

USE OF RENEWABLE ENERGY SOURCES IN SLOVAKIA

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The European Union is a group of 28 countries in Europe and Slovak Republic is also a full member. Slovak Republic is trying to keep up with the EU Member States, which already use renewable energy. It is well known, that the use of new technologies is very expensive. It is true, that the use of these energy sources requires an initial investment, but it can reduce the cost of running a household and ultimately the investment returns. The use of these renewable energy, policy of raw materials won't depend on the mining sector and also can reduce the negative impacts of mining on the environment. This article examines the use of renewable energy sources in Slovak Republic.

Key words: renewable energy, Slovakia, European Union, comparison.

Korištenje obnovljivih izvora energije u Slovačkej. Europska unija je skupina od 28 zemalja u Europi, a Slovačka je također punopravni član. Slovačka pokušava držati korak s državama članicama EU-a, koji se već koriste obnovljivim izvorima energije. Poznato je, da je uporaba novih tehnologija vrlo skupa. Istina je, da korištenje tih izvora energije zahtijeva početno ulaganje, ali može smanjiti troškove vođenja kućanstva i na kraju vraća uloženo. Upotrebom ovih obnovljivih izvora energije, politika sirovine neće ovisiti o sektoru rudarstva i također će se moći smanjiti negativni učinci kopanja na okoliš. Ovaj članak istražuje korištenje obnovljivih izvora energije u Slovačkej.

Ključne riječi: obnovljivi izvori energije, Slovačka, Europska unija, usporedba.

INTRODUCTION

Planet Earth represents large quantities of minerals, which are considered to be finite. These sources are sufficient for several centuries, but the current generation is looking for an alternative, that would provide the same and friendly base to produce various kinds of energy. This is why our generation uses definition of renewable energy. Energy from these sources is

practically inexhaustible. Renewable energy sources have much more advantages than mining and quarrying: less pollution of the environment, environmentally friendly and does not pollute mankind. They can be used in every corner of the world. Their occurrence is not as specific as the occurrence of certain raw materials.

RENEWABLE ENERGY SOURCES

Renewable energy means renewable non-fossil energy sources (wind, solar energy, geothermal energy, energy waves

and tidal, hydropower, biomass, landfill gas and biogas) [1]. Among the renewable energy, that can be currently used to produce

electricity, heat and transport fuels, are classified:

- Biomass including biofuels and biogas
- Solar energy
- Hydropower
- Wind energy
- Geothermal energy [2].

Using of renewable energy sources is a part of Slovak Republic's Raw Material Policy. The higher share of these sources on manufacture of various types of energy reduces negative impacts on the environment and humanity.

Slovak Republic has to increase the effort for potential use of these sources. Nowadays, the Government is working on creating legal conditions for using this energy potential by the greater part of humanity.

The use of domestic sources of renewable energy sources increases security and diversification of energy supply and reduces the dependence of the economy on unstable oil prices and natural gas. Their use is based on advanced and environmentally friendly technologies and significantly contributes to reducing greenhouse gases and other pollutants [2].

Raw Material Policy of Slovak Republic largely depends on the objectives set by the European Union:

- Reduce greenhouse gas emissions by 20%
- Increase energy efficiency by 20 %
- Use of renewable energy to 20 % by 2020.

Slovak Republic undertook to fulfill these goals by 2020 [3].

USE OF RENEWABLE ENERGY SOURCES FOR HEAT PRODUCTION IN YEARS 2002 - 2012

Biomass, biogas, geothermal and solar energy was used for heat production in 2002. It is possible to follow increased using of these renewable sources during years

2002 – 2012. Production of heat from renewable energy sources during years 2002 – 2012 is shown in table 1.

Table 1. Heat production from renewable energy sources during years 2002 – 2012 [2 - 10]

Tablica 1. Proizvodnja topline iz obnovljivih izvora energije u godinama 2002 – 2012 [2 - 10]

Source, GJ	Years										
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Biomass	474	643	1354	1673	1769	1850	1910	822	4056	5223	7225
Biogas	1	0	0	116	132	151	162	19	70	72	73
Geothermal energy	159	139	144	140	142	145	146	144	139	104	95
Solar energy	36	40	45	50	28	15	7	1	1	1	1

Use of biomass for heat production during years 2002 - 2012 is shown in figure 1.

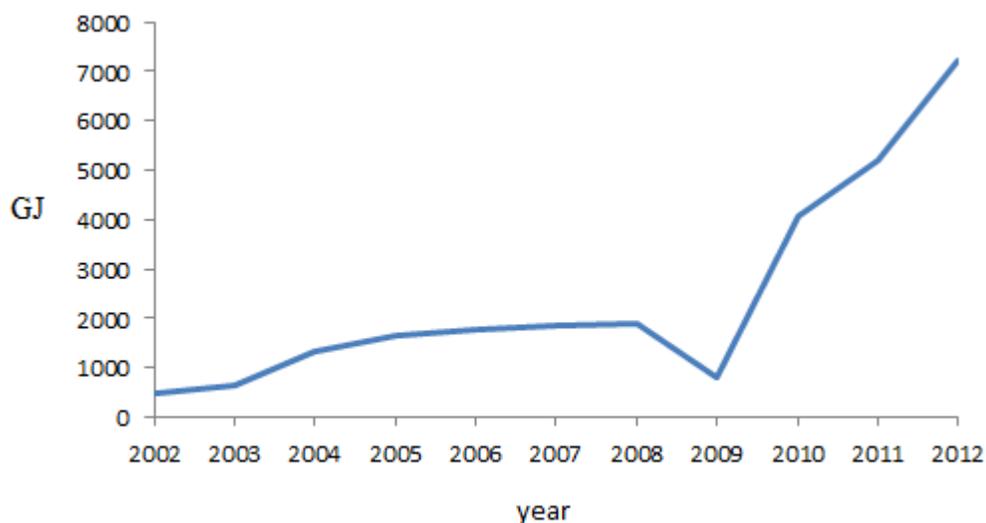


Figure 1. Heat production from biomass during years 2002 – 2012 [2 - 10]

Slika 1. Proizvodnja topline iz biomase tijekom godina 2002 – 2012 [2 - 10]

It is realistic to expect that the use of the biomass will increase in the future, not only for heat production, but also for produce other types of energy.

Use of biogas for heat production during years 2002 - 2012 is shown in figure 2.

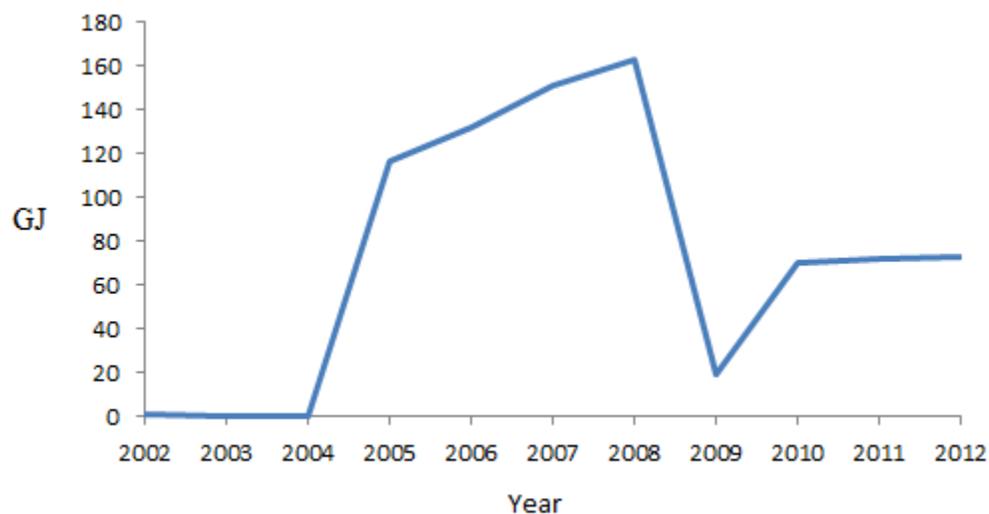


Figure 2. Heat production from biogas during years 2002 – 2012 [2 - 10]

Slika 2. Proizvodnja topline iz bioplina tijekom godina 2002 – 2012 [2 - 10]

Heat production from renewable energy source – biogas was in 2009 the lowest, but in years 2010 – 2012 was on same level.

Geothermal energy is also used for heat production (figure 3), but trend of its use is decreasing.

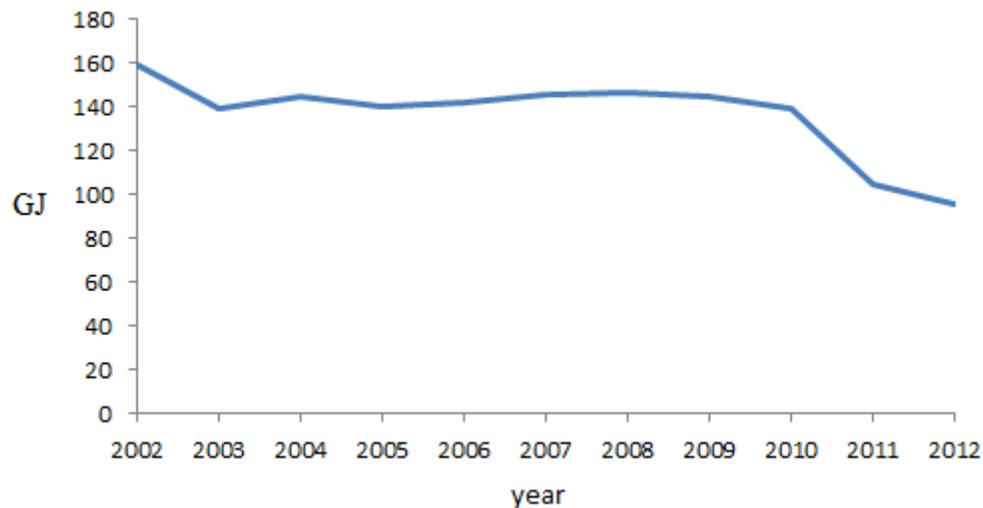


Figure 3. Heat production from geothermal energy during years 2002 – 2012 [2 - 10]

Slika 3. Proizvodnja topline iz geotermalne energije tijekom godina 2002 – 2012 [2 - 10]

The use of solar energy for heat production is shown in figure 4.

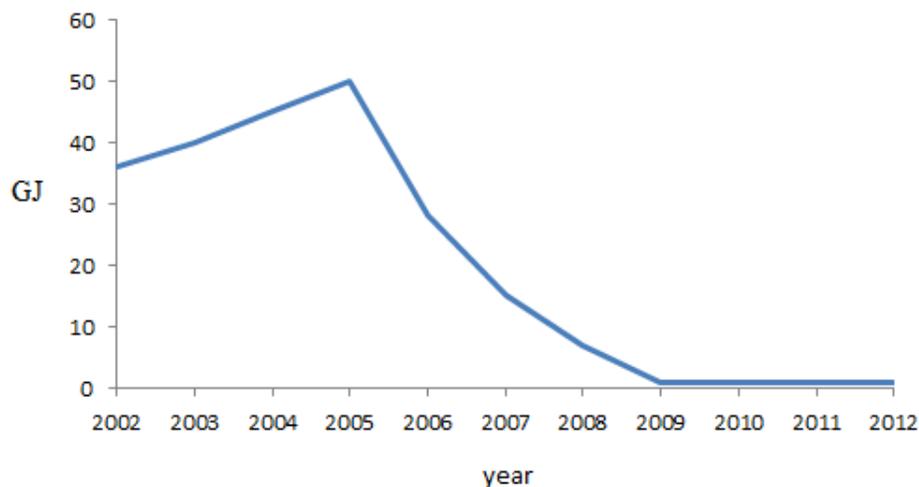


Figure 4. Heat production from solar energy during years 2002 – 2012 [2 - 10]

Slika 4. Proizvodnja topline iz sunčeve energije tijekom godina 2002 – 2012 [2 - 10]

Unfortunately, use of this kind of renewable energy source is decreasing.

USE OF RENEWEABLE ENERGY SOURCES FOR ELECTRICITY IN YEARS 2002 - 2012

Producing of electricity (in GWh) from renewable energy sources in years 2002 – 2012 is shown in table 2.

Table 2. Producing of electricity (in GWh) from renewable energy sources in years 2002 - 2012 [2 - 10]

Tablica 2. Proizvodnja električne energije (u GWh) iz obnovljivih izvora energije u godinama 2002 - 2012 [2 - 10]

Sources, GJ	Years										
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Hydropower plants	5483	3671	4207	4741	4623	4368	4271	4604	5649	4146	4439
Wind power	0	2	6	7	7	7	7	6	6	5	6
Biomass	159	84	3	4	85	153	480	493	606	698	724
Biogas	1	2	2	4	8	12	15	22	32	35	37

Quantity of produced electricity through hydropower plants was the lowest in

2003 and the highest in 2010, as it's seen in figure 5.

