

Country-Specific Energy Sector Analysis

2013

Energy Sector Europe



INTERNATIONAL
TRADE
ADMINISTRATION



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AUSTRIA

| | |
|------------------------|----------------------|
| <i>Capital:</i> | Vienna |
| <i>Population:</i> | 8.4 million |
| <i>GDP:</i> | \$419 billion (2011) |
| <i>GDP per capita:</i> | \$48,809 (2011) |
| <i>Currency:</i> | Euro |
| <i>Language:</i> | German |



Executive Summary

The electric power equipment market in Austria charted a total market size in 2011 over \$2.9 billion. Notable is the rapid rise in imports, a 15% jump from 2010 to 2011 that we predict will continue as Austrian electricity providers invest a projected 15 billion Euro (\$19.2 billion) in power generation, distribution, and efficiency upgrades between now and 2020.

According to statistics prepared by the Austrian electricity regulator e-control in December 2011, there are currently 13,827 power generation facilities in Austria, including almost 2,000 small hydro facilities, with a total installed capacity of 22,628 MW. Domestically produced electricity is dominated by hydro power, which accounted for 60% of the electricity produced in Austria in 2011. It is interesting to note that coal use rose significantly between 2010 and 2011, from 6.7 to 11% of the total, and natural gas as a fuel source fell from 30% to 19%.

Best prospects for U.S. companies include coal exports and specialized processing/transportation solutions; products and services for the operation of flexible fuel and coal-fired power plants; equipment and software solutions for smart grid implementation; as well as products and services for the construction and implementation of supplementary high voltage lines, including public relations and legal services.

Overview

Austrian electric power generation and distribution systems are among the most reliable and environmentally friendly in Europe. According to e-control, Austria's gas and electricity regulator, there were only 48 minutes of unavailability in 2011, down from 52 minutes in 2010. Though dependence on foreign electricity is a matter of increasing concern for policy makers, the high price of domestic power generation has brought a continuous shift toward foreign-sourced electricity. Imports rose by 25% from 2010 to 2011 due to the low precipitation levels in Austria; primary source countries are neighbors Germany and the Czech Republic.

Domestically produced electricity is dominated by hydro power, which accounted for 60% of the electricity produced in Austria in 2011. The second most important source of electricity is natural gas with 19%, followed by coal, which accounted for 11%. Biogenics accounted for 5%, and the remaining 5% is split between alternative sources (wind, solar, small hydro) and the firing of oil derivatives at thermal generation facilities. It is interesting to note that coal use rose significantly between 2010 and 2011, from 6.7 to 11%, and natural gas as a fuel source fell from 30% to 19%. These figures support anecdotal evidence of the far-reaching impact of the U.S. shale gas revolution. Lower demand for coal in the United States brought the world price down. This, in combination with steady natural gas prices in Europe and the failure of the EU's CO² cap and trade program, has created the

economic impetus for coal to partially displace natural gas in the Austrian electricity mix. We expect to see this trend continue, at least until an economic recovery resuscitates the EU cap and trade system.

According to statistics prepared by the Austrian electricity regulator e-control in December 2011, there are currently 13,827 power generation facilities in Austria, including almost 2,000 small hydro facilities, with a total installed capacity of 22,628 MW (megawatt). Here is a breakdown:

- Hydropower: 2,671 plants with a capacity of 13,200 MW
- Fossil fuels: Four coal-fired plants, 18 coal or oil derivate plants, and 64 natural gas fired plants. Together, these have a capacity of 7,079 MW
- Biomass/biogas: 103 facilities with a total capacity of 401 MW
- Other thermal facilities (including those firing a fuel mix and those that are online less than 75% of the time): 394 facilities with a total capacity of 769 MW
- Renewable: 10,573 units are run on renewable sources (including wind turbines, pv and geothermal units) with a capacity totaling 1,179 MW
- There is no nuclear power generated in Austria.

The trend shows a tremendous increase in the number of renewable units (from 5,625 in 2010 to over 10,000 in 2011) but a decrease in renewable gigawatt hours of production (from 2,096 GWH in 2010 to 1,985 GWH in 2011). Another interesting trend is the relationship of gas to coal use. In 2010, five coal-fired plants produced 4,800 GWH; in 2011, four coal-fired plants produced 5,300 GWH. With gas we see the opposite movement. In 2010, 69 gas-fired plants produced 13,500 GWH; in 2011, 64 plants produced 11,400 GWH.

There are a total of 5.9 million electricity delivery points in Austria, of which 4.2 million correspond to private households. The largest electricity consumers are industrial entities, which account for 57% of the electricity distributed. The length of the grid is 235,654 km, including high voltage lines. Over 67% of the lines are underground. There are currently 5 transformer stations for less than 100 KV, 978 transformer stations for 100-200 KV, and 65 stations for voltage over 200 KV. 76,809 transformer stations control middle and low voltage flows (source: e-control 2011).

Sub-Sector Best Prospects

There are three notable best prospect sub-sectors in Austria, namely, prospects related to the economic attractiveness of coal as a fuel source, products and services for the development of smart grids, and the upgrade/expansion of high voltage lines.

Coal

The low world price for coal, in combination with high European natural gas prices and the failure of the EU's CO² cap and trade program, has created the economic impetus in Austria for coal to partially displace natural gas in the electricity mix. In 2010, five coal-fired plants produced 4,800 GWH; in 2011, four coal-fired plants produced 5,300 GWH. Coal imports from the United States rose by a whopping 62% between 2010 and 2011, from just under 540 to over 876 thousand tons.

Smart grids

The market opportunities for smart grids in Austria are largely the result of a regulation passed in April, 2012, which requires that 95% of all household and small commercial customers have a smart meter by 2019. The latest census data reports 678,000 private households in Austria, and 294,000 SMEs. In addition to the meters themselves, there is a market for associated software that ties real-time metering to monitoring, distribution, and billing systems. Another segment that is expected to become popular is energy-saving home automation.

High Voltage Lines

Electricity providers and policymakers agree that the high voltage network in Austria needs to be expanded. Electricity providers plan to add 200 km to the 380 KV and 550 km to the 200 KV networks by 2020 at a cost of approximately 6 billion Euro (\$7.7 billion) in order to accommodate increased EU electricity trading and the transfer and storage of renewable electricity output across Europe. There are significant barriers to the construction of these lines, including massive resistance from residents and the geographical challenges of the alpine regions of the country. The “master plan” for the expansion of high voltage lines calls for construction to begin in 2015, and there are currently several environmental impact studies underway.

Opportunities

Austria’s electricity providers plan to invest over 15 billion Euro (\$19.2 billion) between now and 2020 in upgrades to their power generation equipment, distribution network, and energy efficiency. Specifically, excellent opportunities for U.S. companies exist in these four areas:

- Coal exports, specialized transportation services
- Products and equipment for the support and maintenance of coal-fired and flexible fuel power plants
- Smart grid products and equipment, including smart meters, processing systems, software, and home-automation
- High voltage lines, products, and services, including public relations and legal services

Resources

E-Control GmbH

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U.S. Commercial Service

American Embassy Vienna, Austria

BULGARIA

Capital: Sofia
Population: 7.3 million
GDP:* \$103.8 billion
Currency: Bulgarian Lev
Language: Bulgarian



Executive Summary

The business landscape in the electricity sector of Bulgaria is gradually changing since the beginning of 2000 due to restructuring, privatization and the commitment to follow the European energy policy, namely as far as the development of new subsectors based on RES, climate change, energy efficiency and energy security are considered. Currently the renewable energy sources (RES) in Bulgaria are well developed.

The electricity sector in Bulgaria is managed by the State Energy Regulatory Agency. Under the agency, Nationalna Elektricheska Kompania (NEK) was split into six independent generators, a national transmission system operator, and seven regional distribution system operators. Steps towards the deregulation of the electricity market are underway. As of 2007, the electricity generation companies are mainly state-owned, the electricity distribution companies are privatized, and the district heating companies are still undergoing privatization

Market Entry

Finding a good, reputable local representative is key in order to successfully enter the market, and conducting due diligence before selecting a representative is essential. Enlisting qualified local legal services for contract negotiations is also highly recommended. The U.S. Commercial Service located in the U.S. Embassy in Sofia can assist with market research, contact facilitation, contact evaluation, and service providers – refer to: <http://www.export.gov/bulgaria>.

Current Market Trends

The EU has mandated **full liberalization** of the Bulgarian market by Jan. 1, 2015, which will likely usher in still higher prices, and Brussels is seeking to untangle Bulgaria's energy situation to ease the transition. Adding to the full market liberalization and the complexities of the energy sector in Bulgaria is the process of **joining the international green house gas trading**.

Currently the power sector in Bulgaria faces a number of challenges, which can be addressed through **integration of smart grid technologies**. The Bulgarian electric power system incurs many non-technical losses (NTL). Bulgaria's transmission lines are operating across great distances, resulting in high energy losses. To connect the planned new generation facilities to the grid, Bulgaria has **to increase the transmission system capacity**. However, investments in traditional transmission capacity alone will not be enough **to guarantee the system's stability** because of the intermittent nature of the many new renewable energy power plants. An integrated strategy of smart grid development would help to secure transmission system reliability.

Current Demand

Bulgaria's net installed generating capacity stands at 12,668 MW including thermal, nuclear, RES and hydroelectric resources. The existing generation assets in Bulgaria have been sufficient to supply domestic demand and have created opportunities for a significant export of electricity.

For the period November 2012 – January 2013, the net electricity consumption in Bulgaria fell by 3.97%, compared to the same period of the previous year. The electricity demand is shrinking (domestic and foreign), and access to funding is squeezed.

Currently, domestic consumption would not justify additional power generation capacity. Much of the electricity produced by any expansion of Bulgaria's nuclear sector would be for export.

Competitors

The energy sector in Bulgaria suffers from lack of competition and from inefficient government regulation, both of which create conditions that incur excessive costs at the expense of consumers. The sector is strongly dependent on the energy sources supplied under monopoly import terms and conditions. Quite indicative in this respect is the Russian import of nuclear fuel for Kozlodui NPP.

