

Metrology framework for an integrated GHG measurement and modelling system to inform and track national climate action

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Background

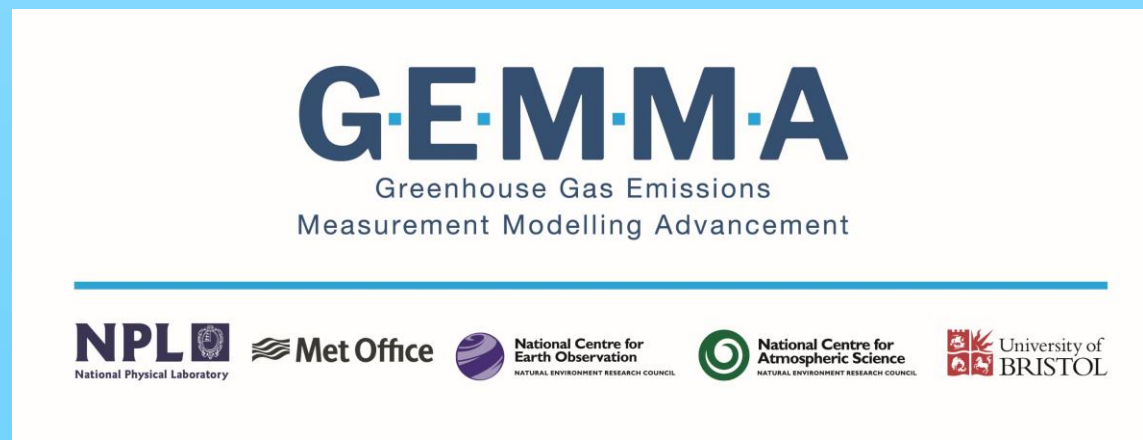
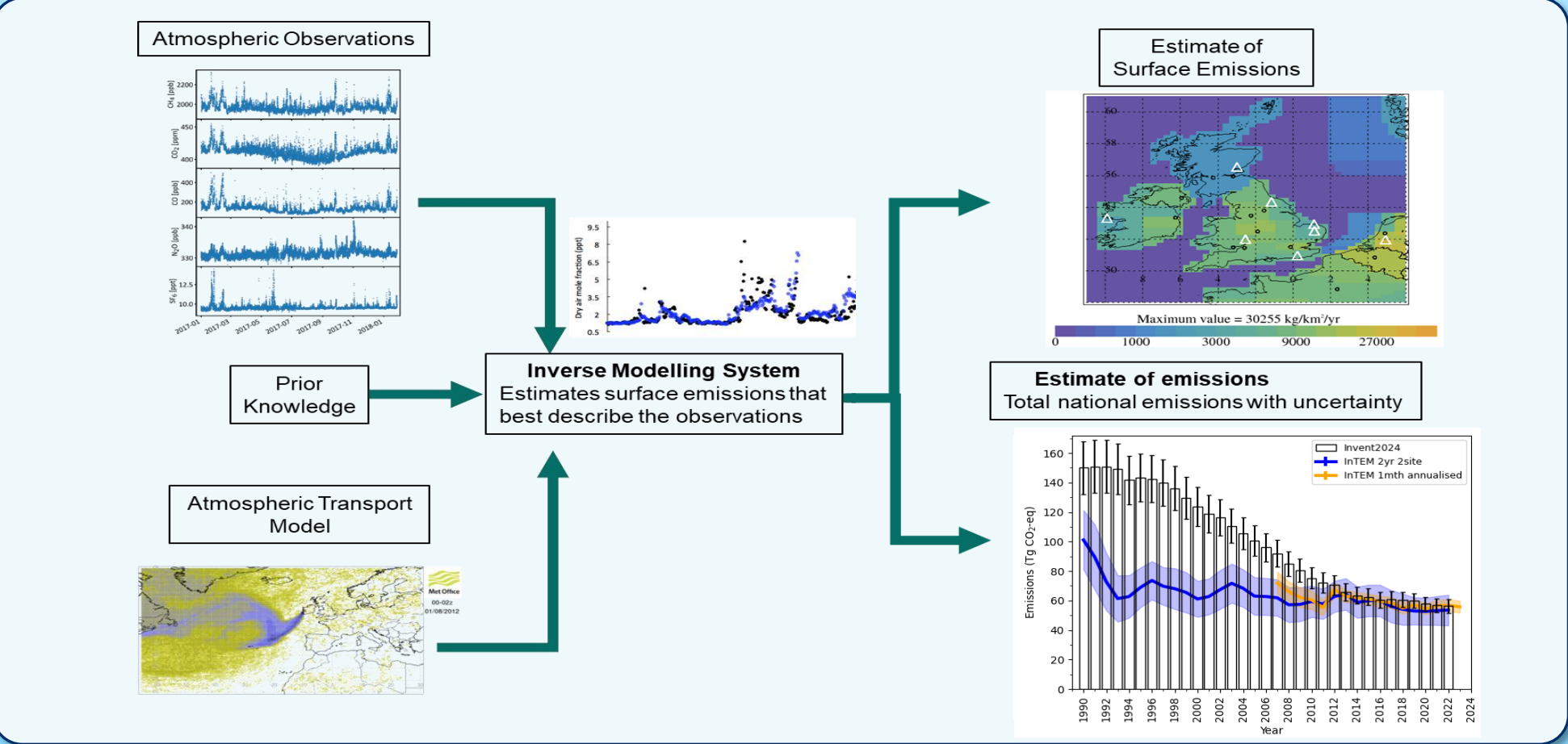
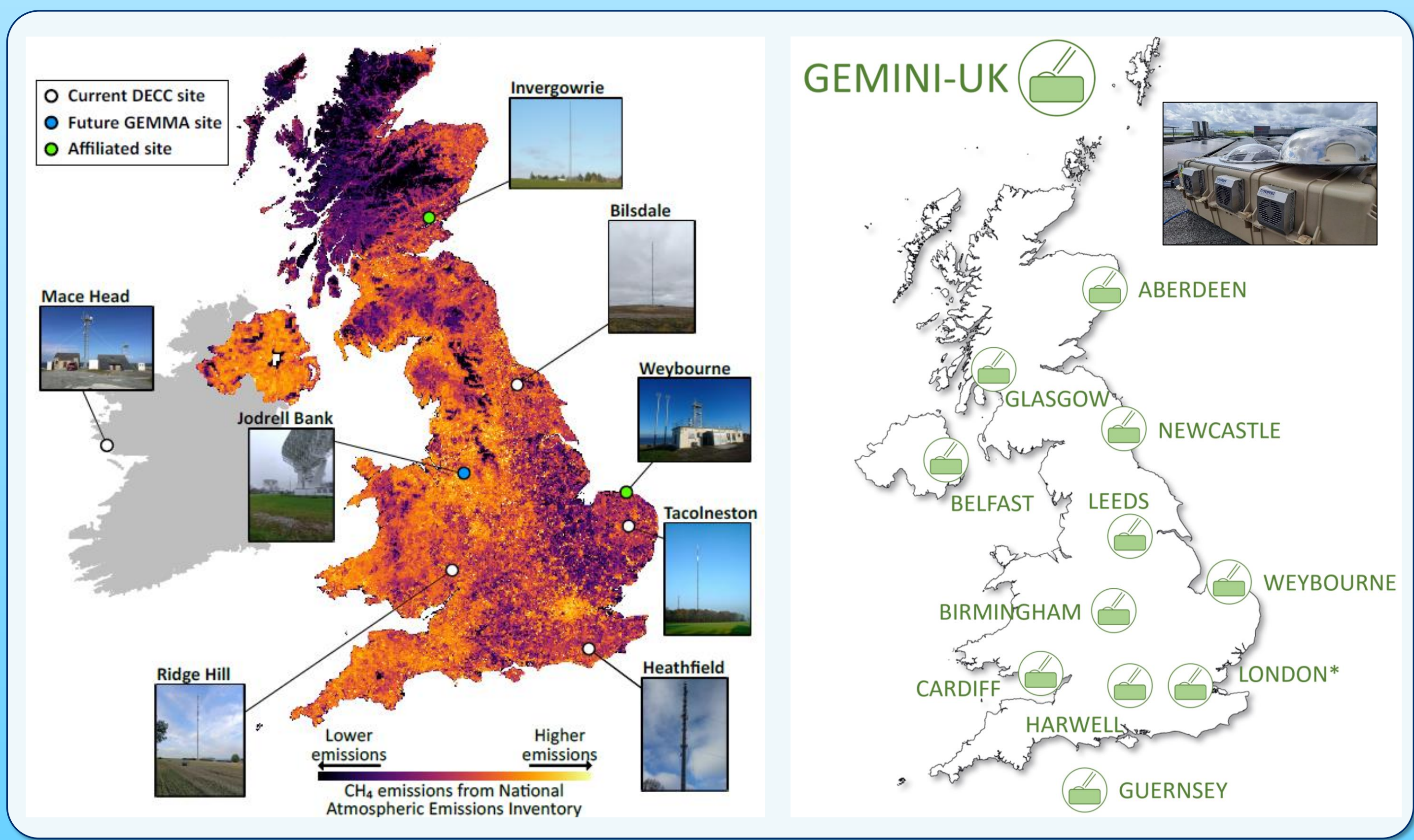
Within an international context of escalating impacts from climate change and complex landscape of diplomatic agreements seeking to mitigate further effects there is an urgent need for trustable data on the emissions and atmospheric composition of greenhouse gases (GHGs). There is opportunity and responsibility for the metrology community to respond as an impactful and impartial part of the solution.

