LONDON LOW EMISSION
CONSTRUCTION PARTNERSHIP

24th April 2018

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10:30	Welcome and introductions	Frances Evans
10:35	Review of previous meetings minutes	Frances Evans
10:40	LLECP Project overview	David Green
	Deliverables for final year of LLECP 2018/19	
10:45	LLECP Project deliverables	David Green
10:55	Group discussion to ensure deliverables meet LA needs	All
	MEASURES PROGRAMME	
11:40	LLECP work update	Daniel Marsh
11:50	LLECP PhD	David Green
11:55	AOB / Date of next meeting	All
12:00	Finish	All

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Industry Outreach

- Raising awareness of industry impacts on local air quality
- Encourage uptake of ‘cleaner’ mitigation measures
- Present case studies with cost benefit for low emission solutions

Testing

- Measure ‘real world’ emissions
- Emission reduction trials
- Improve pollution monitoring and quality of data

NRMM

- LEZ enforcement
- Policy support
- NRMM database

Phase 1: 2014-16
Phase 2: 2016-19

Key Progress since last meeting

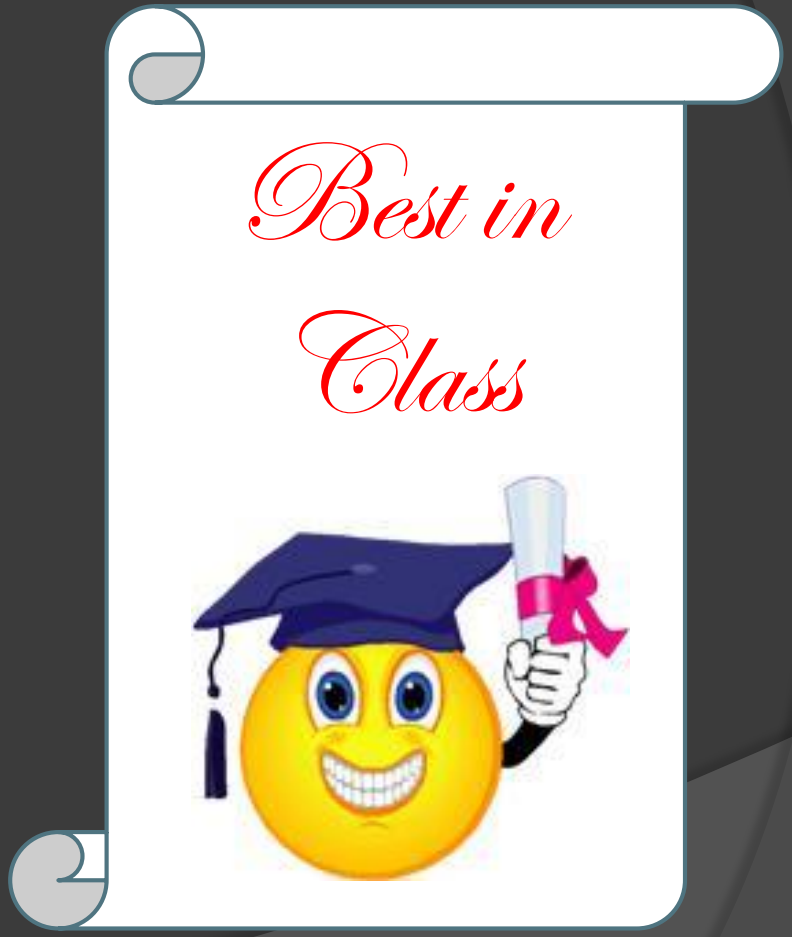
- NRMM PEMS work still ongoing with MACE at Battersea Power Station
  - This round included excavators, dumpers, cranes and a concrete pump
- HS2 Emission proposal succeeded in first round of innovation board approval
- Evelyn Street Construction Logistics Plan
- Continued outreach

LLECP Key Project Deliverables 2018 / 19

1. End of funding cycle outputs:
   a) Construction Industry ‘Best in Class’ Guidance Document
   b) Seminar
2. Continue…
   a) Outreach meetings
   b) Existing case studies (Lewisham CLP)
   c) New case studies (Thames Tideway, HS2, Mecalac)
   d) LA and industry support to NRMM

