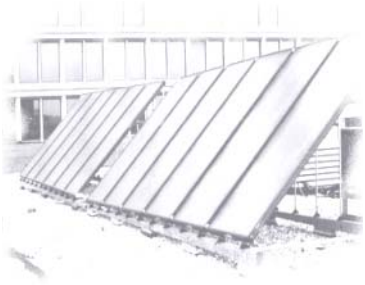
Structural Funds for Renewables

Analysis of Possible uses of Structural Funds for Development of Renewables for

Czech Republic
Estonia
Hungary
Lithuania
Poland
Slovak Republic
and
Slovenia




March 2004

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List of abbreviations

ARDOP Agriculture and Rural Development Operational Programme
CHP Combined Heat and Power
EIOP Environment Protection and Infrastructure Operational Programme
ERDF European Regional Development Fund
ESF European Social Fund
EU European Union
EUR Euro
GHG Greenhouse gas
HUF Hungarian Forint
MoE Ministry of Environment
NDP National Development Plan
OP Operational programme
OP BI Operational programme basic infrastructure
PC Programme complement
PLN Polish Zloty
RES renewable energy sources
R&D research and development
SF Structural Funds
SME small and medium sized enterprise
SOP I&S Sectoral Operational Programme Industry and Services
SPD Single Programming Document
TPES Total primary energy supply
UNFCCC United Nations Framework Convention on Climate Change
VAT Value added tax

Introduction

There is mounting evidence that human activities are responsible for climate change. The energy sector is one of the main culprits for emissions of greenhouse gases and hence also for climate change. In order to reverse present day threatening trends, serious actions must be taken, mainly in the field of efficient energy use and the use of renewable sources of energy (RES).

RES options offer a promising method to protect our climate and decrease our dependency on non-renewable natural resources, such as fossil fuels. The fulfilment of the Kyoto Protocol is also dependent, among other strategies, on the successful use of RES. Therefore the advancement of RES use is of utmost importance. Many governments came to recognise this during the World Summit for Sustainable Development in Johannesburg in 2002, and thereafter formed the Johannesburg Renewable Energy Coalition. Many governments are actively supporting RES through specially earmarked national funds.

With the enlargement of the EU, new member states will get the opportunity to use the Structural Funds (SF) of the EU. This opens many opportunities for RES support, especially since the national and private funds of the acceding countries are not sufficient to support the progress of RES. However, access to the Structural Funds also opens many challenges.

This report provides a brief analysis of how the Structural Funds could stimulate the growth of RES use in the selected acceding countries; namely the Czech Republic, Estonia, Hungary, Lithuania, Poland, the Slovak Republic and Slovenia. The report offers insight into the advancement of RES use, and shows which countries have prioritised the use of RES. The report also highlights any existing concrete plans to utilise the Structural Funds for RES, and the allocation of financial funding. The report also stresses possible challenges to the use of the Structural Funds, such as lack of clearly defined policies, regulations and actions regarding RES.

This document makes suggestions on how governments of the acceding countries can efficiently use the Structural Funds for RES. It demonstrates to EU institutions how prepared the accession countries are to use funds for RES. Finally, it emphasises to potential investors, especially in the RES sector, where opportunities exist in the newly expanded parts of Europe.

Current Status of RES Use and the Potentials in the Region

Current use of RES varies widely between countries in the region. The leading RES country is Estonia, with an 11% share of RES in total primary energy supply (TPES). Slovenia and Lithuania's shares are also relatively high, however, the Slovenian share includes a significant amount of large hydro power, which has highly adverse impacts on the environment. Poland, the Czech Republic and Hungary obtain about 3.5% of their TPES from RES, which is far behind their potentials for use. The Slovak Republic's share is presently the lowest, at 3%. According to analyses, the region mainly has potential for using biomass (including bio-fuels) and wind power. Geothermal and solar energy also show significant potentials in the region.

RES Priorities and Strategies

All countries in the region have an energy act in place; however, only some of them have defined priorities and strategies for RES use. The Czech Republic is currently developing its Renewables Act. Hungary is working on its Renewables Strategy and Poland already has a strategy for RES utilisation with a target of 2020. Estonia, Lithuania, the Slovak Republic and Slovenia still lack explicit RES policies and/or strategies, in spite of RES being addressed in most important strategic documents.

■ Using the Structural Funds for RES

The use of the Structural Funds for the advancement of RES is planned only in some countries, while in others RES support is not explicitly planned.

The **Czech Republic** is planning to allocate funds to RES under three of the five operational programmes: Industry and Enterprise (Specific Objective 2.3: Reducing energy consumption and higher use of renewable sources of energy), Infrastructure (Specific Objective 2.3: Support for the introduction of alternative fuels, Specific Objective 3.3: Air protection infrastructure improvement and Specific Objective 3.4: Waste Management) and Multi-functional Agriculture and Rural Development (Specific Objective 1.1: Investments in agricultural holdings - Further diversification of agricultural activities). Altogether about 100 million EUR can be allocated to RES.

Hungary will also support RES through three of the five operational programmes: Environmental Protection and Infrastructure (Component A: increasing the use of the renewable energy resources), Agriculture and Rural Development (RES as activities as parts of sub-measures) and Economic Competitiveness (RES related research and development (R&D) activities). At least 22 million EUR can be allocated to RES from 2004-2006.

For the **Slovak Republic**, two operational programmes are relevant for the support of RES: Industry and Services (strategic support for renewable sources of energy and cost-effective technologies and production of heat and electrical energy from renewable resources; Measure 1.4: Support for energy saving and use of renewable energy sources), Basic Infrastructure (Measure 2.2: Improvement and development of the infrastructure for the protection of air - changing fuel base of energy resources, with focus on low-emission and renewable resources and Sub-measure 3.1.1: Building and development of education infrastructure and Sub-measure 3.1.2: Building and development of health infrastructure, where RES are explicitly mentioned as a tool to help reduce emissions in present buildings heated by coal or heavy oil).

Poland also plans to support RES within two operational programmes. The Growth of Economic Competitiveness Programme assumes support for investment projects in industrial enterprises relating among others to investments in combined heat and power generation, conversion of fuel combustion installations to more environmental friendly solutions and activities supporting alternative energy sources use. The Integrated Operational Programme for Regional Development includes projects for construction, development and modernisation of public infrastructure for producing electrical energy and heat from renewable resources. Indirectly, RES can also be supported through the Cohesion Fund, mainly under projects for air quality improvement.

Estonia, Lithuania and Slovenia have adopted Single Programming Documents (SPD) - which set priorities for the use of Structural Funds on the basis of the national development and - strategic documents and guidelines of the EU.

Only the SPD of **Lithuania** explicitly specifies plans for using funds for RES. The first priority of the SPD, Development of Social and Economic Infrastructure, lists among other measures also Measure 4: Development of energy efficiency, which includes RES projects. The Annex of the SPD provides more detailed information on RES under the Measure 1.2.: Insurance of stability of energy supply, access and higher energy efficiency. One of the aims of this measure is to increase the use of RES and to install new technologies for RES use. The funds are planned to be allocated not only to concrete RES projects and technologies, but also to R&D, raising public awareness and education.

In the **Estonian** and **Slovenian** SPD the development and use of RES is not listed among the priorities or specific measures and activities. Estonia and Slovenia do not have explicit plans for supporting RES advancement with the Structural Funds; however, there are many opportunities for support of RES under the declared priorities. These aim mostly at increasing economic competitiveness, development of human resources, agricultural development and technical assistance.

■ Opening Challenges

As well as opening opportunities for the expansion of RES, the Structural Funds also provide potential threats and challenges for environmental protection. The main concern is that large investments with doubtful environmental integrity will dominate the use of the Structural Funds in spite of declared environmental protection priorities. Specifically in the field of RES there is a lack of clear priorities and programmes for RES as well as the absence of RES related legislation and regulations. This is expected to negatively effect the use of the Structural Funds in terms of RES. Another possible barrier is the lack of experience, knowledge and enough competent people to prepare and implement projects. There factors could lead to missed opportunities to upgrade national and private funds by stimulating RES use with European Union (EU) funds.

■ Recommendations

According to the future regulations drafted in the Third Report on Economic and Social Cohesion, in the coming programming period (2007-2013), renewable energy and energy efficiency are highlighted as eligible for funding. This is a strong reason for the fulfilment of the main recommendation of this report, which originates from the country reports: *Raising the profile of RES for future programming periods*. This should be achieved mainly through setting binding national and EU-wide targets for the use of RES and adoption of clear and specific programmes for RES activities, but also through raising awareness and education.

Although in some countries the link between job creation, innovation and the promotion of RES is well explored (for example, in the Czech Republic), all countries should pay closer attention to these issues. According to the report of WWF, *Eastern Promise: Progress Report on the EU Renewable Electricity Directive in Accession Countries*, RES could create about 100 000 working positions in Poland and the Czech Republic alone. This should then be one of the major reasons for raising support for RES through the use of the Structural Funds.

The profile of RES should be raised also through creation of a stable and financially favourable investment environment with less complex regulations and comprehensible guidance through the processes. Agencies that can offer support to investments by providing information and guidance, or publications on how to best invest in RES, would be welcomed.

Another important message is the elimination of support for environmentally harmful projects from the Structural Funds. Fuel switch projects and fossil fuel related projects should be excluded from the Structural Funds and financing should be redirected towards strictly RES projects. Generally speaking, in the future more space should be made within the Structural Funds program for environmentally friendly projects.

When promoting RES projects, these should not come into conflict with the EU's Water Framework Directive and Natura 2000. It should be kept in mind that the economic viability and social convenience of RES projects must not be above natural and spatial values.

NGOs must play a crucial role in the formation of priorities for subsequent programming periods from the initial stages of the process. In such a way quality of the programming documents is assured, as well as social and environmental acceptance. The participation of NGOs in the steering and monitoring of RES projects implementation is also of high importance for the environmental and social integrity of the RES projects.

■ Possibilities for NGOs to Use Structural Funds

In all the analysed countries, NGOs could apply to use EU funds for promotion of RES, but the fields in which they may act vary from country to country. In Lithuania, all legal entities which work in the energy field are eligible to use the funds, and thus an NGO dealing with RES could apply for funding. In the Czech Republic, NGOs can benefit from funds under the Operational Programme for Infrastructure. Hungarian NGOs can obtain support under the Environmental Protection and Infrastructure Operational Programme and even apply for a higher share of support than small or medium sized enterprises (SMEs). In Poland, NGOs can apply for funds only in cooperation with the local governments. Slovenian NGOs can be end users under Priority 1: Stimulation of the Production Sector and Competitiveness, but can also participate in raising awareness and informing the community.

WWF. 2004. Eastern Promise: Progress Report on the EU Renewable Electricity Directive in Accession Countries. http://www.panda.org/downloads/europe/easternpromise.pdf [on-line; cited March 15th 2004]

European Commission. A new partnership for cohesion: convergence, competitiveness, cooperation. Third report on economic and social cohesion.
http://www.europa.eu.int/comm/regional_policy/sources/docoffic/official/reports/cohesion3/cohesion3_en.htm [on-line; cited March 15th 2004]

Table 1: Comparative assessment by selected criteria[1]

	Czech Rep.	Estonia	Hungary	Lithuania	Poland	Slovakia	Slovenia
existing policies/strategies/plans	😐	😐	😐	😐	😐	☺	☹
current use of RES	☹	😐	☹	😐	😐	☹	😐
potentials for RES use	biomass 2,2 TWh, small hydro 1,1 TWh, wind 0,9 TWh	biomass 4.5 TWh/y, wind 1.3 TWh/y, solar 0.2 TWh/y	biomass 58 PJ/y, geothermal 50 PJ/y, wind 7,2 PJ/y [2]	biomass 28000 TJ/y, 1570000 ToE for all RES	biomass 570 PJ/y, hydropower 40 PJ/y, wind energy 47 PJ/y [3]	/	small hydro 200 MW, wind 80 MW, biomass 40 MW [5]
2010 targets	☺	😐	☹	😐	😐	☹	☹
prioritisation of RES in the use of EU funds	☺	☹	☺	😐	😐	☺	☹
definition of RES priorities	☺	☹	😐	😐	☹	😐	☹
NGO access to funds	😐	☹	😐	😐	☹ [4]	☹	😐

1 Explanation of criteria:

existing policies/strategies/plans

- ☺ Country has RES policy, strategy and plan/programme
- 😐 Country has RES policy or strategy or programme/plan
- ☹ Country has none of the above

current use of RES

- ☺ Share of RES in TPES is in line with the declared priorities of the country and its potentials.
- 😐 Share of RES in TPES is in line with the declared priorities of the country or its potentials.
- ☹ Share of RES in TPES is not in line with the declared priorities of the country or its potentials.

potential for new RES: What are the three biggest RES potentials that are economically viable, socially desirable and environmentally benign in your country (if figures are available)?

