NIC Full Submission
The City CNG Project

July 2015

Appendix

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KEY

Method	Method name
Method 1	City CNG Project

Gas NIC – financial benefits

APPENDIX A - BENEFITS TABLES

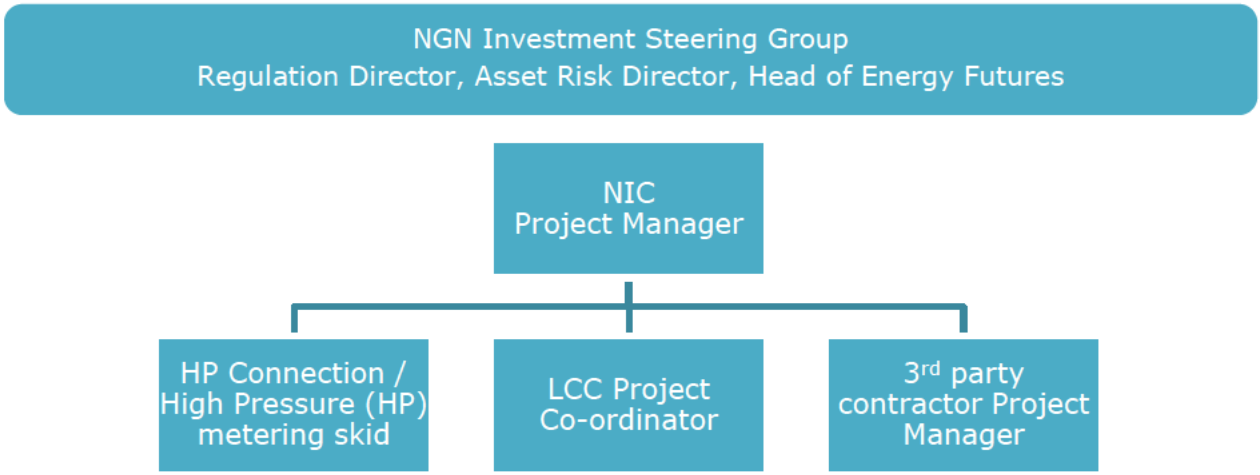
Financial benefit (£m)								
Scale	**Method**	**Method Cost**	**Base Case Cost**	**Benefit**			**Notes**	**Cross-references**
				2020	**2030**	**2050**		
Post-trial solution *(individual deployment)*	Method 1	1,231,495		N/A	N/A	N/A	Method One will have minimal direct benefits back to UK gas customers the financial benefits will be secondary as part of reduced public service cost through cheaper fuel.	See section 4
	Method 2							
	Method 3							
Licensee scale *If applicable, indicate the number of relevant sites on the Licensees' network.*	Method 1	1,231,495		N/A	N/A	N/A	*(Number of sites:12) Any city's (or large towns) within the network could build a city CNG fuelling station once the business case is proven. In NGN this could include Leeds, Wakefield, Bradford, Dewsbury, Halifax, Hull, Middlesbrough, Durham, Sunderland, Gateshead, Newcastle, Carlisle)*	For the purposes of the benefits modelling in section 4 we have assumed just the 8 core cities roll out the CNG station.
	Method 2							
	Method 3							
GB rollout scale *If applicable, indicate the number of relevant sites on the GB network.*	Method 1	1,231,495		N/A	N/A	N/A	*(Number of sites:64) There are 8 gas networks in the UK which have different numbers of large urban centres. For the purposes of this extrapolation we have assumed on average 8 centres per network giving 64 sites.*	For the purposes of the benefits modelling in section 4 we have assumed just the 8 core cities roll out the CNG station. This 64 projection is based on a potential for this type of station if a rapid take up of CNG vehicles occurs in the UK and a very strong business case for these types of station are provided via this project.
	Method 2							
	Method 3							

Gas NIC – carbon and/ or environmental benefits

Carbon and/ or environmental benefit (MtCO2e)								
Scale	**Method**	**Method Cost**	**Base Case Cost**	**2020**	**2030**	**2050**	**Notes**	**Cross-references**
Post-trial solution *(individual deployment)*	Method 1	1,231,495		0.01576	0.2	0.8	For lower and upper limits see Appendix H – business model spreadsheet. For the project pessimistic, realistic and optimistic projections have been developed which provide a range of the MtCO2e benefits. The 2020 figure is taken directly from the business model spreadsheet (appendix H) the 2030 and 2050 figures are taken as an assumed continual benefit with an element of growth in vehicle conversions over the following year	See Appendix H – Business Model spreadsheet data summary tab.
	Method 2							
	Method 3							
Licensee scale *If applicable, indicate the number of relevant sites on the Licensees' network.*	Method 1	1,231,495		0	0.73	1.26	*(Number of sites:12)* The 2030 figure has been provided based on 4 more cities in the NGN region building and city based CNG stations with an associated MTCO2 equivalent saving of 13,424 (the ten year figure from the appendix H spreadsheet), plus the original Leeds station. The 2050 figure has been calculated by assuming all the other 8 cities produce stations all with an annual benefit of circa 2000tonnes per annum (2000tCO2e x12 x 20 years plus 78000tCO2e)	Appendix H – data summary tab Carbon savings over ten years.
	Method 2							
	Method 3							
GB rollout scale *If applicable, indicate the number of relevant sites on the GB network.*	Method 1	1,231,495		0	3.65	7.49	*(Number of sites:64) the 2030 figure has been produced by multiplying the 0.73 (NGN network benefit) by 4 (16 more cities -approximately 1/3 of UK cities) plus 0.73 (NGN 4 cities). The 2050 figure has been* calculated by assuming all the other 44 cities produce stations all with an annual benefit of circa 3000 tonnes per annum (3000tCO2e x64 x 20 years plus 5.6mtCO2e)	Appendix H – data summary tab Carbon savings over ten years.
	Method 2							
	Method 3							
If applicable, indicate any environmental benefits which cannot be expressed as MtCO2e.	**Post-trial solution:** [Explain any environmental benefits which cannot be expressed as MtCO2e]						Particulate Matter and Nitrous Oxide emission reductions are significant environmental benefits which will occur as a result of this project. Projected savings for the Leeds city CNG project of these emissions are: • NOX 75,637 tonnes over ten years, • Particulate Matter 7,723 tonnes over ten years Dependent on the strength of the business case these benefits could extend to circa 64 cities (see justification above). In the main submission document we have extrapolated using just the 8 core cites.	See Appendix H – Business Model spreadsheet data summary tab.
	Licensee scale: [Explain any environmental benefits which cannot be expressed as MtCO2e]							
	GB rollout scale: [Explain any environmental benefits which cannot be expressed as MtCO2e]							

Appendix B: Financial Justification

Project Organogram



Cost Summary Table

The overall project cost summary is included below and is pictorially represented by diagram one.

Figure 1: Project diagram

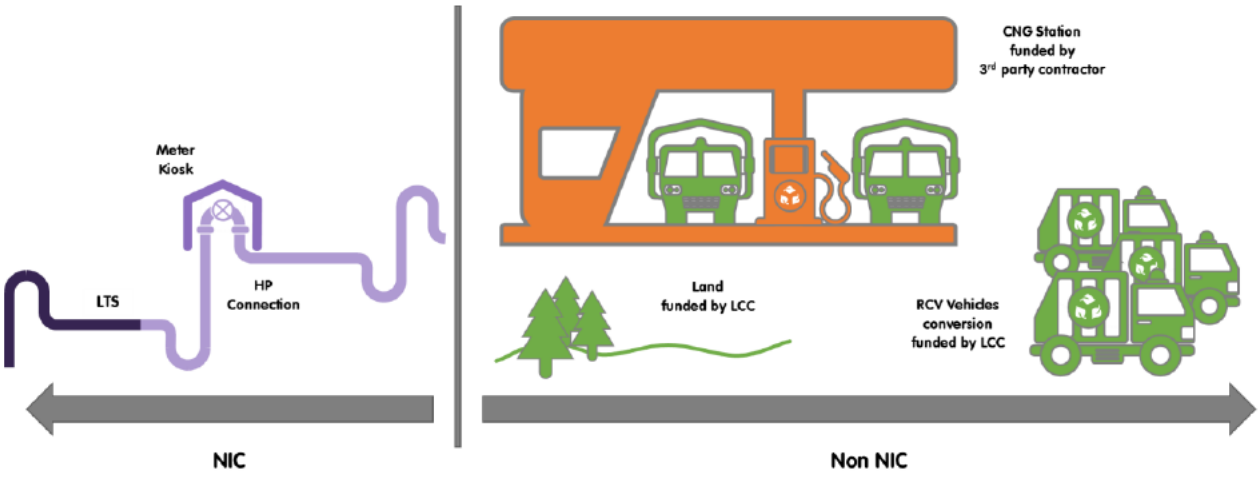


Table 1: NIC / overall project cost (see below for breakdown)

No	Project Element	Funding Provider	Cost	Contingency	Total Cost	Recoverable under NIC commercial agreement
1	HP connection	NIC	£801,300	£120,195	£921,495	Y
2	HP Meter	NIC	£40,000	£10,000	£50,000	Y
3	Web portal	NIC	£175,000	£25,000	£200,000	N
4	Marketing	NIC	£50,000	£10,000	£60,000	N
				Sub-Total NIC	£1,231,495	£971,495
5	Land	LCC	£600,000	£60,000	£660,000	N/A
6	RCV conversion	LCC	£1,500,000	£150,000	£1,650,000	N/A
7	CNG Station build	3rd Party	[redacted]	[redacted]	[redacted]	[redacted]
				Sub Total 'Others'	[redacted]	[redacted]
				Project Total	[redacted]	[redacted]

Item 1- NGN HP Connection Estimate

Three sites have been identified as being both within land accessible to Leeds City Council (LCC) and close enough for a connection to NGN's Local Transmission System (LTS) to be carried out without being cost prohibitive. These costs have been prepared using historic data from previous LTS connection and diversion projects, and have a 15% uplift applied for risk. The connection to the Compressed Natural Gas (CNG) fuelling station will be carried out to IGEM standards and NGN procedures, and as such should not pose any problems which have not been encountered in previous LTS connection and diversion schemes.

The complexity of the scheme will be at the interface between NGN's Emergency Control Valve (ECV), which is the defined boundary of NGN's pipeline and asset, the meter provider and the CNG fuelling station. This will require each of the project participants' designs to be integrated to ensure the seamless integration of the individual elements of the new installation. The costs include an allowance to make the ECV installed at the defined boundary to be remotely operable from the NGN control room allowing the CNG fuelling station flow to be monitored and operated. This is important as NGN need to have the option to limit the volume of gas flowing to the CNG fuelling station and prevent it from affecting NGN's supply to customers in Leeds. An allowance has been made in the design costs for a compressor study which will be required to ensure its operation will have no detrimental effect on the upstream NGN network.

Assumptions

The estimates are based on providing a High Pressure (HP) gas supply at the locations shown in LCC Drg. No 18105, at the blue, green and red points. It is assumed that the connections will be made via a hot tap using either a 50mm or 75mm weldoflange. Subject to the design study, a full encirclement split tee may be required at the connection point to facilitate sufficient capacity and/or mitigate any stress related issues. This is included in the risk allowance. The supply pipeline will be sized at 100mm diameter with a below ground isolation valve at the connection end and the pipeline terminating with an above ground Emergency Control Valve (ECV). It may be a requirement of the design study to install a Remotely Operable Valve (ROV) in lieu of a manual ECV to meet operational safety requirements. The additional cost is included in the risk allowance. A 100mm connection would allow for a flow rate of 10000scmh at the Normal Minimum Pressure for the pipeline (15bar). The pipeline will be electrically isolated at each end and have a dedicated sacrificial anode at each end, which will be a sufficient means of cathodic protection for this length of pipeline.

Cost Breakdown

A breakdown of costs for the connection from NGN's LTS network to each of the potential CNG fuelling station locations are shown below. The price of each connection increases in correlation with the length of pipe to be laid and the complexity of the engineering involved in its installation.

Table 2: Potential sites cost breakdown

	Route 1	Route 2	Route 3
Design **Detail Design (50%)** **Site investigation (25%)** **Compressor Study (25%)**	£40,000	£42,000	£50,000
Construction Contractor **Labour (50%)** **Plant (20%)** **Management (20%)** **Profit (10%)**	£146,300	£171,600	£283,800
NGN Inspection/supervision **Supervision (50%)** **Inspection (50%)**	£20,000	£24,000	£36,000
NGN Project Management **Engineering (50%)** **QUESH (20%)** **Commercial (20%)** **Admin (10%)**	£260,000	£262,500	£270,000
Total Materials **Pipe (75%)** **Fittings (25%)**	£58,500	£92,500	£150,500
NGN Direct labour	£1,000	£1,000	£1,000
NGN legal costs **Accommodation works (50%)** **Permanent Easements (50%)**	£5,000	£7,000	£10,000
Risk Allowance (15%)	£79,620	£90,090	£120,195
Total	**£610,420**	**£690,690**	**£921,495**

Route 1

This route consists of 100m of pipeline to be laid through private grassed waste ground with no obstacles. The connection points and termination points will both be located inside the same waste ground area. There should be minimal issues with proximity of the pipeline to the planned station located along this route.

Route 2

This route consists of 370m of pipeline to be laid through private grassed waste ground with no obstacles. The connection points and termination points will both be located inside the same waste ground area. There should be minimal issues with the proximity of the pipeline to the planned station located along this route.

Route 3

This route consists of 800m of pipeline through private grassed waste ground, public road and public verge. The route will have to cross the A63, with the pipe to be installed using open cut methods. In addition to this approximately half of the route will also need to be laid in the verge beside the dual carriageway. This will require coordination with LCC during the design, planning and construction stages. The uplift in design costs and construction costs reflects that there will be an increased level of complexity in both due to the need for the pipeline to cross the road. There is a possibility of there being proximity to the planned station issues with this route due to there being very little flexibility in where the pipeline can be accommodated.

NGN Project Delivery

The design and delivery of the LTS connection will be carried out by NGN's Major Projects team in conjunction with selected design and delivery partners. The Major Projects team already have experience of coordinating complex LTS connection and diversion schemes, and work to a fully accredited Integrated Management System (IMS). The IMS employed by the Major Projects team will ensure that there is a robust governance structure in place throughout the project lifecycle of the LTS connection. This will ensure the LTS connection is carried out efficiently and cost effectively, without making any compromises in the quality of the infrastructure installed or the safety of the operations carried out.

To ensure the best possible value is achieved, commercial frameworks that are already in place with NGN design, delivery and procurement partners will be utilised. These frameworks will be used as a basis for carrying out competitive tenders to approved NGN suppliers to achieve a cost effective price.

Notes

1. There is also sufficient capacity in NGN's LTS for an 8" connection to be carried out at the same locations, offering flowrates of up to 40,000scmh at normal minimum pressure (15bar). To provide an estimate of the costs for an 8" connection we have applied a 20% uplift to the original estimates.

Table 3: 8" connection estimate

	Original estimate	Estimate for 8" connection
Route 1	£610,420	£732,504
Route 2	£690,690	£828,828
Route 3	£921,495	£1,105,794

1. A budget price has also been prepared for connecting to NGN's 38bar system to provide a significantly cheaper compression plant option. Given that the nearest point on the 38bar system that could be connected to the suggested locations is approximately 8km away. At the moment this connection is considered to be circa £4,000,000. As a result it is not deemed an appropriate connection location due to the high costs and would only be considered if LCC identified a land location nearer the 38 bar pipeline.

2. 'Pressure Reservoir' – No allowance has been made for any large diameter pipework to be installed to act as a 'pool' if identified as being required from the compressor study.

2. HP Meter Skid

The HP meter estimate has been derived from information provided by LCC's shipper and their associated asset meter provider and initial conversations. The costs are based on providing a HP meter skid that is capable of being readily adaptable to a scaling load demand with limited additional cost.

3. Web Portal

In line with the knowledge dissemination objectives of the project a dedicated web portal will be developed. This portal will provide a user focused experience with all the information required to understand the project and the CNG station's current performance.

It is envisaged that the web portal will provide both within day profiles and overall throughput information in real time via a remote monitoring interface at both the HP meter unit and the station pumps (or outlet from the station reservoirs).

The costs are based on benchmarking costs from NGN's previously successful Low Carbon Gas Pre-heating (LCGP) NIC project.

