# Low Carbon Gas Preheating

## Project Progress Report 05

**17 June 2016**

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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.

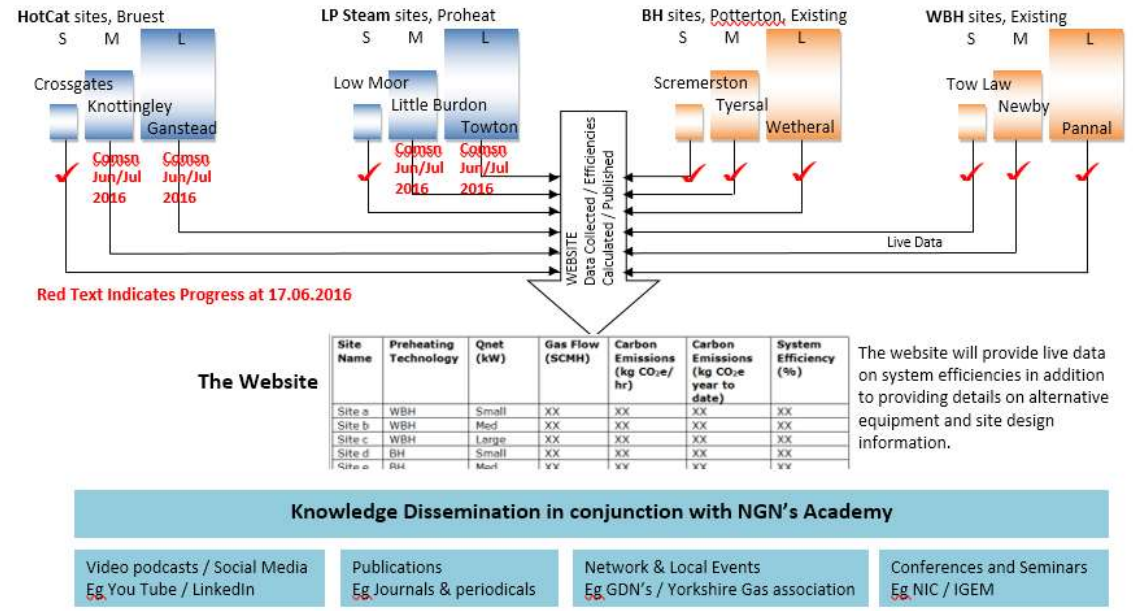



*Figure 1. The LCGP Project*

As detailed in PPR04, all pre-heating equipment is positioned on the LCGP sites. Data is flowing back to the website from 8 of these sites with 4 sites still to be commissioned. Some calculations on the website have been amended in this period to remove some of the previously reported glitches. There is further assessment to be done for this aspect of the project. All of the construction elements associated with the installation of the new preheaters have now been completed and appropriate costs have been apportioned to the LCGP financial accounts. All construction teams on these sites have been demobilized. Commissioning of the large and medium LP Steam and Hotcat units is still to be authorized and carried out by the manufacturers with assistance from NGN.

Delays to the commissioning of the medium and large alternative technologies has resulted in the programmed dates for obtaining simultaneous preheating data from all 12 sites being put back by 1 year, compared to the original programme. As such, data analysis based on 1 full heating season will be carried out post winter 2016 / 17. This data analysis will be carried out ahead of the final project close out report scheduled for December 2017 and as such will not affect the project objectives.

All project costs and analysis of costs are contained within the Confidential Annex.

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

1. Data Collection (Website).

   8 of the 12 sites are commissioned. The uncommissioned sites are those with Large and medium LP Steam Units or Hotcats Mark II. Commissioning of these sites is now expected to be during summer 2016 with data posted to the website shortly after depending on site preheating requirements.

2. Website development / Knowledge Dissemination.

   The website remains live and publically accessible via the NGN Website. All data is available for download to allow individuals to undertake their own data analysis should they wish to do so. However, due to glitches, where work to resolve in ongoing, the data obtained so far does not reflect the actual efficiency of the preheaters.

   Some glitches have been resolved including the difference in kWhours versus $m^3$ of gas dependent on gas meter pressure, but other issues such as inaccurate data due to low flows may not be apparent until the next winter season.

   The website can be viewed at:

   http://www.northerngasnetworks.co.uk/ngn-and-you/gearing-up-for-the-future/low-carbon-gas-preheating-lcgp-project/

3. 2015 Procurement and Construction.

   Construction of preheating on all sites is now complete.

4. 2015 Alternative Technology Equipment

   Approval to commission the large and medium alternative technologies is outstanding. Commissioning is expected to be completed during summer 2016 in readiness of the next winter heating season.

## 1.2 Project Summary

During the fifth 6 month reporting period of the LCGP project the team have completed the installations of the preheating at the 4 medium and large LCGP alternative technology sites. Work has also been carried out to obtain approval to commission the alternative technologies. The team have also visited the other 8 LCGP sites to assess information being provided from the gas site to the website with the aim of identifying any sources of inaccuracy.

There are three 'issues' to report;

1. LP Steam Commissioning approval. The incident at Little Burdon, as reported in PPR04, has led to the requirement for the project partners, Proheat, to carry out a full and thorough investigation and, on NGN's request, obtain an Approval and an Appraisal for this report in a similar fashion to NGN/PM/G/17 procedure. Proheat issued this report to NGN on 16 March 2016. NGN have now requested their own third party, Macaw Engineering ltd, review this document and confirm Macaw Engineering Ltd are confident that implementation of the recommendations in the Proheat report are appropriate and will be safe to operate on a Northern Gas Networks Offtake / AGI.
2. Hotcat commissioning approval. Remedial works to the Hotcat Mark II are being carried out further to the snagging items identified by NGN through their site visits beginning on 3 December 2015. An NGN/PM/G/17 Part D (Approval to commission), has not yet been signed by the G17 Users until all remedial works are completed and tested.
3. Website data. Points 1 and 2, above, are affecting the data being obtained by the website as 4 of the sites are still outstanding. Also, although some glitches have been identified and have been resolved in the SCADA calculation software, we believe that the intention to publish 'hourly' data may not be appropriate as efficiencies calculated hourly can vary excessively resulting in incomparable results. The objectives of the project can still be achieved and the hourly data can still be made available for download, but the daily data is expected to be more useful in comparing technologies.

The implications of the above problems are not seen as critical to the successful delivery of the original project benefits, their impact has only been in the delayed completion of the commissioning of the large and medium LP Steam units and Hotcats and the potential to revise the timeframes the preheater efficiencies are calculated within.

## 1.3 Risk Section

An updated risk register is contained within the Confidential Annex.

Details of live risks are given along with all costs to date and forecast costs to complete the LCGP project.

## 1.4 The Learning Section

The LCGP website is live and contains site data from 8 of the 12 LCGP sites along with mini case studies from the small LP Steam and small hotcat sites. Further information detailing lessons learnt will be added once the large & medium alternative preheaters are commissioned, along with a report to give more detail into instrumentation used to acquire the data from each site.

# 2.0 Project Manager's Report

## 2.1 Project Overview

All construction works to install the new preheaters is now complete with only commissioning of 4 preheaters left to do. Data is flowing back from 8 of the 12 LCGP sites and is being published on an hourly basis on the NGN website. Data is available for any visitors to the NGN website to see and download. Approval to commission the outstanding 4 sites is expected to be received in June / July to allow the preheaters to be commissioned before winter 2016 / 2017.

The website can be viewed at:

http://www.northerngasnetworks.co.uk/ngn-and-you/gearing-up-for-the-future/low-carbon-gas-preheating-lcgp-project/

Calculations are performed on NGN's SCADA system prior to data being issued and published to the website. The LCGP team have identified and resolved calculation glitches resulting in the data looking more accurate, however, further work is required in relation to this as it is believed that the data is less accurate when the gas flow rates are lower. The LCGP team are investigating options to disregard low flow data whilst accurately calculating the overall system efficiency.

The additional project management resources allocated to the LCGP project are no longer attributed to the project as the construction of the sites has been completed.

## 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 is installed
- WP07. Work carried out on the 6 sites with existing technology; 3 boiler houses / 3 water bath heater sites
- WP08. The website and information management
- WP09. Training / System Control
- WP10. Project Management

### 2.2.1 WP01. Hotcat Small (Crossgates)

*Figure 2. Small Hotcat at Crossgates.*

This site installation and commissioning was completed prior to PPR 03. Details can be found in previous PPR's and in the mini case study published on the project website.

The Hotcat has provided preheating to the Crossgates site throughout winter 2015 / 16 with the following faults reported:

1. Overheating alarms. This was determined as a set up issue rather than a fault resulting in reactive maintenance costs. The outlet temperature of the hotcat was initially set to alarm over 20°C. However, in low flow conditions, when ambient temperatures were high, this limit was exceeded. The setting was increased to 40°C.
2. PLC locked out. It was noted on site that the PLC controlling the hotcat froze up. This was resolved with assistance from Bruest. No additional parts were necessary to resolve the issue.

The actual maintenance procedures for this unit are currently in a review procedure via NGN's Standards department.

### 2.2.2 WP02. Hotcat Medium (Knottingley)

As previously reported, Bruest have designed and built the Hotcat Mark II as a direct result of funding from the LCGP project. Whilst this unit is not yet commissioned it is anticipated that approval to commission will be received in summer 2016 and the unit will be providing preheating to the site before winter 2016.

*Figure 3. Medium Hotcat at Knottingley*

1. Approval to commission (NGN/PM/G/17 Part D – Approval to Commission) is anticipated to be received following all remdial works in summer 2016.
2. The main works contractor has completed all installation works and demobilised from site on 1 June 2016.
3. Further to snagging of the units beginning on 3 December 2015, two issues were raised. DNV GL addressed both of these issues in their report dated 19 February 2016. The issues were in relation to the wooden floors and the 'gaps' in structure between the gas safe area and the non-gas safe area.
    a. The wooden floors were risk assessed. No concerns were raised with respect to fire. However, a recommendation was made to raise a technical query to Bruest to question the lifespan of the floor in comparison with the anticipated life span of the hotcat itself.
    b. A specification for sealing the gaps was issued. At the time of writing these remedial works and the associated testing are ongoing at Knottingley, works will follow on at Ganstead.
4. The SDRC states that 'HotCat, smart metering, monitoring & telemetry equipment installed to selected sites - December 2015'. It was anticipated in PPR 04 that monitoring of the data would

begin in early 2016. It is now anticipated that monitoring of the data will occur prior to winter 2016 / 17.

5. Work to remove the existng preheating technology (WBH's) will only be carried out once the Bruest hotcats have proven to be reliable.

*Figure 4. Retained preheating at Knottingley providing an emergency backup only*

### 2.2.3 WP03. Hotcat Large (Ganstead)

Remedial works to the Hotcats at Ganstead is the same as that proposed for the hotcats at Knottingley.


*Figure 5. Large Hotcat at Ganstead*

1. The main works contractor is scheduled to demobilise from site in June 2016.
2. The SDRC states that 'HotCat, smart metering, monitoring & telemetry equipment installed to selected sites - December 2015'. It was anticipated in PPR 04 that monitoring of the data would begin in early 2016. It is now anticipated that monitoring of the data will occur prior to winter 2016 / 17.
3. Work to remove the existng preheating technology (Boilerhouse and Heat exchanger) will only be carried out once the Bruest hotcats have proven to be reliable.


*Figure 6. Retained preheating at Ganstead providing an emergency backup only*

### 2.2.4 WP04. LP Steam Small (Low Moor)


*Figure 7. Small LP Steam at Low Moor*

This site installation and commissioning was completed prior to PPR 03. Details can be found in previous PPR's and in the mini case study published on the project website.

The LP Steam unit has provided preheating to the Low Moor site throughout winter 2015 / 16. Faults received are detailed below.

1. Numerous low temperature alarms have been reported since January 2016. Proheat have advised that a software upgrade should be carried out based on learning obtained from running this unit. Also, separate instruments provide outlet temperature data to the Proheat control panel and NGN's System Control department. This issue will be resolved by NGN in summer 2016 to reduce these faults arising.

The actual maintenance procedures for this unit are currently in a review procedure via NGN's Standards department.

