

# **IEA Renewables and Waste Questionnaire**

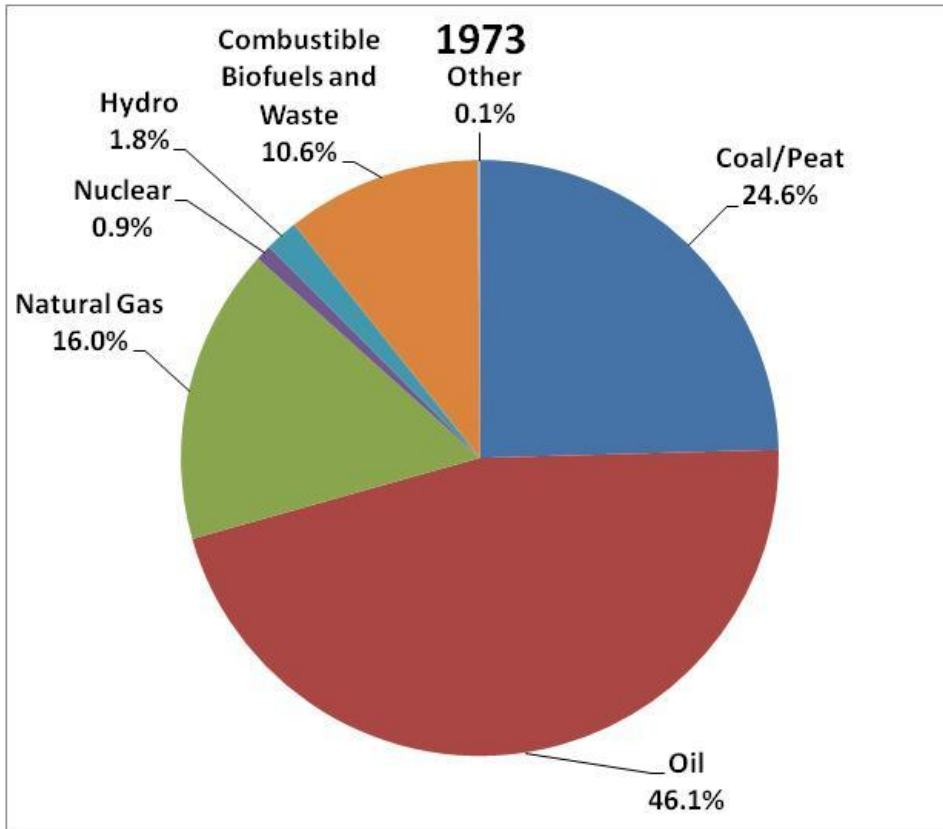
**Joint Rosstat – IEA Energy Statistics Workshop  
Moscow, February, 2012**

**Robert Schnapp  
Energy Data Centre  
Coal, Renewables, Electricity and Heat Section Head**

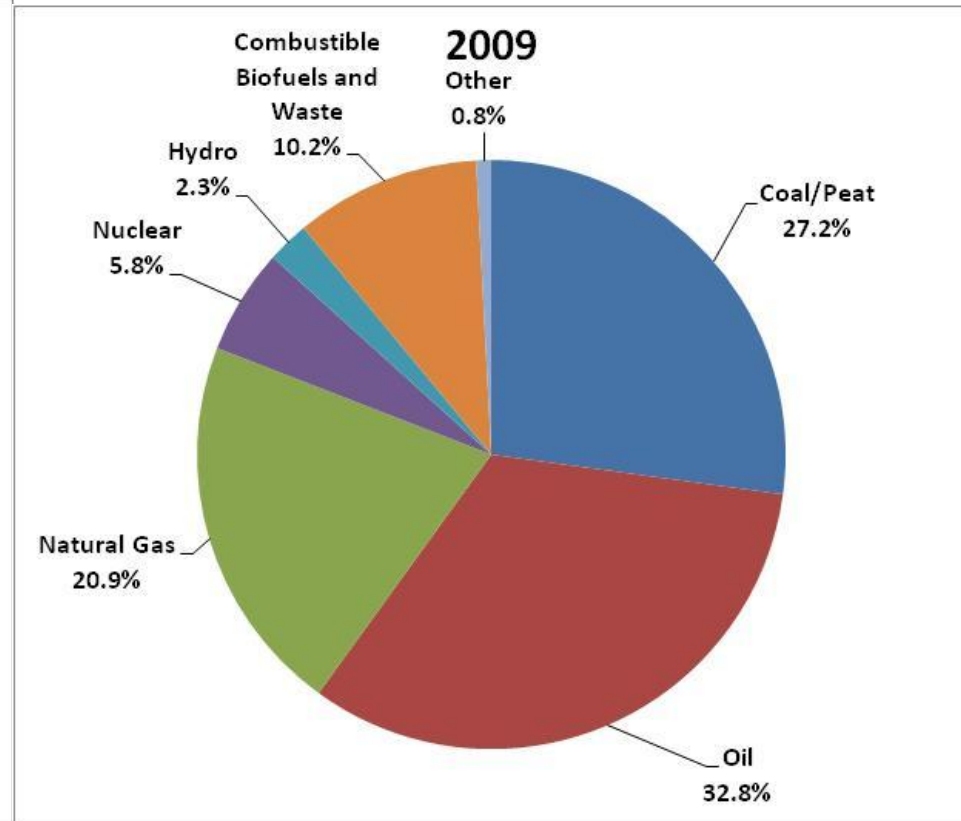
# OVERVIEW

- **Renewable energy in the world**
- **Renewables energy sources**
- **IEA annual questionnaire**
- **On-going challenges**
- **Uses of the data**

# WORLD PRIMARY ENERGY SUPPLY



**6,111 Mtoe**

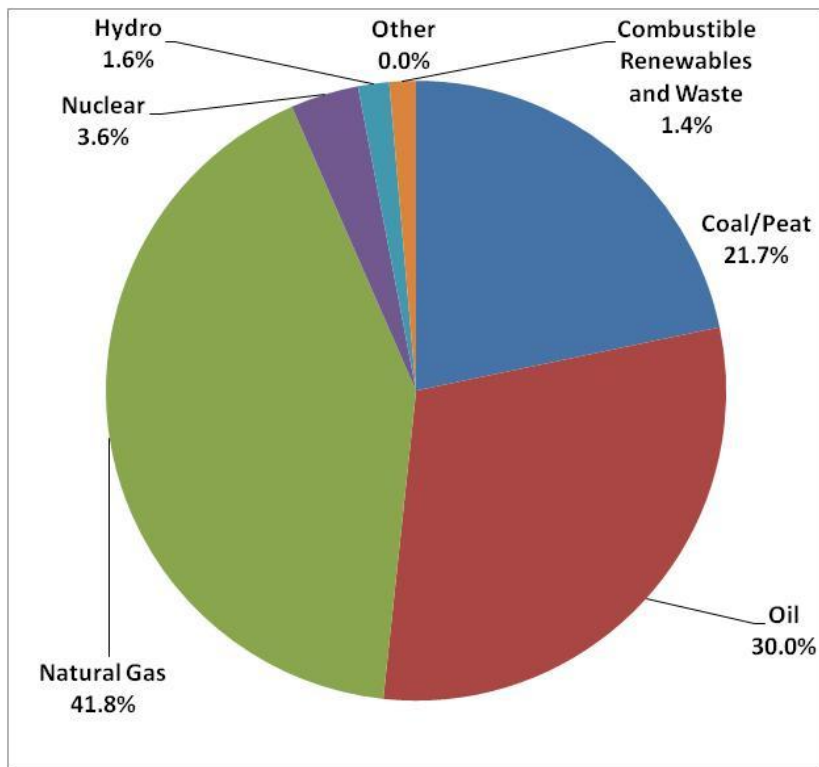


**12,169 Mtoe**

**TPES doubled, but renewables share up only slightly**

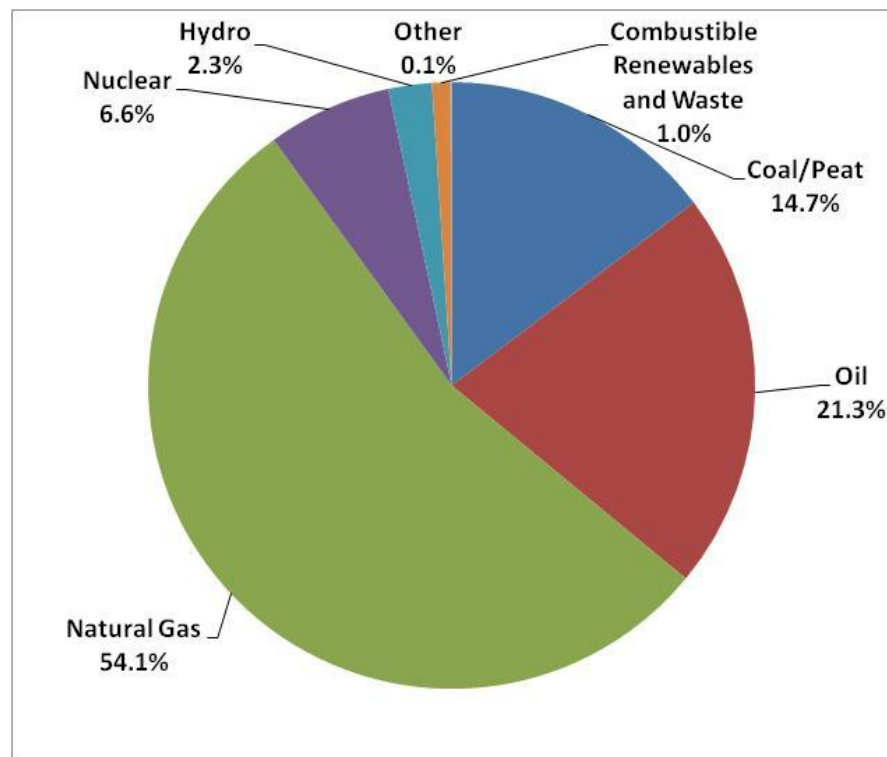
# RUSSIAN PRIMARY ENERGY SUPPLY

**1990**



**879 Mtoe**

**2009**



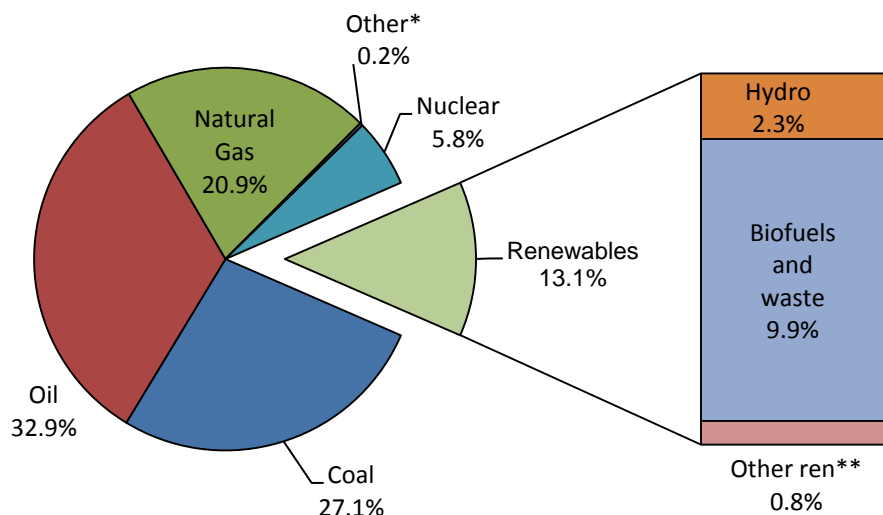
**647 Mtoe**

**Renewables share has increased with hydro and geothermal higher, but combustible renewables cut by half**



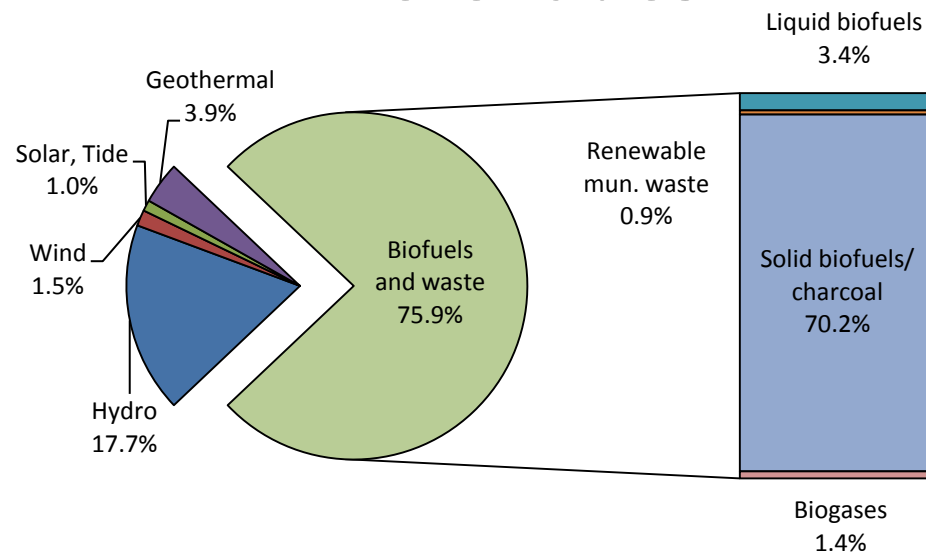
# RENEWABLE FUELS IN THE WORLD, 2009

**TPES**



**12,169 Mtoe**

**Renewables**

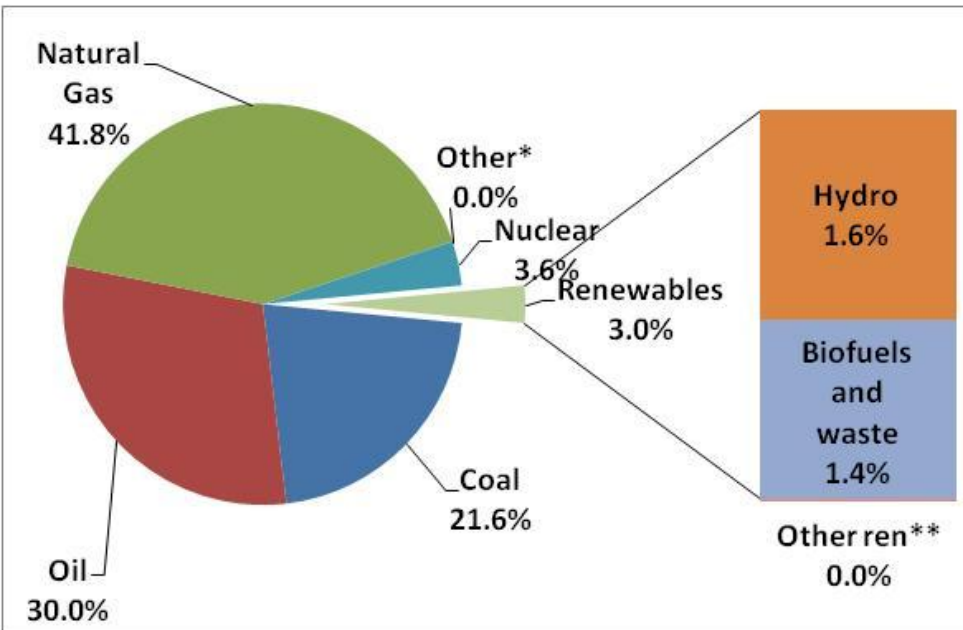


**1,589 Mtoe**

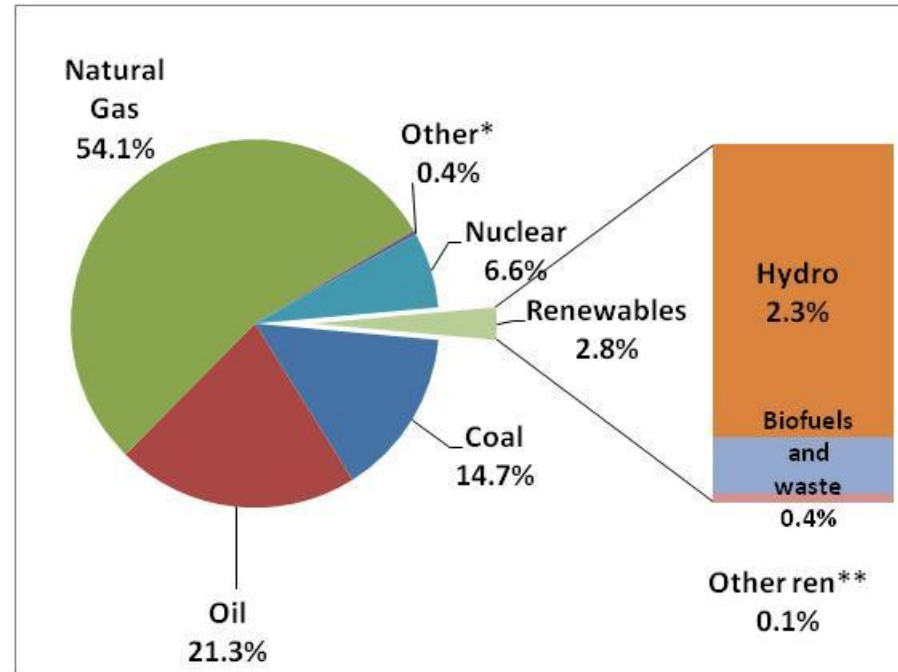
**Majority of renewable energy from solid biofuels and hydroelectricity**

# RUSSIAN PRIMARY ENERGY SUPPLY, 2009

**1990**

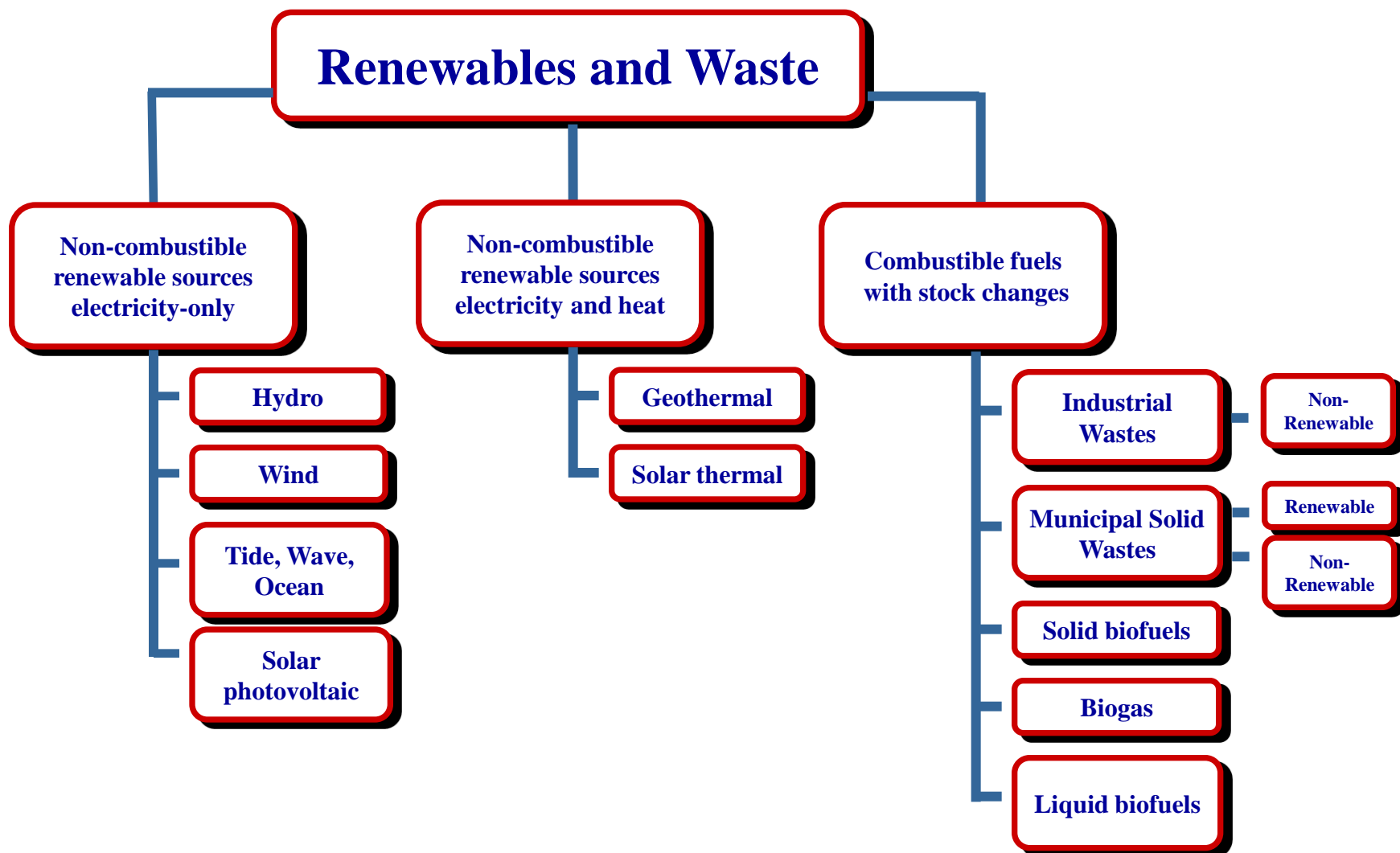


**2009**

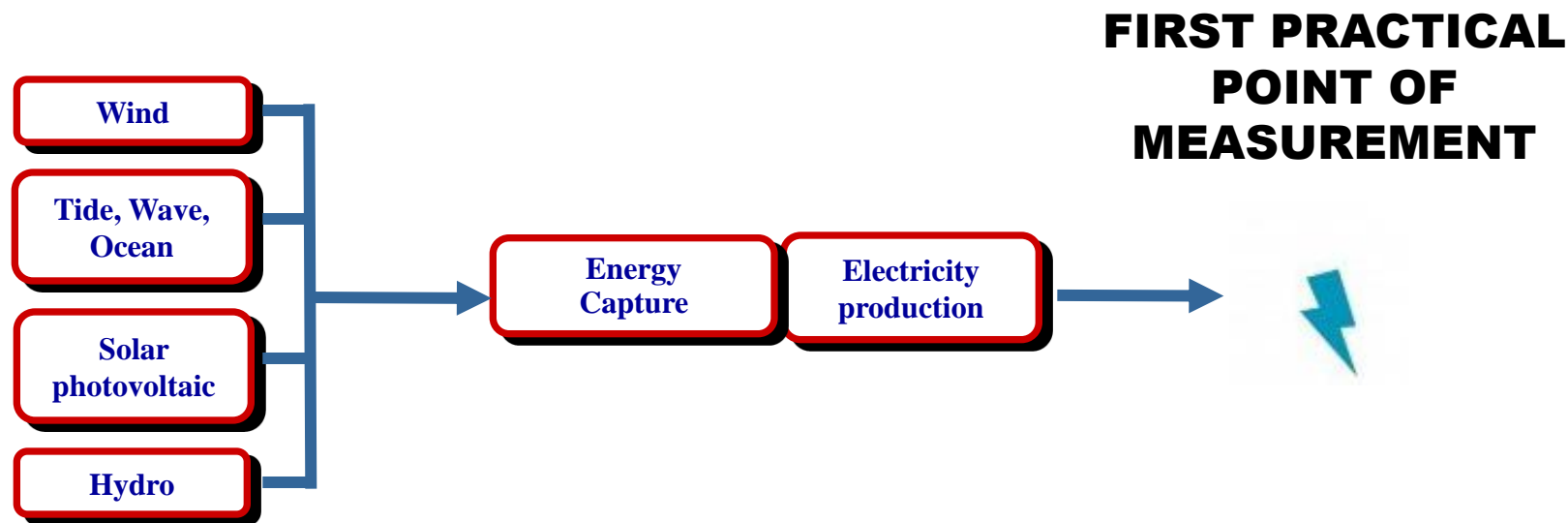


**Hydroelectricity is claiming a larger share of renewable energy sources**

# RENEWABLES AND WASTE CLASSIFICATION



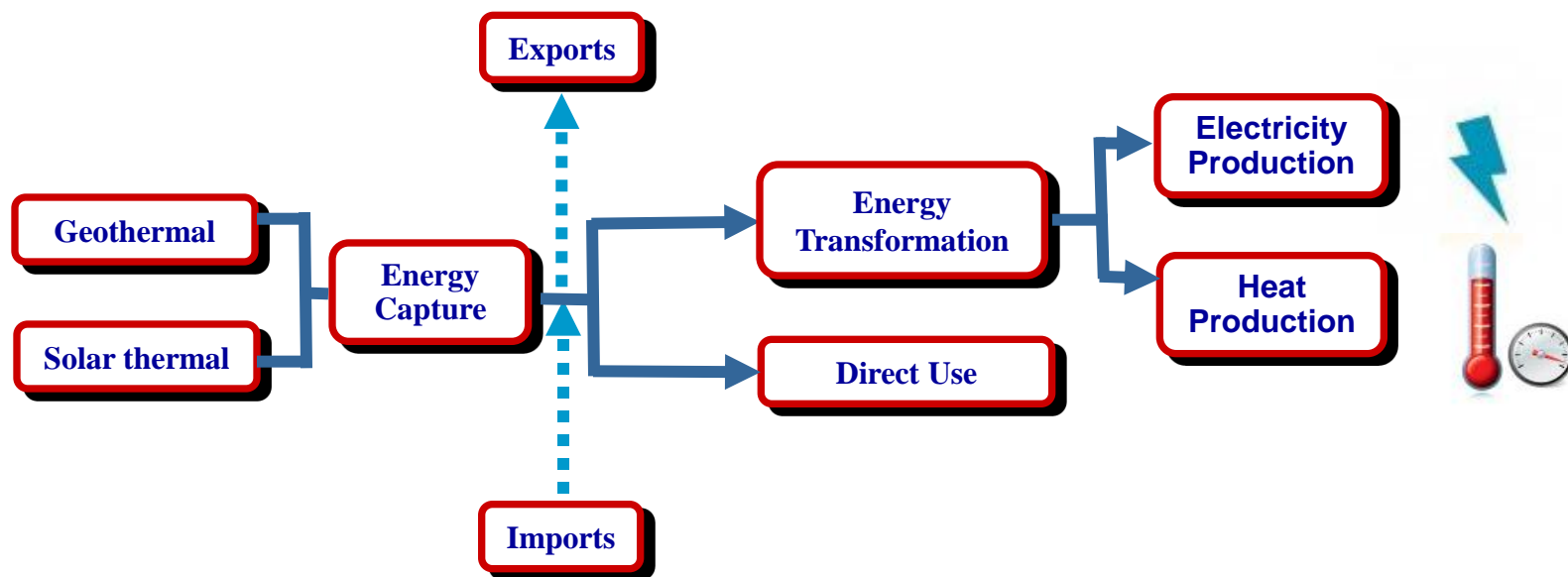
# NON-COMBUSTIBLE RENEWABLE ENERGY SOURCES



**PRIMARY ENERGY FORM = ELECTRICITY**

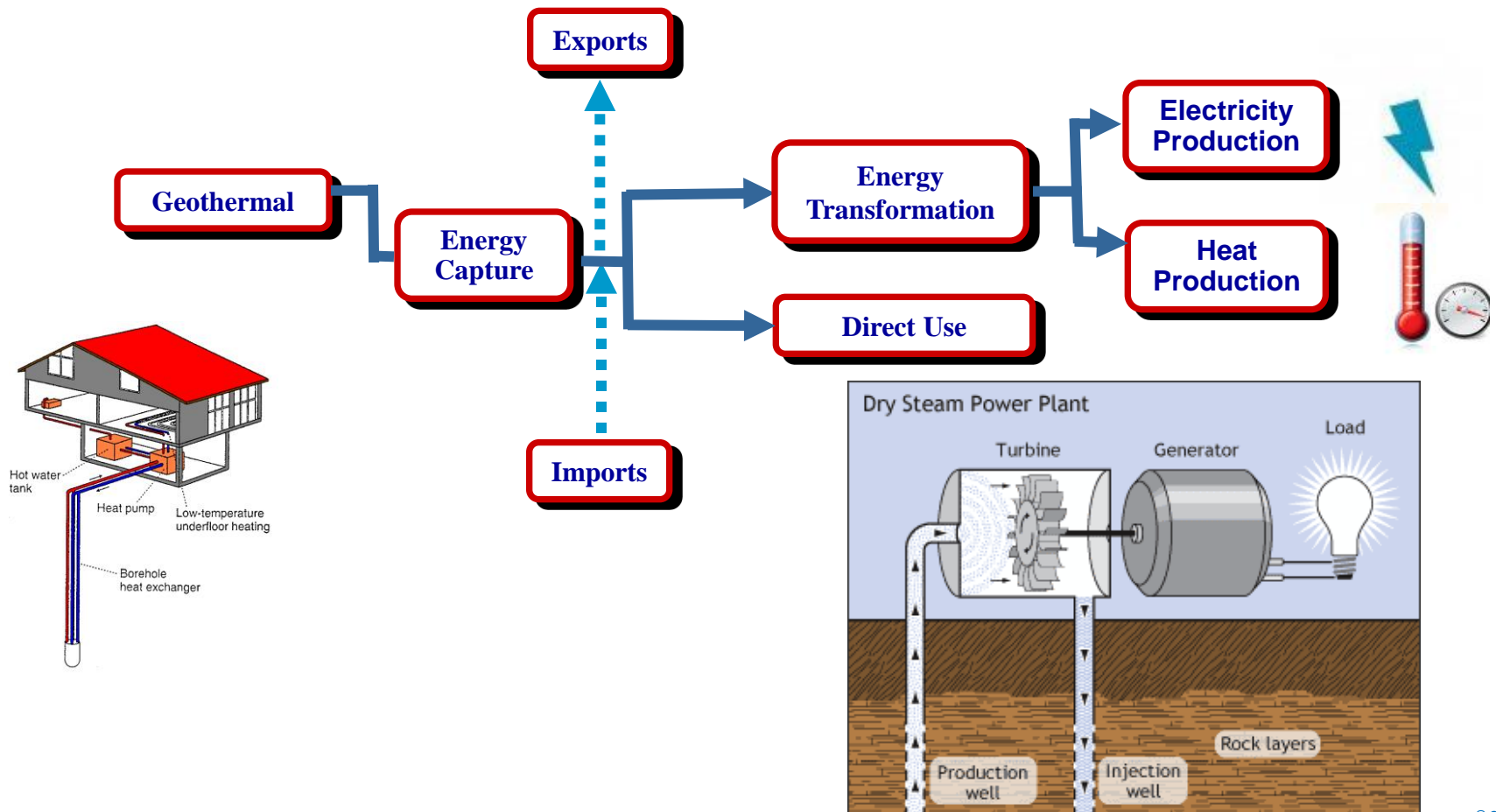


# OTHER NON-COMBUSTIBLE RENEWABLE ENERGY SOURCES

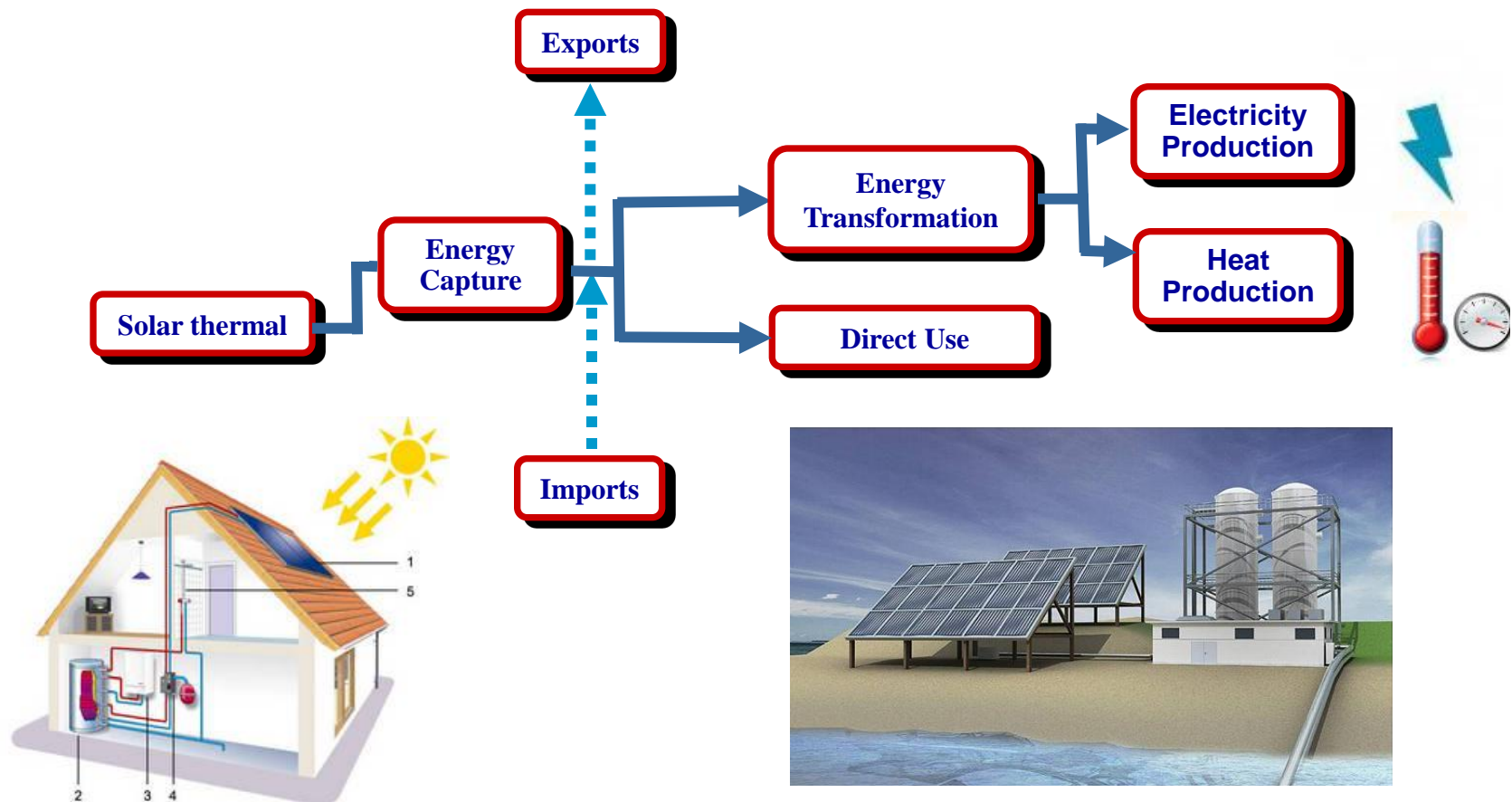


**PRIMARY ENERGY FORM = HEAT**

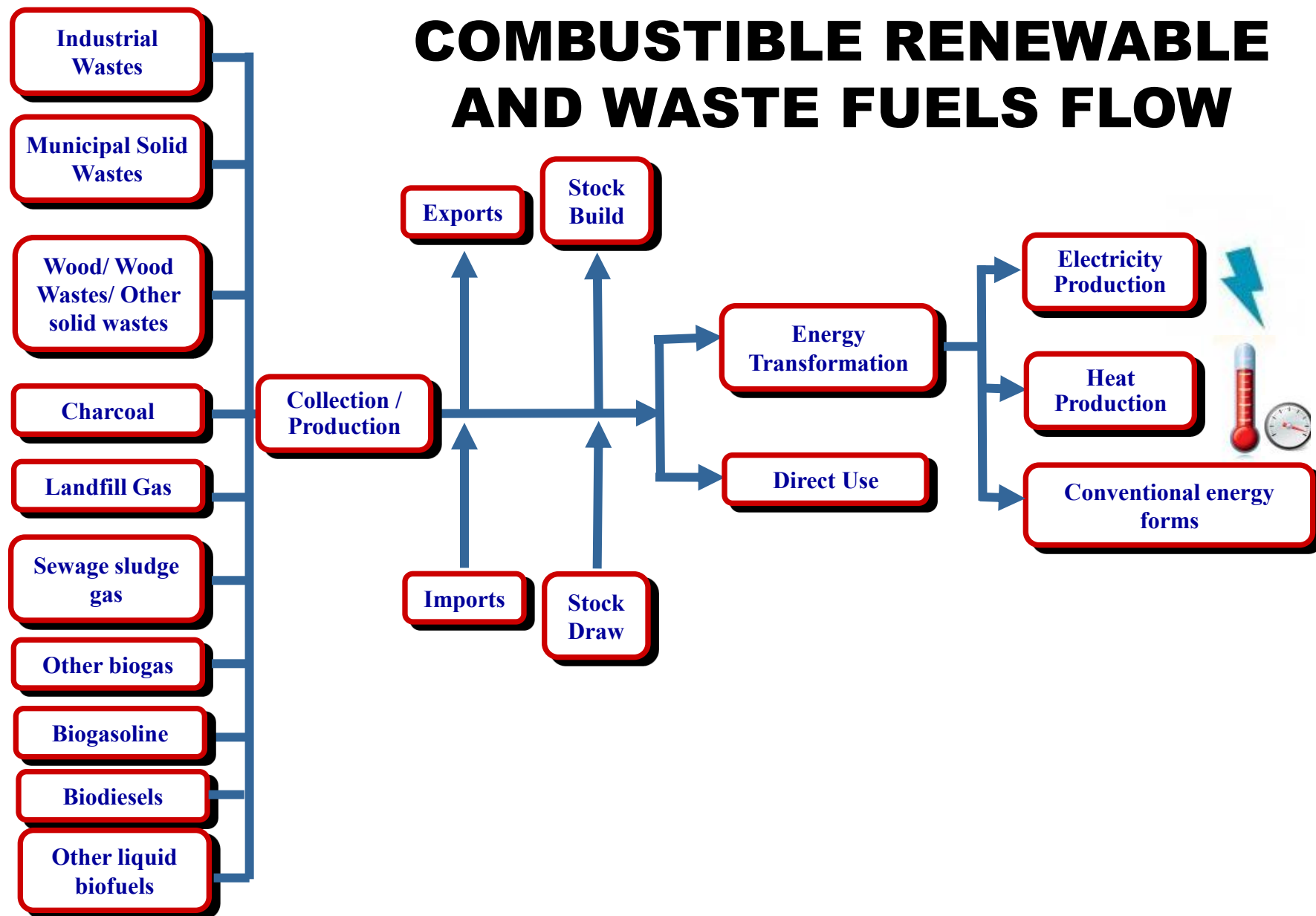
# OTHER NON-COMBUSTIBLE RENEWABLE ENERGY SOURCES



# OTHER NON-COMBUSTIBLE RENEWABLE ENERGY SOURCES



# COMBUSTIBLE RENEWABLE AND WASTE FUELS FLOW



# **STRUCTURE OF ANNUAL QUESTIONNAIRE**

- **Table 1: Gross Electricity and Heat Production**
- **Table 2: Supply, Transformation, Energy Sectors, End-Use**
- **Table 3: Technical Characteristics of Installations**
  - **Net Maximum Capacity (electricity)**
  - **Solar Collectors Surface**
  - **Liquid Biofuels Plants Capacity**
  - **Average Net Calorific Values**
- **Table 4: Production of Wood, Wood Wastes, and Other Solid Wastes**



# TYPES OF ELECTRIC AND HEAT PLANTS

	Electricity Only	CHP	Heat Only
Main Activity Producer	Report all production and all fuel used	Report all electricity and heat produced and all fuel used	Report all heat produced and all fuel used
Autoproducer		Report all electricity produced and <b><u>only</u></b> heat <b><u>sold</u></b> with corresponding fuel used	Report <b><u>only</u></b> heat <b><u>sold</u></b> and corresponding fuel used

# TABLE 1. GROSS ELECTRICITY AND HEAT PRODUCTION

	C	D	E	F	G	H	I	J	K	L
1	Menu		TABLE 1. GROSS ELECTRICITY AND HEAT PRODUCTION							
2										
3										
4	Country		MAIN ACTIVITY PRODUCER PLANTS			AUTOPRODUCER PLANTS			TOTAL	
5	2009		ELECTRICITY (ONLY)	CHP	HEAT (ONLY)	ELECTRICITY (ONLY)	CHP	HEAT (ONLY)	MAIN ACTIVITY PRODUCER	AUTOPRODUCER
6										
7	ELECTRICITY Unit: MWh		A	B	C	D	E	F	G (= A+B+C)	H (= D+E+F)
8	Total	1	175,654,000	0		932,000	2,643,000		175,654,000	3,575,000
9	Hydro	2	175,186,000			932,000			175,186,000	932,000
10	Hydro-1 MW	3	0			0			0	0
11	Hydro 1-10 MW	4	0			0			0	0
12	Hydro 10+ MW	5	173,251,000			932,000			173,251,000	932,000
13	Pumped Hydro	6	1,935,000			0			1,935,000	0
14	Geothermal	7	464,000	0		0	0		464,000	0
15	Solar Photovoltaic	8	0		X	0		X	0	0
16	Solar Thermal	9	0						0	0
17	Tide, Wave and Ocean	10	0			0			0	0
18	Wind	11	4,000			0			4,000	0
19	Industrial Waste	12	0	0		0	2,610,000		0	2,610,000
20	Municipal Waste (Renew)	13	0	0		0	0		0	0
21	Municipal Waste (Non-Renew)	14	0	0		0	0		0	0
22	Wood/Wood Wastes/Other Solid Wastes	15	0	0		0	33,000		0	33,000
23	Landfill Gas	16	0	0		0	0		0	0
24	Sludge Gas	17	0	0		0	0		0	0
25	Other Biogas	18	0	0		0	0		0	0
26	Other Liquid Biofuels	19	0	0		0	0		0	0
27	HEAT Unit: TJ									
28	Total	20		0	0		34,949	83,059	0	118,008
29	Geothermal	21		0	0		0	0	0	0
30	Solar Thermal	22	X	0	0	X	0	0	0	0
31	Industrial Waste	23		0	0		34,557	47,887	0	82,444
32	Municipal Waste (Renew)	24		0	0		0	0	0	0
33	Municipal Waste (Non-Renew)	25		0	0		0	0	0	0
34	Wood/Wood Wastes/Other Solid Wastes	26		0	0		392	35,172	0	35,564
35	Landfill Gas	27		0	0		0	0	0	0
36	Sludge Gas	28		0	0		0	0	0	0
37	Other Biogas	29		0	0		0	0	0	0
38	Other Liquid Biofuels	30		0	0		0	0	0	0

# TABLE 1. GROSS ELECTRICITY AND HEAT PRODUCTION

TABLE 1. GROSS ELECTRICITY AND HEAT PRODUCTION

1	Menu								
2									
3									
4	Country	MAIN ACTIVITY PRODUCER PLANTS			AUTOPRODUCER PLANTS			TOTAL	
5	2009	ELECTRICITY (ONLY)	CHP	HEAT (ONLY)	ELECTRICITY (ONLY)	CHP	HEAT (ONLY)	MAIN ACTIVITY PRODUCER	AUTOPRODUCER
6									
7	ELECTRICITY Unit: MWh	A	B	C	D	E	F	G (= A+B+C)	H (= D+E+F)
8	Total	1	175,654,000	0	932,000	2,643,000		175,654,000	3,575,000
9	Hydro	2	175,186,000		932,000			175,186,000	932,000
10	Hydro-1 MW	3	0	X	0	X		0	0
11	Hydro 1-10 MW	4	0		0			0	0
12	Hydro 10+ MW	5	173,251,000		932,000			173,251,000	932,000
13	Pumped Hydro	6	1,935,000		0			1,935,000	0
14	Geothermal	7	464,000	0	0	0		464,000	0
15	Solar Photovoltaic	8	0		0			0	0
16	Solar Thermal	9	0	X	0	X		0	0
17	Tide, Wave and Ocean	10	0		0			0	0
18	Wind	11	4,000		0			4,000	0
19	Industrial Waste	12	0	0	0	2,610,000		0	2,610,000
20	Municipal Waste (Renew)	13	0	0	0	0		0	0
21	Municipal Waste (Non-Renew)	14	0	0	0	0		0	0
22	Wood/Wood Wastes/Other Solid Wastes	15	0	0	0	33,000		0	33,000
23	Landfill Gas	16	0	0	0	0		0	0
24	Sludge Gas	17	0	0	0	0		0	0
25	Other Biogas	18	0	0	0	0		0	0
26	Other Liquid Biofuels	19	0	0	0	0		0	0
27	HEAT Unit: TJ								
28	Total	20		0	0	34,949	83,059	0	118,008
29	Geothermal	21		0	0	0	0	0	0
30	Solar Thermal	22		0	0	0	0	0	0
31	Industrial Waste	23		0	0	34,557	47,887	0	82,444
32	Municipal Waste (Renew)	24		0	0	0	0	0	0
33	Municipal Waste (Non-Renew)	25		0	0	0	0	0	0
34	Wood/Wood Wastes/Other Solid Wastes	26		0	0	392	35,172	0	35,564
35	Landfill Gas	27		0	0	0	0	0	0
36	Sludge Gas	28		0	0	0	0	0	0
37	Other Biogas	29		0	0	0	0	0	0
38	Other Liquid Biofuels	30		0	0	0	0	0	0

# TABLE 1. GROSS ELECTRICITY AND HEAT PRODUCTION

	C	D	E	F	G	H	I	J	K	L
1	Menu		TABLE 1. GROSS ELECTRICITY AND HEAT PRODUCTION							
2										
3										
4	Country		MAIN ACTIVITY PRODUCER PLANTS			AUTOPRODUCER PLANTS			TOTAL	
5	2009		ELECTRICITY (ONLY)	CHP	HEAT (ONLY)	ELECTRICITY (ONLY)	CHP	HEAT (ONLY)	MAIN ACTIVITY PRODUCER	AUTOPRODUCER
6										
7	ELECTRICITY Unit: MWh		A	B	C	D	E	F	G (= A+B+C)	H (= D+E+F)
8	Total	1	175,654,000	0		932,000	2,643,000		175,654,000	3,575,000
9	Hydro	2	175,186,000			932,000			175,186,000	932,000
10	Hydro-1 MW	3	0			0			0	0
11	Hydro 1-10 MW	4	0			0			0	0
12	Hydro 10+ MW	5	173,251,000			932,000			173,251,000	932,000
13	Pumped Hydro	6	1,935,000			0			1,935,000	0
14	Geothermal	7	464,000	0		0	0		464,000	0
15	Solar Photovoltaic	8	0			0			0	0
16	Solar Thermal	9	0			0			0	0
17	Tide, Wave and Ocean	10	0			0			0	0
18	Wind	11	4,000			0			4,000	0
19	Industrial Waste	12	0	0		0	2,610,000		0	2,610,000
20	Municipal Waste (Renew)	13	0	0		0	0		0	0
21	Municipal Waste (Non-Renew)	14	0	0		0	0		0	0
22	Wood/Wood Wastes/Other Solid Wastes	15	0	0		0	0		0	33,000
23	Landfill Gas	16	0	0		0	0		0	0
24	Sludge Gas	17	0	0		0	0		0	0
25	Other Biogas	18	0	0		0	0		0	0
26	Other Liquid Biofuels	19	0	0		0	0		0	0
27	HEAT Unit: TJ									
28	Total	20		0	0		34,949	83,059	0	118,008
29	Geothermal	21		0	0		0	0	0	0
30	Solar Thermal	22		0	0		0	0	0	0
31	Industrial Waste	23		0	0		34,557	47,887	0	82,444
32	Municipal Waste (Renew)	24		0	0		0	0	0	0
33	Municipal Waste (Non-Renew)	25		0	0		0	0	0	0
34	Wood/Wood Wastes/Other Solid Wastes	26		0	0		392	35,172	0	35,564
35	Landfill Gas	27		0	0		0	0	0	0
36	Sludge Gas	28		0	0		0	0	0	0
37	Other Biogas	29		0	0		0	0	0	0
38	Other Liquid Biofuels	30		0	0		0	0	0	0

Report all  
heat  
produced

Report only  
heat sold to  
third parties

# TABLE 1. GROSS ELECTRICITY AND HEAT PRODUCTION

Menu		TABLE 1. GROSS ELECTRICITY AND HEAT PRODUCTION							
Country		MAIN ACTIVITY PRODUCER PLANTS			AUTOPRODUCER PLANTS			TOTAL	
2009		ELECTRICITY (ONLY)	CHP	HEAT (ONLY)	ELECTRICITY (ONLY)	CHP	HEAT (ONLY)	MAIN ACTIVITY PRODUCER	AUTOPRODUCER
ELECTRICITY Unit: MWh		A	B	C	D	E	F	G (= A+B+C)	H (= D+E+F)
Total	1	175,654,000							75,000
Hydro	2	175,186,000							32,000
Hydro-1 MW	3	0							0
Hydro 1-10 MW	4	0							0
Hydro 10+ MW	5	173,251,000							32,000
Pumped Hydro	6	1,935,000							0
Geothermal	7	464,000							0
Solar Photovoltaic	8	0							0
Solar Thermal	9	0							0
Tide, Wave and Ocean	10	0							0
Wind	11							4,000	0
Industrial Waste	12							0	2,610,000
Municipal Waste (Renew)	13							0	0
Municipal Waste (Non-Renew)	14							0	33,000
Wood/Wood Wastes/Other Solid Wastes	15							0	0
Landfill Gas	16							0	0
Sludge Gas	17							0	0
Other Biogas	18							0	0
Other Liquid Biofuels	19							0	0
HEAT Unit: TJ									
Total	20								
Geothermal	21							0	118,008
Solar Thermal	22		0	0		0	0	0	0
Industrial Waste	23		0	0		34,557	47,887	0	82,444
Municipal Waste (Renew)	24		0	0		0	0	0	0
Municipal Waste (Non-Renew)	25		0	0		0	0	0	0
Wood/Wood Wastes/Other Solid Wastes	26		0	0		392	35,172	0	35,564
Landfill Gas	27		0	0		0	0	0	0
Sludge Gas	28		0	0		0	0	0	0
Other Biogas	29		0	0		0	0	0	0
Other Liquid Biofuels	30		0	0		0	0	0	0

Hydro is broken down by plant size and electricity from pumped storage is reported separately

Hydro =  
Hydro-1 MW +  
Hydro 1-10 MW +  
Hydro 10+ MW +  
Pumped Hydro

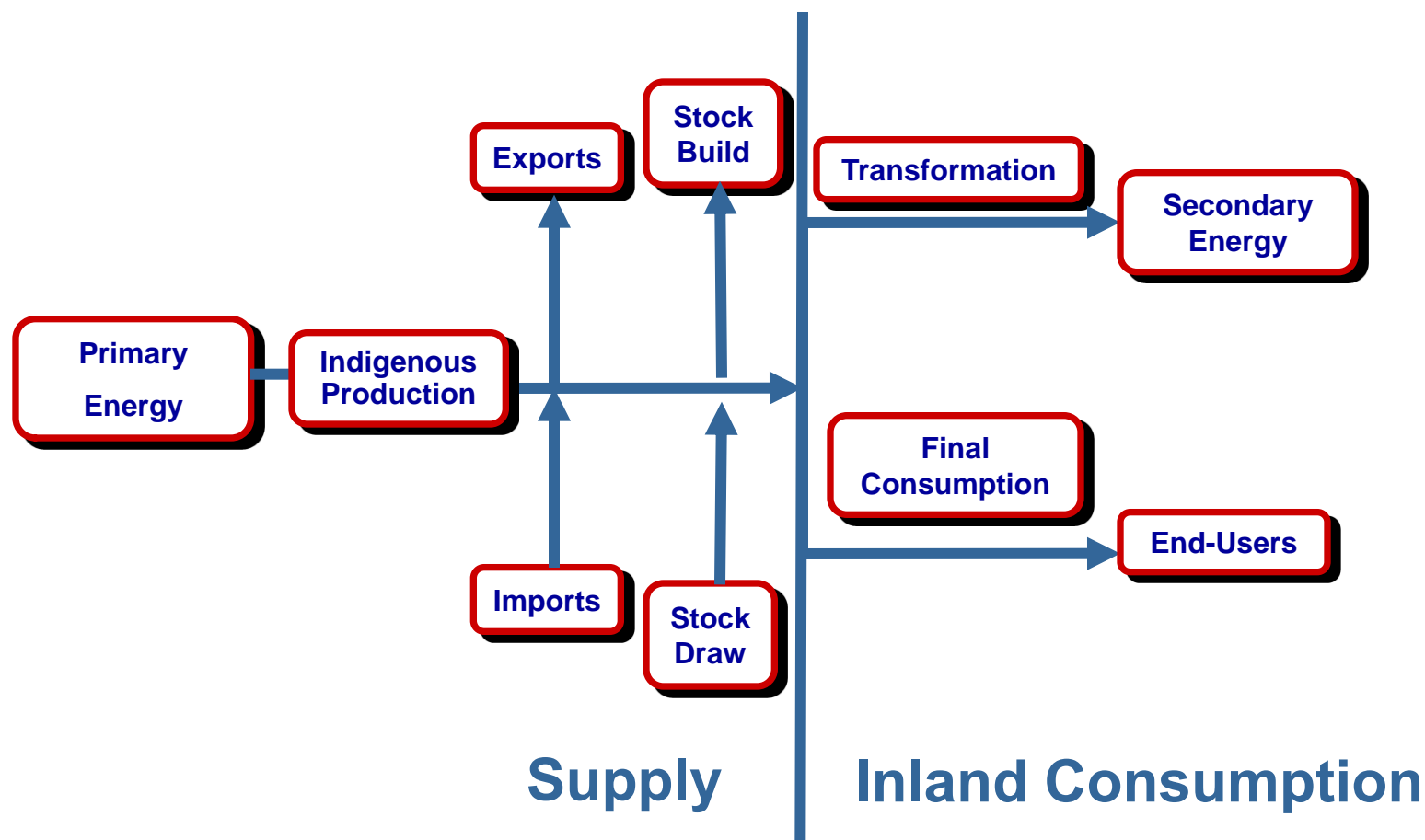


# COMPARISON OF ORIGINAL SUBMISSION WITH FINAL

4	Country		MAIN ACTIVITY PRODUCER PLANTS			AUTOPRODUCER PLANTS			TOTAL	
	<b>Original</b>		ELECTRICITY (ONLY)	CHP	HEAT (ONLY)	ELECTRICITY (ONLY)	CHP	HEAT (ONLY)	MAIN ACTIVITY PRODUCER	AUTOPRODUCER
6	ELECTRICITY Unit: MWh		A	B	C	D	E	F	G (= A+B+C)	H (= D+E+F)
8	Total	1	175,654	0		932	0		175,654	932
9	Hydro	2	175,186			932			175,186	932
10	Hydro-1 MW	3	0			0			0	0
11	Hydro 1-10 MW	4	0			0			0	0
12	Hydro 10+ MW	5	0			0			0	0
13	Pumped Hydro	6	0			0			0	0
14	Geothermal	7	464	0		0	0		464	0
15	Solar Photovoltaic	8	0			0			0	0
16	Solar Thermal	9	0			0			0	0
17	Tide, Wave and Ocean	10	0			0			0	0
18	Wind	11	4			0			4	0
19	Industrial Waste	12	0	0		0	0		0	0
20	Municipal Waste (Renew)	13	0	0		0	0		0	0
21	Municipal Waste (Non-Renew)	14	0	0		0	0		0	0
22	Wood/Wood Wastes/Other Solid Wastes	15	0	0		0	0		0	0

4	Country		MAIN ACTIVITY PRODUCER PLANTS			AUTOPRODUCER PLANTS			TOTAL	
	<b>Final</b>		ELECTRICITY (ONLY)	CHP	HEAT (ONLY)	ELECTRICITY (ONLY)	CHP	HEAT (ONLY)	MAIN ACTIVITY PRODUCER	AUTOPRODUCER
6	ELECTRICITY Unit: MWh		A	B	C	D	E	F	G (= A+B+C)	H (= D+E+F)
8	Total	1	175,654,000	0		932,000	2,643,000		175,654,000	3,575,000
9	Hydro	2	175,186,000			932,000			175,186,000	932,000
10	Hydro-1 MW	3	0			0			0	0
11	Hydro 1-10 MW	4	0			0			0	0
12	Hydro 10+ MW	5	173,251,000			932,000			173,251,000	932,000
13	Pumped Hydro	6	1,935,000						1,935,000	0
14	Geothermal	7	464,000	0		0	0		464,000	0
15	Solar Photovoltaic	8	0			0			0	0
16	Solar Thermal	9	0			0			0	0
17	Tide, Wave and Ocean	10	0			0			0	0
18	Wind	11	4,000			0			4,000	0
19	Industrial Waste	12	0	0		0	2,610,000		0	2,610,000
20	Municipal Waste (Renew)	13	0	0		0	0		0	0
21	Municipal Waste (Non-Renew)	14	0	0		0	0		0	0
22	Wood/Wood Wastes/Other Solid Wastes	15	0	0		0	33,000		0	33,000

# COMMODITY BALANCE FORMAT



# **TRANSFORMATION VS. ENERGY SECTORS**

## ■ **Transformation Sector**

- **Fuel used for the conversion of primary forms of energy to secondary (e.g. landfill gases to electricity)**
- **Fuels used for the transformation to derived energy products (e.g. biogas used for blended natural gas)**

## ■ **Energy Sector**

- **Fuels consumed by the energy industry to support**
  - **fuel extraction**
  - **transformation activities**

# TABLE 2. SUPPLY, TRANSFORMATION, ENERGY SECTORS AND END USE

			MUNICIPAL WASTE		SOLID BIOMASS		BIOGAS			LIQUID BIOFUELS		
Geothermal Energy	Solar Thermal	Industrial Waste (non-renewable)	Renewable	Non-Renewable	Wood/Wood Wastes/Other Solid Wastes	Charcoal	Landfill Gas	Sewage Sludge Gas	Other Biogas	Biogasoline	Biodiesels	Other Liquid Biofuels
TJ (NCV)	TJ (NCV)	TJ (NCV)	TJ (NCV)	TJ (NCV)	TJ (NCV)	1000 tonnes	TJ (NCV)	TJ (NCV)	TJ (NCV)	tonnes	tonnes	tonnes

## Transformation

## Energy industries own use

## Industry

## Transport

## Other final consumption

Transformation Sector	7											
Main Activity Producer Electricity Plants	8											
Main Activity Producer CHP Plants	9											
Main Activity Producer Heat plants	10											
Autoproducer Electricity Plants	11											
Autoproducer CHP Plants	12											
Autoproducer Heat plants	13											
Patent Fuel Plants (Transformation)	14											
BKB Plants (Transformation)	15											
Gas Works (Transformation)	16											
For Blended Natural Gas	17											
For Blending to Motor Gasoline/Diesel	18											
Charcoal Production Plants (Transformation)	19											
Non-specified (Transformation)	20											
Energy Sector	21											
Gasification Plants for Biogas	22											
Own Use in Electricity, CHP and Heat Plants	23											
Coal Mines	24											
Patent Fuel Plants (Energy)	25											
Coke Ovens (Energy)	26											
Petroleum Refineries	27											
BKB Plants (Energy)	28											
Gas Works (Energy)	29											
Blast Furnaces (Energy)	30											
Charcoal Production Plants (Energy)	31											
Non-specified (Energy)	32											
Distribution losses	33											
Total Final Consumption	34											
Final Energy Consumption	35											
Industry Sector	36											
Iron and Steel	37											
Chemical (including Petrochemical)	38											
Non-Ferrous Metals	39											
Non-Metallic Minerals	40											
Transport Equipment	41											
Machinery	42											
Mining and Quarrying	43											
Food, Beverages and Tobacco	44											
Paper, Pulp and Printing	45											
Wood and Wood Products	46											
Construction	47											
Textiles and Leather	48											
Non-specified (Industry)	49											
Transport Sector	50											
Rail	51											
Road	52											
Domestic Navigation	53											
Non-specified (Transport)	54											
Other Sectors	55											
Commercial and Public Services	56											
Residential	57											
Agriculture/Forestry	58											
Fishing	59											
Non-specified (Other)	60											

- 13 energy products
- 60 flows divided into 6 sections
  - Supply
  - Transformation Sector
  - Energy Sector
  - Industry Sector
  - Transport Sector
  - Other Sectors

# TABLE 2. SUPPLY, TRANSFORMATION, ENERGY SECTORS AND END USE

TABLE 2. SUPPLY, TRANSFORMATION, EN

1	Menu							
2								
3								
4								
5	Country							
6								
7	2009							
8	Indigenous Production	1	16,676	0	145,474	0	0	122,953
9	Total Imports (Balance)	2	0	0	0	0	0	0
10	Total Exports (Balance)	3	0	0	0	0	0	0
11	Stock Changes (National Territory)	4	0	0	0	0	0	-1,445
12	Inland Consumption (Calculated)	5	16,676	0	145,111	0	0	121,508
13	Statistical Differences	6	0	0	0	0	0	0
14	Transformation Sector	7	16,676	0	123,913	0	0	40,666
15	Main Activity Producer Electricity Plants	8	16,676	0	+	0	0	0
16	Main Activity Producer CHP Plants	9	0	0	+	0	0	0
17	Main Activity Producer Heat plants	10	0	0	+	0	0	0
18	Autoproducer Electricity Plants	11	0	0	+	0	0	0
19	Autoproducer CHP Plants	12	0	0	69,391	+	0	813
20	Autoproducer Heat plants	13	0	0	54,522	+	0	39,853
21	Patent Fuel Plants (Transformation)	14	0	0	0	+	0	0
22	BKB Plants (Transformation)	15	0	0	0	+	0	0
23	Gas Works (Transformation)	16	0	0	0	0	0	0
24	For Blended Natural Gas	17	0	0	0	0	0	0
25	For Blending to Motor Gasoline/Diesel	18	0	0	0	0	0	0
26	Charcoal Production Plants (Transformation)	19	0	0	0	0	0	0
27	Non-specified (Transformation)	20	0	0	0	0	0	0
28	Energy Sector	21	0	0	5,628	0	0	240
29	Gasification Plants for Biogas	22	0	0	0	0	0	0
30	Own Use in Electricity, CHP and Heat Plants	23	0	0	0	0	0	240
31	Coal Mines	24	0	0	0	0	0	0



# TABLE 2. SUPPLY, TRANSFORMATION, ENERGY SECTORS AND END USE

TABLE 2. SUPPLY, TRANSFORMATION, ET

1	Menu		TABLE 2. SUPPLY, TRANSFORMATION, EN					
2								
3								
4								
5	Country		Solar Thermal	Industrial Waste (non-renewable)	MUNICIPAL WASTE		SOLID BIOMASS	
6					Renewable	Non-Renewable	Wood/Wood Wastes/Other Solid Wastes	Charcoal
			TJ (NCV)	TJ (NCV)	TJ (NCV)	TJ (NCV)	TJ (NCV)	1000 tonnes
7	2009		B	C	D	E	F	G
27	Non-specified (Transformation)	20	0	0	0	0	0	0
28	Energy Sector	21	0	5,628	0	0	240	0
29	Gasification Plants for Biogas	22	0	0	0	0	0	0
30	Own Use in Electricity, CHP and Heat Plants	23	0	0	0	0	240	0
31	Coal Mines	24	0	0	0	0	0	0
32	Patent Fuel Plants (Energy)	25	0	0	0	0	0	0
33	Coke Ovens (Energy)	26	0	0	0	0	0	0
34	Petroleum Refineries	27	0	5,628	0	0	0	0
35	BKB Plants (Energy)	28	0	0	0	0	0	0
36	Gas Works (Energy)	29	0	0	0	0	0	0
37	Blast Furnaces (Energy)	30	0	0	0	0	0	0
38	Charcoal Production Plants (Energy)	31	0	0	0	0	0	0
39	Non-specified (Energy)	32	0	0	0	0	0	0
40	Distribution losses	33	0	0	0	0	0	0
41	Total Final Consumption	34	0	15,570	0	0	80,602	0
42	Final Energy Consumption	35	0	15,570	0	0	80,602	0
43	Industry Sector	36	0	9,940	0	0	5,454	0
44	Iron and Steel	37	0	2,438	0	0	15	0
45	Chemical (including Petrochemical)	38	0	1,079	0	0	193	0
46	Non-Ferrous Metals	39	0	0	0	0	0	0
47	Non-Metallic Minerals	40	0	269	0	0	38	0
48	Transport Equipment	41	0	79	0	0	15	0
49	Machinery	42	0	146	0	0	23	0
50	Mining and Quarrying	43	0	0	0	0	0	0

21,198

# TABLE 2. SUPPLY, TRANSFORMATION, ENERGY SECTORS AND END USE

TABLE 2. SUPPLY, TRANSFORMATION, EI

Country			Geothermal Energy	Solar Thermal	Industrial Waste (non-renewable)	MUNICIPAL WASTE		SOLID BIOMASS	
						Renewable	Non-Renewable	Wood/Wood Wastes/Other Solid Wastes	Charcoal
			TJ (NCV)	TJ (NCV)	TJ (NCV)	TJ (NCV)	TJ (NCV)	TJ (NCV)	1000 tonnes
			A	B	C	D	E	F	G
2009									
Distribution losses	33		0	0	0	0	0	0	0
Total Final Consumption	34		0	0	15,570	0	0	80,602	0
Final Energy Consumption	35		0	0	15,570	=	0	80,602	0
Industry Sector	36		0	0	9,940	+	0	5,454	0
Iron and Steel	37		0	0	2,438		0	15	0
Chemical (including Petrochemical)	38		0	0	1,079		0	193	0
Non-Ferrous Metals	39		0	0	0		0	0	0
Non-Metallic Minerals	40		0	0	269		0	38	0
Transport Equipment	41		0	0	79		0	15	0
Machinery	42		0	0	146		0	23	0
Mining and Quarrying	43		0	0	29		0	404	0
Food, Beverages and Tobacco	44		0	0	569		0	410	0
Paper, Pulp and Printing	45		0	0	358		0	2,104	0
Wood and Wood Products	46		0	0	4,847		0	1,884	0
Construction	47		0	0	0		0	146	0
Textiles and Leather	48		0	0	111		0	23	0
Non-specified (Industry)	49		0	0	15		0	199	0
Transport Sector	50		0	0	0	+	0	0	0
Rail	51		0	0	0		0	0	0
Road	52		0	0	0		0	0	0
Domestic Navigation	53		0	0	0		0	0	0
Non-specified (Transport)	54		0	0	0		0	0	0
Other Sectors	55		0	0	5,630	+	0	75,148	0
Commercial and Public Services	56		0	0	4,047		0	26,072	0
Residential	57		0	0	0		0	37,224	0
Agriculture/Forestry	58		0	0	1,583		0	11,837	0
Fishing	59		0	0	0		0	15	0
Non-specified (Other)	60		0	0	0		0	0	0

# TABLE 3. TECHNICAL CHARACTERISTICS

TABLE 3. TECHNICAL CHARACTERISTICS OF INSTALLATIONS AT THE END OF THE YEAR			
1			
2			
3	Country	Unit = MWe	
4	2009		ELECTRICAL
5	(or other data: )		CAPACITY
6	NET MAXIMUM CAPACITY		A
7	CLASSIFICATION BY TECHNOLOGY		
8	Hydro	1	47,308
9	Hydro-1 MW	2	0
10	Hydro 1-10 MW	3	0
11	Hydro 10+ MW	4	0
12	Pumped Hydro	5	1,216
13	Geothermal	6	81
14	Solar Photovoltaic	7	0
15	Solar Thermal	8	0
16	Tide, Wave and Ocean	9	0
17	Wind	10	10
18	Industrial Waste	11	0
19	Municipal Waste	12	0
20	Wood/Wood Wastes/Other Solid Wastes	13	0
21	Landfill Gas	14	0
22	Sludge Gas	15	0
23	Other Biogas	16	0
24	Other Liquid Biofuels	17	0

# TABLE 3.

## TECHNICAL CHARACTERISTICS

27	<b>SOLAR COLLECTORS SURFACE</b>		
28	Unit = 1000 m <sup>2</sup>		
29	Solar collectors surface (1000m <sup>2</sup> )	18	0
30			
31	<b>LIQUID BIOFUELS PLANTS CAPACITY</b>		
32	Unit = tonnes/year		
33	Biogasoline	19	0
34	Biodiesels	20	0
35	Other Liquid Biofuels	21	0
36			
37	<b>AVERAGE NET CALORIFIC VALUE</b>		
38	Unit = kJ/kg		
39	Biogasoline Average Net Calorific Value	22	0
40	Biodisel Average Net Calorific Value	23	0
41	Other Liquid Biofuels Average Net Calorific Value	24	0
42	Charcoal Average Net Calorific Value	25	0

# TABLE 4. PRODUCTION OF WOOD, WOOD WASTE AND OTHER SOLID WASTES

TABLE 4. PRODUCTION OF WOOD / WOOD WASTES / OTHER SOLID WASTES

Menu

Country

Unit = TJ (net)

2009

A

Wood/Wood Wastes/Other Solid Wastes

1

122,953

Memo: Wood (TJ-net)

2

122,953

Memo: Vegetal Waste (TJ-net)

3

Memo: of which: Wood Waste (TJ-net)

1

Menu

Memo: Black Liquor (TJ-net)

2

Memo: Other Solid Biomass (TJ-net)

3

4

Data should correspond to cell F1 in Table 2.

Country

TABLE 2

Indigenous Production

1

122,953

0

Total Imports (Balance)

2

0

0

Total Exports (Balance)

3

0

0

Stock Changes (National Territory)

4

-1,445

0

Inland Consumption (Calculated)

5

121,508

0

Statistical Differences

6

0

0

Y, TRANSFORMATION, EI

SOLID BIOMASS

Wood/Wood  
Wastes/Other  
Solid Wastes

Charcoal

TJ (NCV)

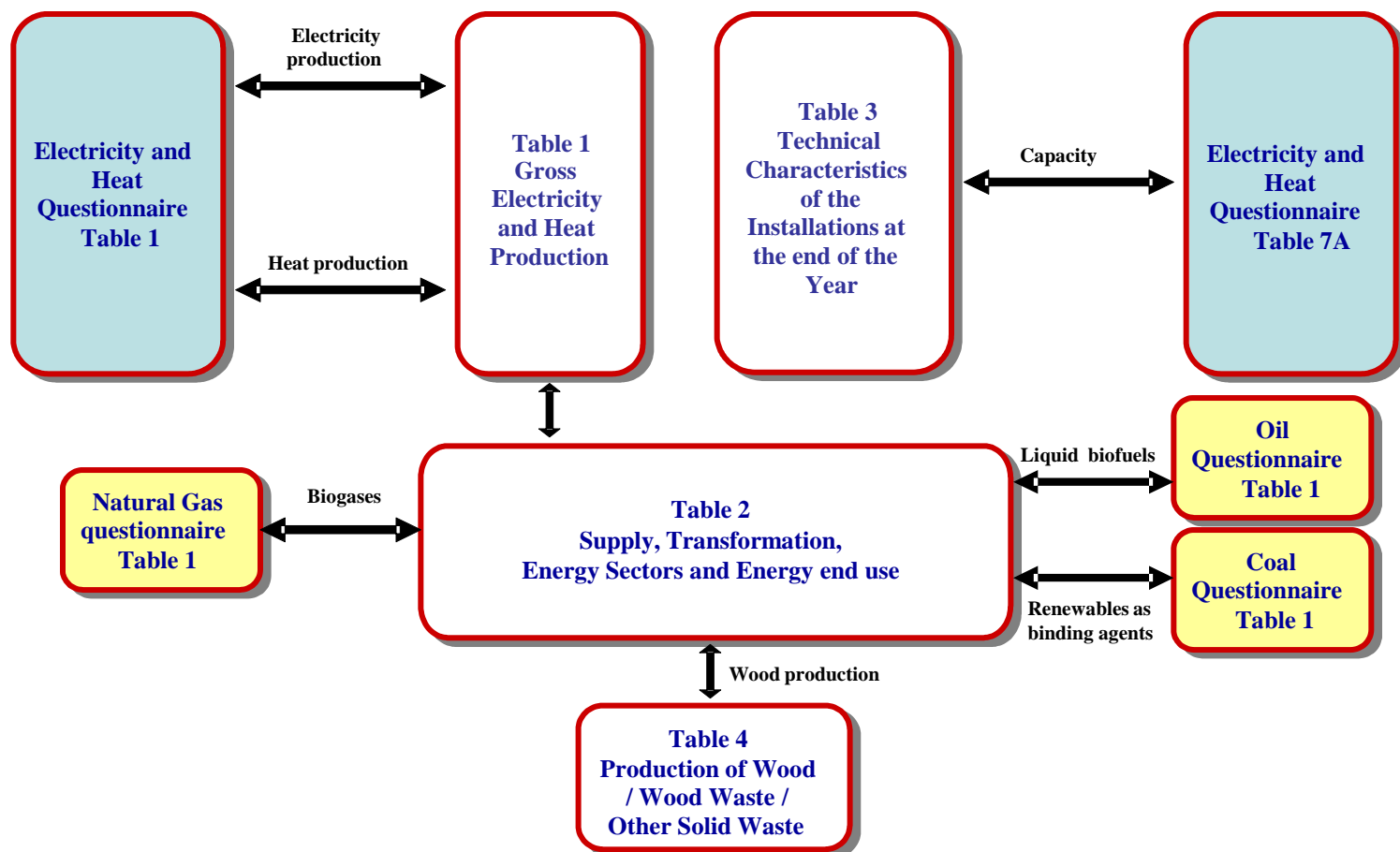
1000 tonnes

F

G



# INTERRELATIONSHIP OF QUESTIONNAIRES



# **DATA QUALITY CHECKS**

- **Integers, negative numbers, sums**
- **Percentage differences with prior year**
- **Comparisons to other questionnaires**
- **Calorific values**
- **Statistical difference**
- **Transformation efficiency rates**
- **Breaks in series**

# **RUSSIAN DATA ISSUES**

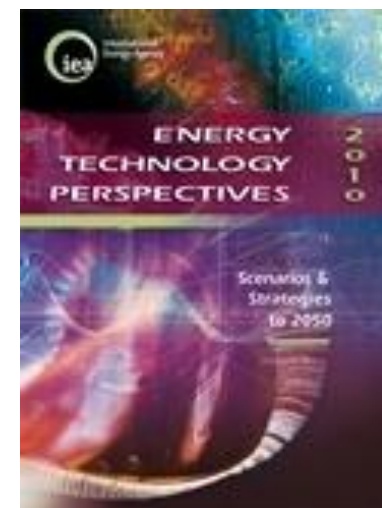
- **Table 1 gross electricity and heat production reported in the wrong units**
- **Table 1 gross electricity and heat production data for autoproducers mostly missing – resolved by taking them from the electricity questionnaire**
- **Table 2 geothermal electricity production and use not reported, but was reported in Table 1**
- **Hydroelectricity capacity not reported by size in Table 3**

# **ON GOING CHALLENGES**

- **Not all renewable and waste energies flow through conventional systems**
- **Multitude of individual small installations**
- **Lack of standardized estimation methodology**

# USES OF THE DATA

- **Renewable Information Book**
- **Electronic online files**
- **Energy balances**
- **Data support for other IEA divisions and other organizations**
- **Country reviews**
- **Analysis**
  - **Assessing security of supply**
  - **Evolution of efficiencies**
  - **Environmental impacts**
- **Making policy and business decisions**



**Thank you**