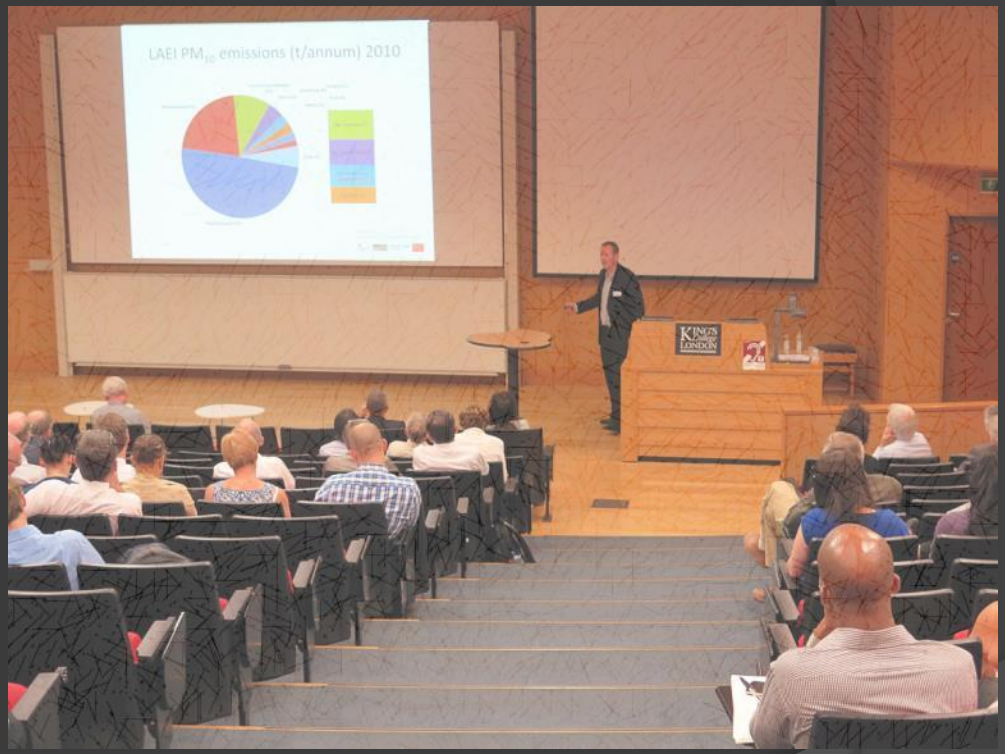
Guidance Document

- ‘Best in Class’ Guidance Document for local authorities.
- This will aim to
  - condense all the information and learnings from both rounds of the LLECP
  - possibly publish in one of the Institute of Civil Engineering Journals.
  - integrate this into the website
  - Delivered in Feb 2019



LLECP Seminar

- Seminar focused on LAs rather than industry.
- Present the case studies
- Outline the industry engagement
- March 2019?



Discussion Points

Guidance Document

- Checklists to allow easy handover of NRMM responsibilities to new staff
- SOPs
- Guides
- NRMM toolkit
- Input from compliance officers

Seminar

- Where?
- External speakers – who?
- As part of LAQN Seminar?

Abatement MeasuresProgramme

LLECP work update

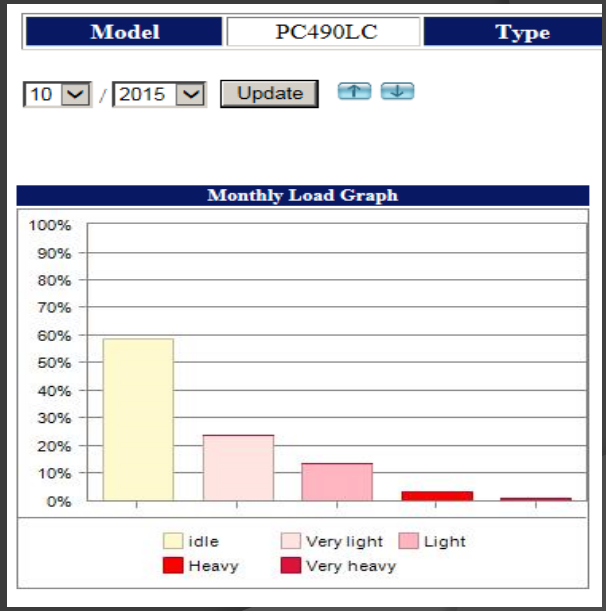
- Full site NRMM emissions inventory
  - Real world measurement using ‘mini-PEMS’ over a wide range of machines
  - Creates baseline with scientific evidence
  - Use for modelling future intervention impacts
  - Correlate telematics/HEMS activity data

