

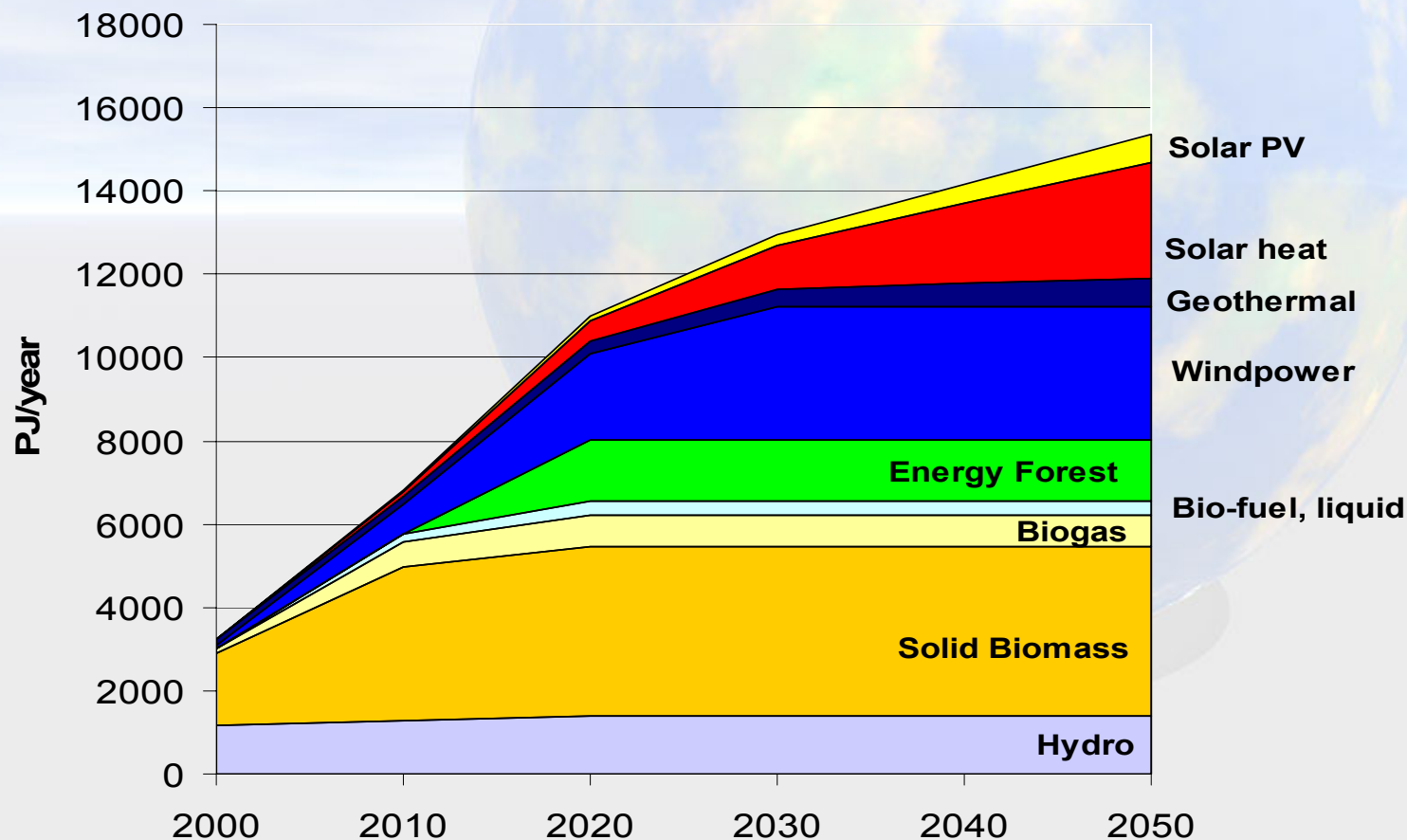
Share of biomass in the model of Sustainable Energy Vision 2050 for Lithuania

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Why environmental NGO's promoting renewable energy?

