

Report of: Projects, Programmes and Procurement Unit

Report to: The Chief Officer Highways and Transportation

Date: 11th April 2017

Subject: Clean Air Zone and Air Quality Improvement – Refrigeration Technology

Capital Scheme Number : 32750

Are specific electoral wards affected? If relevant, name(s) of ward(s)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Are there implications for equality and diversity and cohesion and integration?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Is the decision eligible for call-In?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Does the report contain confidential or exempt information? If relevant, access to information procedure rule number: Appendix number:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

Summary of main issues

1. Leeds City Council has recently succeeded in obtaining £150,000 of funding from DEFRA's 2016/17 "Taking the Lead" Air Quality Grant fund to undertake a project to measure real-world emissions from road transport refrigeration equipment.
2. The project bid was developed in conjunction with Defra and the Dearman Engine Company Limited (Dearman), a company that specialises in developing low emission technologies powered by liquid air or nitrogen. The project is dependent on £321,222 of match funding from Dearman, in the form of labour and materials.
3. As part of the bid, Dearman will undertake the day to day management of the project under the oversight of Leeds City Council.
4. The aims of the project will be to measure emissions from conventional fossil fuelled Transport Refrigeration Units (TRU) during operation in Leeds, estimate the number of refrigerated vehicles operating in Leeds along with their duty cycles, develop the evidence base and tools required to reduce the impact of TRU's on local air quality and undertake a field trial demonstration of zero emission transport refrigeration technology in Leeds.
5. The project will consist of four workstreams:
 - The acquisition of data on the Leeds refrigerated vehicle fleet.

- Refrigerated vehicle emission testing to assess the real world emissions of TRVU's currently in use.
 - A city level emissions reduction assessment to ascertain how emissions could be reduced through the adoption of liquid nitrogen technology for TRV's.
 - Deployment of Liquid Nitrogen infrastructure in the city to enable the use of zero emission TRV's within the city into the future.
6. Dearman will be responsible for undertaking and managing these workstreams on a day to day basis.
 7. The Council has made a commitment to complete the project by the end of December 2017, and therefore project delivery needs to start as soon as possible..
 8. PPPU have drafted a Grant Agreement to allow for the grant to be passed through to Dearman to allow them to make payment for works completed. A copy of the Agreement can be found at Appendix A.

Recommendations

9. That the Chief Officer of Highways and Transportation approves:
 - I. The injection of £150,000 into the Highways and Transportaion capital programme, fully funded by Government Grant.
 - II. The discharge of the £150,000 to the Dearman Engine Company Ltd in order to commence work on the above workstreams.
 - III. The use of a Grant Agreement as a means of discharging the grant funding to the Dearman Engine Company Ltd for its intended purpose.

1 Purpose of this report

- 1.1 To request approval to distribute the grant funding and to discharge the grant to Dearman using the Grant Agreement found at Appendix A as the basis for doing so.

2 Background information

- 2.1 In DEFRA's September 2015 consultation paper, Leeds was identified as one of a number of cities in the UK forecasted to fail EU limit values for NOx by 2020.
- 2.2 Pollution from transport is the primary cause of NOx emissions, therefore in addressing the cities air quality issues there is a requirement to prioritise solutions targeting vehicles.
- 2.3 Many vehicles delivering refrigerated foodstuffs rely on a Transport Refrigeration Unit (TRU) powered by a secondary diesel engine. Whilst emissions standards have been strengthened for vehicles over time, these do not currently apply to secondary diesel engines powering TRU's. It is estimated that such engines can

emit up to six times as much NO_x and almost thirty times as much particulate matter (PM) as a Euro VI HGV propulsion engine.

