



Heatropolis - Alpha Phase

UKRI Alpha Mid-Point Meeting

24th January 2024



Agenda for today

1

Welcome & introductions

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Project progress update

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Project plan

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Key risks

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Communications & engagement activities

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Next steps

Heatropolis – Welcome & introductions

Our mission: The aim of the project is to establish a new framework that takes a whole system perspective to evaluate the costs, benefits and efficiencies that can be achieved through a collaborative approach between the heat network developer and distribution network operator (DNO) to coordinate investment decisions from the multiple stakeholders. The framework will maximise the use of existing electricity network capacity while minimizing the need for network reinforcement, the curtailment of renewable generation, and cascading costs to customers.

Lead Partners



UK's largest electricity distributor delivering power to 8.5 million homes and businesses. UK Power Networks is the lead applicant.



Smart controls market-leaders in delivering net-zero innovation projects with deep domain expertise in monitoring, controlling and optimising low-carbon technologies.



Manage over 75 Energy Service Companies (ESCOs) contracts for district heating networks and is responsible for provisioning the design-engineering subcontractor for the heat-load modelling and data validation.

Sub-Contractors



Provision of a complete ecosystem of smart energy services to create innovative solutions to empower smart energy services.



A leading international energy consultancy, to support the economic modelling and appraisal work.



An international, integrated consultancy of engineers, designers and advisers. Delivering creative, value-led solutions for the benefit of people, places and planet.

Heatropolis – Project Progress Update

Key headlines

- Contracts were signed in December
- No material changes since project kick-off or significant risks – the plan has shifted out slightly to incorporate timelines of receiving data for analysis

Key achievements

- Subcontractors selected and most project contracts signed
- Smart control testing site selected and data feed and hypotheses drafted
- Network impact model completed and recommended design and business models drafted

Recent deliverables

- 18/01/24 Workshop - work towards Beta phase trial implementation plan (D5.3)
- 26/01/24 (D2.1, 2,2) Test site finalised and control feed agreed
- 19/02/24 Delivery of smart control interventions
- 23/01/24 Report mapping out business model options for Beta (D4.5)

Key risks & our mitigations

- | | |
|--|---|
| • Beta bid will require a large amount of dedicated time, esp. as this is the first Beta round for DNOs | › Monthly BUUK senior steering group, Guidehouse partnership |
| • Complex interlinking of data and iterations required, this could lead to duplication, misalignment or gaps | › Regular comms focusing on critical path |
| • Access to key UK Power Networks staff is required for key requirements clarification and refinement | › Successful escalation with Innovation Programme Manager and alignment with other projects |

Key next steps

- Beta workshop in January and output review with UK Power Networks
- Smart control data feed receipt, analysis and scenarios testing (Feb)
- Review Distribution Network Operator benefits model and integrate the smart solution costs
- Crossbreed contract finalised (subcontractor for optimisation software for smart controls management. & calculations)

Work Package Updates

WP1 Project Management

What is it?

Project managed to time, cost and quality

Highlights & progress so far

- ✓ SIF contract signed by all parties and funding allocated.
- ✓ Project Governance and shared area set up.
- ✓ PID, DPIA, risks, project plan, lessons learnt and comms plan signed-off and regularly updated.

What's next

- Ongoing project management
- Finalise NODA contract & Crossbreed contract to complete onboarding for smart control testing activities



The collage features several key project management documents:

- Heatropolis: External Governance Cadence:** A Gantt chart showing project milestones from September 2023 to March 2024, with categories for 'Stakeholder Meeting', 'Working group', and 'UKRI Funder Meeting'.
- Heatropolis - Alpha Project Initiation Document (PID):** A document with a colorful logo and the date 10/11/2023.
- Data Protection Impact Assessment: Heatropolis Phase 2:** A document detailing the project's data processing activities and legal basis.
- Project Overview Table:** A table summarizing project details:

Project summary	This is a follow-up project to Heatropolis Discovery (C00045). We intend to build on our Discovery findings and further our relationship with Metropolitan and support the smart control heat pump proposition.
Processing purposes	There will be data extraction and smart control experimentation in a strictly commercial building context. The purpose of processing this data is legitimate interest - to test technical requirements and validate the commercial mechanisms needed to deliver the Heatropolis framework ahead of a large-scale sandbox-trial in Beta Phase.
Lawful ground for processing	The lawful basis is 'contract'. The Collaboration Agreement includes protection sections. Agreements will be restricting and def...
- Meeting Agendas:** Detailed agendas for 'Stakeholder Meeting' and 'Working group' meetings, listing chairs, attendees, and purposes.
- Project Plan Grid:** A large grid at the bottom showing task dependencies, durations, and completion dates for various project activities.

Work Package Updates

WP2 Smart Control Testing

What is it?

Smart Control Integration & Operation of buildings for modelling

Highlights

- ✓ Site selected
- ✓ Data feed options reviewed, and methodology agreed.
- ✓ Smart control testing hypotheses agreed

Challenges

- Many different involved parties for our trial site (Havas, Argent, Optimised) which is complicated to get agreement and find responsible party for activities such as aligning on data sharing and analysis
- Data will be used to updated Metropolitan work and the critical path is tight.

What's next

- Onboarding the data stream to the NODA platform for analysis and active control
- Performing response modelling during which the NODA system will perform a series of control actions. This will make it possible for the NODA system to learn the flexibility characteristics of the particular buildings
- Performing automated impact evaluation as input for project reporting



Smart Control Onboarding Process

		Status
Step 1		
	1. Offsite technical audit	✓
	2. Data Requirement & Integration Requirement validation	✓
	3. API Specification validation	✓
	4. Integration	
	5. API test	
Step 2		
	1. Create new Service Activation profile in CEOS (Crossbreed Energy OS platform)	
	2. Access to Test Device	
	3. Provision to NODA	
	4. Test Communication and Service Activation of Test Device	
Step 3		
	1. Onboarding of Service	
	2. Activate Service monitoring in Crossbreed Support Desk (and NODA Energyview)	
	3. Operational launch of Service	

Work Package Updates

WP3 Technical Design

What is it?

Technical requirements and design for Beta testing

Highlights

- Scope agreed with Buro Happold - data on modelling and additional thermal storage and operating regimes
- Work underway on modelling and engineering of potential thermal storage - engagement with phase change material manufacturers started
- Integration work with Buro Happold and Guidehouse to ensure gaps and data handoffs ongoing
 - Workshops held in December 2023 and January 2024
 - Interface sheet drafted and being developed
 - Process for scaling up in development

Challenges

- Data is iterative and needs to be aligned to flow between Crossbreed/NODA and Metropolitan, Buro Happold and Guidehouse

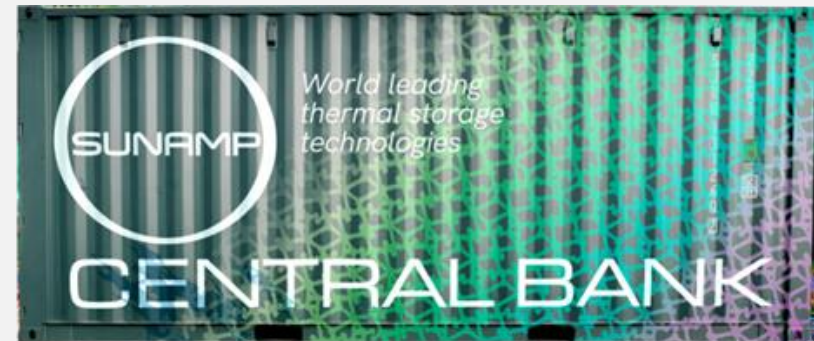
What's next

- First iteration of Buro Happold modelling due w/c 22 January 2024
- Test of integration with Guidehouse model end of January 2024
- Update of Buro Happold model based on smart building tests end February/start March 2024

Example of model interface sheet

The screenshot displays a complex spreadsheet interface for a model. It is divided into several sections:

- CAPEX:** A table with columns for 'Year' (2024-2034) and rows for 'Investment in Thermal Storage', 'Investment in PV', 'Investment in Battery', 'Investment in Heat Pump', 'Investment in Heat Exchanger', 'Investment in Control System', 'Investment in Monitoring System', 'Investment in Maintenance System', and 'Investment in Other'. Values are shown in thousands of pounds (£k).
- REVENUE:** A similar table with rows for 'Revenue from PV', 'Revenue from Battery', 'Revenue from Heat Pump', 'Revenue from Heat Exchanger', 'Revenue from Control System', 'Revenue from Monitoring System', 'Revenue from Maintenance System', and 'Revenue from Other'.
- DEVI (applied to CAPEX and REVENUE):** A table with rows for 'Investment in Thermal Storage', 'Investment in PV', 'Investment in Battery', 'Investment in Heat Pump', 'Investment in Heat Exchanger', 'Investment in Control System', 'Investment in Monitoring System', and 'Investment in Other'.
- OPEX:** A table with columns for 'Year' (2024-2034) and rows for 'Operating Costs', 'Maintenance Costs', 'Monitoring Costs', 'Control System Costs', 'Other Costs', and 'Total OPEX'.



