



# Renewable Energy in Hungary

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To address heavy reliance on Russian gas and oil, rising energy costs and compliance with EU quotas for greenhouse gas emissions, Hungary is looking to renewable energy sources. This report provides a brief overview of Hungary's energy sector (as of April 2007), its renewable energy policy, its sources of renewable energy, and how U.S. businesses might enter Hungary's renewable energy market.

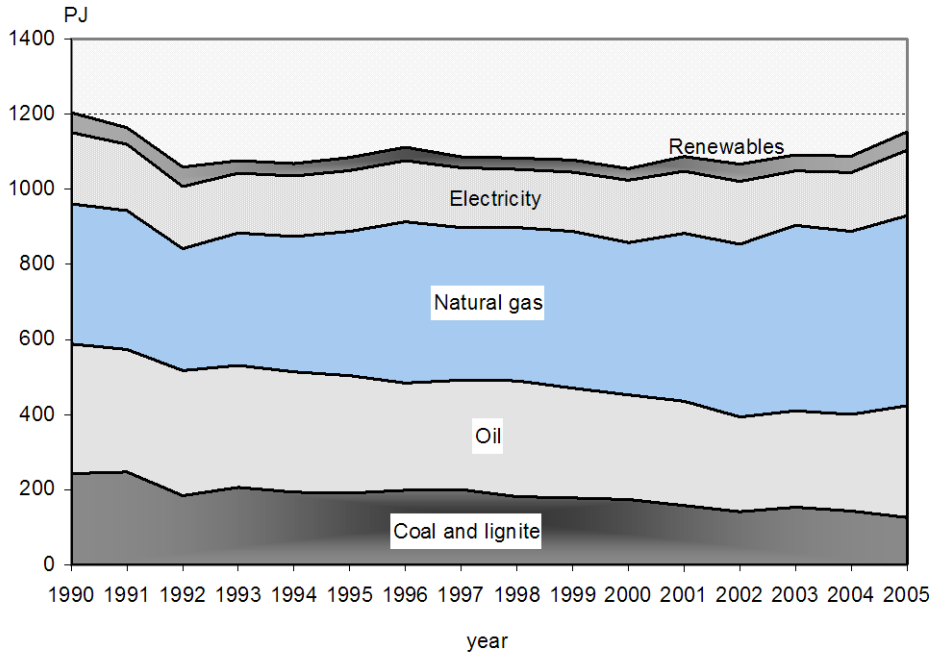
### Hungary's Energy Sector

To meet its needs, Hungary must import more than half of its energy. Supplying and administering Hungary's dynamic energy sector is a diverse cast of entities – domestic and foreign, public and private. They include:

- *Hungarian Energy Office (HEO)*: An independent agency, which develops new legislation and governmental policy, licenses gas and electricity producers, and hears consumer complaints.
- *MVM (Hungarian Electricity Works)*: State-owned electricity wholesaler.
- *MAVIR*: Electricity transmission grid operator; fully owned by MVM.
- *MOL (Hungarian Oil & Gas Company)*: A regional leader in the oil industry (owning Slovakian *Slovnaft* and Croatian *INA*), MOL is the dominant domestic oil and gas producer, with ownership in explorations in Russia as well. MOL also owns Hungary's only oil refinery and operates the country's oil storage and oil and gas pipeline systems. In 2006, MOL's gas storage and trading divisions were sold to German *E.On* and Russian *Gazprom*, respectively.
- *Power Plants*: All privately owned, mainly by major international energy companies, except for the state-owned Paks nuclear plant.
- *Regional Electricity and Gas service providers*: Six of each, mainly owned by German and French utility companies and smaller trading companies.

Liberalization is a major issue facing Hungary's energy market. According to the EU's energy strategy, member states must fully liberalize their energy markets by July 1, 2007. The Hungarian Parliament is considering a national energy strategy through 2020, which includes the EU liberalization requirements.

