

Benchmarking for Global Sectoral Approaches

**Technical workshop on sectoral approaches:
Benchmarking, sector boundary and monitoring,
reporting & verification issues**

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Outline

- Purposes of Benchmarks in GSA study
- Existing programmes
 - Measurement protocols
 - Performance metrics
- Multidimensional problem
- Recommendations



Purposes of Benchmarks in GSA study

- Enrich quantitative analysis of SA case studies
- Frame SA design, negotiation, execution, monitoring and verification
 - giving guidance to countries in designing SAs
 - improving communications during SA negotiations
 - highlighting the relative magnitudes of efforts, incentives and impacts of SAs under consideration
 - monitoring and verification of SA execution
 - perhaps, providing foundation for SA incentives, rewards and penalties

Benchmarking Elements

- Measurement Protocols -- how and what to measure
 - data reporting, verification, security and validation
 - guidelines, tools, processes and institutions used to assess plant-level energy use and GHG emissions
 - Performance Metrics -- how to assess performance from what is measured
 - energy use and GHG emissions indicators
 - corresponding reference standards -- normalised to countries' circumstances
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- GSA - sector level vs. plant level
- GSA - "one size may not fit all"
- GSA study - primary benchmarking goal is the enumeration of performance indicators and standards

Boundaries & Metrics

- Where we draw the measurement boundary, or “fence,” has important implications for sectoral agreements
 - » What we choose to measure (or not measure)
 - » Energy use vs. emissions
 - » Direct use, indirect use, & process emissions
 - » How far to go “upstream”?
 - » How far to go “downstream”?
- Poor choices for boundaries and metrics can limit the potential benefits
 - Attractive opportunities may be overlooked
 - Good actions may be taken but not counted
 - Unproductive activities may be rewarded
 - “Gaming” opportunities can undermine confidence

Existing Measurement Protocols

- Greenhouse Gas Protocol Initiative (GHG Protocol)
- EU Emissions Trading Scheme (ETS) Monitoring and Reporting Guidelines
- Cement Sustainability Initiative (CSI) database
- International Iron and Steel Institute (IISI) database
- International Aluminium Association (IAI) statistics and reporting on voluntary objectives

Existing Performance Metrics (1)

- Netherlands and Flanders : Benchmarking Covenants
- UK: Climate Change Agreements
- Benchmark-based EU ETS allowance allocations
- Clean Development Mechanism (CDM) methodologies
- Benchmarking and Energy Saving Tool (BEST) Cement for China

Existing Performance Metrics (2)

□ Other Programmes

- European Integrated Pollution and Control Bureau (EIPPCB) BAT Reference documents (BREFs)
- IEA Greenhouse Gas R&D Programme
- Asia-Pacific Partnership on Clean Development and Climate (APP)
- Mexico GHG Program
- US EPA Energy Star for Industry
- US Climate Leaders
- US Voluntary Reporting of Greenhouse Gases Program, Section 1605(b)
- US Climate VISION
- Japan Federation of Economic Organisations (Keidanren) Voluntary Action Plans
- Canadian Industry Program for Energy Conservation (CIPEC) & Industrial Energy Innovators Initiative (IEII)

Multidimensional Problem (1)

- fuel use, electricity use and GHG emissions (direct combustion and process)
- relative and absolute bases
- on-site and off-site (optional)

- 3 (or 5) relative performance indicators
- 3 absolute performance indicators
- based on 3 "Subject Sector" components and 3 corresponding "Reference Sector" components

Multidimensional Problem (2)

Performance Indices and Fundamental Components Map

Energy & GHG Parameters	Performance Indices		Fundamental Components	
	Relative =(100*A/B)	Absolute =(A-B)	Subject Sector (A)	Reference Sector (B)
On-site -- within sector boundaries				
Fuels use	FEI = Fuel Efficiency Index	FURP = Fuel Use Reduction Potential	Fuel Use _{subj}	Fuel Use _{ref}
Purchased electricity use
GHG emissions (direct combustion and process)
Offsite -- associated with purchased electricity (optional)				
Fuels use
GHG emissions (direct combustion)