Example of phase change thermal store – Sunamp Central Bank (courtesy of Sunamp)

Work Package Updates

WP4 Commercial and Operational Framework

What is it?

Integrated Cost Benefit Analysis (CBA) and framework for business model options for Beta Phase

Highlights

- Developed a Distribution Network Operator network impact model which calculates the benefits of avoided reinforcement by deploying the smart solutions, which directly reduce the peak demand across heat networks
- Executed various workshops to finalise the recommendations to be implemented into the business case, as well as brainstorming possible business models to be recommended in January 2024
- Recommended design and business models drafted, and positive initial reaction from UK Power Networks

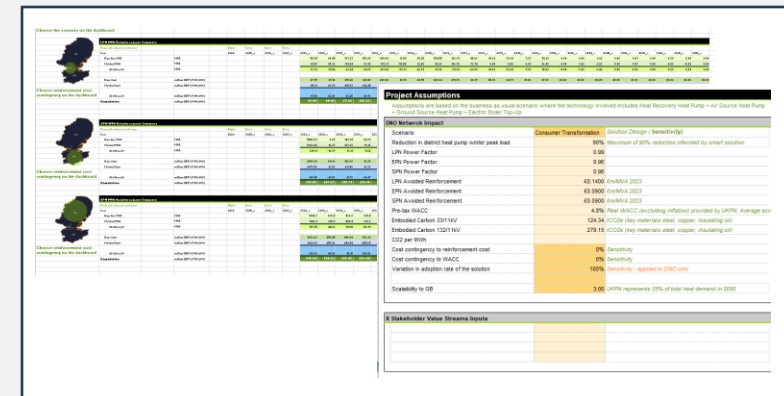
Challenges

- Access to UK Power Networks teams (highlighted risk)
- Integrating the costs of smart solutions into the integrated cost-benefit analysis (highlighted risk)

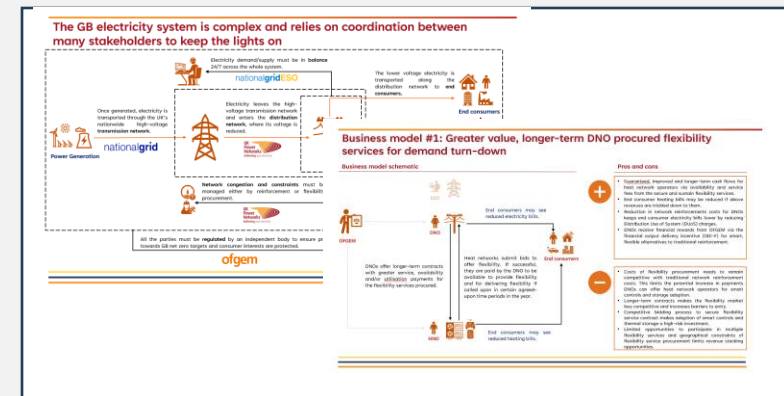
What's next

- Finalise the business model options report
- Integrate the costs of operating the smart solution into the business case. Build in the recommended business model to capture the payments between stakeholders.
- Connect with the Electricity System Operator (ESO) to discuss benefit streams at a national level
- Review the model outputs and build into the SIF CBA template

Example of work in progress cost benefit analysis



Example of work in progress business models



Work Package Updates

WP5 Dissemination and Planning for Beta Phase Trial

1

Report

- End of phase report – end of March
- Summary report for external dissemination

2

Beta phase trial

- High level meeting scheduled for BUUK directors
- Workshop completed in January 2024 with Guidehouse, Crossbreed, Metropolitan to start preparation of Beta application

