Low Carbon Gas Preheating

Project Progress Report 02

19 December 2014

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1.0 Executive Summary

1.1 Project Snapshot

The transition to a low carbon energy sector in the UK presents Gas Distribution Networks (GDNs) with a number of challenges, including reducing the Business Carbon Footprint (BCF) of operating gas networks. The requirement for GDNs to preheat gas at pressure reduction stations (PRS) to avoid freezing the outlet pipework and ensure continuity of supply is a significant contributor to our BCF. GDN's preheating requirement is currently delivered using aging Water Bath Heaters (WBH) or more modern Boiler Package technologies (BH). However, there are several key issues that GDNs currently face when appraising investment options for preheating technology. Firstly, the whole life costs and in particular the carbon impact of currently available technologies is not understood. Secondly, there has been limited research or development in this area resulting in no financially viable alternative to existing technologies. And finally, the current shrinkage arrangements provide no incentive to target reductions in BCF associated with preheating.

The Low Carbon Gas Preheating (LCGP) seeks to address these issues directly. The project will install two 'alternative' preheating technologies across six NGN sites of differing scale - three Thermo Catalytic Systems (HotCat) and three Low Pressure Steam Systems (LP Steam). Smart metering technology will be installed on each of the six sites to provide data required to calculate and publish the system efficiency of each site and each technology. Additionally, smart metering technology will be installed separately on six sites that employ existing technologies. System efficiencies will be calculated and published for direct comparison.

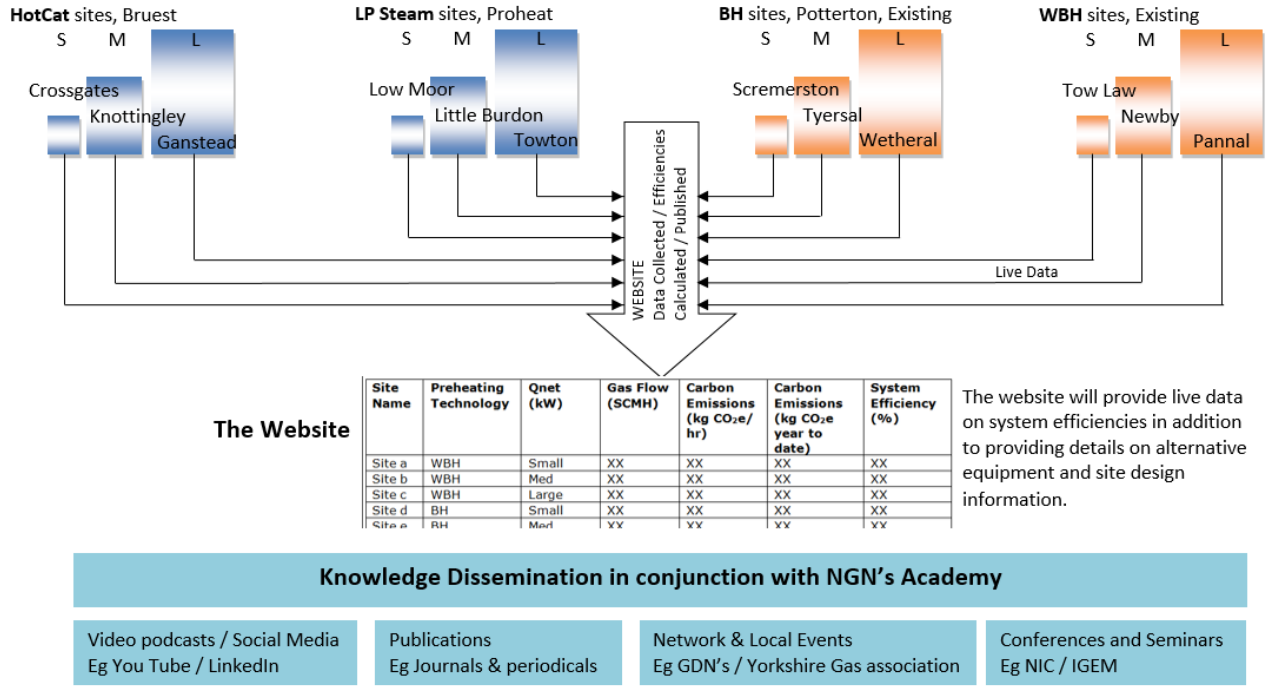

Figure 1. The LCGP Project

With reference to Figure 1, the project can be summarised as follows:

1. Site installations.

   Small Hotcat site (Crossgates) and small LP Steam site (Low Moor) installation complete. Final element of pipework to connect at Crossgates and then commissioning for both sites to be completed December 2014 / January 2015.

2. Measuring equipment – existing sites.

   Scremerston, Tyersal, Wetheral, Tow Law, Newby, Pannal. All additional signals have been designed. Installation complete. Commissioning to be completed December 2014 / January 2015.

3. Website development and procurement.

   It is now possible to share information collected from an NGN gas site with the LCGP website. Data will pass from gas site to website automatically following the site commissioning.

4. 2015 Designs.

   Knottingley, Ganstead, Little Burdon, Towton. Designs issued to NGN for internal comments. Builds to be carried out in 2015.

5. Knowledge dissemination.

   Design data and preheating manufacturer information has been added to the project website http://corporate.northerngasnetworks.co.uk/innovation/network-innovation-competition/

1.2 Project Summary

During the second 6 month period of the LCGP project, the team have delivered designs and builds for the two small alternative sites (Crossgates and Low Moor) and the 6 existing sites (Scremerston, Tyersal, Wetheral, Tow Law, Newby and Pannal).

The alternative technologies have been installed at Low Moor (LP Steam) and Crossgates (Hotcat). Once commissioning is complete data will flow back to NGN's System Control department where it will be formatted and forwarded for display on the project website.
The designs for the alternative technologies at the medium and large sites have been completed and issued for comment, appraisal and formal approval.

Design documents have been uploaded to the project website along with general arrangement drawings of the alternative technologies and the new Boilerhouse installed at Wetheral.

The approval and appraisal stage of the design for the alternative technology on the small sites within the project has taken considerably longer than originally anticipated as there are no NGN Standards which the new equipment can be said to comply with. A meeting was held on 03 December 2014 to agree all required documentation required from the site designers / equipment suppliers and thus this lessons learned will assist in all design appraisal and approval for the medium and large sites. It is not envisaged that these delays will impact the delivery of the SDRCs.

