

Presentation by

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Putting people at the heart of Air Quality Management: Developing a more social approach to emissions analysis and reduction.

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Vehicles don't cause pollution...

People do.

Presentation

- A new approach to Air Quality Management
- Moving from “What and Where” to include “Who and Why”
- Why? The role of social activities
- Who? Differentials between the polluters and the polluted
- Conclusions

<http://MOTproject.net>



Motoring and Vehicle Ownership Trends in the UK



EPSRC
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2012-16



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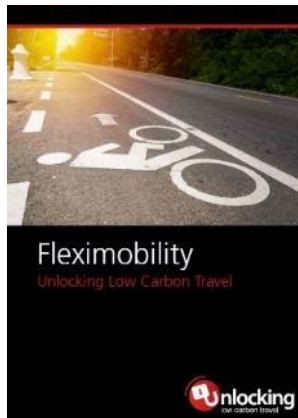
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Air Quality Management vs Air Pollution Control

Pollution Control = Use of predominantly technical measures (end-of-pipe or before) to control *emissions* from individual sources (stacks or exhaust pipes)

Air Quality Management = The control of diffuse sources to achieve reductions in *ambient concentrations* of pollutants

Air Quality Management has failed!

Not all of it...and it wasn't its fault!

- Local Air Quality Management (LAQM) process was designed in 1997 when it was expected that there would be "*a handful of AQMAs in large cities and metropolitan areas*"
- **2005:** Achievement date for UK NO₂ AQ Objective
- **By 2008:** 225 LAs (52%) had AQMAs ($\approx$ 500 AQMAs in total)
- **Now:** 260 LAs (67%) with AQMAs (650 AQMAs)
- These are not 'localised hotspots' they are local manifestations of a national problem
- Not going to be solved by 5 "Clean Air Zones"

A new approach to Air Quality Management

WHO & WHY not just WHERE AND WHAT!

- Traditionally AQM has focussed very much on 'hotspots' where concentrations are highest
= WHERE
- It also focusses on the objects that emit the pollution (e.g. cars, industrial plant, boilers etc.)
= WHAT

We propose:

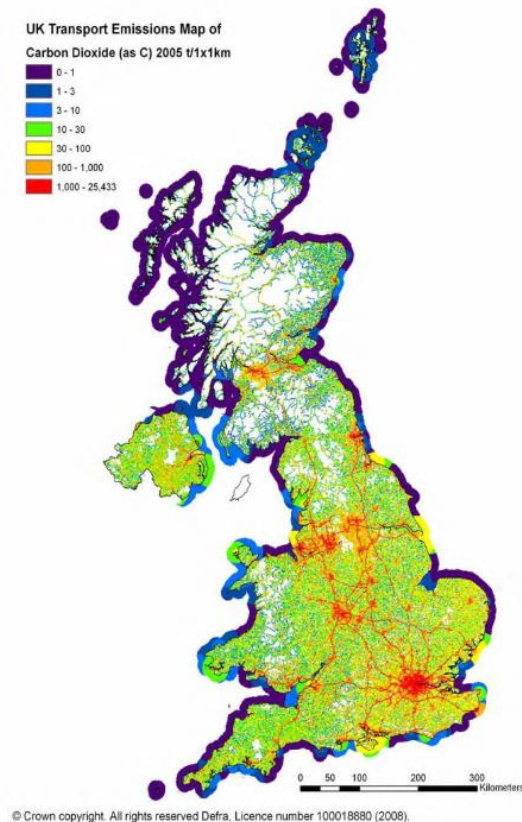
- Looking not at cars but at drivers/owners **= WHO**
- Apportioning emissions not by type of vehicle but by the type of journey being undertaken **= WHY**

Why is Pollution Created?



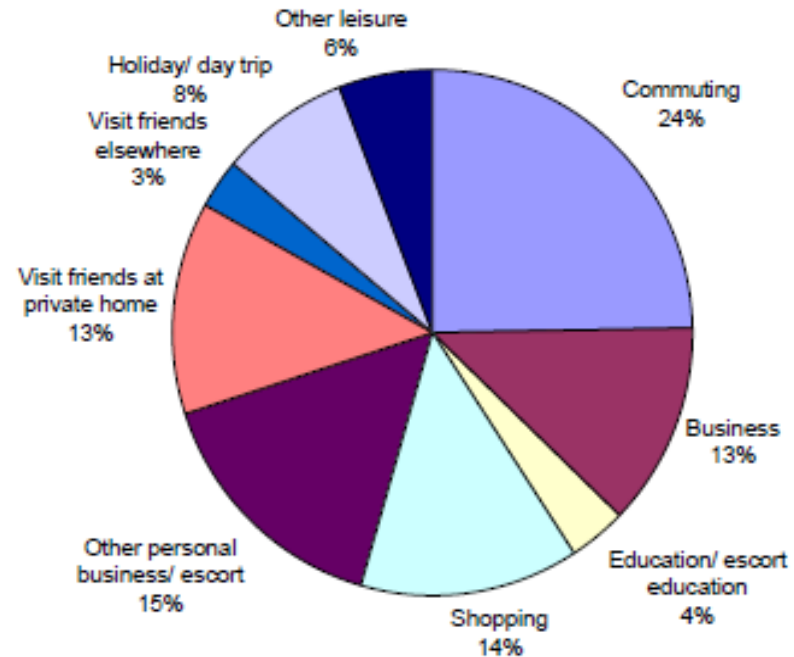
Moving from *point of use*....

Figure 1.4: Domestic transport CO₂ emissions as carbon, UK, 2005



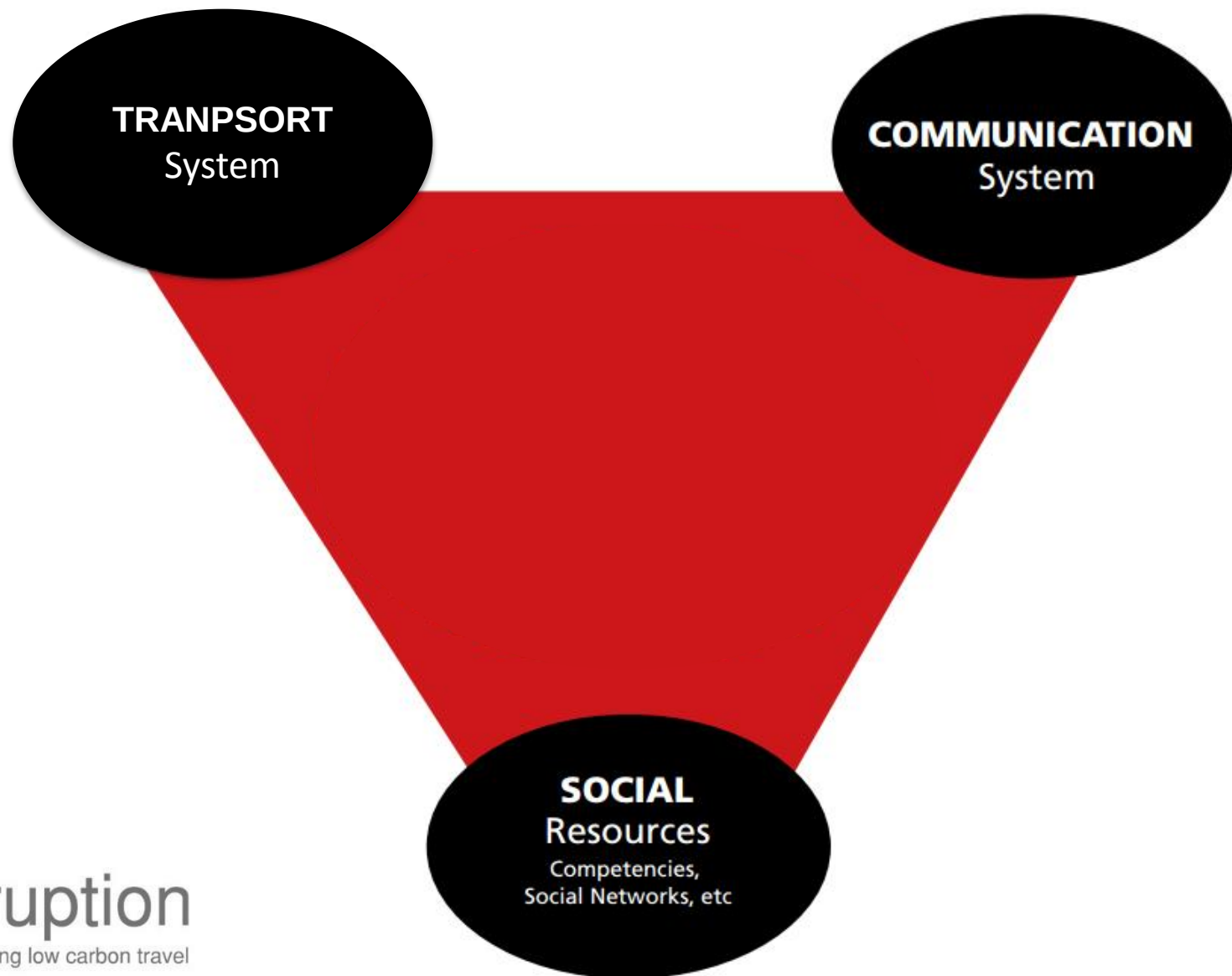
...to *journey purpose*

Figure 3.3: Estimated CO₂ emissions from all modes of passenger transport by journey purpose, GB, 2002/2006 average



Source: DfT analysis

The 'Mobility System'



The role of 'activities'

- Transport is generated through the participation of people within sets of socially constructed 'activities'
- How it is considered 'normal' to participate in these is established through a range of things from physical infrastructure to cultural conventions
- Organisations (employers, service providers etc.) at the heart of these activities often take unrestricted (auto)mobility as a given
- Where some attention is paid (green travel plans etc.) this is often seen as helping out individual travellers...
- ..rather than addressing a fundamental part of their 'business model'

Who is Creating Pollution?

- Looking at the “Polluter” not just the “Polluted”
- Who are the people driving the cars that cause the emissions?
- Do the people who cause the most pollution suffer from the most pollution?
- What types of areas lead to the most emissions?
- Are there social or structural reasons for this?

UK MOT (Ministry of Transport) test

MOT dataset (test data)

- Test date
- Test type and result
- **Odometer reading**
- Location of test (Postcode Area)

MOT dataset (vehicle data)

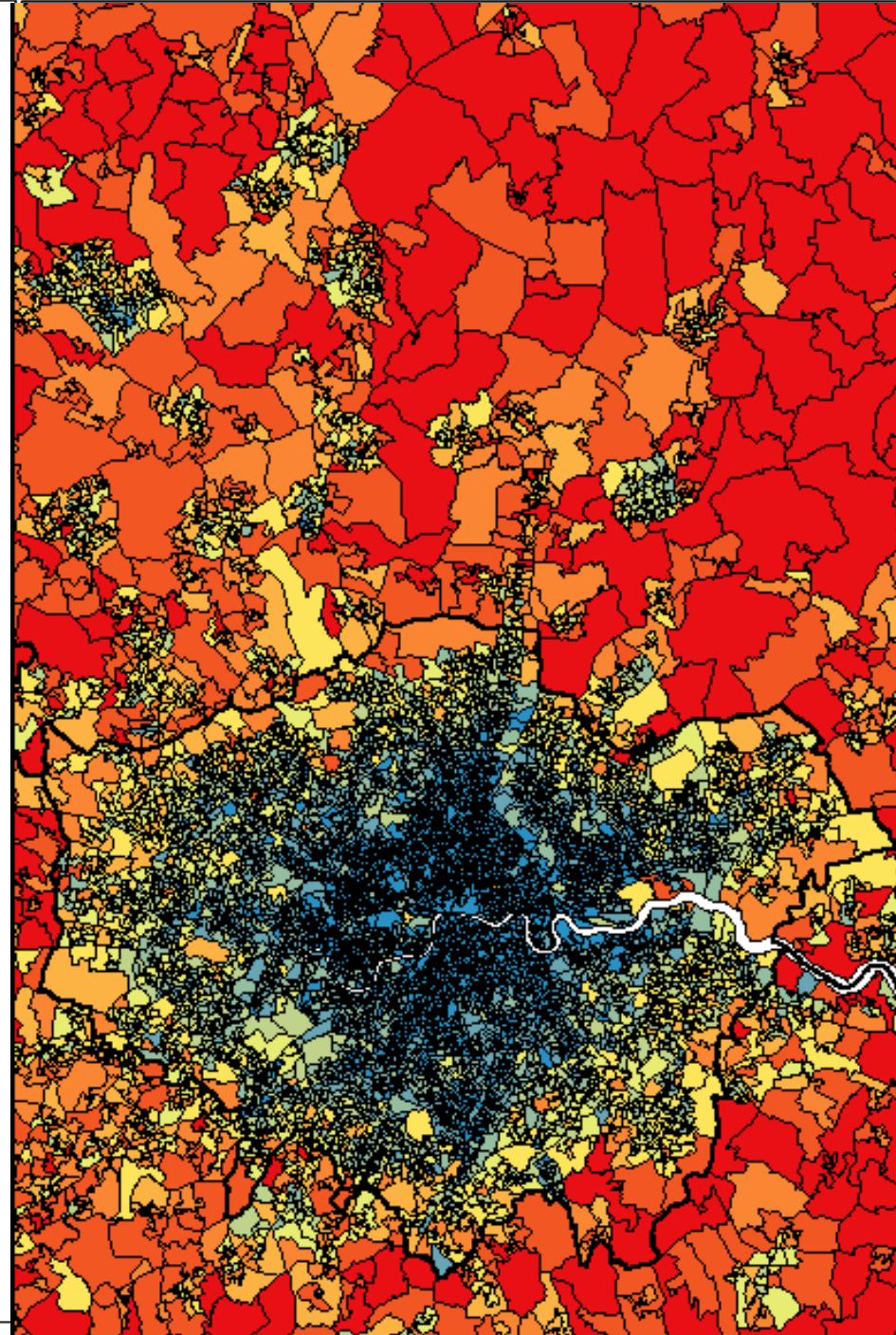
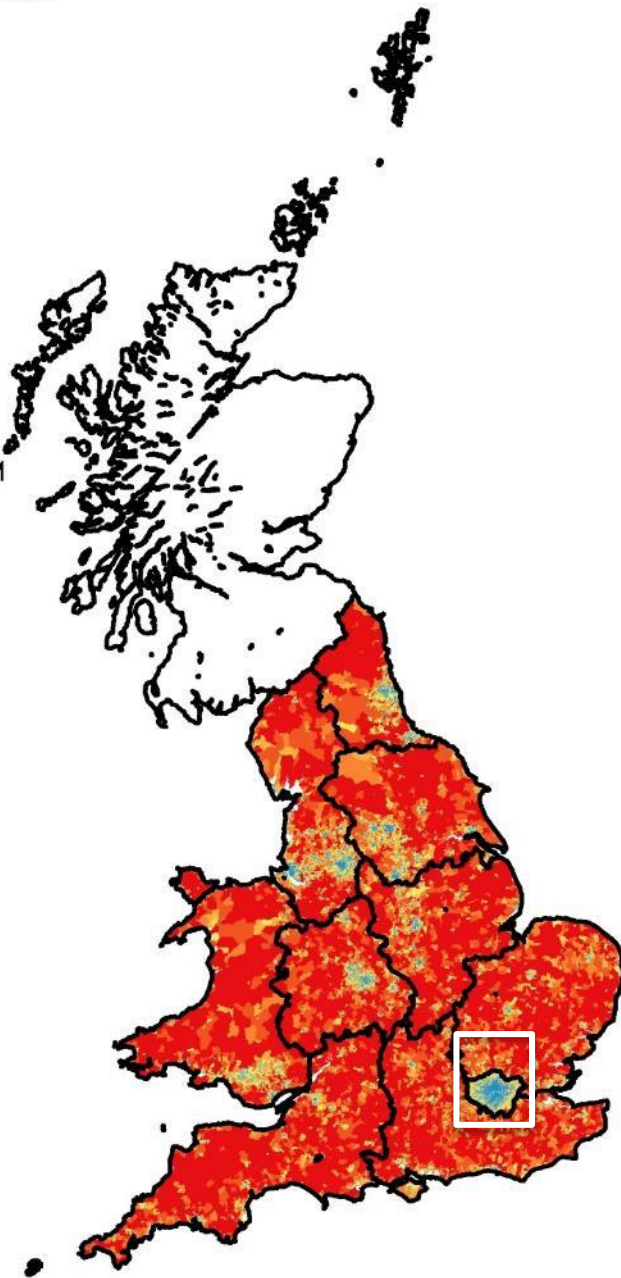
- **First use date**
- Make, model and colour
- **Engine size**
- **Fuel type**
- Vehicle class

Stock tables (vehicle data)

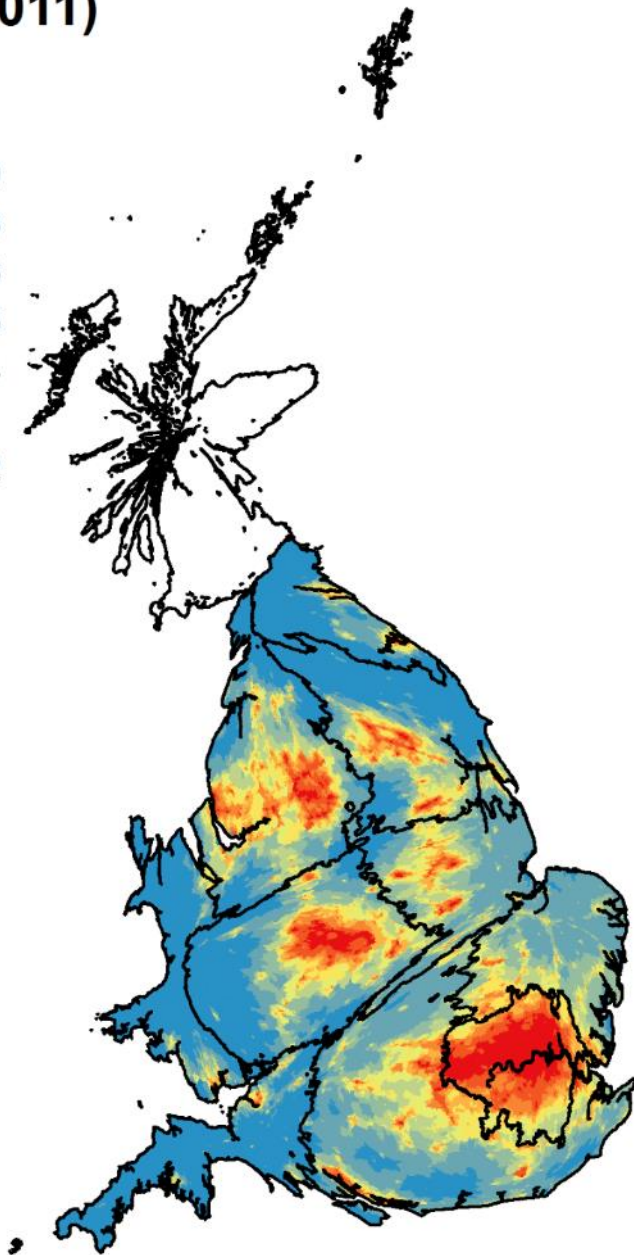
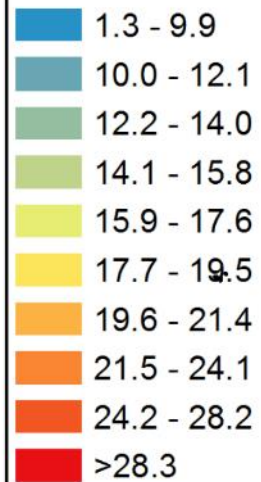
- **Keeper location (LSOA/ Data Zone)**
- **Private or commercial**
- CO₂ value

≈ 30 million vehicles per year

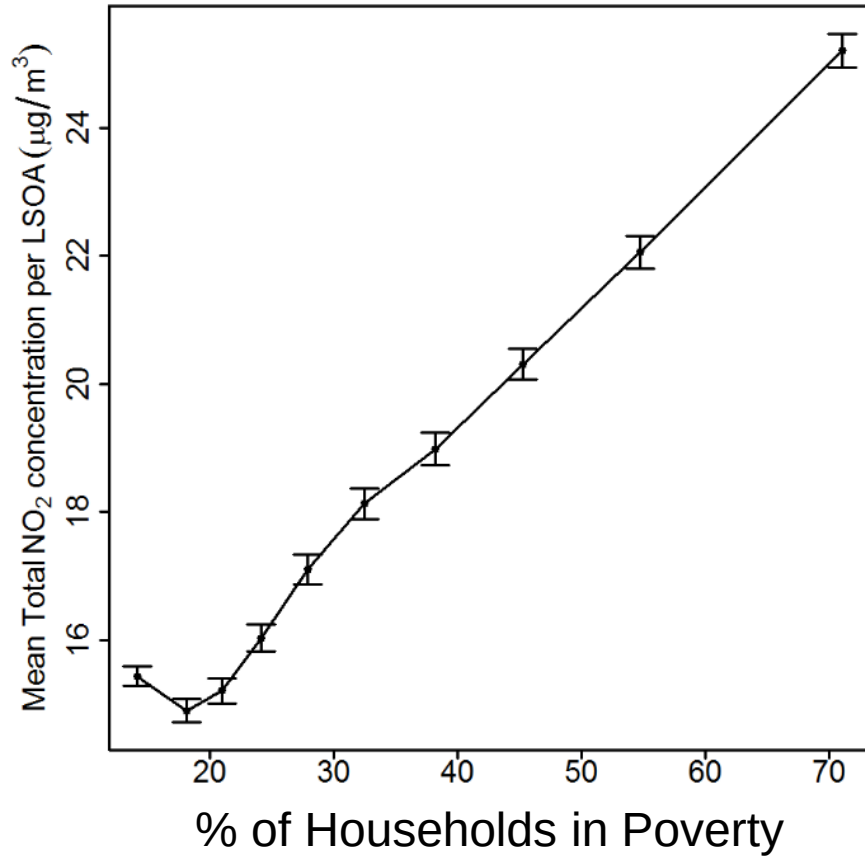
**Total km Driven by
Registered Vehicles
per LSOA
(2011)**



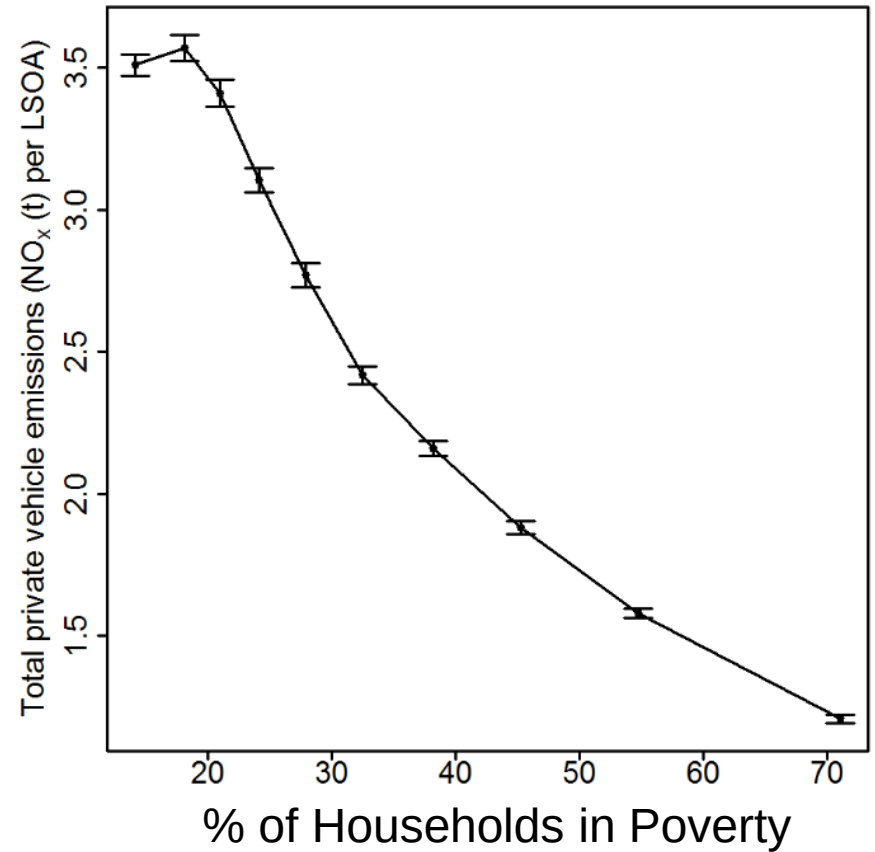
Concentrations of Nitrogen Dioxide ($\mu\text{g}/\text{m}^3$ 2011)



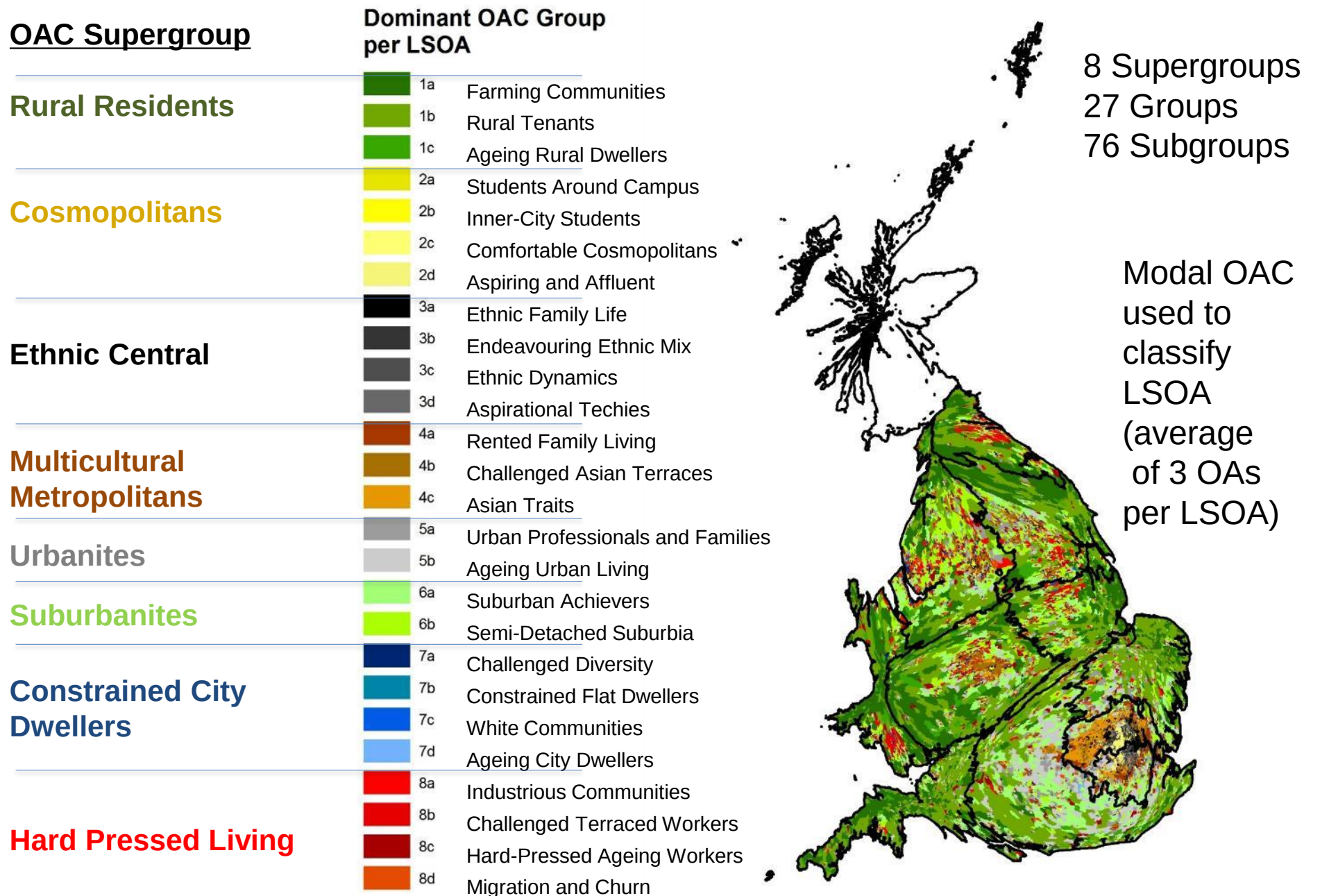
Exposure to NO₂ Concentrations



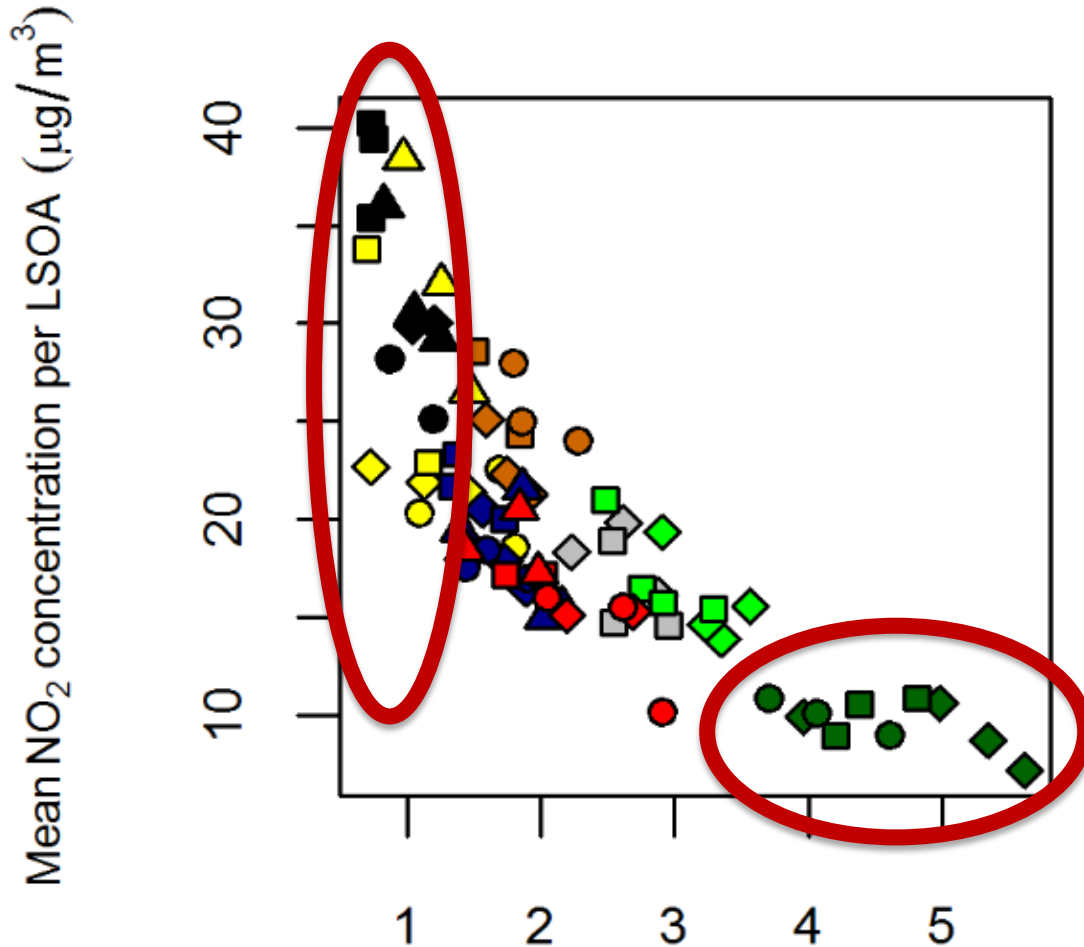
NO_x Emissions from Local Vehicles



Office for National Statistics Output Area Classifications



Emissions vs Exposure



OAC Supergroup

Rural Residents

Cosmopolitans

Ethnic Central

Multicultural Metropolitans

Urbanites

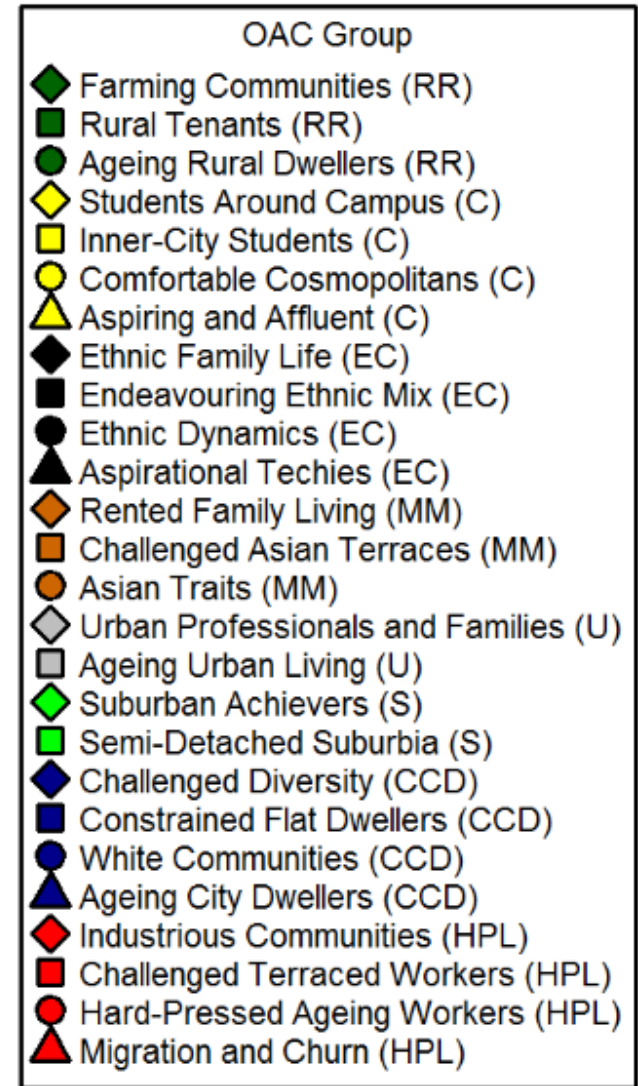
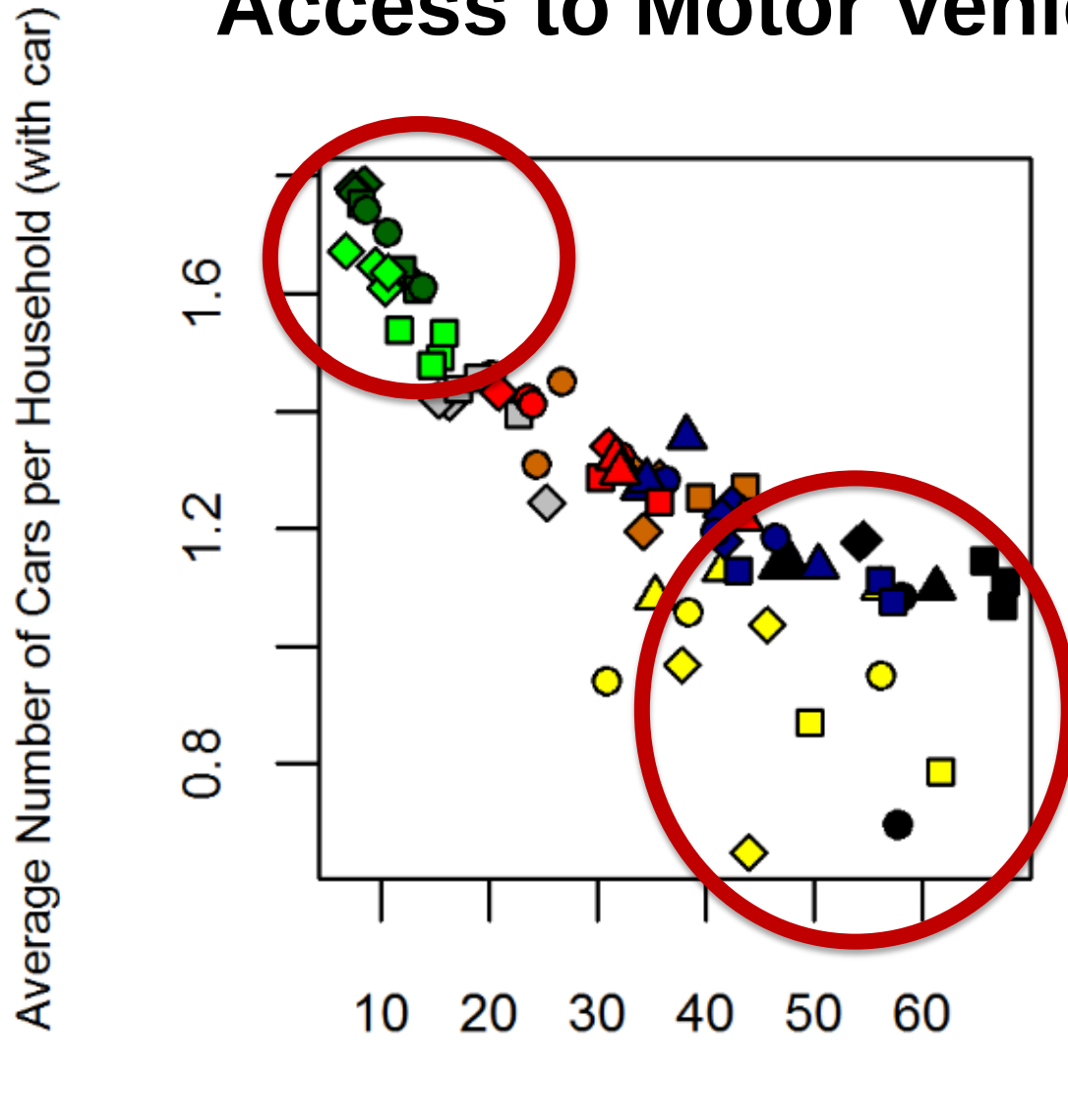
Suburbanites

Constrained City Dwellers

Hard Pressed Living

NOx Emissions from Private Registered Vehicles (t/y 2011)