- **Much less pollution than from fossil and nuclear energy, no environmental hazards;**
- **Socially acceptable, creates jobs;**
- **Large share of local production;**
- **Reduces dependency on imported fuels;**
- **No price surprises at oil crisis etc.;**
- **Large price reductions indicates that renewable energy can be the cheapest solution in the future;**
- **Smaller units, more flexible and therefore cheaper power development plans;**

Sustainable Energy Vision for EU-15 developed by INforSE and Alborg university



Aim of the study “Sustainable Energy Vision for Lithuania 2050 “

- **Lobbying and public advocacy purposes;**
- **To demonstrate that alternatives to dangerous and dirty nuclear exist;**
- **To show that sustainable energy development scenario is possible;**
- **Usage of renewable and local primary energy resources is the best way to ensure security of energy supply;**

Methodology for investigation

- **MS Exel based mathematical model;**
- **For checking was used software :Energy Plan”
to evaluate hourly energy balances;**
- **Data for calculations was taken from existing
scientific studies;**
- **Assumptions on future development trends was
done on analysis of Governmental program's;**

Promoting sustainable bioenergy production and use - policies, showcases and business solutions in the Baltic Sea Region



Lithuania-3 - OpenOffice.org Calc

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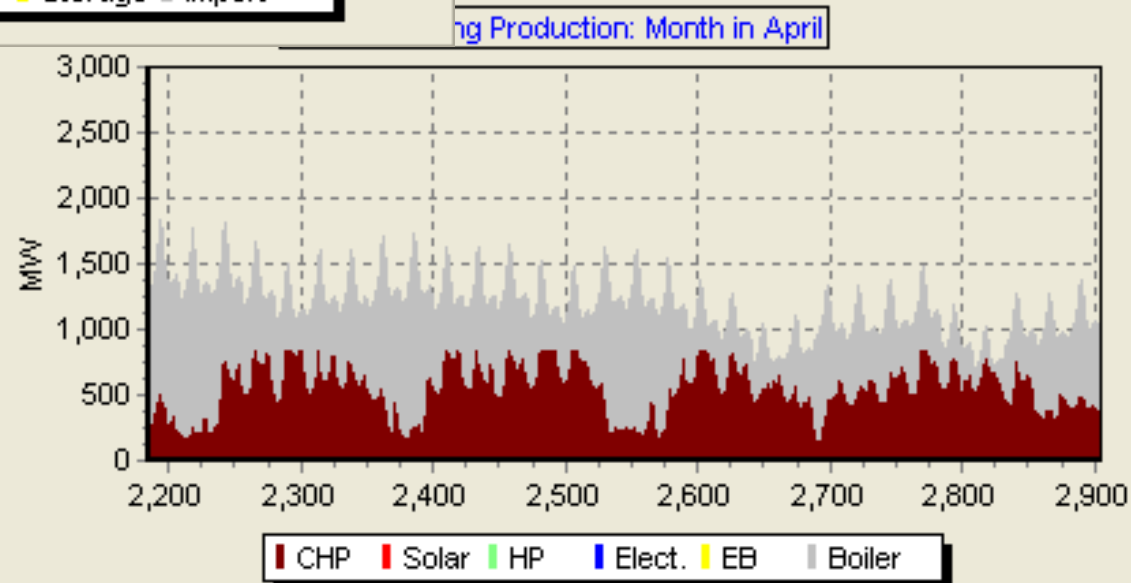
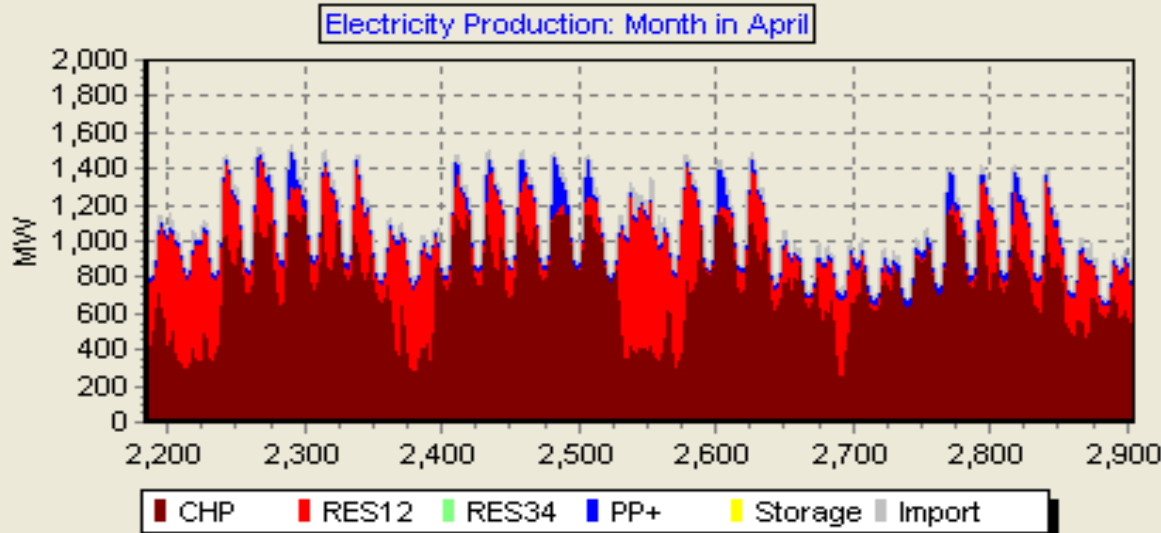
	A	B	C	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL
3																	
4	TABLE 1						Primary - summarized:						Secondary		Total		
5	Year 2020						Fuels				Other Renewables		Elec- tricity 1)	District heating	Hydrogen		
6							Oil products	Coal, gas, waste	Nuclear	Biomass fuels	RE electric.	RE heat					
7	Primary Production			7,20	2,65	0,00	12,23	0,36		84,72	9,86	3,06					110,21
8																	
9	Refineries/gas works /blast furnaces/peat briquette						- 11,60	0,04		- 0,06							- 11,62
