Hungary

Country Profile

1. Overview of Electricity Supply

Hungary began the process of economic reform in the early 1980's and was one of the leading countries in dismantling communism in Eastern Europe in 1989. Following the governmental transition, Hungary experienced high inflation and GDP depreciation throughout the early 1990's. In the second half of the decade the economy began to grow, while inflation was reigned in to below 10 percent. The level of energy consumption of the year 1987 (the year of peak consumption) should not be reached again until 2010.

Hungary's power consumption levels have been roughly constant over the last 15 years. In 2001, the government implemented a plan that projects primary energy supply to grow at an annual rate of approximately 1 percent between 2000 and 2020. By 2020, the share of coal is expected to decrease to 11 percent, oil to remain roughly stable at 31 percent, and gas to grow slightly to 41 percent. Nuclear is expected to decrease to 13 percent. This scenario estimated the growth of the share of renewables from 3.6 percent to about 7 percent until 2010.

There is currently a push in the Hungarian energy sector to move from coal and fuel oil dependent generation to natural gas. Units have been repowered with combustion turbines, and all newly proposed major facilities are simple cycle or combined cycle plants.

Hungary covers approximately 80 percent of its oil needs from imports, most of which come from Russia and the Middle East. Domestic oil and gas production has peaked and is now expected to decrease gradually. Oil and gas imports are expected to rise as consumption increases in the coming years.

The figure below shows the location of existing generation and transmission systems in Hungary. The transmission grid consists of an extensive network of 750 kV, 400 kV, 220 kV, and 120 kV lines. To provide further opportunity for trade and stability of supply, the grid has

been recently expanded in two major projects: interconnection with the Western Europe UCPTE system in 1995; and 400 kV interconnection with Croatia in November 1999.

Hungarian Electricity Infrastructure

According to a 1998 Report of the IEA on RENEWABLE ENERGY POLICY IN IEA COUNTRIES (Vol.II. Country Reports), renewable energy in Hungary is promoted via economic incentives, indirect subsidies and interest-free loans for research and development activities. The primary reason for promoting increased use of renewables is to mitigate local pollution: over 13 percent of Hungary's land is at least moderately polluted. Much of the pollution is due to the use of indigenous low-quality high-ash and high-sulphur coal in power generation.

A 1999 energy plan issued by the government indicates a movement toward cleaner technologies including emissions controls for coal-fired generation and replacement of existing generation with natural gas. This plan seeks to reduce pollution levels to EU standards. Additionally, the 2001 Electricity Act brought Hungary in line with EU directives in terms of third party access, subsidy elimination, and segmenting the electricity market into generation, distribution, and trading companies, while providing for an electricity grid operator to manage the system.

Attracting foreign investment is a priority for the Hungarian government. A substantial body of law and a number of treaties protect foreign investment in Hungary, provide for national treatment, and ensure profit repatriation. Hungary's accordance to the EU standards, supported by all major political parties, further affirms the country's commitment to an open investment regime.

Hungary Country Summary Table

Demographical Information	
Population, millions (2003)	10.0
Land area, thousand Ha (2002)	9,303
Macroeconomic Information (2003)	
GDP, billion US$	82.7
Real GDP growth rate, percent	3.05
Foreign direct investment (net), million US$	874
Electricity sector	
Electricity tariff, US¢/kWh (2002)	8.7
Collection rate, percent (2002)	90
Load utilization factor, percent (2000)	NA
Current Feed-In (Euro)	0.073
Renewable Target (2010)	4.5%
Electricity disposition, billion kWh (2003)	
Generation	32.21
Consumption	36.96
Exports	7.10
Imports	14.10
Generation capacity, million kWh (2003)	
Nuclear	1.9
Thermal	6.5
Hydro	0.0
Other renewables	0.0
Total	8.4

Sources: European Bank for Reconstruction and Development, U.S. Energy Information Administration, Food and Agriculture Organization of the United Nations.

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2. Energy Policy, Barriers and Incentives

Hungary's energy policy is oriented in compliance with European Union (EU) energy policy and has the following main guidelines:

- Security of hydrocarbon supplies and diversification of import sources to reduce dependence on Russia.
- Promotion of energy efficiency by encouraging energy conservation and modernization and the elimination of the remaining price distortions.
- Price deregulation and the opening of all sectors to competition.
- Environmental protection.
- Attracting foreign capital for investment in capital-intensive energy projects.

As in other fields of energy policy, complying with EU requirements appears to be the principal driving force. Increasing the country's renewable energy use from presently 3.5 percent to 6-7 percent by 2010 is another policy aim.

Support Mechanisms and feed-in conditions for electricity from renewable energy sources include Feed-In Tariffs that were introduced through the Electricity Act which entered into force on 1st January 2003. According to the Regulation Nr. 105/2003. (XII.29.) GKM, the Electricity Suppliers are obliged to purchase electricity from producers utilizing RES, if their capacity is over 100 kW. However, in the case of smaller plants, individual arrangements are possible. There is no differentiation between the renewable sources. Hungarian law gives renewables priority access to the grid for eight years.