4. Marketing

The commercial success of the CNG fuelling station is important both in terms of the commercial payback of the NIC funding and to provide the proof of concept evidence to help accelerate the adoption, and associated benefits, of this technology across the UK. As such a £60,000 provision has been included, based on an average of £20,000 per year, for the first three years of the project to help promote the CNG fuelling station and canvas expertise / case studies from around the globe and especially Europe.

5,6,7 Land, RCV Conversion, CNG Station Build

All costs associated with these aspects of the project have been provided by LCC via their work to date and soft market test information, (for relevant excerpts see appendix D).

Leeds CITY COUNCIL

Northern Gas Networks

Environment and Housing
Neil Evans
Director of Environment and Housing
Thoresby House Level 2
2, Rossington Street
Leeds LS2 8HD

Tel: 0113 247 4721

17 July 2015

Dear Northern Gas Networks

Thank you for the invitation to work alongside you in developing this Network Innovation Competition bid to assist in the realisation of a CNG station in Leeds.

The Council has an ambition to become the 'best city' in the UK, our commitments in this regard are outlined in our 'Best Council Plan'. A key element of becoming the best city is to take bold action to cut emissions. Our commitment to this is set out in our 'low carbon breakthrough' programme (announced at the start of this year), where the Council made a commitment to cut the city's carbon emissions by 40% by the year 2021 (from 2009 levels), with a sub-commitment of switching our entire transport fleet to alternative fuels by 2025. Since this time, the city's Air Quality problem and the need to reduce harmful pollutants from transport has taken priority. The Council is therefore in the process of developing a strategy and setting challenging targets to address this area of public health concern.

The Council recognises it has a role to play in leading by example. We are in the fortunate position of being operators of quite a large fleet that we can make changes to, to assist in influencing others to make greener transport choices, and positively impact Air Quality. The Council's Executive Board, with cross party support, has endorsed the bid. Key decision makers in the Council are excited about the opportunity to see a CNG station built in Leeds that will allow us to shift a significant proportion of our fleet away from conventional fuels and provide a viable green fuel choice for other public and private fleet operators in the city. Indeed, the approval of a capital injection to purchase the gas refuse fleet is demonstrable of our commitment to seeing this transition happen.

The Council is supportive of the CNG project and is committed to working alongside NGN to see it brought to fruition. The Council will contribute to the knowledge dissemination aspect of the project, recognising that the commercial interests of the parties concerned should be carefully considered prior to publication of any information.

Ultimately, there is a will and a drive to see big changes happen in Leeds, the CNG station project is viewed as fundamental to our overall strategy for seeing a step change in the uptake of cleaner transport fuels.

Yours sincerely

R. N. Evans

Neil Evans
Director of Environment & Housing

need to be sufficiently robust to ensure the specification deals with the operational planning elements.

- There is a risk that the station isn't as successful as hoped, resulting in the cost of CNG remaining at the higher end of the scale due to lower levels of offtake, which would affect the payback of the premium for the RCVs. However, to mitigate this risk, the NIC bid includes an amount of money to fund an intensive marketing programme and web-portal to publish data to showing performance of the station, to encourage its use and replication of the business model in other areas.
- The successful implementation of the CNG station is intrinsically linked to the conversion of the Council's RCVs, an objective that can only be met if the RCVs are located within the same area of the City. Waste management have been involved in all discussions to date on the establishment of the CNG station.
- The business case has been developed using cost projections from DECC on diesel, and CNG priced as per the same and feedback from soft market test respondents, and a CNG consultant. However there is a risk that if diesel prices do not behave as predicted, e.g. rise, then the payback model and fuel cost savings may not be as significant as anticipated.

5 Conclusions

5.1 Moving away from reliance on diesel is an essential component in the drive to cut transport based emissions. As electric vehicle technology is not suitable for all vehicle types, particularly heavy vehicles, then development of infrastructure to bring gas into the range of solutions makes sense from air quality and financial perspectives. The NIC bid provides a viable opportunity to develop a CNG station, which is commercially viable, offers value for money in satisfying the Council's CNG needs and helps towards the Council's Air Quality duties.

6 Recommendations

6.1 Executive Board is asked:

- To support the Council's involvement in the NIC bid
- To approve the injection of £1.58 million into the Capital Programme to be fully funded by unsupported borrowing (contingent on the success of the NIC bid), for use as set out in this report
- To authorise delegated powers to the Director of Environment and Housing to enter into the contractual arrangements with NGN for the delivery of a gas main connection.
- To support in principle the decision to enter into arrangements with a private sector partner to deliver a CNG station.

ENVIRONMENTAL PROTECTION AND COMMUNITY SAFETY

27 Compressed Natural Gas Filling Station

The Director of Environment and Housing submitted a report providing an update on the progress made to date in developing a business model which facilitated the build of a Compressed Natural Gas (CNG) filling station in Leeds. In addition, the report sought approval to the request for a commitment from the Council to support the project, including a commitment for the additional funding required for the fleet conversion. Furthermore, the report sought the Board's support for the Council's involvement in OFGEM's Network Innovation Competition (NIC), which would look to fund elements of a CNG filling station project.

Members welcomed the submitted report, highlighting how the proposals would help in an environmentally sustainable way to further establish the Leeds Enterprise Zone and also develop the local economy.

RESOLVED –

(a) That support be given for the Council's involvement in the NIC bid;

(b) That approval be given to the injection of £1.58 million into the Capital Programme to be fully funded by unsupported borrowing (contingent on the success of the NIC bid), for use as set out in the submitted report;

(c) That authority be given to provide the Director of Environment and Housing with the necessary delegated powers to enter into the contractual arrangements with Northern Gas Networks (NGN) for the delivery of a gas main connection;

(d) That in principle support be given to the decision to enter into arrangements with a private sector partner to deliver a CNG station, which is anticipated to be a joint venture.

ECONOMY AND CULTURE

28 West Yorkshire Playhouse

The Director of City Development submitted a report regarding potential investment from the Council for the development and future sustainability of West Yorkshire Playhouse alongside an application to Arts Council England. In addition, the report also looked to establish the approach to any future developments in terms of a partnership with the Playhouse itself.

Members highlighted the significance and timing of the proposals detailed within the submitted report, specifically when considering the new Victoria Gate development which was adjacent to the playhouse site. The Board highlighted the need to ensure that there was effective connectivity between the playhouse and its surrounding area, such as the Victoria Gate development.

Appendix D

Supporting Evidence

Evidence number	Evidence name	Bid Section Number
D1	Soft Market Test scope and summary of responses	3
D2	Cenex biomethane report	3/4
D3	The Oxford Institute for Energy Studies – Prospects for Natural Gas as a Transport Fuel in Europe	4
D4	Public Health England – Estimating Local Mortality Burdens associated with Particulate Matter report 2014.	4
D5	Public Health Leeds Ward Member briefing note	4
D6	Joulevert Feasibility study	4
D7	Eurogas paper	6

D1 Soft Market Test scope and summary of responses

Leeds City Council (LCC) regularly conducts market sounding/soft market tests to understand the appetite in the market place for the provision of goods and/or services, and to obtain the specialist views of providers to inform our procurement processes and initiatives.

LCC have carried out two rounds of soft market testing in relation to the design, build and operation of a CNG fuelling station.

The first market test took place in June 2014. The scope was as follows:

Summary

1. LCC are considering the appointment of a Filling Station Construction/Engineering and Operating Company to self-finance the development of a CNG filling station piped in at a gas main at a strategic location in the Leeds Enterprise Zone. In return LCC are proposing to guarantee to use a set volume of fuel which will ramp up on a cyclical basis as existing vehicles are converted from Diesel to Gas engines. LCC would like to understand the appetite for the undertaking of such works and the practicalities of bringing a scheme to fruition based on the real-world experiences of the companies participating in this market test.
2. LCC see the supply of Biomethane for use in selected vehicles, where direct benefits can be had both financially and from an emissions reporting standpoint, as being part of this investigation.

ofgem

RIIO NIC NETWORK INNOVATION COMPETITION

Scope

1. The key objectives of the project include:
   - The design and construction of a CNG filling station with adequate capacity to support the Council's RCV fleet.
   - For the filling station to be a key driver in developing the City's alternative fuel infrastructure.
   - For the filling station to be marketed to other companies with an interest in switching their fleet to gas, to maximise profit potential for the builder and to contribute to the City's air quality targets.
2. It is proposed that procurement will take place using the competitive process.
3. As an indication the Council's fleet is likely to start with five CNG RCV's rising on a cyclical basis, with 12 trucks due for replacement in 2015/16 and 14 due between 2016 and 2019. Additionally we run six small vans on gas which would also use the station initially.

   The size of the overall RCV fleet is 75 (there are a small number of narrow track vehicles which currently do not have a suitable gas alternative so would remain on diesel pending changing technology). Due to the expansion of housing in Leeds, it is likely this number will need to increase in future to accommodate the volume of bin collections needed.

   The average annual consumption of the five gas powered vehicles currently in use is 19109kgs of LNG.

Programme

1. The draft programme for both tenders is outlined overleaf:

Milestone	Duration	Month
Soft market testing, including contractor meetings if required	4 weeks	June 2014
OJEU / PQQ preparation	4 weeks	July/August 2014
Preliminary ISOS preparation	4 weeks	July/August 2014
Leaders Decision	Board meeting	July/August 2014
Procurement	8 weeks	
Bidders Information Day & meetings	2 weeks	August 2014
OJEU Notice, Information Pack and PQQ published	2 weeks	August 2014
ISOS preparation	8 weeks	September – November 2014
PQQ evaluation	2 weeks	November 2014
ISOS	18 weeks	
ISOS Published	-	December 2014
ISOS dialogue	14 weeks	December 2014 – February 2015
ISDS Preparation	14 weeks	December 2014 – February 2015
ISOS evaluation and long list confirmed (including bidder interviews)	4 weeks	March 2015
ISDS	13 weeks	

Milestone	Duration	Month
Issue ISDS (3 bidders)	-	April 2015
ISDS dialogue	9 weeks	April – June 2015
ISDS Short List confirmed (Reduce from 3 to 2 bidders)	4weeks	June 2015
Draft Final Tenders submitted and assessed	4 weeks	June 2015
Call for Final Tenders	8 weeks	
Final Tenders submitted (2 bidders)	-	June 2015
Evaluation of Final Tenders (2 bidders)	4 weeks	June 2015
Draft contract award report	1 week	June 2015
Appointment of Preferred Bidder	-	August 2015
Call In period	2 weeks	August 2015
Alcatel Period	2 weeks	August 2015
Contract Award	-	August 2015

Feedback

1. LCC wish to engage with a CNG station operator for the construction of the CNG fuelling station project proposals, as such a series of questions are attached below. The responses received will assist the Council in assessing the scope and project proposals prior to entering procurement.
2. The City Council understands that not all organisations can give detailed responses to all of the questions – if this is the case then your general comments on the proposals would still be welcomed. If, within your organisation, there are staff that are familiar with the area, it would be greatly appreciated if you could seek their views, or ask them to complete these questions.
3. Responding (or not responding) to this questionnaire will not affect the opportunity for any contractor to participate in the project, nor will any responses be evaluated for that purpose or any purpose following formal commencement of procurement.
4. This market testing brief has a range of questions relating to the scope of the CNG project. The City Council requests that this information is treated as commercially confidential.
5. By submitting a response to the City Council you acknowledge that the responses provided are for the purposes of the proposed procurements. The Council reserves the right not to procure the project in its entirety or in part, to procure a different project, or to procure with a variation to this project should it so wish. Contractors therefore provide such information entirely at their own risk and expense. The Council will not accept any claim for any losses or expenses incurred by contractors irrespective of whether the project proceeds whatever the reason.
6. Based on all the information provided, please now consider the questions overleaf.

Response Summary

The responses to the soft market test are commercially confidential, however can be summarised on behalf of LCC as follows:

- There were four respondents.

- Concerns included:
    - Anchor load
    - Rate of anchor load conversion
    - Lack of established customer base/appetite to convert
    - Recovery of investment
- All four respondents submitted unrealistic costs for high pressure mains connection, ranging from £100k to £350k.
- All stated a 'through the nozzle' pricing mechanism, where Capex would be recovered through the ppkg of CNG.
- Subsequent conversations with the industry revealed the high pressure mains connection would be a barrier due to uplifted investment, thus creating a 'catch 22' – CNG prices would be inflated to recover the costs, and this would lead to low levels of conversion.

Please see as follows some anonymised excerpts from the market test that support the above assertions:

"There are some challenges with the fleet increase especially given the unguaranteed nature of the additional vehicles."

"(The council would need) to ensure some type of guarantees for the financer, a minimum take or pay would need to be looked at."

"Commitment to convert also quite low – greater commitment to converting vehicles needed to justify investment"

*"700-900 tonnes (35-45 vehicles @ 20 TPA) of throughput to be a minimum before committing investment on this scale… This throughput does not necessarily need to be secured on "Day One" of operation, but there must be a firm indication ramp up within 1-2 years to justify FID." **note the realistic scenario doesn't meet this until year 4*

"The Capex, Opex, fuel and service costs would all be presented as a ppkg price, fixed for 2-3 years, then tracker priced thereafter, based on a minimum take volume."

The second round of soft market testing took place in March 2014. The scope was as follows:

Summary

1. LCC conducted an initial market testing exercise in June 2014, which considered the appointment of a Filling Station Construction/Engineering and Operating Company to self-finance the development of a CNG filling station piped in at a gas main at a strategic location in the Leeds Enterprise Zone.
2. The Council's direction in respect of CNG infrastructure has slightly changed since the June 2014 soft-market test. A potential partial funding opportunity has become available which could allow the Council to be the owner/operator of the station, either in full or in partnership with a commercial operator.
3. This partial funding opportunity may allow for mitigation of some of the risks and provide towards a proportion of the upfront costs associated with the high pressure gas pipeline connection.
4. This market test is seeking further information from Providers to inform our bid for funding based on this revised position.

Scope

1. The key objectives of the project include:
    - The design and construction of a CNG filling station with adequate capacity to support a large section of the Council's fleet (initially RCVs), and the fleet of 3rd party customers. The Council operates a fleet of almost 1,200 vehicles which are replaced on a five year basis. The Council is committed to transitioning these vehicles to alternative fuel by 2025 with the expectation that a proportion of those will be transferred to gas. RCV's will form the significant basis of this switch, however there is scope for a number of the Council's larger vans and trucks to also transfer to CNG.
    - For the filling station to be a key driver in developing the City's alternative fuel infrastructure.
    - For the filling station to be marketed to other companies with an interest in switching their fleet to gas, to ensure the financial feasibility of the plant and to contribute to the City's air quality targets.
4. It is anticipated that procurement will take place using the Competitive Dialogue procedure.
5. The size of the overall RCV fleet is 79 and we intend to convert all trucks to CNG should a station be built. Initially the council will convert 19 trucks in year one with the remainder of the fleet being converted over a five year period thereafter. Due to the expansion of housing in Leeds, it is likely this number will need to increase in future to accommodate the rising volume of bin collections needed.

   The Council currently operates five gas RCVs from a small LNG filling station. The average annual consumption of the five gas powered vehicles currently in use is 19109kgs of LNG.
6. The Council is developing its bid for funding on the basis of considering the following elements as central to the development and operation of the plant:
    - High pressure main connection
    - Land
    - Construction
    - RCV Capital outlay
    - Project management (including procurement, marketing, site management)
    - Contract management and technical support
    - Operation

Programme

1. The Council will be aware of its success in securing alternative funding by Q4 2015. It is anticipated that tenders for the build would therefore commence in late Q4 2015/Q1 2016, with contract award taking place mid-2016.

Feedback

1. LCC wishes to engage with a CNG station operator to inform our bid for funding, as such a series of questions are attached below. The responses received will assist the Council in assessing the scope and project proposals prior to submitting a funding application.
2. The Council understands that not all organisations can give detailed responses to all of the questions – if this is the case then your general comments on the proposals would still be welcomed. If, within your organisation, there are staff who are familiar

with the area, it would be greatly appreciated if you could seek their views, or ask them to complete these questions.

3. Responding (or not responding) to this questionnaire will not affect the opportunity for any contractor to participate in the project, nor will any responses be evaluated for that purpose or any purpose following formal commencement of procurement.
4. This market testing brief has a range of questions relating to the scope of the build of a CNG station. The Council requests that this information is treated as commercially confidential.
5. By submitting a response to the Council you acknowledge that the responses provided are for the purposes of the proposed project. The Council reserves the right not to procure the project in its entirety or in part, to procure a different project, or to procure with a variation to this project should it so wish. Contractors therefore provide such information entirely at their own risk and expense. The Council will not accept any claim for any losses or expenses incurred by contractors irrespective of whether the project proceeds; whatever the reason.
6. Based on all the information provided, please now consider the questions overleaf.
7. We require a response by close of business Tuesday 31st March 2015.