Major competitors in energy projects considering Bulgaria as a good place for investment are Atomstroyexport (ASE), Rosatom, Lukoil, Gazprom, RWE, Siemens, ABB, Dalkia, ENEL, Schneider Electric, Toshiba, Hitachi, Gas de France Suez.

Barriers

When designing equipment and machinery for export to Bulgaria, a potential market issue should be kept in consideration. This is the necessity for U.S. manufacturers to use the European metric system. Equipment and materials, exported from the USA, should also comply with the ISO quality standards. Additionally products tested and certified in the U.S. to American standards are likely to have to be retested and re-certified to EU standards.

Trade Events/Associations

Name of event: **South East European Exhibition and Congress on Energy Efficiency and RES**

Location: Sofia, 29-31 May 2013

English language website: <http://www.eeandres.viaexpo.com/en/exhibition/>

Description: Main Exhibition branches: Energy Efficiency, Bio-, Wind-, Solar-, Geothermal- and Hydro Energy, Waste-to-Energy, e-mobility,

Name of event: **Plovdiv International Technical Fair**

Location: Plovdiv, September 30 – October 5 2013

English language website: <http://www.tradefairdates.com/Eltech-M1522/Plovdiv.html>

Description: **Eltech** presents the latest developments on the sector of electronics and electrical engineering. The international fair offers new opportunities for business contacts and ideas for business expansion. The exhibition

is organized in cooperation with the Bulgarian Chamber of Electrical Engineering and is held within the framework of the International Technical Fair.

Bulgarian Photovoltaic Association

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<http://www.bsrec.bg>

Important links:

Ministry of Economy and Energy – <http://www.mi.government.bg>

Energy Efficiency Agency – <http://www.seea.government.bg>

State energy and water regulatory commission – <http://www.dker.bg>

Bulgarian Energy Holding – <http://www.bgenh.com>

Available Market Research

Energy Brief 2013 – Bulgaria

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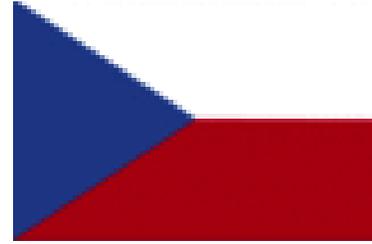
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U.S. Commercial Service

American Embassy Sofia, Bulgaria

CZECH REPUBLIC

Capital: Prague
Population: 10.5 million
GDP:* USD 189 billion
Currency: Czech Crown (1 US\$=19 CZK)
Language: Czech



Executive Summary

The Czech electricity generation system will continue to rely primarily on two energy sources: lignite coal reserves and nuclear. The Czech Republic has an installed capacity of 17.3 GW. The majority of installed power generation capacity is based on coal (57%). The shares of nuclear and RES are 30% and 13%, respectively. In 2012, 76.6 TWh was generated in the country. 17.8 TWh was exported to neighboring countries (Slovakia 7.8 TWh, Austria 2.9 TWh, Germany 8.6 TWh).

CEZ (www.cez.cz) is the dominant player in the Czech energy market. It owns and operates the majority of coal-fired power plants and both Czech nuclear power plants. CEZ generates 59.5 TWh, which represents a 72% share of total power generation. CEZ also has a 93% stake in the largest Czech mining company Severoceske doly (North Bohemia Mines) producing 22 million tons of lignite, thus representing 45% of total lignite mining in the Czech Republic.

CEZ is 60.7% state-owned. The company has launched retrofit and capacity expansion of four of its fleet of coal-fired power plants. On August 3, 2009, CEZ opened a tender for the supply of two nuclear units for the expansion of the Temelin NPP. Of three bidders, French Areva was disqualified from the tender. US Westinghouse and Russian Atomstroyexport are competing in the tender worth \$28 billion. A winner will be announced in the end of June 2013.

Market Entry

The import climate is open and the Czech market is receptive to U.S. products. A recommended strategy for a U.S. company interested in penetrating the Czech market would be to find a local partner/representative or to open an office in the country. Without a local representative who can support everyday contact with customers and government representatives, it is very difficult to succeed in the market. Generally, importers and agents have distribution channels already set up and are well connected with the end-users. Licensing should also be considered as a way to successfully enter the market. Selling directly from the U.S. is not recommended as the market is very complex and difficult to penetrate. A U.S. company can stimulate further sales by working with Czech partners on effective marketing campaigns, as well as by utilizing trade shows, in-country promotions, and advertising. The U.S. Commercial Service offers a number of ways to help U.S. companies find business partners in the Czech market. These include setting up meetings with Czech companies interested in partnership, government officials and associations representatives (Gold Key Service), due diligence on prospective partners (International Company Profile) and events to introduce new product lines to potential customers (Single Company Promotion). More information and contacts can be found at:

<http://www.buyusa.gov/czechrepublic/en/>

Current Market Trends

Key projects in 2013-2017:

- new nuclear units in Temelin , construction is estimated to start in 2017
- upgrade of lignite-fired plants in Ledvice and Prunerov
- new CCGT (Combined Cycle Generated Technology) unit in Pocerady power plant

Current Demand

See above

Competitors

- Atomstroyexport
- Siemens
- Doosan
- ABB
- Local companies such as: Sigma Group (pumps), I&C Energo (instrumentation), Kralovopolska RIA (engineering works), Mavel (wind turbines), and many others.

Barriers

Equipment must be labeled with the CE mark. The CE mark certifies that the product is in compliance with the European Union standards equivalent to Czech standards and can be used in the Czech Republic without further testing. Consulting the Czech Office for Technical Standardization, Measurement and Testing (<http://www.unmz.cz/office/en>) is recommended.

Most U.S. equipment has a nominal duty rate of 2%, while equipment imported from EU countries enter duty-free. If imports from U.S. companies into the Czech Republic originate from production facilities in Europe, then the preferential rates for those countries are applicable. All products, regardless of origin, are subject to 22% VAT, which is actually paid by the end-user.

Trade Events/Associations

Name of event: **International Engineering Fair**

Location: Brno, Czech Republic

English language website: <http://www.bvv.cz/en/msv/>

Description: the largest engineering fair in Central Europe attracting hundreds of industrial exhibitors and tens of thousands of visitors from CEE, Russia, Ukraine and other post-Soviet Union republics.

Trade Associations

[Association of Managers of Energy](#)

[Heating Association](#)

[Wind Energy Association](#)

[Photovoltaic Association](#)

Available Market Research

ISA:

- Renewable Energy in the Czech Republic, July 2011
- Smart Grids, August 2010
-

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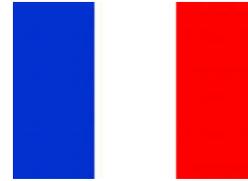
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U.S. Commercial Service

American Embassy Prague, Czech Republic

FRANCE

Capital: Paris
Population: 66 million
GDP: \$2.8 trillion
Currency: Euro
Language: French



Executive Summary

The power market in France is highly concentrated and dominated by a small number of very large incumbent suppliers, but competition from alternative suppliers has been increasing. Partly privatized Electricité de France (EDF) dominates the power generation sector, retaining up to 85% of installed production capacity. It also operates the national electricity grid, and owns (ERDF), which manages the majority of the public electricity distribution networks in France, with 35 million customers and 1.3 million km of power lines. The government wants to boost the share of renewable energy to meet President Hollande's goal of reducing nuclear power share from 75% to 50%.

Market Entry

Electricité de France has 87% of installed production capacity and supplies 95% of customer sites. One hundred and sixty local distribution companies (local authorities or public or private companies) supply the remaining 5%, purchasing electricity wholesale from EDF and then selling it to large industrial and commercial customers. Market entry opportunities are slowly opening as the renewable sector develops, relating to the government's goal of reducing the nuclear power share, in ensuring the safety and security of nuclear power generation, and in technologies used for energy reliability and smart controls.

Current Market Trends

Power generation in 2011 remained stable. Overall power generation is expected to increase 2012-2021 by an average of 1.16% p.a. due to rises in gas-fired generation, nuclear powers, and renewables. Coal and oil power generation is expected to fall, and natural gas could be the alternative choice. The French power supply surplus is likely to increase because of new nuclear capacity. EDF would have to invest almost \$13 billion in tighter safety controls in its nuclear plants. Expansion of nuclear reactors is highly questionable. RTE (French electricity transmission system operator) announced it would require a €19 billion (\$24 billion) investment in France's transmission and distribution network to meet the government's goal of reducing nuclear energy. This money will be used for new transmission lines to new renewable energy projects. Hydroelectric power is expected to increase steadily, but concessions have yet to be offered to tender inciting possible legal battles. Renewables are expected to grow by 8.5% in 2012 due to the sizeable wind energy sector and the up-and-coming solar sector. Progress in renewable energy has been limited. France is targeting 25 GW of installed wind capacity by 2020.

Current Demand

The average household electricity price is one of the lowest in the European Union and there is a considerable energy surplus. Weak macroeconomic conditions have impaired growth in energy consumption, and government debt has been steadily rising and is expected to affect power utilities and subsidies. Austerity measures and

growing risk aversion will favor divestments over capital expenditures. Feed-in tariffs (FITs, policy mechanisms used to accelerate investment in renewable energy technologies) are being reduced by up to 10% per quarter. Nonetheless the share of natural gas and renewable energy is set to grow in the energy mixes.

Competitors

EDF retains 87% of installed production capacity. There are a few competitors, mostly entities that distribute EDF's energy or are in the renewable sector.

Barriers

The construction and operation of energy power plants are subject to several pre-requisites:

- Obtaining an authorization to operate from the Ministry of Energy
- Obtaining the relevant planning authorizations (in particular a building permit or building declaration) from the competent local public authority
- Obtaining the connection of the plant to the electricity grid
- Complying with relevant environmental prescriptions

Trade Events/Associations

Energies Renouvelables (EnR, Renewable Energy Trade Show) in Lyon, France

Website: <http://www.enr.fr>

Promotes renewable energy in the EU

Energaia Expo in Montpellier, France

Website: <http://energaia-expo.com/2012uk/>

International players in the renewable energies field meet annually in Montpellier to discuss markets, innovation, products, and services.

