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



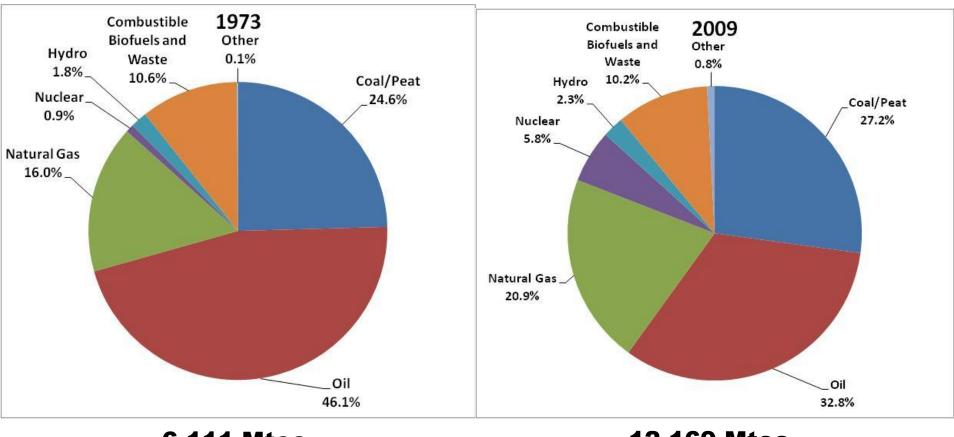
International Energy Agency



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

International

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Energy Agency

12,169 Mtoe

TPES doubled, but renewables share up only slightly

RUSSIAN PRIMARY ENERGY SUPPLY

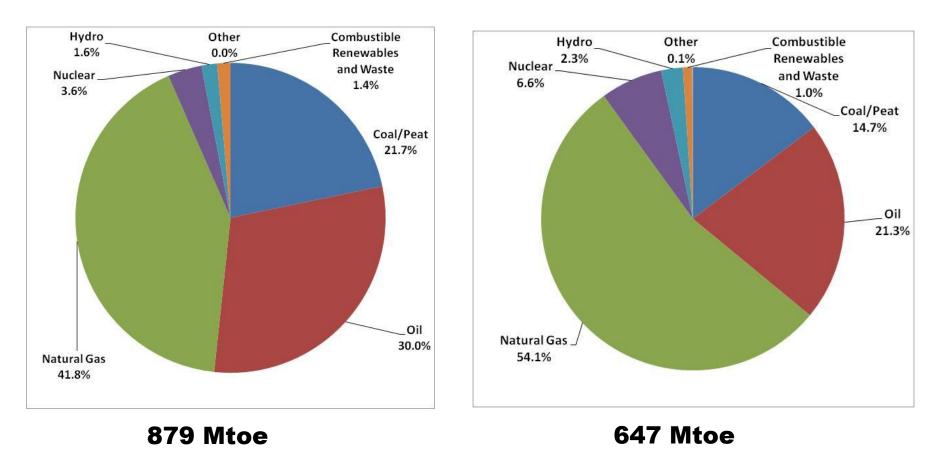
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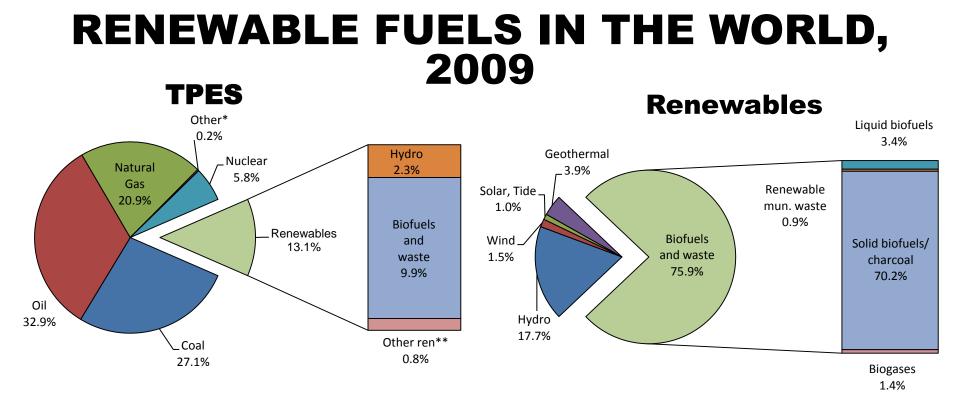
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Energy Agency

2009



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



12,169 Mtoe

International Energy Agency

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1,589 Mtoe

Majority of renewable energy from solid biofuels and hydroelectricity

RUSSIAN PRIMARY ENERGY SUPPLY, 2009

2009 1990 Natural Natural Gas Gas Other* 41.8% 54.1% Other* 0.4% Hydro 0.0% Nuclear Nuclear 1.6% 3.6% Renewables 6.6% Hydro Renewables 2.3% 3.0% 2.8% Biofuels and Biofuels Coal waste and 14.7% 1.4% Coal waste 21.6% 0.4% Other ren** Oil-0.0% Other ren** 30.0% Oil 0.1% 21.3%