Response Summary

The responses to the soft market test are commercially confidential, however can be summarised on behalf of LCC as follows:

- There were two respondents (both of whom had participated in June 2014's test)
- Both firmly indicated a willingness to invest if the risk of the investment on the high pressure main connection was mitigated by the NIC funds.
- Both estimated a large station to cost [redacted] to build.
- Both estimated Opex to be in the region of £100k per annum and this is reflected in the theoretical CNG station model (see appendix H, Business Model Spreadsheet).

D2 Cenex Biomethane Report

P2 excerpt (relevant to section 2.1):

The Green Fleet Review showed that RCVs accounted for just 7% of the fleet but around 25% of overall fuel use.

P25 excerpt (relevant to section 4):

Although the gas Econic uses more fuel than its diesel equivalent on an energy basis, because gas is cheaper and subject to less duty than diesel, there are significant running cost savings. The basic calculation… shows that….. a biomethane-powered vehicle in the Leeds RCV fleet would, on average, save a little over £4,000 per year on fuel compared to its diesel equivalent.

P26 excerpt (relevant to section 2.1):

This trial has demonstrated that a spark-ignition biomethane-powered RCV can perform effectively and deliver significant running cost and emissions savings against its diesel equivalent.

The gas powered Mercedes-Benz Econic trialled was as reliable as its diesel counterparts, and it consumed an average of 0.79 kg of biomethane per km travelled. The lower price of biomethane compared to diesel, and its lower emissions, mean that this translates into a running cost saving of around £2,500 per year, and a 49-78% reduction in greenhouse gas emissions (depending on how the biomethane is supplied). The vehicle also exceeds Euro VI emissions standards for air quality pollutants, and is significantly quieter than the diesel equivalent.

Page 27/28 excerpts (relevant to section 4):

"There are broadly three main drivers to the uptake of natural gas or biomethane powered vehicles. These are the rising cost of diesel fuel, the pressure to reduce greenhouse gas emissions, and the pressure to reduce air quality emissions.

It is very likely that the cost of diesel will continue to rise at a rate outstripping inflation…The fundamentals of increasing demand from developing economies, combined with the need to supply oil from more costly sources, strongly support a continuing upward trend in oil price."

"The public sector, and especially local authorities (LAs), is also under increasing pressure to lead by example in reducing emissions. Although the coalition government has largely removed the set of 'National Indicators', LAs are still expected to report on the GHG emissions of their own estates, and for many such as Leeds, their RCV fleet will be a significant contributor to overall emissions."

"The very low emissions of particulates and oxides of nitrogen from gas vehicles may already be an important driver for their use in big UK cities, especially London. Dedicated gas vehicles such as the gas Econic in this trial meet or exceed Euro V and EEV emissions standards, currently the toughest in force, due to the inherently cleaner burning characteristics of gas compared to diesel"

P30 excerpt (relevant to section 2 "The problem"):

The cost of refuelling infrastructure is likely to remain a barrier to widespread use of gas vehicles, restricting their use to commercial fleets. Filling stations for liquefied gas are cheaper than the compressors needed to dispense compressed gas – however, this is offset by the additional upstream cost of liquefying gas in the first place.

D3 The Oxford Institute for Energy Studies – Prospects for Natural Gas as a Transport Fuel in Europe

Page 1 excerpts (referenced in section 3):

"The use of natural gas in transportation is well established globally with over 17 million natural gas vehicles available worldwide. There are some 24,000 refuelling stations and demand in 2013 accounted for 2% of the total energy use in road transport."

"Furthermore with the exception of Italy and Ukraine, Europe currently has a relatively small share (just over 10%) of the global NGV population."

Page 5 excerpt (relevant to section 3):

Within the EU transport accounts for around 25% of greenhouse gases (GHGs) and road transport alone contributes about 20% of CO_2 emissions. The EC notes that whilst GHGs in non-transport sectors decreased by 15% between 1990 and 2007 emissions from transport increased by 36% over the same period as a result of increased demand outweighing any improvements in vehicle efficiency.

Page 6 excerpt (relevant to section 3):

Eurogas (2013b) provides data on natural gas consumption in transport by country. In 2012 transport represented only 0.4% of natural gas sales in the EU though this was an increase of 6% on 2011. The countries where gas consumption in transport is significant (i.e > 0.8 TWh/a) are shown in Table 1: Gas consumption by country. This demonstrates that with the notable exception of Italy and (possibly) Poland gas consumption in transport is still a very small proportion of the total.

Table 1: Gas consumption by country

Country	Total gas consumption (TWh)	Of which transport	
		TWh	%
France	492.4	1.3	0.3%
Germany	909.1	2.8	0.3%
Italy	792.6	9.6	1.2%
Poland	176.9	3.3	1.9%
Spain	362.6	0.9	0.2%
Other	2327.3	1.9	0.1%
EU28	5060.9	19.8	0.4%

Page 11 excerpt (relevant to section 4):

Furthermore, and perhaps more critically, the so-called "chicken and egg" syndrome hampers the development of an effective refuelling infrastructure. Simply stated this refers to the unwillingness of vehicle manufacturers and/or buyers to invest in NGVs until there is a widespread network of refuelling stations whilst fuel infrastructure providers will be unwilling to make such investments until there is evidence of significant and growing NGV ownership.

Page 26 excerpt (relevant to section 3):

In technical terms there are no major obstacles facing gas as a fuel though diesel and gasoline represent the most efficient delivery of energy per unit of volume. The infrastructure requirements for refuelling road-based natural gas vehicles are well understood for both CNG and LNG options though coverage across Europe is patchy and well below the level provided for petroleum products. Marine-based LNG refuelling is undeveloped though a range of configurations could be relatively quickly established.

Industry standards for the NGV sector are still at a nascent stage and whilst much work is evidently underway differing and overlapping standards and procedures are likely to be a feature for some time to come.

The environmental performance of transport modes is a crucial area both in terms of the general contribution to GHGs but also the impact of air pollution on public health. Whilst natural gas is less polluting (lower $C0_2$ and NO, emissions and zero particulate matter) than petroleum products methane itself is a potent GHG so tight control of the supply and combustion process is vital. Evaluation of the environmental performance of a fuel can be on a tank to wheel (TTW) or a well to wheel (WTW) basis and the impact of the latter is particularly profound with regard to bio-fuels. However a total market share for biogas in the gas fuelled transport sector in excess of 20% is unlikely. In the marine sector the legislative drive to remove sulphur pollution from ship exhausts is an important factor favouring natural gas.

The financial and commercial case for natural gas in transport is primarily a trade-off between the differential between natural gas and oil product prices and the additional capital (and possibly running) cost of a new LNG/CNG vehicle or vessel. The wholesale price of natural gas is typically at a discount to gas-oil prices though the differential to fuel oil is less marked. There is a significant discount to petroleum retail prices, which is strongly influenced by differential tax rates, and the future level of fuel taxation is a crucial issue in the road sector. In addition the overall economic case for natural gas will have to include the additional costs of building and operating the required infrastructure.

D4 Public Health England – Estimating Local Mortality Burdens associated with Particulate Matter report 2014.

Excerpt from table, p11 (relevant to section 4):

Table 2: Leeds local mortality burden excerpt

Area	Population age 25+ (x103)	Deaths age 25+	Mean anthropogenic PM2.5	Attributable fraction (%)	Attributable deaths age 25+	Associated life years lost
Leeds	516.7	6347	9.7	5.5	350	3835

D5 Public Health Leeds Ward Member briefing note

P2 excerpts (relevant to section 4)

"EU and UK limit values are in place to protect human health. In Leeds, the target for PM is met, but the target for NO2 is not. DEFRA have forecast that Leeds, London and Birmingham will not meet the NO2 target until 2030, 20 years after the original deadline. In April 2015, in Client Earth's case against the UK Government, the Supreme Court ruled that the Government must draw up new air quality plans by the end of this year (2015) to speed up action to address this issue."

"It is now recognised that there are no absolutely safe levels of the main pollutants of concern. Negative health impacts heave been found well below current EU and UK limits for both PM and NO_2. Any improvement in air quality will have positive health consequences."

"Vehicle exhaust pollution was classified as carcinogenic in 2013."

"The scientific understanding of the health effects of everyday air pollution has changed dramatically since 2005 when air quality limits were set. There is now categorical evidence that long-term exposure to everyday air pollutants contributes to cardiovascular disease (CVD, including heart diseases and stroke), lung cancer, and respiratory disease (which includes asthma and chronic bronchitis)."

"Any improvement in air quality will have positive health consequences".

D6 Joulevert Feasibility study

Please see tables below extracted from the report, that provide the starting point for the assumptions listed in section 4, that feed into the business model found in appendix H, Business Model Spreadsheet.

Table 3: Joulevert feasibility study excerpt for assmptions

Vehicle Type	Total fleet mileage	Average MPG	Total Diesel used	CNG Usage, kg
RCVs	870,844	3.2	1,233,884	1,020,839
Vans <3.5te	1,371,101	29.5	215,421	178,226
Buses	1,472,500	8.5	787,543	651,565
Symingtons	450,000	8.0	232,926	137,549

Joulevert 'Mother and Daughter' definition

Excerpts from page 29 of the report giving the definition of a 'Mother and Daughter' station, as referenced in Section 2 of the submission.

The definition of a 'Mother & Daughter' station is where a main high throughput station is used to fill pressurised gas storage on an articulated trailer unit which is then driven to a subsequent location where it is connected to a CNG boost compressor that is in turn connected to a small amount of permanent onsite storage and the necessary fuel dispenser to produce a 'dummy' remote station but with the economics of a large dedicated station. The gas trailer would have a capacity of 4000kg which is enough to refuel 100 vans or over 40 trucks.

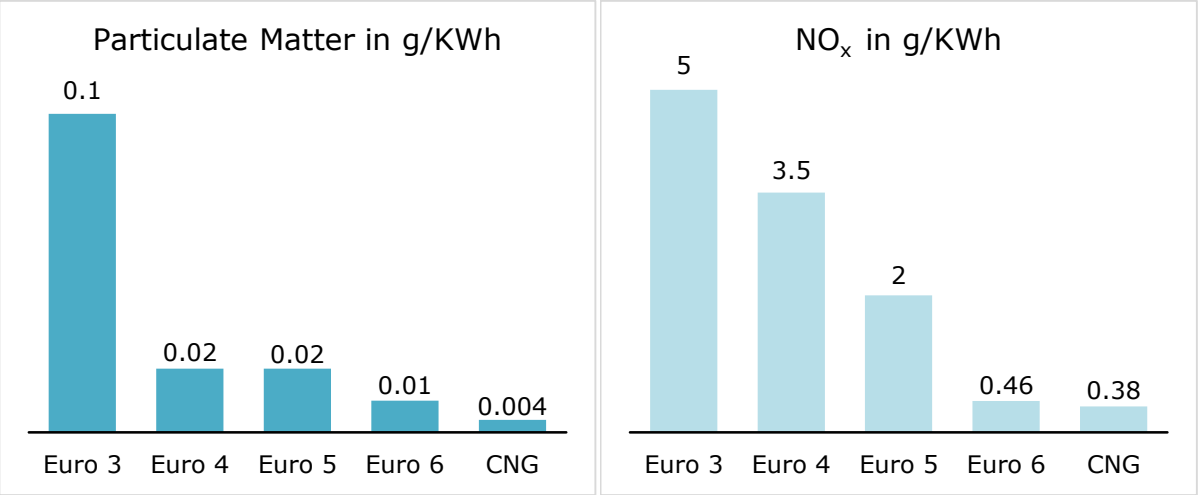
D7 Eurogas paper

Excerpts from page 3 in support of percentages of emissions used in the CNG station business model:

1. *The use of gas offers considerable benefits in air quality, as it is virtually free of particulate matter emissions and has a very low Nitrogen Oxide (NO_X) output. Given the fact that there are approximately 400,000 premature deaths each year in Europe due to bad air quality (which is ten times higher than the number of deaths from road accidents), using gas in transport can help towards significant health*

improvements and the reduction of carcinogenic diseases. It is to be noted that the air quality in cities is measured by Nitrogen Dioxide (NO_2), a component of NO_x, and the NGVs produce zero NO_2.

Graph 1: Eurogas excerpts for PM and NOx



The use of gas offers considerable benefits in reducing greenhouse gas emissions. Gas has very favourable carbon dioxide (CO_2) emissions versus petrol and diesel. According to the Natural Gas Vehicle Association (NGVA), 25% lower CO_2 emissions are released on average for light-duty vehicles and up to 15% lower for heavy-duty vehicles. A new generation of heavy gas engines is expected to increase this advantage to 20%.

Links to Publically available reports

Eurogas:
http://www.eurogas.org/uploads/media/15CR190__Review_of_White_Paper_on_Transport.pdf

Public Health England mortality:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/332854/PHE_CRCE_010.pdf

Oxford Uni report:
http://www.oxfordenergy.org/wpcms/wp-content/uploads/2014/03/NG-84.pdf

LCC exec board paper:
http://democracy.leeds.gov.uk/mgChooseDocPack.aspx?ID=7243

LCC exec board minutes:
http://democracy.leeds.gov.uk/documents/g7243/Printed%20minutes%2015th-Jul-2015%2013.00%20Executive%20Board.pdf?T=1

DECC cost of carbon:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/360316/20141001_2014_DECC_HMT_Supplementary_Appraisal_Guidance.pdf

DEFRA cost of NOX/PM:
https://www.gov.uk/air-quality-economic-analysis

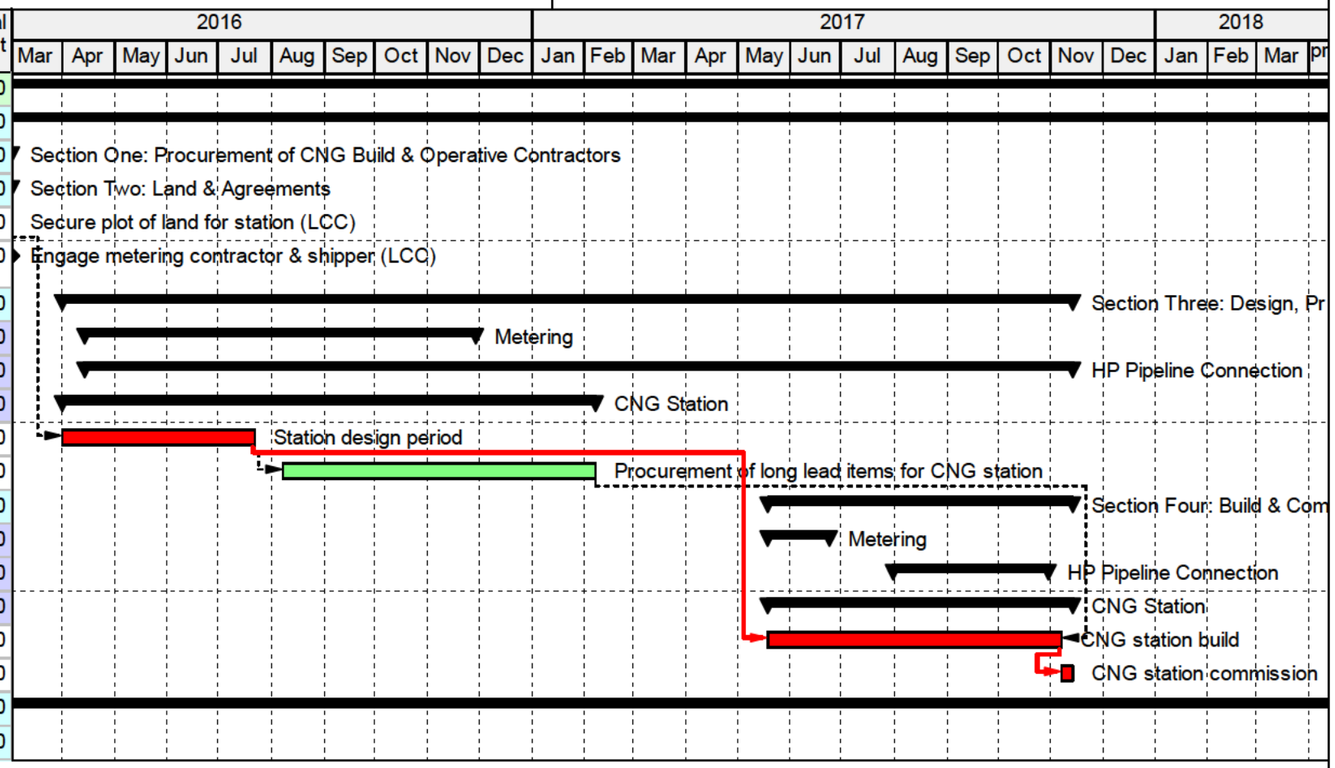
CENEX LCC biomethane trial report:
http://www.cenex.co.uk/resources/leeds-biomethane-rcv-trial-report/

