Project logo:

Priority logo:

Project No: **INCO – CT – 2004 – 509205**
Project acronym: **VBPC – RES**
Project title: **Virtual Balkan Power Centre for Advance of Renewable Energy Sources in Western Balkans**

Instrument: Coordination Action

Thematic priority:
International Cooperation (INCO)

FINAL ACTIVITY REPORT

Period covered: from 01.01.2005 to 31.12.2007

Date of preparation:

Start date of project: 01.01.2005

Duration: 36 months

Project coordinator:

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University of Ljubljana,
Faculty of Electrical engineering,
Slovenia

Revision : 1

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1 Abstract

VBPC-RES has been a 3-year project with an aim to disseminate the information on Renewable Energy Sources (RES) and to remove barriers for their implementation in the Western Balkan (WB) countries. The Western Balkan region has great yet underexploited potential of RES, and by their efficient use, RES could significantly contribute to security of energy supply within the region and wider. Special care has been devoted by this project to sound solutions for electricity supply in undeveloped and isolated regions due to war damage.

In the project, a set of events have been held, each of which focusing on specific topic or addressing a specific target group of stakeholders. First, a set of four knowledge-gathering workshops have been organised to compile information on best practices and best available technologies in RES that could apply to isolated regions. The workshops focused on state-of-the-art energy transformation, distribution, operation and control, connection to the local network, energy storage and organisational issues. In parallel, a set of three workshops have been organized to identify regulatory and institutional framework suitable for RES implementation. The workshops pointed out the optimal incentives and mechanisms available to overcome local hurdles to RES operation in WB countries.

Based on the knowledge gathered in the first two set of workshops, a series of events have been organized, each of them targeting specific stakeholders such as experts, decision makers, local stakeholders and higher education. Among them, two main region-wide conferences have been held in order to stimulate discussion between experts about RES technologies application and regulations with relevance to Balkan region. Two workshops have been held in order to raise awareness among business decision makers, policy makers, governmental officials and consultants. Those workshops highlighted successful experiences with harmonisation of EU legislation in EU, Associated Countries and Western Balkan countries. In addition, five local workshops have been performed and adapted to local conditions in Bosnia and Herzegovina, Croatia, FYRO Macedonia, Serbia and Montenegro and Albania. Finally, the interaction with educational process has been set up through a targeted study curriculum focusing on RES technology, economics, and policy. The RESTEP Curriculum was implemented through summer schools and student contest that have been set up to educate students on RES and create a network between universities in Western Balkan region. The proceedings of the project have been published in two brochures, on RES technologies and RES implementation best practice, published in English and four local languages (Croatian, Serbian, Macedonian and Albanian).

All the knowledge gathered within VBPC-RES events is available on its website http://www.vbpc-res.org/.

2 Partnership

2.1 Overview

VBPC-RES has been a co-operative effort of multiple partners and multiple pan-European structures. The Western Balkan are historically related and some EU country partners are part of former Yugoslavia thus facilitating co-operation within both the Balkan region and the EU. The work started with the EC project well before 1 January 2005, as energy supplies needed cooperation work to overcome war damages in the Balkans.

Growing demand for secure energy led to a common concern at a European level and beyond, bringing together EU countries, New Member States and Western Balkan countries. This led to a consortium of 17 organisations working on VBPC-RES, with a wide complementary range of experiences and skills. The structure is summarised in Figure 1, and the partners are listed in the sections below.

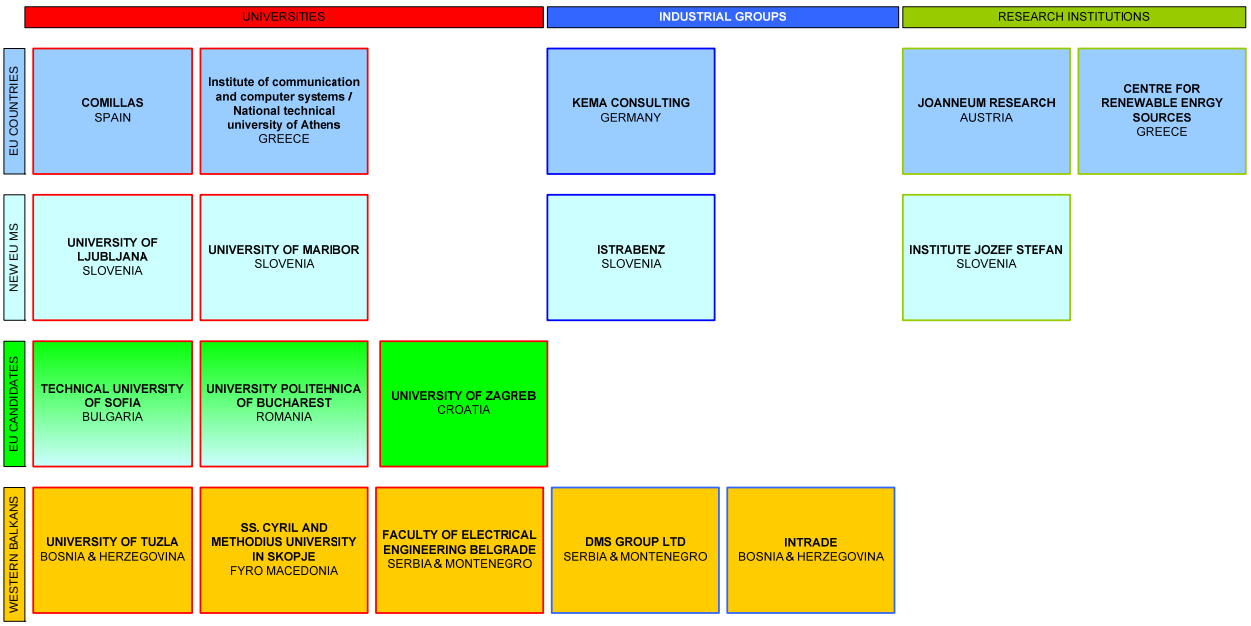

Figure 1: The relationship of the various partners with regards to geographical and institutional representation.

As seen on a geographical scale, the VBPC-RES project worked on building a market for Renewable Energy Sources in Western Balkan in order to accelerate the use of RES, develop sustainable technologies and contribute to the EU security of supply. The overall budget was around 600 000 euros of which 100 % was granted by the European Commission.

It was agreed that *Knowledge* used, transferred and disseminated during VBPC-RES project shall be the property of the *contractor* carrying out the work leading to that *knowledge*.

2.2 EC Components and Partners

VBPC-RES Virtual Balkan Power Centre for Advance of Renewable Energy Sources in the Western Balkans - 1 January 2005 to 31 December 2007 - Supported by the European Commission in the 6th Framework Programme, Coordination Action for sustainable development, global change and ecosystems.

2.2.1 New Member State Partners

Among the 10 countries of Central and Eastern Europe that joined the European Union in 1. May 2004 and in 1. January 2007, three countries, Slovenia, Bulgaria and Romania were participating in the project. Four Slovenian partners were involved in the VBPC-RES project, one of which was the co-ordinator of the project.

UNIVERSITY OF LJUBLJANA (FE) – CO-ORDINATOR
Laboratory for Energy Policy,
Faculty of Electrical Engineering, Trzaska 25, SI-1000 Ljubljana,
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http://blisk.fe.uni-lj.si/lest/eng/index.html

Project contact: Dr. Andrej Gubina,
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The University of Ljubljana was represented by the PSR group. The Government of Slovenia engaged the Power Systems Research (PSR) Group as the principal consultant of Slovenian power market deregulation. Some of the experiences gained throughout this process have already been successfully transferred to other Western Balkan countries. The PSR Group established the Balkan Power Centre to facilitate generation, acquisition and dissemination of knowledge on regulatory issues pertinent to electricity market liberalisation. The main aim of the centre is to facilitate the transition from monopoly to market conditions by adoption of common rules throughout the Balkan region.

Within VBPC-RES, the PSR group was responsible for the management of the project, administrative and technical event support and for the organization of the virtual Balkan conferences and summer schools.

ISTRABENZ ENERGETSKI SISTEMI (ISTRABENZ)
Energetske Storitve, d.o.o., Tumova 5, 5000 Nova Gorica, Slovenia
http://www.istrabenz-es.si

Contact: Borut Del Fabbro
Tel.: + 386 5 33 11 974
Fax: + 386 5 33 11 979
Email: borut.delfabbro@istrabenz.si

Istrabenz Energetski Sistemi is active in the field of financial engineering in sustainable energy. Since the beginning of 2003, the company operates in four markets within or bordering the Balkan area: Slovenia, Italy, Croatia and Bosnia & Herzegovina. The main activities of Istrabenz Energetski Sistemi are focused on: integrated energy services, renewable energy markets and consulting in other energy markets.