The work involved in creating the information route from gas site to website has been ongoing. The route is now operational awaiting one further element of work to be completed before the regular flow of data will occur. This will be completed in December 2014.

2.0 Project Manager's Report

2.1 Project Overview

Year 1 of the project has involved building the small alternative sites, developing the website, designing & installing the new signals to the existing technology sites, and designing the projects for the 2015 builds. Lessons learned over the period will prove useful in avoiding problems in the 2015 builds. Overall the project is on programme to provide data analysis in the in the second half of 2015. SDRC's continue to be the focus for delivery. The details of SDRC progress is contained in section 7.0.

2.2 Work Packages

The project has been broken down into 10 work packages. Each is detailed in this section but can be summarised as follows:

- WP01 to 06. Each of the 6 sites where alternative technology will be installed
- WP07. Work to be carried out on the 6 boiler house / water bath heater sites
- WP08. The website and information management
- WP09. Training / System Control
- WP10. Project Management

2.2.1 WP01. Hotcat Small (Crossgates)

- The Hotcat arrived in Liverpool docs in August 2014. The unit was installed on site at Crossgates in December 2014 and the final element of the pipework is due to be connected by the end of December 2014
- Associated electrical site upgrades have also been carried out.
- The site will be ready for commissioning in January 2015.

Figure 2. Installation of the small Hotcat at Crossgates

Challenges for the LCGP team included the following four main items. These are valuable lessons learned for the 2015 construction projects on the medium and large sites.

1. Remedial works required to the unit following close inspection from NGN.

   Whilst there are some outstanding issues with respect to the snagging items identified, we anticipate that these will be resolved in December 2014.

2. Site issues identified by NGN's contractor when excavating at Crossgates.

   Issues identified were as a result of discovering substantial unused brick built ducts under the proposed location of the new preheater. These are thought to have been ventilation ducts of some kind previously used when the site was used to produce town gas. The ducts were relatively short and had previously been blanked off at either end. They were backfilled to allow the new hotcat base to be cast.

3. Enabling works for the Crossgates gas holder demolition project.

   Some existing electrical equipment, identified for removal in the Crossgates preheating project, was required on site by a business as usual project to demolish the gas holder on this site. This work has now been completed.

4. Approval and appraisal of the Crossgates design incorporating the Hotcat.

   The approval and appraisal stage of the design for this project has taken considerably longer than originally anticipated as there are no NGN Standards which the new equipment can be said to comply with. A meeting was held on 03 December 2014 to agree all required documentation required from the site designers / equipment suppliers.

2.2.2 WP02. Hotcat Medium (Knottingley)

The detailed design has been issued for comment within NGN. The proposed layout and the engineering line diagrams have been published on the website.

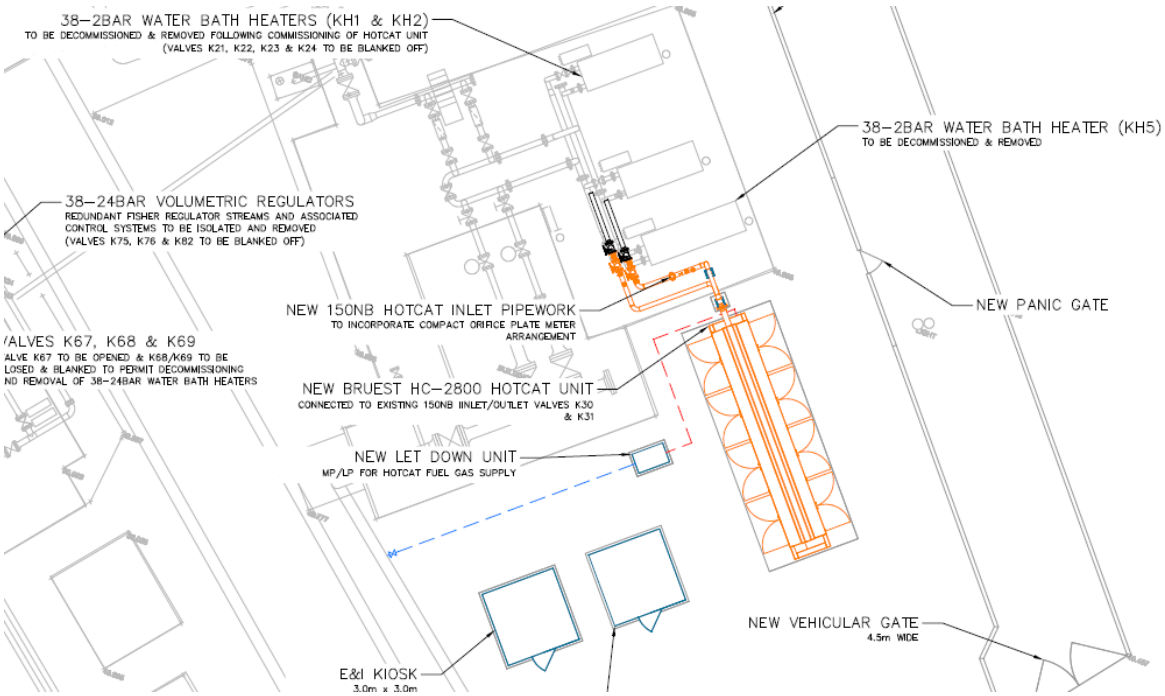

Figure 3. Proposed location of new Medium Hotcat at Knottingley

Key dates are as follows:

- MAY 2014 Hotcat Quotation provided by Bruest
- MAY 2014 Scope of Services issued for tender (design)
- JUNE 2014 Designer appointed (Rush Construction Services)
- SEPT 2014 HAZOP
- NOV 2014 All RCS detailed design drawings issued for NGN comment
- NOV 2014 20% payment released to Bruest in line with agreed terms and conditions
- DEC 2014 Review of all comments carried out (NGN / RCS)

Bruest have requested time in the design programme to develop the hotcat to attempt to maximize efficiency. This will result in a delay to the original design programme provided by RCS but is something

that NGN feel Bruest should be allowed time to complete as the project is focusing so strongly on the efficiency of the preheaters being assessed.