Where, for each Energy & GHG Parameter,

Relative Index = 100 x Subject Sector Fundamental Component / Reference Sector Fundamental Component

Absolute Index = Subject Sector Fundamental Component - Reference Sector Fundamental Component

Multidimensional Problem (3)

$$\text{Relative Index} = 100 \times \frac{\text{Fuel Use}_{\text{subject}}}{\text{Fuel Use}_{\text{reference}}} = 100 \times \frac{\text{Fuel Use}_{\text{subject}}}{\sum \text{Subprocess Fuel Use}_{\text{reference}}} \quad (\text{dimensionless})$$

$$= 100 \times \frac{\text{Fuel Intensity}_{\text{subject}}}{\text{Fuel Intensity}_{\text{reference}}} \quad (\text{only in case where sector produces a single product})$$

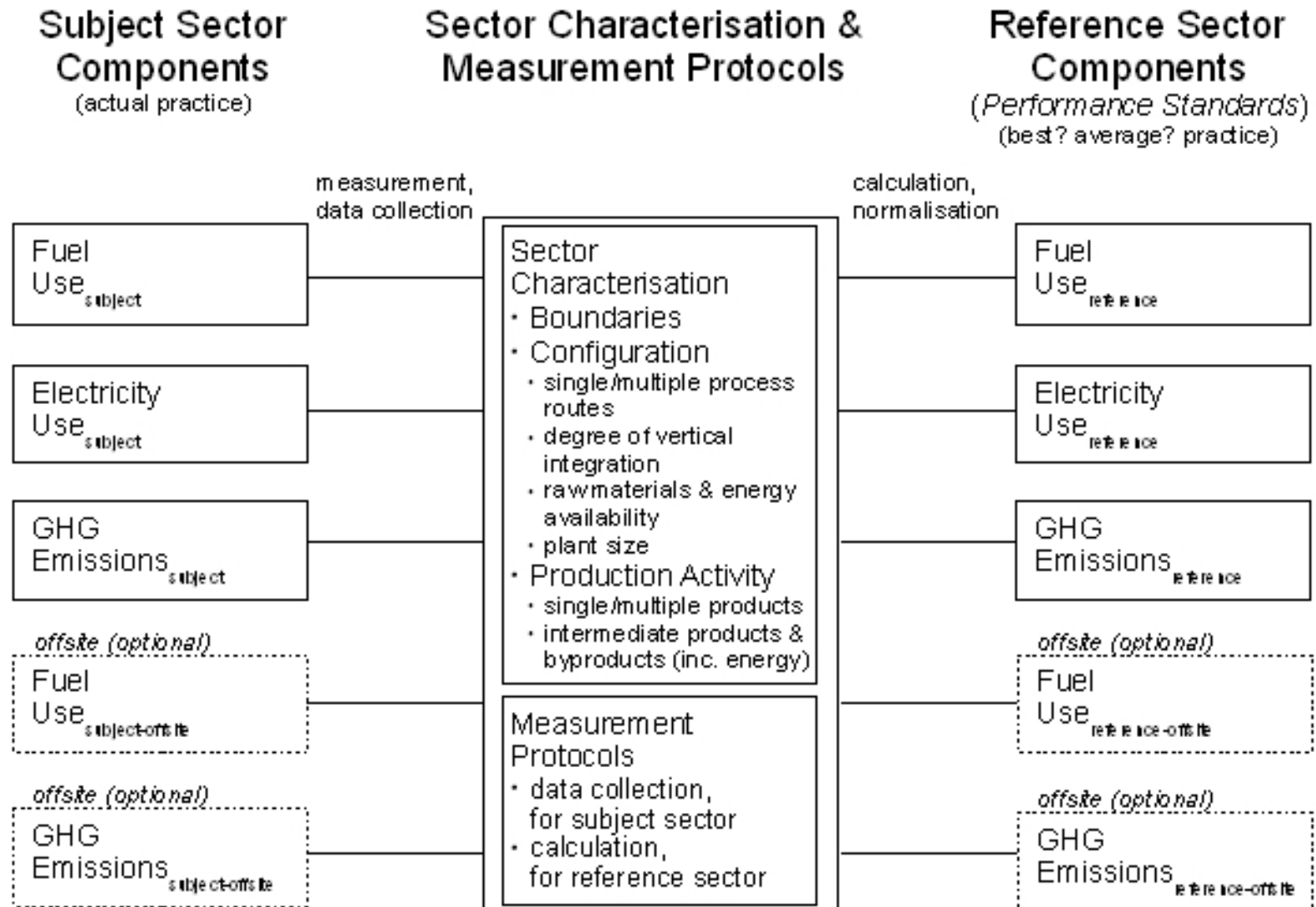
$$= 100 \times \frac{\text{Fuel Intensity}_{\text{subject}}}{\text{Fuel Intensity}_{\text{global reference}}} \quad (\text{only in case where sector produces a single product \& where mix of subprocess is same globally})$$

