



**EXPERT EVALUATION NETWORK  
DELIVERING POLICY ANALYSIS ON THE  
PERFORMANCE OF COHESION POLICY 2007–2013  
YEAR 1 – 2011**

**TASK 1: POLICY PAPER ON RENEWABLE ENERGY AND  
ENERGY EFFICIENCY OF RESIDENTIAL HOUSING**

**SLOVAKIA**

**VERSION: FINAL**

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**A report to the European Commission  
Directorate–General Regional Policy**

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## LIST OF ABBREVIATIONS

- BIDSF – Bohunice International Decommission Support Fund
- EBRD – European Bank for Reconstruction and Development
- EEN – Expert Evaluation Network
- ERDF – European Regional Development Fund
- ESF – European Social Fund
- JESSICA – Joint European Support for Sustainable Investment in City Areas
- kWh – kilowatt hour
- OP – Operational Programme
- OP BK – Operational Programme Bratislavský Kraj
- PV – photovoltaic
- RES – renewable energy sources
- RONI – Regulatory Office for Network Industries
- ROP – Regional Operational Programme
- SETS – The Slovak Electricity Transfer System a.s.
- SHDF – State Housing Development Fund
- SIEA – Slovak Innovation and Energy Agency
- SLOVSEFF – Slovak Energy Efficiency and Renewable Energy Finance Facility
- TJ – terajoule
- UDF – Urban Development Fund

## 1. EXECUTIVE SUMMARY

The aim of public intervention in renewable energy in Slovakia is to increase its share in total gross energy consumption from 6.7 % in 2005 to 14 % in 2020. It is also to reduce fossil fuel consumption and CO<sub>2</sub> emissions. In the past few years, support of RES has undergone several changes and is likely to be modified further and substantially in the near future. Support was too generous (especially as regards feed-in-tariffs for photovoltaic plants), creating excess capacity and distorting the electricity market. Feed-in-tariffs have already been reduced substantially and a new system is expected to be introduced in 2012. This will be based on more sustainable schemes aimed at achieving renewable energy objectives in a cost-effective way.

As regards energy efficiency in residential housing, total investment amounted to EUR 282 million between 2008 and 2010, with estimated energy savings of 388 terajoules (TJ). The majority of programmes were financed from the central government budget via the State Housing Development Fund. The European Bank for Reconstruction and Development (EBRD) allocated EUR 38 million to energy efficiency drawing from the Slovak Energy Efficiency and Renewable Energy Finance Facility (SLOVSEFF (I and II)) and Bohunice International Decommission Support Fund (BIDSF).

In the current programming period, ERDF support is concentrated on renewable energy in enterprises and the energy efficiency of public buildings.

ERDF support of RES in enterprises is focused on biomass, solar power, small hydro and geothermal plants. Support goes, in particular, to the construction or upgrading of plants and is channelled through the OP Competitiveness and Economic Growth, complying with state aid and *de minimis* regulations. Unlike national policy, ERDF support varies between regions (in Central and Eastern Slovakia, support covers 50% of eligible costs, while in Western Slovakia it covers only 40%). Besides feed-in-tariffs, RES are supported through loans and grants from SLOVSEFF I and II.

ERDF support of energy efficiency in residential housing, involving a reallocation of financial resources from the Regional Operational Programme and OP Bratislavský region, was approved by the Government in June 2011 and will be implemented as part of the *Draft Pilot Approach for Support of Residential Housing Infrastructure*. The aim is to create additional financial capacity in this area and provide financial assistance for the construction of new housing for Roma communities. The further aim is to foster new innovative financial initiatives for sustainable urban development with the involvement of private capital. The rationale for public intervention to promote renewables is stated in the Slovak programme

documents<sup>1</sup>. It consists of the need to reduce fossil fuel consumption and CO<sub>2</sub> emissions, to meet international commitments as regards renewable energy targets and to reduce dependence on natural gas imports. There is some debate in the country about the rationale and methods used for supporting renewable energy sources. The rationale for support of energy efficiency in housing is related to the positive employment effects in the construction industry, the improved quality of life and the environment and the increase in disposable income of households from lower heating costs.

The rate of support for RES is based on the profitability of energy production and the investment costs of each type of renewable, the amount involved varying between the different types. Support of energy efficiency in residential housing has changed over time, as a result of the amount of national funding available rather than of changes in electricity or heating costs. There is no clear relationship between market prices or rents of residential housing and the energy efficiency of buildings.

