

**CENTRAL STATISTICAL OFFICE**

**ENERGY FROM RENEWABLE  
SOURCES IN 2013**

**WARSAW 2014**

**STATISTICAL INFORMATION AND ELABORATIONS**

Publisher: Central Statistical Office, Industry Division  
Ministry of Economy, Energetic Department

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Printed: Statistical Publishing Establishment  
Al. Niepodległości 208,  
00-925 Warszawa

ISSN: 1898-4347

Publikacja dostępna na [www.stat.gov.pl](http://www.stat.gov.pl)  
*Publication available on [www.stat.gov.pl](http://www.stat.gov.pl)*

## ***Preface***

*The publication “Energy from renewable sources in 2013” is the next edition of study prepared by the Central Statistical Office pertaining to renewable energy sources (RES) within the series “Statistical Information and Elaborations”.*

*Publication contains national energy balances from renewable sources as well as information about the production of electricity and heat obtained from these sources. The data in this respect are presented with the results of the EU and selected countries. The publication also presents information on the share of energy from renewable sources in gross final energy consumption, which is the indicator aimed to monitor realization of the obligations of the EU.*

*The publication was elaborated by Energy Market Agency staff and by the employees of the Production Department of the Central Statistical Office.*

*With passing this publication to the hands of the readers we would welcome any comments that will help to improve next editions of the publication.*

*Wanda Tkaczyk  
Deputy Director of the Production Department*

*Warsaw, November 2014*

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# 1. Introduction

## 1.1. Energy from renewable sources

Demand for energy growing with civilization development, with simultaneous exhaustion of its traditional resources – mainly fossil fuels (coal, oil, natural gas) and an increase in natural environment pollution accompanying their use, brings increased interest in use of renewable energy.

**Renewable energy** is an energy derived from repeating natural processes, obtained from renewable non-fossil energy sources (energy: water, wind, solar, geothermal, waves, currents and tides, and energy produced from solid biofuels, biogas and liquid biofuels and also ambient heat energy used by heat pumps.)

Renewable energy sources (RES) are alternative for traditional primary non-renewable energy sources (fossil fuels). Their resources replenish themselves in natural processes, which in practice allows to treat them as inexhaustible. Moreover, obtaining energy from such sources is, as compared to traditional sources (fossil), more environmentally friendly. Use of RES significantly lowers negative impact of power industry on the natural environment, mainly by limiting emission of harmful substances, especially greenhouse gases.

In Polish conditions energy from renewable sources includes energy from direct use of solar energy, wind, geothermal resources (from Earth interior), water, solid biofuels, biogas and liquid biofuels.

The scope of use of renewable energy in EU member states is governed by EU documents and regulations, establishing general and detailed aims pertaining to the obligation to obtain certain indicators of share of renewable energy in use of primary energy, as well as that of electricity produced from renewable sources in total use of this energy. The basic EU documents and legal regulations in this respect are:

- Regulations Regulation (EC) no 1099/2008 of the European Parliament and of the Council of 22 October 2008 on energy statistics (OJ L 304 14.11.2008),
- Commission Regulation (EU) No 431/2014 of 24 April 2014 amending Regulation (EC) No 1099/2008 of the European Parliament and of the Council on energy statistics, as regards the implementation of annual statistics on energy consumption in households (OJ L 131 1.5.2014)

- Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC,
- Commission Decision of 1 March 2013 establishing the guidelines for Member States on calculating renewable energy from heat pumps from different heat pump technologies pursuant to Article 5 of Directive 2009/28/EC of the European Parliament and of the Council
- White Paper – Energy for the Future: Renewable sources of energy (1997),
- Green Paper – Towards a European strategy for the security of energy supply (2001),

In adopted on 23 April 2009 by the European Parliament and Council Directive 2009/28/EC on the promotion of energy from renewable sources has identified a number of tasks for the EU Member States, in particular:

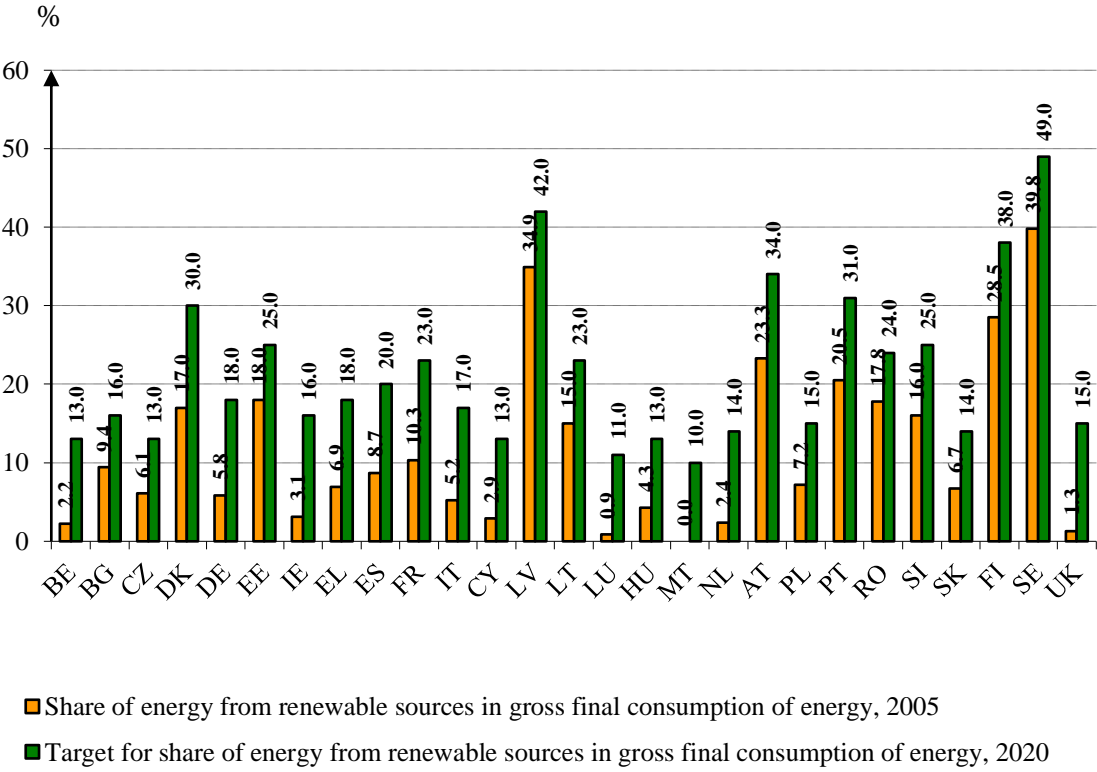
- ⇒ the common frameworks for the promotion of renewable energy;
- ⇒ mandatory national overall targets for the total share of renewables in gross final energy consumption and in relation to share of energy from renewable sources in transport;
- ⇒ rules concerning:
  - a) statistical transfers a certain amount of energy from renewable sources between Member States,
  - b) common projects between Member States and third countries,
  - c) guarantees of origin,
  - d) administrative procedures,
  - e) information and training,
  - f) access of renewable energy to the electricity grid;
- ⇒ sustainability criteria for biofuels and bioliquids.

Established in the Directive the overall targets for the share of energy from renewable sources in final energy consumption in 2020 for individual EU Member States are shown in Fig. 1.



In Poland the assumptions for development of renewable power industry were established in a government document entitled: “Strategy for renewable power industry development” (accepted by the Sejm on 23 August 2001) and in documents: “Energy politics of Poland until 2030” (accepted by the Council of Ministers on 10 November 2009) and in the “Programme for electrical power engineering” (accepted by the Council of Ministers on 28 March 2006). The strategic aim of the state policy is increasing the use of renewable energy resources so that the share of this energy in gross final energy consumption achieves 15% in 2020.

**Fig. 1. National overall targets for the share of energy from renewable sources in gross final consumption of energy in 2020.**



On 7 December 2010, the Council of Ministers adopted, submitted by the Minister of the Economy, "National Action Plan for energy from renewable sources", which was sent to the European Commission. The plan assumes that the development of renewable energy sources will allow to meet the growing demand for energy and increase the degree of independence from imported energy supplies. Promoting the use of renewable energy sources will also allow to increase the level of diversification of supply sources and create conditions for the development of distributed energy, based on locally available raw materials.

Preparing and submitting to the European Commission of the National Action Plan in the field of renewable energy, flows directly from the provisions of Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of energy from renewable sources.

The National Action Plan in the field of renewable energy contains forecasts for Poland in 2020 to achieve 15.5% of the share of energy from renewable sources in gross final energy consumption in a sustainable way, taking into account many factors, such as resources of renewable energy, raw materials for the production of fuels and the role of power system. It was assumed that the pillar of increasing the share of energy from renewable sources will be increased use of biomass and wind energy. The document develops and refines the predictions about consumption of renewable energy sources which were contained in the "Polish Energy Policy until 2030".

The plan sets out national targets for the share of energy from renewable energy sources (RES) in the sectors of transport, electricity and heating and cooling in 2020, taking into account the effects of other policy measures on final energy consumption. Also defines the measures to be taken to achieve national targets for the overall share of renewable energy in final energy use.

The basic legal regulations pertaining to the obligation in respect of RES consumption in Poland are:

- Law of 10 April 1997 – Energy Law (Journal of Laws of 2012, item. 1059),
- Law of 26 July 2013 amending the Law - Energy Law and certain other acts (Journal of Laws of 2013, item. 984),
- Regulation of the Minister of Economy of 14 August 2008 on the specific responsibilities to obtain and submit to the redemption of certificates of origin to pay the replacement fee, purchase of electricity and heat produced from renewable energy sources and the obligation to confirm the data on the amount of electricity generated in the renewable energy source (Journal of Laws of 2008, No 156, item. 969 as amended),
- Law of 25 August 2006 on biocomponents and liquid biofuels (Journal of Laws of 2006, No 169, item. 1199),
- Law of 21 March 2014 amending the Law on biocomponents and liquid biofuels and certain other acts (Journal of Laws of 2014, item. 457).

## **1.2. Characteristics of renewables (energy commodities)**

Occurring in the publication renewable energy carriers are defined as follows:

### ***Hydro power***

Water energy (potential and kinetic) is determined on the basis of the amount of electricity produced in hydro-electric power stations. Renewable energy includes only production of electricity in power stations with natural flow.

### ***Geothermal energy***

Geothermal energy is heat obtained from Earth interior in the form of hot water or steam.

Geothermal energy is used directly as heat for municipal heating and in production processes in agriculture, as well as for production of electricity (using dry steam or brine with high enthalpy).

### ***Solar energy***

Solar energy is energy of solar radiation transformed into heat or electricity. Solar energy is used in:

- flat, vacuum-tube and other types of solar collectors (liquid or air) for heating running water, water in swimming pools, heating rooms, in drying processes, in chemical processes;
- photovoltaic cells for direct production of electricity;
- solar power stations for production of electricity.

Solar energy is used in passive heating systems (by system of direct gains through windows, by annexed greenhouses, and other), cooling and lighting of rooms is not included in the statistical reporting.

### ***Wind energy***

Wind energy is a kinetic energy of wind used for production of electricity in wind turbines. Similarly as in the case of hydro-electric power station, the potential of wind power stations is determined by their potential to generate electricity.

### ***Municipal waste***

The national statistical reporting on fuel and energy management includes also waste fuels coming from flammable industrial waste and municipal waste, such as: rubber, plastics, waste oils, and other similar products. They have solid or liquid form and are classified as renewable fuels or not, depending on whether they undergo biodegradation.

Renewable fuels used in the process of electricity and/or heat production include renewable solid municipal waste incinerated in appropriately adapted installations. These include wastes from households, hospitals, and services sector (waste biomass) consisting of organic fractions subject to biodegradation.

### ***Solid biofuels***

Solid biofuels includes organic, non-fossil material of biological origin, which can be used as fuel to produce heat or electricity generation.

The basic solid biofuels is forest biomass (firewood) in the form of chunks, round timber, chips, briquettes, pellets, and waste from forestry, wood and paper industry, i.e. branches, poles, thinning, shrubs, brush-wood, rootwood, bark, sawdust, black liquor. A separate group consist of agricultural biomass fuels from energy crops (fast-growing trees, dicotyledonous perennials, perennial grasses, energy cereals) and organic remnants from agriculture and horticulture (e.g. wastes from horticultural production, animal manure, briquettes and pellets of straw and so on).

The group of solid biofuels also contains charcoal, understood more broadly as the solid residue of the destructive distillation and pyrolysis of wood and other vegetal material.

### ***Biogas***

Biogas is a gas composed mostly of methane and carbon dioxide, obtained in the process of anaerobic fermentation of biomass. In statistical reporting, due to the method of production, we distinguish:

- *landfill gas*, obtained from fermentation of wastes in landfills,
- *sludge gas*, produced in result of anaerobic fermentation of sludge
- *other biogases*:
  - a) *agricultural biogas obtained from anaerobic fermentation of biomass from energy crops, residues from crop production and animal manure;*
  - b) *biogas obtained from anaerobic fermentation of biomass from wastes of slaughterhouses, breweries and from other activities in agricultural and food manufacturing.*

### ***Biofuels (liquid biofuels for transport from biomass)***

Biofuels are produced from organic materials (from biomass or biodegradable fractions of wastes). The statistical reporting includes the following products: bioethanol, biodiesel, biomethanol, bio-dimethyl-ether, bio-ETBE (ethyl-tertio-butyl-ether produced on

the basis of bioethanol), bio-MTBE (methyl-tertio-butyl-ether produced on the basis of biomethanol). Also natural plant oils may serve as biofuels.

The aforementioned products are used as biocomponents added to engine fuels produced from oil. The most frequently used additives are: bioethanol (engine fuels additive) and biodiesel (diesel fuels additive).

### ***Bioliquids***

‘Bioliquids’ means liquid fuel for energy purposes other than for transport, including electricity and heating and cooling, produced from biomass.

Besides these occurring in the publication renewable energy commodities (covered by the national statistical reporting), for which relevant data are collected pursuant to Commission Regulation (EU) No 431/2014 of 21 April 2014 amending Regulation of the European Parliament and Council Regulation (EC) No 1099/2008 on energy statistics in relation to the implementation of the annual statistics on energy consumption in households (Dz. U. L131 of 01.05.2015), in accordance with the provisions of the above Directive (of the European Parliament and Council Directive 2009/28 / EC on the promotion of renewable energy), when calculating the share of energy from renewable sources is also included heat from heat pumps using ambient energy (environment)

### ***Heat from the environment (ambient heat) captured by the heat pumps***

Classified as renewable energy environmental heat is trapped by the heat pumps from the outside air (outdoor), soil (shallow geothermal energy), and groundwater and surface water (rivers, ponds, lakes). Assuming used in the above Directive naming conventions of energy, you can call them as follows:

#### ***Aerothermal energy***

‘Aerothermal energy’ means energy stored in the form of heat in the ambient air.

#### ***Hydrothermal energy***

‘Hydrothermal energy’ means energy stored in the form of heat in surface water and ground water.

## 2. Methodical notes

### 2.1. Subject scope of the study

This publication is a “resulting statistical information” containing statistical data on renewable energy sources (RES). This information was collected within statistical surveys on energy included in annual programmes of statistical surveys of the public statistics realized in 2004 – 2013. The scope of the presented data does not give full picture of the situation in respect of production and consumption of energy sources from RES in Poland, mostly due to significant dispersion of sources and to a large degree local character of their use. Low production capacity of the majority of facilities producing and consuming energy from renewable sources make it difficult to include them in the statistical survey.

The publication contains collective statistical data pertaining to production and consumption of energy from renewable energy sources used in Poland, in particular:

- water energy,
- geothermal energy,
- solar energy,
- wind energy,
- municipal waste,
- solid biofuels,
- biogas,
- liquid biofuels for transport,
- ambient heat for heat pumps.

The publication also includes the data pertaining to the amount of electricity and heat obtained from RES.

The statistical data presented in the publication are expressed in energy units (TJ – terajoules, GWh – giga-hours, toe - tons of oil equivalent [1 toe =  $41.868 \times 10^9$  J]) and for liquid biofuels additionally in natural units (t (Mg) – tons).

The study uses statistical data obtained from questionnaires with symbols:

- **G-02o** – report of a heat from renewable sources,
- **G-02b** – balance report on energy commodities and heating infrastructure,
- **G-03** – report on fuels and energy consumption,
- **E-GD** – questionnaire of the fuel and energy consumption in households
- **G-10.1(w)k** – report on basic operation of hydro (and wind) electric power station,
- **G-10.2** – report on basic operation of thermal main activity producer power station,
- **G-10.3** – report on capacity and production of heat and power of autoproducer (electricity / CHP) plants,
- **G-10.6** – report on capacity and electricity production of the power stations (by: hydro / wind / and other renewable sources),
- **RAF-1** – report on the settlement process of transformation in companies producing and handling a refined petroleum products,
- **RAF-2** – report on production and turnover of petroleum products.

The study also presents data for UE-28, for selected neighbouring countries or for countries with similar climatic conditions according to the statements in balance sheets drawn up and released by EUROSTAT<sup>1</sup>

Some of the data presented in this publication have been given on the basis of the preliminary data, so that they may be slight changes in the next edition.

*Due to the electronic technique of data processing, in some cases, the sum of the components may vary slightly from the stated amount "of the total."*

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<sup>1</sup> [http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search\\_database](http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database) (Data for the Polish have been updated and may differ from the data published by Eurostat)

## 2.2. Definitions

**Primary energy** is energy contained in primary energy sources obtained directly from natural resources, both renewable and non-renewable.

**Renewable primary energy** is an energy obtained from natural, constantly repeating natural processes.

**Derived energy** is energy contained in secondary energy sources, i.e. sources generated in processes of energy transformations.

**Indigenous production** is the amount of energy obtained from natural primary energy sources.

**Transformation output** is the quantity of energy commodities (the only energy derivative) obtained through the energy transformation processes

**Stock change** (+/-) any increase in energy commodities stocks is indicated by a sign "-" and reduction by a sign "+".

**Energy transformation** is the technological process in which one form of energy (mostly primary energy sources) is transformed into other, secondary form of energy.

Energy used in the transformation is used for:

- **transformation sector** (use of energy sources constituting technological material of transformation, being subject to conversion into another energy commodities),
- **own consumption in transformation process** (use of energy by auxiliary devices operating transformation process, such as: fuel feeders, pump drives and ventilators, etc.)

**Final energy consumption** is the consumption of energy commodities by consumers (industry, services, households) to their technological, productive and living needs. Final consumption does not include the processing to other energy commodities.

Input and needs of energy transformation and losses resulting at the producers' and distributors are not included in this position. The final consumption, on the other hand, includes consumption of fuels for production of heat used entirely by the producer.

Total final consumption is divided into two parts: the consumption of energy and the non-energy consumption (raw materials).



**Energy sector** is use of a given energy source in energy transformations for own consumption in transformation process.

**Gross final consumption of energy** means the energy commodities delivered for energy purposes to industry, transport, households, services including public services, agriculture, forestry and fisheries, including the consumption of electricity and heat by the energy branch for electricity and heat production and including losses of electricity and heat in transmission and distribution.

**The gross final consumption of energy from renewable sources in each Member State shall be calculated as the sum of:**

- gross final consumption of electricity from renewable energy sources;
- gross final consumption of energy from renewable sources for heating and cooling;  
and
- final consumption of energy from renewable sources in transport.

**Ambient heat** it is the energy obtained from the environment, i.e. from the air, soil, groundwater and shallow geothermal surface (rocks, waters), using heat pumps.

Heat pump transfers heat from the environment of the lower temperature (lower source) to the environment with higher temperature (upper source), using energy from the outside (in the form of a work or heat).

**Installed capacity** it is the maximum constant power with which the devices can work having good technical state and in normal operating conditions

**Main Activity Producer Plants** include entities for which the basic type of activity is the activity mentioned in Polish Classification of Activities (PKD<sup>2</sup>) in the group 35.1 and group 35.3.

**Autoproducer Plants** includes entities for which the additional type of activity is the activity mentioned in PKD classification in section 35.

**The full scope of definitions and terms used in energy statistics is contained in the study entitled “Methodological rules of statistical reporting on fuels and energy and definitions of the terms used” – CSO methodological notebook, Warsaw 2006.**

[http://www.stat.gov.pl/gus/definicje\\_PLK\\_HTML.htm?id=DZI-44.htm](http://www.stat.gov.pl/gus/definicje_PLK_HTML.htm?id=DZI-44.htm)

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<sup>2</sup> Polish Classification of Activities (PKD-2007 in force since 1 January 2008)

### 3. Energy from renewables in the EU countries

The data pertaining to the amount of total primary energy (including energy from renewable sources) in 28 states of the European Union (EU-28) in 2004-2012 are presented in table 1.

**Table 1. Production of primary energy (including from renewable sources) for EU-28 and Poland in the years 2004 – 2012**

Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012
	Mtoe								
Total primary energy in EU [Mtoe] .....	930.1	900.2	881.7	856.5	850.7	815.5	831.6	802.9	794.6
Total primary energy in Poland <sup>3</sup> [Mtoe] .....	78.7	78.4	77.7	72.6	71.3	67.3	67.5	68.8	72.6
<i>from renewable sources (RES) in EU [Mtoe] .....</i>	<i>111.3</i>	<i>115.9</i>	<i>122.6</i>	<i>129.9</i>	<i>137.7</i>	<i>145.8</i>	<i>163.0</i>	<i>162.2</i>	<i>177.4</i>
<i>from renewable sources (RES) in Poland [Mtoe] .....</i>	<i>4.3</i>	<i>4.5</i>	<i>4.8</i>	<i>4.9</i>	<i>5.4</i>	<i>6.1</i>	<i>6.9</i>	<i>7.5</i>	<i>8.5</i>
	%								
Share of energy from RES in the total primary energy in EU [%].....	12.0	12.9	13.9	15.2	16.2	17.9	19.6	20.2	22.3
Share of energy from RES in the total primary energy in Poland [%].....	5.5	5.8	6.1	6.7	7.6	9.0	10.2	10.9	11.7

In the years 2004 -2012 there is a constant increase (apart of 2011) in the amount of energy from renewable sources in EU-28 countries as compared with the preceding year. In 2010 this increase was the largest and amounted to 11.8% for EU-27 and 13.7% for Poland.

In 2011 it was observed 0.5% decrease in the EU-28, while in Poland there was further increase in the amount of energy from renewable sources by 8.6%, compared to 2010.

However, in the case of production of total primary energy there was a decline tendency in EU-28.

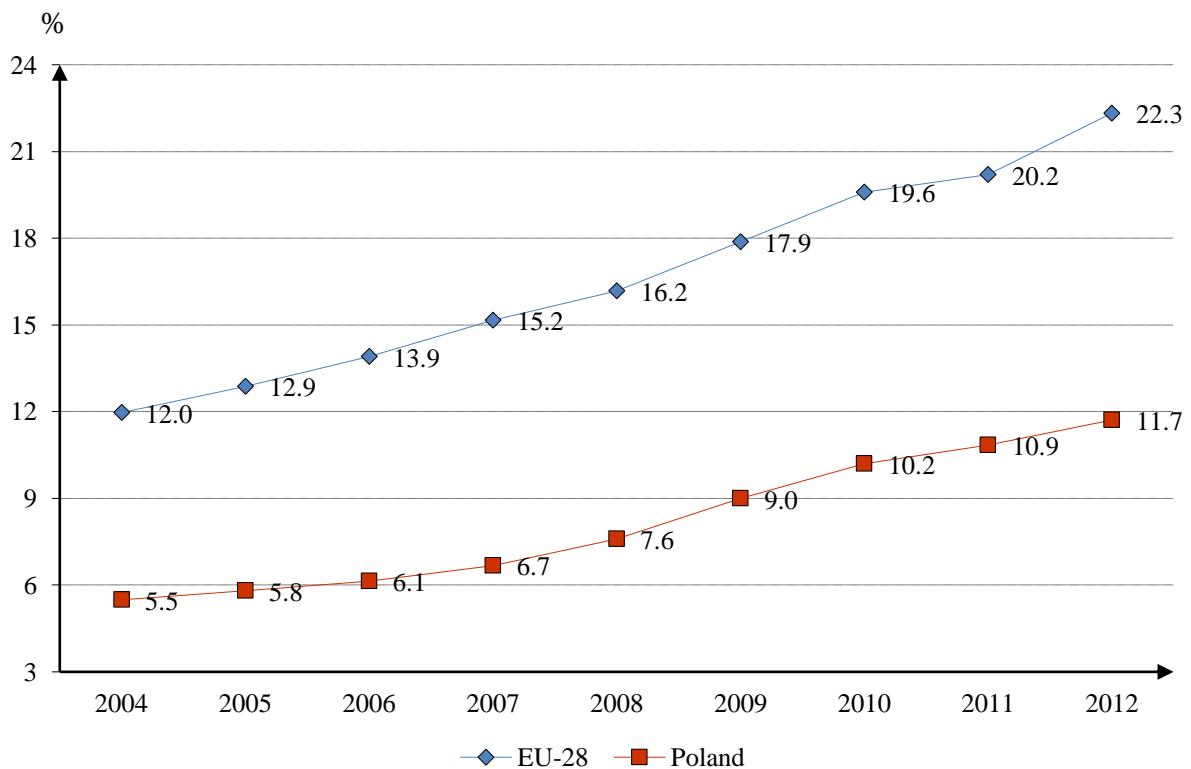
In the years 2004 - 2012 the share of renewable energy in total primary energy growing steadily. In 2012 it amounted to 22.3% for EU-28 and was higher compared to with the

<sup>3</sup> according to the accepted rules "total primary energy" position does not include energy from coal reclaimed from mine waste dumps and energy from waste fuels of non-organic origin.

previous year by 10.5%. For Poland these indicators amounted to respectively 11.7% and 8.0%.

