

Methodologies + Taxable Emission Streams – Fishing Industry



Presentation at the DEA/Fishing Industry training workshop in Cape Town: 2014-03-17



Overview of presentation

- 2006 IPCC Guidelines
- 2006 IPCC Guidelines vs. GHG Protocol
- IPCC Source-Categories and Taxable Source-Categories (Taxable Emission Streams)
- Data needed for carbon tax calculation
 - Energy example
- Emission Factors
- Other Considerations [Calorific Values and Global Warming Potentials]



2006 IPCC Guidelines





2006 IPCC Guidelines – Overview (1 of 3)

- Focus – national emissions profile. This ensures that double counting of emissions are avoided
- Provides flexible methodological approaches:
 - Bottom-up approaches (default methodologies using public datasets)
 - Top-down approaches (country specific methodologies)
- Based on key principles
 - Transparency (reporting, methods, emission factors, activity data)
 - Accuracy (methods, emission factors, activity data)
 - Completeness (emission sources, activity data, etc.)
 - Comparability (methods, emission factors, etc.)
 - Consistency (methods, emission factors, activity data, etc.)

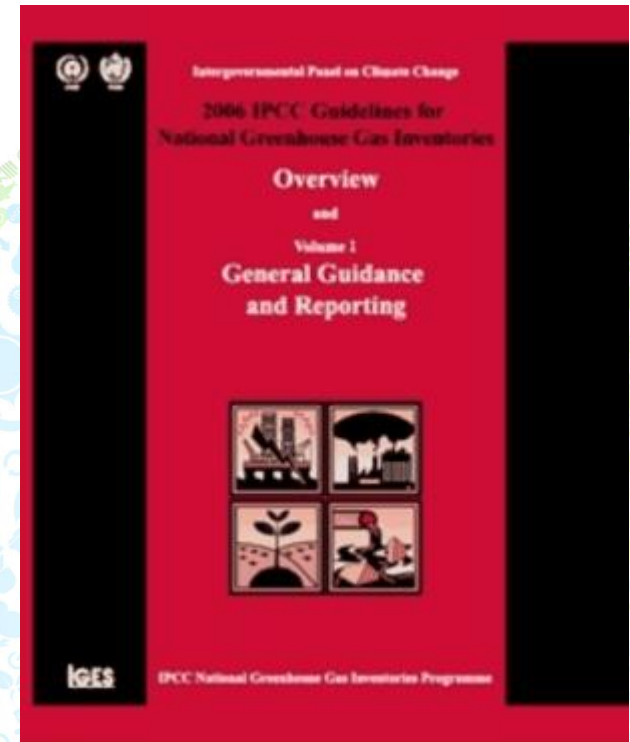


2006 IPCC Guidelines – Overview (2 of 3)

The 2006 Guidelines consists of 5 volumes based on cross-cutting issues and individual sectors:

Overview

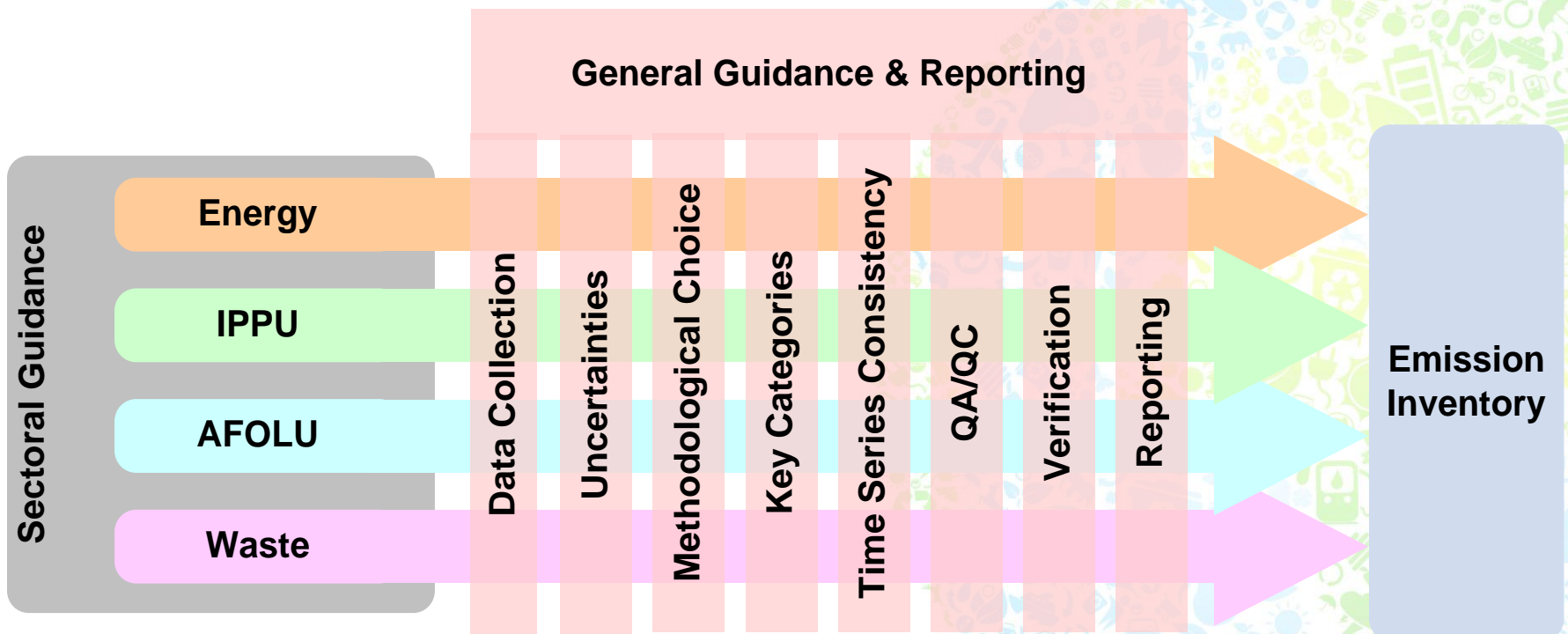
1. General Guidance and Reporting
2. Energy
3. Industrial Processes and Product Use (IPPU)
4. Agriculture, Forestry and Other Land Use (AFOLU)
5. Waste





2006 IPCC Guidelines – Overview (3 of 3)

Good Practice Guidance & Methodologies





2006 IPCC Guidelines vs. GHG Protocol

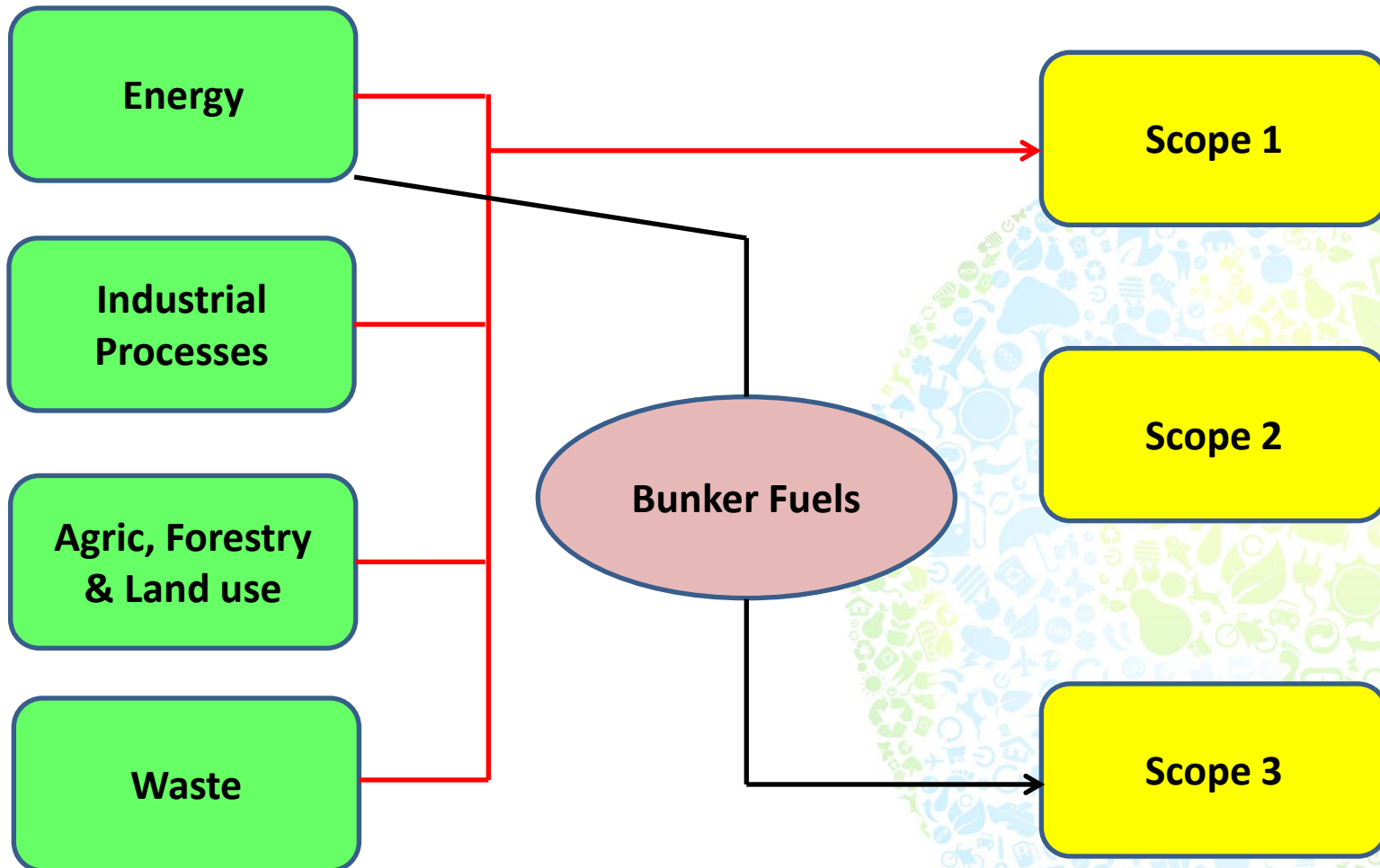




IPCC guidelines vs. GHG Protocol

IPCC Guidelines (National Emissions profile)

GHG Protocol (corporate reporting standard)



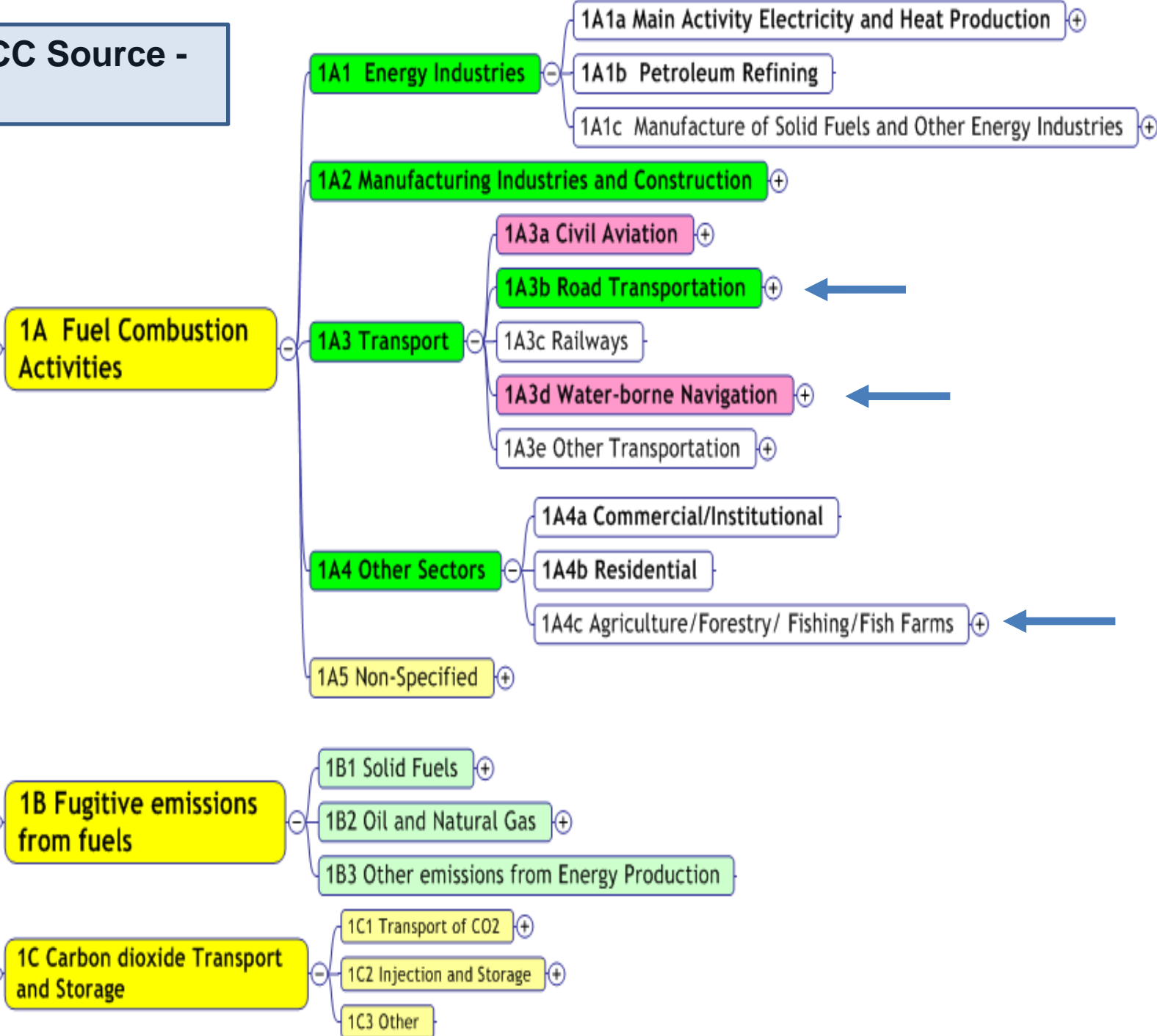


IPCC Source-Categories Applicable to the Fishing Industry + Taxable Source-Categories

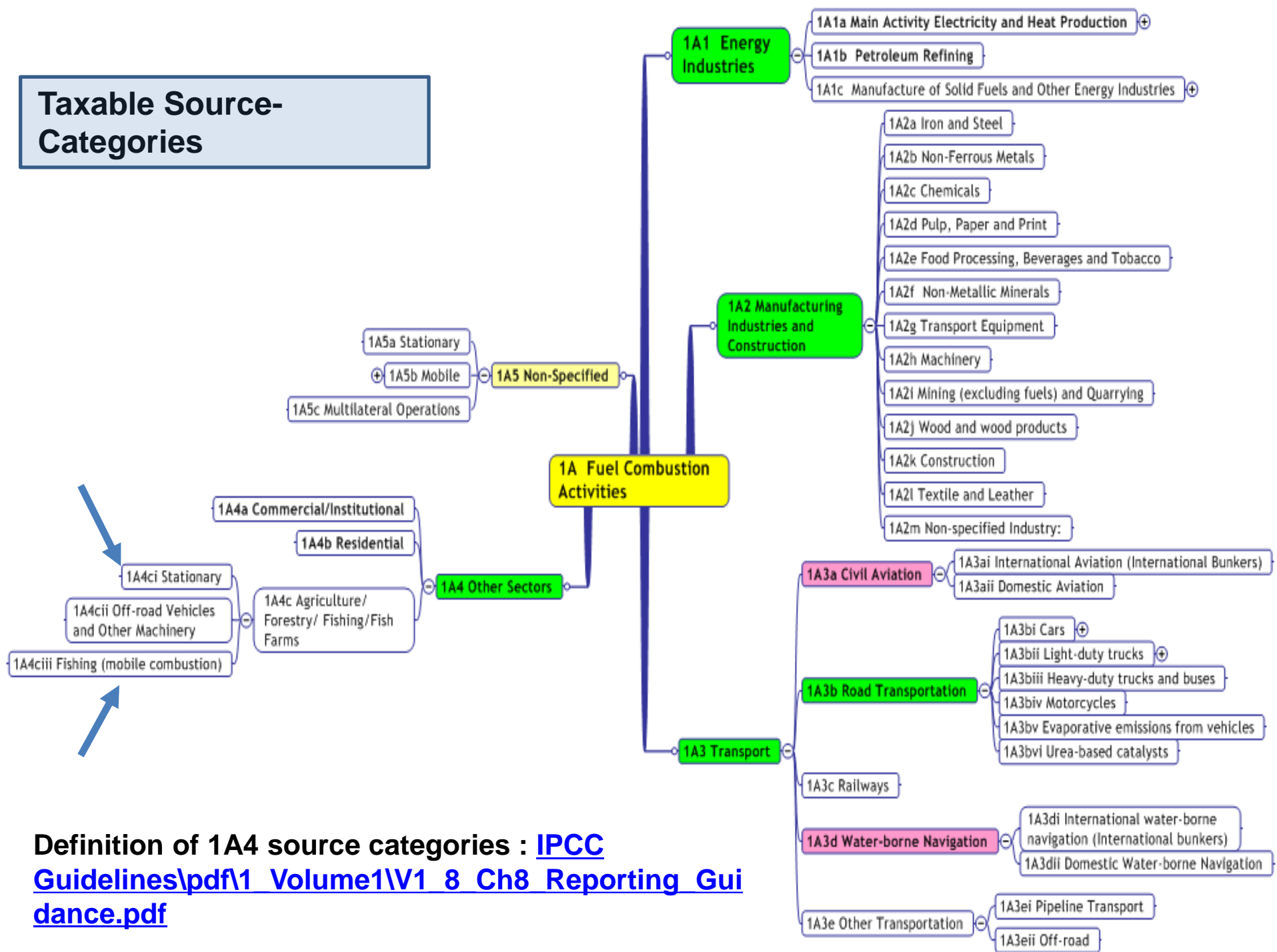


Relevant IPCC Source - Categories

Energy



Taxable Source-Categories



Definition of 1A4 source categories : [IPCC Guidelines\pdf1 Volume1\V1 8 Ch8 Reporting Guidance.pdf](#)



Domestic vs. International Water-borne Navigation/Fishing

TABLE 3.5.4

CRITERIA FOR DEFINING INTERNATIONAL OR DOMESTIC WATER-BORNE NAVIGATION (APPLIES TO EACH SEGMENT OF A VOYAGE CALLING AT MORE THAN TWO PORTS) *

Journey type between two ports	Domestic	International
Departs and arrives in same country	Yes	No
Departs from one country and arrives in another	No	Yes

* Most shipping movement data are collected on the basis of individual trip segments (from one departure to the next arrival) and do not distinguish between different types of intermediate stop (as called for in *GPG 2000*).

Basing the distinction on individual segment data is therefore simpler and is likely to reduce uncertainties. It is very unlikely that this change would make a significant change to the emission estimates. This does not change the way in which emissions from international journeys are reported as an information item and not included in national totals.

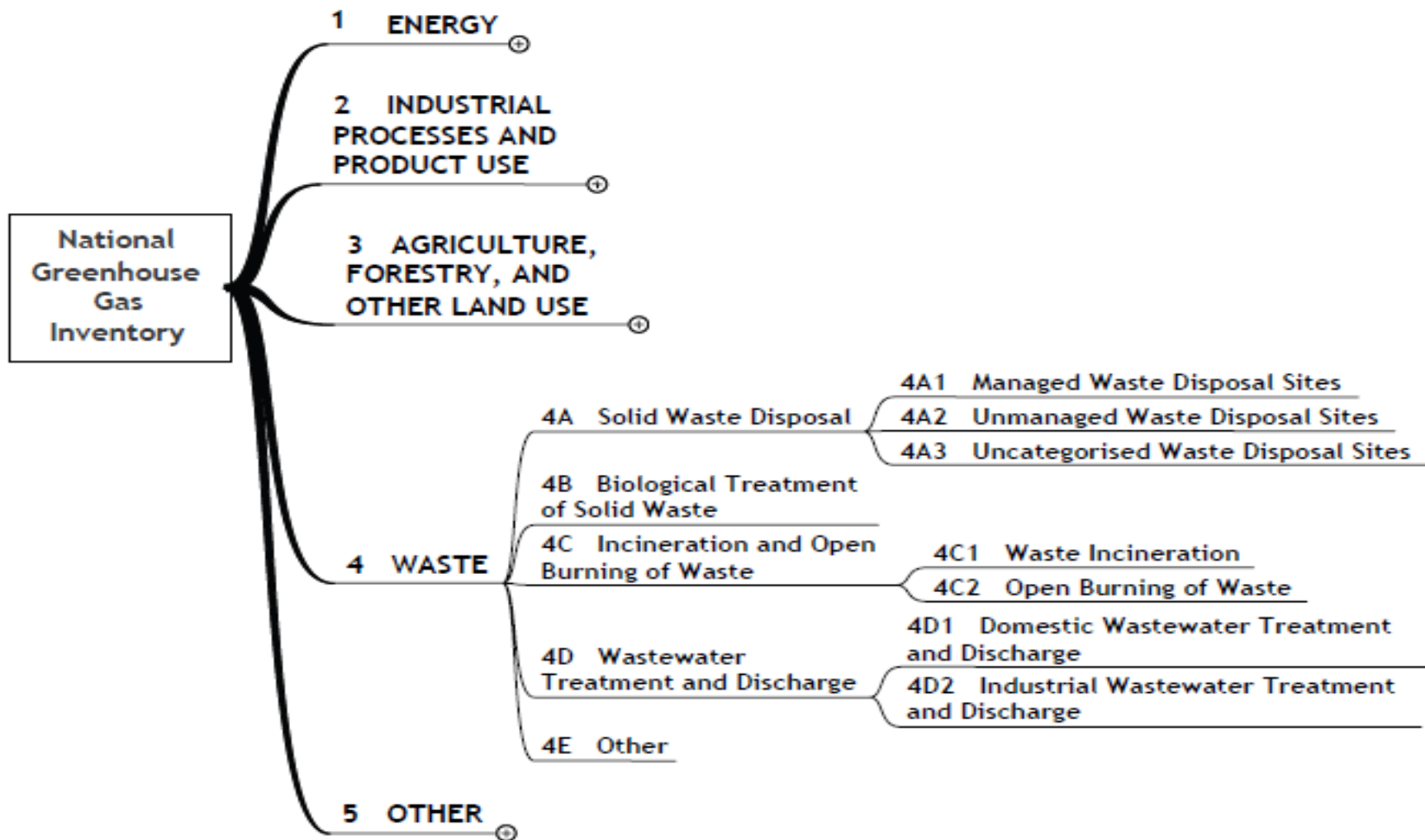


Industrial Processes and Product Use

- Source-categories: [IPCC Guidelines\pdf\3_Volume3\V3_1_Ch1_Introduction.pdf](#)
- Use of Ozone-Depleting Substance Replacements (e.g. Hydroflourocarbons –HFCs) is not listed as a Taxable Source-Category)

Waste Sector

- Relevant IPCC Source-Categories
- Please note that there are no Taxable Source-Categories for the Waste Sector





**Data needed for carbon tax calculation
[Same data is needed for emissions reporting
purposes]**





Ctax - Energy example – Coal use in a power station

$$E = AD \times EF \quad (1)$$

- Where E = emissions, AD = Activity data -amount of coal in energy units and EF = kg CO₂ per unit of coal burned
- However coal is available in mass units (kg or metric tons). That means we need a **Calorific Value (CV)** to convert from mass units to energy units.
- According to Eskom, their coal **NCV is = 20.1 MJ/kg = 20.1 x 10⁻³ TJ/t**
- Therefore equation 1 above becomes:

$$E = M \times NCV \times EF \quad (2) \quad \text{that means } \{AD = M \times NCV\}$$

- If we calculate CO₂ emissions based on **1 metric tonne of coal burned** and using the **IPCC default CO₂ emission factor of 96100 kg/TJ**, we get:

$$E = 1t \times 20.1 \times 10^{-3} \text{ TJ/t} \times 96100 \text{ kg/TJ} = 1932 \text{ kg CO}_2$$



Ctax - Energy example – Coal use in a power station

$$E = AD \times EF \quad (1)$$

- What happens if we use a different **calorific value** (24.1×10^{-3} TJ/t) based on public source B and a **country-specific emission factor** developed by Eskom 97400 kg/TJ :

$$E = M \times NCV \times EF \quad (2)$$

- If we calculate CO₂ emissions based on 1 metric tonne of coal burned and using the Eskom emission factor of 97400 kg/TJ , we get:

$$E = 1\text{t} \times 24.1 \times 10^{-3} \text{ TJ/t} \times 97400 \text{ kg/TJ} = 2347 \text{ kg CO}_2$$

- Difference in emissions = 2347-1932 = **415 kg CO₂**



Emission Factors





IPCC Emission Factors: Stationary Combustion – Onsite Combustion Installations

- [Available in IPCC Guidelines, Volume 2, Chapter 2, Table 2.5 \(All three gases CO₂, CH₄ and N₂O\)](#)
 - [IPCC Guidelines\pdf\2_Volume2\V2_2_Ch2_Stationary_Combustion.pdf](#)

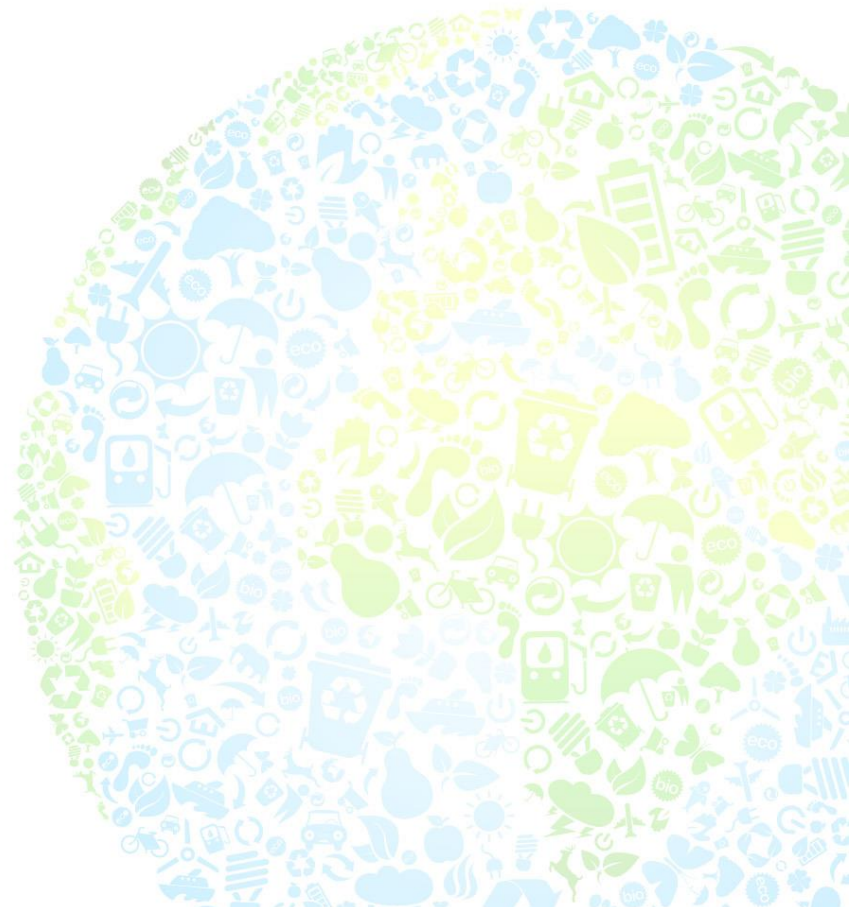


IPCC Emission Factors: Mobile Combustion – Fishing Vessels

- [Available in IPCC Guidelines, Volume 2, Chapter 2, Table 3.5.2 \(CO₂ only\) and 3.5.3 \(CH₄ and N₂O\)](#)
 - [IPCC Guidelines\pdf\2_Volume2\V2_3_Ch3_Mobile_Combustion.pdf](#)



Other considerations





Net Calorific Values for Liquid and Gaseous Fuels

Types of Fuel	Net Calorific Value for Fuels (TJ/L)
Petrol	0.0000342
Diesel	0.0000381
Jet Fuel	0.0000343
Paraffin	0.000037
Fuel Oil	0.0000416
Bitumen	0.0000402
LPG	0.0000267
Natural Gas	1



Global Warming Potentials

Greenhouse gas	Chemical formula	TAR IPCC GWP
Carbon dioxide	CO ₂	1
Methane	CH ₄	23
Nitrous oxide	N ₂ O	296
Hydrofluorocarbons (HFCs)		
HFC-23	CHF ₃	11 700
HFC-32	CH ₂ F ₂	650
HFC-41	CH ₂ F	150
HFC-43	C ₅ H ₂ F ₁₀	300
Perfluorocarbons (PFCs)		
Perfluoromethane	CF ₄	6 500
Perfluoroethane	C ₂ F ₆	9 200
Perfluoropropane	C ₃ F ₈	7 000
Perfluorobutane	C ₄ F ₁₀	7 000
Perfluorocyclobutane	c-C ₄ F ₈	8 700
Perfluoropentane	C ₅ F ₁₂	7 500
Perfluorohexane	C ₆ F ₁₄	7 400
Sulphur hexafluoride		



Thank You





Linking Sec 21 with IPCC guidelines

Sec 21 (Air pollutant emissions)

IPCC Sectors (GHG Emissions)

