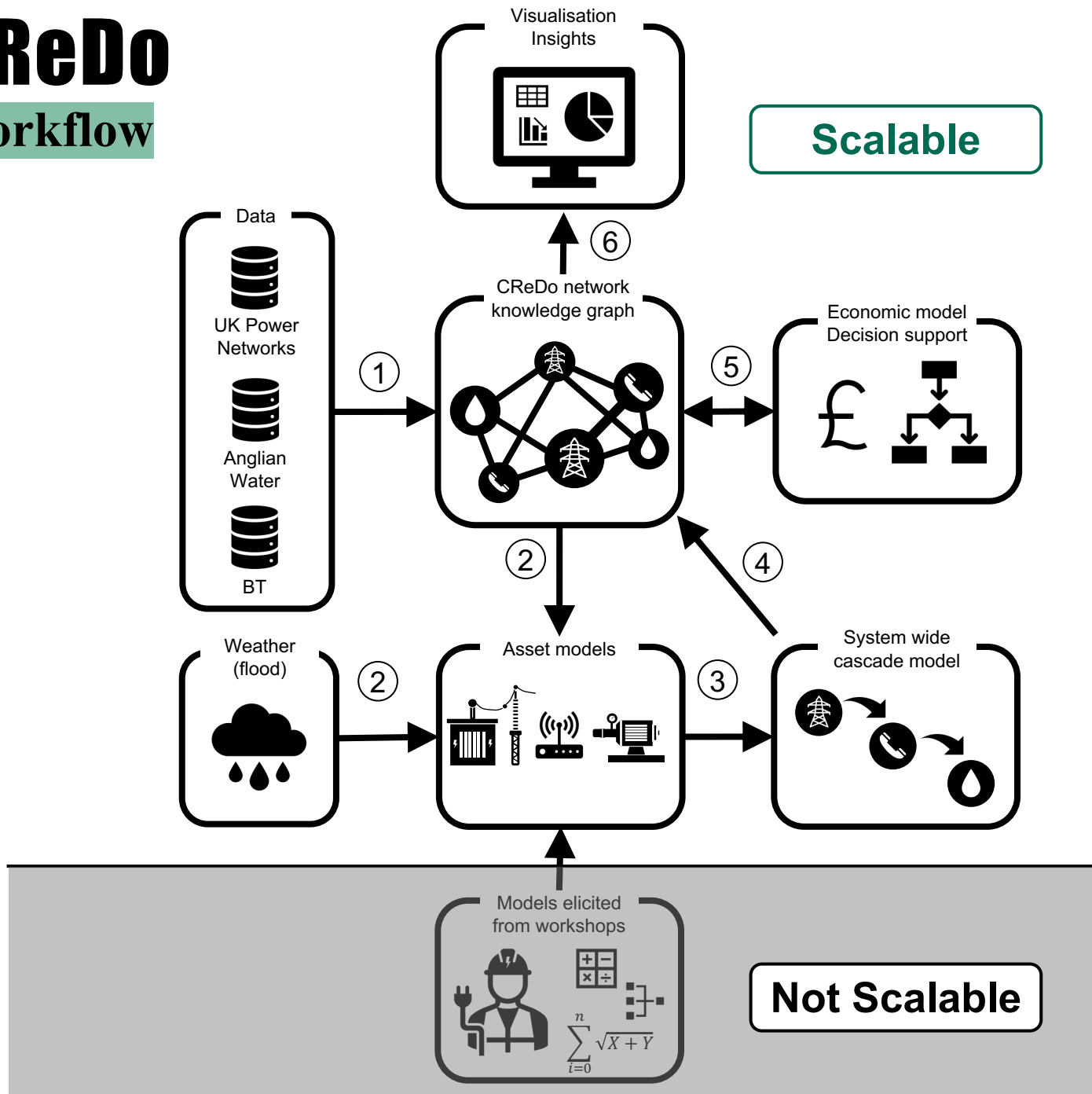


- Asset connected criticality and likely failures.
- Potential costs of weather events to system, operators and society.
- Decision support for cost effective investment in adaptation and mitigation.



