ANNEX 1

WORKSHEETS

Contents

1.1 INTRODUCTION

This Annex presents worksheets to enable inventory compilers to readily implement the Tier 1 methods. Volume 1, Chapter 8 gives guidance on how to report the resulting emission estimates.

Table 1 explains the main considerations concerning fuel consumption to be taken into account with respect to column A of the fuel combustion activities worksheets.

Worksheets for fuel combustion activities also cater for CO_2 capture from the subcategories 1A 1 and 1A 2.

Emissions of CO_2 from biomass fuels are estimated and reported in the AFOLU sector as part of the AFOLU methodology. In the reporting tables, emissions from combustion of biofuels are reported as information items but not included in the sectoral or national totals to avoid double counting.

Worksheets for fugitive emissions are of two types:

(1) Emissions arising from mining, processing, storage and transportation of coal. This includes the new method of determining CH_4 emissions from abandoned coal mines.

(2) Emissions from oil and natural gas systems.

Reference Approach worksheets are also included though its main purpose in the *2006 IPCC Guidelines* is to serve as an independent verification cross-check of the bottom-up approach methods described in Tiers 1, 2 and 3.

TABLE 1

MAIN CONSIDERATIONS CONCERNING THE FUEL CONSUMPTION TO BE INCLUDED IN COLUMN A OF THE FOUR WORKSHEETS

Fuel[1]	Activity data
Liquid Fuels	
Crude Oil	Only the amount used as a fuel should be included.
Orimulsion	Only the amount used as a fuel should be included.
Natural Gas Liquids	Only the amount used as a fuel should be included.
Motor Gasoline	Generally, all consumption is used as a fuel.
Aviation Gasoline	In unusual circumstances small quantities may be burned as a fuel in stationary sources.
Jet Gasoline	In unusual circumstances small quantities may be burned as a fuel in stationary sources.
Jet Kerosene	In unusual circumstances small quantities may be burned as a fuel in stationary sources.
Other Kerosene	Only the amount used as a fuel should be included. Do not include the fraction used as petrochemical feedstock.
Shale Oil	Only the amount used as a fuel should be included.
Gas/Diesel Oil	Only the amount used as a fuel should be included. Do not include the amount used as petrochemical feedstock.
Residual Fuel Oil	Generally, all consumption is used as a fuel.
Liquefied Petroleum Gases	Only the amount used as a fuel should be included. Do not include the amount used as petrochemical feedstock.
Ethane	Only the amount used as a fuel should be included. Do not include the amount used as petrochemical feedstock.
Naphtha	Only the amount used as a fuel should be included. Do not include the amount used as petrochemical feedstock.
Lubricants	Only include the amount of fuel that is mixed with gasoline for 2-stroke engines.
Petroleum Coke	Only the amount used as a fuel should be included. The amount used as a feedstock (e.g. in coke ovens for the steel industry, for electrode manufacture and for production of chemicals) should not be included.
Refinery Feedstocks	Generally used as a feedstock. The amount used as petrochemical feedstock should not be included.
Refinery Gas	Only the amount used as fuel should be included. Do not include the amount used as petrochemical feedstock.
Paraffin Waxes	Only the amount used as a fuel should be included. Do not include the amount that is burned as waste.
Other Petroleum Products	Only the amount used as a fuel should be included. Do not include the amount used as petrochemical feedstock.
Solid Fuels	
Anthracite	Only the amount used as a fuel should be included.
Coking Coal	Only the amount used as a fuel should be included.
Other Bituminous Coal	Only the amount used as a fuel should be included.
Sub-Bituminous Coal	Only the amount used as a fuel should be included.
Lignite	Only the amount used as a fuel should be included.
Oil Shale / Tar Sands	Only the amount used as a fuel should be included.
Brown Coal Briquettes	Generally, all consumption is used as a fuel.
Patent Fuel	Generally, all consumption is used as a fuel.
Coke Oven Coke / Lignite Coke	Do not include amount delivered to industrial processes (e.g. metal production).
Gas Coke	Generally, all consumption is used as a fuel.
Coal Tar	Do not include amount delivered to the chemical and petrochemical industries or for construction.
Gas Works Gas	Only the amount used as a fuel should be included.

