

# Reducing Non-Road Mobile Machinery Emissions on Construction Sites: Market Sounding Questionnaire

December 2023



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# 1. Introduction

This Market Sounding Questionnaire (MSQ) is issued by Transport for London (TfL).

This MSQ is seeking market feedback on potential solutions to trial to reduce emissions associated with Non-Road Mobile Machinery (NRMM) in TfL's construction portfolio.

Non-Road Mobile Machinery (NRMM) is a broad category which includes mobile machines, and transportable industrial equipment or vehicles which are fitted with an internal combustion engine and not intended for transporting goods or passengers on roads.

The primary focus of this MSQ is to better understand market interest, capability and capacity, and to gather market feedback on risks and opportunities.

## 2. MSQ Brief

The global construction sector is responsible for 39% of carbon emissions. In 2020, the UK construction industry consumed 2.5m tonnes of diesel, emitting 6m tonnes of CO<sub>2</sub>e, greenhouse gases and other air pollutants that damage the environment but also significantly impacting the health of those working on sites.

The London Atmospheric Emissions Inventory 2019 estimates that NRMM exhaust emissions in construction are responsible for approximately 2550 Tonnes of Particulate Matter (PM), 1350 Tonnes of toxic Oxides of Nitrogen (NO<sub>x</sub>) and 420,000 Tonnes of CO<sub>2</sub> emissions in London each year<sup>1</sup>.

TfL is seeking to reduce construction site emissions, specifically in relation to the use of Non-Road Mobile Machinery (NRMM) and explore feasibility of solutions which reduce associated on-site emissions.

NRMM, particularly from the construction sector, is a significant contributor to London's air pollution, in April 2023 1,365 NRMMs were actively operating in London, of which 1163 were compliant with the NRMM Low Emission Zone (LEZ)<sup>2</sup>. The NRMM LEZ uses the Mayor and London Borough's planning powers to control emissions from NRMM used on construction sites.

The NRMM LEZ requires all engines with a power rating between 37 kW and 560 kW to meet an emission standard based on the engine emission "stage". Stages describe the standards that need to be met depending on where the site is. The current NRMM LEZ requirements are:

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<sup>1</sup> [London Atmospheric Emissions Inventory \(LAEI\) 2019 - London Datastore](#)

<sup>2</sup> [Non-Road Mobile Machinery \(NRMM\) | London City Hall](#)

- Stage IV for construction machinery operating in the Central Activities Zone and Opportunity Areas (including Canary Wharf) and stage IIIB in the rest of London.
- Stages IIIB and IV have not been defined for machines with constant speed engines, such as generators. This means that these machines will need to meet stage V.
- Stage IV has also not been directly defined for variable speed engines smaller than 56 kW. In most cases these engines will need to meet stage V if they are in the Central Activities Zone and Opportunity Areas (OAs).

NRMM LEZ requirements are set to become more stringent;

- From 1 January 2025 the standards will be stage IV throughout London
- From 1 January 2030 the standards will be stage V throughout London

Significant progress has been made in the move to reduce emissions from NRMMs on construction sites, by using new and existing technologies, such as batteries on site to provide energy.

However, at present, many NRMMs on construction sites around London still face challenges in the transition to zero emission technology.

Challenges in using emission free NRMM include:

- Power loading Requirements – Construction sites often have fluctuating power demands based on the machinery and equipment in use. Emission-free NRMM may face challenges in meeting the power loading requirements, especially during peak usage times.
- Battery Recharging- Establishing charging infrastructure on construction sites poses a significant challenge. Power connections can be expensive and subject to long lead times and delays. Site layouts also changes continuously during the construction so locating charging stations may not be practical. As a result, recharging batteries can be logistically complex. The time required for recharging batteries can also lead to downtime for construction equipment which may impact efficiency.
- Battery Reliability and Confidence - The reliability of batteries is a critical factor in the successful deployment of emission-free NRMM. Construction sites demand robust and durable power sources that can withstand the often harsh and demanding conditions of construction environments. Building trust in the reliability of emission-free NRMM involves addressing concerns related to reliability. Construction companies may be cautious about adopting new technologies due to concerns about reliability and the potential impact of technology failures on construction processes.
- Hydrogen Storage –Storing hydrogen safely is essential when used on construction sites and Hydrogen is highly flammable and this can add an

additional layer of Health and Safety complexity to the deployment of hydrogen-powered NRMM especially adjacent to TfL's Infrastructure'.

- Tower Crane Power Requirements – Tower cranes are essential on construction site and ensuring that emission-free power sources can meet the power demands of these cranes is crucial. This includes considerations for heavy lifting, especially in compliance with Stage V emissions standards. Meeting the stringent Stage V emissions standards while maintaining the necessary power output for tower cranes requires advanced technology. Developing NRMM that aligns with these standards without compromising performance is still a significant challenge.

Based on the challenges identified above and our experience to date, TfL would be seeking to trial solutions which can address the following problem statement:

How might we reduce emissions associated with the use of NRMM within TfL's construction portfolio?

We are seeking solutions which allow for the transition to diesel-free, zero emission plant in the near future.

We would also be interested in the better use of existing machinery through efficiencies which would reduce emissions.

### **3. Feedback Request**

Feedback is requested in relation to the proposals described within this document. Your feedback is important as it will allow views from the market to inform the development and finalisation of the procurement strategy and the tender documents that may follow.

TfL would greatly appreciate your feedback in the form of a response to the questionnaire in Section 3. Please submit your responses via Email to [Innovation@tfl.gov.uk](mailto:Innovation@tfl.gov.uk)

The feedback that we receive will be reviewed and analysed and will be taken into account in finalising the trial to go to market strategy.

For your feedback to be taken into account, your completed MSQ must be received by 16 February 2024.

### **4. Legal Notice**

Information provided within this MSQ and the associated PIN ("the EME documents/Early Market Engagement Documents") does not purport to be comprehensive or verified by TfL or its advisers. No representation or warranty, express or implied, is or will be given by TfL or any of its officers, employees, servants, agents or advisers with respect to the information or opinions contained in the EME documents. Any liability in respect of such representations or warranties, howsoever arising, is hereby expressly disclaimed but nothing in the EME documents shall exclude or restrict liability for fraudulent misrepresentations.

Neither TfL nor its advisors accept any liability or responsibility for the adequacy, accuracy or completeness of any of the information or options stated and the information should not be relied upon as an undertaking or representation as to TfL's ultimate decision in relation to the Reducing NRMM Emission on Construction Site Requirement. TfL reserves the right without prior notice to amend the information provided, including, but not limited to, changing the timetable, the scope and nature of the procurement and the procurement process.

In particular, TfL reserves the right to issue circulars to interested parties providing further information or supplementing and / or amending the procurement process. In no circumstances shall TfL incur any liability in respect of any changes. This will be subject to the requirements of public law, the UK and EU procurement rules and Treaty on the functioning of the European Union rules and general principles.

TfL reserves the right without prior notice not to follow up the EME documents in any way or with any interested parties. TfL also reserves the right to terminate this process at any time without awarding a contract. TfL will not enter into a contract based solely on the responses to the EME documents and no information contained within the EME documents or in any communication made between TfL and any interested party in connection with the EME documents shall be relied upon as constituting a contract or representation that any contract shall be offered.

Direct or indirect canvassing of the Mayor, any members of the Greater London Authority, employees, directors, board members, agents and advisers of TfL and any of its subsidiaries by any person concerning the EME documents or any related procurement process and any attempt to procure information from any of the foregoing concerning the EME documents may result in the disqualification of the person and / or the relevant organisation from consideration during the market engagement or for any associated procurement.

## **5. Freedom of Information**

TfL is committed to open government and to meeting their legal responsibilities under the Freedom of Information Act 2000. Accordingly, all information submitted to a public authority may need to be disclosed by the public authority in response to a request under the Act. TfL may also decide to include certain information in the publication scheme, which TfL maintains under the Act.

If an interested party considers that any of the information included in their Market Sounding Questionnaire (MSQ) response is commercially sensitive, it should identify it and explain (in broad terms) what harm may result from disclosure if a request is received, and the time period applicable to that sensitivity. Interested parties should be aware that, even where they have indicated that information is commercially sensitive, TfL might be required to disclose it under the Act if a request is received. Interested parties should also note that the receipt of any material marked 'confidential' or equivalent by TfL should not be taken to mean that TfL accepts any duty of confidence by virtue of that marking.

## 6. Questionnaire

As part of this market sounding exercise, TfL wishes to seek your views on the extent of your capabilities and appetite participating in a trial of innovative solutions to the challenges outlines above.

TfL would appreciate your feedback in the form of a response to the following questionnaire, with the specific questions to be answered in the blank tables/boxes provided. Should you consider a particular question is not applicable to your organisation, please state “not applicable” in the tables/boxes provided.