### 2.2.5 WP05. LP Steam Medium (Little Burdon)

*Figure 8. Medium LP Steam Units at Little Burdon*

1. Commissioning began 30 September 2015. Site Acceptance Testing (SAT) was not completed fully.
2. Unit A was left running in 'hand' mode on 7 October 2015.
3. 10 October 2015 - An incident occurred with Unit A leading to overheating of the Stage 2 burner head which subsequently caused damage to the unit.
4. 13 October 2015 – An instruction was issued from Barry Dalus, Head of Asset Integrity, appointing Peter Bates, High Pressure Investment Lead, to carry out an investigation into the incident. Towton commissioning was put 'on hold' until this investigation was concluded.
5. Remedial works proposed and installed by Proheat prior to re-commissioning the units during w/c 7 December 2015 were found to be inadequate on re-inspection of the burner grates on Monday 14 December 2015.
6. Proheat issued a first draft of the report on 14 January 2016.
7. Proheat issued the final, Approved and Appraised report into the incident on 16 March 2016.
8. Macaw Engineering Limited were issued the Proheat report to review on NGN's behalf on 21 March 2016. NGN expect this work to be complete in summer 2016 allowing the unit to be commissioned prior to the 2016 / 17 winter.
9. The main works contractor has demobilised from site. The manufacturer shall return to site with NGN's permission to commission the preheaters.

10. The SDRC states that 'LP Steam, smart metering, monitoring & telemetry equipment installed to selected sites - December 2015'. Monitoring of the equipment is likely to begin prior to winter 2016 / 17.
11. The Proheat report into the incident at Little Burdon shall be published on the website once approval to commission is received from NGN.
12. Work to remove the existng preheating technology (WBH) will only be carried out once the Proheat Units have proven to be reliable.

*Figure 9. Retained preheating at Little Burdon providing an emergency back up only*

### 2.2.6 WP06. LP Steam Large (Towton)

*Figure 10. Large LP Steam at Towton*

1. Following the incident with overheating at Little Burdon and the subsequent instruction issued 13 October 2015, Towton commissioning was put 'on hold' until this investigation was concluded.
2. The incident at Little Burdon has led to delays in the commissioning of the Proheat units at Towton. As such, the water bath heaters have been recommissioned to provide preheating to the site until further notice.
3. The main works contractor has now demobilised from site.
4. The SDRC states that 'LP Steam, smart metering, monitoring & telemetry equipment installed to selected sites - December 2015'. Monitoring of the equipment is likely to begin prior to winter 2016 / 17.
5. The retained water bath heaters will continue to provide preheating to the site until the Proheat equipment is commissioned.

*Figure 11. Retained preheating at Towton providing an emergency backup only*

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

All instrumentation is now live and reporting back to SCADA.

### 2.2.8 WP08. Website.

The website can be viewed at:

http://www.northerngasnetworks.co.uk/ngn-and-you/gearing-up-for-the-future/low-carbon-gas-preheating-lcgp-project/

Work has been undertaken to check all instrumentation from site. To do this the NIC Project Manager and a commissioning engineer have attended each site to check each instrument and to check the telemetry is functioning correctly with System Control.

Initial issues have been identified and shared with personnel at System Control. These will be proven over the coming months:

1. Calculation of energy contained within $1m^3$ of gas were not fully developed. i.e. it was identified that a co-efficient had not been calculated to take into consideration the pressure at the gas meter. This tends to be different for each site and makes a significant difference to the efficiency calculation.
2. In some cases, the incorrect volume of gas per pulse was being calculated at system control.
3. Other differences which should be identified prior to drawing any conclusions include:
    a. Some sites have surface mounted temperature sensors, others have thermowells
    b. Some sites have fiscal quality metering, others have orifice plate metering.
4. Where hourly efficiencies are being calculated, these can show wide swings in value due to the nature of the preheater. For example, a WBH burner may fire for 30 minutes, but the WBH continues to provide heating to the gas stream for 4 hours. So in hour 1 the heater appears inefficient, but in hours 2, 3 and 4 the preheater appears infinitely efficient.
5. Where metering is not fiscal quality, it is suspected that the low flows, especially during summer, disproportionately affect the efficiency calculations. To address this, trials are being undertaken on the SCADA system to remove data from calculations which were carried out when the flow rate was under a given percentage of the design flow rate. So for example, if the flow rate through site is less than 20% of the anticipated maximum flow rate, then the values are discarded. These trials are likely to need a relatively cold time of year to be able to be verified. The intention is to ensure these calculations are all accurate prior to the next winter period.