Commission de Régulation de l'Énergie (CRE)

Website: <http://www.cre.fr/en>

Agence de l'Environnement et de la Maîtrise de l'Énergie (ADEME, French Environment and Energy Management Agency)

Website: <http://www.ademe.fr>

French Ministry of Ecology, Sustainable Development, and Energy

Website: <http://www.developpement-durable.gouv.fr>

Available Market Research

The French Electricity Market

Website: <http://www.xerfi.fr>

France Power Report Q2 2013

Website: <http://www.marketresearch.com>

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GERMANY

Capital: Berlin
Population: 82 million
GDP:* \$ 3.3 trillion
Currency: Euro
Language: German



Executive Summary

The estimated German power generation in 2012 was 578.3 terawatt hours (TWh).

The German electricity production sector (23,000 firms) generates an annual turnover of over \$125 billion. The number of people directly and indirectly employed in the sector is over 605,000 (235,000 conventional sectors, 370,000 renewable sectors).

Energy transition and nuclear phase out are the most important topics. The overall estimated direct costs for the German energy transition are 550 billion EUR until 2050 according to the Federal Government. This includes investments in renewable energy technology, new power plants, storage technology, new and more powerful grids. According to this forecast the German energy industry will invest more than \$79 billion by 2020 in constructing and modernizing power plants, partly to compensate for the phase-out of nuclear energy in the country.

Germany's dedication to the energy transition is an opportunity to U.S. companies who are looking to extend their business into Germany and Europe and who might be able to assist Germany by providing their products or services.

Market Entry

The German electricity market is highly mature and competitive. However, U.S. products and services are very well accepted and a lot of U.S. companies are already in the market. Germany ranks number 6 for U.S. exports after Canada, Mexico, China, Japan, and the U.K.

A U.S. exporter would need a local partner who has local contacts and a good understanding of local procurement practices. Another option is to exhibit at one of Germany's international trade shows. In Germany, trade fairs play a major role in product marketing. U.S. companies wishing to penetrate the German market often make their first approach at major trade fairs. For U.S. manufacturers and exporters wishing to sell in Germany (and in Europe) it is important to exhibit at one of Germany's major international fairs. Exhibiting at fairs can bring direct sales, but, more significantly, it can be one of the least expensive ways to test the market's receptivity. Further, the strength and scope of the competition can be assessed and contacts with others "in the trade" can be established. From these contacts, U.S. companies can gather a great deal of valuable information about marketing in Germany and Europe.

Prospects for U.S. companies:

Demand remains high in power plant technology, turbine technology, and maintenance technology for conventional power plants. The supply of mechanical power transmission equipment, power distribution and

specialty transformers, power boilers and heat exchangers, turbines, and turbine generator sets, oil and gas field machinery and equipment of electronic coils, transformers and inductors, plastic tubes, hoses, pipes, and pipe fittings as well as coal and petroleum gases are the best prospects for U.S. companies. There is a high potential for state of the art energy storage technology and a slightly growing demand for renewable energy.

Current Market Trends

German Energy Transition and nuclear phase out

- Goal: 35% clean energy in 2020 and 80% in 2050 with making a break with coal, oil and nuclear energy.
- Implementation: The Renewable Energy Source Act (EEG) that guarantees a fixed tariff and grid priority. Feed-in-tariff – a fixed amount that you'll be paid for each kilowatt-hour that you generate. Renewable energy has "grid priority" over coal, oil, etc.
- Estimated direct costs: 550 billion EUR until 2050 according to the Federal Government (renewable energy technology, storage technology, new and more powerful grids). Germany must build or upgrade 8,300km (5,157 miles) of transmission lines (not including connections to offshore wind farms). Wind and sun power creates a need for backup generators. Additional costs/investments: Energy performance in buildings - 90 % of housing area needs to be upgraded until 2050 - about 300 billion EUR only for private households.
- Criticism: The price will be high, the risks are large. Possible blackouts during peak load times. Overload the grids in neighboring countries. Hence, conventional power plants will be needed until at least 2050. Operating power plants need to remain economically attractive. The ability to upgrade the national transmission grid to facilitate distribution will have a decisive impact. There is a risk that Germany might not meet the targets established by its ambitious energy agenda, and renewables (excluding hydropower) will contribute 30.7% to the total electricity mix by 2022.

The four big players

Germany's electricity market is characterized by a high degree of vertical integration, with large incumbents that own the majority of the generating capacity, and also own and operate a piece of the transmission network.

Four companies control the largest share of Germany's electricity generation (approximately 80% between them), following a consolidation over several years: **RWE, E.ON, EnBW and Sweden's Vattenfall**. Significant cross-ownership by these incumbents in retail and distribution is still present, although a number of deals have been concluded since 2008 in order to conform to EU legislation on unbundling (separation of power production from transmission).

RWE, E.ON, EnBW, and Vattenfall operate Germany's national transmission grid, as there is no unified operator for the entire country. These four companies also control around half of the power retail market, even though there are numerous local distribution companies, many of which are owned by state or municipal governments that sell electricity to end users. These companies often also own a small amount of generating capacity. Under the new German energy law, state governments (not BNA) have regulatory oversight of these smaller operators.

Energy investments

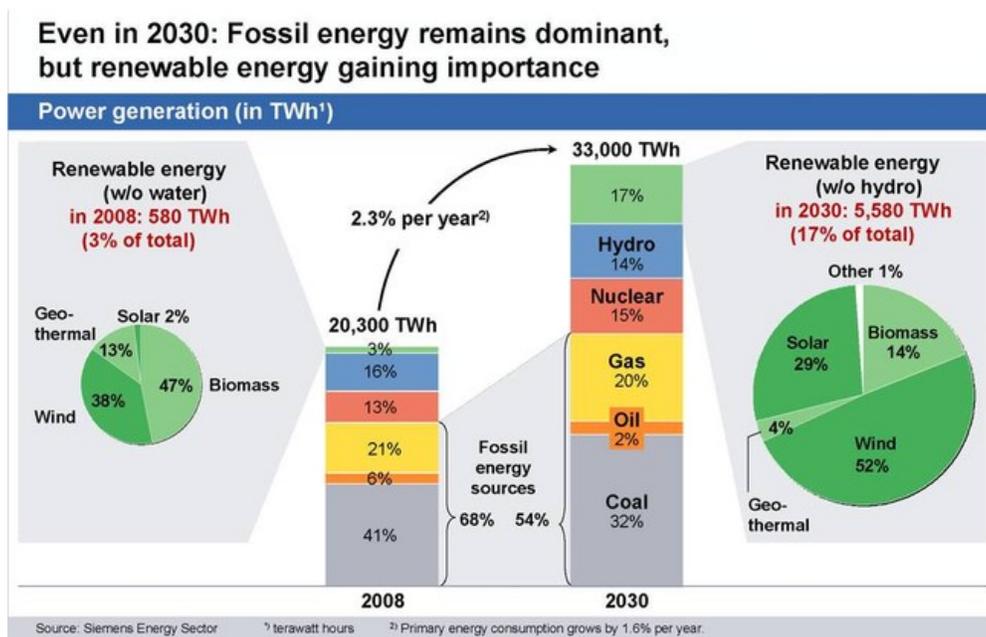
The German energy industry will invest more than \$79 billion by 2020 in new and modernized power plants. The German Association of Energy and Water Industries (Bundesverband der Energie- und Wasserwirtschaft, BDEW) says that some 84 large power projects are planned, each of which will add at least 20 MWe of generating capacity. These facilities include 23 offshore wind farms, 29 gas-fired plants, 17 coal-fired plants and 10 pumped-storage power plants and have a combined capacity of 42,000 MWe. Of these 84 projects, 69 are already in at least the permitting stage, while 15 are still at the planning stage under the management of various public utilities, large energy companies, associations and private investors. The increased commitment to including offshore units and pumped storage plants is a positive sign that the industry is investing in future energy supply.

While some gas power plants have already been approved, actual investment decisions are still pending because companies are concerned about the profitability of such plants due to uncertainty of how many hours they would be able to operate to provide base load power. The government must have an energy policy in place by 2015 that removes uncertainties about investing in energy projects so that new generating capacity can be built by 2020. http://www.world-nuclear-news.org/NP-Germany_plans_79_billion_dollar_in_energy_investments-2404124.html

Current Demand

Being the manufacturing powerhouse that they are, Germany requires a significant amount of energy. In fact they are the largest consumer of energy in Europe.

German power generation in 2012 was 578.3 terawatt hours (TWh). Between 2012 and 2022, Germany's overall power generation is expected to increase by an annual average of 1.0%, ending the period at 639.1TWh. The commitment to renewable energy has helped to create jobs and drive economic opportunities. However, fossil energy will remain dominant until 2030.



Competitors

U.S. exporters will face a competitive market in Germany, but international companies also praise the country as one of the best locations for doing business. Germany has a welcoming attitude towards foreign trading partners and foreign direct investment. Business activities are free from regulations restricting day-to-day business. German law makes no distinction between Germans and foreign nationals regarding investments or the establishment of companies. The legal framework for in Germany favors the principle of freedom of foreign trade and payment. There are no restrictions or barriers to capital transactions or currency transfers, real estate purchases, repatriation of profits, or access to foreign exchanges. Incentives in Germany are available to all investors – regardless of investor country of provenance.

http://www.gtai.de/GTAI/Content/DE/Trade/Fachdaten/PUB/2011/06/pub201106298000_14783.pdf

Barriers

Equipment and products need to be tested and certified according to European standards.

http://export.gov/germany/doing_business_in_germany/EUStandardsMetricDirective/index.asp

Trade Events/Associations

Trade events

- Hannovermesse, April 7-11, 2014. Hannover. <http://www.hannovermesse.de/home>
- Power-Gen Europe. June 3-5, 2014. Cologne. <http://www.powergeneruope.com/index.html>
- VGB Conference “Gas Turbines and Operation of Gas Turbines 2013”, June 11-12, 2013. Friedrichshafen. http://www.vgb.org/en/vfgt_2013.html
- VGB Conference “Power Plants 2013”, September 25-27, 2013. Maastricht. http://www.vgb.org/en/hv_2013.html

Associations

- VGB <http://www.vgb.org/> European technical association for power and heat generation - a voluntary association of companies for which power and heat generation
- DENA Germany Energy Agency www.dena.de
- BDEW German Association of Energy and Water industries http://www.bdew.de/internet.nsf/id/EN_Home
- BEE German Renewable Energy Federation <http://www.bee-ev.de/BEE/English.php>

Available Market Research

- Germany Power Report 2013 including power project database and company profiles of the big four players
- Power plants in planning and power plants under construction

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GREECE

Capital: Athens
Population: 10,767,827 (July 2012 est.)
GDP:* \$280.8 billion (2012 est.)
Currency: Euro
Language: Greek



Executive Summary

Greece has strategically focused on its energy road map for the past three years by passing laws that encourage direct foreign investment. Exploration and exploitation of hydrocarbons are in the planning process at the same time that privatization of major energy-related assets is underway and major energy projects have been announced. The Government's effort to deregulate the energy market is helping create a stable environment for investment. Hence, opportunities will present themselves for U.S. companies that wish to export relevant technology and services. For a successful outcome however, a local partnership is strongly advised.