$$\text{Absolute Index} = \text{Fuel Use}_{\text{subject}} - \text{Fuel Use}_{\text{reference}} \quad (\text{shows scale of reductions})$$

Solomon Index

Note: Reference is not the same as Goal or Target

Multidimensional Problem (4)



Sector Characterisation & Protocols

- Sector Boundaries
 - Sector Configuration
 - single/multiple process routes
 - degree of vertical integration
 - raw materials & energy availability
 - plant size
 - Sector Production Activity
 - single/multiple products
 - intermediate products & byproducts (including energy)
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- Measurement Protocols
 - data collection (Subject Sector)
 - calculation (Reference Sector)



Sector Characterisation & Protocols

- How to find the “right level” for benchmarks?
 - Not too detailed for industry-wide agreements
 - Not too simplified for plant-level operations

Recommendations (1 & 2)

1. Vastly different levels of rigour are required for executing the measurement protocols and calculating the performance metrics for the two purposes of the GSA benchmarking exercise
2. Performance metrics and corresponding measurement protocols should span multiple dimensions
 - fuel use, electricity use and GHG emissions (direct combustion and process)
 - relative and absolute bases
 - on-site and off-site fuel use and GHG emissions

Recommendations (3)

3. Performance indicators should be expressed using an index approach -- having 6 (optionally 10) indices based on a similar number of fundamental performance components

Recommendations (4)

4. Sector characterisations should be set in manner that promotes consistency, avoids double counting, and is reflective of real world plant conditions, consistent with measurement protocols and data collection capabilities, and reproducible and accepted by all parties
 - Ideally embodying: simplicity, transparency and standardisation; technical feasibility and political acceptability; verifiability; consistency with plants' circumstances; minimised perverse incentives and "gaming" opportunities with respect to realising least cost mitigation options; incentives for best practice; and certainty

Recommendations (5)

5. Performance standards should be set in a way that is entirely consistent with the chosen sectoral characterisation and measurement protocols
- They can be defined as best practice, average practice or some other internationally recognised performance level. **World best practice is the preferred.**
 - A certain amount of **process and product differentiation** is needed to suit country/sector circumstances. Differentiation should be kept to a minimum. Too much lessens incentives for improved performance; too little ignores legitimate differences in circumstances. Too much differentiation also entails additional data collection and analysis, and lessens policy transparency. The main test for differentiation is the extent of plant operator choice.