Please read the following appendices provided as this will provide background needed to inform your responses to this questionnaire:

- Appendix 1 – Anticipated Timelines

# Innovation Capability Supplier – Market Sounding Questionnaire

Please complete:

- Organisation Name:
- Key Contact Name:
- Key Contact Email & Telephone Number:

This exercise does not form part of a formal procurement process. All responses will be carefully considered but will not bind TfL to undertaking a procurement or any particular approach to a procurement, nor will responses be treated as conveying any promise or commitment on the part of the respondent.

## Section A: Company Appetite/Delivery

### Q1. Interest

Is your organisation interested in participating in this trial? If you are NOT interested, please provide details, below, of any critical factor(s) that may have led to your decision (e.g. capacity or resourcing constraints, risk exposure, strategy misalignment, etc)

Interest (Y/N)

If interested:

Reasons for Interest	Please score 1-5 (with 5 being very high) as to how much this factor contributes to your organisation's interest
Potential financial reward directly from contracted work in future procurement	
Alignment with current experience and expertise of your organisation	
Market visibility and branding opportunities derived from working with TfL	
Opportunity to understand better TfL's approach to innovation, carbon reduction and/or construction	
Alignment with organisational vision, values and actions on diversity and inclusion	
[other reason]	

If not interested:

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Q2. Question 2: Based on your understanding of the problem statements we are exploring, please provide details of the extent of your company's experience in delivering the following scope areas. Please provide further details where appropriate.

Scope Area	Are you able to deliver in this area (Y/N)	Describe what solution you have developed, tested or delivered to address this scope area in the last 5 years (to TfL or elsewhere)
NRMM emission reduction		
Zero Emission NRMM		
Zero Emission site generation		
Mobile power solutions		
Retrofits to bring NRMM kit up to stage IV or V		
Other:		

Q3. Please indicate at what stage of development and deployment your solution(s) is at :

Stage of solution	Please indicate one box only (Yes / No)	Comments
Concept (the solution is in the design stage)		
Prototype (the solution has been developed and is being tested)		
Deployed (the solution has been deployed in a live environment)		
Other		

Q4. Please expand on the solution(s) have you developed that could be applied to address emissions associated with NRMM? Can you describe the solution(s)/technology and how it could applied on TfL construction sites? Please describe any assumptions that you make about TfL’s infrastructure, processes and resources.

If you have photos, diagram and videos you would like to share in response to this answer, please include them in your submission as an attachment via SAP Ariba. if you are having issues with attaching content, please send the attachments via email to [innovation@tfl.gov.uk](mailto:innovation@tfl.gov.uk) with the subject ‘NRMM Emissions MSQ’, only such us attachments directly addressing the question) (Maximum 300 words):

Q5. If your solution(s) has been tested or deployed in a live environment, please explain the outcomes of the tested and or deployment in a live environment. (Maximum 300 words)

Q6. If you were to participate in a trial to test your solution, what would you need from TfL and what do you anticipate as potential barriers? How long should we run the trial to test your solution? What are your expectations beyond a trial? (Maximum 500 words)

Q7. What are the three largest risks involved with your solution and how do you propose mitigating them (Maximum 500 words)

Q8. Based on your answer to question 6, how much would it cost to trial your solution in a non-live and or live test environment and what are the costs to maintain the solution? Please explain your answer (Maximum 300 words)

Q9. How would you suggest scaling the solution, should a trial be successful, across TfL's construction portfolio? (Maximum 300 words)

Q10. Would any element of your solution require a need to subcontract any part of the trial, please provide details of the services/disciplines you would expect to subcontract?

Q11. Participation

What would encourage you or deter you from participating in this trial? Please list and explain 2 factors for each.

	Encourage		Deter
1		1	
2		2	

Q12. Follow up Engagement:

Would you be prepared to follow up this market engagement questionnaire with further engagement activity, for example through a 1-2-1 engagement session?

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Q13. Other Comments:

Do you have any other comments regarding the proposals set out in this market engagement questionnaire?

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## 7. Appendix 1 Anticipated Timelines

All timelines provided are subject to change at TfL's discretion:

Activity	Date
Early Market Engagement Questionnaire Issued	6 December 2023
Early Market Engagement Questionnaire Response Deadline	16 February 2024
Further Engagement	February-March 2024
Contract Award	N/A
Contract Start	N/A