Greenhouse gas Emissions Measurement and Modelling Advancement (GEMMA)

A key element of the framework is the GEMMA programme which is targeting spatially and temporally resolved, sector-level GHG emission estimates to track changes in emissions and the progress of GHG reduction actions. A collaborative UK team are now extending existing inventory verification capability through technical improvements including the integration of a new ground-based solar FTIR remote sensing network (Gemini-UK), the addition of new in-situ measurement capabilities and sites, with a focus on source attribution tracers. Another new element is the integration, with related uncertainty assessment, of multiple atmospheric transport and inversion models including assimilation of the new measurements and future Earth Observation data.

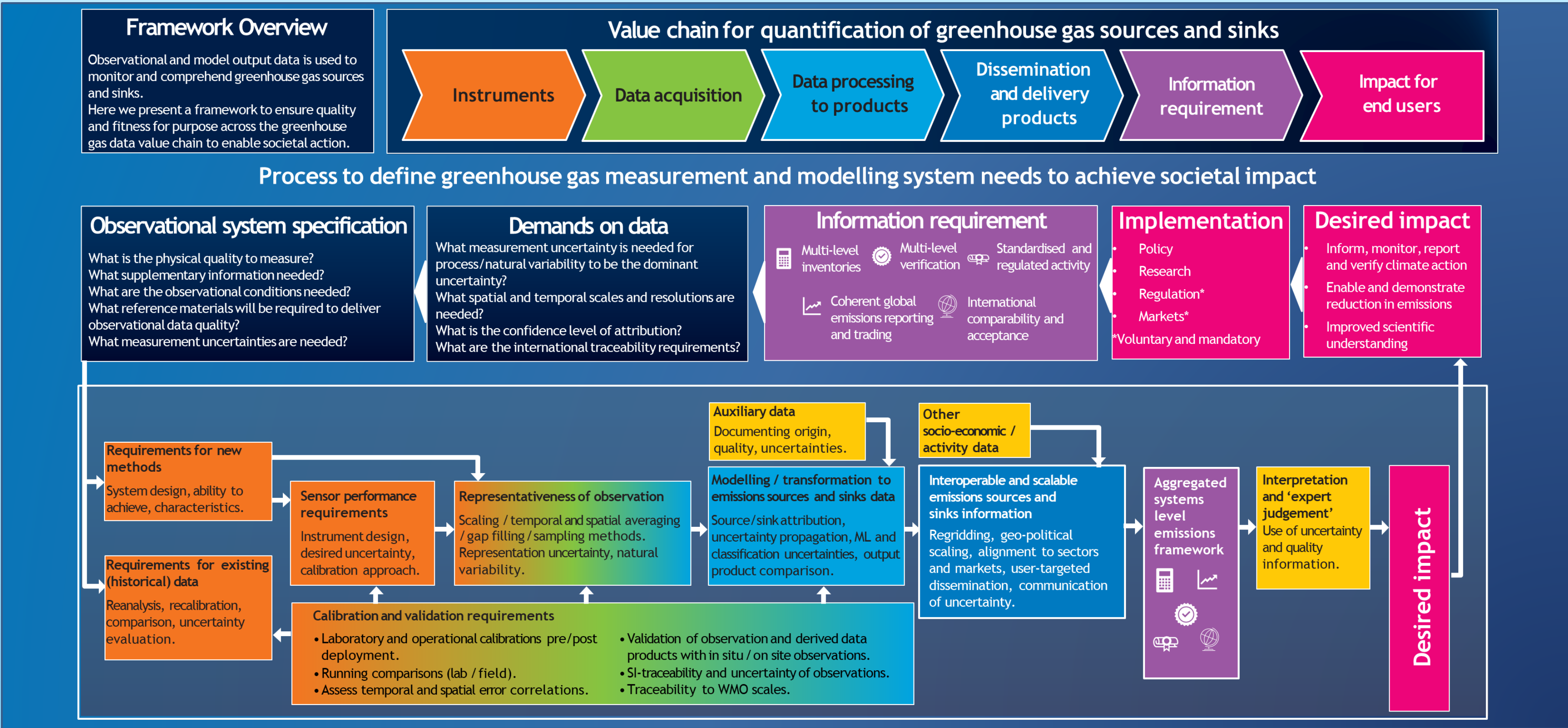
Metrology-based GHG Emissions Framework

NPL is developing a framework to ensure actionable data for GHG sources and sinks which aims to address the measurement needs of multiple stakeholders, including government, industry, researchers, and the general public. This aims to assure effective progress towards national objectives linked into a coherent global emissions reporting infrastructure as well as providing a trading framework with international comparability and acceptance.



Operational System Development

The initial three-year objective for the programme is to establish the operational requirements for a long-term national capability with the supporting quality assurance systems, automated data flows and processing, and stakeholder-focused outputs. The goal being an operational network providing sub-annual emissions updates of net-CO₂, CH₄, N₂O and F-gases, including estimates of sectoral emissions for CH₄.



International Aspects

While the GEMMA programme is primarily focused on national challenges and impact, traceability to globally-recognised GHG standards is a key element in achieving this, as is integration with various relevant international initiatives. Direct links are already in place with ICOS and GAW, and alignment with WMO-G3W activities will be an important future goal.