International Energy Agency

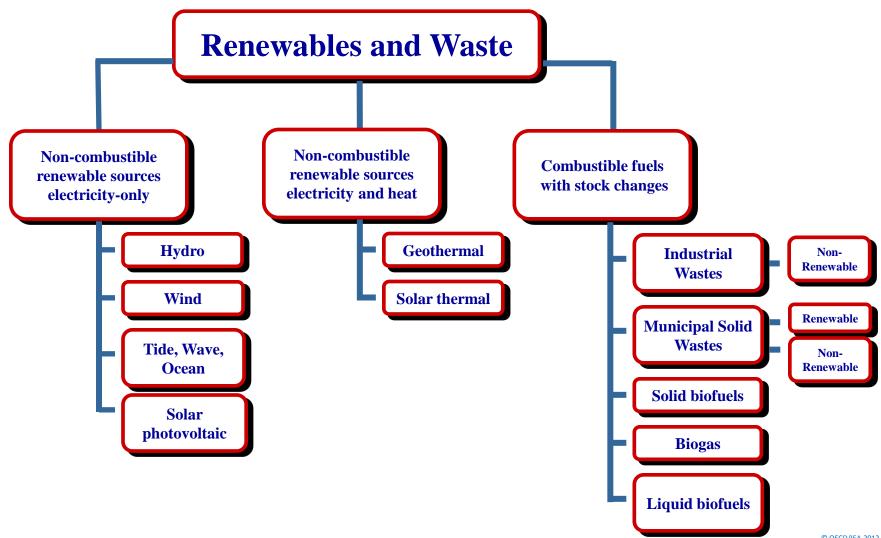
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Hydroelectricity is claiming a larger share of renewable energy sources

RENEWABLES AND WASTE CLASSIFICATION

International **Energy Agency**

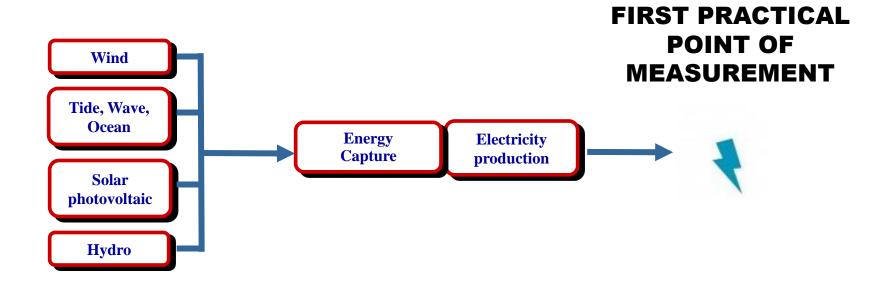
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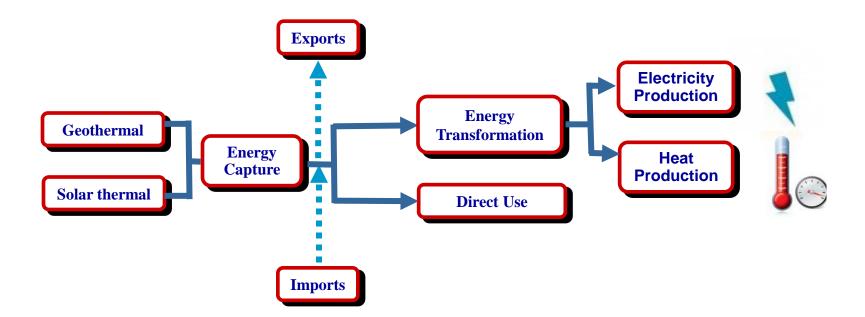
NON-COMBUSTIBLE RENEWABLE ENERGY SOURCES



PRIMARY ENERGY FORM = ELECTRICITY



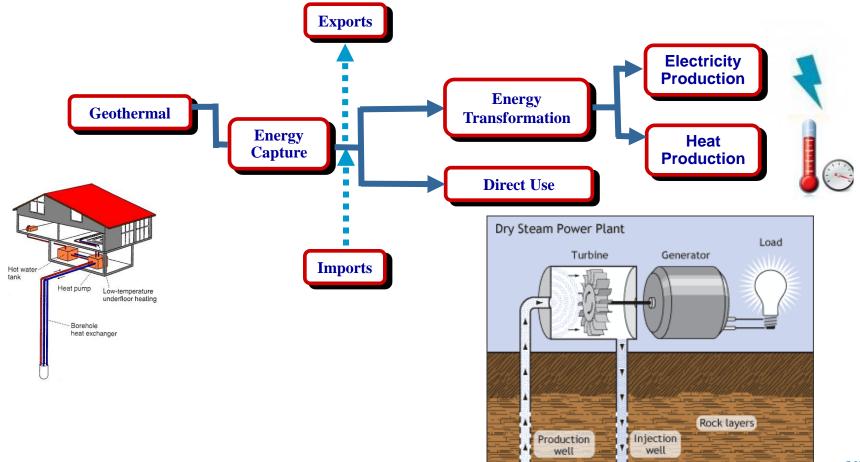
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PRIMARY ENERGY FORM = HEAT

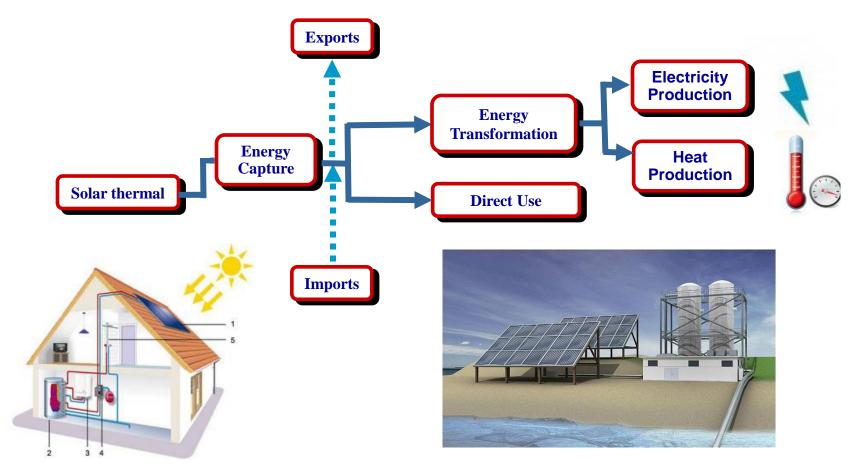


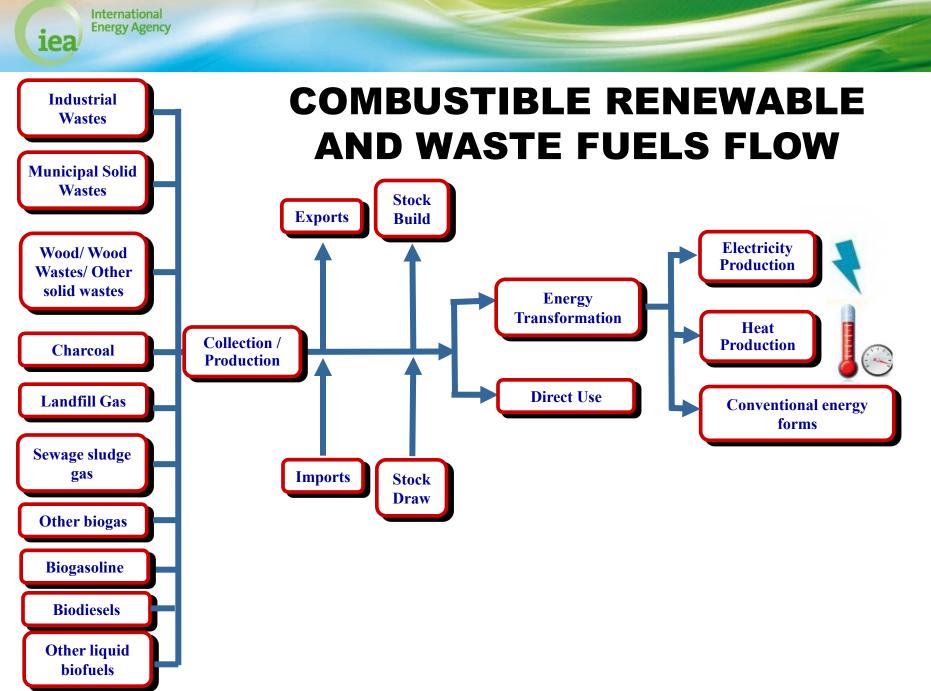
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- Table 1: Gross Electricity and Heat Production
- Table 2: Supply, Transformation, Energy Sectors, End-Use
- Table 3: Technical Characteristics of Installations
 - Net Maximum Capacity (electricity)
 - Solar Collectors Surface

- Liquid Biofuels Plants Capacity
- Average Net Calorific Values
- Table 4: Production of Wood, Wood Wastes, and Other Solid Wastes



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

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TABLE 1. GROSS ELECTRICITY AND HEAT PRODUCTION

	С	D		E	F	G		H	I	J	K	L
1	Menu					TABLE 1. G	ROSS I	ELECT	RICITY AND	HEAT PRO	DUCTION	
2		,										
3		,										
4	Country	ļ	M	AIN ACTI	IVITY PRODUC	ER PLANTS		AUTO	PRODUCER PLA	ANTS	TO	TAL
	· · · · · · · · · · · · · · · · · · ·	-		TRICITY	CHP	HEAT		RICITY	CHP	HEAT	MAIN ACTIVITY	AUTOPRODUCER
-	0000	ľ	(0)	NLY)		(ONLY)	(0)	NLY)	.	(ONLY)	PRODUCER	1
5	2009	ľ			1	/	4			1	1	1
6		<u> </u>								·'	·	
7	ELECTRICITY Unit: MWh	<u> </u>		A	В	С		D	E	F	G (= A+B+C)	H (= D+E+F)
8	Total	1		5,654,000	0	1		932,000	2,643,000		175,654,000	
9	Hydro	2	17	5 <mark>,186,000</mark>				932,000			175,186,000	932,000
10		3		0				0			0	
11	Hydro 1-10 MW	4		0				0			0	
12		5		3,251,000				932,000			173,251,000	
13		6		1,935,000				0			1,935,000	0
14		7		464,000	0			0	0		464,000	0
15	Solar Photovoltaic	8		C				0			0	-
16		9		C				0			0	
17	Tide, Wave and Ocean	10		C				0			0	-
18		11		4,000				0			4,000	
19		12		C	0			0	2,610,000		0	
20		13		0	0			0	0		0	0
21	Municipal Waste (Non-Renew)	14		0	0			0	0		0	-
22		15		0	0			0	33,000		0	33,000
23		16		0	0			0	0		0	0
24		17		0	0			0	0		0	0
25		18		0	0			0	0		0	0
26	Other gold Biolueis	19		<u> </u>	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	(l l		0		0	
30		22			0	, (0	d	0	0
31	Industrial Waste	23		X	0	(X	34,557	47,887	0	82,444
32	Municipal Waste (Renew)	24			0	(0	d	0	0
33		25			0	0 0			0	d	0	0
34	· · · · · · · · · · · · · · · · · · ·	26			0	1			392	35,172	0	35,564
35		27			0	1			0		0	
36		28			0	(<u>ار</u>		0	d	0	0
37	Other Biogas	29			0	0 0			0	o	0	0
38		30			(C		5		0	d	0	0

