MRV systems at different aggregation levels

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Tracking Progress and MRV for Greenhouse Gas Emission Reductions

This presentation

- Objectives and principles of a domestic MRV system
- Top-down vs bottom up
- Standardisation and coordination
- Example cases
- Summary

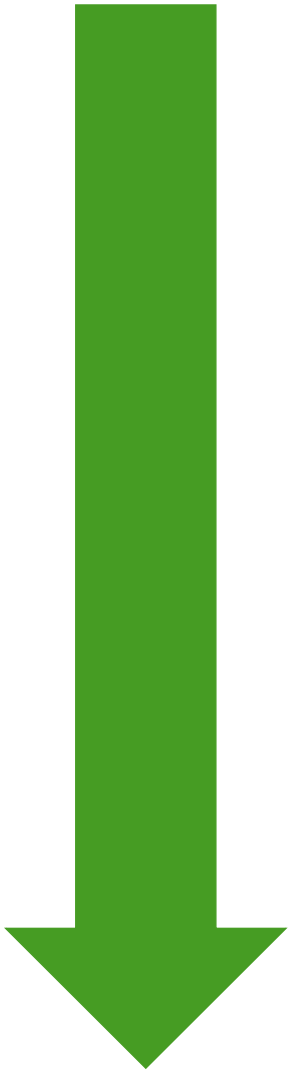
Objectives of a domestic MRV system

- Clear picture of mitigation measures
  - To increase transparency
  - To inform future decisions on climate change responses
- To provide an assessment of the impacts and effectiveness of climate change response measures
  - Emissions impacts
  - Non-GHG impacts: co-benefits, negative impact, transformational change
  - Costs
- A more efficient, joined-up approach to mitigation MRV

Principles

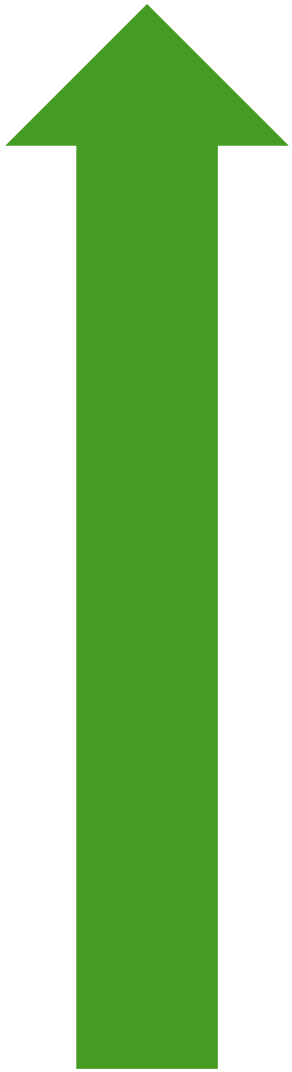
- Simplification
- Timeliness
- Accuracy
- Transparency and confidentiality
- Relevance
- Influential (on policy development)
- Flexibility (but also certainty)
- Good communication and cooperation

Domestic MRV: Top-down vs bottom-up

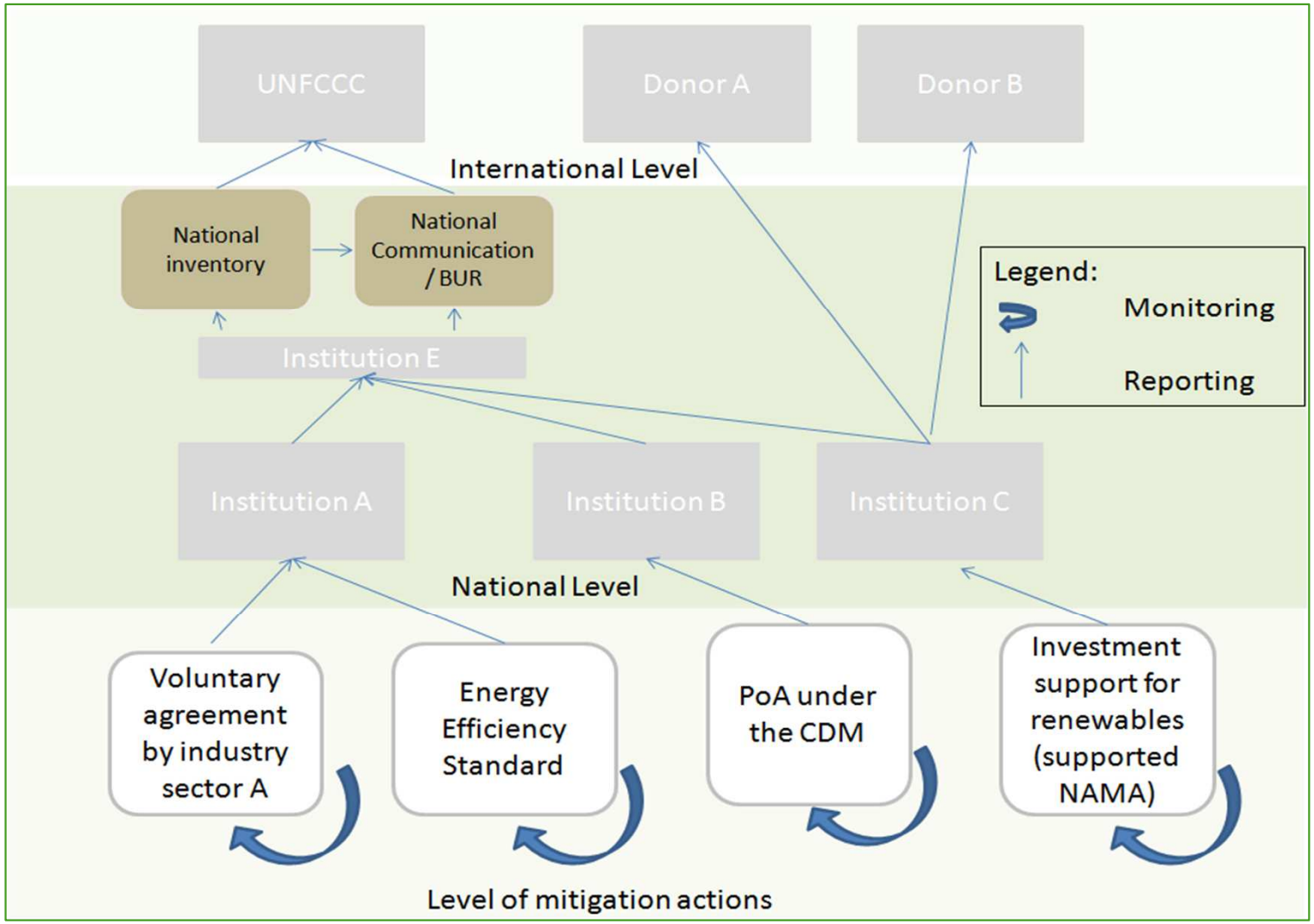


Top down:
Start from the big picture, analyse impacts of measures

Bottom-up:
Start from measures, aggregate to form big picture



Typical levels of a bottom-up approach



Various data collected and evaluated/aggregated by several institutions and reported again to several institutions.

Consistency?
Comparability?
Overlaps?
Gaps?

What can be added up?

If you want a MEANINGFUL result you should only add up comparable information, meaning information which is

- Of the same type
- Of comparable accuracy
- Using the same units
- Based on the same assumptions (e.g. related to a baseline) and the same approaches (e.g. using the same emission factor)
- Free from overlaps

Alternatives to Aggregation

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Assessing effectiveness of measures:

- How have GHG emissions developed? -> inventory
- How have other effects developed? -> Existing inventorisation/statistics (e.g. air quality, job creation) or dedicated assessments
- Was a mitigation measure successful? -> policy design, analysis of drivers, process indicators, ex-post estimations
- Why was it not successful? -> in-depth analysis of drivers

-> increase comparability through standardisation where cost-effective
-> find alternative solutions where this is not the case, e.g.