CReDo

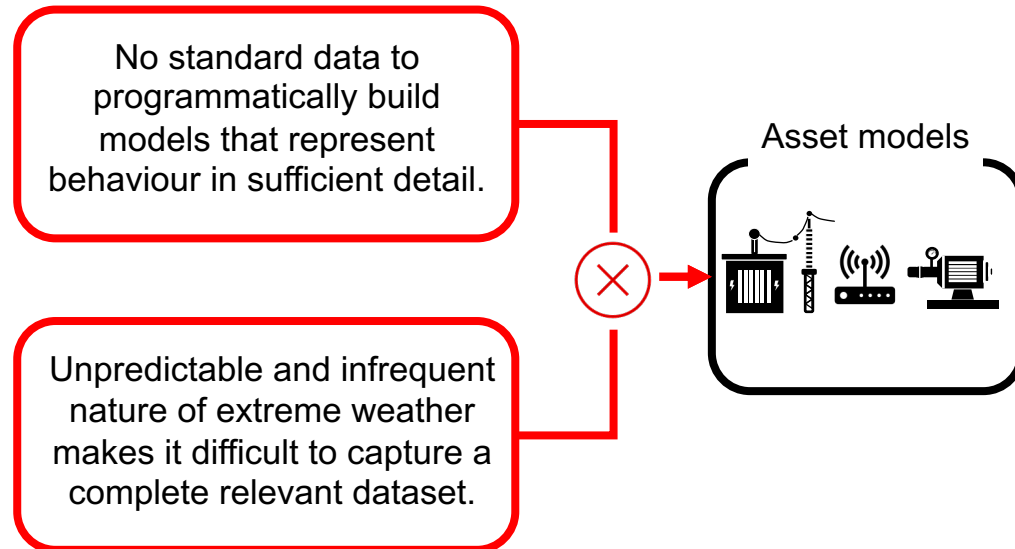
Workflow



ASSET MODELS



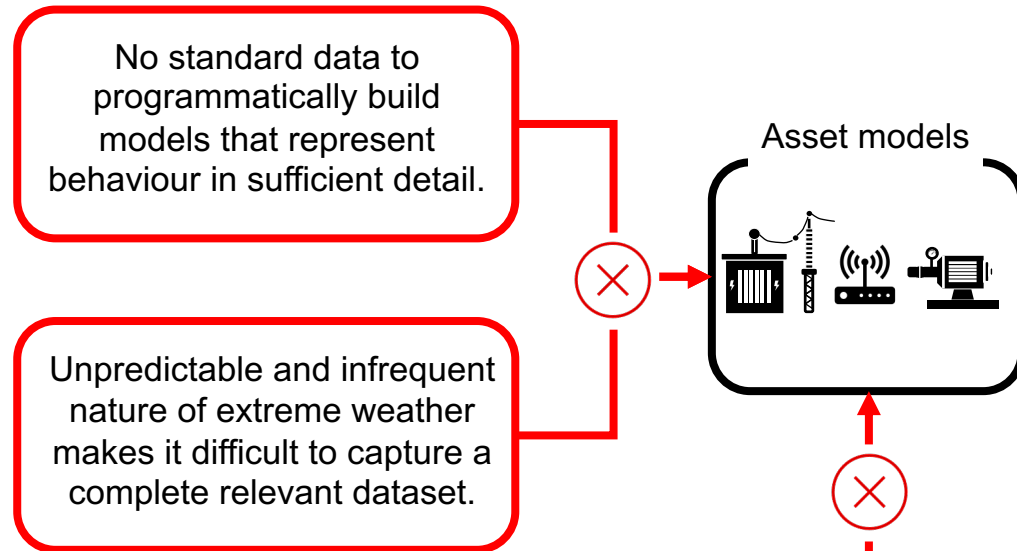
Why model in this way? Why do you need elicitation from workshops?



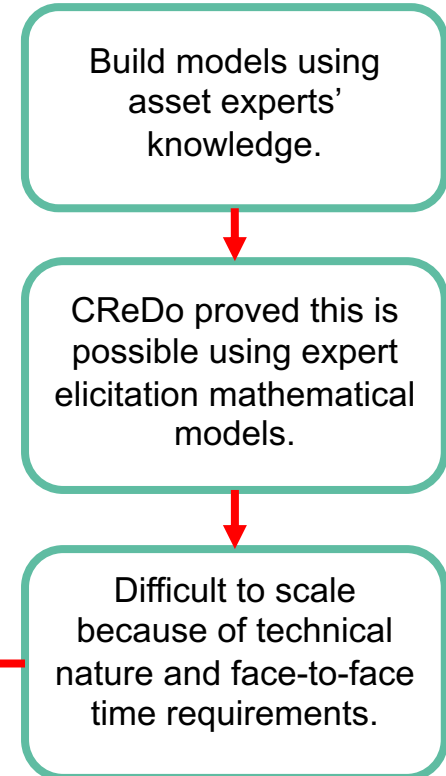
ASSET MODELS



Why is the approach not scalable?



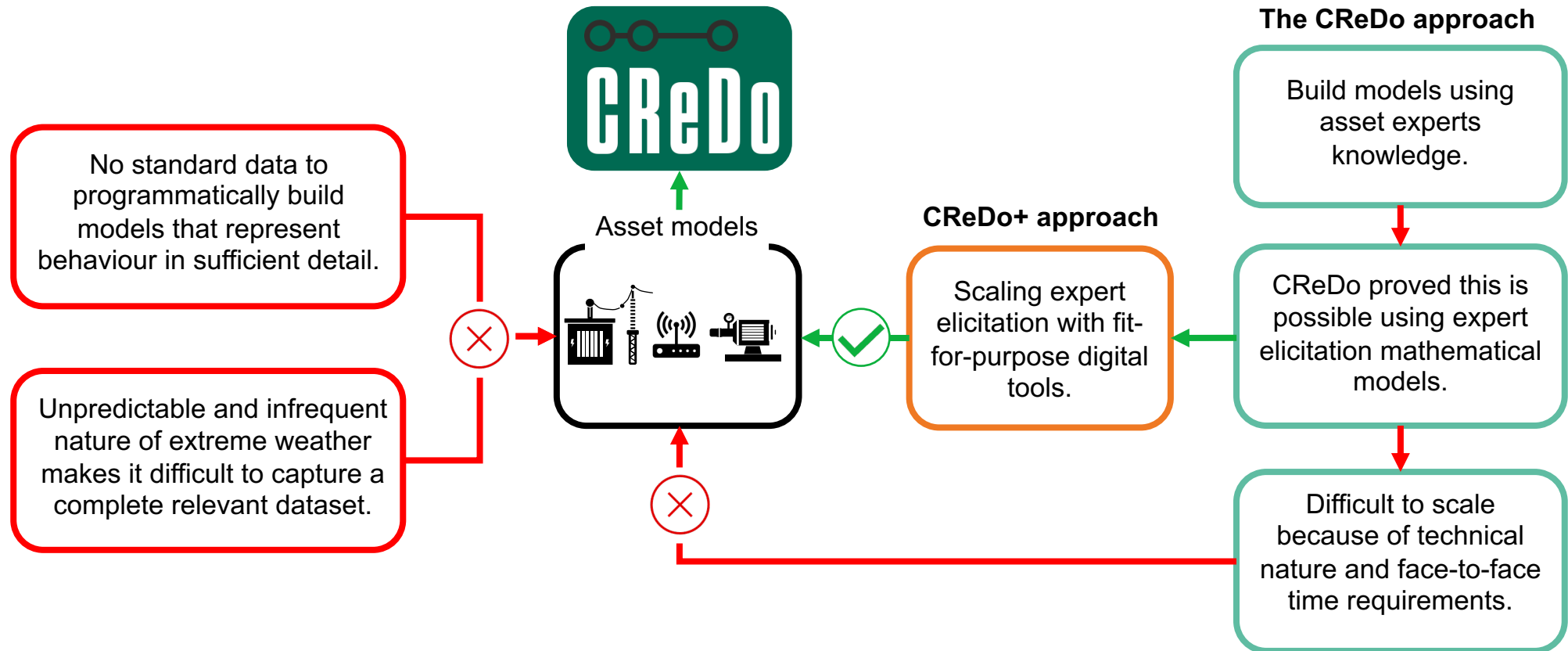
The CReDo approach



ASSET MODELS

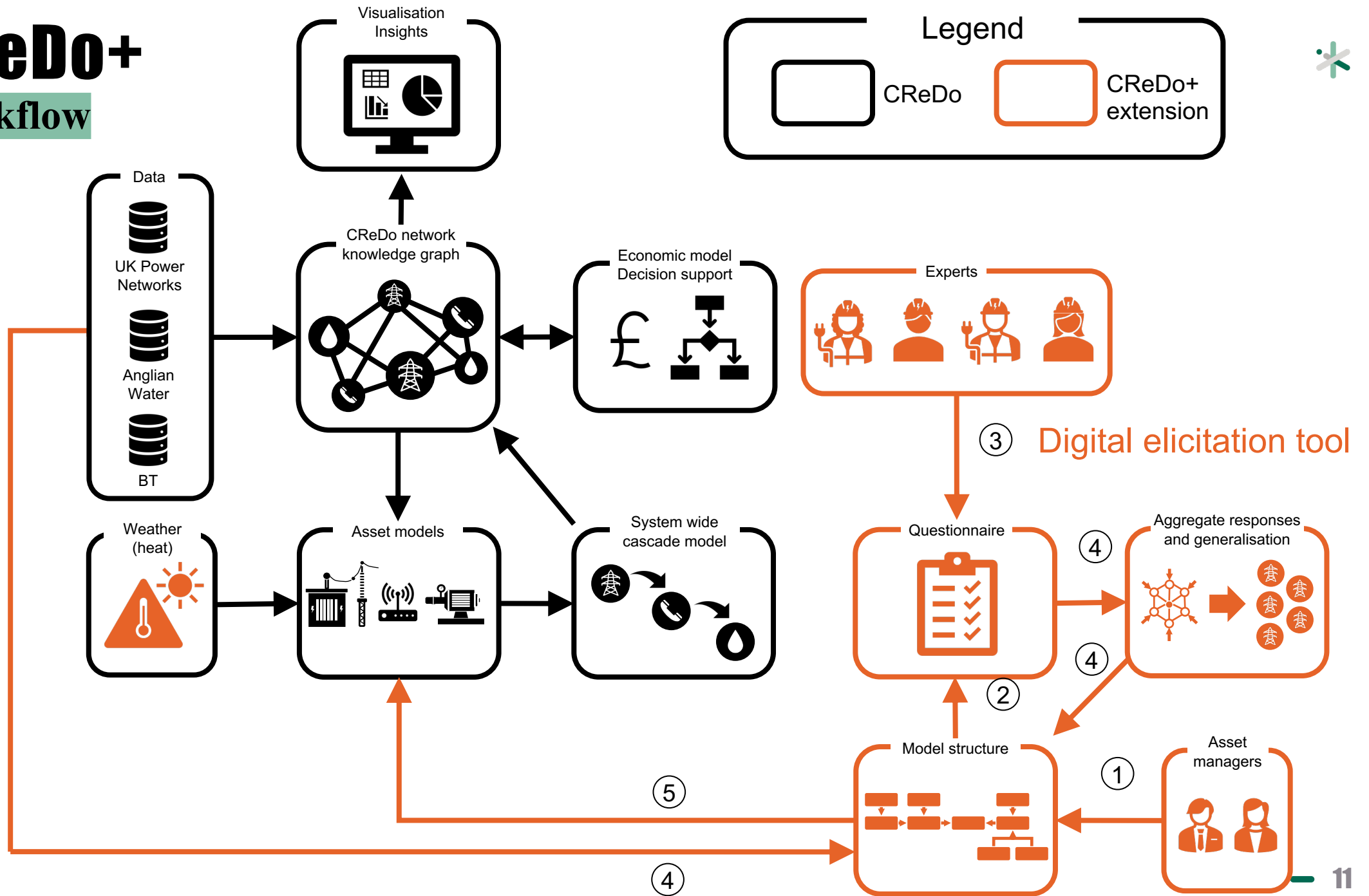


CReDo+ will make model building scalable, enabling CReDo technology to scale



CReDo+

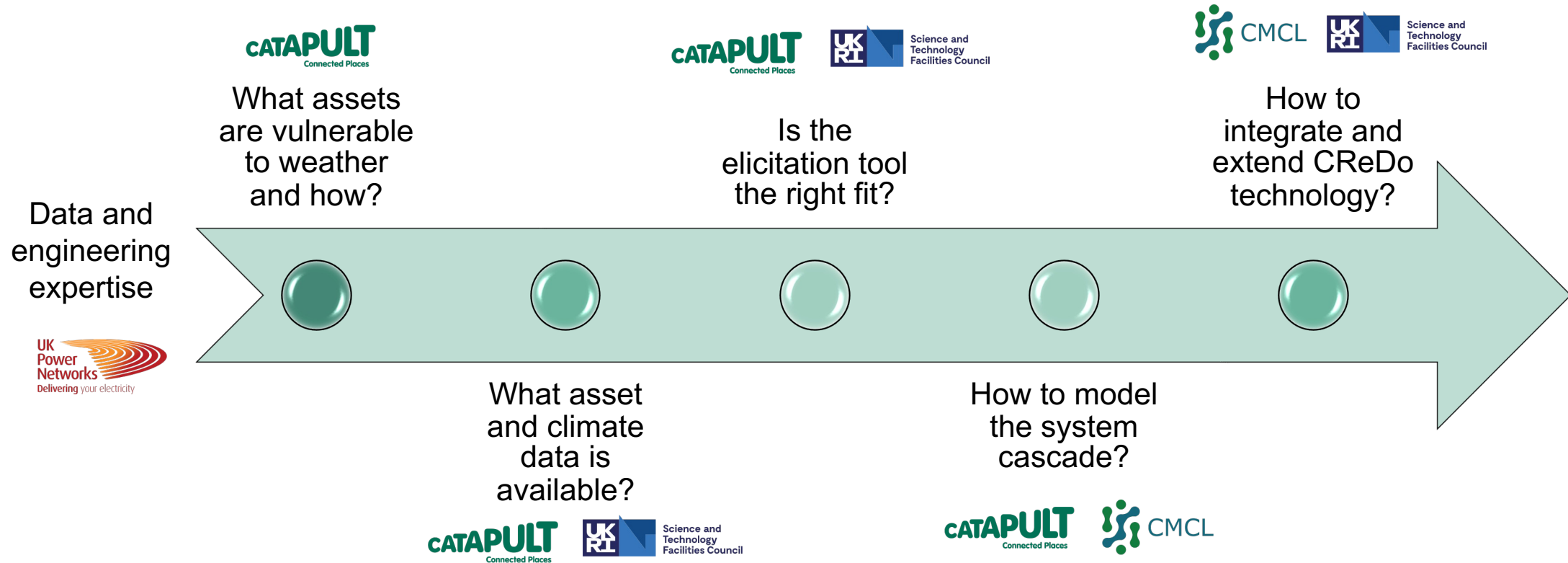
Workflow





DISCOVERY PHASE KEY QUESTIONS

Agile feasibility study preparing for Alpha prototyping and demonstration

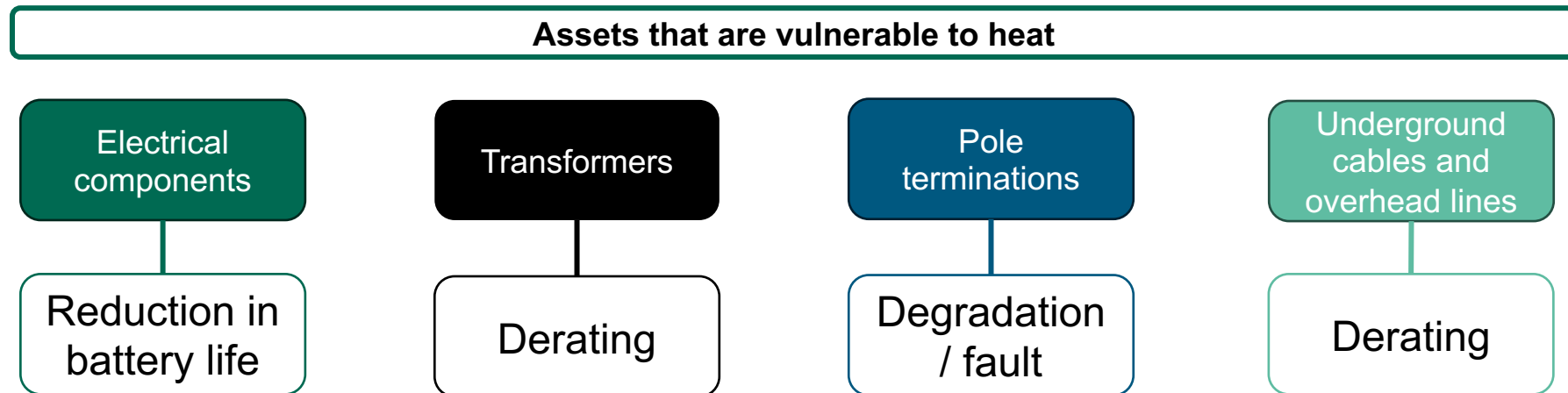


Ways of working: 2-week sprints, bi-weekly stand-ups, single collaborative MS (Microsoft) SharePoint.

ASSET VULNERABILITY TO HEAT



Early workshops with asset managers prioritised extreme heat as an emerging risk that is poorly understood and in need of innovation

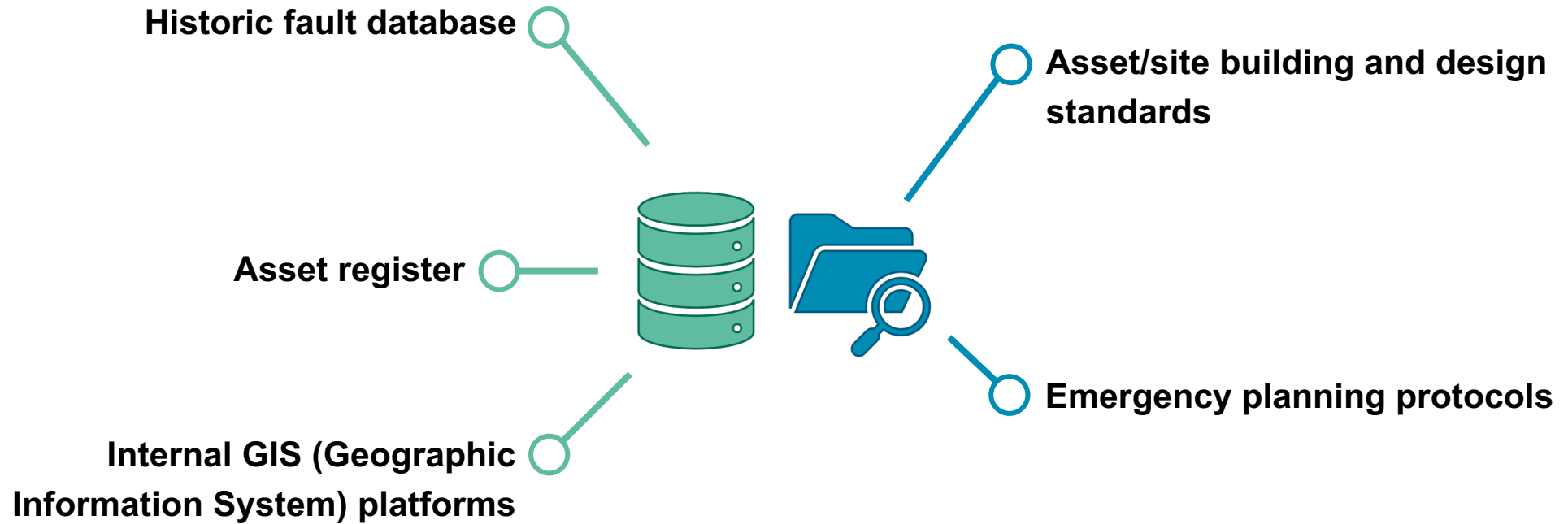


- The modelling principles are different to flooding, so will be a good test of the extensibility of the CReDo technology.
- The elicitation tool will provide a collaborative framework to extend and enrich this early understanding.