By continuing to resolve the above, we aim to be in a position for the website to accurately compare the preheater efficiency across all 12 sites beginning in winter 2016 / 17.

Once the website is functioning with no glitches, a mini-case study will be uploaded showing more details of the gas pressure co-efficient table and differences between instrumentation.

### 2.2.9 WP10. Project Management

Site supervisors and project leads are no longer charged to the LCGP project costs as all installation works are now complete.

## 2.3 The next 6 months

Priorities over the next 6 months can be categorized into 5 main areas:

1. Commissioning – Medium Hotcat – Knottingley
2. Commissioning – Large Hotcat – Ganstead
3. Commissioning – Medium LP Steam – Little Burdon
4. Commissioning – Large LP Steam –Towton
5. Data collection and website development

### 2.3.1 Commissioning – Medium Hotcat – Knottingley.

Work remaining includes;

1) Completing and testing remedial works to hotcat
2) Obtaining approval to commission from NGN
3) Arranging commissioning with Bruest

### 2.3.2 Commissioning – Large Hotcat - Ganstead

Work remaining includes;

1) Completing and testing remedial works to hotcat
2) Obtaining approval to commission from NGN
3) Arranging commissioning with Bruest (work will follow commissioning at Knottingley)

### 2.3.3 Commissioning – Medium LP Steam – Little Burdon

Work remaining includes;

1) Obtaining approval of Proheat report from Macaw Engineering Limited
2) Obtaining approval to commission from NGN
3) Arranging commissioning with Proheat

### 2.3.4 Commissioning – Large LP Steam – Towton

Work remaining includes;

1) Completing works at Little Burdon
2) Obtaining approval to commission at Towton from NGN
3) Arranging commissioning with Proheat

### 2.3.5 Data collection & Website Development

Work remaining includes;

1) Add all meter pressure co-efficients into the SCADA calculation
2) Add all impulse values into the SCADA calculation
3) Re-check data over a range of site flow rates
4) Amend the SCADA calculations to remove inaccurate data (i.e. data where we know there is a problem due to inaccurate flow figures at low flow rates.)

## 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*.

All sizes of all technologies (including hotcats and LP Steam units) shall be able to be monitored and compared over winter 2016 / 17.

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*.

This report acknowledges there are some issues with the data provided so far. However, the objective of the project will ultimately be achieved when further data is obtained from site.

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

The Hotcat Mark II is available from Bruest for other GDN's, as is the Hotcat Mark I. The developments in the Proheat equipment are also available for other GDN's.

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*.

We will carry out our own data analysis and share this through presentations or via the website once all 12 LCGP sites are commissioned and are reporting back to the website.

## 4.0 Progress Against Plan

The latest project programme is contained in Appendix A of this report.

There have been 5 main areas of work over the last 6 months. These are:

1. Proheat Sites. Completion of the installation phase of the large and medium Proheat sites
2. Hotcat Mark II Sites. Completion of the installation phase of the large and medium Bruest sites
3. Proheat Approval. Obtaining satisfactory evidence that an incident will not occur further to the revised design of the 2 stage burner head.
4. Bruest Mark II Approval. Obtaining solutions to the 'snagging' of the Bruest Hotcat Mark II.
5. 8 of 12 sites. Visiting all sites currently reporting data back to the project website to ensure instrumentation signals are processed correctly when calculating the system efficiency of the preheaters.

### 4.1 Proheat sites

Contractors have demobilised from site at Little Burdon and at Towton. The preheaters will need to be commissioned as an independent item and will not form part of the contractors works.

### 4.2 Bruest Mark II sites

Contractors have / will demobilise from sites at Knottingley and Ganstead in June 2016. The preheaters will need to be commissioned as an independent item and will not form part of the contractors works.

### 4.3 Proheat approval

The Proheat units were scheduled to be commissioned by 30 September 2015 at Little Burdon and Towton. Once approval to commission is received it is anticipated that the units will be operational prior to winter 2016 / 17.

### 4.4 Hotcat approval

The Hotcat Mark II units were scheduled to be commissioned by 30 September 2015 at Knottingley and Ganstead. Once approval to commission is received it is anticipated that the units will be operational prior to winter 2016 / 17.

### 4.5 8 of 12 sites

Site visits have taken place to resolve all issues with either instrumentation at site, or calculations on SCADA. The work to firm up the accuracy of the system efficiency calculation is ongoing.

A system has also been developed with System Control to share information on faults associated with these 8 sites. Each fault can be priced accordingly prior to the final PPR to allow the team to report an anticipated whole life cost while taking into account reactive maintenance and planned maintenance costs.

### 4.6 The next 6 months

Over the next 6 months the team will focus on;

1. Obtaining approval to commission the 4 medium or large alternative preheating sites
2. Data collection and website development
3. Data Analysis & Knowledge Dissemination where possible.

## 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)

The one outstanding instrument, the flow meter at Newby, has now been installed and commissioned. This Item is now complete.

### 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

Construction Issue drawings have been produced for all medium and large sites. Detailed design drawings have been uploaded to the website previously.

## 7.3 Technology Build & Installation

Update on text below from PPR04; Monitoring of the medium and large equipment is anticipated to begin prior to the winter heating season of 2016 / 17. This is subject to achieving approval to commission the units. Achieving this approval is a project priority for the LCGP team.

Text from PPR 04:

"The **large and medium hotcats** have been installed in line with the SDRC as detailed earlier in this document. However, as a result of the delay in the delivery of the Hotcats, caused by encouraging Bruest to re-design them to improve their efficency, the units will not be commissioned until early 2016. Following commissioning the data produced will be sent back to NGN's SCADA system where it will be manipulated prior to being published for monitoring on the project website in terms of hourly / daily efficiency and carbon emissions. This '**monitoring**' aspect of the SDRC is later than initially planned for the hotcat. This is as a result of improving the design of the hotcats with a view to increasing the efficiency and decreasing the carbon emissions. The improved hotcat design is now available for other GDN's to benefit from should they chose to procure and install one following this project.

The SDRC states that '**LP Steam, smart metering, monitoring & telemetry equipment installed to selected sites - December 2015'**. The medium LP Steam equipment, smart metering and new telemetry is installed on site in line with the SDRC. A solution to the problem which occurred at Little Burdon is currrently being detailed by Proheat and their burner manufacturer. Details of the overheating incident and the agreed remdial works will be shared on the project website within the next reporting period. The monitoring of this technology will only be available following the testing, installation and proving of any remdial works to each unit at Little Burdon and at Towton.

The **large LP Steam units** have been installed in line with the SDRC as detailed earlier in this document. However, the overheating incident at Little Burdon lead to a delay in the completion of the

commissioning of the medium LP Steam units, this then lead to a subsequent delay in commissioning the large LP Steam units at Towton. The team would like to stress that the medium LP Steam units at Little Burdon were the first units of this size and burner configuration to be commissioned in the UK. As with the developed Hotcat design, the subsequent remedial works which we believe will now form part of the 'standard design' of this size unit from Proheat, is a development which will hopefully be seen by NGN and other GDN's as beneficial for future Proheat orders."

### 7.4 Successful trialling and demonstration of alternative preheating technologies

This SDRC was largely complete prior to PPR 03.

Case studies for the large and medium sites were scheduled to be uploaded to the website in line with the SDRC by January 2016. However, these case studies for the medium and large alternative sites will be issued following successful commissioning of each of the sites to ensure they provide as much relevant information as possible for other GDN's to use.

### 7.5 Successful estimation of system efficiencies of existing preheating technologies

Update on text below from PPR04; Work has been carried out over this reporting period to identify and resolve issues with the SCADA calculations. This work is not yet complete and further testing may be required once the preheaters are operating in colder conditions. There are still 4 sites with preheaters to be commissioned.

Text from PPR 04:

"The system efficiency of the preheaters can be clearly seen on the project website. Calculations are being carried out within NGN's SCADA system as detailed in Section 2.2.8. Meetings have been held at System Control, Moorside to resolve the efficiency values which appear to be inaccurate (eg, some show 255%), whilst these meetings have resolved quite a number of issues, we cannot be sure that there are no other glitches in the calculations until there is a period of cold weather where the demand on all of the preheaters is high. All issues with data accuracy and calculation co-efficients should be resolved within the next reporting period.

4 of the sites (medium & large, hotcat and medium & large LP Steam) will not have data flowing back to the website in line with this SDRC (December 2015) due to issues as described in 7.3."

### 7.6 Knowledge, Learning & Dissemination Strategy

The functionality of the website was proven prior to PPR 03.

As per 7.5, 4 of the sites (medium and large, hotcat and LP Steam) will not have data flowing back to the website in line with this SDRC (December 2015) due to issues as described in 7.3.

### 7.7 Project Evaluation & Final Project Report

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

## 8.0 Learning Outcomes

Designs have been published on the project website for the Hotcat Mark II to allow other GDN's to better understand the preheater.

Once any remedial work has been carried out on the Proheat units following the overheating incident at Little Burdon, and the modifications have been proven to be successful, we will produce a mini case study of the events and the proposed / accepted improvements to the units for other GDN's to view.

## 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. Some areas of risk have been increased. 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: Stephen Parker

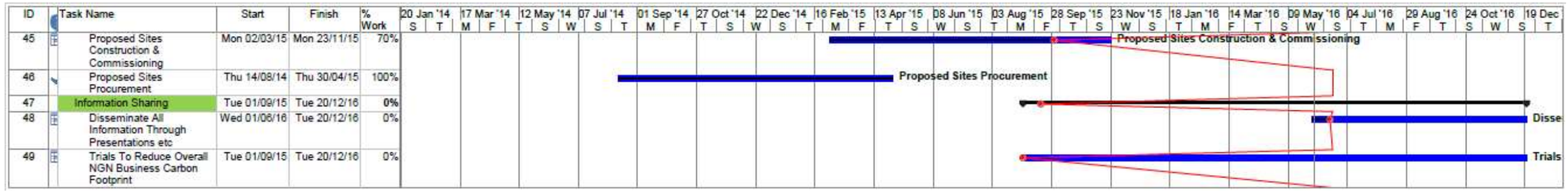
Position: Regulation Director

Signature: 