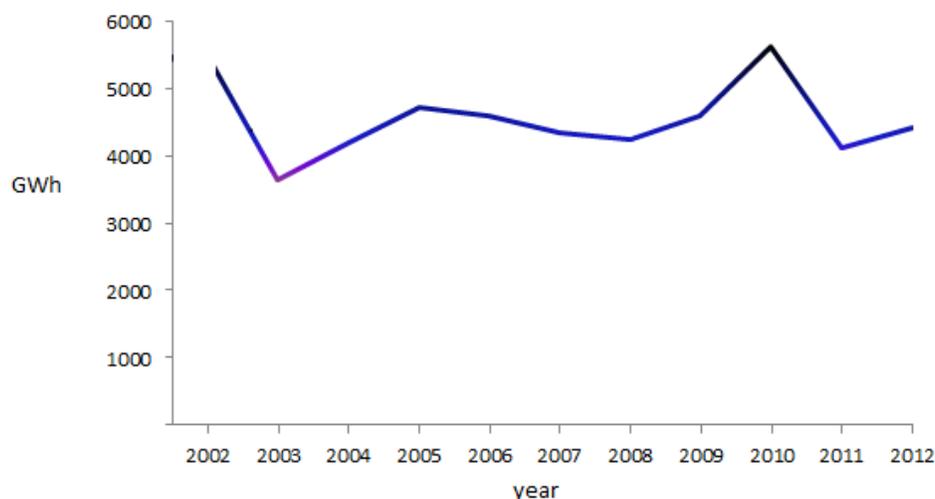


Figure 5. Producing of electricity (in GWh) from renewable energy source - hydropower plants in years 2002 – 2012 [2 - 10]

Slika 5. Proizvodnja električne energije (u GWh) iz obnovljivih izvora energije - hidroelektrane u godinama 2002 – 2012 [2 - 10]

Quantity of produced electricity through wind power was in 2002 zero,

conversely, the highest was in years 2005 – 2008 (seen in figure 6).

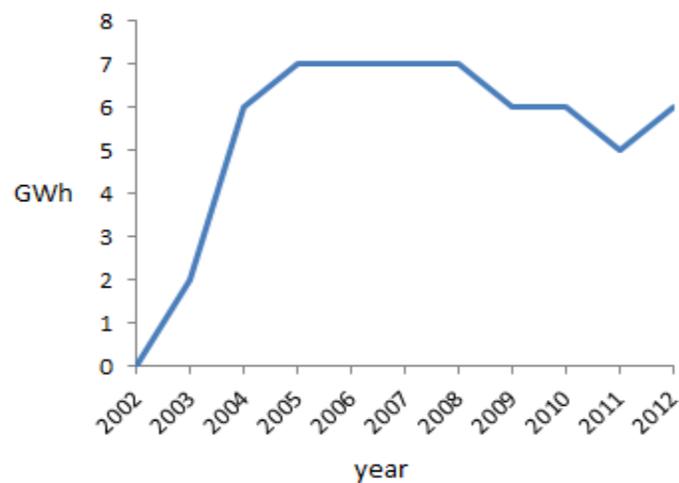


Figure 6. Producing of electricity (in GWh) through wind power in years 2002 – 2012 [2 - 10]
Slika 6. Proizvodnja električne energije (u GWh) iz vjetroagregata u godinama 2002 – 2012 [2 - 10]

The use of biomass for producing electricity is increasing, as it's shown in figure 7.