[1] Fuels not burned for energy purposes are not included in this table (e.g. bitumen and white spirits).

<table>
<tr><td colspan="2" align="center">TABLE 1 (CONTINUED)
MAIN CONSIDERATIONS CONCERNING THE FUEL CONSUMPTION TO BE INCLUDED IN COLUMN A OF THE WORKSHEETS</td></tr>
</table>

Fuel[2]	Activity data
Coke Oven Gas	Include the amount that is used as a fuel except the gas used in the iron and steel industry since these emissions are accounted for in the IPPU sector.
Blast Furnace Gas	Include the amount that is used as a fuel except the gas used in the iron and steel industry since these emissions are accounted for in the IPPU sector.
Oxygen Steel Furnace Gas	Include the amount that is used as a fuel except the gas used in the iron and steel industry since these emissions are accounted for in the IPPU sector.
Natural Gas	
Natural Gas (Dry)	Only the amount used as a fuel should be included. Do not include the amount used as petrochemical feedstock or used for reducing purposes in blast furnaces or direct reduction processes.
Other Fossil Fuels	
Municipal Wastes (non-biomass fraction)	Only the non-biomass fraction that is used as a fuel should be included.
Industrial Wastes	Only the amount used as a fuel should be included. Do not include the amount that is burned without energy recovery. For waste gas from the petrochemical industry, do not include the amount combusted since these emissions are accounted for in the IPPU sector.
Waste Oils	Only the amount used as a fuel should be included.
Peat	
Peat	Only the amount used as a fuel should be included
Biomass	
Wood/Wood Waste	Only the amount used as fuel should be included.
Sulphite lyes (Black Liquor)	Only the amount used as fuel should be included.
Other Primary Solid Biomass	Only the amount used as fuel should be included.
Charcoal	Only the amount used as fuel should be included.
Biogasoline	In unusual circumstances small quantities may be burned as a fuel in stationary sources.
Biodiesels	In unusual circumstances small quantities may be burned as a fuel in stationary sources.
Other Liquid Biofuels	Only the amount used as fuel should be included.
Landfill Gas	Only the amount used as a fuel should be included.
Sludge Gas	Only the amount used as a fuel should be included.
Other Biogas	Only the amount used as a fuel should be included.
Municipal Wastes (biomass fraction)	Only the amount used as a fuel should be included. Do not include the amount that is burned without energy recovery.

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[2] Fuels not burned for energy purposes are not included in this table (e.g. bitumen and white spirits).

Sector	Energy								
Category	**Fuel combustion activities**								
Category Code	**1A** [a]								
Sheet	**1 of 4 (CO_2, CH_4 and N_2O from fuel combustion by source categories – Tier 1)**								
	Energy consumption			**CO_2**		**CH_4**		**N_2O**	
	A Consumption (Mass, Volume or Energy unit)	B Conversion Factor[b] (TJ/unit)	C Consumption (TJ)	D CO_2 Emission Factor (kg CO_2/TJ)	E CO_2 Emissions (Gg CO_2)	F CH_4 Emission Factor (kg CH_4/TJ)	G CH_4 Emissions (Gg CH_4)	H N_2O Emission Factor (kg N_2O /TJ)	I N_2Oemissions (Gg N_2O)
			C=A*B		**$E=C*D/10^6$**		**$G=C*F/10^6$**		**$I=C*H/10^6$**
Liquid fuels									
Crude Oil									
Orimulsion									
Natural Gas Liquids									
Motor Gasoline									
Aviation Gasoline									
Jet Gasoline									
Jet Kerosene									
Other Kerosene									
Shale Oil									
Gas / Diesel Oil									
Residual Fuel Oil									
LPG									
Ethane									
Naphtha									

a Fill out a copy of this worksheet for each source category listed in Table 2.16 of the Stationary Combustion Chapter and insert the source category name next to the worksheet number.

b When the consumption is expressed in mass or volume units, the conversion factor is the net calorific value of the fuel.

Sector	Energy
Category	**Fuel Combustion Activities**
Category Code	**1A** [(a)]
Sheet	**2 of 4 (CO_2, CH_4 and N_2O from fuel combustion by source categories – Tier 1)**

	Energy consumption			CO_2		CH_4		N_2O	
	A Consumption (Mass, Volume or Energy unit)	B Conversion Factor (TJ/unit)	C Consumption (TJ)	D CO_2 Emission Factor (kg CO_2/TJ)	E CO_2 Emissions (Gg CO_2)	F CH_4 Emission Factor (kg CH_4/TJ)	G CH_4 Emissions (Gg CH_4)	H N_2O Emission Factor (kg N_2O /TJ)	I N_2O Emissions (Gg N_2O)
			$C=A*B$		$E=C*D/10^6$		$G=C*F/10^6$		$I=C*H/10^6$
Lubricants									
Petroleum Coke									
Refinery Feedstocks									
Refinery Gas									
Paraffin Waxes									
Other Petroleum Products									
Solid fuels									
Anthracite									
Coking Coal									
Other Bituminous Coal									
Sub-bituminous coal									
Lignite									
Oil Shale and Tar Sands									
Brown Coal Briquettes									

[a] Fill out a copy of this worksheet for each source category listed in Table 2.16 of the Stationary Combustion chapter and insert the source category name next to the worksheet number.

Sector	Energy								
Category	Fuel combustion activities								
Category Code	1A [a]								
Sheet	3 of 4 (CO_2, CH_4 and N_2O from fuel combustion by source categories – Tier 1)								
	Energy consumption			**CO_2**		**CH_4**		**N_2O**	
	A Consumption (Mass, Volume or Energy unit)	B Conversion Factor (TJ/unit)	C Consumption (TJ)	D CO_2 Emission Factor (kg CO_2/TJ)	E CO_2 Emissions (Gg CO_2)	F CH_4 Emission Factor (kg CH_4/TJ)	G CH_4 Emissions (Gg CH_4)	H N_2O Emission Factor (kg N_2O /TJ)	I N_2O Emissions (Gg N_2O)
			C=A*B		**E=C*D/10^6**		**G=C*F/106**		**I=C*H/106**
Patent Fuel									
Coke Oven Coke / Lignite Coke									
Gas Coke									
Coal Tar									
Gas Work Gas									
Coke Oven Gas									
Blast Furnace Gas									
Oxygen Steel Furnace Gas									
Natural gas									
Natural Gas (Dry)									
Other fossil fuels									
Municipal wastes (non-biomass fraction)									
Industrial Wastes									
Waste Oils									
Peat									
Peat									
Total									

[a] Fill out a copy of this worksheet for each source category listed in Table 2.16 of the Stationary combustion chapter and insert the source category name next to the worksheet number.

Sector	Energy								
Category	**Fuel combustion activities**								
Category Code	**1A** [(a)]								
Sheet	**4 of 4 (CO_2, CH_4 and N_2O from fuel combustion by source categories – Tier 1)**								
	Energy consumption			**CO_2**		**CH_4**		**N_2O**	
	A Consumption (Mass, Volume or Energy unit)	B Conversion Factor (TJ/unit)	C Consumption (TJ)	D CO_2 Emission Factor (kg CO_2/TJ)	E CO_2 Emissions (Gg CO_2)	F CH_4 Emission Factor (kg CH_4/TJ)	G CH_4 Emissions (Gg CH_4)	H N_2O Emission Factor (kg N_2O /TJ)	I N_2O emissions (Gg N_2O)
			C=A*B		**E=C*D/10^6**		**G=C*F/10^6**		**I=C*H/10^6**
Biomass				**Information Items**[b]					
Wood / Wood Waste									
Sulphite Lyes									
Other Primary Solid Biomass									
Charcoal									
Biogasoline									
Biodiesels									
Other Liquid Biofuels									
Landfill Gas									
Sludge Gas									
Other Biogas									
Municipal wastes (biomass fraction)									
				Total		**Total**		**Total**	

[a] Fill out a copy of this worksheet for each source category listed in Table 2.16 of the Stationary combustion chapter and insert the source category name next to the worksheet number.

[b] Information item: Emissions from biomass fuels are only reported as an information item because they are not added to the national totals. They are dealt with in the AFOLU sector.

Sector	Energy
Category	Fuel combustion activities
Category Code	1A 1 and 1A 2
Sheet	1 of 1 (CO_2 emissions from capture for sub-categories 1A 1 and 1A 2 by type of fuel (Gg CO_2))

	Liquid fuels			Solid fuels			Natural gas			Other fossil fuels			Peat			Biomass			Total		
	A[a] CO_2 produced	B CO_2 captured	C CO_2 emitted	D[a] CO_2 produced	E CO_2 captured	F CO_2 emitted	G[a] CO_2 produced	H CO_2 captured	I CO_2 emitted	J[a] CO_2 produced	K CO_2 captured	L CO_2 emitted	M[a] CO_2 produced	N CO_2 captured	O CO_2 emitted	P[a] CO_2 produced	Q CO_2 captured	R CO_2 emitted	S[a] CO_2 produced	T CO_2 captured	U CO_2 emitted
			C=A-B			F=D-E			I=G-H			L=J-K			O=M-N			R=-Q	S=A+D +G+J +M+P	T=B+E +H+K+ N+Q	U=C+F +I+L+O
1A Fuel Combustion Activities																					
1A1 Energy Industries																					
1A1a Main Activity Electricity and Heat Production																					
1A1ai Electricity Generation																					
1A1aii Combined Heat and Power Generation (CHP)																					
1A1aiii Heat Plants																					
1A1b Petroleum Refining																					
1A1c Manufacture of Solid Fuels and Other Energy Industries																					
1A1ci Manufacture of Solid Fuels																					
1A1cii Other Energy Industries																					
1A2 Manufacturing Industries and Construction																					
1A2a Iron and Steel																					
1A2b Non-Ferrous Metals																					
1A2c Chemicals																					
1A2d Pulp, Paper and Print																					
1A2e Food Processing, Beverages and Tobacco																					
1A2f Non-Metallic Minerals																					
1A2g Transport Equipment																					
1A2h Machinery																					
1A2i Mining and Quarrying																					
1A2j Wood and wood products																					
1A2k Construction																					
1A2l Textile and Leather																					
1A2m Non-specified Industry																					

Note: CO_2 produced is the sum of the amounts of CO_2 captured and emitted.

Sector	Energy						
Category	Solid Fuels - Coal Mining and Handling - Underground Mines						
Category Code	1B 1 a i						
Sheet	1of 3 (CH_4 and CO_2 emissions from underground mining activities)						
CH_4 Emissions							
	A **Amount of Coal Produced** **(tonne)**	**B** **Emission Factor** **(m^3 tonne^{-1})**	**C** **Methane Emissions** **(m^3)** **C = A*B**	**D** **Conversion Factor** **(Gg CH_4 m^{-3})**	**E** **Methane Emissions** **(Gg CH_4)** **E=C*D**	**F** **Methane Recovered** **(Gg CH_4)**	**G** **Methane Emissions to be Reported** **(Gg CH_4)** **G=E-F**
Mining (1.B.1.a.i.1)				0.67×10^{-6}			
Post-Mining (1.B.1.a.i.2)				0.67×10^{-6}			
CO_2 Emissions							
	A **Amount of Coal Produced** **(tonne)**	**B** **Emission Factor** **(m^3 tonne^{-1})**	**C** **CO_2 Emissions** **(m^3)** **C=A*B**	**D** **Conversion Factor** **(Gg CO_2 m^{-3})**	**E** **CO_2 Emissions** **(Gg CO_2)** E=C*D		
Mining (1.B.1.a.i.1)				1.83×10^{-6}			
Post-Mining (1.B.1.a.i.2)				1.83×10^{-6}			

Sector	Energy
Category	Solid Fuels - Coal Mining and Handling - Underground Mines
Category Code	1B 1 a i
Sheet	2 of 3 (Methane emissions from abandoned coal mines)

	CH₄ Emissions						
	A	**B**	**C**	**D**	**E**	**F**	**G**
Closure Interval (e.g., 1901-1925)	**Number of Abandoned Mines**	**Fraction of Gassy Coal Mines**	**Emission Factor** (m^3 $year^{-1}$)	**Conversion Factor** (Gg CH_4 m^{-3})	**Methane Emissions** (Gg CH_4) E=A*B*C*D	**Methane Recovered** (Gg CH_4)	**Methane Emissions to be Reported** (Gg CH_4) G=E-F
				0.67×10^{-6}			
				0.67×10^{-6}			
				0.67×10^{-6}			
			Total				

Sector	Energy
Category	Solid Fuels - Coal Mining and Handling - Underground Mines
Category Code	1B 1 a i
Sheet	3 of 3 (CO_2 emissions and unburnt CH_4 emissions from drained methane flared or catalytically oxidised)

	CO_2 emissions from CH_4 flaring				
	A	**B**	**C**	**D**	**E**
	Volume of Methane Combusted (m^3)	**Conversion Factors** (Gg CH_4 m^{-3})	**Factor to Take Account of Combustion Efficiency**	**Stoichio-metric Mass Factor**	**Emissions (Gg)** E=A*B*C*D
CO₂		0.67×10^{-6}	0.98	2.75	
CH₄			0.02	1	

Sector	Energy
Category	Solid Fuels - Coal Mining and Handling - Surface Mines
Category Code	1B 1 a ii
Sheet	1of 1 (CH_4 and CO_2 emissions from surface mining activities)

CH_4 Emissions					
	A	**B**	**C**	**D**	**E**
	Amount of Coal Produced **(tonne)**	**Emission Factor** **(m^3 tonne^{-1})**	**Methane Emissions** **(m^3)** **C = A*B**	**Conversion Factor** **(Gg CH_4 m^{-3})**	**Methane Emissions** **(Gg CH_4)** **E=C*D**
Mining (1.B.1.a.ii.1)				0.67×10^{-6}	
Post-Mining (1.B.1.a.ii.2)				0.67×10^{-6}	

CO_2 Emissions					
	A	**B**	**C**	**D**	**E**
	Amount of Coal Produced **(tonne)**	**Emission Factor** **(m^3 tonne^{-1})**	**CO_2 Emissions** **(m^3)** **C=A*B**	**Conversion Factor** **(Gg CO_2 m^{-3})**	**CO_2 Emissions** **(Gg CO_2)** **E=C*D**
Mining (1.B.1.a.ii.1)				1.83×10^{-6}	
Post-Mining (1.B.1.a.ii.2)				1.83×10^{-6}	

The following worksheet for the Tier 1 approach should be filled in for each source category and subcategory. The potential subcategories are indicated in Tables 4.2.2 and 4.2.4 to 4.2.5 of the Chapter 4: Fugitive Emissions.

	Sector	Energy								
	Category	Oil and natural gas								
	Category Code	1B 2								
	Sheet	1 of 2								
					CO$_2$		CH$_4$		N$_2$O	
IPCC Code	Sector Name	Subcategory	A Activity	B Emission Factor	C Emissions (Gg)	D Emission Factor	E Emissions (Gg)	F Emission Factor	G Emissions (Gg)
					C=A*B		E=A*D		G=A*F
1.B.2	Oil and Natural Gas								
1.B.2.a	Oil								
1.B.2.a.i	Venting								
1.B.2.a.ii	Flaring								
1.B.2.a.iii	All Other								
1.B.2.a.iii.1	Exploration								
1.B.2.a.iii.2	Production and Upgrading								
1.B.2.a.iii.3	Transport								
1.B.2.a.iii.4	Refining								
1.B.2.a.iii.5	Distribution of oil products								
1.B.2.a.iii.6	Other								
				TOTAL		TOTAL		TOTAL	
1.B.2.b	Natural Gas								
1.B.2.b.i	Venting								
1.B.2.b.ii	Flaring								

Sector	Energy								
Category	Oil and natural gas								
Category Code	1B 2								
Sheet	2 of 2								

				CO$_2$		CH$_4$		N$_2$O	
IPCC Code	Sector Name	Subcategory	A Activity	B Emission Factor	C Emissions (Gg)	D Emission Factor	E Emissions (Gg)	F Emission Factor	G Emissions (Gg)
					C=A*B		E=A*D		G=A*F
1.B.2.b.iii	All Other								
1.B.2.b.iii.1	Exploration								
1.B.2.b.iii.2	Production								
1.B.2.b.iii.3	Processing								
1.B.2.b.iii.4	Transmission and Storage								
1.B.2.b.iii.5	Distribution								
1.B.2.b.iii.6	Other								
				TOTAL		TOTAL		TOTAL	
1.B.3	Other emissions from Energy Production								

Sector	Energy					
Category	Fuel combustion activities					
Category Code	1A					
Sheet	1 of 3 (CO₂ from energy sources - Reference Approach)					
		STEP 1				
		A Production	B Imports	C Exports	D International Bunkers	E Stock Change	F Apparent Consumption
Fuel Types							F=A+B-C-D-E
Liquid Fossil	Primary Fuels	Crude Oil						
		Orimulsion						
		Natural Gas Liquids						
	Secondary Fuels	Gasoline						
		Jet Kerosene						
		Other Kerosene						
		Shale Oil						
		Gas / Diesel Oil						
		Residual Fuel Oil						
		LPG						
		Ethane						
		Naphtha						
		Bitumen						
		Lubricants						
		Petroleum Coke						
		Refinery Feedstocks						
		Other Oil						
Liquid Fossil Total							
Solid Fossil	Primary Fuels	Anthracite[a]						
		Coking Coal						
		Other Bit. Coal						
		Sub-bit. Coal						
		Lignite						
		Oil Shale						
	Secondary Fuels	BKB & Patent Fuel						
		Coke Oven/Gas Coke						
		Coal Tar						
Solid Fossil Total							
Gaseous Fossil		Natural Gas (Dry)						
Other	Municipal Wastes (non-bio. fraction)							
	Industrial Wastes							
	Waste Oils							
Other Fossil Fuels Total							
Peat							
Total							

[a] If anthracite is not separately available, include with Other Bituminous Coal.

Sector	Energy			
Category	Fuel combustion activities			
Category Code	1A			
Sheet	2 of 3 (CO_2 from energy sources - Reference Approach)			

			STEP 2		STEP 3	
			G(a) Conversion Factor (TJ/Unit)	H Apparent Consumption (TJ)	I Carbon Content (t C/TJ)	J Total Carbon (Gg C)
Fuel Types				**H=F*G**		**J=H*I/1000**
Liquid Fossil	Primary Fuels	Crude Oil				
		Orimulsion				
		Natural Gas Liquids				
	Secondary Fuels	Gasoline				
		Jet Kerosene				
		Other Kerosene				
		Shale Oil				
		Gas / Diesel Oil				
		Residual Fuel Oil				
		LPG				
		Ethane				
		Naphtha				
		Bitumen				
		Lubricants				
		Petroleum Coke				
		Refinery Feedstocks				
		Other Oil				
Liquid Fossil Total						
Solid Fossil	Primary Fuels	Anthracite				
		Coking Coal				
		Other Bit. Coal(b)				
		Sub-bit. Coal				
		Lignite				
		Oil Shale				
	Secondary Fuels	BKB & Patent Fuel				
		Coke Oven/Gas Coke				
		Coal Tar				
Solid Fossil Total						
Gaseous Fossil		Natural Gas (Dry)				
Other	Municipal Wastes (non-bio. fraction)					
	Industrial Wastes					
	Waste Oils					
Other Fossil Fuels Total						
Peat						
Total						

a Please specify units.

b If anthracite is not separately available, include with Other Bituminous Coal.

Sector	Energy				
Category	Fuel combustion activities				
Category Code	1A				
Sheet	3 of 3 (CO_2 from energy sources - Reference Approach)				
		STEP 4		**STEP 5**	
		K Excluded Carbon (Gg C)	L Net Carbon Emissions (Gg C)	M Fraction of Carbon Oxidised	N Actual CO_2 Emissions (Gg CO_2)
Fuel Types			**L=J-K**		**N=L*M*44/12**
Liquid Fossil	Primary Fuels	Crude Oil				
		Orimulsion				
		Natural Gas Liquids				
	Secondary Fuels	Gasoline				
		Jet Kerosene				
		Other Kerosene				
		Shale Oil				
		Gas / Diesel Oil				
		Residual Fuel Oil				
		LPG				
		Ethane				
		Naphtha				
		Bitumen				
		Lubricants				
		Petroleum Coke				
		Refinery Feedstocks				
		Other Oil				
Liquid Fossil Total						
Solid Fossil	Primary Fuels	Anthracite				
		Coking Coal				
		Other Bit. Coal[a]				
		Sub-bit. Coal				
		Lignite				
		Oil Shale				
	Secondary Fuels	BKB & Patent Fuel				
		Coke Oven/Gas Coke				
		Coal Tar				
Solid Fossil Total						
Gaseous Fossil		Natural Gas (Dry)				
Other	Municipal Wastes (non-bio-fraction)					
	Industrial Wastes					
	Waste Oils					
Other Fossil Fuels Total						
Peat						
Total						

[a] If anthracite is not separately available, include with Other Bituminous Coal.

Sector	Energy				
Category	Reference Approach (Auxiliary Worksheet 1-1: Estimating Excluded Carbon)				
Category Code	1A				
Sheet	1 of 1 Auxiliary Worksheet 1-1: Estimating Excluded Carbon				
		A Estimated Fuel Quantities	B Conversion Factor (TJ/Unit)	C Estimated Fuel Quantities (TJ)	D Carbon Content (t C/TJ)	E Excluded Carbon (Gg C)
Fuel Types				**C=A*B**		**E=C*D/1000**
LPG[a]						
Ethane[a]						
Naphtha[a]						
Refinery Gas[a] [b]						
Gas/Diesel Oil[a]						
Other Kerosene[a]						
Bitumen[c]						
Lubricants[c]						
Paraffin Waxes[b] [c]						
White Spirit[b] [c]						
Petroleum Coke[c]						
Coke Oven Coke[d]						
Coal Tar (light oils from coal)[e]						
Coal Tar (coal tar/pitch)[f]						
Natural Gas[g]						
Other fuels[h]						
Other fuels[h]						
Other fuels[h]						

Note: Deliveries refers to the total amount of fuel delivered and is not the same thing as apparent consumption (where the production of secondary fuels is excluded).

[a] Enter the amount of fuel delivered to petrochemical feedstocks.

[b] Refinery gas, paraffin waxes and white spirit are included in "other oil".

[c] Total deliveries.

[d] Deliveries to the iron and steel and non-ferrous metals industries.

[e] Deliveries to chemical industry.

[f] Deliveries to chemical industry and construction.

[g] Deliveries to petrochemical feedstocks and blast furnaces.

[h] Use the Other fuels rows to enter any other products in which carbon may be stored. These should correspond to the products shown in Table 1-1.