The Electricity Act intends the Feed-In Tariffs to be an intermediate solution which should lead to a green certificate system. However, this step needs further legislative procedures and no date for its realization has been fixed.

There are some tax incentives for the utilization of RES like the 0 percent VAT on biofuels. There had been a favorable VAT-rate of 12 percent on solar applications, however, since 1st January 2004, the highest level of VAT tariffs of 25 percent is imposed on them.

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3. Wind

The wind energy potential in Hungary is assumed to be rather low, but there is opportunity for wind energy development in the next 10 years.

In the last five years four wind turbines were built: 250 kW in the region of Várpalota-Inota, 600 kW in Kulcs and 2x600 kW near to Mosonszolnok. All investments were partly financed by the Hungarian government and the electricity sold to the national grid will pay off the investments in an estimated ten years. There is currently 14 MW of wind capacity installed in Hungary. In addition to large scale wind power plants, small scale wind uses are under development.

A country-wide wind atlas is believed to be available for the country, although it could not be located. In general, wind energy in Hungary is thought of as having low potential. This is not necessarily true; The 600 kW wind project in Kulcs has operated at a relatively good capacity factor (approximately 28.5 percent), and Austria's largest wind farm has been built just across the border, implying a good regional resource.

The most promising sites are probably towards the Austrian border, north of the lake Balaton.

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4. Biomass

Biomass accounts for the largest share of Hungary's renewable energy consumption. Currently fuelwood combustion is the primary use of biomass. Forestry wastes and sawmill byproducts are currently burnt in furnaces to provide heat for the forestry industry or briquetted for retail sale. Nearly 40 percent of the roundwood production is used for energy purposes.

Despite the extensive use of forestry wastes for energy production, it is estimated that only 10 percent of this resource is currently being utilized. The significant amount of forestry byproducts could potentially be used to generate electricity on a large scale, or more completely utilized to supply for heat residential and industrial needs.

Hungary Biomass Resource Data

Biomass resource type	Total production	Production density

Percent of total land area covered by		
Forests	11%	
Shrublands, savanna, and grasslands	0%	
Cropland and crop/natural vegetation mosaic	86%	
Urban and built-up areas	2%	
Sparse or barren vegetation; snow and ice	0%	
Wetlands and water bodies	2%	
Primary crop production, tonne	(avg. 1999-2001, tonne)	(tonne /1000 Ha)
Total primary crops (rank among COO)	29,279,246 (8)	3,171 (4)
Top 10 primary crops		
Maize	6,606,544	715
Wheat	3,835,637	415
Alfalfa for Forage & Silage	3,760,000	407
Maize for Forage & Silage	3,022,490	327
Sugar Beets	2,604,501	282
Barley	1,081,067	117
Potatoes	954,064	103
Grasses (misc), Forage & Silage	888,820	96
Leguminous (misc), Forage & Silage	839,667	91
Grapes	680,304	74
Animal units, number	(number)	(number / 1000 Ha)
Cattle	865,000	94
Poultry	28,224,000	3,057
Pigs	5,407,000	586
Equivalent animal units	3,310,040	358
Annual roundwood production	(1996-98, 000 m^3)	(m^3 / Ha)
Total	4020	435.3
Fuel	1878	203.4
Industrial	2143	232.1
Wood-based panels	497	53.8
	(1996-98, 000 metric tons)	(metric tons / Ha)
Paper and paperboard	465	50.4
Recovered paper	258	27.9

In addition to the very good wood fuel opportunities, there may also be potential for use of agricultural residues from crops and livestock.

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5. Solar

Hungary lies in the middle of a basin, on a relatively flat surface surrounded mainly by mountains, and has favorable solar conditions compared to other European countries. The number of the annual sunny hours is 1900-2200, and the average annual total of the incident sunshine is 1300 kWh/m^2.

Adequate potential for low intensity solar energy has been identified. However, currently there is no widespread implementation of this resource. Limited use of solar energy for water and space heating has been observed, based on flat plat collectors. Photovoltaic applications have

been implemented on an experimental basis in the telecommunications and other sectors. But this technology has not yet reached wide scale of commercialization in Hungary.

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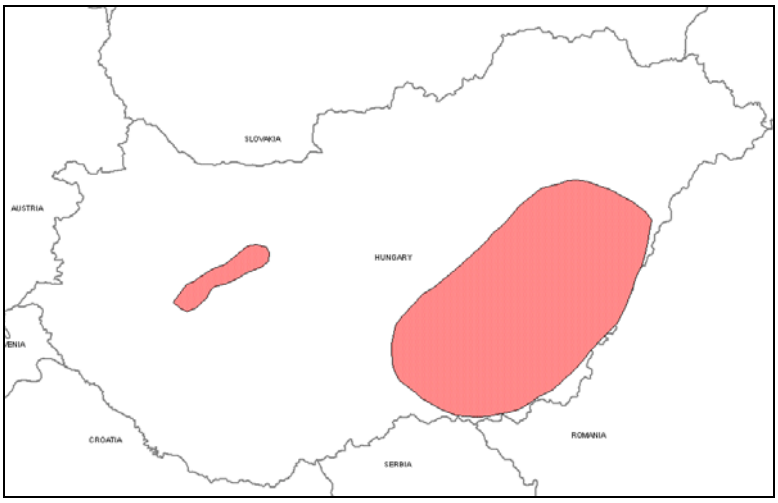
6. Geothermal

