



LONDON LOW EMISSION
CONSTRUCTION PARTNERSHIP

24th January 2017

SUPPORTED BY
MAYOR OF LONDON



Supported by



THE ROYAL BOROUGH OF
KENSINGTON
AND CHELSEA





LONDON LOW EMISSION
CONSTRUCTION PARTNERSHIP

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

10:30	Welcome	Adam Webber
10:35	Review of previous meetings minutes	David Green
	INDUSTRY OUTREACH PROGRAMME	
10:40	Industry Outreach Meeting	Daniel Marsh
10:45	NRMM Seminar	Daniel Marsh
10:50	LLECP Website	Daniel Marsh
	ABATEMENT MEASURES PROGRAMME	
10:55	Abatement Projects	David Green
11:15	NRMM Emissions Inventory PhD	David Green
11:05	Generator PEMS	Carl Desouza
11:15	Future Projects	David Green
	LOCAL AUTHORITIES SUPPORT PROGRAMME	
11:25	NRMM Helpdesk	Daniel Marsh
11:30	NRMM Website update	Daniel Marsh
11:40	NRMM Officer Support	Daniel Marsh
11:50	AOB / Date of next meeting	All
12:00	Finish	All

LAEI PM₁₀ emissions (t/annum) 2010



Industry Outreach Programme

22/09/2016	Speedy Services Brian Cornett Derek Bailey	Raising awareness to hire compant of impacts on air quality and importance of supplying correct emission stage equipment to London industry
27/09/2016	CapCo - Earls Court	World Green Building Week sustainability and environmental impacts
18/10/2016	Firefly CE Andy Meads and Emissions Analytics	Discuss real world power profiles from offgrid power supply on constuction sites
01/11/2016	MACE Chelsea Barracks Omar Rouchdy	Discuss potential trials and PEMS testing of Keltbray NRMM fleet
15/11/2016	Energy4Power Live, Park Lane Hilton	AMPS sponsered event
16/11/2016	Hydrogen London Partners meeting	Reviewig potential use of hydrogen cell technology for the construction industry
06/12/2016	Costain Damien Canning Geraint Rowland	Scoping meeting for future LLECP projects / Thames Tideway Tunnel
09/12/2016	British Lands/SRM Broadgate	Scoping future LLECP projects/beyond construction AQ planning for development users
20/12/2016	Shell GTL James Lyon Richard Clark	Discuss benefits to GTL fuel and potential trials to run with CWC and Speedy at the Shell Building
17/01/2017	Energy Solutions - Mark Penny and Matt Lawrence BAE Systems	Variable speed hybrid generators

NRMM Seminar for Industry

Eventbrite

Search for events

BROWSE EVENTS

HELP

DANIEL

CREATE EVENT



FEB
03

Cleaner Machinery for London

by London Low Emission
Construction Partnership

Free

REGISTER



DESCRIPTION

You are invited to join the London Low Emission Construction Partnership and Greater London Authority at City Hall for an afternoon of presentations and discussions relating to non-road mobile machinery (NRMM) use in

DATE AND TIME

Fri, February 3, 2017
12:30 PM – 6:00 PM GMT
[Add to Calendar](#)

NRMM Seminar for Industry

⦿ Aims

- Raising awareness of 'best in class' dust and emission control
- Raising awareness of the NRMM LEZ policy requirements
- User training session for the NRMM register with direct feedback to the GLA and LLECP

NRMM Seminar for Industry

12:30	Registration	
13:00	Welcome from the GLA	Shirley Rodrigues, Deputy Mayor for Environment and Energy
13:10	London Low Emission Construction Partnership (LLECP)	Dr David Green Senior Research Fellow, KCL
13:30	Air Quality Policy for London	Elliot Treharne or Oliver Lord, Air Quality Manager, GLA
13:50	NRMM – An International Perspective	Urs Halter Halter Management Ltd
14:10	Coffee	
14:40	Occupational Exposure from Construction Industry Emissions	Owen Butler – HSE
15:00	Non Road Mobile Machinery Register – Updates and Feedback	Daniel Marsh, Senior Air Quality Analyst, KCL
15:20	A Boroughs Perspective on Working with the Industry and NRMM Enforcement	Jason Andrews/Luis Bassett – Merton
15:40	Retrofit Technology and Certification	Colin Smith, Certification Manager – Transport, EST
16:00	Speaker TBC	TBA
16:20	Discussion and way forward	All
16:30	Close + networking session	



London Low Emission
Construction Partnership
Website and social media

LLECP website

Google analytics for previous 12 months up until January 1st 2017

- ◎ 2,920 Sessions
- ◎ 2,247 Users
- ◎ 6,018 Page Views
- ◎ 2.06 Avg. Session Duration
- ◎ 76 % new visitors

