

## Summary

In 2007, Croatia adopted important regulations to support development of renewable energy projects required to meet the goal of the minimal share of 5.8% of the renewable energy in the total electric energy supply by 2010. The overall size of the renewable electric energy projects is about 330 MW of new capacity in the next three years, estimated to cost 400-500 million euros. Numerous private sector investors have submitted over a hundred projects for preliminary approval to the Ministry of Economy, 90% of which are for wind farms. During the first half of 2008, the Ministry is expected to publish the list of approved project holders. Besides wind farms, other renewable energy best prospects include biomass cogeneration plants, solar thermal collectors, and biofuel plants. The regulations on biofuels and solar thermal energy are expected to be adopted in 2008. German and Austrian investors and equipment suppliers are very active in the market, mostly in partnership with local companies. Croatian reputable electric industry manufacturer Koncar has been developing its own production of wind turbines.



## Market Demand

Following the [European Union directive 2001/77/EC](#), Croatia has committed to have at least 5.8% of its gross electric energy produced from (non-conventional) renewable sources by the end of 2010 (currently 1.8%). To meet this goal, a total of about 330 MW in new capacity will have to be installed during the next two-three years, for which estimated required investments amount to 400-500 million euros. With five [regulations](#) adopted in 2007, the Croatian government specified the types of power plants that will be supported, the [feed-in tariffs](#), the sources of funding the incentives, and the [procedures](#) for interested [investors](#) to obtain permissions for exploring sites, building plants and connecting them to the grid.

The investors were requested to report their ongoing project activities and plans for approval to the Renewable Energy Resources Department at the [Ministry of Economy, Labor, and Entrepreneurship](#), which is now in charge of the Registry of Projects and Plants for use of Renewable Energy Sources and Cogeneration and of Eligible Producers. In November 2007, the Ministry reported that the applications from investors have five times exceeded current grid and incentives limits. By then, the Ministry had received 112 applications for a total of about 2000 MW of capacity in renewable energy plants (of which 90% for wind plants), which is a truly impressive number given that current total electric power generation capacity in Croatia is about 3,700 MW (60% hydro, 40% thermal). However, experts do estimate that, without the current grid and incentives limits, Croatia would indeed have a total potential for about 2,000 MW of electric energy capacity from renewable sources (of which about 1,000 in wind power).

The Ministry is currently reviewing the applications and will publish the list of preliminary approved projects and investors, probably during the first half of 2008. With a preliminary approval, an investor becomes a project holder with the exclusive right to test the potential of the specific site and acquire ownership or obtain concession on the eventually state-owned land. The project holder is responsible to follow the preparation and licensing procedure within certain time limits for each step and depending on the site and type of project. The preliminary approvals are granted on a first-come-first-serve basis, and for the sites for which several investors have submitted applications in this "initial call" (at least 7 sites), the Ministry will grant the approval to the one that can document that the first begun project preparation. Per current applications, most of the approved projects will be wind farms.

but not more than 85% of the total capacity, which is the government's limit for a single source of renewable energy.

The regulations for biofuels and solar thermal energy are being drafted and are expected to be adopted in 2008. According to the Ministry, the target share of biofuels in the total annual consumption of gasoline and diesel fuel to be achieved by 2010 will be also 5.8%. The regulation will primarily deal with the quality of biofuels and no incentives are planned.

## Market Data

According to the statistics available from the Ministry of Economy, in 2005, Croatia imported over a half of its energy consumption (411.66 PJ) and only 0.05% of the total energy supply came from renewable sources. Only 35 MW of the installed electrical capacity in renewable resources were in place in 2005 (less than 1% of the total capacity), so there are 330 MW missing to reach the target 365 MW for 2010.

RENEWABLE ENERGY SOURCES INDICATORS – CROATIA 2005				
	Installed thermal capacity	Installed electrical capacity	Electricity production	Thermal Energy Production
Solar	N/A	48.8 kW	50.1 MWh	N/A
Wind	0	5.95 MW	9.5 GWh	0
Biomass	512.0 MW	2.0 MW	10.9 GWh	14.77 PJ
Small Hydro	0	26.7 MW	108.3 GWh	0
Geothermal	113.9 MW	0	0	0.55 PJ
<b>Total</b>	<b>623.0 MW</b>	<b>34.7 MW</b>	<b>128.7 GWh</b>	<b>15.32 PJ</b>

Source: Ministry of Economy, Labor and Entrepreneurship

Complete and detailed energy sector statistics for 2005. in English is available on the [Internet](#) (note: the report can also be downloaded from the website of the [Ministry](#), but is not easily found, as it is only available from the Croatian version of the site: click on language: Hrvatski, Gospodarstvo, Uprava za energetiku i rudarstvo, Energija u Hrvatskoj, Energija u Hrvatskoj 2005).