APPENDIX E - PROJECT PLAN

NIC 2015 - City CNG - Metering Unit Programme

09-Jul-15 12:08

Activity Name	Start	Finish	Budgeted Total Cost
NIC 2015 - City CNG	01-Jun-15	21-Oct-19	£1,066,300
Summary Levels	01-Jun-15	21-Oct-19	£0
Section One: Procurement of CNG Build & Operative C	01-Jun-15	01-Mar-16	£0
Section Two: Land & Agreements	03-Feb-16	01-Mar-16	£0
Secure plot of land for station (LCC)	03-Feb-16	01-Mar-16	£0
Engage metering contractor & shipper (LCC)		01-Mar-16	£0
Section Three: Design, Procurement & Notifications	31-Mar-16	13-Nov-17	£480,500
Metering	14-Apr-16	28-Nov-16	£0
HP Pipeline Connection	14-Apr-16	13-Nov-17	£480,500
CNG Station	31-Mar-16	06-Feb-17	£0
Station design period	31-Mar-16	22-Jul-16	£0
Procurement of long lead items for CNG station	08-Aug-16	06-Feb-17	£0
Section Four: Build & Commission	19-May-17	13-Nov-17	£360,800
Metering	19-May-17	23-Jun-17	£40,000
HP Pipeline Connection	31-Jul-17	30-Oct-17	£320,800
CNG Station	19-May-17	13-Nov-17	£0
CNG station build	19-May-17	06-Nov-17	£0
CNG station commission	07-Nov-17	13-Nov-17	£0
Section Five: Marketing & Dissemination of Information	01-Mar-16	11-Feb-19	£225,000
Section Six: RCV Conversion	01-Jun-15	01-Jun-15	£0



Remaining Level of Effort
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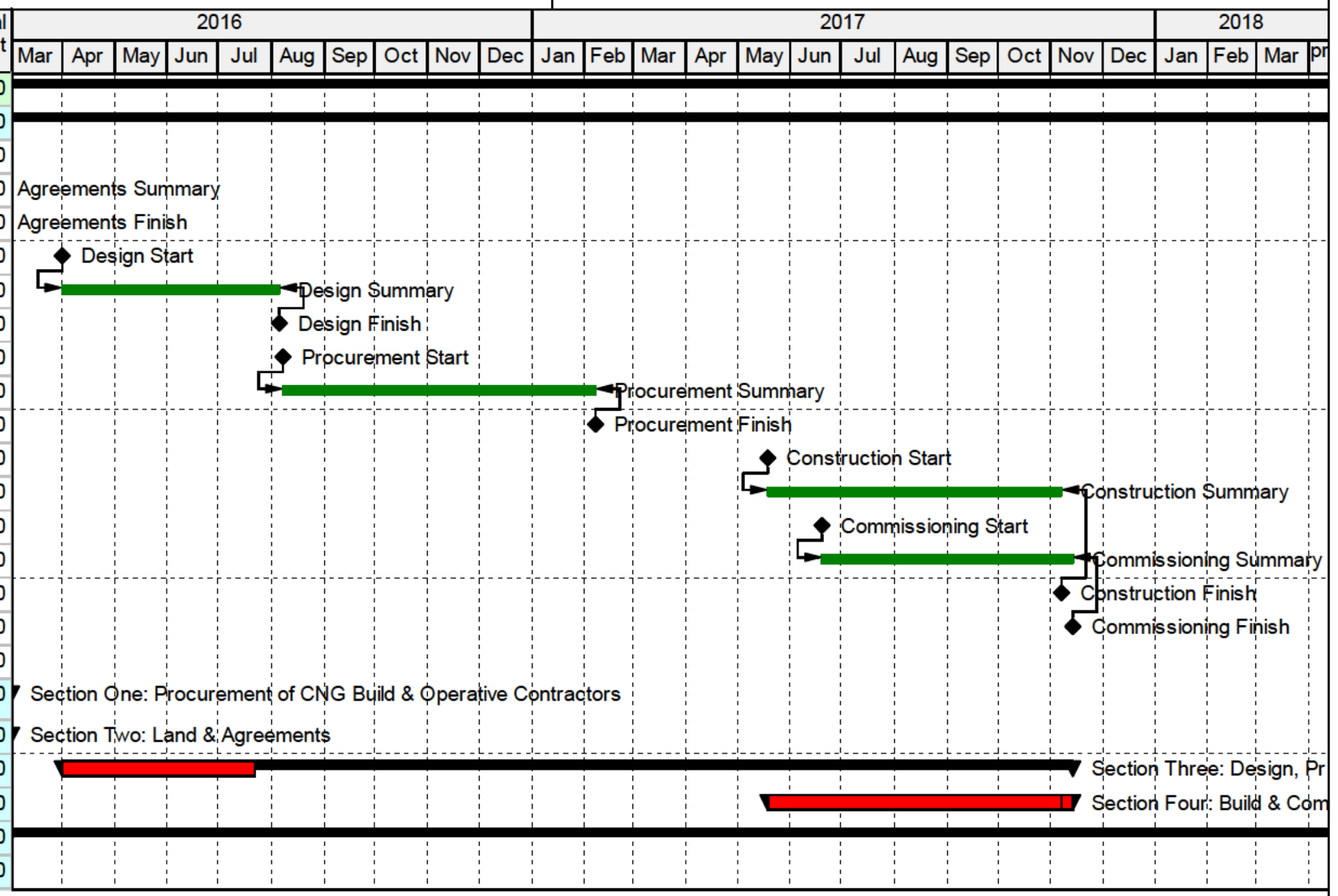
Remaining Work
Critical Remaining ...
Milestone

TASK filter: All Activities

NIC 2015 - City CNG - Metering Unit Programme

09-Jul-15 12:11

Activity Name	Start	Finish	Budgeted Total Cost
NIC 2015 - City CNG	01-Jun-15	21-Oct-19	£1,066,300
Summary Levels	01-Jun-15	21-Oct-19	£0
Project Start	01-Jun-15		£0
Contractual Agreements Summary	01-Jun-15	21-Dec-15	£0
Contractual Agreements Finish		21-Dec-15	£0
Design Start	31-Mar-16		£0
Design Summary	31-Mar-16	05-Aug-16	£0
Design Finish		05-Aug-16	£0
Procurement Start	08-Aug-16		£0
Procurement Summary	08-Aug-16	06-Feb-17	£0
Procurement Finish		06-Feb-17	£0
Construction Start	19-May-17		£0
Construction Summary	19-May-17	06-Nov-17	£0
Commissioning Start	19-Jun-17		£0
Commissioning Summary	19-Jun-17	13-Nov-17	£0
Construction Finish		06-Nov-17	£0
Commissioning Finish		13-Nov-17	£0
NIC Project Closure & Final Report		21-Oct-19	£0
Section One: Procurement of CNG Build & Operative C	01-Jun-15	01-Mar-16	£0
Section Two: Land & Agreements	03-Feb-16	01-Mar-16	£0
Section Three: Design, Procurement & Notifications	31-Mar-16	13-Nov-17	£480,500
Section Four: Build & Commission	19-May-17	13-Nov-17	£360,800
Section Five: Marketing & Dissemination of Information	01-Mar-16	11-Feb-19	£225,000
Section Six: RCV Conversion	01-Jun-15	01-Jun-15	£0



Remaining Level of Effort
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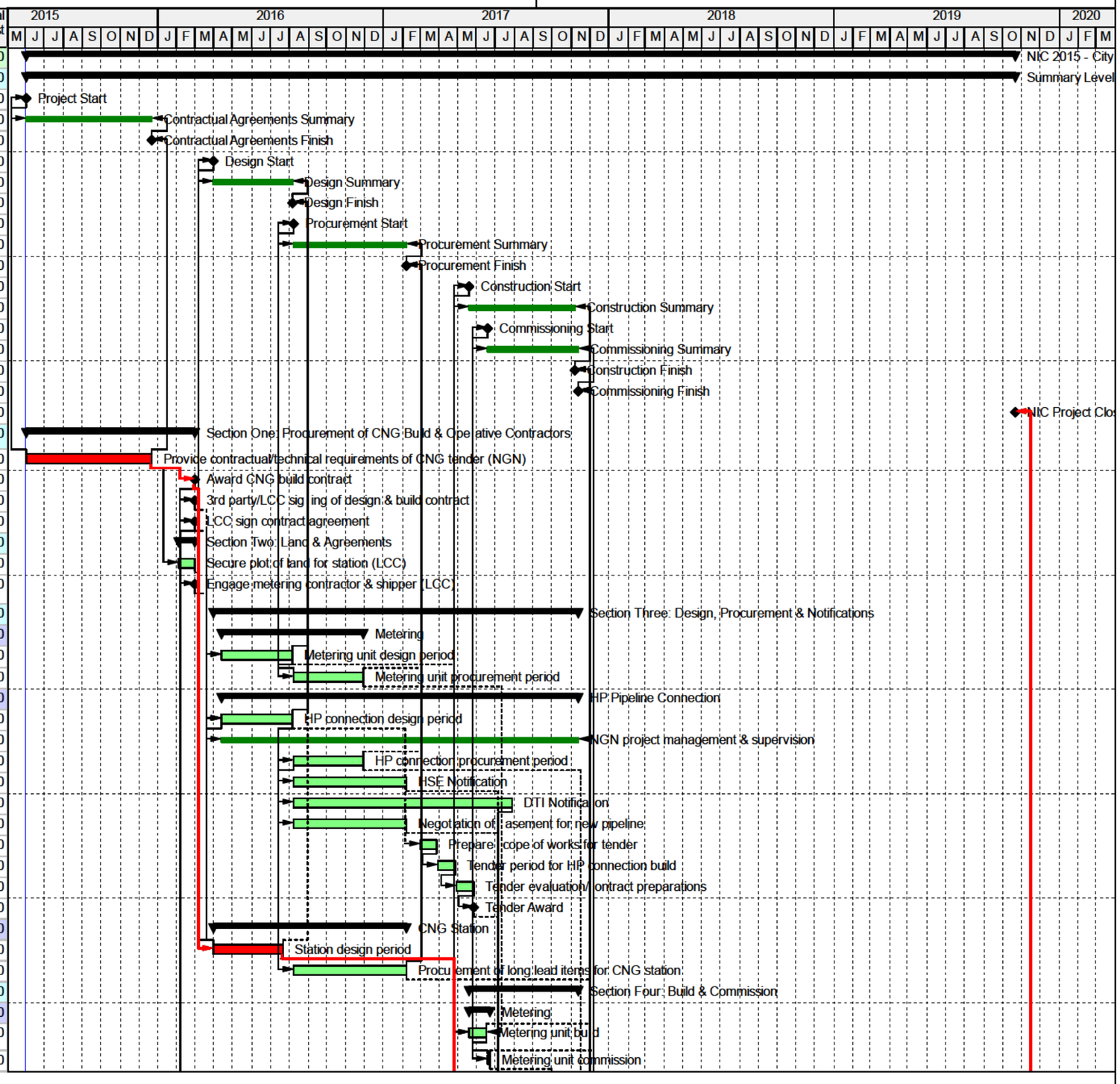
Actual Work
Remaining Work
Critical Remaining ...
Milestone

TASK filter: All Activities

NIC 2015 - City CNG - Metering Unit Programme

09-Jul-15 12:12

Activity Name	Start	Finish	Budgeted Total Cost
NIC 2015 - City CNG	01-Jun-15	21-Oct-19	£1,066,300
Summary Levels	01-Jun-15	21-Oct-19	£0
Project Start	01-Jun-15		£0
Contractual Agreements Summary	01-Jun-15	21-Dec-15	£0
Contractual Agreements Finish		21-Dec-15	£0
Design Start	31-Mar-16		£0
Design Summary	31-Mar-16	05-Aug-16	£0
Design Finish		05-Aug-16	£0
Procurement Start	08-Aug-16		£0
Procurement Summary	08-Aug-16	06-Feb-17	£0
Procurement Finish		06-Feb-17	£0
Construction Start	19-May-17		£0
Construction Summary	19-May-17	06-Nov-17	£0
Commissioning Start	19-Jun-17		£0
Commissioning Summary	19-Jun-17	13-Nov-17	£0
Construction Finish		06-Nov-17	£0
Commissioning Finish		13-Nov-17	£0
NIC Project Closure & Final Report		21-Oct-19	£0
Section One: Procurement of CNG Build & Operative C	01-Jun-15	01-Mar-16	£0
Provide contractual/technical requirements of CNG t	01-Jun-15	21-Dec-15	£0
Award CNG build contract		29-Feb-16	£0
3rd party/LCC signing of design & build contract		01-Mar-16	£0
LCC sign contract agreement		01-Mar-16	£0
Section Two: Land & Agreements	03-Feb-16	01-Mar-16	£0
Secure plot of land for station (LCC)	03-Feb-16	01-Mar-16	£0
Engage metering contractor & shipper (LCC)		01-Mar-16	£0
Section Three: Design, Procurement & Notifications	31-Mar-16	13-Nov-17	£480,500
Metering	14-Apr-16	28-Nov-16	£0
Metering unit design period	14-Apr-16	05-Aug-16	£0
Metering unit procurement period	08-Aug-16	28-Nov-16	£0
HP Pipeline Connection	14-Apr-16	13-Nov-17	£480,500
HP connection design period	14-Apr-16	05-Aug-16	£50,000
NGN project management & supervision	14-Apr-16	13-Nov-17	£270,000
HP connection procurement period	08-Aug-16	28-Nov-16	£150,500
HSE Notification	08-Aug-16	06-Feb-17	£0
DTI Notification	08-Aug-16	28-Jul-17	£0
Negotiation of easement for new pipeline	08-Aug-16	06-Feb-17	£10,000
Prepare scope of works for tender	01-Mar-17*	28-Mar-17	£0
Tender period for HP connection build	29-Mar-17	27-Apr-17	£0
Tender evaluation/contract preparations	28-Apr-17	26-May-17	£0
Tender Award		26-May-17	£0
CNG Station	31-Mar-16	06-Feb-17	£0
Station design period	31-Mar-16	22-Jul-16	£0
Procurement of long lead items for CNG station	08-Aug-16	06-Feb-17	£0
Section Four: Build & Commission	19-May-17	13-Nov-17	£360,800
Metering	19-May-17	23-Jun-17	£40,000
Metering unit build	19-May-17	16-Jun-17	£40,000
Metering unit commission	19-Jun-17	23-Jun-17	£0



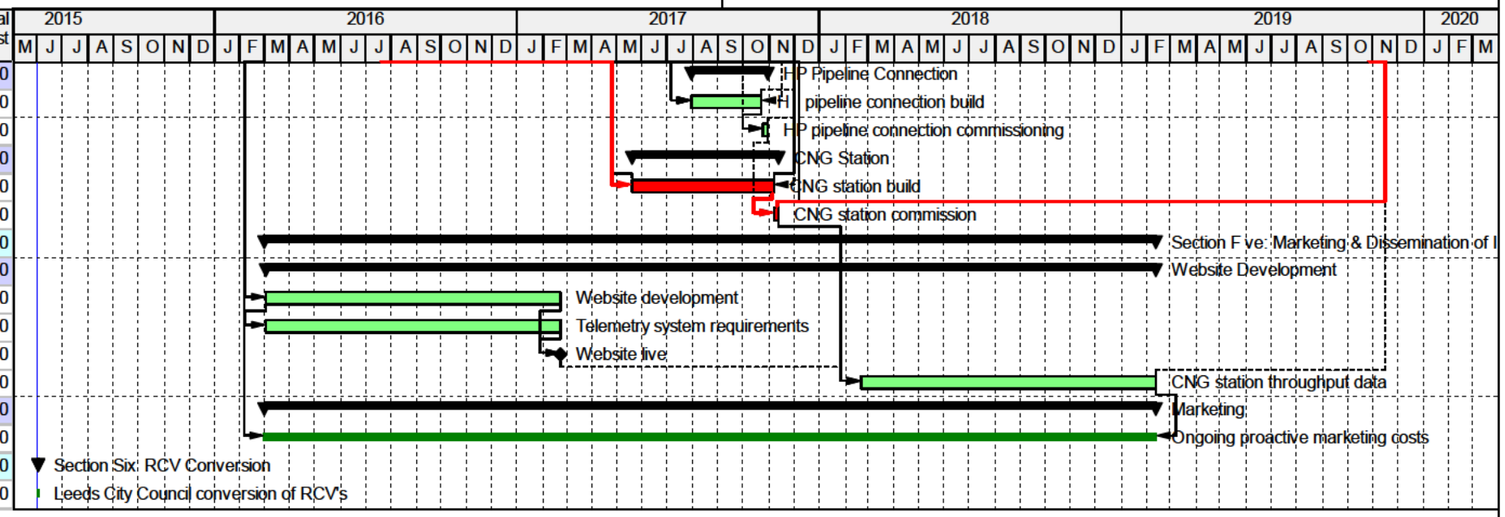
Remaining Level of Effort | Actual Work | Critical Remaining ...
Actual Level of Effort | Remaining Work | Milestone