Once all comments from the design review and the Bruest Hotcat design have been received and incorporated the design documents will be issued for tender. The anticipated delivery of the Hotcat is July 2015. Live data sent will be sent to the website after successful commissioning.

2.2.3 WP03. Hotcat Large (Ganstead)

The detailed design has been issued for comment within NGN. The proposed layout and the engineering line diagrams have been published on the website.

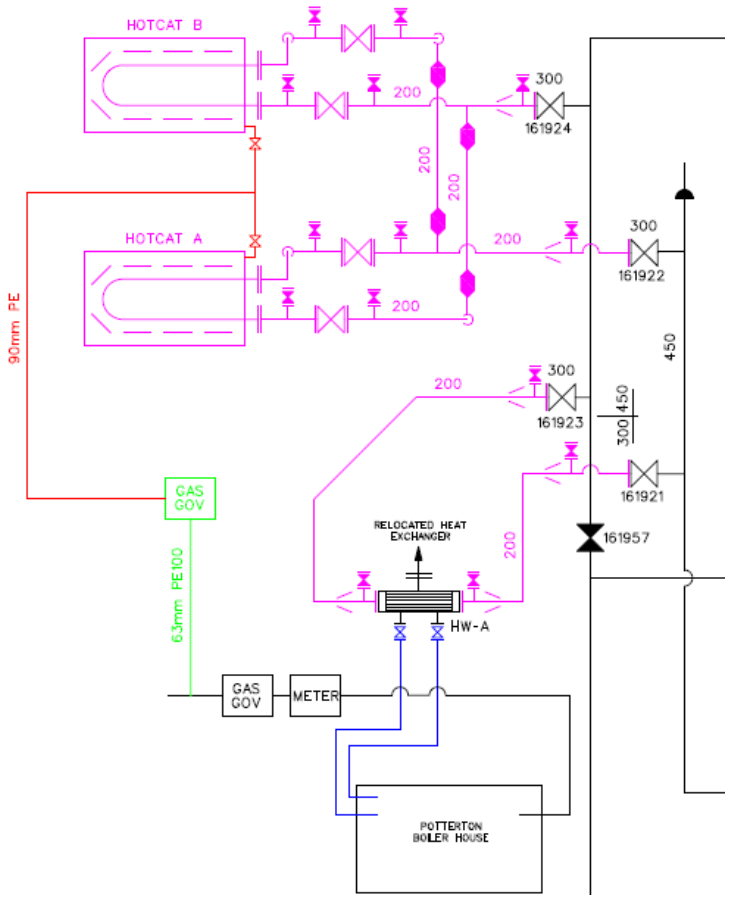

Figure 4. Proposed engineering line diagram of the large Hotcats at Ganstead

Key dates are as follows:

- MAY 2014 Hotcat Quotation provided by Bruest
- MAY 2014 Scope of Services issued for tender (design)
- JUNE 2014 Designer appointed (Rush Construction Services)
- SEPT 2014 HAZOP
- NOV 2014 All RCS detailed design drawings issued for NGN comment

- NOV 2014 20% payment released to Bruest in line with agreed terms and conditions
- DEC 2014 Review of all comments carried out (NGN / RCS)

As per item 2.2.2, the product developments being carried out at Bruest will also affect the design progress and date of tender issue for Ganstead.

2.2.4 WP04. LP Steam Small (Low Moor)

The construction phase of this project is complete. Commissioning will take place in December 2014 / January 2015.

Figure 5. Small LP Steam unit installation at Low Moor

As item 2.2.1, the approval and appraisal stage of the design for this project has also taken longer than originally anticipated. A meeting was held on 01 September 2014 with the suppliers, NGN's senior Asset Managers and a Quality Assurance adviser to agree all requirements. The LCGP team are currently working through the agreed actions involving the original site designers.

2.2.5 WP05. LP Steam Medium (Little Burdon)

The detailed design has been issued for comment within NGN. The proposed layout and the engineering line diagrams have been published on the website.

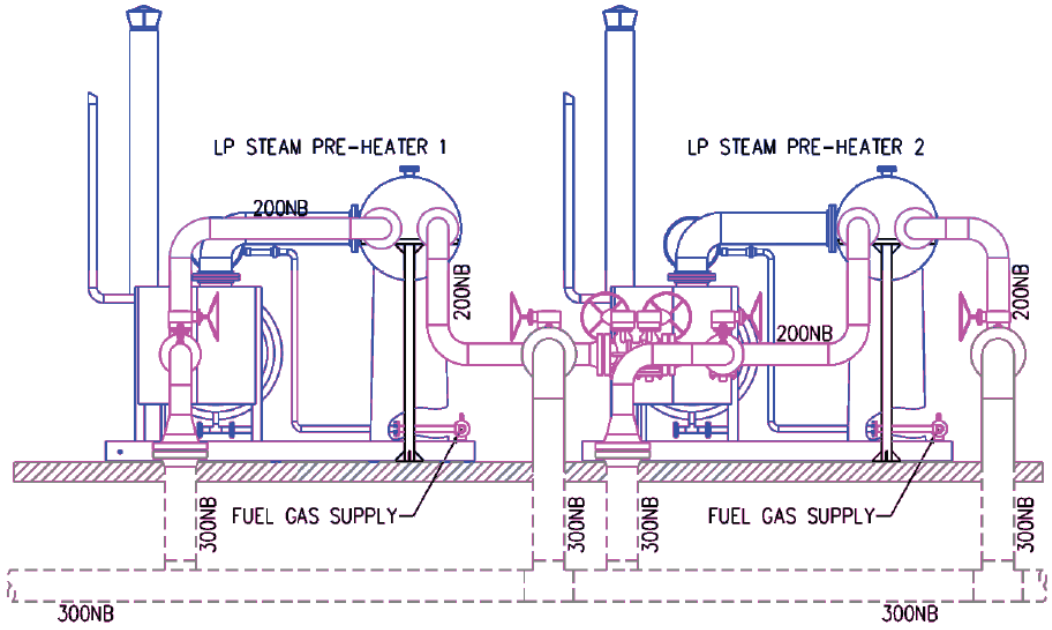

Figure 6. Elevation. Proposed Medium LP Steam units at Little Burdon.

Key dates are as follows:

- MAY 2014 Scope of Services issued for tender (design)
- JUNE 2014 Designer appointed (Capita)
- JULY 2014 HAZOP
- OCT 2014 LP Steam Quotation provided by Proheat
- NOV 2014 All Capita detailed design drawings issued for NGN comment
- NOV 2014 Review of all comments carried out (NGN / RCS)
- NOV 2014 2x25% payment released to Proheat in line with agreed terms and conditions (design and manufacture milestones)

Once comments have been incorporated the design documents will be tendered for construction in 2015.

Further information was made available from NGN's LTS Planning department in August 2014 resulting in a re-quote required from Proheat and some re-design by Capita. Whilst this caused a delay to the design and to the manufacture period for the units we do not believe it will affect the construction programme planned for 2015.

2.2.6 WP06. LP Steam Large (Towton)

The detailed design has been issued for comment within NGN. The proposed layout and the engineering line diagrams have been published on the website.

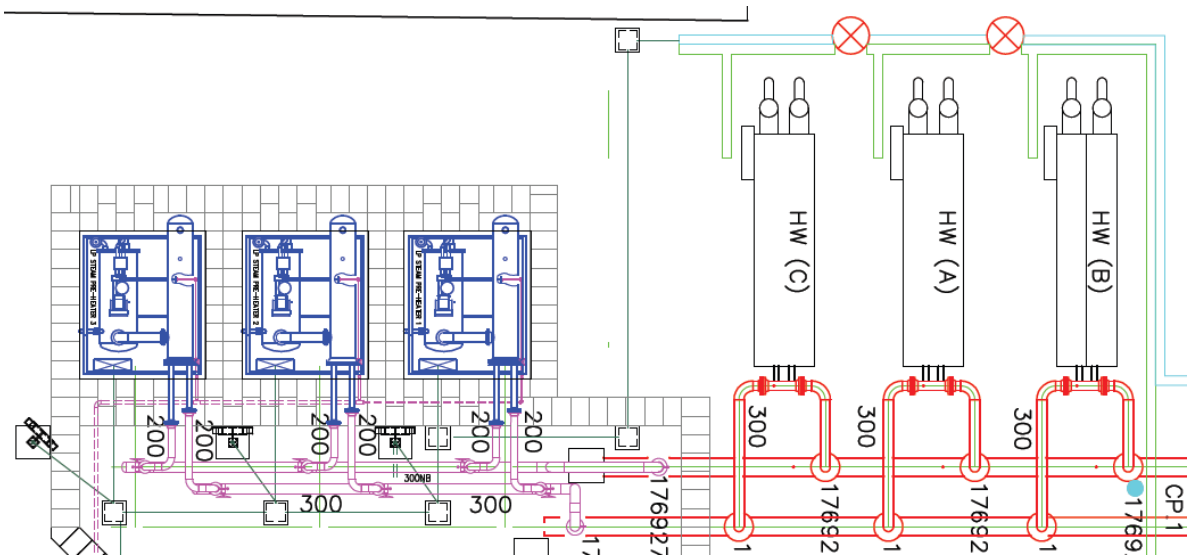

Figure 7. Proposed layout of large LP Steam units at Towton adjacent to the existing WBHs

Key dates are as follows:

- MAY 2014 Scope of Services issued for tender (design)
- JUNE 2014 Designer appointed (Capita)
- JULY 2014 HAZOP
- AUG 2014 LP Steam Quotation provided by Proheat
- SEPT 2014 25% payment released to Proheat in line with terms and conditions
- NOV 2014 All Capita detailed design drawings issued for NGN comment
- NOV 2014 Review of all comments carried out (NGN / RCS)
- NOV 2014 25% payment released to Proheat in line with agreed terms and conditions

Once comments have been incorporated the design documents will be tendered for construction in 2015.

2.2.7 WP07. Existing Technology (Boilerhouses (BH) and Water Bath Heaters (WBH))

Figure 8. WBH's at Pannal where additional instrumentation has been installed

The below table details the sites, designers and installers used to add the additional signals to the 'existing sites'.

Item	Site	Designer	Installer	Commissioner	Comments
01	Scremerston	RCS	NGN, STS	Brightwell	Work carried out in relation to NIC LCGP only
02	Tyersal	RCS	NGN, STS	Brightwell	Work carried out in relation to NIC LCGP only
03	Wetheral	RCS	Murphy's	Brightwell	Work carried out along with installation of new Boilerhouse
04	Tow Law	RCS	NGN, STS	Brightwell	Work carried out in relation to NIC LCGP only
05	Newby	RCS	NGN, STS	Brightwell	Work carried out in relation to NIC LCGP only
06	Pannal	Fingleton White	NGN, STS	Brightwell	Design carried out along with design of new metering

All site designs have been approved and appraised. Installation of all sites has been completed. Commissioning is ongoing in December 2014. Following commissioning of each site the data produced will be shown on the website.

2.2.8 WP08. Website

Data is collected from site based instrumentation using the existing remote telemetry units (RTU's). It is collated by NGN's SCADA system where it is formatted and pushed to the project website. To achieve this the LCGP team have involved the following organisations:

Item	Company	Purpose
01	NGN System Control	To obtain the data from each site utilising NGN's SCADA system To produce the algorithm to calculate the theoretical value of heat in kW required by the gas stream
02	Schneider	To produce 3 mimics for data to be able to pass automatically from one system to another.
03	Enzen	To manage the project data at all phases from SCADA to the website
04	Wipro	To provide all necessary authorisation to be able to share data from NGN's Business Admin system with an external company.
05	Digital Wellie	To develop the front end of the website To store the data being issued from Business Admin To produce all necessary graphics to allow users to manipulate and download data.

Calculations are carried out by NGN's SCADA system to calculate the efficiency of the preheating system based on the information collected from site. An example of the information produced prior to pushing the data to the website is shown in Figure 9.

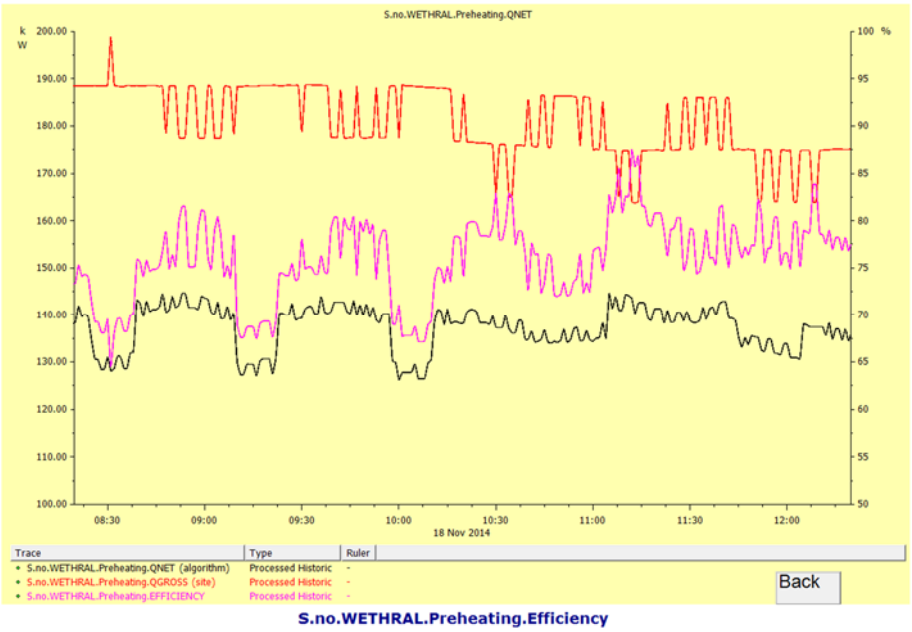

Figure 9. Sample Efficiency calculation graph, Wetheral

2.2.9 WP09. Training / System Control

Information has been shared in various formats over the previous 6 months. Data analysis from the trials will be carried out in the second half of 2015. The below article was published in NGN's 'Inspire' Magazine in August. Other presentations etc are listed in the following table.

Northern Gas Networks Magazine
August 2014

inspire.
Together we can reach our potential

Issue No.12

Business improvement | INNOVATION

HEAT IS ON FOR OUR GROUNDBREAKING PILOT STUDY

We're making great progress with an important innovation project which could help the gas industry save money and benefit the environment, by taking a new approach to pre-heating.

When gas moves from the high pressure distribution network to our own low pressure network, it needs heating to prevent the pipes and surrounding ground from freezing. Traditionally, the industry has used water bath heaters or boiler houses for this purpose, both of which are regarded as inefficient.

Thanks to new innovation funding made available under RIIO's 2013 Network Innovation Competition (NIC), we've launched a pilot project to explore existing and alternative preheating technologies, in the hope that a more cost effective and environmentally friendly solution can be found.

The project will see new preheating systems installed and monitored on six sites, and existing technology monitored on another six sites, so that performance can be compared. The new preheating systems are the impressively named 'HotCat' unit, built in Kansas, USA and a low pressure steam unit, manufactured in the UK.

We'll be monitoring their performance by capturing a whole ream of data, from carbon emissions to overall efficiency.

Test data and results are due to be published from the first few sites by the end of 2014, and made widely available across the industry.

Adam Sadler, NIC Project Manager for NGN said: "All the data we capture from the trial will be made available on our website, to be downloaded and analysed by any interested party. In fact, we'll be encouraging other networks to perform their own data analysis, so that we can build up a really detailed picture.

"Ultimately, we're hoping this trial will help pave the way for a new, more economical and environmentally friendly approach to pre-heating – an area which has seen very little innovation for over a decade."

If you'd like to know more about this project, you can email the Low Carbon Gas Preheating team at LCGP@northerngas.co.uk

Figure 10. LCGP article published in August 2014

The most significant internal training to date has been completed on the LP Steam equipment involving all mechanical / instrumentation and electrical operatives from the north east. Each operative attended for 1 day. 4x1 day sessions were held between 18 November and 21 November 2014.

Item	Event / Publication	Date	Presenter(s)	Attendees	Comments
01	Inspire Magazine	Sept 14	-	NGN Business	Article regarding the LCGP project
02	Major Projects Interface meeting	23.09.14	Bruest / Proheat	21	Maintenance overview provided
03	NGN Finance Department Team Day	26.09.14	A.Sadler	33	Overview of the project to the Finance Department
04	LCNI Conference, Aberdeen	21.10.14	A.Sadler / D.Sadler	Circa 60	Asset Management at NGN and innovation (breakout session)
05	Proheat Training	18 – 21.11.14	T.Hoyland (Proheat)	43	Familiarisation / Fault finding and maintenance
06	Project Website	Dec 2014	-	Users	The Sites – designs published
07	Project Website	Dec 2014	-	Users	Technologies – data published

2.2.10 WP10. Project Management

The LCGP core team members have not changed since the last reporting period. The LCGP team consists of the following full time members, Adam Sadler, NIC Project Manager; Bill Fleming, NIC Project Engineer; Neil Pike, NIC Quantity Surveyor and Andy Coyne, NIC Project Supervisor.

The LCGP team is supported by various other staff and departments within NGN. These have included:

- Installation teams from NGN Specialist Technical Services department
- Designers from RCS to support the 'existing sites' designs (see item 2.2.7)
- Technical input from Major Projects (various disciplines)

2.3 The next 6 months

Priorities over the next 6 months can be categorized into 4 main areas:

1. Commissioning of the 2014 builds
2. Design approvals for the medium and large hotcat and LP Steam sites
3. Tenders for the construction of the medium and large Hotcat and LP Steam sites
4. Data collection from the website for the 2014 builds (8 sites)

2.3.1 Commissioning of the 2014 builds

A number of NGN personnel and contractors are currently involved in commissioning the existing sites and the alternative technologies. Wetheral has been successfully commissioned and actual data from site has been used to calculate the system efficiencies of the Boilerhouse. Major Projects employed additional resources from 8 December 2014 which will assist with the LCGP commissioning in December and January 2015.

2.3.2 Design approvals

The lessons learnt regarding approvals from the Crossgates project (small hotcat) and the Low Moor project (small LP Steam) will assist in obtaining all necessary approvals for Knottingley and Ganstead (medium and large hotcat) and for Little Burdon and Towton (medium and large LP Steam) in a timelier manner. Stakeholders within NGN are being regularly involved in the design reviews / commenting processes to obtain positive engagement and to ensure support for the projects continues.