- 2.4 Whilst emissions standards for road vehicles have been strengthened over time, these have as yet not been applied to Transport Refrigeration Units.
- 2.5 The draft DEFRA Clean Air Zone Framework, published in October 2016 is the first time that diesel powered TRU's have been officially recognised in the UK as a substantial polluter, and recommends that fleet operators upgrade to less polluting options to improve air quality in city centres.
- 2.6 Of the five cities mandated to implement a CAZ, Leeds is estimated to receive the highest proportion of pollution from refrigerated transport sources. It is estimated that nitrogen oxides and particulate matter emissions from TRUs are nearly twice that in Birmingham, the second highest city in terms of TRU emissions.
- 2.7 Dearman's in-house analysis estimates that auxiliary TRU's operating in the five Clean Air Zone cities emit a total of 118 tonnes of Nitrogen Oxide (NO_x), 16 tonnes of Particulate Matter (PM) and 34,000 tonnes of Carbon Dioxide (CO₂) per annum. If their emissions are as disproportionate as expected, replacing auxiliary TRU's with zero emissions alternatives could be the NO_x equivalent to removing 4,000 Euro VI HGV's or 111,000 Euro 6 cars and the PM equivalent to removing 21,600 HGV's or 236,600 cars from the roads in the UK.
- 2.8 To better understand the nature and extent of pollution of TRUs in Leeds, a bid was submitted to Defra setting out proposal to establish the extent of emissions from TRUs in Leeds and implement a demonstration project to test the viability of the liquid nitrogen fuelled refrigeration equipment patented by Dearman as an alternative to diesel.
- 2.9 Whilst the findings of the project will be shared nationally, the benefits to Leeds will be enhanced by both the creation of liquid nitrogen infrastructure as part of this project and the reduction in air pollution during the demonstration of Dearman's TRU.

3 Main issues

- 3.1 Leeds City Council has secured £150,000 of air quality grant funding for the project, which will leverage approximately £380,000 of additional funding from Dearman.
- 3.2 The grant funding has been allocated to the following three workstreams:
 - £25,000 for refrigerated vehicle emission testing. Portable Emissions Measurement Systems (PEMS) equipment will be installed in vehicles to measure true in-use emissions of carbon oxides, oxides of nitrogen, hydrocarbons, particulates and fuel consumption.
 - £20,000 for a city level emissions reduction assessment using number plate recognition, traffic data and specialist vehicle data to assess the level of usage of such vehicles in Leeds currently.

- £105,000 for the installation of a Liquid Nitrogen (LIN) refuelling station consisting of a 40T liquid nitrogen vessel, a quick connect/release filling station and the related construction works.

3.3 It is anticipated that the project will commence in April 2017 with data collection and analysis, moving to the creation on liquid nitrogen infrastructure in September 2017 and testing of Dearman refrigerated vehicles. The project is expected to complete in December 2017 and communication with Leeds City Council, the other CAZ cities and Defra will be undertaken throughout the project. A project plan for delivery is detailed in the Appendix

3.4 The Grant Agreement stipulates that funding shall be discharged on the basis of the funds are expended in entirety on the project referred to in the agreement (found at Appendix A).

3.5 The grant rules stipulate that the funding must be discharged and the final report submitted by March 2018. Therefore, there is a requirement for the Chief Officer of Highways and Transportation to approve the recommendations contained in this report to allow for the conditions of the funding award to be satisfied.

4 Corporate considerations

4.1 Consultation and engagement

4.1.2 The proposal has been developed in consultation with the Environmental Studies team of the Highways & Transportation Service.

4.1.3 The Director of Resources and Environment and the Executive Member for Environment and Sustainability were consulted and are fully aware of the intention and purpose of applying for the Grant from DEFRA.

4.2 Equality and diversity / cohesion and integration

4.2.1 There are no equality and diversity issues arising from this paper. This paper solely relates to a grant arrangement to facilitate the flow of money to allow for works to be undertaken in respect of 3rd party vehicles.

4.3 Council policies and best council plan

4.3.1 The establishment of current emissions outputs from auxiliary TRU's and the proof of the effectiveness of alternative technology will contribute to the aims and objectives of the Council's cutting carbon and improving air quality breakthrough project and the West Yorkshire Low Emissions Strategy (WYLES).

4.4 Resources and value for money

4.4.1 The grant funding awarded of £150,000 will leverage in £371,222 of additional resource from Dearman. This will include £46,222 of labour costs along with £300,000 for five low emissions TRU's, £15,000 liquid nitrogen fuel supply for the duration of the project and the provision of spare parts, maintenance and £10,000 of staff training for end user staff for the duration of the project.

4.4.2 Resources from Leeds City Council will be limited to a small amount of officer time for project management, based mainly in the Projects, Programmes and Procurements Unit which will include quarterly reporting to the Environment Programme Board and DEFRA.

4.4.3 **Budget profile and funding :**

Funding Approval :	Capital Section Reference Number :-						
Previous total Authority to Spend on this scheme	TOTAL £000's	TO MARCH 2016 £000's	FORECAST				
			2016/17 £000's	2017/18 £000's	2018/19 £000's	2019/20 £000's	2020 on £000's
LAND (1)	0.0						
CONSTRUCTION (3)	0.0						
FURN & EQPT (5)	0.0						
DESIGN FEES (6)	0.0						
OTHER COSTS (7)	0.0						
TOTALS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Authority to Spend required for this Approval	TOTAL £000's	TO MARCH 2016 £000's	FORECAST				
			2016/17 £000's	2017/18 £000's	2018/19 £000's	2019/20 £000's	2020 on £000's
LAND (1)	0.0						
CONSTRUCTION (3)	0.0						
FURN & EQPT (5)	0.0						
DESIGN FEES (6)	0.0						
OTHER COSTS (7)	150.0			150.0			
TOTALS	150.0	0.0	0.0	150.0	0.0	0.0	0.0
Total overall Funding (As per latest Capital Programme)	TOTAL £000's	TO MARCH 2016 £000's	FORECAST				
			2016/17 £000's	2017/18 £000's	2018/19 £000's	2019/20 £000's	2020 on £000's
Government Grant	150.0			150.0			
Total Funding	150.0	0.0	0.0	150.0	0.0	0.0	0.0
Balance / Shortfall =	0.0	0.0	0.0	0.0	0.0	0.0	0.0

4.5 **Legal Implications, access to information and call In**

4.5.1 Because of the grant amount, this is a delegated decision and therefore not eligible for call in.

4.5.2 The Grant Agreement has been drafted by PPPU, and it mirrors and backs-off the terms and requirements of the DEFRA grant to the Council.

4.6 **Risk management**

4.6.1 A delivery timeline with milestones and deliverables is presented in Appendix B.

4.6.2 Leeds City Council will provide oversight to the project via the Projects, Programmes and Procurement Unit, who will act as the key liaison with Dearman to ensure that the project progresses to plan. The projects progress will be reported as part of a Programme Check Point Report that is presented at the Environment Programme Board on a 6-weekly basis.

- 4.6.3 Dearman have successfully delivered three Innovate UK Integrated Delivery Programme projects using Prince 2 methodologies, gateways, risk registers and tracking to an individual plan which is aligned to partners' individual plans to the venture. They will take day to day responsibility for project management, and their dedicated project manager will have overall responsibility for delivering the project to time and to budget. The project management structure will be based on the three workstreams outlined in section 3.2.
- 4.6.4 The project will have bi-weekly reviews between the work stream leads, the project manager and Leeds City Council to ensure that any delivery concerns are brought to the attention of the Council in time. A risk management plan will be maintained throughout the life of the project and will be reviewed quarterly.

5 Conclusions

- 5.1 The Council has been successful in its application for grant funding to establish the scale of the problem currently posed by auxiliary TRU's to air quality within Leeds and trial an alternative technology solution.
- 5.2 The project is helping to address a recognised knowledge gap with regard to TRU emissions and will contribute towards Leeds' Cutting Carbon and Improving Air Quality Breakthrough projects as well as providing replicable lessons for cities across the UK and further afield.
- 5.3 The grant agreement allows for the clean and efficient transfer of the grant and will bring in considerable additional resource to the city.

6 Recommendations

- 6.1 That the Chief Officer, Highways and Transportation, approves:
- I. The injection of £150,000 into the Highways and Transportation capital programme, fully funded by Government Grant.
 - II. The discharge of the £150,000 to Dearman Engine Company Ltd in order to commence work on the above workstreams.
 - III. That the Grant Agreement is the means of discharging the grant funding to Dearman for its intended purpose.

7 Background documents¹

- 7.1 Appendix A, Grant Agreement.
- 7.2 Appendix B, Project Plan

¹ The background documents listed in this section are available to download from the Council's website, unless they contain confidential or exempt information. The list of background documents does not include published works.

Appendix B – Project Plan