Market Entry

Entering the Greek energy market is promising due to the various attractive projects. The energy market map is currently being redrawn and the Greek government is actively involved in pushing for structural reforms and deregulation of this sector. Opportunities are present, as many energy-related projects are under consideration.

For example, the Hellenic Republic, acting through its competent authority, the Ministry of Environment, Energy and Climate Change, invited qualified natural or legal persons to apply for granting and using authorizations for exploration and exploitation of hydrocarbon in certain areas of western Greece. The invitation referred to three areas available in accordance with section 2, §17(c) of Law 2289/1995 as amended by section 156 §10 of Law 4001/2011; the onshore area known as "Ioannina" and the offshore areas as "Gulf of Patraikos (west)" and "Katakolon". It has been estimated that the oil reserves for these three areas are 250-300 mn bbl.

Other projects of interest include: the Trans-Adriatic gas pipeline (TAP); the gas pipeline interconnector between Greece and Bulgaria (IGB); the creation of additional LNG terminals along with the upgrade of an existing one; the grid system Euroasia interconnector, connecting the power grids of Greece, Cyprus and Israel; and the privatization of energy-related state assets. Additional updated information and counseling can be provided by contacting the U.S. Commercial Service, located in the U.S. Embassy at Athens, Greece.

The restructuring of the Greek energy market will provide ongoing opportunities for U.S. companies in the field of technology and services. Therefore, US companies may be interested in supplying the Greek energy market.

Current Market Trends

The Greek state has placed emphasis on its energy policy through market deregulation and modernization of its relevant legal framework. Its goal is to establish energy efficiency and effectiveness and to become an alternate route for supplying Europe's energy needs.

Accordingly, privatization of energy-related organizations and the exploitation of potential energy resources are central to the Greek state's agenda. Natural gas supplier, DEPA; natural gas network distributor, DESFA; the major electric power company, PPC; and a major oil refining company, Hellenic Petroleum, are to be privatized. The Greek government will soon complete the open invitation for the exploration and exploitation of three blocks. In addition, PGS, a Norwegian seismic survey company will have completed its compiled seismic data analysis, covering an area in the Ionian Sea from northern Greece to south of Crete, by the end of 2013. It is expected that additional blocks for concessions will be made available during the 2nd Quarter of 2014.

The government of Azerbaijan is expected to make a final decision regarding the Trans Adriatic Pipeline. The creation of additional LNG terminals has been announced, along with port-related upgrades in the existing Revithousa LNG terminal.

Current Demand

In Greece, lignite is the single most important local energy source. However, low-quality black coal is also used for power generation. In 2009, it was estimated that 70.5% of electricity production was based on fossil fuels, 17% on hydroelectric plants and 8.5% on renewable sources. In 2010, it was estimated that 57.11 billion kWh were produced, 2.571 billion kWh were imported and 8.517 billion kWh were exported.

Greece had an approximated oil production of 3 mn bbl/year in 2012. However, the country relies heavily on oil imports, mainly from Russia, Libya, Egypt, Iran and Saudi Arabia, to meet its estimated consumption needs. In 2012, total net oil exports, including crude oil and oil products, were estimated at 283,700 bbl/day, whereas; total oil consumption was estimated to 291,900 bbl/day.

Lastly, Greece imports one-hundred percent of this 4.6 bn m3 (2012 estimate) natural gas consumption.

Competitors

Competition in the energy sector is global, attracting mainly top companies in the field. Establishing a partnership with a local company can be an advantage. The local company will have responsibility for monitoring all marketing activities and assist its partner to respond quickly and fulfil its local customer's needs and requirements. In addition, the local partner would ensure that the technical specifications are well defined before the bidding process and provide the necessary documentation required in the local message.

Barriers

U.S. products imported into Greece have to comply with EU standards, have the CE mark and meet environmental and safety requirements set by the EU. The use of the metric system is also something that US companies should consider.

Trade Events/Associations

Climatherm Energy 2014, Athens, Greece, <http://www.climatherm.gr/index.php?id=39>

It is an exhibition that focuses on natural gas, liquid gas and renewable energy sources among other areas.

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U.S. Commercial Service

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HUNGARY

Capital: Budapest
Population: 10 million
GDP:* 195.4 billion
Currency: Hungarian Forint
Language: Hungarian



Executive Summary

The Hungarian Government has given energy a predominate role in the country's road to recovery and growth. As highlighted in the National Energy Strategy 2030, the three pillars are: security of supply, competitiveness, and sustainability, with the main focus on regional co-operation. The re-structuring process entailed 4 key elements: widespread energy efficiency, more renewable and low CO2 intensity power generation, and low CO2 emission when it comes to transportation. In fact the energy sector has undergone many rapid changes in the past years. The government has been very active with recurring changes in regulations, increasing government involvement in setting prices and new taxes. Due to the changing nature of the energy sector, it is therefore vital to have a proper understanding of the market.

Market Entry

In most cases, traditional methods of entry are advisable, for example connecting with local partners who are able to provide information on local business practices, rules and regulations, technical assistance, and of equal importance, are able to help out with the Hungarian language.

Current Demand

Total electricity consumption (gross production and import-export balance) was 42.6% TWh in 2011, a slight increase to the previous year. From total consumption, production of domestic power plants was 84.4% (36 TWh), while import export balance was 15.6% (the volume of import-export balance increased by 17.9%). Domestic production decreased by 3.7%.

For the Hungarian government, nuclear has been at the core when it comes to energy policy. Nuclear makes up the largest part of electricity production. The current nuclear power plant with four units (Paks) accounts for over 43% percent of Hungary's electricity output (15,685 GWh in 2011). The lifetime of the current units has been lengthened for another 20 years, while an expansion of the plant has been a top priority. The finalization of the tender is ongoing. As part of the energy based electricity generation, 29% derives from natural gas, 18% from coal and between 7.9%-9.3% from waste and renewable. As part of the 2020 EU directive Hungary is committed to reach the 14.65% from renewable energy. A new financial support system (feed-in tariffs or METÁR) is expected soon.

Competitors

In reference to the energy sector the Hungarian market is open to foreign products and services and a large number of foreign companies, including from the U.S., are present in Hungary.

Barriers

Technical specifications are the same as in other EU countries, including ISO quality standards.

Trade Events/Associations

- **RENEXPO**, Budapest: <http://renexpo-budapest.com/index.php?id=7&L=1>
- **ENERGOexpo**, Debrecen: <http://www.energoexpo.hu/?lng=eng>
- **Hungarian Energy and Public Utility Regulatory Authority**, <http://www.eh.gov.hu/en/>
- **Hungarian Atomic Energy Authority**: http://www.oah.hu/web/v2/portal.nsf/index_en
- **Energiaklub** – climate policy institute: <http://energiaklub.hu/>
- **Hungarian Renewable Energy Association (MMESZ)**, <http://www.mmesz.hu/>
- **Hungarian National Association of Machinery and Power Engineering Industries (MAGEOSZ)**, <http://mageosz.hu/>
- **Hungarian Electrotechnical Association**, <http://www.mee.hu/english>
- **Hungarian Energy Traders' Association**, <http://meksz.eu/>

Available Market Research

- The Hungarian Smart Grid Market

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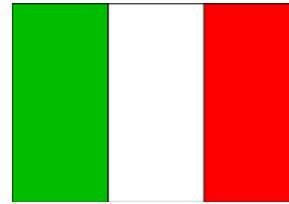
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U.S. Commercial Service

American Embassy Budapest, Hungary

ITALY

Capital: Rome
Population: 60 million
GDP:* \$ 1.98 trillion
Currency: Euro
Language: Italian



Current Supply Trends

Electricity Production in Italy, by Source of Power (most recent data)

| | 2009 | 2010 | 2011 | Percent Change 2010-2011 |
|-------------|-------|-------|-------|-----------------------------|
| Coal | 14% | 13.2% | 14.8% | +1.6% |
| Petroleum | 5.5% | 3.3% | 2.6% | -0.7% |
| Natural Gas | 50% | 50.7% | 47.9% | -2.8% |
| Renewables | 23.5% | 25.5% | 27.4% | +1.9% |
| Other | 7% | 7.3% | 7.3% | 0 |

The electricity production mix in Italy is characterized by a substantial reliance on oil and gas. Proportionally, Italy employs more gas than the rest of Europe. Nevertheless, the intensity of oil and gas utilization is gradually decreasing, while renewable energies (hydro, solar, wind, and biomass) are registering a strong growth trend. The imbalance in the Italian production mix towards gas for energy generation, beyond the issues related to supply security, is economically disadvantageous. Italy imports 100% of its coal, and a significant quantity of oil and gas. The rate of energy dependence, which is the relationship between energy imports and gross consumption, is 81%, compared to an EU average of 53.8% (with Great Britain at 36% and France at 48.9%).

Specifically about renewable sources: in 2011, the renewables sector covered almost 28% of electric consumption, with over 600 thousand renewable power plants dispersed all over the country. Hydroelectric power covers about 47% of renewable energy production (43 terawatt-hour) and the rest is more or less equally distributed between photovoltaic power (20% of total, i.e. 18 terawatt-hour), wind power (14% of total, i.e. 13 terawatt-hour), and biomass (13% of total, i.e. 12 terawatt-hour), and a more modest contribution from geothermal sources (about 5% of total, i.e. 5 terawatt-hour).