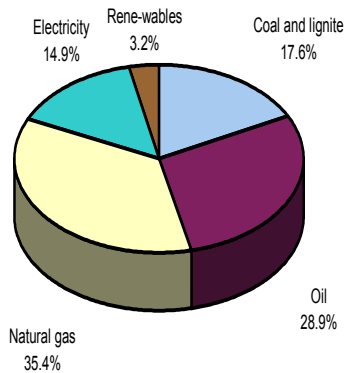
**Total Primary Energy Sources  
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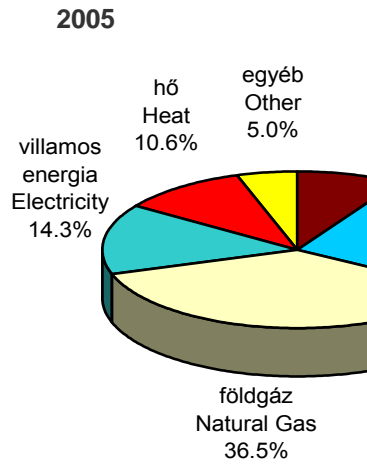
Source: Energy Statistical Yearbook 2005 by Energy Center Kht

**Total Primary Energy Supply 1995 and 2005**

1995



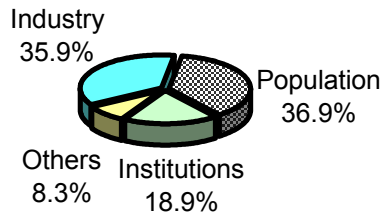
Source: Energy Statistical Yearbook 2005 by Energy Center Kht



Source: Energy Statisti  
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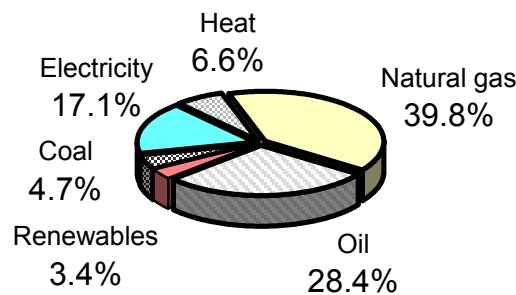
**Energy consumption  
(end users) 2005**



Source: Energy Statistical Yearbook 2005 by Energy Center Kht

**Oil and Gas:** Hungary relies heavily on Russia for its oil and gas, although MOL and several foreign firms conduct some relatively small-scale exploration and production. Eighty percent of Hungary’s oil consumption must be imported, and over 80 percent of this (6.9 million tons/year) comes from Russia. (By contrast, most EU countries import only 30 percent of their oil from Russia.) Likewise, Hungary relies on Russia for nearly half its natural gas (14.5 million m3/year), also far above the EU average. Hungary is unique in the EU in that it uses more natural gas than oil.

### Direct energy consumption 2005



Source: Energy Statistical Yearbook 2005 by Energy Center Kht

**Electricity:** In 2006, Hungary had 9,500 MW of electricity at its disposal, with 90 percent domestically generated and 10 percent coming from Slovakia, Ukraine, and Austria. Daily demand varies between 3,800 and 5,500 MW. Households and manufacturers consume the most electricity, followed by commercial activities, transportation, and telecommunication.

Nuclear energy accounts for nearly 40 percent of Hungary's electricity output. The country's only nuclear power plant generates electricity at a very competitive price. Built in the 1980s, the plant's lifespan would have expired in the next decade. But the Hungarian Parliament has voted to extend the plant's life until between 2032 and 2037; this project is underway.

Natural gas and fuel-oil account for another 40 percent of Hungary's electricity production, and coal/lignite roughly 15 percent.

**Renewable Energy Needed:** In a recent study, MVM estimated that only 50 to 60 percent of Hungary's current generating capacity would still be on-line by 2020. At the same time, MVM projected Hungary's power consumption will increase nearly 2 percent each year. To resolve this expected energy shortfall, MVM estimates that some 6,300 MW of new capacity must be built over the next 10 to 15 years, much of it in renewable energy.

In 2006, renewable energy only accounted for 170 MW (or 4.5 percent) of Hungary's total energy production (compared to 6 percent in the EU). MVM recommends this amount rise to 600 MW by 2020,

mostly from smaller power plants. To accomplish this, HEO is licensing 300 small, mainly renewable plants with capacities of less than 50 MW each.

**Renewable Energy - in the EU and Hungary**

EU Policy: In early 2007, the European Commission’s (EC) Council of Energy Ministers issued a plan for a more cooperative EU energy policy, increased renewable energy use, and less dependence on Russian oil and gas. Under the Kyoto Protocol’ Emissions Trading System (ETS) framework, the EC’s plan calls for sweeping changes to reduce fossil fuel consumption, setting a target for EU members to convert 20 percent of their energy mix to renewable energy by 2020.

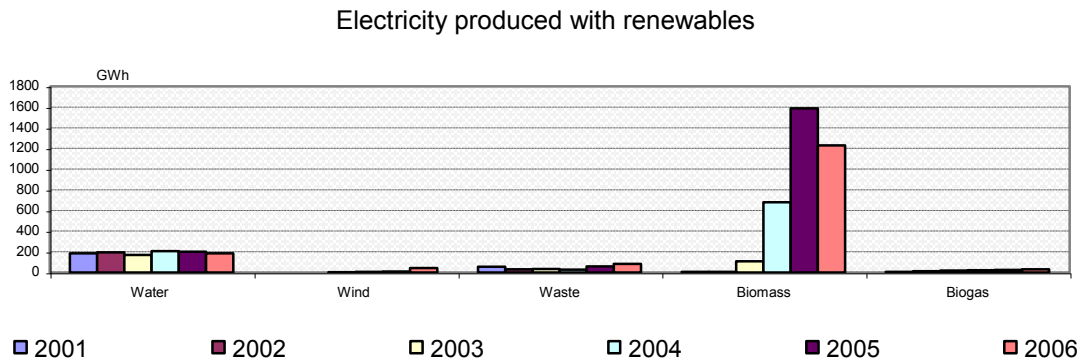
Hungarian Policy: Along with others in the region, Hungary’s government has protested that the EC’s 20 percent target would be “too expensive.” Instead, the government aims to find a “wise compromise” with the EC, with a target in the 15 to 16 percent range. (Meanwhile, other EU countries with the ability to do so will exceed the target, so that the average goal remains 20 percent across the EU.)

As a first step, Hungary’s government has committed to boost the country’s share of renewable energy use to 8.3 percent by 2013. The government will channel over US\$200 million in EU development funds into renewable energy projects in biomass, biogas, and geothermal energy.

To spur investment in renewable energy production, Hungary’s government has established subsidy and incentive systems. Under law, MVM must buy “green” electricity from licensed producers at a subsidized price far above that of the market. The subsidy is built into electricity prices and ultimately passed on to consumers. According to the HEO, the recent rise in the number of renewable energy projects under development indicates that the subsidy scheme is attracting investment.

