



## **Pollution Team**

**Regulatory Services Partnership**

**Jason Andrews & Andrew Gordon**

27<sup>th</sup> March 2025



# Some of our work with the construction industry

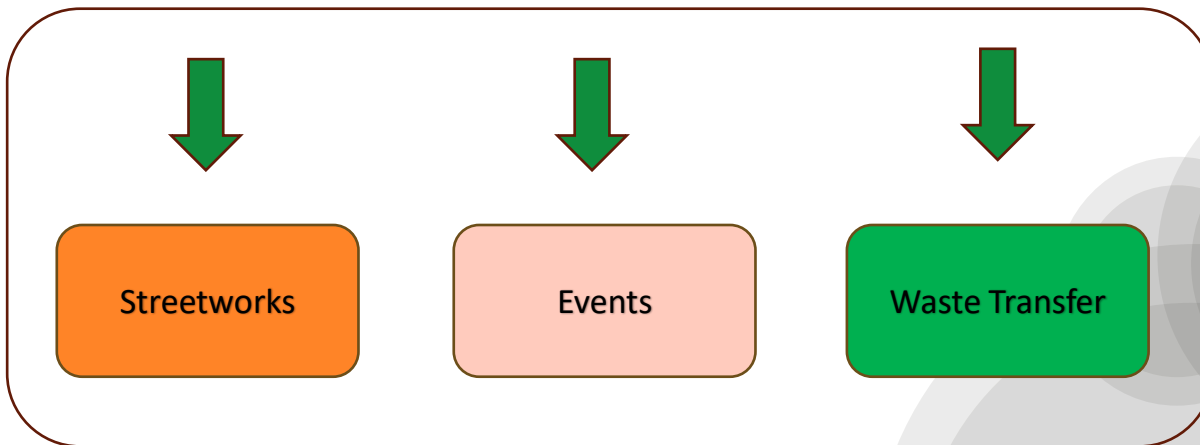
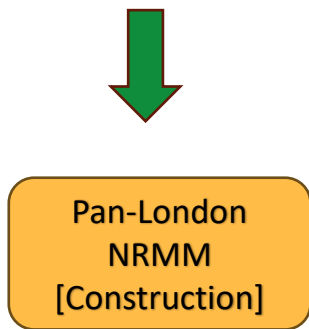
- Construction Low Emission Zone implementation
- Guidance & signposting of enhanced requirements
- Power management expertise
- Innovative technology
- Emissions modelling
- Technical retrofit matters
- Training events





# CLEANER MACHINERY

Reducing emissions



Beyond Construction Project

# Origins

- Mayor of London published the *Control of Dust and Emissions from Construction and Demolition Supplementary Planning Guidance* (the SPG) in 2014
- This included restrictions on the use of older, more polluting NRMM from 1<sup>st</sup> September 2015 onwards.
- Many Local Authorities had neither the resource nor the desire to regulate this themselves.
- Joint project funded by the GLA and the partner boroughs



# Origins

*“All Non-Road Mobile Machinery (NRMM) of net power of 37kW and up to and including 560kW used during the course of the demolition, site preparation and construction phases shall comply with the emission standards set out in chapter 7 of the GLA's supplementary planning guidance “Control of Dust and Emissions During Construction and Demolition” dated July 2014 (SPG), or subsequent guidance. Unless it complies with the standards set out in the SPG, no NRMM shall be on site, at any time, whether in use or not, without the prior written consent of the local planning authority. The developer shall keep an up to date list of all NRMM used during the demolition, site preparation and construction phases of the development on*



# What the project entails

- Changing established practices
- What emergent technologies exist?
- Education on site
- Inspections



# Audit Process

- Physical inspections of deployed plant
- What is the engine Emissions Stage?
- Shortfalls of expectation?
- How to rectify
- Follow-up
- How to get the best results next time...



