

# ***ANNEX 1***

# Annex 1: Key sources

## Methodology

*IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories Chapter 7 Methodological Choice and Recalculation*

The Tier 1 method to identify *key source categories* assesses the impacts of various source categories on the level and, if possible, the trend, of the national emissions inventory. When the national inventory estimates are available for several years, it is *good practice* to assess the contribution of each source category to both the level and trend of the national inventory. If only a single year's inventory is available, only a Level Assessment can be performed.

The Tier 1 method to identify *key source categories* can be readily completed using a spreadsheet analysis.

### Level Assessment – TIER I

The contribution of each source category to the total national inventory level is calculated according to

Equation 7.1

$$\text{Source Category Level Assessment} = \text{Source Category Estimate} / \text{Total Estimate}$$
$$L_{x,t} = E_{x,t} / E_t$$

Where:

$L_{x,t}$  is the Level Assessment for source x in year t

**Source Category Estimate** ( $E_{x,t}$ ) is the emission estimate of source category x in year t

**Total Estimate** ( $E_t$ ) is the total inventory estimate in year t

### Trend Assessment - TIER I

The contribution of each source category's trend to the trend in the total inventory can be assessed if more than one year of inventory data are available, according to

Equation 7.2:

$$\text{Source Category Trend Assessment} = (\text{Source Category Level Assessment}) / (\text{Source Category Trend} - \text{Total Trend})$$

$$T_{x,t} = L_{x,t} * \{ [(E_{x,t} - E_{x,0}) / E_{x,t}] - [(E_t - E_0) / E_t] \}$$

Where:

$T_{x,t}$  is the contribution of the source category trend to the overall inventory trend, called the Trend Assessment. The Trend Assessment is always recorded as an absolute value, i.e. a negative value is always recorded as the equivalent positive value.

$L_{x,t}$  is the Level Assessment for source x in year t (derived in Equation 7.1)

$E_{x,t}$  and  $E_{x,0}$  are the emissions estimates of source category x in years t and 0, respectively

$E_t$  and  $E_0$  are the total inventory estimates in years t and 0, respectively

The Source Category Trend is the change in the source category emissions over time, computed by subtracting the base year (year 0) estimate for source category x from the current year (year t) estimate and dividing by the current year estimate.

The Total Trend is the change in the total inventory emissions over time, computed by subtracting the base year (year 0) estimate for the total inventory from the current year (year t) estimate and dividing by the current year estimate.

Table 1: GPG Table 7.A1 (Tier I approach)

rank	CRF	IPCC Source Category		Direct	Gg CO2 eq.	Gg CO2 eq.	level 2006	trend	trend	KS
level 2006	Sector			GHG	1986	2006	%	equ. 7.2	%	trend
1	1A	1. Energy Industries	a. Public Electricity and Heat Production	CO2	6533,755	6340,489	25,04	4,120	9,90	yes
2	5	LULUCF	A. Forest Land	CO2	1589,253	4733,091	18,69	9,909	23,80	yes
3	1A	3. Transport	b. Road Transportation	CO2	1913,811	4566,970	18,03	8,059	19,36	yes
4	1A	2. Manufacturing Ind. and Construction	f. Other	CO2	1775,750	1421,159	5,61	2,153	5,17	yes
5	1A	4. Other Sectors	b. Residential	CO2	1100,185	1343,283	5,30	0,249	0,60	yes
6	1A	4. Other Sectors	a. Commercial/Institutional	CO2	612,110	629,344	2,49	0,265	0,64	yes
7	2	Industrial Processes	1. Cement Production	CO2	514,615	523,016	2,07	0,244	0,59	yes
8	6	A. Solid Waste Disposal on Land	1. Managed Waste Disposal on Land	CH4	298,801	476,326	1,88	0,449	1,08	yes
9	1A	2. Manufacturing Ind. and Construction	d. Pulp, Paper and Print	CO2	649,556	470,803	1,86	0,955	2,29	yes
10	4	D. Agricultural Soils	1. Direct Soil Emissions	N2O	434,006	399,349	1,58	0,348	0,84	yes
11	4	A. Enteric Fermentation	1. Non-Dairy Cattle	CH4	301,880	375,413	1,48	0,092	0,22	no
12	4	D. Agricultural Soils	3. Indirect Emissions	N2O	333,371	307,938	1,22	0,263	0,63	yes
13	1B	Fugitive Emissions from Fuels	a. Coal Mining and Handling	CH4	358,906	254,479	1,00	0,547	1,31	yes
14	1A	4. Other Sectors	c. Agriculture/Forestry/Fisheries	CO2	426,782	230,564	0,91	0,897	2,15	yes
15	4	A. Enteric Fermentation	1. Dairy Cattle	CH4	429,314	228,617	0,90	0,914	2,19	yes
16	1A	2. Manufacturing Ind. and Construction	a. Iron and Steel	CO2	1141,586	224,883	0,89	3,739	8,98	yes
17	2	Industrial Processes	3. Aluminium Production	CO2	89,402	206,881	0,82	0,354	0,85	yes
18	1A	2. Manufacturing Ind. and Construction	e. Food Processing, Beverages and Tobacco	CO2	247,754	202,490	0,80	0,286	0,69	yes
19	4	B. Manure Management	8. Swine	CH4	232,219	184,394	0,73	0,286	0,69	yes
20	1A	3. Transport	b. Road Transportation	N2O	23,696	166,526	0,66	0,476	1,14	yes
21	1A	2. Manufacturing Ind. and Construction	c. Chemicals	CO2	98,052	163,948	0,65	0,173	0,42	no
22	4	B. Manure Management	13. Solid Storage and Dry Lot	N2O	259,261	153,611	0,61	0,499	1,20	yes
23	4	B. Manure Management	1. Non-Dairy Cattle	CH4	93,492	150,003	0,59	0,144	0,35	no
24	2	Industrial Processes	2. Lime Production	CO2	220,206	134,462	0,53	0,410	0,98	yes
25	2	Industrial Processes	3. Aluminium Production	PFC	276,291	115,550	0,46	0,696	1,67	yes
26	2	Industrial Processes	1. Refrigeration and AC Equipment	HFC	0,000	111,362	0,44	0,381	0,91	yes
27	4	B. Manure Management	1. Dairy Cattle	CH4	167,074	111,047	0,44	0,280	0,67	yes
28	1B	Fugitive Emissions from Fuels	c. Other (SO2 scrubbing)	CO2	0,000	97,093	0,38	0,332	0,80	yes
30	1A	4. Other Sectors	b. Residential	CH4	134,677	89,205	0,35	0,227	0,54	yes
29	6	B. Waste Water Handling	2. Domestic and Commercial Waste Water	CH4	112,561	95,227	0,38	0,119	0,29	no
31	1B	Fugitive Emissions from Fuels	a. Coal Mining and Handling	CO2	120,238	80,989	0,32	0,198	0,48	yes
32	6	B. Waste Water Handling	1. Industrial Wastewater	CH4	96,116	67,763	0,27	0,148	0,36	no