2.3.3 Tenders

Tenders will be sent out for the construction of the medium and large Hotcat and LP Steam projects within the next 6 months. These are all likely to be high value projects. The project team will follow the NGN commercial procedures in obtaining a contractor from the Major Projects' framework.

2.3.4 Data collection

Data will be collected on the NGN website for any user to download. The LCGP team will ensure any site problems affecting the data collection are resolved quickly and the flow of information is not blocked in any way before it reaches the website. Once a sufficiently substantial amount of data has been collected the LCGP team will provide analysis of the data available. This data analysis will be shared at any events in the second half of 2015.

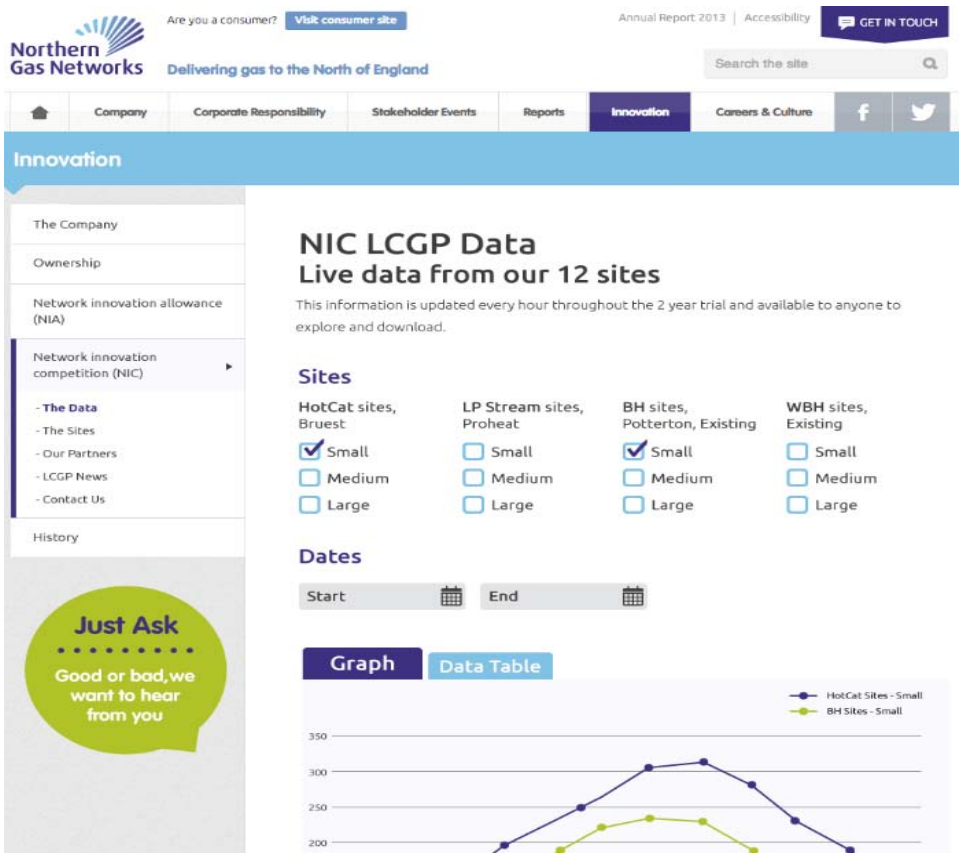

Figure 11. Website view. Comparing technologies

3.0 Business Case Update

The benefits to be gained from this project have not changed since the full submission. The four key objectives will be achieved:

1. *Assess the potential for alternative technologies to meet preheating requirements across a range of heating system sizes and operating site parameters*.

Construction has been underway for the small hotcat and LP steam sites. Following commissioning we will be able to assess the efficiency of both of these technologies. The medium and large versions of these technologies will be assessed following commissioning in 2015.

2. *Provide an independent and accurate model for assessing the efficiency of preheating systems across the UK based on reducing business carbon footprint (BCF) and whole life costs*.

Information on system efficiency will be provided in a standard format for all preheating technologies. Data on carbon footprint and whole life costs will be provided on the website. Data will begin to flow automatically from the gas sites to the website imminently, the data will then be visible and available for download to all website users.

3. *Increase the technological options available to gas transporters for the replacement of preheating assets and increase the supply side of this market*.

Along with our project partners we are continuing to develop the designs of the Hotcat and of the LP Steam unit. The developments we incorporate into the equipment we procure will be available for all other networks to gain the benefit. Bruest are currently concentrating on product developments for incorporation into the medium and large sites, these product developments will be available to any future Bruest customers. The aim of the product developments is to increase the system efficiency of the units.

Challenges for Proheat over the last 6 months have been to design medium and large systems with sufficient spare capacity in line with NGN requirements whilst minimising system efficiency losses. This learning will be applied by Proheat to future customers.

Armstrong (Boilerhouses) have developed their product to incorporate all preheating equipment onto one skid in a similar way to the Proheat and Bruest units.

4. *Provide quantified data on system efficiency of both alternative and existing technologies that can provide the industry with information that will allow more informed investment decisions and a more efficient operation of the network*.

Following commissioning of the 'existing technology' sites and the completion of the information route to the website, we will be able to provide this data to all website users.

4.0 Progress Against Plan

There have been 3 main areas of work over the last 6 months. These are:

1. Construction. Involving 8 sites.
2. Designs. Medium and large sites.
3. Information route. Developing systems to collect data from site, process it and share it on the website.

4.1 Construction

Following competitive tender, the construction of the small hotcat and LP steam sites has been carried out by a contractor selected from the NGN framework. The construction of the 5 existing sites where a contractor was not already on-board (see 2.2.7) has been carried out by NGN's Specialist Technical Services (STS) department.

Construction of the small hotcat and LP Steam sites have suffered delays to completion due to the approvals process. The designers employed by NGN have not accepted responsibility for the new alternative technologies as there are no standards as such to detail the requirement for these preheaters. The designers have also noted that the equipment was specified, in conjunction with NGN's partners in the project, by NGN. To resolve the matter we have engaged additional support from DNV GL Noble Denton to provide 'fit for purpose' certificates for the equipment. We have requested that the designers incorporate the full equipment design into their electrical and instrumentation drawings. Whilst this will inevitably be completed and approved, it has caused a delay to the completion of the construction projects. This delay has affected the commissioning of the projects. The commissioning will begin in December 2014 and will be completed in January 2015.

4.2 Design

We have employed two designers from the NGN framework for the medium & large hotcat sites and for the medium & large LP Steam sites. Detailed designs for the medium and large Hotcat and LP steam sites were completed and issued for comment in November 2014. We anticipate that the fully approved and appraised designs will be complete by February 2015. When the original programme was produced we did not anticipate all other associated design requirements at these sites. This other associated work is necessary as the medium and large Offtake sites tend to involve a greater workload than the smaller AGI sites. Examples of increased design workload include the need to design in Flow Weighted Averaging racks (FWACV racks) and the interface on Offtake sites with other GDNs (i.e. National Grid).

4.3 Information Route

Data is scheduled to be published to the website in December 2014 in line with the programme dates shown. As detailed in 2.2.8 there are a number of companies involved in this process. We have results available from Wetheral (large Boilerhouse) to demonstrate the algorithm produced by NGN System Control is working as we are calculating the system efficiency as detailed in the original bid. Enzen, Wipro and Digital Wellie are currently finalising interface details and testing systems. Schneider will produce x3 mimics required to automate the process in December 2014.

Data will begin to appear on the project website in line with the programmed dates shown.

4.4 The next 6 months

Over the next 6 months the team will,

1. Commission the 7 sites constructed this year (2 with alternative technologies, 5 with existing technologies (Wetheral is already complete)) to ensure the data can follow the route provided and be captured on the website.
2. Obtain design approval and appraisals for the 4 sites ready for construction in 2015.
3. Tender the construction contracts for the 4 2015 build projects.
4. Collect data from the 8 sites constructed in 2014 and begin to analyse the results.

5.0 Progress Against Budget

The project against budget summary is contained in the confidential annex.

6.0 Bank Account

The bank account details are contained in the confidential annex.

7.0 SDRC

7.1 Preheating Site Selection

Completed in the first 6 month period of the project.

7.2 Preheating Site & Technology Design

7.2.1 Smart Metering (Existing Technology)

Design of the smart metering and the additional site signals was completed in 2014. Commissioning of these sites is currently ongoing and will be completed in January 2015.

7.2.2 HotCat and LP Steam Small Site Designs

This aspect of the project was completed prior to PPR01. The site layouts and the equipment layouts can be found on the project website.

7.2.3 HotCat & LP Steam Medium and Large Site Design

Detailed designs were issued for NGN comment from the designers in November 2014 in line with the SDRC. There are some items delaying the completion of the designs such as outstanding hotcat design data and outstanding FWACV rack data for the offtake sites. However, it is a benefit to the project overall to allow Bruest (hotcat) time to develop their product prior to finalizing the design. We do not anticipate that this delay to the approval and appraisal of the design will affect the construction of the sites planned for 2015. Other aspects of the design could potentially affect the construction window planned for 2015, these will be monitored closely over the next 6 month period.

7.3 Technology Build & Installation

The smart metering and additional signals for the existing sites is all installed in line with the SDRC. Commissioning will be completed by January 2015.

All required signals for the additional metering on the alternative technology medium and large sites will be installed at the same time as the installation of the preheater equipment in 2015 in line with the December 2015 deadline as detailed in the SDRC's.

7.4 Successful trialling and demonstration of alternative preheating technologies

The website has been established with click through pages for each site and for each technology. Each of these has information provided to give users an understanding of the designs. This is currently available on the project website in line with the SDRC requirement.

The knowledge and learning associated with the design, installation and commissioning etc of the alternative preheating technologies will be added to the website after each site has become operational. All learning from this element will be available and published in line with the SDRC by January 2016. Additionally, we will upload content to the website on a site by site basis and hence we will begin to add this content in advance of the agreed SDRC.

7.5 Successful estimation of system efficiencies of existing preheating technologies

As detailed in the full submission, to calculate the overall system efficiency of the preheating equipment we have to calculate the theoretical amount of energy required by the gas stream, then we need to measure how much energy the preheating equipment is taking in practice. By dividing one by the other we get the overall system efficiency. To do this we have created an algorithm within our SCADA system. The algorithm has been proven to work with data received from the site installation at Wetheral. The data will be shared on the project website once the information route is fully operational from gas site to website.

We remain on target to have all 12 sites reporting back to the website via live feed by December 2015.

7.6 Knowledge, Learning & Dissemination Strategy

The information route detailed below will be established during December 2014 as detailed in the SDRC. Following the establishment of the information route graphs of system efficiency and carbon emissions will be available in addition to options for users to compare how system efficiencies change with respect to one and other. Data will be downloadable for other networks / interested parties to analyze as they choose.

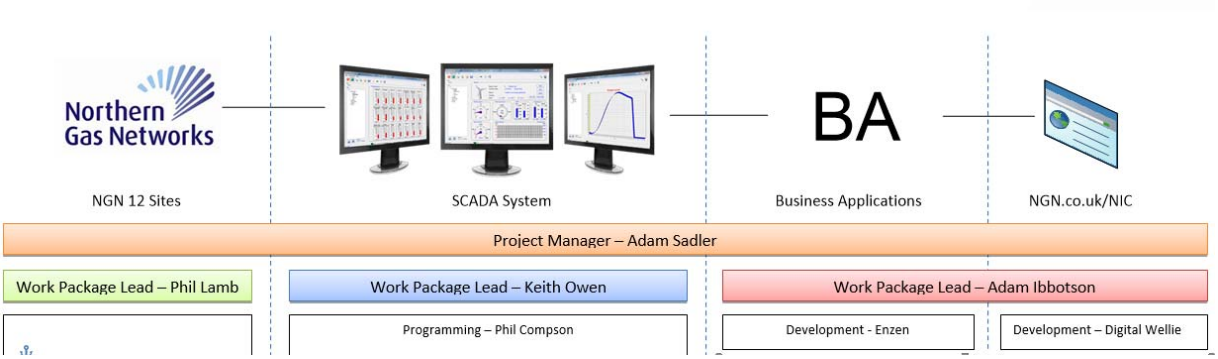

Figure 12. Information route from gas site to website

NGN attended the LCNI Conference in Aberdeen in October 2014 and presented details of the LCGP project at one of the breakout sessions.

7.7 Project Evaluation & Final Project Report

The detailed final report is not yet due to be produced.

