

RENEWABLE ENERGY SOURCES AND THEIR EFFICIENCY

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Rezumat. *Utilizarea surselor regenerabile de energie împreună cu eficiența energetică vor ajuta reducerea emisiilor gazelor cu efect de seră, cu alte cuvinte la prevenirea schimbărilor climatice. În Strategia energetică a României pentru perioada 2007-2020, potențialul surselor regenerabile de energie este estimat la 14.718 ktep. Potențialul este mai mare decât importul de energie primară în 2010, acesta fiind de 11.239 ktep. În continuare s-au prezentat tabele ce cuprind evoluția resurselor de energie primară, structura resurselor de energie primară, evoluția producției de energie primară pe anul 2010. În tabelul producția prognozată de energie electrică din surse regenerabile de energie pe termen mediu și lung, s-a făcut o comparație a producției de surse regenerabile de energie în anul 2010 și 2015, rezultând producția de surse regenerabile mai mare în anul 2015.*

Abstract. *The use of renewable energy with energy efficiency will help reduce greenhouse gas emissions, in other words to prevent climate change. In Romania's energy strategy for 2007-2020, renewable energy potential is estimated at 14 718 ktep. The potential is higher than the import of primary energy in 2010, which is the 11 239 ktep. Next were presented tables include development of primary energy resources, the structure of primary energy resources, changes in primary energy production in 2010. The table forecasted production of electricity from renewable energy sources in the medium and long term, a comparison was made of the production of renewable energy sources in 2010 and 2015, resulting in greater production of renewable sources in 2015.*

Keywords: *the potential of renewable energy, climate change, renewable energy sources.*

[Renewable energy is also called alternative energy sources derived usable energy that are able to recover, such as the sun (solar energy), wind (wind energy), rivers (hydropower), thermal sources (geothermal energy) tides (tidal power) and biomass (biofuels).

Renewable energy is energy which comes from natural resources such as sunlight, wind, rain, tides and geothermal heat, which are renewable (naturally completed).

A non-renewable resource is a natural resource that cannot be reproduced, cultivated, generated or used on a scale that can support consumption rate. Once gone it is available for future needs. The resources are non-renewable resources

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are consumed faster than nature can create, such as fossil fuels (such as coal, oil and natural gas), nuclear energy (uranium) and some examples aquifers. Metal ores are the first examples of non-renewable resources.] [1]

[Greenhouse gas emissions are a serious threat in terms of producing climate change, with potentially disastrous effects on humanity. Using renewable energy sources (RES) together with energy efficiency improvements (EE) can help reduce energy consumption, reduce greenhouse gas emissions and therefore prevent dangerous climate change.

Unused potential of biomass, solar, hydro, wind and geothermal is still important. However, in recent years, thanks to financial support mechanisms such as feed-in-tariff mechanism or the granting of green certificates in many European countries this sector has progressively.

The EU adopted its own strategy to combat climate change by adopting a plan for sustainable growth, Europe 2020, which established a set of ambitious energy (so-called 20-20-20 targets). The road to a low carbon economy means developing a local public sector able to identify and support economic opportunities. In particular, local public sector can play a strategic role as administrator of the territory's final and enforceable policies. Therefore, sustainable energy is essential to strengthen local knowledge of public employees.] [2]

[According to Romania's energy strategy for 2007-2020, updated 2020 national potential of renewable energy in Romania is estimated at 14.718 ktep higher than Romania's imports of primary energy in 2010 (11.239 ktep) and is as follows:

- Solar thermal power 1433 mii tep
- Solar Photovoltaic 103 mii tep
- Wind Power 1978 mii tep
- Hydro 3440 mii tep
- Biomass and biogas 7597 mii tep
- Geothermal 167 mii tep

To meet the target set by Directive 2009/28 / EC for 2020, Romania will have to capitalize 50% of this potential, which will involve an investment effort consistent.

Wind and hydropower potential is effectively harnessed more technically inferior arranged due to environmental restrictions (prohibition of use or locations with very high costs of realization).