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TABLE 1. GROSS ELECTRICITY AND HEAT PRODUCTION 1

TABLE 1. CROSS ELECTRICITY AND HEAT BRODUCTION

1	Menu		TABLE 1. GROSS ELECTRICITY AND HEAT PRODUCTION									
3												
	Country		MAIN ACTI	VITY PRODUCI	ER PLANTS	AUTO	PRODUCER PL	ANTS	TOTAL			
	2009		ELECTRICITY (ONLY)	CHP	HEAT (ONLY)	ELECTRICITY (ONLY)	CHP	HEAT (ONLY)	MAIN ACTIVITY PRODUCER	AUTOPRODUCER		
5	2009		<mark>.</mark>									
6	ELECTRICITY Unit: MWh		А	В	с	D	E	F	G (= A+B+C)	H (= D+E+F)		
7	Total	1	A 175,654,000	0	C	932,000	2,643,000	r	(= A+B+C) 175,654,000	A (= D+E+F) 3,575,000		
8	Hydro	1		0			2,043,000					
9	Hydro-1 MW	2	175,186,000 0			932,000 0			175,186,000	932,000		
10	Hydro 1-10 MW	4	0	_ Y		0			0	0		
11	Hydro 10+ MW	5	173,251,000	- A		932,000			173,251,000	932,000		
12 13	Pumped Hydro	6	1,935,000			932,000			1,935,000	932,000		
	Geothermal	7	464,000	0		0	0		464,000			
14	Solar Photovoltaic	8	404,000	0		0	0		404,000	0		
16	Solar Thermal	9	0			0			0	0		
17	Tide, Wave and Ocean	10	0	_X		0			0	0		
18	Wind	11	4,000			0			4,000	0		
	Industrial Waste	12	0	0		0	2,610,000		0	2,610,000		
	Municipal Waste (Renew)	13	0	0		0	0		0	0		
	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		
	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		
	Municipal Waste (Renew)	24		0	0		0	0	0	0		
	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		
	Landfill Gas	27		0	0		0	-	0	0		
	Sludge Gas	28		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 EA 2012		

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TABLE 1. GROSS ELECTRICITY AND HEAT PRODUCTION D E

	С	D	E	F	G	Н		J	К	L	
1	Menu				TABLE 1. GI	ROSS ELECT	RICITY AND	HEAT PRO	DUCTION		
2											
3							PROBUCES C				
4	Country		MAIN ACT	IVITY PRODUCE	R PLANTS		PRODUCER PL		TOTAL		
			ELECTRICITY	CHP	HEAT	ELECTRICITY	CHP	HEAT	MAIN ACTIVITY	AUTOPRODUCER	
5	2009		(ONLY)		(ONLY)	(ONLY)		(ONLY)	PRODUCER		
6	2000		i	}							
7	ELECTRICITY Unit: MWh		A	В	С	D	E	F	G (= A+B+C)	H (= D+E+F)	
8	Total	1	175,654,000			932,000	2,643,000	-	175,654,000	3,575,000	
9	Hydro	2	175,186,000			932,000	21010,000		175,186,000	932,000	
10	Hydro-1 MW	3	0			002,000			0	002,000	
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	6	0		C	0		0	0	
21	Municipal Waste (Non-Renew)	14		Report	t a11		Repor	t only	0	0	
22	Wood/Wood Wastes/Other Solid Wastes	15		Kepor	i all		Repor	t <u>omy</u>	0	33,000	
23	Landfill Gas	16		heat		<u> </u>	heat so	old to	0	0	
24	Sludge Gas	17		neat			near so		0	0	
25 26	Other Biogas Other Live Courses	18 19		nrodu	bod		third p	artias	0	0	
		19	•	produc	Jeu	<u> </u>	սասի	val 1155	0	U	
27	HEAT Unit: TJ	20			-			00.050		440.000	
28	Total Geothermal	20 21		0	0		34,949	83,059	0	118,008	
29 30	Solar Thermal	21		0	0		0	0	0	0	
30	Industrial Waste	22		0	0		34,557	47,887	0	82,444	
32	Municipal Waste (Renew)	23		0	0		04,007	1,007	0	02,444	
33	Municipal Waste (Non-Renew)	24		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		C	0	0	0	
37	Other Biogas	29		0	0		c	0	0	0	
38	Other Liquid Biofuels	30		0	0		c	0	0	0 _{/IEA}	