LLECP twitter feed

Construction Dust UK
@ConstructDustUK

Raising awareness of the impacts on air quality from construction & demolition in London and testing new emission reduction technology

London, UK llecp.org.uk

1,371 FOLLOWING 1,516 FOLLOWERS

TWEETS MEDIA LIKES

Pinned Tweet

Construction Dust UK @ConstructDustUK · 12 Mar 16
Working together to improve #London's #air via @LDN_environment london.gov.uk/city-hall-blog... #construction #NRMM @LondonAir @KingsCollegeLon

5 7

Construction Dust UK @ConstructDustUK · 7s
#London breaches annual #air #pollution limit for #2017 in just five days

@ConstructDustUK

1,516 industry followers

2,023 tweets so far....





LLECP Meeting Minutes

This section of the LLECP website is not for public access or linked through to the main site and is for archiving the presentations given at each of the LLECP group meetings for member reference. These meetings are held quarterly and are attended by representatives of the LLECP member boroughs, GLA, TfL and King's College London.

4th June 2014

10th July 2014

2nd October 2014

13th January 2015

Quick links

About

Read more about the project.

Advice

Health advice for construction dust.

Resources

Useful resources to download.

<http://www.llecp.org.uk/LLECP-Meeting-Minutes>



Abatement Measures Programme

Targeted construction sites



Emission reduction trials



MRC-PHE
Centre for Environment & Health

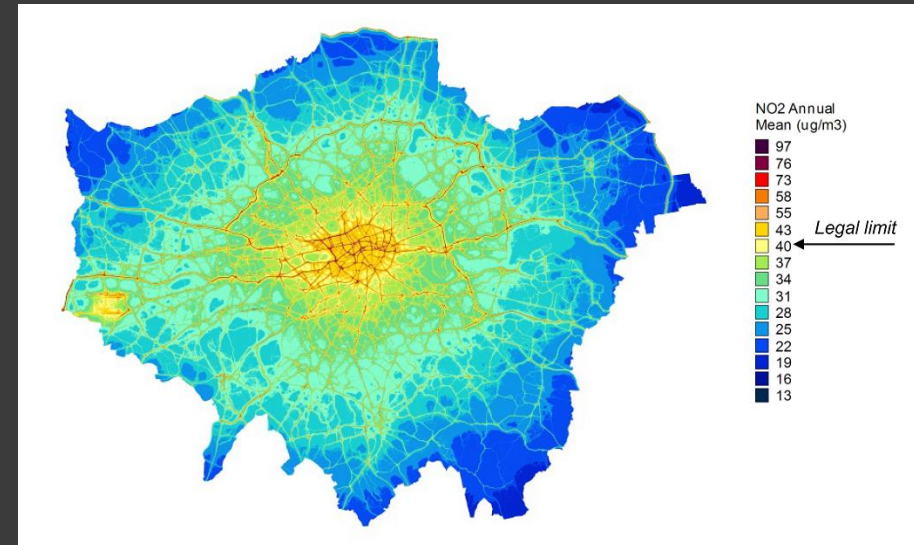
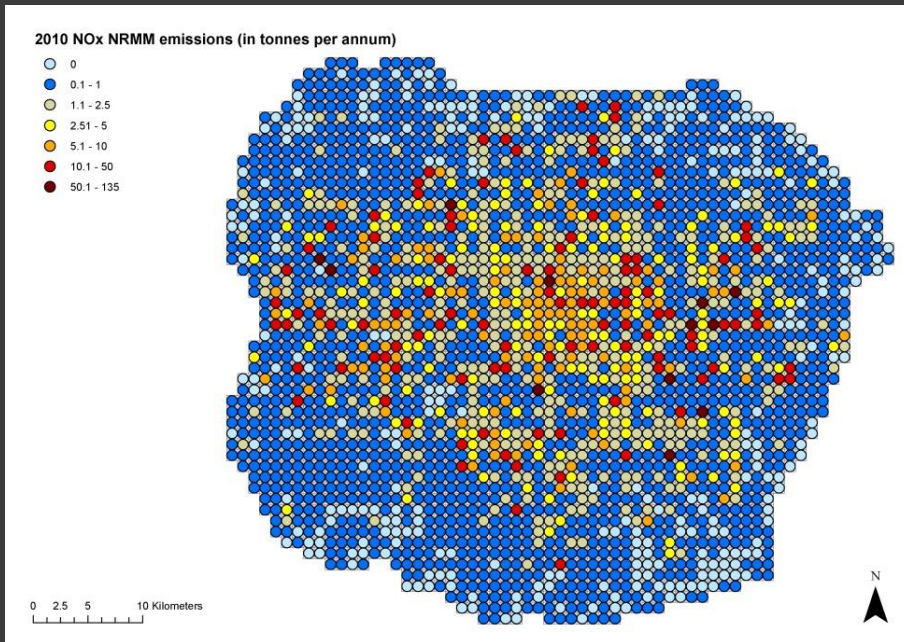