Nuclear energy was used for electrical power generation until the 1980s but, following a Referendum in November 1987 after the Chernobyl accident, developments in the nuclear area were largely dropped. In 1988, the government decided to stop all nuclear power plant construction, shut the remaining reactors and decommission them starting in 1990. Consequently, Italy is the only G8 country without its own nuclear power and is the world's largest net importer of electricity.

Market Drivers and opportunities

The Italian government has developed a National Energy Strategy to make the energy market more efficient. The plan aims to make Italy one of the "best practice" countries by exceeding all of the European environmental objectives and cutting the nation's electric and gas bill by 9 billion euros per year by 2020. By 2020 the government's National Energy Strategy also foresees 180 billion euros in investments in green economy

(renewables, energy efficiency) and traditional sectors (networks, regasification units, stocks, hydrocarbon production). These programs should allow Italy's foreign dependence for its energy to be reduced from 81% to 65%. Additionally, the National Energy Strategy aims to achieve a 35-38% production quota from renewable sources by 2020.

Specifically about energy efficiency, the National Energy Strategy aims to reduce consumption of electricity, gas, and combustibles by 23% by the year 2020. Italy pioneered the establishment of Energy Efficiency Certificates (or "White Certificates") to promote energy efficiency. The certificates mandate that electricity and natural gas distributors achieve annual energy saving targets that are certified by the presence of a corresponding number of white certificates (each equal to one TOE- Ton of Oil Equivalent). The distributors can reach their target either by implementing energy efficient solutions among end-users or by purchasing white certificates from other distributors.

There are significant opportunities for smart grid technologies, even if many of them are not very widespread commercially (aside from advanced metering systems and automation, control, and sensor systems). In fact, a study carried out by the Politecnico University in Milan estimated a very large potential market (between \$19.5 and \$78.2 billion) for smart grid technologies in the 2012-2020 time period. The most significant part of the market potential concerns solutions for the distribution phase (between \$11.7 and \$19.5 billion), because it is the one area that is currently most affected by the diffusion of non-programmable renewable sources and shows a level of "intelligence" that is considerably lower than that of the transmission phase.

Trade Events/Associations

Smart Energy Expo

Verona, 9-11 October 2013

<http://www.smartenergyexpo.net>

Energy Efficiency

The Innovation Cloud

Milan, May 2014

<http://www.innovationcloud-expo.com>

Renewable energy sources, energy efficiency

ZeroEmission

9-11 October 2014, Rome

<http://www.zeroemissionrome.eu>

Renewable energy sources, energy efficiency

Assosolare (Solar PV Association)

<http://www.assosolare.org>

Assocarboni (Coal Association)

<http://www.assocarboni.it>

Unione Petrolifera (Oil Association)

<http://www.unione petrolifera.it>

Cogena (Cogeneration Promotion Association)

<http://www/cogena.ascomac.it>

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U.S. Commercial Service

American Embassy Rome, Italy

SLOVAK REPUBLIC



| | |
|----------------------------------|-------------------------------|
| <i>Country/Market:</i> | Slovakia |
| <i>Capital:</i> | Bratislava |
| <i>Population:</i> | 5.4 million |
| <i>Language:</i> | Slovak |
| <i>Monetary Unit:</i> | Euro |
| <i>Exchange Rate:</i> | 1 Euro=1.311 USD (April 2013) |
| <i>GDP per Capita (in US\$):</i> | \$9,700 |

Executive Summary

The current situation in the Slovak energy market has been stabilized. Economic crisis have led to a decrease in the demand for energy in the Slovak Republic. Energy demand in Slovakia is still 1.9 times higher than the EU average. The Slovak market for electric power generation is small compared to that of other European countries. In 2011 there was a total installed capacity (from all sources) of 8,152 MW. Approximately 53.4% of the total consumption of 28,862 GWH of electricity in Slovakia was obtained from nuclear power stations, 19.8% from conventional power stations, 13.9% from hydro stations, 10.4% from industrial power sources and about 2.5% was imported, mostly from Ukraine, the Czech Republic and Poland.

Market Entry

Electric power generating equipment is subject to import tariffs that range from three to five percent. Power generating equipment used in Slovakia must comply with European standards and in some instances with Slovak technical norms and safety standards as well.

Slovak standards legislation is regulated by the Technical Requirements for Products and Conformity Assessment Act, which follows EU legislation. Conformity with Slovak technical standards is voluntary except when specifically required by this Act or other technical regulations. Conformity to Slovak technical standards is mandatory if there is a direct reference to the issue in the technical regulations. According to the law, importers or producers are responsible to assess the conformity of their product to technical requirements.

The National Testing Center for certification of power generating equipment is the [Electrotechnical Research and Design Institute](#) (Elektrotechnicky skusobny a projektovy ustav a.s.)

Slovak state-owned or public companies interested in purchasing power generating equipment issue a public tender with technical specifications. Private companies prefer to contact potential suppliers directly. They also may issue a public tender with technical specifications. Each public tender is published in *Obchodny Vestnik* magazine, which is issued by the [Slovak Public Procurement Office](#).

Current Market Trends

During negotiations to become a member of the European Union, the Slovak Government agreed to close two nuclear reactors at Nuclear Power Plant V1 Jaslovske Bohunice. One reactor was closed in 2006. After the second reactor was closed in 2008, total installed production capacity in Slovakia dropped to 7,453 MW. Slovenske Elektrarne a.s. is completing two new nuclear reactors at the Mochovce plant that will be completed in 2013 and 2014. In the meantime, the share of nuclear power stations installed capacity dropped starting in 2006 then again in 2009 and will remain at current levels until 2013.

Current Demand

The most important energy project is the construction of a new 1,000 MW to 1,700 MW third generation Pressure Water Reactor (PWR) type nuclear power plant with a minimum design life of 60 years. This project would most likely be situated in Jaslovske Bohunice in order to take advantage of the existing infrastructure network from the closed [Nuclear Power Plant V1 Jaslovske Bohunice](#). The government approved the construction of the new plant in December 2008. The total cost of the new plant has been estimated at between \$4.8 to 7.2 billion (EUR 4 to 6 billion). Preparatory work is estimated to cost \$280 million (EUR 232 million), and will include a feasibility study and an environmental impact study.

[Slovenske Elektrarne a.s.](#) is the largest investor in the energy sector in Slovakia. Slovenske Elektrarne a.s. plans to invest more than \$4.8 billion in Slovakia between 2009 and 2014. The greatest portion of this investment, almost \$3.32 billion, has to be spent to complete two additional reactors at the [Nuclear Power EMO 2 Plant Mochovce](#). The company plans to complete the third Mochovce reactor by the end of the year 2013 and the fourth Mochovce reactor by 2014.

The less portion of Slovenske Elektrarne a.s. investment, almost \$625 million, has to be spent in order to complete modernization projects at [Nuclear Power Plant EMO 1 Mochovce](#) and [Nuclear Power Plant V2 Jaslovske Bohunice](#). The [Nuclear Power Plant EMO 1 Mochovce](#) modernization project will increase the power output by 42 MW and switch to gadolinium-II fuel.

The state-owned company [JAVYS a.s.](#) is in the process of decommissioning the first two reactors at [Nuclear Power Plant V1 Jaslovske Bohunice](#) that were shut down in 2006 and 2008. The planned expenses for the first phase of decommissioning of V1 had been approximately \$111.2 million through 2011. The planned expenses for the second phase of decommissioning of V1 will be approximately \$204.7 million between years 2012 - 2015. The total decommissioning cost for V1 is estimated at \$594.3 million.

Competitors

Compared to market share in other Central and Eastern European countries, the U.S. share of energy equipment, technologies and services in Slovakia is relatively low. European competitors are already located in the Slovak market and have a long-standing tradition of serving this market. Slovak business representatives indicate that they would welcome U.S. suppliers because Russian, German and French companies can sometimes be insensitive to local market conditions.

U.S. suppliers often win international tenders in neighboring countries. U.S. companies can compete and win similar business opportunities in Slovakia. Major U.S. suppliers should have branch offices in Europe, as customers prefer to do business with companies that have a presence nearby. Positive references from customers in other Central European countries are highly valued in Slovakia.

Barriers

Foreign goods imported into Slovakia from non-EU countries are subject to customs inspection and imposition of customs duty, taxes, and import charges. Import and excise duties as well as value-added taxes are collected by the Slovak Customs Office after submission of a customs declaration for release of these goods into free circulation. The customs authorities collect both customs duties and value added tax (VAT) for imports. The VAT rate is 20 percent. The licensing system is Slovakia's primary non-tariff measure. The Ministry of Economy is authorized to issue import and export permits or licenses for sensitive goods with the objective of protecting the domestic market. The licensing procedure is governed by Regulation no. 15/1998 and amended Regulation no.

163/1999, which describes the conditions for issuing official authorization for import/export of goods and services.

Trade Events/Associations

Name of event: [Racioenergia 2014](#)

Location: Bratislava

Racioenergia 2014 includes an international trade fair for heating, air-conditioning, and saving of energy.

Governmental institutions/associations: [Ministry of Economy](#), [Public Procurement Office](#), [Office for the Regulation of Natural Monopolies](#), [Slovak Nuclear regulatory Authority](#), [National Nuclear Fund](#), [Nuclear Power Research Institute](#), [Office of Standards, Metrology and Testing](#), [Electrotechnical Research and Design Institute](#)

Available Market Research

Slovakia Nuclear Energy 2012

Slovakia Renewable Energy 2012

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American Embassy Bratislava, Slovakia

SWEDEN

| | |
|--------------------|-----------------|
| <i>Capital:</i> | Stockholm |
| <i>Population:</i> | 9 million |
| <i>GDP*:</i> | USD 538 billion |
| <i>Currency:</i> | SEK |
| <i>Language:</i> | Swedish |



Executive Summary

The annual energy supply in Sweden amounts to approximately 614 TWh. Fossil fuels, such as crude oil, natural gas and coal, used mainly by the transportation and refinery sectors, account for 35% of the current supply, followed by biofuels, nuclear power and hydropower. There are no commercially exploitable oil, gas or coal reserves in Sweden. Renewable energy plays an increasingly important role in the Swedish energy system, and currently contributes to 48% of the overall energy supply.