2010 target for RES

- ☺ 2010 target is in line with the declared priorities and potentials.
- 😐 2010 target is in line with the declared priorities or the potentials.
- ☹ 2010 target is not in line with the declared priorities or the potentials.

prioritisation of RES in the use of EU funds

- ☺ RES are specifically listed as a priority/measure/sub-measure in more areas (environment, infrastructure, enterprises, technical assistance).
- 😐 RES are specifically listed as a priority/measure/sub-measure in one area only.
- ☹ RES are not specifically listed as a priority/measure/sub-measure at all.

RES priorities clearly defined

- ☺ The RES priorities are clearly defined and it is known how much money will be allocated for the activities.
- 😐 The RES priorities are defined vaguely and there are some funds vaguely defined for the activities.
- ☹ RES are mentioned as a priority/measure/sub-measure, but not defined further at all.

NGO access to the use of Structural Funds

- ☺ High
- 😐 Some
- ☹ Low

2 according to the governmental estimations

3 It is a very difficult task to assess the potential of RES that is "economically viable, socially desirable and environmentally benign" as these three factors can be internally in conflict; but by a way of very general approximation it may be assumed that the listed 3 potentials are the most promising RES potential for Poland. Numbers are valid for both heat and electricity generation

4 NGO will not have access to the SF. In Poland there are Steering and Monitoring Committees for each fund and members of NGOs are included to those committees.

5 figures available only for economical potential

■ Czech Republic

The Czech Republic has a substantial potential to develop renewable resources of energy, especially biomass. However, only a fraction of this potential is currently utilised and no mandatory targets for the period beyond 2010 have yet been set up. Indicative targets, such as 20% of energy production from RES by 2030, can be found in the Climate Change Programme, that was approved by government in March 2004. The decision concerning a new Energy Policy as well as a new Renewables Act is still to be developed.
Strategies and objectives for Structural Funds are set up in the National Development Plan and financial sources for renewables can be found in three operational programmes: Industry and Enterprise, Infrastructure and Multi-functional Agriculture and Rural Development. Allocated finances under programme infrastructure, for example, are roughly twice as high as present support from the State Environmental Fund.
The challenge for monitoring committees is to sort out environmentally controversial projects, such as road construction and modernisation of waterways.
From a long-term perspective, mandatory targets and additional support mechanisms (such as ecological tax reform) are essential to secure future profits of investments into renewables.

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■ Country profile and summary statistics

Gross domestic electricity consumption in 2002 was 65 000 GWh; The main energy sources are coal (68%) and nuclear (25%). The average percentage share of renewable energy sources on gross domestic electricity consumption is about 3.5%, where 2% comes from large hydroelectric plants. This means that only a fraction of renewable energy potential is being used. Analysis of the potential of renewable energy in the Czech Republic revealed that by 2050, renewables may cover up to 30% of present consumption of primary energy sources and there is still great potential for decreasing energy intensity. If the assumptions that sustainable consumption of energy should not exceed 20% of the present amount are correct, we can conclude, that the Czech Republic has a sufficient potential to evolve renewables for sustainable development.
Emission reductions: The estimated amount of emission reductions due to an increased share of renewables is 5 Mt CO2 eqv. annually (2010).
Job creation: By the year 2010 about 10 000 new permanent jobs directly connected to renewable energy are expected.

Table 2: Present and estimated available potential for generation of energy from renewables in Czech Republic.

Energy Source	Electricity in 2003 (GWh)	Heat 2003 (PJ)	Estimated production in 2010 (GWh)	Available potential by 2050 (GWh)
Wind	4	-	930	4 081-6 530
Small Hydro (< 10 MW)	750	-	1 120	1 565
Large Hydro (> 10 MW)	1 165	-	1165	1 165
Solar Heating Systems	-	0.4	N/A	4 722
Photovoltaics	0.03	-	15	5 500
Geothermal Energy	0	0.2	15	7.7 (GW)
Biomass	420	22	2 200	37 777 (incl. bio-fuels)
Bio-fuels	-	2.5	N/A	-
Total	2 339	25	5 445	138 889

Source: Association for Renewables, 2003, Enviros

■ Main strategic and development documents

According to the EU Accession Treaty, Czech Republic must generate 8% of its gross electricity consumption in 2010 from renewables. Domestic policies reflect this target.
Renewables that are subject to support mechanisms are at present defined in the Energy Act from 2000 and feed-in tariffs are in place since 2002, declared in two decrees of Energy Regulatory Office. Investors to renewables projects might also apply for grant from State Environmental Fund (up to 80% of costs). However, there is a new proposal of Renewables Act right now in the parliament, which can be characterised as a mixture of quota system and feed-in tariffs.

In March 2004, Czech climate change programme was approved by the government. In addition to per capita carbon dioxide cuts by at least 30% between 2000 and 2020, it also sets target for renewables, such as 20% of energy production from RES by 2030 and 20% transport fuels from alternative sources (bio-fuels and gas) by 2020. Environmental groups welcome the programme as a first ambitious step of Czech government to reduce our extremely high per capita emissions.[1] The government's seriousness in meeting these targets will be tested by the final shape of the National Energy Strategy to 2030. The cabinet is due to discuss it in March 2004 as well.

■ Financing from the SF

Czech strategies and objectives are set up in the National Development Plan and five[2] operational programmes for the period 2004-2006 have been developed to meet its priorities. Regarding financial possibilities for renewables, three programmes are relevant: Industry and Enterprise, Infrastructure and Multi-functional Agriculture and Rural Development.

Operational Programme Industry and Enterprise

Priority 2: Development of Enterprise Competitiveness
Specific objective 2.3: Reducing energy consumption and higher use of renewable sources of energy
The aim of this priority is to enhance the competitiveness of Czech companies by reducing energy consumption in manufacturing and increasing the use of renewable and secondary sources of energy. Beneficiaries are small and medium-sized individual enterprises. Contribution: 46% of costs, it can be increased up to 66%, minimum is 17 000 EUR, maximum is 1 000 000 EUR. Finances for the period 2004-2006[3]: 17 390 144 EUR. Institutions Responsible for Implementation are: the managing authority is the Ministry of Industry and Trade[4] with CzechInvest and the Czech Energy Agency as implementing agencies.

Operational Programme Infrastructure

Priority 2: Improvement of the quality of living conditions by reducing negative environmental impacts of transport
Specific objective 2.3: Support for the introduction of alternative fuels
The aim is to finance research projects which support the development of non-classic types of propulsion, support for the introduction of alternative fuels (including bio-fuels) into existing works and for support for application of the technology for the production and storage of hydrogen for road vehicles and the technology of fuel cells. Beneficiaries are the manufacturers and owners of vehicles, researchers. Contribution: 35% for private enterprises, 50-75% for others. Finances for period 2004-2006: 3 956 416 EUR. Institution responsible for implementation is Ministry of Transport[5].
Priority 3: Improvement of the quality of particular environmental components
Specific objective 3.3: Air protection infrastructure improvement
Support will be focused on projects for construction and reconstruction of power plants using renewable sources of energy, transition from existing systems to systems using renewable sources of energy and the use of heating pumps, use of renewable sources of energy from municipal heat-generating plants and construction of combined systems generating electricity and heat from biomass and biogas. Projects will contribute to achieve the national target of electricity from renewables.[6] Beneficiaries are public, municipal or non-profit making sector or operators of public services. Contribution: 50-75% of eligible costs. Finances for period 2004-2006: 44 110 378 EUR. Institutions responsible for implementation are Ministry of Environment and State Environmental Fund[7]
Specific Objective 3.4: Waste Management
The purpose is to improve the standards of waste management and utilisation for energy-generating purposes (composting, biogas stations). Beneficiaries are public, municipal or non-profit making sector or operators of public services, private enterprises. Contribution: 35% for private companies, 50-75% for others. Finances for period 2004-2006: 49 473 908 EUR. Institutions responsible for implementation are Ministry of Environment and State Environmental Fund.

Operational Programme Multi-functional Agriculture and Rural Development[8]

Priority 1: Support to Agriculture, Forestry and Processing of Agricultural Products
Specific Objective 1.1: Investments in agricultural holdings - Further diversification of agricultural activities
The objective is to support production, processing and marketing of biomass produced from one's own agricultural activity. Beneficiaries are natural/legal persons or an individual farmer deriving income from farming as a systematic and independent activity. Contribution: Up to 60% of eligible cost in less-favoured areas, up to 50% of eligible cost in other areas (the eligible cost for which support can be provided shall range from EUR 2 000 to EUR 50 000 per individual project). Finances for period 2004-2006: 151 141 395 EUR for all projects under Priority 1. Institution responsible for implementation is the Ministry of Agriculture[9].

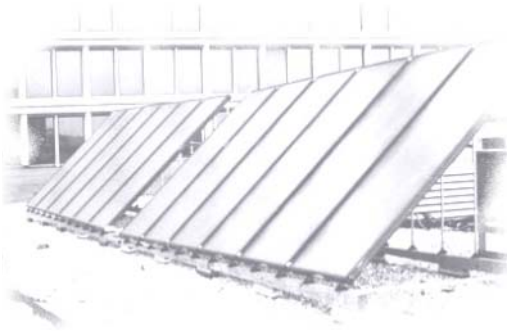
■ Challenges for the future

Although highest priority is given to increasing competitiveness of enterprises and capacity building, from an environmental perspective all larger investments into infrastructure may pose major threats. Environmental groups are especially cautious of construction of town bypasses and modernisation of waterways. Some of the projects are rather megalomaniac, unnecessary and controversial (from both a financial and environmental point of view) - for example the objective to meet international classification criteria in Czech waterways.

■ Conclusions

From a political point of view, the idea of promoting renewables must be widely accepted by the majority of political parties as well as key politicians. Competency disputes between the Ministry of Industry and Trade and the Ministry of Environment shall no longer block the boom of renewables.
New, legally binding targets for the share of renewables by 2020 must be established, both on a national and EU level to attract investments into RES. Ensuring long-term financial profits for investors is essential. Environmental tax reform shall become a reality. If this is not achieved, the funds that are now available might miss their long-term objective.
Structural Funds shall give opportunities for the realisation of environmental friendly projects, such as renewables, but simultaneously eliminate the possibility of funding projects with negative impacts. This is a challenge for monitoring committees to overcome. NGOs' participation in this process is of crucial importance.
For practical reasons, it would be very helpful to unify the documents under different programmes to one form, so that all involved parties could easily find the desired information. It is also not always easy to find a contact with a competent person. Documents in national languages shall match to the English version.

1 Czech greenhouse gas emissions per capita are around a third higher than current EU states and around twice as high in terms of unit GDP.
2 Operational Programme (OP) Industry and Enterprise - 261mil. EUR, OP Infrastructure - 246 mil. EUR, OP Multi-functional Agriculture and Rural Development - 174 mil. EUR, OP Human Resources Development - 319 mil. EUR, Joint Regional Operational Programme - 454 mil. EUR (financial contribution from the EU for the period 2004-2006)
All documents and other relevant information are (or will be) available in English on a special webpage of the Ministry of Regional Development: http://www.strukturalni-fondy.cz
3 The amount of public finances allocated for respective priorities is ONLY indicative and can be subject to change. Monitoring committees and the Office for the Protection of Competition of Czech Republic are to make the final decision.
4 http://www.mpo.cz, http://www.czechinvest.org, http://www.ceacr.cz
5 http://www.mdcr.cz
6 8% of electricity consumption from renewable energy sources by 2010
7 http://www.env.cz, http://www.sfzp.cz
8 Has not yet been approved by the Commission
9 http://www.mze.cz



■ Estonia

The Estonian energy sector is based to large extent on domestic low grade fossil fuel – oil shale (in 2002 the share of oil shale in primary energy supply was 61% and in power production even up to 91%). The share of RES (wood and peat) in the primary energy supply has been rather stable (about 12%) over recent years, though it is feasible to raise the RES share in primary energy supply up to 20% by the year 2010. Unfortunately, the Long-term National Development Plan for the Fuel and Energy Sector foresees almost no increase in RES in primary energy supply (only 13% by 2010). To reach a realistic target of 20% by 2010, much effort must be put into restructuring the energy sector in favour of RES. Unfortunately, investments in the energy sector are now mainly limited to refurbishing large oil shale fired power plants to meet environmental requirements and enhance the efficiency of power production. In spite of the fact that Estonia has a considerable potential for wind energy, development of this type of energy production is very slow due to the lack of corresponding legislation which would allow wind energy to compete on a commercial basis and to allow proper grid related facilities. Concerning RES, Structural Funds should be used to update the electricity grid in Estonia - which is already 35 years old, and install some cogeneration gas fired power plants. This would make the electricity system more flexible, and the updating of the grid would remove a major obstacle to the development of large scale wind energy use in the country.