Imperial College
London



Characterising Non-Road Mobile Machinery Emissions through Portable Emissions Testing and Emissions Inventory Development

London Atmospheric Emissions Inventory



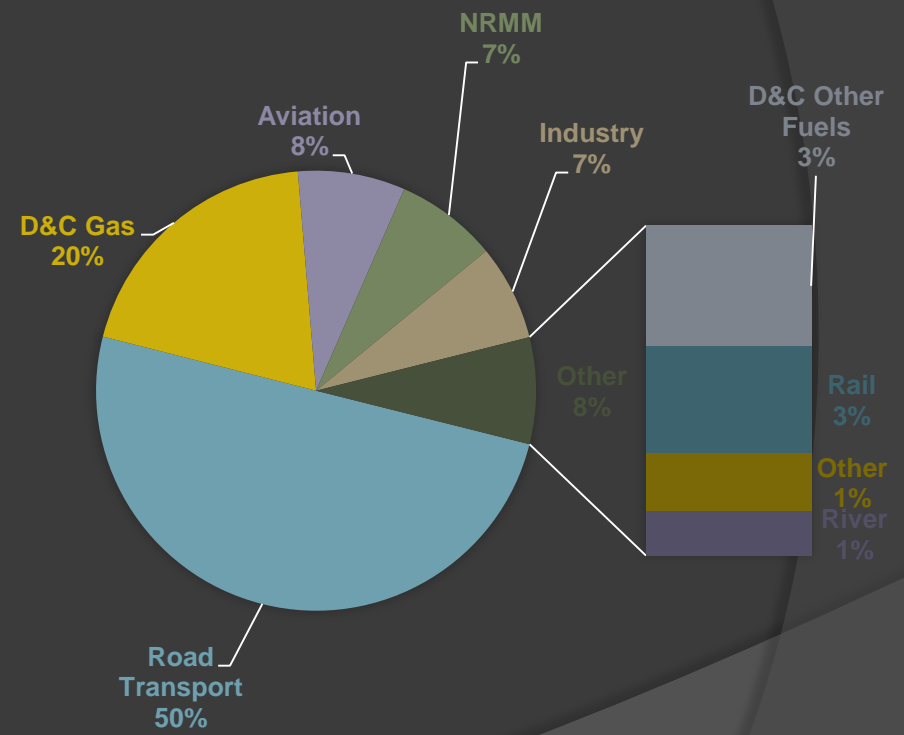
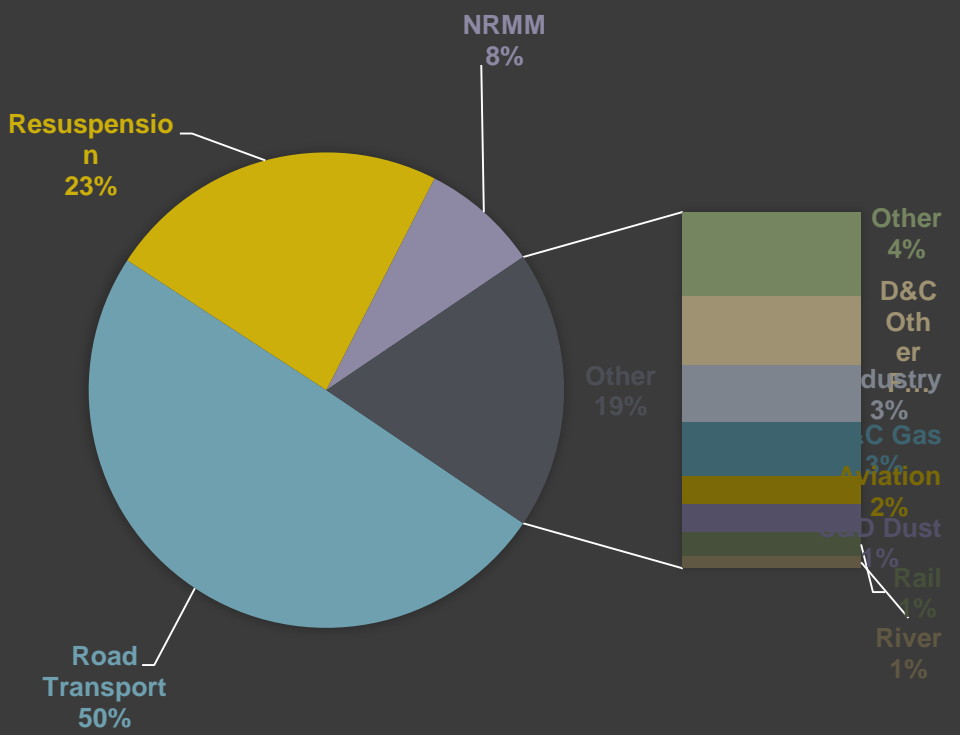
NRMM NO_x Emissions
Inventory

