

CREDO +

End of project review
16 June 2023

AGENDA

1. Final update on the project plan
2. Project outputs achieved and lessons learnt
3. Barriers, problems or risks encountered
4. Project specific conditions
5. Communication and engagement
6. Plans for the Alpha Phase

HIGH-LEVEL PROJECT PLAN

List of deliverables

Work package 1:

1. Define and document the baseline documents.
2. Kick-off meeting.
3. Risk register.
4. Project Gantt.
5. Project plan for Alpha Phase.
6. Close-down meeting.
7. Project closure report.

Work package 2:

1. Current baseline performance approach.
2. Catalogue of asset data.
3. Current asset understanding approach summary.
4. Overview of cost/performance/impact of asset failure.
5. Likely asset failure cascade report.

Work package 3:

1. Stakeholder map.
2. User persona pen portraits with decision and needs articulation.
3. Identify end-user requirements based on personas.

Work package 4:

1. Summary of dataset(s) or methodologies to generate suitable climate & weather datasets.
2. Report outlining the feasibility of failure model integration into CReDo framework.
3. Document outlining security requirements and proposed solution.

Work package 5:

1. Work plan for Alpha Phase for digital elicitation tool and integration with CReDo.
2. Short report detailing design choices and motivation.
3. Ontology feasibility assessment supported from CReDo core architecture perspective.

WP1: PROJECT MANAGEMENT

03 April 2023– 02 June 2023, CPC

Project Deliverables & Milestones					WP1 Details
#	Status	Description	Owner	Comments	
D1.1	●	Define and document the baseline documents.	CPC	Completed	Achievements / Outputs: <ul style="list-style-type: none"> Project kick-off. Main documentation set-up and updated periodically (Gantt, task board, risks & issues log) Communications set-up (progress meetings twice a week, sprint reviews / sprint planning every fortnight) Risks (R) / Issues (I) / Barriers (B): <ul style="list-style-type: none"> Worked started at risk, as contract signing took longer than allocated. Potential overall delay due to: <ul style="list-style-type: none"> Interviews with stakeholders taking longer than anticipated. Holidays period and short weeks (Easter holidays, May bank holidays) Please note that individual WP delays were caught up on the project was completed on time, as per plan.
D1.2	●	Kick-off meeting.	CPC	Completed	
D1.3	●	Risk register.	CPC	Completed	
D1.4	●	Project Gantt.	CPC	Completed	
D1.5	●	Project plan for Alpha phase.	CPC	Completed	
D1.6	●	Close-down meeting.	CPC	Completed	
D1.7	●	Project closure report.	CPC	Completed	
WP1 Summary					
●	Overall	Project delivered as per plan.			
●	Time	Project delivered within planned timeline.			
●	Scope	Project delivered the agreed scope.			
●	Cost	Project delivered within allocated budget.			

WP2: RESEARCH AND DATA GATHERING

11 April 2023– 05 May 2023, CPC

Project Deliverables & Milestones				
#	Status	Description	Owner	Comments
D2.1	●	Current baseline performance approach.	UKPN	Completed
D2.2	●	Catalogue of asset data.	UKPN	Completed
D2.3	●	Current asset understanding approach summary.	CPC	Completed
D2.4	●	Overview of cost/performance/impact of asset failure.	UKPN	Completed
D2.5	●	Likely asset failure cascade report.	CMCL	Completed

WP2 Summary		
●	Overall	Slight delays due to interview process taking longer than anticipated and the short weeks / holidays, resulting in a potential timeline slip of approximately two weeks. The overall timeline of the project was not affected by this delay.
●	Time	Slight delays due to interview process taking longer than anticipated and the short weeks / holidays – D2.5 will run into w/c 8 May. Overall project timeline not affected by this delay.
●	Scope	Project delivered agreed WP2 scope.
●	Cost	Project delivered within allocated budget.

WP2 Details
<p>Achievements / Outputs:</p> <ul style="list-style-type: none"> We have run eight online sessions with a variety of stakeholders within UK Power Networks. This has allowed us to collect rich high-level information about a variety of topics that are key in the development of the concept that CReDo+ is proposing to build. Together with high-level stakeholders we have made a strategic decision to focus efforts on the project within the context of extreme heat. This requires of fundamentally different modelling considerations to those developed previously in the CReDo project. Further developing this capability will allow for CReDo to extend to other climate events easier and faster in the future.
<p>Risks / Issues / Barriers:</p> <ul style="list-style-type: none"> R: availability of stakeholders for follow-up questions. I: delays in finalising WP2 – D2.5 will run over into w/c 8 May.

WP3: STAKEHOLDER MAPPING

24 April 2023– 5 May 2023, CPC

Project Deliverables & Milestones				
#	Status	Description	Owner	Comments
D3.1	●	Stakeholder map.	CPC	Completed
D3.2	●	User persona pen portraits with decision and needs articulation.	CPC	Completed
D3.3	●	Identify end-user requirements based on personas.	CMCL	Completed

WP3 Summary		
●	Overall	Slight delays due to interview process taking longer than anticipated and the short weeks / holidays, resulting in a potential timeline slip of approximately two weeks. Overall project timeline not affected by this delay.
●	Time	Slight delays due to interview process taking longer than anticipated and the short weeks / holidays – D3.3 will run into w/c 8 May. Overall project timeline not affected by this delay.
●	Scope	WP3 delivered the agreed scope.
●	Cost	WP3 delivered within allocated budget.

WP3 Details

Achievements / Outputs:

- Identified the main stakeholders in the immediate context of the CReDo+ tool as the Asset Management, Strategy and Maintenance teams, the Information and Data Solutions team and the Emergency Planning team. All these groups play a role in inputting information or using the tool, but also in interacting with outputs of it.
- Detailed two user personas based on the expected direct users of the tool (i.e. users that would login into the tool and perform a variety of tasks). These are asset managers and asset engineers.
- Created a list of technical and user requirements based on the information obtained on the user research that was consolidated into the user personas and the insight provided by the technical feasibility assessments that have been described in Discovery Phase summary report.

Risks / Issues / Barriers:

- R: availability of stakeholders for follow-up questions.
- I: delays in finalising WP2 – D3.3 will run over into w/c 8 May.

WP4: MODELLING PRINCIPLES

09 May 2023– 19 May 2023, STFC

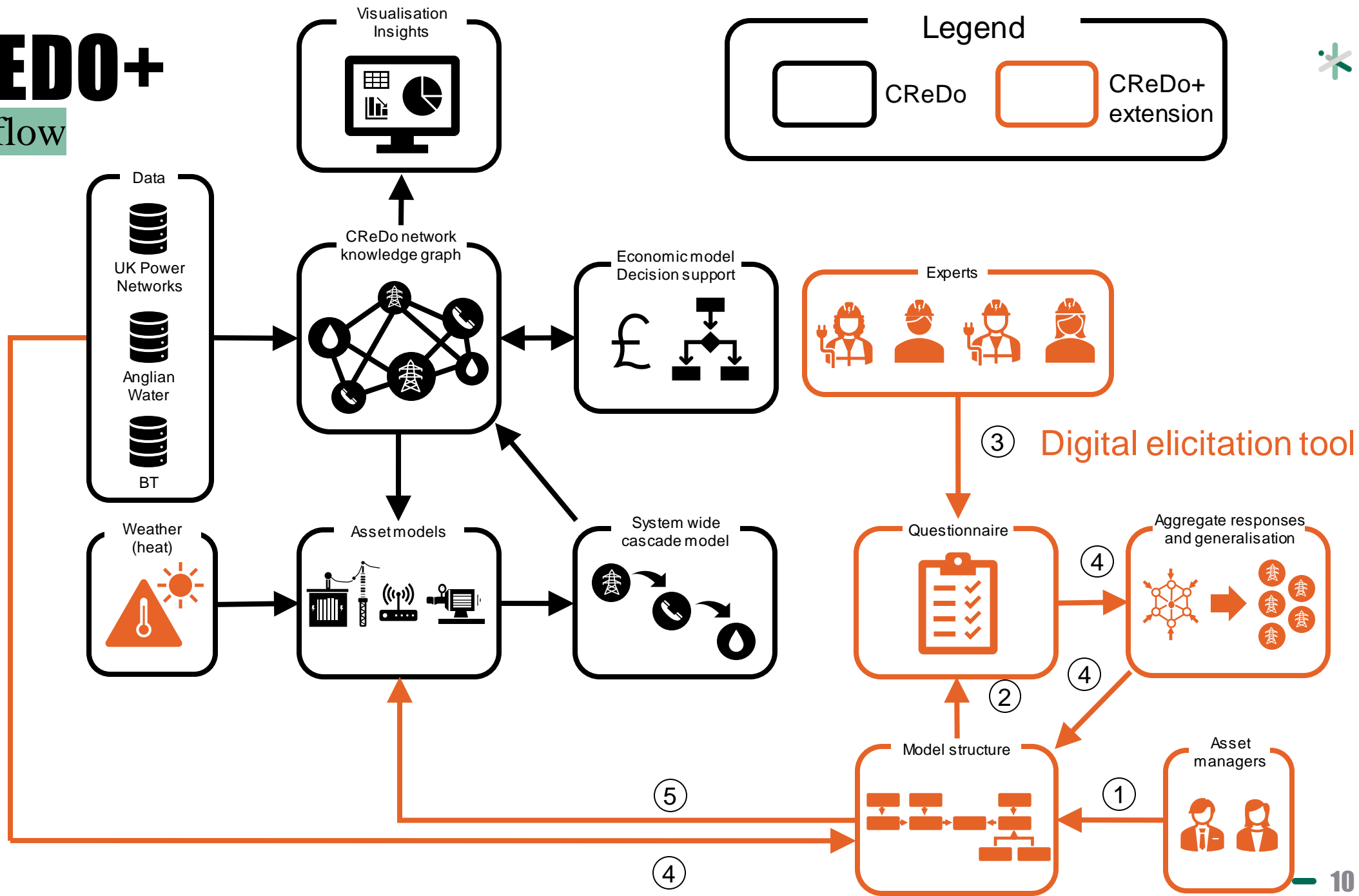
Project Deliverables & Milestones					WP4 Details
#	Status	Description	Owner	Comments	Achievements / Outputs:
D4.1	●	Summary of dataset(s) or methodologies to generate suitable climate & weather datasets.	STFC	Completed	<ul style="list-style-type: none"> Identified climate and weather data to estimate probabilities of "extreme" weather conditions at asset site(s) and reviewed data security considerations for asset data. Identified pre-existing datasets for likelihood of conditions which result in risk threshold breaches, or propose methodologies to generate suitable dataset. Investigated three potential security arrangements required for CReDo and the application.
D4.2	●	Report outlining the feasibility of failure model integration into CReDo framework.	CMCL	Completed	
D4.3	●	Document outlining security requirements and proposed solution.	STFC	Completed	
WP4 Summary					Risks / Issues / Barriers:
●	Overall	WP4 delivered as per plan.			<ul style="list-style-type: none"> N/A
●	Time	WP4 delivered within planned timeframe.			
●	Scope	WP4 delivered the agreed scope.			
●	Cost	WP4 delivered within allocated budget.			

WP5: TECHNICAL FEASIBILITY, DESIGN STUDY & RECOMMENDATIONS

22 May 2023– 02 June 2023, STFC

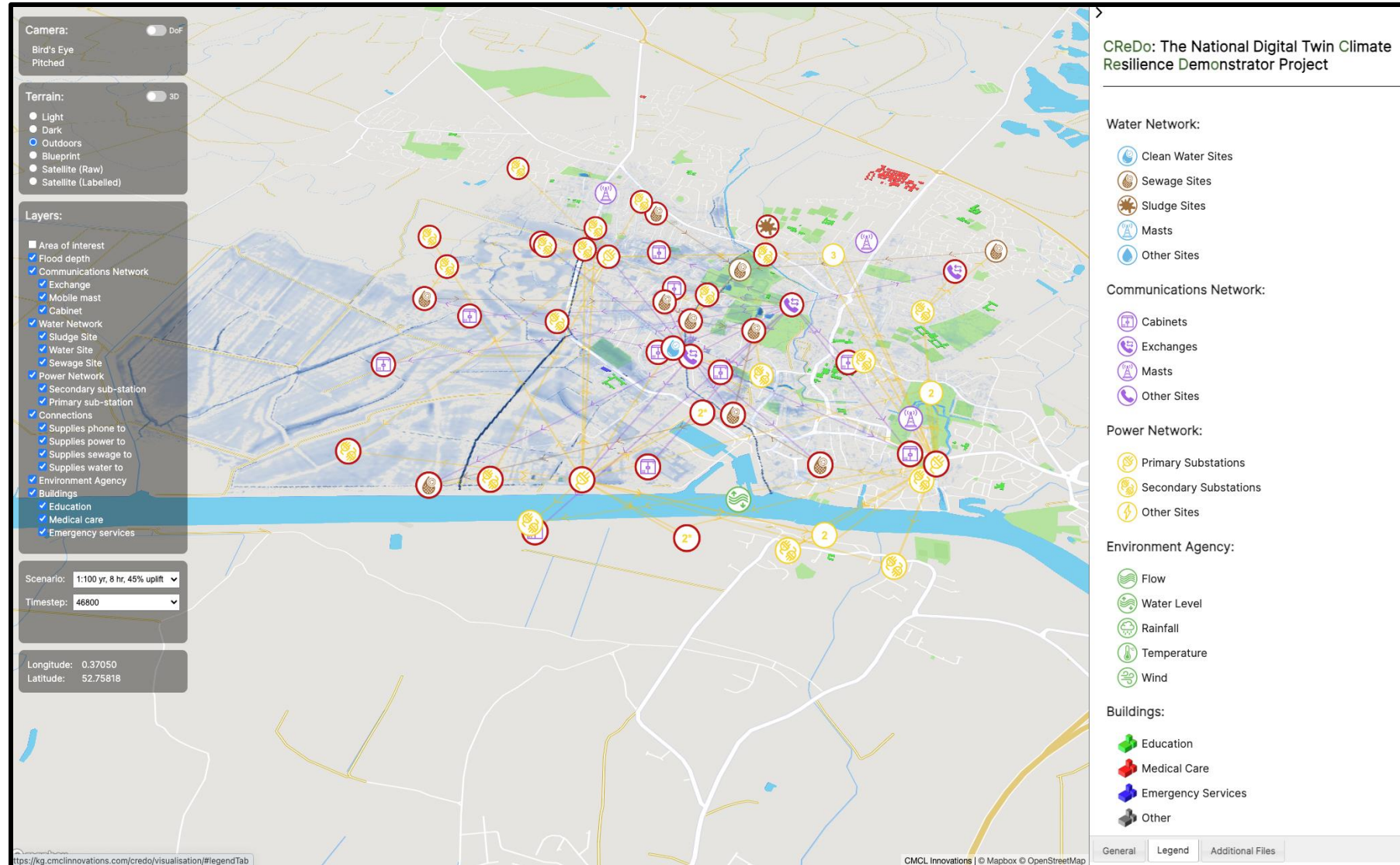
Project Deliverables & Milestones					WP5 Details
#	Status	Description	Owner	Comments	Achievements / Outputs:
D5.1	●	Work plan for Alpha Phase for digital elicitation tool and integration with CReDo.	STFC	Completed	<ul style="list-style-type: none"> Worked with asset owners, CPC, engineering partners and asset owners to identify the key functionality of a tool to build in alpha and beta phases of the project. Developed a high-level project plan which can form the foundation on later work. Definition of requirements with key stakeholders. Produced journey map based on user stories. Design study. Produced outline plan for Alpha Phase for digital elicitation tool and integration with CReDo.
D5.2	●	Short report detailing design choices and motivation.	STFC	Completed	
D5.3	●	Ontology feasibility assessment supported from CReDo core architecture perspective.	CMCL	Completed	
WP5 Summary					Risks / Issues / Barriers:
●	Overall	WP5 delivered as per plan.			<ul style="list-style-type: none"> Due to the detailing of the Alpha Phase bid, there are likely to be some changes to the Alpha Phase planning that will not be captured in the deliverables for this project.
●	Time	WP5 delivered within planned timeframe.			
●	Scope	WP5 delivered the agreed scope.			
●	Cost	WP5 delivered within allocated budget.			

CREDO+ Workflow



CReDo USER INTERFACE (UI)

The main CReDo map based visualisation



- In this map, the circles represent the assets for the different utility networks.
- The coloured outlines represent the operational status (i.e. operational / non-operational)
- The lines between circles represent the connectivity.

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

Climate (flooding) – Model builder – Questionnaire

Model name: Subterranean Substation

Asset Wetness - Question

What is your probability that in the scenario:
"the asset fails (i.e. stops its operation) given that the water has overwhelmed its flood protections and has reached the electrical components?"

Extreme weather → Extra protection → Flood depth → Asset wetness → Fault – stop operation → Incoming power → Back-up generation / Network reconfiguration

Information

You are presented with the positions for where questions are needed for the subsequent assignment of probabilities.

Click on the "Q icons" to confirm, modify or input questions.

Click "Next" when you are ready to proceed to the next building stage.