3

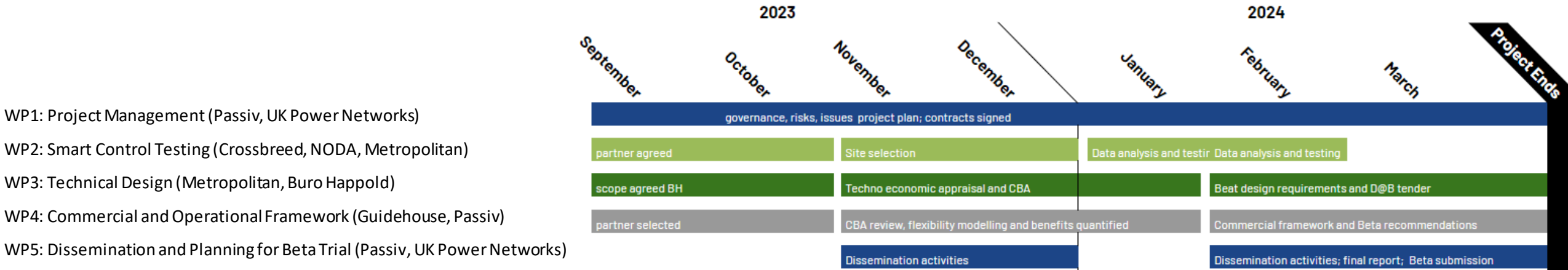
Dissemination

- Press release live on 18th December 2023
- ADE presentation in September 2023
- Review, presentation and site tour DESNZ in December 2023
- Support for UK Power Networks In-Person Dissemination Event: Net Zero Networks

WHAT WE PROPOSE IS INCLUDED IN THE BETAPHASE

1. Design, develop, test, and **trial new business models** and **technical integration** to **unlock flexibility** of low carbon heat networks
2. New business models could include **novel commercial arrangements** that build on existing flexibility products and **curtailable connections**
3. Business models and technical integration **tested across multiple heat networks use cases:**
 1. high-density residential and commercial e.g., King's Cross
 2. residential
 3. communal high-rise
4. **Enhanced digital customer connections and planning tools** that improve load forecasting and support improved heat network and electricity network investment planning
5. **Two-way consumer engagement** (Heat Network Operators, commercial end-users, domestic end-users) to inform novel commercial arrangement and digital tools whilst simultaneously building awareness and trust

Heatropolis – Project Plan (*minor changes*)



WP1: Project Management (Passiv, UK Power Networks)

WP2: Smart Control Testing (Crossbreed, NODA, Metropolitan)

WP3: Technical Design (Metropolitan, Buro Happold)

WP4: Commercial and Operational Framework (Guidehouse, Passiv)

WP5: Dissemination and Planning for Beta Trial (Passiv, UK Power Networks)

Delays not material but caused by:

- Collaboration agreement 2-month delay.
- Access to key expertise has been challenging due to clashes in other priorities such as future scenario planning; changes to roles.
- Building site selection - complexity in identifying key stakeholders.

Heatropolis – Financial Update *(no change)*

There are no changes to our forecasted project spend across our five work packages (25 deliverables) since kick-off.

Ref	Work Package Title	Partner Responsible	Due Date	SIF funding
WP1	Project Management	Partner 1 - Passiv UK	21/03/2024	
WP2	Smart Control Testing	Partner 1 - Passiv UK	26/01/2024	
WP3	Technical Design	Partner 2 - Metropolitan	15/03/2024	
WP4	Commercial and operational framework	Partner 1 - Passiv UK	08/03/2024	
WP5	Dissemination and planning for Beta Phase Trial	Lead partner - UK Power Networks	31/03/2024	
			Total:	£483,374.00

Heatropolis – Key Risks

Beta resourcing

Description:

Beta bid will require a large amount of dedicated time from all parties, especially as none of the lead partners have experience of Beta.

Impact:

Additional resources required, Senior stakeholder engagement.

Mitigation:

- Senior level discussion underway within BUUK; workshop scheduled for 18th January 2024.
- Agreement to get Guidehouse embedded in bid.

WP link:

All, WP5

Data & synchronisation across work packages

Description:

Interlinking of data and iterations required.

Impact:

Data duplication, misalignment or gaps in data provision.

Mitigation:

- Regular discussions to agree approach and identify early a clear view of all data
- Agree process and roles and responsibilities for who owns the data and when it should be collected.

WP link:

WP3 and WP4

UK Power Networks subject matter expert access

Description:

Access to key expertise is required to support the review and shaping of requirements and problem.

Impact:

Delays to get information and input leading to project delays or lower quality outputs.

Mitigation:

- Plan key interactions in advance to enable access to key stakeholders.
- Maximise the interactions with key stakeholders to ensure the required information is collected.

WP link:

WP4, All

Beta information timing

Description:

Running Alpha whilst also planning Beta and only being half-way through the project yet committing to a Beta is distracting and risky.

Impact:

Additional time, also duplication and wasted effort as Beta high-level scope etc. Required well before Alpha output and Beta approach formally agreed.

Mitigation:

- Accept and ensure that where the scope is speculative or yet to be firmed up it is clearly highlighted.

