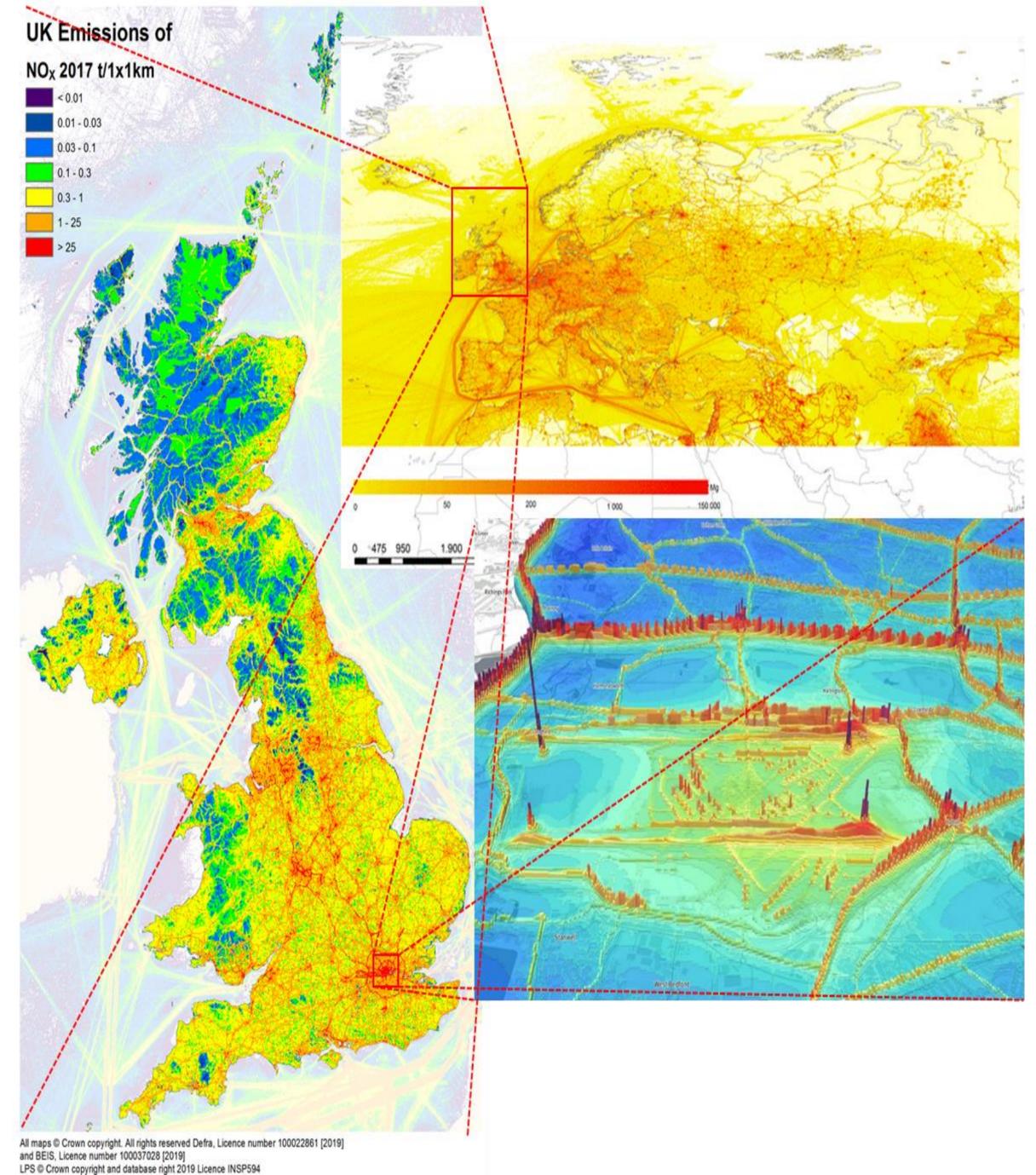


Developing a UK Community Emission Modelling System (DUKEMS)

UKRI SPF Wave 1 – UK MetOffice CA19/3:
Clean Air Programme - UK Emissions Modelling System

The core objectives are the delivery of a **framework and tools** designed to be operational long term in supporting the atmospheric modelling community by providing a flexible, user-friendly system to deliver **emission input data** for modelling in a **transparent, traceable and reproducible** manner.

January 2020 – March 2022



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Met Office



The Clean Air (W1) programme is led by NERC and the Met Office, with Innovate UK, EPSRC, ESRC, MRC, NPL & Defra as delivery partners.

Key deliverables

- ❑ **D1:** An **operational framework** for a flexible, scalable and future-proof community Emission Modelling System (EMS) implemented on **JASMIN**
- ❑ **D2:** A process for a **community-driven, co-designed** UK-EMS enabling the atmospheric modelling community to **generate emission input data at the spatial, temporal and substance resolution required** for a wide range of use cases
- ❑ **D3:** An open, accessible **system and demonstrators for the integration of novel emission calculation methods**, including approaches for future expansion.
- ❑ **D4:** The operational **integration of anthropogenic and biogenic emissions** into consolidated output datasets.
- ❑ **D5:** A consistent approach for the provision of **temporally and spatially resolved emission data** across a range of scales.
- ❑ **D6:** A demonstrated **output generation process for frequently used data formats**, including meta-data and supporting documentation of the calculations included, and **open for future extension to new formats**.

Project Overview

□ Component 1: System design and implementation

- WP1 - Data Product pipelines – “What applications / data products are we building?” 
- WP2 - Implementation of UK-EMS infrastructure and IT services – “How will the applications be hosted?” 

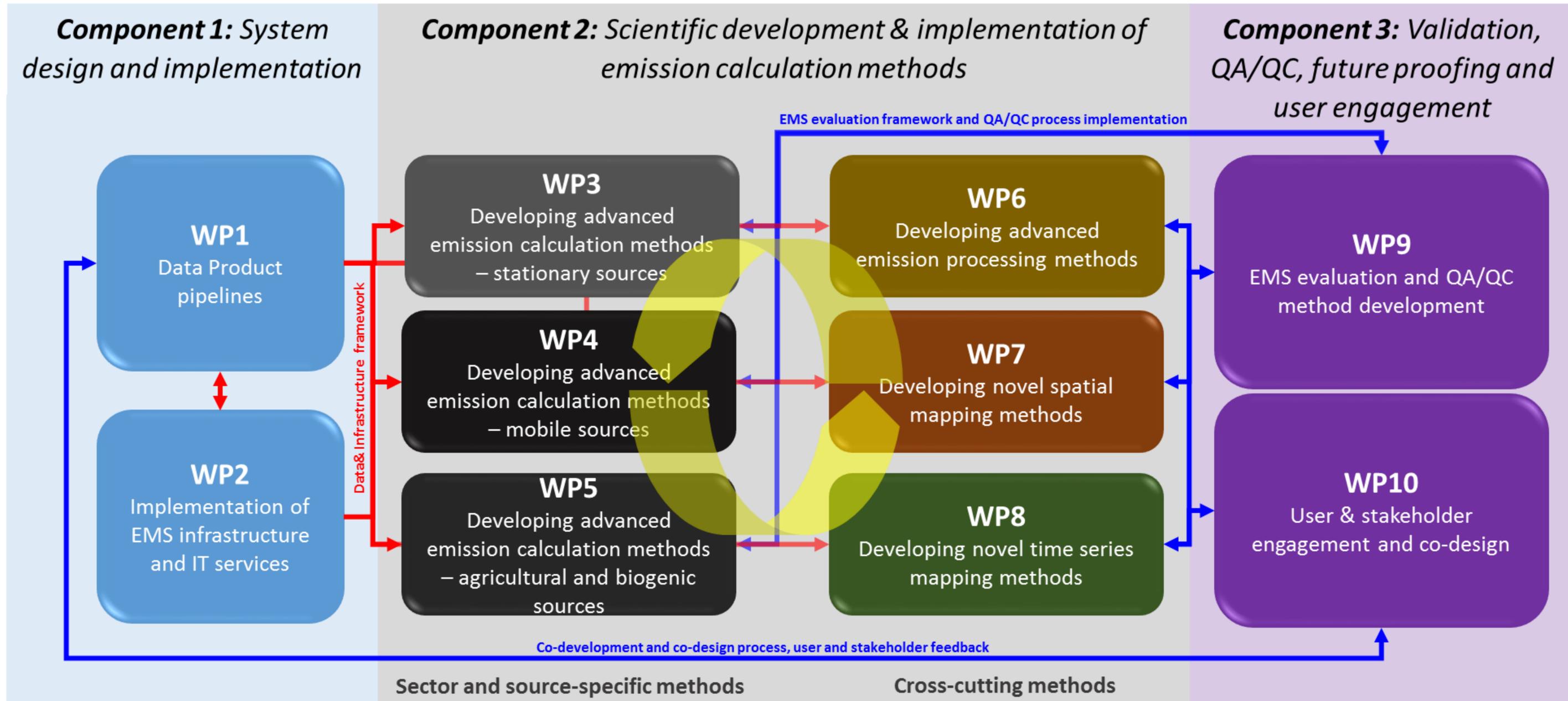
□ Component 2: Scientific development & implementation of emission calculation methods

- WP3 – Development of emission inventories for stationary sources 
- WP4 - Developing advanced emission calculation methods – mobile sources  
- WP5 - Developing advanced emission calculation methods – agricultural and biogenic sources 
- WP6 - Developing advanced emission processing methods 
- WP7 - Developing novel spatial mapping methods 
- WP8 - Temporal profiling of UK emissions 

□ Component 3: Validation, QA/QC, future proofing and user engagement

- WP9 - UK-EMS Evaluation and QA/QC method development 
- WP10 - User and stakeholder engagement 

Project structure



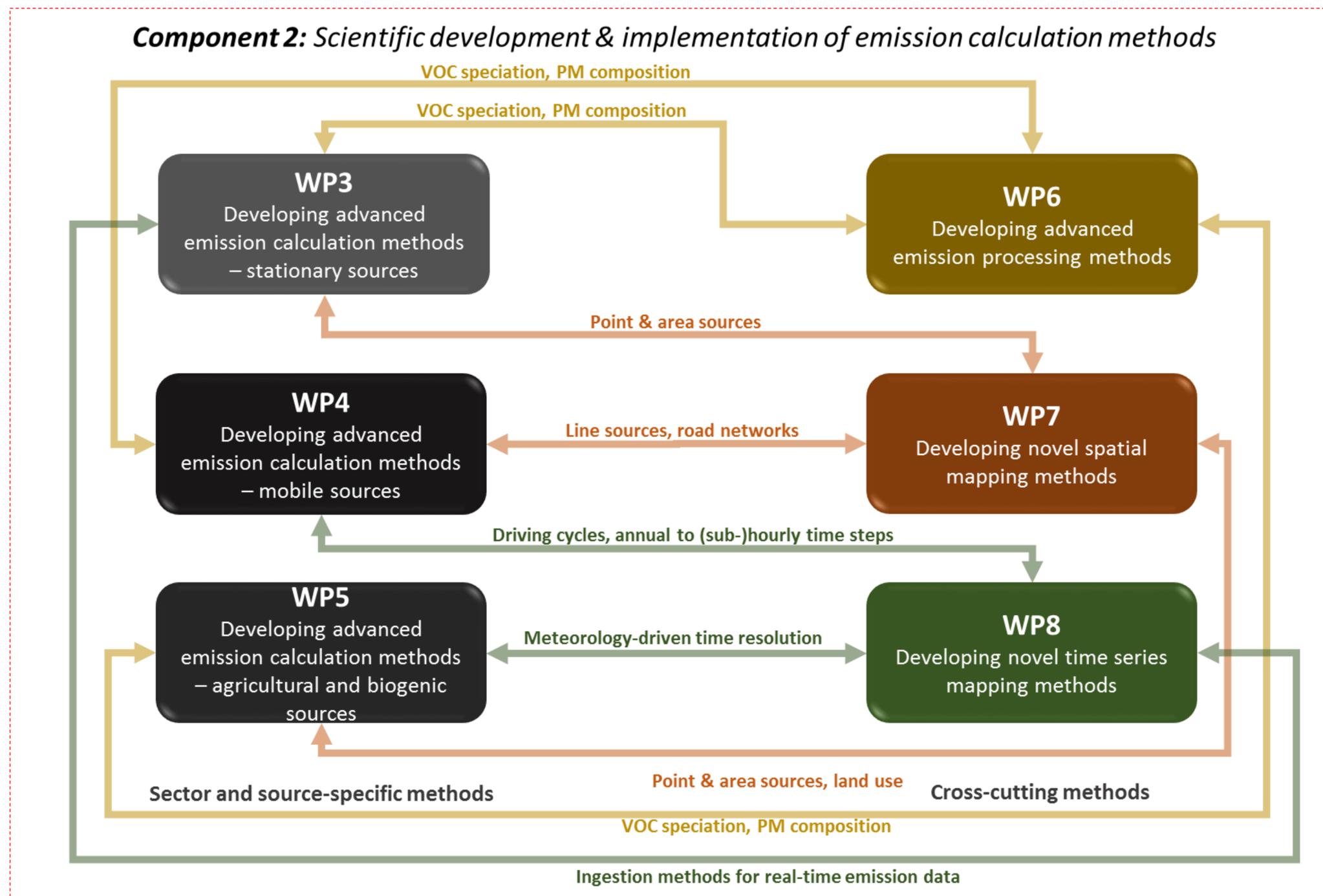
 Methodology integration across work packages and tasks

 IT and systems framework implementation

 Emission science & methods

Project structure

Detailed illustration of exemplary links between the WPs in Component 2 – the matrix of method development and implementation of existing approaches for emission calculations will require a consistent coordination and joined-up framework development across these WPs and the UK-EMS overall



Engagement mechanisms

A **User Group** (UG) has been set up, drawing on atmospheric modelling experts involved in the sister projects, as well as inviting other modellers from the wider UK modelling community. This user group has had a first meeting earlier in 2020, is scheduled to meet again in early 2021, and is chaired by Prof. Ranjeet Sokhi.

- ❑ User engagement is linked/coordinated with other SPF activities and projects, and the wider (international) research community.
- ❑ Its key objective is to support and inform the project in taking stock and conducting detailed analyses of requirements from the modelling community
- ❑ Informing the design, implementation and testing phases in particular

A **Stakeholder Group** (SG) will be formed, including representatives of the funding agency, the wider SPF Clean Air Programme and UKRI, Defra, BEIS, Devolved Administration authorities and other regulatory and arms-length bodies with an interest in air pollution. A first stakeholder event is scheduled for mid October 2020.

Contact & Links

Project website will be launched on **8th October 2020** (Clean Air Day) at <http://www.uk-ems.org.uk/>

Project lead: Stefan Reis, UK Centre for Ecology & Hydrology (srei@ceh.ac.uk)
Presenter: Beth Conlan, Ricardo Energy & Environment (beth.conlan@ricardo.com)



UKRI Clean Air Programme: <https://www.ukcleanair.org/>

Information about other funded projects: <https://www.ukcleanair.org/research/wave-1/>