ISTRABENZ was responsible for identifying regulatory barriers in WB countries and providing with solutions for improvement of RES penetration. Due to its expertise, ISTRABENZ was also contributing to biomass technology transfer.

INSTITUT JOZEF STEFAN (IJS)
Jamova 39, 1001 Ljubljana, Slovenia
http://www.rcp.ijs.si/~eec

Contact: MSc Stane Merse
Tel: +38615885250
Fax: +38615612335
Email: stane.merse@ijs.si

The Energy Efficiency Centre of the Jozef Stefan Institute is the main national technological institute complementing the role of the universities and bridging the gap between science and applications. The mission of the Centre is to promote sustainable energy development.

IJS was involved in knowledge transfer on RES policy.

UNIVERSITY OF MARIBOR (UNI-MB)

Power Laboratory, Faculty for electrical and computer science,
Institute of Power Engineering, Slomskov trg 15, 2000 Maribor, Slovenia
http://www.powerlab.uni-mb.si

Contact: Prof. Joze Vorsic
Tel: +38622207050
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Email: vorsic@uni-mb.si

The Power Lab Research Group (PLR Group) represented the University of Maribor. It mainly focuses on various issues related to power system operation and control, renewable energy sources and energy policy. It also benefits from a 15 years research experience in the field of solar and wind energy.

The PLR Group was involved in RES technologies workshops.

TECHNICAL UNIVERSITY OF SOFIA (TUS)

Thermal and Nuclear Power Engineering Department,
Kliment Ohridski Str., 8, 1000 Sofia, Bulgaria
http://www.tu-sofia.bg

Contact: Prof. Dimitar Popov
Tel: +35929652303
Fax: +35929652303
Email: dpopov@tu-sofia.bg

The main subject of the Department of Thermal and Nuclear Engineering in Technical University of Sofia is tuition of engineers, which are able to work in the field of thermal and nuclear engineering (Thermal power plants, Nuclear power plant, Renewable energy source and technologies). In the last few years members of the Department took part in the following EU R&D projects: PECO, INCO – COPERNICUS and "Thematic Network for Cleaner and More Efficient Gas Turbines".

TUS was responsible for dissemination activities and communication to key focus groups.

UNIVERSITY "POLITEHNICA" OF BUCHAREST (UPB)
Department of Electrical Power Engineering,
Power Engineering Faculty, Spl. Independentei, nr. 313,
RO-060032 BUCHAREST 6, Romania
http://www.pub.ro
http://el.poweng.pub.ro

Contact: Prof. Mircea Eremia
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Fax: +40214029446
Email : eremia1@yahoo.com

The Faculty of Power Engineering (FPE), University "Politehnica" of Bucharest, is the largest HE entity in Romania. The Power Systems Laboratory (PSL) at FPE covers most of electrical energy and power systems areas.

UPB has been involved in the preparation of high education materials and the organization of the Balkan Summer School 2005.

2.2.2 EU15 Partners

JOANNEUM RESEARCH (JR)
Institute of Energy Research,
Forschungsgesellschaft m.b.H., Steyrergasse 17, 8010 Graz, Austria
http://www.joanneum.at

Contact: Dr. Reinhard Padinger
Tel: +433168761333
Fax: +433168761320
Email: reinhard.padinger@joanneum.at

Joanneum Research is one of the focal points of scientific research in Austria. The Institute of Energy Research offers experts for technologies and techniques in the fields of renewable energy, co-operation in the IEA Bioenergy Agreement and consulting activities concerning technological policies and investigations of various energy scenarios with regard to the greenhouse effect (implementation of concepts for renewable energy sources).

Due to extensive knowledge in RES technologies, JR was responsible for best practices and knowledge transfer in this area.

NATIONAL TECHNICAL UNIVERSITY OF ATHENS (ICCS/NTUA)

Electric Energy Systems Laboratory,
Institute of Communication and Computer Systems / NTUA,
42 Patission str., 106 82 Athens, Greece
http://www.ntua.gr

Contact: Prof. Nickolas Hatziargyriou
Tel: +30210 7723661
Fax: +30210 7723659
Email: nh@power.ece.ntua.gr

The Electric Energy Systems (EES) Laboratory of NTUA has been actively involved in research on the Renewable Energy Sources (RES) since 1980. The Institute of Communication and Computer Systems (ICCS) is a private law body associated with the Department of Electrical and Computer Engineering of the National Technical University of Athens (ICCS/NTUA). In the last 10 years, ICCS has participated in several relevant R&D EU projects, as a coordinator in CARE, MORE CARE and MICROGRIDS, or as a partner in "Lightning Protection of Wind Turbines", "Electricity Tariffs and Embedded Renewable Generation", DISPOWER, ANEMOS, and RESPIRE.

ICCS/NTUA was responsible for identifying barriers and incentives for RES penetration and organised one workshop for RES technology transfer.

KEMA CONSULTING (KEMA)

Kurt-Schumacher-Str. 8, 53113 Bonn, Germany
http://www.kema.com

Contact: Dr. Konstantin Petrov / Dr. Katja Keller
Tel. +49 228 44 690 00
Fax. +49 228 44 690 99
Email: konstantin.petrov@kema.com
katja.keller@kema.com

KEMA Consulting has been implanted in Central and Eastern Europe for more than 10 years and has carried out many projects in the electricity sector mainly focused on regulatory issues in Central and Eastern European countries. In 1992 KEMA Consulting was asked by the European Union to assist in the drafting of the TPA Directive. The unique combination of technical and economic expertise is fundamental for providing competent advice in the area of deregulation and market/industry design as well as the various aspects related to this transition processes.

KEMA was in charge with providing experience in regulatory issues.

COMILLAS UNIVERSITY (COMILLAS)

Instituto de Investigación Tecnológica,
Universidad Pontificia Comillas, Alberto Aguilera, 23, 28015 Madrid,
Spain
http://www.upco.es

Contact: Prof. Tomás Gómez
Tel: +34 91 540 62 60
Fax: +34 915423176
Email: Tomas.Gomez@iit.upco.es

Universidad Pontificia Comillas has been represented in this project by the Institute of Technology Research. The Institute of Technology Research (IIT) is the leading institution in Spain on the development of integrated models for the operation and planning of electricity systems under deregulation. It has also provided extensive international consultancy on electricity market designs and network regulation.

COMILLAS was responsible for knowledge transfer from EU to WB countries on regulatory issues regarding RES implementation.

CENTRE FOR RENEWABLE ENERGY SOURCES (CRES)

Directorate of Renewable Energy Sources,
Department of Ocean Energy and Small Hydro,
19th Marathon Avenue, 19009 PIKERMI, Greece
http://www.cres.gr

Contact: Mr. KOSTIS KARRAS
Tel: +3021066265
Fax: +302106603301
Email: kkarras@cres.gr

The Centre for Renewable Energy Sources is the Greek national centre for Renewable Energy Sources (RES), Rational Use of Energy (RUE) and Energy Saving (ES). CRES works on research and development, demonstration projects, projects dealing with energy information systems, feasibility studies, technical and economic studies, market research, as well as promotional activities for the use of RES/RUE/ES. Over the years the Directorate of Renewable Energy Sources of CRES has been successfully involved on more than 100 European projects in the areas of its expertise (JOULE, THERMIE, AIR, FAIR, FWP5 etc.).

CRES was in charge with knowledge and best practices transfer in the field of RES and their implementation to isolated power system.

2.2.3 Candidate Country Partner

Romania and Bulgaria joined the EU in 2007 during the ongoing VBPC-RES project, while Croatia started accession negotiations in 2005 and thus stands today as a candidate country.

UNIVERSITY OF ZAGREB (UNI-ZG)
Department of Power Systems,
Faculty of Electrical Engineering and Computing, Unska 3, 10000 Zagreb,
Croatia
http://www.fer.hr

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Fax: +38516129890
Email: zeljko.tomsic@fer.hr
vesna.bukarica@fer.hr

Department of Power Systems within the Faculty of Electrical Engineering and Computing of Zagreb, has been dedicated to analyze technical, economic and environmental aspects of various RES technologies, examine the role and support mechanisms for RES within a liberalised market, develop power system planning methods under uncertain conditions, and examine the role of decentralised energy sources in increasing power supply reliability and efficiency for sustainable development.

UNI-ZG was responsible for the oraganisation of two RES knowledge transfer workshops and the oraganisation of the Croatian local workshop.

2.2.4 Western Balkan Partners

Western Balkan countries are potential candidate countries provided they fulfill the accession criteria. However accession negotiations have not started yet.

UNIVERSITY OF TUZLA (UNTZ)
Department for network and system theory
Faculty for Electrical Engineering, Franjevacka 2, 75000 Tuzla,
Bosnia and Herzegovina
http://www.untz.ba

Contact: Dr. Suad Halilcevic
Tel: +38735259627
Mobile phone: + 387 35 61 845 300
Email: suad.halilcevic@untz.ba

The Department for network and system theory (DNST) at the Faculty for Electrical Engineering, University of Tuzla, is involved in several research activities in the fields of power system operation and control, planning and power industry restructuring. The local authorities in Bosnia engaged the DNST members as the principal consultants in the postwar reconstruction in the fields of energy, communal issues and implementation of the transition processes. Some of these activities have already been successfully conducted in collaboration with institutions from other European countries.

UNTZ as brought its expertise in local regulatory specifics in Bosnia and Herzegovina. UNTZ was responsible for the organization of one decision-makers workshop, one summer school and the local workshop in Bosnia and Herzegovina.

SS. CYRIL AND METHODIUS UNIVERSITY IN SKOPJE (CMU)

Faculty of Electrical Engineering,
Ss. Cyril and Methodius University, Karpos II bb, 1000 Skopje,
Former Yugoslav Republic of Macedonia
http://www.etf.edu.mk

Contact: Prof. Vlastimir Glamocanin
Tel: +389 23062224
Fax: +389 23064262

Email: vlasto@etf.ukim.edu.mk

The Faculty of Electrical Engineering, SS. Cyril and Methodius University in Skopje is the only institution of high education in the country and also the only institution carrying out organized research work in areas of electrical engineering.

CMU was responsible for providing with information and solutions in local specifics and for the organizations of both workshops in FYROM and Albania.

DMS GROUP LTD (DMSG)

Puskinova 9a, 21000 Novi Sad, Serbia and Montenegro
http://www.dmsgroup.co.yu

Contact: Prof. Dr. Dragan Popovic/ Elena Boskov
Tel: +38121 475 0376
Fax: +38121455865
Email: dpopov@uns.ns.ac.yu

DMS GROUP is a propulsive and fast developing SME acting in the field of computer applications for distribution management systems. DMS Group software solutions are implemented in several control centres in the region and worldwide.

DMSG gave IT support for the VBPC-RES web portal and web-page infrastructure and was responsible for organising one workshop on technology transfer and the realization of the two brochures.

INTRADE ENERGY (INTRADE)
Zmaja od Bosne 44, 71000 Sarajevo, Bosnia and Herzegovina
http://www.intrade.co.ba/intrade-energija

Contact: Emir Avdic
Tel: +38733657205
Fax: +38733657206
Email: emir.avdic@intrade.co.ba

INTRADE is a SME involved in project management in energy business in Bosnia and Herzegovina. It's main expertise lies in: power plants on renewable energy resources, thermal power plants, heating plants and cogeneration plants.

INTRADE was involved in various workshops for enhancing RES implementation in WB countries and in the local workshop organized in Bosnia and Herzegovina.

FACULTY OF ELECTRICAL ENGINEERING, BELGRADE (ETF)
Bulevar Kralja Aleksandra 73, 11 120 Belgrade, Serbia and Montenegro
http://www.etf.bg.ac.yu

Contact: Prof. Nikola Rajakovic
Tel: +381 11 337 01 68
Fax: +381 11 324 86 81
e-mail: rajakovic@etf.bg.ac.yu

The Faculty of electrical engineering at University of Belgrade covers a wide spectrum of area of study in electrical engineering. The School takes an active part in scientific work by collaboration in research projects, resulting in large number of papers in world's most respected scientific publications.

ETF was responsible for the coordination of the workshop on regional aspects with regards to RES promotion mechanisms.

3 Objectives

The main objectives of the VBPC were the transfer of know-how in RES technology in isolated regions, identify the main economic and legislative factors influencing investment decisions in RES including barriers and local specifics, with option to overcome them, and finally build awareness on modes, means and benefits of renewable energy sources.

To achieve the above objectives the following actions have been undertaken:

- A series of four experts workshops on RES technologies dealing with transfer of best practice and best technologies in RES for isolated regions, comprising energy transformation, distribution, operation and control, connection to the local network, energy storage and organisational as also other implementation issues.

- A series of three expert workshops on RES regulation to analyse each WB country barriers and local specifics. VPBC-RES intended to overcome theses barriers by exchange of information on incentives for promotion of RES and experiences with harmonisation with EU legislation in both EU, and WB countries.

- Two scientific conference sessions to discuss VBPC topic area, and two regional decision makers conferences on RES technologies regulation to raise awareness among key focus groups.

- Five local workshops in each WB country to focus on each country's specifics, strengthening the link between the scientific community and decision makers.

- Two summer schools for students and Exchange of personnel within the region focusing on RES technologies.

4 Work Performed

4.1 Transfer of Best Practices and Best Available Technology in RES for Isolated Regions

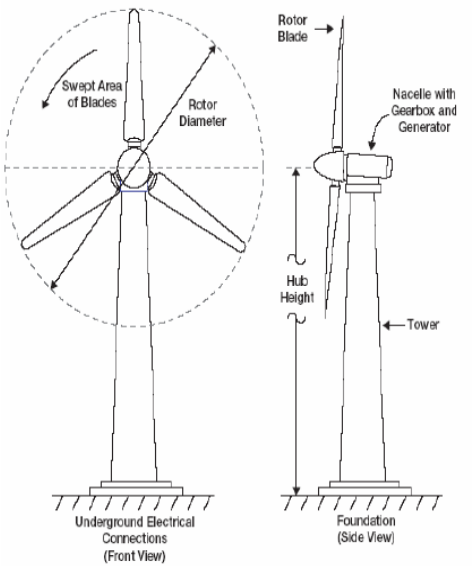
The best practices and state of the art technologies in renewable energy sources that have been transferred within VBPC-RES project range from energy transformation, trough energy distribution, operation and control, connection to the local network, to energy storage, organisational and other implementation issues.

In order to cover the full scope in RES technologies, three workshops were scheduled for the first year of the project and another one during the second year. Each workshop focused on a particular aspect of RES technologies as follow:

- Workshop 1: "**Guidelines for RES technologies**"
- Workshop 2: "**Technical design of RES-plants for isolated regions**"
- Workshop 3 : "**Operation an control of RES of isolated power systems**"
- Workshop 4: **"RES Project implementation"**

4.1.1 Workshop "Guidelines for RES technologies"

The first workshop was held on 10th and 11th of March 2005, in the Faculty of Electrical Engineering, University of Tuzla, Bosnia and Herzegovina. Its aim was to give an overview about all RES technologies possibly relevant for application in insulated regions. In particular, the following technologies have been presented and discussed:



- Wind power
- Photovoltaic
- Biomass fired ORC power generation
- Biomass fired Stirling engine power generation
- Small hydro power
- Solar/biomass/waste driven Desiccant air-conditioning
- Geothermal energy
- Biogas production and power generation with gas-Otto engine
- Pelletizing of woody fuel for room heating for small automatic boilers

As assumed that the WBC could have in common a significant increase in the share of renewable energy sources in the next decades, which will be in accordance with the general trend in EU countries, objectives and strategy of implementation for each renewable energy source were presented. Knowledge on state-of-the-heart wind power, photovoltaic technology products, "Organic

Rankine Cycle"-power generation, biomass fired Stirling engine, absorption refrigeration and "biogas production" were exchanged and analysed as possible solutions for energy supply in isolated regions of the Western Balkan countries. The WB countries analysed were: Bosnia and Herzegovina, Croatia, Macedonia and Serbia and Montenegro as targeted by VBPC project.

Different successful experiences were discussed such as small hydro plants in Serbia and Montenegro, a solar/biomass heat driven ammonia/water cooling machine in a private winery in Austria, and pelletizing woody fuel for room heating or for small automatic boilers in Germany.

From a technical point of view the contributions reflected the deep knowledge of the authors on the presented topics. The contributors presented many interesting details regarding design, operation conditions, technical details, selection of the suitable and the cost effective equipment. The contributions were understandable and a benefit for the audience. As targeted, the participants were representatives of the state energy regulatory commission, Tuzla's canton ministry of science and the ministry of industry, Tuzla's canton ecology agency, graduate and postgraduate students, interested entrepreneurs and the project's partners. All of them have actively discussed on the best solution regarding the RES technologies which can be successfully applied into isolated regions.

4.1.2 Workshop "Technical design of RES-plants for isolated regions"

The second workshop was held on 23rd and 24th of May 2005 in the Faculty of Electrical Engineering and Computing, Zagreb, Croatia. It focused on specific requests on the technical design of RES-plants for isolated regions. The following thematic issues have been treated in detail:

- Renewable energy sources in Croatian power systems,
- Technical design of micro hydro and small hydro power plants,
- Increasing penetration of RES in island energy systems,
- Technical design of photovoltaic & wind power for a tourist centre at an Adriatic Island,
- Technical design of wood pellet fired micro CHP,
- Technical design of wood chip fired steam engine/generator at district heating plant,
- Wood chip fired ORC-plant for CHP-production for rural village,
- RES application in the Kynthos Island,
- Legislative framework for renewable energy use in Croatia,
- Absorption cooling system based on waste-wood biomass,
- Technical design of a geothermal driven ORC-Plant ,
- Technical definition and current Status of RES in Greek Islands.

As a subsequent of the first workshop, this second workshop focused on technical design of renewable energy sources that have been introduced previously.

With regards to isolated regions, the workshop exposed actional and reactional principles based on water energy, (including the pressure water pipeline parameters, power house equipment criteria and power plant equipment needed), Pellet fired micro CHP which presents many advantages for isolated regions, where electricity cost is considerably higher and no network connection exist. Emphasis has been shown upon the use of biomass as energy source because it is locally oriented, and reduces dependence on imported fuels. The workshop also pointed out that biomass was contributing to a strong socio-economic factor of increasing life standard in rural areas and preventing major migration of population from rural to urban areas. With aiming toward this goal, experts proposed technical design of CHP plant with steam turbine, powered by biomass – wood chips.

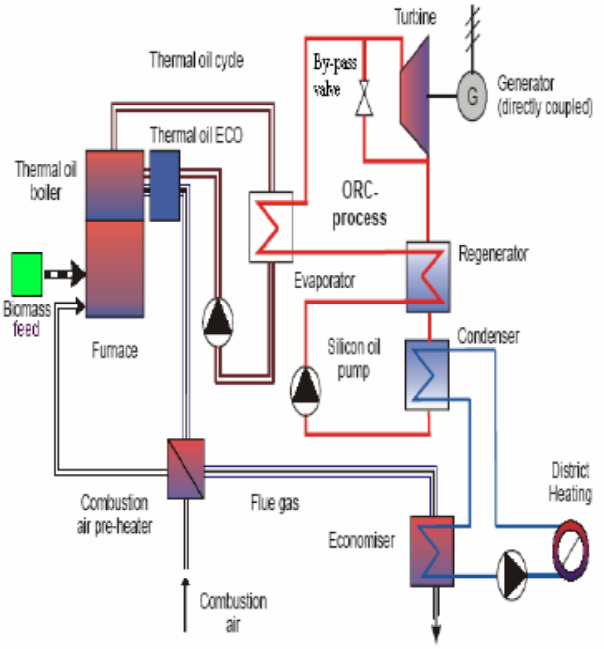


Figure 2 *Organic Rankine Cycle process*

The Organic Rankine Cycle (ORC) process has also been reviewed bringing to the conclusion that this energy source fits well for power generation in woody and agriculture rural areas. Compression and absorption cooling systems have been described in details as they can be provided with input based on Wood chips or pellets based combustors. The workshop exposed to participants some of the reasons why the biomass boiler driven ACS is not developed yet on the market.

Some study cases on Croatian and Greek Islands were proposed as a learning experience. They provided with basic data on islands energy consumption, national energy programme aiming for increasing energy efficiency, alternative energy use and environment protection, current status of renewable energy sources technologies installed on islands, the demand and installed capacity, the RES capacity by type, the RES share in energy demand and the energy cost on those islands. The VBPC project have also examined aspects of installation of an autonomous Organic Rankine Cycle (ORC) power production unit, on Milos Island and discussed.

The workshop also addressed participants on the need for future legislation, proposals, regulations and standards favouring energy use of renewable sources, but also and mainly, of capability and willingness of all involved in this business - investors, producers, research institutions, forestry and agricultural sectors, financial institutions - to individually give their contribution to greater use of biomass as energy source.

4.1.3 Workshop "Operation and control of RES of isolated power systems"

The third workshop was held on the 07th and 08th of November 2005 at the Faculty of Electrical Engineering, Belgrade, Serbia and Montenegro. It focused on specific problems on operation and control of RES in isolated power systems. The following thematic issues have been treated in detail:

- Integrated system of DMS analytical functions,
- Load flow and optimal PF,
- Optimal configuration of power system,
- Modeling and fault analysis of different wind generator technologies,
- In field verification of the Real-Time Distribution State Estimation,
- Control aspects: SCADA,
- Security aspects,
- State of the art in wind power forecasting,
- Distribution management system software for isolated power systems,
- Power quality and network planning.

As the next step in implementing RES, the third workshop focused on technical aspects of operation and control of RES.

The presentation considered the impact of distribution generators on existing relay protection on feeders. Different methods for power flow calculations in distribution networks have also been gone trough: Iterative method for power flow calculations in radial networks, the compensation method for networks with small number of loops, the modified Newton-Raphson method, the node voltage method and the fuzzy methods. The question of how to practically implement them into some existing or new distribution networks has been raised. The workshop pointed out the optimal configuration of power system and described the idea of Real-Time Distribution State Estimation (DSE) as a fast, robust and very efficient distribution real-time state estimator. In-field proof of its efficiency was the main aspect of this issue.

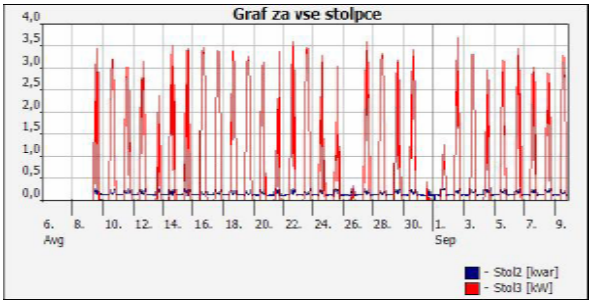


Figure 3 RES Testing

Three main wind generator technologies have been presented including power electronics and sophisticated control procedures. In this issue and in order to find the best solution it has been recommended to carry out detailed analysis with simulation models for every specific system.

Practical case about the biggest Greek island has been used to illustrate the state-of-the-art wind power forecasting. While another case study highlighted pilot installations of advanced control functions that have been implemented on the islands of Crete, Ireland and Madeira.

4.1.4 Workshop "RES project implementation"

The last workshop on RES technologies was held on the 6th and 7th of April 2006 at the University of Zagreb, Faculty of Electrical Engineering, Croatia. The Workshop gave an overview about needs and challenges in implementation of projects applying, dealing with or supporting RES projects in insulated regions. In particular, the following issues were presented in detail:

- Technical and non-technical aspects of RES project implementation, including project preparation, management, decision making processes at project level, organisation of RES systems,
- EU best practice at project implementation,
- Barriers and country specifics,
- Potentials in WB region.

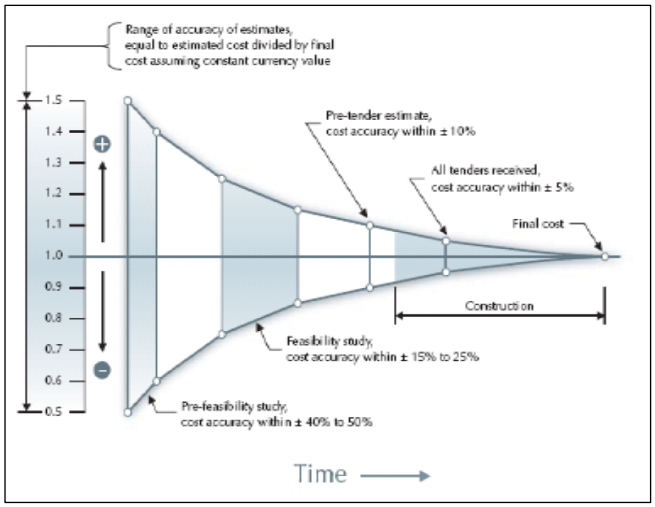


Figure 4 *RES Investment cost over time*

Many interesting issues were presented: best practices in RES project implementation in the EU, potentials for RES implementation in Western Balkans, RES project development through different phases (planning, preparation, design, construction and operation), economics of distributed generation that are relatively small in scale and located near to the end-user, connection of distributed generation to the grid, incentives and barriers to RES project implementation, and Combined Heat and Power (CHP) generation systems. The exchange of knowledge was understandable as fully explained and illustrated with concrete cases. For exemple, successful case studies were presented and analysed such as wind power development in Spain or RES technologies installed in Greek Islands. Many RES implementation local

projects were discussed such as the virtual power plant planned in the south-eastern part of Austria, Macedonia's hydro projects, wind power project WPP Stupišće on the island of Vis, croatia and RES installation projects in Romania.

During the Workshop valuable theoretical and practical knowledge and experience regarding to the RES project implementation was exchanged and gathered. All the findings will be useful to all participants as well as to future readers of this material. The participants of this workshop were project partners as well as key target groups for RES implementation: representatives of the Ministry of Economy, Labour and Entrepreneurship, Croatian Energy Market Operator, Croatian electric utility (HEP) and Končar – Power Plant and Electric Traction Engineering Inc.

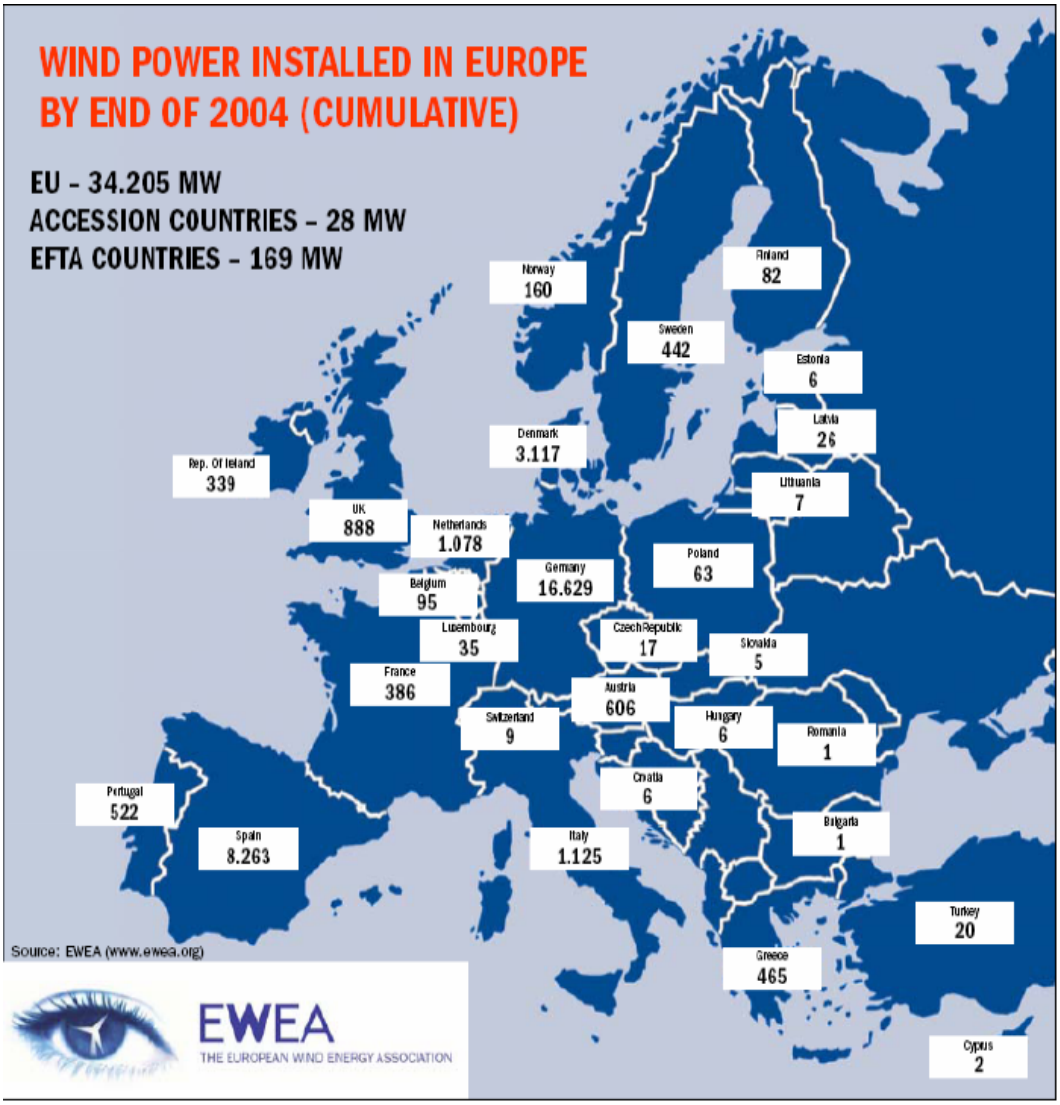


Figure 5 Installed wind power statistics

Thus, the first set of workshops can be evaluated as very interesting, useful and successful. It allowed a knowledge building from state-of-the-art RES technologies, trough technological design, operation and control to its implementation.

4.2 Exchange of Information on Regulatory and Organisation Framework

A set of three workshops has been organised to fulfil VBPC-RES objective with regards to regulatory and institutional framework, highlighting incentives for RES installations in WB countries, identifying main factors influencing investment decisions and options to improve RES implementation.

The first workshop focused on **country experiences**, the second one on **regional aspects** both gathering information to lead to the third workshop providing with solutions to **enhance implementation in WB countries**.

4.2.1 Workshop "Country experiences"

The first Workshop took place in Athens, Greece, the 18th and 19th of April 2005. It overviewed the country experiences in legal and institutional framework, barriers and incentives to support RES penetration. In particular, the following subjects were covered with regards to country experiences:

- The best practices and lessons learned with various types of economic incentives for RES penetration such as green certificates, feed-in tariffs, and others various tax schemes,
- Responsibilities for RES penetration at governmental level and evaluation of country best practices,
- Motivation for RES implementation – investment decisions barriers and success factors,
- Economic background – costs and values of electricity from renewable sources,
- Role of system analysis in preparation and dimensioning RES promotion mechanisms.

In this workshop, possibilities and problems for penetration of supply systems based on RES were geographically described. The analysis was based on recent developments in several countries with different models for support of installations based on renewable energy. The following countries were analysed with regards to RES: Germany, Spain, Slovenia, Romania, Croatia, Serbia & Montenegro, Bosnia & Herzegovina, Greece, Macedonia, Netherland, Austria, Albania and Bulgaria.

The lessons learned throughout this workshop are: connection standards should be adapted to each technology, the use of fixed premium, if it is high enough, is the most effective way to promote a technology, rules for expansion of RES at a higher penetration should be defined (for example, in Spain, the problem now is how to better integrate the huge amount of wind generation to allow a higher penetration) and finally licensing procedures should be simplified.
In general, **the main barriers** to the development of RES have been defined as follow by the workshop experts: Insufficient network capacity to evacuate generated energy, time consuming administrative processes (building a wind park may take 5 years), complexity of the legal framework and particularly the licensing procedure, and in the case of wind farms, public acceptability, basically due to visual impact or other reasons.

4.2.2 Workshop "Regional aspects"

The second workshop took place in Belgrade, Serbia and Montenegro, the 9th and the 10th of November 2005. It focused on Western Balkan regional aspects of RES promotion mechanisms and covered in details the following aspects:

- Harmonisation with EU and the present status of RES promotion in WB Countries,
- Integration of RES promotion into other policies (as regional development, social and employment policy including other socio-economic aspects). Local and global environmental issues and security of supply for RES,
- Policies and specific incentives for RES in isolated regions,
- Impact of integral market development on implementation of stand alone RES,
- Analyses of economic incentives,
- Recommendations for future activities.

The idea was to present a sort of applied regulation in Western Balkan countries and in Europe. This has been achieved by overviews of different regulations, promotion mechanisms, and best regulation examples from the world. Their potential impact on future RES regulation in WB countries has been analysed.

In Europe the member states operate different **mechanisms of support for RES** at the national level, such as: Investment aid, tax exemptions or reductions, tax refunds and aid supporting the price paid to the producer. Some of promotion mechanisms seemed very promising, like third party financing, public private partnership or emission trading. Also the increase of funds for support of investments in RES and ensuring an adequate regulatory frame has been pointed out as important. The primary goal of RES promotion mechanisms is to increase the usage of renewables. Thus discussions during the workshop have identified different **barriers in connection to RES promotion mechanisms in WB region**. Some of them are institutional (lack of communication between relevant ministries or lack of strong

national focal point to promote RES activities), others informational (lack of awareness, experience or capacity of stakeholders) or financial (high investment costs of RES, high project preparation costs, uncertainty about future fuel costs).

Several **conclusions** have been made during the workshop advising stakeholders to review the existing measures, pointing out the importance of setting up of a single reception point for authorisation applications, ensuring co-ordination between the different administrative bodies involved and establishment of reasonable deadlines. Then tradable green certificates and instruments for transfer of the information on production attributes of RES-E are needed.

4.2.3 Workshop "Enhancing implementation in WB countries"

The third workshop on barriers and incentives to enhance RES implementation took place in Skopje, FYROM, the 2nd and 3rd of March 2006. It analysed the success factors of RES penetration for application in WB countries and compared different schemes for implementation in WB countries. The following aspects were detailed:

- Organisation framework,
- Economic incentives,
- Information, promotion and demonstration activities,
- RES promotion programmes.

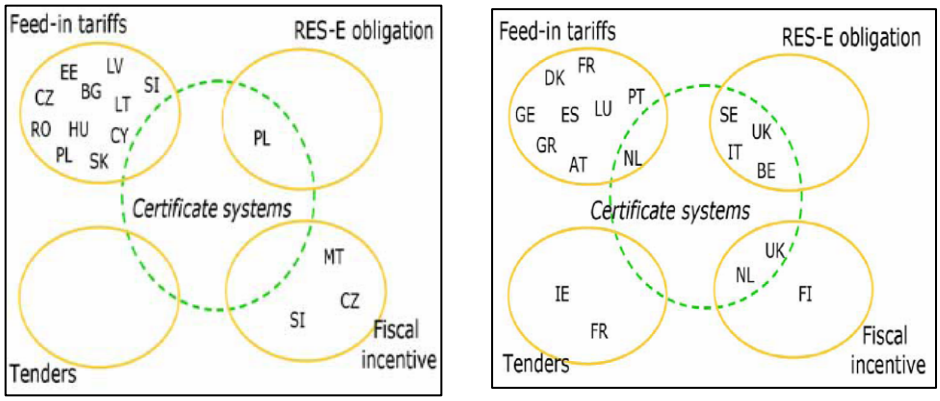


Figure 6 Support Systems in EU 10 and in EU 15

As stated in previous workshop, the EU Member States have chosen different policy mechanisms to support RES-E. This workshop highlighted that these mechanisms have met different success in promoting the consumption of RES-E according to the national indicative targets, including cost effectiveness, cost efficiency, compatibility with the internal market, and the ability to develop different technologies. To provide financial support, a range of different systems is also in place, with the two most important: RES feed-in tariffs (FIT) and tradable green certificate (TGC) systems.

Experts pointed out that the barriers identified in the previous workshop (administrative, grid, social and financial nature) can increase the cost of RES-E or can inhibit the deployment completely, so they are crucial in the policy deployment strategy.

Member States are encouraged by the commission to optimise and improve the success of their support schemes by enacting the following measures: Increase of legislative stability and reducing investment risk, reduction of administrative barriers, review of grid issues and the transparency of connection conditions, encouraging technology diversity, better use of tax exemptions, ensuring compatibility with the internal electricity market, encouraging employment, twinning energy efficiency, demand management and Greenhouse Gas Emissions Trading Scheme. All those measures were fully explained.

Using case studies, a methodology for the calculation of the penetration limits of renewable energy sources in non-interconnected islands was presented. The workshop also entailed a presentation of success factors in implementation of solar energy in public institutions, financial incentives for RES penetration in Croatia and the Operational Competitiveness Program for the development of private Renewable Energy Sources and Energy Saving investments in Greece.

4.3 Virtual Balkan Power Conferences

First established in 2001, the conference has grown in size and scale year on year, covering key industry issues and market developments as well as the latest strategies employed by energy practitioners across Europe. The 5th and the 6th conferences focused on electricity market issues and Renewable Energy Sources.

4.3.1 The 5th Balkan Power Conference

The **5th Balkan Power Conference** was held between the 14th and the 16th of September in Hotel Princess Sofia, in Sofia, Bulgaria. It was successfully concluded with more than 100 participants from 22 countries.

The three-days conference was introduced with a Pre-conference Workshop, containing two thematic modules entitled "**Impact on the Liberalisation of the Power Supply Industry"** and **"Regional Aspects and Potentials of RES in Bulgaria".** The next day, was held the main event, BPC 2005, entitled "**Future Challenges for Balkan Power Industry**", dealing with regional electricity market, investments and the influences on system operation; On the third day, was held the **1st International RES seminar**, partially sponsored by EC, FP6, INCO, dealing with renewable energy sources, their technology, regulatory aspects, investments and potentials in the Balkan region. To give the topic of Renewable energy sources additional emphasis, the proceedings in this topic were singled out as a seminar coupled to the traditional Balkan Power Conference.

While the Pre-conference Workshop was designed as a primer for the conference topics, the BPC 2005 and 1st International RES Seminar (1st IRESS) were true places of scientific exchange as some 40 scientific papers were presented by international experts in the field of power systems deregulation and RES technology and policy. In addition to paper sessions, two thematic

panels were designed to highlight the most relevant developments in the field and to ensure the interaction of the panels with the audience. The 1st International RES seminar was concluded by a presentation of Dr. Dirk Pottier on the new developments tied to FP7 and EC DG RTD Energy Programme that outlined the salient features of the new research opportunities in the field and prompted a sizeable feedback from the audience.

The conference, with an emphasis on this year's IRESS, again proved to be a great forum to meet experts from the field, exchange the views and strike new international research and business partnerships. Special mention deserves the support of the EC, FP6, INCO that enabled the scope of the BPC to broaden and cover the renewable energy sources as well.

An important feature of the RES Seminar is the establishment of the connection between the research community and the industry that supplies the necessary knowledge for investments in renewable energy sources, one of the key development possibilities for the Balkans. By presenting new technical solutions and efficient regulatory measures to foster new investments in renewable energy generation, this year's IRESS at the Balkan Power Conference has fulfilled its mission.

4.3.2 The 6th Balkan Power Conference

The conference was held between the 31st of May and 2nd of June in Ohrid, Republic of Macedonia. Its objective was to stimulate a discussion of RES relevance for the Balkan region. The 6th Balkan Power Conference was successfully concluded with more than 110 participants from 18 countries. It was organized as a seminar and composed of three-days events:

- Pre-conference, 1st **Decision Maker's Workshop** on Best practice transfer in RES technology;
- Main event, Balkan Power Conference 2006, entitled "**Ensuring Energy Independence in the Balkans**", dealing with regional electricity market, investments and the influences on system operation;
- **2nd International RES seminar**, partially sponsored by EC, FP6, INCO, dealing with renewable energy sources, their technology, regulatory aspects, investments and potentials in the Balkan region.

In addition to the regular topics of the conference, the Balkan Power Conference 2006 was enriched with two events organised under auspices of the EU, 6th Framework Program (INCO):

the 1st Decision Makers Workshop and the 2nd International RES Seminar. The seminar was titled "Promoting Excellence in RES in the Balkans" and was devoted to contemporary renewable energy topics.


4.4 Decision-Makers Workshops

As stated previously, the first decision maker workshop was included in the 6th Balkan Power Conference, benefiting from the audience of a wider participants attendance.

The 1st Decision Maker's Workshop for Decision Makers was aimed to further discuss the issues addressed in the first set of workshops on transfer of best practice and best available technology in RES for isolated regions. The 1st Decision Maker's Workshop entitled “Best practice transfer in RES technology”, was held in Hotel Bellevue/ Metropol, Ohrid, Republic of Macedonia on 31st of May 2006. It was attended by 65 participants from 9 countries both from the Western Balkans Region and the rest of Europe.

The **2nd Decision Maker's Workshop** entitled "Regulatory framework for RES penetration support" was held in Hotel Zenit in Neum, Bosnia and Herzegovina, between September 14-15, 2006. The workshop was attended by 39 participants from 9 countries both from the Western Balkans Region and the rest of Europe. During the two days of the workshop, experts focused on issues connected to regulation and other governmental incentives supporting RES penetration in isolated regions.

4.5 Local Workshops

With the same methodology than the two previous Decision Makers workshops, Local workshops picked on gathered knowledge to target more specifically the Western Balkan region. In order to answer efficiently to RES implementation barriers in this region, knowledge needed to be adapted to each focused geographical, political and economical area concerned.

4.5.1 Local Workshop in Bosnia and Herzegovina

The Local Conference in Bosnia and Herzegovina entitled **"RES in Bosnia & Herzegovina and other country experiences"** was held on the 23rd of February 2007, in Tuzla. The presentations focused on the issues connected to renewable energy, regulation and other governmental incentives supporting RES penetration in isolated regions.

Experts presented many interesting details, facilitating the exchange of information on establishing incentives for promotion of RES. Experiences with harmonisation with EU legislation in EU and WB countries were also discussed.

4.5.2 Local Workshop in Croatia

The Local workshop in Zagreb focused on "**Promotion of Renewable Energy Sources**". It was held on the 23rd of March 2007 at the University of Zagreb, Faculty of Electrical Engineering and Computing, Croatia. It was attended by 79 participants from 6 countries from the Western Balkans Region and the rest of Europe.

The local workshop aimed at presenting the results of VBPC-RES project to the Croatian public. Partners from Spain and Slovenia as well as guest speakers from Netherlands and Austria have presented successful support mechanisms for RES applied in their countries, while national experts form different institutions have presented the RES situation in Croatia. The targeted audience were key actors for implementation of RES in Croatia: governmental officials and officials from interested local communities, business sector and experts. The goal through

information exchange and discussion was to draw conclusions with stakeholders that will help in overcoming existing barriers for stronger RES penetration in Croatia.


4.5.3 Local Workshop in FYRO Macedonia

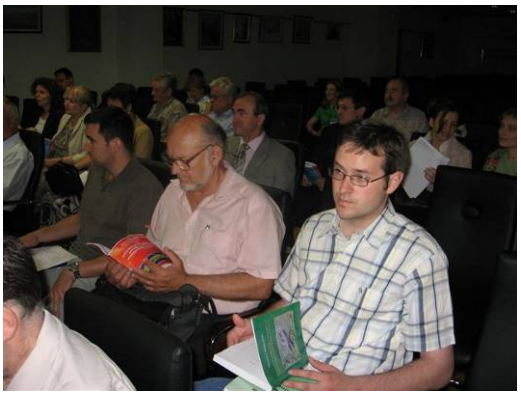
The Local workshop in Skopje also focused on "**Promotion of Renewable Energy Sources**". It was held in the Congress Hall "Клуб на пратеници, Кино сала", Skopje, Macedonia, on the 27th of April 2007. It was attended by 38 participants from 5 countries of the Western Balkans Region and the rest of Europe.

The local workshop aimed at presenting the results of VBPC-RES project to the Macedonian public. Partners from Greece, Bosnia & Herzegovina and Macedonia have presented the VBPC-RES project and situation regarding RES use in their countries. Local experts have focused on Macedonian situation with regard to RES. The targeted audience were key actors for implementation of RES in FYRO Macedonia: governmental officials and officials from interested local communities, business sector and experts. This local conference allowed information exchange and discussion that will help in overcoming existing barriers for RES penetration in FYRO Macedonia.

4.5.4 Local Workshop in Serbia and Montenegro

The Local workshop in Novi Sad entitled "**Promotion of Renewable Energy Sources**" was held in the University of Novi Sad, Faculty of Technical Sciences, Conference room FTN, Serbia and Montenegro, on the 08th of June 2007. It was attended by 31 participants from 4 countries from the Western Balkans Region and the rest of Europe.

Partners and experts from Serbia, Bosnia and Herzegovina, Norway and Romania have presented the VBPC-RES project and situation regarding RES use in their countries. The targeted audience were key actors for implementation of RES in Serbia and Montenegro: governmental officials and officials from interested local communities, business sector and experts. This resulted in discussion with local stakeholders to allow stronger RES penetration in Serbia and Montenegro.



4.5.5 Local Workshop in Albania

The Local workshop in Tirana entitled "Promotion of Renewable Energy Sources" was held in the International Centre of Culture "Pjeter Arbnori", Tirana, Albania, on the 25th of May 2007. It was attended by 68 participants from various countries from the Western Balkans Region and the rest of Europe.

Local workshop in Tirana aimed at presenting the results of VBPC-RES project to the Albanian public. Partners from Bosnia & Herzegovina, Croatia, Macedonia and Slovenia have presented the VBPC-RES project and situation regarding RES use in their countries. As in other local workshop the targeted audience were key actors for implementation of RES in Albania: governmental officials and officials from interested local communities, business sector and experts. The goal of information exchange and discussion was achieved drawing conclusions that will help in overcoming existing barriers for stronger RES penetration in Albania.

4.6 Education

The two main achievements with education were the Balkan Power Student Contests and Balkan Power Summer Schools.

4.6.1 Balkan Power Student Contest

To promote renewable energy issues among higher education a **student contest** was organised targeting power engineering students younger than 26 in the WB region. The students were invited to think about alternatives of sustainable development and to participate by submitting an essay on the topic of "Renewable energy sources – the way to sustain environmentally friendly economic growth?" The authors of the three best papers were invited to Balkan Power Conference 2005, and authors of ten best papers were awarded free participation on Balkan Power Summer School 2006. A total of ten students from Slovenia, Croatia, Serbia, Bosnia & Herzegovina and Macedonia who qualified at the Balkan Power Student Contest 2005 and 2006 were invited to participate in the BPSS 2006. They met in Fojnica to discuss Renewable Energy Sources, contemporary issues technologies and solutions.

A total of 13 papers arrived to the competition. The international committee composed of partners and industry participants selected the three winners that attended BPC 2005 in Sofia.

4.6.2 Balkan Power Summer Schools

The **Balkan Power Summer School 2005** took place at "Politehnica" University in Bucharest, Romania, between the 10th and the 16th of October 2005.

A typical working day was divided to two one-hour lectures in the morning followed by lunch and free time. By dinner, two more hours of exercises were scheduled. Five international and two local lecturers prepared interesting lectures and exercises with focusing on RES problems, solutions and policies. The work was devoted primarily to policy and operational issues of RES as well as their potentials, photovoltaics and small hydro energy sources received their fair share of attention.
To ensure the wide dissemination of the proceedings, all interested students of the "Politehnica" University had free access to the lectures and exercises.

The **Balkan Power Summer School 2006** took place in Fojnica, Bosina and Herzegovina, between the 17th and the 22nd of July 2006. The 6 lectures presented had the main goal of involving students in problems related to Renewable Energy Sources (RES) in the region of Western Balkan.

The High Education Materials have been prepared in accordance to the Renewable Energy Sources Technology, Economics and Policy (RESTEP) Curriculum. The Curriculum itself has been developed and tested during the VBPC-RES Summer Schools. The High Education Materials consists of 11 chapters covering both the transfer of best practice and best available technology in RES for isolated regions and the regulatory and organization framework: barriers and incentives for RES penetration.

4.7 Website and Brochures

In order to keep the VBPC gathered knowledge disseminating, two brochures were created. Their content present the VBPC workshop results**:**

- The first brochure is entitled "**Brochure on RES technologies:** Transfer of best practice and available technology in RES for isolated regions" and
- The second brochure is entitled "**Brochure on RES Implementation and Support Best Practice:** Regulatory and Policy Issues".

In line with the European Union willing to recognise linguistic diversity as a democratic and cultural cornerstone of the Union (Article 22 of the Charter of Fundamental Rights of the European Union), brochures have been prepared in English, and translated into Croatian, Serbian, Macedonian and Albanian language. They can be downloaded in electronic form (pdf) on the VBPC-RES project website as follows.

The **official web site** of the project has been set up at the following address: www.vbpc-res.org . The project web site content covers all the materials published in the frame of the project including workshop reports, announcements of the coming events, Student activities' reports and support (Student Contest, Personnel Exchange, etc.) and information on open calls and tenders suitable for further cooperation.

The web site is organized under following links:

- News Section
- About the project
- RES technologies
- Members
- Conference
- Workshops
- Education program
- Publications

An **address list** of SMEs and other entities acting in the field of RES for isolated regions was prepared by the partners of the project, each covering their respective country. The purpose is to facilitate the information exchange with the key focus groups in the Western Balkans. All the information regarding the upcoming events is being sent to the address list, ensuring successful information dissemination.

5 Summary of Results

VBPC-RES offered a unique opportunity for networking between research institutions, industrial partners and utilities within the region, which will contribute to reinforce WB research potential. Cooperation with research institutions from EU member states will additionally allow to position and integrate individual research activities from the WB region into the common European Research Area.

5.1 Achievements

The VBPC-RES' project partners decided that the first year of the project should be devoted to collecting and coordination of the knowledge and expertise on RES within the Consortium. In the second and third year the work was focused on the resulting synergies and knowledge transfer to the interested public. To ensure the transfer of knowledge to be as efficient as possible, the materials needed to be well prepared and discussed.
All the events performed within the VBPC-RES project were successful in attaining their goals. The two first sets of workshops (7 workshops) gathered state-of-the-art knowledge on RES technologies and related incentives for implementation. Through information exchanges between experts and learning from success stories, VBPC-RES partners have been able to adapt and transfer knowledge to key target groups in Western Balkans such as decision makers, policy makers, industrials, SME's, scientists and students. Six Events were organised and adapted to each target group: conferences, Decision-makers workshops and summer schools.
Further from those target groups and in view of achieving better results, VBPC-RES project also focused to local specifics in each Western Balkan country: Croatia, Bosnia & Herzegovina, FYRO Macedonia, Serbia & Montenegro and Albania (five local workshops). This approach proved to be efficient for awareness raising and sounding solution to overcome barriers to RES implementation in this region.
At last, future dissemination about VBPC-RES results is foreseen trough web materials and through brochures available in four languages.

5.2 Impacts of the Project on Industry and Research Sector

This project worked on bridging the gap between research sector and industry, bringing them together to discuss RES implementations with regards to technologies but also with regards to local specifics, economic analysis, investment costs, regulations and incentives.
Thus VBPC-RES project allowed a better understanding of RES implementation from energy generation to its distribution in a larger scope. Energy supply being a concern at a European level, it was of great importance to raise awareness among stakeholders and enhance cooperation at a pan European level. This cooperation will avoid duplicate work in research ensuring that state-of-the-art technologies and best practices are widely spread and used. Furthermore the European Union is leader in RES technologies and should spare its researchers' time for further innovations.

5.3 Final Plan for Using and Disseminating the Knowledge

5.3.1 Exploitable Knowledge and its Use

The VBPC-RES project as a co-ordinated action is primarily geared towards identification, transfer and solution provision for application of the existing RES technology and best practice to the specific case of isolated regions supply, and towards concentration and concerting of the knowledge in the area to provide a critical mass of research capacities for screening the foreign experiences, merge with domestic experiences (gained at traditional technologies for RES and at other modernisation processes in the energy sector in countries) and to provide for new and efficient solutions to be applied in WB isolated regions. It achieves these objectives through a series of workshops, seminars, summer schools and other knowledge gathering and dissemination activities.

The knowledge gathered at the activities is organized in such a way to provide for a lasting impact as a reference for future research, cooperation and implementation activities of the project partners as well as of the target public in the Western Balkans region – decision makers on all levels (governments, academia, industry, non-governmental organizations) and higher education participants. Since the level of dissemination of most of the deliverables is Public, this is considered as the knowledge generated at the project.

Tab. 5.1 Exploitable results overview table

Exploitable Knowledge (description)	**Exploitable product(s) or measure(s)**	**Sector(s)** of application	Timetable for commercial use	Patents or other IPR protection	**Owner** & Other Partner(s) involved
1. Proceedings of the WP1 on RES Technology	*Reports of WS1.1, WS 1.2, WS 1.3, WS 1.4*	*1. Energy 2. Power systems*	*2005-*	*public dissemination*	***VBPC-RES Consortium***
2. Proceedings of the WP2 on RES Policy	*Reports of WS 2.1, WS 2.2, WS 2.3*	*1. Energy 2. Power systems*	*2005-*	*public dissemination*	***VBPC-RES Consortium***

The results will serve as the basis for development of new and improved policies for support of Renewable Energy Sources within the regulatory framework and for preparation of guidelines for best practice and best technologies in RES for isolated regions. Leading to critical mass of gathered knowledge and reinforced research network within the WB region, the results will form the basis for further research within targeted consortia where the VBPC-RES project partners from Western Balkan region will build on newly acquired and improved knowledge, connections and experience.

5.3.2 Dissemination of knowledge

An important part of the project is geared towards dissemination of knowledge. The entire set of events addressed to target groups is devoted to dissemination activities, ranging from workshops, seminars, conferences, summer schools to brochures and interaction with higher education in a form of RES curriculum for graduate and/or post-graduate study level.

The Dissemination Activities Overview table is shown in Table 1. In addition to the regular project milestones, additional opportunities are presented that provide for good dissemination of knowledge gathered within the project.

Table 1 *Dissemination Activities Overview table*

Event No.	**Planned /Actual Dates**	**Type**	**Type of audience**	**Countries addressed**	**Size of audience**	**Partner responsible /involved**
1	25.09.2005	Press release	Finance, Slovenian business daily	Slovenia	Business community of Slovenia	FE, ISTRABENZ
2	31.10.2005	Publications	Naš Stik, published by ELES d.o.o.	Slovenia	Energy industry of Slovenia	FE, ISTRABENZ
3	01.02.2005	Project web-site www.vbpc-res.org	General Public	Western Balkans (HR, SC, BA, MK, AL)	European researchers	FE/ all VBPC-RES partners
4	31.05.2005	Direct e-mailing Posters: Balkan Power Student Contest 2005	Higher education	Western Balkans (HR, SC, BA, MK, AL)	Western Balkans Students	FE/ all VBPC-RES partners
5	14 - 16.09.2005	Balkan Power Conference 2005, 1. International RES Seminar	Higher education Research Industry (Energy) Policy Makers	Western Balkans (HR, SC, BA, MK, AL)	European researchers; over 100 participants	FE/ all VBPC-RES partners
6	10.10 - 16.10.2005	1st Summer school, Bucharest, RO	Higher education	Western Balkans (HR, SC, BA, MK, AL)	*Western Balkans Students; 15 students and lecturers*	*TUS/ all VBPC-RES partners*
7	31.03.2006	Direct e-mailing Posters: Balkan Power	Higher education	Western Balkans (HR, SC, BA, MK,	Western Balkans Students	FE/ all VBPC-RES partners

Event No.	**Planned /Actual Dates**	**Type**	**Type of audience**	**Countries addressed**	**Size of audience**	**Partner responsible /involved**
		Student Contest 2006		AL)		
8	31.05 - 01.06.2006	Balkan Power Conference 2006, 2. International RES Seminar	Higher education Research Industry (Energy) Policy Makers	Western Balkans (HR, SC, BA, MK, AL)	European researchers	FE/ all VBPC-RES partners
9	31.05.2006	1. Workshop for Decision Makers, Ohrid, MK	Higher education Research Industry (Energy) Policy Makers	Western Balkans (HR, SC, BA, MK, AL)	Energy industry of Western Balkans	TUS/ all VBPC-RES partners
10	17.07-22.07.2006	2nd Summer school, BA	Higher education	Western Balkans (HR, SC, BA, MK, AL)	Western Balkans Students	TUS/ all VBPC-RES partners
11	14.09 - 15.09.2006	2. Workshop for Decision Makers, Neum, BA	Higher education Research Industry (Energy) Policy Makers	Western Balkans (HR, SC, BA, MK, AL)	Energy industry of Western Balkans	TUS/ all VBPC-RES partners
12	31.07.2006	Brochure on RES technologies – isolated regions	Higher education Research Industry (Energy) Policy Makers	Western Balkans (HR, SC, BA, MK, AL)	Energy industry of Western Balkans	TUS/ all VBPC-RES partners
13	01.10 2006	Brochure on RES implementation best practice	Higher education Research Industry (Energy) Policy Makers	Western Balkans (HR, SC, BA, MK, AL)	Energy industry of Western Balkans	TUS/ all VBPC-RES partners
14	31.11.2006	Educational learning material for students on RES	Higher education	Western Balkans (HR, SC, BA, MK, AL)	Western Balkans Students	TUS/ all VBPC-RES partners

Event No.	**Planned /Actual Dates**	**Type**	**Type of audience**	**Countries addressed**	**Size of audience**	**Partner responsible /involved**
15	23.02.2007	Local conference in Bosnia and Herzegovina	Higher education Research Industry (Energy) Policy Makers	Western Balkans (HR, SC, BA, MK, AL)	Energy industry of Western Balkans	TUS/ all VBPC-RES partners
16	23.03.2007	Local conference in Croatia	Higher education Research Industry (Energy) Policy Makers	Western Balkans (HR, SC, BA, MK, AL)	Energy industry of Western Balkans	TUS/ all VBPC-RES partners
17	27.04.2007	Local conference in FYRO Macedonia	Higher education Research Industry (Energy) Policy Makers	Western Balkans (HR, SC, BA, MK, AL)	Energy industry of Western Balkans	TUS/ all VBPC-RES partners
18	08.06.2007	Local conference in FR Serbia and Montenegro	Higher education Research Industry (Energy) Policy Makers	Western Balkans (HR, SC, BA, MK, AL)	Energy industry of Western Balkans	TUS/ all VBPC-RES partners
19	25.05.2007	Local conference in Albania	Higher education Research Industry (Energy) Policy Makers	Western Balkans (HR, SC, BA, MK, AL)	Energy industry of Western Balkans	TUS/ all VBPC-RES partners