

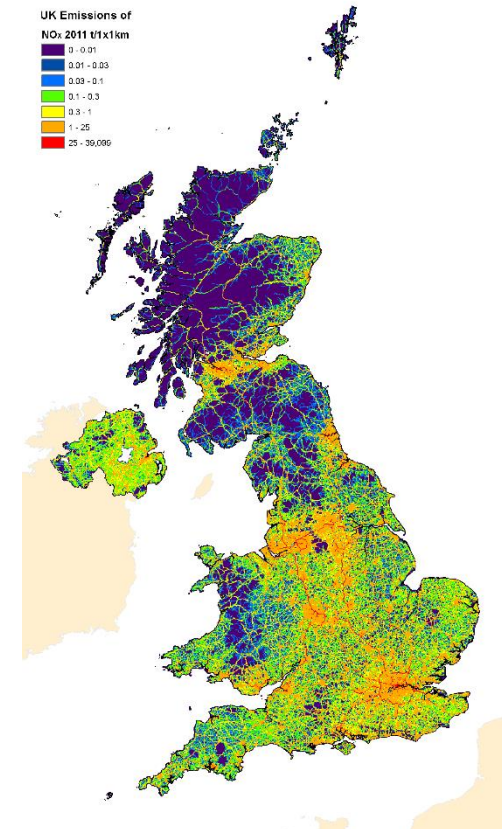


**Research to inform policy development to  
address emissions from Non-Road Mobile  
Machinery (NRMM) – UK**

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FAIRMODE September 2020

# The NRMM challenge

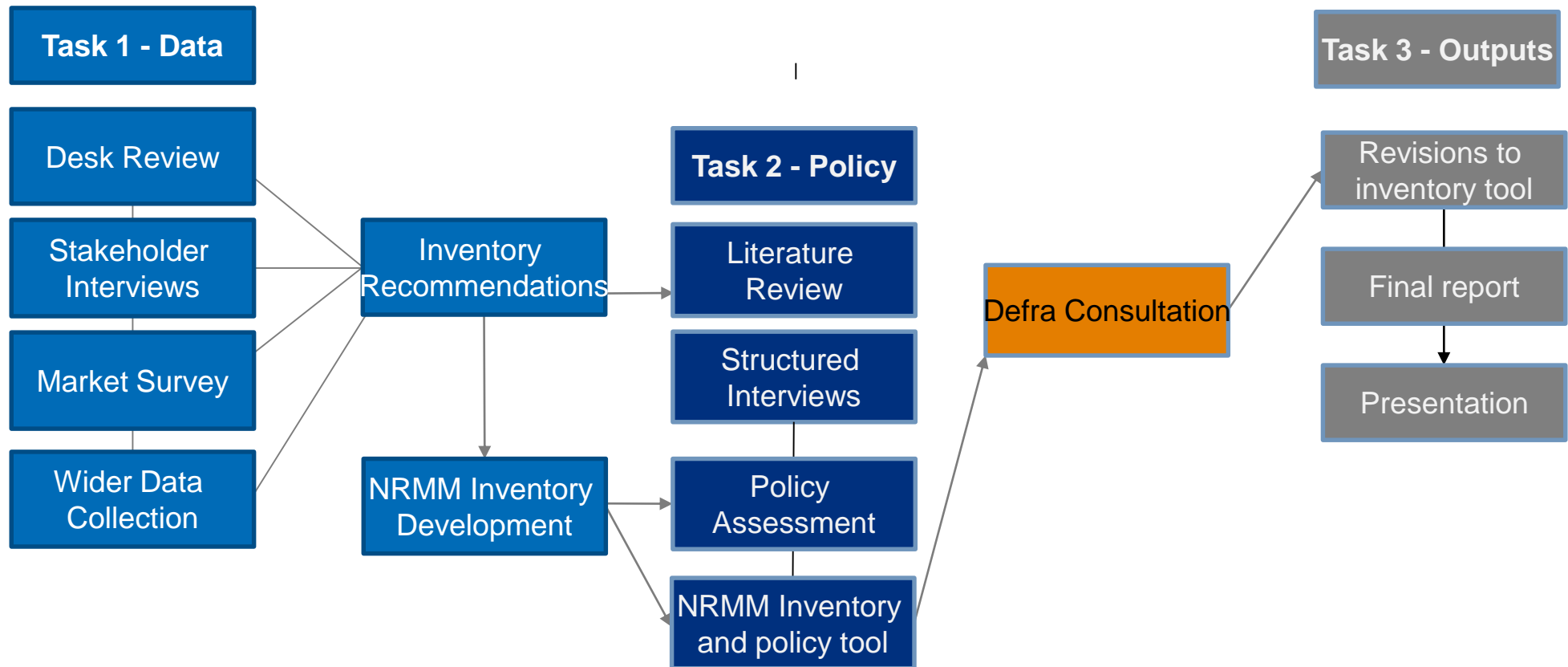
- Non-Road Mobile Machinery (NRMM) covers a very wide range of machinery, which spans from very small machinery to heavy machinery.
- Diverse nature of use, it represents an uncertain and challenging emission source to characterise.
- May be a potentially significant source in urban areas, particularly NO<sub>2</sub> and PM.
- 77 different types of NRMM are currently covered in the UK's National Atmospheric Emission Inventory (NAEI).
- Challenging to regularly update.



# Overview of key tasks

The overall objective of the project is to develop a better understanding of the NRMM fleet in the UK and how it will respond to proposed measures to reduce emissions from this sector. The project is broadly split into two main tasks:

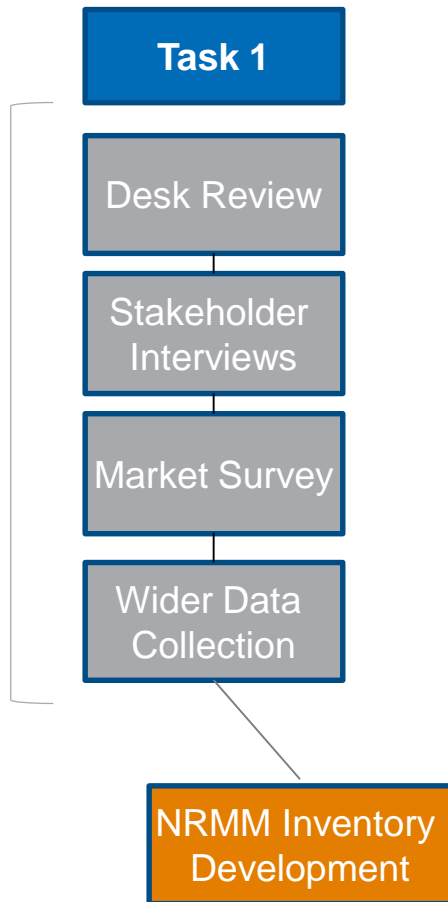
- Task 1: to gather updated evidence on the ownership structure and operation of NRMM to improve the current National Atmospheric Emissions Inventory (NAEI);
- Task 2: to explore the likely behavioural responses by different sectors to the introduction of emissions controls and other policy measures.



- Specific focus on construction equipment in urban areas and auxiliary Transport Refrigeration Units (TRUs) on vehicles
- Rail and shipping sectors covered under other policy areas and accounted for separately in the National Atmospheric Emissions Inventory (NAEI)
- Low-emissions alternative technologies

Industry Sector	Within scope:	Priority:
Construction	Yes	High
Roadworks	Yes	High
Transport refrigeration units	Yes	High
Airports/Ports	Yes	Medium/High
Permitted sites (large industrial complexes)	Yes	Medium/High
Sites not subject to permitting (warehousing/storage)	Yes	Low/Medium
Mining and quarrying	Yes	Low
Rail vehicles, agricultural machinery, fishing vessels and other marine vessels, smaller domestic NRMM	No	-

# Task 1 – Developing the inventory



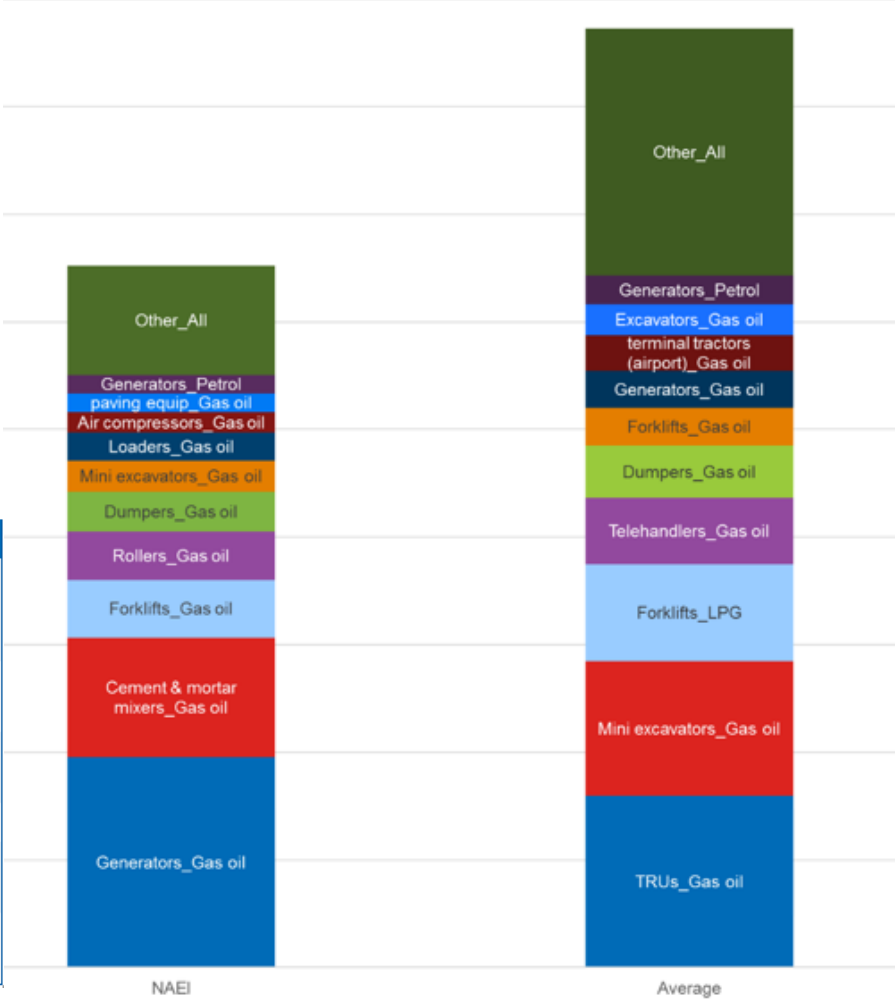
- Highest tier (most detailed) methodology from international guidance to be used:
 
$$\text{Emissions} = N \times \text{HRS} \times P \times \text{LF} \times (1 + \text{DFA}) \times \text{LFA} \times \text{EF}_{\text{Base}}$$
- List of parameters to work on/refine assumptions
  - Population by machinery type (N)
  - Annual hours of use (HRS)
  - Typical power rating (P)
  - Load factor (LF)
  - Fleet mix by emission stage (link to emission factor  $\text{EF}_{\text{Base}}$  and degradation factor – DFA)
  - *Other aspects for Defra: split emissions (hours of use) by urban vs rural, and by sector*

# Source Apportionment informs abatement measures

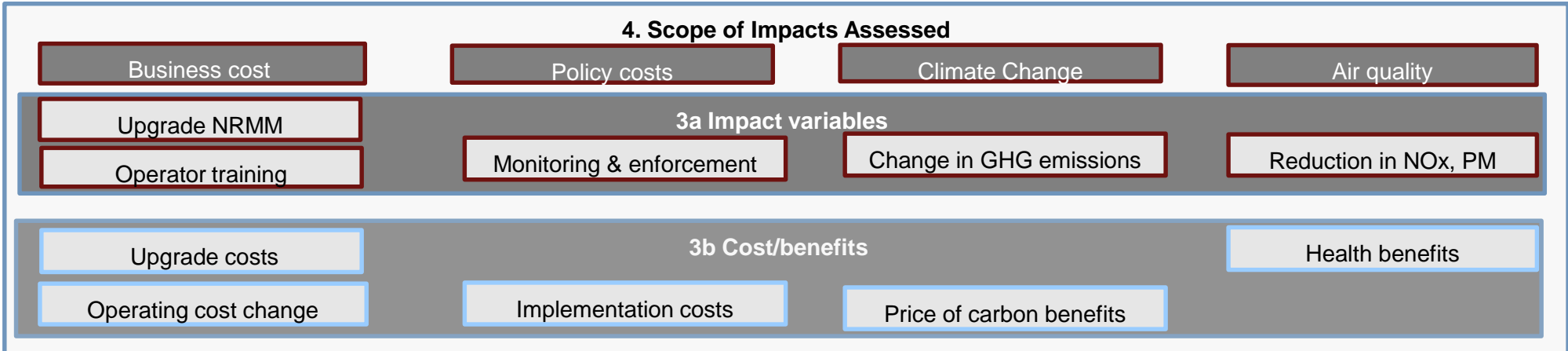
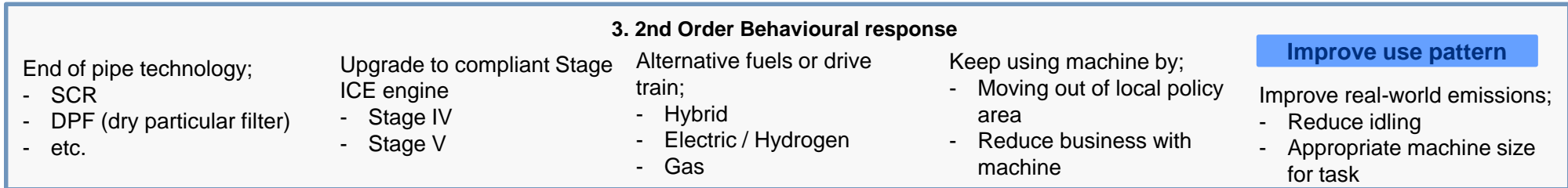
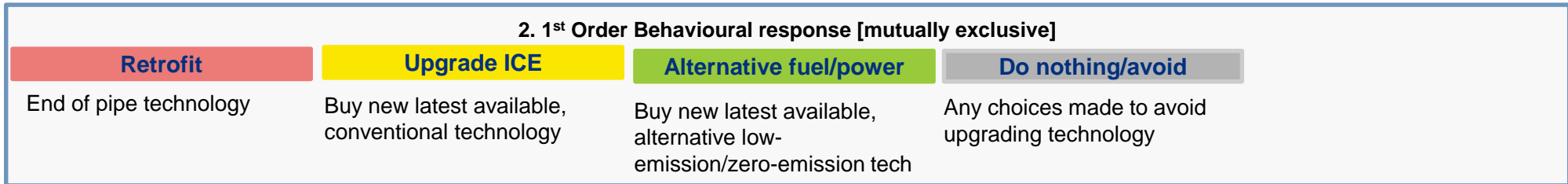
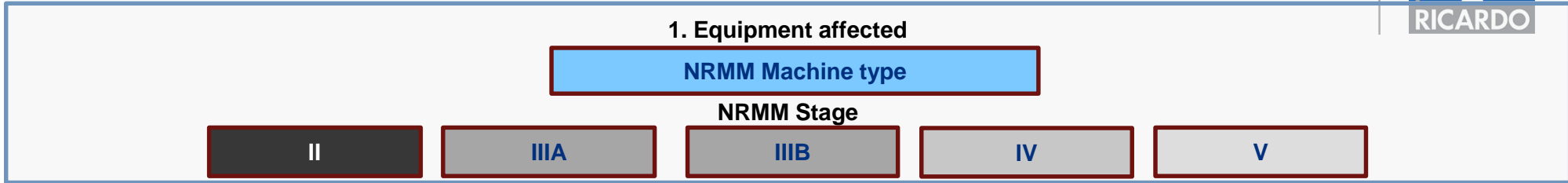


- Depends on lifetime scenarios
- TRUs important as regulation introduced at Stage V
- Mini-excavators important due to their high population
- Forklifts powered by LPG is a new category

NRMM Policies	Countries
EC Directive for sales equipment in the EU. All new NRMM must meet the specified pollutant emission standards	European Member States <sup>2</sup>
Minimum standards for construction sites or low emission zone for construction	Switzerland, Germany, UK (London LEZ)
Minimum standards where EU Air Quality Limits for PM are exceeded	Austria
Minimum standards for public work	Denmark, Sweden
Best practice guidelines and information publications	France, Spain
Financial support programme	Germany (Berlin - pilot programme for retrofitting inner-city passenger ships)



# Modelling impact of response to new policy measures



# Any Questions ?



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