

NIA Project Registration and PEA Document

Date of Submission

Nov 2013

Project Reference Number

NIA_NGGT0042

Project Registration

Project Title

Ramp Rate Study System

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NIA_NGGT0042

Project Licensee(s)

National Gas Transmission PLC

Project Start

October 2013

Project Duration

0 years and 7 months

Nominated Project Contact(s)

Robert Longwe

Project Budget

£58,000.00

Summary

When a new connection to the network is requested by a National Grid customer, a ramp rate study may be carried out to determine the consequences of bringing it online. If the new connection ramps up or down more quickly than the system can handle, it can lead to abnormal operating conditions which can have adverse impact on compressors and existing points of offtakes or affect the safety and security of the NTS. A ramp rate study endeavours to model this situation to determine if a particular ramp rate can be safely accommodated by the system.

At present a ramp rate study, carried out internally by National Grid, takes about three months and can involve between one and three network analysts (costing £25k -£35k to the customer). Normally, only one ramp rate study is carried out at a time. Up to five ramp rate studies can be requested in a typical year, and depending on workload, some work may be outsourced to a third party consultant. Studies carried out by the consultancy take between four to six months to complete (costing up to £50k to the customer).

The main tool used by National Grid to carry out a ramp rate study is Simone, a windows application which is a mathematical model of the gas transmission network. Generally, a study starts by selecting the most challenging NTS demand /supply scenario for the type of connection under study. For this scenario, the most challenging time of day is selected for the ramp up (first using the requested ramp rate) to start. The output from the simulation of the scenario is a "transient alarm table" that identifies pressure breaches in the network, as well as a number of graphs which show different variables against time. On examining these outputs, an analyst carries out configuration changes (e.g. turning on a compressor, shutting a valve, etc) in an attempt to "solve" the scenario by bringing the variables to within acceptable levels. Setting up a new scenario in Simone is onerous and typically between thirty to forty scenarios are investigated for a ramp rate study. Excel spreadsheet tools have been developed to facilitate this and scenario results are exported from Simone to an Access database via an Access application. In addition, various applications from the Microsoft Office suite are used to monitor the study's progress, record the results, create the final report, communicate with the customer, and generate audit forms. Information is transferred between these different applications by manual copying and pasting, which is timeconsuming and has the potential for error.

This project looks to develop an intelligent tool with the appropriate algorithms to speed up the ramp rates process, providing process

improvements and increased functionality.

Third Party Collaborators

Oxford Computer Consultants

Nominated Contact Email Address(es)

Box.GT.Innovation@nationalgrid.com

Problem Being Solved

When a new connection to the network is requested by a National Grid customer, a ramp rate study may be carried out to determine the consequences of bringing it online. A ramp rate study is a type of flow analysis carried out to ensure rapid changes in flow rate will not have an adverse impact on the safety and security of the NTS infrastructure.

The current process relies on an unwieldy and time consuming interaction between Simone (the software package National Grid Gas Transmission use for network simulation), Microsoft excel spreadsheet and access tools and a third party consultant.

It has been identified that the current methodology for ramp rate analysis process needs be less cumbersome and longwinded, and more standardised. The development of a novel software tool would improve the level of service provided to the customer as clearly the customer would like to know the outcome of ramp rate studies as soon as possible, to feed into their investment decisions. A lower cost service could be achieved through an intelligent automated tool and it is perceived that achieving these efficiencies would lead to improved customer satisfaction.

Method(s)

The project will consist of the following tasks:

1. Detailed design
2. Application Infrastructure
3. Study database and Data Access
4. User Interface
5. Simone Service and Interface
6. File interface and document automation
7. SharePoint and Email interface
8. Business logic
9. Additional document automation (timebox)
10. Integration testing
11. Deployment and documentation

Scope

When a new connection to the network is requested by a National Grid customer, a ramp rate study may be carried out to determine the consequences of bringing it online. If the new connection ramps up or down more quickly than the system can handle, it can lead to abnormal operating conditions which can have adverse impact on compressors and existing points of offtakes or affect the safety and security of the NTS. A ramp rate study endeavours to model this situation to determine if a particular ramp rate can be safely accommodated by the system.

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This project looks to develop an intelligent tool with the appropriate algorithms to speed up the ramp rates process, providing process improvements and increased functionality.

Objective(s)

To automate and standardize the ramp rate study process by developing a software system which automates some of the ramp rate study tasks and integrates various software tools used in the process.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Reduced time, and therefore cost, to carry out ramp rate studies.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The project will deliver a novel tool suitable for the assessment of proposed ramp rates associated with connections across the National Transmission System.

Technology Readiness at Start

TRL4 Bench Scale Research

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

The project is a desk-based activity which will take place at the OCC in Oxford and National Grid House Warwick.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

Total project expenditure expected is £58k

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:

n/a

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)

Based on current costs of studies carried out by National Grid, it is estimated that a savings of £150,000 over a 5 year period if this programme is successful.

Please provide a calculation of the expected benefits the Solution

We would expect the new technique to enable studies to be performed for £15k, therefore the benefit based on a typical study which currently costs £25k would be as follows:

	13/14	14/15	15/16	16/17	17/18	Total
Expected number of studies to use the new method	1	4	5	5	5	20
Base Cost (£)	£25k	100k	£125	£125k	£125k	£500k
Method Cost (£)*	£73k	£60k	£75k	£75k	£75k	£358k
Expected Benefit (£)	-£48k	£40k	£50k	£50k	£50k	£142k

*including the R&D cost of developing the tool.

In addition we should be able to undertake the studies faster and the results should be more consistent.

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

The tool will be developed specifically to interact with Simone (the NGGT network simulation tool), and it will be suitable for use on all proposed customer connections requiring ramp rate analysis.

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

None expected.

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

Learning will be used to deliver a more efficient, more standardized service to customers requiring ramp rate studies for their connections onto the gas transmission system.

The learning will be made available via the ENA Smart Portal as well as on www.nationalgrid.com/innovation, project progress and annual reporting will be made available in accordance with NIA governance.

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

- Has the Potential to Develop Learning That Can be Applied by all Relevant Network Licensees

Is the default IPR position being applied?

- Yes

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.

n/a

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

n/a

Additional Governance And Document Upload

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

n/a

Relevant Foreground IPR

n/a

Data Access Details

n/a

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

n/a

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

n/a

This project has been approved by a senior member of staff

Yes