- Assessment of cumulative effects of measures at sectoral level
- Qualitative or semi-quantitative assessment of transformational changes and co-benefits

Example Case: Inventories of UK Devolved Administrations

Regional Inventory Compilation Approach

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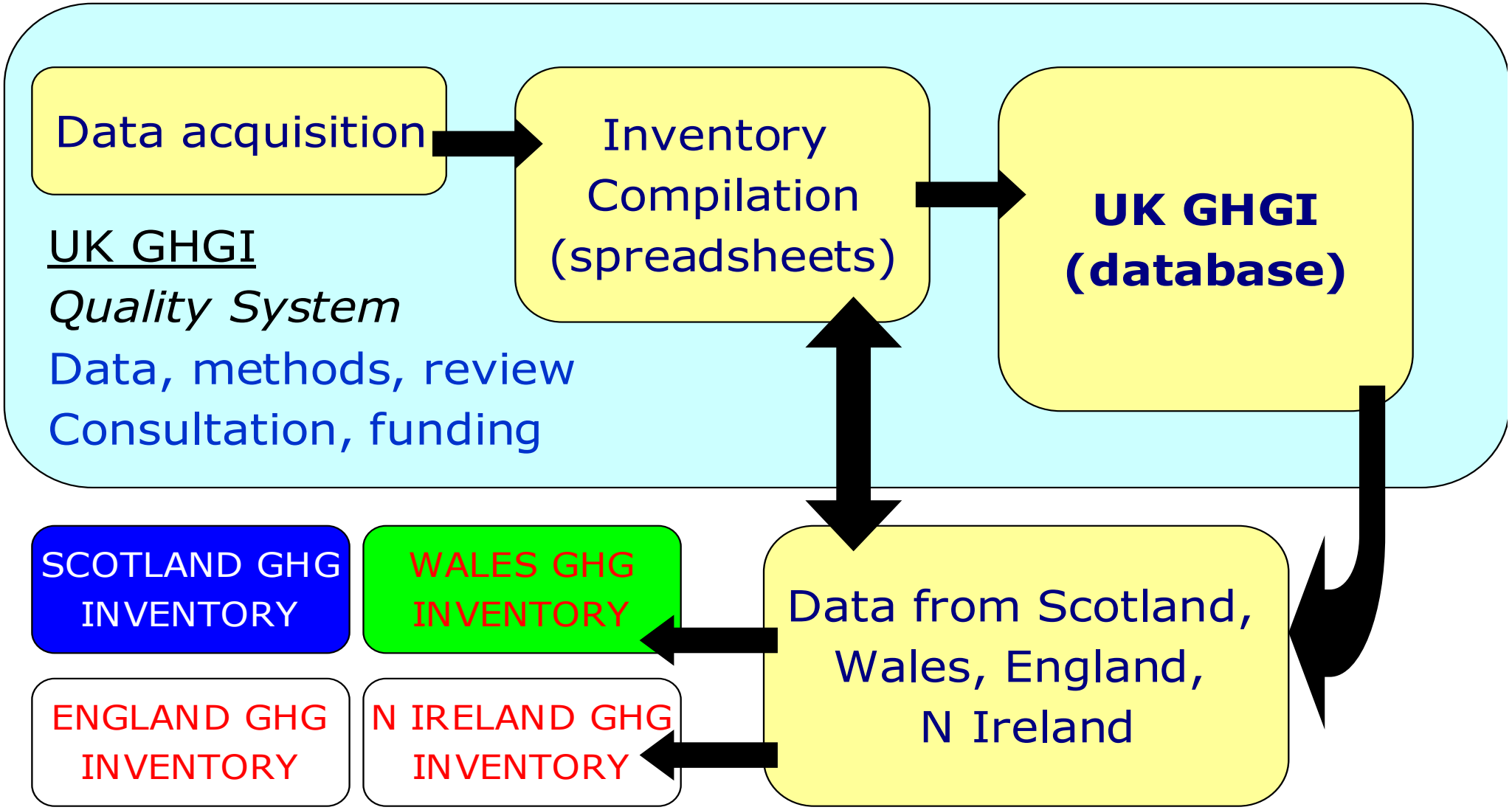


Example Case: MRV of UK Climate Change Act

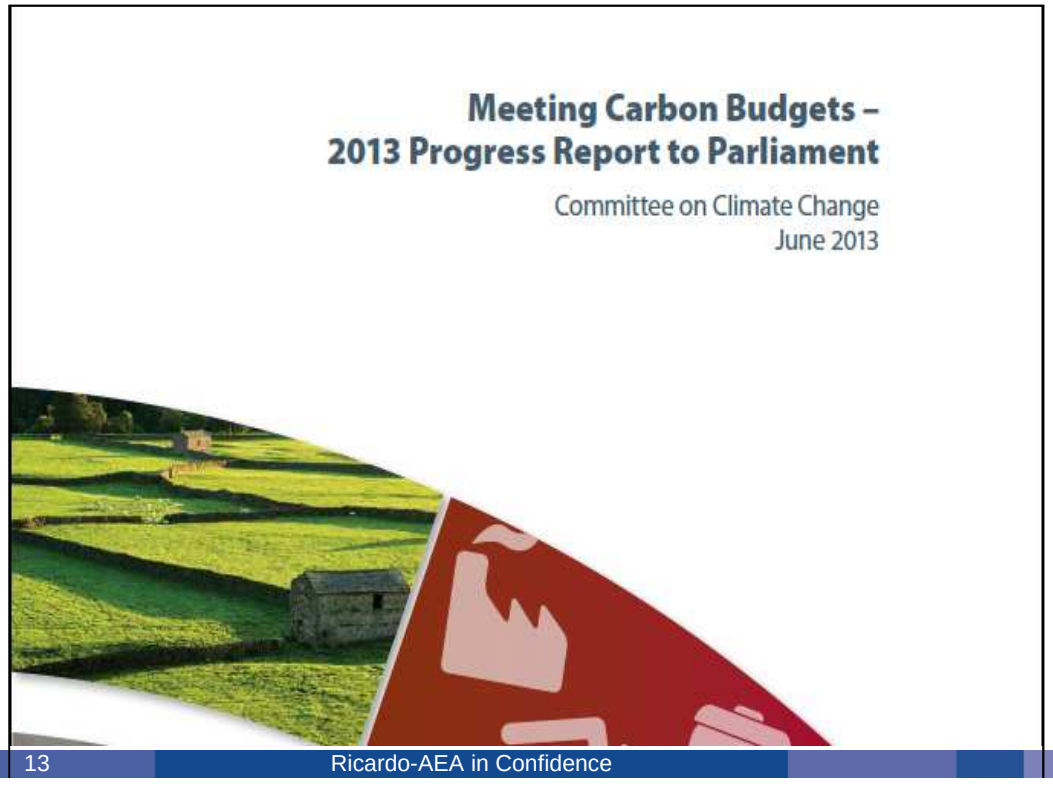
UK Climate Change Act 2008

- Requires Government to set 5 year carbon budgets, with first 3 carbon budgets being set by June 2009, and later carbon budgets being set 11 ½ years before they start
- Requires Government to meet these carbon budgets
- Sets up the Committee on Climate Change
- Requires Government to report annually to Parliament on emissions levels
- Requires CCC to report annually to Parliament on progress in meeting carbon budgets

CCC	Government
• Advising on level of carbon budgets • Monitoring progress	• Setting carbon budgets • Meeting carbon budgets

Basic Approach

- Causality not always straightforward – many potential drivers to emission development
- CCC Approach:
  - Define indicators based on relevant effects as well as drivers
  - Develop indicator trajectories based on expected developments
  - Collect indicators values annually (emissions from inventory)
  - Compare collected indicator values with trajectories



Report can be found under: http://www.theccc.org.uk/publication/2013-progress-report/