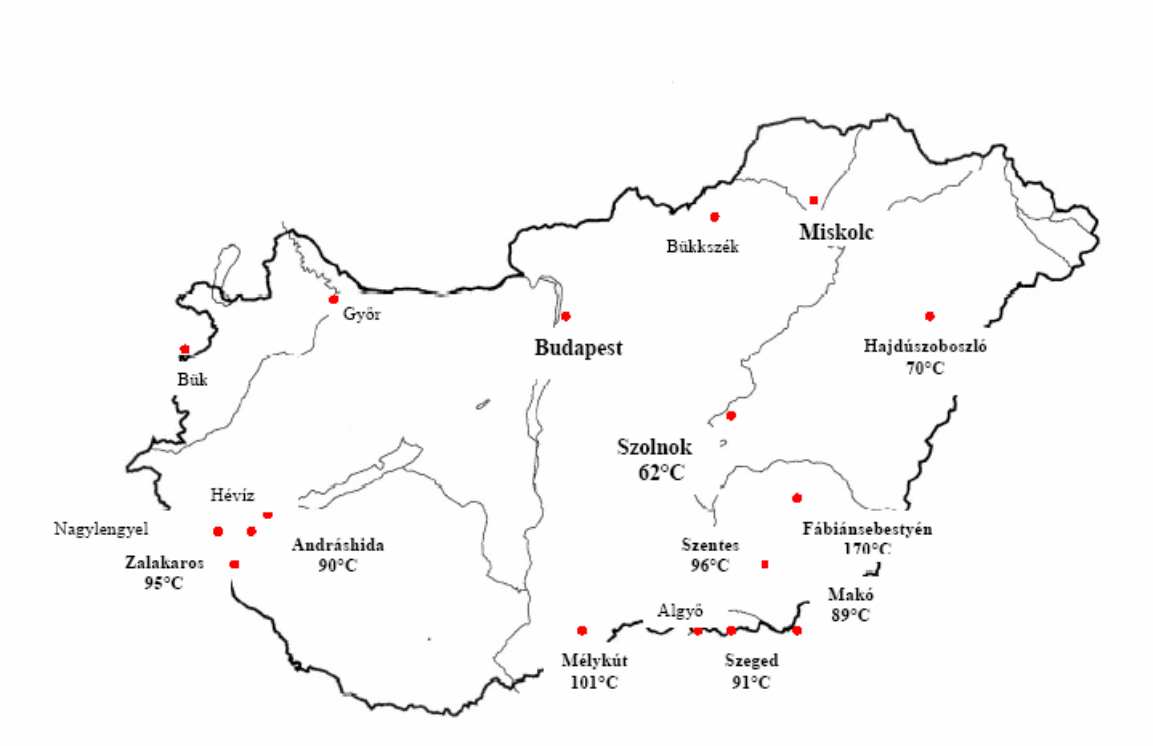
Hungary has some of the largest reserves of geothermal energy in Eastern Europe. Generally, the identified resources are low to medium enthalpy, 50 °C to 200 °C, and more suitable for heat supply than electricity production. Because of this, there is currently no utilization of geothermal energy for electricity production. However, there has been considerable use of the low to medium enthalpy geothermal energy throughout Hungary. Current demand for geothermal energy has been for direct heating and balneology. Direct heating is most extensively used in horticulture on the Great Hungarian Plain. The majority of horticultural facilities heated with geothermal energy in the world are in Hungary. The residential and industrial demands have led to over 2000 wells currently in operation supplying over 270,000 TOE (tons of oil equivalent) of energy to Hungary.

Geothermal installations in Hungary have been estimated as having a total capacity of 350 MW used only for heat generation. They are put to a variety of applications: crop drying, green house heating and district heating, with “one third” of the country having useful geothermal resources.

The primary geothermal resource area in Hungary is the Upper Pannonian reservoir system that extends through nearly the entire country and enters some of the adjoining countries. The basin is surrounded by the Alps, Carpathians, and Dinarides, which form the large low enthalpy aquifer. This is the system that is used for heating of horticultural facilities. The figure below identifies the large low to moderate enthalpy geothermal basins.



Hungary Geothermal Resource Areas



Wellhead temperature regions of Hungarian Upper Pannonian water wells

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7. Hydroelectric

Hungary is one of the less mountainous countries in central Europe, and therefore has only limited hydroelectric potential. Hungary has little potential for further water power development with the exception of small and micro sized power plants. There are only three small commercial hydroelectric power plants in the country.

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8. Relevant Links

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9. References

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10. Country Contacts

Contacts made in the preparation of this assessment are gratefully thanked for their contribution to this report. Contacts include: