Gas NIC Final Report

Low Carbon Gas Pre heating

Project Reference: NGN GN 01

REPORT from RUNE ASSOCIATES LTD

(Confidential)

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2. SUMMARY OF PROJECT INFORMATION

2.1. SUMMARY DETAILS

Basic Project Information	
Project name	Low Carbon Gas Pre Heating
Project Short Name	NGN GN 01 GPH
The Funding Licensee	Northern Gas Networks Limited
Total Project Cost (Cell I13[1])	£6,332k
External Funding. (Cell I25)	Nil
Network Licensee Compulsory Contribution. (Cell I66)	£1,415k
Network Licensee Extra Contribution. (Cell I37)	Nil
Gas NIC Funding Request. (Cell I85)	£4,917k
Direct Benefits.	Nil
Requested threshold for the funding of cost over-runs if different to the default.	11.4% (page 34)
Requested protection on Direct Benefits, if different to the default.	No Direct Benefits specified. Not applicable therefore.

2.2. SYNOPSIS

Synopsis of Project Submission	
Description of the problem	The proposal is intended to address the following problems associated with gas preheating plant located at transmission pressure reduction installations: • Existing water bath preheaters are a mature technology with limited performance in terms of current efficiency and environmental standards. • The options for the application of alternative preheating technologies are currently limited. • Reliable data on the efficiency or carbon emissions of current or alternative preheating technologies in a live operating environment is not available. • Investment decisions regarding replacement preheating assets can be considered suboptimal due to lack of data. • Potential carbon emissions benefits from network operational flexibility are inhibited by lack of accurate emissions information.

[1] Cell references relate to the NIC Funding request tab of the Financial workbook

Synopsis of Project Submission	
Description of the proposed method	NGN proposes to adopt the methods outlined below: • Existing technologies - Select a broad range of representative sites with waterbath or boiler house preheating systems and install monitoring equipment to obtain energy performance information under a range of operating conditions. • Alternative technologies - Install 3 Thermo Catalytic Systems and 3 Low Pressure Steam Systems at representative sites, in parallel with existing preheating plant, with monitoring equipment to determine energy performance information under a range of operating conditions. Operational performance comparison – Operational performance will be compared taking into account the potential to meet preheating requirements, assessment of whole life cost, carbon emissions and thermal losses. This information will be used to optimise management and investment decision making.
Description of proposed Trial(s)	NGN proposes to undertake comprehensively monitored field trials of the existing and alternative technologies to obtain energy performance information under a wide range of operating conditions. NGN indicates that site selection will be critical to ensure that the data collected and analysed can be rolled out across NGN's sites and utilised by other gas distribution network owners. The calculated results, with respect to system efficiency and carbon emissions, need to be applicable to any other site across the network and across the country if they are to prove ultimately useful. The submission sets out criteria to be used in selecting sites that include a range of heat loads and gas flow throughputs, and the potential to maximise gas flows through the test location thereby reducing the heating load of less efficient sites. Identification of best value for money by replacing assets already in need of upgrade will also be taken into account.
Intended outcomes (solutions)	The problems/issues specified are longstanding. Achievement of the project objectives is expected to drive significant cost and environmental benefits. NGN indicates that they expect the solution to: • Significantly accelerate the development of alternative technologies and increase the level of competition in the preheating technology market. • Provide necessary data to allow networks to optimise investment decisions, including reducing the business carbon footprint of preheating. • Provide robust quantified data to assess the accuracy of current estimates of GDNs 'Own Use Gas' within the current Shrinkage Gas estimates. • Reduce whole life costs of preheating installations and provide direct benefit to customers in the form of lower charges and improved environmental performance.
Customer impact of Project implementation.	NGN State '*The project will not have a direct impact on customer's premises nor is it planned to cause any interruption to supplies. The project does not require any customer disconnections or interruptions during installation or operation of new equipment'*.