TABLE 1. GROSS ELECTRICITYAND HEAT PRODUCTION

1	Menu		TABLE 1. GROSS ELECTRICITY AND HEAT PRODUCTION									
2												
3				UBBOBLIC	D DI ANITO		PRODUCTD 21			TOTAL		
4	Country		MAIN ACTIVIT	Y PRODUCE	EK PLANTS	AUTOPRODUCER PLANTS			TOTAL			
			ELECTRICITY	CHP	HEAT	ELECTRICITY	CHP	HEAT	MAIN ACTIVITY	AUTOPRODUCER		
5	2009		(ONLY)		(ONLY)	(ONLY)		(ONLY)	PRODUCER			
5	2009		├ ₩									
6					~						-	
7	ELECTRICITY Unit: MWh	_	A	В	С	D	E	F	G (= A+B+C)	H (= D+E+F)	4	
8	Total	1	175,654,000							75,000	2	
9	Hydro	2	175,186,000	$-H_{\rm M}$	dro ig	s brok	en do	wn h	y plant	SIZA 32,000	2	
10	Hydro-1 MW	3	0	_ ' ' y		y plaint		2				
11	Hydro 1-10 MW	4	0		dala	ctricity	1 from		nod	0	2	
12	Hydro 10+ MW	2	173,251,000		ipeu	32,000	2					
13	Pumped Hydro	6	1,935,000							0	4	
14	Geothermal	7	464,000	- sto	brade	is rer	ortec	sepa	arately	0	4	
15	Solar Photovoltaic	8	0	_ 0.0	nugo			· Sope	alory	0	4	
16	Solar Thermal	9	0			· · · · ·			U	0	4	
17	Tide, Wave and Ocean	10							0	0	4	
18	Wind	11	-Hydro				1		4,000	0	2	
19	Industrial Waste	12					-		0	2,610,000	2	
20	Municipal Waste (Renew)	13	– TT.	ا معامد	1. NAME				0	0	4	
21	Municipal Waste (Non-Renew)	14	_ п	yuro-i	l MW				0	0	2	
22	Wood/Wood Wastes/Other Solid Wastes	15							0	33,000	2	
23	Landfill Gas	16	⊢ H•	vdro 1	-10 M	$W \dashv =$			0	0	4	
24	Sludge Gas	17		y name na si si					0	0	4	
25	Other Biogas	18	- U.	nden 1	$0\pm M3$				0	0	4	
26	Other Liquid Biofuels	19	L U.	yaro I	0+ MV	~ ¬ר			0	0	<u>'</u>	
27	HEAT Unit: TJ					_					-	
28	Total	20	– Pu	impec	i Hydra		I	3,059	0	,	3	
29	Geothermal	21		Jr. 2. 2				0	0	0	2	
30	Solar Thermal	22		0	0		0	0	0	0	2	
31	Industrial Waste	23		0	0		34,557	47,887	0	82,444	L.	
32	Municipal Waste (Renew)	24		0	0		0	0	0	0	의	
33	Municipal Waste (Non-Renew)	25		0	0		0	0	0	0	2	
34	Wood/Wood Wastes/Other Solid Wastes	26		0	0		392	35,172	0	35,564	L.	
35	Landfill Gas	27		0	0		0	0	0	0	2	
36	Sludge Gas	28		0	0		0	0	0	0	2	
37	Other Biogas	29		0	0		0	0	0	0	2	
38	Other Liquid Biofuels	30		0	0		0	0	0	0	A 2012	

COMPARISON OF ORIGINAL SUBMISSION WITH FINAL

4	Country		MAIN ACTIV	ITY PRODUCE	ER PLANTS	AUTOPRODUCER PLANTS			TOI	TAL
5	Original		ELECTRICITY (ONLY)	СНР	HEAT (ONLY)	ELECTRICITY (ONLY)	СНР	HEAT (ONLY)	MAIN ACTIVITY PRODUCER	AUTOPRODUCER
6										
7	ELECTRICITY Unit: MWh		А	В	С	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
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	Ÿ		0	0
20	Municipal Waste (Renew)	13	0	0		P	0		0	0
21	Municipal Waste (Non-Renew)	14	0	0			0		0	0
22	Wood/Wood Wastes/Other Solid Wastes	15	0	0		0	0		0	0
4	Country		MAIN ACTIVI	TY PRODUCE	R PLANTS	AUTO	PRODUCER PL	ANTS	TOI	AL
5	Final		ELECTRICITY (ONLY)	CHP	HEAT (ONLY)	ELECTRICITY (ONLY)	CHP	HEAT (ONLY)	MAIN ACTIVITY PRODUCER	AUTOPRODUCER
7	ELECTRICITY Unit: MWh		A	В	С	P		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	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

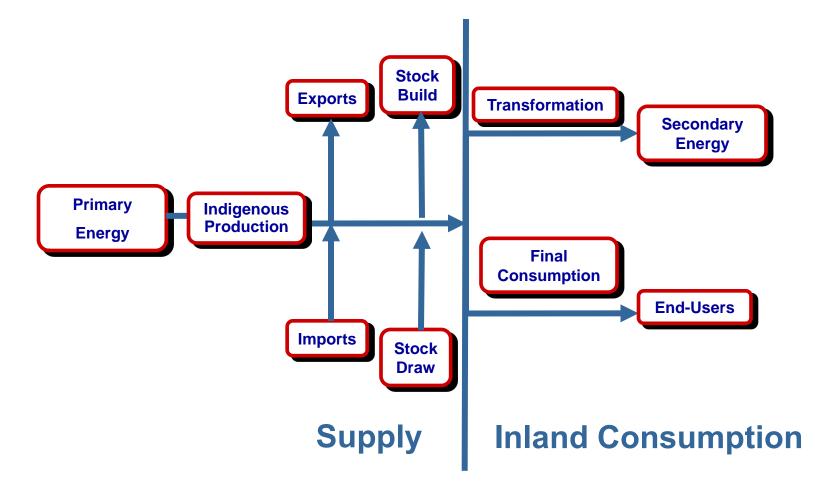
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COMMODITY BALANCE FORMAT



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

International Energy Agency

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

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

Contermal Solar Thermal Vaste (non-reservable Reservable Vastes (Other Sold V				1			T THE OTT									
Image: Thermal Waste (non- resevable) Renewable WastesOther (NCV) Studge Cas Biogas Liquid Liquid Liquid (NCV) TJ (NCV) TJ (NCV) </th <th></th> <th></th> <th></th> <th></th> <th></th> <th>MUNICIPA</th> <th>AL WASTE</th> <th>SOL</th> <th>TD BIO</th> <th>DMASS</th> <th></th> <th>BIOGAS</th> <th></th> <th></th> <th>UID BIOFUI</th> <th>ELS</th>						MUNICIPA	AL WASTE	SOL	TD BIO	DMASS		BIOGAS			UID BIOFUI	ELS
Image: Thermal Waste (non- resevable) Renewable WastesOther (NCV) Studge Cas Biogas Liquid Liquid Liquid (NCV) TJ (NCV) TJ (NCV) </th <th></th>																
Image: Thermal Waste (non- resevable) Renewable WastesOther (NCV) Studge Cas Biogas Liquid Liquid Liquid (NCV) TJ (NCV) TJ (NCV) </th <th></th>																
Image: Thermal Waste (non- resevable) Renewable WastesOther (NCV) Studge Cas Biogas Liquid Liquid Liquid (NCV) TJ (NCV) TJ (NCV) </th <th></th> <th>Geothermal</th> <th>Solar</th> <th>Indus</th> <th>trial</th> <th>Renewable</th> <th>Non-</th> <th>Wood/</th> <th>Nood</th> <th>Charcoal</th> <th>Landfill Gas</th> <th>Sewage</th> <th>Other</th> <th>Biogasoline</th> <th>Biodiesels</th> <th>Other</th>		Geothermal	Solar	Indus	trial	Renewable	Non-	Wood/	Nood	Charcoal	Landfill Gas	Sewage	Other	Biogasoline	Biodiesels	Other
TJ (NCV) TJ (NCV) <th< th=""><th></th><th></th><th></th><th>1</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>-</th><th></th><th></th><th></th><th></th></th<>				1								-				
Ti (NCV) TJ (NCV) <th< th=""><th></th><th>Lifergy</th><th>пегшаг</th><th>1</th><th>-</th><th></th><th>Kellewable</th><th></th><th></th><th></th><th></th><th>Sludge Gas</th><th>Diogas</th><th></th><th></th><th>-</th></th<>		Lifergy	пегшаг	1	-		Kellewable					Sludge Gas	Diogas			-
Transformation • 13 energy products Energy industries own use • 60 flows divided into 6 sections Industry • 13 energy products Industry • 13 energy products Other final consumption • 13 energy products 0 ther final consumption • 13 energy products • 60 flows divided into 6 sections • Supply • Transformation Sector • Energy Sector • Industry • Transport Sector • Other Sectors • Other Sectors																Biofuels
Transformation 		TJ (NCV)	TJ (NCV)	TJ (N	CV)	TJ (NCV)	TJ (NCV)	TJ (NO	CV)	1000 tonnes	TJ (NCV)	TJ (NCV)	TJ (NCV)	tonnes	tonnes	tonnes
Transformation 																
Transformation 			-	_			6				, 			, 		
Transformation Name to the third the third							7	0								
Transformation Finergy industries own use Industry Transport Other final consumption							9		• 1	2 on	Draw	nrod	unte			
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 Supply Transformation Sector Energy Sector Industry Transport Sector Other final consumption 			_	٦			14									
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Energy - Transformation Sector industries - Industry Sector Industry - Industry Sector Industry - Transport Sector Stransport - Other Sector Other final consumption - Other of the sector Other final consumption - Other of the sector							18									
Energy industries own use Industry Industry Marson Marson Other final consumption Noter final consumption							20			• Tra	anefo	rmat	ion (Socto		
Energy industries own use Industry Cher final Other final industry 0 ther final industry							21	0								
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 Industry Other final consumption Other final consumption 		own use	9				29				-	_				
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Densetic Nargation 51 0		i rans	por				51									
Other final consumption 5 6 <th></th> <th></th> <th></th> <th></th> <th>Domestic Na</th> <th></th> <th>53</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>					Domestic Na		53									
Other final consumption 5 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>54</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>							54									
Other final consumption 51 0 </th <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>56</th> <th>0</th> <th>0</th> <th>0</th> <th><u>u 0</u></th> <th>0 0</th> <th>0</th> <th>u 0</th> <th></th> <th>1</th>							56	0	0	0	<u>u 0</u>	0 0	0	u 0		1
Consumption	C)thar fi	nal I		Residential		57									
						Forestry	58									
		OBCIDE	ntion			d (Other)	60									
	C	JUIJUIN	Prion													

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

1 2	Menu					ТА	BLE 2. SUPPI	Y, TRANSFOI	RMATION, EN
3	-					MUNICIP	AL WASTE	SOLID B	IOMASS
5	Country		Geothermal Energy	Solar Thermal	Industrial Waste (non-renewable)	Renewable	Non-Renewable	Wood/Wood Wastes/Other Solid Wastes	Charcoal
6	· · · · · · · · · · · · · · · · · · ·		TJ (NCV)	TJ (NCV)	TJ (NCV)	TJ (NCV)	TJ (NCV)	TJ (NCV)	1000 tonnes
7	2009		А	В	С	D	E	F	G
8	Indigenous Production	1	16,676	0	145,474	0	0	122,953	0
9	Total Imports (Balance)	2	0	0	0	0	0	0	0
10	Total Exports (Balance)	3	0	0	0	0	0	0	0
11	Stock Changes (National Territory)	4	0	0	4 4 5 4 4 4	0	0	-1,445	0
12	Inland Consumption (Calculated)	5	16,676	0	145,111	0	0	121,508	0
13	State-ind Differences	6	0	0	0		21,198	0	0
14	Transformation Sector	7	16,676	C	123,913		0	40,666	0
15		8	16,676	C	125,715	+ 0	0	0	0
16	Main Activity Producer CHP Plants	9	0	C	0	+ 0	0	0	0
17	Main Activity Producer Heat plants	10	0	C	0	+ 0	0	0	0
18	Autoproducer Electricity Plants	11	0	C	0	+ 0	0	0	0
19	Autoproducer CHP Plants	12	0	C	69,391	+ 0	0	813	0
20	Autoproducer Heat plants	13	0	C	54,522	+ 0	0	39,853	0
21	Patent Fuel Plants (Transformation)	14	0	C	0	+ 0	0	0	0
22	BKB Plants (Transformation)	15	0	C	0	+ 0	0	0	0
23	Gas Works (Transformation)	16	0	0	0	0	0	0	0
24	For Blended Natural Gas	17	0	0	0	0	0	0	0
25	For Blending to Motor Gasoline/Diesel	18	0	0	0	0	0	0	0
26	Charcoal Production Plants (Transformation)	19	0	0	0	0	0	0	0
27	Non-specified (Transformation)	20	0	0	0	0	0	0	0
28	Energy Sector	21	0	0	5,628	0	0	240	0
29	Gasification Plants for Biogas	22	0	0	0	0	0	0	0
30	Own Use in Electricity, CHP and Heat Plants	23	0	0	0	0	0	240	0
	Coal Mines	24 Table 4	0				0 JNWASTER / MUNV	0	0

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

T

1 Menu		TABLE 2. SUPPLY, TRANSFORMATION, EN									
2											
4				MUNICIP	AL WASTE	SOLID B	IOMASS				
5 Country		Solar Thermal	Industrial Waste (non-renewable)	Renewable	Non-Renewable	Wood/Wood Wastes/Other Solid Wastes	Charcoal				
6		TJ (NCV)	TJ (NCV)	TJ (NCV)	TJ (NCV)	TJ (NCV)	1000 tonnes				
7 2009		В	С	D	E	F	G				
27 Non-specified (Yransformation)	20	0		0	0	0	0				
28 Energy Sector	21	0	5,628	0	0	240	0				
9 Sasification Plants for Biogas	22	0		0	0	0	0				
0 Own Use in Electricity, CHP and Heat Plants	23	0	0	0	0	240	0				
1 Coal Mines	24	0	0	0	0	0	0				
2 Patent Fuel Plants (Energy)	25	0	0	0	0	0	0				
3 Coke Ovens (Energy)	26	0	0	0	0	0	0				
4 Petroleum Refineries	27	0	5,628		0	0	0				
5 BKB Plants (Energy)	28	0	0	0		0	0				
6 Gas Works (Energy)	29	0	0	0	21,198	0	0				
7 Blast Furnaces (Energy)	30	0	0	0		0	0				
8 Charcoal Production Plants (Energy)	31	0	0	0	0	0	0				
9 Non-specified (Energy)	32	0	0	0	0	0	0				
0 Distribution losses	33	0	0	0	0	0	0				
Total Final Consumption	34	0	15,570	0	0	80,602	0				
2 Final Energy Consumption	35	0	15,570	0	0	80,602	0				
3 Industry Sector	36	0	9,940	0	0	5,454	0				
4 Iron and Steel	37	0	2,438	0	0	15	0				
5 Chemical (including Petrochemical)	38	0	1,079	0	0	193	0				
6 Non-Ferrous Metals	39	0	0	0	0	0	0				
7 Non-Metallic Minerals	40	0	269	0	0	38	0				
8 Transport Equipment	41	0	79	0	0	15	0				
9 Machinery	42	0		0		23	0				
Initial and Oversing Start Cover Menu Table1 Table2 Table3	Table4										

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

1	Menu				TA	BLE 2. SUPPL	Y, TRANSFOI	RMATION, EI	
2									
4					MUNICIP	AL WASTE	SOLID BIOMASS		
5	Country	Geothermal Energy	Solar Thermal	Industrial Waste (non-renewable)	Renewable	Non-Renewable	Wood/Wood Wastes/Other Solid Wastes	Charcoal	
6	,	TJ (NCV)	TJ (NCV)	TJ (NCV)	TJ (NCV)	TJ (NCV)	TJ (NCV)	1000 tonnes	
7	2009	A	В	с	D	E	F	G	
40	Distribution losses 33	0	0	0	0	0	0	0	
41	Total Final Consumption 34	0	0	15,570	0	0	80,602	0	
42	Final Energy Consumption 35	0	0	15,570	= 0	0	80,602	0	
46	Industry Sector 36	0	0	9,940	• 0	0	5,454	0	
44	Step and Steel 37	0	0	2,438	0	0	15	0	
45	Chemical (including Petrochemical) 38	0	0	1,079	0	0	193	0	
46	Non-Ferrous Metals 39	0	0	0	0	0	0	0	
47	Non-Metallic Minerals 40	0	0		0	0	38	0	
48	Transport Equipment 41	0	0	79	0	0	15	0	
49	Machinery 42	0	0	146	0	0	23	0	
50	Mining and Quarrying 43	0	0	29	0	0	404	0	
51	Food, Beverages and Tobacco 44	0	0	569	0	0	410	0	
52	Paper, Pulp and Printing 45	0	0	358	0	0	2,104	0	
53	Wood and Wood Products 46	0	0	4,847	0	0	1,884	0	
54	Construction 47	0	0	0	0	0	146	0	
55	Textiles and Leather 48	0	0	111	0	0	23	0	
56	Mon-specified (Industry) 49	0	0	15	0	0	199	0	
67	Transport Sector 50	0	0	0	+ 0	0	0	0	
58	Reil 51	0	0	0	0	0	0	0	
59	Road 52	0	0	0	0	0	0	0	
60	Domestic Navigation 53	0	0	0	0	0	0	0	
61	Aton-specified (Transport) 54	0	0	0	0	0	0	0	
2	Other Sectors 55	0	0	5,630	+ 0	0	75,148	0	
63	Commercial and Public Services 56	-	0	4,047	0	0	26,072	0	
64	Residential 57	0	0	0	0	0	37,224	0	
65	Agriculture/Forestry 58	0	0	1,583	0	0	11,837	0	
66	Fishing 59		0	0	0	0	15	0	
67	Non-specified (Other) 60	0	0	0	0	0	0	0	
68									

H + H Start Cover Menu Table1 Table2 Table3 Table4 ELE HEAT GEOTHERM SOLARTH INDWASTE MUNWASTE MUNWASTER MUNWASTER

TABLE 3. **TECHNICAL CHARACTERISTICS**

International **Energy Agency**

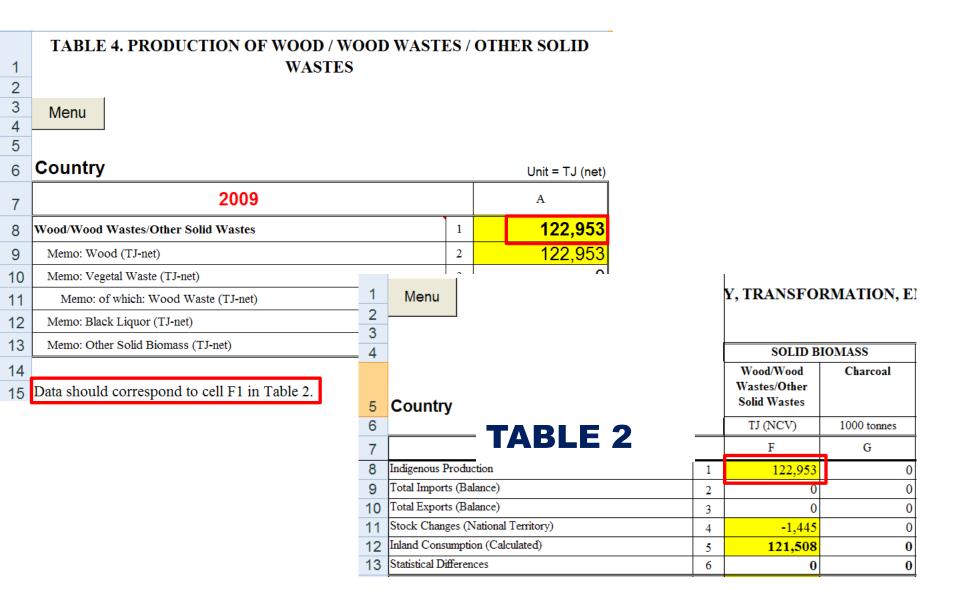
1	TABLE 3. TECHNICAL CHARACTERISTICS OF INSTALLATIONS AT THE END OF THE YEAR										
3	Country		Unit = MWe								
4	2009		ELECTRICAL								
5	(or other data:)		CAPACITY								
6	NET MAXIMUM CAPACITY										
7	CLASSIFICATION BY TECHNOLOGY		А								
8	Hydro	1	47,308								
9	Hydro-1 MW	2	0								
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	SOLAR COLLECTORS	SURF	ACE
28			Unit = 1000 m ²
29	Solar collectors surface (1000m2)	18	0
30			Ĩ
31	LIQUID BIOFUELS PLANT	S CA	PACITY
32			Unit = tonnes/year
33	Biogasoline	19	0
34	Biodiesels	20	0
35	Other Liquid Biofuels	21	0
36			
37	AVERAGE NET CALORIF	IC V	ALUE
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

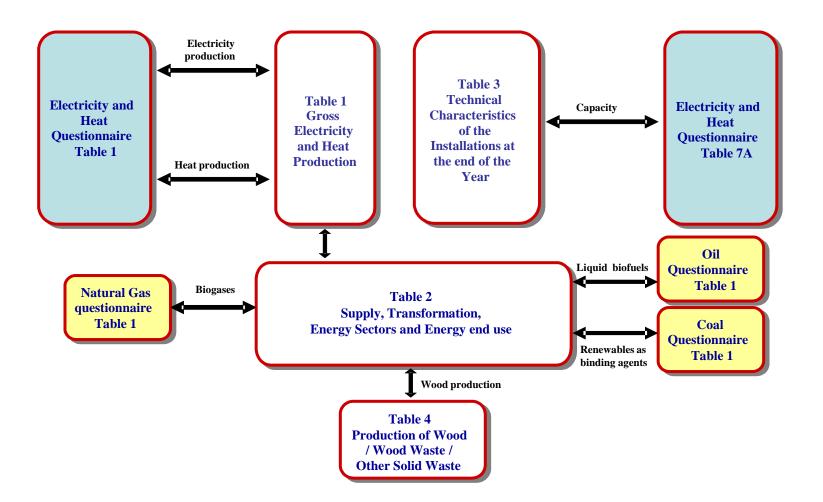
International Energy Agency

TABLE 4. PRODUCTION OF WOOD, WOODWASTE AND OTHER SOLID WASTES



International Energy Agency

INTERRELATIONSHIP OF QUESTIONNAIRES



International Energy Agency

DATA QUALITY CHECKS

- Integers, negative numbers, sums
- Percentage differences with prior year
- Comparisons to other questionnaires
- Calorific values

Energy Agency

- 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

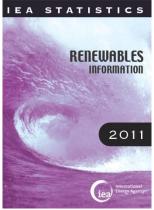
- Not all renewable and waste energies flow through conventional systems
- Multitude of individual small installations
- Lack of standardized estimation methodology

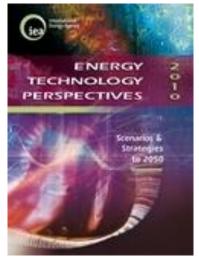


- Renewable Information Book
- Electronic online files
- Energy balances
- Data support for other IEA divisions and other organizations
- Country reviews
- Analysis

iea

- Assessing security of supply
- Evolution of efficiencies
- Environmental impacts
- Making policy and business decisions





Thank you