Budgets, trajectories and real emissions

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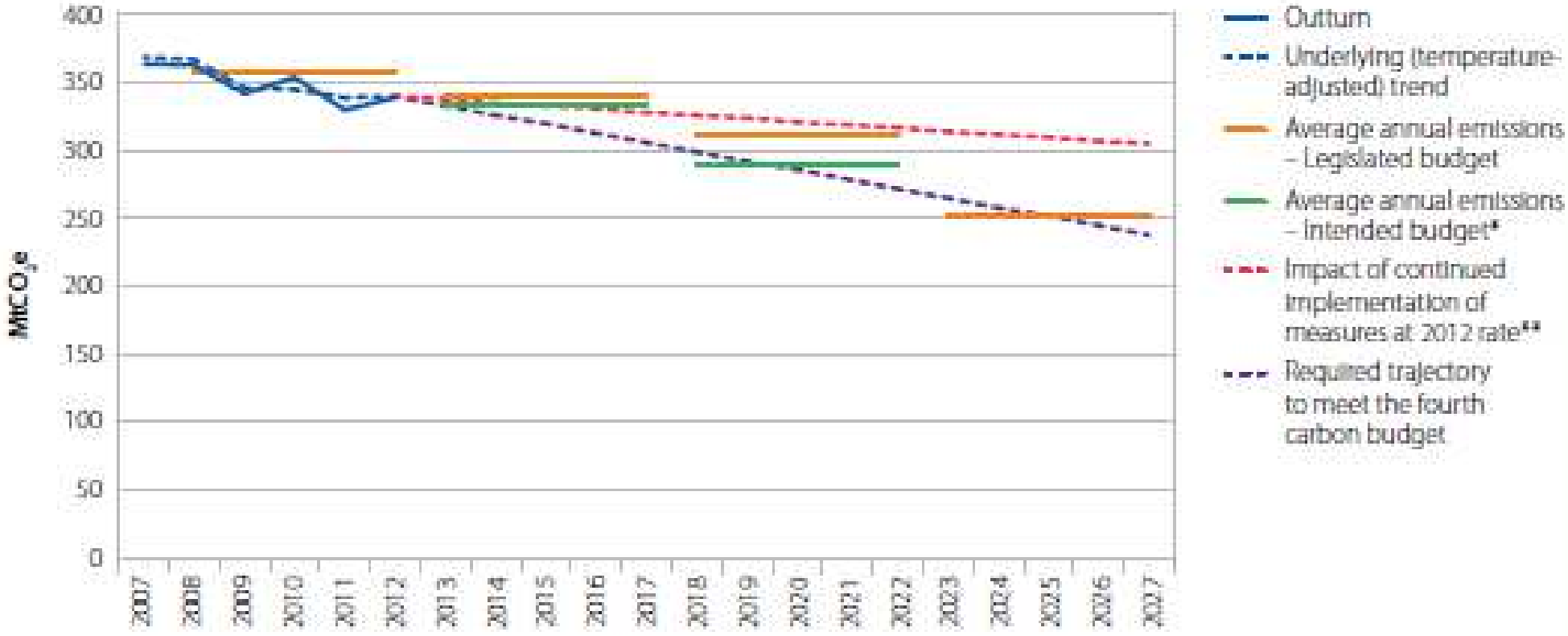
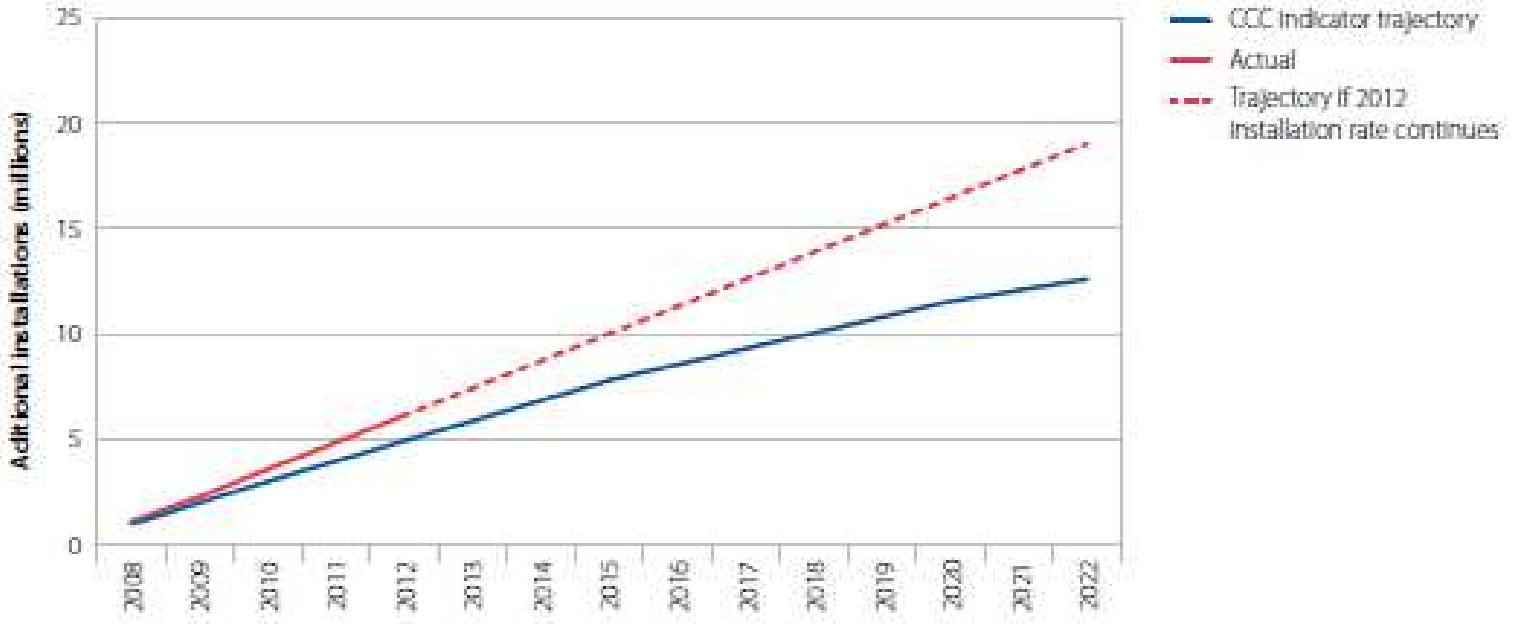
Figure 1.8: Non-traded sector emissions based on continued implementation of measures at 2012 rate (2007-2027)



Source: NAEI (2013); DECC (2013) *2012 UK Greenhouse gas emissions, provisional figures*; European Commission (2013) *Verified Emissions for 2008-2009-2010-2011-2012 and allocations 2008-2009-2010-2011-2012*; DECC (2012) *Updated Emissions Projections*; CCC calculations.

Notes: *As proposed in our 2008 report, the Intended budget (2008-2022) corresponds to the UK share of an EU 30% 2020 target. We recommended it should be enacted in the context of a global deal to reduce emissions. **Based on the Baseline scenario from DECC (2012) UEP, net of estimated savings ensuing from continued uptake of measures at the rates seen in 2012, until 2027 or until full potential is realised (e.g. all lofts have been insulated), whichever is sooner. Trajectory has been smoothed.

Figure 3.11: A-rated boilers cumulative installations (2008-2022)



Source: DCLG (2012) Housing statistics – Table 241, Heating and Hot Water Industry Council (2013); CCC calculations.

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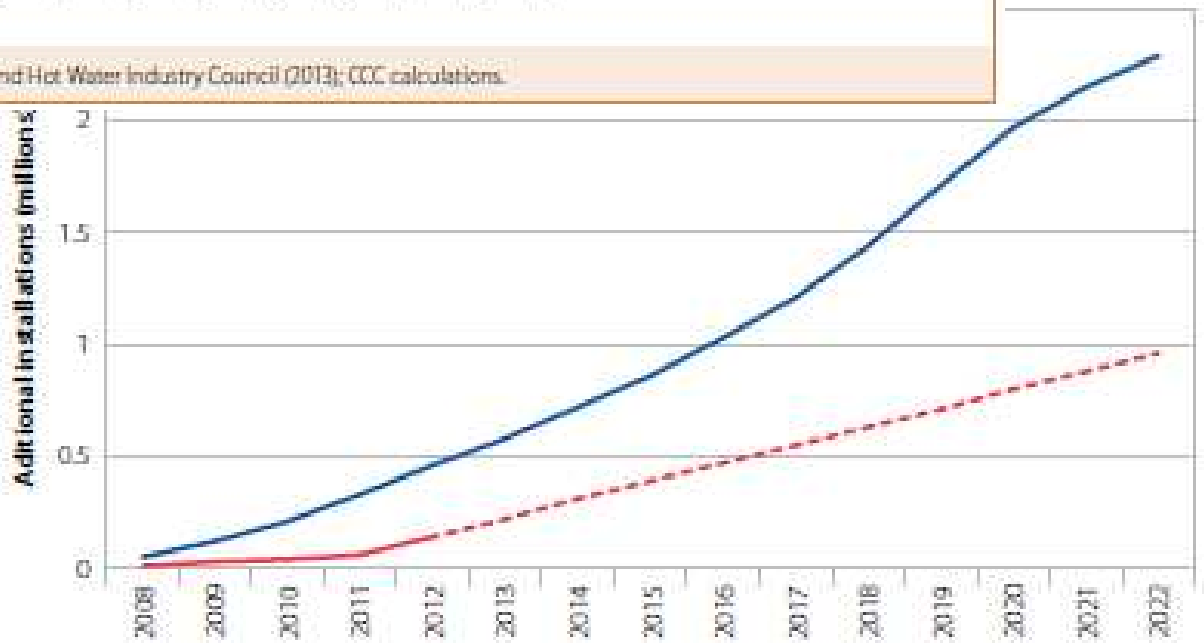
Source: NAEI (2013), DECC (2013), *Energy Trend*
Notes: 2012 emission estimates are provisiona

- Emissions rose by 12%
- Direct emissions rose
- Indirect emisions incre
  intensity (fuel switch fr
- Overall downwards ter



Source: Ofgem (2012 and 2013), DECC (2012) Estimates of home insulation levels in Great Britain; CESP data; CCC Calculations.