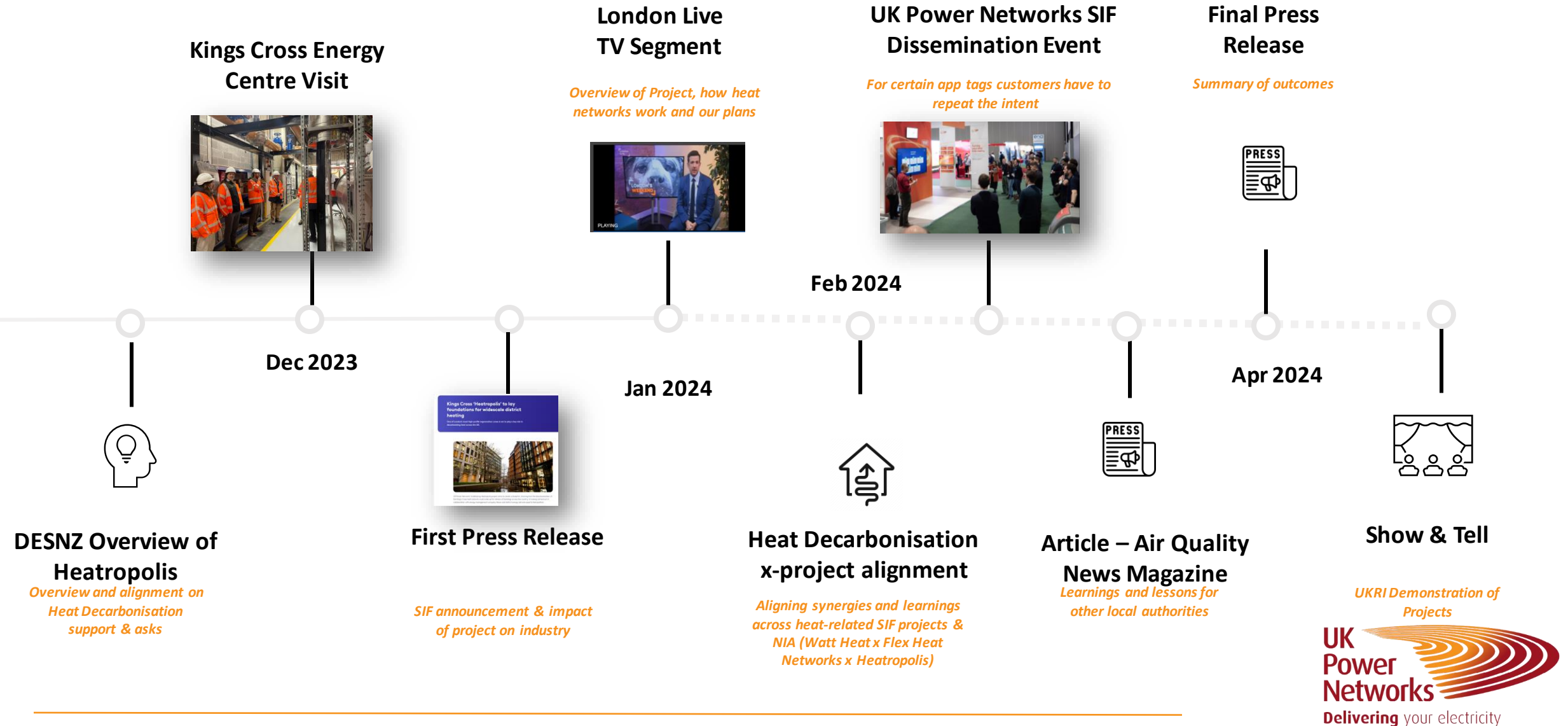
WP link:

All, WP5

Heatropolis – Project specific conditions

Condition	Status
Condition 1 - The Funding Party must not spend any SIF Funding until contracts are signed.	✓
Condition 2 - 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 - participate in all meetings related to the Project that they are invited to by Ofgem, UKRI and DESNZ	✓
▶	<ul style="list-style-type: none"> • Held introductory session with DESNZ providing overview of Heatropolis project • Next steps with DESNZ – follow up meeting on conclusion of work – agree simple statement of benefits and any policy support required

Heatropolis – Communications & Engagement Activities



Heatropolis – Next steps

- Book End of Phase session – Beginning of April 2024
- Show & Tell slot: Wednesday 24th April 2024 10:00 - 12:35
 - Show & Tell guidance on what to include?
- CBA template for Beta
 - Training 22nd February
- Plan for engagement with Ofgem as regulator to input for Beta