Synopsis of Project Submission	
Key strengths of the proposal	• Compliance with NIC requirements and the overall detailed quality of the submission gives confidence that the project objectives are achievable. • The project proposes an innovative solution to address the problems identified. • The quantified potential financial and environmental benefits are substantial. • The learning is directly relevant to all UK gas transportation businesses.
Key weaknesses of the proposal	No material weaknesses identified.
Project management structure and related information.	• The Project Team is appropriately resourced to deliver the project effectively and on time, and responsibilities are specified. • The project plan is sufficiently detailed and comprehensive to provide confidence in terms of feasibility. • Governance arrangements are specified.
Derogations/ Exemptions that the Project would/may require.	The submission, Section 7, confirms that no derogations/exemptions are required.
Proposed Successful Delivery Reward Criteria for the Project.	7 critical stages of project delivery are defined that are directly linked to key project milestones, and target dates for completion are specified. 18 deliverables are proposed that are clearly and appropriately linked to the specified criteria.
The key learning outcomes which the Project aims to deliver.	The submission provides details of the plan and process for internal and external dissemination of learning to all stakeholders in real time throughout the project period and on completion. The learning from this project will give benefit to the management and investment decision making processes for every site requiring preheating, and will be relevant to all gas distribution network owners.

3. SUMMARY OF ASSESSMENT AGAINST THE EVALUATION CRITERIA

3.1. OVERALL ASSESSMENT

Overall summary
The project addresses several problems that are associated with existing gas preheating plant located at transmission system pressure reduction installations. The problems are clearly specified in the submission, are common to all gas transmission systems and are significant in terms of both operational costs and environmental impact. New learning from the project will, therefore, be of high relevance to not only to NGN but also to other Network Licensees. Existing water bath preheaters are a mature technology with limited performance in terms of current efficiency and environmental standards. The primary objective of the project is to install and trial the application of alternative technologies in order to assess performance under a wide range of operating conditions. Operational performance, including that of the existing waterbath type installations, will be compared taking into account the potential to meet preheating requirements, assessment of whole life cost, carbon emissions and thermal losses. This information will be used to optimise management and investment decision making. NGN has provided comprehensive and credible details of the methodology, the Project Plan, the Project Team structure/resources and the governance arrangements. This information establishes a high degree of confidence in the feasibility of the project proposal. The project has the potential to deliver substantial financial and environmental benefits. Detailed information is provided, including the underlying assumptions, to justify NGN's quantification of these benefits which far exceed the project cost. Over a 40 year period, NGN claims that their customers could see a cost benefit between circa £60m and £200m with an overall reduction in Business Carbon Footprint (BCF) between 74m to 535m tCO_2e. The timing of the project is appropriate in terms of the UK wide planned investment, not quantified in the submission, in preheating assets under RIIO-GD1, and in the period beyond.

3.2. SUMMARY OF ASSESSMENT AGAINST INDIVIDUAL EVALUATION CRITERIA

Key to ratings		• Seems to be generally in line with the objectives and requirements of the NIC Gas evaluation criteria, • Whilst there are some areas where additional information would be useful, that provided is generally comprehensive and provides no immediate cause for concern.
		• Some indication that the project is in line with the objectives and requirements of the NIC Gas evaluation criteria. However further scrutiny is required to ensure this, • There are some gaps in the information provided, • Further assurance is needed to confirm that the project is viable and that risks are appropriately managed
		• Significantly more assurance is required that the project is in line with the objectives and requirements of the NIC Gas evaluation criteria, • There are some major gaps in the information provided, • Considerable scrutiny is needed to confirm that the project is viable and that risks are appropriately managed, • Potential major risks to the viability of the project.

Evaluation Criteria[2]	Rating	Overall assessment
Criterion A: Low carbon and benefits		Over a 40 year period, NGN's customers could see a cost benefit between circa £60m and £200m with an overall reduction in Business Carbon Footprint (BCF) between 74m to 535m tCO_2e
Criterion B: Value for money		The learning from this project and the potential benefits, both financial and reduction in emissions, have a significant bearing on NGN's operational and environmental impact performance. Over a 40 year period, NGN's customers could see a cost benefit between circa £60m and £200m with an overall reduction in BCF between 74m to 535m tCO2e.
Criterion C: Generates new knowledge		There is no reliable data on the efficiency or carbon emissions of current or alternative gas preheating technologies in a live operating environment. The project addresses these issues and will generate new learning relevant to the gas transportation industry in the UK.