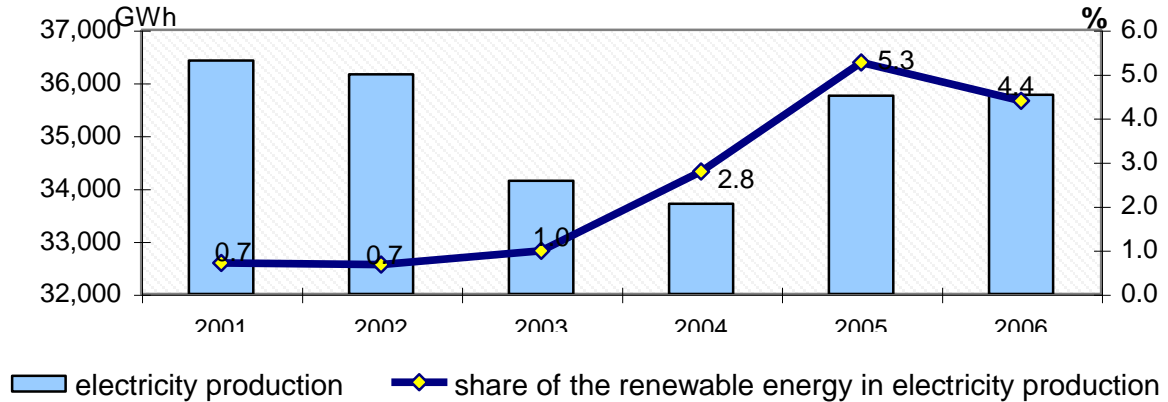
Hungary is also using incentives. Its National Environmental Authority issues emissions licenses to power plants, oil refineries, metallurgy plants, paper mills, and other major greenhouse gas generators. Companies that cut emissions through environmental investments can trade their surplus units on the EU’s ETS via an online trading platform (managed by domestic firm *Vertis Environmental Finance Zrt.*).

**Sources of Hungary’s Renewable Energy**



Source: Energy Statistical Yearbook 2005 by Energy Center Kht

## Share of the renewable energy in electricity production



Source: Energy Statistical Yearbook 2005 by Energy Center Kht

### Bio-fuels – diesel and ethanol

**Bio-fuel Policy:** EU governments have endorsed a broader use of bio-diesel and bio-ethanol in a bid to cut vehicle pollution and reduce dependence on Russian oil. Member states are targeting bio-fuel content of 5.75 percent by 2010 and 10 percent by 2020.

Hungary has committed to achieve these targets. To achieve them, Hungary will have to boost current bio-fuel production from around 70,000 tons per year to 200,000. This will require production of three million tons of raw material – mostly corn and wheat. Ambitiously, the Hungarian government intends to boost bio-ethanol production beyond this amount, to 800,000 tons by 2010, with the aim of exporting the amount that exceeds domestic needs.

To accomplish this aim, according to the Ministry of Agriculture, Hungary's government will make large bio-fuel investments eligible only for "general investment benefits" such as subsidized loans, job-creation grants, and corporate tax breaks. Smaller bio-ethanol projects, however, may receive further support in the form of specialized programs co-financed by the EU.

Hungary's government has also created a tax incentive system for bio-component blending in vehicle fuels. The required amount was 0.75 percent in 2005, 1.5 in 2006, and will be 4.4 by 2008. From July 1, 2007, under the new tax regime, gasoline without 4.4 percent bio-content will be penalized, and the same will be true for diesel by January 2008.

Also promoting bio-fuels for vehicles is E85, a new excise tax-free bio-fuel that became the official EU standard in January 2007. Saab and Ford are bringing out models that run on E85. At present, only 30 to 40 such vehicles operate in Hungary, but the country's first E85 filling stations will open later this year.

**MOL and Bio-fuels:** To meet EU and Hungarian requirements, in 2006, MOL set up a mixing facility to produce bio-enhanced diesel fuel. MOL has also been active in producing bio-ethanol from corn and sugar cane since 2005. As such, 70 percent of the fuel MOL sells contains bio-components.

The company is also establishing a major bio-diesel facility with Austrian company *Rossi* at MOL's Komárom site, to open in November 2007. With some government grant funding, MOL has launched an R&D project with the Pannon University in Veszprem to develop so-called "second-generation" bio-diesel.

**Bio-fuel Investment:** Bio-fuel production in Hungary is on the rise as investors have taken notice of its potential. Since the spring of 2006, investments have been announced for a number of bio-fuel production projects. Although it is likely that not all of these initiatives will be realized, the plans include the following:

**Győr Distillery:** A leading producer of alcohol from molasses and grains, *Győr* announced plans to triple its 2005 bio-ethanol output to 15 million liters by 2007.

**Hungrana Zrt.:** Jointly owned by Austria's *Agrana* and U.K. sugar maker *Tata & Lyle*, *Hungrana* aims to expand its capacity to 190 million liters of bio-ethanol by the third quarter of 2007. Its new production capacity will use corn exclusively.

**Magyar Bioenergetikai Zrt. (Mabio):** This Hungarian firm is investing HUF 92 billion (US\$460 million) to build five plants around the country, which will produce a combined 600 million liters of bio-ethanol by 2010 (using 1.75 million tons of corn per year).

**Sekab:** A Swedish firm, it will build four bio-ethanol plants in Hungary at a cost of HUF 94 billion (US\$475 million). Using 1.5 million tons of grain (mostly corn), combined annual output is expected to reach 480 thousand tons by late 2008.

**Bio-Tech-Energy Kft.:** Together with U.S. investor *CSLM Group*, this domestic firm plans a HUF 64 billion (US\$320 million) grain-based bio-ethanol plant in Hajdúsámson. The two firms are also building a HUF 18 billion (US\$90 million) plant in Marcali.

**Rodeport Kft.:** Owned by Swiss and Hungarian investors, the company plans to complete a bio-ethanol plant near Fadd-Dombori by mid-2008. The plant will have capacity to use up to 300,000 tons of corn. *Rodeport* has also invested HUF 5 billion (US\$25 million) to open an agricultural logistics and distribution center in early 2007. The facility will have a 51,000-ton storage capacity, plus a port for cargo ships.

**Biofuels Holding Europe AG:** This Swiss firm will invest HUF 22 billion (US\$112 million) to construct bio-ethanol plants in Mohács and Csurgó. Each will use 300,000 tons of corn to produce 80,000 tons of bio-ethanol per year.

**Öko-Line Kft.:** In the first quarter of 2007, this Hungarian firm will open a bio-diesel plant in Nagyigmánd, which will sell much of its annual 50,000-ton output to MOL. (To gain a tax refund, MOL mixes 2 percent bio-ethanol into much of the petrol it sells.)

**Mabio Hungarian Bio-Energy:** Investing US\$ 400 million, the company will build five plants producing a total of 600 million liters of bio-ethanol by 2010.

**Inter-Tram:** A privately-owned Hungarian firm, it finished its plant in November 2006 and is now at full capacity of 10,000 tons.

## Biomass

Energy from plants and plant-derived materials – known as biomass – represents the largest source of renewable energy in the EU (60 percent share) and Hungary (over 70 percent share). The share of “green” energy in Hungary increased from 2.2 percent in 2004 to 4.5 in 2006, due mostly to conversion of five coal-fueled plants to biomass use. U.S.-owned *AES Borsod* power plant was among Hungary’s first to do so, thereby reducing its CO<sub>2</sub> emission by 700,000 tons annually.

In the coming years, up to one million hectares of Hungarian agricultural land could be withdrawn from the EU’s agricultural support system, creating an opportunity to plant biomass crops. An agricultural research institute in Szarvas is developing strains of energy-rich crops well-suited for the growing conditions of these lands.

Power companies with biomass-fuel plants are supporting efforts to farm energy-rich trees and plants in the regions around their facilities. For example, *AES Borsod* has signed long-term supply contracts with several forestry firms in northeast Hungary (where its plant is located). *Pannonpower* has made similar arrangements in south Hungary.

Taking advantage of government-sponsored grants and incentives available under Hungary’s National Agricultural Energy Alliance, an increasing number of municipalities are setting up co-generation heating using biomass. The facilities use wood industry waste and dry agricultural by-products like straw, corn, and sunflower stem. The largest, in Szombathely, has 7 MW of heat production capacity.

## Biogas

Produced by the anaerobic digestion or fermentation of organic matter, biogas is typically made from manure, sewage sludge, municipal solid waste, or biodegradable feedstock. As a large agricultural producer (in plant cultivation and animal husbandry), Hungary has potential to become a significant biogas producer.