TASK filter: All Activities

NIC 2015 - City CNG - Metering Unit Programme

09-Jul-15 12:12

Activity Name	Start	Finish	Budgeted Total Cost
HP Pipeline Connection	31-Jul-17	30-Oct-17	£320,800
HP pipeline connection build	31-Jul-17	23-Oct-17	£320,800
HP pipeline connection commissioning	24-Oct-17	30-Oct-17	£0
CNG Station	19-May-17	13-Nov-17	£0
CNG station build	19-May-17	06-Nov-17	£0
CNG station commission	07-Nov-17	13-Nov-17	£0
Section Five: Marketing & Dissemination of Information	01-Mar-16	11-Feb-19	£225,000
Website Development	02-Mar-16	11-Feb-19	£175,000
Website development	02-Mar-16	21-Feb-17	£50,000
Telemetry system requirements	02-Mar-16	21-Feb-17	£60,000
Website live		21-Feb-17	£0
CNG station throughput data	20-Feb-18	11-Feb-19	£65,000
Marketing	01-Mar-16	11-Feb-19	£50,000
Ongoing proactive marketing costs	01-Mar-16	11-Feb-19	£50,000
Section Six: RCV Conversion	01-Jun-15	01-Jun-15	£0
Leeds City Council conversion of RCV's	01-Jun-15	01-Jun-15	£0



Remaining Level of Effort
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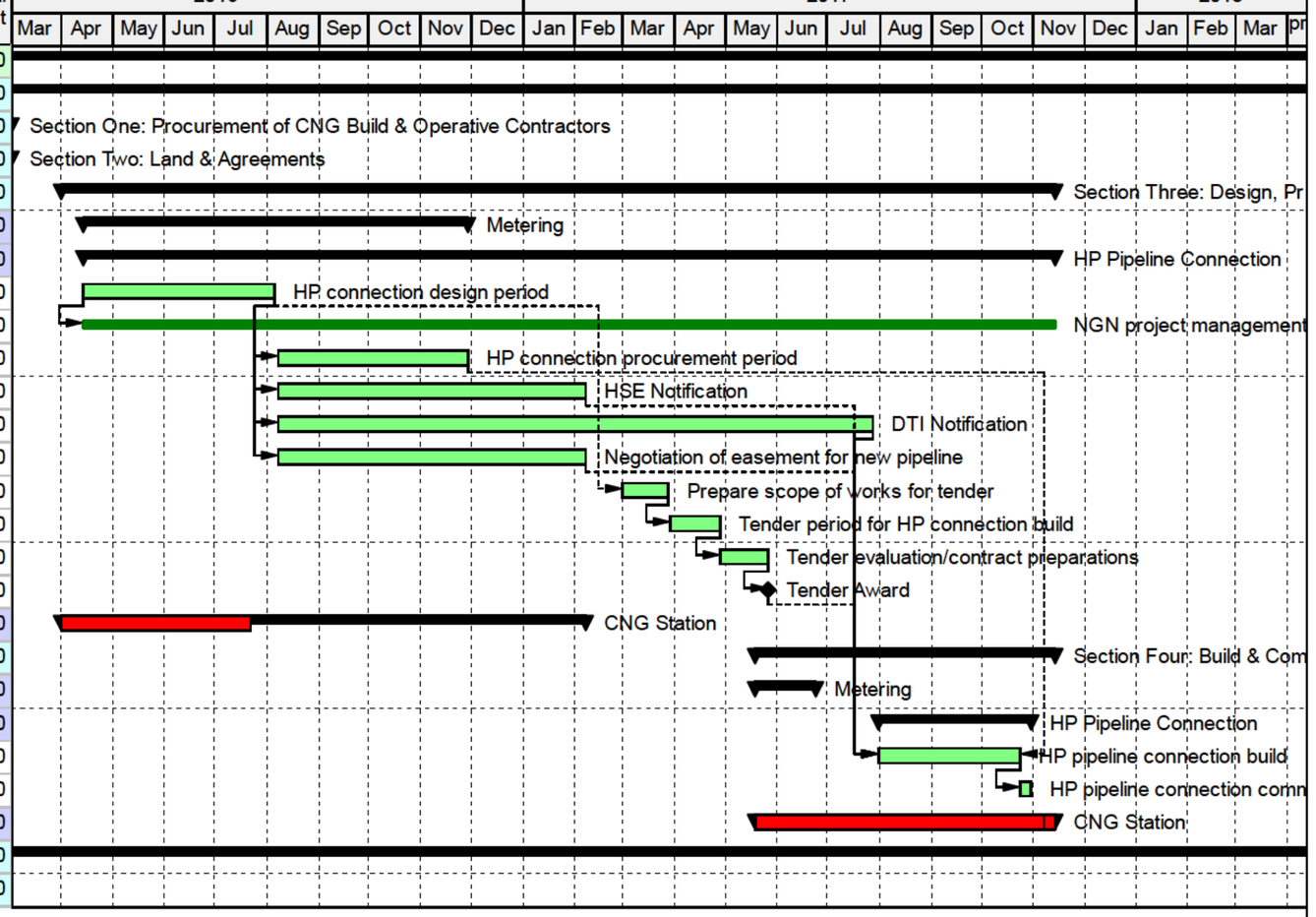
Actual Work
Remaining Work
Critical Remaining ...
Milestone

TASK filter: All Activities

NIC 2015 - City CNG - Metering Unit Programme

09-Jul-15 12:07

Activity Name	Start	Finish	Budgeted Total Cost
NIC 2015 - City CNG	01-Jun-15	21-Oct-19	£1,066,300
Summary Levels	01-Jun-15	21-Oct-19	£0
Section One: Procurement of CNG Build & Operative C	01-Jun-15	01-Mar-16	£0
Section Two: Land & Agreements	03-Feb-16	01-Mar-16	£0
Section Three: Design, Procurement & Notifications	31-Mar-16	13-Nov-17	£480,500
Metering	14-Apr-16	28-Nov-16	£0
HP Pipeline Connection	14-Apr-16	13-Nov-17	£480,500
HP connection design period	14-Apr-16	05-Aug-16	£50,000
NGN project management & supervision	14-Apr-16	13-Nov-17	£270,000
HP connection procurement period	08-Aug-16	28-Nov-16	£150,500
HSE Notification	08-Aug-16	06-Feb-17	£0
DTI Notification	08-Aug-16	28-Jul-17	£0
Negotiation of easement for new pipeline	08-Aug-16	06-Feb-17	£10,000
Prepare scope of works for tender	01-Mar-17*	28-Mar-17	£0
Tender period for HP connection build	29-Mar-17	27-Apr-17	£0
Tender evaluation/contract preparations	28-Apr-17	26-May-17	£0
Tender Award		26-May-17	£0
CNG Station	31-Mar-16	06-Feb-17	£0
Section Four: Build & Commission	19-May-17	13-Nov-17	£360,800
Metering	19-May-17	23-Jun-17	£40,000
HP Pipeline Connection	31-Jul-17	30-Oct-17	£320,800
HP pipeline connection build	31-Jul-17	23-Oct-17	£320,800
HP pipeline connection commissioning	24-Oct-17	30-Oct-17	£0
CNG Station	19-May-17	13-Nov-17	£0
Section Five: Marketing & Dissemination of Information	01-Mar-16	11-Feb-19	£225,000
Section Six: RCV Conversion	01-Jun-15	01-Jun-15	£0



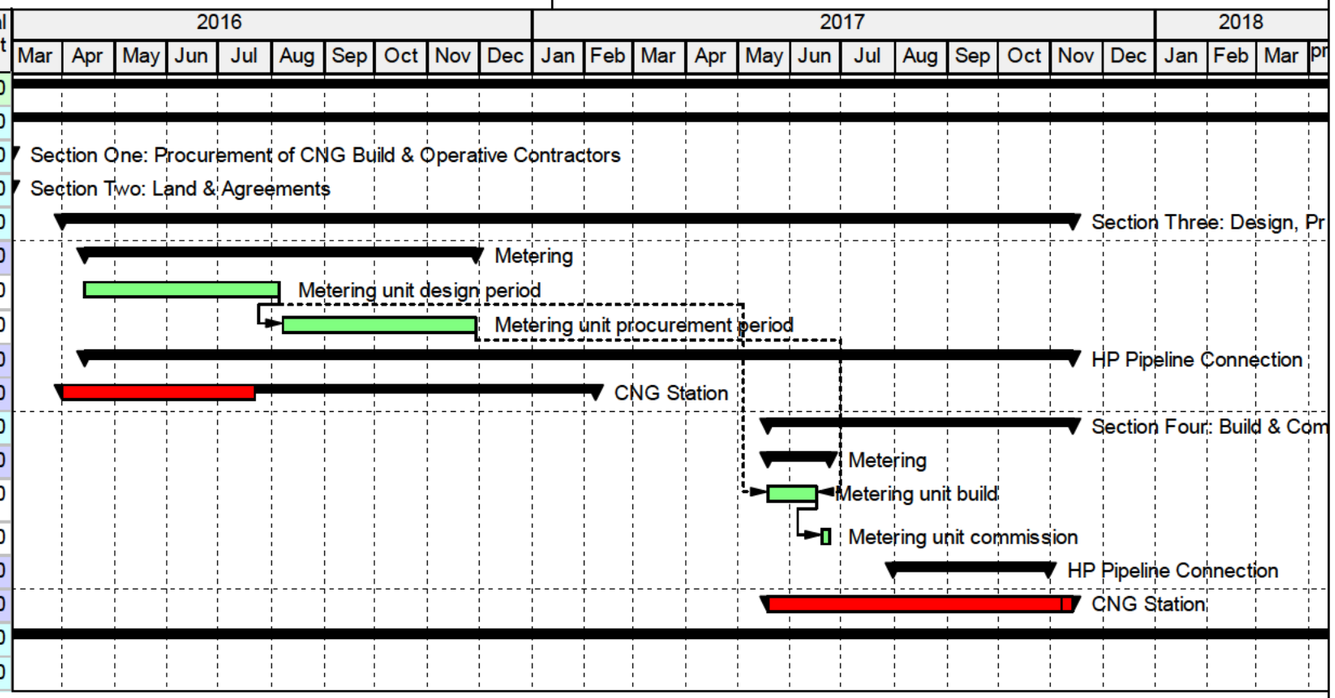
Remaining Level of Effort | Actual Work | Critical Remaining ...
Actual Level of Effort | Remaining Work | Milestone

TASK filter: All Activities

NIC 2015 - City CNG - Metering Unit Programme

09-Jul-15 12:06

Activity Name	Start	Finish	Budgeted Total Cost
NIC 2015 - City CNG	01-Jun-15	21-Oct-19	£1,066,300
Summary Levels	01-Jun-15	21-Oct-19	£0
Section One: Procurement of CNG Build & Operative C	01-Jun-15	01-Mar-16	£0
Section Two: Land & Agreements	03-Feb-16	01-Mar-16	£0
Section Three: Design, Procurement & Notifications	31-Mar-16	13-Nov-17	£480,500
Metering	14-Apr-16	28-Nov-16	£0
Metering unit design period	14-Apr-16	05-Aug-16	£0
Metering unit procurement period	08-Aug-16	28-Nov-16	£0
HP Pipeline Connection	14-Apr-16	13-Nov-17	£480,500
CNG Station	31-Mar-16	06-Feb-17	£0
Section Four: Build & Commission	19-May-17	13-Nov-17	£360,800
Metering	19-May-17	23-Jun-17	£40,000
Metering unit build	19-May-17	16-Jun-17	£40,000
Metering unit commission	19-Jun-17	23-Jun-17	£0
HP Pipeline Connection	31-Jul-17	30-Oct-17	£320,800
CNG Station	19-May-17	13-Nov-17	£0
Section Five: Marketing & Dissemination of Information	01-Mar-16	11-Feb-19	£225,000
Section Six: RCV Conversion	01-Jun-15	01-Jun-15	£0



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining ...
Milestone

TASK filter: All Activities

Northern Gas Networks	EXP01 - Expenditure Approval Form		Version 03/15-1
BSR Number and Name:	41 - Funded Innovation	Project No. and Name:	2015 NIC Bid - The City CNG Project
Approval Required	CEO via ISG	Sanction Type	Full Project
Driver & Deliverables	The City CNG Project will build the UK's first scalable compressed natural gas fuelling station for back to depot city based vehicles. Leeds City Council are planning to convert all refuse collection vehicles in leeds to run on CNG. The NIC funding element covers the high pressure connection and metering under a novel commercial arrangement with deferred payment terms over a 10 year period linked to throughput volumes. This will remove a significant barrier to the building of the station - the up front cost of the HP connection. If the specified volumes are not achieved, a proportion of the NIC funds provided will be written off. There is a small none recoverable element related to information desimination and marketing. NGN customers will benefit through expanding use of the LTS and the significant environmental benefits of using CNG rather than diesel.		

FULL PROJECT - FOR APPROVAL

Project Lead	Dan Sadler	Delivery Partner	Leeds City Council & Private sector station developer		
Dates	Year	2015/16	2016/17	Remainder	Total
Start Date	Nov-15	P0	£0	£1,066,300	£0	£1,066,300
P0 End Date	Nov-26	Risk	£0	£165,195	£0	£165,195
P50 End Date	Nov-26	P50	£0	£1,231,495	£0	£1,231,495

Signatories	Name	Date	Signature
Investment Lead	Dan Sadler	27/7/15	
Finance	David Waite	27/7/15	
Delivery	Howard Forster	27-7-15	
Asset	Martin Alderson	27/7/15	pp BS
CEO	Mark Horsley	29/7/15	

SAP Order Number		CRRP Table	

Email showing support from Symingtons

From: James Bridson [mailto:james.bridson@symingtons.com]
Sent: 13 May 2015 15:26
To: Slater, Emma
Subject: RE: Compressed Natural Gas feasibility study

Emma

I can confirm that we use diesel powdered HGV's at the moment within the Leeds area and would be interested in looking at the feasibility of moving to Gas powered trucks if a supply was available locally

I hope this helps

James

From: Slater, Emma [mailto:Emma.Slater@leeds.gov.uk]
Sent: 13 May 2015 10:42
To: info@longsofleeds.co.uk; James Bridson
Subject: Compressed Natural Gas feasibility study

Good morning

I email to follow up on some contact you received recently from a consultant working on our behalf (Colin Matthews, Joulevert) and by way of introduction.

I am leading on a bid for funds to develop a CNG refuelling station in the Aire Valley on behalf of the Council. To support the bid, I am contacting businesses who expressed a potential interest in converting to CNG, to ask whether you would be willing to send a letter of support stating that in principle, you would be willing to convert XX numbers of vehicles to CNG, should a sustainable supply of the fuel become available.

This letter would not commit you to anything, however it would give some assurance to the funder that a station could become commercially viable based on offtake should one be built.

Many thanks in anticipation of your reply.

