

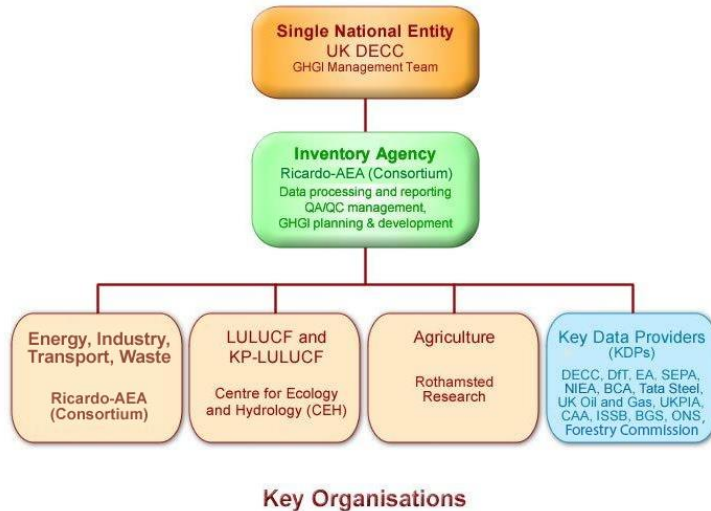
The UK National System

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15th October 2015

The National system

Structure of the National System



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The Single National Entity

- DECC is the Single National Entity and has ultimate responsibility for the Inventory
- Formal governance process within DECC to support this – Inventory signed off by head of Science & Innovation
- GHG Inventory team:
 - Manages Inventory contract (and verification contract)
 - Represents UK at international level
 - Liaises with internal (Carbon Budgets, International Climate Change) and external (public, academia, industry) stakeholders
 - Produces National Statistics and non CO2 GHG projections

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The Inventory Agency

- The Inventory Agency is responsible for the delivery of the Inventory
- The Inventory Agency undertakes the.....
 - planning
 - scheduling of tasks to deliver Inventory
 - preparation
 - agreements with key data providers
 - review of data and identification of developments to improve quality
 - management
 - documentation and archiving
 - Management of QA/QC plans and actions
 - and compilation of the Inventory
 - data acquisition, processing and reporting
 - delivery of NIR to time and quality

The Inventory Agency

- Current Inventory Agency is Ricardo Environment and Energy
- Ricardo are the lead contractors in a consortium:
 - Ricardo
 - ultimate responsibility for the planning, preparation, management and delivery of the Inventory
 - emissions estimates for Energy, Waste and IPPU
 - Aether – estimates from railways, Overseas Territories, Crown Dependencies and improvements to QA/QC plan
 - Ray Gluckman Consulting – contributions to F-gas inventory
- Separate contracts for:
 - Agriculture emissions – Rothamsted Research (Defra contract)
 - LULUCF emissions – Centre for Ecology and Hydrology (CEH)
 - Inventory Agency is responsible for incorporating these emissions estimates into Inventory



National Inventory Steering Committee

- Established to help ensure UK conforms to international obligations for producing a GHG Inventory
- Cross-Government body tasked with the official consideration and approval of the Inventory prior to submission to the UNFCCC
- Responsibilities:
 - Review the Inventory (and recalculations)
 - Respond to issues raised through the UNFCCC review process
 - Facilitate better communication between stakeholders
 - Agree priorities for the Inventory Improvement Programme
 - Ensure that the Inventory meets standards of quality, accuracy and completeness

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Inventory Improvement Programme

- Formal system for implementing Inventory improvements
- Designated budget
- Recommendations for projects based on:
 - semi-quantitative Key Category Analysis
 - feedback from Expert Review Teams
 - qualitative judgement by Inventory Agency
 - new IPCC reporting guidelines
- Proposed projects reviewed and approved by NISC
- Recent examples:
 - “Emissions estimation for IPCC 2006 Guidelines Compliance in the UK Industrial Processes sector”
 - “Analysis of volumes of landfill gas flared in the UK between 1990 and 2013”

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Legal framework

- Data acquisition is a combination of existing environmental and energy legislation and informal arrangements (with industry and trade associations)
- The Inventory Agency works closely with UK-based regulators (through the NISC, annual stakeholder meetings, periodic inventory improvement research and regular phone and email contact) to ensure a strong link and good relationship is maintained.
- **Legislation (non GHGI specific)**
 - Integrated Pollution Prevention and Control (IPPC) regulations (industry point source emission data from UK environmental regulatory agencies)
 - Statistics of Trade Act (UK energy statistics from DECC)
- **Legislation (GHGI specific)**
 - Greenhouse Gas Emissions Trading System (Amendment) and National Emissions Inventory Regulations 2005
 - Climate change act
- **Data Supply Agreements (DSAs)**

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National Atmospheric Emissions Inventory

- The Inventory Agency is also responsible for delivery of the Air Quality Pollution Inventory (under a separate contract)
- The GHGI and the AQPI together form the NAEI
- This joined up approach is beneficial because:
 - The two inventories share much of the same activity data, methodologies and models
 - Leads to resource efficiencies
 - Helps Government to better understand the activities that drive trends in air quality and GHGs

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Data sharing agreements

Annual Data Requirements			
Data Required	Key Data Provider	Deadline each year	Comments
Access to the SEPA SPRi inventory for previous years data	SEPA	15 August*	Electronic version of Scottish Pollutant Release Inventory (SPRi), including emissions where below reporting threshold. Could you please include site details such as address, post codes, grid references and permit numbers please.
Previous years EU-ETS Installation-specific fuel use and characterisation data for all sites in Scotland	SEPA	15 August	<p>EU ETS activity data, calorific values, carbon factors, oxidation factors and carbon emissions by fuel and installation for fossil fuels, 2005-onwards</p> <p>EU ETS activity data, calorific values, carbon factors, oxidation factors and carbon emissions by fuel and installation for bio fuels, 2005-onwards</p> <p>EU ETS activity data, carbon factors, and carbon emissions by installation for process emissions, 2005-onwards</p> <p>Note: Confidentiality of data will be respected and any issues that prevent the data being provided these will be highlighted at the earliest opportunity and aggregated data provided where applicable</p>

Example table of data required, taken from the SEPA DSA



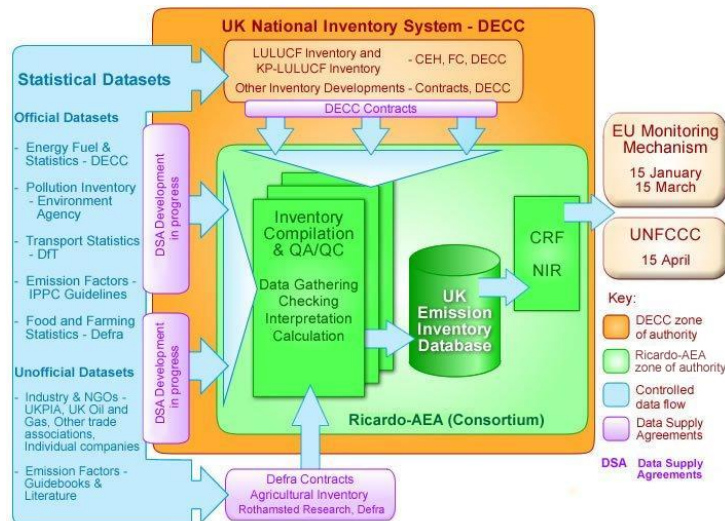
Standard table regarding data processes and quality checking used in all DSAs



<p>1. How are the data that you provide compiled by your organisation?</p> <p>e.g. "Data are compiled using company systems for financial / energy / emissions data reporting for regulatory / company performance monitoring." "Data are aggregated from across X operating sites, provided by site SHE managers."</p>
<p>2. Do you conduct any data quality checking, and if so, could you provide an outline of the process?</p> <p>e.g. "Data are sense-checked against annual data from last year, for each site and overall". "We have a checklist of sites / emission sources / companies that we use to ensure that all data are included". "Emission and energy use estimates are benchmarked against production output at each site". "Our organisation has a quality assurance system accredited to ISO9001 and ISO14001, and these data fall within the scope of that accreditation".</p>
<p>3. What is your estimate for the level of uncertainty associated with the data that you provide to the NAEI/GHG?</p> <p>e.g. "Our carbon dioxide emission estimates are within a 2% error margin, due to the close control over fuel quality". "Our estimates for pollutant X stem from emission monitoring trials which have an uncertainty on the standard method cited as plus or minus 15%". "We are reliant on data from many other third parties and are unable to provide a reliable estimate for the data uncertainty."</p>