## Best Prospects

According to the Ministry of Economy, the most competitive renewable energy plants in Croatia would be: for electricity generation – wind farms and biomass cogeneration; for heat generation – biomass heat plants and solar thermal collectors; for transportation sector – liquid biofuel plants. Secondary best prospects would be: for electricity generation – small hydro plants (less than 10MW), geothermal cogeneration and solar photovoltaic plants; for heat production – geothermal plants.

In December 2007, the Global Environment Facility trust fund of the International Bank for Reconstruction and Development has approved another [grant of \\$5.5 million](#) for preparation of renewable energy resource projects (primarily biomass and small hydro plants). Given the relatively limited practical experience with renewable energy projects in Croatia (except in the wind and hydro sector), many non-expert investors will likely rely on foreign consultants for project selection, development and management.

## Key Suppliers

Of the foreign companies involved in the renewable energy sector in Croatia, German and Austrian are the most active, both as investors and equipment suppliers. [Siemens](#) and [ABB](#) have local facilities and are traditionally strong competitors in the market. The key local equipment suppliers are [Koncar Power Plant and Electric Traction](#)

[Engineering](#) (developing own wind turbines), [Dalekovod](#) (construction engineering), and [Djuro Djakovic](#) (construction engineering).

Given that the necessary legislation was not in place until mid 2007, currently, there are only a few renewable energy plants in operation in Croatia. There are two wind farms: 5.95 MW plant Ravne I on the Island of Pag with seven turbines (Danish [Vestas'](#) equipment) and the 11.2 MW plant Trtar-Krtolin in Sibenik with 14 turbines ([Siemens'](#) equipment). There is a 2 MW bio-gas cogeneration plant at the solid-waste disposal site in Zagreb (mostly domestic equipment). The Croatian state-owned electric utility company [HEP](#) owns a number of small hydro plants (up to 1 MW, relatively old and in need for refurbishment; domestic equipment), and there is a total of about 20,000 square meters of solar cells in Croatia. There are two bio-diesel producers: one in Ozalj with annual production of 20,000 tons and one in Virovitica with annual production of 6,000 tons. Geothermal energy is currently used for heating only in spas.

However, there are a number of ongoing projects, some of which in a rather advanced stage of implementation. [HEP](#) has established its own, well organized company [HEP OIE](#) to specialize in renewable energy projects and has signed partnership agreements with Austrian electric utility companies [Verbund](#) and [Bewag](#). HEP has also partnered with [Dalekovod](#) in a joint-venture project of 60 MW wind farm near Zadar and is exploring about 20 other potential sites in Croatia and Bosnia. Local company [Valalta](#) partnered with German [Wallenborn Projektentwicklung](#) in a 80 MW wind farm in Istria (Cicarija), in a 42 MW wind farm near Senj (Vratarusa), and in a wind farm Mazin near Gracac (size to be determined). Local company Zensur Zrmanja from Zadar partnered with Austrian [CE Energy Holding AG](#) on 60 MW wind farm near Obrovac (Jasenice). Both of the two current wind farms operators, [Adria Wind Power](#) (Ravne I on Pag) and [Energys](#) (Trtar-Krtolin in Sibenik) have announced a number of additional projects that they are working on. In early 2008, Koncar plans to begin with installation and testing its own developed wind turbines (60% locally produced parts) on its 15 MW wind farm Konjsko near Split (reportedly, Koncar and Djuro Djakovic were also negotiating with Valalta and their German partners for construction of their wind farms). [Siemens](#) and [Ormat](#) (U.S. – Israeli company) are competing on a geothermal cogeneration plant project in Bjelovar. Austrian [Jenbacher](#) (owned by General Electric) has also begun actively exploring biogas projects in Croatia. Several ethanol plants are in the planning stage (one of which to be built by U.S. investors in partnership with [Fagen, Inc.](#))

## Prospective Buyers

As soon as the Ministry of Economy publishes the list of the preliminary approved renewable energy project holders, most of the prospective buyers will be known. However, experts estimate that many of the applicants have already pre-selected their equipment suppliers. Also, it is almost certain that the vast majority of the approved projects will be wind farms and there are several wind-turbine suppliers that are already strongly positioned in the market. Obviously, the market entry in the wind sector will not be easy for U.S. companies, but in all other sectors (except may be hydro where local Koncar is also very strong), realistic opportunities do exist. Also, experts say that it is very likely that many of the current applicants only applied for a project in order to sell the title at a later date, in which case both the investor and the equipment supplier will be re-defined.