Kind regards

Emma Slater
Senior Project Officer
Projects Programmes & Procurement Unit
Leeds City Council

Direct line: 0113 3952134
www.leeds.gov.uk/Business/Pages/Working-with-us.aspx
PPPU: 0113 39 52451
St George House Reception: 0113 39 75303/78930

This Letter of Intent (LOI) is between

Gas Alliance Solutions Holdings Limited (the Supplier)

Whose registered office is at
Pennine House, 8, Stanford Street, Nottingham.NG1 7BG

and its subsidiaries : Gas Bus Alliance Limited
Gas Vehicle Alliance Limited

And

To whom it may concern (the Buyer(s))

and constitutes evidence of the intent of the Supplier and with its successors to enter into Contractual Agreements for the supply of Bio-Methane to refuel gas powered vehicles through a UK gas mains connected High Pressure gas refuelling station or Stations.

This refuelling station(s) will be supplied, installed and operated by the SUPPLIER at no (zero) capital cost to the site and gas vehicle operator(s), or BUYER(s), who will use the station to refuel their vehicles and with whom the SUPPLIER will enter into the contractual agreements to supply the bio-methane at an agreed cost (per kg) for the duration of the contractual agreements.

The Goods shall be supplied in accordance with the Contractual Agreement(s), Purchase Order(s) and any documents referenced therein.

Any order placed with the SUPPLIER by the BUYER (s) will be dependent on:–

a) Agreement of final contractual terms and conditions as stipulated in the Contractual Agreement.

It is the intention of the SUPPLIER to agree the Contractual terms and have an Agreement in place with the BUYER(s) within 8 weeks of the date of receiving a letter of Intent from the BUYER(s).

Signed on behalf of

SUPPLIER

Name Phil Lowndes BSc

Signature 

Position Managing Director

Date 20.07.2015

APPENDIX H - BUSINESS MODEL SPREADSHEET

REALISTIC SCENARIO

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Council : RCV's	12	21	36	39	56	74	79	79	79	79	79
Council : vans <3.5t	23	30	46	62	78	95	127	143	159	175	184
Council : Total	**35**	**51**	**82**	**101**	**134**	**169**	**206**	**222**	**238**	**254**	**263**
Buses	-	-	-	2	4	5	12	14	14	19	20
NGN	-	-	0	9	23	33	53	53	53	53	53
Others	-	-	1	3	6	11	17	18	18	18	18
Others light commercial	-	-	-	-	9	24	39	58	78	98	118
Taxis	-	-	-	-	-	7	27	38	65	87	107
Private Car Owners	-	-	-	-	-	-	-	-	-	-	-
Average vehicles	**35**	**51**	**83**	**115**	**177**	**248**	**353**	**403**	**467**	**529**	**579**
Throughput (scm)	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Total throughput (scm)	**46,198**	**472,034**	**820,033**	**992,590**	**1,518,439**	**2,068,205**	**2,561,363**	**2,674,007**	**2,744,847**	**2,931,018**	**3,019,584**
Total throughput (kg)	34 186	349 305	606 825	734 516	1 123 645	1 530 472	1 895 409	1 978 765	2 031 187	2 168 953	2 234 492
Total throughput (tonnes)	34	349	607	735	1 124	1 530	1 895	1 979	2 031	2 169	2 234
Total throughput (therms)	17 503	178 844	310 694	376 072	575 306	783 602	970 449	1 013 128	1 039 968	1 110 504	1 144 060
Total throughput (kwh)	512 973	5,241,413	9,105,549	11,021,594	16 860 562	22,965,097	28,441,063	29,691,848	30 478 449	32,545,669	33,529,093
Total (diesel litres equivalent)	40 578	414 610	720 274	871 839	1 333 718	1 816 603	2 249 768	2 348 708	2 410 931	2 574 453	2 652 245
Financial Evaluation											
1. Revenue from vehicles	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Fuel Selling Price assumed : £/kg	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
REVENUE	**27,349**	**279,444**	**485,460**	**587,613**	**898,916**	**1,224,377**	**1,516,327**	**1,583,012**	**1,624,950**	**1,735,163**	**1,787,594**
2. Operational costs	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Transp. Charges (NTS & GDN)											
Gas Cost Price assumed : £/kg	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
GDN Transportation Costs	(1 026)	(10 479)	(18 205)	(22 035)	(33 709)	(45 914)	(56 862)	(59 363)	(60 936)	(65 069)	(67 035)
Gas Cost											
Gas Cost Price assumed : £/kg	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Cost of Gas	(8 547)	(87 326)	(151 706)	(183 629)	(280 911)	(382 618)	(473 852)	(494 691)	(507 797)	(542 238)	(558 623)
Fuel Duty											
Rate per kg assumption	0.247	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Fuel Duty Cost	(8 444)	(86 278)	(149 886)	(181 426)	(277 540)	(378 027)	(468 166)	(488 755)	(501 703)	(535 732)	(551 920)
Opex £ assumption	(100,000)	(100 000)	(100 000)	(150 000)	(150 000)	(150 000)	(150 000)	(150 000)	(150 000)	(150 000)	(150 000)
OPERATIONAL COSTS	**(118,016)**	**(284,084)**	**(419,797)**	**(537,090)**	**(742,161)**	**(956,559)**	**(1,148,880)**	**(1,192,809)**	**(1,220,435)**	**(1,293,038)**	**(1,327,577)**
3. Financing Costs	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Repayment of start up loan 1	Yr 0 (2017)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Loan value	900,000										
Term of loan (years)	10										
Number of payments (months)	120										
Interest Rate	5%										
Annual repayment amount		(114 551)	(114 551)	(114 551)	(114 551)	(114 551)	(114 551)	(114 551)	(114 551)	(114 551)	(114 551)
Repayment of additional loan 2	Yr 0 (2020)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Loan value	300,000										
Term of loan (years)	10										
Number of payments (months)	120										
Interest Rate	5%										
Annual repayment amount					(38 184)	(38 184)	(38 184)	(38 184)	(38 184)	(38 184)	(38 184)
Repayment of £971k NIC loan											
NIC loan value	971,195										
Rate per SCM (on bandings)	0.0245	0.0245	0.0367	0.0367	0.0367	0.0612	0.0734	0.0734	0.0734	0.0734	0.0734
Loan repayment profile	(1 130)	(11 549)	(30 094)	(36 426)	(55 724)	(126 499)	(187 994)	(196 262)	(201 462)	(124 056)	0
Cumulative repayment	(1 130)	(12 679)	(42 772)	(79 199)	(134 923)	(261 421)	(449 416)	(645 678)	(847 139)	(971 195)	(971 195)
FINANCING COSTS (EXC. NIC)		**(114,551)**	**(114,551)**	**(114,551)**	**(152,734)**	**(152,734)**	**(152,734)**	**(152,734)**	**(152,734)**	**(152,734)**	**(152,734)**
FINANCING COSTS (INC. NIC)	**(1,130)**	**(126,099)**	**(144,644)**	**(150,977)**	**(208,458)**	**(279,233)**	**(340,729)**	**(348,996)**	**(354,196)**	**(276,790)**	**(152,734)**
CASH FLOW (EXC. NIC)	**(90,667)**	**(119,190)**	**(48,888)**	**(64,028)**	**4,021**	**115,084**	**214,712**	**237,469**	**251,780**	**289,390**	**307,282**
CASH FLOW (INC. NIC)	**(91,797)**	**(130,739)**	**(78,981)**	**(100,454)**	**(51,703)**	**(11,414)**	**26,718**	**41,206**	**50,318**	**165,334**	**307,282**
Emissions Savings: CO2	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
CO2 tonnes saved /lt	0.00077	0.00077	0.00077	0.00077	0.00077	0.00077	0.00077	0.00077	0.00077	0.00077	0.00077
Total tonnes saved by year	31	319	555	671	1 027	1,399	1,732	1,809	1 856	1,982	2,042
Total tonnes saved cumulative	31	350	905	1,576	2 603	4,002	5,734	7,543	9 399	11,382	13,424
CO2 £ per tonne saving	61.8	61.8	61.8	61.8	61.8	61.8	61.8	61.8	61.8	61.8	61.8
Total	1,931	19,726	34,269	41,481	63 456	86,431	107,040	111,748	114 708	122,488	126,189
Emissions Savings: NOX	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Counc l RCV's (NOX tonnes saved)	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040
Counc l Vans (NOX tonnes saved)	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002
Buses (NOX tonnes saved)	0.000016	0.000016	0.000016	0.000016	0.000016	0.000016	0.000016	0.000016	0.000016	0.000016	0.000016
NGN (NOX tonnes saved)	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002
Othe s (NOX tonnes saved)	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040
Othe s l ght comm (NOX tonnes saved)	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002
Tax s (NOX tonnes saved)	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002
P vate Ca Owne s (NOX tonnes saved)	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002
Total by year	1	15	27	31	47	64	75	76	77	79	79
Cumulative	1	17	44	75	122	187	261	338	414	493	572
NOX £ per tonne saving	955	955	955	955	955	955	955	955	955	955	955
Total	1,406	14,762	25,845	30,002	44 853	61,334	71,414	72,802	73 094	74,968	75,637
Emissions Savings: PM10	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Counc l RCV's PM tonnes saved)	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004
Counc l Vans PM tonnes saved)	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001
Buses (PM tonnes saved)	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007
NGN PM tonnes saved)	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001
Othe s (PM tonnes saved)	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004
Othe s l ght comm PM tonnes saved)	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001
Tax s (PM tonnes saved)	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001
P vate Ca Owne s PM tonnes saved)	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001
Total by year	0.002	0.016	0.028	0.034	0 053	0.072	0.092	0.096	0 098	0.107	0.110
Cumulative	0.002	0.017	0.045	0.079	0 132	0.204	0.296	0.392	0 490	0.596	0.706
PM10 £ per tonne saving	70,351	70 351	70 351	70 351	70 351	70 351	70 351	70 351	70 351	70 351	70 351
Total	107	1,113	1,943	2,393	3 746	5,059	6,474	6,759	6 872	7,493	7,723