# Audit forms

London Borough of Islington **NRMM Audit**

**Initial Findings**


Office: Luis Bassett	Time: 10:00	Date: 04.06.2021	Site Complete: <input type="checkbox"/>
Site Address: [Redacted]	Post Code: WC1X 0HA	Addr N°: 1	CAZ/DAGL: CAZ
Contact Name: [Redacted]	Telephone: (Eoin) 07843552149	Site Registered: <input checked="" type="checkbox"/>	No NRMM: <input type="checkbox"/>
Email: charc	Company: McAuley & Ruize	Development Type: Major	

Supplier	Engine Manufacturer	Item Manufacturer	Machine Type	ID	kW	Type Approval Number	S / P / PW / ST	EU Stage	Exempt / Exemption	Registered	Compliant
Abird	Cummins	Bruno	Generator	1500427	285.6	e11*97168HB*2004/26*0720*02	P	IIIA	none	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Foran	Isozu	Hitachi	Excavator	06398	128	e4*97168RA*2012/46*0354*01	P	IV	n/a	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Abird	Cummins	Bruno	Generator	140079/3	254	[Engine plate missing information]	P	?	none	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Foran	Isozu	Hitachi	Excavator	12745	79	e4*97168RA*2012/46*0354*01	P	IV	n/a	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

**Recommendations\*** nb03/1W 7

- \* Register Generator 1500427 and apply for Viability exemption using rationale: "Stage IV & V Generators not yet available"
- \* Seek supportive documentation for Generator 140079/3 to evidence the EU Emission Stage and emissions Type Approval Number. If emission Stage IIIA, register for Viability exemption as above. If emission Stage II, remove the generator from site.

\*Recommendations are to be enacted within 5 working days from receipt of this advisory, in order for the site to achieve compliance.  
In addition to the recommendations specified above you are expected to continue to keep the NRMM Register updated with the arrival of any new in-scope machinery.



**Current Compliance Status:**

**Non-Compliant**  
*Fail*


<b>Mandatory Requirements</b>	
Machinery Compliant	<input checked="" type="checkbox"/>
Site Registered	<input checked="" type="checkbox"/>
Machinery Registered	<input checked="" type="checkbox"/>
No recommendations were required	<input checked="" type="checkbox"/>
<b>Additional Recognition</b>	
Machinery Beyond Compliance	
Full Historic record of Machinery	
Off-scope emissions reductions	
Evidenced Plate Checks	
Other special recognition:	
<small>Enter Here</small>	


Code	Emission Stage	Power Bands
A	EU Stage I	130 ≤ kW ≤ 560
B		75 ≤ kW < 130
C		37 ≤ kW < 75
D	EU Stage II	18 ≤ kW < 37
E		130 ≤ kW ≤ 560
F		75 ≤ kW < 130
G	EU Stage IIIA	37 ≤ kW < 75
H		130 ≤ kW ≤ 560
I		75 ≤ kW < 130
J	EU Stage IIIB	37 ≤ kW < 75
K		18 ≤ kW < 37
L		130 ≤ kW ≤ 560
M	EU Stage IIIC	75 ≤ kW < 130
N		56 ≤ kW < 75
P		37 ≤ kW ≤ 56
Q	EU Stage IVD	130 ≤ kW ≤ 560
R		56 ≤ kW < 130
NRE - v/c 6		130 ≤ kW ≤ 560
NRE - v/c 5	EU Stage V	56 ≤ kW < 130
NRE - v/c 4		37 ≤ kW ≤ 56


**Important!**  
Compliance status must be achieved in order to obtain the Additional Recognition.

SUPPORTED BY

**MAYOR OF LONDON**











# London Construction Zone Requirements

129 kW Excavator



Huge potential for emission reductions from upgrading NRMM fleet

Emission Stage	NOx/PM	Per day (5h)	Per year (x254)
Stage I	NOx	6kg	1.5 Tonne
Stage II	NOx	3.9kg	1.0 Tonne
Stage IIIA	NOx	2.6kg	0.7 Tonne
Stage IIIB	NOx	2.1kg	0.5 Tonne
Stage IV & V	NOx	258g	65kg
Stage I	PM	450g	110kg
Stage II & IIIA	PM	190g	50kg
Stage IIIB & IV	PM	16g	4kg
Stage V	PM	10g	2.5kg