SW4

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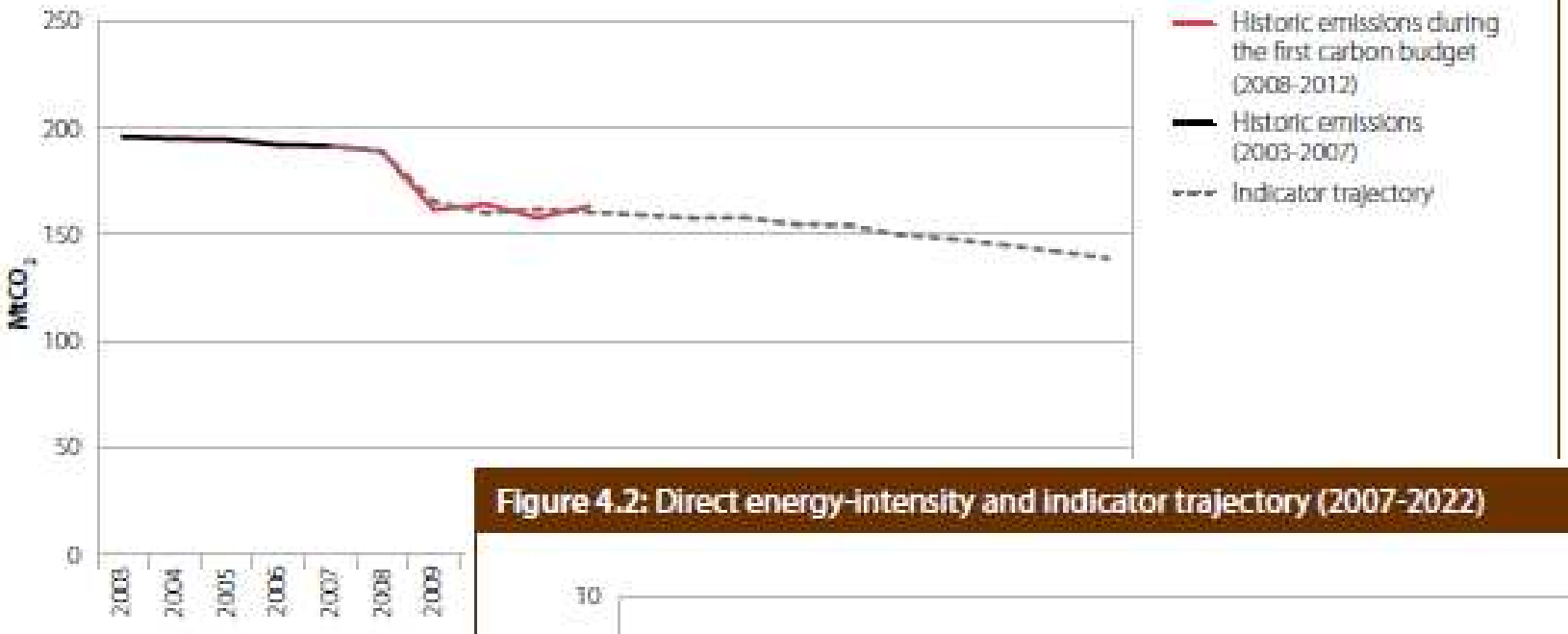
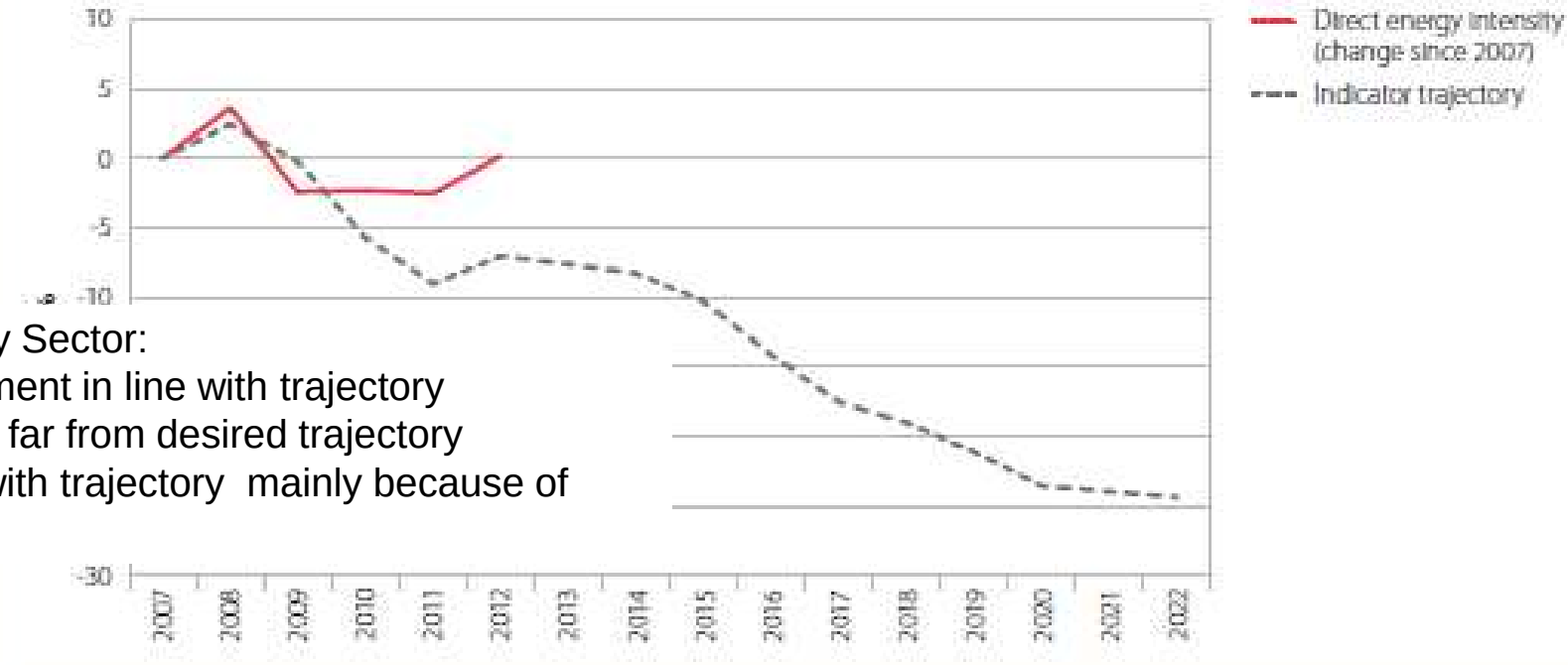
ure 4.3: Historic emissions vs indicator trajectory (2003-2022)



Source: NAEI (2013); DECC (2013) *Energy Trends*, Marc
Notes: 2012 emission estimates are provisional.

Figure 4.2: Direct energy-intensity and indicator trajectory (2007-2022)



Source: DECC (2013) *Energy Trends*, March 2013; DECC (2012) DUKES 2012; ONS (2012) *Index of Production*; CCC calculations.
Notes: This chart shows energy-intensity for direct fuels only (ie. non-electricity).

Energy Efficiency in the industry Sector:

- Absolute emission development in line with trajectory
- Key driver energy efficiency far from desired trajectory
- Absolute emissions in line with trajectory mainly because of economic downturn

SW4 James, this will be animated.
Sina Wartmann; 12.08.2013

Summary

- Bottom-up approaches provide detailed information but aggregation can be a problem
- Top-down approaches might not always provide required level of detail, e.g. when reporting to NAMA donors
- Standardisation and coordination can improve comparability in top-down approaches
- Accept the limits of comparability and consider alternative approaches
- In practice a combination of top-down and bottom-up is likely to provide good results

Sir Harry Ricardo
(26 January 1885 – 18 May 1974)