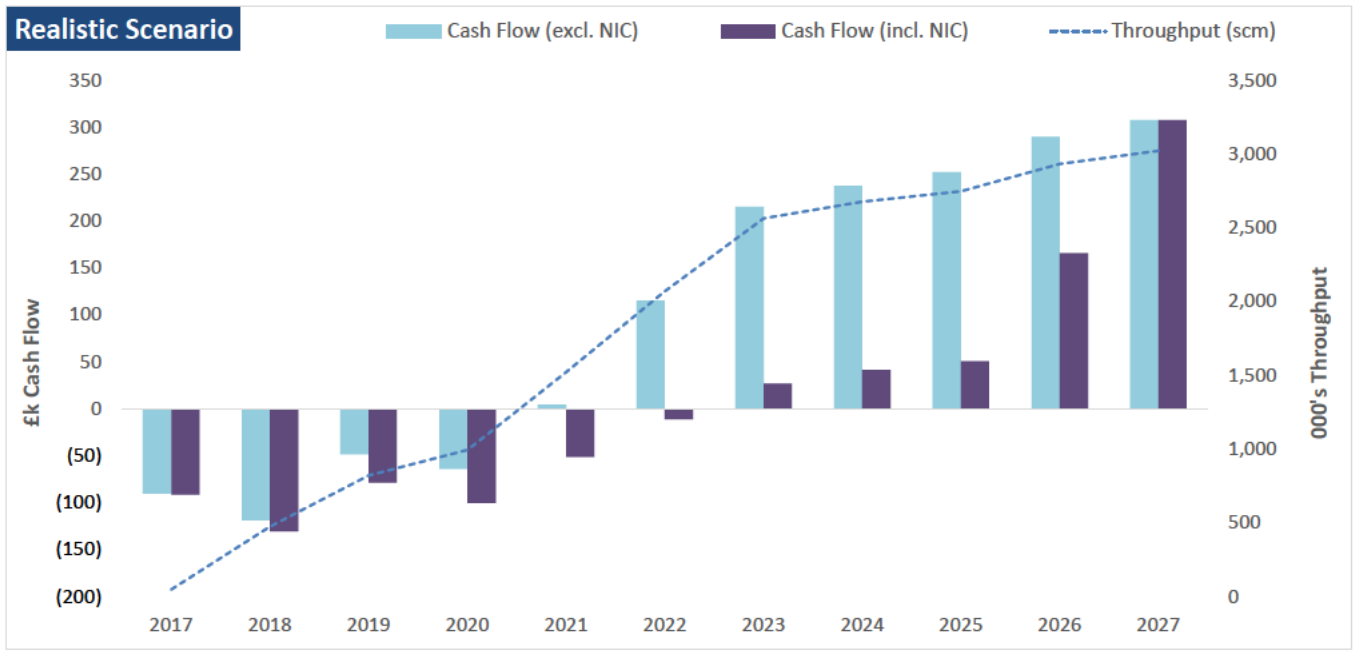
OPTIMISTIC SCENARIO

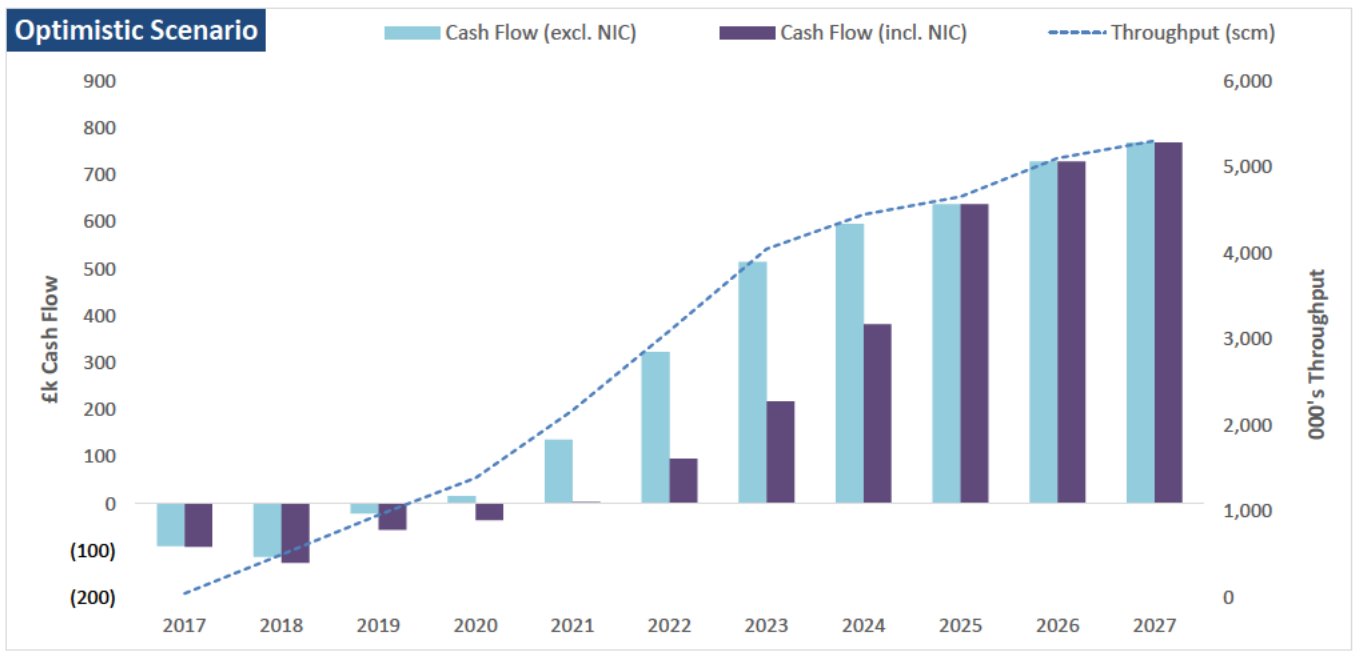
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Council : RCV's	12	21	36	39	56	74	79	79	79	79	79
Council : vans <3.5t	27	36	58	80	102	124	168	190	210	219	219
Council : Total	**39**	**58**	**94**	**120**	**159**	**199**	**247**	**269**	**289**	**298**	**298**
Buses	-	-	2	8	18	31	50	61	65	76	80
NGN	-	-	1	10	24	34	54	54	54	54	54
Others	-	1	5	11	17	22	29	29	29	29	29
Others light commercial	-	-	5	14	33	52	98	128	158	197	237
Taxis	-	-	-	-	8	27	67	87	141	219	272
Private Car Owners	-	-	-	-	-	-	-	-	34	92	142
Average vehicles	**39**	**59**	**106**	**162**	**258**	**364**	**545**	**628**	**769**	**965**	**1,113**
Throughput (scm)	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Total throughput (scm)	**46,982**	**500,756**	**960,003**	**1,389,344**	**2,173,895**	**3,097,769**	**4,048,722**	**4,450,908**	**4,657,869**	**5,105,857**	**5,306,561**
Total throughput (kg)	34 767	370 559	710 402	1 028 115	1 608 682	2 292 349	2 996 055	3 293 672	3 446 823	3 778 334	3 926 855
Total throughput (tonnes)	35	371	710	1 028	1 609	2 292	2 996	3 294	3 447	3 778	3 927
Total throughput (therms)	17 801	189 726	363 726	526 395	823 645	1 173 683	1 533 980	1 686 360	1 764 773	1 934 507	2 010 550
Total throughput (kwh)	521,687	5,560,334	10,659,759	15 427 108	24,138,668	34,397,252	44,956,521	49 422 342	51,720,413	56,694,811	58,923,410
Total (diesel litres equivalent)	41 267	439 838	843 217	1 220 327	1 909 436	2 720 919	3 556 187	3 909 445	4 091 229	4 484 718	4 661 006
Financial Evaluation											
1. Revenue from vehicles	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Fuel Selling Price assumed : £/kg	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
REVENUE	**27,814**	**296,448**	**568,322**	**822,492**	**1,286,946**	**1,833,879**	**2,396,844**	**2,634,938**	**2,757,459**	**3,022,667**	**3,141,484**
2. Operational costs	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Transp. Charges (NTS & GDN)											
Gas Cost Price assumed : £/kg	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
GDN Transportation Costs	(1 043)	(11 117)	(21 312)	(30 843)	(48 260)	(68 770)	(89 882)	(98 810)	(103 405)	(113 350)	(117 806)
Gas Cost											
Gas Cost Price assumed : £/kg	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Cost of Gas	(8 692)	(92 640)	(177 601)	(257 029)	(402 171)	(573 087)	(749 014)	(823 418)	(861 706)	(944 583)	(981 714)
Fuel Duty											
Rate per kg assumption	0.247	0.247	0.247	0.247	0.247	0.247	0.247	0.247	0.247	0.247	0.247
Fuel Duty Cost	(8 587)	(91 528)	(175 469)	(253 944)	(397 345)	(566 210)	(740 025)	(813 537)	(851 365)	(933 248)	(969 933)
Opex £ assumption	(100 000)	(100 000)	(100 000)	(150 000)	(150 000)	(150 000)	(150 000)	(150 000)	(150 000)	(150 000)	(150 000)
OPERATIONAL COSTS	**(118,322)**	**(295,285)**	**(474,382)**	**(691,816)**	**(997,776)**	**(1,358,068)**	**(1,728,921)**	**(1,885,765)**	**(1,966,476)**	**(2,141,182)**	**(2,219,453)**
3. Financing Costs	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Annual repayment amount	0	(114 551)	(114 551)	(114 551)	(114 551)	(114 551)	(114 551)	(114 551)	(114 551)	(114 551)	(114 551)
Annual repayment amount	0	0	0	0	(38 184)	(38 184)	(38 184)	(38 184)	(38 184)	(38 184)	(38 184)
Rate per SCM (on bandings)	0.0245	0.0245	0.0367	0.0367	0.0612	0.0734	0.0734	0.0734	0.0734	0.0734	0.0734
Loan repayment profile	(1 149)	(12 251)	(35 230)	(50 986)	(132 963)	(227 365)	(297 161)	(214 089)	0	0	0
Cumulative repayment	(1 149)	(13 401)	(48 631)	(99 617)	(232 580)	(459 945)	(757 106)	(971 195)	(971 195)	(971 195)	(971 195)
FINANCING COSTS (EXC. NIC)	**0**	**(114,551)**	**(114,551)**	**(114,551)**	**(152,734)**	**(152,734)**	**(152,734)**	**(152,734)**	**(152,734)**	**(152,734)**	**(152,734)**
FINANCING COSTS (INC. NIC)	**(1,149)**	**(126,802)**	**(149,781)**	**(165,537)**	**(285,698)**	**(380,099)**	**(449,895)**	**(366,823)**	**(152,734)**	**(152,734)**	**(152,734)**
CASH FLOW (EXC. NIC)	**(90,509)**	**(113,388)**	**(20,611)**	**16,125**	**136,436**	**323,077**	**515,189**	**596,438**	**638,248**	**728,751**	**769,297**
CASH FLOW (INC. NIC)	**(91,658)**	**(125,639)**	**(55,841)**	**(34,862)**	**3,473**	**95,712**	**218,027**	**382,349**	**638,248**	**728,751**	**769,297**
Emissions Savings: CO2	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
CO2 tonnes saved /lt	0.00077	0.00077	0.00077	0.00077	0.00077	0.00077	0.00077	0.00077	0.00077	0.00077	0.00077
Total tonnes saved by year	32	339	649	940	1,470	2,095	2,738	3 010	3,150	3,453	3,589
Total tonnes saved cumulative	32	370	1,020	1,959	3,430	5,525	8,263	11 273	14,424	17,877	21,466
CO2 £ per tonne saving	62	62	62	62	62	62	62	62	62	62	62
Total	1,963	20,927	40,119	58,061	90,848	129,457	169,197	186 005	194,654	213,375	221,763
Emissions Savings: NOX	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Counc l RCV's (NOX tonnes saved)	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040
Counc l Vans (NOX tonnes saved)	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002
Buses (NOX tonnes saved)	0.000016	0.000016	0.000016	0.000016	0.000016	0.000016	0.000016	0.000016	0.000016	0.000016	0.000016
NGN (NOX tonnes saved)	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002
Othe s (NOX tonnes saved)	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040
Othe s l ght comm (NOX tonnes saved)	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002
Tax s (NOX tonnes saved)	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002
P vate Ca Owne s (NOX tonnes saved)	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002
Total by year	1	16	30	40	60	82	99	104	106	111	112
Cumulative	1	18	48	88	147	230	329	433	538	649	761
NOX £ per tonne saving	955	955	955	955	955	955	955	955	955	955	955
Total	1,408	15,490	28,891	37,858	57,204	78,505	94,664	99 242	100,890	105,544	107,182
Emissions Savings: PM10	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Counc l RCV's PM tonnes saved)	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004
Counc l Vans PM tonnes saved)	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001
Buses (PM tonnes saved)	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007
NGN PM tonnes saved)	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001
Othe s (PM tonnes saved)	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004
Othe s l ght comm PM tonnes saved)	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001
Tax s (PM tonnes saved)	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001
P vate Ca Owne s PM tonnes saved)	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001
Total by year	0.002	0.017	0.033	0.051	0.084	0.124	0.169	0 190	0.198	0.220	0.228
Cumulative	0.002	0.018	0.051	0.102	0.186	0.311	0.479	0 670	0.868	1.088	1.316
PM10 £ per tonne saving	70 351	70 351	70 351	70 351	70 351	70 351	70 351	70 351	70 351	70 351	70 351
Total	108	1,172	2,311	3,610	5,886	8,758	11,886	13 384	13,946	15,484	16,041

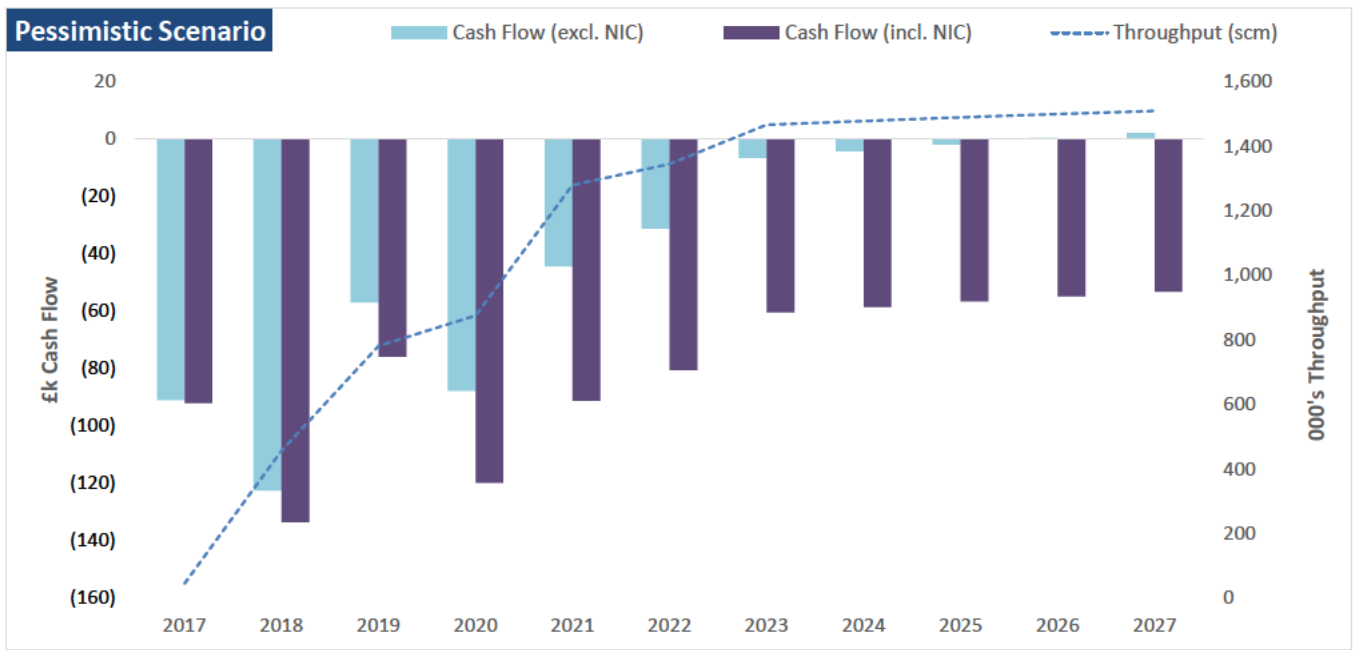
PESSIMISTIC SCENARIO

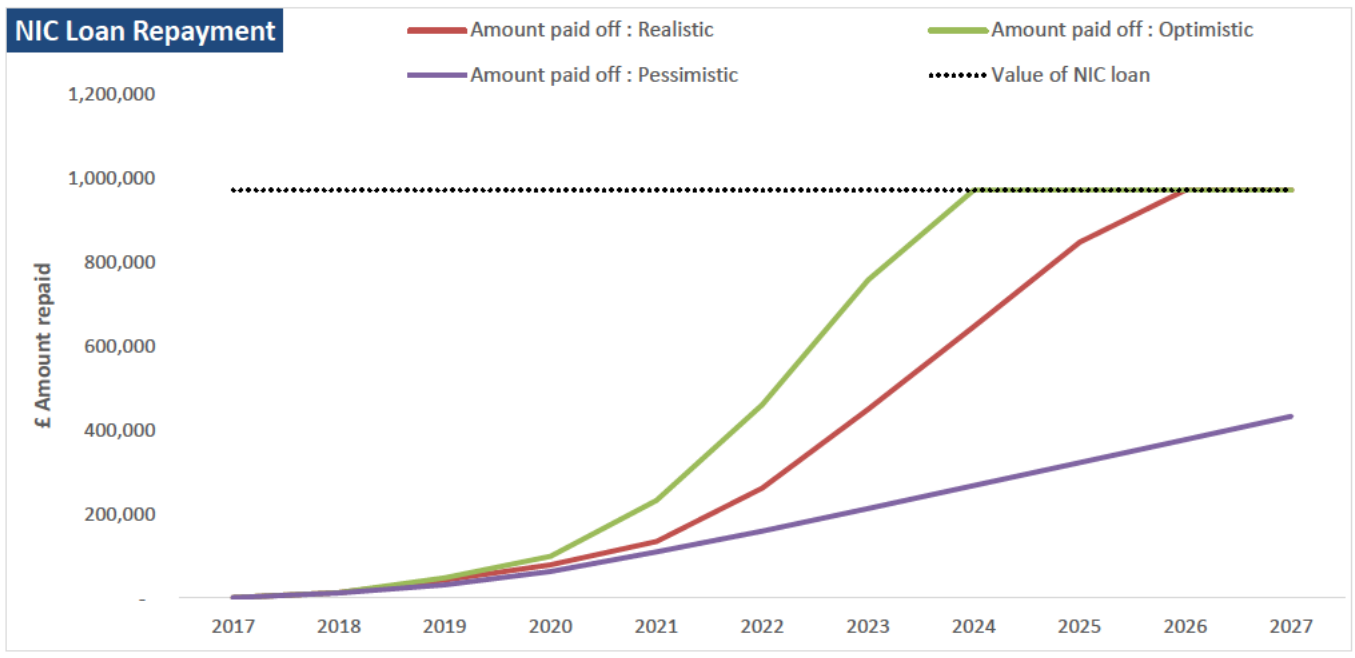
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Council : RCV's	12	21	36	39	55	55	55	55	55	55	55
Council : vans <3.5t	13	15	20	25	30	35	45	50	55	60	63
Council : Total	**25**	**36**	**56**	**64**	**85**	**90**	**100**	**105**	**110**	**115**	**118**
Buses	-	-	-	-	2	2	5	5	5	5	5
NGN	-	-	0	3	7	11	20	20	20	20	20
Others	-	-	1	2	3	5	6	6	6	6	6
Others light commercial	-	-	-	-	-	-	5	10	15	20	25
Taxis	-	-	-	-	-	-	-	-	-	-	-
Private Car Owners	-	-	-	-	-	-	-	-	-	-	-
Average vehicles	**25**	**36**	**57**	**69**	**97**	**108**	**136**	**146**	**156**	**166**	**174**
Throughput (scm)	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Total throughput (scm)	**44,236**	**455,423**	**780,297**	**874,955**	**1,278,479**	**1,343,783**	**1,465,408**	**1,476,744**	**1,488,080**	**1,499,416**	**1,508,354**
Total throughput (kg)	32 734	337 013	577 420	647 467	946 074	994 400	1 084 402	1 092 791	1 101 179	1 109 568	1 116 182
Total throughput (tonnes)	33	337	577	647	946	994	1 084	1 093	1 101	1 110	1 116
Total throughput (therms)	16 760	172 551	295 639	331 503	484 390	509 133	555 214	559 509	563 804	568 099	571 485
Total throughput (kwh)	491,187	5,056,959	8,664,325	9,715,396	14,196,073	14,921,205	16 271 716	16,397,590	16,523,464	16,649,337	16 748 584
Total (diesel litres equivalent)	38 854	400 020	685 372	768 515	1 122 949	1 180 309	1 287 138	1 297 095	1 307 052	1 317 009	1 324 860
Financial Evaluation											
1. Revenue from vehicles	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Fuel Selling Price assumed : £/kg	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
REVENUE	**26,187**	**269,610**	**461,936**	**517,973**	**756,859**	**795,520**	**867,522**	**874,233**	**880,944**	**887,655**	**892,946**
2. Operational costs	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Transp. Charges (NTS & GDN)											
Gas Cost Price assumed : £/kg	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
GDN Transportation Costs	(982)	(10 110)	(17 323)	(19 424)	(28 382)	(29 832)	(32 532)	(32 784)	(33 035)	(33 287)	(33 485)
Gas Cost											
Gas Cost Price assumed : £/kg	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Cost of Gas	(8 184)	(84 253)	(144 355)	(161 867)	(236 519)	(248 600)	(271 101)	(273 198)	(275 295)	(277 392)	(279 046)
Fuel Duty											
Rate per kg assumption	0.247	0.247	0.247	0.247	0.247	0.247	0.247	0.247	0.247	0.247	0.247
Fuel Duty Cost	(8 085)	(83 242)	(142 623)	(159 924)	(233 680)	(245 617)	(267 847)	(269 919)	(271 991)	(274 063)	(275 697)
Opex £ assumption	(100 000)	(100 000)	(100 000)	(150 000)	(150 000)	(150 000)	(150 000)	(150 000)	(150 000)	(150 000)	(150 000)
OPERATIONAL COSTS	**(117,251)**	**(277,606)**	**(404,300)**	**(491,215)**	**(648,581)**	**(674,049)**	**(721,480)**	**(725,901)**	**(730,322)**	**(734,742)**	**(738,228)**
3. Financing Costs	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Annual repayment amount	0	(114 551)	(114 551)	(114 551)	(114 551)	(114 551)	(114 551)	(114 551)	(114 551)	(114 551)	(114 551)
Annual repayment amount	0	0	0	0	(38 184)	(38 184)	(38 184)	(38 184)	(38 184)	(38 184)	(38 184)
Rate per SCM (on bandings)	0.0245	0.0245	0.0245	0.0367	0.0367	0.0367	0.0367	0.0367	0.0367	0.0367	0.0367
Loan repayment profile	(1 082)	(11 142)	(19 090)	(32 109)	(46 918)	(49 314)	(53 778)	(54 194)	(54 610)	(55 026)	(55 354)
Cumulative repayment	(1 082)	(12 224)	(31 315)	(63 424)	(110 342)	(159 656)	(213 434)	(267 628)	(322 237)	(377 263)	(432 617)
FINANCING COSTS (EXC. NIC)	**0**	**(114,551)**	**(114,551)**	**(114,551)**	**(152,734)**	**(152,734)**	**(152,734)**	**(152,734)**	**(152,734)**	**(152,734)**	**(152,734)**
FINANCING COSTS (INC. NIC)	**(1,082)**	**(125,693)**	**(133,641)**	**(146,660)**	**(199,652)**	**(202,049)**	**(206,512)**	**(206,928)**	**(207,344)**	**(207,760)**	**(208,088)**
CASH FLOW (EXC. NIC)	**(91,063)**	**(122,546)**	**(56,915)**	**(87,792)**	**(44,456)**	**(31,263)**	**(6,693)**	**(4,402)**	**(2,112)**	**178**	**1,983**
CASH FLOW (INC. NIC)	**(92,146)**	**(133,688)**	**(76,005)**	**(119,902)**	**(91,374)**	**(80,578)**	**(60,470)**	**(58,596)**	**(56,722)**	**(54,848)**	**(53,370)**
Emissions Savings: CO2	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
CO2 tonnes saved /lt	0.00077	0.00077	0.00077	0.00077	0.00077	0.00077	0.00077	0.00077	0.00077	0.00077	0.00077
Total tonnes saved by year	30	308	528	592	865	909	991	999	1,006	1,014	1 020
Total tonnes saved cumulative	30	338	866	1,457	2,322	3,231	4,222	5,221	6,227	7,241	8 261
CO2 £ per tonne saving	62	62	62	62	62	62	62	62	62	62	62
Total	1,849	19,032	32,609	36,565	53,428	56,157	61,240	61,714	62,187	62,661	63 035
Emissions Savings: NOX	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Counc l RCV's (NOX tonnes saved)	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040
Counc l Vans (NOX tonnes saved)	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002
Buses (NOX tonnes saved)	0.000016	0.000016	0.000016	0.000016	0.000016	0.000016	0.000016	0.000016	0.000016	0.000016	0.000016
NGN (NOX tonnes saved)	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002
Othe s (NOX tonnes saved)	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040	0.000040
Othe s l ght comm (NOX tonnes saved)	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002
Tax s (NOX tonnes saved)	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002
P vate Ca Owne s (NOX tonnes saved)	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002	0.000002
Total by year	1	15	27	30	43	44	46	46	46	46	46
Cumulative	1	17	44	73	116	160	207	253	299	346	392
NOX £ per tonne saving	955	955	955	955	955	955	955	955	955	955	955
Total	1,403	14,735	25,439	28,352	40,808	42,421	44,171	44,190	44,209	44,228	44 243
Emissions Savings: PM10	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Counc l RCV's PM tonnes saved)	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004
Counc l Vans PM tonnes saved)	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001
Buses (PM tonnes saved)	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007	0.00000007
NGN PM tonnes saved)	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001
Othe s (PM tonnes saved)	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004	0.00000004
Othe s l ght comm PM tonnes saved)	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001
Tax s (PM tonnes saved)	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001
P vate Ca Owne s PM tonnes saved)	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001	0.00000001
Total by year	0.001	0.016	0.027	0.030	0.045	0.047	0.053	0.053	0.053	0.053	0 053
Cumulative	0.001	0.017	0.044	0.074	0.119	0.166	0.219	0.272	0.325	0.379	0 432
PM10 £ per tonne saving	70 351	70 351	70 351	70 351	70 351	70 351	70 351	70 351	70 351	70 351	70 351
Total	105	1,098	1,891	2,112	3,161	3,328	3,723	3,733	3,743	3,753	3 760