Add context scenario

Previous

Next

Logged in as "user 1"

Model questionnaire – Questionnaire (1/10)

Model name: Secondary Substation type 2

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"

- in the case that the flood depth is
(a) between 0 mm and 150 mm,

Probability: Please provide probability as percentage

Rationale: Please provide a few lines explaining why you chose this probability

Additional resources

- Site layout plan
- Site photos
- 3D site construct
- Flood visual aid

Go to event context

Logged in as "user 1"



COMMUNICATIONS & ENGAGEMENT

Summary of engagement activities

UKRI (UK Research and Innovation) meetings

- **Kick-off** (5 April 2023)
- **SIF** (Strategic Innovation Fund) **Advisory Group** (19 April 2023)
- **Mid-point** (5 May 2023)
- **Show and Tell** (12 June 2023)
- **End-point** (16 June 2023)

SIF-based project meetings

- **WARN** - Weather Alerts and Risk analysis for Network operators (10 and 31 May)
- **Predict 4 Resilience** (11 May 2023)
- **DR2** – Scenarios for Extreme Events (22 May 2023)
- **Comms connect** (2 June 2023)

UK Power Networks Stakeholders

- Senior Asset Engineers (11 and 18 April 2023)
- Civil Asset Strategy Engineers (11 and 19 April 2023)
- Network Development Engineers (11 and 18 April 2023)
- Emergency Planning Managers (12 April 2023)
- Head of Enterprise Data Management (12 and 20 April 2023)
- Head of Asset Strategy (12 and 21 April 2023)
- Digital Solution Architects (20 April 2023)
- Information and Data Solutions Manager (20 April 2023)

External Stakeholders

- Energy Team Business Development / Met Office
- Services Directorate / Met Office
- Data Scientist Manager / DNV - Det Norske Veritas group
- Senior Research Scientist, Climate and Sustainability / IBM
- Academic experts in Climate Dynamics / University of East Anglia
- Land Surface Modellers /UK Centre for Ecology and Hydrology

Other Engagements

- **CReDo Group / Plenary:** we have been continuously sharing updates of CReDo+ (as an extension of CReDo) on the CReDo plenary (Anglian Water & BT) every other Thursday.
- **Virtual roundtable with USA:** will include contacts from North American Electric Reliability Corporation (NERC) and the Lawrence Livermore National Laboratory (LLNL) We will also have representatives from the UK, more specifically, Edinburgh, Newcastle, and Warwick universities, Imperial College, UK Power Networks and National Grid. It is scheduled for the 29 of June.
- **Other relevant engagements:** Ofwat (Office of Water Services) “Outside In”, Environment Agency, National Infrastructure Commission, Anglian Water, BT Group, Utility Week Live, Digital Construction Week.

PROJECT SPECIFIC CONDITIONS

Summary of project conditions

Condition 1

The funding party must not spend any SIF funding until contracts are signed with the project partners named in table 1 for the purpose of completing the project.

Condition 2

The funding party must report on the financial contributions made to the project as set out in its application. any financial contributions made over and above that stated in its application should also be reported and included within the project costs template.

Condition 3

The funding party must participate in all meetings related to the project that they are invited to by Ofgem, UKRI and BEIS (Department for Business, Energy and Industrial Strategy) during the project phase.

Condition 4

Prior to the end of the Discovery phase, the funding party must engage with the Ofwat Innovation Fund to discuss the applicability of its proposed solution to the water industry and whether there are opportunities to engage with projects participating in Ofwat's Innovation Fund. the funding party must provide a summary of this engagement to the monitoring officer prior to the end of the Discovery phase. Innovate UK can facilitate an introduction if necessary.

Condition 5

Prior to the end of the Discovery phase, the funding party must engage with the SIF project 'Scenarios for Extreme Events' to examine areas of commonality and potential overlap, and how the two projects could inform each other on their findings and potentially work together in future project phases. Innovate UK can facilitate an introduction if necessary.

CONDITION 4

Prior to the end of the Discovery phase, the funding party must engage with the Ofwat Innovation Fund to discuss the applicability of its proposed solution to the water industry and whether there are opportunities to engage with projects participating in Ofwat's Innovation Fund. The funding party must provide a summary of this engagement to the monitoring officer prior to the end of the Discovery phase. Innovate UK can facilitate an introduction if necessary.

- We applied for and were successful to do a CReDo extreme heat project (Ofwat Breakthrough Challenge 3 Catalyst Stream) with Anglian Water and other partners from the water industry. UK Power Networks, Connected Places Catapult, CMCL, and UK Research and Innovation - Science & Technology Facilities Council, are all named partners on this project. This is implicit recognition of the applicability of the CReDo (and by extension CReDo+) applicability in the water industry. Project start date: 1 July 2023.
- We also presented CReDo activities and complementarities (CReDo, CReDo+ and the Catalyst Stream) at the Ofwat "Outside In" internal session on 8 June 2023, with Ofwat Innovation Fund representatives present.
- Learnings will be shared throughout our fortnightly CReDo plenary sessions.
- Both projects are delivering towards CReDo.
- Focus of Alpha phase is on building the elicitation tool whereas the Ofwat project focuses on data and modelling. The two projects are complementary and both delivering towards CReDo.

CONDITION 5

Prior to the end of the Discovery phase, the funding party must engage with the SIF Project ‘Scenarios for Extreme Events’ to examine areas of commonality and potential overlap, and how the two projects could inform each other on their findings and potentially work together in future project phases. Innovate UK can facilitate an introduction if necessary.

During the project we engaged with the following SIF projects:

- **WARN** (10 and 31 May)
- **DR2** – Scenarios for Extreme Events (22 May 2023)
- **Comms connect** (2 June 2023)

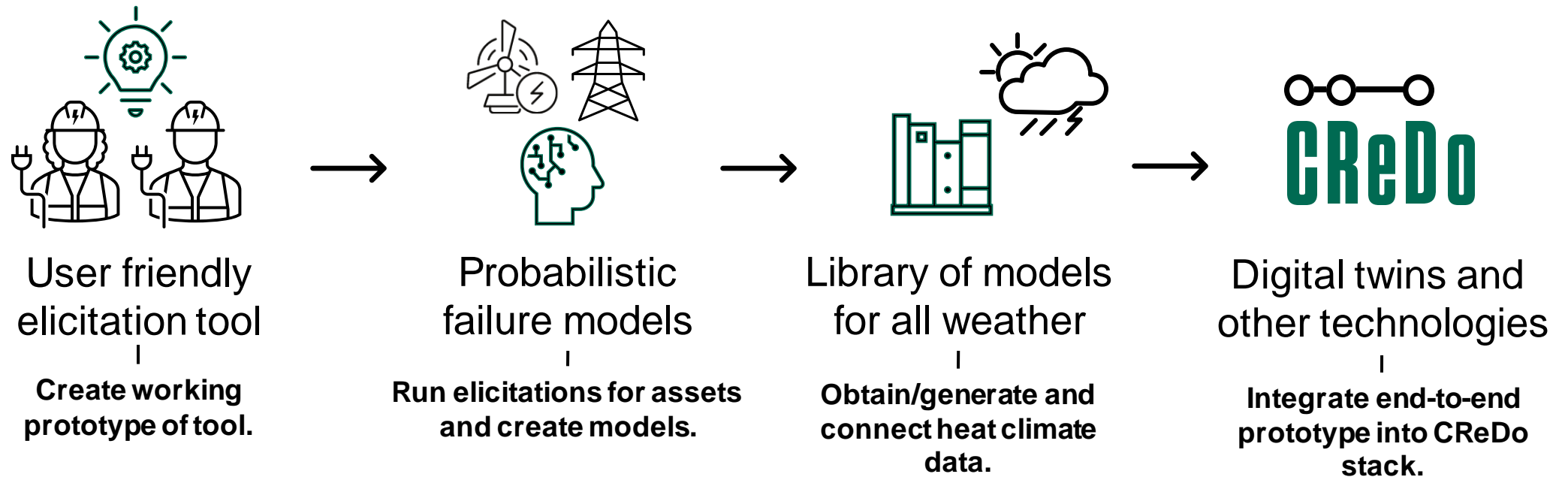
LESSONS LEARNT

Project daily operational learnings

- **Agile delivery framework:** the project was delivered in an agile way. The team considered that stand-ups (twice per week), sprint planning and review sessions (every fortnight) added structure to the project and clear monitoring.
- **Technical Lead:** the team leading the project stated expectations clearly, which lead to more targeted and higher quality outputs. CPC acting as lead provided clearer strategic direction and has helped in keeping the project deliverables coherent, supporting the overall vision of the project. Also, it has helped in reducing potential silos of working in a project team with multiple organisations involved in such a short timeline.
- **Visualisation:** the sketches and visual resources helped the project team get a better understanding of the overall idea and concept of the project. Again, the CReDo+ concept can be easily misunderstood or can be interpreted in more than one way. This work helped making sure efforts were focus on the same end goal.
- **Technical staff early involvement:** involving technical teams earlier in user research is preferable for future phases, so that they can input and get the information earlier in the process. That helps anticipating blockers and prime thinking for later technical planning and delivery.

CReDo+ ALPHA PHASE

Deliver end-to-end working prototype of CReDo+ elicitation tool and asset models for extreme heat use case and integrate with existing CReDo technology





THANK YOU!