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■ Country profile and summary statistics

Estonia is one of the smallest countries in Europe, both in area (45,200 km^2) and population (1.36 million – 2002). The population distribution is rather centralised, as 69% of the population lives in towns. Forests and marshes cover more than 60% of the territory.

The GDP per capita in Estonia amounts to no more than 42% of the respective EU indicator (2002) and the energy intensity of Estonian GDP is rather high (47 MJ/GDP). In comparison with the respective EU average, the amount of CO_2 per capita emitted annually in Estonia is almost twice as much as in the EU (Estonia - 14 t, EU – 9 t) while the respective amounts of SO_2 are even six times greater (Estonia – 0.18, EU – 0.03 t).

The main problems of the Estonian energy sector are related to high spatial concentration of power production and the considerable environmental burden caused by it. The energy sector is responsible for 92% of the total amount of CO_2 emitted. A major share of waste generation (90%) is also due to Estonia's oil shale mining, chemical industry and oil shale based power systems. In Estonia, electricity is mainly produced from oil shale fired power stations that are seriously out of date - with the oldest energy blocks already having been in service for up to 40 years. The renovation of these power stations is presently under way with the target of 430MW set as the capacity of the renovated blocks.

Estonia is quite rich in renewable energy resources, however, the utilisation of renewable fuels has not witnessed much progress within the period of 1998–2002. In 2002 the share of RES was only 11% of the total energy supply. Biomass activities are of special importance for Estonia due to its significant forest potential and also due to the fact that 25% of agricultural land is presently left unused. Energy-crops and afforestation of abandoned land could decrease the underemployment of rural areas and generate sustainable energy sources, contributing also to the production of liquid bio-fuels in line with Directive 2003/30/EC. Onwards from 1998, heat pumps have become increasingly popular. At the end of 2002 the total number of installed heat pumps was approximately one thousand and their total output capacity became about 10MW.

Table 3: The breakdown of TPES in Estonia for the year 2002

FUEL	PERCENTAGE
Oil shale	61
Natural Gas	13
Motor fuels	11
Fuel oils	3
Firewood and peat	12

A rough evaluation of the RES resource in Estonia:
1. Today about 51% of the country is covered by forest and therefore the biomass (including peat) based energy potential in Estonia is significant and should be by no means neglected. Biogas production from animal manure is still in its initial stage of development with only some demonstration plants in operation. Consumption of straw as local fuel has not yet got off the ground and is still an unknown choice in Estonia.
2. Historically, wind energy has been in use in Estonia already for some time. On the coastal areas and islands of Estonia contemporary wind-turbines can produce annually at least 5–7 GWh/km^2 and by a rough estimation the total economical wind energy annual potential is up to 1.3 TWh.
3. The total theoretical hydropower resources of Estonian rivers amount to about 300 MW with the annual energy potential of 0.2 TWh.
4. Solar energy for domestic hot water is feasible in Estonia with the annual technical solar energy potential up to 0.6 TWh.
The RES annual total economical potential is estimated to be up to 6 TWh.

■ Main strategic and development documents

1. *The National Long Term Fuel and Energy Supply Development Plan.* Orientated towards reduction of GHG emissions and adopted by the Estonian Parliament in 1998.
2. *Sustainable Energy Alternatives for Estonia* (1998). Completed by the Re-En Center TAASEN within the framework of the REC project *Sustainable Energy Alternatives for the Baltic States*
3. *The Pollution Charge Act.* Responsible for the fixing rates of pollution charges, providing higher rates in densely populated areas, recreational areas and areas with a heavy industrial load.
4. *The Energy Act.* This act was amended in June 1998 with the provision that an energy trader dominating the market is required to purchase electric power from traders connected to its network and which produce such power from water, wind or solar energy, biomass, waste gases or waste material.
5. *Act on Pollution Charges* (1994). The goal of environmental charges is to provide enterprises with economic incentives to foster environmental protection. Generally, this means fiscal compensation, enforced by the Estonian Government, for damages caused to the environment and paid by the polluter.
6. *Act of Sustainable Development* (1995). The act sets out the general principles of sustainable development and therefore forms a basis for the formulation of national and regional programmes, including action plans to reduce atmospheric emissions.
7. *The Estonian National Environmental Strategy* (1997). This is the basic document for policy-making process in regard to the environment. It identifies the principal environmental problems facing Estonia, establishes short and long-term objectives and activities aimed at tackling these problems and achieving the objectives, proposes reforms for instruments and institutions of environmental management.
8. *National Environmental Action Plan* (1998). Focused on defining concrete conceptual, legislative, organizational, educational, training and in particular investment measures of the adopted strategy to be implemented, including concrete measures for reduction of atmospheric pollutants.
9. *The Long-term National Development Plan for the Fuel and Energy Sector* (1998). Sets targets for the development of the fuel and energy sector up to the year 2005 and gives principal development trends until 2018. As environmental impacts from the energy sector cannot be reduced to required levels without restructuring the use of energy sources, a major part of energy demand increase is projected to be met by natural gas. This will result in doubling its share in primary energy supply in 10–15 years. The plan is an utter disappointment considering the use of RES, leaving their share in the total energy supply at 13%.
10. *The Ambient Air Protection Act* (1999). Regulates activities which involve the emission of pollutants into ambient air and damage the ozone layer. It also deals with factors affecting climate change.
11. *The Pollution Charge Act* (1999). Provides charging rates for the release of pollutants or waste into the environment and the procedure for the calculation and payment of the charge.
12. *The National Energy Conservation Programme* (2000). The main objective of the programme is to propose concrete measures to ensure achievement of relevant objectives set by the Development Plan (see 8). One of the main goals of the programme is to ensure that CO_2 emissions are kept lower than the limits set by the Kyoto Protocol (between 2008–2012 the emission level must be 8% lower than in 1990).
13. *National Programme on Reduction of Pollutant Emissions from Large Combustion Plants for 1999 – 2003* (2000). According to the programme emissions of pollutants from large combustion plants should be reduced substantially each year.
14. *The Fuel Excise Tax Act* (2000). This act is designed to support wider use of RES in Estonia. Tax exemption has been made for electricity generated

by hydro and wind turbines – a rate of 0% is levied up to the end of 2006.

15. *Action Plan for Energy Conservation - Target Programme* (2001). The goal of the plan is to co-ordinate and carry out measures planned in the programme during the period 2001–2005.

16. *The Estonian Oil Shale Energy Refurbishing Plan 2001–2006.* According to this plan the exploitation of oil shale as the main fuel for electricity production in Estonia should continue no later than 2015.

17. *Estonian National Development Plan for the Implementation of EU Structural Funds, Single Programming Document 2004–2006.* Identifies priorities for Estonia while using EU funds. The priorities were selected on the basis of relevant strategic and development documents of Estonia and the guidelines of the EU. In accordance with the criteria which were established in Council Regulation (EC) No 1260/1999 of June 21, 1999, Estonia is a region covered by Objective 1. The regulation lays down the general provisions of Structural Funds.

■ Financing from the SF

Estonia adopted the Single Programming Document for the period 2004-2006 in December 2003 in which the following five priority areas were identified:

1. Human resource development
2. Competitiveness of enterprises
3. Agriculture, fisheries and rural development
4. Infrastructure and local development
5. Technical assistance

As can be seen, the development and use of RES is not among the priorities identified. However, the document recognizes that RES is one of the tools to reach sustainable development targets, and thus should not be neglected. This means that there is a possibility to embed RES projects into the use of Structural Funds and this is an opportunity not to be wasted. In the following discussion we consider the possibility of incorporation of RES projects into projects outlined for funding.

Priority Task No.1: Human resource development

a) Job creation and entrepreneurship (RES application would allow the creation of new jobs in rural areas and promote entrepreneurial qualities among the local population).

b) Increasing labour supply and promoting active ageing (RES application creates facilities for active ageing and expands the local labour supply).

Priority Task No.2: Competitiveness of enterprises

a) Promotion of research, development of technology and innovation (refurbishing the main high voltage grid to facilitate the use of wind energy).

b) Creation of new knowledge (RES application would create new knowledge focused on sustainable energy supply).

Priority Task No.3: Agriculture, fisheries and rural development

a) Diversification of economic activities in rural areas (RES application provides good opportunity for the diversification of economic activities in rural areas).

b) Integrated land improvement (RES projects would allow better land use in places where there exists land surplus in areas used for agricultural crops),

c) Renovation and development of villages (RES application would make villages more self sufficient and less dependant on the central energy supply),

d) Local initiative based development projects (local RES and cogeneration plants),

e) Forestry (RES application would ensure a more complete use of forest products).

Priority Task No.4: Infrastructure and local development

a) Development of environmental infrastructure (RES application would improve environmental infrastructure),

b) Local socio-economic development (RES projects would contribute to local socio-economic development).

Priority Task No.5: Technical assistance

a) Information dissemination, publicity and computerisation (projects focused on disseminating information about RES).

■ Challenges for the future

The main threat facing Estonia concerning the Structural Funds is that it might blow the chance to use this tool for financing RES projects. As RES is not explicitly put down in the list of priority tasks, there is a chance that it would be left out of the circle to benefit from the structural pie. Unless stimulated through extensive information and awareness raising campaigns, the project developers might not even think of RES as potential projects under the Structural Funds. Another possible threat is that not all the money will be fully used under the Structural Funds. The excessive use of oil shale for power production in the energy sector in Estonia is intolerable in long prospective and therefore much effort should be put into switching the Estonian energy sector over to RES.

Conclusions

Perusal of the Single Programming Document reveals that contrary to all expectations, RES has been excluded from the priority tasks eligible for the Structural Funds. However, it appears that within this document there still exists some opportunity to obtain funding for RES projects. One opportunity that should not be ruled out is to refurbish the high voltage electricity grid and install some gas fired cogeneration plants into the power system. The flexibility provided by this would then allow the use of wind energy. It is a paramount to find energy-related uses for land that is not under agricultural application. Another important issue is the training of a labour force with the skills needed to work with RES applications. In respect to sustainable development, it is important to raise public awareness of RES. It is of utmost importance to raise the profile of RES to cater for future programming periods. Estonia should not neglect its obligations to fulfil EU energy related directives and the Kyoto Protocol. To reach these previously discussed targets, it is necessary to take advantage of the Structural Funds. The ultimate goal should be to change the Estonian energy sector from a dependency on fossil fuels to RES and reach according to the Directive 2001/77/EC the target of 5.1% RES penetration by the year 2010.

Energy Strategy for Estonia, PHARE ES 94.04/01.03, May, 1997.
Long Term Development Plan for the Estonian Fuel and Energy Sector, Tallinn, 1998.
Sustainable Energy Alternatives for the Baltic States, Re-En Center TAASEN, Tallinn, 1998.
Definition of Consequences for Energy Consumers, Energy Market Actors and Overall Economic Situation of Implementation of Electricity and Gas Directive, Inspection Report, PHARE Energy Framework Contract, April 2000.
National Energy Conservation Programme, Ministry of Economic Affairs and Communication, Tallinn, 2000.
Investigation and Usage of Renewable Energy Sources, Tartu, 2000.
Estonian Oil Shale Energy Refurbishing Plan 2001–2006, Ministry of Economic Affairs and Communication, Tallinn, 2001.

■ Hungary

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In Hungary, the share of renewables in TPES is currently only 3.6 %. However, due to EU-accession, their utilisation is becoming more important as can be shown by strategic energy policy documents.
This process, which began just 1-2 years ago can be pushed forward by recently opened financial sources of the Structural Funds (SF). These funds are six times higher than the present available national support.
Although it is not a mistake of the SF that the existing legal and economic framework is inefficient and insufficient (e.g. problems with the feed-in tariff and guaranty of take-off of electricity) it is obvious that the SF, unfortunately, cannot change the whole system fundamentally, only contribute to a more dynamic progress of renewables.
Perhaps efficiency of the SF in terms of renewables could be higher if support of them from different aspects integrated into more Operational Programmes and more directly. They could have quite a significant role in the field of rural development where establishment of energy crops on fallow areas could contribute to job creation and thus slow down or stop migration from the rural area to the city. For this reason the Economic Competitiveness Operational Programme and the Regional Development Operational Programme should be amended and the Agricultural and Rural Development Operational Programme needs some modification as well as the Environmental Protection and Infrastructure Operational Programme.

■ Country profile and summary statistics

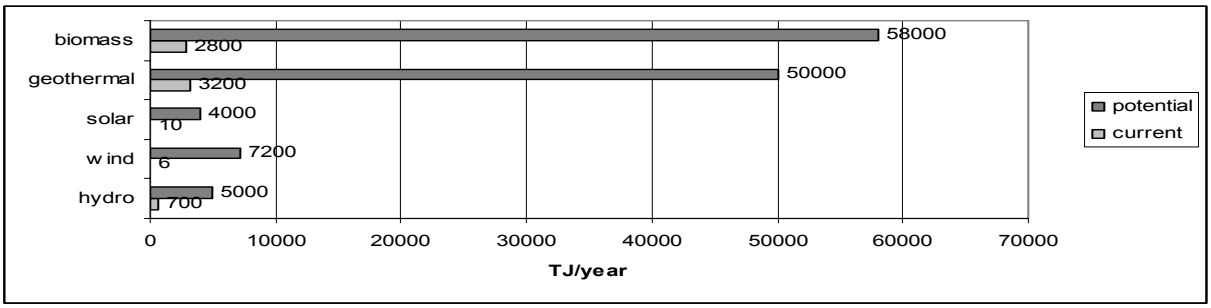
Hungary has no considerable domestic conventional fuel resources, the import dependence is high with 74.5% of TPES in 2002. Until 2020 this percentage is expected to grow steadily as the domestic fossil fuel supply decreases.

Table 4: The energy consumption portfolio in 2001[1]

coal	11.06 %
oil	15.79 %
nuclear	13.21 %
hydropower	0.17 %
wood	1.27 %
others	0.46 %
export-import	58.04 %

The present utilisation of renewable energy sources in Hungary is low in spite of the fact that geographical and other natural conditions are favourable for particular renewable energy technologies. At present, the share of renewables in the total primary energy supply is 3.6%. In electricity generation it is only 0.5%[2]. Currently wood is the most significant renewable energy source in Hungary (67 % of the total renewable), however, this utilisation is not sustainable. In regards to electricity generation, hydropower takes first place. According to official sources biomass and geothermal power have the largest potential in the country (see Figure 1).

Figure 1: Current utilisation and future potential of RES (2003)



■ Main strategic and development documents

In Hungary, the expression 'utilisation of renewable energy sources', as a principle of energy policy, appeared only in 1993 when the Parliament approved the new energy policy objectives (Parliament Resolutions 21/1993 (IV.9). Later these principles were confirmed by the Government Resolutions 2199/1999 (VIII.6.), which established the base of liberalisation of the energy market and also emphasised the role of renewables in energy production. Currently a new energy policy concept is

being formulated, which also stresses the importance of renewable sources. However, according to the concept, development of renewables is quite limited in Hungary and very expensive. This draft version does not attempt to offer solutions for the removal of the main barriers to the development of renewables, such as grid capacity or the complexity of administrative procedures.

Actually the development of renewables is based on the Energy Savings Strategy and Action Plan, approved by the Parliament in 1999 (1107/1999). The main objective of the Strategy in connection with renewables is to increase the consumption of renewable energy from 28 PJ/year to 50 PJ/year by 2010. Parallel with this, the government declared in 2003 that it aims to double the current share of renewables in TPES, namely increase the proportion from 3.6% to 7.2 % by 2010.[3]

During the negotiation process with the EU, no derogation was requested in the field of energy, as Hungary managed to agree on a less ambitious target for the share of renewable electricity. Although the EU previously tried to set 11.5 % as a target for 2010, the government managed to decrease this objective to 3.6 %.

Beside the new energy policy concept, a comprehensive 'Renewable Strategy' is also under preparation. Before compiling this document a detailed analysis was undertaken regarding the potential and costs of different renewable technologies. These documents might have influenced the priorities of the SF. The latter can be split up into two parts in terms of national level: on the one hand, the Electricity Act is an important document defining the feed-in tariff system; on the other hand the National Energy saving Programme has two specific windows focusing on renewables.

Hungary joined the Kyoto Protocol in 2002 and committed itself to a 6% GHG emission reduction for the period of 2008-2012 as measured against the average emissions level of 1985-1987. Although currently it seems that the country can meet this target, due to the large emission reduction in the nineties, in preparation for the period after 2012 quite a few measures should be implemented - renewables are taken into account as tool for meeting future targets.

■ Financing from the SF

As Hungary meets the requirements of the first objective of the EU, a National Development Plan for 2004-06 was prepared that investigates each important field of the economy and defines the main directions of development. The chapter dealing with energy stresses such key problems in Hungary as over-dependence on imported fuel, insufficient and poor energy conservation, and the small share of renewable energy. Realising the EU requirements and the low utilisation of renewables, the NDP emphasises the role of a "significant investment support as well as much higher purchase prices guaranteed in the long run"

The long-term objective of the NDP is to catch up with the current EU member states in terms of economy and society. To achieve this, four specific aims have been defined: a more competitive economy, human resources, higher quality of environment and balanced regional development. These aims are supported by five operational programmes some of which deal with renewables directly or indirectly.

The Environmental Protection and Infrastructure Operational Programme has the clearest role in the support of renewables. The Programme has three priorities among which the environmental protection priority has a specific measure (Environmentally friendly development of energy resources; Component A: increasing the use of the renewable energy resources): dealing with renewables. The following fields are supported: fuel supply of renewable based generating capacities; significant renewable based capacity investments; public renewable investments. As medium and large sized projects are preferred, projects with less than 125 million HUF (0.49 million €) are not supported. The maximum amount of support is 300 million HUF (1.17 million €). Share of support is differentiated by the different renewable technologies and preferred fields (e.g. 25% support for wind, 50% for biomass and 60% for public investment). Municipalities and non-profit organisations can obtain a higher share of support than small and medium sized enterprises. Financial frames for renewables and energy efficiency (Component B) between 2004-06 amounts to 5.2 billion HUF (20.2 million €). 4-25 applications will be funded in the first year.

Besides the EIOP, renewables also appear in the Agriculture and Rural Development Operational Programme (ARDOP). According to the Programme Complement (PC) of ARDOP, EU money can be obtained in the framework of the measure 'Development and improvement of infrastructure related to agriculture.' Although the PC is provisional and therefore the required application forms are not available. It is predicted that the financial share of renewables will not be large, since renewable sources are represented only in an activity as a part of a sub-measure. In other measures renewables can be found as a preferred tool or method but not as a supported area.

Within the frames of the Economic Competitiveness Operational Programme renewables related R&D activities can be funded with 11.42 billion HUF (1.17 million €) in total until 2006. Currently no more information is available.

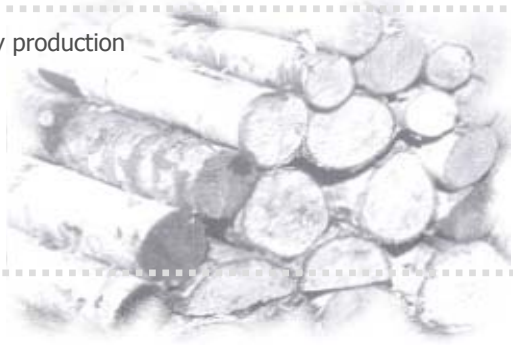
■ Challenges for the future

The first round of the Environment Protection and Infrastructure Operational Programme (EIOP) application is currently running between the 16th of February and 21st of May, 2004. Since these applications have not yet been evaluated, it is difficult to report on their inadequacies.
In 2003 the National Development Office founded the Project Generation Facility (PFG). The aim of this facility was to collect project ideas and select the most suitable to be developed into high quality projects that will be able to obtain support from the European Regional Development Fund (ERDF) and the European Social Fund (ESF) between 2004 and 2006. The first round of the PGF has been closed and work on these proposals will soon begin.
At the end of 2003, 21 ideas were chosen for the EIOP application. Out of these 21, eight applications concern the energy efficiency and renewable energy window. The successful applicants are four local government, two enterprises and two foundations. It is problematic, however, that one of these applications is concerned with the development of main lines for a district heating system. The RES projects, financed by SF - like other RES projects - can cause other negative effects resulting from the lack of RES regulation of Hungary.
A potential problem is that the SF EIOP application, which has been announced for Hungarian enterprises, NGOs, local governments will be won by foreign companies because of their prior experience and stable financial background. In this case, the SF application will not have the desired effect.

■ Conclusions

The role of renewable energy sources in Hungarian energy policy is growing and it is also frequently making appearances in strategic documents. As a result of joining the EU, a fund bigger than any other before will be available to finance the development of RES projects on a large scale, but this opportunity requires professionalism. As the relevant RES tenders of the SF have only partly been published and only a few weeks ago, we lack objective experience in relation to realisation of projects. Hence we can only indirectly draw conclusions about the projects and point out the potential defects.
These conclusions are based on the project proposals selected for support submitted to the National Development Office in the framework of the Project Generation Facility mentioned above. It is planned that the selected projects will commence in the southern part of Hungary. No proposal from the economically underdeveloped north-eastern region has been granted support, whereas the PGF should have also functioned to assist and provide opportunity to "vulnerable" regions which have no funds to finance project generation and development. Although the so-called "support intensities" are in favour of underdeveloped regions, the development of projects and representation of self-interests in project budgets is a problem almost impossible to exclude.
Another difficulty is the time gap between the announcement of some of the facilities of the Structural Funds and the finalisation of the RES Strategy: the focal points of the facilities might have been different had the time order been reversed.
The Structural Funds undoubtedly provide the largest amount of funds for RES (six times higher than the National Energy Efficiency Program), but this is not necessarily enough given the high investment intensity of RES projects. One has to note also that for example, in the case of electricity generated using RES it is not the lack of support for investments that prevents the expansion of these projects, it is rather the unfavourable feed-in. Therefore the availability of SF will not in itself resolve the delay, although it will definitely play a crucial role in coming years.
Although the system of support-differentiation (using available support percentage per project) among regions, enterprises, municipalities and NGOs is quite progressive, it may also be worthwhile representing these percentages as part of the total available fund, preventing some enterprises getting an ill-proportioned share of these funds.
Similarly, in our opinion it would be favourable to set the share of RES and energy efficiency projects within the EIOP's 1.2 bn HUF. Projects involving a larger number of active partners should be given priority. Another possibility is to give priority in the ECOP's SME Technical Development Facility to investments related to RES and EE, thus increasing their competitiveness and role in environmental protection.
Last but not least the objective of the ROP ("The sustainable development of regions rich in natural and cultural values using internal resources") - that has as an inherent part to it the support of RES but not on the level of actions - should be reinforced.

1 the sum of the renewables is less than the actual use of renewable sources in primary production because non-commercially traded renewable energy sources are not represented.
2 Ministry of Economy and Transport 2003
3 Daniel Reiche (ed.): Handbook of Renewable Energies in the European Union II – Case Studies of all Accession States. Peter Lang 2003.



■ Lithuania

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The potential for RES projects to be financed by the EU Structural Funds in Lithuania is high. The promotion of RES use in Lithuania is stated in related national laws, and activities needed in order to promote RES are identified in the Single Programming Document. The closure of Ignalina Nuclear Power Plant will lead to the need to replace this electricity production by other sources. In addition to this closure, reduction of GHG emissions, an increase of independence from imported fuels as well as the EU requirements are among the reasons set out to increase the use of RES by 12% by 2010. NGOs have an opportunity to play a role in the promotion of RES via information, consultation, education projects and feasibility studies. These projects could well benefit from the Structural Funds.

■ Country profile and summary statistics

After restoration of independence in 1991, all sectors of the economy, including the energy sector, have undergone complicated changes. A very sharp increase in primary energy prices and the loss of former Eastern markets brought about a noticeable decline in national energy related industry and energy exports. Energy demand and its production decreased almost by half in 1995, and at that time electricity consumption made up only 53 % of the consumption level of 1990 (a decrease from 12.0 TWh in 1990 to 6.35 TWh in 1995). In 1996 and 1997, the energy sector covered about 6-7 % of the national GDP, including the supply of electricity, heat and gas which made up 2.7-2.9% of this percentage (Lithuania's second National Communication under UNFCCC, 2002).

The potential of RES in Lithuania is quite considerable. The potential for wind energy amount to 600 GWh/y (Measurements of the Royal RISO Laboratory for the project "Wind Energy Development in the Baltic States). There is one large-scale hydro power plant in Lithuania located on the River Nemunas. It has a total capacity of 100 MW and total output of 375 GWh/year. In 2001, there were 41 hydro power stations (with a capacity less than 10 MW), having a total output of 41 GWh/year. Therefore, hydro electricity comprises a mere 0.3% of the total primary energy supply (Renewable Energy Sources in Estonia, Latvia and Lithuania, Baltic Environmental Forum, 2003).

In regards to wood–based fuels, Lithuania has vast potential - as 31% of the country is covered by forest. This can be estimated as a total wood stock of 378 million m^3, while the annual felling volume of wood is only 4 million m^3. Therefore, the production of heat from wood-based fuels was 28005t, which can in turn be translated into an 8% share of the total primary energy supply. Straw is also available as a bio-fuel (0.5 million tonnes), however straw boilers are installed only in few boiler houses. Furthermore, there are some initiatives to produce energy from biodegradable waste.

A considerable change in the electricity supply will be caused by decommission of the Ignalina Nuclear Power Plant: the first block by 2005 and the second block by 2010. Currently Ignalina Nuclear Power Plant produces about 80% of all electricity needs. The energy supply forecast according to basic energy needs is presented as a scenario in Table 5. According to the table, RES made up 9% of all energy demands in 2000. In 2010, it is forecasted that RES will make 14% of all energy demands.

Table 5: Energy demand forecast, TWh. (D. Streimikiene, Lithuanian Energy Institute, Feb. 2004)

	1990	1995	2000	2005	2010	2015	2020
Renewables	**0.42**	**0.58**	**0.66**	**0.81**	**1.00**	**1.16**	**1.32**
Coal	0.64	0.24	0.09	0.11	0.11	0.1	0.09
Natural gas	4.68	2003	2.07	2.66	4.54	4.76	4.96
Oil products	7.01	2.95	2.23	2.52	2.72	2.88	3.05
Nuclear	4.45	3.09	2.19	1.95	0	0	0
Total	**17.19**	8.89	**7.24**	8.05	8.37	8.89	**9.42**

■ Main strategic and development documents

The main documents that directly identify RES policy are the National Energy Strategy (adopted by the Governmental Resolution No. IX–1130, on 10 October 2002) and the National Energy Efficiency Program (approved by the Order of the Minister of Economy No 319, on 26 October 2001).
The National Energy Strategy identifies 13 objectives in energy sector development and within these objectives it is stated that the RES share of the primary energy demand should make up 12% by 2010.
Furthermore, the National Energy Strategy identifies targets and measures to achieve these objectives – including the promotion of RES and local energy sources. In order to use local energy sources more efficiently and to reduce fuel imports as well as establish new working places and improve the quality of environment, the following measures will be undertaken:
Promotion of the use of RES by administrative, economic and financial incentives (companies will be supported, as will be the production of equipment for the use of those resources).
Programs for the use of RES and local energy resources will be prepared and adopted.
The implementation of projects concerning wind, hydro, solar energy and waste energy use will be supported by the Government.
Preconditions for the development of bio-fuel production will be created. Relevant legal acts will be reviewed regularly and amended to promote the production and use of bio-fuels.
These measures should imply compatibility with the EU requirements laid out for the energy sector. The current National Energy Efficiency Program is set for 2001–2005 and is being updated on a regular basis. The program implies the development of RES should focus on the development of biomass, as it is considered to have the greatest potential in Lithuania. Therefore, effective collection and use of wood residues, as well as growing forests for energy on abandoned land, the use of depleted peat bogs and gravel quarries should be promoted.
The promotion of RES has been declared in the national legislation. The Law on Energy (2002) sets a framework for, and defines the responsibilities of different institutions involved in the promotion of RES. The Law on Electricity (2000), article 11 Promotion and Consumption of Electricity Produce from Local, Renewable and Waste Energy Resources states that the State shall encourage customers to purchase electricity produced from local, renewable and waste energy resources. A procedure for the purchase of electricity produced form RES in plants with less than 20MW installed capacity has been approved. The fixed purchase price for the next ten years for electricity is defined as: 0.058 Euro/kWh for hydropower plants and power plants using biomass and 0.062 Euro/kWh for wind power plants. These prices are higher than the prices for electricity produced by power plants operating on fossil fuels. Moreover, the Law on Thermal Economy (2003) states that the State and municipalities should promote the purchase of thermal energy produced from RES as an activity that serves public interest. The prices for heat generated from RES are set on a case by case basis.
The National Sustainable Development Strategy (2003) also promotes the use of RES. As regards to climate change policy, a lot of recent activities have taken place. The Climate Change Mitigation Program adopted in 1996 will be amended. In addition, the National Inventory of GHG will be reviewed and amended as required. A UNFCCC in depth review will take place in spring 2004.

■ Financing from the SF

The Single Programming Document (SPD) contains the strategy and priorities for the Structural Funds for the years 2004 to 2006. On the basis of the decisions of the Copenhagen European Council last December, about 900 million Euros will be allocated to Lithuania under the EU Structural Funds and some 610 million Euros under the Cohesion Fund. Structural support for Lithuania is predicted to be 3-4% of Lithuanian GDP. The SPD was adopted by the Governmental Resolution No. 1679, on the 24 December 2003.
The Government shall create funding opportunities for RES projects from EU Structural Funds as is stated in the National Energy Strategy. The SPD identifies measures in the energy and environmental sectors in *Priority 1: Development of Social and Economic Infrastructure*. Among other measures, *Measure 4: Development of Energy Efficiency* includes RES. The SPD states that the objective is to increase the use of local energy resources and RES based on the need to minimise the use of imported fuel, save financial resources needed for purchasing fuel, improve the state of the environment and create new jobs. This measure will be implemented through development and implementation of projects and by application of new technologies. Feasibility studies on the use of geothermal energy and hydro energy will be prepared, and research on wind, energy and biomass energy will be carried out. In addition, *Measure 4* indicated that raising awareness, education and consultation activities should take place.

The Annex of the SPD prepared according the Structural Funds regulation 1260/99, article 18 provides more detailed information on investment strategy, measures and activities to be implemented. The RES promotion falls under *Measure 1.2: Insurance of stability of energy supply, access and higher energy efficiency*. One of the aims of this measure is to increase the use of RES and install new technologies for RES use. Support will be provided for the use of geothermal, hydro wind and solar energy, as well as biomass and household waste energy use. These activities will contribute to the implementation of the requirements of EU Directive 2001/77/EB.

Furthermore, it is worth mentioning, that the information spread, feasibility studies, education, consultation and research in fields related to this measure are activities eligible for funding.

Although NGOs are not directly listed as possible applicants for the Structural Funds, it is stated that all juridical persons, whom work in the field of energy may be eligible. Thus, this means that an NGO dealing with RES could apply for the funds.

■ Conclusions

The SPD, as well as other national legislation clearly endorses the use of RES. The National Energy Strategy has set a qualitative target for the use of RES by 2010 and the programs how to achieve this target have been prepared.

The impact of measures promoting RES and security of energy supply funded by the Structural Funds will be measured by two indicators: decreased level of dependency on imported fuel and reduction of CO^2 emissions. It is envisaged that appropriate measures will reduce CO^2 emissions by 270 000t. However, it is difficult to distinguish how much of this reduction will be achieved by the increased use of RES.

Promotion of RES, will have an impact on regional development, creation of new jobs and reduction of migration from the region. However, in order to quantify how much SF financed RES projects will contribute to GHG emission reduction, employment increases and local development, a baseline analysis should be made and monitoring should be carried out.

■ Poland

Poland is one of the world's leading producers and exporters of hard coal and its energy sector is heavily dependent on hard coal and lignite as primary energy sources. Since several years diversification of the energy sources has been recognised as a strategic priority. One of the potential directions of this process is promotion of RES. In spite of a sizeable potential, the RES unfortunately play a small role in total primary energy supply in Poland. Altogether they accounted for only 3.6% in TPES in 2002.

In recent years, to improve the existing situation a number of strategic policy documents related to RES development have been adopted. The key document is The Polish National Strategy for the Utilisation of RES by 2020. The Strategy has set specific targets for the development and implementation of RES - to increase the share of RES in the country's fuel and energy balance to 7.5% by the year 2010 and 14% by 2020. The development of RES is seen also as an appropriate policy to achieve the goals of The Climate Policy of Poland - Greenhouse Gas Emission Reduction Strategies until 2020.

In the framework of Cohesion and Structural Funds between 2004 and 2006 Poland will receive 11,3686 billion EUR (11,368.6 million EUR) from the European Union. Analysis of the National Development Plan shows that support from the Cohesion and Structural Fund for RES development between 2004 and 2006 will be of marginal importance for the development of this type of energy in Poland. The main threat for RES development in Poland will be excessive financing of activities related to fuel conversion in local boiler houses from coal to gas as well as the financing of environmental investments in large coal power plants. The main recommendations to improve the existing situation are:

- **To supplement the National Development Plan with a document specifying in detail the types of renewable energy sources that will receive support;**
- **Withdraw support from the EU Funds for investments aiming at the change of energy carrier from coal to gas;**
- **To prepare a detailed handbook for investors interested in constructing installations utilising RES.**

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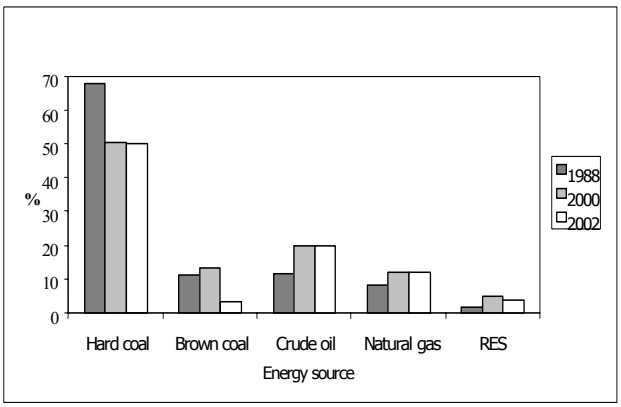
■ Country profile and summary statistics

As stated above, Poland is one of the world's leading producers and exporters of hard coal and its energy sector is heavily dependent on hard coal and lignite as primary energy sources. The majority of electricity generation in the country is coal-based (98%), though diversification toward natural gas and other energy sources has been recognised as a strategic priority. As demonstrated by the following chart, coal still accounts for over 50% of Poland's total energy consumption although its share has substantially decreased in recent years.

Figure 2: Shares of energy sources in primary energy use in Poland



Electricity is generated at about 400 power stations and CHP plants, with total installed capacity in 2002 amounting to 35,018 MWe, thus highly exceeding domestic needs (roughly by 30%). The Polish Power Grid (PSE) is responsible for power transmission and dispatch. In 2002 almost 11 billion m^3 of natural gas was used in Poland, the majority of which was imported from Russia. This dependency on a single source of supply (Gazprom) becomes an increasingly important policy issue.

Despite a sizeable potential, RES play a small role in total primary energy supply in Poland. Altogether they accounted for only 3.6% of TPES in 2002. The actual share is somewhat higher, since most of self-supplying consumers of renewable energy are not accounted for in these statistics.

Hydropower: Polish hydropower resources are small due to the limited and unfavourably distributed precipitation, high soil permeability and relative flatness of the country. The total installed capacity of large hydroelectric power stations is around 630 MW, and 160 MW for small plants. The technical potential for small hydropower production is estimated at 1,6 TWh/year.

Biomass: The combustion of straw and wood-waste in boilers of district heating plants provides an economically profitable option in many rural regions where suppliers are located quite close, while the delivery of other fuels is expensive. In Poland a rising number of wood or straw boilers are coming into operation. Areas with the highest potential for biomass energy are in the northern, western and eastern parts of Poland. Technology and supply sources are relatively mature and investment costs are competitive in comparison with other RES applications.
Wind: The technical potential of wind energy is good: 30% of the land surface is economically suitable for wind turbine applications, and 5% is very favourable with very good offshore wind conditions. The best sites are in north-eastern Poland and along the coastal strip where the average wind speed reaches 5 m/s. Currently, wind energy is used to a small extent. In recent years, several modern, grid connected wind turbines have been installed. So far they offer rather long payback periods, although some investors are keen to install more turbines at locations on the coast and some locations in central Poland.
Geothermal: Poland is rich in geothermal resources. A sizeable geothermal potential can be found in almost 80% of the total land area. Particularly good conditions exist in the mountainous region of southern Poland as well as in many locations in the north (in the region of Szczecin) and in central Poland (Łódź). In a few cases geothermal energy has been used for district heating (Police, Podhale). Geothermal projects have been supported by World Bank funds and grants or loans are provided by Polish environmental funds. The current installed capacity is approximately 70 MWt.

■ Main strategic and development documents

In recent years a number of strategic policy documents relating to RES development have been adopted. The Second National Ecological Policy, adopted by Parliament in 2001, calls for better integration of sectoral strategies (including environmental, energy and regional development policies). Climate protection issues have been identified as one of the main priorities. The Second National Ecological Policy envisages that the share of RES in the energy balance should be doubled by 2010, and RES development plans should be made part of regional development strategies adopted by regional and local authorities. (This requirement is important in the context of use of Structural Funds, as regional development strategies form a base for projects that are eligible for funding). The provisions of the Policy are expanded in the National Environmental Policy for 2003-2006 with a view to 2007-2010[1], which refers to priority measures set out in the 6th EU Environmental Action Program.
The Government's energy policy is described in the Guidelines for Poland's Energy Policy with a target to be achieved by the year 2020, which was adopted by the Council of Ministers in February 2000. Promotion of renewable energy sources is indicated as one of the policy objectives but the policy has not specified more concrete measures to support its implementation. At the beginning of 2002, an Assessment of Implementation and Amendment to the Guidelines for Energy Policy of Poland by 2020 was approved by the Council of Ministers, containing in particular a new short-term forecast for the development of Poland's economy and the fuel and energy sector until 2005. According to this assessment, it is expected that RES will develop relatively slowly, with little chance for reaching the targets set by the environmentally oriented policy documents (see Table 6).

Table 6: Renewable energy consumption projection (PJ)

Type of renewable energy	2000	2005
Biomass	142.7	127-142
Biomass-heat and power	3.5	4.4-5.9
Hydropower	7.6	8.1
wind energy	0.02	0.57
Biogas	1.3	2.92

Source: Assessment of implementation and revision of energy policy objectives for Poland till 2020, adopted by the Council of Ministers in April 2002.

The key document from the RES perspective is The Polish National Strategy for the Utilisation of RES by 2020, officially adopted on August 23, 2001. The strategy set specific targets for the development and implementation of RES, recognising the multi-dimensional social, economic and environmental benefits from this action. The main strategic goal of this policy is to increase the share of RES in the country's fuel and energy balance to 7.5% by the year 2010 and 14% by 2020. The strategy recognises the use of RES as an essential factor contributing to sustainability. The development of RES is to bring about measurable environmental and energy benefits, and the increased share of RES in the energy and fuel balance will contribute to economising non-renewable energy sources, and to better the state of the environment by reducing air emissions, water pollution and waste streams.
In November 2003 the Council of Ministers adopted The Climate Policy of Poland - Greenhouse Gas Emission Reduction Strategies until 2020 - yet another document partly devoted to RES development. The Climate Policy identifies an increase in the use of RES as one of the most effective instruments in delivering GHG reduction, however it is rather weak in terms of qualitative

targets with regard to RES development, especially in a long-term perspective.
Certain regulations stimulating the development of the RE were taken into account in the Energy Law. They include provisions obliging the Council of Ministers to integrate issues involved in the development of RES into the preparation for the National Energy Policy. There is also a regulation of the Minister of Economy imposing an obligation to purchase electric energy and heat from RES from entities that trade in energy[2]. According to the regulation, the share of RES in total energy sales should increase from 2.4% in 2001 to 7.5% in 2010. To support renewable energy production, the Excise Ordinance provides an exemption of excise tax on green electricity: 0.02 PLN/kWh (€0.056), 10% of electricity price; and exemption of excise tax on fuels: around 45% of the fuel price for bio-ethanol.

■ Financing from the SF

The National Development Plan
The National Development Plan for 2004-2006 (NDP)[3] specifies the manner and directions of allocation of financial means that Poland will receive from the European Union funds between 2004 and 2006. It identifies the most important structural activities that Poland should conduct. Environmental protection will be mostly financed from two EU sources: the Cohesion Fund and the European Regional Development Fund .

The Cohesion Fund
The main aim of the Cohesion Fund is to support public authorities in implementing EU environmental legislation. It does not directly include RES development, however, there exists a slight possibility that such activities will be financed to a limited extent under projects for air quality improvement, relating among others to: modernisation and development of urban heating systems (sources, distribution network) and system conversion of domestic furnaces. According to a representative of the Ministry of Environment, the resources from the Cohesion Fund will be first and foremost allocated to investment projects that contribute to achieving commitments ensuing from the transition periods negotiated with the EU (RES do not belong to this group). To date, almost all of the projects that have applied for co-financing from the Cohesion Fund relate to the supply of drinking water and wastewater management. The fact that the minimum cost of projects financed under the Cohesion Fund is 10 million EUR; this further limits possibilities for financing RES from this source.

The European Regional Development Fund
It was initially assumed that a Separate Sector Operational Programme - environmental protection would be prepared to specify the general allocation of resources from the ERDF. Unfortunately, due to incompetence of the Ministry of Environment, the European Commission did not accept the programme. Therefore, environmental investments have been included in two other sector programmes: Growth of Economic Competitiveness and the Integrated Operational Programme for Regional Development. The Growth of Economic Competitiveness Programme[4] assumes support for investment projects in industrial enterprises relating among others to:
- investments in combined heat and power generation,
- conversion of fuel combustion installations to more environmental friendly solutions,
- activities supporting the use of alternative energy sources.

As the activities focus on the implementation of requirements of Directive 2001/80/EC, the support will be directed to projects aiming at reducing emissions from large installations (more than 50 MW_t). This limits the possibility to finance RES. Beneficiaries include economic subjects and the funds will not be available for non-governmental organisations that do not conduct economic activities.
The Integrated Operational Programme for Regional Development[5] clearly relates to activities for RES development - it includes projects for construction, development and modernisation of public infrastructure for producing electric energy and heat from renewable resources. Support will be granted for projects with the total cost from one to ten million euros. Both preparatory and investment activities will be financed. The beneficiaries include public institutions- first and foremost territorial local government units. Non-governmental organisations will obtain aid only if they cooperate with local governments. The projects under the Integrated Operational Programme for Regional Development relating to new renewable energy sources will undergo a procedure of notification by the European Commission. The amount for RES development granted under the Integrated Operational Programme for Regional Development has not been specified.

■ Challenges for the future

The most significant threats include:

1. Lack of a separate, individual operational programme for environmental protection activities that would include specifications on RES development. This leads to a situation where environmental protection issues, including RES development, are granted just a supplementary role in other programmes.
2. A too general approach to the issue of renewable energy sources development, lack of a cohesive programme for RES development within the NDP. The possibility of RES financing is usually named as one of the options for improving air quality; it is placed together with activities relating to, for example, the change of an energy carrier from coal to gas.
3. Although the government has already adopted a strategy stipulating the necessity of RES development, a cohesive programme supporting activities in this field has not been created so far. This may result in lack of sufficient domestic financial resources for completing the EU co-financing for RES development.
4. The most significant threat is the energy surplus in Poland and the aggressive promotion of natural gas as a fuel replacing coal; both in individual (domestic) boiler houses and in small or medium sized local boiler houses. Due to this, instead of constructing installations based on renewable resources, a lot of investors choose installations powered with natural gas, which excludes the possibility for RES development in such areas for the next twenty years.

■ Conclusions

The NDP marginalizes the issue of renewable energy sources development. The statements on the issue are of a very general character, among others it is impossible to calculate the funds that will be allocated for activities in this field, and the types of projects (installations, energy sources) that will receive support also have not been specified.

It is highly likely that support from the Structural and Cohesion Funds for RES development between 2004 and 2006 will be of marginal importance for the development of this type of energy production in Poland.

The main threat for RES development, both in terms of a short (2004 - 2006) and long (through 2020) perspective, will be excessive financing of activities relating to fuel conversion in local boiler houses from coal to gas.

Excessive financing from public resources (also from the NDP) of environmental investments in large coal power plants also constitutes to be a threat, as it preserves the coal structure of the Polish energy sector and limits the possibility for RES development.

Recommendations

It is necessary to supplement the NDP with a document specifying in detail the types of renewable energy sources that will receive support. The possibility for framework specification of financial means allocated to RES development should be considered.

Support from the Cohesion and Structural Funds for investments aiming at the change of energy carrier from coal to gas should be withdrawn, especially in the areas lacking gas infrastructure (rural areas).

It is advisable to prepare a detailed handbook for investors interested in constructing installations utilising RES (both local governments and private investors) that would make it easier for them to apply for EU assistance funds (procedures, applications, sources of additional technical information, possibility of co-financing from environmental protection funds, etc.).

1 Adopted by the Council of Ministers on December 17, 2002.

2 Regulation of the Minister of Economy, Labour and Social Policy on Specific Requirements to Purchase Electricity and Heat from Renewable Sources and Cogeneration, adopted on May 30, 2003 (Journal of Laws Issue. No 104 Section 971)

3 Poland is not fully prepared to utilise the Structural Funds allocations; not all of the operational programmes have been accepted and neither has a procedure for funds management been prepared so far. Therefore, this evaluation should be treated as a preliminary step. Moreover, it appears that the level of utilisation of Structural Funds in the first period will be lower than was previously assumed - this is a period when Poland should first and foremost learn how to effectively utilise the coming financial resources.

4 The final version of the sector operational programme - Growth of Economic Competitiveness has not yet been prepared, only a draft version (in Polish) is available at http://www.konkurencyjnosc.gov.pl/_fundusze.php

5 0n 19 February 2004 the European Commission accepted the Integrated Operational Programme for Regional Development (Ministry of Economy, Labour and Social Policy, Warsaw, 2004, Polish version available at http://www.konkurencyjnosc.gov.pl/_fundusze.php)

■ Slovak Republic

Renewable energy sources have not yet been considered by the government or industry as important sources of energy in Slovakia. RES currently have a 3% share of primary energy consumption and this is far below its possible potential. Underdevelopment of these sources has been caused by a lack of supportive measures and an information gap in how RES could contribute to sustainable development including, job creation, emissions reductions, etc. At a minimum, financial barriers, which have always been related to the development of RES in Slovakia, could be removed by the Structural Funds. Several policy documents list renewable energy projects as being eligible for funding.
To the advantage of Slovakia, a huge amount of funds have been allocated for SF, and the Slovak government has a willingness to effectively use these funds (if the government does not take full advantage of these funds Slovakia could become a net donor to the EU budget). On the other hand, lack of experience, human resources and public awareness seem to be the biggest obstacles in utilisation of Structural Funds for development of renewables.

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■ Country profile and summary statistics

Energy is mainly produced from fossil fuels in Slovakia. The share of renewables is minuscule, (at 3% this represents half the EU average) and despite the large potential for renewables generated from policy measures, has not yet been able to stimulate their further development. The share of RES is higher in electricity production - 16 % (2001), whereas the rest is covered by nuclear energy, gas and coal. Nevertheless, almost all RE electricity is produced by large hydropower plants (see table 7). The installed capacity of other renewable sources is negligible for biomass and zero for wind and solar.

Table 7: Power production in 2001.

Total power production from all sources	31,9 TWh	100 %
Hydropower (of which is pumped hydro)	5,117 TWh (0,119 TWh)	16 % (0,37 %)
Solid biomass	0,153 TWh	0,5 %
Biogas	0,001	0,003 %

Source: IEA Country Submissions (2002).

■ Main strategic and development documents

The main strategic document where RES are mentioned is the Energy Policy Plan produced by the Ministry of Economics (MoE). It is a pity that this plan does not have any specific message regarding renewable energy targets. What is more striking is that there is no target for RE electricity as it is required by the EU Directive on electricity from RES. In general, the Plan says that under good financial conditions it could be possible to double the share of renewables (total heat + electricity) by the year 2010. Nevertheless, clear targets and timetables are missing. Biomass is considered as the most promising source of energy for heating.
There are some other governmental documents produced at the Ministry of Environment which are related to climate change (National Communication to UNFCCC Secretariat), which based their prediction on future development of RES. However, these documents do not have the power to change governmental energy policy.

■ Financing from the SF

Structural Funds seem to be the ultimate source for financing of RES. There are several reasons for this. Primarily, governmental support for RES is negligible. Secondly, renewable energy projects are eligible under SF scheme support.
The objectives of the National Development Plan (NDP) for Slovakia determine the direction of development and the priority to be supported from Structural Funds during the period of 2004 to 2006. Fortunately NGOs influenced the NDP, and consequently renewables are explicitly mentioned several times and thus projects incorporating them are eligible and usually have high priority among selection criteria.
In particular, RES projects could be financed according to several schemes and under various programming documents. Most important of them is Sectoral Operational Programme Industry and Services. RE projects are eligible for funding also through the Sectoral Operational Programme Basic Infrastructure.

Sectoral Operational Programme Industry and Services (SOP I&S)

Mentioned in the SOP I&S is a strategy for the development of industry and services aimed at:
- enhancing competitiveness of regional areas by expanding activities in companies and services, creating jobs and profits and thereby strengthening the principle of solidarity
- increasing the diversification of energy sources and ensuring their interconnection (between distribution networks)
- support for *renewable sources of energy* and cost-effective technologies

The Sectoral Operational Programme Industry and Services for the 2004-2006 period has already been developed by the Ministry of the Economy of the Slovak Republic. It applies to regions, whose per capita GDP, measured in purchasing power parities for recent years, is lower than 75% of the community average. In geographic terms, this covers the whole territory of the Slovak Republic, expect the Bratislava region. The European Regional Development Fund supports the Sectoral Operational Programme Industry and Services. According to this document industrial strategy will be aimed towards:
- Renovating old technologies and the introduction of new technologies, which have less demand on material and energy resources and are environmentally friendly. This would increase production quality, which contributes to increased competitiveness of industry and allows businesses to link to production chains (i.e. to link as direct suppliers or secondary suppliers)
- Production of heat and electrical energy from *renewable resources*.

Measure 1.4: Support for energy saving and use of renewable energy sources

The aim of this measure in the area of energy is to reduce the energy consumption of manufacturing processes to a level comparable with the EU, thereby achieving significant energy savings, as well as efficient use of energy, including an increase in the share of generation from renewable sources. Support should be given primarily to programs that lead to an increased share of electricity generation from renewable sources, and programmes aimed at savings and effective use of energy in industry and services that support it.

Expected results: energy saving, reduction in energy consumption, reduction in energy demands in industry and related services; modernisation of existing sources of energy and electricity (support for reduction of environmentally polluting production of energy and electricity, increased use of combine heat and power plants); an increased share of overall production of energy from renewable resources, through the use of biomass, construction of small hydroelectric power stations and other alternative energy sources; preparation of studies (e.g. feasibility studies) and projects, in accordance priority 1.

Support for energy saving and use of renewable energy sources is explicitly mentioned in Measure 1.4 under priority 1 of the SOP I&S. It is proposed to allocate 15% of all funds for this measure alone. The SOP I&S is targeted only at industry and services within the private sector.

The SOP I&S will be financed from the ERDF. A total of 133.76 million EUR has been provided from ERDF funds for the plan. The SOP I&S financial plan anticipates the use of community resources and public and private funds. National public funds will be allocated from the budget of the MoE SR, the Managing Authority for SOP I&S. The ratio between ERDF funds and MoE funds will be 75% to 25%.

Operation Plan: Basic Infrastructure (OP BI)

The OP BI is focused on the reconstruction of buildings, increasing their standards and renewal of their equipment. This aim is also focused toward the support of local infrastructure in the field of regional policy. Renewable energy projects are eligible for funding and are covered by Priority 2.

Priority 2: Environmental infrastructure

Measure 2.2: Improvement and development of infrastructure for the protection of air

This measure is designed to achieve compliance, especially with the following EU directives: Council Directive 2001/80/ES on the limitation of emissions of certain pollutants into the air from large combustion plants directives. The measure is to contribute to reduction of air pollution, in particular by solid pollutants and sulphur dioxide, as well as to the reduction of greenhouse gas emissions. The measure is also designed to improve air quality in population centres by introducing technology that reduces air pollution, as well as by introducing low-emission technology in various areas of production. The measure's implementation shall be based among others on:
- a change to the fuel base of energy resources, with focus on low-emission and renewable resources.

Final beneficiaries: Regional self-government, local self-government (municipalities and towns) and their associations, state administration and business entities. Measurable outputs: reduction of emissions of pollutants and greenhouse gases; reduction of emissions in per capita terms; achievement of the percentage (%) usage of renewable energy resources.

Priority 3: Local infrastructure

Sub-measure 3.1.1: Building and development of education infrastructure

Sub-measure 3.1.2: Building and development of health infrastructure

These sub-measures are focused on reconstruction and refurbishment of buildings used for education and healthcare. The objective is to improve the

technical status of these facilities. Renewables are explicitly mentioned as the tool for helping to reduce emissions in present buildings heated by coal or heavy oil.

Of the total assistance of 422,3 mil. EUR, an amount of 96,4 mil. EUR (22,82%) has been allocated towards priority environmental infrastructure and 95,1 mil. EUR (22,54%) towards priority 3 Local infrastructure.

■ Challenges for the future

It seems that the major threats to the success of RES will be related to lack of experience, skilled people and knowledge. Another problem will be the introduction of RES at a local level. Lack of knowledge is especially significant at the level of community leaders and decision-makers that are responsible for project preparation.

There is a risk that if no or only a few small scale RES projects will be accepted, the majority of funds will go towards large scale energy projects (e.g. highway construction) or projects which are based on fossil fuels like natural gas. Scarcity of agencies or lobby groups promoting RES will also contribute to threats (and it will be difficult to overcome this in the near future). Nevertheless, there are some attempts by NGOs to fill the gap and they are coming up with their own project proposals centred mainly on biomass heat utilisation at a community level (i.e. the substitution of coal by wood).

At this time it should be mentioned that some administrative problems and discouraging aspects have great importance for electricity produced from renewables. Firstly, the feed-in tariffs set by the distributing companies are extremely low - recently at the level of 3 Euro cents/kWh for all kinds of renewables. As the result of this, most of the potential projects will have long repayment times. This is usually unacceptable for domestic banks which finance such projects. Another issue is the value-added tax (VAT) which should be set at a lower level to stimulate the purchase of renewable energy technologies. In Slovakia just the opposite trend has been observed - towards higher taxation. As an example, VAT for solar collectors has been increased from 5% to 20%. There has basically been no willingness to change this situation despite the fact that due to permanently low sales of renewable technologies, the VAT revenues for the state budget for these items were practically negligible. The price increase for the buyers, however, has been quite significant. Under the new law on taxation, which will come into force in January 1, 2004, Slovakia will introduce an equal tax rate for VAT (all items) and income at 19%, and there are no exclusions or reduced rates for renewables.

■ Conclusions

It is not clear yet if the SF will provide the needed support for renewables in Slovakia, but the spirit of the program documents is promising. The future of these projects will depend on the activity of individuals and even NGOs whose main goal is to get the involved parties (local decision makers and industry) together in order to prepare joint projects. The first attempts have been already been made.

It is of great importance to be successful during this first program period (2004 -2006) and thus open the door for the next period. NGOs can play a leading role in this matter, as the governmental and even regional authorities do not seem to have significant interest in renewables. The main activity should be centred on raising awareness of the issue. It is obvious that community leaders should be educated on how the RES could help them to cut energy costs and stimulate new business in their regions. These regions are currently being hit hard by the constant increase of fuel costs. Benefits like job creation and emission reductions related to increased utilisation of renewables - especially biomass, are not well known at a community level. These benefits have gone unrecognised by the government, so it is important to orient efforts towards promoting these issues, especially in regions with high unemployment (half of all Slovak regions suffer from higher than 25% unemployment).

There is no doubt that all stakeholders (government, regional or community leaders, NGOs and industry) need to commit more effort and allocate more resources in order to obtain use of SF for the broader utilisation of renewable energy sources in Slovakia.

The main reference is the Ministry of Regional Development (http://www.build.gov.sk/index.php).
1. Narodny rozvojovy plan. Ministerstvo regionalneho rozvoja SR. 2003 (National Development Plan for Slovakia. Ministry of Regional Development).
2. Sektorovy operacny plan pre priemysel a sluzby. Ministerstvo regionalneho rozvoja SR. 2003. (Sectoral Operational Programme Industry and Services. Ministry of Regional Development).
3. Operacny plan zakladna infrastruktura. Ministerstvo regionalneho rozvoja SR. 2004. (Operating Plan Basic Infrastructure. Ministry of Regional Development).
4. IEA Country Submissions (2002).
5. Energeticka politika do roku 2005. Ministerstvo hospodarstva. 1999. (Energy Policy Plan until 2005. Ministry of Economy).

Slovenia

Slovenia's energy system is heavily dependent on fossil fuels and nuclear energy. There are good economic potentials for increasing the use of RES. However, a clear policy on and prioritisation of RES is alarmingly lacking. The main strategic and development documents do not set RES as a priority and this is transferred also to the Single Programming Document, on the basis of which the Structural Funds will be used. The document defines the following priority areas: competitiveness of the production sector, development of human resources and employment, balanced regional development, restructuring the agricultural sector and technical assistance. Although RES are not highlighted in any of the priority areas, there are numerous opportunities for using Structural Funds to support RES. These opportunities include: establishing centres of excellence for the use of RES and development of RES technologies, development of SMEs that produce RES technologies, R&D for stimulation of RES, support for investments in the use of RES, human resources training to produce and use RES, support to biomass, establishment of a biomass market and promotion and marketing of biomass products. However, as RES are not mentioned in the priority tasks, it is highly possible that project developers may not consider the potential of RES for projects under the Structural Funds. Efforts should be made to avoid these problems through the fulfilment of the objective of the fourth priority task from the Programming Document, which is to support the use of EU funds through informing, raising awareness and assistance in project development, monitoring and evaluation.

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Country profile and summary statistics

Slovenia's energy system is heavily dependent on fossil fuels and nuclear energy (see Table 8). Energy dependency was estimated at about 77% in 2000 (if nuclear energy is considered to be a domestic source, then dependency is about 53%). Energy intensity is high - 0.29 toe/1000 - 95 USD in 2001. Industry uses 29.4%, transport 34.3% and other sectors (households, services and commercial activities) use 36.3% of the total available energy.

Table 8: TPES distribution in 2001

Hydro	4.7%
Comb. RES and Waste	6.4%
Coal	20.5%
Oil	36%
Gas	12.8%
Nuclear	19.2%

Source: IEA 2001.

The share of TPES for RES was estimated to be about 9.4% of in 2000. In 2001 the share of renewables in gross electricity production was 27.9%, of which almost 99% is hydropower, and a remaining 1% is biomass. 25.5% is large-scale hydropower (>10 MW), 2.0% small-scale hydropower (<10 MW), and 0.37% is estimated to be biomass. According to the Analysis of Economic Potential of Renewables, the projections for use of RES in electricity production by 2010 are:

- A chain of 5 hydro power plants with a total of 187 MW (0.72 TWh annual production) is under construction on the Lower Sava stretch, further large HPPs are possible on the middle Sava and Mura rivers; however, the environmental integrity of these potentials is dubious;
- Total additional potential estimated for small hydropower is 200 MW, of which up to 40 MWe may be built by 2010;
- Existing landfills, existing and planned waste water treatment plants in cities and animal farms have a economic potential of at least 10 to 30 MWe;
- The first geothermal power plant with 5 MW power could be built by 2010 (the theoretical potential is estimated to be from 50 to 70 MWe);
- The potential of biomass is estimated to be about 40 MW; a plant with total power from 8 to 10 MW could be built; the most important potentials are district heating systems, ensuring heat in the production sector, communal and individual furnaces in households;
- Wind power plants have a potential to be built for a total power of 40 to 80 MW;
- Solar power is too expensive and other renewable sources are not expected to contribute a significant share toward electricity production.

The largest potentials for RES are in the sector of heating supply for households and the public sector (biomass, biogas, geothermal).

■ Main strategic and development documents

The main two Slovenian development documents are the Strategy of Economical Development of Slovenia and the National Development Programme, both for the period 2001-2006. According to these documents, the strategic objective of development of economical infrastructure is to assure a cost-efficient supply of energy services, while ensuring the safety of the population, rational use of energy and environmental protection. Among the priority tasks of the National Development Programme the open opportunities for RES are: increasing the use of business opportunities, closing down of mines, energy sector investments, development of regional infrastructure, integrated development of rural and urban areas and stimulation of development in rural areas.

According to the Kyoto Protocol, Slovenia must reduce its emissions in the period of 2008-2012 by 8% in comparison to 1986. The use of RES is highlighted as one of the strategies for reducing GHG emissions. It also recognises that the use of RES not only has positive spin-offs for the environment, but also can contribute to the job creation in regional areas. It stipulates subsidies to overcome the obstacle of high investment costs and an increased amount of applied research and demonstration projects. The First National Communication to the UNFCCC prescribes that a quantitative target for the use of RES by 2020 should be established. The only existing RES target is one from the Accession Treaty: stating that 33.6% of electricity must be produced from renewables by 2010. An overall RES target is not explicitly stated, but quotation of the EU target of 12% indicates that this is the target level that Slovenia is aiming at.

The Energy Law from 1999 stipulates that diversification of energy sources, stimulation of the use of RES, prioritising efficient energy use and the use of RES and environmental acceptance of all sorts of energy should be the priorities of energy policy. It stresses that appropriate measures should be adopted to give priority to the use of RES. The Energy Law gives priority to qualified producers, under which also the use of RES is defined. Electricity, produced from RES is stimulated through feed-in tariffs. The Energy Law also stipulates that every five years a National Energy Programme should be adopted, to specify a long-term energy strategy, the RES investments and other energy investments according to integrated planning approach. Currently a new National Energy Programme is being adopted, which, on a declarative level, shows clear support to RES, while on an operative level, fossil fuels and nuclear energy are maintained heavily. The new NEP sets a target of 2% share of bio-fuels by 2010, which opens a basis for bio-fuel projects.

All in all, it must be recognised that the Strategy of Economical Development clearly highlights sustainable development and includes an environmental perspective in all of the priorities. In addition, all other relevant documents show a tendency to the promotion of sustainable development. However, the gap between what is declared in those documents and what happens in realisation of these measures, is one of the ever-growing challenges of Slovenia.

■ Financing from the SF

Slovenia adopted the Single Programming Document for the period 2004-2006 in December 2003. The document identifies the priorities of Slovenia in using EU funds. Priorities were selected on the basis of strategic and development documents of Slovenia (listed above) and the guidelines of the EU. As the priority areas the following are identified: competitiveness of the production sector, development of human resources and employment, balanced regional development, restructuring the agricultural sector and technical assistance. The development and use of RES is not listed among the priorities or specific measures and activities, however, the document recognises that the energy policy prioritises use of RES and that one of the objectives of the environmental policy is the use of RES. Therefore it is necessary to look for potentials for use of RES in line with the declared priority areas. The priority areas are thus listed below, with an indication of declared objectives of the priority areas and suggestions[1] on how RES development and use would fit under the priority area.

Priority Task No.1: Stimulation of the Production Sector and Competitiveness

This task aims at developing an innovative environment, stimulating investments in innovation, improving access to information, knowledge and financial sources and development of SMEs.

Although this priority task does not specify RES as one of the possible fields of action, it does, however, provide an opportunity to use Structural Funds for promotion of RES use and further development of RES technologies. RES can be an important means to increasing the competitiveness of companies and should not be neglected under this task. Within this priority the possibilities for RES stimulation are in the following areas:

- establishing centres of excellence for the use of RES and development of RES technologies
- development of SMEs that produce RES technologies

- R&D for stimulation of RES
- advisory centres for companies on how to use RES in their production systems
- use of RES as local sources of energy in the development of tourist destinations
- support of investments in the use of RES
- ensuring renewable energy for companies and tourist destinations

The beneficiaries under this priority are the Ministry for Economy, the Agency for Regional Development, the Ministry for Education, Science and Sports, the Fund for Development of Small Enterprises. The end users are mainly technological centres, business incubators, SMEs and institutions. However, NGOs, non-profit companies and municipalities can also be end users.

Priority Task No. 2: Knowledge, Human Resource Development and Employment

This task aims at developing human resources through enhancement of knowledge and increasing employment. RES opportunities under this task are in the following areas:

- Use of RES creates new working places in rural areas as well as in the RES sector
- Training human resources to use RES, producing RES technologies or providing information on RES for companies, local authorities, etc.
- Equipping workers from diminishing sectors (e.g. mining) with knowledge and skills to engage in the development of RES technologies

Under the second priority, the main beneficiary is the Office for Employment and the end users are unemployed people or people under threat of becoming unemployed. This priority task provides an excellent prospect for qualifying people to work in the RES sector.

Priority Task No. 3: Restructuring Agriculture, Forestry and Fisheries

This task aims at the improvement of production and marketing of agricultural products and diversification of agricultural activities. Under this priority, in Measure 3.3.: Diversification of agricultural activities and activities that are close to agriculture, RES are specifically mentioned: 'The measure will ensure assistance for the following types of investments in the agriculture: (…) - investments into obtaining energy from biomass.' The whole measure is allocated 9.4 million EUR, 50% financing will be obtained from the EU funds.

However, even without being specified, there are many opportunities for the RES under this priority:

- production of bio-fuels
- production of pellets and wood chips
- research into biomass use and production
- establishment of a biomass market
- promotion and marketing of biomass products

This priority lists the Agency for Agricultural Markets and Development of Rural Areas as the main beneficiary, while end users can be farms, farming associations and companies involved in the agricultural business. Again, in spite of RES not being specified as a focus field, under this priority task there is vast potential for RES, especially for biomass and bio-fuels.

Priority Task No. 4: Technical Assistance

The aim of this task is to support the use of EU funds through the provision of information, raising awareness, assistance and developing systems for monitoring and evaluation of projects. As in the previous priority tasks, RES are not mentioned as focus fields, however, this priority task has the potential to provide financing for RES projects with Structural Funds going to the public and potential investors. This will stimulate RES projects in the other priority fields.

The beneficiary here is the Office for Structural Policy and Regional Development and it can delegate the fulfilment of the task to other (non-specified) bodies. Hence NGOs could take over the task of providing information and raising awareness.

■ Challenges for the future

Slovenia's clearest threat in relation to the use of Structural Funds is that it will miss an important opportunity to finance RES investments. As RES are not mentioned in the priority tasks, it is highly likely that no or little money will be spent on projects stimulating the use of RES. Unless stimulated through extensive information and awareness campaigns, project developers may fail to consider funding for RES projects under the Structural Funds. Another possible threat is that the total value of the Structural Funds will not be used to their full extent, as has been happening with the use of other EU financial programmes.

A dependency of 77% in the energy field is politically, strategically and morally intolerable in the long term and by not listing RES support as one of the main tasks for the use of Structural Funds, Slovenia is wasting a good opportunity to reduce its energy dependency by developing the use of local renewable sources. Although the Slovene NDP highlights RES as a development priority, it does not mention them as a vital element of agriculture and forestry development, regional development and harmonised development of the rural areas.

Another central challenge is lack of an agency that would be in charge of RES (on national or regional level) and also within the government there is no cross-sector body for harmonisation and development that would create links between energy, agriculture, forestry, education, transport etc.

■ Conclusions

Revision of the Single Programming Document shows that renewable sources of energy are not defined among the priority tasks for the use of Structural Funds. In spite of this, there are many possibilities to stimulate RES through fulfilling the priority tasks of the Single Programming Document.

One opportunity that should be taken advantage of under the Structural Funds is the development of the RES sector in Slovenia. As there are some regions that are burdened by a decline in their economy (e.g. mining), development of the RES sector should be the strategy for those regions. Training a workforce for the production and use of RES technologies, supporting RES R&D and establishment of companies to produce RES technologies are activities that are clearly in line with the priority tasks of the Single Programming Document. If such opportunity is exploited, it can contribute considerably to the competitiveness of the Slovenian economy, employment, independence of the energy sector and protection of the environment.

Another opportunity that should not be missed is explicit prioritisation of RES in future programming periods. Slovenia must fulfil the EU directives related to energy and also the Kyoto Protocol. At present, the possibility that this will occur is limited, especially in the RES sector. The initial required investment in RES is still high and non-competitive compared to heavily subsidised fossil fuel and nuclear sectors. The potential of private capital faces obstacles in the RES field because of complex procedures involved in RES use. Use of Structural Funds to overcome these obstacles should be the strategy chosen by Slovenia in coming programming periods.

Both suggested actions would have increased chance of success if Slovenia would finally adopt a clear renewables policy, supported by an agency for RES and less complex regulations established through a RES law. When forming the RES policies two important things should be born in mind. One is that the RES may only be used in such a way as not to affect the environment and the spatial values of Slovenia. The other is that the share of RES in the TPES can also be increased through reducing the energy intensity, mainly the industrial electricity use.

1 The suggestions are not listed in the Single Programming Document. They are listed mainly as ideas on how the use of RES could fit under the priorities, specified by the Single Programming Document.

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Table 9: Selected facts from country reports

	relevant documents	use of RES	targets	RES priorities in Structural Funds use
Czech Rep.	▪ Accession Treaty ▪ Energy Act ▪ climate change programme ▪ coming National Energy Strategy to 2030 ▪ new proposal of Renewables Act	3.5%	20% by 2030, 8% by 2010 in electricity	NDP and five OPs for the period 2004-2006 Operational Programme Industry and Enterprise: Priority 2; Specific objective 2.3: Reducing energy consumption and higher use of renewable sources of energy Operational Programme Infrastructure: Priority 2; Specific objective 2.3: Support for the introduction of alternative fuels; Priority 3; Specific objective 3.3: Air protection infrastructure improvement and Specific Objective 3.4: Waste Management Operational Programme Multi-functional Agriculture and Rural Development: Priority 1; Specific Objective 1.1: Investments in agricultural holdings - Further diversification of agricultural activities
Estonia	▪ National Long Term Fuel and Energy Supply Development Plan ▪ Energy Act ▪ National Environmental Action Plan ▪ Long-term National Development Plan for the Fuel and Energy Sector	11%	13% by 2018	Single Programming Document for the period 2004-2006 The development and use of RES is not listed among the priorities or specific measures and activities.
Hungary	▪ Energy Savings Strategy and Action Plan ▪ National Energy Saving Programme ▪ Renewable Strategy under preparation ▪ new energy policy concept	3.6% (0.5% in electricity production)	7.2% by 2010,	NDP and five OPs for the period 2004-2006 The Environmental Protection and Infrastructure Operational Programme Environmentally friendly development of energy resources; Component A: increasing the use of the renewable energy resources. Agriculture and Rural Development Operational Programme RES are in an activity as a part of a sub-measure. Economic Competitiveness Operational Programme RES related R&D activities can be funded with 1,17 million € until 2006
Lithuania	▪ National Energy Strategy ▪ National Energy Efficiency Program ▪ Law on Energy ▪ Law on Electricity ▪ Law on Thermal Economy ▪ National Sustainable Development Strategy ▪ Climate Change Mitigation Programme	9%	12% by 2010	The SPD identifies measures in energy and environmental sector in the Priority 1. Development of social and economic infrastructure. Among other measures, Measure 4. Development of energy efficiency includes RES. The SPD stays that the objective to increase the use of local energy resources and RES is based on the need to minimise the use of imported fuel, save financial resources needed for purchasing fuel, improve the state of the environment and create new jobs.
Poland	▪ Guidelines for Poland's Energy Policy until the year 2020 ▪ Assessment of Implementation and Amendment to the Guidelines for Energy Policy of Poland Until 2020 ▪ National Strategy for the Utilisation of RES by 2020 ▪ GHG Emission Reduction Strategies until 2020	3.6%	7.5% until 2010 and 14% until 2020	NDP 2004-2006 The Cohesion Fund: there exists a possibility that RES activities are financed under projects for air quality improvement The Growth of Economic Competitiveness Programme: support for investments in: combined heat and power generation, conversion of fuel combustion installations to more environmental friendly solutions, activities supporting alternative energy sources use. The Integrated Operational Programme for Regional Development: activities for RES use in public infrastructure for producing electric energy and heat from renewable resources.
Slovakia	▪ Energy Policy Plan ▪ National Communication to UNFCCC Secretariat	3% (16.8% in electricity production; with large hydro)	double RES share by 2010	NDP 2004 to 2006 Sectoral Operational Programme Industry and Services: support for renewable sources of energy and cost-effective technologies; production of heat and electrical energy from renewable resources; Measure 1.4: Support for energy saving and use of renewable energy sources Operating Plan Basic Infrastructure: Priority 2; Measure 2.2: Improvement and development of the infrastructure for the protection of air (change fuel base of energy resources, with focus on low-emission and renewable resources) Priority 3; Sub-measure 3.1.1: Building and development of education infrastructure and Sub-measure 3.1.2 Building and development of health infrastructure (RES as the tool to reduce emissions in present buildings heated by the coal or heavy oil)
Slovenia	▪ Energy Law ▪ Strategy for reduction of GHG emissions ▪ coming National Energy Programme	9.4% (27.9% in electricity production; large hydro)	12% by 2010, 33.6% electricity by 2010	Single Programming Document for the period 2004-2006 The development and use of RES is not listed among the priorities or specific measures and activities.

This report was produced by:

Centre for Transport and Energy, Czech Republic

Renewable Energy Centre, Estonia

Energy Club, Hungary

Center for Environmental Policy, Lithuania

Polish Ecological Club, Poland

Foundation for Alternative Energy, Slovak Republic and

Focus Association for Sustainable Development, Slovenia

in co-operation with

Climate Action Network Central and Eastern Europe (CAN CEE)

and with the financial support of

WWF European Policy Office

German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety