WM-Air: West Midlands Air Quality Improvement Programme

"Poor air quality is the largest environmental risk to public health in the UK" (DEFRA, *UK plan for roadside NO_2*, 2017)

"WM-Air will address and answer questions that are crucial to local and regional policy-making with regard to improving air quality"
(Andy Street, *Mayor of the West Midlands / Chair of the WMCA, 2018*)

"The health impacts of Air Pollution cost the UK £20bn in 2016"
(National Audit Office, *Air Quality report*, 2017).

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national express West Midlands
RFG Rail Freight Group
NetworkRail
ARUP
NHS Birmingham & Solihull STP
Dudley Metropolitan Borough Council
hs2
Forest Research
CALTHORPE ESTATES
amey
Greater Birmingham & Solihull Local Enterprise Partnership
MB PLANNING
Walsall Council
RICARDO
Public Health England

Background – the NERC opportunity

NERC: Natural Environment Research Council

RISE: Regional Impact from Science of the Environment

- Regional Impact from Science of the Environment (RISE) is dedicated to bringing research organisations together with businesses, policy bodies and other actors contributing to economic development specific to their location to deliver significant regional impact from NERC environmental science.

Funding will be provided to support

- Translation of existing data, knowledge and/or expertise to **meet user needs**;
- Decision-support tools;
- Model synthesis, merging and manipulation;
- Direct embedment of new knowledge in user organisations;
- Commercialisation focused upon taking academic outputs further towards
- Exploitation for likely economic return (including costs avoided)

The Opportunity: Air Quality in the West Midlands

Strategic and Political Opportunity	▪ Industrial Strategy: Clean Growth challenge ▪ Formation of WMCA; Mayor of West Midlands ▪ "Devo-2" regional devolution deal (Nov 2017)
	▪ Major regional developments ▪ Current focus upon AQ nationally ▪ (emerging) UK Government AQ Strategy
Key Challenges	▪ Health and economic costs of air pollution in region: 1500 deaths; £860m yr^{-1}
Context to date	▪ Traditional Local Air Quality Management and action plans – compliance focus

WM-Air…

- Project fully funded, announced 19th Oct, started 1 Jan 2019
- 5-year duration

- Series of **planned** and **to-be-confirmed** activities and opportunities around AQ in the West Midlands

- Dissemination, Legacy

- Ongoing co-design process
- Emerging opportunities
- Maximise impact from NERC investment
- Leverage additional funding draw-down

WM-Air Structure and Outcomes

WMAQIP Themes

- **1 Situational awareness**
- **2 Predictive Capability**
- **3 Application, Impact Fellows, Projects Arising…**

Outcomes **at Proposal Stage**

- Refinement (and evaluation) of policy interventions
- AQ horizon-scanning capability
- Lifecourse approach to health impact predictions
- Econometric analysis of air quality costs
- Application to major infrastructure
- Support LA, CA strategy under Devo-2

- **Impact Fellows – Applications, Projects…**
- **Legacy**: Continuing use, application; wider regional, national, international uptake

WM-Air Structure and Outcomes

WMAQIP Themes

- 1 Situational awareness
- 2 Predictive Capability
- 3 Application, Impact Fellows, Projects Arising…

Situational Awareness

- Strand 1: Observational capability
- Strand 2: Sources & vehicle emissions

Predictive Capability

- Strand 3: Horizon-scanning AQ prediction
- Strand 4: Lifecourse health & care impacts
- Strand 5: Putting AQ into economic strategy
- Strand 6: Green Infrastructure for AQ

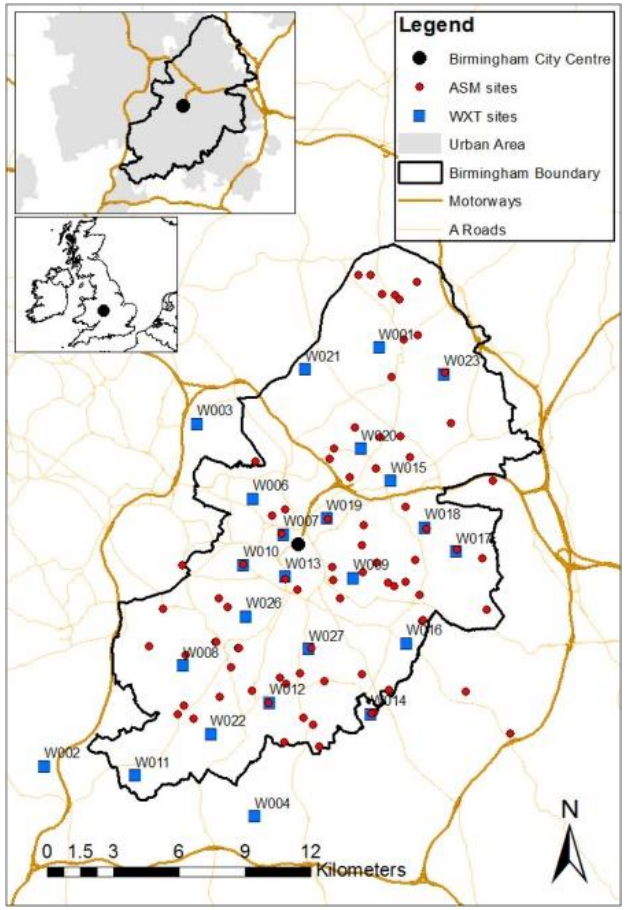
Applications to further Impact

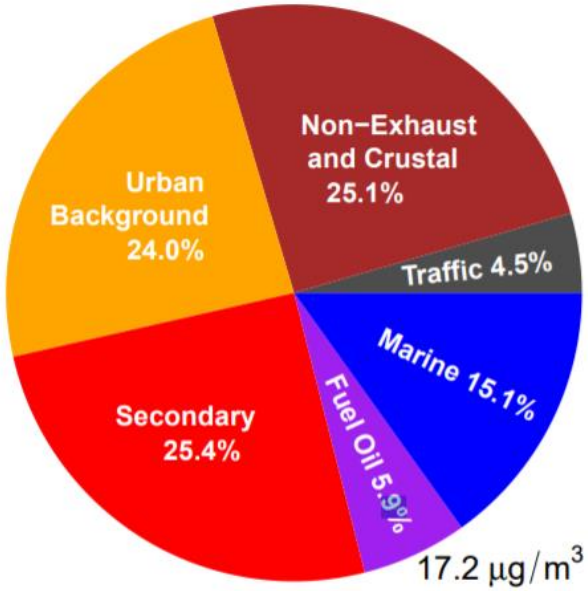
Strand 7:
Policy Scenarios / Impact Fellows

Strand 8: Dissemination, Legacy

1 Observational Capacity

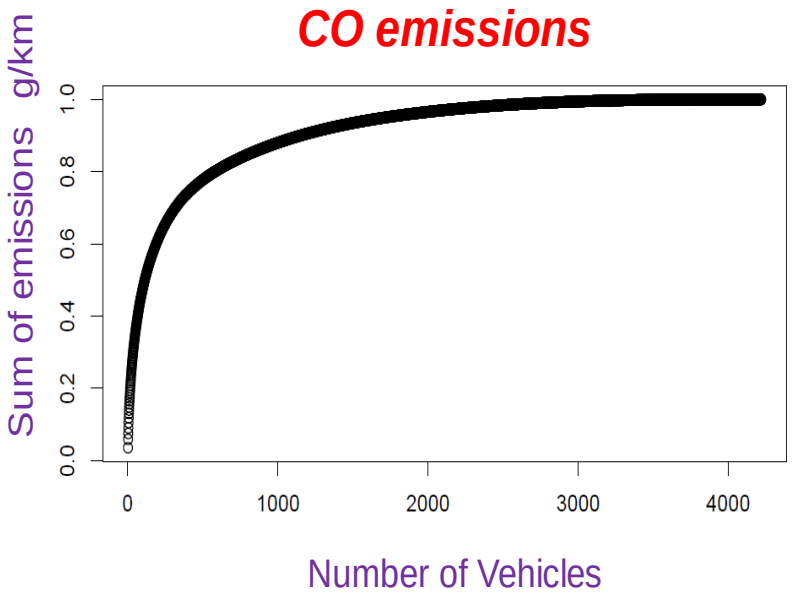
- What are the abundance, distribution, sources of $PM_{2.5}$ in the West Midlands ?
- What are the real-world, on-road vehicle emissions (and their response to CAZ) ?





2 Real-World Vehicle Emissions

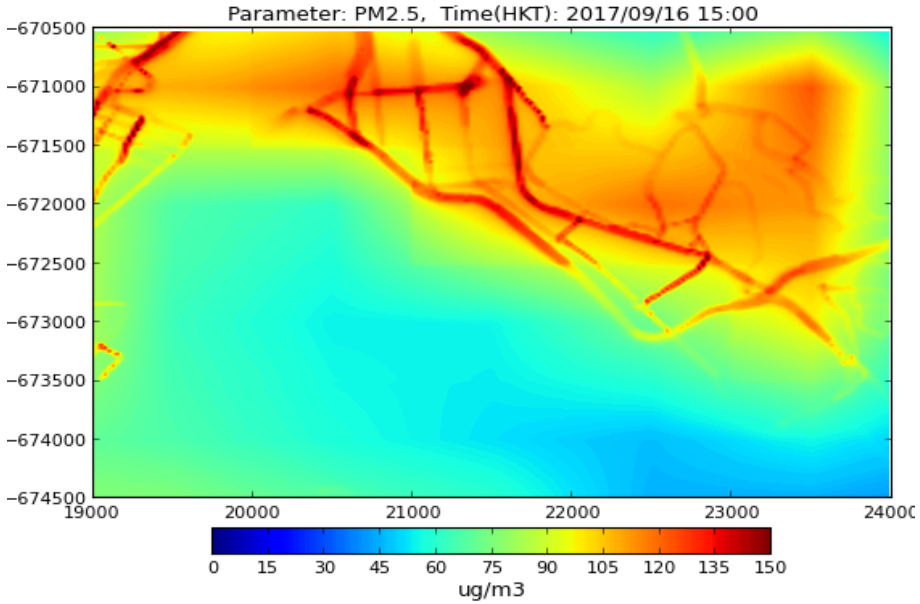
- What are the abundance, distribution, sources of $PM_{2.5}$ in the West Midlands ?
- What are the real-world, on-road vehicle emissions (and their response to CAZ) ?



3 Predicting AQ response to policy

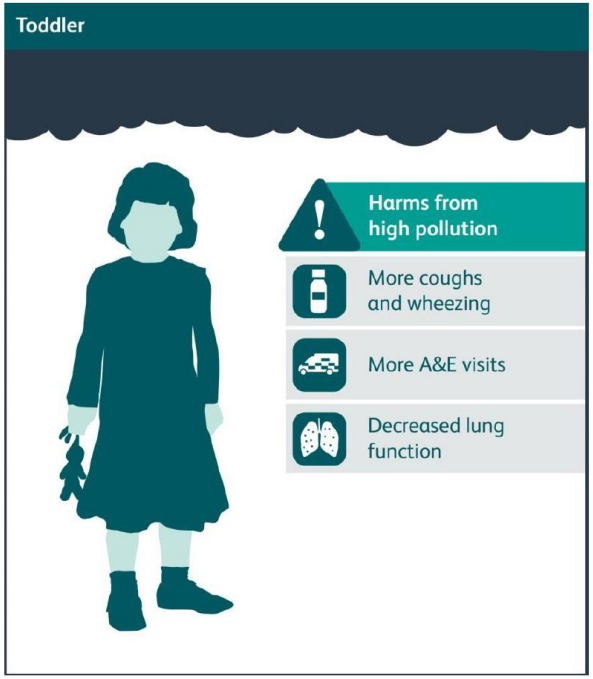
- What are the air quality impacts of specific policy interventions (and business-as-usual) ?
- What scale of intervention (e.g. traffic change) is required for a given policy outcome ?

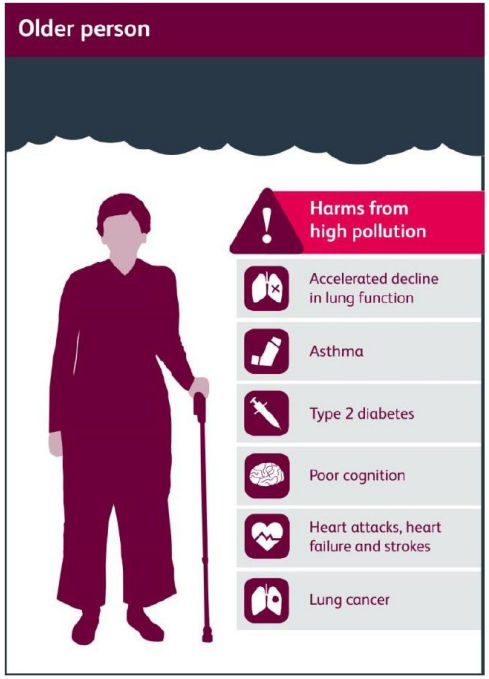
- Extend existing $PM_{2.5}$, NO_2 modelling capability cross-region
  (CERC; ADMS base + existing emissions inventories)
- Permit **direct exploration of potential future policy scenarios (via Impact Fellows)**
- **Flexible use in support of projects**; horizon scanning capability [parallel development]



4 Health Effects

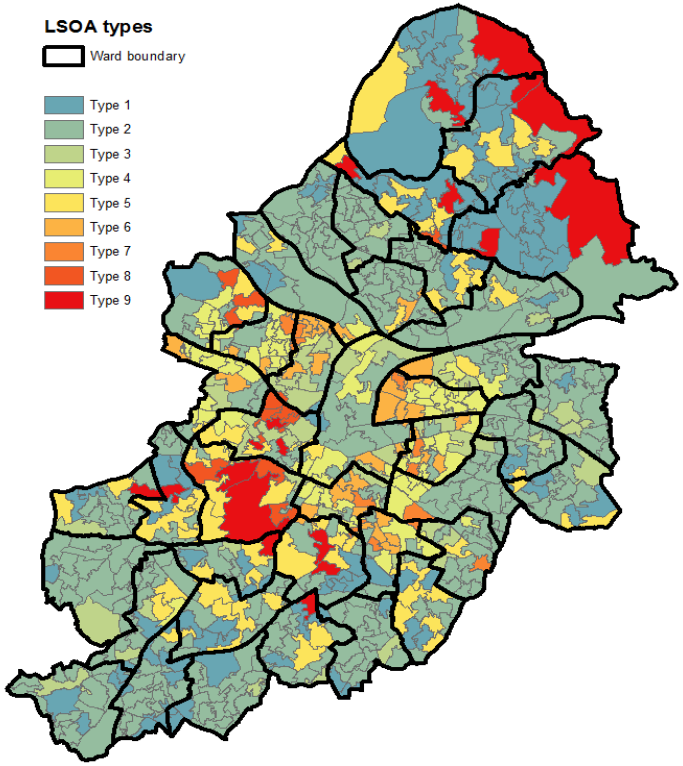
- Health – not compliance – key driver for WM-Air
- What are the *whole lifecourse* benefits and costs of present-day and future air quality ?
- AQ-driven health outcome inequalities - by population group and spatial location





5 Economic Metrics

- Assessing the spatial economic impacts of air quality across the West Midlands
- Integrating Air Quality with economic metrics to enable better investment decisions



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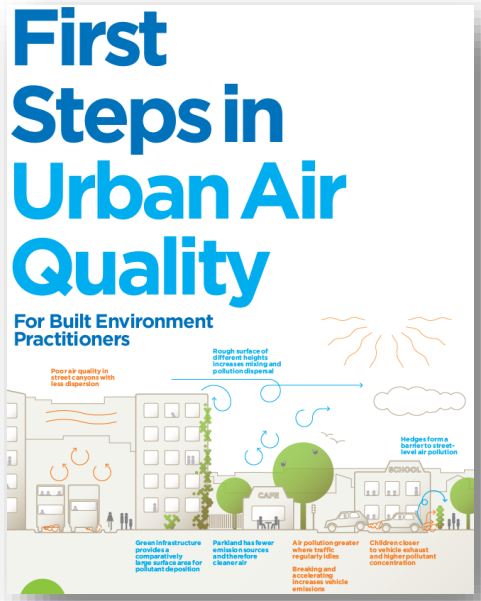
STRATEGIC ECONOMIC PLAN

Technical appendix
DYNAMIC ECONOMIC IMPACT MODEL (DEIM)

6 Green Infrastructure for Air Quality

- *Effective* use of Green Infrastructure (urban vegetation) to improve air quality (and quality-of-life) at scales from regional to individual development



Impact - Applications

- Application of existing NERC research expertise, and WM-Air Situational Awareness and Predictive Capability, via cohort of Impact Fellows (funded and adopted).
- **Delivery of WM-Air impact through specific projects / policy scenarios.**

Possible Example Questions

- How effective are the [planned future] potential interventions to improve AQ ?
- What are the impacts of fleet evolution to electric vehicles ?
- What is the benefit of (e.g.) modal shift from cars to bicycles ? [5% journeys by 2023]
- What scale of change is needed to achieve (e.g.) ambition of halving AQ-related mortality by 2030 ?

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Delivers *the WM-Air derived air quality impact from NERC science*
Supporting *delivery of the Clean Growth challenge from the Industrial Strategy*

WM-Air…

- Air pollution is a critical environmental science issue, affecting 2.8m in the W Midlands
- Unique opportunity to deliver transformative impact from NERC science in the UK's second city, building upon formation of the WMCA and the devolution agenda
- WM-Air has been co-designed to deliver air quality, public health and economic benefits, enabling the region to deliver key aspects of the Industrial Strategy and Devo-2 deal
- Within programme and legacy impact on deaths avoided, costs saved, improved (equity in) life expectancy, reduction of AQ-derived economic growth penalty

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