rank	CRF	IPCC Source Category		Direct	Gg CO2 eq.	Gg CO2 eq.	level 2006	trend	trend	KS
level 2006	Sector			GHG	1986	2006	%	equ. 7.2	%	trend
33	1A	2. Manufacturing Ind. and Construction	<b>b. Non-Ferrous Metals</b>	CO2	440,325	67,540	0,27	1,508	3,62	yes
34	6	B. Waste Water Handling	2. Domestic and Commercial Waste Water	N2O	58,716	62,856	0,25	0,017	0,04	no
35	4	D. Agricultural Soils	2. Pasture, Range and Paddock Manure	N2O	23,753	52,523	0,21	0,086	0,21	no
36	2	Industrial Processes	4. Carbide Production	CO2	44,985	46,201	0,18	0,020	0,05	no
37	3	Solvent and Other Product Use	D. 1. Use of N2O for Anaesthesia	N2O	81,903	44,153	0,17	0,172	0,41	no
38	2	Industrial Processes	2. Ferroalloys Production	CO2	57,635	38,279	0,15	0,097	0,23	no
39	1A	3. Transport	c. Railways	CO2	68,182	37,471	0,15	0,141	0,34	no
40	1B	Fugitive Emissions from Fuels	b. Natural Gas	CH4	56,090	31,610	0,12	0,113	0,27	no
41	2	Industrial Processes	1. Iron and Steel Production	CO2	40,149	28,688	0,11	0,060	0,15	no
42	1A	4. Other Sectors	c. Agriculture/Forestry/Fisheries	N2O	49,388	27,808	0,11	0,100	0,24	no
43	1A	2. Manufacturing Ind. and Construction	f. Other	N2O	35,133	27,215	0,11	0,046	0,11	no
44	1A	1. Energy Industries	a. Public Electricity and Heat Production	N2O	26,201	27,086	0,11	0,011	0,03	no
45	4	A. Enteric Fermentation	3. Sheep	CH4	4,242	22,097	0,09	0,059	0,14	no
46	1A	3. Transport	b. Road Transportation	CH4	18,220	19,915	0,08	0,004	0,01	no
47	1A	4. Other Sectors	b. Residential	N2O	20,936	19,857	0,08	0,015	0,04	no
48	4	A. Enteric Fermentation	8. Swine	CH4	23,103	19,463	0,08	0,025	0,06	no
49	2	Industrial Processes	8. Electrical Equipment	SF6	10,241	18,840	0,07	0,024	0,06	no
50	1A	<b>1. Energy Industries</b>	<b>b. Petroleum Refining</b>	CO2	62,225	8,532	0,03	0,217	0,52	yes
51	4	B. Manure Management	12. Liquid Systems	N2O	6,764	8,469	0,03	0,002	0,01	no
52	2	Industrial Processes	4. Soda Ash Production and Use	CO2	10,290	6,899	0,03	0,017	0,04	no
53	4	A. Enteric Fermentation	6. Horses	CH4	5,498	6,380	0,03	0,000	0,00	no
54	2	Industrial Processes	3. Limestone and Dolomite Use	CO2	20,305	5,911	0,02	0,060	0,14	no
55	2	Industrial Processes	5. Other (Methanol)	CH4	2,929	5,446	0,02	0,007	0,02	no
56	4	B. Manure Management	9. Poultry	CH4	16,446	5,007	0,02	0,048	0,11	no
57	1A	3. Transport	c. Railways	N2O	8,651	4,754	0,02	0,018	0,04	no
58	1A	2. Manufacturing Ind. and Construction	f. Other	CH4	6,676	3,953	0,02	0,013	0,03	no
59	4	A. Enteric Fermentation	4. Goats	CH4	1,050	2,919	0,01	0,006	0,01	no
60	1A	2. Manufacturing Ind. and Construction	d. Pulp, Paper and Print	N2O	1,383	2,781	0,01	0,004	0,01	no
61	1A	1. Energy Industries	a. Public Electricity and Heat Production	CH4	1,595	1,853	0,01	0,000	0,00	no
62	1A	4. Other Sectors	a. Commercial/Institutional	CH4	15,279	1,799	0,01	0,054	0,13	no
63	1A	2. Manufacturing Ind. and Construction	d. Pulp, Paper and Print	CH4	1,060	1,781	0,01	0,002	0,00	no
64	1A	4. Other Sectors	a. Commercial/Institutional	N2O	5,087	1,557	0,01	0,015	0,04	no
65	1A	3. Transport	a. Civil Aviation	CO2	0,622	1,506	0,01	0,003	0,01	no
66	4	B. Manure Management	14. Other AWMS	N2O	1,322	0,735	0,00	0,003	0,01	no
67	1A	<b>1. Energy Industries</b>	c. Manufacture of Solid F. and Oth. Energy Ind.	CO2	104,769	0,675	0,00	0,411	0,99	yes