Fig. 2 shows share of energy from renewable sources in production of primary energy for EU-28 and Poland in the years 2004 – 2012.

**Fig. 2. Share of energy from renewable sources in production of primary energy for EU-28 and Poland in the years 2004 – 2012**



In most EU-28 countries there is an increase in the share of energy from renewable energy sources in production of total primary energy.

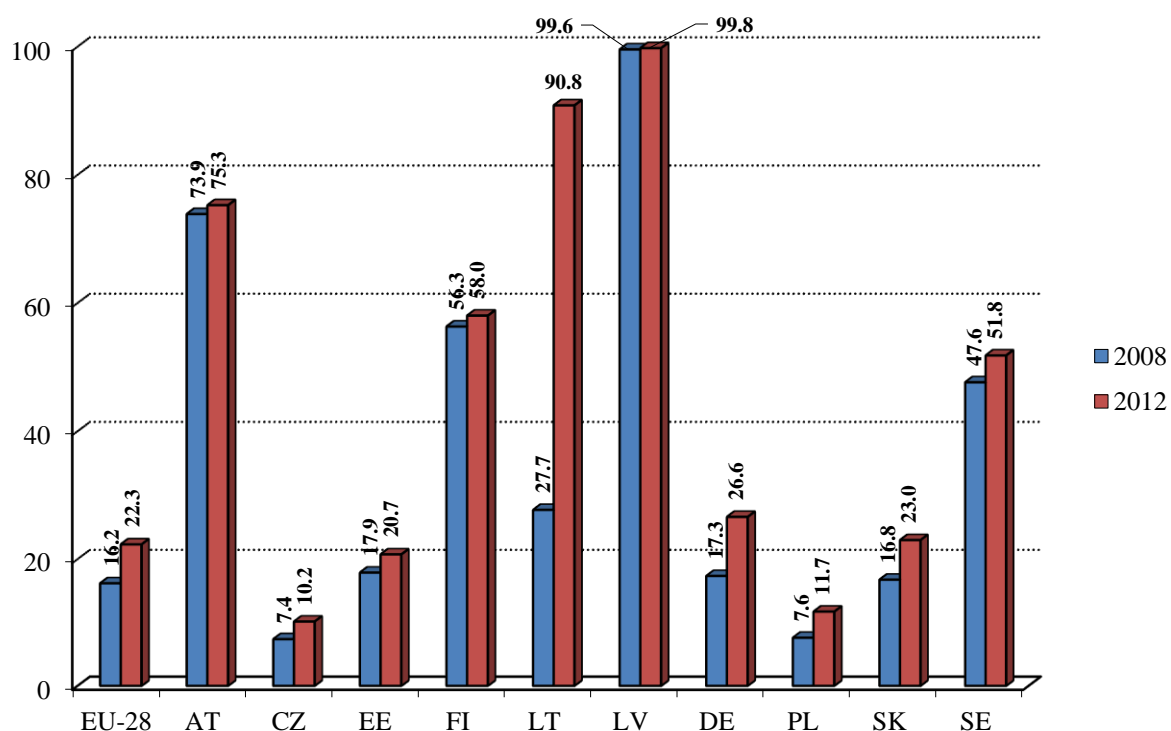
In table 2 and on graph (Fig. 3) was presented how these values looked in selected EU countries.

In 2008-2012 the share of renewable energy in primary energy increased in the EU-28 from 16.2% to 22.3% and in Poland from 7.6% to 11.7%. At the same time, the production of primary energy from RES has grown in the EU-28 by 29% and in Poland by 57%.

**Table 2. Production of energy from renewable sources in selected EU countries in the years 2008 – 2012**

Specification	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
	Production of total										Share of energy from renewable sources in the total primary energy [%]				
	primary energy [Mtoe]					energy from RES [Mtoe]									
EU-27.....	850.7	815.5	831.6	802.9	794.6	137.7	145.8	163.0	162.2	177.4	16.2	17.9	19.6	20.2	22.3
AT.....	11.2	11.6	12.1	11.5	12.8	8.3	8.5	8.9	8.4	9.6	73.9	73.1	74.0	73.0	75.3
CZ.....	32.8	31.2	31.5	32.0	32.0	2.4	2.6	2.9	3.0	3.2	7.4	8.3	9.2	9.5	10.2
EE.....	4.2	4.2	4.9	5.0	5.1	0.8	0.9	1.0	1.0	1.1	17.9	20.8	20.0	19.4	20.7
FI.....	16.3	16.4	17.3	17.0	17.1	9.2	7.9	9.4	9.1	9.9	56.3	48.3	54.3	53.6	58.0
LT.....	3.8	4.1	1.3	1.3	1.3	1.1	1.2	1.2	1.2	1.2	27.7	28.2	90.4	90.1	90.8
LV.....	1.8	2.1	2.1	2.1	2.3	1.8	2.1	2.1	2.1	2.3	99.6	99.6	99.4	99.8	99.8
DE.....	132.8	126.6	129.4	123.1	123.5	23.0	24.2	28.4	29.8	32.9	17.3	19.2	22.0	24.3	26.6
PL.....	71.3	67.3	67.5	68.8	72.6	5.4	6.1	6.9	7.5	8.5	7.6	9.0	10.2	10.9	11.7
SK.....	6.2	5.7	6.0	6.2	6.2	1.0	1.2	1.4	1.4	1.4	16.8	21.4	23.5	22.5	23.0
SE.....	32.8	29.9	32.7	32.9	35.7	15.6	15.8	17.0	16.5	18.5	47.6	52.8	52.0	50.3	51.8

**Fig. 3. Share of energy from renewable sources in total primary energy in selected EU countries in the years: 2008 and 2012**

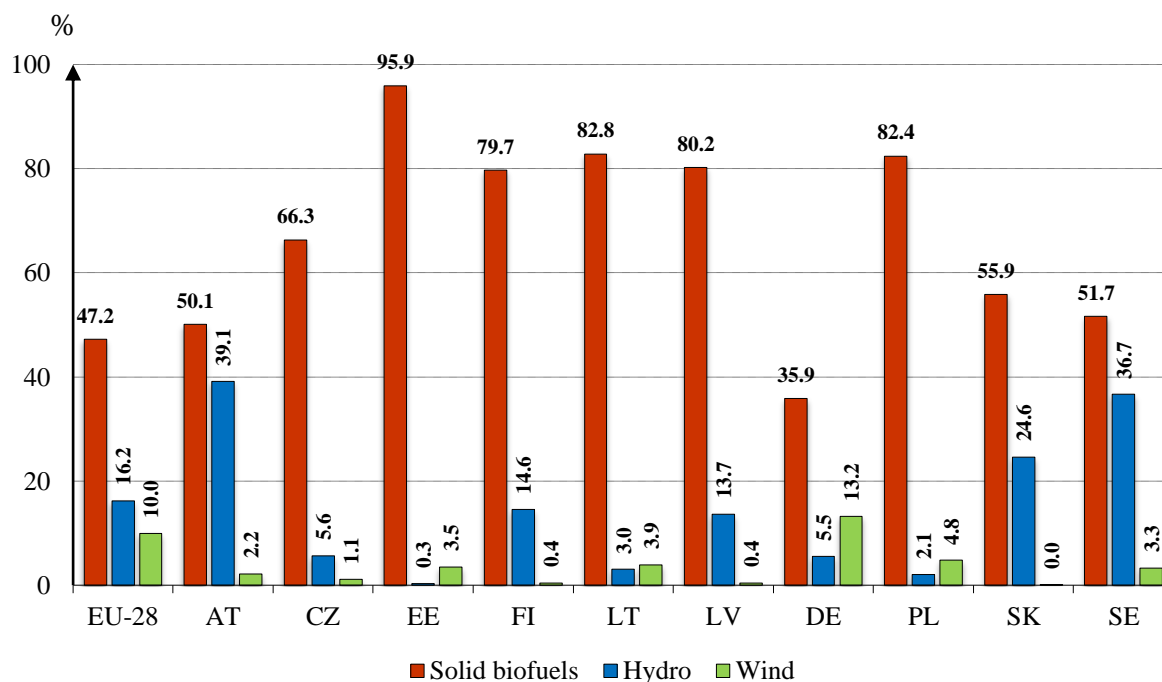


The structure of production of energy by sources in selected European Union countries in the years 2008 – 2012 is presented in table 3. Moreover, on the figures 4 it was illustrated the share of energy from solid biofuels, wind and water in the total production of energy from renewable sources in 2012.

**Table 3. The structure of energy production from particular sources in selected EU countries in the years 2008 – 2012**

Specification		EU-28	AT	CZ	EE	FI	LT	LV	DE	PL	SK	SE
		%										
Solid biofuels	2008	50.0	49.3	81.2	97.8	80.5	88.8	82.4	37.8	87.7	48.7	53.2
	2009	49.4	47.5	75.9	97.4	80.6	85.7	82.8	39.6	86.0	52.9	54.5
	2010	49.4	52.3	72.2	97.0	82.5	84.6	82.5	41.4	85.6	52.7	55.9
	2011	48.6	53.8	68.6	96.2	83.4	84.6	84.0	37.0	85.3	56.5	54.0
	2012	47.2	50.1	66.3	95.9	79.7	82.8	80.2	35.9	82.4	55.9	51.7
Solar energy	2008	1.3	1.4	0.2	-	0.0	-	-	3.3	0.0	-	0.1
	2009	1.8	1.5	0.5	-	0.0	-	-	4.2	0.1	-	0.1
	2010	2.3	1.9	2.1	-	0.0	-	-	5.3	0.1	0.4	0.1
	2011	3.8	2.2	6.5	-	0.0	-	-	7.5	0.1	2.8	0.1
	2012	5.1	2.1	6.1	-	0.0	0.0	-	8.6	0.2	2.9	0.1
Hydro	2008	20.7	39.8	7.2	0.3	16.0	3.3	15.0	7.4	3.4	33.6	38.0
	2009	19.7	41.5	8.1	0.3	13.8	3.1	14.2	6.6	3.4	30.7	35.8
	2010	19.8	36.9	8.3	0.2	11.8	3.9	14.4	6.2	3.7	32.2	33.6
	2011	16.5	34.9	5.6	0.3	11.7	3.6	12.0	5.0	2.7	23.4	34.5
	2012	16.2	39.1	5.6	0.3	14.6	3.0	13.7	5.5	2.1	24.6	36.7
Wind	2008	7.5	2.1	0.9	1.5	0.2	1.1	0.3	15.1	1.3	0.1	1.1
	2009	7.8	2.0	1.0	1.9	0.3	1.2	0.2	13.7	1.5	0.0	1.4
	2010	7.9	2.0	1.0	2.4	0.3	1.6	0.2	11.4	2.1	0.0	1.8
	2011	9.5	2.0	1.1	3.2	0.5	3.5	0.3	14.1	3.7	0.0	3.2
	2012	10.0	2.2	1.1	3.5	0.4	3.9	0.4	13.2	4.8	0.0	3.3
Biogas	2008	4.8	2.1	3.7	0.4	0.5	0.3	0.5	13.2	1.8	1.0	0.7
	2009	5.1	1.8	5.0	0.3	0.5	0.4	0.5	14.5	1.6	1.3	0.7
	2010	5.2	1.7	6.1	0.4	0.4	0.8	0.6	14.9	1.7	1.0	0.7
	2011	6.4	2.0	8.2	0.3	0.6	1.0	1.1	17.4	1.8	3.3	0.7
	2012	6.8	2.2	11.5	0.3	0.6	1.0	2.2	19.5	2.0	4.3	0.7
Biofuels	2008	6.4	3.5	4.4	-	1.2	6.5	1.8	13.4	5.5	13.4	2.9
	2009	7.3	3.7	7.5	-	3.1	9.2	2.3	12.3	7.1	12.3	3.5
	2010	7.2	3.4	8.1	-	3.3	8.6	2.3	12.3	6.7	11.5	3.7
	2011	6.5	3.1	7.3	-	2.3	7.1	2.6	10.7	5.8	12.2	3.2
	2012	6.5	2.5	6.7	-	2.8	9.0	3.5	9.0	8.0	10.5	3.4
Geothermal energy	2008	4.0	0.4	-	-	-	0.1	-	0.3	0.2	0.8	-
	2009	3.7	0.4	-	-	-	0.4	-	0.3	0.2	0.7	-
	2010	3.3	0.4	-	-	-	0.4	-	0.3	0.2	0.6	-
	2011	3.5	0.4	-	-	-	0.3	-	0.3	0.2	0.5	-
	2012	3.2	0.4	-	-	-	0.3	-	0.3	0.2	0.4	-
Municipal waste	2008	5.3	1.6	2.4	-	1.5	-	-	9.4	0.0	2.4	4.1
	2009	5.1	1.5	2.1	-	1.7	-	-	8.7	0.0	2.0	4.1
	2010	4.9	1.5	2.2	-	1.6	-	-	8.2	0.0	1.5	4.4
	2011	5.2	1.6	2.6	-	1.5	-	-	8.1	0.4	1.3	4.3
	2012	4.9	1.5	2.6	-	1.9	-	-	7.9	0.4	1.3	4.2

**Fig. 4. Share of energy from solid biofuels, wind and hydro in total production of energy from RES in 2012**

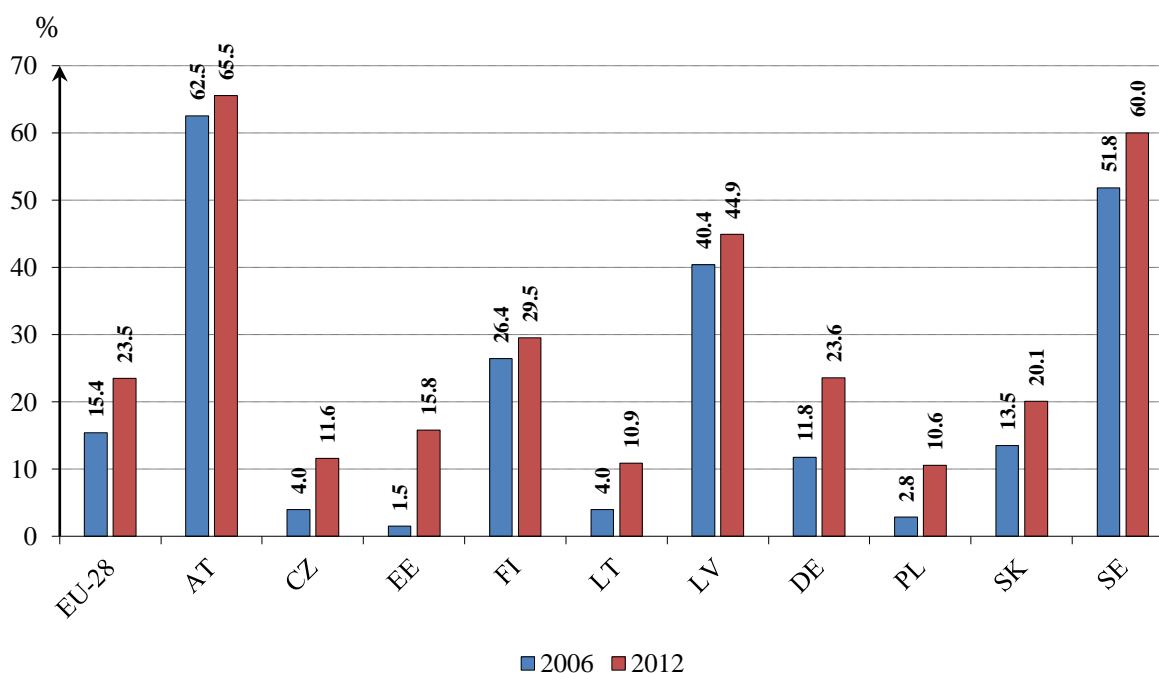


One of the aims of European Union in respect of development of renewable energy is to increase the share of electricity generated from renewable sources in the national use of this energy. The indicators for selected EU countries in 2006 – 2012 are presented in table 4 and in figure 5.

**Table 4. The share of generated electricity from renewable sources in the total gross use of electricity in selected EU countries in the years 2006 – 2012**

Specification	2006	2007	2008	2009	2010	2011	2012
	%						
EU-28.....	15.4	16.1	17.0	19.0	19.7	21.7	23.5
AT.....	62.5	64.8	64.8	67.1	64.9	65.0	65.5
CZ.....	4.0	4.6	5.2	6.4	7.5	10.6	11.6
EE.....	1.5	1.5	2.1	6.1	10.4	12.3	15.8
FI.....	26.4	25.5	27.3	27.3	27.6	29.4	29.5
LT.....	4.0	4.7	4.9	5.9	7.4	9.0	10.9
LV.....	40.4	38.6	38.7	41.9	42.1	44.7	44.9
DE.....	11.8	13.6	15.1	17.4	18.1	20.9	23.6
PL.....	2.8	3.5	4.3	5.8	7.0	8.3	10.6
SK.....	13.5	14.5	16.0	17.8	17.8	19.3	20.1
SE.....	51.8	53.2	53.6	58.3	56.0	59.9	60.0

**Fig. 5. Share of electricity generated from renewable sources in the total gross use of electricity in selected EU-28 countries in the years 2006 and 2012**



The share of generated electricity from renewable sources in the total gross use of electricity in selected EU countries in the years 2006 – 2012 increased from 15.4% to 23.5%. For particular countries the value of this indicator is very diverse, e.g. for Poland in that period the share increased from 2.8% to 10.6%.

The share of particular sources of renewable energy in the production of electricity from RES in selected EU countries in 2008 – 2012 is presented in table 5.

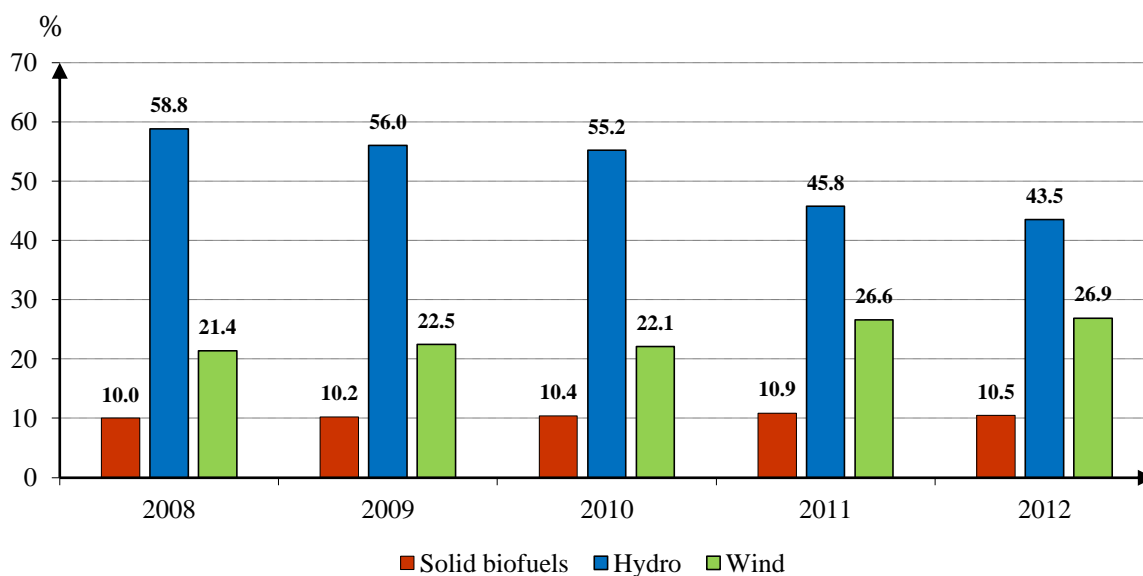
Moreover, on the Fig. 6 are shown shares of energy from solid biomass, hydro and wind in the production of electricity for EU-28 in the years 2008 - 2012, and on the Fig. 7 are shown the shares for Poland.

**Table 5. The structure of electricity production from renewable energy sources in selected EU countries in the years 2008 – 2012**

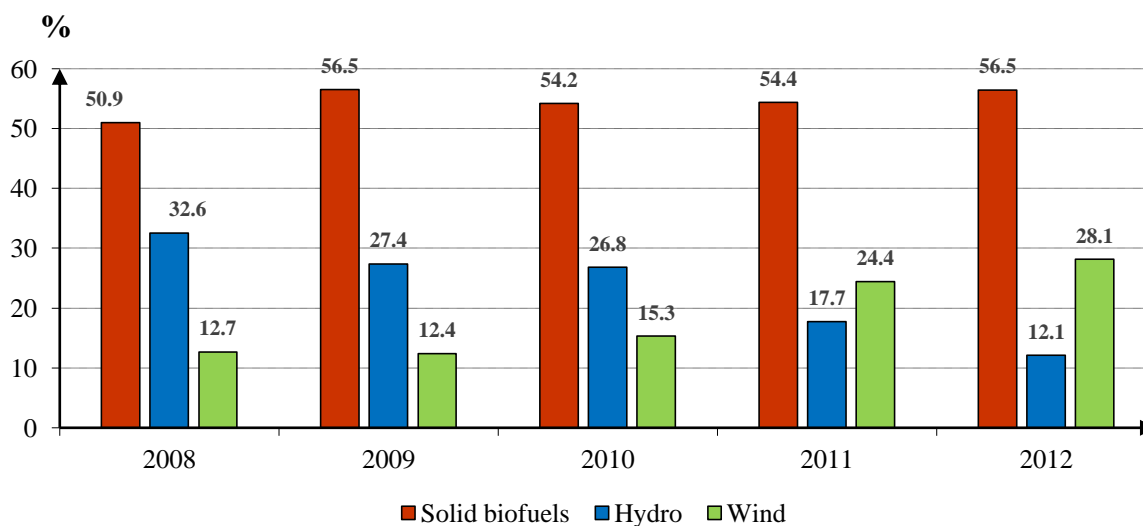
Specification		EU-28	AT	CZ	EE	FI	LT	LV	DE	PL	SK	SE
		%										
Solid biofuels	2008	10.0	7.5	31.4	13.7	36.2	10.0	0.2	9.8	50.9	10.5	11.0
	2009	10.2	7.2	30.0	56.7	38.7	12.7	0.1	10.0	56.5	10.0	12.7
	2010	10.4	8.0	25.3	69.9	43.7	12.7	0.2	10.3	54.2	10.2	12.5
	2011	10.9	9.0	23.3	65.0	44.8	10.9	0.4	9.2	54.4	13.6	11.5
	2012	10.5	7.3	22.5	66.7	37.5	14.9	1.6	8.5	56.5	13.2	10.7
Solar energy	2008	1.3	0.1	0.3	-	0.0	-	-	4.8	-	-	0.0
	2009	2.4	0.1	1.9	-	0.0	-	-	7.0	-	-	0.0
	2010	3.4	0.2	10.4	-	0.0	-	-	11.2	-	0.3	0.0
	2011	7.0	0.4	30.1	-	0.0	-	-	15.9	-	7.9	0.0
	2012	9.3	0.7	26.6	-	0.0	0.2	-	18.5	0.0	7.7	0.0
Hydro	2008	58.8	85.8	54.2	14.2	61.6	66.8	96.8	21.5	32.6	88.5	84.8
	2009	56.0	86.6	52.2	5.9	58.5	62.0	97.2	19.7	27.4	88.9	82.5
	2010	55.2	85.3	47.3	2.6	53.4	59.3	96.8	19.6	26.8	88.5	80.9
	2011	45.8	83.7	27.1	2.5	51.5	43.2	93.8	14.0	17.7	75.6	79.0
	2012	43.5	85.5	26.4	2.8	59.1	35.8	90.2	14.8	12.1	75.0	80.3
Wind	2008	21.4	4.5	6.6	67.5	0.9	21.8	1.8	43.8	12.7	0.2	2.5
	2009	22.5	4.2	6.2	36.0	1.3	23.1	1.4	40.9	12.4	0.1	3.1
	2010	22.1	4.6	5.7	26.5	1.2	24.6	1.3	36.2	15.3	0.1	4.3
	2011	26.6	4.7	5.5	31.2	2.0	42.7	2.3	39.6	24.4	0.1	7.2
	2012	26.9	4.8	5.2	29.4	1.7	45.6	2.8	35.5	28.1	0.1	7.3
Biogas	2008	4.4	1.3	7.2	4.6	0.1	1.5	1.2	14.0	3.8	0.3	0.0
	2009	4.7	1.3	9.5	1.3	0.1	2.2	1.3	15.9	3.7	0.4	0.0
	2010	4.7	1.4	10.8	1.0	0.4	3.4	1.6	16.7	3.7	0.6	0.0
	2011	5.6	1.5	12.8	1.3	0.6	3.2	3.4	17.2	3.4	2.3	0.0
	2012	6.1	1.2	18.2	1.1	0.5	3.6	5.4	19.1	3.3	3.5	0.0
Biofuels	2008	0.3	0.1	-	-	-	-	-	1.2	-	-	0.1
	2009	0.6	0.1	-	-	-	-	-	1.8	0.0	-	0.3
	2010	0.7	0.1	-	-	-	-	-	1.3	0.0	-	0.2
	2011	0.5	0.0	-	-	-	-	0.0	0.3	0.0	-	0.0
	2012	0.5	-	-	-	-	-	0.0	0.2	-	-	0.0
Geothermal energy	2008	1.0	0.0	-	-	-	-	-	0.0	-	-	-
	2009	0.9	0.0	-	-	-	-	-	0.0	-	-	-
	2010	0.8	0.0	-	-	-	-	-	0.0	-	-	-
	2011	0.9	0.0	-	-	-	-	-	0.0	-	-	-
	2012	0.8	0.0	-	-	-	-	-	0.0	-	-	-
Municipal waste	2008	2.7	0.7	0.3	-	1.1	-	-	5.0	-	0.5	1.6
	2009	2.6	0.5	0.2	-	1.3	-	-	4.6	-	0.4	1.3
	2010	2.5	0.5	0.6	-	1.2	-	-	4.6	-	0.4	2.1
	2011	2.7	0.5	1.2	-	1.1	-	-	3.9	-	0.5	2.2
	2012	2.5	0.5	1.1	-	1.2	-	-	3.5	-	0.5	1.7