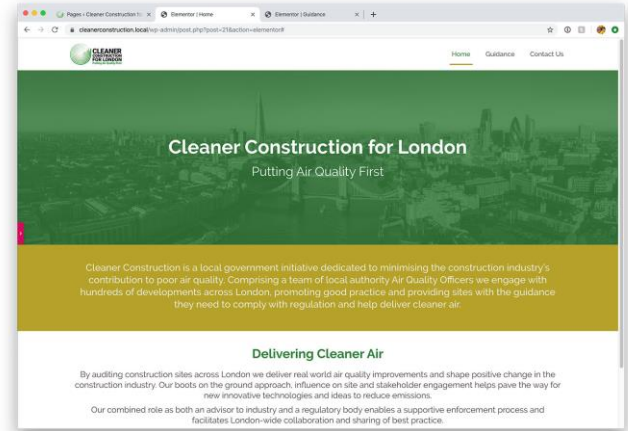
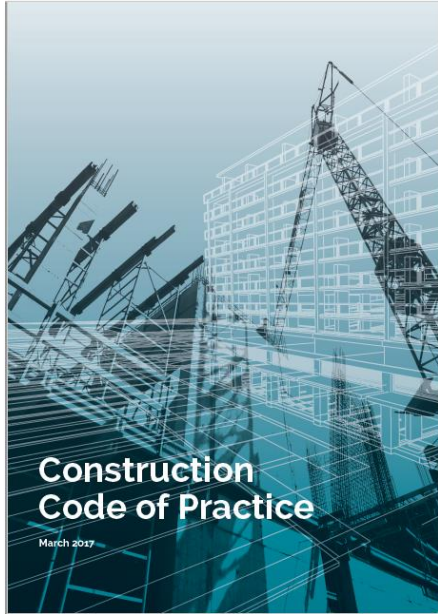
# Compliance timeline



# NRMM Certificates

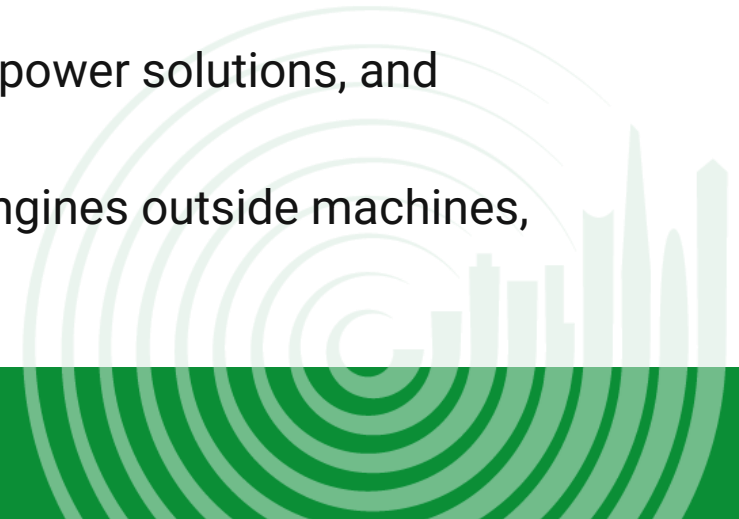


# Guidance



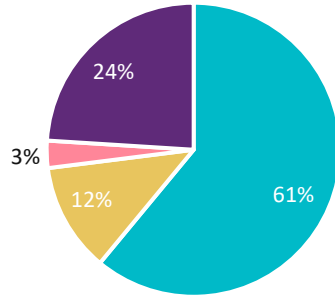
# Emissions from Diesel Generators

- Diesel Generators are approx. 10% of the construction NRMM fleet in London
- However, they are also responsible for around half of the pollution and one third of CO<sub>2</sub> emissions from that fleet
- There is limited grid capacity
- There is a supply shortage of low emission site power solutions, and technical challenges with new technology
- Substitution of engines inside machines, with engines outside machines, can in many cases worsen emissions



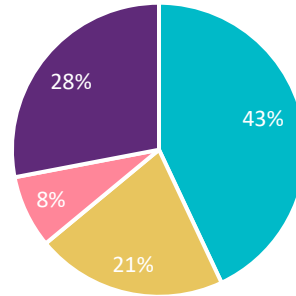
# Emissions from Diesel Generators

PM



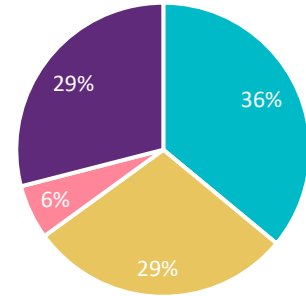
- Generators (11%)
- Excavators (36%)
- Telehandlers (15%)
- Other (38%)