Due to stricter EU regulations for agricultural waste handling, energy analysts expect the amount of biogas produced in Hungary to increase by 4 to 5 times in the next 3 to 5 years. Since 2003, a number of biogas plants have been established in Hungary, with capacities ranging between 1.7 to 3.5 MW.

## Wind Energy

At the end of 2006, Hungary boasted a total wind-energy capacity of 60.8 MW, generated from seventeen different wind farms. The largest such farm, with 24 MW of capacity, is co-owned by Hungarian investors and Spanish firm *Acciona*, the world’s largest independent wind energy supplier.

Although data from HEO suggests strong investment interest (both Hungarian and foreign) in large-scale wind turbine development (above 1,500 MW capacity), Hungary’s electrical grid is not yet capable to take it on. To harness the uneven output of wind farms requires an electrical system that can collect and store energy; Hungary’s cannot.

As such, according to grid operator *Mavir*, until 2010 only roughly 330 MW of wind power plant output may be connected to Hungary’s grid. HEO, therefore, has issued permits to 48 companies to build wind turbines with a collective capacity of 330 MW.

## Geothermal Energy

With its vigorous geothermal activity (evident in the many steaming thermal springs), Hungary has larger geothermal energy potential than any other European country. This potential, however, goes largely untapped. Only a few of Hungary's geothermal springs are harnessed for heating energy, and none for commercial use.

But this will change. MOL set up a joint venture in 2003 with *Enex*, a technology provider from Iceland, and *Greenrock Energy*, an Australian financial investor, to explore the viability of a geothermal plant in Iklodbordoce. The World Bank-funded Geothermal Energy Development Fund is underwriting the project, suggesting it is a pilot for something larger.

## Water Power

Hungary's current hydro-power capacity of 40 MW comes from over twenty different power plants. But little potential exists for further hydro-power development, with the exception of small and micro sized plants. Over the next several years, *Power Consulting Kft.* has the permits and will build three such plants with roughly 1.7 MW of capacity each.

## Solar Power

Solar power is little used in Hungary. A small number of residences and community buildings, like hospitals, use roof-mounted solar panels to supplement their heating energy. Also, a few domestic and international companies manufacture solar panels, film, batteries, and air-conditioning equipment, nearly exclusively for export.

## Entering Hungary's Renewable Energy Market

For U.S. companies considering entering or investing in Hungary's renewable energy market, U.S. Commercial Service in Budapest (USCS Budapest) recommends first finding a local partner and doing thorough due diligence groundwork. Conferences and scientific & commercial gatherings offer a useful means of collecting information, networking in the industry, and meeting potential partners. USCS Budapest offers a wide range of services that can help U.S. companies enter the Hungarian energy & renewable energy market and meet their business objectives.

## Upcoming Events

The U.S. Department of Commerce will sponsor a Trade Mission to Central Europe (Hungary, Czech Republic, Poland, Slovakia) for companies interested in renewable energy projects, in September 2007. For more information, please contact USCS Budapest.

The American Chamber of Commerce in Hungary will organize a major Energy Conference/Roundtable, in October 2007.

## Website Resources

Hungarian Energy Office: <http://www.eh.gov.hu>  
EU website for information & business: <http://www.biofuelmarketplace.com>  
Website for EU-wide emission trading: <http://www.euets.com>  
U.S. Mission to the EU: <http://www.buyusa.gov/europeanunion>  
The Intelligent Energy Europe Program (projects until 2013):  
[http://ec.europa.eu/energy/intelligent/index\\_en.html](http://ec.europa.eu/energy/intelligent/index_en.html)  
Hungarian Biogas Association <http://www.biogas.hu/English>  
Hungarian Biomass Association <http://www.mbmt.hu>  
Information on Bio-ethanol in Hungary <http://www.etanol.info.hu>

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