# SIF Alpha Round 2 Project Registration

### Date of Submission

Nov 2023

### Project Reference Number

UKRI10079052

## Initial Project Details

### Project Title

REACT – Rapid Evaluation Areal Connection Tool

### Project Contact

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### Challenge Area

Improving energy system resilience and robustness

### Strategy Theme

Net zero and the energy system transition

### Lead Sector

Electricity Transmission

### Other Related Sectors

Gas Distribution

### Project Start Date

01/10/2023

### Project Duration (Months)

6

### Lead Funding Licensee

SSEN - Scottish Hydro Electric Transmission

### Funding Licensee(s)

SSEN - Scottish Hydro Electric Transmission

## Funding Mechanism

SIF Alpha - Round 2

## Collaborating Networks

SGN

National Grid Electricity Transmission

## Technology Areas

Low Carbon Generation

Modelling

Demand Response

Digital Network

Offshore Transmission

Electricity Transmission Networks

Stakeholder Engagement

Gas Distribution Networks

## Project Summary

REACT (Rapid Evaluation Areal Connection Tool) aims to create a geographical planning tool providing users with the ability to view electricity grid connection requests in real-time using an interactive visualisation map. Users will be able to identify the best possible locations to connect to the network, based on dynamic geospatial and network information, as well as a view of future demand and generation requests. This will streamline the connection process where limited pre-application information impacts formal applications. Optimising the location of demand and generation will increase the efficient use of existing assets and the effective roll-out of new infrastructure.

## Add Preceding Project(s)

UKRI10058535 - REACT

## Add Third Party Collaborator(s)

Olsights

MapStand

Icebreaker One

## Project Budget

£553,671.00

## SIF Funding

£496,625.00

# Project Approaches and Desired Outcomes

## Problem statement

**Problem Summary**

The Climate Change Committee's June 2023 Report to Parliament's top recommendations included *'Ensuring sufficient network capacity and timely grid connections is a critical priority to support an increasingly electrified economy and enable available low-carbon generation to be fully utilised.'* The UK currently has around 330TWh of annual electricity demand, a figure set to more than double by 2050 to deliver Net Zero.

Determining the best location for new demand and generation connections can have a significant impact, positive or negative, on network configuration and operation. In the North of Scotland, 18.1TWh was generated in 2020/21, compared to 6.7TWh consumed. Added to this, demand from electrolytic hydrogen projects requiring transmission-level connections is growing rapidly in line with the Scottish Government policy of 5GW by 2030 and 25GW by 2045.

Currently, the process for reviewing connection requests is carried out in isolation, i.e., other potential developments are not considered, so there is little time to explore solutions that are optimal for the network. The current system only provides a static view of the potential network impact a connection will have; however, this view changes each time a new project is contracted, making it difficult to assess the long-term cumulative impact each request has on the grid. The existing connections process is complicated, with large numbers of, sometimes unrealistic, requests clogging the system, undermining the strategic aims.

REACT is addressing the challenges in the connection request process by providing an early dynamic view of all forecasted connection requests to highlight optimal locations and other key parameters. The focus is the H2 use case explored in Discovery.

**Project Evolution**

The Discovery Phase has highlighted:

1. Significant frustrations from connecting applicants with the timescales, process and pre-application stage lacking an opportunity to discuss the best options. Applicants are submitting large numbers of speculative connection requests with limited knowledge of network constraints or opportunities, burdening system planning and missing optimisation opportunities.
2. A sophisticated, geographical planning tool providing the ability to visualise connection requests in real-time should focus on the pre-application stage where maximum impact will be achieved. The tool will facilitate exploratory development discussions providing applicants with timely insights to inform the optimal siting for connections.
3. Areas, where key information was unavailable to developers in a timely manner, included existing bays at substations and whether substations could be expanded due to geographic constraints. These have been incorporated into the Alpha stage.
4. The importance of being aligned with longer-term SSEN power flow data and other ESO digitalisation programmes to avoid duplication and find synergies that REACT can support.
5. Hydrogen connections were confirmed as a highly relevant use case although the benefits to the Transmission Network of strategically adding electrolytic hydrogen were not investigated in Discovery.

**Innovation Challenge alignment**

The project scope continues to be aligned with Challenge Area 3, supporting the efficient rollout of new infrastructure. REACT will ensure that decisions on new developments are informed by a more detailed consideration of the available transmission infrastructure, network constraints and planned upgrades so developments are located and sized optimally alleviating, rather than adding to constraints. This will aid Transmission Owners (TOs) and Distribution Network Owners (DNO) planning, reduce application workloads, and help applicants who will benefit from early well-informed data for their pre-application decisions.

**Potential users**

The primary users of the innovation are the TOs and DNOs, hydrogen producers, generators, and energy storage developers whose needs have been captured during detailed conversations held throughout Discovery. Secondary users of the tool include gas distribution operators (SGN partner), water authorities and environmental agencies that would benefit from the visual integration for planning purposes.

## Innovation justification

**Challenge theme**

The project addresses Challenge Area 3 and theme 'strengthening the UK's energy system robustness to support the efficient roll-out of new infrastructure'.

**Discovery to Alpha Learning**

Discovery provided a clear understanding of pre-application process challenges. REACT's now focuses on identifying and sharing early insights on constraints, aiding grid connection decision-making specifically the pre-application stage, as opposed to addressing the entire connection request process. Grid access is a critical consideration for large-scale energy customers and early and reliable information is vital to making efficient, cost-effective, and deliverable connection applications.

**Discovery has established the technical development approach:**

1. Data sources: The near-term treatment and visualisation of network power flow required utilising exported power flow models (Siemens PSSE or DIgSILENT Powerfactory). The tool will be developed to integrate with longer-term SSEN power flow and connection digitalisation programmes, avoiding duplication.

2. Data modelling and visualisation: new opportunities to enhance the useability and accessibility tool whilst avoiding demanding computations e.g., SSEN's PI historian network data provides a statistical understanding of intra-day/seasonal flow behaviour useful for developer discussions.

**Stakeholders**

REACT has connected with relevant SIF projects featuring power flow modelling, visualization and connection management: Powering Wales Renewably (NG-ESO); DNIM (SGN); Supply Chain Resilience in The Transition (National Gas Transmission); Connectrolyser (UK Power Networks).

REACT also interviewed hydrogen developers in SSEN-T's area including Statera (3GW Kintore hydrogen project) regarding pre-application site optimisation.

Other relevant stakeholders interviewed included Crown Estate Scotland; Roadnight Taylor grid consultants; Supernode transmission technology developer and Energy Systems Catapult.

These conversations confirmed there is no duplication of REACT's planned scope, but some useful project synergies and relationships to be deepened during Alpha.

**Innovative Aspects**

REACT's core innovation combines two traditionally distinct capabilities into one user-friendly tool allowing developers to easily identify the optimal location for future connections:

*Spatial Planning: incorporating current/future power and gas infrastructure, allowing users to understand alternative grid connections and optimise the location of future developments. This requires aggregation and integration of multiple spatial datasets, including new data for early-stage projects and online measuring tools to quickly screen cable routes.

*Power flow modelling: The tool will approximate the impact and feasibility of connections before application, dynamically considering other connection requests.

Once delivered, the tool will be a powerful enabler for further innovation as a comprehensive and easy-to-use energy system planning tool accessible to planners, developers, government and researchers designing the net zero network.

**Comparison to State-of-the-Art**

Spatial Planning, Power flow modelling- REACT will integrate disparate and often incompatible datasets into one tool: Transmission Entry Connection Register, Electricity Ten-Year Statement appendices, Renewable Energy Project Database, secondary datasets including land-use, gas infrastructure, water supply; SSEN GIS shapefiles and power flow outputs.

Data visualization- REACT will use cutting-edge spatial data processing and interactive JavaScript-based web developer frameworks (e.g. Sveltekit), embedded Business Intelligence products and geographic mapping platforms, browser and mobile

device accessible and surpassing traditional GIS solutions.

**Size/Scale**

Alpha is framed around hydrogen developments ensuring it is sufficiently narrow in scope for timely delivery. The tool will be accessible to other organisations via its web-based platform, enabling the rapid uptake of additional network operators and developers.

**SIF Funding**

The innovative/risky nature of REACT means it cannot be funded through business-as-usual activities as there is no certainty of success.

**Counterfactual solutions and approaches**

There is no known network visualisation tool offering this functionality at the pre-application stage. The counterfactual would be waiting 2-3 years for a traditional IT Project to deliver an improved digitised power flow visualisation capability, developing this into a pre-application tool, 4-5 years in total.

## Impact and benefits (not scored)

Financial - cost savings per annum for users of network services

Environmental - carbon reduction – direct CO2 savings per annum

Environmental - carbon reduction – indirect CO2 savings per annum

New to market – products

New to market – processes

New to market - services

## Impacts and benefits description

**Impacts and benefits description**

REACT will deliver the following net benefits to consumers:

**Financial - Cost savings for users of network services**

High demand for grid connections, such as large-scale hydrogen electrolysers and generation assets, has resulted in expensive connection offers being made to developers, many of which have long lead-times. This is due to the large volumes of capacity requested and limited availability on the network. Many incoming requests trigger costly reinforcement work of the network, which delays the connection of these developments, thereby slowing down the energy transition and increasing consumer bills.

REACT's pre-application tool will give developers increased early network insights and visibility of optimal network connection points for these sites, which could deliver large cost and time savings. Providing a more up-to-date integrated view of all potential network connection requests will be an enabler for improving the efficiency of the network, and provide the opportunity to reduce system constraints, curtailments and TNUoS (Transmission Network Use of System) charges. Total annual cost avoidance is projected to average £20.8M in the period 2024 to 2031. In addition, early visibility of this holistic and comprehensive view will allow for more streamlined pre-application discussions between developers, the ESO, and the TO, resulting in time and resource savings for the developer and SSEN-T and reducing the risk of repeat applications.

**Environmental - Direct CO2 savings per annum against a business-as-usual counterfactual**

REACT will reduce the carbon emissions of building new infrastructure which would be required for the increase in connection requests. By utilising the existing network in a more optimal way, for example, exploiting locations of spare capacity or low constraint, REACT will deliver direct environmental benefits.

**Environmental - Indirect CO2 savings per annum against a BaU counterfactual**

Carbon reductions will be investigated to identify the amount saved through reducing the delivery delays of hydrogen and other projects while taking into consideration the ESOs and SSEN-T's North of Scotland future energy scenarios.

New connection requests are currently subject to long lead times, due to the large volume of applications being processed, as well as the increasing need for network reinforcements. By providing a combined geospatial and power systems view -- enabling developers to submit targeted applications considering both technology-specific land requirements as well as optimal grid connection points -- the tool will help limit the volume of application requests as well as reduce the need for network reinforcement. Furthermore, the strategic planning insight provided by the tool will reduce the hurdle to market for new hydrogen and other developers entering the market. These factors will accelerate the connection process for key developments needed to achieve a timely Net Zero transition.

**New to market - products, processes, and services**

REACT is new to the market and will combine power flow modelling and spatial planning tool, making it a unique innovation. The license would be jointly owned by the developing parties during the SIF process. As the tool developer, Olsights would administer license agreements on behalf of the joint owners. Licensees would enjoy commercial use of the tool, either as an adapted version for their own jurisdictions or as part of a broader software package. The SME partners (Olsights, MapStand) could see significant business-growth if this tool is rolled-out across the industry. By combining multiple processes (spatial planning and power flow modelling) into one, REACT will streamline the connections process and provide quicker results for developers, in turn accelerating the uptake of renewable technologies and supporting the rise in green jobs across GB.

## Teams and resources

The Discovery project team included SSEN-T and three other UK-based specialist SMEs bringing high levels of innovation and growth potential to the project, namely Olsights, MapStand and Icebreaker One.

The consortium for Alpha will be enhanced to include a second transmission owner National Grid Electricity Transmission (NGET), plus a gas network operator Scotland Gas Networks (SGN) to ensure the requirements of the REACT tool satisfy a wide set of stakeholders. These organisations have been approached during Discovery to understand their connection challenges and build working relationships.

During Alpha, further stakeholder engagement with Developers (e.g., hydrogen developer Statera) is planned to help develop and refine the tool, through a series of software testing sprints.

The six Alpha stage partners are described here:

**SSEN Transmission (SSEN-T)**

Transmission Owner of the North of Scotland electricity network with a license obligation to make connection offers to developers looking to connect to the network. SSEN-T has the key competencies in system planning, connection management, and the data sets to lead this project and develop the best solution for deployment into BaU.

**Olsights**

An SME that has developed a clean energy digital data visualisation tool that allows rapid decision-making to solve difficult energy transition problems. Their interactive digital tool is proposed as the backbone for the REACT tool. Before REACT, Olsights had used its tool to model national hydrogen and carbon capture project developments for clients such as The Crown Estate and DESNZ. The Olsights team has more than 40 years of combined global experience delivering energy projects. Olsights will sub-contract some aspects of the architecture and front-end tool design to Blue Summit Technologies -- an experienced IT support and software development company with over 14 years of experience and 200+ developers spread across the UK, US and India. Olsights will also contract a professional cartographer to help with elements of geographic spatial styling.

**MapStand**

A micro-enterprise research firm that builds and maintains spatial datasets relating to energy infrastructure. MapStand's expertise complements that of Olsights whom they have worked collaboratively on several other projects over the past few years. The datasets built by MapStand are a vital part of the information required to power Olsights data analytics visualisation tools.

**Icebreaker One**

An independent non-profit creating a web of net-zero data to connect financial, industry and environmental data to inform net-zero decisions. They enable sectors to create net-zero data strategies and open standards. In Alpha, Icebreaker One will be convening an Advisory Group for industry feedback on REACT's development, testing data sensitivity classes, and developing guidelines on applying use case analysis across the sector and for different use cases.

**National Grid Electricity Transmission (NGET)**

Transmission Owner NGET is the largest electricity transmission business in the UK that owns and maintains the high-voltage electricity transmission network in England and Wales. They are committed to streamlining processes including connections and see REACT as being a valuable tool in helping to reform the process to expedite connections.

**Scotland Gas Networks (SGN)**

The SGN Group owns the gas distribution networks, operating across Scotland, southern England and Northern Ireland. They believe this project will provide valuable insight when selecting sights for their hydrogen development and transition projects in general.

# Project Plans and Milestones

## Project management and delivery

**Approach**

The Alpha Phase project has been divided into six work packages. SSEN-T will follow its well-established robust and proven project management processes successfully applied to SIF Round 1 Alpha Phase projects by applying an agile, flexible, and adaptable approach throughout the project. Moreover, an SSEN-T SIF Governance document was produced at the request of the auditing team and will be followed in the execution of SIF projects.

WP and milestone links and dependencies:

**WP1: Project Management [Lead: SSEN-T]**

Weekly project partner meetings to discuss progress, issues, and risks and ensure all funding requirements continue to be met.
Delivery of all project milestones and deliverables and ensuring a plan for Beta is developed and a decision is reached on whether to proceed with an application.

**WP2: User Group Requirements and Tool Evaluation [Lead: NGET]**

Define and articulate the full set of network requirements.
Engagement with developers to understand their set of user needs.

**WP3: Data Accessibility and Interoperability [Lead: IB1]**

Organise advisory group which will include network data analytics and IT team members.
Data sensitivity testing with key users.
Provide data-sharing recommendations and guidance for use case analysis.

**WP4: Management and Integration of Datasets [Lead: MapStand]**

Development and integration of a variety of network data sets.
Make data available as an API and Database.

**WP5: Tool Development and Testing [Lead: Olsights]**

Design, style and build a power network visualisation model.
Work with partners to iteratively test and refine the model according to their collective feedback.

**WP6: Development of CBA [Lead: SSEN-T]**

Review and update the CBA such that the data can be viewed with a greater level of confidence.

**Risk Management Strategy**

The partners have compiled a list of risks as part of the REACT Project Management and will hold regular reviews to update the risk register. The risks are assigned to the most applicable partner and are distributed as evenly as is practicable to help ensure no one partner is overly burdened.

**Proposed stage-gates**

A Beta Phase go / no go review.

**Planned or unplanned supply interruptions**

The project has no detrimental effect on the consumer and will not require access to the electricity or gas network.

**Consumer interactions**

The project will help reduce the connection time for higher energy consumers (developers) whilst improving the overall efficiency of the existing energy network given the greater visibility made available through the tool.

**Subcontractors**

Olsights plans on contracting some front-end development support and cartography development.

MapStand plans on contracting a former senior employee who now contracts. They will support software development and project guidance.

All subcontractors are UK in origin.

## Key outputs and dissemination

**Key outputs**

The project team will work collaboratively to ensure the key targeted outputs are delivered and the knowledge learned is disseminated via suitable routes and platforms.

More specifically, by the end of the Alpha Phase, the project aims to achieve the following key outcomes with the responsible partner(s) indicated:

1. Confirmation of the Beta Phase approach incorporating a detailed implementation plan and future commercialisation roadmap (All partners)
2. Establish a set of stakeholder requirements and feedback that is used to inform the design and development of the tool. (NGET, SGN, SSEN-T, MapStand, Olsights).
3. Establish guidelines on consistent use case analysis across the distribution network and transmission organisations. (SSEN-T, NGET)
4. Provide recommendations on how open and relevant, data sets can be accessed in an efficient way, and guidelines for retooling for different assets. (IB1)
5. Establish a functional base modelling tool integrating datasets and core functionality including visualisation. (Olsights)
6. Undertake detailed CBA analysis. (SSEN-T)
7. Prepare a commercialisation roadmap for the rollout of the solution (All partners)

Collaboration is critical to the development of this work from both a technical perspective (solutions must meet user needs) and a cultural perspective (solutions must be co-designed, adopted, used and iterated upon by market participants). Our approach to the development of REACT will embrace these principles.

**Knowledge dissemination**

Icebreaker One's communications team will scope and develop a stakeholder engagement plan and knowledge dissemination strategy for REACT which will enable open and transparent ways of working whilst seeking industry feedback and sharing knowledge.

Stakeholder engagement: The project will engage in direct, open collaboration with the sector via the Advisory Group and accompanying workshops and will consult with stakeholders and incorporate their feedback into the development and implementation work. This will include co-identifying contacts and stakeholders within and beyond the existing 300+ energy sector connections with industry stakeholders, publishing a call for engagement with our wide and varied energy industry-engaged stakeholders, and routinely validating groups and engaging with new contacts as required.

Dissemination: The dissemination strategy will identify target audiences, outputs, the means and a schedule for sharing key results from the project. To enable wider outreach and engagement with the sector the means of dissemination will be multi-channel including social media (e.g., LinkedIn), public written reports, dedicated project webinars, conference/workshop presentations, SIF forums, and TO forums. These interactions will further facilitate stakeholder feedback to shape REACT.

## Commercials

### Intellectual property rights, procurement and contracting (not scored)

**Intellectual Property Rights**

For the Alpha phase, all the IPR arrangements will follow the default recommendations of the Chapter 9 SIF Governance Document.

To ensure clarity is provided to the Project Partners, UKRI and Ofgem regarding the IP landscape, the Project is using an IP register to track the Background IP provided to the Project, the Foreground IP the Project generates, and the use and access rights to all this IP. The current REACT IP register includes the following identified IP:

**Background IP - SSEN-T:**

A database and a visual map to show Transmission Network connection capacities and an indication of spare capacity.
A method for estimating operational capacity, engineering, project delivery and commercial implications for Transmission Network demand expansion, in response to individual network connection requests.

**Background IP - MapStand:**

A method of automatically interrogating open data sources for relevant energy supply + demand, licencing, project facilities and transmission infrastructure data
A method for automatically capturing energy project development initiation data, news stories, planning status changes and trends etc.
A method for aggregating such energy project data into a single database, in a common/standard format that others can digitally connect with and/or collaborate with for specific projects.

**Background IP - Olsights:**

A method for styling and visualising relevant energy projects and operations in an interactive 3D globe, for enhanced organisational understanding.
A toolkit for reporting filtered management-level spatial energy supply and demand data within an interactive 3D globe.
A platform upon which to perform & integrate various predictive technical and commercial calculations + analytics relating to energy developments, network resilience and robustness, cost and economics etc within an interactive 3D globe.

**Background IP - 3rd Party Power Flow Simulation Software Providers (e.g., Siemens, DigSilent):**

A method to automatically simulate and solve electrical power flows across a power transmission network and through connection components.

**Foreground IP**

The REACT Project has evolved somewhat from automatically calculating power flows as explored during Discovery - to a broader understanding of transmission connection development success, and the currently identified

Foreground IP includes:

- A toolkit for measuring, aggregating, averaging (and performing other statistical analysis on) transmission network power supply and demand data - within an interactive map, based on user-drawn lines/areas to represent new power demands from energy transition development projects such as electrolytic hydrogen, carbon capture plants etc. (Olsights).
- A toolkit for automatically estimating operational capacity, engineering, project delivery, and commercial implications for Transmission Network demand expansion scenarios, in response to individual and multiple network connection requests (Olsights).

The main contract governing the Project (the Collaboration Agreement) will include detailed, mutually agreed terms governing IP that are in line with the SIF Governance Document.

Icebreaker One has an open-by-default policy and their relevant outputs will be openly licensed.

**Procurement and contracting**

Subcontract arrangements will be managed by the relevant appointing partner in accordance with their procurement processes. This applies only to Olsights and MapStand who will award three subcontracts for key services. If detailed discussions with third parties require it, an NDA will be put in place beforehand to protect confidentiality.

## Commercialisation, route to market and business as usual

**BaU adoption and competitive markets**

REACT benefits from the involvement of three partners SSEN-T, NGET and SGN who are positioned to adopt the tool. The anchor adopter will be SSEN-T's Systems Planning and Investment Teams who assess, manage, and respond to all connection requests and are therefore ideally placed to make REACT's tool a BaU solution.

To ensure widespread adoption within SSEN-T and the partner TO/DNOs, other TO/DNOs and the developer community, the project will undertake several activities, including:

1. Host workshops to share learnings and best practices with the wider industry.
2. Launch a public version of the tool on the SSEN-T website, allowing developers access to it prior to submitting connection requests. This would allow for more informative discussions and enhance decision-making.
3. Include a link to the REACT tool in the SSEN-T Customer Connections section of the website and the 'Transmission Connections Guide', making it easily accessible for developers.
4. Train the SSEN-T Connections Team on how to use the tool and update the 'Connection Application' work instructions to ensure the tool is used when assessing new connection requests.
5. Roll this out in a similar way in NGET and SGN's connection application processes.

REACT aims to provide developers with information on the best location to site their connection based on the current grid capacity. This should not impact the development of a competitive market as developers maintain the right to where they connect their projects.

**Customers and value proposition**

The primary customer segment the tool is targeting is large-scale energy consumers, such as electrolytic hydrogen producers, seeking an electricity network connection. SSEN-T, NGET and SGN are in Alpha to help shape the product offering from a range of network perspectives including transmission and distribution levels, electricity and gas.

Secondary customer segments could include local planning authorities, regional government, other utilities (gas and water), Crown Estate Scotland and supply chain companies. As the tool will be hosted in the cloud and can be made available with the SSEN-T website, it will be openly available to anyone. This tool has the potential to bring large business-growth opportunities for the SME technology partners involved, as the scale of this project could be rolled out across the entire industry - including overseas networks.

The ultimate value proposition for REACT is reducing the cost of operating the network, as it allows developers to identify the optimal sites for locating future connections and best utilising existing network capacity. This will reduce the need for costly reinforcement, consequently reducing the long-term impact on consumers' bills.

A further user segment that can exploit the power and accessibility of the tool would be planners and researchers investigating long-term energy system developments such as scenarios to accommodate 25GW of hydrogen production in Scotland by 2045.

**Commercial readiness**

As the tool leverages the capabilities of Olsights and MapStand, ongoing costs for the use of the tool would likely result in a licensing agreement between Olsights and MapStand for the ongoing infrastructure, data maintenance and further development of the tool. The long-term funding plan is for it to become part of the regular capital and operational expenditure of the network's business (SSEN-T, NGET) and be included in future price control budgets (RIIO-T3) following the Beta Phase.

**Lead Partner Senior sponsor**

SSEN-T's Innovation Governance Board oversees REACT and has representation from key departments: System Planning, IT, Project Engineering, Asset Management and Finance. REACT is Sponsored by a company Director and final approval to submit

the project is obtained from our Transmission Executive Committee, the highest approval level within SSEN-T.

## Policy, standards and regulations (not scored)

At this stage we do not foresee any policy barriers to the continuation of the REACT project nor do we anticipate the need for any derogations in future stages of the project.

We are aware of the sensitivity needed when processing and making publicly available information on customer applications as they move through the connection pipeline. Moving towards a more transparent connection queue will require consideration of customer data confidentiality. The public-facing side of the REACT tool will only be displaying connection pipeline information, which is already in the public domain, with the value being added by combining these many available data sources and presenting a more holistic pipeline picture from these.

By integrating and displaying power flow data the REACT tool will make available information to customers which can assist them in their early decision-making on where to site and how to configure new developments. We believe that this will assist the TO in making the network available to users in line with the CUSC obligations. However, some consideration will be required to ensure that all power flow data remains anonymised and that it will not be possible to defer individual user operating characteristics from this data. This will be ensured by only using aggregated power flows between substations, which can no longer be traced back to individual generators or demand connections.

Visualising power flows within the REACT tool will give developers information related to constraints on the network. This is an essential feature of the tool, as it will be supporting the strategic siting of new developments to make optimal use of existing transmission infrastructure. However, the tool will need to ensure that this information cannot be abused by developers to exploit the BMU system and capitalise on constraint payments. The power flows data publicly displayed in the REACT tool will not be a real-time representation of the network. The exact representation will be developed as part of the Alpha phase; however, the granularity of the power flow data displayed should not be high enough to inform real-time BMU dispatch decisions.

## Value for money

The total project costs for the Alpha Phase are £553,671 with £496,625 funding requested from the SIF, and the project partners providing the remaining contribution. This meets the compulsory contribution and demonstrates the partners' commitment to this innovative project.

The benefits to the Consumer of developing and implementing the REACT solution have been calculated as part of the Discovery phase through the development of a Cost Benefit Analysis; it has been estimated that cost savings of more than £20 million per annum could be realised through the combined avoidance of constraints, curtailment, and Transmission Network Use of System costs. This figure is based on a conservative set of assumptions.

SSEN-T has costs of £51,102 and will lead the project, manage its delivery and provide technical guidance to the other partners. This figure also includes system planning resources who will be involved in all the technical work packages working closely with the WP leads to steer their effort and furnish them with the appropriate data. The REACT project complements the Value Stream activities within the business and the team will work closely with data analytics to ensure there is no duplication in effort.

Olsights has costs of £199,240 to develop the software tool (WP5) which will require a regular dialogue with all partners to implement any feedback from the test users into the functionality of the model through an iterative process.

MapStand has costs of £153,500 to lead the identification and integration of the critical datasets (both restricted and open) from which they will generate spatial data. Consequently, they will work closely both with Olsights and Icebreaker One.

IB1 has costs of £123,006 to lead the data accessibility and interoperability work which is essential to ensure that data sharing does not restrict the use and users of the tool as it heads towards Business as Usual.

As potential end users, NGET and SGN have costs of £18,211 and £8,712, respectively. Their principal focus will be defining requirements and evaluating the REACT tool through the series of Sprints, alongside SSEN-T. They will also support the evolution of the CBA.

**Subcontractor costs**

Olsights and MapStand will award three subcontracts worth £57,500. The scope of these has been determined as essential to

deliver the project as they sit outside of the capabilities of the partners. These subcontractors will be appointed in accordance with the partner's procurement processes to ensure value for money.

**Other innovation funding**

No other funds are being requested from other innovation funding streams.

**Use of pre-existing assets or facilities**

No specific facilities will be required as the project is largely related to database and software development.

The costs submitted in the budget are in full accordance with the terms set out in the UKRI costs guidance. Therefore, these are cost rates without profit that offer more competitive rates than standard industry rates that the partners would apply to commercial work.

## Associated Innovation Projects

- ○ Yes (Please remember to upload all required documentation)
- ◉ No

## Supporting documents

### File Upload

REACTD~1.PDF - 13.1 MB
REACT Energy Innovation Summit Poster-Final version 2023-10-12.pdf - 503.9 KB
REACT Alpha - Show and Tell 2024-04-25.pdf - 2.0 MB
REACT Alpha - End of Phase Meeting 2024-04-17.pdf - 3.0 MB
SIF Alpha Round 2 Project Registration 2023-11-24 3_05 - 92.6 KB

### Documents uploaded where applicable?

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