Concentrations of NO₂
annual average

Sources of emissions* (Tonnes/year) in

2013 PM₁₀ EMISSIONS 2013

NO_x EMISSIONS 2013



*Reference: London Atmospheric Emissions Inventory (LAEI) data

London Non-Road Mobile Machinery Low Emission Zone

(NRMM LEZ)

- From 1st Sep 15 construction equipment used on the site of any major development will be required to meet the EU Stage IIIA
- Construction equipment used on any site within the Central Activity Zone or Canary Wharf will be required to meet the EU Stage IIIB

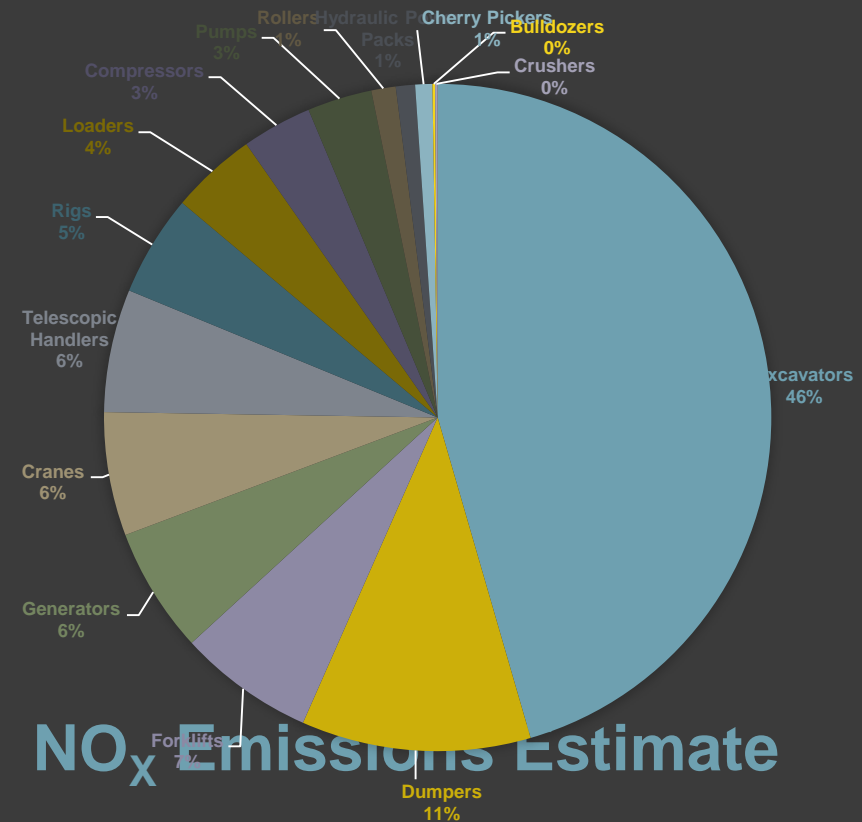
The screenshot displays the NRMM Register website interface. At the top, there is a navigation menu with links for Home, About, NRMM Register, How to use, Guidance, and Contact. The NRMM logo and 'non-road mobile machinery' text are prominently displayed. Below this, the page title reads 'London's 'Low Emission Zone' for non-road mobile machinery'. The main content area is titled 'Sign up for NRMM Register' and includes a brief explanation of the form's purpose. A yellow callout box instructs users to add the email address website@nrmmlondon to their client safe list. The registration form contains fields for Site Name, Contact Email, and Contact Name. A 'Quick links' sidebar on the right provides additional resources. A small pop-up window at the bottom right asks for user feedback, and a cookie consent message is visible at the very bottom.

Rank Classification of NRMM (Register)

Rank	Machinery Type	Total Emissions (g/kWh)	Total number	Power Range (kW)	Engine Stages
1	Excavators	1466.1	378	37 - 560	I, II, IIIA, IIIB, IV
2	Dumpers	357.9	82	37 - 234	I, II, IIIA, IIIB, IV
3	Forklifts	212.1	54	22 - 560	I, II, IIIA, IIIB, IV
4	Generators	195.7	48	22 - 500	I, II, IIIA, IIIB, IV
5	Cranes	192.9	49	41 - 450	I, II, IIIA, IIIB, IV
6	Telescopic Handlers	191.9	50	12 - 125	IIIB, IV
7	Rigs	158.1	42	38 - 505	I, II, IIIA, IIIB, IV
8	Loaders	134	68	37 - 220	I, IIIA, IIIB, IV
9	Compressors	109.4	20	22 - 323	I, II, IIIA, IIIB, IV
10	Pumps	100.9	26	45 - 205	I, II, IIIA, IIIB, IV
11	Rollers	38.1	7	55 - 115	II, IIIA, IIIB
12	Hydraulic Power Packs	30	6	99 - 353	II, IIIA
13	Cherry Pickers	26.6	7	42 - 67	IIIA, IIIB, IV
14	Bulldozers	4.1	3	22 - 115	II, IIIB, IV
15	Crushers	4	2	130 - 560	IIIB

