

UN Economic Commission for Europe

Policy Reforms to Promote Energy Efficiency
and Renewable Energy Investments in **Croatia**

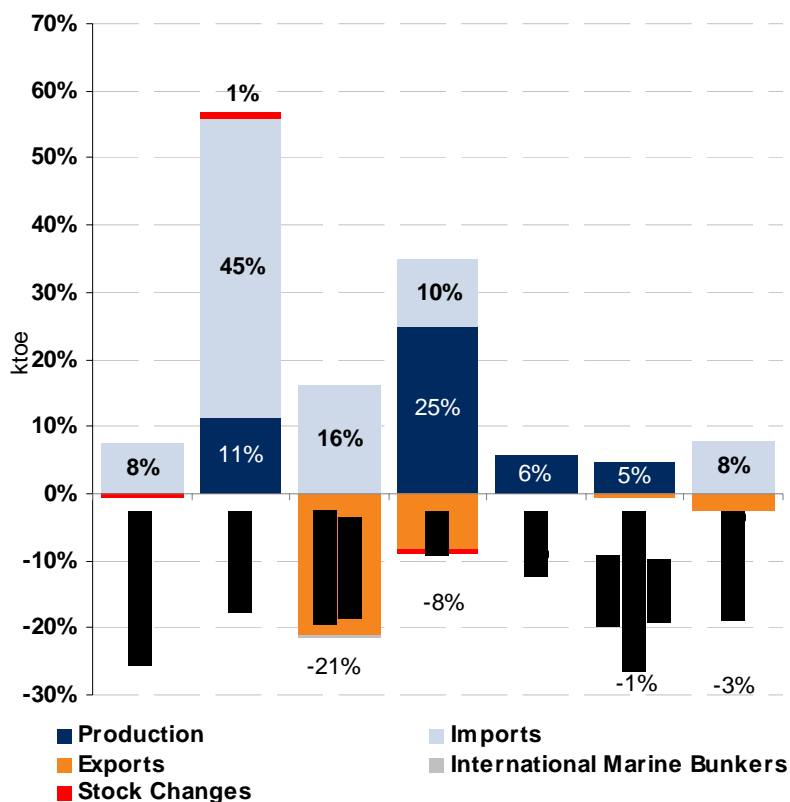
Seminar on Policy Reforms to Promote
Energy Efficiency and Renewable Energy Investments

Geneva, October 7.-8., 2009

Energy Balance of Croatia

Even though Croatia has its own gas and oil resources, the dependency on primary imports is high

Energy Balance



Source: IEA 2006

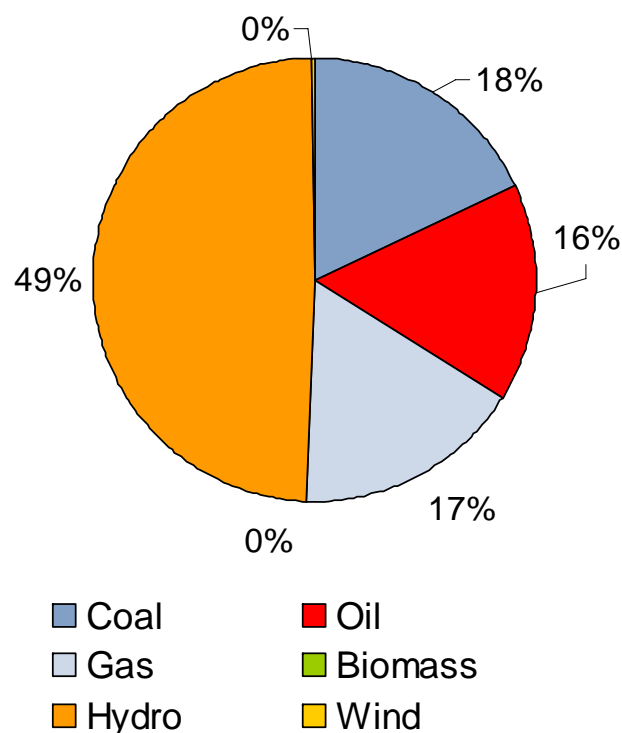
Comments

- The overall dependency from primary energy imports of Croatia is 54%, mainly based on the import of crude oil
- Electricity imports account for 8% of the total energy balance and derive mainly from the Croatian participation in the NPP Krško (50%) located in Slovenia
- Croatia has substantial national production of natural gas, which is also exported
- Renewable energy sources represent 10% of the total energy balance

Power Generation in Croatia

Nearly half of the electricity production in Croatia is based on hydro power

Energy Sources for Power Generation



Comments

- 49% the electricity generation in Croatia is based on hydro power
- The other half of the electricity generation is equally divided among oil, coal and gas
- The majority of the hydro power capacity (in total of 2'071 MW) comes from large power plants, most of which are over 20 years old
- Wind and biomass account for less than 1% of the total electricity generation
- The growing electricity demand will require 4'500 MW of new capacity by 2020; 40% of this capacity is planned to be based on RES¹⁾

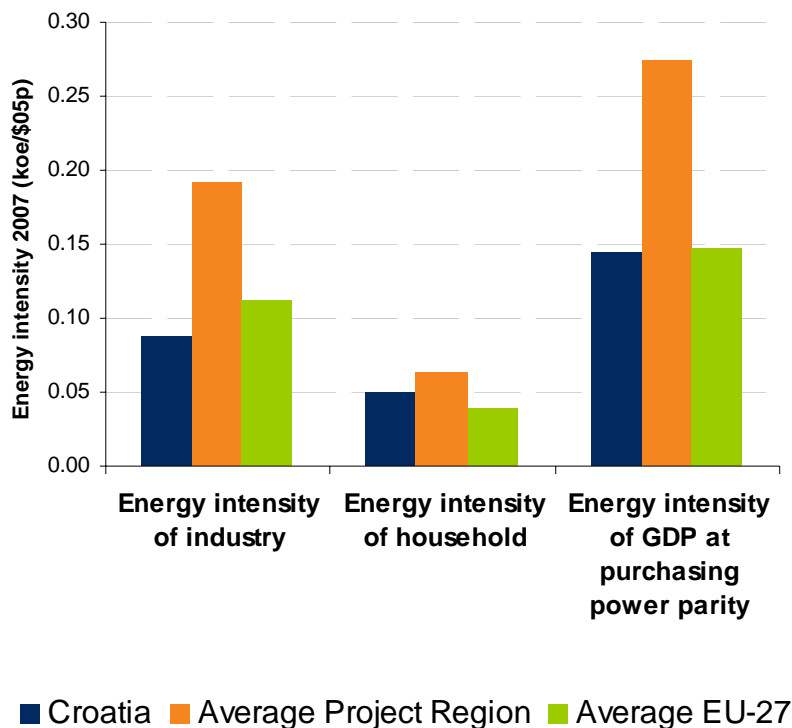
Source: IEA 2006

¹⁾ National Energy Strategy of 04/2009

Energy Intensity in Croatia

The overall energy intensity of Croatia is in line with the EU-27 average and significantly lower than the project region average

Energy Intensity



Source: Enerdata 2007

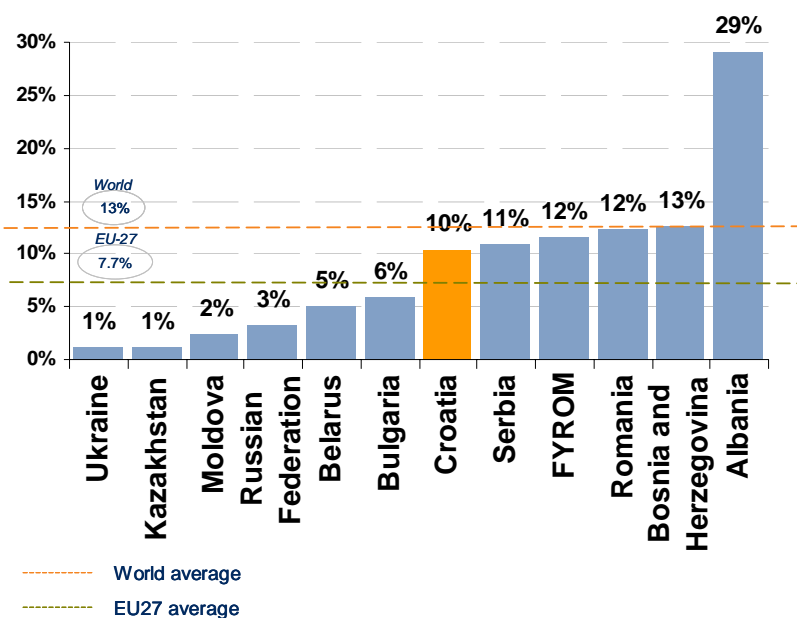
Comments

- Having an economy strongly based on tourism, services and a “light” industry, Croatia shows one of the lowest energy intensities in the project region
- The energy intensity of the Croatian sector is even below the average value of EU-27
- Instead, the energy intensity of the residential sector is higher than the EU-27 average and close to the average of the project region, pointing out the necessity of improvement

Renewable Energy Sources in Croatia

Croatia's share of renewable energy sources in the total primary energy supply is well above the EU-27 average

Renewable Energy Sources



Comments

- Croatia's high share of RES is based on the strong share of hydro power in electricity generation and in the use of fuel wood
- 97% of the installed power generation capacity is based on large hydro power plants
- The remaining 3% is covered by small hydro (60%), wind (30%) and solar (10%)
- The Croatian wind sector is in strong expansion, with more than 300 wind power projects announced and a planned share among generation from RES of 70%

Source: IEA 2006

Barriers for Investments in EE and RES in Croatia

The barriers for investments in Croatia are similar to those of most project countries: mainly complex authorization procedures and lack of funding for project developers

**Legal,
institutional
and
administrative
barriers**

**Economic and
financial
barriers**

**Lack of
awareness,
human
capacities and
professional
skills**

- **Complex authorization procedures and lack of simplified procedures for EE or RES projects**
- **Lack of coordination between different governmental agencies involved in EE and RES**
- **Limited capacity of the power transmission grid for intermittent sources (wind)**
- **Project developers face capital constraints in form of high upfront costs and long payback periods**
- **Absence of a feed-in-tariff for heat production from renewable energy sources**
- **No support for RES electricity projects from the Croatian Environmental Protection and Energy Efficiency Fund, due to the feed-in-tariff system implementation**
- **The creation of the Agency for Energy Efficiency and Renewable Energy Sources has been abandoned**
- **The promotion of available funds for energy efficiency and renewable energy projects among bank clients is virtually non-existent on the part of commercial banks**

Successful Policy Reforms in Croatia

One example of a successful policy reform in Croatia is the introduction of the Physical Planning and Building Act in 2007

THE CROATIAN PHYSICAL PLANNING AND BUILDING ACT INTRODUCES MANDATORY ENERGY CERTIFICATION FOR BUILDINGS

Policy Instrument

Physical Planning and Building Act in 2007, implementing the EU Directive 2002/91/EC on Energy Performance of Buildings

Responsible Institution

Ministry of Environmental Protection, Physical Planning and Construction (definition of energy classes, issuing of certificates) and partly the Ministry of Economy, Labour and Entrepreneurship (inspection of boilers and inspection of air-conditioning systems)

Implementation Timeframe

The Physical Planning and Building Act has been in place since September 2007, while mandatory energy certificates will be introduced by April 2010

The Physical Planning and Building Act of Croatia

The introduction of mandatory energy certificates will allow Croatia to improve the existing and future building stock

Description

- **Mandatory Energy Certification for new and existing buildings**
- **Certificates are issued through an energy audit on the basis of calculation data (EN 13790)**
- **Change of ownership or lease of a building will only be possible with the energy certification**

Beneficiaries

- **Building owners will benefit from increase asset value following a positive certification**
- **Building leasers and tenant will have transparent information about energy costs of the building**

Results

- **Energy certificates will bring transparency to the energy costs of buildings and motivate building owners to make investments in EE to enhance the value of the building**
- **The market for EE projects (audits and implementation of measures) will be stimulated**

Long-Term Effects

- **Improvement of the building stock**
- **Reduction of energy consumption in the building sector and therefore mitigation of climate change effects**
- **Creation of new professional skills and new employment**

Recommendations to overcome barriers for investments in EE and RES in Croatia

Policy development for EE and RES is well advanced in Croatia, but monitoring of implementation and simplification of administrative procedures is recommended

Legal, institutional and administrative barriers

- **Monitoring of policy implementation**
- **Public procurement procedures**
- **Transparent one-stop authorization**
- **Master Plan Transmission Grid**

Economic and financial barriers

- **Strengthening of available financing schemes**
- **Adaptation of existing feed-in tariff for electricity from renewable energy sources and cogeneration**

Lack of awareness, human capacities and professional skills

- **National education, training and public awareness program**
- **Capacity building for policy makers**
- **Capacity building for local financing institutions**

Recommendations to overcome barriers for investments in EE and RES in Croatia

Legal, institutional and administrative barriers (1/3)

Monitoring of policy implementation

- Croatia has well advanced in the proper implementation of laws, strategies and action plans promoting energy efficiency and renewable energy. However, the adequate regulatory measures, such as the building code or the regulation on biofuels, necessary to foster investment, lack behind: implementation of existing regulation, monitoring for compliance, continuous improvement and appropriate use of funds rather than development of new policies would be crucial.
- The monitoring of energy policy progress should evaluate implementation effectiveness, cost-effectiveness as well as the socio-economic side effects of policy measures employed. Based on this evaluation, policy measures should be further developed and improved.

Public procurement procedures

- The introduction of sustainable energy criteria in tendering procedures for public procurement is recommend for Croatia. The Croatian public sector should set a good example regarding investments, maintenance and other expenditure in energy efficiency and renewable energy use

Recommendations to overcome barriers for investments in EE and RES in Croatia

Legal, institutional and administrative barriers (2/3)

Transparent one-stop authorization

- **Complex authorization procedures requiring e.g. about 20 different permits for the development of a renewable energy projects are a major barrier towards the development of sustainable energy projects. Numerous ministries, national and local institutions are involved in the permitting and authorization process in Croatia. Lack of coordination between authorities often leads to delays, investment uncertainty and a multiplication of necessary efforts. One responsible authorization agency appointed by the government can drastically reduce the administrative burden for the developer related to authorization of new projects.**
- **Clear guidelines for authorization procedures would further contribute to overcome the above mentioned barrier. Obligatory response periods for the authorities involved can be incorporated in such procedures. Setting approval rates can be a tool for checking the streamlining of authorization procedures.**

Recommendations to overcome barriers for investments in EE and RES in Croatia

Legal, institutional and administrative barriers (3/3)

Master Plan Transmission Grid

- **The main barrier to the development of renewable electricity in general, and wind power in particular, is current limited capacity of the transmission grid: 360 MW grid capacity for new wind power projects vs. expressed interest for the development of 5,000 MW.**
- **Increased investment in grid structure will therefore be necessary in the short and medium term. The Master Plan Transmission Grid shall:**
 - **be elaborated by the Ministry of Economy, Labor and Entrepreneurship in close cooperation with the Croatian Energy Regulatory Agency, the Croatian Energy Market Operator and the transmission and distribution system operator,**
 - **identify and evaluate the needs for an upgrade and expansion of the transmission capacity,**
 - **look at strategies for overcoming planning hurdles, sharing costs, accessing equipment and assessing priority actions,**
 - **identify market mechanism and funding models, and**
 - **define an actionable horizon plan for the successful integration of renewable energy projects in the grid.**
- **The content of the Master Plan Transmission Grid could comprise indicative overall and intermediate targets, description and cost-benefit evaluation of planned measures, time schedule for implementation, monitoring and reporting.**

Recommendations to overcome barriers for investments in EE and RES in Croatia

Economic and financial barriers (1/2)

Strengthening of available financing schemes

- **High upfront costs, long payback periods, difficult access for small independent project developers are major economic barriers to the development of renewable energy and energy efficiency projects, despite the availability of several credit lines.**
- **Several efforts can be made to overcome those barriers. Similar projects can be aggregated and bundled into one financing package or can be replicated in a large number of similar enterprises or situations. Another solution is clustering. The cluster approach can bring specialized technical support and outreach to smaller enterprises along with follow-up loan provisions based on a standardized, replicable model that can result in substantial reductions in transaction costs per loan.**
- **The ESCO portfolio guarantee offered by the Bulgarian Energy Efficiency Fund (BEEF) is a good ex-ample for a clustering solution. BEEF signs a framework agreement with the ESCO to issue a portfolio guarantee for a pre-approved portfolio of projects. If the ESCO wins a tender for an energy efficiency project, BEEF approves the project and adds it to the portfolio of the approved projects. BEEF guarantees that it will cover up to 5% (the percentage is negotiable) of the defaults of the delayed payments of this portfolio.**

Recommendations to overcome barriers for investments in EE and RES in Croatia

Economic and financial barriers (2/2)

Adaptation of existing feed-in tariff for electricity from RES and cogeneration

- In August 2007, the Government of the Republic of Croatia instituted a feed-in tariff system, requiring the Croatian Electricity Market Operator (HROTE) to off-take the electricity produced from renewable energy sources or cogeneration units fueled by natural gas. However, due to the absence of an economic incentive for heat production the advantages of the co-generated useful heat are lost.
- Therefore, the Croatian government shall ensure that support for cogeneration – existing and future units – is based on the useful demand for heating and cooling and primary energy savings . Feed-in tariffs can be designed to incentivise high efficiency cogeneration plants, for example by ensuring they reach a minimum efficiency threshold to qualify for support. High efficiencies can further be encouraged by linking the level of bonus to the efficiency.
- Key factors of success to be taken into consideration are:
 - The tariff must be set sufficiently high to allow for an attractive return on investment. This should also involve linking the tariff to the price of fuel to avoid, as far as possible, fuel-price risk.
 - The feed-in contract should be of sufficient length to provide investor confidence. The typical term of these arrangements is 10 to 20 years.
 - The remuneration should as far as possible reflect the environmental, social and network benefits that cogeneration provides.

Recommendations to overcome barriers for investments in EE and RES in Croatia

Lack of awareness, human capacities and professional skills (1/2)

National education, training and public awareness program

- **Lack of awareness among final energy consumers has been identified to be one of the main bottlenecks for the development of a domestic market for energy efficiency and renewable energy projects in Croatia.**
- **To overcome this barrier and to create a positive image for investments in sustainable energy, the Croatian government with participation of local and regional authorities, shall develop suitable information, awareness-raising, guidance or training programs in order to inform citizens of the benefits and practicalities of developing and using energy from renewable sources and energy efficiency measures.**
- **Information dissemination needs to be tailored to the end-user in order to be effective. Activities could comprise advertising campaigns, information dissemination on energy labels and standards, advice on behavioral practices, information dissemination through energy auditors, and capacity building for project developers, architects, installers etc.**
- **Given the ambitious targets of the Master Plan for Energy Efficiency and the resulting need for around 5,000 energy auditors, an extension of the existing trainings program for energy auditors in accordance with the Slovenian Energy Auditing Program (EAP) and the allocation of additional resources is highly recommended.**

Recommendations to overcome barriers for investments in EE and RES in Croatia

Lack of awareness, human capacities and professional skills (2/2)

Capacity building for policy makers

- In order to ensure successful monitoring of policy implementation, it is necessary to provide adequate funding and training for the staff of ministries, regulators and other governmental or municipal agencies with responsibilities in the energy sector

Capacity building for local financing institutions

- Lack of awareness and expertise with financing energy efficiency and renewable energy projects hampers the implementation of sustainable energy projects despite the availability of dedicated credit lines and funds.
- To raise awareness about the availability of funding schemes, intensive marketing including dissemination of information about schemes to project developers and client enterprises is necessary.
- To increase expertise with financing energy efficiency and renewable energy projects, support to local banks in terms of assistance and training in refining, standardizing and evaluating loan applications and appraisal procedures is highly recommended.
- This capacity building and awareness raising initiative should be a joint initiative of the Croatian Bank for Reconstruction, participating banks, HEP ESCO and international institutions (e.g. European Bank for Reconstruction and Development (EBRD), the United Nations Development Program (UNDP)).

Conclusions

Croatia has a strong commitment to EE and RES and has one of the most advanced markets for EE services in non-EU Eastern Europe

- **Despite disposing of own natural resources, such as gas and oil, Croatia has a high import dependency on primary energy sources**
- **Renewables account for 49% of the electricity generation in Croatia and the share of renewables is expected to increase further by the gradual commissioning of planned wind power plants**
- **The energy intensity of Croatia is in line with the EU-27 average and one of the lowest among project countries**
- **Croatia is expected to further improve its energy intensity levels by the introduction of mandatory energy certificates as of April 2010**
- **Policy development for EE and RES is well advanced in Croatia, but monitoring of implementation and simplification of administrative procedures is recommended**

Pöyry Energy Consulting

Claudio Waldburger

Managing Director

Phone: +41 (0) 44 288 90 84

Claudio.Waldburger@poyry.com

Dr. Francesca Paoletti

Senior Consultant

Phone: +41 (0) 44 288 90 86

Francesca.Paoletti@poyry.com

Pöyry Energy Consulting (Schweiz) AG

Hardturmstrasse 185

CH-8005 Zurich

Switzerland

The background of the slide features a close-up, artistic photograph of a sailboat's rigging. A small, glowing globe of the Earth is positioned where a rope or cable meets a metal fitting. The overall color palette is dark green and blue. At the bottom of the slide, the word "PÖYRY" is written in a large, bold, light-colored sans-serif font, with a double slash symbol above the 'Y'.

PÖYRY