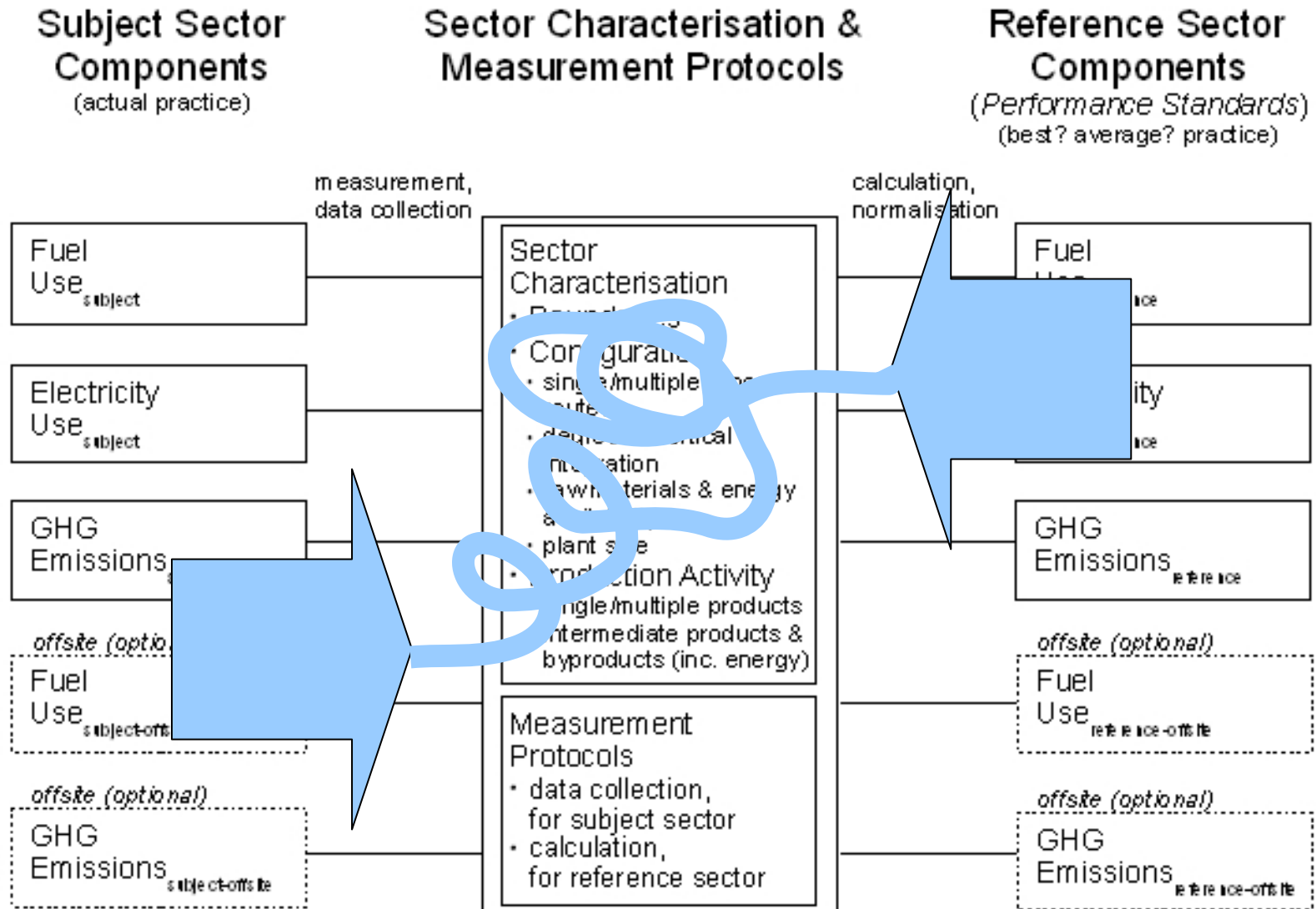
Recommendations (6)

6. The measurement protocols and data collection systems must be consistent with the sectoral characterisation and performance standards calculation methods. Existing sectoral data collection templates should be used as starting points for GSA data collection efforts. The preferred base templates are:
- BEST-Cement tool, assuming it can be made consistent with CSI's data collection forms, for the cement sector
 - IISI data collection forms for the iron and steel sector
 - IAI data collection forms for the aluminium sector

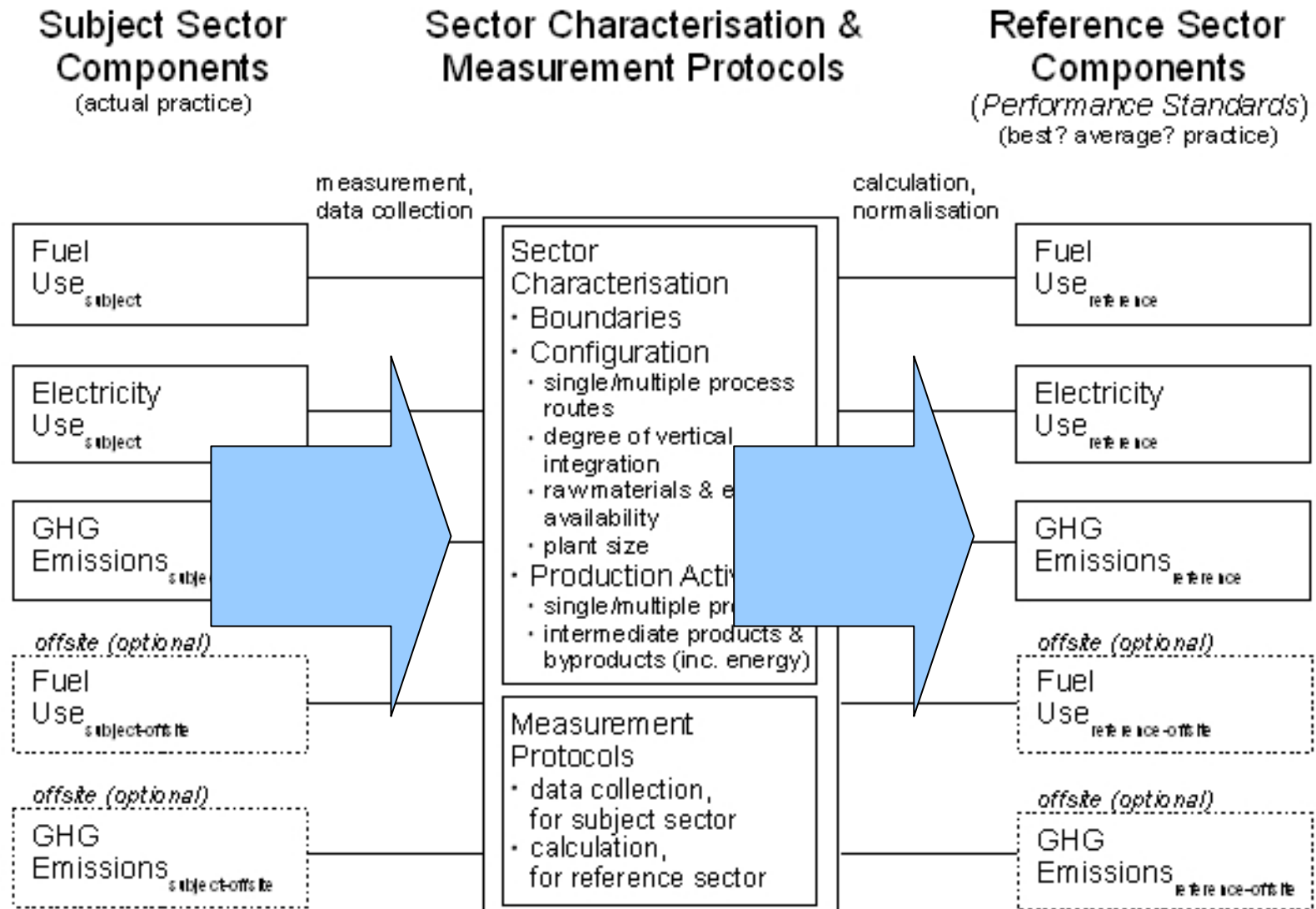
Recommendations (Summary)

1. Use multidimensional index system
2. Work to ensure the pieces fit
 - among themselves - giving an internally consistent package
 - with reality of country/sector situation
 - with reality of data collection/analysis situation
 - with SA goals and incentives
3. Be realistic about strategy for making the pieces fit