Contribution by NRMM type

Category	Net Power	Date	CO	HC	HC+NO _x	NO _x	PM
	kW						
Stage III A							
H	130 ≤ P ≤ 560	2006.01	3.5	-	4	-	0.2
I	75 ≤ P < 130	2007.01	5	-	4	-	0.3
J	37 ≤ P < 75	2008.01	5	-	4.7	-	0.4
K	19 ≤ P < 37	2007.01	5.5	-	7.5	-	0.6
Stage III B							
L	130 ≤ P ≤ 560	2011.01	3.5	0.19	-	2	0.025
M	75 ≤ P < 130	2012.01	5	0.19	-	3.3	0.025
N	56 ≤ P < 75	2012.01	5	0.19	-	3.3	0.025
P	37 ≤ P < 56	2013.01	5	-	4.7	-	0.025



EU Emission Standards

NO_x Emissions Estimate

Test Number	Rank	Type	Range	Power kW	Total Number	Emission Factor
1	1	Excavators IIIB (M)	75 ≤ P < 130	122kw	112	369.6
2	2	Excavators IIIB (P)	37 ≤ P < 56	49kw	36	169.2
3	3	Excavators IIIB (N)	56 ≤ P < 75	73kw	40	132
4	19	Excavators IV (R)	56 ≤ P < 130	73kw	41	16.4
5	5	Excavators IIIB (L)	130 ≤ P ≤ 560	130/202kw	49	98
6	34	Excavators IV (Q)	130 ≤ P ≤ 560	130kw	7	2.8
7	4	Dumpers IIIB (P)	37 ≤ P < 56	55kw	25	117.5
8	8	Dumpers IIIB (M)	75 ≤ P < 130	85kw	16	52.8
9	11	Dumpers IIIB (N)	56 ≤ P < 75	70kw	12	39.6
10	39	Dumpers IV (R)	56 ≤ P < 130	43/55kw	2	0.8
11	9	Telehandlers IIIB (M)	75 ≤ P < 130	81kw	13	42.9
12	37	Telehandlers IV (R)	56 ≤ P < 130	81kw	4	1.6
13	10	Rigs IIIB (L)	130 ≤ P ≤ 560	403kw	20	40
14	38	Rigs IV (Q)	130 ≤ P ≤ 560	403kw	4	1.6
15	16	Forklifts IIIB (M)	75 ≤ P < 130	81kw	6	19.8
16	29	Forklifts IV (R)	56 ≤ P < 130	81kw	11	4.4
17	12	Cranes IIIB (L)	130 ≤ P ≤ 560	230kw	17	34
18	41	Cranes IV (Q)	130 ≤ P ≤ 560	230kw	2	0.8
19	20	Pumps IIIB (L)	130 ≤ P ≤ 560	147kw	7	14
20	43	Pumps IV (Q)	130 ≤ P ≤ 560	147kw	2	0.8
21	17	Compressors IIIB (N)	56 ≤ P < 75	60kw	6	19.8
22	42	Compressors IV (R)	56 ≤ P < 130	55kw	2	0.8
23	23	Loaders IIIB (L)	130 ≤ P ≤ 560	220kw	3	6
24	46	Loaders IV (Q)	56 ≤ P < 130	191kw	1	0.4
25	13	Cranes IIIB (M)	75 ≤ P < 130	129kw	10	33
26	44	Cranes IV (R)	56 ≤ P < 130	129kw	1	0.4
27	21	Rigs IIIB (M)	75 ≤ P < 130	130kw	3	9.9
28	45	Rigs IV (R)	37 ≤ P < 56	129kw	1	0.4
29	30	Crushers IIIB (L)	130 ≤ P ≤ 560	560kw	2	4
30	33	Rollers IIIB (M)	37 ≤ P < 56	115kw	1	3.3
31	36	Bulldozers IIIB (L)	56 ≤ P < 130	115kw	1	2
32	49	Cherry Pickers IV (R)	130 ≤ P ≤ 560	55kw	1	0.4
33	35	Dumpers IIIB (L)	56 ≤ P < 75	234kw	1	2
34	51	Dumpers IV (Q)	130 ≤ P ≤ 560	?kw	0	0
35	40	Forklifts IV (Q)	130 ≤ P ≤ 560	443kw	2	0.8
36	52	Forklifts IIIB (L)	130 ≤ P ≤ 560	?kw	0	0

MRC-PHE
Centre for Environment & Health



Imperial College
London



Portable Emission Measurement System (PEMS) Testing of Generators

Carl Desouza, Daniel Marsh, David C. Green
Environmental Research Group, King's College London

Objectives

- Measure the gaseous and particle emissions from different capacity of Generators used in London.
- Compare the emissions from the two different fuels used on the same 100 KVA generator .

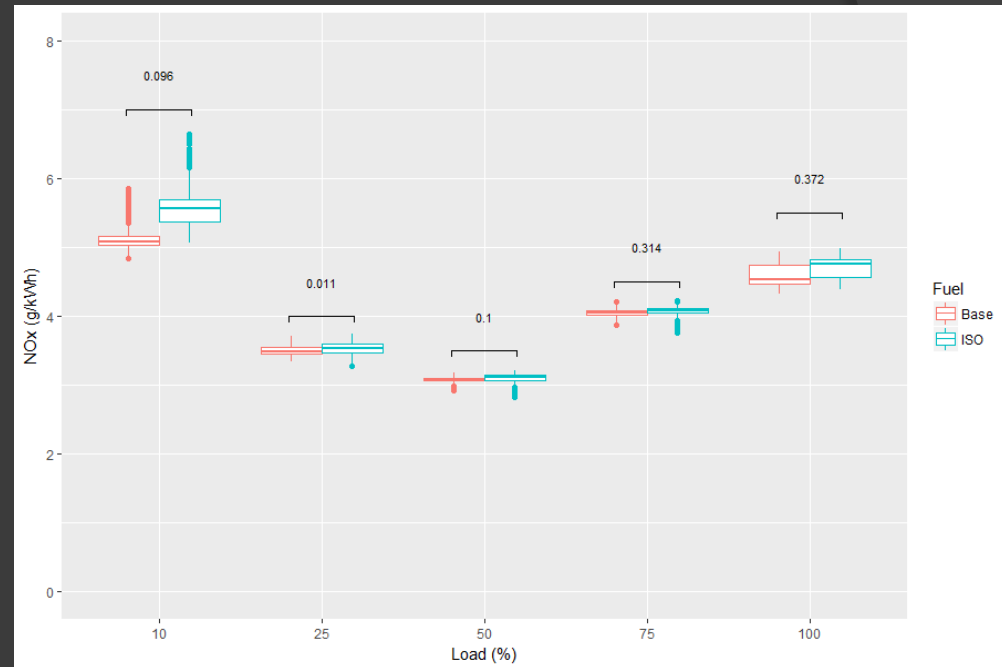
Methodology

- 6 different capacity generators were tested – 30KVA, 60KVA, 80KVA, 100KVA, 200KVA, 500KVA.
- All generators tested were Stage III-A.
- The generator was operated at 10%, 25%, 50%, 75%, and 100% load, using a load bank.
- Gaseous emissions were measured using the Semtech DS analyser. This included HC, CO, CO₂, NO, NO₂, and NO_x
- Particles were measured by the Pegasor Mi2 analyser.
- Two fuels were used on the 100KVA generator
- Standard Red Diesel-Base fuel and cleaned ISO grade diesel-ISO fuel



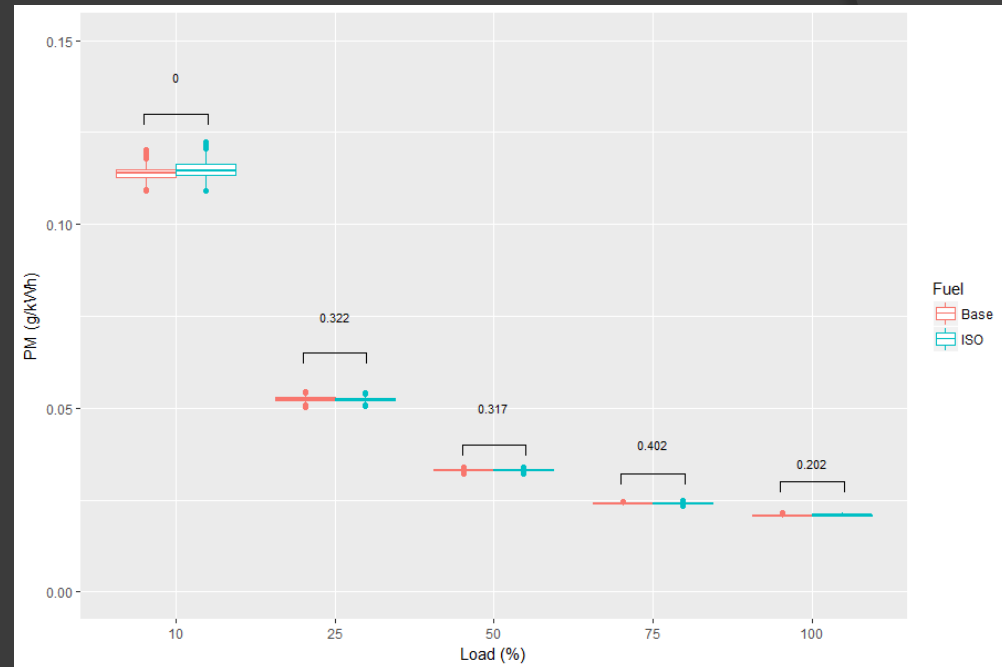
Results 1

- NO_x – constitutes 90% NO and 10% NO_2 .
- A 'u-shaped' curve is noted, similar to variable speed engines.
- Generally ISO is higher than Base, but, only 25% load showed a significant difference between the fuels, at 95% CI.
- If Stage III-B emission regulations were applied, generator would have to be operated at 50% load.



Results 2

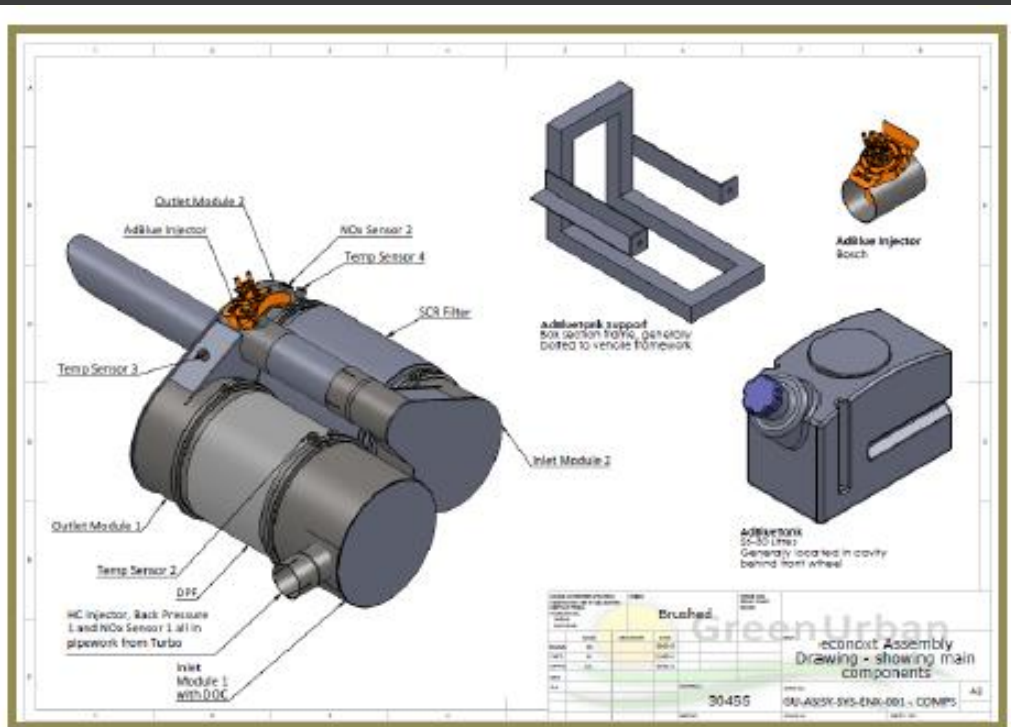
- Particulate Matter (PM) were identical at all loads except at 10% load.
- PM emissions are below the Stage III-A emission standard regulations.
- If III-B standards were applied, the generator would have to be operated at 75% load and above, to achieve compliance.



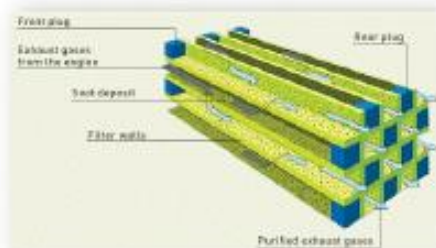
Conclusions

- ⦿ In general, the emissions using the two fuels were very similar.
- ⦿ Improvements in emissions using ISO fuel were only observed at low loads for CO (10%-50%) – however, at these loads, the generator was not compliant with the emission regulations.
- ⦿ Small deterioration in emissions was observed at low loads for NO (10%-50%) and PM (10%).
- ⦿ NO₂ emissions increased at all loads – although, concentrations measured were very low, constituting 10% of total NO_X.
- ⦿ ISO fuel may offer substantial benefits in terms of generator operation and maintenance, there is no significant emission reductions.
- ⦿ Generators should be operated at 50% load and above, in order to be compliant with the present (Stage III-A) and future (Stage III-B) emission standards.
- ⦿ This is important when specifying types of generators to be operated at construction sites.

Working with Green Urban



- Developing a new SCR DPF system specific to generators
- SCRT
 - DPF to reduce CO/HC & PM
 - SCR Technology to reduce NOx.



Intervention trials

- Costain - Thames Tideway diesel to hybrid / H₂
- British Land / Sir Robert McAlpine - Liverpool St bus intervention
- Shell, Canary Wharf Contractors, Speedy Hire - Gas to Liquid Fuel

NRMM Helpdesk

- Support for local authorities, developers and contractors using the NRMM register
- Enquiries submitted through nrmm.london
- Online support only for industry (no phone)
- Responding within a reasonable time
- Recent security updates on the site have significantly reduced requests for IT support

NRMM Website Update

- New site developed based on wider industry user feedback than first release
- Allows advanced search and data download functions
- Enforcement officer support tools
- Improved system self-checks for non-complaint plant, registered developments with no NRMM, duplication etc



LONDON'S 'LOW EMISSION ZONE' FOR NON-ROAD MOBILE MACHINERY

Since 2008, heavy duty diesel road vehicles have had to meet emissions standards for particulate matter to avoid being charged for travelling within the London Low Emission Zone (LEZ). The Mayor has recently announced his intention to introduce an ultra low emission zone (ULEZ) in central London from 2020. This will require all vehicles to be either zero or ultra-low emission. It is also important to take action to reduce emissions from non-road mobile machinery (NRMM) to protect and improve Londoners health. The latest version of the London Atmospheric Emissions Inventory estimates that in 2013 the NRMM used on construction sites was responsible for 7% of NO_x emissions, 14% for PM_{2.5} and 8% of PM₁₀ emissions in Greater London.

NRMM admin view : Total entries (807)

Advanced Filter ▼

Filter active machinery by date

All Today Range

Filter by Exception Status

No filter

Filter by deletion requested:

CSV Print

Show 25 entries

Search:

Deployment Date	Site Name	Plant Id	Type	Manufacturer	Engine Approval Number	Power Kw	Duration	Exemption Status	Actions
01/01/2017	Brook Building Site	efsfef	Forklift	Zoomlion	32e2	12	27		Item Details Delete Requested
15/11/2016	EarisCourt2015 testing		Forklift - Rough Terrain	brooksie	e11*97/68LA*2010/26*1073*00	33	4		Item Details
01/11/2016	Rowstock Gardens 2016	BR5339	Forklift - Rough Terrain	Terex	e11*97/68LB*2004/26*0324*71	55	60		Item Details
01/11/2016	Canterbury Mills Primary Academy 2016	V3307-DI-T-EU5	Excavator - Trenchers	Kubota	E11*97/68JA*2004/26*0460*00	50	5	None	Item Details
31/10/2016	Chestnut Park Primary School 2016	21973810	Excavator	Komatsu	e11*97/68AB*2004/26*XXXX*YY	149	70	None	Item Details
29/10/2016	EarisCourt2015 KB 490		Excavator	Komatsu	e11*97/68LA*2010/26*1073*00	270	180		Item Details
29/10/2016	EarisCourt2015 KB 490		Excavator	Komatsu	e11*97/68LA*2010/26*1073*00	270	180		Item Details
28/10/2016	Prince of Wales Drive	705	Excavator	Doosan infracore	e11*97/68RA*2012/46*3041*00	86	180		Item Details
28/10/2016	Prince of Wales	624	Dumper	Terex	e11*97/68MA*2012/46*0673*02	90	180		Item Details

Advanced filters active, date range, data download and print options

NRMM enforcement tools

Diary entries

CSV Print

Show 10 entries

Search:

Entry Date	Sitename	Entry	Diary Status	Actions
17/01/2017	1 Angel Court 2015	EC2R 7HJ - City of London site still operating	Closed	edit del
16/01/2017	Test new unregistered site	(missing postcode) - Havering testing 1	Needs attention	edit del
11/01/2017	1 Angel Court 2015	EC2R 7HJ - City of London Mike called regarding requirementsss - send info	Closed	edit del
10/01/2017	1 Angel Court 2015	EC2R 7HJ - City of London - Inside CAZ awdwdwa5	Closed	edit del

NRMM officer support

- MAQF funded projects for 4 cross-borough NRMM enforcement officers
- Lead boroughs are Merton and Barnett
- Supported by the LLECP through development of web-based tools that link back into the NRMM register
- Allows for 'desktop' site assessment and 'on the ground' audits
- All local authorities need to request access

Any other business?

- Date of next meeting