Worker exposure risk assessment

- Worker personal exposure assessment
  - Real time black carbon measurement used with personal monitors, GPS and workers diary
  - Compares different construction roles and highlights areas of greatest risk
- Indoor/outdoor NRMM
  - Highlights risk to workers of NRMM emissions when used in poorly ventilated areas
- Machine cabin exposure assessment
  - Impact of cabin filtration systems vs open machines

Engine telematics – a better way to understand & improve operator behaviour?

- Telematics included on larger machines (>14t) but increasingly full NRMM fleet
- Often only installed on the newest (and therefore cleanest) machines
- Engine activity and operator behaviour, current industry focus on:
  - Tracking machine location/Anti-theft
  - Monitoring hours/fuel use
  - Scheduling routine maintenance/fault codes
  - Excessive idling hours (warranty penalties)
- Monitoring whole project improvements and cost benefit
- Correlated with ‘mini-PEMS’ emission measurements
- Developing eco-driver training programmes /Operator incentives
- What else can we learn?



Smarter machines are coming!

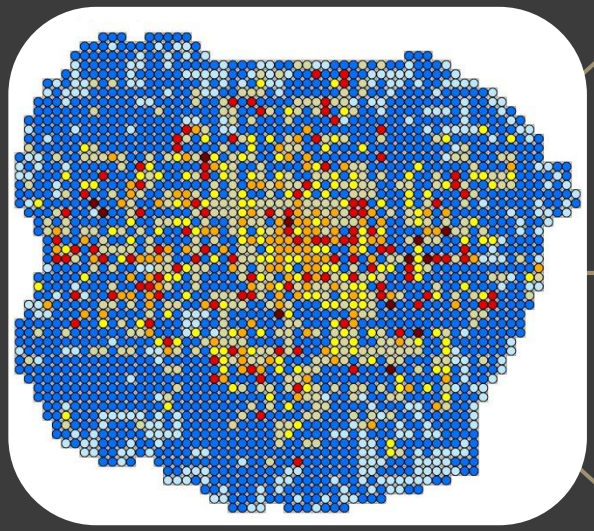
After-exhaust Retrofit Technology

- Advanced retrofit *'beyond Stage IIIB'*
- Generator SCR DPF retrofit

Technology	Emission Reduction Potential		
	Particle Mass	Particle Number	Nitrogen oxides
Wall-Flow Filter	> 95%	> 99%	< 5%
Partial Flow Filter	30 - 60%	No data	< 5%
Diesel Oxidation Catalyst	< 25%	No impact	< 5%
Selective Catalytic Reduction	< 10%		> 70% (up to 95%)
Combined DPF+SCR	> 95%	> 99%	> 70% (up to 95%)