NOx



- Generators (11%)
- Excavators (36%)
- Telehandlers (15%)
- Other (38%)

CO2



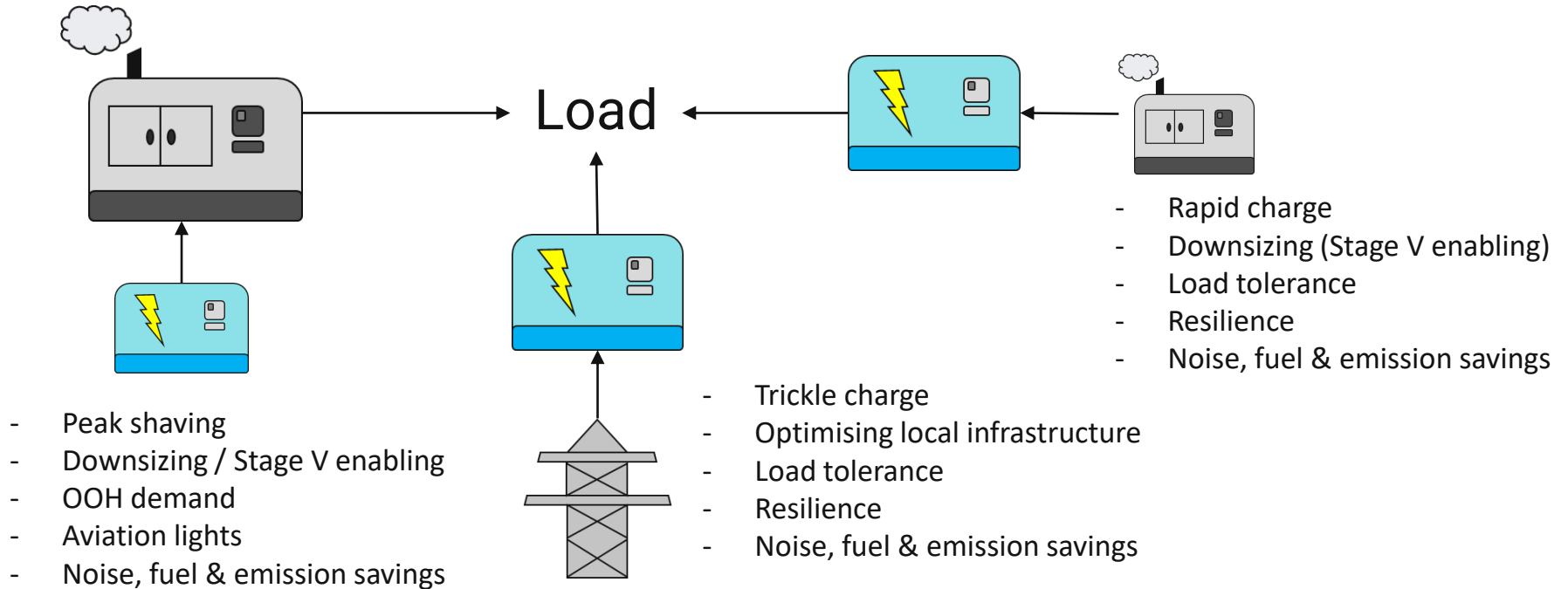
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\*Modelled emissions estimates based on machine details recorded during NRMM emissions audits 2019-2024