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<sup>1</sup> See Annex for documents discussing the rationale for public intervention.

## 2. NATIONAL POLICY

National support of renewables is implemented under legislation passed in 2009 (Law No. 309/2009), the legal framework being based on a number of previously adopted documents and initiatives (see Annex). Support (in the form especially of feed-in-tariffs) has been gradually reduced over time and the connection of additional power plants to the national electricity grid is being regulated increasingly more effectively by the Regulatory Office for Network Industries (RONI). The rate of support varies between different types of energy sources based on the costs of investment. The installed capacity of renewable energy plants was increased to such an extent (due to generous feed-in-tariffs especially for photovoltaics, (PV) that permission for building new PV and wind power plants has been suspended by the Regulatory Office for Network Industries and the Slovak Electricity Transmission System (SETS), which is responsible for electricity supply.

The rapid increase in installed capacity of PV plants also led to upward pressure on the price of electricity. Accordingly, the existing support system for renewables is in the process of being changed and a new system is expected to be implemented in 2012. Besides feed-in-tariffs, RES is supported by loans and grants from SLOVSEFF, which subsidise the construction and upgrading of small hydro plants (with maximum installed capacity of 10 MW), wind power, solar systems for heating, biomass, geothermal, biogas and landfill gas. In addition to finance, SLOVSEFF provides support in the form of simplified energy audits, advice on rational energy use and consultancy and assistance. The Fund finances RES projects that are able to produce a rate of return of at least 10%.

Proposed changes in the system are outlined in the *Analysis of Renewable Support and Proposal for its Reassessment*. The aim is to implement sustainable support schemes which will contribute to meeting renewable energy objectives in a cost-effective way without having a significant impact on the price of electricity. The feed-in-tariffs set will be linked to the development potential of each specific renewable energy source. The main measures are:

- An auction system for feed-in-tariffs for fixed annual amounts of installed capacity in selected types of renewable (solar and wind power, especially). These amounts will be regulated by the Ministry of Economy and RONI with the aim of maintaining the stability of the distribution network and achieving the objectives of the National Action Plan on Renewable Energy Support.
- Feed-in-tariffs that are in line with the aim of minimising the effect on electricity prices.

- The centralisation of the purchase and administration of electricity from renewables in order to increase liquidity in the energy market and lower the costs of distribution.

Support to energy efficiency in residential housing is predominantly financed from national sources and does not vary across regions. From 2008 to 2010, total investment in this area amounted to EUR 282 million, with estimated energy savings of 388 terajoules (TJ)<sup>2</sup>. The majority of programmes have been financed from the central government budget via the State Housing Development Fund (SHDF). The European Bank for Reconstruction and Development (EBRD) provided EUR 60 million through SLOVSEFF I and SLOVSEFF II with an additional EUR 90 million and EUR 15 million from the Bohunice International Decommissioning Support Fund. The SHDF supports projects capable of producing energy savings of at least 15%. Support is also provided for RES in the form of grants covering 15 % of the investment cost of projects as well as consultancy services and simplified energy audits.

In response to the economic and financial crisis and the global recession, support for energy efficiency of residential housing was stepped up through a special government programme implemented by the SHDF, with additional finance from national sources amounting to EUR 71 million<sup>3</sup>. A central aim was to provide a stimulus to the construction industry.

At the same time, support of RES remained unchanged (because of the possible increases in electricity prices which might result if energy production from RES were expanded).

### 3. ERDF AND COHESION FUND SUPPORT AND CONTRIBUTION TO NATIONAL POLICY

In the current programming period, ERDF support is concentrated on energy efficiency and the use of renewable energy in enterprises and public building.

The OP Competitiveness and Economic Growth<sup>4</sup> is aimed in part at expanding the use of RES in enterprises while respecting EU state aid and *de minimis* regulations. Support is given to construction and upgrading of plants for producing energy from renewables. The Slovak Innovation and Energy Agency (SIEA) has launched two calls for proposals in relation to renewables, allocating EUR 82.9 million (state aid scheme) and EUR 23.2 million (*de minimis* scheme). The indicative allocation for the present programming period is EUR 24.5 million

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<sup>2</sup> Some examples of good practice (case studies) are presented here [http://www.slovseff.eu/sk\\_pripadove\\_studie.html](http://www.slovseff.eu/sk_pripadove_studie.html).

