

Gas Network Innovation Competition Full Submission
Supplementary Answer Form

Project: __ Real-Time Networks_____

Tick if this answer has been provided verbally: ☐

Project code	SGN_GN_03	Question Number	14
Question date	08/09/15	Answer date	11/09/15
Submission section question relates to			
Topic			
Question	<p>"(i) Are you aware of other any of real-time gas network projects in Europe? For example, this publically available paper by PwC on Smart Grids and gas distribution suggests, at a high-level, that there may be some similar projects being explored elsewhere –</p> <p>http://www.pwc.com/us/en/power-and-utilities/publications/smart-gas-distribution-benefits.jhtml</p> <p>(ii) If there is similar work being investigated elsewhere, in what areas do you consider that your project is different in terms of the method being employed and its objectives? "</p>		
Notes on question			
Answer	<p>As part of the feasibility study for the Real-Time Networks bid, a cross-industry review of relevant projects throughout the world was conducted by both DNV GL and Enzen. This was used to gain learning and inform best practice for developing a real-time network.</p> <p>(i) There are a number of projects purporting to develop smart gas grids. Marcogaz, the technical association for the European gas industry, describes a smart gas grid as "Maximising the efficiency of overall energy usage and taking full advantage of all the opportunities that the gas grid can offer:</p> <ul style="list-style-type: none">• Empower consumers to optimise their energy use• Enable the active participation of the end-users in the energy market• Provide a user-oriented service		

- Secure and robust energy networks are essential for the continued improvement in the operation of the European energy markets”¹

The PwC paper is a discussion paper that is very high level and non-specific. The paper refers mainly to gas distribution and transmission assets rather than energy usage and energy networks; on that basis it does not fulfil the criteria for a smart network as defined by Marcogaz nor does it replicate the work proposed in the Real-Time Networks project.

- (ii) As part of the forward horizon scanning undertaken in the NIA_SGN0066 (RTN feasibility study), we identified a number of projects being explored in Europe.

One example of a conceptual smart grid is being undertaken by Alliander², mentioned during the recent bilateral, which operates energy networks distributing gas and electricity to large parts of the Netherlands. This project will:

- monitor flow, pressures and demand throughout the network
- build in controls and pressure regulation
- seek to incorporate smart metering data

The Alliander project does not:

- address issues relating to demand assumptions
- account for understanding energy flow within the network as no gas quality monitoring is to be installed
- allow for management of embedded entries within the distribution network
- demonstrate the impact of downstream renewables on the network

Another example of a real-time smart grid has been delivered in Germany by SIMONE; this is described in a paper entitled “On-line simulation of gas distribution networks”. This project does provide online monitoring of the network but, as for the Alliander project, it is assuming a constant gas quality described as “enriched low-BTU gas”. This is a pragmatic approach that has been implemented on an existing network. The authors acknowledge that calorific value measurements would improve the understanding of the energy flow but this was outside the scope of the project. The authors also recognise that the lack of measurement data in the network is a real issue.

The Real-Time Networks project is a first step towards a smart gas network as defined by Marcogaz. The project concentrates on energy demand and the provision of a gas network that takes account of the energy contribution from both traditional and non-traditional gas supplies as well as renewable energy sources. The Real-Time Networks project is a test bed for novel sensor technologies including the development of power requirements for sensor and data transmission equipment. The project will also generate data to investigate the impact of renewable technologies on future energy

	<p>networks. A cloud solution will be developed on a standard platform that can easily be shared and used by other GB distribution networks. The project will facilitate the integration of smart meter data, if and when it becomes available, into data management systems. A knowledge of calorific value within the network may afford the opportunity to improve billing.</p> <p>The Real-Time Networks project does not include dynamic pressure and flow control at this stage, however the project is designed to ensure data management and communication can be flexible to future needs. The integration of control mechanisms could follow in the future, perhaps using some of the results from the smart network models as described in the PwC paper.</p> <p>Work management activities such as locating gas escapes, repairs and maintenance etc. can utilise smart devices which automate data capture and could use the data methodology devised to improve and influence overall asset management. A number of smart/automated devices for specific processes are being investigated under NIA, these include: Automated Gas Detection, Automated Pressure Tester, Smarter Network Control, Smart Pressure Sensor Device etc.⁴</p> <p>References</p> <p>1 http://www.eurogas.org/uploads/media/DEHAESELEER.pdf</p> <p>2 Feasibility Study for the Implementation of Real Time Networks – Enzen Global Ltd (available on request)</p> <p>3 Online simulation of gas distribution networks. Aymanns, P; Stolte A; Wilms, D and Dörner W. 9th SIMONE Congress 2008</p> <p>4 http://www.smarternetworks.org/</p>
Attachments	