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How it works to produce an Inventory



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Data collection and processing

Key Data Providers

- Key data providers have a formalised role within the NIS, with defined responsibilities:
 - Delivery of data in appropriate format in sufficient time (including QC)
 - Assessment of their own data acquisition, reporting and QC systems
 - Identification of organisational developments required to meet changing NIS requirements
- The National Inventory System provides reassurances about data confidentiality but not absolute guarantees

Table of data suppliers by category:

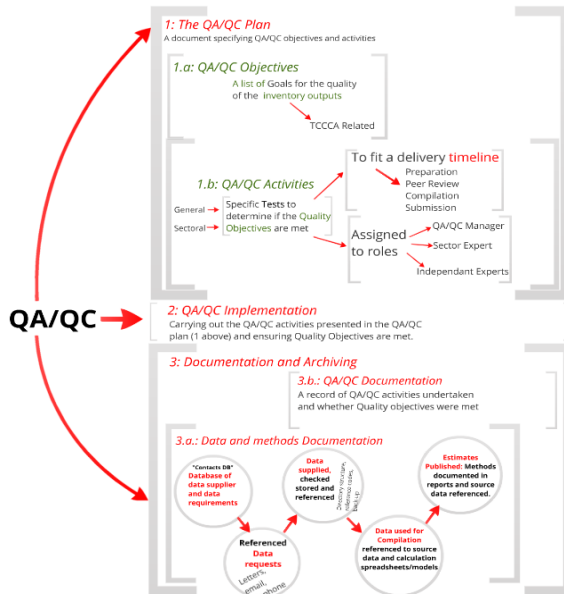
- Government Statistics
- Industry/Trade association reporting/Company data
- Other Statistics

Source (and publisher)	Relevant activity data contained in the source
Digest of UK Energy Statistics (UK Department of Energy and Climate Change)	<ul style="list-style-type: none"> Energy statistics for the UK (imports, exports, production, consumption, demand) of liquid, solid and gaseous fuels; and Calorific values of fuels and conversion factors.
Emissions Trading System (EU ETS regulatory agencies in the UK; data supplied via UK Department of Energy and Climate Change)	<ul style="list-style-type: none"> Emissions from installations and characteristics of fuels consumed. Energy data are aggregated by sector and used to inform inventory estimates. Fuel quality data are used to derive up to date carbon emission factors for major fuels in energy intensive sectors.
Transport Statistics GB (UK Department for Transport)	<ul style="list-style-type: none"> Vehicle km according to vehicle type and road type; Vehicle licensing statistics (split in vehicle km by fuel type); and Selected domestic and international civil aviation aircraft km flown. Automatic Number Plate Recognition (ANPR) data used to help define fleet composition on different road types in the UK.
Northern Ireland Statistics: Inventory of Statutory Releases, transport data (NI Department of the Environment, NI Department for Regional Development)	<ul style="list-style-type: none"> Traffic count and vehicle km data for Northern Ireland; and Information on regulated processes in NI.
Civil Aviation Authority	<ul style="list-style-type: none"> Detailed domestic and international civil aviation aircraft km flown.
Pollution Inventory (Environment Agency)	<ul style="list-style-type: none"> Information on emissions from regulated processes in England and Wales.
Scottish Pollutant Release Inventory (Scottish Environment Protection Agency)	<ul style="list-style-type: none"> Information on regulated processes in Scotland.
United Kingdom Petroleum Industry Association	<ul style="list-style-type: none"> Refinery emissions; Lead and sulphur contents of fuels, benzene content of petrol, RVP of petrol.
Environmental Emissions Monitoring System (EEMS) (DECC Offshore Inspectorate)	<ul style="list-style-type: none"> Detailed inventory of oil and gas emissions.
UK Iron and Steel Industry Annual Statistics (International Steel Statistics Bureau)	<ul style="list-style-type: none"> Energy production and consumption in the Iron and Steel industry; and Other statistics regarding the Iron and Steel industry.
United Kingdom Minerals Yearbook (British Geological Society)	<ul style="list-style-type: none"> Statistical data on minerals production, consumption and trade.
Annual Abstract of Statistics (Office for National Statistics)	<ul style="list-style-type: none"> Population data.