<sup>3</sup> The financial allocation of this programme is expected to cover the increase of energy efficiency in approximately 20,000 – 25,000 apartments.

<sup>4</sup> Priority axis 2 – Energy; Measure 2.1 – Increasing energy efficiency both on the side of generation and consumption and introducing advanced technologies in the energy sector.

for solar power, EUR 24.5 million for biomass and EUR 41.2 million for hydro and geothermal energy.

Under priority axis 2 of the OP, 178 projects had been supported by the end of 2010 and from 2009, non-repayable grants had led to the creation of an additional 29.35 MW of installed capacity, especially in plants using biomass. The projects already contracted are expected to add installed capacity of 65.71 MW by the end of 2012. In addition, new installed capacity helped to increase turnover in the enterprises supported by 35% compared to the baseline.<sup>5</sup> The funding provided to the projects implemented under this measure (measure 2.1 – Increasing energy efficiency both in generation and consumption and introducing advanced technologies in the energy sector) amounted to EUR 18.4 million, which represents 15% of the overall allocation for the 2007–2013 period. In addition, a national project is being implemented with total allocation of EUR 10.8 million which is aimed at increasing public awareness of RES and energy efficiency.

Unlike national support for renewables, ERDF support varies between regions. In Central and Eastern Slovakia support provided in the form of grants covers 50% of the eligible costs of investment, while in Western Slovakia it covers only 40%.

The ERDF currently is concentrated exclusively on renewables and energy efficiency in enterprises and public buildings. A pilot programme for improving energy efficiency in residential housing (*Proposal for Pilot Approach for Support of Residential Housing Infrastructure*) has been designed by the managing authorities of the Regional Operational Programme and the OP Bratislava region<sup>6</sup>, which is aimed at creating additional financial capacity for supporting energy efficiency in residential housing and the construction of new housing for marginalised Roma communities by combining EU and domestic funding. The pilot programme is expected to provide new experience with innovative financial schemes for sustainable urban development with the involvement of private capital, so reducing the need for additional financing from the central government budget.

The programme was approved by the government in June 2011. Support is provided under a JESSICA initiative via the newly established Urban Development Fund (UDF), which will provide loans for projects for improving energy efficiency in residential housing in urban areas. The Fund has a budget of EUR 11.5 million, met partly by the Regional Operational Programme and the Bratislavský kraj OP, and is expected to provide support to 1,000 housing units.

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<sup>5</sup> Annual Implementation Report – Operational Programme Competitiveness and Economic Growth 2010.

<sup>6</sup> The Government will decide on the implementation mechanism of pilot approach on support of housing by EU funds in autumn 2011.



## 4. RATIONALE FOR PUBLIC INTERVENTION

The rationale for public intervention in renewables is based on the following arguments<sup>7</sup>:

- to reduce fossil fuel consumption and .CO<sub>2</sub> emissions;
- to fulfil international commitments to meet renewable energy targets;
- to reduce dependence on natural gas imports.

Support of energy efficiency in residential housing is delivered through a number of government programmes aimed at meeting the renewable energy targets by 2020.

Improving energy efficiency in residential housing has been a priority of successive governments. Public intervention is based on the following arguments<sup>8</sup>:

- to produce positive effects on employment with multiplier effects on the construction industry (it is estimated that every EUR 33,000 invested creates two jobs);
- to improve the quality of life and the environment;
- to increase disposable income of households by reducing the cost of heating, which accounts for 60% of the overall energy consumption of Slovak households. Increased energy efficiency of housing is expected to lower these costs by 30%.

The majority of residential housing is still characterised by low energy efficiency and a neglect of maintenance. According to the *Draft Pilot Approach to Support Residential Housing Infrastructure* currently under discussion, 602,000 out of approximately 778,000 apartments built in the socialist style need general renovation and 176,000 need more basic restoration. The overall cost is estimated at EUR 13 billion. Previous governments as well as the present one have implemented a series of legislative measures in order to gradually improve living conditions and the quality of residential housing, including its energy efficiency.

There is a debate in the country about the rationale and the methods used for supporting renewable energy sources, the appropriateness of rates of support and the corresponding benefits and costs. The attitude towards support of renewables in general is rather cautious and conservative. The main concern of is to moderate the effect of RES support on the price of electricity. The newly installed capacity of PV plants and the high level of feed-in-tariffs are increasing the costs of the operation of the system which is consequently pushing up the price of electricity for consumers.

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<sup>7</sup> For further reference see Annex- National legislative framework on energy efficiency and renewable energy support.

<sup>8</sup> For further reference see Annex - National legislative framework on energy efficiency and renewable energy support.

According to the Study on Non-Cost Barriers to Renewables (Ecofys, 2010), renewable energy sources are regarded by the public mostly in a negative light, the view being that they are increasing energy prices. The only type of renewable which is presented in a positive light is biomass.

## 5. RATE OF SUPPORT AND PROFITABILITY

The rate of support for RES is based on the profitability of energy production and the investment costs of each type of renewable (Table A). The financial incentives for solar power are larger than those for biomass and reflect the differential in investment costs (Figure 1 which shows feed-in tariffs relative to the market price of electricity).

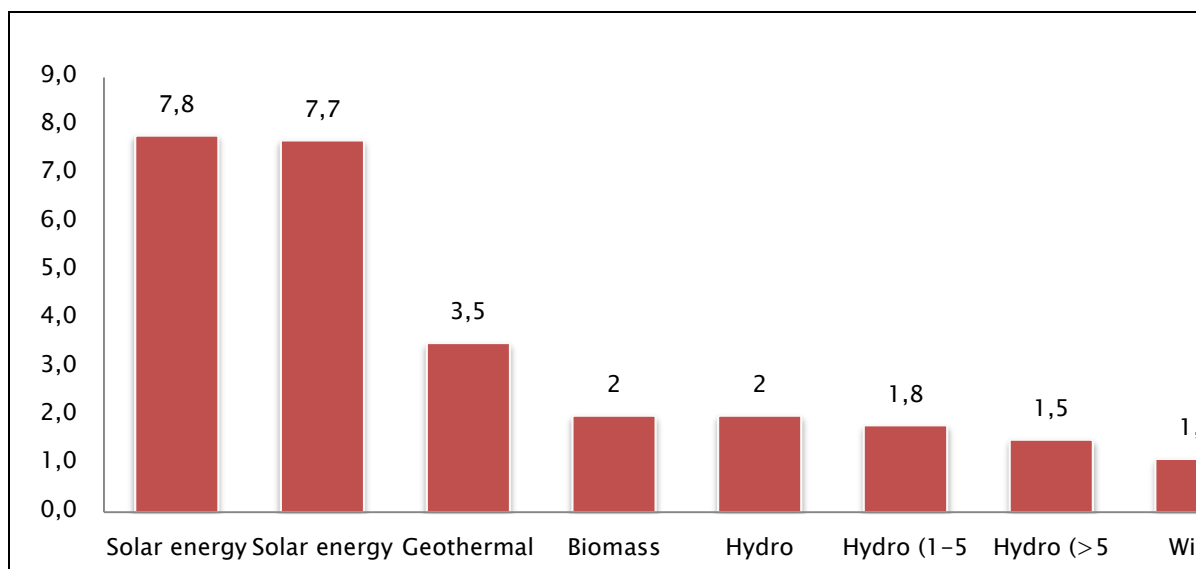
**Table A – Overview of economic & technical-specifications for new plants**

	Investment costs (EUR per kWh)	O&M cost (EUR per kW year)	Lifetime (average years)	Typical plant size (MW)
Biomass plant	2225 – 2995	84 – 146	30	1 – 25
Hydro small scale	1275 – 5025	40	50	2
Photovoltaics	2950 – 4750	30 – 42	25	0.005–0.05
Solar thermal power	3600 – 5025	150 – 200	30	2–50
Wind onshore	1125 – 1525	35 – 45	25	2
Wind offshore, 30–50 km	3100–3350	110	25	5

Source: Ecofys. Note: O&M– Overhead and maintenance costs.

Support of energy efficiency in residential housing has changed since the first support schemes were put in place. The changes have been implemented through various governments and have been determined more by the amount of national financing available, than by changes in electricity or heating costs. Support is based on a combination of grants and loans from national sources provided by several funds (institutions) and private co-financing, as well as loans and grants from the EBRD. The role of the ERDF in this area is limited to only one pilot project which is in the process of being implemented (see above). However, the amount of finance allocated to this compared to other domestic measures is very small.