**Fig. 6. Share of energy from solid biofuels, hydro and wind in production of electricity from RES in EU-28 countries in the years 2008 - 2012**



**Fig. 7. Share of energy from solid biofuels, hydro and wind in production of electricity from RES in Poland in the years 2008 - 2012**



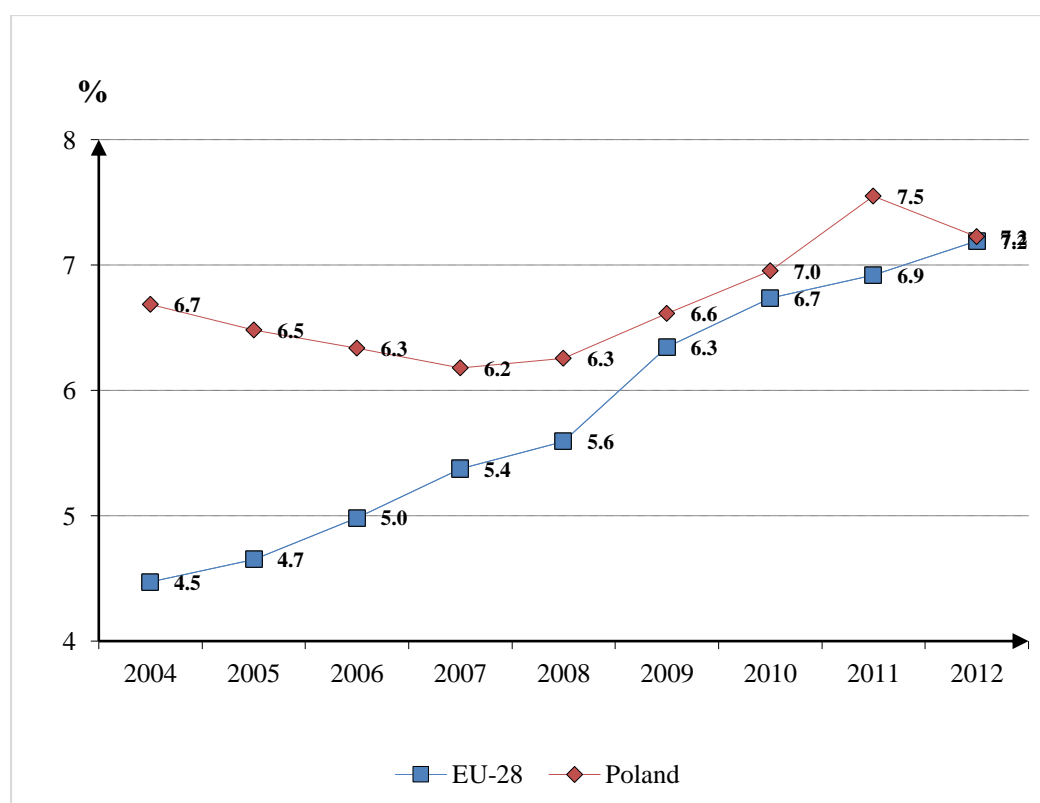
In table 6 and figure 8 there are the data on final energy consumption including renewable energy for the EU-28 and Poland in the years 2004 - 2012.

In 2012 share of energy from renewable sources in the total final energy consumption amounted to 7.2% in EU-28 as well in Poland (Fig. 8).

**Table 6. Total final energy consumption (including from renewable sources) for EU-28 and Poland in the years 2004-2012**

Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	
	Mtoe									
Total final energy consumption in EU-28.....	1186.6	1188.5	1190.1	1170.4	1174.6	1107.8	1159.8	1108.0	1104.5	
Total final energy consumption in Poland .....	57.9	58.2	60.8	61.7	62.2	61.0	66.5	64.7	64.7	
<i>including from renewable sources in EU-27.....</i>	53.1	55.3	59.3	62.9	65.7	70.3	78.1	76.7	79.4	
<i>including from renewable sources<sup>4</sup> in Poland.....</i>	3.9	3.8	3.9	3.8	3.9	4.0	4.6	4.9	4.7	
	%									
Share of energy from renewable sources in the total final energy consumption in EU-28.....	4.5	4.7	5.0	5.4	5.6	6.3	6.7	6.9	7.2	
Share of energy from renewable sources in the total final energy consumption in Poland .....	6.7	6.5	6.3	6.2	6.3	6.6	7.0	7.5	7.2	

**Fig. 8. Share of energy from renewable sources in the total final energy consumption in EU-28 and Poland**



<sup>4</sup> in energy consumption from renewable energy sources it was in total included consumption of municipal waste (biodegradable and non-biodegradable) and consumption of biofuels in transport and for blending of petroleum products.

#### 4. National balances of renewable energy

National balance of renewable energy commodities for years 2008-2013, prepared on the basis of data collected within public statistics, is presented in table 9.

During this period there was a continuous increase in the production of energy from renewable sources with a low growth rate of total primary energy production, which resulted in systematic increase of the share of renewables in total primary energy production. This regularity is presented in Table 7.

**Table 7. The share of renewable energy in the overall obtaining of the primary energy in the years 2008 – 2013**

Specification	2008	2009	2010	2011	2012	2013
	<b>TJ</b>					
Production of total primary energy.....	2 985 356	2 816 880	2 824 028	2 882 363	3 038 921	3 005 544
Production of total energy from RES .....	226 788	253 352	287 953	312 828	356 069	357 537
	<b>%</b>					
Share of energy from renewable sources in the total primary energy .....	<b>7.6</b>	<b>9.0</b>	<b>10.2</b>	<b>10.9</b>	<b>11.7</b>	<b>11.9</b>

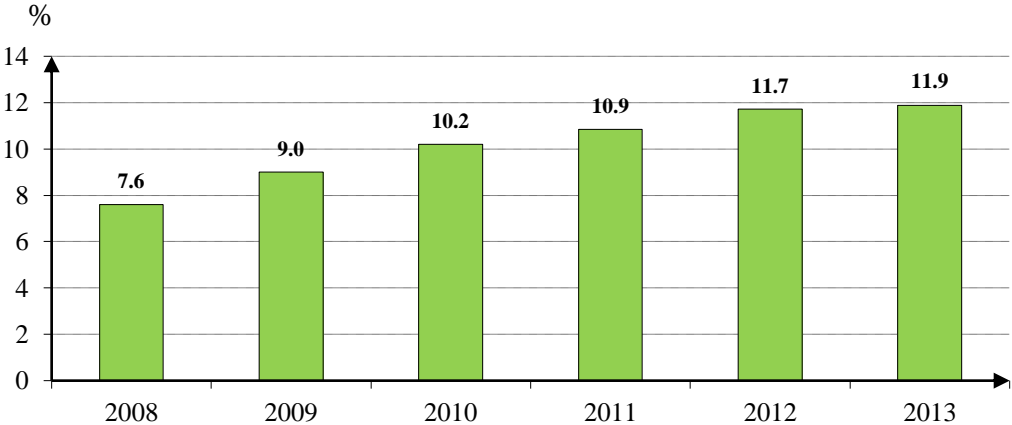
In the years 2008 - 2013, energy of solid biomass accounted for the largest item of the balance of renewable energy. Share of other renewables varies annually with a clear upward trend of biofuels, wind energy, biogas and solar radiation and the oscillating trend of decline for water energy. Table 8 shows the share of energy from renewable sources in the total obtaining of renewable energy.

**Table 8. The share of renewable energy in the total obtaining of renewable energy in the years 2008 – 2013**

Specification	2008	2009	2010	2011	2012	2013
	<b>%</b>					
Solid biofuels.....	87.48	85.77	85.29	85.00	82.16	80.03
Solar energy .....	0.02	0.11	0.12	0.14	0.15	0.18
Hydro .....	3.42	3.37	3.65	2.68	2.06	2.46
Wind .....	1.33	1.53	2.08	3.69	4.80	6.05
Biogas .....	1.78	1.62	1.67	1.83	1.98	2.12
Biofuels .....	5.47	7.04	6.64	5.76	7.97	8.20
Geothermal energy .....	0.23	0.24	0.20	0.17	0.19	0.22
Municipal waste .....	0.00	0.01	0.04	0.43	0.38	0.42
Heat pumps.....	0.27	0.30	0.31	0.30	0.31	0.33

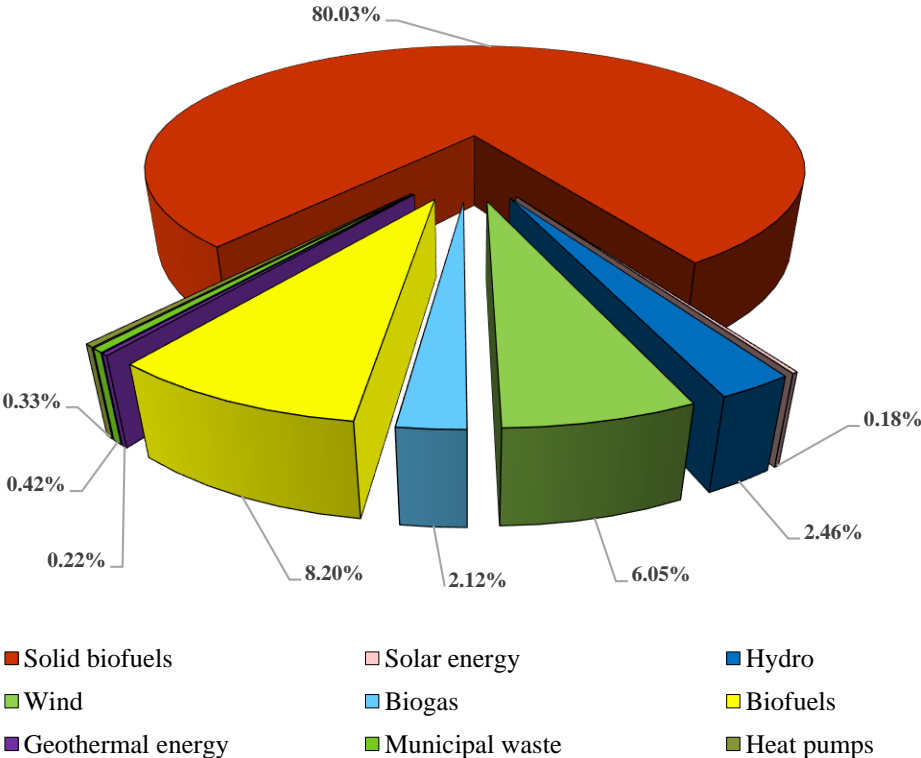
The share of renewable energy in total primary energy production in the years 2008 - 2013 is shown in Fig. 9.

**Fig. 9. The share of renewable energy in the overall obtaining of the primary energy in the years 2008 - 2013**



The share of renewable commodities in the total energy obtained from renewable sources in 2013 is presented in Fig. 10.

**Fig. 10. The share of renewable commodities in the total obtaining energy from renewable sources in 2013**



**Table 9. The balance of renewable energy commodities in the years 2008 – 2013**

Specification	2008	2009	2010	2011	2012	2013
	TJ					
	Solid biofuels					
<b>Indigenous Production</b> .....	<b>198 401</b>	<b>217 302</b>	<b>245 606</b>	<b>265 888</b>	<b>292 562</b>	<b>286 144</b>
<b>Imports(+)</b> .....	-	-	-	-	-	-
<b>Exports (-)</b> .....	-	-	-	-	-	-
<b>Stock Changes (+/-)</b> .....	<b>500</b>	-	-	-	-	-
<b>Inland Consumption</b> .....	<b>198 901</b>	<b>217 302</b>	<b>245 606</b>	<b>265 888</b>	<b>292 562</b>	<b>286 144</b>
<b>Transformation Sector</b> .....	<b>38 251</b>	<b>55 083</b>	<b>66 119</b>	<b>78 539</b>	<b>105 475</b>	<b>87 595</b>
<b>of which:</b>						
Main Activity Producer Electricity /CHP Plants .....	30 428	46 497	54 804	65 520	92 840	73 138
Main Activity Producer Heat Plants .....	1 897	1 555	1 447	1 404	1 424	1 546
Autoproducer Electricity/CHP Plants .....	5 726	6 650	9 437	11 247	10 950	12 462
Autoproducer Heat Plants .....	200	381	431	368	261	449
For Blending to Motor Gasoline/Diesel	-	-	-	-	-	-
<b>Energy Sector</b> .....	<b>20</b>	<b>134</b>	<b>349</b>	<b>162</b>	<b>160</b>	<b>122</b>
<b>of which:</b>						
Own Use in Electricity, CHP and Heat Plants .....	20	47	292	123	108	77
Mining of coal and lignite .....	-	87	57	39	52	45
Oil and Natural Gas Extraction Plants ....	-	-	-	-	-	-
<b>Final Energy Consumption</b> .....	<b>160 630</b>	<b>162 085</b>	<b>179 138</b>	<b>187 187</b>	<b>186 927</b>	<b>198 427</b>
<b>of which:</b>						
<b>Industry Sector</b> .....	<b>34 088</b>	<b>33 423</b>	<b>37 249</b>	<b>40 313</b>	<b>42 176</b>	<b>53 092</b>
<b>of which:</b>						
Iron and Steel.....	1	1	-	-	-	1
Non-Metallic Minerals .....	223	285	299	348	407	498
Transport Equipment .....	5	4	6	7	4	3
Machinery.....	37	45	39	14	27	56
Food, Beverages and Tobacco.....	365	192	441	534	436	664
Paper, Pulp and Printing.....	19 729	19 171	19 117	19 402	20 358	27 152
Wood and Wood Products.....	11 532	11 718	15 229	16 621	17 707	21 012
Non-specified (industry) .....	2 196	2 007	2 118	3 387	3 237	3 706
<b>Construction</b> .....	<b>6</b>	<b>34</b>	<b>126</b>	<b>125</b>	<b>120</b>	<b>115</b>
<b>Transport Sector</b> .....	-	-	-	-	-	-
<b>Other Sectors</b> .....	<b>126 536</b>	<b>128 628</b>	<b>141 763</b>	<b>146 749</b>	<b>144 631</b>	<b>145 220</b>
<b>of which:</b>						
Commerce and Public Services .....	5 012	7 098	7 929	7 818	6 833	7 433
Households .....	102 500	102 500	112 746	115 000	116 850	116 850
Agriculture / Forestry.....	19 024	19 030	21 088	23 931	20 948	20 937

**Table 9. The balance of renewable energy commodities in the years 2008 – 2013 (cont.)**

Specification	2008	2009	2010	2011	2012	2013
	TJ					
	Solar energy					
<b>Indigenous Production</b> .....	<b>54</b>	<b>283</b>	<b>350</b>	<b>434</b>	<b>544</b>	<b>639</b>
<b>Imports(+)</b> .....	-	-	-	-	-	-
<b>Exports (-)</b> .....	-	-	-	-	-	-
<b>Stock Changes (+/-)</b> .....	-	-	-	-	-	-
<b>Inland Consumption</b> .....	<b>54</b>	<b>283</b>	<b>350</b>	<b>434</b>	<b>544</b>	<b>639</b>
<b>Transformation Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Main Activity Producer Electricity /CHP Plants .....	-	-	-	-	-	-
Main Activity Producer Heat Plants .....	-	-	-	-	-	-
Autoproducer Electricity/CHP Plants.....	-	-	-	-	-	-
Autoproducer Heat Plants .....	-	-	-	-	-	-
For Blending to Motor Gasoline/Diesel	-	-	-	-	-	-
<b>Energy Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Own Use in Electricity, CHP and Heat Plants .....	-	-	-	-	-	-
Mining of coal and lignite.....	-	-	-	-	-	-
Oil and Natural Gas Extraction Plants ....	-	-	-	-	-	-
<b>Final Energy Consumption</b> .....	<b>54</b>	<b>283</b>	<b>350</b>	<b>434</b>	<b>544</b>	<b>639</b>
<b>of which:</b>						
<b>Industry Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Iron and Steel.....	-	-	-	-	-	-
Non-Metallic Minerals .....	-	-	-	-	-	-
Transport Equipment .....	-	-	-	-	-	-
Machinery.....	-	-	-	-	-	-
Food, Beverages and Tobacco.....	-	-	-	-	-	-
Paper, Pulp and Printing.....	-	-	-	-	-	-
Wood and Wood Products.....	-	-	-	-	-	-
Non-specified (industry) .....	-	-	-	-	-	-
<b>Construction</b> .....	-	-	-	-	-	-
<b>Transport Sector</b> .....	-	-	-	-	-	-
<b>Other Sectors</b> .....	<b>54</b>	<b>283</b>	<b>350</b>	<b>434</b>	<b>544</b>	<b>639</b>
<b>of which:</b>						
Commerce and Public Services .....	54	83	100	134	164	179
Households .....	-	200	250	300	380	460
Agriculture / Forestry.....	-	-	-	-	-	-

**Table 9. The balance of renewable energy commodities in the years 2008 – 2013 (cont.)**

Specification	2008	2009	2010	2011	2012	2013
	TJ					
	Hydro					
<b>Indigenous Production</b> .....	<b>7 748</b>	<b>8 550</b>	<b>10 512</b>	<b>8 393</b>	<b>7 333</b>	<b>8 781</b>
<b>Imports(+)</b> .....	-	-	-	-	-	-
<b>Exports (-)</b> .....	-	-	-	-	-	-
<b>Stock Changes (+/-)</b> .....	-	-	-	-	-	-
<b>Inland Consumption</b> .....	<b>7 748</b>	<b>8 550</b>	<b>10 512</b>	<b>8 393</b>	<b>7 333</b>	<b>8 781</b>
<b>Transformation Sector</b> .....	<b>7 748</b>	<b>8 550</b>	<b>10 512</b>	<b>8 393</b>	<b>7 333</b>	<b>8 781</b>
<b>of which:</b>						
Main Activity Producer Electricity /CHP Plants .....	7 740	8 543	10 505	8 385	7 326	8 769
Main Activity Producer Heat Plants .....	-	-	-	-	-	-
Autoproducer Electricity/CHP Plants.....	8	8	7	8	7	12
Autoproducer Heat Plants .....	-	-	-	-	-	-
For Blending to Motor Gasoline/Diesel	-	-	-	-	-	-
<b>Energy Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Own Use in Electricity, CHP and Heat Plants .....	-	-	-	-	-	-
Mining of coal and lignite.....	-	-	-	-	-	-
Oil and Natural Gas Extraction Plants ....	-	-	-	-	-	-
<b>Final Energy Consumption</b> .....	-	-	-	-	-	-
<b>of which:</b>						
<b>Industry Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Iron and Steel.....	-	-	-	-	-	-
Non-Metallic Minerals .....	-	-	-	-	-	-
Transport Equipment .....	-	-	-	-	-	-
Machinery.....	-	-	-	-	-	-
Food, Beverages and Tobacco.....	-	-	-	-	-	-
Paper, Pulp and Printing.....	-	-	-	-	-	-
Wood and Wood Products.....	-	-	-	-	-	-
Non-specified (industry) .....	-	-	-	-	-	-
<b>Construction</b> .....	-	-	-	-	-	-
<b>Transport Sector</b> .....	-	-	-	-	-	-
<b>Other Sectors</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Commerce and Public Services .....	-	-	-	-	-	-
Households .....	-	-	-	-	-	-
Agriculture / Forestry.....	-	-	-	-	-	-

**Table 9. The balance of renewable energy commodities in the years 2008 – 2013 (cont.)**

Specification	2008	2009	2010	2011	2012	2013
	TJ					
	Wind					
<b>Indigenous Production</b> .....	<b>3 012</b>	<b>3 878</b>	<b>5 992</b>	<b>11 536</b>	<b>17 088</b>	<b>21 614</b>
<b>Imports(+)</b> .....	-	-	-	-	-	-
<b>Exports (-)</b> .....	-	-	-	-	-	-
<b>Stock Changes (+/-)</b> .....	-	-	-	-	-	-
<b>Inland Consumption</b> .....	<b>3 012</b>	<b>3 878</b>	<b>5 992</b>	<b>11 536</b>	<b>17 088</b>	<b>21 614</b>
<b>Transformation Sector</b> .....	<b>3 012</b>	<b>3 878</b>	<b>5 992</b>	<b>11 536</b>	<b>17 088</b>	<b>21 614</b>
<b>of which:</b>						
Main Activity Producer Electricity /CHP Plants .....	3 012	3 878	5 992	11 536	17 088	21 614
Main Activity Producer Heat Plants .....	-	-	-	-	-	-
Autoproducer Electricity/CHP Plants.....	-	-	-	-	-	-
Autoproducer Heat Plants .....	-	-	-	-	-	-
For Blending to Motor Gasoline/Diesel	-	-	-	-	-	-
<b>Energy Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Own Use in Electricity, CHP and Heat Plants .....	-	-	-	-	-	-
Mining of coal and lignite.....	-	-	-	-	-	-
Oil and Natural Gas Extraction Plants ....	-	-	-	-	-	-
<b>Final Energy Consumption</b> .....	-	-	-	-	-	-
<b>of which:</b>						
<b>Industry Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Iron and Steel.....	-	-	-	-	-	-
Non-Metallic Minerals .....	-	-	-	-	-	-
Transport Equipment .....	-	-	-	-	-	-
Machinery.....	-	-	-	-	-	-
Food, Beverages and Tobacco.....	-	-	-	-	-	-
Paper, Pulp and Printing.....	-	-	-	-	-	-
Wood and Wood Products.....	-	-	-	-	-	-
Non-specified (industry) .....	-	-	-	-	-	-
<b>Construction</b> .....	-	-	-	-	-	-
<b>Transport Sector</b> .....	-	-	-	-	-	-
<b>Other Sectors</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Commerce and Public Services .....	-	-	-	-	-	-
Households .....	-	-	-	-	-	-
Agriculture / Forestry.....	-	-	-	-	-	-



**Table 9. The balance of renewable energy commodities in the years 2008 – 2013 (cont.)**

Specification	2008	2009	2010	2011	2012	2013
	TJ					
	Biogas from landfills					
<b>Indigenous Production</b> .....	<b>1 433</b>	<b>1 487</b>	<b>1 811</b>	<b>2 323</b>	<b>2 249</b>	<b>2 157</b>
<b>Imports(+)</b> .....	-	-	-	-	-	-
<b>Exports (-)</b> .....	-	-	-	-	-	-
<b>Stock Changes (+/-)</b> .....	-	-	-	-	-	-
<b>Inland Consumption</b> .....	<b>1 433</b>	<b>1 487</b>	<b>1 811</b>	<b>2 323</b>	<b>2 249</b>	<b>2 157</b>
<b>Transformation Sector</b> .....	<b>1 433</b>	<b>1 471</b>	<b>1 790</b>	<b>1 818</b>	<b>1 841</b>	<b>1 961</b>
<b>of which:</b>						
Main Activity Producer Electricity /CHP Plants .....	-	-	-	-	-	-
Main Activity Producer Heat Plants .....	-	-	-	-	-	-
Autoproducer Electricity/CHP Plants.....	1 433	1 471	1 790	1 818	1 841	1 961
Autoproducer Heat Plants .....	-	-	-	-	-	-
For Blending to Motor Gasoline/Diesel	-	-	-	-	-	-
<b>Energy Sector</b> .....	-	<b>1</b>	-	-	-	-
<b>of which:</b>						
Own Use in Electricity, CHP and Heat Plants .....	-	1	-	-	-	-
Mining of coal and lignite.....	-	-	-	-	-	-
Oil and Natural Gas Extraction Plants ....	-	-	-	-	-	-
<b>Final Energy Consumption</b> .....	-	<b>15</b>	<b>21</b>	<b>506</b>	<b>408</b>	<b>196</b>
<b>of which:</b>						
<b>Industry Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Iron and Steel.....	-	-	-	-	-	-
Non-Metallic Minerals .....	-	-	-	-	-	-
Transport Equipment .....	-	-	-	-	-	-
Machinery.....	-	-	-	-	-	-
Food, Beverages and Tobacco.....	-	-	-	-	-	-
Paper, Pulp and Printing.....	-	-	-	-	-	-
Wood and Wood Products.....	-	-	-	-	-	-
Non-specified (industry) .....	-	-	-	-	-	-
<b>Construction</b> .....	-	-	-	-	-	-
<b>Transport Sector</b> .....	-	-	-	-	-	-
<b>Other Sectors</b> .....	-	<b>15</b>	<b>21</b>	<b>506</b>	<b>408</b>	<b>196</b>
<b>of which:</b>						
Commerce and Public Services .....	-	15	21	506	408	196
Households .....	-	-	-	-	-	-
Agriculture / Forestry.....	-	-	-	-	-	-

**Table 9. The balance of renewable energy commodities in the years 2008 – 2013 (cont.)**

Specification	2008	2009	2010	2011	2012	2013
	TJ					
	Biogas from sludge					
<b>Indigenous Production</b> .....	<b>2 486</b>	<b>2 429</b>	<b>2 652</b>	<b>2 775</b>	<b>3 321</b>	<b>3 352</b>
<b>Imports(+)</b> .....	-	-	-	-	-	-
<b>Exports (-)</b> .....	-	-	-	-	-	-
<b>Stock Changes (+/-)</b> .....	-	-	-	-	-	-
<b>Inland Consumption</b> .....	<b>2 486</b>	<b>2 429</b>	<b>2 652</b>	<b>2 775</b>	<b>3 321</b>	<b>3 352</b>
<b>Transformation Sector</b> .....	<b>1 498</b>	<b>1 464</b>	<b>1 529</b>	<b>639</b>	<b>858</b>	<b>2 315</b>
<b>of which:</b>						
Main Activity Producer Electricity /CHP Plants .....	-	-	-	-	-	-
Main Activity Producer Heat Plants .....	19	16	6	6	6	7
Autoproducer Electricity/CHP Plants.....	1 477	1 437	1 514	622	843	2 300
Autoproducer Heat Plants .....	2	11	9	10	9	8
For Blending to Motor Gasoline/Diesel	-	-	-	-	-	-
<b>Energy Sector</b> .....	<b>17</b>	<b>2</b>	-	-	-	-
<b>of which:</b>						
Own Use in Electricity, CHP and Heat Plants .....	17	2	-	-	-	-
Mining of coal and lignite.....	-	-	-	-	-	-
Oil and Natural Gas Extraction Plants ....	-	-	-	-	-	-
<b>Final Energy Consumption</b> .....	<b>971</b>	<b>963</b>	<b>1 123</b>	<b>2 136</b>	<b>2 462</b>	<b>1 037</b>
<b>of which:</b>						
<b>Industry Sector</b> .....	<b>94</b>	<b>127</b>	<b>150</b>	<b>218</b>	<b>258</b>	<b>261</b>
<b>of which:</b>						
Iron and Steel.....	-	-	-	-	-	-
Non-Metallic Minerals .....	-	-	-	-	-	-
Transport Equipment .....	-	-	-	-	-	-
Machinery.....	-	-	-	-	-	-
Food, Beverages and Tobacco.....	94	109	101	145	175	169
Paper, Pulp and Printing.....	-	18	49	73	83	91
Wood and Wood Products.....	-	-	-	-	-	-
Non-specified (industry) .....	-	-	-	-	-	-
<b>Construction</b> .....	<b>1</b>	<b>3</b>	-	-	-	-
<b>Transport Sector</b> .....	-	-	-	-	-	-
<b>Other Sectors</b> .....	<b>876</b>	<b>833</b>	<b>973</b>	<b>1 918</b>	<b>2 205</b>	<b>776</b>
<b>of which:</b>						
Commerce and Public Services .....	876	833	973	1 918	2 205	776
Households .....	-	-	-	-	-	-
Agriculture / Forestry.....	-	-	-	-	-	-

**Table 9. The balance of renewable energy commodities in the years 2008 – 2013 (cont.)**

Specification	2008	2009	2010	2011	2012	2013
	TJ					
	Biogas – other biogas					
<b>Indigenous Production</b> .....	<b>107</b>	<b>188</b>	<b>334</b>	<b>634</b>	<b>1 463</b>	<b>2 084</b>
<b>Imports(+)</b> .....	-	-	-	-	-	-
<b>Exports (-)</b> .....	-	-	-	-	-	-
<b>Stock Changes (+/-)</b> .....	-	-	-	-	-	-
<b>Inland Consumption</b> .....	<b>107</b>	<b>188</b>	<b>334</b>	<b>634</b>	<b>1 463</b>	<b>2 084</b>
<b>Transformation Sector</b> .....	<b>107</b>	<b>188</b>	<b>334</b>	<b>357</b>	<b>980</b>	<b>1 545</b>
<b>of which:</b>						
Main Activity Producer Electricity /CHP Plants .....	-	-	-	-	-	-
Main Activity Producer Heat Plants .....	-	-	-	-	-	-
Autoproducer Electricity/CHP Plants.....	107	188	334	357	980	1 545
Autoproducer Heat Plants .....	-	-	-	-	-	-
For Blending to Motor Gasoline/Diesel	-	-	-	-	-	-
<b>Energy Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Own Use in Electricity, CHP and Heat Plants .....	-	-	-	-	-	-
Mining of coal and lignite.....	-	-	-	-	-	-
Oil and Natural Gas Extraction Plants ....	-	-	-	-	-	-
<b>Final Energy Consumption</b> .....	-	-	-	<b>277</b>	<b>484</b>	<b>539</b>
<b>of which:</b>						
<b>Industry Sector</b> .....	-	-	-	-	<b>32</b>	<b>33</b>
<b>of which:</b>						
Iron and Steel.....	-	-	-	-	-	-
Non-Metallic Minerals .....	-	-	-	-	-	-
Transport Equipment .....	-	-	-	-	-	-
Machinery.....	-	-	-	-	-	-
Food, Beverages and Tobacco.....	-	-	-	-	32	33
Paper, Pulp and Printing.....	-	-	-	-	-	-
Wood and Wood Products.....	-	-	-	-	-	-
Non-specified (industry) .....	-	-	-	-	-	-
<b>Construction</b> .....	-	-	-	-	-	-
<b>Transport Sector</b> .....	-	-	-	-	-	-
<b>Other Sectors</b> .....	-	-	-	<b>277</b>	<b>452</b>	<b>506</b>
<b>of which:</b>						
Commerce and Public Services .....	-	-	-	6	51	-
Households .....	-	-	-	-	-	-
Agriculture / Forestry.....	-	-	-	271	401	506

**Table 9. The balance of renewable energy commodities in the years 2008 – 2013 (cont.)**

Specification	2008	2009	2010	2011	2012	2013
	TJ					
	Biogas - Total					
<b>Indigenous Production</b> .....	<b>4 026</b>	<b>4 104</b>	<b>4 797</b>	<b>5 731</b>	<b>7 032</b>	<b>7 593</b>
<b>Imports(+)</b> .....	-	-	-	-	-	-
<b>Exports (-)</b> .....	-	-	-	-	-	-
<b>Stock Changes (+/-)</b> .....	-	-	-	-	-	-
<b>Inland Consumption</b> .....	<b>4 026</b>	<b>4 104</b>	<b>4 797</b>	<b>5 731</b>	<b>7 032</b>	<b>7 593</b>
<b>Transformation Sector</b> .....	<b>3 038</b>	<b>3 123</b>	<b>3 653</b>	<b>2 813</b>	<b>3 678</b>	<b>5 821</b>
<b>of which:</b>						
Main Activity Producer Electricity /CHP Plants .....	-	-	-	-	-	-
Main Activity Producer Heat Plants .....	19	16	6	6	6	7
Autoproducer Electricity/CHP Plants.....	3 017	3 096	3 638	2 797	3 663	5 806
Autoproducer Heat Plants .....	2	11	9	10	9	8
For Blending to Motor Gasoline/Diesel	-	-	-	-	-	-
<b>Energy Sector</b> .....	<b>17</b>	<b>3</b>	-	-	-	-
<b>of which:</b>						
Own Use in Electricity, CHP and Heat Plants .....	17	3	-	-	-	-
Mining of coal and lignite.....	-	-	-	-	-	-
Oil and Natural Gas Extraction Plants ....	-	-	-	-	-	-
<b>Final Energy Consumption</b> .....	<b>971</b>	<b>978</b>	<b>1 144</b>	<b>2 918</b>	<b>3 354</b>	<b>1 772</b>
<b>of which:</b>						
<b>Industry Sector</b> .....	<b>94</b>	<b>127</b>	<b>150</b>	<b>218</b>	<b>290</b>	<b>293</b>
<b>of which:</b>						
Iron and Steel.....	-	-	-	-	-	-
Non-Metallic Minerals .....	-	-	-	-	-	-
Transport Equipment .....	-	-	-	-	-	-
Machinery.....	-	-	-	-	-	-
Food, Beverages and Tobacco.....	94	109	101	145	207	202
Paper, Pulp and Printing.....	-	18	49	73	83	91
Wood and Wood Products.....	-	-	-	-	-	-
Non-specified (industry) .....	-	-	-	-	-	-
<b>Construction</b> .....	<b>1</b>	<b>3</b>	-	-	-	-
<b>Transport Sector</b> .....	-	-	-	-	-	-
<b>Other Sectors</b> .....	<b>876</b>	<b>847</b>	<b>994</b>	<b>2 700</b>	<b>3 064</b>	<b>1 478</b>
<b>of which:</b>						
Commerce and Public Services .....	876	847	994	2 429	2 663	972
Households .....	-	-	-	-	-	-
Agriculture / Forestry.....	-	-	-	271	401	506

**Table 9. The balance of renewable energy commodities in the years 2008 – 2013 (cont.)**

Specification	2008	2009	2010	2011	2012	2013
	TJ					
	Biofuels - bioethanol					
<b>Indigenous Production</b> .....	<b>2 459</b>	<b>3 838</b>	<b>4 538</b>	<b>4 057</b>	<b>5 124</b>	<b>5 098</b>
<b>Imports(+)</b> .....	<b>3 027</b>	<b>4 322</b>	<b>3 505</b>	<b>3 566</b>	<b>1 302</b>	<b>1 099</b>
<b>Exports (-)</b> .....	<b>11</b>	<b>-</b>	<b>43</b>	<b>-</b>	<b>56</b>	<b>73</b>
<b>Stock Changes (+/-)</b> .....	<b>-184</b>	<b>2</b>	<b>-92</b>	<b>-144</b>	<b>74</b>	<b>-81</b>
<b>Inland Consumption</b> .....	<b>5 291</b>	<b>8 162</b>	<b>7 909</b>	<b>7 479</b>	<b>6 443</b>	<b>6 043</b>
<b>Transformation Sector</b> .....	<b>5 291</b>	<b>7 249</b>	<b>5 478</b>	<b>5 566</b>	<b>6 113</b>	<b>5 213</b>
<b>of which:</b>						
Main Activity Producer Electricity /CHP Plants .....	-	-	-	-	-	-
Main Activity Producer Heat Plants .....	-	-	-	-	-	-
Autoproducer Electricity/CHP Plants.....	-	-	-	-	-	-
Autoproducer Heat Plants .....	-	-	-	-	-	-
For Blending to Motor Gasoline/Diesel	5 291	7 249	5 478	5 566	6 113	5 213
<b>Energy Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Own Use in Electricity, CHP and Heat Plants .....	-	-	-	-	-	-
Mining of coal and lignite.....	-	-	-	-	-	-
Oil and Natural Gas Extraction Plants ....	-	-	-	-	-	-
<b>Final Energy Consumption</b> .....	-	<b>913</b>	<b>2 431</b>	<b>1 913</b>	<b>330</b>	<b>830</b>
<b>of which:</b>						
<b>Industry Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Iron and Steel.....	-	-	-	-	-	-
Non-Metallic Minerals .....	-	-	-	-	-	-
Transport Equipment .....	-	-	-	-	-	-
Machinery.....	-	-	-	-	-	-
Food, Beverages and Tobacco.....	-	-	-	-	-	-
Paper, Pulp and Printing.....	-	-	-	-	-	-
Wood and Wood Products.....	-	-	-	-	-	-
Non-specified (industry) .....	-	-	-	-	-	-
<b>Construction</b> .....	-	-	-	-	-	-
<b>Transport Sector</b> .....	-	<b>913</b>	<b>2 431</b>	<b>1 913</b>	<b>330</b>	<b>830</b>
<b>Other Sectors</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Commerce and Public Services .....	-	-	-	-	-	-
Households .....	-	-	-	-	-	-
Agriculture / Forestry.....	-	-	-	-	-	-

**Table 9. The balance of renewable energy commodities in the years 2008 – 2013 (cont.)**

Specification	2008	2009	2010	2011	2012	2013
	TJ					
	Biofuels - biodiesel					
<b>Indigenous Production</b> .....	<b>9 943</b>	<b>14 010</b>	<b>14 584</b>	<b>13 974</b>	<b>23 247</b>	<b>24 217</b>
<b>Imports(+)</b> .....	<b>3 547</b>	<b>5 819</b>	<b>15 271</b>	<b>19 032</b>	<b>6 965</b>	<b>5 889</b>
<b>Exports (-)</b> .....	-	<b>320</b>	<b>502</b>	<b>1 438</b>	<b>1 863</b>	<b>5 956</b>
<b>Stock Changes (+/-)</b> .....	<b>-279</b>	<b>92</b>	<b>-133</b>	<b>52</b>	<b>-321</b>	<b>751</b>
<b>Inland Consumption</b> .....	<b>13 211</b>	<b>19 600</b>	<b>29 221</b>	<b>31 621</b>	<b>28 028</b>	<b>24 902</b>
<b>Transformation Sector</b> .....	<b>12 986</b>	<b>16 230</b>	<b>20 358</b>	<b>22 443</b>	<b>26 631</b>	<b>24 671</b>
<b>of which:</b>						
Main Activity Producer Electricity /CHP Plants .....	-	32	9	23	3	7
Main Activity Producer Heat Plants .....	-	-	-	-	-	-
Autoproducer Electricity/CHP Plants.....	-	-	-	-	-	-
Autoproducer Heat Plants .....	-	-	-	-	-	-
For Blending to Motor Gasoline/Diesel	12 986	16 199	20 349	22 420	26 629	24 664
<b>Energy Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Own Use in Electricity, CHP and Heat Plants .....	-	-	-	-	-	-
Mining of coal and lignite.....	-	-	-	-	-	-
Oil and Natural Gas Extraction Plants ....	-	-	-	-	-	-
<b>Final Energy Consumption</b> .....	<b>225</b>	<b>3 370</b>	<b>8 863</b>	<b>9 178</b>	<b>1 397</b>	<b>231</b>
<b>of which:</b>						
<b>Industry Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Iron and Steel.....	-	-	-	-	-	-
Non-Metallic Minerals .....	-	-	-	-	-	-
Transport Equipment .....	-	-	-	-	-	-
Machinery.....	-	-	-	-	-	-
Food, Beverages and Tobacco.....	-	-	-	-	-	-
Paper, Pulp and Printing.....	-	-	-	-	-	-
Wood and Wood Products.....	-	-	-	-	-	-
Non-specified (industry) .....	-	-	-	-	-	-
<b>Construction</b> .....	-	-	-	-	-	-
<b>Transport Sector</b> .....	<b>225</b>	<b>3 370</b>	<b>8 863</b>	<b>9 178</b>	<b>1 397</b>	<b>231</b>
<b>Other Sectors</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Commerce and Public Services .....	-	-	-	-	-	-
Households .....	-	-	-	-	-	-
Agriculture / Forestry.....	-	-	-	-	-	-

**Table 9. The balance of renewable energy commodities in the years 2008 – 2013 (cont.)**

Specification	2008	2009	2010	2011	2012	2013
	TJ					
	Biofuels - Total					
<b>Indigenous Production</b> .....	<b>12 402</b>	<b>17 847</b>	<b>19 123</b>	<b>18 030</b>	<b>28 371</b>	<b>29 315</b>
<b>Imports(+)</b> .....	<b>6 574</b>	<b>10 141</b>	<b>18 777</b>	<b>22 598</b>	<b>8 267</b>	<b>6 988</b>
<b>Exports (-)</b> .....	<b>11</b>	<b>320</b>	<b>545</b>	<b>1 438</b>	<b>1 919</b>	<b>6 029</b>
<b>Stock Changes (+/-)</b> .....	<b>-463</b>	<b>94</b>	<b>-225</b>	<b>-91</b>	<b>-248</b>	<b>670</b>
<b>Inland Consumption</b> .....	<b>18 502</b>	<b>27 762</b>	<b>37 130</b>	<b>39 099</b>	<b>34 471</b>	<b>30 944</b>
<b>Transformation Sector</b> .....	<b>18 277</b>	<b>23 480</b>	<b>25 836</b>	<b>28 009</b>	<b>32 744</b>	<b>29 884</b>
<b>of which:</b>						
Main Activity Producer Electricity /CHP Plants .....	-	32	9	23	3	7
Main Activity Producer Heat Plants .....	-	-	-	-	-	-
Autoproducer Electricity/CHP Plants.....	-	-	-	-	-	-
Autoproducer Heat Plants .....	-	-	-	-	-	-
For Blending to Motor Gasoline/Diesel	18 277	23 448	25 826	27 986	32 741	29 876
<b>Energy Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Own Use in Electricity, CHP and Heat Plants .....	-	-	-	-	-	-
Mining of coal and lignite.....	-	-	-	-	-	-
Oil and Natural Gas Extraction Plants ....	-	-	-	-	-	-
<b>Final Energy Consumption</b> .....	<b>225</b>	<b>4 283</b>	<b>11 294</b>	<b>11 090</b>	<b>1 727</b>	<b>1 061</b>
<b>of which:</b>						
<b>Industry Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Iron and Steel.....	-	-	-	-	-	-
Non-Metallic Minerals .....	-	-	-	-	-	-
Transport Equipment .....	-	-	-	-	-	-
Machinery.....	-	-	-	-	-	-
Food, Beverages and Tobacco.....	-	-	-	-	-	-
Paper, Pulp and Printing.....	-	-	-	-	-	-
Wood and Wood Products.....	-	-	-	-	-	-
Non-specified (industry) .....	-	-	-	-	-	-
<b>Construction</b> .....	-	-	-	-	-	-
<b>Transport Sector</b> .....	<b>225</b>	<b>4 283</b>	<b>11 294</b>	<b>11 090</b>	<b>1 727</b>	<b>1 061</b>
<b>Other Sectors</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Commerce and Public Services .....	-	-	-	-	-	-
Households .....	-	-	-	-	-	-
Agriculture / Forestry.....	-	-	-	-	-	-

**Table 9. The balance of renewable energy commodities in the years 2008 – 2013 (cont.)**

Specification	2008	2009	2010	2011	2012	2013
	TJ					
	Geothermal energy					
<b>Indigenous Production</b> .....	<b>531</b>	<b>600</b>	<b>563</b>	<b>531</b>	<b>661</b>	<b>778</b>
<b>Imports(+)</b> .....	-	-	-	-	-	-
<b>Exports (-)</b> .....	-	-	-	-	-	-
<b>Stock Changes (+/-)</b> .....	-	-	-	-	-	-
<b>Inland Consumption</b> .....	<b>531</b>	<b>600</b>	<b>563</b>	<b>531</b>	<b>661</b>	<b>778</b>
<b>Transformation Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Main Activity Producer Electricity /CHP Plants .....	-	-	-	-	-	-
Main Activity Producer Heat Plants .....	-	-	-	-	-	-
Autoproducer Electricity/CHP Plants.....	-	-	-	-	-	-
Autoproducer Heat Plants .....	-	-	-	-	-	-
For Blending to Motor Gasoline/Diesel	-	-	-	-	-	-
<b>Energy Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Own Use in Electricity, CHP and Heat Plants .....	-	-	-	-	-	-
Mining of coal and lignite.....	-	-	-	-	-	-
Oil and Natural Gas Extraction Plants ....	-	-	-	-	-	-
<b>Final Energy Consumption</b> .....	<b>531</b>	<b>600</b>	<b>563</b>	<b>531</b>	<b>661</b>	<b>778</b>
<b>of which:</b>						
<b>Industry Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Iron and Steel.....	-	-	-	-	-	-
Non-Metallic Minerals .....	-	-	-	-	-	-
Transport Equipment .....	-	-	-	-	-	-
Machinery.....	-	-	-	-	-	-
Food, Beverages and Tobacco.....	-	-	-	-	-	-
Paper, Pulp and Printing.....	-	-	-	-	-	-
Wood and Wood Products.....	-	-	-	-	-	-
Non-specified (industry) .....	-	-	-	-	-	-
<b>Construction</b> .....	-	-	-	-	-	-
<b>Transport Sector</b> .....	-	-	-	-	-	-
<b>Other Sectors</b> .....	<b>531</b>	<b>600</b>	<b>563</b>	<b>531</b>	<b>661</b>	<b>778</b>
<b>of which:</b>						
Commerce and Public Services .....	129	140	123	101	151	217
Households .....	402	460	440	430	510	561
Agriculture / Forestry.....	-	-	-	-	-	-



**Table 9. The balance of renewable energy commodities in the years 2008 – 2013 (cont.)**

Specification	2008	2009	2010	2011	2012	2013
	TJ					
	Municipal waste					
<b>Indigenous Production</b> .....	<b>9</b>	<b>29</b>	<b>123</b>	<b>1 338</b>	<b>1 360</b>	<b>1 490</b>
<b>Imports(+)</b> .....	-	-	-	-	-	-
<b>Exports (-)</b> .....	-	-	-	-	-	-
<b>Stock Changes (+/-)</b> .....	-	-	-	-	-	-
<b>Inland Consumption</b> .....	<b>9</b>	<b>29</b>	<b>123</b>	<b>1 338</b>	<b>1 360</b>	<b>1 490</b>
<b>Transformation Sector</b> .....	-	-	-	-	-	<b>99</b>
<b>of which:</b>						
Main Activity Producer Electricity /CHP Plants .....	-	-	-	-	-	99
Main Activity Producer Heat Plants .....	-	-	-	-	-	-
Autoproducer Electricity/CHP Plants.....	-	-	-	-	-	-
Autoproducer Heat Plants .....	-	-	-	-	-	-
For Blending to Motor Gasoline/Diesel	-	-	-	-	-	-
<b>Energy Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Own Use in Electricity, CHP and Heat Plants .....	-	-	-	-	-	-
Mining of coal and lignite.....	-	-	-	-	-	-
Oil and Natural Gas Extraction Plants ....	-	-	-	-	-	-
<b>Final Energy Consumption</b> .....	<b>9</b>	<b>29</b>	<b>123</b>	<b>1 338</b>	<b>1 360</b>	<b>1 391</b>
<b>of which:</b>						
<b>Industry Sector</b> .....	<b>1</b>	<b>29</b>	<b>123</b>	<b>1 338</b>	<b>1 360</b>	<b>1 391</b>
<b>of which:</b>						
Iron and Steel.....	-	-	-	-	-	-
Non-Metallic Minerals .....	-	29	123	1 338	1 360	1 391
Transport Equipment .....	-	-	-	-	-	-
Machinery.....	-	-	-	-	-	-
Food, Beverages and Tobacco.....	-	-	-	-	-	-
Paper, Pulp and Printing.....	-	-	-	-	-	-
Wood and Wood Products.....	1	-	-	-	-	-
Non-specified (industry) .....	-	-	-	-	-	-
<b>Construction</b> .....	-	-	-	-	-	-
<b>Transport Sector</b> .....	-	-	-	-	-	-
<b>Other Sectors</b> .....	<b>8</b>	-	-	-	-	-
<b>of which:</b>						
Commerce and Public Services .....	8	-	-	-	-	-
Households .....	-	-	-	-	-	-
Agriculture / Forestry.....	-	-	-	-	-	-

**Table 9. The balance of renewable energy commodities in the years 2008 – 2013 (cont.)**

Specification	2008	2009	2010	2011	2012	2013
	<b>TJ</b>					
	<b>Heat pumps (ambient heat)</b>					
<b>Indigenous Production</b> .....	<b>605</b>	<b>758</b>	<b>888</b>	<b>946</b>	<b>1 118</b>	<b>1 184</b>
<b>Imports(+)</b> .....	-	-	-	-	-	-
<b>Exports (-)</b> .....	-	-	-	-	-	-
<b>Stock Changes (+/-)</b> .....	-	-	-	-	-	-
<b>Inland Consumption</b> .....	<b>605</b>	<b>758</b>	<b>888</b>	<b>946</b>	<b>1 118</b>	<b>1 184</b>
<b>Transformation Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Main Activity Producer Electricity /CHP Plants .....	-	-	-	-	-	-
Main Activity Producer Heat Plants .....	-	-	-	-	-	-
Autoproducer Electricity/CHP Plants.....	-	-	-	-	-	-
Autoproducer Heat Plants .....	-	-	-	-	-	-
For Blending to Motor Gasoline/Diesel	-	-	-	-	-	-
<b>Energy Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Own Use in Electricity, CHP and Heat Plants .....	-	-	-	-	-	-
Mining of coal and lignite.....	-	-	-	-	-	-
Oil and Natural Gas Extraction Plants ....	-	-	-	-	-	-
<b>Final Energy Consumption</b> .....	<b>605</b>	<b>758</b>	<b>888</b>	<b>946</b>	<b>1 118</b>	<b>1 184</b>
<b>of which:</b>						
<b>Industry Sector</b> .....	-	-	-	-	-	-
<b>of which:</b>						
Iron and Steel.....	-	-	-	-	-	-
Non-Metallic Minerals .....	-	-	-	-	-	-
Transport Equipment .....	-	-	-	-	-	-
Machinery.....	-	-	-	-	-	-
Food, Beverages and Tobacco.....	-	-	-	-	-	-
Paper, Pulp and Printing.....	-	-	-	-	-	-
Wood and Wood Products.....	-	-	-	-	-	-
Non-specified (industry) .....	-	-	-	-	-	-
<b>Construction</b> .....	-	-	-	-	-	-
<b>Transport Sector</b> .....	-	-	-	-	-	-
<b>Other Sectors</b> .....	<b>605</b>	<b>758</b>	<b>888</b>	<b>946</b>	<b>1 118</b>	<b>1 184</b>
<b>of which:</b>						
Commerce and Public Services .....	605	758	888	946	1 118	1 184
Households .....	-	-	-	-	-	-
Agriculture / Forestry.....	-	-	-	-	-	-

**Table 9. The balance of renewable energy commodities in the years 2008 – 2013 (end)**

Specification	2008	2009	2010	2011	2012	2013
	TJ					
	Total					
<b>Indigenous Production</b> .....	<b>226 788</b>	<b>253 352</b>	<b>287 953</b>	<b>312 828</b>	<b>356 069</b>	<b>357 537</b>
<b>Imports(+)</b> .....	<b>6 574</b>	<b>10 141</b>	<b>18 777</b>	<b>22 598</b>	<b>8 267</b>	<b>6 988</b>
<b>Exports (-)</b> .....	<b>11</b>	<b>320</b>	<b>545</b>	<b>1 438</b>	<b>1 919</b>	<b>6 029</b>
<b>Stock Changes (+/-)</b> .....	<b>37</b>	<b>94</b>	<b>-225</b>	<b>-91</b>	<b>-248</b>	<b>670</b>
<b>Inland Consumption</b> .....	<b>233 388</b>	<b>263 267</b>	<b>305 960</b>	<b>333 897</b>	<b>362 170</b>	<b>359 167</b>
<b>Transformation Sector</b> .....	<b>70 326</b>	<b>94 114</b>	<b>112 111</b>	<b>129 291</b>	<b>166 318</b>	<b>153 793</b>
<b>of which:</b>						
Main Activity Producer Electricity /CHP Plants .....	41 180	58 949	71 309	85 464	117 257	103 627
Main Activity Producer Heat Plants .....	1 916	1 571	1 453	1 410	1 430	1 553
Autoproducer Electricity/CHP Plants.....	8 751	9 754	13 082	14 052	14 620	18 280
Autoproducer Heat Plants .....	202	392	440	378	270	457
For Blending to Motor Gasoline/Diesel	18 277	23 448	25 826	27 986	32 741	29 876
<b>Energy Sector</b> .....	<b>37</b>	<b>137</b>	<b>349</b>	<b>162</b>	<b>160</b>	<b>122</b>
<b>of which:</b>						
Own Use in Electricity, CHP and Heat Plants .....	37	50	292	123	108	77
Mining of coal and lignite.....	-	87	57	39	52	45
Oil and Natural Gas Extraction Plants ....	-	-	-	-	-	-
<b>Final Energy Consumption</b> .....	<b>163 025</b>	<b>169 015</b>	<b>193 500</b>	<b>204 444</b>	<b>195 692</b>	<b>205 251</b>
<b>of which:</b>						
<b>Industry Sector</b> .....	<b>34 183</b>	<b>33 580</b>	<b>37 522</b>	<b>41 869</b>	<b>43 826</b>	<b>54 776</b>
<b>of which:</b>						
Iron and Steel.....	1	1	-	-	-	1
Non-Metallic Minerals .....	223	314	422	1 686	1 767	1 889
Transport Equipment .....	5	4	6	7	4	3
Machinery.....	37	45	39	14	27	56
Food, Beverages and Tobacco.....	459	301	542	679	643	866
Paper, Pulp and Printing.....	19 729	19 189	19 166	19 475	20 441	27 243
Wood and Wood Products.....	11 533	11 718	15 229	16 621	17 707	21 012
Non-specified (industry) .....	2 196	2 007	2 118	3 387	3 237	3 706
<b>Construction</b> .....	<b>7</b>	<b>37</b>	<b>126</b>	<b>125</b>	<b>120</b>	<b>115</b>
<b>Transport Sector</b> .....	<b>225</b>	<b>4 283</b>	<b>11 294</b>	<b>11 090</b>	<b>1 727</b>	<b>1 061</b>
<b>Other Sectors</b> .....	<b>128 610</b>	<b>131 116</b>	<b>144 558</b>	<b>151 360</b>	<b>150 018</b>	<b>149 300</b>
<b>of which:</b>						
Commerce and Public Services .....	6 684	8 926	10 034	11 428	10 930	9 986
Households .....	102 902	103 160	113 436	115 730	117 740	117 871
Agriculture / Forestry.....	19 024	19 030	21 088	24 202	21 349	21 443

**Table 10. Energy balance of solid biofuels in the years 2004 - 2013**

Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	TJ									
<b>Indigenous Production .....</b>	<b>170056</b>	<b>174431</b>	<b>181107</b>	<b>184917</b>	<b>198401</b>	<b>217302</b>	<b>245606</b>	<b>265888</b>	<b>292562</b>	<b>286144</b>
<b>Stock Changes (+/-).....</b>	-	-	-73	-924	500	-	-	-	-	-
<b>Inland Consumption.....</b>	<b>170056</b>	<b>174431</b>	<b>181034</b>	<b>183993</b>	<b>198901</b>	<b>217302</b>	<b>245606</b>	<b>265888</b>	<b>292562</b>	<b>286144</b>
<b>Transformation Sector .....</b>	<b>8905</b>	<b>17500</b>	<b>21180</b>	<b>25434</b>	<b>38251</b>	<b>55083</b>	<b>66119</b>	<b>78539</b>	<b>105475</b>	<b>87595</b>
<b>of which:</b>										
Main Activity Producer Electricity /CHP Plants.....	3837	9641	13430	17471	30428	46497	54804	65520	92840	73138
Main Activity Producer Heat Plants .	1244	1412	1601	1529	1897	1555	1447	1404	1424	1546
Autoproducer Electricity/CHP Plants .....	3598	6194	5954	6266	5726	6650	9437	11247	10950	12462
Autoproducer Heat Plants.....	226	253	195	168	200	381	431	368	261	449
<b>Energy Sector .....</b>	<b>4</b>	<b>2</b>	<b>11</b>	<b>57</b>	<b>20</b>	<b>134</b>	<b>349</b>	<b>162</b>	<b>160</b>	<b>122</b>
<b>of which:</b>										
Own Use in Electricity, CHP and Heat Plants .....	4	2	10	56	20	47	292	123	108	77
Mining of coal and lignite.....	-	-	-	-	-	87	57	39	52	45
Oil and Natural Gas Extraction Plants.	-	-	1	1	-	-	-	-	-	-
<b>Final Energy Consumption.....</b>	<b>161147</b>	<b>156929</b>	<b>159843</b>	<b>158502</b>	<b>160630</b>	<b>162085</b>	<b>179138</b>	<b>187187</b>	<b>186927</b>	<b>198427</b>
<b>of which:</b>										
<b>Industry Sector.....</b>	<b>31864</b>	<b>30990</b>	<b>30762</b>	<b>31939</b>	<b>34088</b>	<b>33423</b>	<b>37249</b>	<b>40313</b>	<b>42176</b>	<b>53092</b>
<b>of which:</b>										
Iron and Steel .....	4	2	1	1	1	1	-	-	-	1
Chemical (incl. Petrochemical) .....	102	165	-	121	-	58	58	53	131	50
Non-Ferrous Metals .....	-	-	-	-	-	-	-	-	-	-
Non-Metallic Minerals .....	261	110	139	116	223	285	299	348	407	498
Transport Equipment .....	6	1	7	5	5	4	6	7	4	3
Machinery .....	52	54	29	25	37	45	39	14	27	56
Mining and Quarrying .....	10	1	-	-	-	-	-	15	24	17
Food, Beverages and Tobacco.....	373	214	239	164	365	192	441	534	436	664
Paper, Pulp and Printing .....	18957	18611	19379	18644	19729	19171	19117	19402	20358	27152
Wood and Wood Products.....	9327	9641	7952	9925	11532	11718	15229	16621	17707	21012
Textile and Leather .....	4	1	-	1	1	-	-	-	4	5
Non-specified (industry).....	2768	2190	3016	2937	2195	1949	2060	3319	3078	3634
<b>Construction .....</b>	<b>17</b>	<b>30</b>	<b>24</b>	<b>21</b>	<b>6</b>	<b>34</b>	<b>126</b>	<b>125</b>	<b>120</b>	<b>115</b>
<b>Other Sectors .....</b>	<b>129266</b>	<b>125909</b>	<b>129057</b>	<b>126542</b>	<b>126536</b>	<b>128628</b>	<b>141763</b>	<b>146749</b>	<b>144631</b>	<b>145220</b>
<b>of which:</b>										
Commerce and Public Services.....	6028	6171	4580	5482	5012	7098	7929	7818	6833	7433
Households.....	103360	100700	104500	102000	102500	102500	112746	115000	116850	116850
Agriculture / Forestry .....	19878	19038	19977	19060	19024	19030	21088	23931	20948	20937

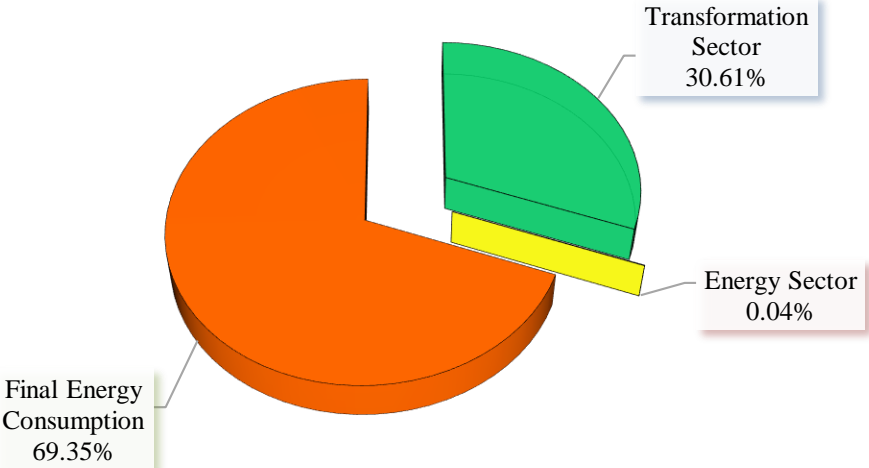
Table 10 shows the synthetic balance of solid biomass in the years 2004 - 2013.

The data presented in subsequent years show a steady increase in the amount of production and consumption of energy from the solid biofuels. In 2013 there was a slight decrease of the size compared to the year 2012 at 2.2% (but compared to the year 2004 its growth is more than 68%).

In the years 2004 - 2013 it was changed the structure of consumption of solid biofuels. The share of final consumption was increasingly smaller while the share of consumption in transformation sector was increasingly bigger.

Figure 11 illustrates the structure of consumption of solid biofuels in 2013.

**Fig. 11. The structure of solid biofuels consumption in 2013**



**Table 11. The balance of solar energy in 2004-2013**

Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	TJ									
<b>Solar energy</b> .....	<b>3.6</b>	<b>6.3</b>	<b>10.6</b>	<b>15.0</b>	<b>54.0</b>	<b>283.4</b>	<b>350.0</b>	<b>434.4</b>	<b>544.0</b>	<b>639.3</b>
<b>Final Energy Consumption</b> ....	<b>3.6</b>	<b>6.3</b>	<b>10.6</b>	<b>15.0</b>	<b>54.0</b>	<b>283.4</b>	<b>350.0</b>	<b>434.4</b>	<b>544.0</b>	<b>639.3</b>
<b>of which:</b>										
Commerce and Public Services .....	3.6	6.3	10.6	15.0	54.0	83.4	100.0	134.4	164.2	179.3
Households .....	.	.	.	.	.	200.0	250.0	300.0	379.8	460.0

The presented data on obtaining solar energy (Table 11) show a steady increase. By 2008, the survey covered only entities which were in the group of commerce and public services. Households and agricultural have not been included in it.

Surveys on consumption of fuel and energy in households have been started in 2009 and are carried out every 3-years. As a result we have obtained additional data on production and consumption of solar energy

Statistical results on 2013 showed that the total installed collector area was approximately 700 thousand m<sup>2</sup>. But data from some sources differ on this data, e.g. study of Institute for Renewable Energy (EC BREC) showed that volume of the total area solar collectors which were sold and installed in Poland was 1 480 thousand m<sup>2</sup> in 2013.

Summary data for water and wind which were used for electricity generation in the years 2004 - 2013 are shown in Table 12

**Table 12. Generation of electricity from hydro and wind in the years 2004 – 2013**

Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	TJ									
Hydro .....	7 494	7 924	7 352	8 468	7 748	8 550	10 512	8 393	7 333	8 781
Wind.....	512	488	922	1 878	3 012	3 878	5 992	11 536	17 088	21 614

The data presented above demonstrate that in situation of being maintained on similar level of water energy use, the discussed period saw a constant increase in the use of wind energy: from 519 TJ in 2004 to 21 614 TJ in 2013.

Detailed data pertaining to use of electricity in hydro and wind power stations are presented in points 5 and 6 of this study.

**Table 13. Balance of biogas in the years 2004 – 2013**

Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	TJ									
<b>Indigenous Production .....</b>	<b>1 941</b>	<b>2 243</b>	<b>2 613</b>	<b>2 708</b>	<b>4 026</b>	<b>4 104</b>	<b>4 797</b>	<b>5 731</b>	<b>7 032</b>	<b>7 593</b>
<b>Transformation Sector .....</b>	<b>1 293</b>	<b>1 820</b>	<b>2 021</b>	<b>2 305</b>	<b>3 038</b>	<b>3 123</b>	<b>3 653</b>	<b>2 813</b>	<b>3 678</b>	<b>5 821</b>
<b>of which:</b>										
Main Activity Producer CHP Plants .....	57	21	18	15	-	-	-	-	-	-
Main Activity Producer Heat Plants .....	-	-	2	4	19	16	6	6	6	7
Autoproducer CHP Plants .....	1 236	1 798	2 001	2 286	3 017	3 096	3 638	2 797	3 663	5 806
Autoproducer Heat Plants .....	-	1	-	-	2	11	9	10	9	8
<b>Energy Sector .....</b>	<b>16</b>	<b>12</b>	<b>15</b>	<b>28</b>	<b>17</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Final Energy Consumption .....</b>	<b>632</b>	<b>411</b>	<b>577</b>	<b>375</b>	<b>971</b>	<b>978</b>	<b>1 144</b>	<b>2 918</b>	<b>3 354</b>	<b>1 772</b>
<b>of which:</b>										
Food, Beverages and Tobacco .....	74	68	72	84	94	109	101	145	207	202
Paper, Pulp and Printing .....	-	-	-	-	-	18	49	73	83	91
Construction.....	-	-	-	-	1	3	-	-	-	-
Commerce and Public Services.....	558	343	505	291	876	847	994	2 429	2 663	972
Agriculture / Forestry	-	-	-	-	-	-	-	271	401	506

The balance-sheet data for biogases for years 2004 – 2013 are presented in table 13 and in tables 14 – 16 presented detailed data on particular types of biogases (landfill, from sludge and others).

In the discussed period there was a significant increase in the amount of produced biogas. The production of biogas in 2013 was higher by 8.0% than the production in 2012. As input of energy transformations was used 76.7% of produced biogas, and 23.3% was constituted by final consumption, of which majority in units belonging to commerce and public services (54.9%).

In the years 2004 – 2013, this fuel has been mostly used as input in transformation sector.

The structure of biogases use in 2013 is presented in figure 12.

**Fig. 12. The structure of biogas consumption in 2013**

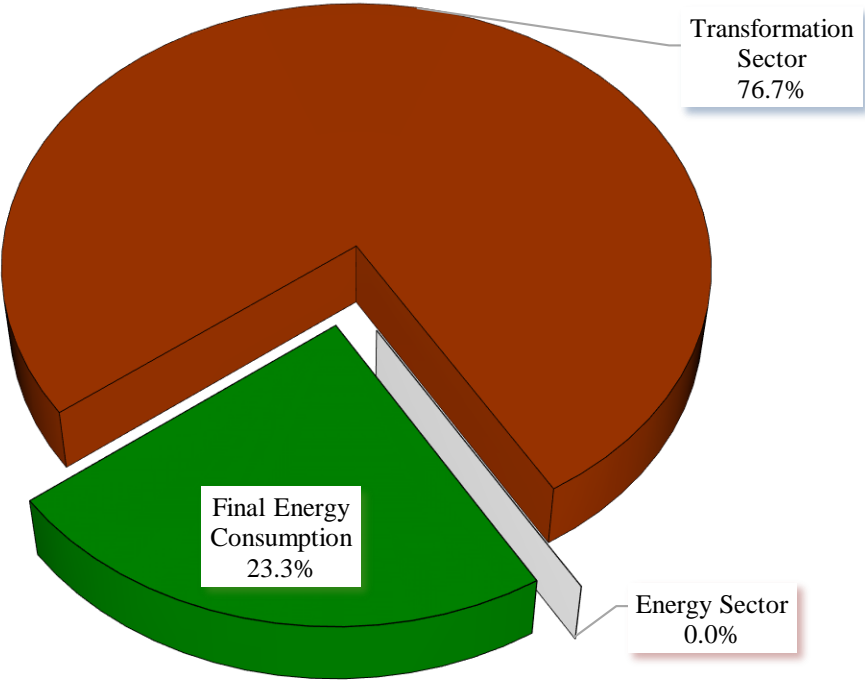


Table 14 presents detailed data for 2004 – 2013 pertaining to the biogas obtained from landfills.

From 2004 to 2011 there was a systematic increase in the extraction of landfill biogas. However, in the years 2012 and 2013 the amount of obtained landfill biogas was respectively lower by 3.2% and 4.1% compared to the previous year.

Landfill gas was entirely used in the transformation sector for generation of electricity and heat by autoproducers CHP.

Table 15 presents balance-sheet data for years 2004 – 2013 pertaining to biogas obtained from sludge.

During this period it was reported generally increases the quantities of biogas extracted from sewage treatment plants. In 2012 compared with the previous year there was 19.7% increase, in 2013 – 1.0% increase compared to the year 2012.

**Table 14. Balance of biogas from landfills in the years 2004 – 2013**

Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	TJ									
<b>Indigenous Production</b> .....	<b>636</b>	<b>649</b>	<b>791</b>	<b>879</b>	<b>1 433</b>	<b>1 487</b>	<b>1 811</b>	<b>2 323</b>	<b>2 249</b>	<b>2 157</b>
<b>Transformation Sector</b> .....	<b>636</b>	<b>649</b>	<b>791</b>	<b>879</b>	<b>1 433</b>	<b>1 471</b>	<b>1 790</b>	<b>1 818</b>	<b>1 841</b>	<b>1 961</b>
<b>of which:</b>										
Main Activity Producer CHP Plants..	57	21	18	15	-	-	-	-	-	-
Autoproducer CHP Plants .....	579	628	773	864	1 433	1 471	1 790	1 818	1 841	1 961
Autoproducer Heat Plants .....	-	-	-	-	-	-	-	-	-	-
<b>Energy Sector</b> .....	-	-	-	-	-	<b>1</b>	-	-	-	-
<b>Final Energy Consumption</b> .....	-	-	-	-	-	<b>15</b>	<b>21</b>	<b>506</b>	<b>408</b>	<b>196</b>

**Table 15. Balance of biogas from sludge in the years 2004 – 2013**

Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	TJ									
<b>Indigenous Production</b> .....	<b>1 297</b>	<b>1 586</b>	<b>1 803</b>	<b>1 802</b>	<b>2 486</b>	<b>2 429</b>	<b>2 652</b>	<b>2 775</b>	<b>3 321</b>	<b>3 352</b>
<b>Transformation Sector</b> .....	<b>649</b>	<b>1 163</b>	<b>1 211</b>	<b>1 399</b>	<b>1 498</b>	<b>1 464</b>	<b>1 529</b>	<b>639</b>	<b>858</b>	<b>2 315</b>
<b>of which:</b>										
Main Activity Producer Heat Plants ...	-	-	2	4	19	16	6	6	6	7
Autoproducer CHP Plants .....	649	1 162	1 209	1 395	1 477	1 437	1 514	622	843	2 300
Autoproducer Heat Plants .....	-	1	-	-	2	11	9	10	9	8
<b>Energy Sector</b> .....	<b>16</b>	<b>12</b>	<b>15</b>	<b>28</b>	<b>17</b>	<b>2</b>	-	-	-	-
<b>Final Energy Consumption</b> .....	<b>632</b>	<b>411</b>	<b>577</b>	<b>375</b>	<b>971</b>	<b>963</b>	<b>1 123</b>	<b>2 136</b>	<b>2 462</b>	<b>1 037</b>
<b>of which:</b>										
Food, Beverages and Tobacco.....	74	68	72	84	94	109	101	145	175	169
Paper, Pulp and Printing.....	-	-	-	-	-	18	49	73	83	91
Construction .....	-	-	-	-	1	3	-	-	-	-
Commerce and Public Services .....	558	343	505	291	876	833	973	1 918	2 205	776

Table 16 presents detailed data on production and consumption of other biogases for years 2004 – 2013.



**Table 16. Balance-sheet of other biogas in the years 2004 – 2013**

Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	TJ									
<b>Indigenous Production</b> .....	8	8	19	27	107	188	334	634	1463	2084
<b>Transformation Sector</b> (Autoproducer CHP Plants) .....	8	8	19	27	107	188	334	357	980	1545
<b>Final Energy Consumption</b> .....	-	-	-	-	-	-	-	277	484	539

The presented data suggest that this group of biogases constitutes a small (but steadily increasing) part of all biogases. In 2006 the gases constituted 0.7% and in 2013 constituted 27.4% of the total amount of obtained biogases.

The balances of biofuels (bioethanol and biodiesel) appearing in the trade of liquid fuels, are presented in units of mass [tons] – in Table 17 and units of energy [TJ] in table 18.

By 2008, inland consumption of bioethanol was entirely used to blending with gasoline (for engine). Direct consumption of bioethanol in the transport was first reported in 2009.

**Table 17. Balance of bioethanol and biodiesel in the years 2008 - 2013**

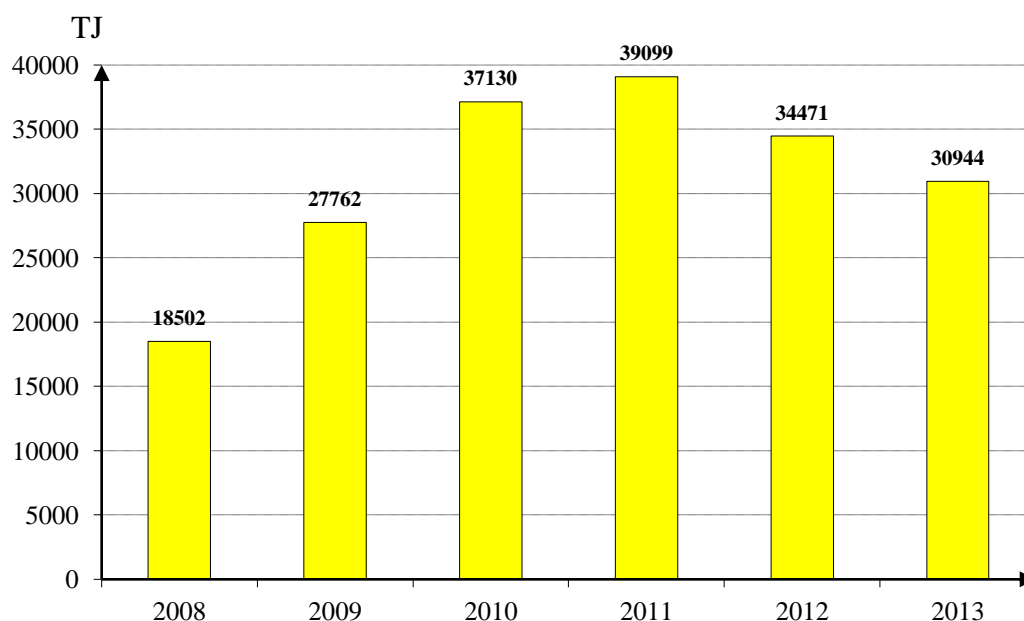
Specification	2008	2009	2010	2011	2012	2013	2008	2009	2010	2011	2012	2013
	tonne											
	bioethanol						biodiesel					
<b>Indigenous Production</b> .....	92088	127344	152799	136583	172530	190919	263729	364832	379802	363894	605385	642371
<b>Imports(+)</b> .....	113376	136873	118027	120064	43828	41158	94034	151535	397689	495634	181390	156218
<b>Exports (-)</b> .....	400	-	1450	-	1900	2725	-	8343	13060	37441	48508	157984
<b>Stock Changes (+/-)</b> .....	-6906	80	-3091	-4832	2480	-3038	-7408	2392	-3468	1365	-8365	19915
<b>Inland Consumption</b> .....	198158	264297	266285	251815	216938	226314	350355	510416	760963	823452	729902	660520
<b>of which:</b>												
Main Activity Producer Electricity Plants .....	-	-	-	-	-	-	-	825	240	599	71	192
For Blending to Motor Gasoline/Diesel .....	198158	233563	184437	187413	205823	195228	344391	421837	529912	583853	693451	654211
Finale consumption in transport .....	-	30734	81848	64402	11115	31086	5964	87754	230811	239000	36380	6117

**Table 18. Balance of bioethanol and biodiesel in the years 2008 - 2013**

Specification	2008	2009	2010	2011	2012	2013	2008	2009	2010	2011	2012	2013
	<b>TJ</b>											
	<b>bioetanol</b>						<b>biodiesel</b>					
<b>Indigenous Production ....</b>	2459	3838	4538	4057	5124	5098	9943	14010	14584	13974	23247	24217
<b>Imports(+)</b> .....	3027	4322	3505	3566	1302	1099	3547	5819	15271	19032	6965	5889
<b>Exports (-)</b> .....	11	-	43	-	56	73	-	320	502	1438	1863	5956
<b>Stock Changes (+/-)</b> .....	-184	2	-92	-144	74	-81	-279	92	-133	52	-321	751
<b>Inland Consumption</b> .....	<b>5291</b>	<b>8162</b>	<b>7909</b>	<b>7479</b>	<b>6443</b>	<b>6043</b>	<b>13211</b>	<b>19600</b>	<b>29221</b>	<b>31621</b>	<b>28028</b>	<b>24902</b>
<b>of which:</b>												
Main Activity Producer Electricity Plants.....	-	-	-	-	-	-	-	32	9	23	3	7
For Blending to Motor Gasoline/Diesel.....	5291	7249	5478	5566	6113	5213	12986	16199	20349	22420	26629	24664
Finale consumption in transport.....	-	913	2431	1913	330	830	225	3370	8863	9178	1397	231

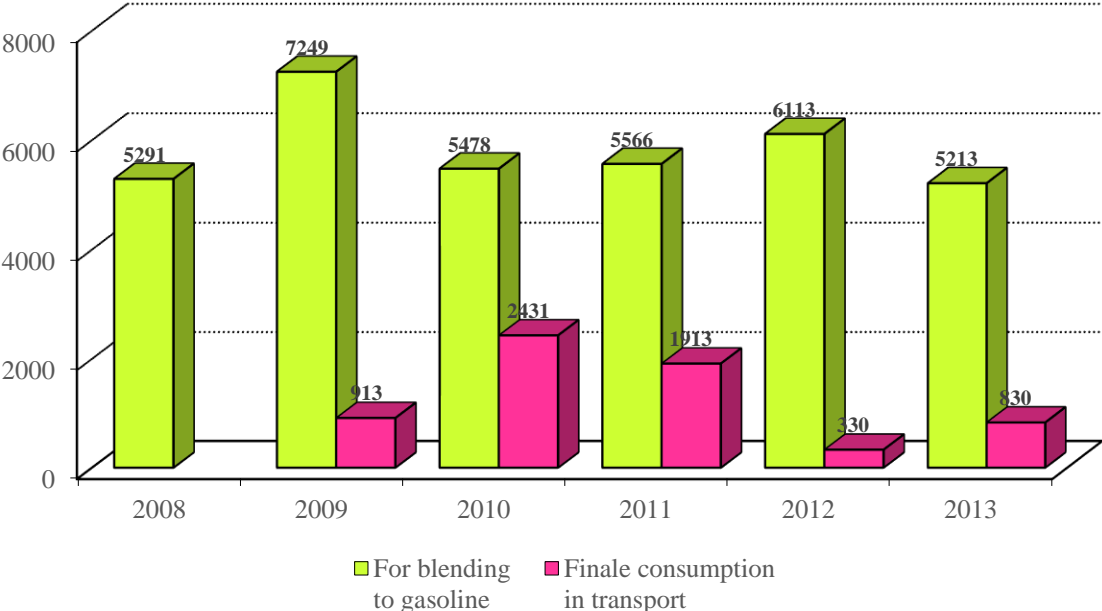
In the years 2008 - 2013 inland consumption of biofuels every year showed trends, as illustrated in Figure 13.

**Fig. 13. Overall inland consumption of liquid biofuels in the years 2008 - 2013**



The structure of consumption of biofuels in the years 2008 – 2013 show: Figure 14 for bioethanol and Figure 15 for biodiesel.

**Fig. 14. Consumption of bioethanol in the years 2008 - 2013**



**Fig. 15. Consumption of biodiesel in the years 2008 - 2013**

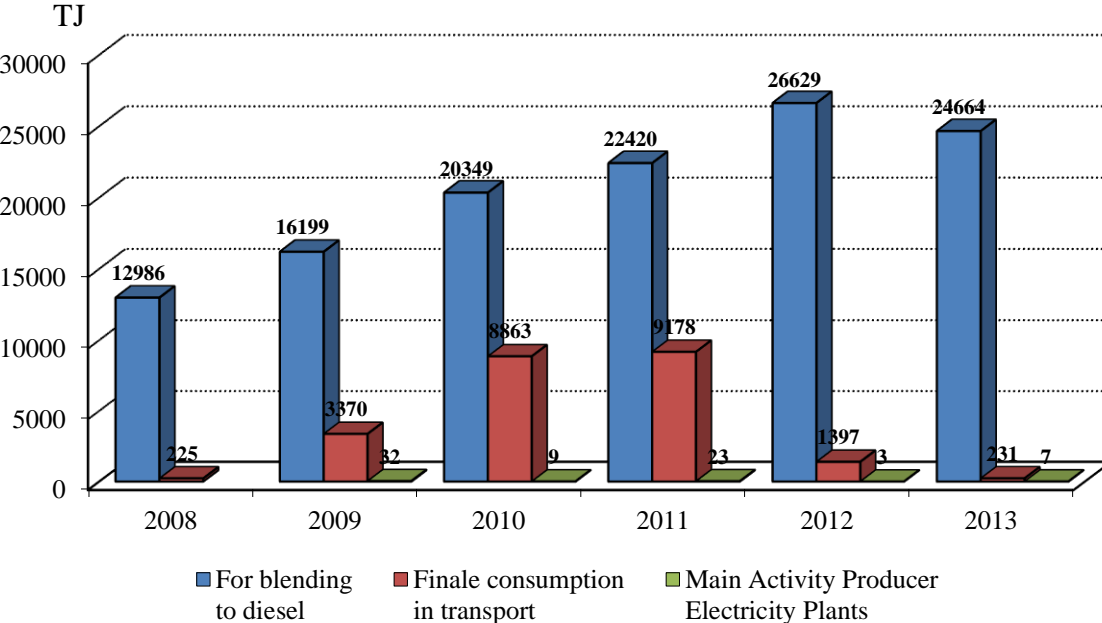


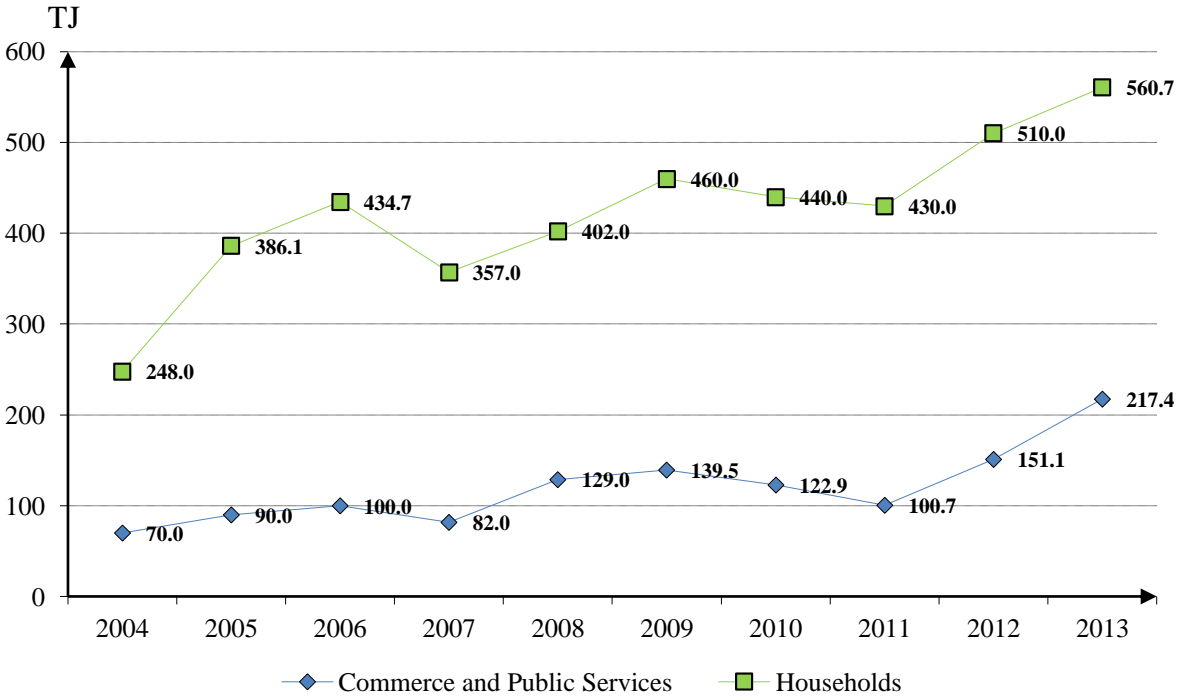
Table 19 presents the available data of the quantity of geothermal heat which was obtained in the years 2004 - 2013.

**Table 19. The balance of geothermal energy in the years 2004 – 2013**

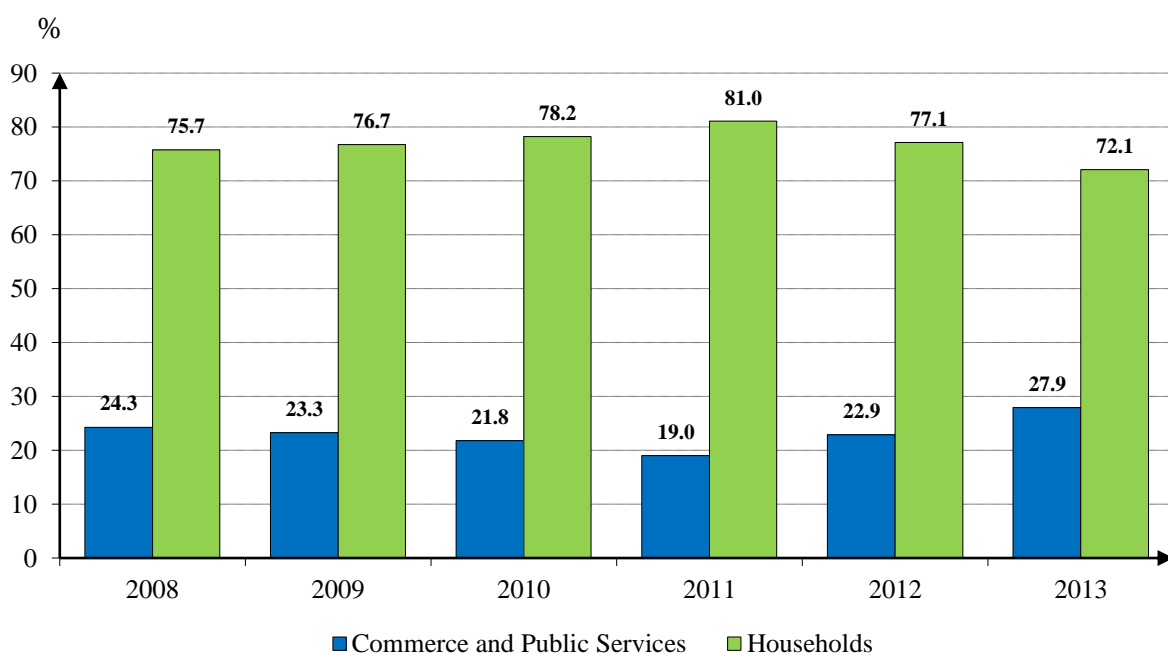
Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	TJ									
Indigenous Production.....	318.0	476.1	534.7	439.0	531.0	599.5	562.9	530.7	661.1	778.2
Final Energy Consumption . of which:	318.0	476.1	534.7	439.0	531.0	599.5	562.9	530.7	661.1	778.2
Commerce and Public Services.	70.0	90.0	100.0	82.0	129.0	139.5	122.9	100.7	151.1	217.4
Households.....	248.0	386.1	434.7	357.0	402.0	460.0	440.0	430.0	510.0	560.7

Geothermal energy was mainly used to meet the heat demand in households. Consumption of geothermal energy and its structure are illustrated on figures 16 and 17

**Fig. 16. Consumption of geothermal energy in the years 2002 – 2011**



**Fig. 17. Structure of the consumption of geothermal energy in the years 2008 – 2013**



Balance-sheets of biodegradable municipal waste for years 2004 – 2013 are presented in table 20.

**Table 20. The balance of renewable municipal waste in the years 2004 – 2013**

Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	<b>TJ</b>									
<b>Indigenous Production</b> .....	13	30	27	35	9	29	123	1338	1360	1490
<b>Stock Changes (+/-)</b> .....	0	-	3	-	-	-	-	-	-	-
<b>Inland Consumption</b> .....	13	30	30	35	9	29	123	1338	1360	1490
<b>Energy Sector</b> .....	-	-	-	-	-	-	-	-	-	99
(Own Use in Electricity, CHP and Heat Plants)										
<b>Final Energy Consumption:</b> .....	13	30	30	35	9	29	123	1338	1360	1391
<b>Industry Sector</b> .....	-	-	2	6	1	29	123	1338	1360	1391
of which:										
Non-Metallic Minerals .....	-	-	-	1	-	29	123	1338	1360	1391
Wood and Wood Products.....	-	-	2	5	1	-	-	-	-	-
<b>Other Sectors</b> .....	13	30	28	29	8	-	-	-	-	-
of which:										
Commerce and Public Services .....	13	30	28	29	8	-	-	-	-	-
Agriculture / Forestry.....	-	-	-	-	-	-	-	-	-	-

Up to the year 2010 the data presented above indicate small share of municipal waste in national balances of renewable energy. The largest increase of biodegradable municipal waste energy appeared in 2011, for almost 10-fold (988%), as compared to 2010. In subsequent years, the increase was much smaller and amounted to 1.6% in 2012 and 9.6% in 2013.

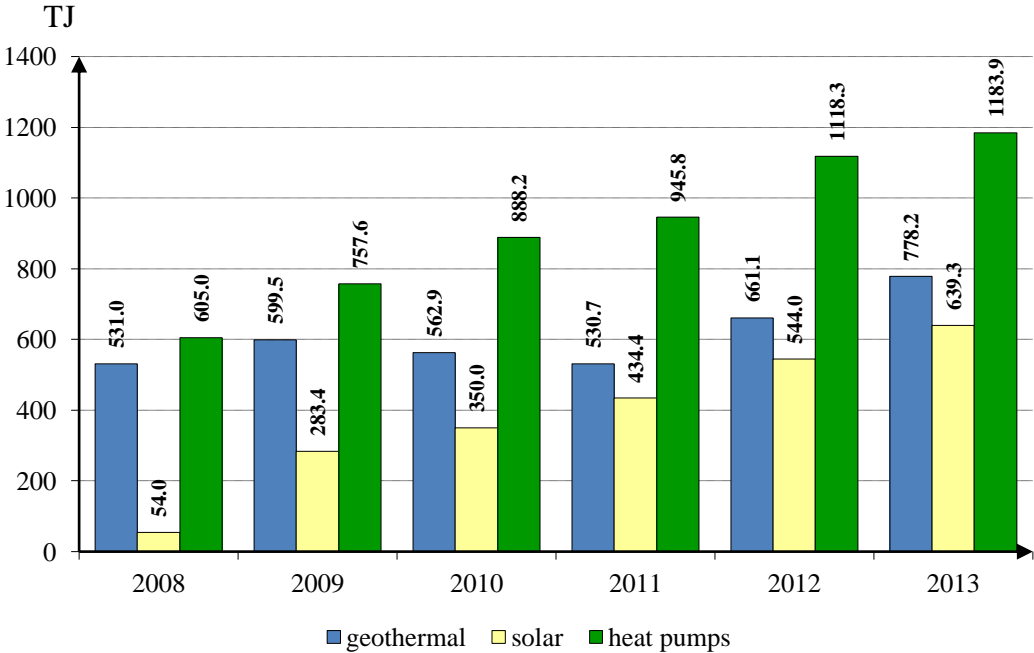
Data on the amount of renewable energy produced by the heat pumps in the years 2008 - 2013 are presented in Table 21. In all subsequent years, compared with the year before, there was an increase in the amount of produced energy (for example in 2013 by 5.9%).

**Table 21. Energy balance of ambient abstracted by the heat pumps in 2004-2013**

Specification	2008	2009	2010	2011	2012	2013
	TJ					
Indigenous Production.....	605.0	757.6	888.2	945.8	1118.3	1183.9
Final Energy Consumption .....	605.0	757.6	888.2	945.8	1118.3	1183.9
of which:						
Commerce and Public Services....	605.0	757.6	888.2	945.8	1118.3	1183.9

Data concerning heat produced by solar collectors, geothermal and heat pumps, which are given in Tables 11, 19 and 21, are presented by graphs shown in Figure 18.

**Fig. 18. Heat production from geothermal, solar collectors and heat pumps in the years 2008-2013**



## 5. Production of electricity and heat from renewables

The amount of electricity generated from renewables in the years 2004 – 2013 was given in table 22.

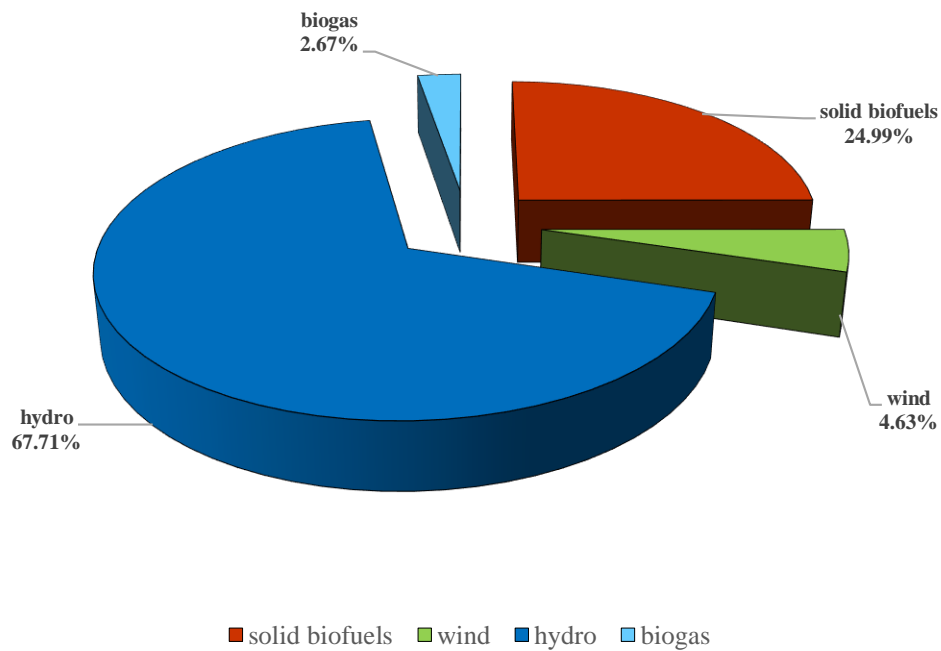
**Table 22. Generation of electricity from renewables in the years 2004 – 2013**

Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	GWh									
<b>Total</b> .....	<b>3074.4</b>	<b>3847.7</b>	<b>4291.2</b>	<b>5429.3</b>	<b>6606.0</b>	<b>8678.7</b>	<b>10888.8</b>	<b>13137.0</b>	<b>16878.9</b>	<b>17066.5</b>
<b>Hydro</b> .....	<b>2081.7</b>	<b>2201.1</b>	<b>2042.3</b>	<b>2352.1</b>	<b>2152.2</b>	<b>2375.1</b>	<b>2919.9</b>	<b>2331.4</b>	<b>2036.9</b>	<b>2439.1</b>
<b>of which:</b>										
Hydro-1 MW .....	273.5	358.2	247.9	306.3	290.2	292.2	516.0	307.0	320.7	351.9
Hydro 1-10 MW .....	616.9	504.2	566.6	658.1	605.4	627.9	667.2	636.1	619.5	645.3
Hydro 10+ MW .....	1191.4	1338.7	1227.8	1387.7	1256.6	1455.0	1736.7	1388.3	1096.7	1442.0
<b>Wind</b> .....	<b>142.3</b>	<b>135.5</b>	<b>256.1</b>	<b>521.6</b>	<b>836.8</b>	<b>1077.3</b>	<b>1664.3</b>	<b>3204.5</b>	<b>4746.6</b>	<b>6003.8</b>
<b>Solid biofuels</b> .....	<b>768.2</b>	<b>1399.9</b>	<b>1832.7</b>	<b>2360.4</b>	<b>3365.4</b>	<b>4904.1</b>	<b>5905.2</b>	<b>7148.4</b>	<b>9528.7</b>	<b>7923.5</b>
<i>in which co-combustion</i> .....	620.5	1236.3	1644.6	2125.6	2963.3	4660.8	5592.5	6388.8	7238.6	3928.5
<b>Municipal waste</b> .....	-	-	-	-	-	-	-	-	-	<b>8.3</b>
<b>Biogas</b> .....	<b>82.2</b>	<b>111.3</b>	<b>160.1</b>	<b>195.2</b>	<b>251.6</b>	<b>319.2</b>	<b>398.4</b>	<b>451.1</b>	<b>565.4</b>	<b>689.7</b>
<b>of which:</b>										
Landfill gas .....	63.3	75.3	92.0	113.6	148.4	174.8	219.9	233.7	236.5	240.7
Sludge gas .....	18.1	35.4	66.7	79.5	94.9	122.7	132.4	149.8	193.7	233.5
Other biogas .....	0.8	0.6	1.5	2.1	8.3	21.7	46.1	67.7	135.1	215.5
<b>Bioliquids</b> .....	-	-	-	-	-	<b>3.0</b>	<b>0.9</b>	<b>1.4</b>	<b>0.2</b>	<b>0.6</b>
<b>Photovoltaics</b> .....	-	-	-	-	-	-	-	<b>0.2</b>	<b>1.1</b>	<b>1.5</b>

In the years 2004 - 2013 the production of electricity from renewable energy sources was growing systematically.

Figure 19 and Figure 20 illustrate the changes that occurred in the share of different renewable energy sources in electricity production in the years 2004 and 2013.

**Fig. 19. Share of renewable energy sources in electricity production in 2004**



**Fig. 20. Share of renewable energy sources in electricity production in 2013**

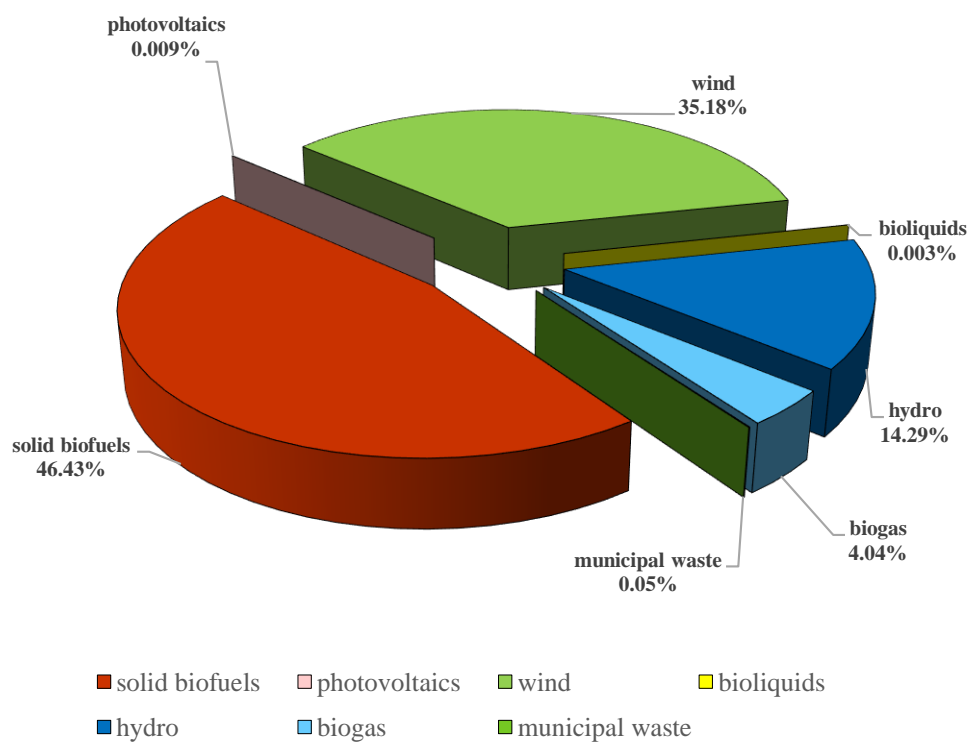
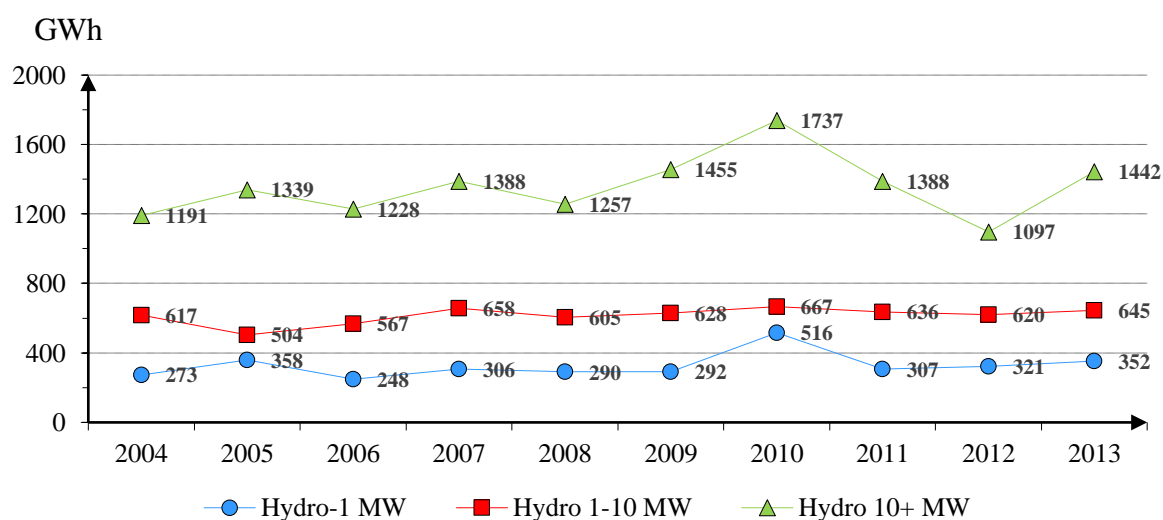


Figure 21 shows the amount of electricity produced by hydroelectric power stations in the three intervals of capacity (< 1MW; 1 – 10 MW, > 10 MW).



**Fig. 21. Generation of electricity in hydro power stations in the years 2004 – 2013**



Data on the generation of electricity from renewables by main activity producers and autoproducers in the years 2008 – 2013 are shown in Tables 23 – 25.

**Table 23. Generation of electricity from renewables by main activity producers and autoproducers in the years 2008 – 2013**

Specification	2008	2009	2010	2011	2012	2013	2008	2009	2010	2011	2012	2013
	GWh											
	Main Activity Producer Plants						Autoproducer Plants					
<b>Total</b> .....	<b>5678.5</b>	<b>7604.0</b>	<b>9582.4</b>	<b>11484.7</b>	<b>15106.9</b>	<b>15123.2</b>	<b>927.5</b>	<b>1074.7</b>	<b>1306.4</b>	<b>1652.4</b>	<b>1772.0</b>	<b>1943.4</b>
<b>Hydro</b> .....	<b>2149.9</b>	<b>2372.9</b>	<b>2917.9</b>	<b>2329.2</b>	<b>2035.1</b>	<b>2435.8</b>	<b>2.3</b>	<b>2.2</b>	<b>2.0</b>	<b>2.2</b>	<b>1.8</b>	<b>3.3</b>
<b>of which:</b>												
Hydro-1 MW .....	287.9	290.0	514.0	304.7	318.9	348.6	2.3	2.2	2.0	2.2	1.8	3.3
Hydro 1-10 MW .....	605.4	627.9	667.2	636.1	619.5	645.3	-	-	-	-	-	-
Hydro 10+ MW .....	1256.6	1455.0	1736.7	1388.3	1096.7	1442.0	-	-	-	-	-	-
<b>Wind</b> .....	<b>836.8</b>	<b>1077.3</b>	<b>1664.3</b>	<b>3204.5</b>	<b>4746.6</b>	<b>6003.8</b>	-	-	-	-	-	-
<b>Solid biofuels</b> .....	<b>2691.8</b>	<b>4150.8</b>	<b>4999.2</b>	<b>5949.5</b>	<b>8325.0</b>	<b>6674.7</b>	<b>673.6</b>	<b>753.3</b>	<b>906.0</b>	<b>1198.8</b>	<b>1203.7</b>	<b>1248.9</b>
<i>in which co-combustion...</i>	<i>2525.1</i>	<i>4142.4</i>	<i>4988.1</i>	<i>5888.9</i>	<i>6742.8</i>	<i>3443.6</i>	<i>438.2</i>	<i>518.4</i>	<i>604.5</i>	<i>499.8</i>	<i>495.7</i>	<i>485.0</i>
<b>Municipal waste</b> .....	-	-	-	-	-	<b>8.3</b>	-	-	-	-	-	-
<b>Biogas</b> .....	-	-	-	-	-	-	<b>251.6</b>	<b>319.2</b>	<b>398.4</b>	<b>451.1</b>	<b>565.4</b>	<b>689.7</b>
<b>of which:</b>												
Landfill gas .....	-	-	-	-	-	-	148.4	174.8	219.9	233.7	236.5	240.7
Sludge gas .....	-	-	-	-	-	-	94.9	122.7	132.4	149.8	193.7	233.5
Other biogas .....	-	-	-	-	-	-	8.3	21.7	46.1	67.7	135.1	215.5
<b>Bioliquids</b> .....	-	<b>3.0</b>	<b>0.9</b>	<b>1.4</b>	<b>0.2</b>	<b>0.6</b>	-	-	-	-	-	-
<b>Photovoltaics</b> .....	-	-	-	-	-	-	-	-	-	<b>0.2</b>	<b>1.1</b>	<b>1.5</b>

**Table 24. Generation of electricity from renewables by main activity producer plants in the years 2008 – 2013**

Specification	2008	2009	2010	2011	2012	2013	2008	2009	2010	2011	2012	2013
	GWh											
	Electricity (only)						CHP					
<b>Total</b> .....	<b>2986.7</b>	<b>3450.2</b>	<b>4582.3</b>	<b>5533.7</b>	<b>6781.7</b>	<b>8439.6</b>	<b>2691.8</b>	<b>4153.8</b>	<b>5000.1</b>	<b>5950.9</b>	<b>8325.3</b>	<b>6683.5</b>
<b>Hydro</b> .....	<b>2149.9</b>	<b>2372.9</b>	<b>2917.9</b>	<b>2329.2</b>	<b>2035.1</b>	<b>2435.8</b>	-	-	-	-	-	-
<b>of which:</b>												
Hydro-1 MW .....	287.9	290.0	514.0	304.7	318.9	348.6	-	-	-	-	-	-
Hydro 1-10 MW .....	605.4	627.9	667.2	636.1	619.5	645.3	-	-	-	-	-	-
Hydro 10+ MW .....	1256.6	1455.0	1736.7	1388.3	1096.7	1442.0	-	-	-	-	-	-
<b>Wind</b> .....	<b>836.8</b>	<b>1077.3</b>	<b>1664.3</b>	<b>3204.5</b>	<b>4746.6</b>	<b>6003.8</b>	-	-	-	-	-	-
<b>Solid biofuels</b> .....	-	-	-	-	-	-	<b>2691.8</b>	<b>4150.8</b>	<b>4999.2</b>	<b>5949.5</b>	<b>8325.0</b>	<b>6674.7</b>
<i>in which co-combustion.....</i>	-	-	-	-	-	-	2525.1	4142.4	4988.1	5888.9	6742.8	3443.6
<b>Municipal waste</b> .....	-	-	-	-	-	-	-	-	-	-	-	<b>8.3</b>
<b>Biogas</b> .....	-	-	-	-	-	-	-	-	-	-	-	-
<b>of which:</b>												
Landfill gas .....	-	-	-	-	-	-	-	-	-	-	-	-
Sludge gas .....	-	-	-	-	-	-	-	-	-	-	-	-
Other biogas .....	-	-	-	-	-	-	-	-	-	-	-	-
<b>Bioliquids</b> .....	-	-	-	-	-	-	-	<b>3.0</b>	<b>0.9</b>	<b>1.4</b>	<b>0.2</b>	<b>0.6</b>

**Table 25. Generation of electricity from renewables by autoproducer plants in the years 2008 – 2013**

Specification	2008	2009	2010	2011	2012	2013	2008	2009	2010	2011	2012	2013
	GWh											
	Electricity (only)						CHP					
<b>Total</b> .....	<b>2.3</b>	<b>2.2</b>	<b>2.0</b>	<b>2.4</b>	<b>3.0</b>	<b>4.8</b>	<b>925.2</b>	<b>1072.5</b>	<b>1304.4</b>	<b>1650.0</b>	<b>1769.0</b>	<b>1938.6</b>
<b>Hydro</b> .....	<b>2.3</b>	<b>2.2</b>	<b>2.0</b>	<b>2.2</b>	<b>1.8</b>	<b>3.3</b>	-	-	-	-	-	-
<b>of which:</b>												
Hydro-1 MW .....	2.3	2.2	2.0	2.2	1.8	3.3	-	-	-	-	-	-
Hydro 1-10 MW .....	-	-	-	-	-	-	-	-	-	-	-	-
Hydro 10+ MW .....	-	-	-	-	-	-	-	-	-	-	-	-
<b>Wind</b> .....	-	-	-	-	-	-	-	-	-	-	-	-
<b>Solid biofuels</b> .....	-	-	-	-	-	-	<b>673.6</b>	<b>753.3</b>	<b>906.0</b>	<b>1198.8</b>	<b>1203.7</b>	<b>1248.9</b>
<i>in which co-combustion.....</i>	-	-	-	-	-	-	438.2	518.4	604.5	499.8	495.7	485.0
<b>Biogas</b> .....	-	-	-	-	-	-	<b>251.6</b>	<b>319.2</b>	<b>398.4</b>	<b>451.1</b>	<b>565.4</b>	<b>689.7</b>
<b>of which:</b>												
Landfill gas .....	-	-	-	-	-	-	148.4	174.8	219.9	233.7	236.5	240.7
Sludge gas .....	-	-	-	-	-	-	94.9	122.7	132.4	149.8	193.7	233.5
Other biogas .....	-	-	-	-	-	-	8.3	21.7	46.1	67.7	135.1	215.5
<b>Photovoltaics</b> .....	-	-	-	<b>0.2</b>	<b>1.1</b>	<b>1.5</b>	-	-	-	-	-	-

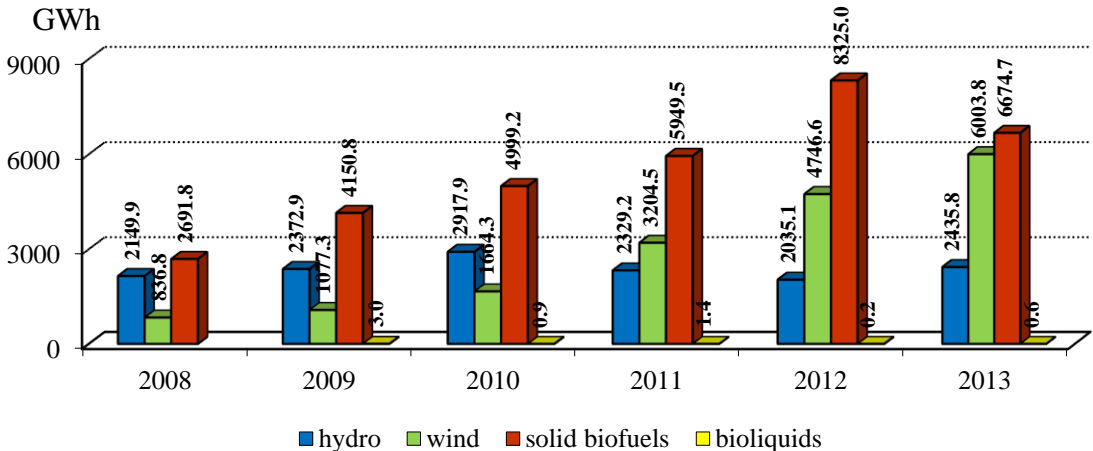
Electricity generated from renewables accounted for 4.3% in 2008, 5.8% in 2009, 7.0% in 2010, 8.3% in 2011, 10.6% in 2012 and 10.7% in 2013 of the national gross electricity consumption (the share of electricity generated from renewable energy in national gross electricity consumption is defined as the ratio of energy generated from renewable energy sources to gross electricity consumption i.e. including losses and balance sheet differences).

In the years 2008 - 2013 the share of electricity generated from hydropower in total electricity production from renewables gradually diminishes, and amounted 14.29% in 2013. At that same time the share of electricity produced from solid biofuels has been increasing, in the total production of electricity from RES, reaching a value of 46.43% in 2013.

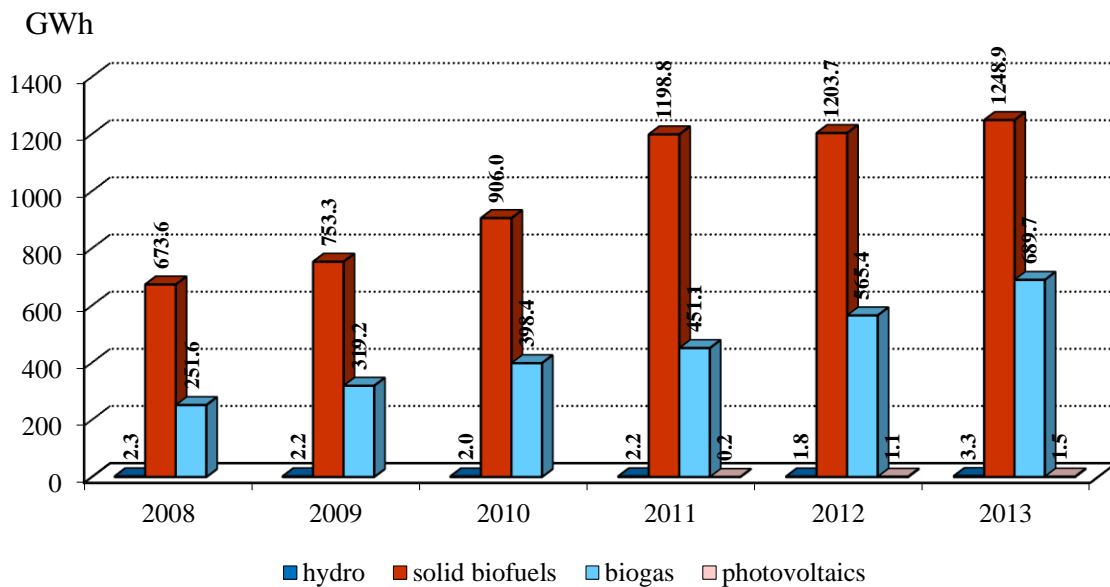
Further energy sources used for electricity generation (in terms of share in total electricity production from RES) in 2013 were: wind - 35.18%, hydro - 14.29% and biogas - 4.04%. Municipal waste, solar radiation and bioliquids accounted for its small proportion in 2013 i.e. respectively 0.049, 0.009% and 0.003%.

In figures 22 and 23 are shown the value of electricity production in the years 2008 to 2013 according to the RES energy commodities, separately for the main activity producers and autoproducers. By contrast, figure 24 illustrates generation of electricity from renewables by main activity producers and autoproducers, in the same period of time, by electricity power stations and CHP stations.

**Fig. 22. Generation of electricity from renewables by main active producer plants in the years 2008 – 2013**



**Fig. 23. Generation of electricity from renewables by autoproducer plants in the years 2008 – 2013**



**Fig. 24. Generation of electricity from renewables by main activity producers and autoproducers in the years 2008 – 2013**

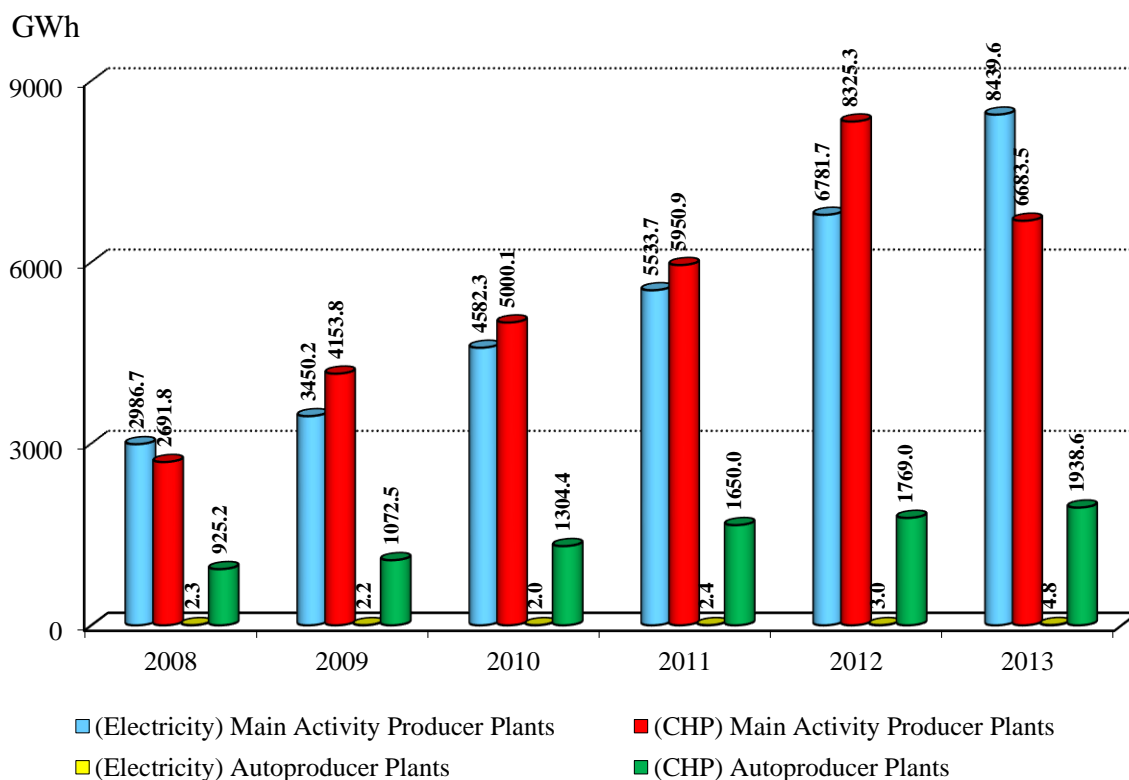


Table 26 contains data on domestic production of heat by combustion of renewable energy carriers in the years 2004 - 2014.

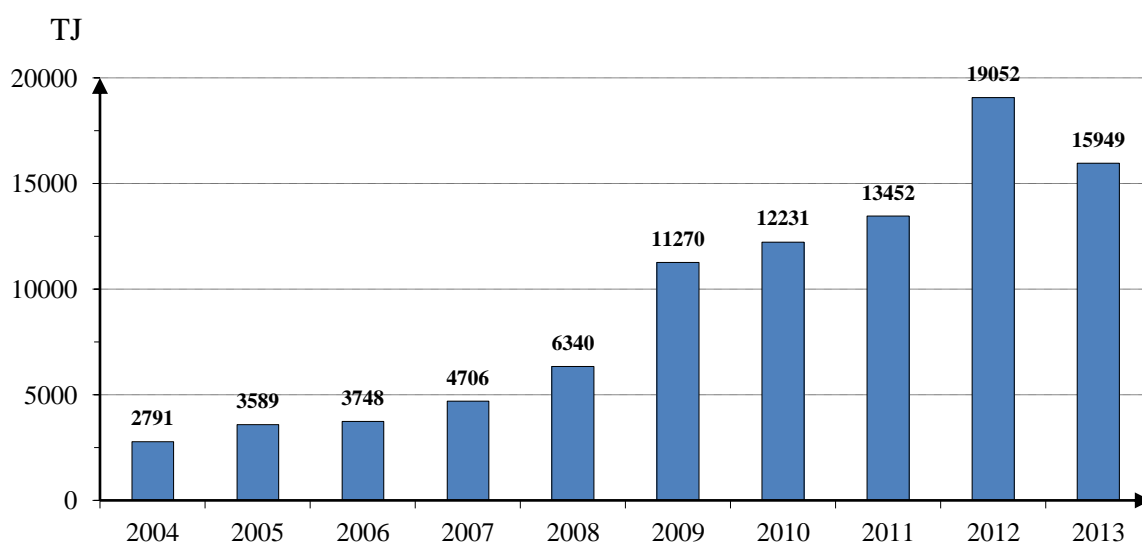
**Table 26. Production of heat from renewables in the years 2004 - 2013**

Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	TJ									
<b>Total .....</b>	<b>2791</b>	<b>3589</b>	<b>3748</b>	<b>4706</b>	<b>6340</b>	<b>11270</b>	<b>12231</b>	<b>13452</b>	<b>19052</b>	<b>15949</b>
<b>Solid biofuels .....</b>	<b>2242</b>	<b>2768</b>	<b>3049</b>	<b>4008</b>	<b>5414</b>	<b>10448</b>	<b>11479</b>	<b>13320</b>	<b>18840</b>	<b>15572</b>
<b>Biogas .....</b>	<b>549</b>	<b>821</b>	<b>699</b>	<b>698</b>	<b>926</b>	<b>817</b>	<b>751</b>	<b>131</b>	<b>212</b>	<b>377</b>
<b>of which:</b>										
Landfill gas .....	136	91	109	30	148	112	113	62	69	74
Sludge gas .....	411	727	583	658	734	624	617	23	40	128
Other biogas.....	2	3	7	10	44	80	21	46	103	174
<b>Bioliquids .....</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>5</b>	<b>1</b>	<b>1</b>	<b>0,1</b>	<b>0,4</b>

The data in the table show a systematic increase in heat production from renewable energy sources in the years 2004 - 2012. This increase in 2012 was the largest and amounted 41.6%, compared to the previous year. In 2013, the total heat production decreased by 16.3%, compared to 2012.

These data are illustrated in figure 25.

**Fig. 25. Production of heat from renewables in the years 2004 - 2013**



In tables of 27 – 29 are presented the amount of heat production by main activity producers and autoproducers in the years 2008 – 2013, i.e. by CHP and heat plants where basic is combustion process.

Fig. 26 and Fig. 27 illustrated the share of main activity producer and autoproducer plants in heat production from renewables in the years 2008 – 2013 and the share of CHP and heating plants in heat production from renewables in 2013.

**Table 27. Production of heat from renewables by main activity producers and autoproducers in the years 2008 – 2013**

Specification	2008	2009	2010	2011	2012	2013	2008	2009	2010	2011	2012	2013
	TJ											
	Main Activity Producer Plants						Autoproducer Plants					
<b>Total</b> .....	<b>4295</b>	<b>8974</b>	<b>9697</b>	<b>12151</b>	<b>17808</b>	<b>13784</b>	<b>2045</b>	<b>2295</b>	<b>2534</b>	<b>1301</b>	<b>1244</b>	<b>2165</b>
<b>Solid biofuels</b> .....	<b>4280</b>	<b>8957</b>	<b>9691</b>	<b>12145</b>	<b>17803</b>	<b>13778</b>	<b>1134</b>	<b>1491</b>	<b>1788</b>	<b>1175</b>	<b>1037</b>	<b>1794</b>
<b>Biogas</b> .....	<b>15</b>	<b>13</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>6</b>	<b>911</b>	<b>804</b>	<b>746</b>	<b>126</b>	<b>207</b>	<b>371</b>
<b>of which:</b>												
Landfill gas .....	-	-	-	-	-	-	148	112	113	62	69	74
Sludge gas .....	15	13	5	5	5	6	719	612	612	18	35	122
Other biogas .....	-	-	-	-	-	-	44	80	21	46	103	174
<b>Bioliquids</b> .....	-	<b>5</b>	<b>1</b>	<b>1</b>	<b>0,1</b>	<b>0,4</b>	-	-	-	-	-	-

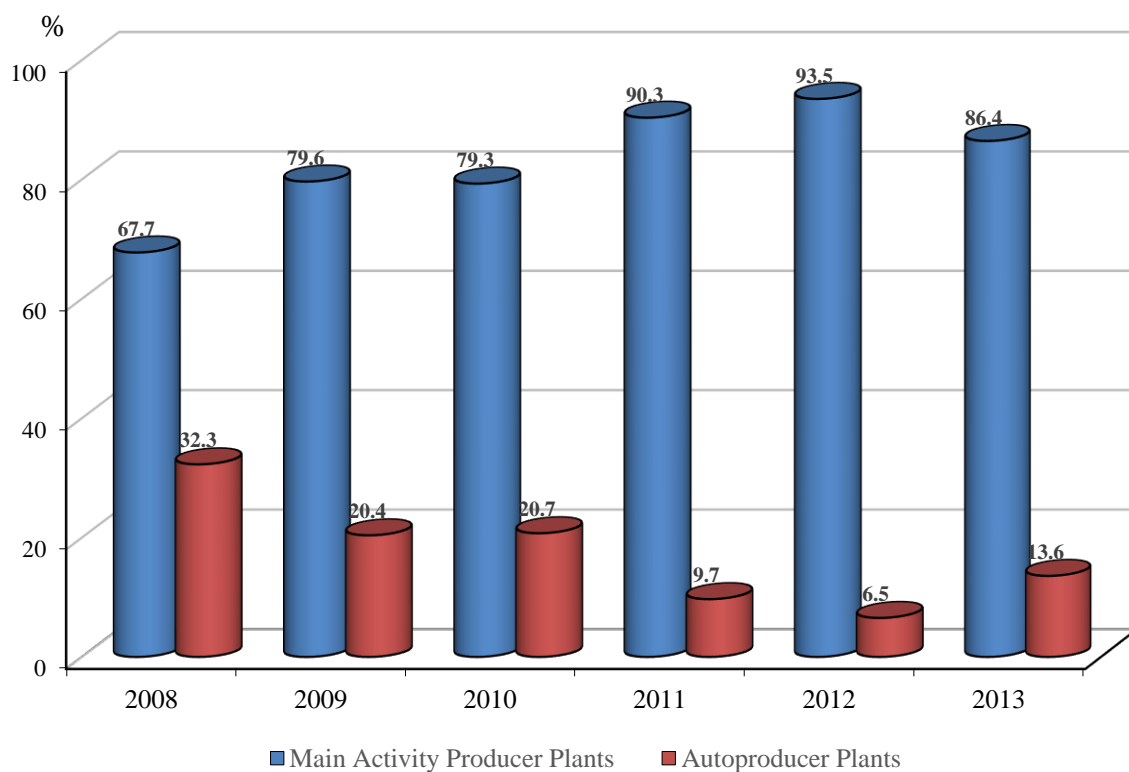
**Table 28. Production of heat from renewables by main activity producers in the years 2008 – 2013**

Specification	2008	2009	2010	2011	2012	2013	2008	2009	2010	2011	2012	2013
	TJ											
	CHP						Heat (only)					
<b>Total</b> .....	<b>2746</b>	<b>7708</b>	<b>8513</b>	<b>10998</b>	<b>16635</b>	<b>12515</b>	<b>1549</b>	<b>1266</b>	<b>1184</b>	<b>1153</b>	<b>1173</b>	<b>1269</b>
<b>Solid biofuels</b> .....	<b>2746</b>	<b>7703</b>	<b>8512</b>	<b>10997</b>	<b>16635</b>	<b>12515</b>	<b>1534</b>	<b>1254</b>	<b>1179</b>	<b>1148</b>	<b>1168</b>	<b>1263</b>
<b>Biogas</b> .....	-	-	-	-	-	-	<b>15</b>	<b>13</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>6</b>
<b>of which:</b>												
Landfill gas .....	-	-	-	-	-	-	-	-	-	-	-	-
Sludge gas .....	-	-	-	-	-	-	15	13	5	5	5	6
Other biogas .....	-	-	-	-	-	-	-	-	-	-	-	-
<b>Bioliquids</b> .....	-	<b>5</b>	<b>1</b>	<b>1</b>	<b>0,1</b>	<b>0,4</b>	-	-	-	-	-	-

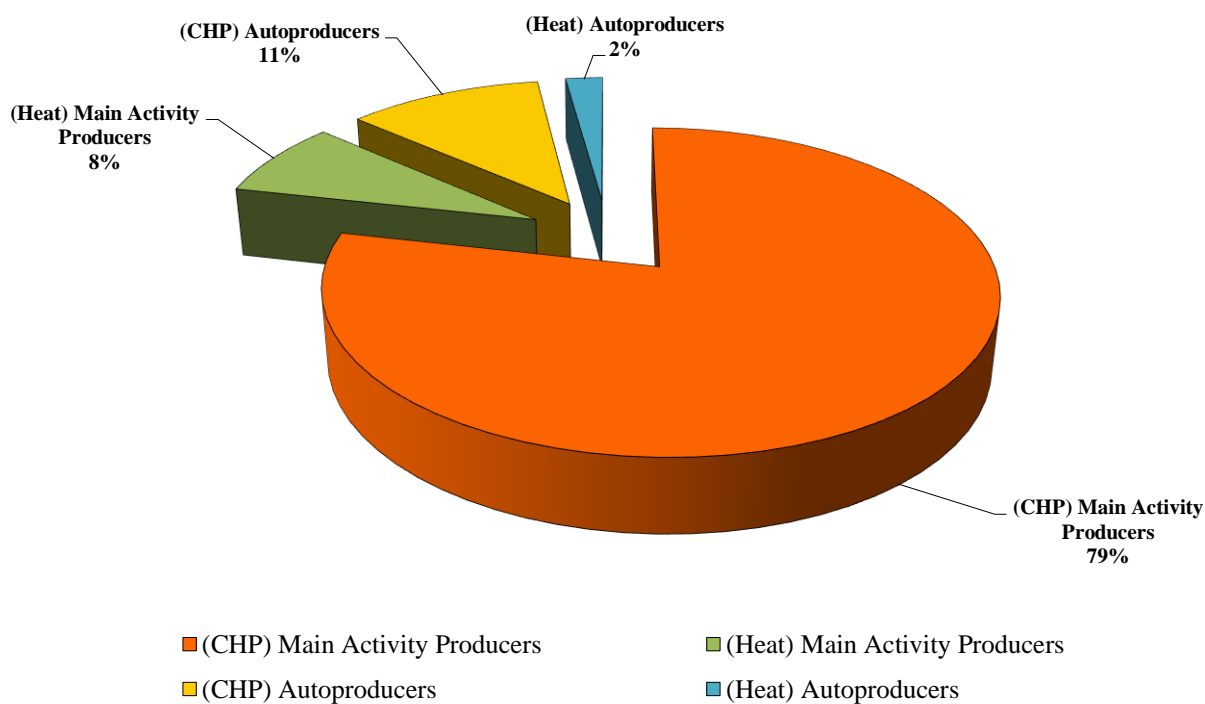
**Table 29. Production of heat from renewables by autoproducers in the years 2008 – 2013**

Specification	2008	2009	2010	2011	2012	2013	2008	2009	2010	2011	2012	2013
	TJ											
	CHP						Heat (only)					
<b>Total</b> .....	<b>1852</b>	<b>1925</b>	<b>2115</b>	<b>1025</b>	<b>1059</b>	<b>1819</b>	<b>193</b>	<b>370</b>	<b>419</b>	<b>276</b>	<b>185</b>	<b>346</b>
<b>Solid biofuels</b> .....	<b>943</b>	<b>1131</b>	<b>1377</b>	<b>906</b>	<b>858</b>	<b>1454</b>	<b>191</b>	<b>360</b>	<b>411</b>	<b>269</b>	<b>179</b>	<b>340</b>
<b>Biogas</b> .....	<b>909</b>	<b>794</b>	<b>738</b>	<b>119</b>	<b>201</b>	<b>365</b>	<b>2</b>	<b>10</b>	<b>8</b>	<b>7</b>	<b>6</b>	<b>6</b>
<b>of which:</b>												
Landfill gas .....	148	112	113	62	69	74	-	-	-	-	-	-
Sludge gas .....	717	602	604	11	29	116	2	10	8	7	6	6
Other biogas .....	44	80	21	46	103	174	-	-	-	-	-	-

**Fig. 26. The share of main activity producer and autoproducer plants in heat production from renewables in the years 2008 – 2013**



**Fig. 27. Share of CHP and heating plants in heat production from renewables in 2013**



## 6. Achievable capacity of power plants using renewable sources for electricity generation in the years 2004 – 2013

Generating capacities of power stations using renewable energy sources in 2004 – 2013 are presented in table 30 and figure 28.

**Table 30. Capacities of power stations using renewable energy sources in the years 2004 – 2013**

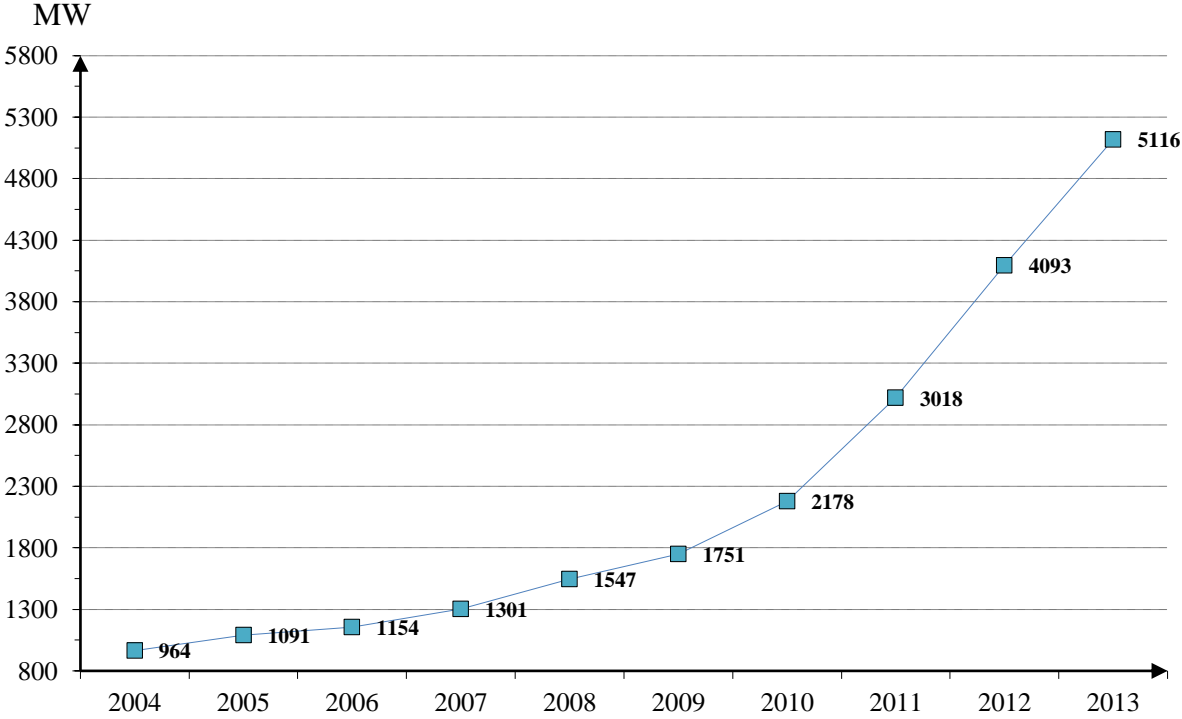
Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	<b>MW</b>									
<b>Total</b> .....	<b>964</b>	<b>1091</b>	<b>1154</b>	<b>1301</b>	<b>1547</b>	<b>1751</b>	<b>2178</b>	<b>3018</b>	<b>4093</b>	<b>5116</b>
<b>Hydro</b> .....	<b>876</b>	<b>915</b>	<b>925</b>	<b>922</b>	<b>929</b>	<b>932</b>	<b>936</b>	<b>940</b>	<b>945</b>	<b>949</b>
<b>of which:</b>										
Hydro-1 MW.....	77	72	72	72	74	76	78	82	88	88
Hydro 1-10 MW.....	184	174	181	178	183	184	185	186	185	189
Hydro 10+ MW.....	615	669	672	672	672	672	673	672	672	672
<b>Wind</b> .....	<b>40</b>	<b>121</b>	<b>172</b>	<b>306</b>	<b>526</b>	<b>709</b>	<b>1108</b>	<b>1800</b>	<b>2564</b>	<b>3429</b>
<b>Solid biofuels</b> .....	<b>24</b>	<b>25</b>	<b>25</b>	<b>33</b>	<b>40</b>	<b>42</b>	<b>53</b>	<b>175</b>	<b>455</b>	<b>582</b>
<b>Biogas</b> .....	<b>24</b>	<b>30</b>	<b>32</b>	<b>40</b>	<b>52</b>	<b>68</b>	<b>81</b>	<b>102</b>	<b>128</b>	<b>154</b>
<b>of which:</b>										
Landfill gas.....	18	23	25	29	31	39	44	51	57	56
Sludge gas.....	6	7	6	10	19	24	31	35	42	51
Other biogas.....	-	-	1	1	2	5	6	16	29	47
<b>Photovoltaics</b> .....	-	-	-	-	-	-	-	<b>1</b>	<b>1</b>	<b>2</b>

In the analysed period there was a constant increase recorded in the total power of electricity-generating devices using RES. Moreover, for the first time in 2011 it was noted photovoltaics participation in the production of electricity of which generating capacity increased from 1 MW to 2 MW in the years 2011 – 2013.



The highest annual increases of generating capacity took place for wind energy in particularly in the years 2007 - 2013. Recently, there are also growth of capacity of the biogas plants, every year from a few to several percent compared to the previous year. In 2013 this increase amounted 20.3%.

**Fig. 28. Capacities of power stations using renewable energy sources in the years 2004 – 2013**



## 7. The share of energy from renewables in gross final energy consumption in Poland in the years of 2011 - 2013

In accordance with the Directive 2009/28/EC each Member State shall ensure that the share of energy from renewable sources, in gross final consumption of energy in 2020 is at least its national overall target for the share of energy from renewable sources in that year, as set out and specified in the Directive and shown in Fig. 1 of our development. This goal has been set for Poland at 15%.

Moreover, each Member State shall ensure that the share of energy from renewable sources in all forms of transport in 2020 is at least 10% of the final consumption of energy in transport in that Member State.

Such mandatory national overall targets are consistent with a target of at least a 20 % share of energy from renewable sources in the Community's gross final consumption of energy in 2020.

The share of energy from renewable sources shall be calculated as the gross final consumption of energy from renewable sources divided by the gross final consumption of energy from all energy sources, expressed as a percentage.

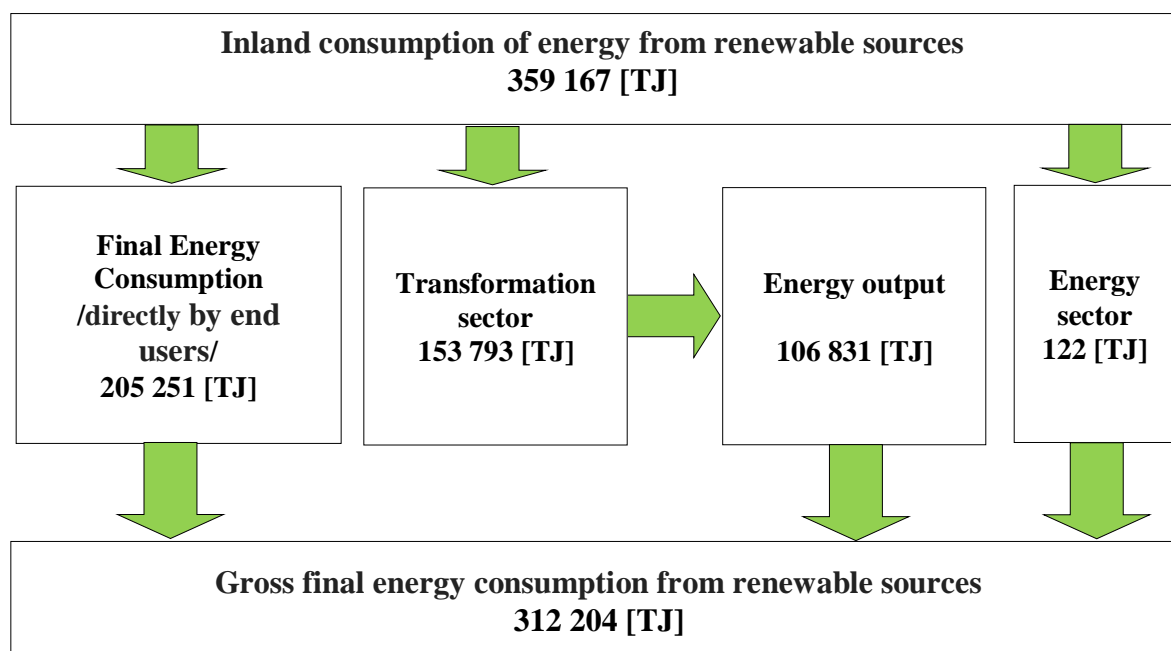
In the tables 31 and 32 are presented data on gross final energy consumption from renewable sources by sectors and the sectoral and total share of energy from renewable sources in gross final energy consumption in the years 2011 – 2013 (for Poland).

**Table 31. Gross final energy consumption from renewable sources in the years 2011 - 2013**

Specification	2011	2012	2013	2011	2012	2013
	[TJ]			[ktoe]		
Gross final consumption of RES for heating and cooling .....	206 099	212 164	219 288	4 923	5 067	5 238
Gross final consumption of electricity from RES .....	44 121	58 810	59 151	1 054	1 405	1 413
Gross final consumption of energy from RES in transport .....	41 357	36 722	33 766	988	877	806
Gross total RES consumption .....	291 577	307 696	312 204	6 964	7 349	7 457

In addition, it has been showed in the Fig. 29 a diagram of structure of gross final energy consumption from renewable sources in 2013.

**Fig. 29. Structure of gross final energy consumption from renewable sources (for 2013)<sup>5</sup>**



**Table 32. Sectoral and total share of energy from renewable sources in gross final energy consumption in the years 2011 - 2013**

Specification	2011	2012	2013
	%		
The share of renewable energy in heating and cooling sector .....	13.07	13.31	13.89
The share of RES in electricity.....	8.16	10.68	10.73
The share of renewable energy in transport .....	6.51	6.09	6.03
The share of energy from renewable sources in gross final energy consumption.....	10.28	10.89	11.25

Data presented in Tables 31 and 32 were based on statistical surveys of public statistics and calculated by using application of SHARES, which was made available by Eurostat to calculate the share of energy from renewable sources in gross final energy consumption.

<sup>5</sup> Numeric data come from the Tables: 9 and 31

## Units of measure to be applied in energy statistics

Units commonly used to express the amount of fuel and energy are the units that define: volume, mass and energy of carrier.

Units which are accepted in the international turnovers, cover the measurement of the quantities of fuel and energy, and are named as follow: the cubic meter (m<sup>3</sup>), ton (metric ton, 1 ton = 10<sup>3</sup> kg), joule (1 J = 1 N • m, 1 N (Newton) = 1 kg • m • s<sup>-2</sup>, s - seconds). These units are included in the International System of Units, designated by the abbreviation "SI" (Système International d'Unités). Apart from the applicable SI units there are also used other units, depending on the country and local traditions reflecting the historical conditions of each country.

### 1. Prefixes of decimal system and the major abbreviations

Below there are the prefixes and symbols, and more important abbreviations to express decimal multiples and sub-units of measurement commonly used in fuel economy and energy:

Prefixes of decimal system		Major abbreviations			
decy (d)	=10 <sup>-1</sup>	dag	dekagram	GW	gigawatt
deka (da)	=10	kg	kilogram	kWh	kilowatt-hour
hekto (h)	=10 <sup>2</sup>	t	ton (10 <sup>3</sup> kg)	MWh	megawatthour
kilo (k)	=10 <sup>3</sup>	tys. t	thousand tons	GWh	gigawatt-hour
mega (M)	=10 <sup>6</sup>	km	kilometer (thousand meters)	TWh	terawatt hour
giga (G)	=10 <sup>9</sup>	tys. km	one thousand km	kJ	10 <sup>3</sup> Joule
tera (T)	=10 <sup>12</sup>	m <sup>3</sup>	cubic meter	MJ	10 <sup>6</sup> Joule
peta (P)	=10 <sup>15</sup>	dam <sup>3</sup>	thousand cubic meters	GJ	10 <sup>9</sup> Joule
		%	percent	TJ	10 <sup>12</sup> Joule
		l	liter (10 <sup>-3</sup> m <sup>3</sup> )	PJ	10 <sup>15</sup> Joule
		kW	kilowatt	toe	tonne of oil equivalent
		MW	megawatt	Mtoe	million tonnes of oil equivalent

### 2. Selected units of mass

No.	Name	symbol	
1.	kilogram	kg	-
2.	ton (megagram)	t (Mg)	10 <sup>3</sup> kg
3.	long ton (tona ang.)	lt	1016 kg
4.	short ton (tona USA)	st	907.2 kg

### 3. Selected units of pressure

No.	Name	symbol	
1.	pascal	Pa	$1 \text{ Pa} = 1 \text{ N} \cdot \text{m}^{-2}$
2.	physical atmosphere	atm	101325 Pa
3.	tor (1 mm Hg)	Tr	133,3 Pa
4.	bar	bar	$10^5 \text{ Pa}$

### 4. Selected units of energy

No.	Name	symbol	
1.	joule	J	$1 \text{ J} = 1 \text{ N} \cdot \text{m}$
2.	calorie	cal	4.1868 J
3.	ton of conventional fuel	tpu	$29.3076 \cdot 10^9 \text{ J}$
4.	tonne of oil equivalent	toe	$41.868 \cdot 10^9 \text{ J}$
5.	kilowatt-hour	kWh	$3.6 \cdot 10^6 \text{ J}$
6.	British unit of heat	Btu	1055 J

Ton of equivalent fuel (tpu) is the equivalent of one ton of coal with a calorific value equivalent to seven thousand kilocalories per kilogram (7000 kcal / kg).

Tonne of oil equivalent (toe) is equivalent to one metric ton of crude oil with a calorific value equivalent to ten thousand kilocalories per kilogram (10000 kcal / kg).

British thermal unit (Brytyjska jednostka ciepła) is the energy needed to heat one pound of water by 10 degrees Fahrenheit.

### 5. Selected units of power

No.	Name	symbol	
1.	watt	W	$1 \text{ W} = 1 \text{ J} \cdot \text{s}^{-1}$
2.	megawatt	MW	$10^6 \text{ W}$

Degrees of Kelvin (K) and also degrees Celsius ( $^{\circ}\text{C}$ ) are used for measuring of differences of the temperature, wherein the unit of temperature rise is the same on the both of scales:

$$1^{\circ}\text{C} = 1 \text{ K}$$

and for the determination of temperature:

$$T = t_c + 273.15$$

where: T - thermodynamic temperature in K,  
 $t_c$  - temperature in degrees of Celsius.

**Names of types of activity groupings  
(classification of PKD<sup>6</sup> and NACE Rev.2<sup>7</sup>)**

<b>Lp.</b>		<b>PKD (NACE Rev 2)</b>
1.	Industry Sector of which:	total from: 2 - 12
2.	Iron and steel	24.1, 24.2, 24.3,24.51, 24.52
3.	Chemical (including Petrochemical)	20
4.	Non-Metallic Minerals	23
5.	Transport Equipment	29,30
6.	Machinery	25,28,26,27
7.	Mining and Quarrying	07,08
8.	Food, Beverages and Tobacco	10,11,12
9.	Paper Pulp and Printing	17,18
10.	Wood and Wood Products	16
11.	Textile and Leather	13,14,15
12.	Non-specified (industry)	22,32,31,38
13.	Construction	41,42,43
14.	Transport Sector	49-51
15.	Other Sectors of which:	
16.	Commerce and Public Services	36, 45, 46, 47, 55, 56, 52, 53, 61 ,64, 65, 66, 68, 77, 62, 63, 72, 58, 69, 70, 71, 73, 74, 78, 79, 80, 81, 82, 33, 95, 84, 85, 75, 86, 87, 88, 37, 38, 39, 94, 59, 60, 90, 91, 92, 93, 96, 97, 98, 99
17.	Agriculture / Forestry	01,02,03

<sup>6</sup> Polish Classification of Activities (PKD in force since 1 January 2008)

<sup>7</sup> Statistical Classification of Economic Activities in the European Union, NACE Revision 2 (Rev. 2), in force since 1 January 2008