## Market Entry

As in most other industries with complex technology and licensing procedures, the easiest (and often the only) way for a U.S. supplier to enter the market is to have a local representative or partner. This could vary from contracting an individual expert or partnering with some of the well established local engineering and consulting companies (see their list at the end of this report, under Resources and Key Contacts).

## Market Issues & Obstacles

The Croatian government is making a lot of effort to include domestic manufactures (especially Koncar with its wind turbines) in the renewable energy projects. However, this support reportedly does not represent a serious obstacle for foreign suppliers. For example, Article 4, Paragraph 3 of the regulation on feed-in tariffs does make

feed-in tariffs lower for the projects with less than 60% of the domestic content, but only up to 7% lower from the original tariff.

Based on free-trade agreements with [EU](#) and [CEFTA](#) countries, imports for most of industrial equipment produced on their territory is imported in Croatia duty free. The same equipment imported from the U.S. might be subject to customs duties of 5-10% ad valorem (to find out the duty for the specific equipment, visit the Croatian [customs tariff online](#) and type your HS code next to “Trazi” and read the applicable rate at “Stopa” ).

## Trade Events

- Energetics International Fair, Zagreb (annually in September): <http://www.zv.hr>
- International Forum on Renewable Energy, Dubrovnik (annually in September): [www.hgk.hr/ebfres](http://www.hgk.hr/ebfres)
- SASO energy fair, Split (annually in October): <http://www.sasofair.com/>
- CIGRE conference, Cavtat (annually in May or November): <http://www.hro-cigre.hr/eng/>

The key foreign fair visited by Croatian renewable energy developers is the TAU International Exhibition of Technologies and Services for Environment held biannually in Milan, Italy ([www.fieramilanotech.it](http://www.fieramilanotech.it)). In June 2008, the [Renewable Energy Europe show](#) will be also held in Milan along with the [PowerGen](#).

## Resources & Key Contacts

- Ministry of Economy: [www.mingorp.hr](http://www.mingorp.hr)
- Croatian Energy Regulatory Agency: [www.hera.hr](http://www.hera.hr)
- Croatian Energy Market Operator: [www.hrote.hr](http://www.hrote.hr)
- Electric Energy System Operator: [www.hep.hr/ops](http://www.hep.hr/ops), [www.hep.hr/ods](http://www.hep.hr/ods)
- HEP – Renewable Energy Resources: [www.hep.hr/oie/en](http://www.hep.hr/oie/en)
- HEP (electric utility): [www.hep.hr](http://www.hep.hr)
- Energy Institute Hrvoje Pozar: [www.eihp.hr](http://www.eihp.hr)
- Institute for Electric Energy: [www.ie-zagreb.hr](http://www.ie-zagreb.hr)
- Ekoneg – Energy and Environment Protection Institute: [www.ekonerg.hr](http://www.ekonerg.hr)
- Elektroprojekt: [www.elektroprojekt.hr](http://www.elektroprojekt.hr)
- Zagreb University – Faculty of Mechanical Engineering: [www.fsb.hr](http://www.fsb.hr)
- Zagreb University – Faculty of Electrical Engineering: [www.fer.hr/en](http://www.fer.hr/en)
- Croatian Solar Energy Association: <http://www.hsuse.hr/>
- Green Action (NGO): <http://www.zelena-akcija.hr/sic/index.html>
- Energetika-Net (web portal): <http://www.energetika-net.hr/>
- EGE (energy magazine): <http://www.ege.hr/>
- Moja Energija (web portal): <http://www.mojaenergija.hr/>
- Environmental Protection and Energy Efficiency Fund: [www.fzoeu.hr](http://www.fzoeu.hr)
- Ministry of Environmental Protection: [www.mzopu.hr](http://www.mzopu.hr) and <http://okolis.mzopu.hr/>
- Croatian Chamber of Commerce (Renewable Energy Assn): [www.hgk.hr](http://www.hgk.hr)
- American Chamber of Commerce in Croatia (Environmental Committee): [www.amcham.hr](http://www.amcham.hr)

## For More Information

The U.S. Commercial Service in Zagreb, Croatia can be contacted via e-mail at: [Damjan.Bencic@mail.doc.gov](mailto:Damjan.Bencic@mail.doc.gov); Phone: (+385 1) 661-2186; Fax: (+385 1) 661-2446 or visit our website: <http://www.buyusa.gov/croatia/en/>.

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