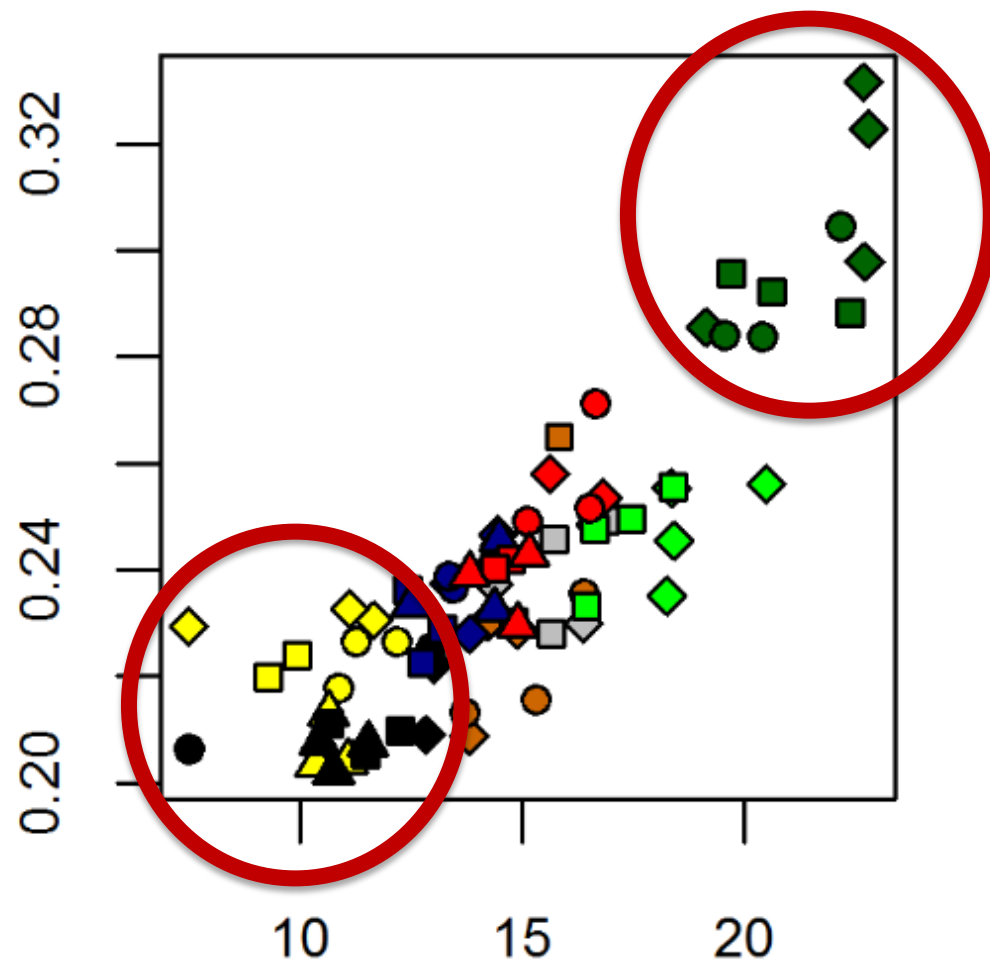
Access to Motor Vehicles



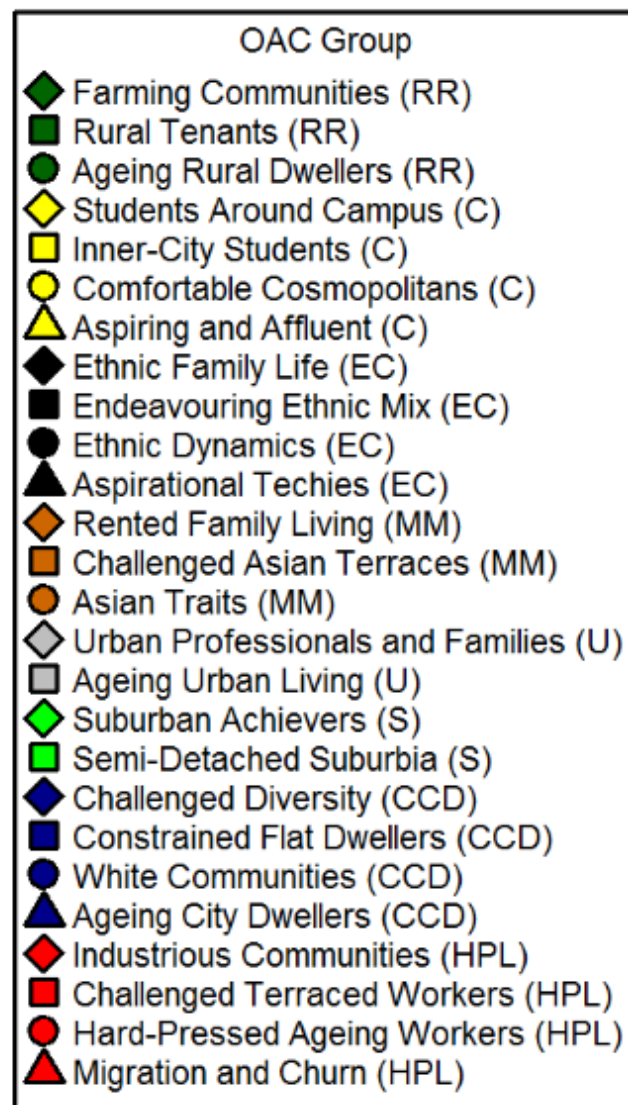
Percentage of Households with No Access to Car/Van

Emission Factors vs Distance Driven

Average Emission Factor (NOx g/km)



Annual km ('000s) driven per Household (with car)





What next? (1)

- H2020 ClairCity project
- 4 year project: 2016-2020
- 10 Research + 6 City partners across Europe
- Extend 'social activities' approach to quantitative emissions and concentration modelling for alternative source apportionment
- Use new approaches to carry out improved public engagement with city management (through workshops, game and app)

What next? (2)

- HARVEST (HARnessing emerging Vehicle data for Sustainable Transport)
- Combining traditional 'point-of-use' approach with MOT registered keeper viewpoint
- Done by linking problem locations e.g. CAZs to owners and route choices, using:
 - Conventional transport models
 - ANPR data
 - Vehicle telematics (via The Floow)
 - Other data sources incl. mobile phones and bluetooth

Summary

- AQM has failed to achieve both high levels of public engagement or to address activity part of the equation: *emissions = emission factors x activity*
- A social rather than technocentric and point-of-use approaches may help and should be complementary to current practice
- This will help to address the social and structural inequalities related to both the causes of air pollution and its impacts....
- And enable widespread emission reductions - not just hotspot management – linking more clearly to energy and carbon agendas and achieving co-benefits

Thank You!

<http://www.Fleximobility.Solutions>

<http://MOTproject.net>

<http://ClairCity.eu>

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