10	Import /export (incl. bunkring and international flights)						105,05	51,86		- 0,26				- 1,07			155,69
11																	
12	Total Net supply			7,20	2,65	0,00	105,68	52,25		84,41	9,86	3,06	- 1,07	- 0,00			254,18
13	Oil, coal and gas sector	Energy sect. other/misc					0,09	0,12					2,46	0,35			3,01
14		Exploitation own consumption, flaring					0,00	0,00					0,03				0,03
15		Refineries own consumption					15,54	0,03					1,80	1,17			18,54
16	Electricity and	District heating stations					2,00	4,17		4,88		2,90	1,01	- 13,04			1,92
17	District heating sector	Heat pump stations															
18		Condensing power stations					2,23			- 0,00				- 1,12			1,12
19		Cogeneration stations					0,59	9,61		48,50				- 25,14	- 20,36		13,19
20		RE (solar, wind, hydro, wave, tidal)		7,20	2,65	0,00					9,86			- 9,86			
21		Hydrogen stations															
22		Grid losses etc.					0,23	1,13					3,76	6,04			11,16
23	Final Energy consumption	Non-energy purposes					5,75	23,34									29,08
24		Transport								7,56							74,60
25		Road															
26		Rail					3,47						1,53				5,00
27		Aviation					1,16										1,16
28		Navigation					0,35										0,35
29		Pipeline											0,09				0,09
30		Production					0,10	0,16		0,00			1,77	0,39			2,41
31		Iron and Steel					0,00	0,03		0,00			0,21	0,01			0,25
32		Paper, pulp, wood					0,10	0,89		0,73			1,37	0,14			3,22
33		Other industry					4,41	5,24		1,17			5,66	1,40			17,88
34		Construction					1,33	0,47		0,16			0,60	0,14			2,70
35		Agriculture					1,47	0,72		0,43			0,74	0,42			3,78
36		Service sector					- 0,02	3,73		2,67			7,58	7,78			21,76
37		Households					- 0,14	2,62		18,31		0,16	6,44	15,66			42,94
38	Final Energy consump. ex. non-energy, dom.avia., defense			7,20	2,65	0,00	83,15	28,76		84,41	9,86	3,06	25,99	25,84			202,36
39	Total Consumption			7,20	2,65	0,00	105,68	52,25		84,41	9,86	3,06	- 1,07	- 0,00			254,18
40	Specific CO2-emissions(ton CO2/PJ)																
41	CO2-emissions (million ton CO2)						7,24	3,07									10,31
42													Intermittent	20%			
43													Flexible				

IEA_Input Input 1990 /2000 /2010 /2020 /2030 /2040 /2050 Graphs Instruction /Sheet1

Sheet 6 / 13 PageStyle_2020 75% STD * Sum=0

2010-11-26, Kaunas

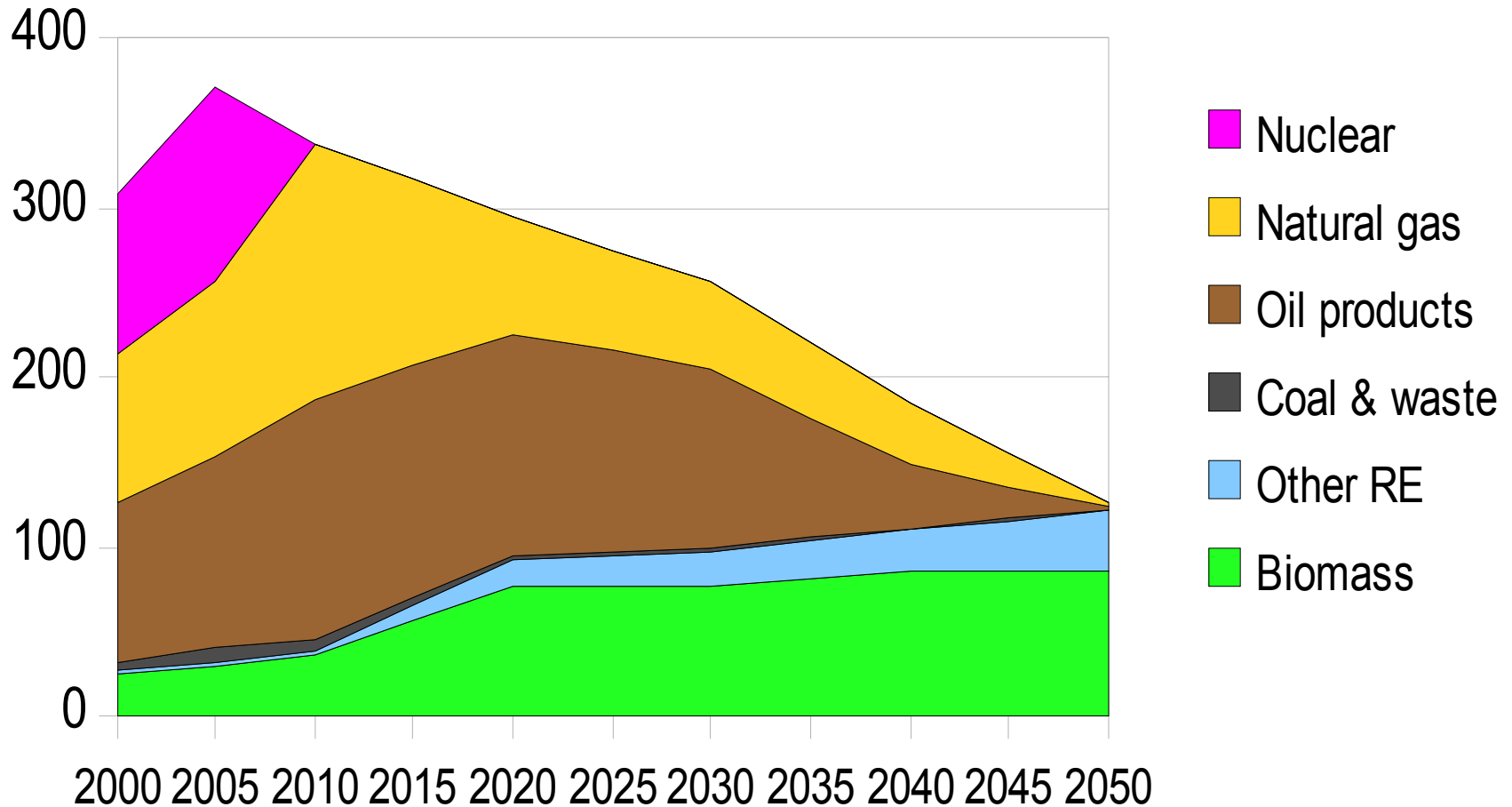
Evaluation of hourly energy balances



Elements of investigation

- **Energy efficiency increase ;**
- **Heat savings in buildings;**
- **Effective transportation;**
- **Grow in energy services;**
- **Development of renewable energy sources;**
- **Decrease in usage of fossil fuels and nuclear;**
- **Usage of modern energy forms (Hydrogen engines, Heat pumps, etc.)**

Primary Energy Supply in Lithuania (PJ)



Different kinds of biomass resources were estimated separately

- **Potential for solid biomass:**
 - **Wood (residues of forestry and wood reprocessing industries);**
 - **Straw;**
- **Potential for biogas;**
- **Potential for energy plantations;**
- **Potential of bio-fuel for transportation;**

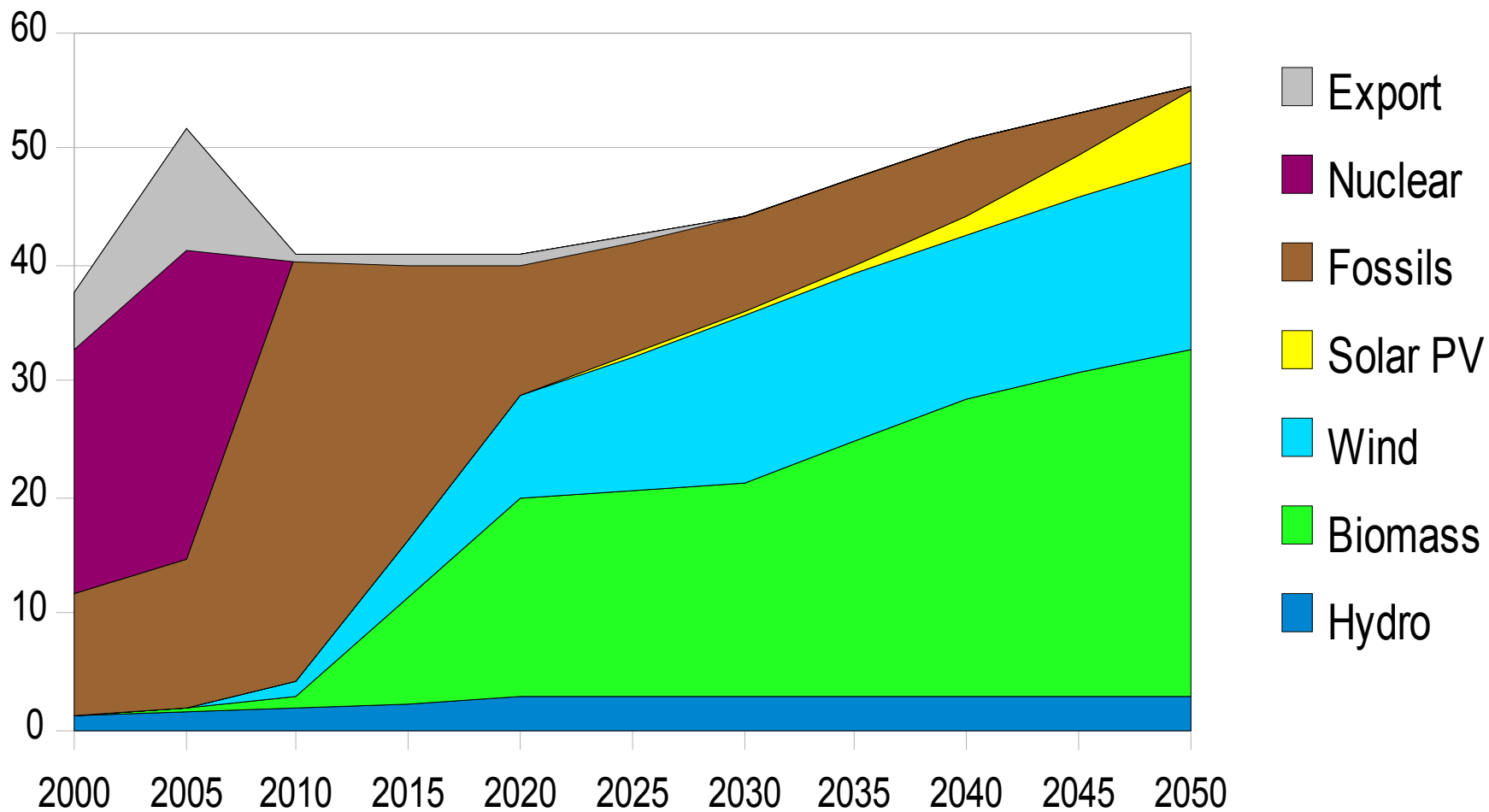
Solid biomass

- **Usage of wood:**
 - **2000 - 26 PJ (IEA online statistics);**
 - **2005 - 30 PJ (IEA online statistics);**
 - **2010 - 35 PJ (estimated in the study);**
- **Straw production is 2.55 mill. ton/year:**
 - **1.75 mill. ton/year is used for agriculture;**
 - **0.53 mill. ton/year is lost on the fields;**
 - **0.27 mill. ton/year technical potential for energy use;**
 - **0.9 mill. ton/year (~ 5.4 PJ) can increase till 2020;**
- **Total solid biomass potential < 40 PJ can be reached in 2020;**

Potential of biogas

- **Estimated potential - 48 million m³ biogas/year, energy content - 1.01 PJ (0.28 TWh);**
 - 95.6% - agriculture;
 - 3.3% - wastewater treatment;
 - 1.1% - food industry;
- **Potential of landfill gas 24 million m³/year, energy content - 0.36 PJ (0.1 TWh);**
- **Total biogas potential including landfill gas is 1.37 PJ;**
- **Development of biogas estimated till 2020;**

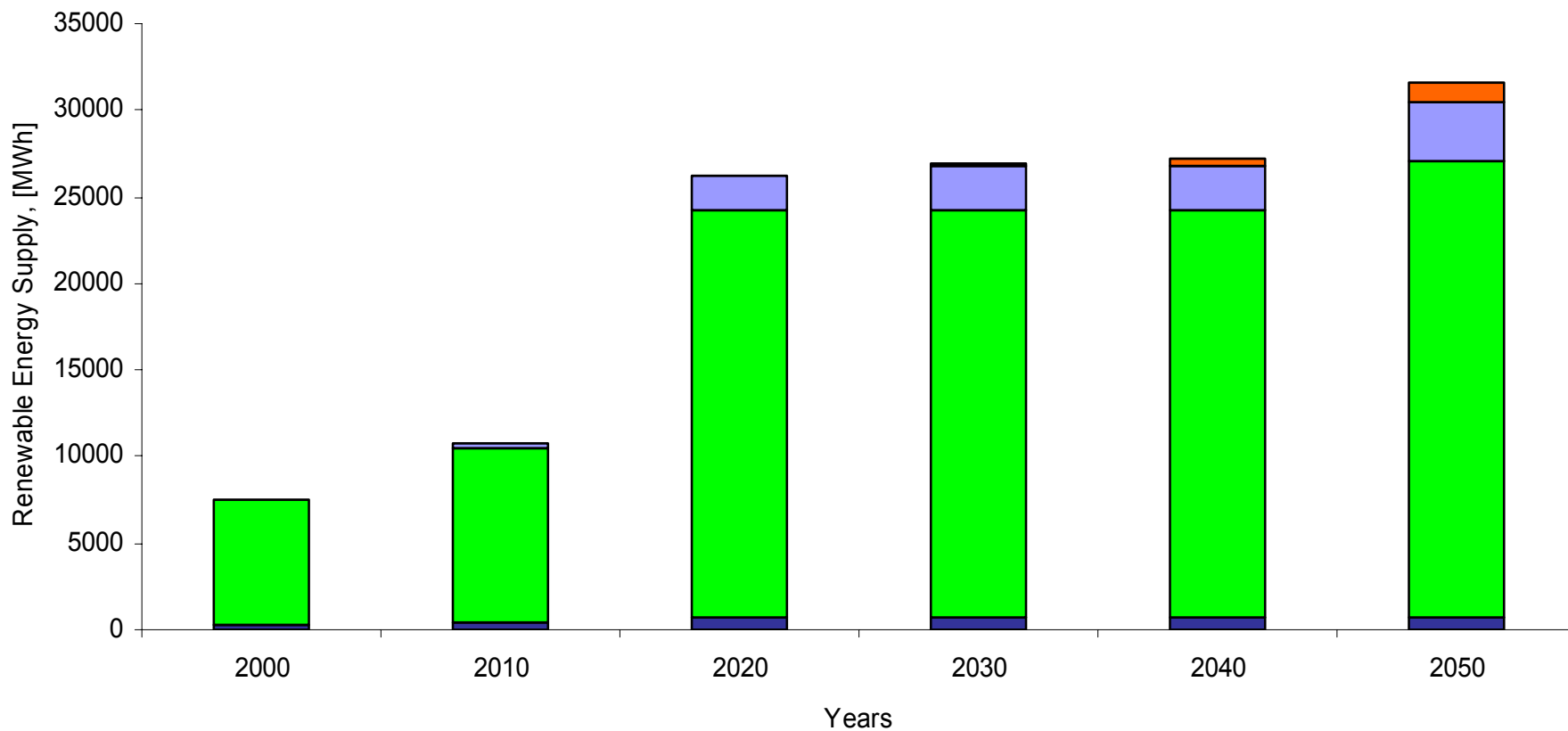
Lithuanian Electricity Production (PJ)



Solid Biomass Crops

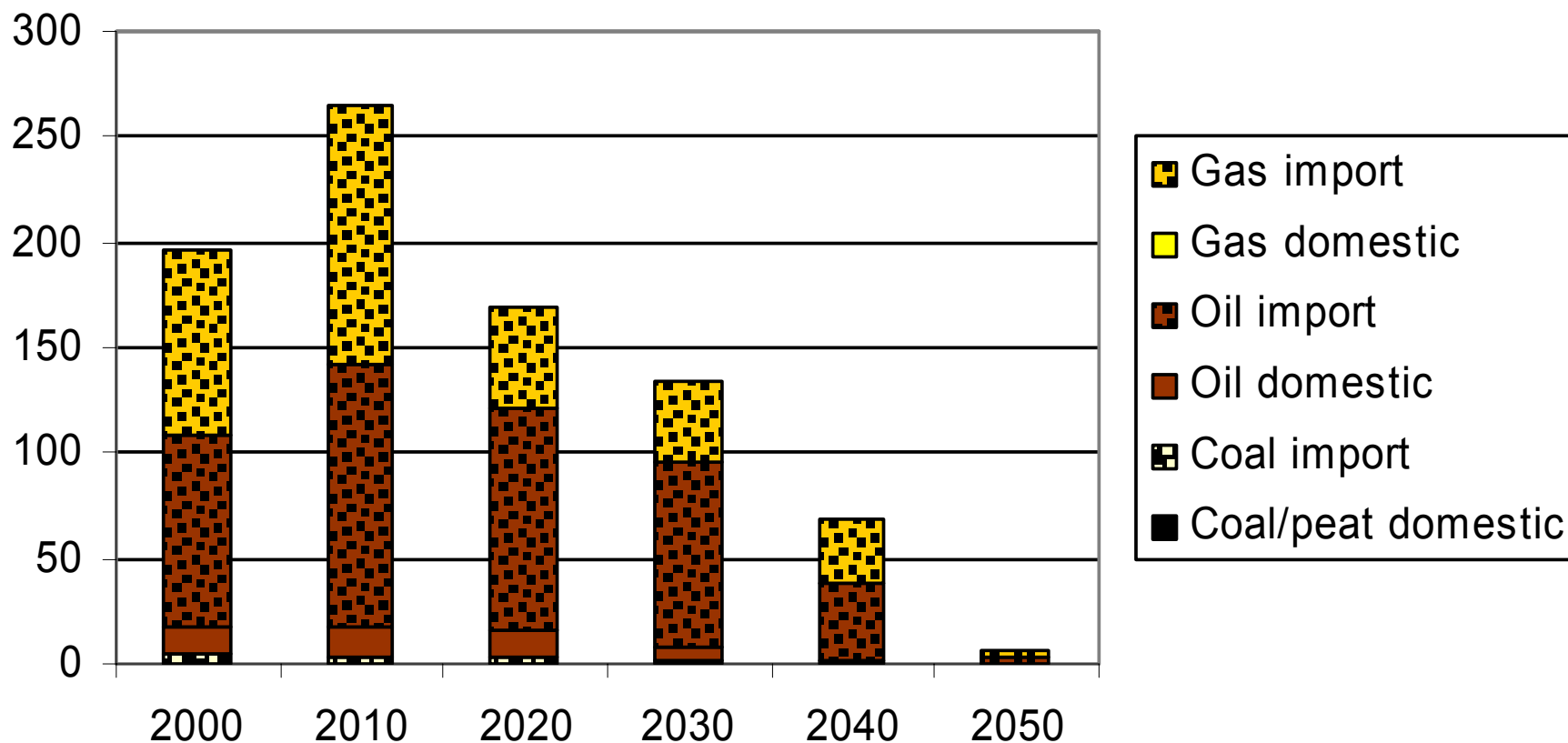
- **500.000 ha (5000 km²) of unused and low-productive agricultural land;**
- **250.000 ha (2500 km²) is estimated in the Vision for energy crops;**
 - **yield on the land of 9 tons dry matter/ha;**
 - **energy content of 4.9 MWh/ton of dry matter;**
- **Total energy potential is 40 PJ (11 TWh);**
- **Faster development can start after 2010;**
- **Till 2020 can be explored up to 60 % of estimated potential;**
- **Till 2030 can be explored all 2500 km² estimated potential;**

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2010-11-26, Kaunas

Fossil fuel supply (PJ)



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Thank you for your attention !

More information community "Atgaja"

www.atgaja.lt

<http://www.inforse.org/europe/>

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