The main sources for electricity in Sweden are hydropower, nuclear power and wind power, accounting for 80% of the supply. The remaining 20% is covered by biofuels, conventional thermal power plants, and a small amount of photovoltaic and geothermal power.

Following the EU directives and regulations, Sweden is concentrating on improving and establishing long-term conditions for even wider use of renewable energy resources, including new plant construction, R&D, incentives funding and industry harmonization. The government is committed to having at least 50 % of the country's total energy use supplied by renewable sources by 2020 and to breaking the dependence on fossil fuels on the transportation sector by 2030. In 2050 the transportation sector as a whole should be climate neutral and free from emissions of greenhouse gases.

Market Entry

The Swedish electricity market was deregulated on January 1, 1996. Generation and trading of electricity are now subject to competition, while transmission and distribution remain natural monopolies, but are regulated and monitored by the Swedish Energy Agency to ensure efficiency and reasonable net-prices.

Since the deregulation, Swedish power generation companies have experienced both vertical and horizontal integration, and the largest companies have acquired local ones in order to gain control over the whole service chain. The companies also share ownership in order to consolidate and get access to new markets. Only three major utilities account for almost 70% of the power production in Sweden: state-owned Vattenfall, Finnish Fortum and German E.ON. Providing for one of these companies is a good way to enter the market and gain access to other Nordic/European markets at the same time.

Current Market Trends

In order to meet both the country specific and EU mandated climate change goals, Sweden needs to expand wind, solar and geothermal power production, further improve its biomass utilization and validate new technologies that enable efficient and cost-effective power production. U.S. companies can provide world-

leading product and technologies within many of these areas and have good opportunities in Sweden for cooperation and technology exchange.

There are three nuclear power plants in Sweden with 10 reactors (3 PWR and 7 BWR) that account for 30-40% of the electricity production. The current reactors are old, and on an average only four reactors are normally in use due to service stops and minor malfunctions. In 2010, Swedish Parliament approved a bill for replacement of its 10 existing reactors. The bill enables operators to apply for permits for the construction of a new reactor, provided that one of the existing ones will be closed, keeping the number of active reactors at the current 10. Also, the new reactor must be placed in one of the existing plants.

Sweden is very active in smart grid development and already making large investments in smart transmission systems. The smart meters and hourly metering are in place, there are several grid demonstration projects in both cities and rural areas, and the government has a national plan to help accelerate the development. Sweden is also the European node for Innovation on Smart Grids and Electricity Storage (InnoEnergy Sweden).

Current Demand

Equipment and plant technology for the upgrade/replacement of nuclear, hydropower and CHP plants; wind power turbine technology and spare parts; solar, photovoltaic and geothermal technologies; biomass processing technology; smart grid infrastructure and IT solutions; renewable vehicle fuel production technologies and electric vehicle/battery/infrastructure technologies.

Competitors

The Swedish power market is very open and competitive, and the country is already working closely with its Nordic neighbors and several large European utilities. There is a common Nordic electricity market where all the Nordic countries, except Iceland are included. When the electricity market was deregulated in Sweden, it was to increase competition in the electricity supply and to give customers more choice.

Especially niched companies have great opportunities in Sweden, as long as they contribute to the country's sustainable climate goals and the quest for energy independence. Sweden is inclined to invest in renewable energy and power generation research and development to enable and alleviate the expanded use of bio-fuels and other renewable energy sources for electricity, heat and transportation.

Barriers

When it comes to importing equipment and technologies, Sweden offers an open market with only few regulations and impediments to international trade. Sweden applies EU external tariffs for imports from outside the European Union and United States. The customs duty on equipment used in energy generation varies from 1.5% to 7%, and a 25% Value Added Tax is assessed on all imported goods. Products that are imported or exported within the EU must carry the CE marking. Also, EU voltage/electricity standards must be met.

Trade Events/Associations

Swedish Energy Agency: <http://www.energimyndigheten.se>

Energy in Sweden: <http://www.svenskenergi.se>

Swedish Radiation Safety Authority <http://www.ski.se>

Svenska Kraftnat (National Grid Company) <http://svk.se>

Swedish Bioenergy Association <http://www.svebio.se>

Swedish Wind Energy <http://www.svenskvindenergi.org>

Major Trade Shows

World Bioenergy 2014, June 3-5, 2014, Jönköping, Sweden

- World's leading bioenergy event

Vind 2013, October 23-24, 2013, Stockholm, Sweden

- Conference and exhibition for the wind power market

Elmässa 2013, October 23-24, 2013, Stockholm, Sweden

- A professional meeting point for the electricity market, including smart grids, energy efficiency, installations.

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U.S. Commercial Service

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UKRAINE

Capital: Kiev
Population: 46 million
GDP: USD 165 billion
Currency: Hryvnia
Language: Ukrainian



Executive Summary

Ukraine's market for electric power equipment has good export potential for U.S. companies in 2013. On September 24, 2010, the Ministry of Energy and Coal Industry of Ukraine signed a Protocol Concerning the Accession of Ukraine to the Treaty Establishing the Energy Community. According to the commitments under the Energy Community Treaty, Ukraine will be obliged to increase the usage of renewable energy and improve energy efficiency, in order to contribute to tackling climate change. The introduction of new technologies will strongly contribute to the achievement of the objectives of the Energy Community Treaty, as well as the Kyoto Treaty by attracting investors utilizing new high efficiency CFB technology, suitable for carbon capture and storage (CCS).

Industry Structure

Electricity in Ukraine is generated by the nuclear power plants operated by Energoatom and thermal power plants. The Ukrainian electricity market is currently organized under a single-buyer model. A competitive wholesale electricity market (WEM) was first established in 1996, with the state enterprise Energorynok functioning as market administrator.

Transmission is managed/controlled by NEC Ukrenergo, which owns and operates the high voltage network. Distribution is carried out via 27 regional distribution and supply companies (known as Oblenergos). Supply is managed by Oblenergos (suppliers at regulated tariff) and independent (non-regulated tariff) suppliers. Currently there are no eligible customers; however, large industrial consumers can acquire a non-regulated supply licenses and re-supply electricity their own facilities. The sector's regulation is performed by the National Electricity Regulatory Commission (NERC) and the Ministry of Energy and Coal Industry.

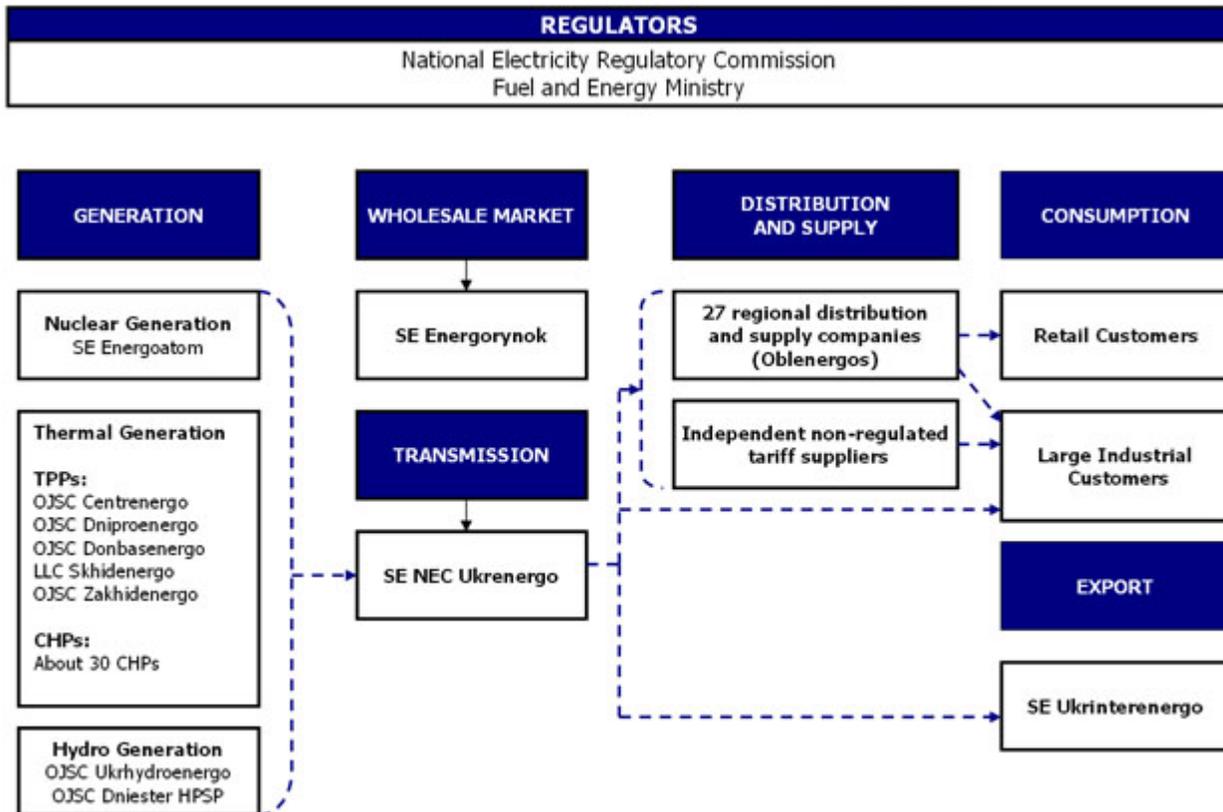
Generation

The major power generation companies in Ukraine at present are:

- 5 thermal power generation companies – Centrenergo, Donbasenergo, Dniproenergo, Skhidenergo and Zahidenergo comprising 14 thermal power plants with total installed capacity of 27.3 GW;
- 4 nuclear power plants with total installed capacity of 13.8 GW united in the State Enterprise Energoatom;
- 2 hydro power generation companies - Ukrhydroenergo and Dniester HPSP comprising cascades of hydro power plants on the Dnieper and Dniester rivers with total installed capacity of 4.6 GW.

There are also number of combined heat & power plants (CHPs). Some of them are being operated by local power distribution companies and other institutions while others became separate enterprises. In addition, small electricity producers (small hydro and wind power plants) operate in Ukraine, but their share of total electricity production is insignificant.