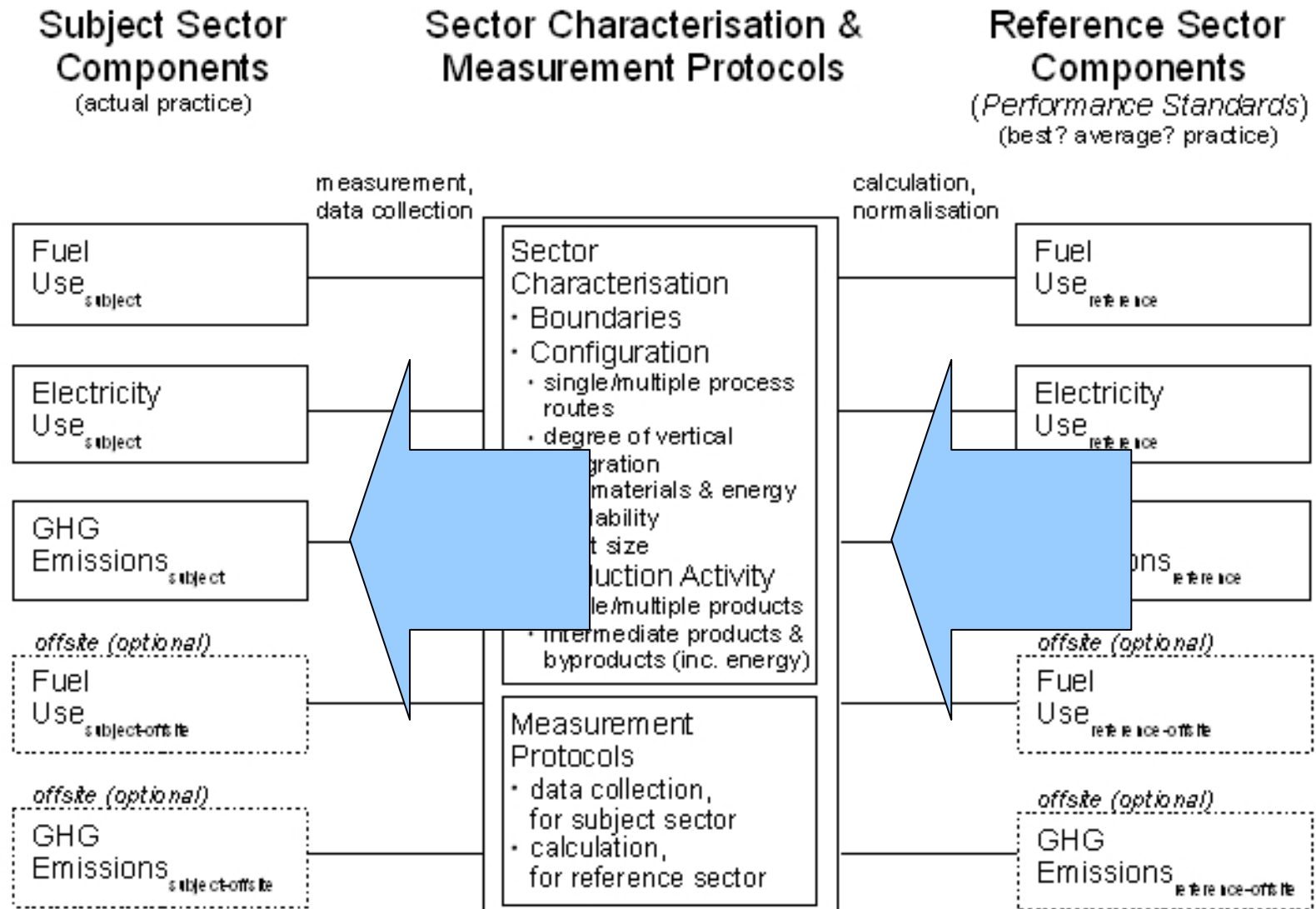
Role 1 - Enrich quantitative analysis



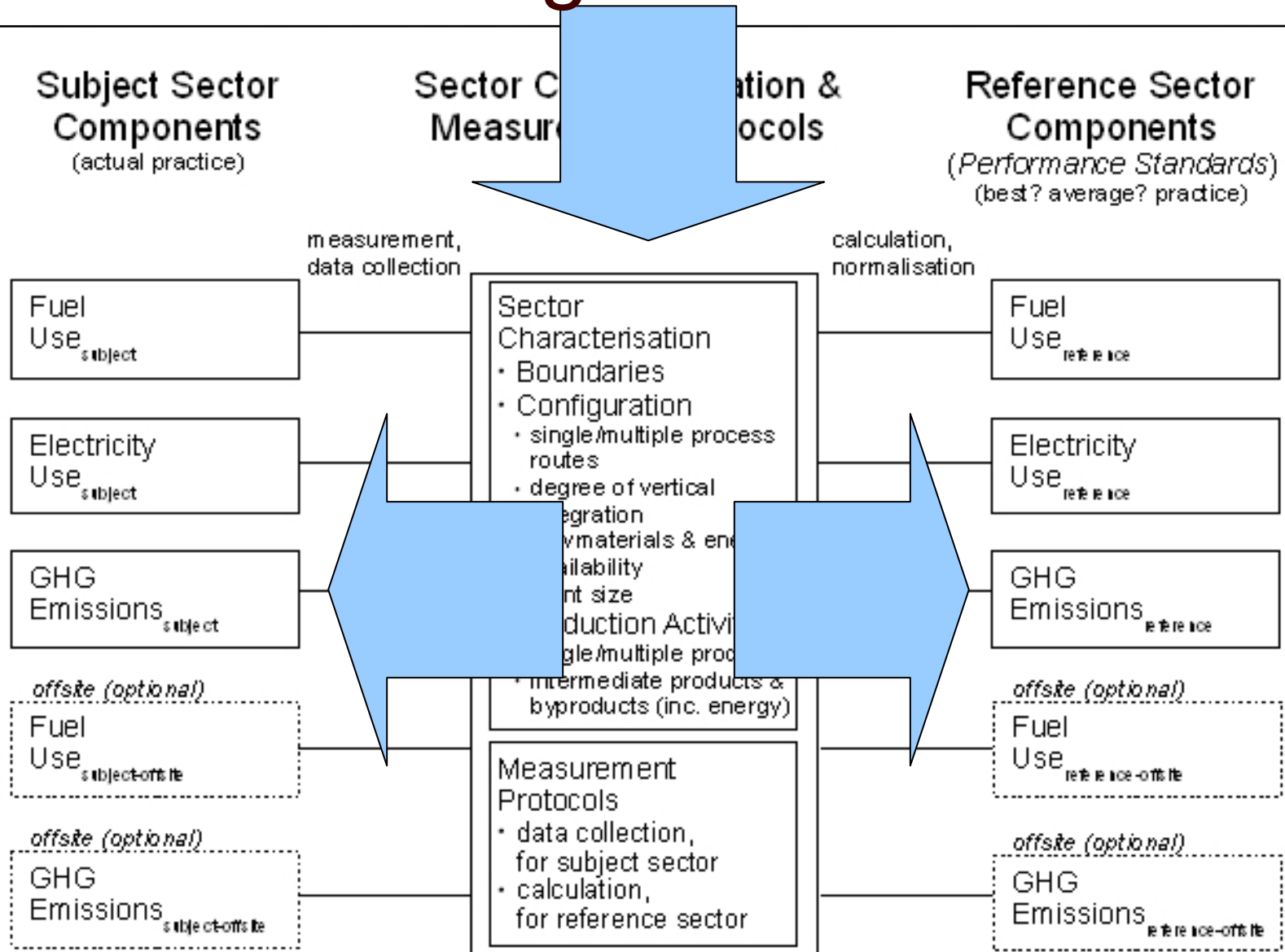
Role 2 - Framing SAs



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Conclusion - Reminder

- Choices regarding sectoral characterisation and measurement/calculation protocols have important implications for sectoral agreements
- Poor choices can limit the potential benefits
 - Attractive opportunities may be overlooked
 - Good actions may be taken but not counted
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Thank you

Comments welcome

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