LLECP PHD UPDATE

NRMM Bottom Up Inventory



Real World Emission Factors

- Engine Test Bed Emissions Factors
- PEMS measurements
- Mini PEMS measurements

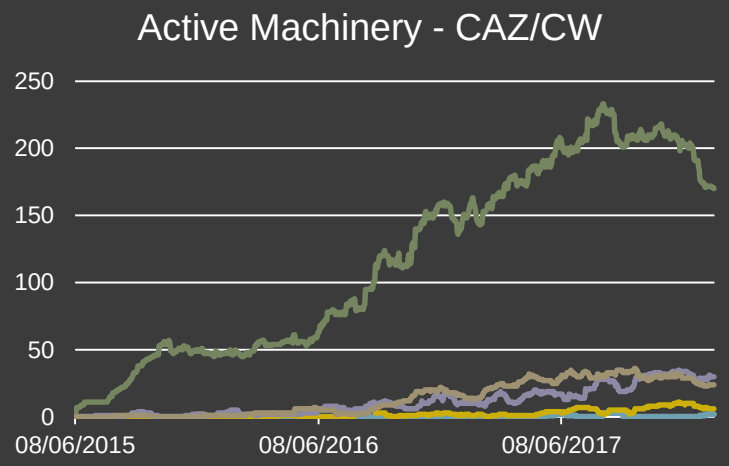
Fleet and Location

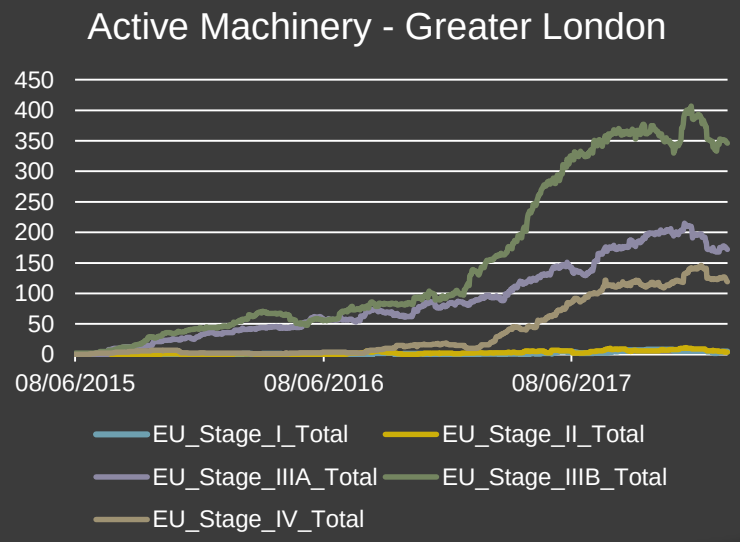
- NRMM Register
- Supplier data (e.g. JCB Live Link)
- Hire company data
- Compliance visits

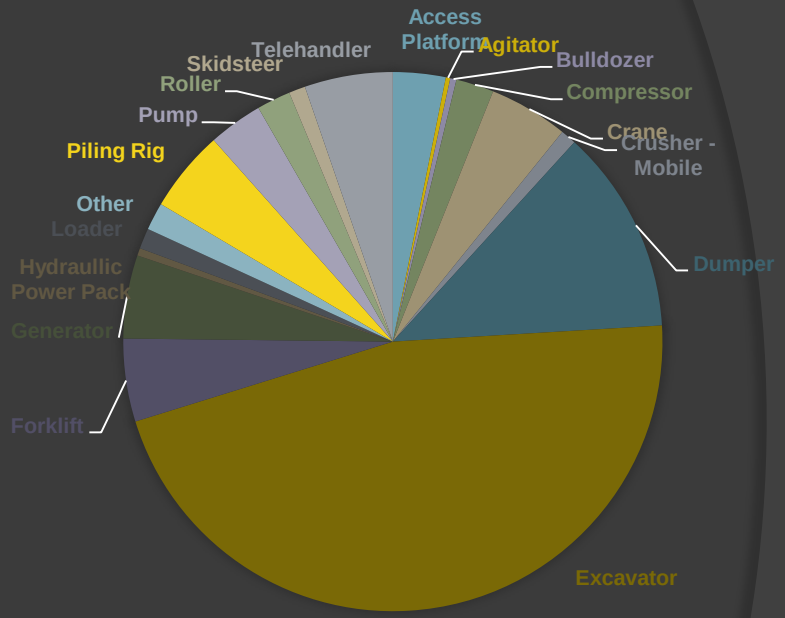
Activity Data

- Engine Telematics
  - JCB Live Link
  - Generator suppliers
  - Direct measurements