As of 2012, the total installed capacity amounts to some 53.1 GW with around 51% generated in thermal power plants, 26% in nuclear power plants, 12% CHP, 10% in hydro power plants and 1% in renewable. Nuclear plants account for the largest share in electricity generation with 47% of the total electricity production of around 168 TWh in 2012, 47% generated in thermal power plants and CHPs, and the remaining 6% is produced by hydro and renewable energy sources.



Source: Imepower Consulting

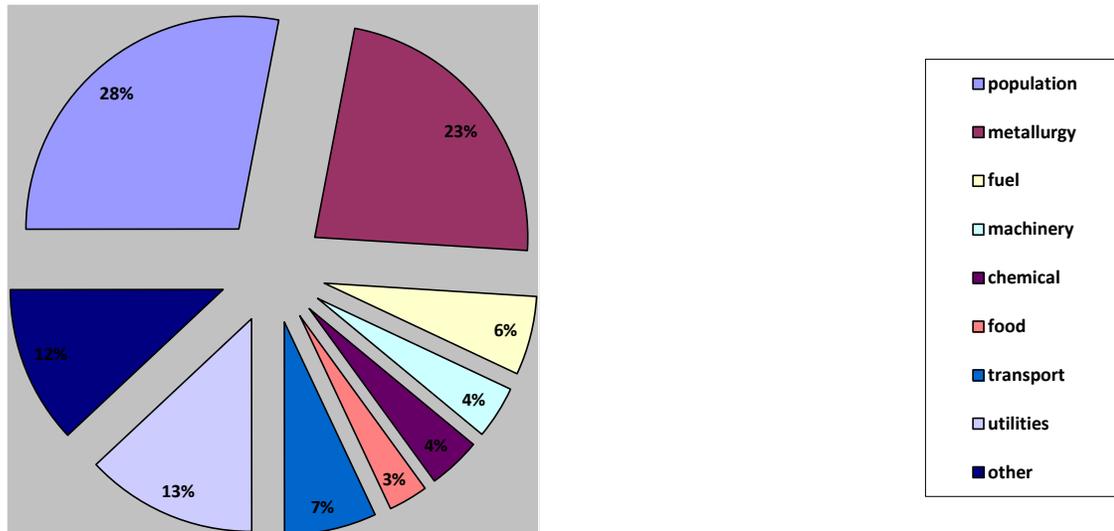
Consumption

Some 97% of electricity produced in Ukraine is consumed domestically. Industry remains the largest consumer, comprising 52% of consumption while households account for 28%. As of 2011, domestic electricity consumption decreased 0.5% due to a slowdown in GDP to 2.1%.

Consumption per capita in Ukraine is more or less in line with that of neighboring countries (3,300 kWh) such as Poland, but significantly less than the EU average of 6,500 kWh.

Distribution and Supply

Domestic Electricity Consumption in 2011



The Oblenergos (27 power distribution and supply companies) are responsible for electricity distribution and retail supply. There are 24 regional companies, 2 companies in the cities of Kyiv and Sevastopol and 1 company in the autonomous republic of Crimea. Oblenergos distribute and supply electricity to retail customers at regulated tariff. However, there are also independent suppliers that hold licenses for electricity supply at the non-regulated tariff rates. The majority of them are industrial customers that purchase electricity for their own needs. Independent suppliers are allowed to use Oblenergos' networks for distribution.

Regional Distribution and Supply Companies



Source: Fuel and Energy Ministry

Transmission

NEC Ukrenergo is the system and network operator that owns high voltage transmission network and cross-border lines of Ukraine.

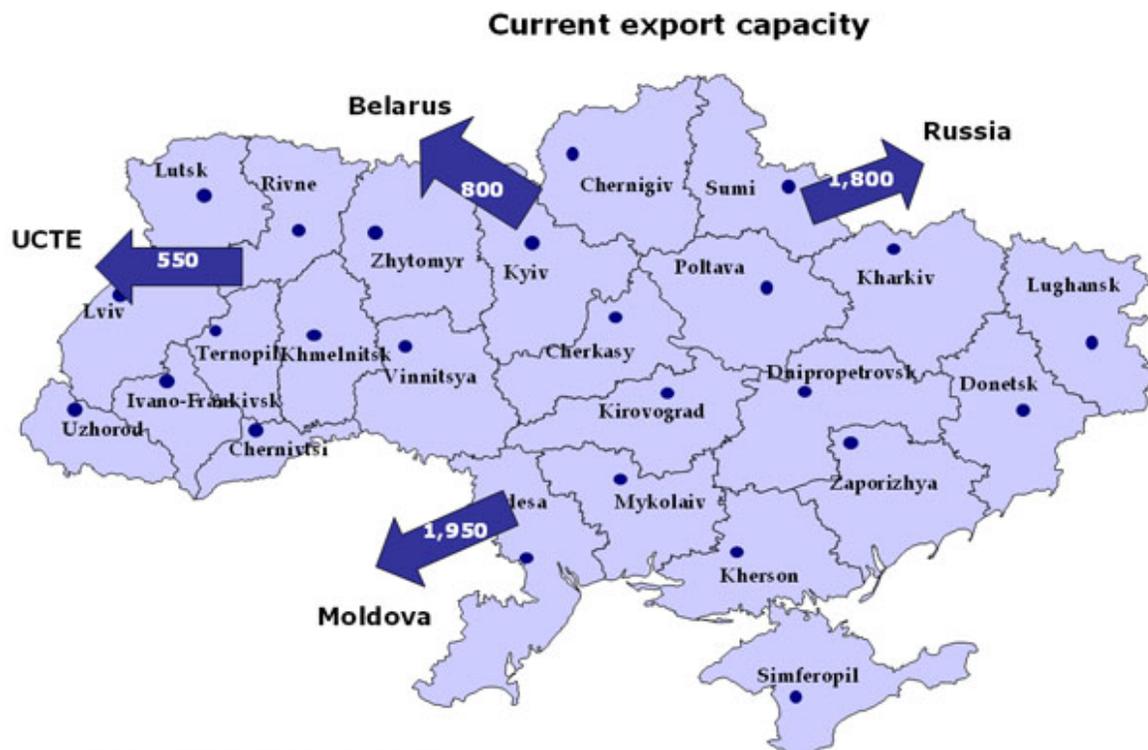
The total length of the transmission lines in Ukraine is more than 22,000 km:

- 4,115 km 750 kV lines
- 375 km 500 kV lines
- 340 km 400 kV lines
- 13,000 km 330 kV lines
- 4,170 km 220 kV lines

Export/Import

Ukraine's power grid has interconnections with neighboring countries, including Russia, Moldova, Belarus, Poland, Slovakia, Hungary and Romania. Only the power plants on Burshtyn Island in Western Ukraine are connected with the European UCTE grid. The export capacity of the island is 550 MW. As a net exporter of electricity Ukraine sold 7.7 TWh in 2010 (15% less than exported in 2009). Ukraine imported 0.6 TWh from Russia in 2010.

The export of electricity is carried out by the State Enterprise Ukrinterenergo which is a de-facto monopoly taking benefit of technically limited cross border capacity. The NERC approves tariffs for electricity purchased by SE Ukrinterenergo from the WEM. Export from Ukraine could be liberalized in the nearest future if NEC Ukrenergo starts competitive allocation of cross border capacity, which has been allocated to serve only Ukrinterenergo's contracts.



Source: IMEPOWER Consulting

Wholesale Electricity Market

The National wholesale electricity market operator, State Enterprise Energoynok, is the single buyer of electricity in Ukraine. SE Energoynok buys all electricity from the generation companies, averages the prices and sells the electricity to electricity distribution companies and independent suppliers at an average rate. Apart from this function Energoynok administers WEM's settlements and funds.

Each member of the WEM must sell all electricity produced and imported for sale in Ukraine exclusively on WEM except of:

- electricity used for own needs by each electricity producer;
- electricity produced at CHPs and supplied to consumers of the region (territory) where they are located;
- electricity produced at power stations with installed capacity and annual electricity output lower than determined limit indices - 20 MW and 100 GWh correspondingly.

The WEM is divided into two parts with TPPs and a few large CHPs functioning in the competitive segment and the remaining generation plants (nuclear, hydro, wind, CHP) working in the fixed tariffs segment (with the tariffs approved by the NERC).

Regulation

National Electricity Regulatory Commission

The National Electricity Regulatory Commission (NERC) is the major agency regulating the energy market. NERC was established in 1994 simultaneously with the restructuring of power sector in Ukraine. The NERC also implements Government policy for development and operation of the WEM, and oil & gas industries; as well as issues and supervises over the fulfillment of production, transmission, wholesale market operation, distribution and supply licenses.

The NERC implements price and tariff policy in power and oil & gas sectors. NERC sets tariffs for the transmission and distribution of electricity and for all electricity produced by nuclear, hydro stations, renewable sources and CHPs.

Ministry of Fuel and Coal Industry

The main function of the Ministry of Energy and Coal Industry is the implementation of Government policy in the energy sector, regulation and reformation of the power industry and energy markets. It is also responsible for maintaining the integrity and reliability of the Ukrainian energy system.

The Ministry takes part in the forecasts and scheduling of energy generation, development of technical, social, financial and other areas of the industry, as well as development and implementation of investment policy in the industry.

Ministry of Energy and Coal Industry manages NEC Ukrenergo, Energoatom and controls the Energy Company of Ukraine which in its turn manages the State's stakes in state owned power companies.