Variations in the cost of fossil fuels and in electricity and heating prices do not affect the amount of support provided. For RES, variations in support are determined mainly by the declining costs of the different technology (e.g. the fall in the costs of PV).

**Figure 1 – Feed-in-tariffs relative to market price of electricity in 2010**

Source: Financial Policy Institute of Ministry of Finance (2011)

## 6. COSTS, PUBLIC SUPPORT AND PRICES

Recent changes in public intervention (feed-in-tariffs) in renewable energy are shown in Table B. The generation of electricity from renewable sources is supported mainly by feed-in-tariffs and exemption from energy tax (at EUR 1.3 per MWh for all renewables). Support is provided without any regional differentiation. The incentives given to each type of renewable are regulated by the Regulatory Office for Network Industries. The amount of support for each type of renewable is tending to change and, at present, the Office is pursuing a policy of gradually reducing feed-in tariffs for all types. The costs of providing support for the production of energy from RES are expected to reach EUR 192 million in 2011<sup>9</sup>, as compared with EUR 39 million in 2010.

From July 2011, feed-in-tariffs for newly connected energy sources were lowered for selected renewable energy sources; the most significant reduction being for solar power (by over 40%). Moreover, the tariffs for new solar power installations are now limited to roof panels and external claddings with a maximum installed capacity of 100 kW. The whole system of support is currently being discussed and it is expected to be further modified later this year. The costs for each type of renewable are shown in Table C.

<sup>9</sup>[http://www.finance.gov.sk/Components/CategoryDocuments/s\\_LoadDocument.aspx?categoryId=7936&documentId=6283](http://www.finance.gov.sk/Components/CategoryDocuments/s_LoadDocument.aspx?categoryId=7936&documentId=6283)

**Table B – Development of feed-in-tariffs for electricity generation from renewables in Slovakia (in EUR/MWh)**

	Before 2011	2011, Q1 - Q2	Since 2011 Q2
Biomass	159.8 – 96.3	159.8 – 96.3	159.8 – 93
Biowaste	159.8 – 96.3	159.8 – 96.3	159.8 – 93
Photovoltaics	430.7 – 425.1	387.65 – 382.6	259.1
Solar thermal	430.7 – 425.1	387.65 – 382.6	259.1
Small hydro	109 – 61.72	109 – 61.72	109 – 61.72
Wind onshore	80.9	80.9	79.2
Geothermal	195.8	195.8	195.8

Source: Regulatory Office for Network Industries

**Table C – Planned costs for renewable energy support in 2010 and 2011**

Renewable source	Installed capacity (MWh)		Costs in EUR	
	2010	2011	2010	2011
Hydro	1,830	689	6.1	25.4
Solar	31	428	10.4	116.8
Wind	5	3	0.2	0.1
Geothermal	0	0	0.0	0.1
Biomass	202	271	18.8	27.7
Biogas	5	71	2.1	21.8
Total	2,072	1,463	37.7	191.9

Source: Regulatory Office for Network Industries. Note: the costs for RES are part of the system operation tariff and affect the final price of electricity.

This sharp increase in costs has been caused mainly by the rapid increase in investment in solar power, due to generous feed-in-tariffs.

It is difficult to know whether and to what extent investment in improving the energy efficiency of existing or newly built residential housing is reflected in the market price. The continuous changes in house prices, such as the reduction which occurred since the crisis hit, make it difficult to identify any relationship between energy efficiency measures and prices. Moreover, since 89.5% of the population own their own housing and only a small minority are tenants paying rent, the market rent is predominantly determined by supply and demand in the different locations. Energy efficiency has at most a marginal effect on the rental market.

## 7. CONCLUSIONS

The legislative framework for supporting renewable energy was adopted only in September 2009 and was under preparation for more than six years. In March 2010, however, only 6 months later, it was significantly changed by the new Energy Law (Ecofys, 2010). This legislative instability is one of the main reasons for the slow development of renewable energy sources. In addition, the general attitude towards the deployment of renewable energy is rather cautious. The high rate of support – especially for solar power – resulted in substantial investment in renewables for electricity generation, which has led to further plans to change the support provided, which are expected to be adopted at the end of 2011. These changes are necessary to ensure the rational growth of renewables in line with their natural potential without substantially distorting the domestic energy market (as a result of speculative investment). Given the changes in national policy for supporting RES, future support from the ERDF should be focused on innovative projects so as to limit possible deadweight effects.