[2] Further information on evaluation criteria can be found in the Gas Network Innovation Competition Governance Document

Evaluation Criteria[2]	Rating	Overall assessment
Criterion D: Innovative and unproven business case		There is no reliable data on the efficiency or carbon emissions of current or alternative gas preheating technologies in a live operating environment. This project proposes an innovative solution to address this issue. NGN has clearly indicated that the project will not proceed without NIC funding due to the significant commercial, operational and security of supply risks entailed. The risks that support this statement have been specified.
Criterion E: Involvement of other partners & external funding		There is no reference to external funding in the project submission. Suitable Suppliers were identified when NGN undertook a Preheating Technology Feasibility Study and were selected based on their experience in manufacturing heating equipment that utilises the trial alternative technologies for industrial scale processes.
Criterion F: Relevance and timing		The project addresses the issues associated with existing gas preheating technology and will deliver outcomes with the potential for significant financial and environmental benefits. The timing of the project is appropriate in terms of the UK wide planned investment in preheating assets under RIIO-GD1. Quantification of the level of investment has not been provided.
Criterion G: Demonstration of robust methodology		The methodology is robust and the project proposals are feasible in terms of technical, customer impact and safety perspectives.
Criterion: Appropriateness of the SDRC definitions and timing and adequacy of links to key project milestones		7 critical stages of project delivery are defined that are directly linked to key project milestones, and target dates for completion are specified. 18 deliverables are proposed that are clearly and appropriately linked to the specified criteria.

4. CRITERION A: LOW CARBON AND BENEFITS

Criteria	Rating	Overall assessment
Criterion A: Accelerates the development of a low carbon energy sector and/or environmental benefits & has the potential to deliver net financial benefits to existing and/or future customers Credibility of the carbon, environmental and financial benefits claimed for the project.		Over a 40 year period, NGN's customers could see a cost benefit between circa £60m and £200m with an overall reduction in Business Carbon Footprint (BCF) between 74m to 535m tCO_2e

Sub-Criteria	Assessment and material document references
* contribution to what part of the DECC Plan?	The submission provides a detailed assessment of the potential carbon benefit for the NGN gas preheating asset base and also for all GB assets. The estimated reduction in BCF over a 40 year period is assessed and valued at DECC's central estimate of Non-traded cost of Carbon. Project Business Case, Section 3.3a, p15.
* carbon benefits claimed & assumptions	NGN have made legitimate engineering assumptions on potential BCF savings associated with alternative technologies. The submission includes details of the assumptions/calculations and the assessment of potential benefit which is extrapolated to include NGN's total preheating asset base. The potential annual carbon saving claimed ranges from 1,850 to 13,400 tCO2e/year. Evaluation Criteria, Section 4.1, p19
* environmental benefits & assumptions	Potential environmental benefits result from reductions in carbon emissions as a consequence of improved energy efficiency associated with the alternative preheating technologies. The submission includes details of the legitimate assumptions/calculations leading to a forecast net reduction in carbon emissions of 41,400 tCO2e over 40 years (1,035 tCO2e per year) for the project 6 test installations. Evaluation Criteria, Section 4.1, p19

Sub-Criteria	Assessment and material document references
* financial benefits claimed, robustness of claims and assumptions	Details of the legitimate assumptions made and the assessment of the financial benefits claimed are provided. The information is credible and comprehensive, and the process seems robust. Extrapolating the potential results of a medium sized site to represent all of NGN's preheating assets (84 existing preheating sites), the output of the process indicates that financial benefits could be between circa £1.5m to £5m per year. Project Business Case, Section 3.3a, p15. Evaluation Criteria, Section 4.1, p19
* quantitative analysis provided	Detailed quantitative analysis is provided to evaluate asset whole life costs and emissions for NGN preheating assets, and also for GB assets, over 40 year period. Evaluation Criteria, Section 3.3a, p15
* cost, time and speed to implement	The project plan extends from initiation at 01/08/2013 to completion, including dissemination of learning, by 20/12/2016. Performance monitoring of the existing water bath/boiler preheating installations will commence 01/04/2014 and will enable a period of trial to confirm the monitoring arrangements. Construction and commissioning of the alternative technology test installations at designated small sites will be completed by 01/09/2014 and the medium/large sites by 01/09/2015. These timescales will ensure that the performance of all of the various technologies can be monitored over the 2015/16 winter peak gas demand period to determine fitness for purpose in all operational respects. The build up of the cost estimates and the timescale of the Project Plan are credible and appropriate with respect to the overall scope of the project and the necessary engineering works. Project Business Case, Section 3.3, p17 Appendix C, Financial Justification p 56 Appendix F, Tables and Charts, p 65 Appendix G, Project Plan, p 73
* claims for potential for replication across GB	Gas preheating is a requirement at all transmission system pressure reduction offtakes and the learning from this project is directly relevant to efficient management, particularly investment optimisation, and operation of these installations. In their submission NGN indicate that their asset base comprises 84 installations and the GB total is approximately 800 installations. Potential financial and carbon benefits are evaluated for both NGN and GB preheating assets. Evaluation Criteria, Section 4.1, p19
* claimed capacity released and how quickly released, if relevant	There are no references to claimed release of gas distribution network capacity from the project. The project does not release network capacity.

5. CRITERION B: VALUE FOR MONEY

Criteria	Rating	Overall assessment
Criterion B: Value for money The size of benefits and learning from the project that is applicable to the relevant network		The learning from this project and the potential benefits, both financial and reduction in emissions, have a significant bearing on NGN's operational and environmental impact performance. Over a 40 year period, NGN's customers could see a cost benefit between circa £60m and £200m with an overall reduction in BCF between 74m to 535m tCO_2e.

Sub-Criteria	Assessment and material document references
* Proportion of benefits to customers (the relevant network system) as opposed to elsewhere on the supply chain	NGN has provided a detailed response to the question how does the project provide value for money to gas customers but the proportion of the financial benefits that goes to customers is not specified. The sum of money has been assessed and it is understood that this will flow through to customers via reductions in transportation charges. Evaluation Criteria, Section 4.2, p21.
* how the project has a potential direct impact on the network	The project has a direct impact on NGN's informed capability to manage and operate of gas preheating installations efficiently. Also, the performance information obtained will support optimisation of investment decisions related to replacement of existing assets and new assets.
* justification that the scale & cost of the Project is appropriate in relation to the learning that is expected.	NGN has provided comprehensive information throughout the submission to justify the scale and cost of the project proposal. The learning is expected to deliver benefits, including environmental benefits, which far exceed the project costs and could be as much as £2.7bn when extrapolated to all the UK preheating assets. Evaluation Criteria, Section 4.2, p23.
* the processes that have been employed to ensure that the Project is delivered at a market competitive cost	NGN has confirmed that all large investment projects are managed and delivered via the Major Projects Team that employs an Integrated Management Systems (IMS) that is integrated with the ISO9001 quality system. This project will be delivered and managed using this system will ensure that the project is managed efficiently. The project will be delivered using NGN's approved framework partners identified and selected through a competitive tender and procurement process. Evaluation Criteria, Section 4.2, p23.

Sub-Criteria	Assessment and material document references
* how Project Partners have been identified and selected including details of the process that has been followed and the rationale for selecting Participants and ideas for the Projects	NGN undertook a Preheating Technology Feasibility Study and published the report in April 2013. The study resulted in a recommendation for the two top performing alternative technologies to be developed for gas preheating application. The main project partners, Proheat Systems Ltd. and Bruest Catalytic Heaters, were selected via this study based on their experience in manufacturing heating equipment that utilises the alternative technologies identified for industrial scale processes. Ideas have been generated by the NGN project team with appropriate input by the partners and independent experts. Project Business Case, Section 3.2, p13
* the costs associated with protection from reliability or availability incentives and the proportion of these costs compared to the proposed benefits of the Project	There are no references to costs associated with protection from reliability or availability incentives in the project submission.

6. CRITERION C: GENERATES NEW KNOWLEDGE

Criteria	Rating	Overall assessment
Criterion C: Generates new knowledge The potential for new learning to be generated by the project		There is no reliable data on the efficiency or carbon emissions of current or alternative gas preheating technologies in a live operating environment. The project addresses these issues and will generate new learning relevant to the gas transportation industry in the UK.

Sub-Criteria	Assessment and material document references
* the potential for new learning to be generated by the Project	There is no reliable data on the efficiency or carbon emissions of current or alternative gas preheating technologies in a live operating environment. Existing water bath preheaters are a mature technology with limited performance in terms of current efficiency and environmental standards. NGN has undertaken a feasibility study which has identified two alternative technologies that have the potential to provide significant financial and carbon emissions benefits if the project trials demonstrate that the necessary UK operational performance requirements are met. Thermo catalytic and low pressure steam technologies have not been developed for gas preheating in the UK previously, and learning from the project will be new and very relevant to the UK gas transportation businesses generally. **Review of NGN Pre – Heating Feasibility Report – 30/04/2013:** • The Report, commissioned by NGN and prepared by independent experts, is structured to provide appropriately reasoned and detailed assessment of the gas preheating capability of a range of alternative technologies. • NGN RIIO-GD1 proposed investment in gas preheating installations – 26 BH and 32 WBH installations will be upgraded or replaced. Forecast cost not stated. • The study takes into account operational requirements, determined by analysis of data for existing installations over a comprehensive range of operating conditions, to determine the necessary performance criteria. • The process to measure the energy balance and determine overall operating efficiency of preheating installations is specified (and is also included in the NIC submission) and the arrangements for the proposed trials will ensure that all necessary information for this purpose is captured. • Theoretical and operational issues are taken into account in order to assess the capability/suitability of each of the new technologies. The advantages and disadvantages of each alternative technology are specified clearly; some are unsuitable (e.g. solar, air source heat pumps) simply because maximum efficiency is in the summer period when gas flow is at a minimum. The technologies considered are: ○ Solar thermal energy ○ Air source heat pumps ○ Ground Source heat pumps

Sub-Criteria	Assessment and material document references
	○ Gas absorption air source heat pumps ○ Biomass boilers ○ Combined heat and power • A range of 7 existing and new technology installation types are ranked to compare performance in terms of: ○ Efficiency ranking ○ Lifecycle cost/Risk ranking(operational) ○ Cost ranking depending on site circumstances/requirements ○ Overall ranking The process is specified and results in LP Steam and Catalytic preheating ranking 1st and 2nd respectively. • The report concludes with recommendations for further study and trials to fully assess the performance of the existing and the new technologies identified to determine actual gas preheating capability under a range of operating conditions. The NIC submission is directly based on these recommendations which we consider to be justified, credible, and appropriate to address the gas preheating problems identified. Project Description, Section 2.1, p3 Pre – Heating Feasibility Report – 30.04.13
* how learning relates to the distribution system	Gas preheating is a requirement at all transmission system pressure reduction offtakes; the learning from this project is directly relevant to efficient management, particularly investment optimisation, and operation of these installations. In their submission NGN indicate that their asset base comprises 84 installations and the GB total is approximately 800 installations. Potential financial and carbon benefits are evaluated for both NGN and GB preheating assets. Evaluation Criteria, Section 4.1, p19
* applicability of learning to other network licensees	Gas preheating is a requirement at all transmission system pressure reduction offtakes; the learning from this project is directly relevant to efficient management, particularly investment optimisation, and operation of these installations. In their submission NGN indicate that their asset base comprises 84 installations and the GB total is approximately 800 installations. Potential financial and carbon benefits are evaluated for both NGN and GB preheating assets. Evaluation Criteria, Section 4.1, p19
* the proposed IP management strategy and conformance with the default principles	NGN intend to conform to the default IPR requirements. There are no IP issues and all learning from the project will be shared with other GDNs. Knowledge Dissemination, Section 5.5, p31

Sub-Criteria	Assessment and material document references
* credibility of the proposed methodology for capturing learning from the trial	Learning from the trials is defined and captured in four categories: • Technical knowledge • Operational knowledge • System efficiency data • Network operation The methodology for capture of operational performance information as the trials progress is comprehensively described and the information will be published as the trials progress. Project Description, Section 2, p3 Knowledge Dissemination, Section 5, p29
* quality of plans for knowledge sharing	Comprehensive details of the proposals for dissemination of learning are provided in the submission. The various processes described are robust and will enable all interested parties/stakeholders, including professional and industry organisations, to access information as the project progresses through to publication of the final report. Knowledge Dissemination, Section 5, p29
* how alternative IP strategy would deliver value for money to customers	There are no IP issues and no references to an alternative IP strategy in the submission.

7. CRITERION D: INNOVATIVE AND UNPROVEN BUSINESS CASE

Criteria	Rating	Overall assessment
Criterion D: Innovative and unproven business case The extent to which projects could not be performed as part of a network licensee's normal course of business.		There is no reliable data on the efficiency or carbon emissions of current or alternative gas preheating technologies in a live operating environment. This project proposes an innovative solution to address this issue. NGN has clearly indicated that the project will not proceed without NIC funding due to the significant commercial, operational and security of supply risks entailed. The risks that support this statement have been specified.

Sub-Criteria	Assessment and material document references
* The justification that the project is truly innovative: how the project is innovative and evidence that it has not been tried before	There is no reliable data on the efficiency or carbon emissions of current or alternative gas preheating technologies in a live operating environment. Existing water bath preheaters are a mature technology with limited performance in terms of current efficiency and environmental standards. NGN has undertaken a feasibility study which has identified two alternative technologies that have the potential to provide significant financial and carbon emissions benefits if the project trials demonstrate that the necessary UK operational performance requirements are met. Thermo catalytic and low pressure steam technologies have not been developed for gas preheating in the UK previously, and learning from the project will be new and very relevant to the UK gas transportation businesses generally. Project Description, Section 2.1, p3
* the credibility of why the network licensee could not fund such a project through its price control allowance	NGN did not request an allowance under RIIO – GD1 Price Control Review and, therefore does not have funding available from that source.

Sub-Criteria	Assessment and material document references
* the justification relating to the specific project risks such as commercial, regulatory and Project risks	NGN has stated clearly that the project will not proceed without NIC funding due to the significant commercial, operational and security of supply risks entailed. BAU funding is not feasible for the following reasons: • The commercial cost of alternative technologies is too great when compared to existing technologies in terms of unit cost and specialist project management. • These alternative technologies have not been used or evaluated in this way in the UK and under the UK operating parameters. • There is no factual data to support any investment in these alternative technologies based on system efficiency. • All monitoring and knowledge dissemination of this equipment would not be required or provided under BAU. NGN Project Team presentation, 4th September, Slide re Innovation
* why the project can only be undertaken with the support of the NIC, including scrutiny of the claimed commercial, technical, or operational risks associated with the project	NGN does not have funding available from the RIIO – GD1allowances. Also, the risks that rule out BAU funding have been succinctly stated (see above) and are credible. A key principle for NIC funding is learning dissemination which would not be required or provided under BAU.

8. CRITERION E: INVOLVEMENT OF OTHER PARTNERS & EXTERNAL FUNDING

Criteria	Rating	Overall assessment
Criterion E: Involvement of other partners & external funding The level of external funding and appropriateness of collaborators involved in each project submission		There is no reference to external funding in the project submission. Suitable Suppliers were identified when NGN undertook a Preheating Technology Feasibility Study and were selected based on their experience in manufacturing heating equipment that utilises the trial alternative technologies for industrial scale processes.

Sub-Criteria	Assessment and material document references
* appropriateness and affiliation of project partners	Partners were identified when NGN undertook a Preheating Technology Feasibility Study and were selected based on their experience in manufacturing heating equipment that utilises the trial alternative technologies for industrial scale processes. It is assumed that NGN regard the Suppliers as Partners because they have both committed to contributing resources to the cost of development, although the scale and format of such contributions are not specified; no external funding is included in the Spreadsheet. The main project partners are Proheat Systems Ltd. and Bruest Catalytic Heaters. Project Business Case, Section 3.2, p13
* level of external funding achieved, presented on a comparable basis	There is no reference to external funding in the project submission.
* effectiveness of systems & processes to obtain partners and ideas	Essentially the process to develop ideas regarding appropriate (to the UK operational requirements) alternative technologies for gas preheating and obtain partners was the Preheating Technology Feasibility Study undertaken by NGN and completed in April 2013. Ideas for the project have been developed in detail by substantially by the NGN Project Team and in collaboration with the partners where necessary. Project Description, Section 2.1, p3
* robustness of contractual arrangements with partners	Whilst the Letters of Support acknowledge the context of the work and confirm that both Suppliers will contribute to development costs, no specific information has been provided to demonstrate the robustness of the contractual arrangements. Appendix D, Project Partners – Letters of Support, p60

Sub-Criteria	Assessment and material document references
* funding and benefits for each partner	The reasonable development costs incurred by the partners in the design, installation and monitoring phases of the project will be NIC funded. If the project is successful and establishes that the alternative technologies are appropriate for gas preheating then each partner will have the commercial opportunity to market the developed equipment within the UK, and perhaps internationally also. NGN has indicated that there are approximately 800 gas preheating installations throughout the UK that will require update/replacement over the next 40 years.

9. CRITERION F: RELEVANCE AND TIMING

Criteria	Rating	Overall assessment
Criterion F: Relevance and timing		The project addresses the issues associated with existing gas preheating technology and will deliver outcomes with the potential for significant financial and environmental benefits. The timing of the project is appropriate in terms of the UK wide planned investment in preheating assets under RIIO-GD1. Quantification of the level of investment has not been provided.

Sub-Criteria	Assessment and material document references
* The significance of the project in: Overcoming current obstacles to a future low carbon economy Trialling new technologies that could have a major low carbon impact Demonstrating new system approaches that could have widespread application	The lack of data about the efficiency of current and prospective technologies for gas pre-heating is a significant impediment to the reduction in the energy used. The project submission provides a detailed assessment of the potential for significant reductions in carbon emissions over a 40 year period. The potential BCF reduction for NGN is estimated between 74m to 535m tCO2e. Evaluation Criteria, Section 4.2, p22. The NGN process to identify appropriate new technologies for gas preheating application development and trial is robust and credible. Both of the technologies selected provide the potential for significant reductions in carbon emissions. The project learning is relevant to gas transportation businesses generally and there is substantial scope for widespread application within the UK.
* why the problem is relevant and warrants funding	The problem is characterised as follows: • Existing water bath preheaters are a mature technology with limited performance in terms of current efficiency and environmental standards. • The options for the application of alternative preheating technologies are limited. • Reliable data on the efficiency or carbon emissions of current or alternative preheating technologies in a live operating environment is not available. • Investment decisions regarding replacement preheating assets can be considered suboptimal due lack of data. • Potential carbon emissions benefits from network operational flexibility are inhibited by lack of accurate emissions information. The project addresses these issues and will deliver outcomes with the potential for significant financial and environmental benefits.

Sub-Criteria	Assessment and material document references
* how the GDN would use the method in future business planning	NGN has significant preheater investment funding within RIIO-GD1 and beyond; quantification of the level of investment funding has not been provided. Investment decisions will be informed by the learning from this project. The project learning will be applied to ensure that assets at the end of their useful lives will be replaced by the optimum form of preheating.
* the appropriateness of the timing of the project	The timing of the project is appropriate in terms of the planned investment in preheating assets under RIIO-GD1. We consider that the recovery of reliable data about effective operation of these assets is long overdue within the industry.

10. CRITERION G: DEMONSTRATION OF ROBUST METHODOLOGY

Criteria	Rating	Overall assessment
Criterion G: Demonstration of robust methodology The feasibility of the project proposals from technical, customer impact and safety perspectives		The methodology is robust and the project proposals are feasible in terms of technical, customer impact and safety perspectives.

Sub-Criteria	Assessment and material document references
* the feasibility/quality of the project plan and programme governance, including responsibilities	The project plan is sufficiently detailed and comprehensive to provide confidence in terms of feasibility. The Project Team is appropriately resourced to deliver the project effectively and on time, and responsibilities are specified. Governance arrangements are specified. Project Readiness, Section 6.4, p37 Appendix B, Project Organogram, p55 Appendix G, Project Plan, p73
* All risks, including customer impact, exceeding forecast costs and missing the delivery date	The submission includes summary details of the project risk and probability assessment. Management of costs is adequately covered by the NGN governance arrangements. NGN State '*The project will not have a direct impact on customer's premises nor is it planned to cause any interruption to supplies. The project does not require any customer disconnections or interruptions during installation or operation of new equipment'*. Project Readiness, Section 6.4, p37 Appendix E, Project Risk Summary Report, p62 Customer Impacts, Section 8.1, p45
* Whether items within the project budget appear to provide value for money	The project cost assessment is detailed comprehensively and appears to provide value for money both in terms of the various cost items. Appendix C, Financial Justification, p57
* whether the proposed resources are sufficient to deliver the project	The proposed project team manpower, external support and financial resources are detailed in the submission and are sufficient to deliver the project.

Sub-Criteria	Assessment and material document references
* whether the project can be started in a timely manner	Project readiness is described in detail and gives confidence that the project can be started in a timely manner.
* the robustness of the project methodology, including technical rigour and statistically robust outputs.	The project methodology is described in detail and is robust, it is structured, well defined, comprehensive and entirely credible. NGN has provided details of all elements of the project delivery, including data acquisition required for the energy balance calculation which is fundamental to the project objectives. Project Description, Section 2, p3
* the appropriateness of the risk mitigation processes	The submission includes summary details of the project risk and probability assessment, including mitigation measures.
* Clear vision for the project	The project objectives are clearly specified and the methodology is both appropriate and credible in terms of delivery.
* Value of the project clear	The submission clearly identifies and quantifies the potential financial and environmental benefits.
* Impact of the project clear	The potential impact of the project and relevance of the project to the UK gas transportation businesses is clear and quantified.
* Obstacles and impediments identified	These matters are addressed in the project description, at high level in the risk and probability assessment and in the Project Team presentation.
* Project outcomes clear	Project outcomes are clearly specified.
* Means to achieve outcomes identified	The proposed methodology is both appropriate and credible in terms of delivery of objectives.
* Risks that may prevent outcomes identified and managed	This issue are addressed at high level in the risk and probability assessment, including mitigation measures.
* Project well planned	The information provided regarding the planning process is comprehensive and robust, commencing with the Preheating Technology Feasibility Study completed in April 2013.
* Resources clearly identified	The proposed project team manpower, external support and financial resources are detailed in the submission and are sufficient to deliver the project.
* Project timeline justified	The project timeline is clearly specified in the Project Plan and Section 6 – Project Readiness.
* Technical standards clear	The submission includes appropriate references to technical standards.
* Performance requirements clear	The trial is designed to assess the performance of the alternative technologies against a range of operational requirements that are clearly specified.

Sub-Criteria	Assessment and material document references
* Evidence of research of existing solutions	NGN undertook a Preheating Technology Feasibility Study, completed in April 2013, to identify appropriate solutions for trial.
* Collaboration options described	Collaboration options evolved from the feasibility study and appropriate partners are specified.
* Project informed by data	The project is informed by data gathered in the feasibility study process which assessed the technical capability of alternative technologies to meet UK operational performance requirements.
* Clear technical governance	Technical governance is incorporated in the project management proposals.
* Clear Project Management	Project management arrangements in terms of resources and governance processes are clear.

11. SUCCESSFUL DELIVERY REWARD CRITERIA

Criteria	Rating	Overall assessment
Criterion: Appropriateness of the SDRC definitions and timing and adequacy of links to key project milestones		7 critical stages of project delivery are defined that are directly linked to key project milestones, and target dates for completion are specified. 18 deliverables are proposed that are clearly and appropriately linked to the specified criteria.

Detailed comments

7 critical stages of project delivery are defined with target dates for completion, as follows:

1. Preheating Site Selection
2. Preheating Site & Technology Design
3. Technology Build & Installation
4. Successful trialling and demonstration of alternative preheating technologies
5. Successful estimation of system efficiencies of existing preheating technologies
6. Knowledge, Learning & Dissemination Strategy
7. Project Evaluation & Final Project Report

The stages are directly linked to key project milestones and 18 deliverables are proposed that are clearly and appropriately linked to the specified criteria.

12. ADDENDUM: SYNOPSIS OF CHANGES TO THE SUBMISSION

NGN chose not to make any changes to their original submission.