SITE PROFITABILITY - WITH AND WITHOUT NIC LOAN REPAYMENT NUMBER OF VEHICLES EMISSIONS SAVINGS

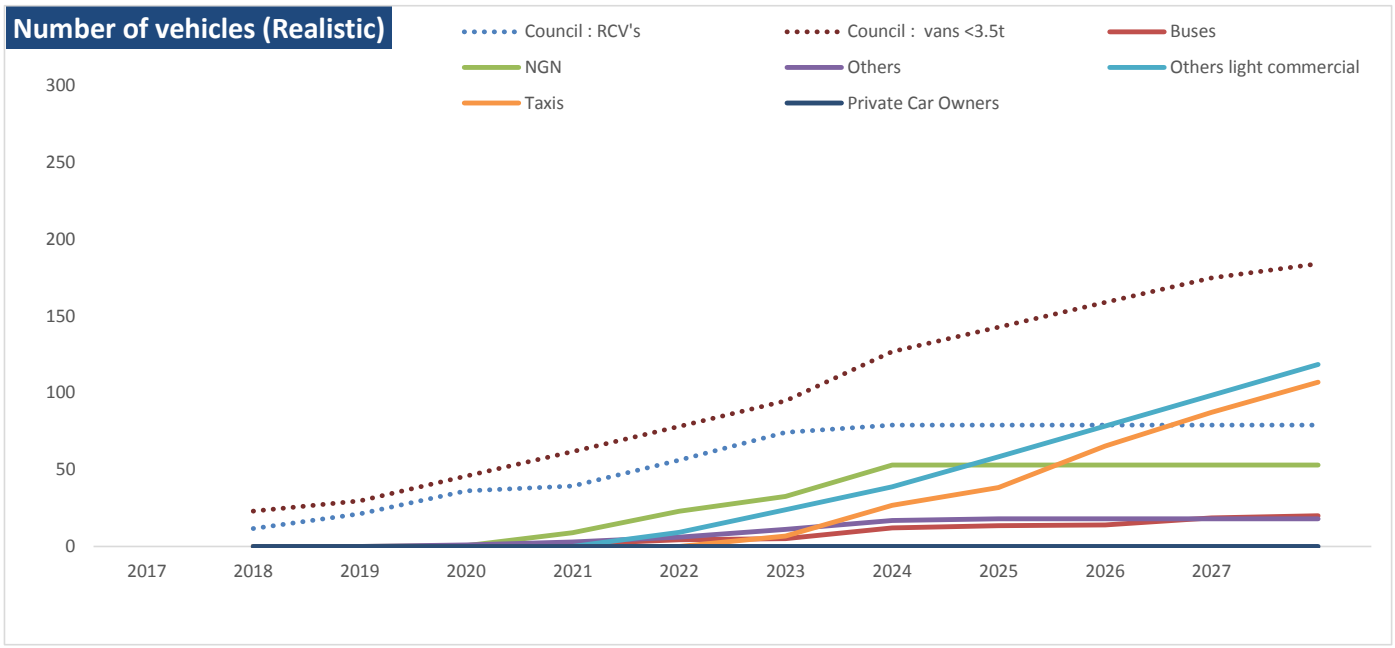


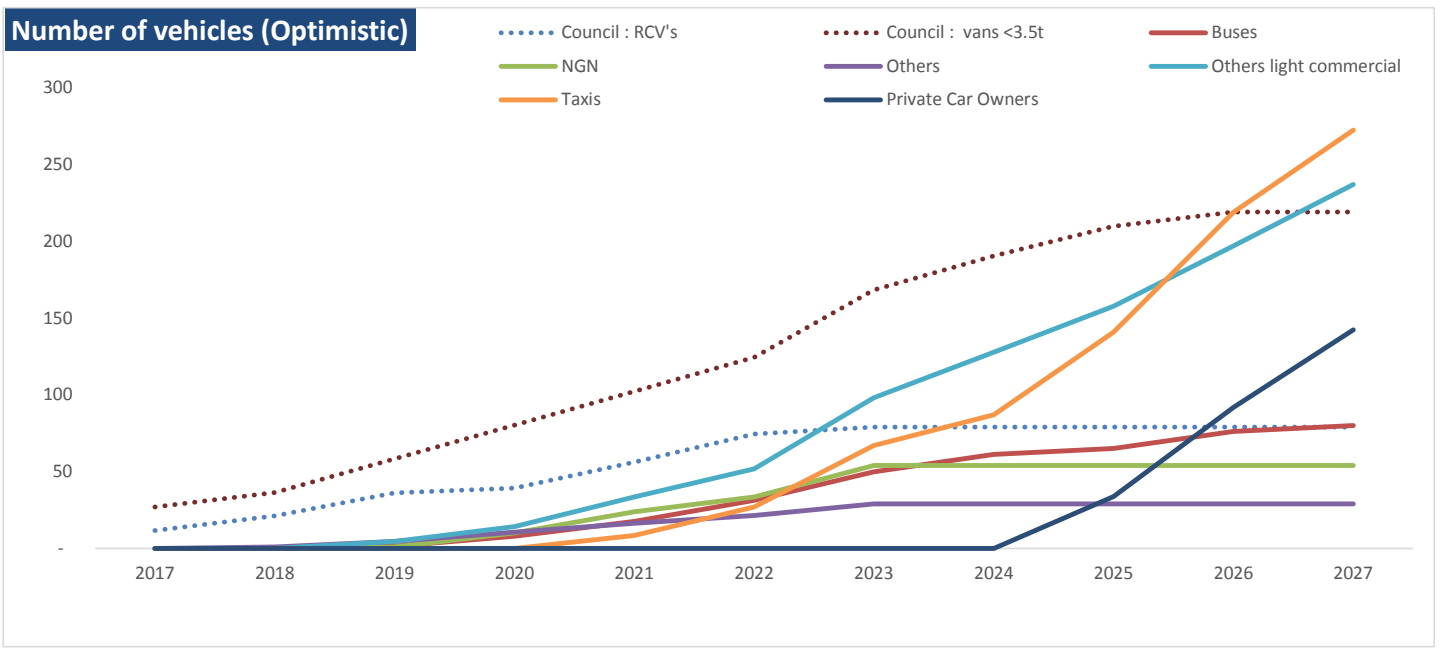


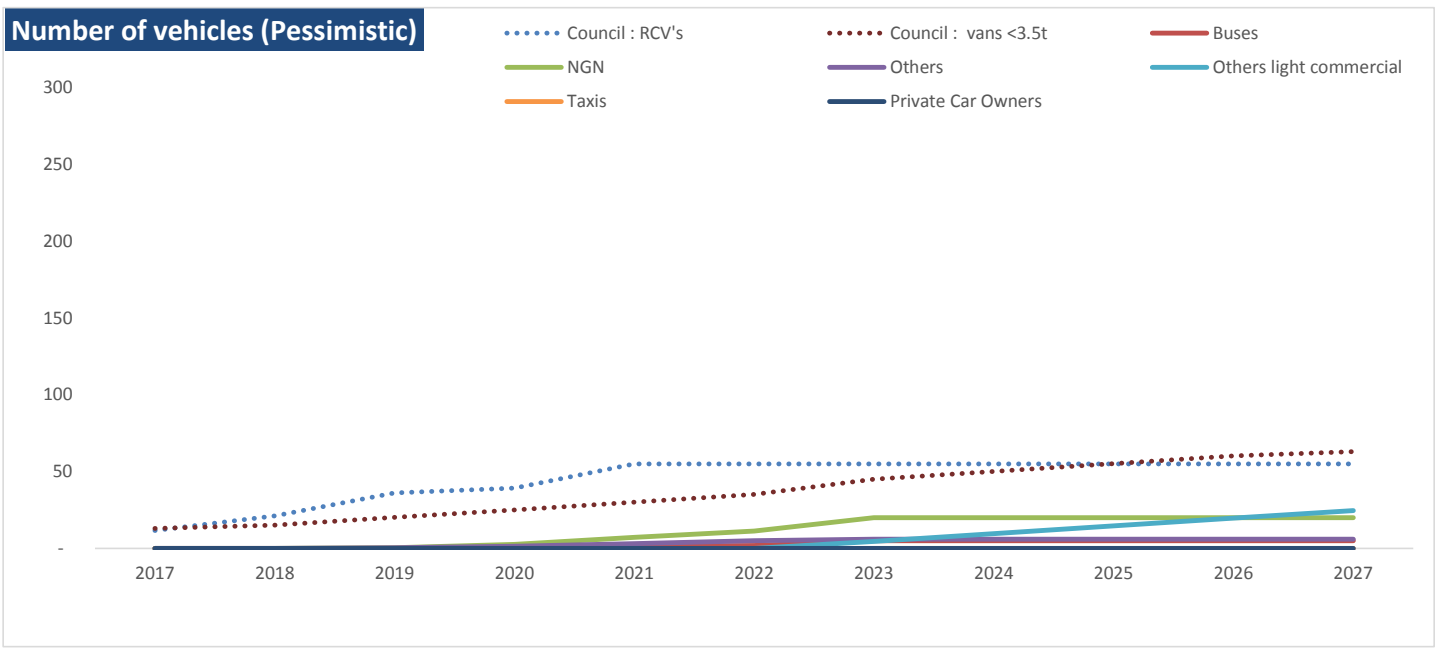


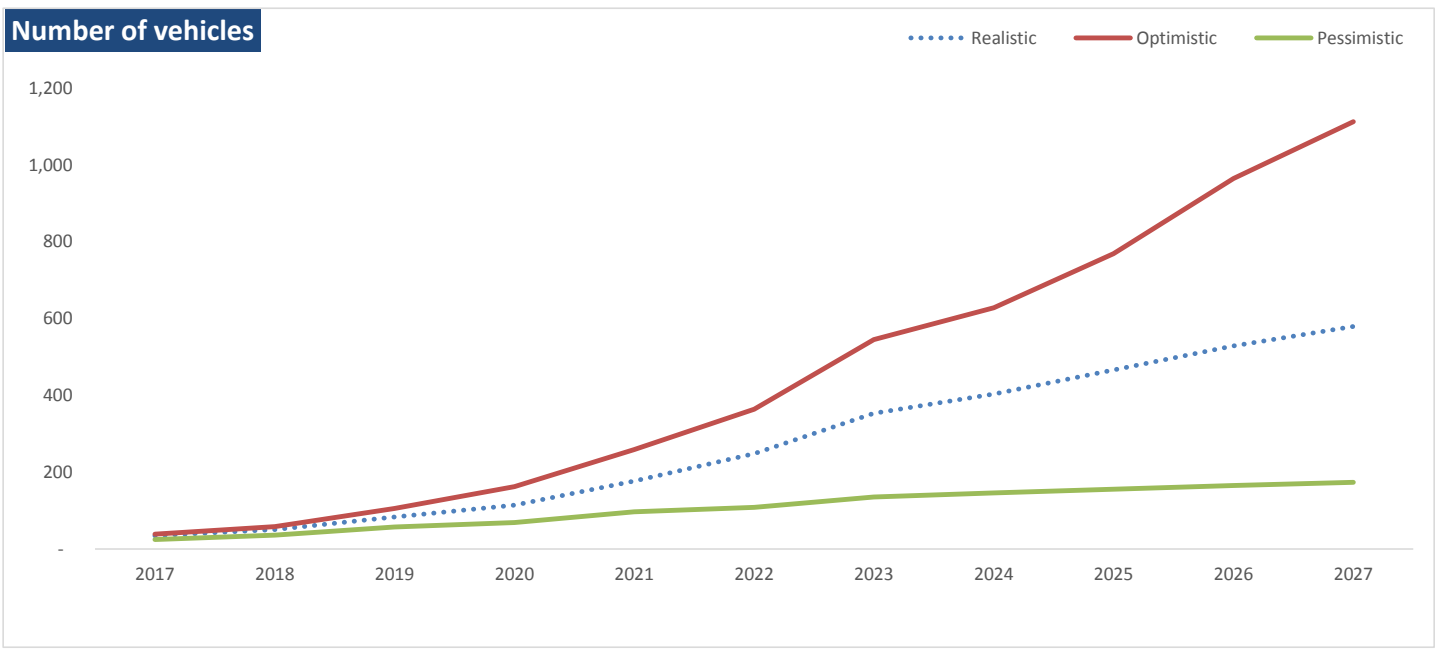


SITE PROFITABILITY - WITH AND WITHOUT NIC LOAN REPAYMENT NUMBER OF VEHICLES EMISSIONS SAVINGS









SITE PROFITABILITY - WITH AND WITHOUT NIC LOAN REPAYMENT NUMBER OF VEHICLES EMISSIONS SAVINGS