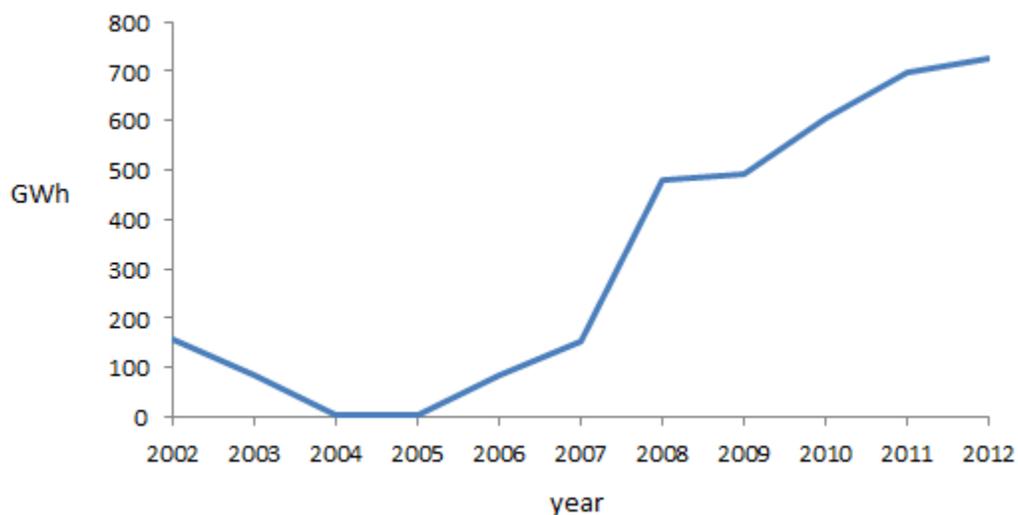


Figure 7. Producing of electricity (in GWh) through biomass in years 2002 – 2012 [2 - 10]
Slika 7. Proizvodnja električne energije (u GWh) iz biomase u godinama 2002 – 2012 [2 - 10]

Biogas, as well as biomass is used for producing of electricity in an increasing way

(figure 8).

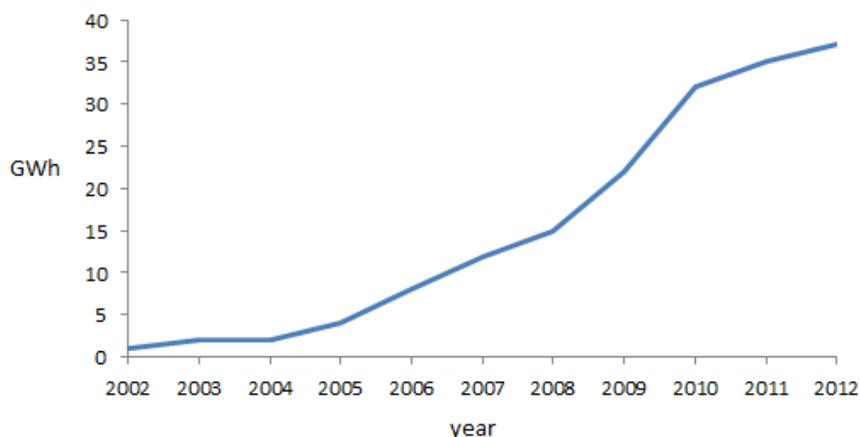


Figure 8. Producing of electricity (in GWh) through biogas in years 2002 – 2012 [2 - 10]

Slika 8. Proizvodnja električne energije (u GWh) iz bioplina u godinama 2002 – 2012 [2 - 10]

GOALS FOR ELECTRICITY PRODUCTION FROM RENEWABLE ENERGY SOURCES BY 2020

Over 90 % of electricity is produced from renewable energy comes from hydropower. This type of electricity is called "green electricity". It is necessary to set goals to reduce the impact of large hydropower [1].

Slovak Republic as a member state of European Union has to accept goals set by European Council:

- Reduction of greenhouse gas emissions (20 % in 2020 compared to 1990)
- Energy savings (20 % of projected consumption for 2020)
- Increase the share of renewable energy sources in total energy consumption (20 % in 2020)

- Share of biofuels in overall petrol and diesel consumption (at least 10 % by 2020) [1].

Not every member state of the European Union has the same opportunities to use renewable resources. Binding indicator 20 % share of energy from renewable sources is target for the European Union as a whole. Share on used renewable energy sources depends on domestic market and substantially existing structure of power generation in the country called energy mix [1].

CONCLUSION

Slovak Republic is trying as much as possible using renewable energy sources and keep up with global developments, as well as Member States of the European Union. Nevertheless, Slovak Republic has to increase its effort to maximum use. Government is working on creating legal conditions for use of renewable energy sources, which are considered as huge energy potential of our planet.

Act no. 309/2009 Coll. is about promotion of renewable energy sources and high-efficiency combined production. This law established general conditions and facilities for people and companies, who produce energy from renewable sources [11].

We shouldn't use renewable sources because of concession, but also to protect the environment.

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