DATA MAPPING

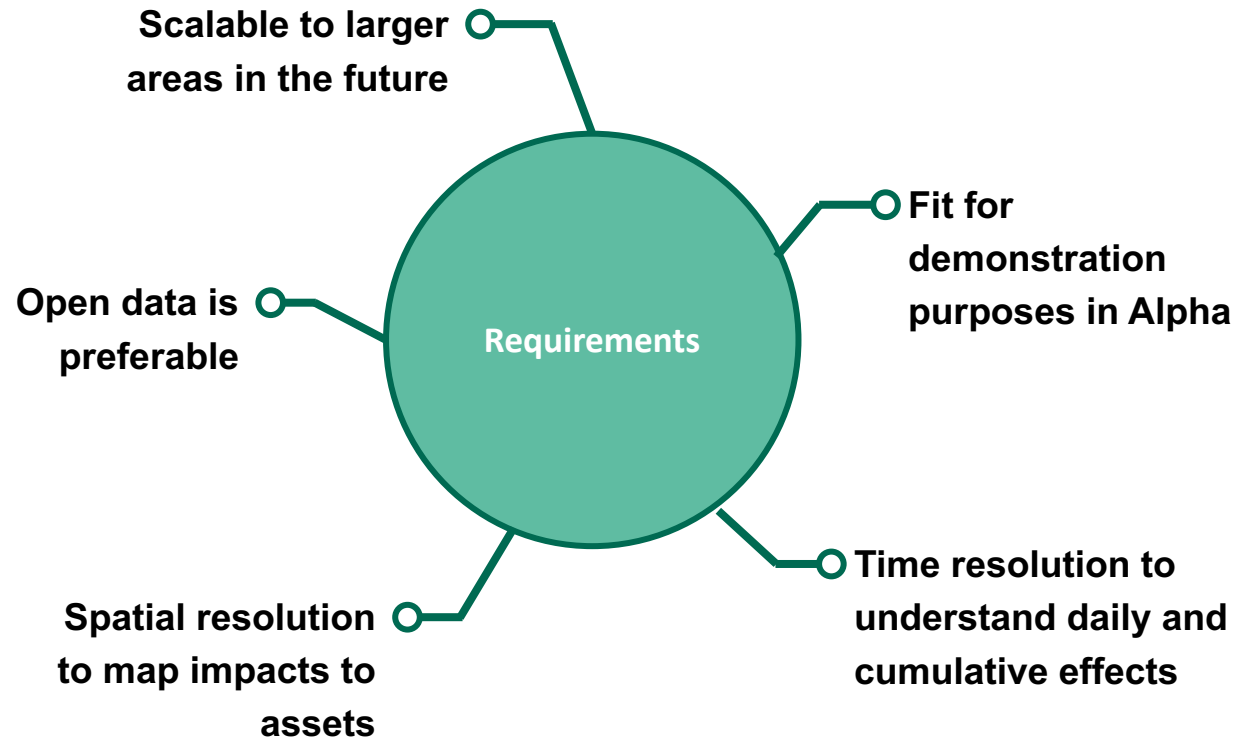
Network operator data holdings





DATA MAPPING

Climate and weather data, models and experts



Short-term

UKCP18 (UK Climate Projections) datasets (Local and Regional)

They cover most of our basic needs to enable short-term development of CReDo+

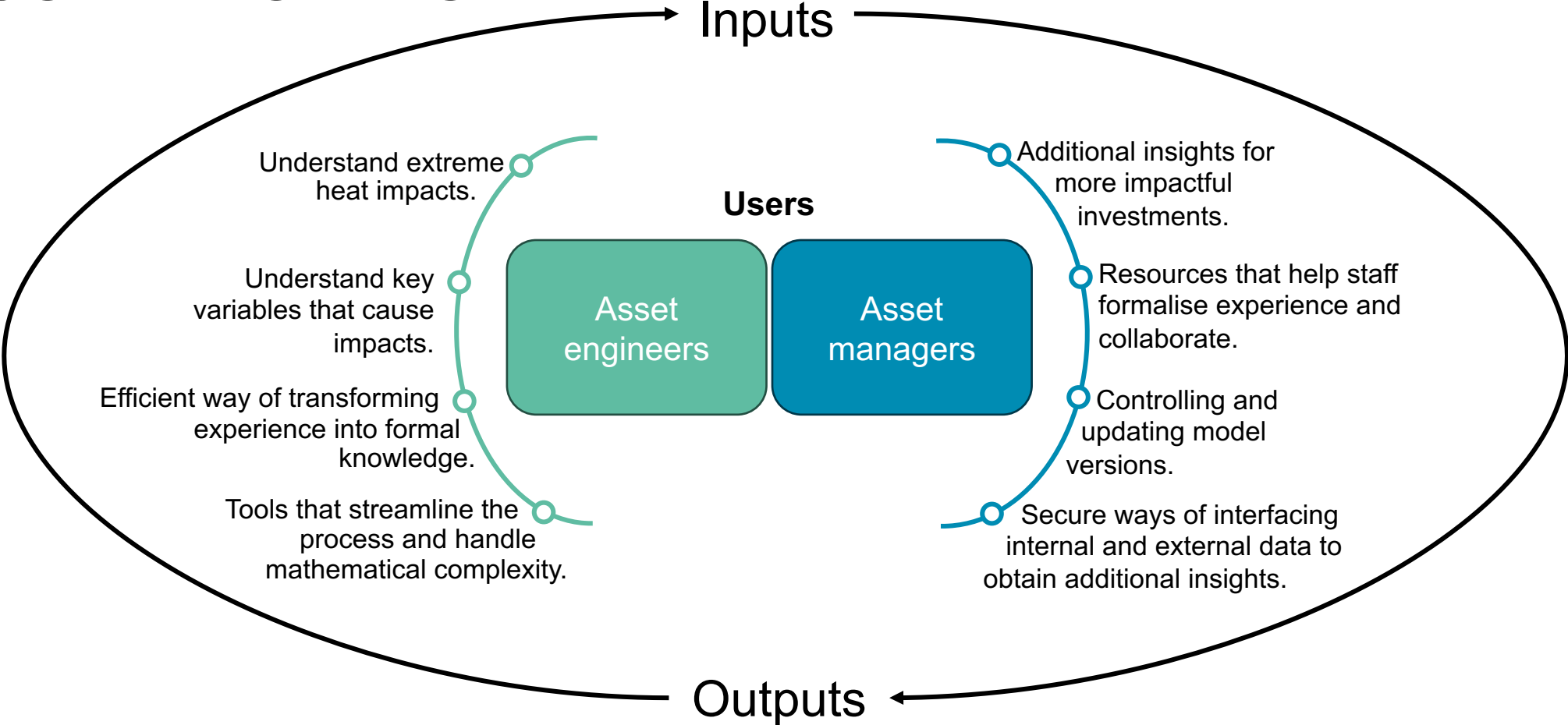
Longer-term

We will investigate how to overcome the limitations of UKCP and who we need to engage with.

Met Office, Centre for Environmental Data Analysis, DNV (Det Norske Veritas group), Centre for Ecology and Hydrology and Academia.



USER RESEARCH



Outputs would play a role in further internal insight generation and as part of CReDo, bringing value to a wider group of stakeholders and decision makers.

Asset Strategy, Management and Maintenance Teams	Information and Data Solutions Team	Analytics Team	Emergency Planning Team
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USER REQUIREMENTS

All this information has been consolidated into a number of basic design principles and a visual representation of our concept.

User friendly

No-code or low code

Model building and publication management

Integrated with CReDo, but also valuable as a stand-alone solution

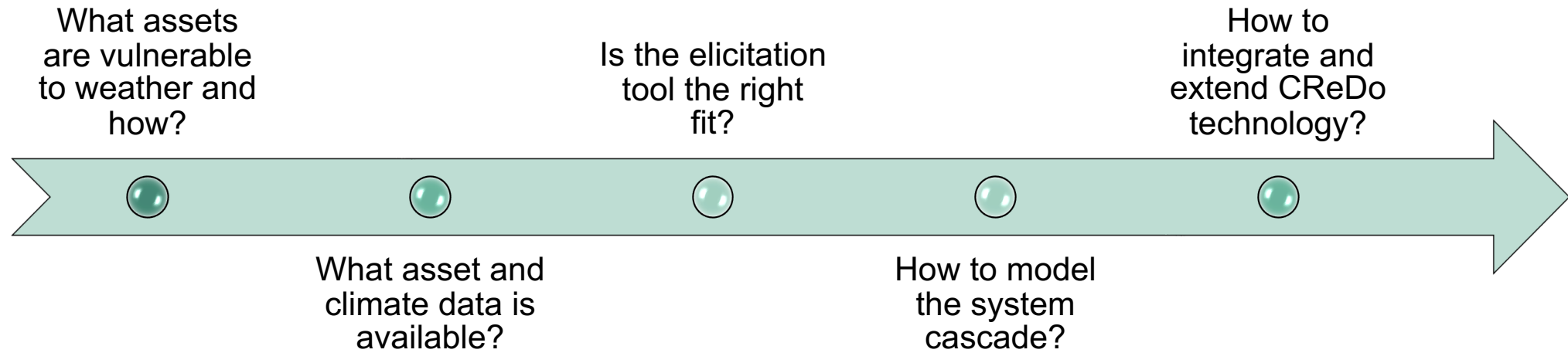
The image shows two screenshots of a software interface. The top screenshot is titled "Climate (flooding) – Model builder – Questionnaire". It displays a flowchart with nodes: "Extreme weather", "Flood depth", "Extra protection", "Asset wetness", "Fault – stop operation", "Incoming power", "Back-up generation", and "Network reconfiguration". A pop-up window titled "Asset Wetness - Question" is open, asking for the probability of asset failure. The interface includes navigation buttons like "Add context scenario", "Previous", and "Next", and a "Logged in as 'user 1'" indicator.

The bottom screenshot is titled "Model questionnaire – Questionnaire (1/10)". It shows a text input area with a scenario description: "Assuming the asset only has its standards structural characteristics to prevent flooding (i.e. building's door threshold). What is your probability that in the scenario: 'the water reaches the electrical components of the asset'". Below this, there are fields for "Probability" and "Rationale". The interface also includes "Additional resources" like "Site layout plan", "Site photos", "3D site construction", and "Flood visual aid", along with a "Go to event context" button and a "Logged in as 'user 1'" indicator.





EVOLUTION OF OUR THINKING



Asset data

Climate data

Asset and system models

Insights platform

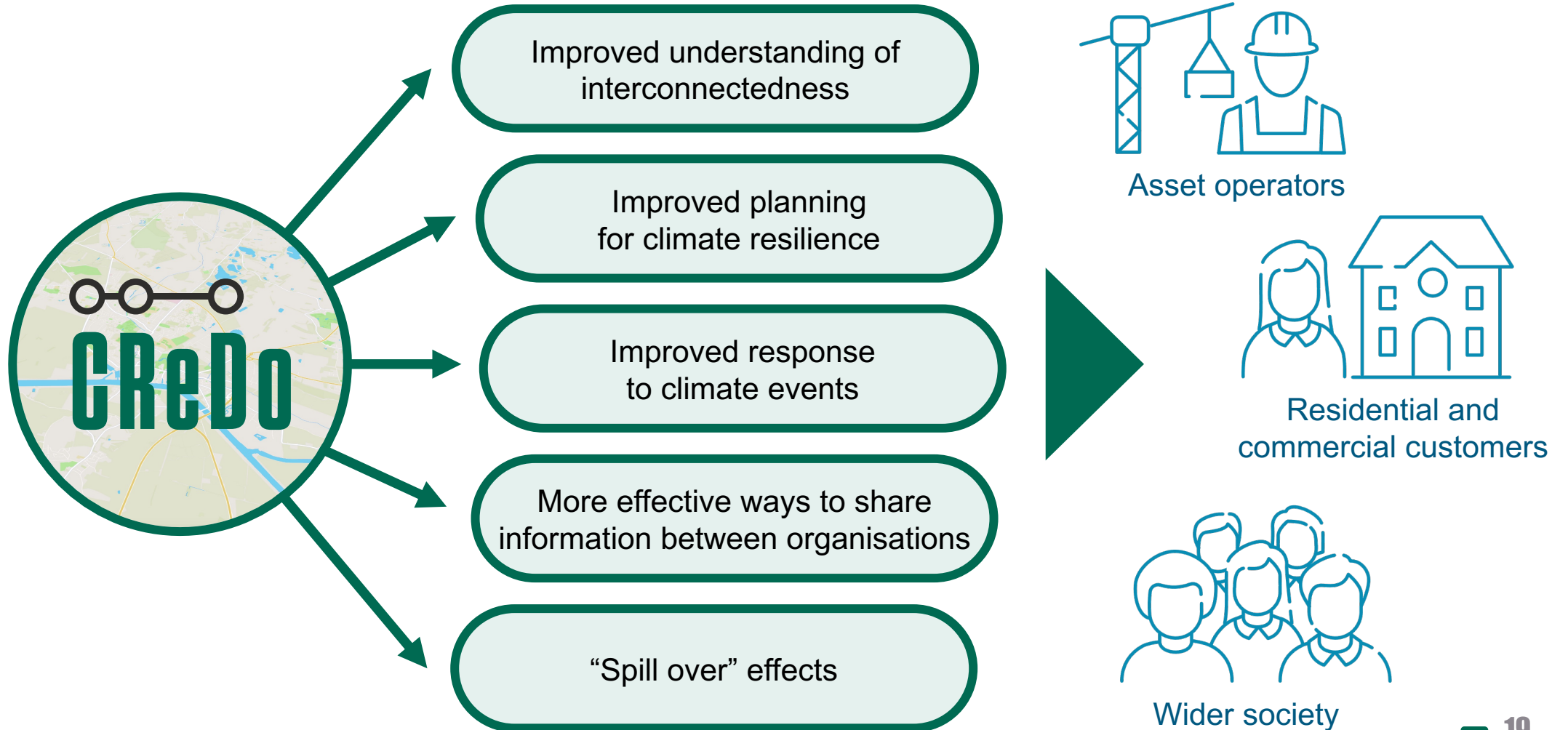
Discovery has set the foundations needed for all elements of CReDo+:

- We know what assets are likely to fail, how and some of the key variables.
- We know where we can get climate data to carry on developing and demonstrating the concept in the next phases.
- We have a first proposal to approach system modelling that makes sense and can be refined and enriched in the future.
- We know the kind of technical work needed to integrate all the above aspects into CReDo and we have assessed its feasibility as high.



BROAD EXPECTED BENEFITS

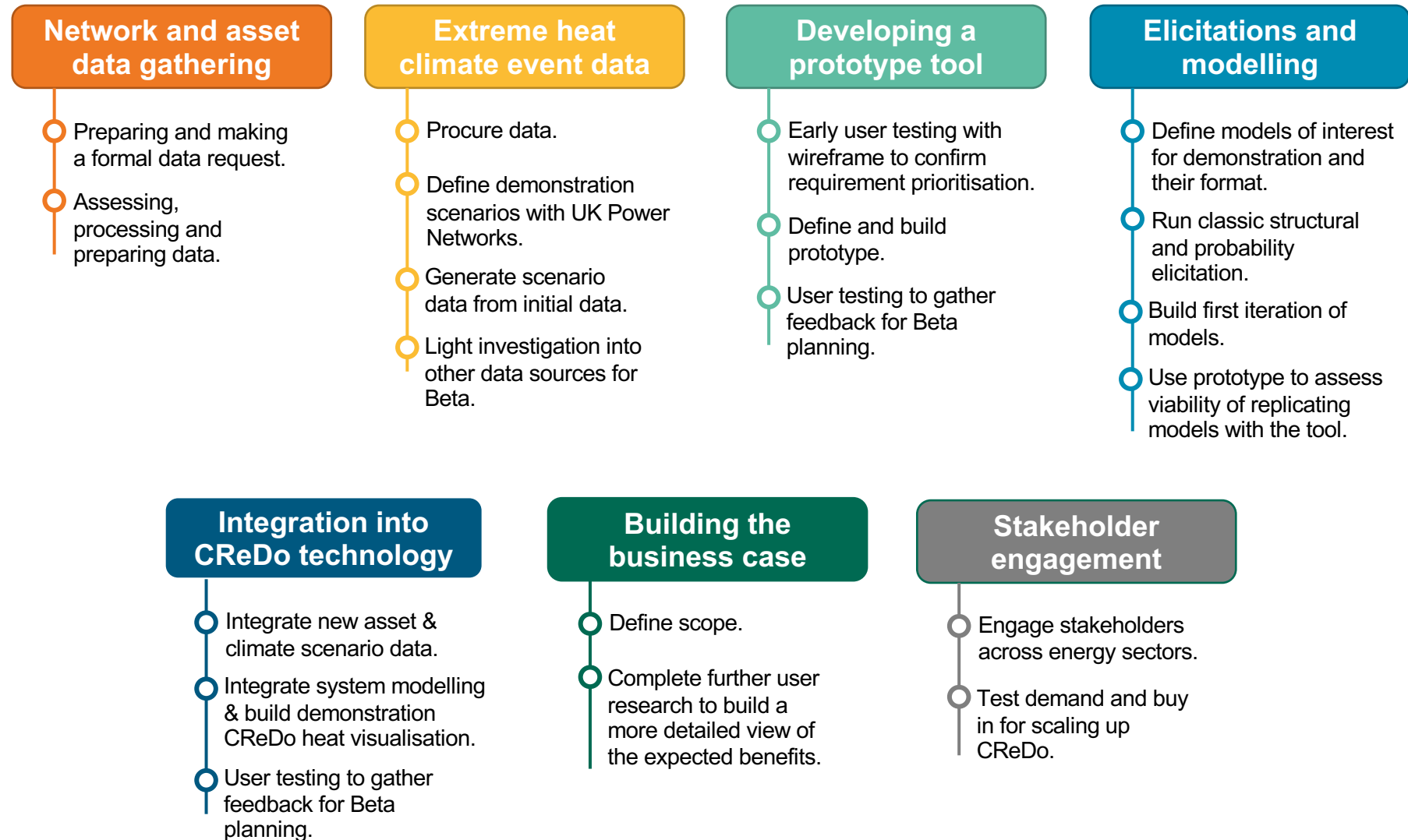
Previous CReDo economic impact undertaken by Frontier Economics simulated expected benefits of £81-186m for UK over 2022-50 period for flooding impacts