The majority of renewable energy is generated in traditional hydro plants. The generation potential of electricity from biomass has also developed in recent years and is expected to reach 1,710 GWh in 2020 as against 32 GWh in 2005. The objective is to increase the share of all RES in total gross energy consumption from 6.7% in 2005 to 14% in 2020.

Support for energy efficiency in residential housing is contributing to the renovation of the housing stock. National policy in this area has been implemented since 1996. However, the demand for grants and loans to support investment is larger than the financial capacity of the different national support schemes and funds. The successful involvement of ERDF in the JESSICA initiative could provide additional funding as well as valuable experience with innovative financial engineering schemes.

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## INTERVIEWS

Juraj Hrdlovič – Ministry of Economy

Tibor Bohó – Slovak Innovation and Energy Agency

Regina Remenárová – Slovak Innovation and Energy Agency

Richard Rúžička – Regulatory Office for Network Industries

Michal Klemanič – SLOVSEFF

## ANNEX

### National Legislative Framework on energy efficiency and renewable energy support

- National Renewable Energy Action Plan adopted on October 6<sup>th</sup> 2010.
- Law No. 139/2011 amending the Law No. 309/2009 on support of renewable energy sources and highly efficient combined energy generation and relevant regulations of Ministry of Economy.
- Operational programme Competitiveness and Economic Growth (Convergence objective) – support is limited to energy efficiency and renewable energy in enterprises.
- Regional Operational Programme (Convergence objective) – support in the priority axis 4 – Regeneration of settlements is limited for public buildings and infrastructure. In the framework of integrated urban strategies, the support for housing is available (especially for Roma communities).
- OP Bratislavský kraj (Competitiveness objective) – support in the priority axis 1 – Infrastructure measure 1.1 Regeneration of settlements in the framework of integrated strategies of urban areas development (JESSICA instrument).
- Action plan on energy efficiency for 2008 – 2010 and the Second Action Plan on Energy Efficiency for 2011 – 2013.
- Proposal for Pilot Approach for Support of Residential Housing Infrastructure (approved by the government on 15<sup>th</sup> June 2011) using the JESSICA financial

instruments combined with existing financial resources from two operational programmes.

## TABLES

**Annex Table A – Expected amounts of electricity generated in 2020 by renewable sources of energy (compared with 2005)**

Indicator	Year	Slovakia (GWh)	EU 27 (TWh)
Total renewables	2005	4,677	492
	2020	8,000	1,217
% electricity consumption	2005	16.7	15.8
	2020	24.0	34.5
% total renewables: Hydropower	2005	0.0	0.0
	2020	0.0	0.0
Solar power	2005	0.0	0.0
	2020	0.0	0.0
Solar PV	2005	0.0	0.0
	2020	0.0	0.0
Wind	2005	0.0	0.0
	2020	0.0	0.0
Total biomass	2005	0.0	0.0
	2020	0.0	0.0

Source: ECN 2011, utilizing the National Renewable Energy Action Plans of the MSs

Note: some figures on solar power and solar PV are unknown but these are likely to be very small.

**Annex Table B – Breakdown of renewables by source (% total renewables) in Slovakia and EU 27**

Source	Year	Slovakia	EU 27
Hydro	2000	81.7	30.9
	2005	48.3	21.8
	2008	34.2	18.6
PV	2000	0.0	0.0
	2005	0.0	0.1
	2008	-	0.4
Wind	2000	0.0	1.9
	2005	0.1	5.0
	2008	0.1	6.7
Solar thermal	2000	0.0	0.4



Source	Year	Slovakia	EU 27
	2005	0.0	0.7
	2008	0.0	1.1
Biomass	2000	18.3	63.2
	2005	50.6	68.0
	2008	64.6	69.4
Geothermal	2000	0.0	3.5
	2005	1.0	4.4
	2008	1.1	3.8

Source: Eurostat

### Annex Table C – Renewable energy as a share of gross final energy consumption in Slovakia and EU 27

	2005	2006	2007	2008	2020
<b>Slovakia</b>	6.7	6.2	7.4	8.4	14.0
<b>EU 27</b>	8.5	8.9	9.7	10.3	20.0

Source: Eurostat