Notes on Completion: Please refer to the appropriate NIA Governance Document to assist in the completion of this form. The full completed submission should not exceed 6 pages in total.

NIA Project Registration and PEA Document

Date of Submission

Nov 2022

Project Reference Number

NIA_NGN_407

Project Registration

Project Title

Asset Data Intelligence

Project Reference Number

NIA_NGN_407

Project Licensee(s)

Northern Gas Networks

Project Start

August 2022

Project Duration

0 years and 6 months

Nominated Project Contact(s)

tpollock@northerngas.co.uk

Project Budget

£205,906.00

Summary

Asset Data Intelligence works by processing Equipment data stored in SAP S/4 HANA and associated Characteristic data. The aim is to identify data outliers and quality issues using artificial intelligence (AI), and optionally to incorporate rule-based validation. The results of the data processing are then exposed to business-users either directly in the data maintenance process in SAP S/4 HANA, or after the fact in the form of business intelligence reports.

Third Party Collaborators

EY AgilityWorks

Nominated Contact Email Address(es)

innovation@northerngas.co.uk

Problem Being Solved

In November 2021 Ofgem introduced a new Licence Condition for all GDNs to comply with Data Best Practice Principles. These principles outline an obligation on networks to treat all data as ‘presumed open’ i.e. we must have a good reason (such as data protection for personal data) not to make our data available for anyone to use, at any time. Our data, about our assets, about our operations and about our interactions, has been identified as critical to the success of whole energy systems and the drive for Net Zero. There is focus from Ofgem, from BEIS and from stakeholders on unlocking quality, unfiltered data from networks to enable major infrastructure, policy and societal decision-making. Bad quality or incomplete datasets will no longer be an internal inconvenience, mitigated by the knowledge of experienced colleagues; now all our data will be laid bare for all to see. It is imperative that we have something that can identify data issues at scale, and provide analysis on these issues in near real-time.

A second obligation placed on GDNs in GD2 is to digitise our operations. There is focus on Digital Twins, on interactive mapping solutions, on asset interoperability for the transition to hydrogen. It should be understood that none of these things will work with poor-

quality or incomplete data, and none of these things will be able to wait a few weeks whilst the neyworks manually correct everything then send it through on a spreadsheet. Any innovation project which relies on data (which is most of them) will not be able to scale up without a constant supply of quality data. No environmental decision will be effective if based on poor quality data. No safety initiative will reach its full potential without good datasets.

To meet the massive challenges and opportunities that are linked to data, we must have a way to efficiently monitor the health of our datasets.

Method(s)

Technical Method: -
Provision of SAP Data Intelligence production tenant in SAP Business Technology Platform
Connection of SAP Data Intelligence to NGN's existing SAP HANA Cloud
Deployment of pre-configured Data Intelligence pipelines to identify anomalies in equipment records in SAP Plant Maintenance and configuration of SAP HANA Cloud to store the results using proprietary data processing algorithm
Deployment of a Data Intelligence pipeline to surface the results of up to 3 rule-based validations in SAP S/4 HANA
Amend pre-configured Data Intelligence pipelines as follows: restrict agreed data scope (medium pressure distribution mains, medium pressure valves) and model data to allow comparison of attributes across both asset classes and within the same class.
Create enhancement in SAP so that the transactions for Equipment change and display (IE02/IE03) allow users to see if the Asset Data Intelligence pipelines have flagged the equipment record displayed in SAP as an outlier. This is facilitated through integrating the results (stored in SAP HANA Cloud) with SAP S/4 HANA via a service in SAP Business Technology Platform.
Outlier report: A visual interface in either an SAP UI5 app or SAP Analytics Cloud report to surface the results of the data intelligence pipelines to end-users

Measurement Quality Statement: -
The following Quality Metrics will be monitored…
Cost Control
Delivery to pre-agreed timescales
Defect Resolution
Failure Rate

Data Quality Statement: -
The following Data Quality Metrics will be monitored…
Accuracy
Completeness
Consistency
Integrity
Timeliness
Uniqueness
Validity

Scope

The AI will assess data quality of NGN mains pipe data.

Objective(s)

To prove the feasibility of using artificial intelligence in automatically detecting, classifying and prescribing non-conformities in large asset data sets.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

No Impact upon consumers in vulnerable situations.

Success Criteria

Specific Success Criteria: -
Combining new insights generated by artificial intelligence to detect data anomalies automatically with existing data validation rules built in SAP Information Steward
Integrating data validation into the current data maintenance process in SAP S/4 HANA

Making anomalous data visible to end-users through end-user reports.
Other measures of success: -
User Perspective
Users can view the results of AI and rule-based validations in the Asset display and change screens in SAP
Users understand the results presented and agree that these are applicable and helpful during data maintenance
Users understand the results presented in the reports and agree that these are applicable and helpful
Solution Perspective
Performs effectively for in-scope data assets
Feasible to extend and scale to other asset classes and data sets
No additional architecture except SAP Data Intelligence
Solution latency can be improved on current batch schedules (daily/weekly) to intra-day Algorithm Perspective
Results vary depending on inputs (e.g. different asset classes and characteristics are handled accordingly)
Sensitivity and confidence levels can be adjusted by key-users according to real-world results
Confidence scores coincide with user experience and are validated accordingly

Project Partners and External Funding

EY AgilityWorks (actual partner)

Potential for New Learning

The feasibility of using AI in data validation
The scalability of this technology
The expected benefits of using this technology at scale.

Scale of Project

Data asset needs to be of sufficient size, with sufficient complexity (associated attributes) to be able to prove the efficacy of the AI bot..

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

The project will focus on data within Northern Gas Networks geographical boundaries (North of England)

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

NGN - £205,906

Project Eligibility Assessment Part 1

There are slightly differing requirements for RIIO-1 and RIIO-2 NIA projects. This is noted in each case, with the requirement numbers listed for both where they differ (shown as RIIO-2 / RIIO-1).

Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations (Please complete sections 3.1.1 and 3.1.2 for RIIO-2 projects only)

Please answer **at least one** of the following:

How the Project has the potential to facilitate the energy system transition:

Energy system transition will rely on an abundant supply of accurate, complete and timely data. This project investigates the potential of AI to facilitate that data supply in an efficient and sustainable way.

How the Project has potential to benefit consumer in vulnerable situations:

N/A

Requirement 2 / 2b

Has the potential to deliver net benefits to consumers

Project must have the potential to deliver a Solution that delivers a net benefit to consumers of the Gas Transporter and/or Electricity Transmission or Electricity Distribution licensee, as the context requires. This could include delivering a Solution at a lower cost than the most efficient Method currently in use on the GB Gas Transportation System, the Gas Transporter's and/or Electricity Transmission or Electricity Distribution licensee's network, or wider benefits, such as social or environmental.

Please provide an estimate of the saving if the Problem is solved (RIIO-1 projects only)

N/A

Please provide a calculation of the expected benefits the Solution

The system will allow better descision making, which reduces manual effort to record data.

Please provide an estimate of how replicable the Method is across GB

Full details of ther system can be shared if requested so others can implement the system

Please provide an outline of the costs of rolling out the Method across GB.

N/A

Requirement 3 / 1

Involve Research, Development or Demonstration

A RIIO-1 NIA Project must have the potential to have a Direct Impact on a Network Licensee's network or the operations of the System Operator and involve the Research, Development, or Demonstration of at least one of the following (please tick which applies):

☐ A specific piece of new (i.e. unproven in GB, or where a method has been trialled outside GB the Network Licensee must justify repeating it as part of a project) equipment (including control and communications system software).

☐ A specific novel arrangement or application of existing licensee equipment (including control and/or communications systems and/or software)

☐ A specific novel operational practice directly related to the operation of the Network Licensees system

☐ A specific novel commercial arrangement

RIIO-2 Projects

☑ A specific piece of new equipment (including monitoring, control and communications systems and software)

☑ A specific piece of new technology (including analysis and modelling systems or software), in relation to which the Method is unproven

☐ A new methodology (including the identification of specific new procedures or techniques used to identify, select, process, and analyse information)

☐ A specific novel arrangement or application of existing gas transportation, electricity transmission or electricity distribution equipment, technology or methodology

☐ A specific novel operational practice directly related to the operation of the GB Gas Transportation System, electricity transmission or electricity distribution

☐ A specific novel commercial arrangement

Specific Requirements 4 / 2a

Please explain how the learning that will be generated could be used by the relevant Network Licensees

The other GDN's could use the same system to better analyse their data in the same manner as NGN mean to do.

Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIIO-1 only)

N/A

Is the default IPR position being applied?

☐ Yes

Please demonstrate how the learning from the project can be successfully disseminated to Network Licensees and other interested parties.

The application of AI should be applicable to all network licencees. Not all licencees will use SAP, however the principles would still be relevant.

Please describe how many potential constraints or costs caused, or resulting from the imposed IPR arrangements.<

not applicable

Please justify why the proposed IPR arrangements provide value for money for customers.

not applicable

Project Eligibility Assessment Part 2

Not lead to unnecessary duplication

A Project must not lead to unnecessary duplication of any other Project, including but not limited to IFI, LCNF, NIA, NIC or SIF projects already registered, being carried out or completed.

Please demonstrate below that no unnecessary duplication will occur as a result of the Project.

NGN is building on works just completed in geospatial platform, whch no other partners have at present

If applicable, justify why you are undertaking a Project similar to those being carried out by any other Network Licensees.

NA

Additional Governance And Document Upload

Please identify why the project is innovative and has not been tried before

The systejms were not available to do this work on until now

Relevant Foreground IPR

This project and the resultant outcomes/deliverables will conform to the default treatment of IPR as set out under the agreed NIA Governance (where the default requirements address two types of IPR: Background IPR and Foreground IPR).

Data Access Details

All data generated by this project is network specific [pressures, locations] and as such does not require any special cleansing. It is not anticipated that there will be any restrictions on data sharing at this stage however any data identified as requiring protections to be applied [for GDPR for instance] will be conditioned appropriately in order to meet the requirement.

For all data access requests, please follow the guidance set out in Northern Gas Networks Innovation Data Sharing Policy https://www.northerngasnetworks.co.uk/ngn-you/the-future/our-funding/

Please identify why the Network Licensees will not fund the project as apart of it's business and usual activities

This is an innovation project to overcome the final hurdles, develop learning and support adoption. No business as usual allowances are suitable to fund development of this type of project.

Please identify why the project can only be undertaken with the support of the NIA, including reference to the specific risks(e.g. commercial, technical, operational or regulatory) associated with the project

This project is being undertaken via NIA to improve the data and digitisation of assets on the network, which will enable the transition to hydrogen as we continue to better plot underground assets.

This project has been approved by a senior member of staff

☑ Yes