Date: 17 June 2016

## Appendix A – Programme

| ID | Task Name | Start | Finish | % Work |
|---|---|---|---|---|
| 1 | BSR02 Preheating NIC Project Programme | Mon 19/08/13 | Fri 29/11/13 | 100% |
| 6 | Website | Mon 22/04/13 | Tue 30/04/19 | 0% |
| 7 | <New Summary Task> | Mon 02/12/13 | Wed 30/04/14 | 100% |
| 8 | Procure Website & Set Up | Mon 02/12/13 | Wed 30/04/14 | 100% |
| 9 | Website Development | Tue 01/04/14 | Wed 31/12/14 | 100% |
| 10 | Show Live Info On Website | Mon 05/01/15 | Fri 16/12/16 | 0% |
| 11 | Water Bath Heater & Boiler Site ( Existing Site) | Thu 10/12/15 | Tue 30/04/19 | 0% |
| 12 | Design Site Modification | Mon 03/03/14 | Thu 19/06/14 | 100% |
| 13 | Finalise Site Selection | Thu 01/08/13 | Fri 28/02/14 | 100% |
| 14 | Info Published Live to Website | Fri 19/12/14 | Fri 19/12/14 | 100% |
| 15 | Monitoring & Analysis of Small, Medium & Large Sites | Mon 22/04/13 | Tue 29/11/16 | 0% |
| 16 | Procure & Set Up Monitoring / Telemetry Equipent | Fri 01/08/14 | Fri 12/12/14 | 100% |
| 17 | HotCat sites | Mon 27/05/13 | Mon 09/01/17 | 0% |
| 18 | Small Site (CrossGates) | Thu 01/08/13 | Tue 20/12/16 | 0% |
| 19 | Info Published Live to Website | Fri 19/12/14 | Fri 19/12/14 | 100% |
| 20 | Monitoring & Analysis of Small Sites | Mon 05/01/15 | Tue 20/12/16 | 0% |
| 21 | Procure & Set Up Monitoring / Telemetry Equipment | Fri 01/08/14 | Fri 12/09/14 | 100% |
| 22 | Small Site Construction and Commissioning | Fri 01/08/14 | Fri 12/09/14 | 100% |
| 23 | Small Site HotCat Design | Thu 01/08/13 | Mon 31/03/14 | 100% |
| 24 | Small Site HotCat Procurement | Fri 01/11/13 | Thu 31/07/14 | 100% |
| 25 | Medium & Large site (Knottingley&Ganstead ) | Mon 27/05/13 | Mon 09/01/17 | 0% |
| 26 | Info Published Live to Website | Wed 30/09/15 | Wed 30/09/15 | 0% |
| 27 | Monitoring & Analysis of Medium & Large Sites | Mon 05/01/15 | Mon 09/01/17 | 0% |
| 28 | Procure & Set Up Monitoring / Telemetry Equipment | Mon 02/03/15 | Wed 30/09/15 | 100% |
| 29 | Proposed Site Design | Mon 16/06/14 | Fri 31/10/14 | 100% |
| 30 | Proposed Sites Construction & Commissioning | Mon 02/03/15 | Wed 30/09/15 | 100% |
| 31 | Proposed Sites Procurement | Thu 14/08/14 | Fri 08/05/15 | 100% |
| 32 | LP Stream Sites | Fri 01/11/13 | Tue 20/12/16 | 0% |
| 33 | Small Site (Low Moor) | Fri 01/11/13 | Tue 20/12/16 | 0% |
| 34 | Info Published Live to Website | Fri 19/12/14 | Fri 19/12/14 | 100% |
| 35 | Monitoring & Analysis of Small Sites | Mon 27/05/13 | Tue 29/11/16 | 0% |
| 36 | Procure & Set Up Monitoring / Telemetry Equipment | Wed 04/06/14 | Fri 18/07/14 | 100% |
| 37 | Small Site Construction and Commissioning | Wed 04/06/14 | Fri 18/07/14 | 100% |
| 38 | Small Site Design | Fri 01/11/13 | Fri 30/05/14 | 100% |
| 39 | Small Site Procurement | Fri 01/11/13 | Mon 30/06/14 | 100% |
| 40 | Medium & Large sites(Little Burden & Towton | Mon 16/06/14 | Tue 20/12/16 | 0% |
| 41 | Info Published Live to Website | Wed 30/09/15 | Wed 30/09/15 | 0% |
| 42 | Monitoring & Analysis of Medium & Large Sites | Thu 01/10/15 | Tue 20/12/16 | 0% |
| 43 | Procure & Set Up Monitoring / Telemetry Equipment | Mon 02/03/15 | Wed 30/09/15 | 100% |
| 44 | Proposed Site Design | Mon 16/06/14 | Mon 03/11/14 | 100% |


ID
Task Name
Start
Finish
% Work
45 Proposed Sites Construction & Commissioning Mon 02/03/15 Mon 23/11/15 70%
46 Proposed Sites Procurement Thu 14/08/14 Thu 30/04/15 100%
47 Information Sharing Tue 01/09/15 Tue 20/12/16 0%
48 Disseminate All Information Through Presentations etc Wed 01/06/16 Tue 20/12/16 0%
49 Trials To Reduce Overall NGN Business Carbon Footprint Tue 01/09/15 Tue 20/12/16 0%
20 Jan '14 17 Mar '14 12 May '14 07 Jul '14 01 Sep '14 27 Oct '14 22 Dec '14 16 Feb '15 13 Apr '15 08 Jun '15 03 Aug '15 28 Sep '15 23 Nov '15 18 Jan '16 14 Mar '16 09 May '16 04 Jul '16 29 Aug '16 24 Oct '16 19 Dec
Proposed Sites Construction & Commissioning
Proposed Sites Procurement
Disse
Trials
Task
Split
Milestone
Summary
Project Summary
External Tasks
External Milestone
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Progress
Deadline