The primary energy resources in 2010 were 42.467 mii tep, toe down 262 mii tep from the previous year in the table below highlighting a decreasing trend from one year to another.] [3]

Total charcoal, of which:	560	623	611	653	619	57	64	68	70	64	59
- charcoal	1	9	7	6	2	93	77	58	11	47	02
- shale	8	8	8	6	-	-	-	-	-	-	-
- other											
huile	117	117	111	980	102	10	83	90	97	75	73
- lignite	1	7	1	549	3	82	7	2	9	1	0
- charcoal	435	497	494	9	512	46	56	59	59	57	51
brown	4	9	2	51	0	98	28	33	85	18	72
	68	75	56		50	13	12	23	47	8	0
Firewood and agricultural wastes	276	213	235	290	316	32	32	33	37	38	39
	2	0	1	3	0	29	35	04	50	38	00
Crude oil	615	610	595	577	559	53	48	46	46	43	41
	7	5	1	0	2	26	97	51	19	90	86
Natural gas	109	108	103	105	101	95	93	90	89	89	87
	68	89	84	29	96	36	95	75	82	64	05
Other fuels	1	4	115	92	92	87	82	12	15	98	90
								7	8		
Energy from unconventional sources	7	7	17	18	13	18	18	21	26	25	26
Hydro energy	127	128	138	114	142	17	15	13	14	13	17
	2	4	1	1	1	39	80	74	81	61	69
Nuclear energy	133	133	135	120	136	13	13	18	27	28	28
	8	6	2	3	0	62	81	90	52	81	49

[Strategy has set targets on medium and long term, as follows:

- during the period 2003-2010: commissioning of new capabilities with a total installed power of around 441,5 MW (electricity) 3.274, 64 thousand toe (heat);
- in the period of 2011-2015: total power 789,0 MW (electrical energy), respectively, 7 thousand toe 3.527 (heat).

In terms of energy production from RENEWABLES, the strategy established that quantitative targets for 2010:

- 19,65 TWh (electricity) and 3.274, 64 thousand toe (heat);
- for 2015: 23,37 TWh (electricity) and 7th 3.527 thousand toe (heat).

The strategy envisioned as targets, weightings of E-RES in electricity generation for about 30.0 percent in 2010 respectively 30.4% in 2015.

NB: These targets were later modified in ascending, the actual values being 33% for 2010, 35% for the year 2015 and 38% for the year 2020.] [4]

Table 3. The forecast production of electricity from renewable energy sources in the medium and long term [4]

Renewable sources of energy	2010 (GWh)	2015 (GWh)
Solar energy	1.860	11.600
Wind energy	314	1.001
Hydro energy – total, of which: small hydro energy (max 10 MW)	18.200	18.700
Biomass	1.100	1.600
Geothermal energy	1.134	3.654
Geothermal energy	-	-
Total	19.650	23.367
Share ESRE in electricity consumption	30.00 %	30.40 %

[In strategy indicates that, except for large hydro, electricity production in units that use renewable sources are now higher than those incurred in the use of fossil fuels. Stimulate the use of these sources and attracting investment in energy units using renewable sources is accomplished by supportive mechanisms, in accordance with European practice.

There is a need for studies regarding the impact of wind turbines on the migration of birds in Dobrogea and the definition of a clear and unique maps relating to areas where there are suitable for the construction of wind power generating units and environmental considerations.

- the use of renewable sources of energy has a significant impact on the national power system, it is necessary:-studies on the impact of the takeover of electricity made with Microhydro and wind turbines, cogeneration using biomass, electric transmission and distribution (higher voltages than or equal to 110 kV), in various scenarios, in areas with high potential;

- development of transmission and distribution networks in the smart grid concept;

- construction of new capacities for production of electricity with high flexibility in operation and market development capabilities, countering and/or limiting the negative effects of uncontrollable wind energy variability and Microhydro.

The strategy presents a forecast of production and gross final consumption of electricity.] [4]

Table 4. The forecast electricity production [4]
TWh

	2005	2008	2009	2010	2011	2012	2015	2020
Total electricity production	59,41	65,5	67,7	70,6	72,2	74,5	89,5	100
Gross domestic consumption of energy	56,48	62,5	64,2	66,1	67,7	69,5	74,5	85
The production of E-SRE	20,21	18	19,5	21,7	22,3	23	26	32,5
The production of electricity in nuclear power plant	5,54	10,8	10,8	10,8	10,8	10,8	21,6	21,6
The production of electric energy in power plants	33,66	36,7	37,4	38,1	39,1	40,7	41,9	45,9
Share in total domestic consumption %	35,8	28,8	30,4	32,8	32,9	33,1	34,9	38,2

Conclusions

Renewable energies are energies that come from solar, wind, hydroelectric, geothermal, tidal and biofuels.

The Romanian Energy Strategy (2007-2020) is seen as a potential renewable energy sources is higher than the 11.239 ktep, 14.718 ktep, representing imports of primary energy in 2010.

Renewable energy sources are abundant and should be used responsibly in order to be in harmony and not to cause environmental problems as well as men.

R E F E R E N C E S

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