rank	CRF	IPCC Source Category		Direct	Gg CO2 eq.	Gg CO2 eq.	level 2006	trend	trend	KS
level 2006	Sector			GHG	1986	2006	%	equ. 7.2	%	trend
68	1A	2. Manufacturing Ind. and Construction	c. Chemicals	N2O	0,248	0,669	0,00	0,001	0,00	no
69	1A	4. Other Sectors	c. Agriculture/Forestry/Fisheries	CH4	1,436	0,562	0,00	0,004	0,01	no
70	4	B. Manure Management	3. Sheep	CH4	0,101	0,525	0,00	0,001	0,00	no
71	1A	2. Manufacturing Ind. and Construction	c. Chemicals	CH4	0,107	0,513	0,00	0,001	0,00	no
72	2	Industrial Processes	2. Foam Blowing	HFC	0,000	0,504	0,00	0,002	0,00	no
73	4	B. Manure Management	6. Horses	CH4	0,428	0,496	0,00	0,000	0,00	no
74	1A	2. Manufacturing Ind. and Construction	a. Iron and Steel	CH4	2,057	0,408	0,00	0,007	0,02	no
75	2	Industrial Processes	7. Other (Glass Production)	CO2	0,226	0,384	0,00	0,000	0,00	no
76	1A	2. Manufacturing Ind. and Construction	e. Food Processing, Beverages and Tobacco	N2O	0,615	0,352	0,00	0,001	0,00	no
77	1A	2. Manufacturing Ind. and Construction	a. Iron and Steel	N2O	3,270	0,290	0,00	0,012	0,03	no
78	1A	2. Manufacturing Ind. and Construction	e. Food Processing, Beverages and Tobacco	CH4	0,178	0,238	0,00	0,000	0,00	no
79	2	Industrial Processes	3. Fire Extinguishers	HFC	0,000	0,182	0,00	0,001	0,00	no
80	4	B. Manure Management	11. Anaerobic Lagoons	N2O	0,948	0,152	0,00	0,003	0,01	no
81	1A	2. Manufacturing Ind. and Construction	b. Non-Ferrous Metals	CH4	0,691	0,101	0,00	0,002	0,01	no
82	1A	2. Manufacturing Ind. and Construction	b. Non-Ferrous Metals	N2O	1,252	0,078	0,00	0,005	0,01	no
83	4	B. Manure Management	4. Goats	CH4	0,025	0,070	0,00	0,000	0,00	no
84	1A	3. Transport	c. Railways	CH4	0,078	0,043	0,00	0,000	0,00	no
85	1A	1. Energy Industries	b. Petroleum Refining	CH4	0,094	0,015	0,00	0,000	0,00	no
86	1A	3. Transport	a. Civil Aviation	N2O	0,005	0,013	0,00	0,000	0,00	no
87	1A	1. Energy Industries	b. Petroleum Refining	N2O	0,069	0,006	0,00	0,000	0,00	no
88	1A	1. Energy Industries	c. Manufacture of Solid F. and Oth. Energy Ind.	N2O	0,226	0,002	0,00	0,001	0,00	no
89	1A	3. Transport	a. Civil Aviation	CH4	0,000	0,000	0,00	0,000	0,00	no
90	1A	1. Energy Industries	c. Manufacture of Solid F. and Oth. Energy Ind.	CH4	0,201	0,000	0,00	0,001	0,00	no
91	1B	Fugitive Emissions from Fuels	a. Oil	CH4	0,422	0,000	0,00	0,000	0,00	no
92	2	Industrial Processes	4. Carbide Production	CH4	0,783	0,000	0,00	0,000	0,00	no
		<b>Total</b>			<b>21.929,335</b>	<b>25.324,440</b>	<b>100,000</b>	<b>41,431</b>	<b>100,000</b>	