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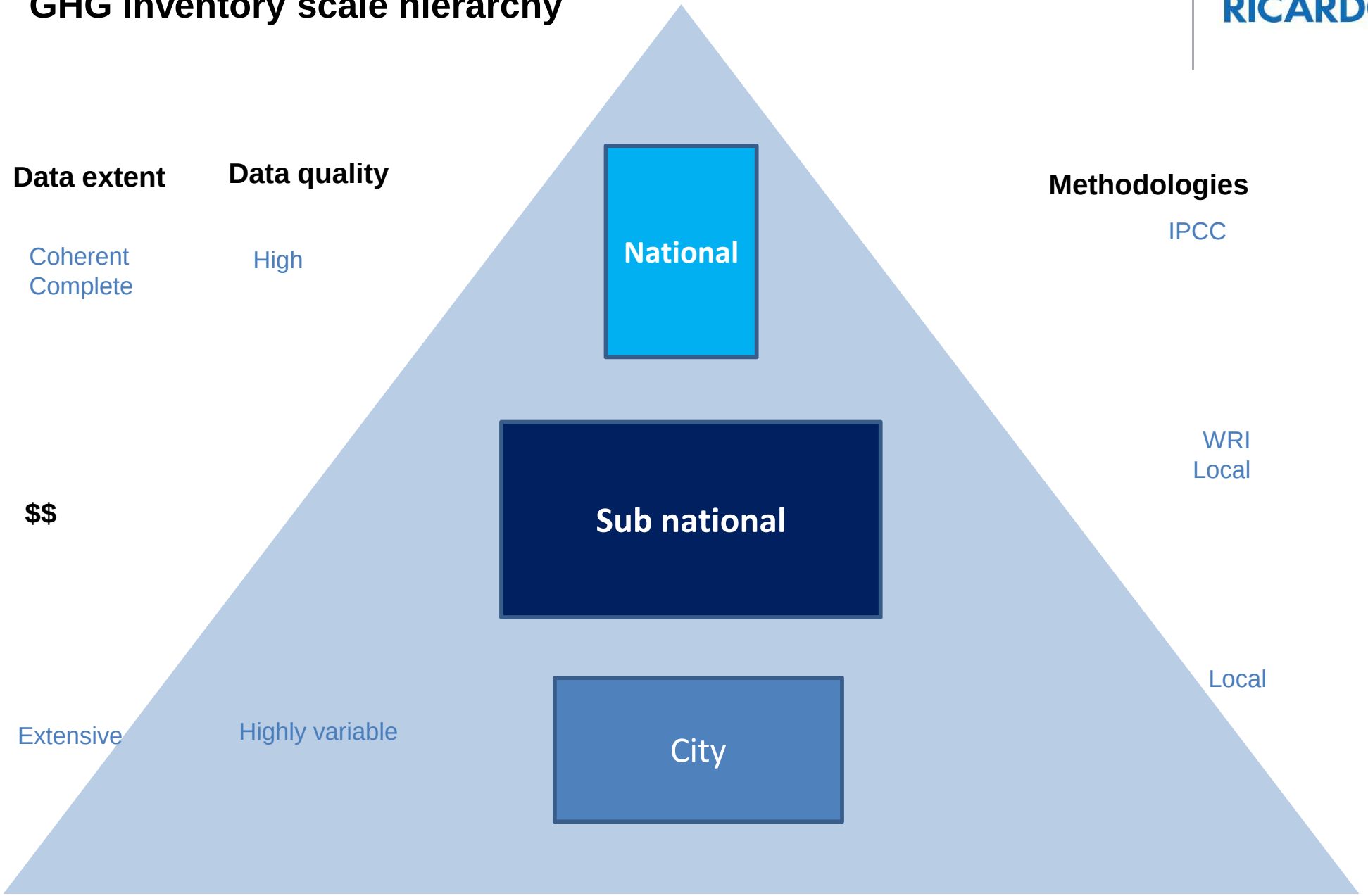
Residential buildings

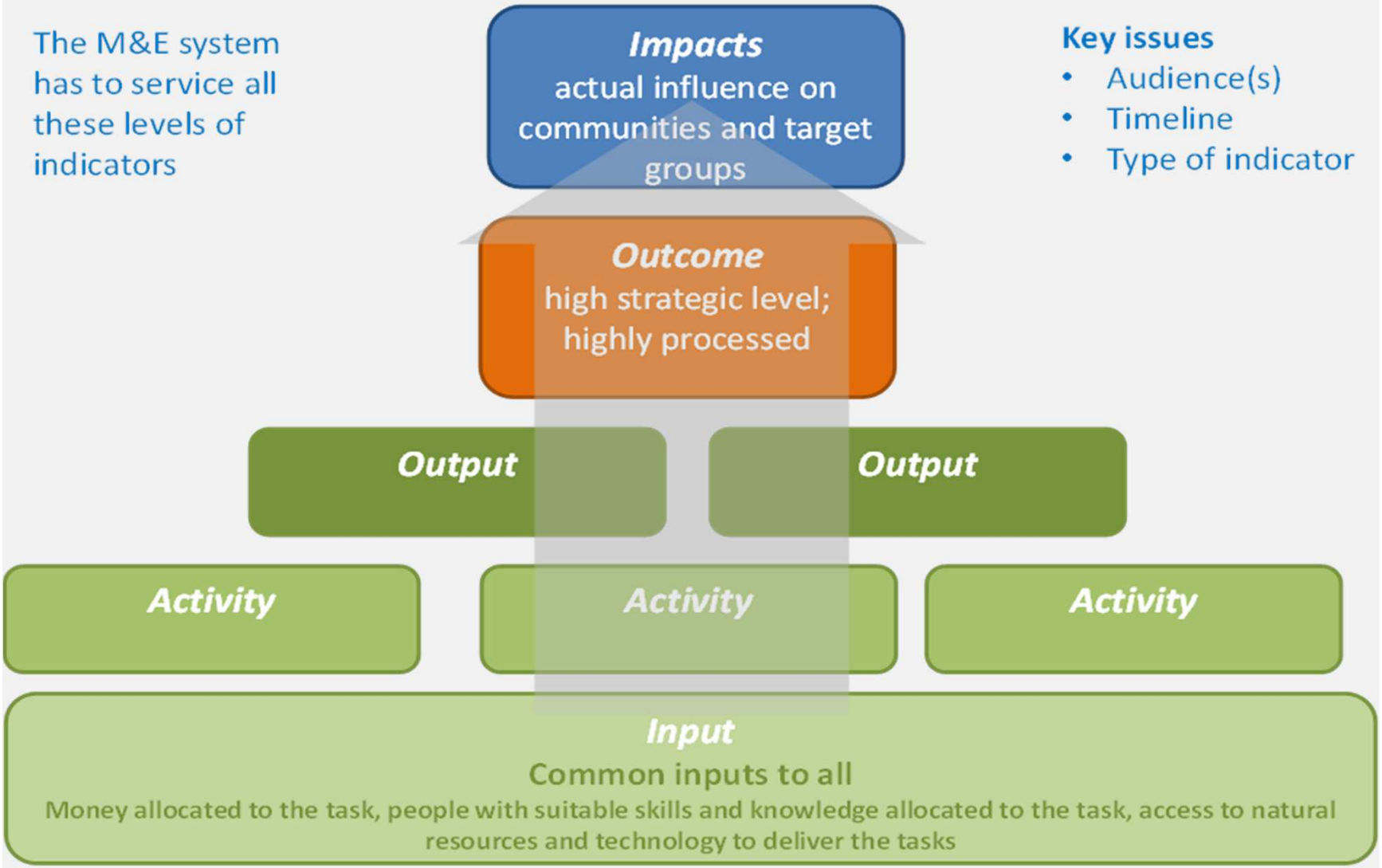
Headline indicators		Target value Budget 1	Target value Budget 2
CO_2 emissions (indicative minimum % change on 2007)**	direct	-8%	-22%
	indirect*	-17%	-28%
Final energy consumption (indicative minimum % change on 2007)	non-electricity	-6%	-18%
	electricity	-5%	-4%
Supporting indicators			
Uptake of solid wall insulation (million homes, total additional installations compared to 2007 levels)		0.5	1.2
Uptake of loft insulation (up to and including 100 mm) (million homes, total additional installations compared to 2007 levels)		2.3	5.6
Uptake of loft insulation (100 mm +) (million homes, total additional installations compared to 2007 levels)		2.0	4.9
Uptake of cavity wall insulation (million homes, total additional installations compared to 2007 levels)		3.9	8.1
Uptake of energy efficient boilers (million homes, total additional installations compared to 2007 levels)		4.9	9.3
Uptake of energy efficient appliances – cold A++ rated (% of stock)		3%	18%
Uptake of energy efficient appliances – wet A+ rated (% of stock)		16%	40%
Every house offered whole-house energy audit			By 2017

GHG inventory scale hierarchy



Hierarchy and flow of indicators

The M&E system has to service all these levels of indicators



Key issues

- Audience(s)
- Timeline
- Type of indicator

Implementation considerations

Define Requirements and Outputs Upfront

Identify and Develop Key Datasets and data requirements

Identify and Engage Key Stakeholders

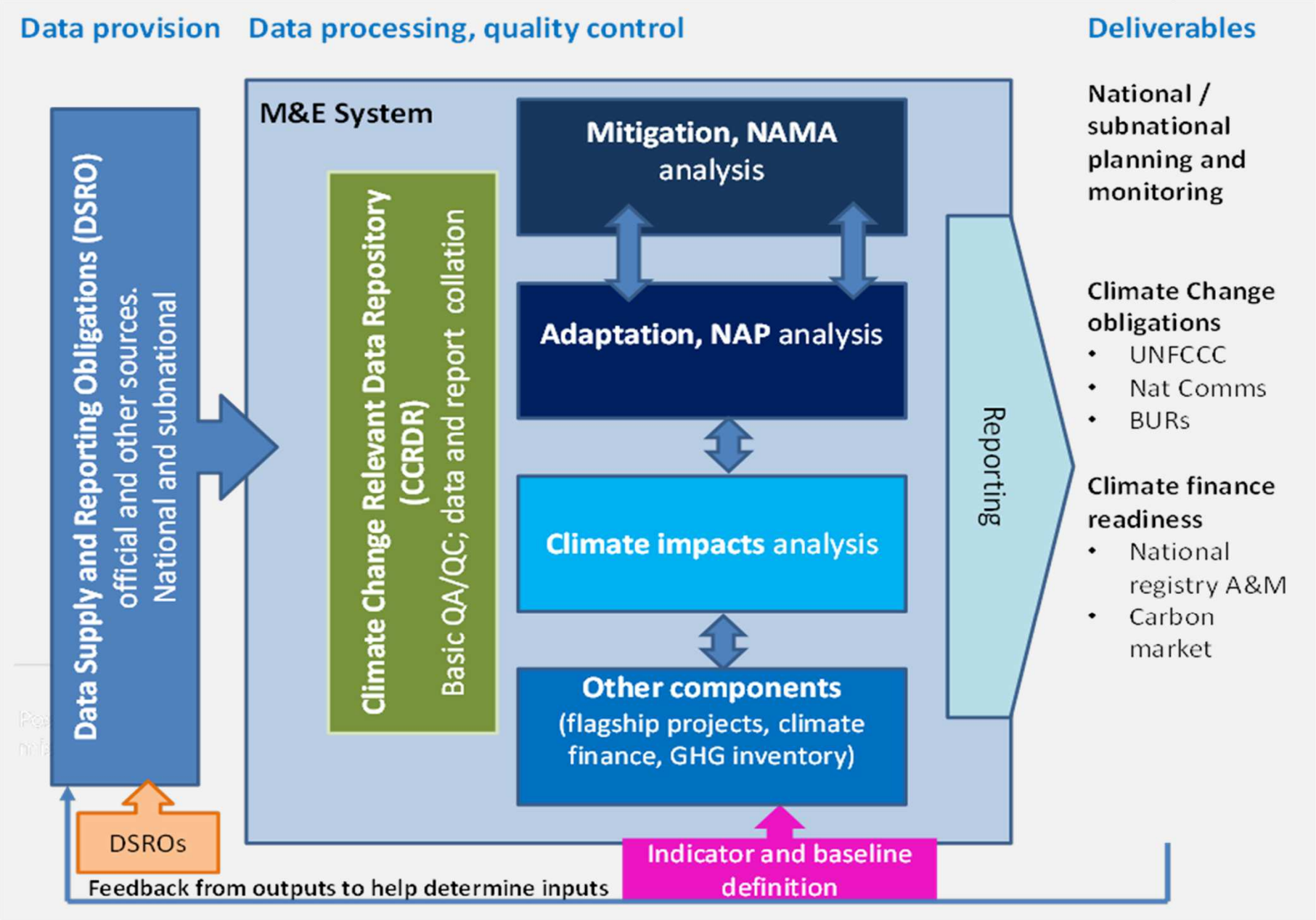
M&E stocktake and gap analysis

Develop a Management Framework

On-going Improvement Programme

Capacity, Capability and Training

Elements of an MRV system



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SW7 James, would you have the original slide where the elements can be changed?
Sina Wartmann; 12.08.2013

Typical Barriers to Aggregation at national level

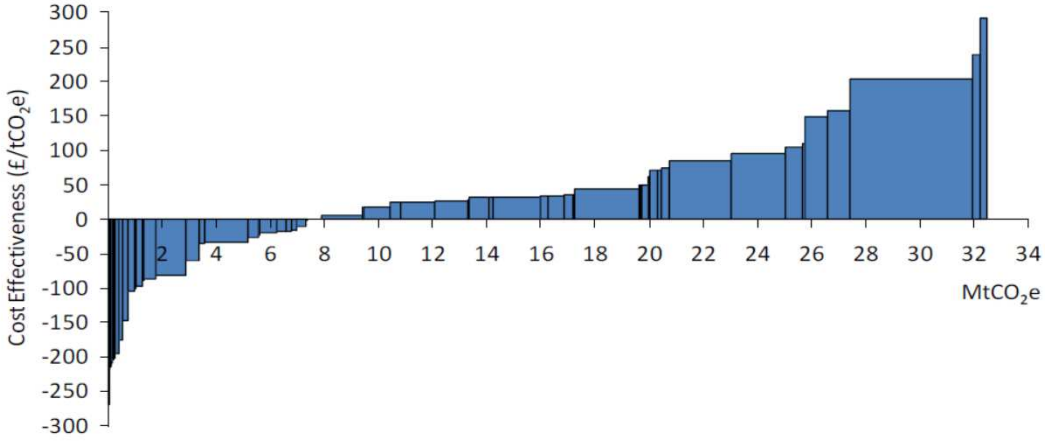
- Gaps or overlaps
- Data not comparable due to:
  - Differences in scope
  - Assumptions/approaches
  - Units
- Attribution
- Qualitative nature of data

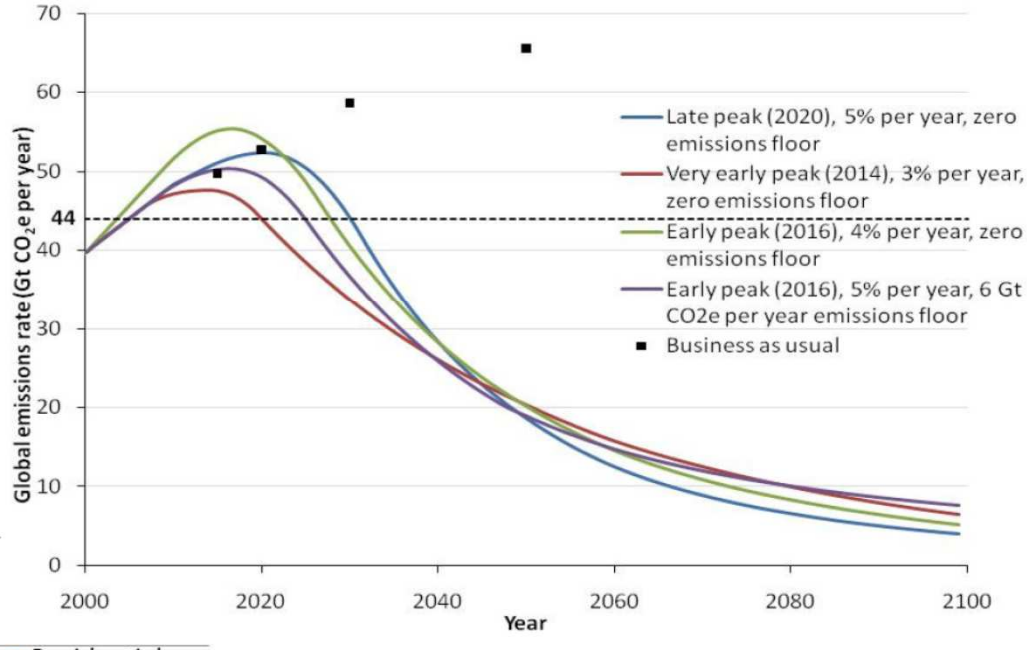
-> MRV system has to ensure completeness and strive for comparability of data

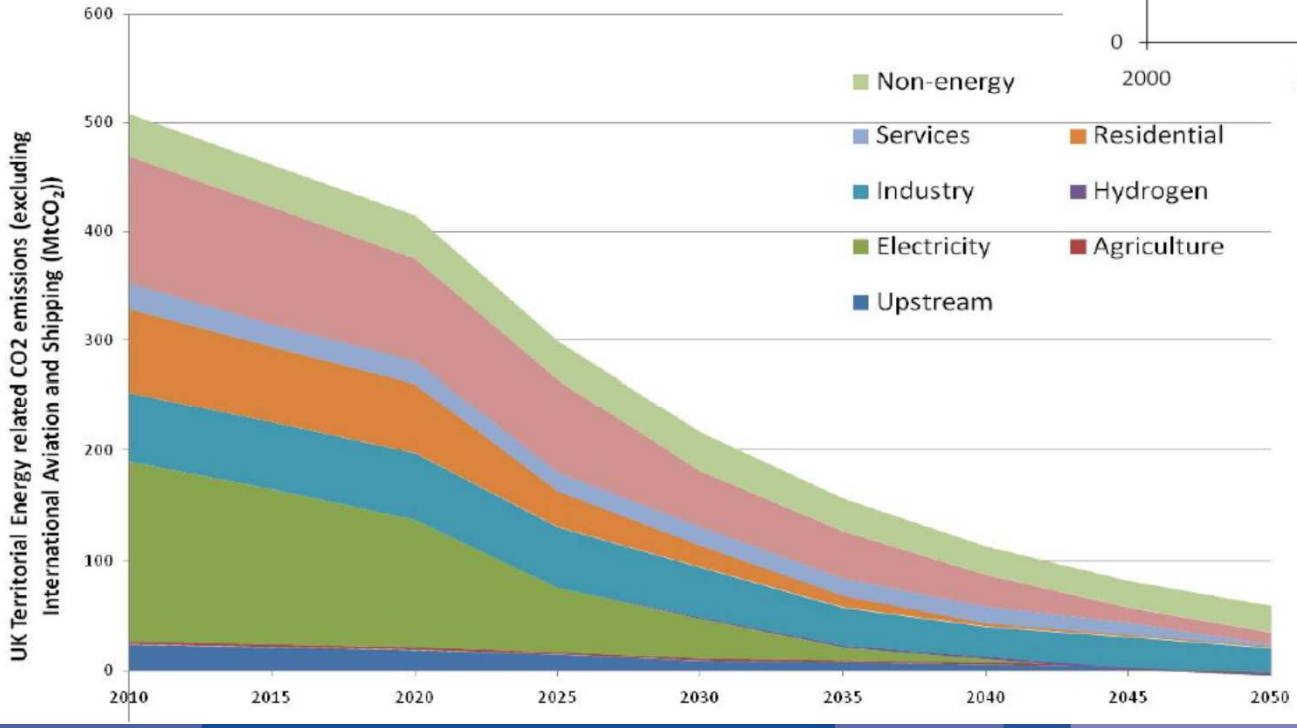
-> What level of comparability is necessary and realistic in order to achieve overall aim of MRV system?

-> Take a systemic view where attribution is not straightforward

-> Not everything can and must be quantified – depending on targets set







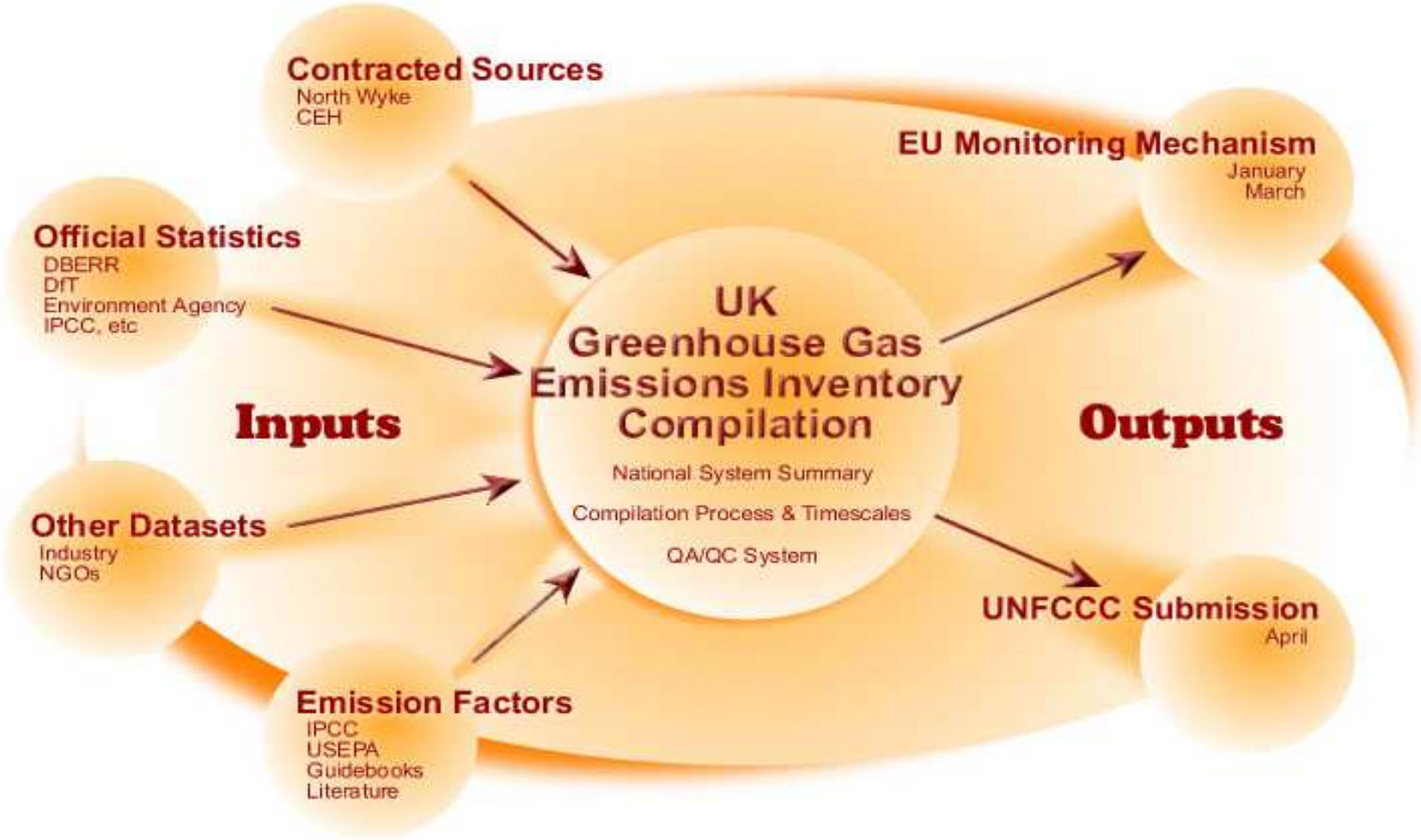
Standardisation

- What can be standardised?
  - Data requirements
  - Methodologies and guidance
  - Reporting processes and deadlines
  - Reporting formats
  - QA/QC, validation, verification processes

- How to ensure standardisation
  - Responsibility assigned to one coordinating entity
  - Entity is entitled and able to enforce compliance with standardisation

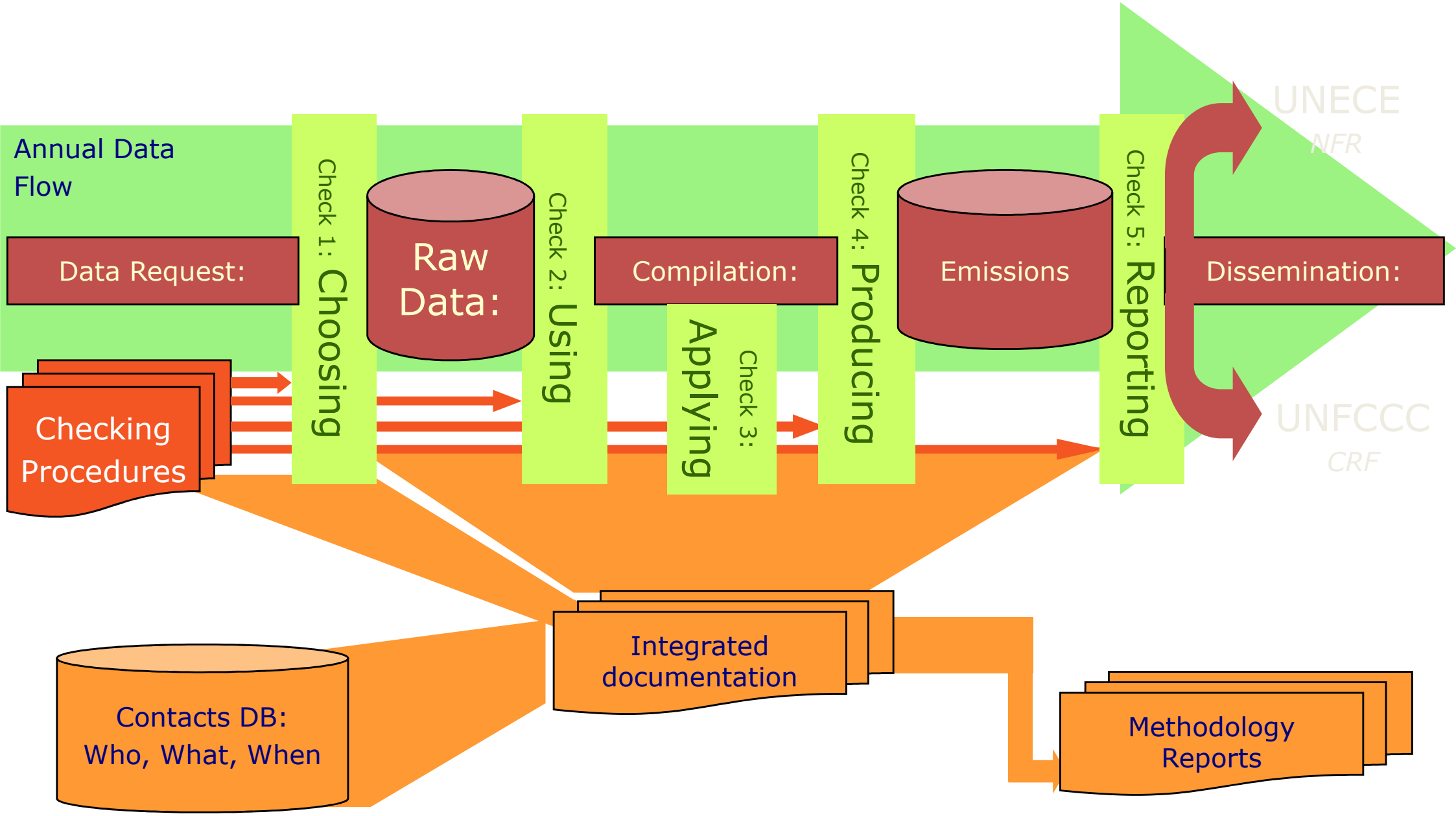
Example Case Bottom-up: GHG inventory compilation

UK GHG Inventory compilation process



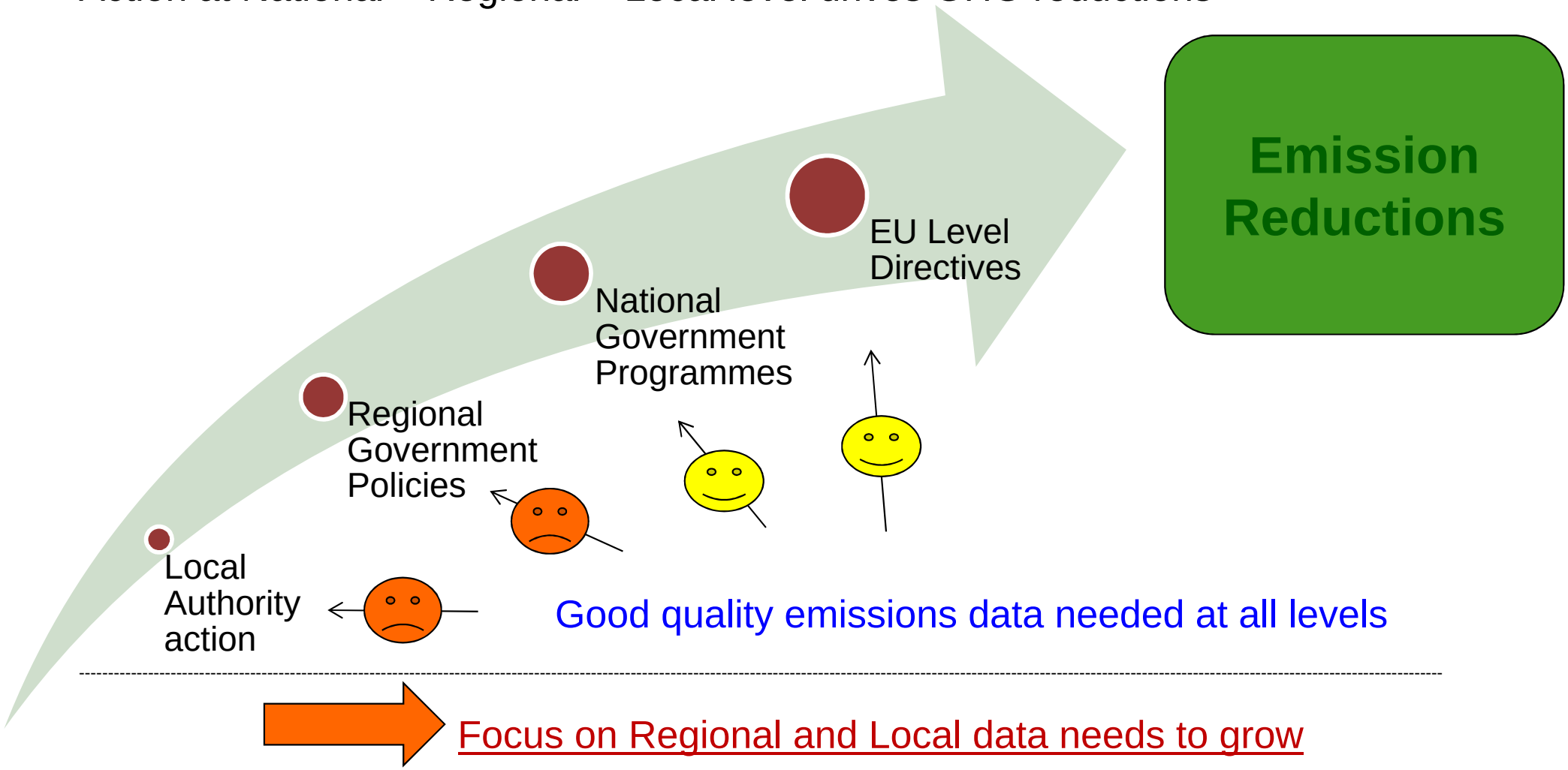
Compiled in compliance with IPCC Good Practice Guidance (2000)

Quality Control & Documentation in the Inventory



Typical levels of a bottom-up approach II

Action at National – Regional – Local level drives GHG reductions



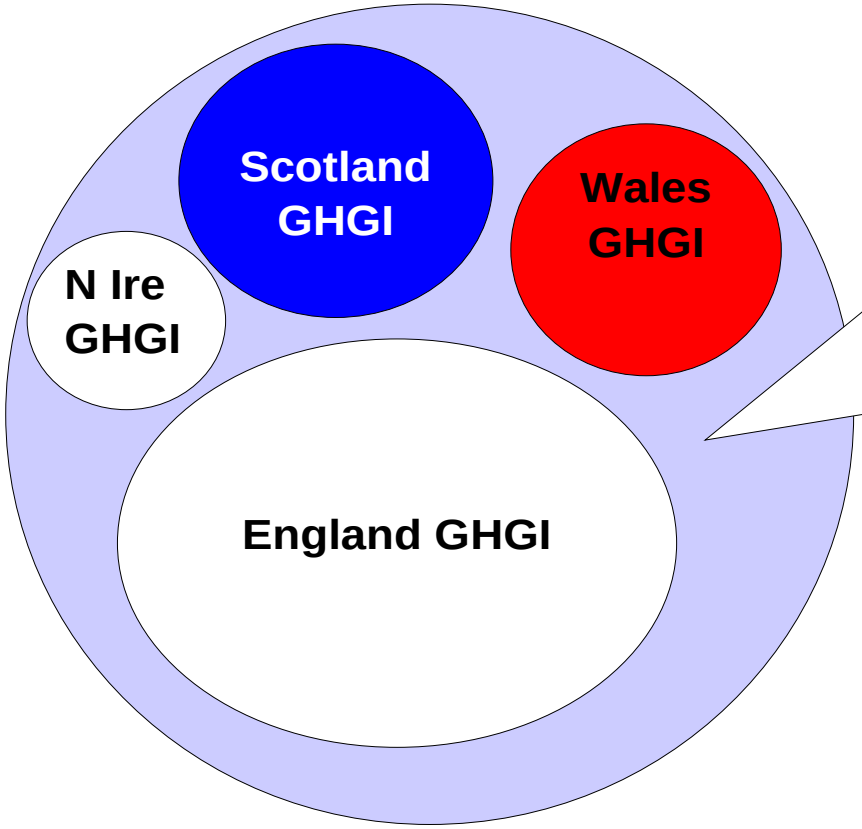
Different data from different sources I

- Carbon market systems, e.g. ETS, CDM PoA
  - Accurate data to ensure market trust
  - ETS: emission level, installation data
  - CDM PoA: emission reduction, activity level data
  - Likely very specific assumptions on scope, baseline development (CDM), emission factors, etc
  - Co-benefits sometimes assessed with CDM, typically not with ETS
  - Transformational changes typically not assessed
  - Usually no discussion on attribution of emission reduction due to limited scope

Different data from different sources II

- End-use focused measures, e.g. energy efficiency standards, feed-in tariffs
  - Typically evaluated ex-ante
  - Use of progress indicators, e.g. MWp installed, share of of standard compliant freezers in total freezer population
  - baseline setting difficult due to a large number of drivers
  - estimation of emissions often difficult due to high effort in data collection
  - Often emission reduction not estimated, available estimation have lower accuracy
  - danger of overlaps with other measures in the same area
  - Transformational change, co-benefits often only assessed quantitatively, if at all

Why this approach to regional inventories?



Bottom-up inventories for England, Scotland, Wales and N Ireland won't add up to the UK GHGI.

Some sectors will be OK.

BUT there will inevitably be some sectors with data gaps and/or overlaps. e.g. due to the fact that there is no E/S/W/NI energy balance.

..and also because this approach is much more cost-effective