8.0 Learning Outcomes

Design documents for all 12 sites have been shared on the project website along with general arrangement drawings of the Crossgates hotcat, the Low Moor LP Steam unit and the Wetheral Boilerhouse.

The website has been built to allow any user to download information on system efficiencies they require. Users will also be able to compare multiple sites to see for themselves which technologies perform best across the different size ranges. Figure 11 (2.3.2) shows a planned image for this.

Learning on the project to date has been shared through regular progress meetings with NGN's Investment Team Leaders and through presentations and training as detailed in 2.2.9.

9.0 IPR

No relevant IPR's have been generated or are forecast to be generated.

10.0 Risk Management

The project risk register has been updated and is contained in the confidential annex.

Over the last 6 months we have obtained actual base costs for certain lines of the risk register. Base costs have been updated and the associated 'risk' values have been reduced. Analysis of the risks and opportunities is contained in the confidential Annex.

11.0 Other

All information and progress relating to the LCGP project is contained in the sections above or in the confidential annex.

12.0 Accuracy Assurance Statement

The report has been prepared in accordance with the Network Innovation Competition Guidance document published by Ofgem. Additionally, this report has been subject to review and challenge via NGN's independent Internal Audit function to provide further assurance on the accuracy and integrity of the data and information being presented.

Senior Manager Sign Off:

I can confirm that the process followed to compile and check this return is compliant with the control requirements outlined above have been completed and the information presented is robust, accurate and complete.

Name: Martin Alderson

Position: Asset Risk Management & Safety Director

Signature: 

Date: 19 December 2014

Remaining Work
Remaining Work
Work Done
Milestone
Summary

Date	Revision	Checked	Approved
18-Nov-13	Rev01 Initial		
19-Jun-14	Rev02 Project Progress Report 1	AS	DS
19-Dec-14	Rev03 Project Progress Report 2	AS	DS

Appendix A – Programme

	Activity Name	Start	Finish
BSR02-NIC-2	BSR02 - Preheating NIC Project Programme	01-Aug-13 A	20-Dec-16
BSR02-NIC-2.1	NIC Submission	19-Aug-13 A	29-Nov-13 A
A1000	Submit Proposals	19-Aug-13 A	23-Aug-13 A
A1010	Presentations	02-Sep-13 A	01-Oct-13 A
A1020	Decision		29-Nov-13 A
BSR02-NIC-2.2	Website	02-Dec-13 A	20-Dec-16
A1050	Procure Website & Set Up	02-Dec-13 A	31-Mar-14 A
A1060	Website Development	01-Apr-14 A	19-Dec-14
A1130	Show Live Info On Website	05-Jan-15	20-Dec-16
BSR02-NIC-2.3	Water Bath Heater & Boiler Sites (Existing Sites)	01-Aug-13 A	20-Dec-16
A1030	Finalise Site Selection	01-Aug-13 A	28-Feb-14 A
A1140	Design Site Modifications	01-Mar-14 A	30-Jun-14 A
A1040	Procure & Set Up Monitoring / Telemetry Equipment	01-Jul-14 A	19-Dec-14
A1120	Info Published Live To Website		19-Dec-14
A1070	Monitoring & Analysis of Small, Medium & Large Sites	05-Jan-15	20-Dec-16
BSR02-NIC-2.4	Hot Cat Sites	01-Aug-13 A	20-Dec-16
BSR02-NIC-2.4.1	Small Site (Crossgates)	01-Aug-13 A	20-Dec-16
A1080	Small Site HotCat Design	01-Aug-13 A	31-May-14 A
A1090	Small Site HotCat Procurement	01-Nov-13 A	31-Jul-14 A
A1100	Small Site Construction & Commissioning	01-Aug-14	12-Sep-14
A1110	Procure & Set Up Monitoring / Telemetry Equipment	01-Aug-14 A	12-Sep-14
A1360	Info Published Live To Website		19-Dec-14*
A1320	Monitoring & Analysis of Small Site	05-Jan-15	20-Dec-16
BSR02-NIC-2.4.2	Medium & Large Sites (Knottingley & Ganstead)	16-Jun-14 A	20-Dec-16
A1200	Proposed Sites Design	16-Jun-14 A	31-Oct-14
A1210	Proposed Sites Procurement	14-Aug-14 A	08-May-15
A1220	Proposed Sites Construction & Commissioning	02-Mar-15*	30-Sep-15
A1230	Procure & Set Up Monitoring / Telemetry Equipment	02-Mar-15*	30-Sep-15
A1370	Info Published Live To Website		30-Sep-15
A1330	Monitoring & Analysis of Medium & Large Sites	01-Oct-15	20-Dec-16
BSR02-NIC-2.5	LP Steam Sites	01-Nov-13 A	20-Dec-16
BSR02-NIC-2.5.1	Small Site (Low Moor)	01-Nov-13 A	20-Dec-16
A1240	Small Site Design	01-Nov-13 A	30-May-14 A
A1250	Small Site Procurement	01-Nov-13 A	30-Jun-14 A
A1260	Small Site Construction & Commissioning	04-Jun-14 A	18-Jul-14
A1270	Procure & Set Up Monitoring / Telemetry Equipment	04-Jun-14 A	18-Jul-14
A1380	Info Published Live To Website		19-Dec-14*
A1350	Monitoring & Analysis of Small Site	05-Jan-15	20-Dec-16
BSR02-NIC-2.5.2	Medium & Large Sites (Little Burden & Towton)	16-Jun-14 A	20-Dec-16
A1280	Proposed Sites Design	16-Jun-14 A	03-Nov-14
A1290	Proposed Sites Procurement	14-Aug-14 A	30-Apr-15
A1300	Proposed Sites Construction & Commissioning	02-Mar-15*	30-Sep-15
A1310	Procure & Set Up Monitoring / Telemetry Equipment	02-Mar-15*	30-Sep-15
A1390	Info Published Live To Website		30-Sep-15
A1340	Monitoring & Analysis of Medium & Large Sites	01-Oct-15	20-Dec-16
BSR02-NIC-2.6	Information Sharing	01-Sep-15	20-Dec-16
A1400	Trials To Reduce Overall NGN Business Carbon Footprint	01-Sep-15*	20-Dec-16
A1410	Disseminate All Information Through Presentations etc	01-Jun-16	20-Dec-16