

RAPID – Automated Routing Infrastructure

End of Phase Meeting

16th September 2025

10:30am – 12:00pm



Contents

- Project Summary
- Project Outputs and Lessons Learnt
- Final update on the project plan
- A summary of work packages
- Overview and Next Steps
- Barriers, risks, issues that you identified and overcame
- Project-specific conditions from project direction
- Comms and engagement plans going forward
- Plans for Alpha



Project Summary

Objectives:

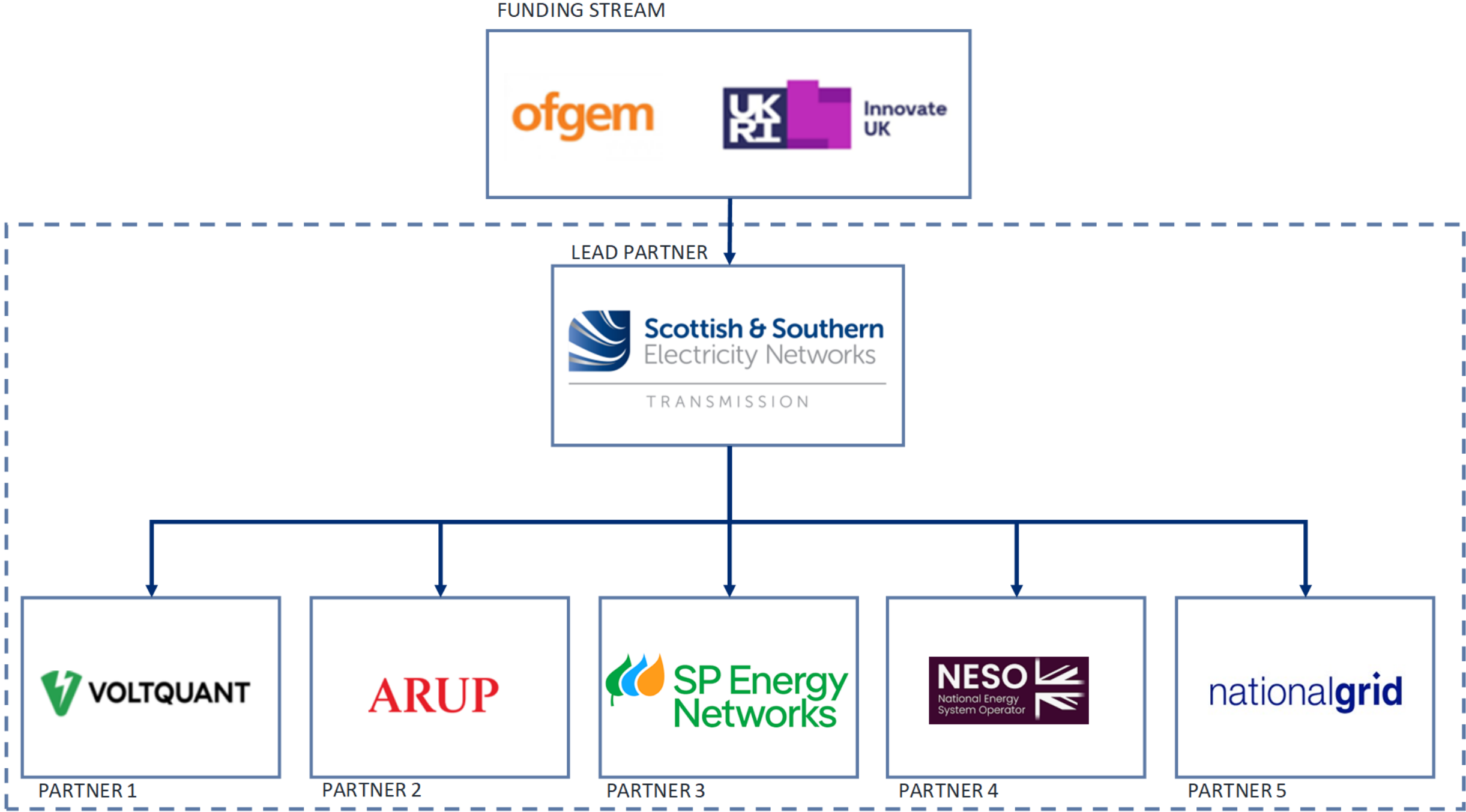
The focus is on understanding current practices within the industry regarding automated infrastructure, identifying discrepancies, and setting out a clear problem statement with a view to improving efficiency. A collaborative response to the Winsor Report, particularly AR1 and AR2 on automated routing, is required. The work also considers where delays occur in the wider transmission build process, and how digital and AI-enabled methods can be leveraged to accelerate overall delivery.

Benefits:

- A coordinated and collaborative response to the Winsor Report
- A clear evidence base of current practices and opportunities for improvement
- Improved definition of data and AI requirements to support future automation

[RAPID Discovery 1
minute video](#)

Project Partners (Discovery)



Key Project Outputs

Technical:

- A literature review that summarises the policy background regarding automated routing of infrastructure
- A benchmarking report that provides a comprehensive evaluation of current routing practices identifying inefficiencies, gaps and opportunities and summarises existing digital tools currently in use.
- A pathways report that assesses a long list of opportunities and evaluates these against defined criteria to establish a shortlist of options with a final recommendation to take forward into Alpha.

Project Management:

- All deliverables have been completed according to the project plan
- Good partner collaboration and planned to continue into Alpha
- Project delivered within financial requirements

Benefits:

- A thorough exploration of the use of digital tools in planning and designing transmission infrastructure projects and a clear recommendation as to which opportunities should be taken forward.

Lessons Learnt



Project



Technical

Collaboration agreement templates should be shared for review as early as possible as with many partners it is difficult and time-consuming awaiting, consolidating, and actioning feedback.

Explainability is critical: Early discussions showed that any automated or AI-driven routing must provide transparent reasoning to build confidence with regulators and stakeholders.

Early alignment adds value: Agreeing shared terminology up front can make cross-partner discussions smoother.

Standardisation needs to be driven by use cases. Stakeholder engagement has highlighted the need for a specific use case to inform data selection, interpretation, and granularity, which will support a roadmap to data interoperability.

Each solution needs to consider the varying needs of system designers, environmental teams, community engagement teams, and various other departments.

Adopt a phased rollout to validate tools before live deployment. Any solution will need to be tested to balance innovation with governance; i.e., automate where possible but maintain SME checks

Project Plan (Final update)

Milestone

Start

End

| WP | Description | Lead | Contributors | 2025 | | | | | | | | | | | | | | | | |
|-----|---|--------------|------------------------------|------|------|------|------|-----|------|------|------|-----|------|------|------|------|------|------|------|------|
| | | | | Jun | | | | Jul | | | | Aug | | | | | Sep | | | |
| | | | | Wk1 | Wk2 | Wk3 | Wk4 | Wk5 | Wk6 | Wk7 | Wk8 | Wk9 | Wk10 | Wk11 | Wk12 | Wk13 | Wk14 | Wk15 | Wk16 | Wk17 |
| | | | | 6th | 13th | 20th | 27th | 4th | 11th | 18th | 25th | 1st | 8th | 15th | 22nd | 29th | 5th | 12th | 19th | 26th |
| 1 | Project Management | SSEN-T | | | | | | | | | | | | | | | | | | |
| 1.1 | Maintain and track the project schedule, deliverables, risks and expenditure forecast | ARUP | All partners All partners | | | | | | | | | | | | | | | | | |
| 1.2 | Develop Project Delivery Plan | ARUP | | | | | | | | | | | | | | | | | | |
| 1.3 | Develop Stakeholder Engagement Plan | ARUP | | | | | | | | | | | | | | | | | | |
| 1.4 | Prepare for Show and Tell webinar | SSEN-T | | | | | | | | | | | | | | | | | | |
| 1.5 | Produce summary report | SSEN-T | | | | | | | | | | | | | | | | | | |
| M1 | Kick-off meeting | ARUP | | | | | | | | | | | | | | | | | | |
| M2 | Internal stage-gate to agree on whether to proceed with Alpha phase application | SSEN-T | | | | | | | | | | | | | | | | | | |
| M3 | Discovery Phase Complete | SSEN-T | | | | | | | | | | | | | | | | | | |
| 2 | Review of available policy documents | VOLTQUANT | | | | | | | | | | | | | | | | | | |
| 2.1 | Literature review based on available policy documents, including CP2030. | VOLTQUANT | | | | | | | | | | | | | | | | | | |
| 2.2 | Assessment of political impetus with recent change of government, with a focus on impacts on | VOLTQUANT | | | | | | | | | | | | | | | | | | |
| 2.3 | Assessment of accelerating existing pipeline projects | VOLTQUANT | | | | | | | | | | | | | | | | | | |
| 2.4 | Identify key short-term impact | VOLTQUANT | | | | | | | | | | | | | | | | | | |
| M4 | Summary of Policy Documents | VOLTQUANT | | | | | | | | | | | | | | | | | | |
| 3 | Review of current practices | ARUP | | | | | | | | | | | | | | | | | | |
| 3.1 | Definition of As-Is process, including user-journeys and definition of current data flows | ARUP | | | | | | | | | | | | | | | | | | |
| 3.2 | Outline of solutions already explored | ARUP | | | | | | | | | | | | | | | | | | |
| 3.3 | Market research on currently available tools | ARUP | | | | | | | | | | | | | | | | | | |
| 3.4 | User-led discovery of challenged and concerns | ARUP | | | | | | | | | | | | | | | | | | |
| 3.5 | Understanding the implementation of ETDP | ARUP | | | | | | | | | | | | | | | | | | |
| 3.6 | Identifying barriers between network development and planning | ARUP | | | | | | | | | | | | | | | | | | |
| 3.7 | Broader analysis of transmission building process | ARUP | | | | | | | | | | | | | | | | | | |
| M5 | Benchmarking report | ARUP | | | | | | | | | | | | | | | | | | |
| 4 | Solution Development | ARUP | | | | | | | | | | | | | | | | | | |
| 4.1 | Complete a GAP analysis to propose optimisation strategies | ARUP | | | | | | | | | | | | | | | | | | |
| 4.2 | Definition of initial key assumptions and proposed optimisation methodology | ARUP | | | | | | | | | | | | | | | | | | |
| 4.3 | Collate all the information into a literature review documentation, drawing out designs and m | ARUP | | | | | | | | | | | | | | | | | | |
| 4.4 | Creation of a statement of requirements for the solution | ARUP | | | | | | | | | | | | | | | | | | |
| M6 | Pathways strategy document | ARUP | | | | | | | | | | | | | | | | | | |
| END | End of Discovery Project | All partners | | | | | | | | | | | | | | | | | | |



Project Finances

| Project Partner | Total Project Costs (£) | Project Contribution (£) | Total SIF Funding Requested (£) | Project contribution (%) |
|-------------------|-------------------------|--------------------------|---------------------------------|--------------------------|
| SSEN Transmission | £9,743.28 | £9,742.28 | £1 | 100 % |
| ARUP | £84,900 | £0 | £84,900 | 0 % |
| VOLTQUANT | £50,600 | £0 | £50,600 | 0 % |
| SPEN | £4,815 | £4,814 | £1 | 100 % |
| NGET | £10,125 | £10,124 | £1 | 100 % |
| NESO | £7,160 | £3,000 | £4,160 | 41.9 % |
| Total | £167,343 | £27,680 | £139,663 | |

- Project has been delivered within the budget that has been allocated within Discovery. Project spend is being reported via the SSEN SIF combined ledger for all projects.
- Final totals will be confirmed and reported after September month end has been reconciled.

Work Package Summary

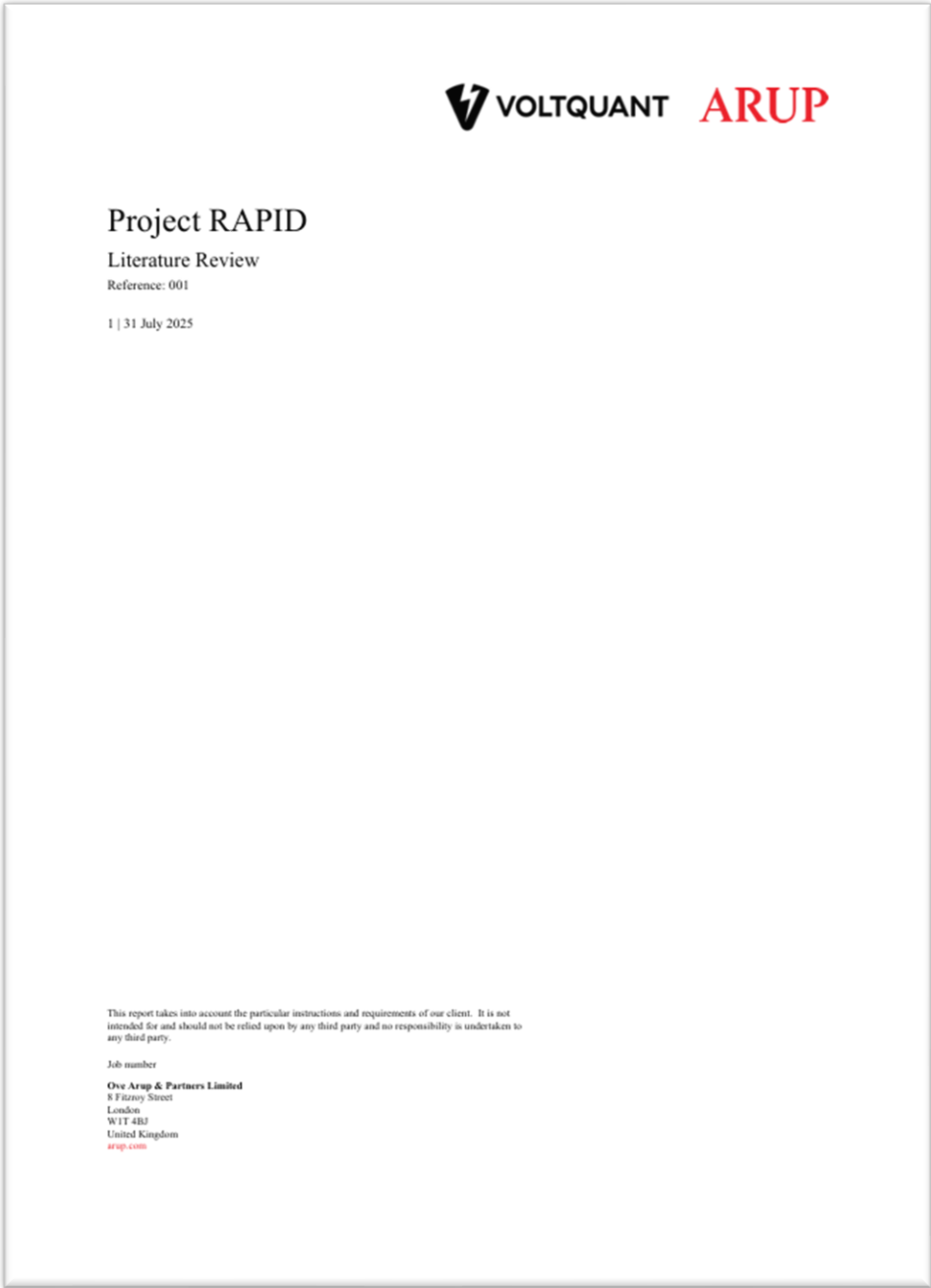
WP1 - Project Management

WP1 Deliverables:

- 1.1 Maintain and track the project schedule, project actions, and project deliverables and expenditure forecast
Project schedule updated as required ([SIF RAPID Project Management Book](#)).
Project ledger updated (expenditure), partners asked to share monthly expenditure. All partners invoicing via SSEN Tradex platform and SSEN-T timesheets recorded on internal systems.
- 1.2 Develop Project Delivery Plan
Project Delivery Plan updated as required and risks closed out when applicable.
([SIF RAPID Project Management Book](#))
- 1.3 Develop Stakeholder Engagement Plan
Stakeholder Engagement Plan developed and updated through the project delivery.
([SIF RAPID Stakeholder Engagement Plan](#))
- 1.4 Prepare for Show and Tell webinars
Show and tell webinar being scheduled by SSEN Communications manager – agreed to delay for maximum exposure as lots of people on annual leave particularly during school holidays.
- 1.5 Prepare conclusion document for monitoring officer
End of phase presentation.

WP2 - Review of available policy documents

WP2 Deliverables:



WP2 Deliverables:

| | | |
|------|---|---|
| D2.1 | Literature review | Reviewed 13 UK policy and regulatory documents (2021–2025), covering Winsor Report, ETDP, CSNP, NPS/EN-5, Horlock and Holford Rules. |
| D2.2 | Assessment of political impetus with recent change of government, with a focus on impacts on funding and project priorities | Analysed implications of recent government and Ofgem directions; confirmed strong policy support for AR1/AR2 but with skills and governance gaps. |
| D2.3 | Assessment of accelerating existing pipeline projects | Identified opportunities for faster delivery through automation and standardisation, aligned with TAAP and ASTI programmes. |
| D2.4 | Identify key short-term impact | Highlighted immediate value areas: data governance, explainable AI in routing, and early integration of environmental/community principles. |

Key areas that require innovation according to the 13 policy documents

Overview

1. **Real-Time Data Integration:** Ensure compatibility with data platforms for real-time updates on land use, ecological constraints, and infrastructure availability.

2. **Conflict Resolution Mechanism:** Include functionality to flag and resolve potential conflicts with existing land use, community objections, and environmental restrictions.

3. **Standardised Design Templates:** Integrate pre-defined templates based on ETDP guidelines for asset design in various environmental conditions (urban, rural, coastal).

4. **Stakeholder Collaboration Module:** Include interactive tools for stakeholders to provide input on design choices within permissible influence areas.

5. **Lifecycle Cost Analysis:** Embed functionality to evaluate long-term costs, carbon impacts, and societal benefits of selected designs.
6. **Compliance Verification System:** Develop automated checks to ensure designs meet equipment standards and regulatory requirements.

7. **Interoperability Across Platforms:** Ensure tools can seamlessly integrate with existing Geographic Information Systems (GIS) and other planning platforms used by TOs and statutory consultees.

8. **Environmental Impact Assessment Integration:** Incorporate modules to quantify ecological impacts of proposed routes and designs.

9. **Community Engagement Optimisation:** Add visual tools for community stakeholders to understand proposed routes and designs.

10. **Training and Skill Development Integration:** Develop training modules within the tools to enhance user competency in automated routing and standardised design principles.

11. **Cross-Border Collaboration Features:** Incorporate functionality to harmonise routing and design processes across regional boundaries.

Documents reviewed

1. Clean Power 2030 (CP2030) Action Plan

2. Electricity Networks Commissioner’s Report (Nick Winser)

3. Electricity Networks Commissioner: Letter to Secretary of State

4. Secretary of State’s Response to the Electricity Networks Commissioner

5. Transmission Acceleration Action Plan (TAAP)

6. National Policy Statement for Electricity Networks Infrastructure (EN-5)

7. Strategic Spatial Energy Plan (SSEP)

8. National Infrastructure Commission (NIC) Reports

9. Strategic Energy Planning Environmental Assessments

10. Clean Power 2030 (CP2030) Technical Annex

11. Horlock Rules

12. Holford Rules

13. Centralised Strategic Network Plan (CSNP) Methodology

WP3 - Review of current practices

WP3 Deliverables:



WP3 Deliverables:

| | | |
|------|---|---|
| D3.1 | Definition of As-Is process, including user-journeys and definition of current data flows | Engaged with SSEN-T, NGET, SPEN-T, and NESO to define current routing processes. |
| D3.2 | Outline of solutions already explored | Outlined 2 existing technologies that are being used by TOs to automate of routing and corridor identification. |
| D3.3 | Market research on currently available tools | Outlined 6 existing technologies that can support automation of routing and corridor identification. |
| D3.4 | User-led discovery of challenged and concerns | Synthesised engagement to 10 core challenges and concerns faced by TOs in scaling transmission infrastructure. |

Key challenges

Overview

- These challenges are categorized into four main areas:
- **Strategic Optioneering:** involves the early-stage decision-making process where geographic constraints and schematic network needs must be balanced.
- **Route Corridor:** focuses on the selection and management of the physical pathways for transmission lines.
- **Route Options:** pertain to the iterative process of refining and selecting the best-possible routes.
- **Planning & Consenting** encompasses the legal and administrative processes required to gain approval for the proposed routes.

Note: *These challenges are an aggregation of stakeholder feedback across all three TOs.*

Strategic Optioneering

- Limited integration of geographic constraints at corridor selection
- Disconnect between schematic network need and spatial feasibility
- Lack of standardised assumptions across TOs

Route Options

- Unforeseen redesign due to late-stage constraints or consultation feedback
- Poor integration between engineering and environmental data
- Manual processes for alignment refinement

Route Corridor

- Balancing environmental, technical, and social constraints
- Early-stage data gaps (e.g. Land ownership, access)
- Inconsistent corridor widths and selection criteria across different TOs

Planning & Consenting

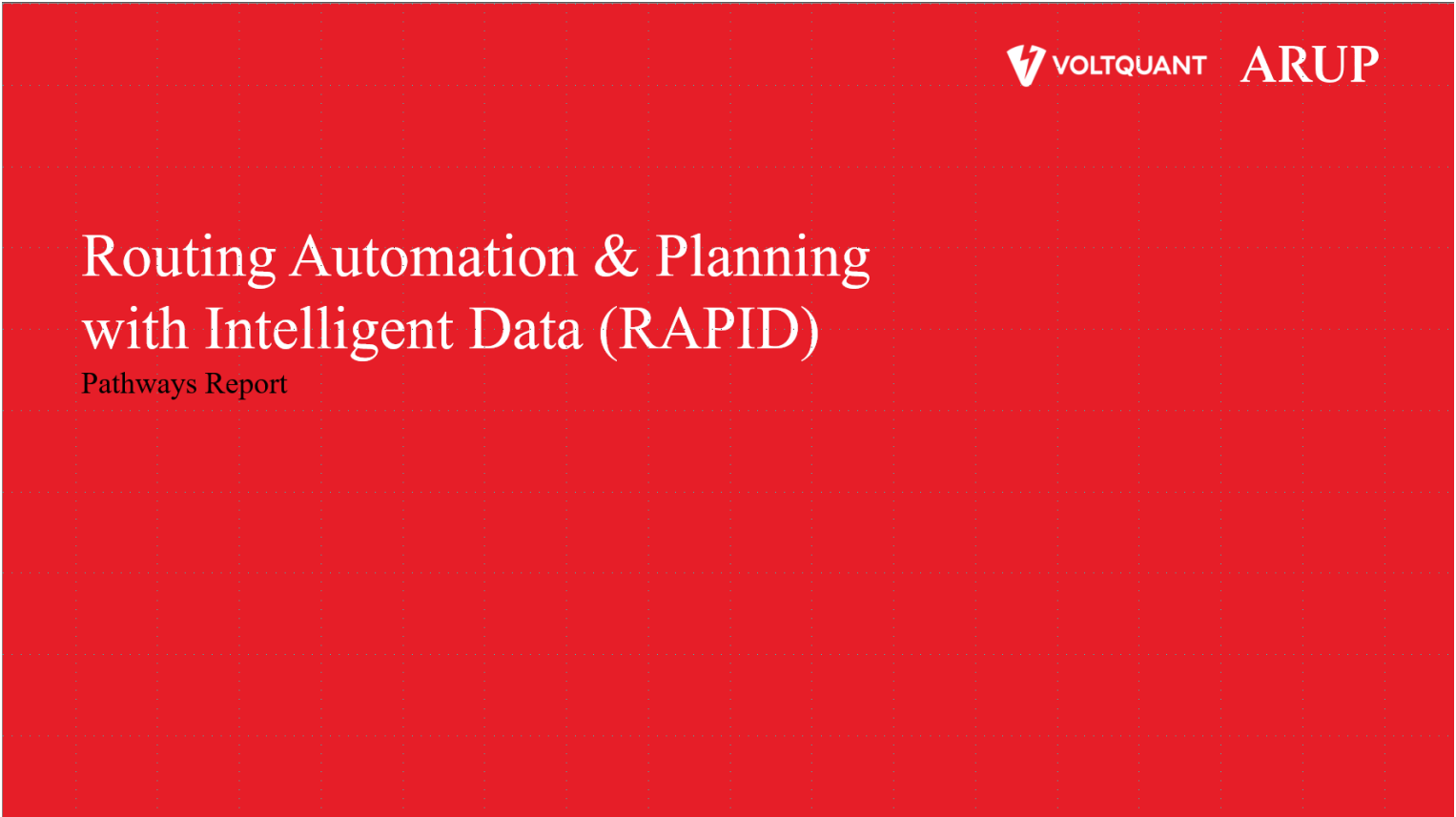
- Land access negotiations and legal processes (e.g. Wayleaves, easements) are often bottlenecks
- High administrative effort to complete the required tasks to get the plan approved

Long list of opportunities

- **Common data model:** Definition of a common data model, data sets, and environment to enable technology and data interoperability.
- **Route-Rationale GPT:** Leverages AI to help subject matter experts answer, “Why this corridor?” rationale at pace and scale.
- **Planning-Pack Generator:** Builds and updates DCO/EIA document packs based on team notes, meeting transcripts, and other data sources.
- **Land consenting tool:** Automation of land access agreements and tracking.
- **Common network assessment tool for strategic route optioneering:** A shared platform to support early-stage corridor identification using a common methodology agreed between TOs.
- **ETDP route scoring tool:** A multi-criteria assessment tool to help narrow down to numerous route options.
- **Stakeholder evaluation tool:** To evaluate and understand concerns based on historic applications.

WP4 - Automatic Issue Identification

WP4 Deliverables:



WP4 Deliverables:

| | | |
|------|--|--|
| D4.1 | GAP analysis | A long-list of opportunities were defined to define GAP analysis through a lens of potential product use cases. |
| D4.2 | Define assessment criteria to inform selection of a recommendation | Undertook a comprehensive evaluation of the long-list of opportunities to reach a short list. Following criteria were used: (1) Ability to meet the stated challenges, (2) Feasibility, (3) User Value, and (4) Viability. |
| D4.3 | Detailed definition of opportunities, including assumptions, constraints, and dependencies | Three opportunities were shortlisted: 1. Route-Rationale GPT 2. Consenting Platform Integrator 3. Land Negotiation Tool |

Prioritisation criteria

Overview

- Each opportunity is thoroughly examined against these five criteria:
- **Ability to Solve the Stated Challenge**
- **Feasibility**
- **User Value**
- **Adoption Viability**
- **Duplication in Thinking**

Ability to solve the stated challenge

- Will it support solving the stated challenges?
- Can it meet the stated needs of the Winner report?

User value

- Is there time or cost savings compared to as-is process?
- Can it support business teams across NGET, SPEN, and SSEN-T make better decisions?

Adoption viability

- How complex is it to integrate this technology into current processes?
- To what extent is this solution scalable?

Feasibility

- Is the opportunity 'innovative', requiring a submission to SiF Alpha?
- What is the confidence level of this tool achieving the stated benefits?

Duplication in thinking

- Does this opportunity have similar functionality as other long list of opportunities?
- Does this opportunity have similar functionality as other external tools and innovation projects?

Narrowing down the list of opportunities

Foundational dependency

- **Common Data Environment:** This foundational dependency ensures data interoperability across multiple technology platforms, enabling consistent and accurate data integration for route planning and decision-making.

Short-listed opportunities

- **Route-Rationale GPT:** This tool provide transparent reasoning for corridor and route options. It leverages AI to support SMEs throughout the reasoning process, significantly reducing the time required for corridor and route studies and enhancing the defensibility of route decisions.
- **Consenting Platform Integrator:** Designed to support the generation of templated documents, this tool leverages AI in the drafting and regeneration of essential statutory and land access documents, saving time and reducing costs.
- **Land Negotiation Tool:** This research/innovation opportunity leverages multi-agent systems & modern portfolio theory to help land teams negotiate with landowners.

Overview and Next Steps

The Discovery Project RAPID, or Routing Automation and Planning with Intelligent Data, is a key initiative designed to modernise the UK's electricity transmission infrastructure development and build process.

This phase delivered a comprehensive overview of:

1. Current routing practices across Transmission Operators (TOs), identifying inefficiencies and opportunities for standardisation.
2. The impact of upcoming changes to the routing process, including the integration of Electricity Transmission Design Principles (ETDP) and alignment with key recommendations from the Winsor Report. Specifically, the automation of corridor routing and improved asset placement.
3. A market review of existing and emerging route planning tools highlighted the potential for AI and data-driven solutions to accelerate infrastructure delivery.

The project also produced a list of opportunities to support cross-sector collaboration and data interoperability.

Next Steps

Building on these achievements, the next step is to submit a proposal for the Alpha Phase, which will focus on prototyping intelligent support tools, establishing governance frameworks, and developing a shared data strategy.

Barriers/Risks/Issues

BARRIERS

- **Fragmented tools & processes** across TOs → limits consistency and slows down decision-making.
- **Regulatory caution** around automated routing → need for explainable, auditable outputs.
- **Complex multi-stakeholder environment** (TOs, NESO, regulators, communities) → high alignment cost.

RISKS

- **AI credibility risk**: if software outputs are not transparent, regulators may reject them.
- **Policy baseline risk**: ETDP not fully finalised; Alpha tools must adapt to evolving rules.
- **Adoption risk**: without user-friendly software, networks and stakeholders may revert to legacy workflows which cause the delays in the first instance.

ISSUE

- **Timing pressure**: compressed 3-month window made partner coordination challenging.
- **No major delivery issues** recorded, outputs delivered to plan.

Project Specific Conditions

| Project Specific Conditions | | How these have been met |
|-----------------------------|--|--|
| 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. | No SIF funding was spent until a collaboration and purchase order was in place with all partners. |
| 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 on the Innovation Funding Service (IFS). | Project finances set up on the IFS portal and project actuals are being reported via the SSEN SIF combined ledger for all projects. Final totals will be confirmed and reported after September month end has been reconciled. |
| Condition 3 | The Funding Party must make reasonable endeavours to participate in all meetings related to the Project that they are invited to by Ofgem, UKRI and the Department for Energy Security and Net Zero during the Discovery Phase | End of Phase Meeting and Show and Tell Webinar. |

Project Specific Conditions cont.

| Project Specific Conditions | | How these have been met |
|-----------------------------|--|---|
| Condition 4 | The Discovery phase will last for a period of up to five months from the date the Project Direction is issued; the Project will be allowed a flexible start date within the five-month period. The Project must provide the monitoring officer with the start date of the Project and must be completed before the end of the five-month period. | Start date was provided to the monitoring officer. All work packages have been fully delivered with show and tell webinar to be completed in the coming weeks. |
| Condition 5 | <p>Prior to the end of the Discovery Phase, the Funding Party must provide to the Monitoring Officer justification as to:</p> <ul style="list-style-type: none"> • Why a standardised framework would offer an improvement over the current route planning practices. • Why a standardised approach will support the problem statement of the Project. | <ul style="list-style-type: none"> • Standardising data across different software and tools removes barriers between systems, making it easier to find, combine, and analyse information, saving time and reducing repeated effort across multiple TOs. • Encourages shared ownership for data quality, assurance, especially for data sets used across multiple organisations. |

Value realisation

Winser report

As part of the discovery phase, the team aimed to answer the following questions as part of it's delivery.

1. Evidenced based approach to addressing the critical key recommendations in the Electricity Networks Commissioner's Report.

AR1: The standardisation of an automated corridor routing process, overseen by landscape architects, to enable broader and more defensible route options.

As noted in the next page.

AR2: The integration of Electricity Transmission Design Principles (ETDP) into route design, supported by new tools that guide asset selection and location within corridors.

ETDP has not been released, and only limited details are available; as a result, any evaluation of its application for RAPID is constrained, presenting difficulties for its incorporation in next step proposals or solution development.

Noted value

The discovery project evidenced, through stakeholder engagement, the following benefits can be realised through the short-listed opportunities, although requiring further analysis in the Alpha phase.

1. Increase efficiency in route planning by reducing the administrative burden on engineering, consenting, land, and construction teams.
2. Improved confidence in route planning process by helping teams focus on value-add activities and share learnings across Transmission Network Owners.
3. Reduction in time taken for public consultations and consenting.
4. Increase in collaboration through shared responsibility for mitigating common challenges.

Need for standardisation

Overview

Data is the foundation of innovation needed to address the challenges associated with corridor and route-finding lifecycle. Without consistent and accurate data, even the most promising innovations cannot succeed. Effective route optioneering relies on timely, accurate, and interoperable data, making a Common Data Environment (CDE) an essential foundation.

For the CDE to facilitate the integration of diverse data sets, including geospatial, engineering, land, stakeholder engagement, and non-technical information such as project plans, meeting minutes, decision records, and voice transcripts, while ensuring the CDE is accessible to all projects across TOs, who have their own unique digital infrastructure, a common data model and an ontology aligned to an agreed upon data standard is a key dependency.

Evidenced through the literature review

Cross-Border Coordination

The absence of explicit mechanisms for harmonising policies across England, Scotland, and Wales risks fragmentation in planning and consenting processes. This is particularly problematic for projects requiring interregional transmission routes.

Clear Data Governance Framework

While data-driven approaches are emphasised, there is no comprehensive strategy for managing, sharing, and securing data across stakeholders. This gap complicates the establishment of interoperable systems for GIS-based routing optimisation and predictive analytics.

Integration of AI and Machine Learning in Planning Processes

None of the reviewed documents provide explicit guidance on how AI-driven tools or machine learning algorithms should be utilised within infrastructure planning frameworks. While integrating legacy qualitative principles from Horlock and Holford Rules alongside the structured approach outlined in the CSNP methodology provides partial guidance, there remains a notable lack of explicit frameworks for embedding these qualitative assessments into automated or AI-driven route planning processes. The recent Linear Infrastructure Planning Panel report similarly notes gaps in regulation and standards around AI and automated planning tools, highlighting the need for clear governance structures and assurance mechanisms tailored specifically for infrastructure planning.

Communications/Engagement Plans

- End of phase meeting 16/09/25
- Discovery Show and Tell Webinar (online) – Planned in for 30th September 2025.
- Publication of key project documents on the ENA Smarter Networks Portal which is publicly available.
- Will be featured in the next SSEN Transmission annual innovation summary report.
- Press release on successful RAPID Discovery funding by SSEN-T.
- Planned press release on the successful completion of the project and next steps.

Plan for Alpha Phase

Aim

- Undertake further stakeholder engagement to quantify the value of each opportunity, while understanding how each opportunity will fit in their existing processes.
- Develop a Proof-of-Concept (PoC) to validate the solution's ability to deliver the stated value

The scope will be delivered across the following work packages:

1. Project management
2. Opportunity refinement
3. Solution architecture
4. Data & framework
5. Build of PoC
6. Model testing

Next Steps

- The draft scope is currently under review by the SSEN-T Innovation Governance board. Bid development is in progress.
- Plan to submit an Alpha phase application during the next funding cycle.

Thank you

For more information, please contact:
nithiananthan.vejayan@sse.com