# Emissions from Diesel Generators

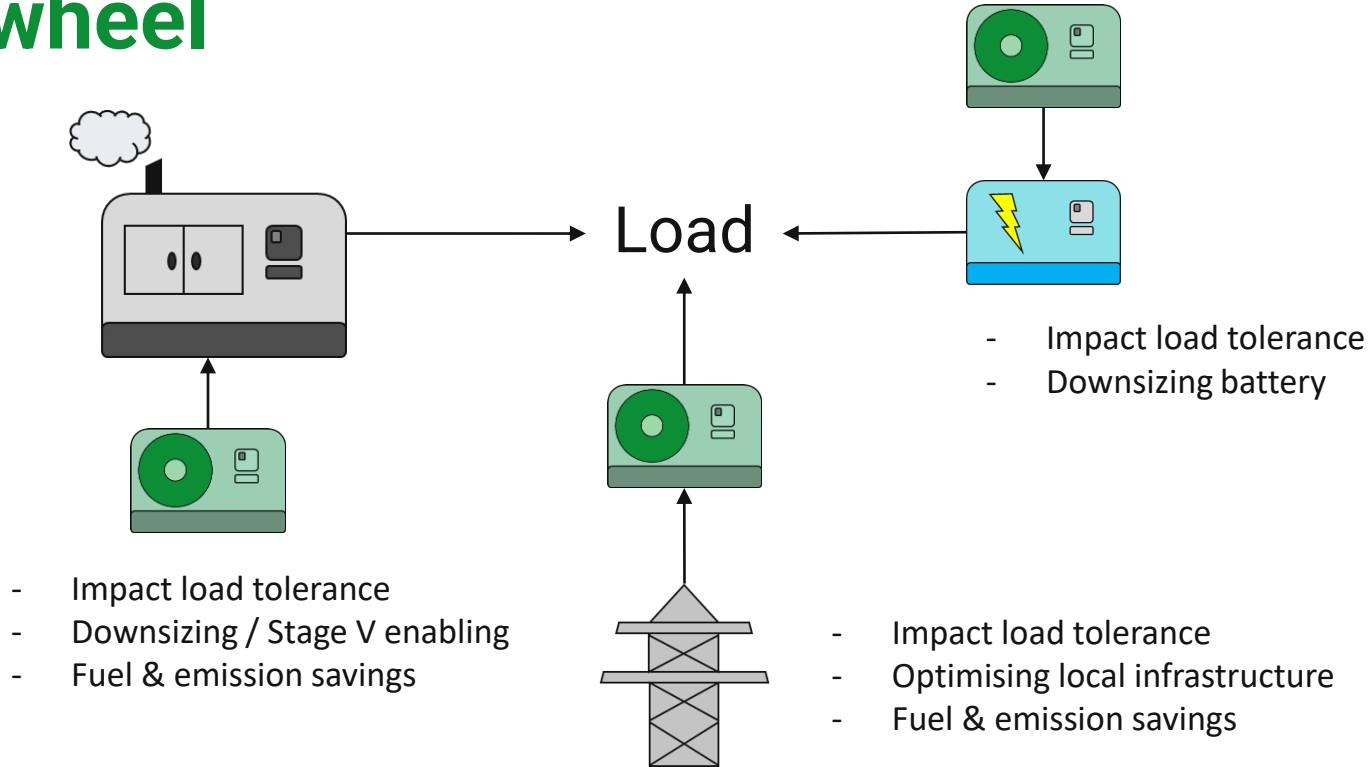


# BESS – Battery Energy Storage System



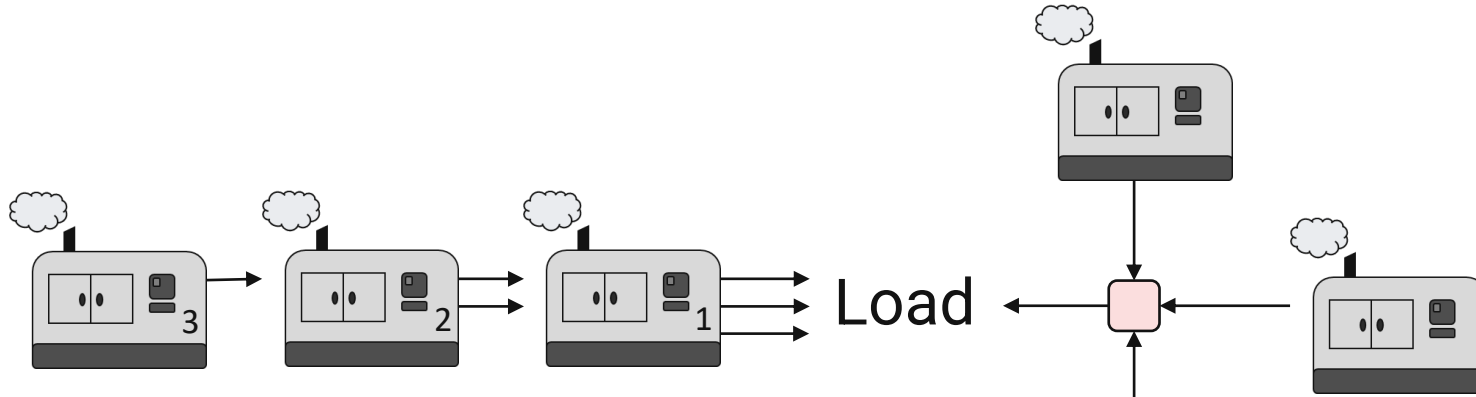


# Flywheel



\*flywheel typically gives 124 Amps for about 5 seconds, with an instant spike of up to 180 Amps.

# Chaining / Load on demand

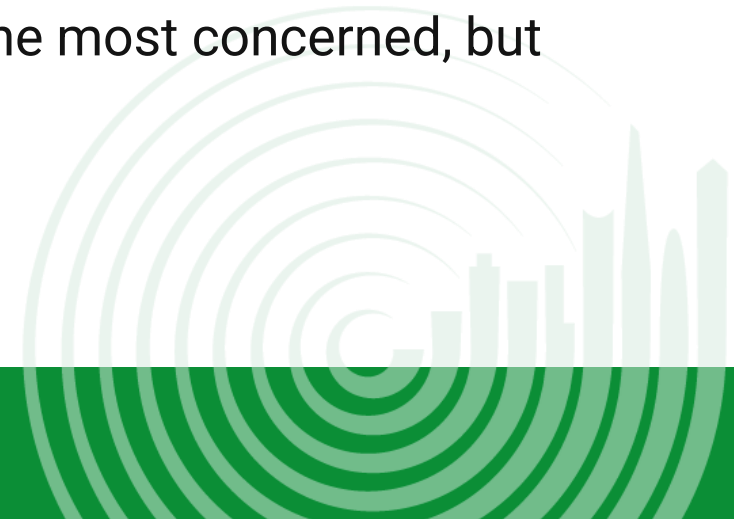


- Better Load (Stage V enabling)
- Fuel and emission savings
- Space can be a limiter
- Some resilience, but what if generator 1 fails?

- Better Load (Stage V enabling)
- Fuel and emission savings
- Space can be a limiter
- Resilience

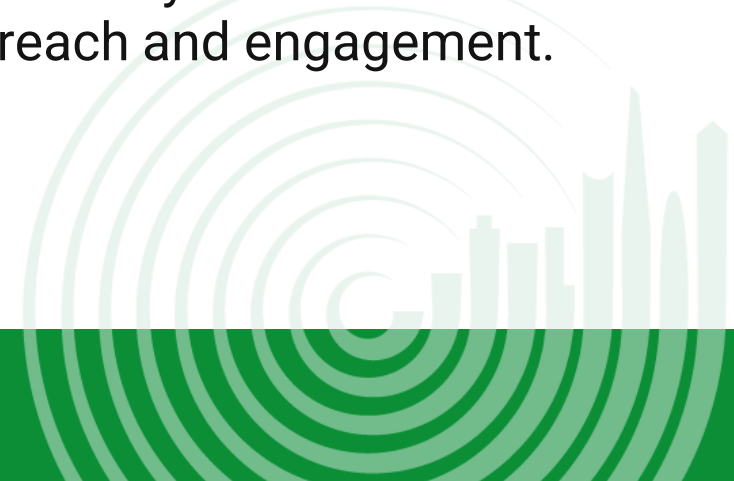
# Industry Response

- Positive from most corners
- Manufacturers receive higher demand for new machinery
- Contractors have a relatively easy way to make significant environmental improvements
- Suppliers and plant-owners are naturally the most concerned, but rarely hostile
- All appreciate our approach



# Why just London?

- London has the cleanest construction fleet of any city in the UK, and very likely worldwide.
- This is a London-based scheme – what is the case for not emulating this in additional metropolitan centres?
- What is on the horizon for construction machinery? What is best practice right now? The importance of outreach and engagement.



# Is 'do nothing' an option?

- This approach can be applied to any industry that uses NRMM in any UK city
- We know it scales, because we've already done that
- We know health benefits
- We know it halves emissions
- If it works in London it can work anywhere



# Questions?

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