ALPHA NEXT STEPS

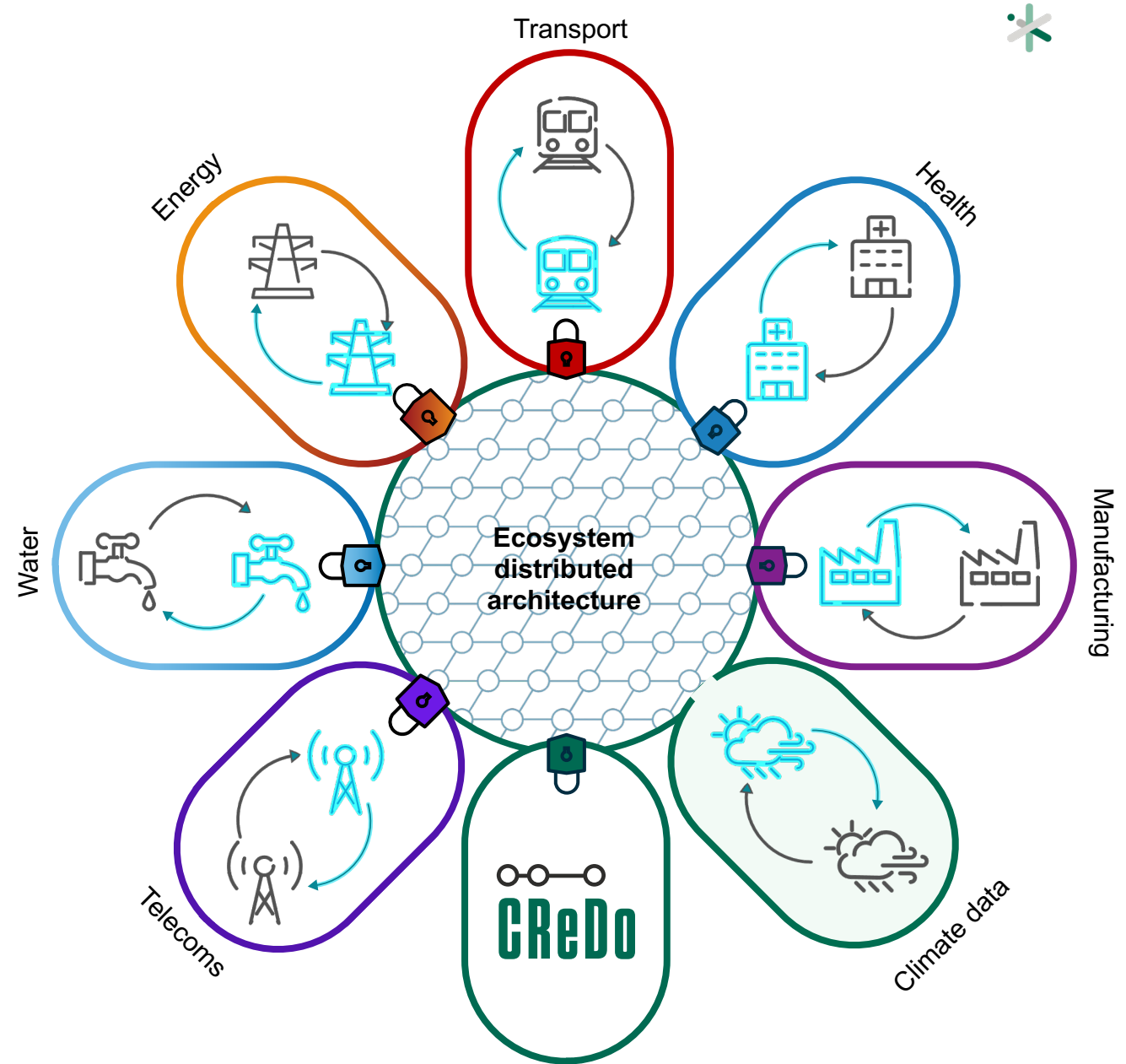


End-to-end CReDo+ demonstration and test scaling and demand assumptions



PARALLEL ACTIVITIES

- Complementary Ofwat Catalyst funded project led by Anglian Water to explore CReDo extreme heat use cases in the water sector.
- Connected Places Catapult developing strategic and business case for CReDo and other cross sector technologies with our core Innovate UK grant.
- Continue to explore opportunities that would enable regulators and network operators to coordinate across sectors.





CReDo+

Extension to new climate risks

THANK YOU

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<https://digitaltwinhub.co.uk/credo/>