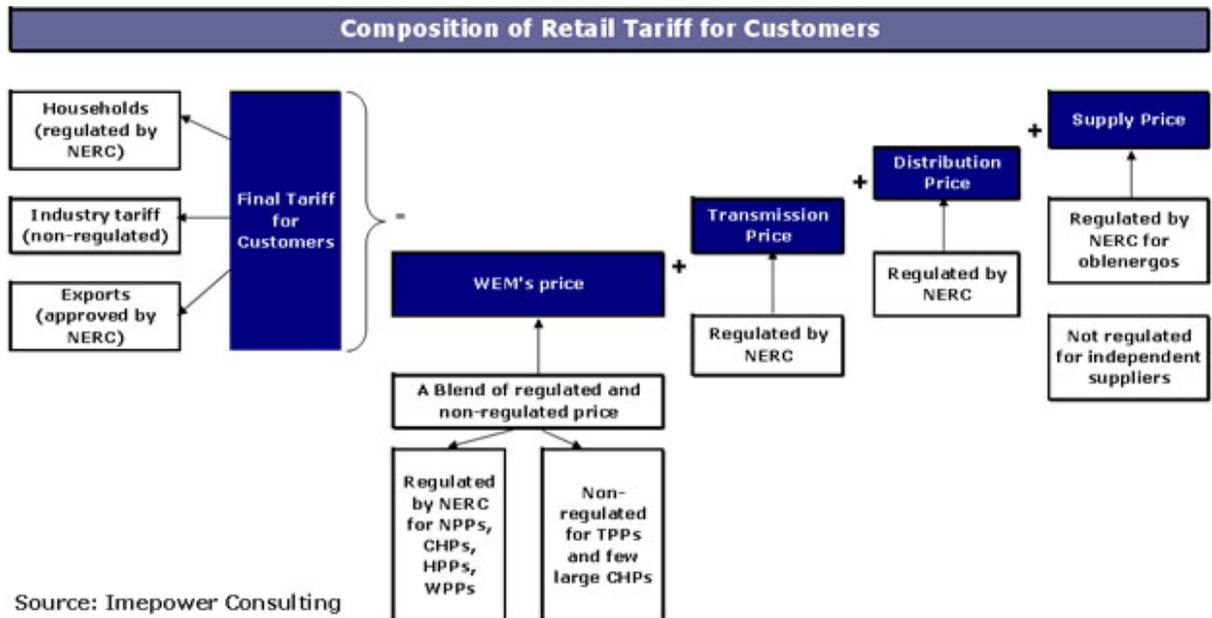
Tariff Formation

The retail electricity price is based on the wholesale electricity price, transmission, distribution and supply tariffs.

Retail tariffs for households and exports are regulated and set by the NERC, while retail tariff for other customers reflects wholesale price fluctuations. Retail tariffs for households are not equal to the cost recovery level, i.e. does not fully recover the distribution and supply expenses as well as wholesale price.

Households are, therefore, subsidized by the industry, and industry tariffs are adjusted as follows:

- the tariff is higher than the cost recovery level;
- tariffs are the same for all regions regardless of distribution and supply cost.



Ownership/Privatization

According to the Ukrainian Cabinet of Ministers Resolution issued in April 2011, the plan to sell to private sector investors 25 to 45.1 percent of generation companies, as well as some stakes in regional distribution companies (Oblenergos). According to the Resolution, the shares in Donbasenergo and Centrenergo will not be included in the privatization process.

Tender conditions will include investment obligations of potential buyers and will be approved by the Government for each company. The sale will be conducted by the State Property Fund on a competitive basis (auction or tender).

Oblenergo privatization is the priority right now. The government is planning to maintain 25% ownership and sell the rest of the shares.

CHP privatization is planned after removal of legal ban.

Sub-Sector Best Prospects

- High-voltage and energy saving technologies
- Equipment for coal-fired power plants, boilers and turbines
- Equipment for thermal power plants, process instrumentation and controls
- Technology, equipment and software for power distribution and transmission

- Heating equipment and auxiliaries
- Alternative/renewable energy equipment
- Cogeneration equipment

Competitors

The major competitors for the U.S. (in this market) are Germany (Siemens), Switzerland (ABB) and France (Alstom, Areva). Major U.S. companies working in Ukraine's power sector include: AES – electric power distribution (owns and operates Kyivoblenergo and Rivneoblenergo regional power distribution companies), Contour Global, Emerson Process Management, Honeywell and GE International. Ukrainian manufacturers supply turbines, generators, transformers, and electric cable at very competitive prices but generally lower efficiency and lifetime.

Energy sector recommendations

While some progress has been made with the recently enactment of a production sharing agreement law, the energy community awaits further support and amendments, namely:

- Further developments in the realm of production sharing agreements, i.e. proper and timely approval of contracts by the Cabinet of Ministers;
- Facilitated reforms in the sphere of subsoil use prescribed by the Subsoil Code of Ukraine, which will send a strong message to international energy market players and enable them to bring new practices and technologies to Ukraine's energy sector;
- Structural reform of the gas sector according to the obligations Ukraine undertook upon acceding to the Energy Community, in particular, nondiscriminatory access to the gas transport system and infrastructure; Energy efficiency: investing into thermal modernization of existing housing, in parallel paying particular attention of energy efficiency in the new construction. The task of the government is to consider the experience of Europe and the CIS, and to offer the most relevant investment model for Ukraine for energy efficiency projects in the residential sector.

Key Contacts

CS Kyiv offers businesses its extensive database of Ukrainian firms to create a Customized Contact List of up to ten companies, which may qualify, to be agents, distributors or business partners. This service does not include evaluating company interest in products or contacting the companies on a client's behalf. Please see the terms at <http://www.buyusa.gov/ukraine/en/8.html>

Information sources on the electric power sector may also include:

Ministry of Energy and Coal Industry of Ukraine: <http://mpe.kmu.gov.ua/fuel/control/uk/index>

Ukrenergo National Energy Company: <http://www.ukrenergo.energy.gov.ua>

Energoatom National Nuclear Power Generating Company: <http://www.energoatom.kiev.ua>

INEKO energy investment company: power sector info <http://www.imepower.com>

Energobusiness magazine: energy sector news, statistics and facts : <http://www.e-i.com.ua>

U.S. Commercial Service Contact Information

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U.S. Commercial Service

American Embassy Kyiv, Ukraine

UNITED KINGDOM

Capital: London
Population: 63 million
GDP:* \$ 2.4 trillion
Currency: Pound Sterling
Language: English



Executive Summary

The UK electricity production sector generates an annual turnover of over \$90 billion. The number of people directly and indirectly employed in the sector is over 600,000. The UK's determination to become a low carbon economy creates many opportunities for U.S. companies to supply products and services that will help the UK develop sustainable, secure, low carbon energy sources. Over \$300 billion of investment is needed over the next ten years to replace older power plants and upgrade the grid - twice the rate of investment seen in the previous decade. Some of the best prospects are found in the smart grid sector, renewable energy, the nuclear sector, and gas-fired generation.

Market Entry

The maturity and competitiveness of the UK electricity market typically make product quality and performance, delivery timescales and costs key to market acceptance. One traditional method of entry for small to medium-sized companies is through a local partner who has local contacts and a good understanding of local procurement practices. Companies favoring direct sales to buyers may find it beneficial to register to the relevant suppliers' websites and establish relationships with local buyers. Many utility industry companies in the UK use procurement intermediary services offered by organizations such as the Achilles Utilities Vendor Database (UVDB), to help shortlist appropriate companies and reduce the time and expense involved in managing official procurement projects.

Current Market Trends

More than \$300 billion will be invested in the UK's electricity sector over the next ten years to replace older power plants and upgrade the grid. UK public and private organizations are investing in the upgrade of the grid, creating significant business opportunities for U.S. companies that have developed products, services or technologies related to smart grids. Pilot projects undertaken in the UK market can serve as a benchmark to provide U.S. companies with early adopter opportunities in other European countries and in the global market.

The uptake of renewable energy technologies has also been identified by the UK Government as key for the provision of new, secure supply, whilst contributing to meeting CO₂ reduction targets.

In 2011, the market for renewable energy products and services was estimated to be worth nearly \$85 billion. The UK is the global leader for offshore wind energy with 1.8 GW of operational capacity with 568 turbines already installed, and is well placed to continue this lead role to 2020 and beyond - up to 18 GW of additional future capacity from offshore wind could be deployed by 2020. Beyond 2020 there is a very high potential for deployment with over 40 GW possible by 2030. Another renewable technology with great potential is biomass. Biomass and waste capacity increased by over 85% in the period from 2004 to 2011. In 2010 the UK had 2.5 GW of capacity in operation and deployment forecast indicates that biomass electricity could

contribute up to 6 GW by 2020, corresponding to an annual growth rate of 9%. Biomass imports are and will continue to be a significant source of biomass feedstocks in the UK.

New nuclear electricity generation plant will also play a role in the UK energy mix. The estimated investment for planned, future 16GW new nuclear capacity currently stands at \$65 billion and is estimated to create 30,000 jobs by 2025. There are also opportunities in nuclear decommissioning.

The UK will also require new gas plant to enable the transition to a low-carbon electricity system while ensuring security of supply. In the long-term, gas with carbon capture and storage could generate significant quantities of low-carbon electricity.

Current Demand

The UK has a generating capacity of some 90 GW. Most of the UK's electricity is produced by burning fossil fuels, especially natural gas (40%) and coal (30%). 19% of the UK electricity comes from nuclear reactors. Currently there are 19 operating nuclear reactors in the UK totaling 11GW capacity. These reactors are now reaching the end of their operational lives and will close gradually. Several companies have plans to build a new generation of reactors, the first of which could be online by the end of the decade. Renewables produce 9.4% of the UK's electricity, and EU and UK CO₂ reduction targets mean that this is likely to increase to some 30% by 2020.

Competitors

The UK is a very mature and competitive market. Over thirty thousand companies are actively involved in the energy industry in the UK. U.S., UK and foreign companies have been attracted to the UK by the strength of market demand, substantial government investment, and the country's relatively low-risk business environment.

Barriers

A potential market issue to keep in consideration when designing products for export to the UK is the need for US manufacturers to use the metric system. Equipment and materials, exported from the USA, should also comply with the ISO quality standards. Additionally products tested and certified in the U.S. to American standards are likely to have to be retested and re-certified to EU standards.

Trade Events/Associations

- All-Energy, 2014, Aberdeen, www.all-energy.co.uk
- Energy UK, <http://www.energy-uk.org.uk/>
- Renewable UK, www.renewableuk.com
- Achilles Utilities Vendor Database <http://www.achilles.com/en/>
- Department for Energy and Climate Change <https://www.gov.uk/government/organisations/department-of-energy-climate-change>
- Energy Networks Association <http://www.energynetworks.org/>
- Nuclear Industry Association Supply Chain <http://www.nuclearsupplychain.com/>

Available Market Research

- The UK Electricity Market
- The UK Smart Grid Market

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