nrmm.london – measuring success







967 registered sites
3,743 pieces of registered NRMM

Types of NRMM tested

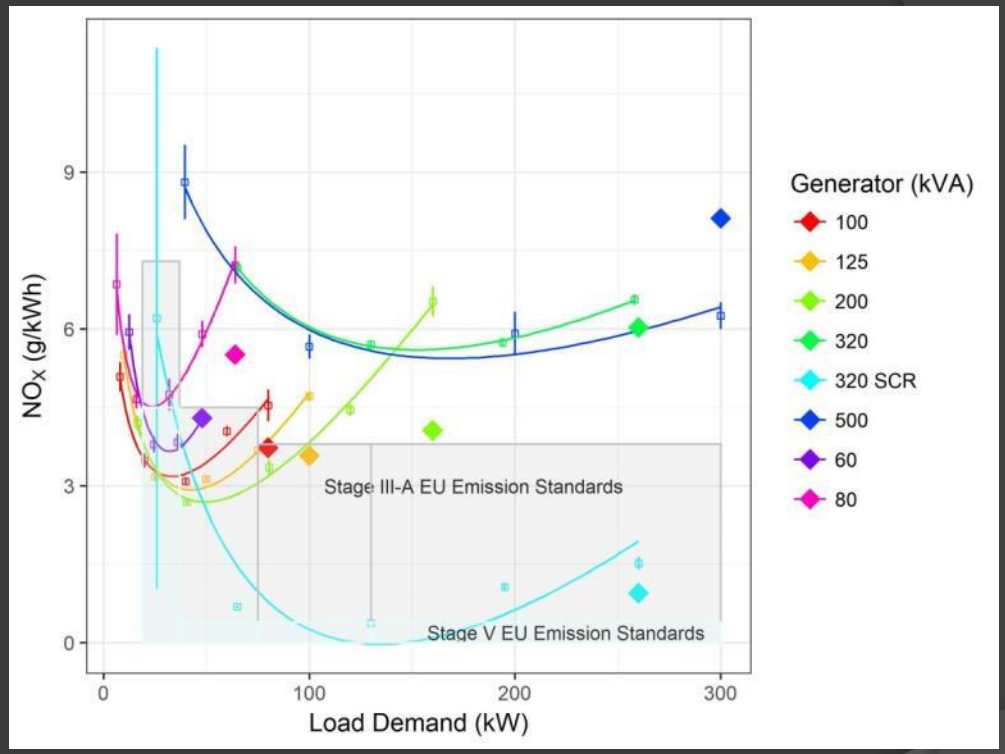
Generators

Excavators

Telehandlers

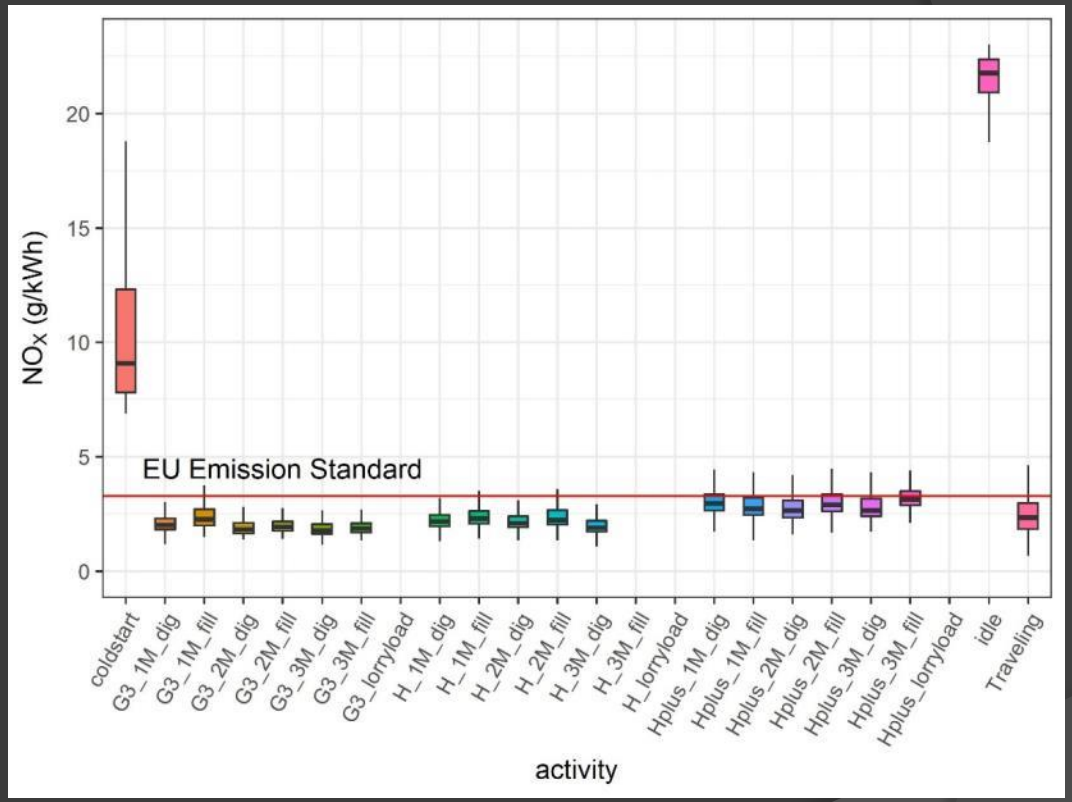
Generator Results:

- Generator emission factors determined using the ISO standards.
- 7 different types of generators.
- All Stage III-A engines



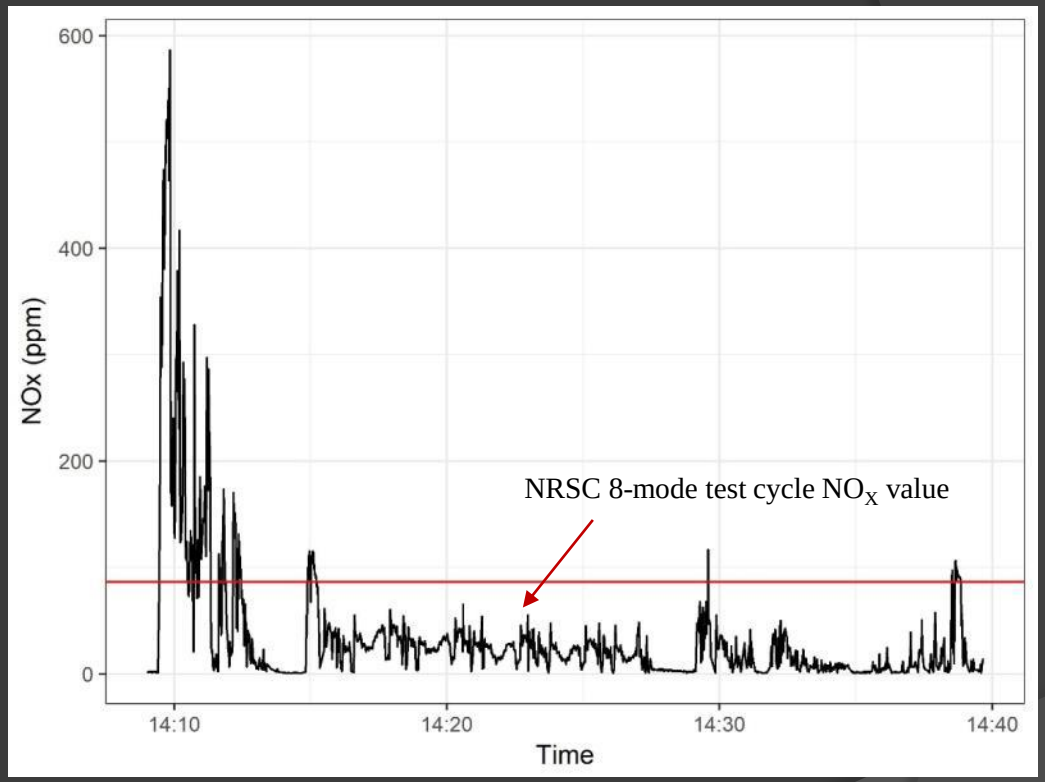
Excavator activity analysis:

- Excavator results based on a single test.
- Different types of activity performed by the excavator.
- Stage III-B engine.



Telehandler mini-PEMS data:

- Preliminary results from the mini-PEMS test.
- Stage IV engine.
- Single-activity test cycle.



Future NRMM to be tested

- Excavators
- Dumpers
- Cranes
- Forklifts
- Loaders
- Rigs
- Pumps

Any other business?

- NRMM training event
  - 9th July 2018, City Hall
- Date of next meeting
  - Tuesday 10 July, 10.30-12pm, Camden offices, 5 Pancras Square