Software tools

- Predominantly reliant on excel/access but currently moving to a MySql platform
- MySql is more stable, has larger storage capacity, better version control and increased functionality for further improvements
- The Inventory also uses a number of models (as opposed to simply activity*emissions factor) to estimate emissions
 - Examples include shipping, closed coal mine, refrigeration and air conditioning, soil carbon
 - All built in Excel, with one exception (soil carbon – CARBINE) in Fortran

QA/QC



• **The QA/QC Plan** - defines Quality Objectives and QA/QC activities needed. The plan assigns roles, responsibilities and a timeline for completion of QA/QC activities.

• **QA/QC implementation** - includes the physical undertaking of the QA/QC activities throughout the data gathering, compilation and reporting phases of the annual emission estimation cycle and in accordance with the QA/QC plan.

• **Documentation and archiving** - includes a) transparent documentation of all data sources, methods, and assumptions; b) transparent documentation of all QA/QC implementation including records of activities undertaken, findings, recommendations and any necessary actions; and c) archiving.

Core elements of QC

Referencing

- What data is used
- Where does it come from



What is
used?

Documentation

- How is data used
- What assumptions are used



How is it
used?

Checking

- Are we meeting data quality objectives
- Identify errors, systematic problems



Are we
sure?

QC in practice – core procedures

- A comprehensive database of contacts
 - tracks all data sources and suppliers and all outputs delivered from Inventory
- Individual data processing tools
 - used to convert majority of source data into activity data and emission factors
 - includes sector specific checks QC checks (e.g. mass balance)
 - general QC checks (e.g. time series consistency, input/output)
 - QC sheet for documentation, version control, checking notes

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QC in practice – core procedures

- A core database (NAEI database) of AD and EF
 - Basis of all reporting
 - Fully transparent, referenced and automated (to avoid transcription errors)
- Data extraction checking routines and procedures
 - Input/output checks for core data
 - CEH and Rothamsted data
 - Mass/Energy balances, DUKES
 - Key UK sources and models
 - Data exported (e.g. to CRF) then checked against direct database output totals

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An evaluation of the UK NIS

Good points

- It works! As demonstrated by successfully enabling the UK to report it's GHG emissions and the stability of the system over many years
- System is robust – was easy to adapt to requirements of MMR
- An example of the NIS in action:
 - Improved QA/QC processes
 - Single National Entity identifies opportunity for strategic development
 - Reviewed by NISC
 - Currently being successfully implemented by Inventory Agency

Good points

- Because the contract to the Inventory Agency lasts for 3-5 years, this forces a regular review of the National System
- Benefits of the NIS structure:
 - Easy access to expertise that does not exist within Government
 - Private company has access to experts who can devote part of their time to the Inventory – leads to efficiency savings
 - Competition and private sector involvement leads to cost savings and enables us to satisfy wider government requirements
 - As the day to day work is done by third party, Government has more resources to devote to important related activities
- Expertise also inputted through NISC

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Negative points

- Contracting the work out introduces risks during handover to new Inventory Agency
- Delays due to need to follow government procurement rules (these would exist regardless but are enhanced)
- Drawbacks of the NIS structure:
 - Project management challenges of managing contract with private sector and academic institutions
 - Important to align different approaches to QA/QC
 - Extra complexity in management

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Recommendations

- Data acquisition is everything. Have a strong understanding of what data is available, how you can access it and what may become available in the future
- Work very hard to get buy-in from the people you want data from. Get their support (high-up if necessary)
- Make sure effort is proportional
- Clear lines of responsibility – make sure everyone knows who is responsible for what and that there is strong accountability
- Having a plan for improvement is more important than being able to do everything from the start

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Questions



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