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)

D21: Report from the Local Conference in Albania

Due date of deliverable: 25. May 2007
Actual submission date: 31. December 2007

Start date of the project: 1.1.2005 Duration: 36 months

Organisation name:
Faculty of Electrical Engineering, Tirana, Albania

Revision:

Project co-funded by the European Commission within the Sixth Framework Programme (2002 – 2006)

Dissemination level

PU	Public

VIRTUAL BALKAN POWER CENTRE FOR ADVANCE OF RENEWABLE ENERGY SOURCES IN WESTERN BALKANS

Local Conference in Albania

Task leader: PUT

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. The conference belongs to the project “Virtual Balkan Power Centre for Advance of Renewable Energy Sources in Western Balkans”, project acronym: VBPC-RES, Contract INCO-CT-2004-509205, under the Sixth Framework Programme, Priority 6, Sustainable Development, Global Change and Ecosystems. This Local Conference is a part of Work Package 3 (WP3) of the VBPC-RES project. It was attended by 68 participants from various countries from the Western Balkans Region and the rest of Europe.

During this Local Conference, the project partners presented 5 contributions, which are included in the report. Local workshop in Tirana aimed at presenting the results of VBPC-RES project to the Albanian public. Partners from Bosnia and Herzegovina, Croatia, Macedonia and Slovenia have presented the VBPC-RES project and situation regarding RES use in their countries. The targeted audience are key actors for implementation of RES in Albania: governmental officials and officials from interested local communities, business sector and experts. The goal was through information exchange and discussion, to draw conclusions that will help in overcoming existing barriers for stronger RES penetration in Albania.

Sixth Framework Programme, DG Research, International Cooperation

Contract: INCO-CT-2004-509205

AGENDA

International Centre of Culture "Pjeter Arbnori"
Tirana, Albania

25. May 2007

$11^{00} – 11^{30}$	Welcome coffee - Registration	
$11^{30} – 11^{45}$	Introduction to VBPC-RES project	Prof. Dr. Andrej Gubina, University of Ljubljana
$11^{45} – 12^{00}$	Overview of VBPC-RES project: objectives and achievements.	Prof. Vesna Bukarica, University of Zagreb
$12^{00} – 12^{30}$	"RES in Macedonia: Legislation and implementation".	Prof. Dr. Vlastimir Glamocanin, Prof. Dr. Marija Kacarska, Faculty of Electrical Engineering, Skopje, Macedonia
$12^{30} – 13^{00}$	"Situation of the renewable energy sources in Bosnia and Herzegovina - possibilities and pricing".	Prof. Suad Halilčević, University of Tuzla, Faculty of Electrical Engineering, Bosnia and Herzegovina
"$13^{00} – 13^{30}$	"The pellets market"	Borut DelFabbro, ISTRABENZ CORPORATION, Ljubljana, Slovenia
$13^{30} – 14^{00}$	"Photovoltaic application in Albanian conditions"	Prof.Dr.Nako Hobdari, Prof.Dr.Rajmonda BUALOTI, Faculty of Electrical Engineering, PUT, Tirana, Albania
14^{00}	Conclusion	
14^{15}	Lunch	

6. Framework Programme, Priority: International Cooperation (INCO),
Contract: INCO – CT – 2004 – 509205

Virtual Balkan Power Centre for Advance of
Renewable Energy Sources in Western Balkans

Balkan Power Centre Report

LOCAL CONFERENCE IN ALBANIA

International Centre of Culture “Pjeter Arbnori”
Tirana, Albania
25. May 2007

Index

1. Prof. Dr. Andrej Gubina, University of Ljubljana, Slovenia.
   Introduction to VBPC-RES project.

2. Prof. Vesna Bukarica, University of Zagreb, Croatia.
   Overview of VBPC-RES project: objectives and achievements.

3. Prof. Dr. Vlastimir Glamocanin, Prof. Dr. Marija Kacarska, Faculty of Electrical Engineering, Skopje, Macedonia.
   "RES in Macedonia: Legislation and implementation".

4. Prof. Suad Halilčević, University of Tuzla, Faculty of Electrical Engineering, Bosnia and Herzegovina.
   "Situation of the renewable energy sources in Bosnia and Herzegovina, possibilities and pricing".

5. Borut DelFabbro, ISTRABENZ CORPORATION, Ljubljana, Slovenia.
   "The pellets market".

6. Prof.Dr.Nako Hobdari, Prof.Dr.Rajmonda BUALOTI, Faculty of Electrical Engineering, PUT–Tirana, Albania.
   "Photovoltaic application in Albanian conditions".

LOCAL CONFERENCE IN ALBANIA

Tirana, 25. May 2007

VIRTUAL BALKAN POWER CENTRE

VBPC - RES

VIRTUAL BALKAN POWER CENTRE FOR ADVANCE OF RENEWABLE ENERGY SOURCES IN WESTERN BALKANS

LOCAL WORKSHOP ~~SKOPJE~~ Albania: PROMOTION OF RENEWABLE ENERGY SOURCES

25th May 2007
Tirana, Albania

Participants

	Acronym	Institution	Participant
1	UNIZG	University of Zagreb, FER	Vesna Bukarica
2	UNIZG	University of Zagreb FER	Slavica Robić
3	UNITZ	University of Tuzla, FE	Suad Halilčević
4	EMU	University in Skopje, FEE	Marija Kacarska
5	UNIZG	University of Zagreb, FER	Robert Pasičko
6	STRABENZ	STRABENZ GORENJE	Andrej Hraban
7		Elijo Kacorste	ELEM MACEDONIA
8	RAFAT	GeoConsult	Bedrat Rafat
9	Peters	DMT	stephan Peters
10	Laux	Vattenfall	
11		Rugero	
12		[illegible]	
13	Paboka	~~[illegible]~~ SIEMENS A.G.	
14		University of Ljubljana, Slovenia	Andrej Gubina
15	Mirela Kamberi	UNDP-Climate Change Unit	MKamb
16	Edmond Hido	Energy Efficiency Centre - EEC	
17	BAHOLLI	PERT EGL	

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18	UBT	Universiteti Bujqësorë i Tiranës	Ramiz Metaliaj
19		J. Pëllumb Miseri	[illegible]
20	UPT	Luan Alite	[illegible]
21	UP-Prishtinë	Fejzullah Krasniqi	[illegible]
22	UPT	Fak. Ing.	Villiamo Hiskaj
23	UPT	Fak. Ing. Elektrike	Kemal Lamko
24	AKBN	Artan Leskoviku	[illegible]
25	F.I.M-Prishtinë	Januz Bunjaku	[illegible]
26	UPT	Fakulteti i Inxhinierisë	Tefik Zeneli
27	UP-FIM-Prishtinë	Mustafe Muhaxheri	[illegible]
28	EGL-Zwitzerland-	Burhan Brecel	[illegible]
29	UP	F.SHTEKNIKE-FERIZAJ	Abdyl Kolcaj
30	Instituti i Transportit	Llukë Zeqo	[illegible]
31	ERE	Enti Rregullator i elektroenergjisë	Agim Welu
32	UPT	Fakulteti i Inxh. Elektrike	Alma Shehi
33	GRG group	Studio project	Sezar Gusollo
34	UPT	Univ. Politek. TIRANE	Ilir Vevecka
35	UPT	Fakulteti i Inxh. Mek.	Romadan Alushaj
36	U.P.T.	Fak. Inxh. Mek.	Artan Hoxha
37	U.P.T	Fak. Inxh. Mekanike	Eduard Papa
38	U.P.T	Fak. Inxh. Ndërtimit	Mirel Mico
39	U.P.T.	F.I.N. Dep. Inxh. Mjedisit	Gjergji Thomai
40	UPT	FIE Dep Elektrik	Rajmonda Çato
41	M.E,TE / Ministr. Ek. Tr. En.	Drejtoria e Tregjeve Politikave / Sektori Politikave Burimore	Stavri Dhimo

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42	MASH	Min. Ars. Shkencës	Edmond Agolli
43	AIMAKORA	INSTAT	[signature]
44	FIM	FAK. i Inxh. Mekanike - Prishtinë	Rexhep Selimaj [signature]
45	UPT	Departament of Physics	Pellumb Berberi [signature]
46	UPT	Depart of Textile	Bleriner Kolgjini
47	UPT	Depart. of Textile	Genti Guxho
48	Fak. Gjeol. Min.	Fakulteti Gjeol-Minier	Jorgjo Hamzallari [signature]
49	UPT	F.I.M. Dep. of Energy	Majlinda Alcani [signature]
50	UPT	FIM. Dep. of Energetic	Flamur Bidaj [signature]
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UIRTUAL BALKAN POWER CENTRE

VBPC - RES

VIRTUAL BALKAN POWER CENTRE FOR ADVANCE OF RENEWABLE ENERGY SOURCES IN WESTERN BALKANS

LOCAL WORKSHOP ~~SKOPJE~~ Albania: PROMOTION OF RENEWABLE ENERGY SOURCES

25th May 2007
Tirana, Albania

Participants

+51	Acronym	Institution	Participant
1	UPT	Univ. Politeknik Tirane	Rajmonda Bualoti
2	UPT	U.P.T, Univers. Politeknik Tiranes	Nike Shanku
3	UPT	UPT Univer. Polit. Tirani	Fatmir Brati
4	UPT	— " —	BORIS CFARKU
5	UPT	UPT TIRANE	FABIAN COPA
6	UPT	Fakulteti Inxhinierise	Nako Hobdari
7	UPT	Fakulteti Inxhinierise Elektrike	Simeon Kromisi
8	UPT	Fak. Inxh. Mek.	Prof. Hysen Agolli
9	UPT	Fak. Inxh. Mek.	Dr. Ramadan Alushaj
10	UPT	Fak. Inxh. Mek.	[illegible]
11	EEC	Energy Efficiency Centre	E Hido
12	UNDP	Climate Change Program	Mirela Kamberi
13	UPT	Fakulteti Inxhinierise	Ismail Lezhani
14	UPT	FIM	Skelqim Zeqiri
15	UP	FSH. TEKNIKE Ferizaj	Abdyl Kelmendi
16	UPT	Dekan FIE	[illegible]
17	UPT	Andrea Dorzelin	[illegible]

Σ = 68

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Overview of VBPC-RES project: objectives and achievements

Vesna Bukarica, M.Sc.E.E.

University of Zagreb
Faculty of Electrical Engineering and Computing
Department of Power Systems

Sixth Framework Programme, DG Research, International Cooperation
Contract: INCO-CT-2004-509205

Contents

- R&D in European Union: Framework programmes→ FP6 i FP7
- Project VBPC –RES
  - Partners
  - Idea and objectives
  - Activities
  - Achievements
- Other possibilities for participating in European projects

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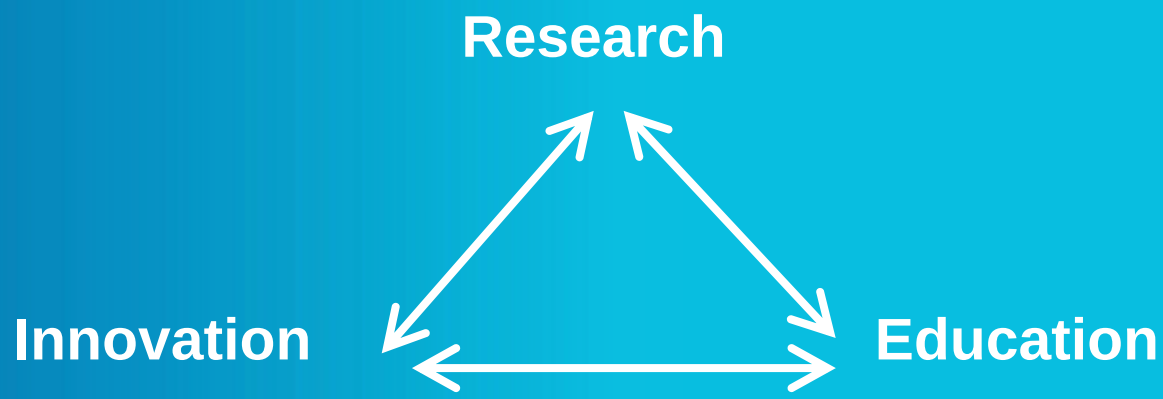
Research & Development in EU

Europe should become the
"most dynamic competitive knowledge-based economy in the world"

Lisabon Strategy



"Knowledge Triangle"

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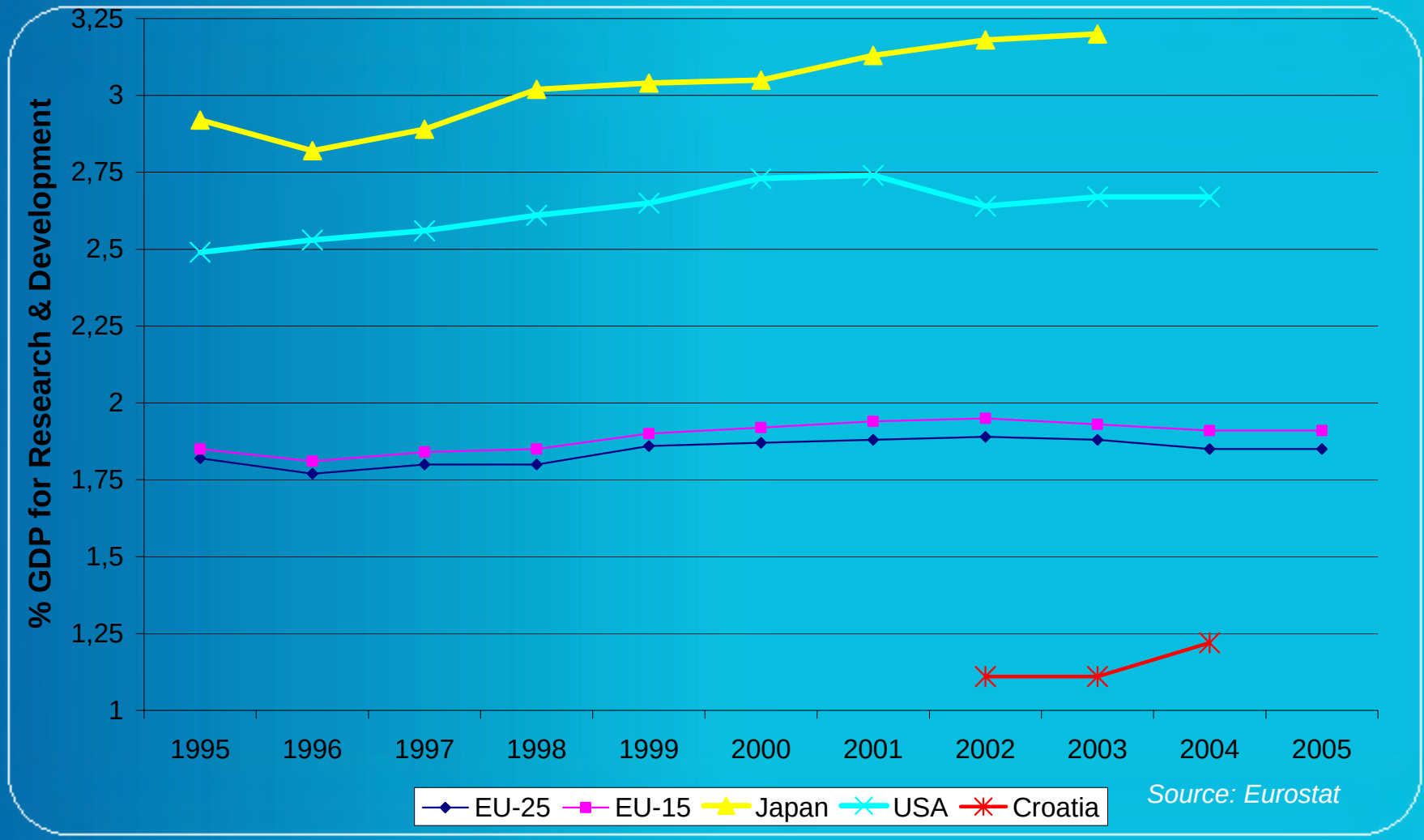
Investments in Research & Development



Source: Eurostat

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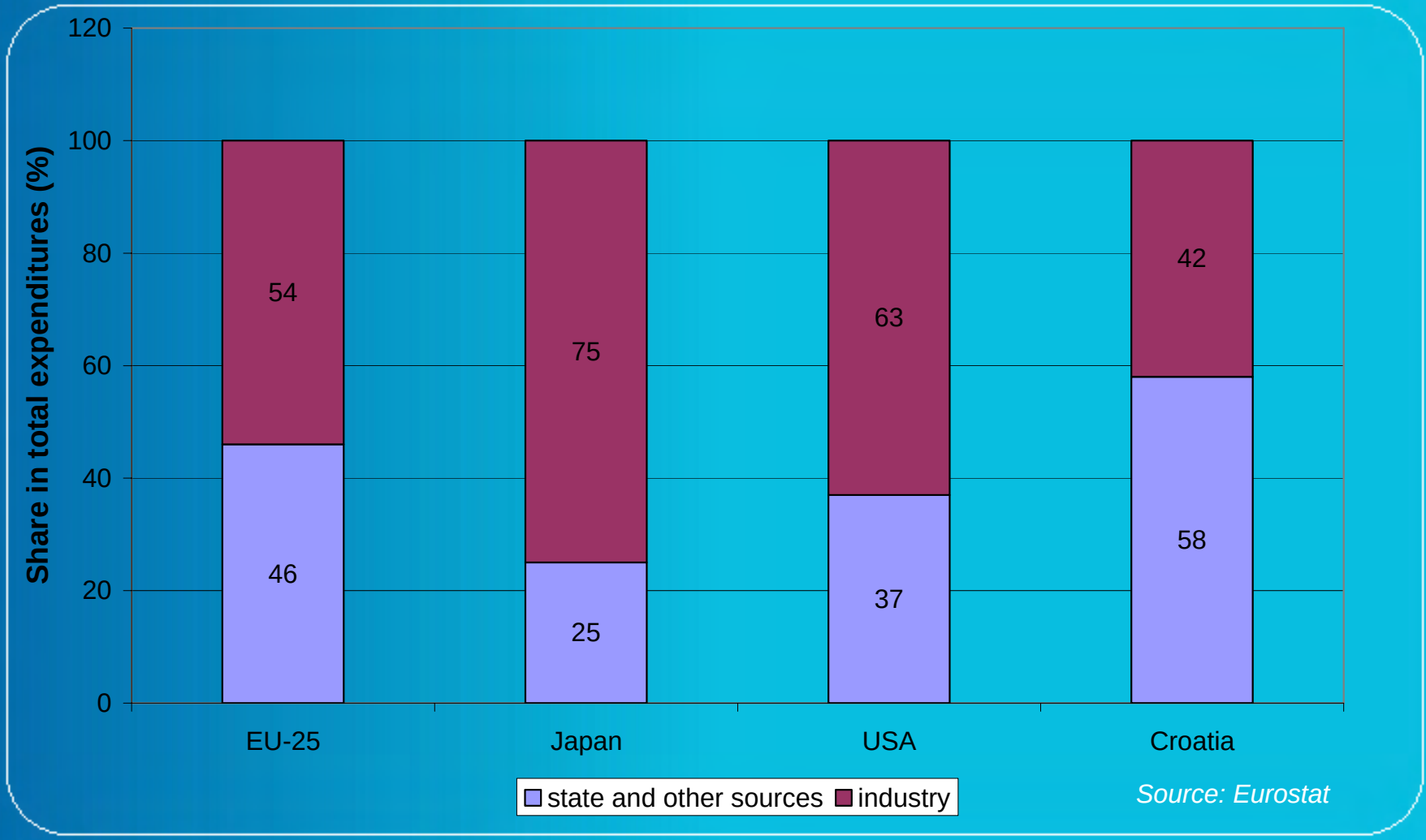
Investments in Research & Development – financing sources



Source: Eurostat

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European Framework Programmes

- *Framework programme*
  - Union's instrument for financing research in Europe
  - Goals:
    - Increasing European competitiveness in science and technology
    - Improve science and innovation
    - Improve international cooperation in R&D
    - Stimulate stronger **cooperation between scientific institutions and industry!**
- Sixth Framework Programme (FP6)
  2003 – 2006
- Seventh Framework Programme → first calls in progress!!!
  2007 – 2013
  Budget ~ 50,5 billion € (40% increase compared to FP6) → 2,3 billion € for energy!

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VBPC – RES project: basic information

- *Virtual Balkan Power Centre for Advance of Renewable Energy Sources in Western Balkans*
- Project belongs to the Sixth Framework Programme
- Research work funded by European Commission, Directorate General on Research and Technology Development (DG RTD) and International Co-operation Activities (INCO)
- Duration: 2005 – 2007

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VBPC – RES project: partners

- International cooperation of 17 institutions and companies from 11 countries:
  - University of Ljubljana, Faculty of Electrical Engineering, Slovenia – coordinator of the project
  - Joanneum Research, Graz, Austria
  - National Technical University of Athens, Greece
  - University of Tuzla, Faculty of Electrical Engineering, Bosnia and Herzegovina
  - Technical University of Sofia, Bulgaria
  - Istrabenz Energetski sistemi, Slovenia
  - Kema Consulting, Germany
  - Ss. Cyril and Methodius University of Skopje, Faculty of Electrical Engineering, Macedonia
  - Universidad Pontificia Comillas, Madrid, Spain
  - DMS Group, Novi Sad, Serbia
  - Institute Jožef Štefan, Slovenia
  - Intrade Energy, Sarajevo, Bosnia and Herzegovina
  - University of Belgrade, Faculty of Electrical Engineering, Serbia
  - University of Maribor, Slovenia
  - University “Politehnica” of Bucharest, Romania
  - Centre for Renewable Energy Sources, Greece
  - University of Zagreb, Faculty of Electrical Engineering and Computing, Croatia

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VBPC – RES project: idea and objectives

- Idea:
  - Western Balkan countries have significant still not sufficiently used renewable energy sources potentials!
  - Special attention should be devoted to underdeveloped and isolated areas, where RES can be important driver for economy development
- Objectives:
  i. Through international cooperation enable **transfer of knowledge and know-how** in best available RES technologies and their implementation (best practice)
  ii. **Identification of main economic and legislative factors** influencing investment decisions in RES → identification of barriers for stronger RES penetration and ways for removing these barriers
  iii. **Promotion, education and awareness raising** on possibilities for RES use and benefits arising from RES use

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VBPC – RES project: organisation

- Four groups of activities (work packages)
  - WP1. **Transfer of best practice and best available technology** in RES for isolated regions
  - WP2. **Regulatory and organisation framework**: barriers and incentives for RES penetration
  - WP3. **Communication and dissemination** with key focus groups
  - WP4. General coordination and project management

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VBPC – RES project: activities (I)

- WP1. **Transfer of knowledge on RES technologies**
  - **RES technologies**
    - wind power plants, photovoltaic systems, biomass (ORC, Stirling engine, wood pellets), biogas (Otto engine), small and micro hydro power plants, absorption cooling
  - **RES in isolated regions**
    - technologies for energy use and storage, operation and control of isolated systems with large share of RES in electricity production, RES as drivers of economy development in islands, hybrid systems
  - **Operation and control of RES in isolated power systems**
    - Optimal system topology (configuration), procedures for control and operation of power system, network connection, impacts on local network, ensuring reserve and additional capacities, tools for predicting production from wind power plants, economic dispatching, power quality, etc.
  - **RES projects implementation**
    - project preparation, research of location, decision making factors, project economics, licensing procedures, construction, financing and contracting models

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VBPC – RES project: activities (II)

- WP2. **Regulatory and organisation framework:** barriers and incentives for RES penetration
  - **Country experiences**: Overview of regulatory frameworks for RES promotion in European Union and Western Balkans countries
    - Overview of installed capacities, legal framework, financial framework, licensing procedures, best practice examples, barriers for stronger RES deployment
  - **Regional aspects** of RES promotion mechanisms
    - Development of regulatory frameworks and comparison with EU (Spain, Greece, Slovenia) and Western Balkans, harmonisation with EU
  - **Enhancing implementation in WB countries**
    - Financial support, development programmes, instruments of energy policy (quotas), awards or punishments?, technical conditions: methods for maximisation of wind power plants share in power system, distributed generation and integration in power systems

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VBPC – RES project: activities (III)

- WP3. **Communication and dissemination** with key focus groups

  - **Scientific and expert community**
    - *Balkan Power Conference*: International seminar on RES http://bpc.fe.uni-lj.si
  - **Students**
    - Student contest on the given topic (RES)
    - Summer Scool on RES
      2005 Bucharest, Romania
      2006 Fojnica, Bosnia and Herzegovina
    - Possibility for student work (diploma thesis) in partner institution 1-3 months
    - Created Curriculum for lectures on RES (high education materials)
  - **Decision makers, business sector**
    - Two Decision Makers workshops (Ohrid, Macedonia and Neum, Bosnia and Herzegovina)
    - Local workshop

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VBPC – RES project: activities (IV)

- WP3. **Communication and dissemination** with key focus groups

  – Brochures in English and national languages
    - RES technologies
    - Regulatory frameworks for RES

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VBPC – RES project: detailed information

- Web site of the project www.vbpc-res.org

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VBPC – RES project: achievements

- Created extensive "knowledge database" on **best available RES technologies based** on **best practices** from EU
- Gathered information of **current status of RES use** in Western Balkans
- Gathered estimations of **potentials for RES use** in Western Balkans
- Extensive overview of **existing regulatory frameworks** for RES in both EU countries and Western Balkans countries
  - identified barriers and offered solutions → improvements already happened (e.g. adoption of secondary legislation in Croatia!)
- **Improved cooperation** in the region!
- Project and partner institution recognition in the region as RES promoters → **public awareness raised**!

Model for future cooperation in the region!!!

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Other possibilities for participating in European projects

- **Intelligent Energy Europe**

- **Competitiveness and innovation framework programme 2007-2013**

  - Support to energy efficiency and renewable energy sources
  - Support to the establishment of regional energy agencies
  - Support for organisation of big events and conferences
  - SMEs → stimulation of innovation through networking, availability of financing and exchange of experiences

http://ec.europa.eu/energy/intelligent/index_en.html

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Thank you for your attention!

Contact:

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RES in Macedonia: Legislation and Implementation

Local Workshop LWS 4 Tirana:
PROMOTION OF RENEWABLE ENERGY SOURCES

Prof. Dr. Marija Kacarska
Faculty of Electrical Engineering
Skopje, Macedonia
Marija.Kacarska@feit.ukim.edu.mk

The environmental impact is one of the most important factors for energy development strategies all over the world. For that purpose, the increased utilization of the renewable energy sources is of a significant consideration in Republic of Macedonia, which in its process of integration in EU progressively adopts the EU Directives concerning environmental protection and renewable energy sources.

Source: AD Macedonian Power Plants (www.elem.com.mk)

Electric energy consumption in RM

Not only the environmental protection is important.

According latest reports overall power consumption is growing every year, 2005/2004 is 7,8 %.

Macedonia imports electric energy!

- ✓ 2000 – 4,4 %
- ✓ 2003 – 15 %
- ✓ 2005 – 33 %
- ✓ 2006 – 34 %

In order to meet the increase in power demand in the incoming period, Macedonia plans to increase the share of renewable energy in the energy balance, which enhances energy sustainability and independency.

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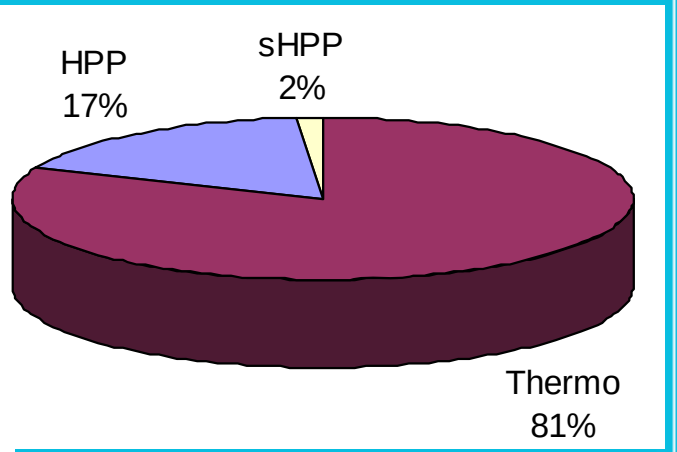
Electric energy in 2006

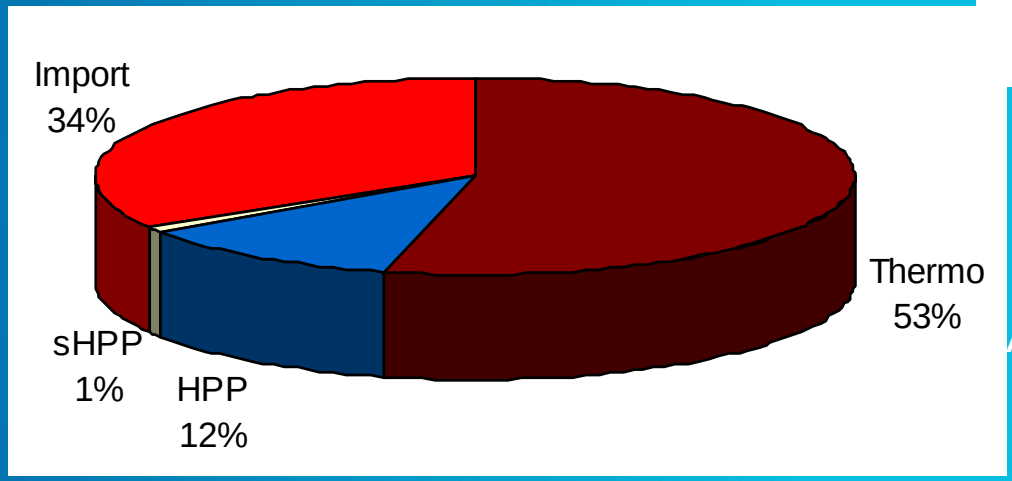
- The structure of total electric energy capacity in Macedonia - 2006:

total hydropower — 1.127 GWh

total production — 5.935 GWh

total consumption — 8.929 GWh





imports — 2.994 GWh

Source:

AD Macedonian Power Plants

www.elem.com.mk

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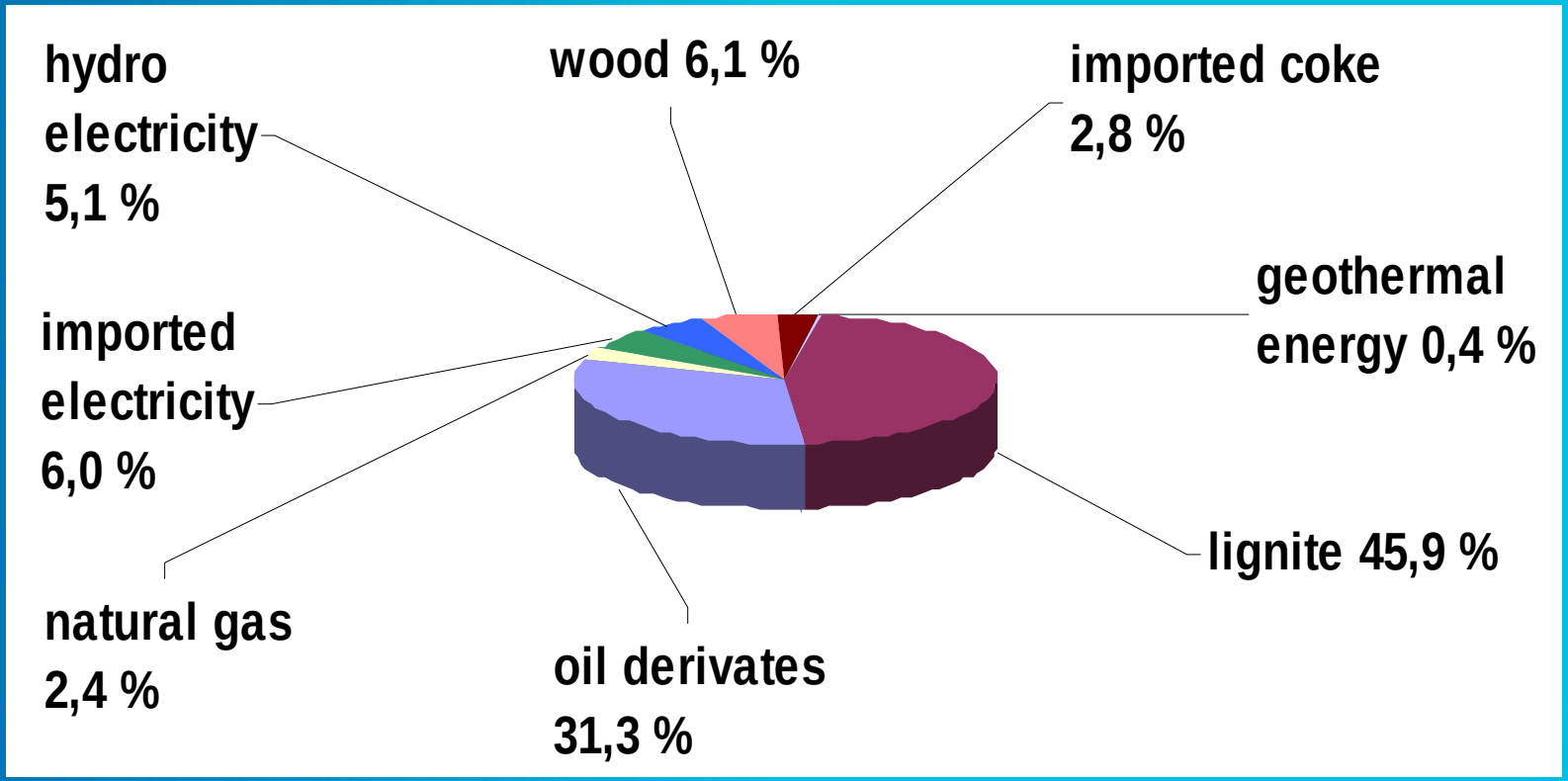
Total energy balance in 2006

Gross energy consumption 115.780 TJ

Source: Ministry of economy



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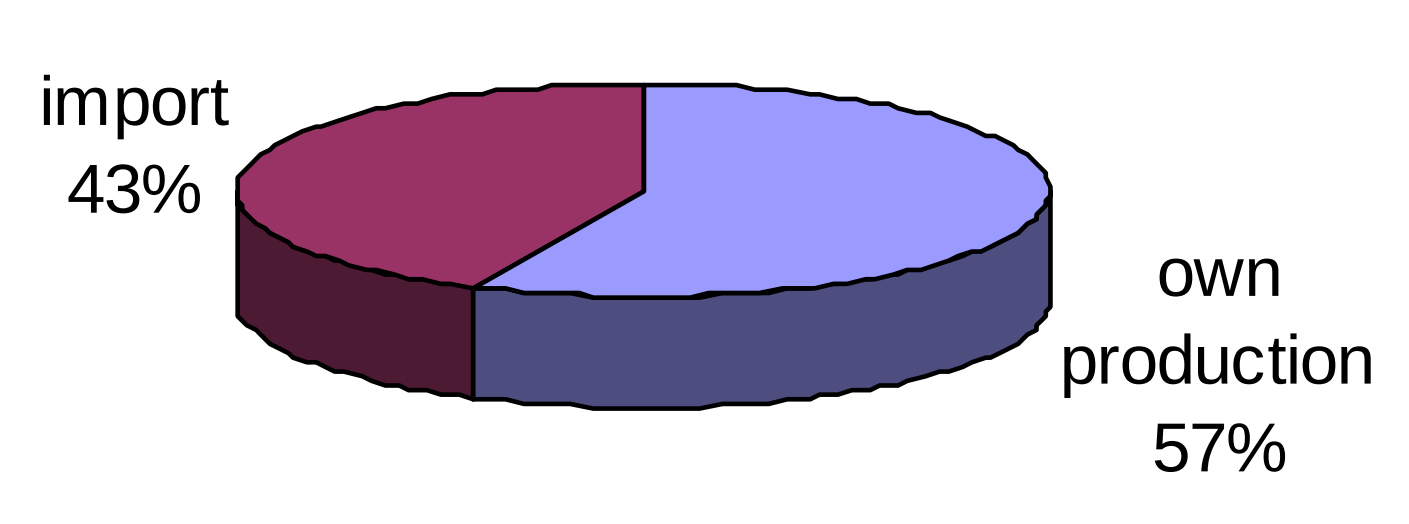
Total energy balance in 2006

Gross energy consumption 115.780 TJ

- Macedonia own production – 65.940 TJ
- Import energy – 49.840 TJ



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Supporting RES in Macedonia

A very important topic is that renewable facilities are very capital intensive and for that reason the price of electricity produced is in most cases still higher than the price of kWh from conventional facilities

Therefore support mechanisms for renewable electricity are needed, that are in line with the liberalized electricity market:

- legislation supporting documents,
- funding mechanism,
- preferential taxation, etc.

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Legal framework 1

1. **Energy Law (Official Gazette of RM No.63/2006)**
2. Law on water (Official Gazette of RM No.4/1998) and Law for modification and amendment of the Law on water (Official Gazette of RM No.42/2005)
3. Law on concessions (Official Gazette of RM No.25/2002) and Law for modification and amendment of the Law on concessions (Official Gazette of RM No.24/2003)
4. Law on terrain and urban planning (Official Gazette of RM No.51/2005)
5. Law on construction (Official Gazette of RM No.51/2005)
6. Law on environment (Official Gazette of RM No.53/2005)

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Legal framework 2

7. Ordinance regulating conditions, manner and the procedure for issuing, changing and canceling licenses for generating electric power (Official Gazette of RM No.42/2005)
8. Ordinance regulating procedure for acquiring electric-energy approval for connection to the electric power system (Official Gazette of RM No.38/1998) and modifications to the Ordinance (Official Gazette of RM No.78/1998)
9. Ordinance regulating conditions and procedures for electricity price adjustment (Official Gazette of RM No.95/2004 and modification from 2005)
10. Decree on general conditions for the supply of electric energy (Official Gazette of RM No.6/2001)

Energy Law

OJ of RM No 63/2006 – 23.05.2006

The Directive 2001/77/EC for promotion of RES is implemented.

- Energy Agency of the Republic of Macedonia
- The Strategy for the exploitation of RES
- Programme for the implementation of The Strategy of RES
- Green certificates
- The Rulebook on the exploitation of RES

Energy Agency

- The Energy agency of the Republic of Macedonia gives its support to the Ministry of economy in the elaboration and implementation of the Strategy for improvement of energy efficiency and the Strategy for renewable energy resources exploitation (*the tender will be announced in 2007*)
- The Energy agency of the Republic of Macedonia gives its support to the Ministry of economy in the elaboration of the Programme for the implementation of the Strategy for renewable energy resources exploitation

Green certificates

- **Energy Agency of RM** issues and maintains a registry of guarantees of origin (green certificates) for electricity produced from renewable energy resources and from high-efficiency cogeneration facilities in the Republic of Macedonia and guarantees of origin associated with imports of electricity issued by other authorised national bodies

- **Market operator** is obligate to purchase the whole electricity generated from the eligible customers and from high-efficiency co-generator

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Tariffs for electricity from RES

- Until the establishment of functional mechanism for trade in green certificates, the **Regulatory Commission of RM** established relevant tariffs for purchase of electricity from the distributional generation of electricity from renewable energy sources
- Rulebook for the method for the calculation and approval of ***feed-in tariffs*** for the sale of electricity produced from Small HPP
  OJ of RM No 16/2007 – 09.02.2007
- Rulebook for the method and conditions for the determination and approval of the use of ***feed-in tariffs*** for the sale of electricity produced from windmills
  16.05.2007 (www.erc.org.mk)

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Financial assistance

- A mechanism for financial assistance is established for the realization of the Strategy for renewable energy resources exploitation
- The means for financial assistance shall be provided by:
  - The Budget of the Republic of Macedonia;
  - The budgets of municipality or budget of Town Skopje;
  - Grants, donations, sponsorships by foreign and domestic entities; and
  - Foreign and domestic loans;
  - State subsidiary in accordance with Law for state subsidiary.

RES in Macedonia:

Potential and implementation

Macedonia has promising native resources of renewable energy. These include:

- Hydropower
- Wind power
- Biomass and biogas
- Geothermal
- Solar (thermal)

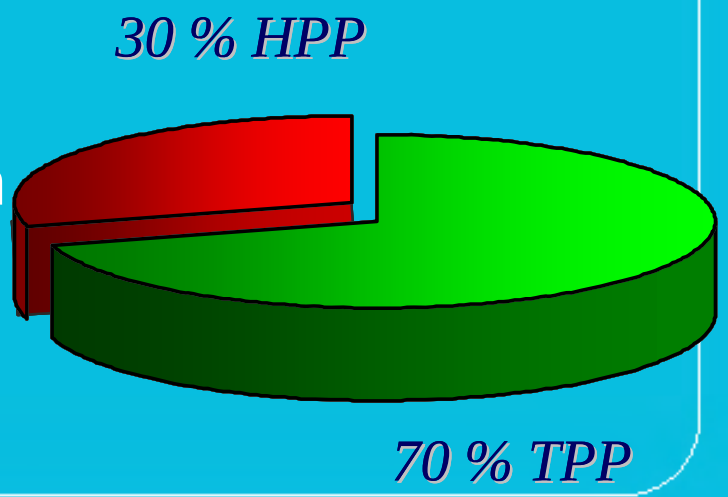
Hydro potential of Macedonia 1

- The total theoretically exploitable energy potential of all rivers is 6.434 GWh.
  Only 1.470 GWh is used, less than 23%.
- **Hydropower energy investments will be targeted!!**
- The structure of total installed electric energy capacity in Macedonia - 2003:

  total hydropower — 1.370 GWh

  total consumption — 7.215 GWh

  imports — 15 %
- 7 % from 21 sHPP.



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Existing HPP in Macedonia

Installed capacity 504 MW , source: www.elem.com.mk

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Existing 21 sHPP in Macedonia

Total capacity 45,5 MW

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sHPP projects support 1

- Study for possible sHPP in Macedonia, 1982
  - 405 possible locations (50 kW to 5.000 kW)
  - total installed power of 256 MW, annual generation of electricity 1.190 GWh
- Programme for sHPP, prepared in 1998 by World bank
  - 70 locations (64 kW to 5.000 kW)
  - total installed power of 186 MW, annual generation of electricity 700 GWh
- Review of 97 sHPP, Ministry of Economy
  - 60 kW to 8.200 kW
  - total installed power of 200 MW, annual generation of electricity 820 GWh

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ROT project of 7 sHPP

1999 FIRST CONCESSION PROJECT IN MACEDONIA
for Rehabilitation, Operation and Transfer of 7 sHPP's:

- HPP DOSNICA
- HPP KALIMANCI
- HPP MATKA
- HPP PENA
- HPP PESOCANI
- HPP SAPUNCICA
- HPP ZRNOVCI

CONCESSION GRANTED TO MAKHIDRO

- **Total investments** **20 mil EUR**
- **Total capacity** **30 MW**
- **Total generation** **86 GWh**
- **Period of concession** **11 years**

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sHPP projects support 2

- Rulebook for establishment of feed-in tariffs for purchasing electricity generated from SHPP – adopted by the Energy Regulatory Commission of RM
- Public call for water concession for **60 sHPP** with installed power up to 5 MW each, total 43 MW
- 15.06.2007 bids opening

  www.economy.gov.mk

REPUBLIC OF MACEDONIA
MINISTRY OF ECONOMY

Pursuant to article 13, item 1 from the Concession law, ("Official Gazette of Republic of Macedonia" No. 25/02 and 24/03) and article 155, item 1 from the Law on waters (Official Gazette of Republic of Macedonia" No. 4/98, 19/00 and 42/05), the Ministry of economy announces

PUBLIC CALL No.12-1220

For collecting bids for granting water concession for electricity generation from 60 small hydro power plants (with installed power up to 5 MW) according to the DBOT model (Design, Build, Operate, Transfer) on the river basins of: **Vardar, Strumica and Crni Drim.**

1. All domestic and foreign legal and private entities that will collect the tender documentation and fulfill the conditions according to the tender documentation have the right to participate.

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Public call for water concession for 60 sHPP

- All necessary hydrological, geological and topographic data as well as information regarding the land ownership are available in the State Hydrometeorology Office, Department for mineral resources in the Ministry of Economy and the State Geodetic Works Office. These data may be obtained pursuant to the Rule Books and Price Books of the above-mentioned institutions
- Only bids submitted by **June 14, 2007**, until 16:00 CET, would be considered for review
- The water concession will be granted for a period of 20 years

Planed HPP in Macedonia

Installed capacity 36,4 MW

Projected installed capacity 921 MW

source: www.elem.com.mk

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Wind energy

- In Macedonia there is no accurate knowledge of country's wind resources and it is a major barrier for any possible development of the utilization of wind power
- Plan for investigation of wind resources and potential:

1. preparation of **Preliminary Wind Atlas of the Republic of Macedonia** which based on geophysical and meteorological inputs (May and June 2005).
2. according the results from the Atlas, in progress is realisation of **Monitoring Program of Macedonian Wind Resources** funded by Norwegian Government on selected 4 locations (measurement campaign – start 2006).
3. preparation of feasibility studies as basis for possible erection of wind farms (number of potential locations 20).

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The map shows that the best wind resources in Macedonia are generally found along high mountain ridges, while lowlands and valleys are likely to have much lower average wind speeds. The predicted mean wind speed at 80m height on the ridge tops varies from 6,5m/s to 8,5m/s.

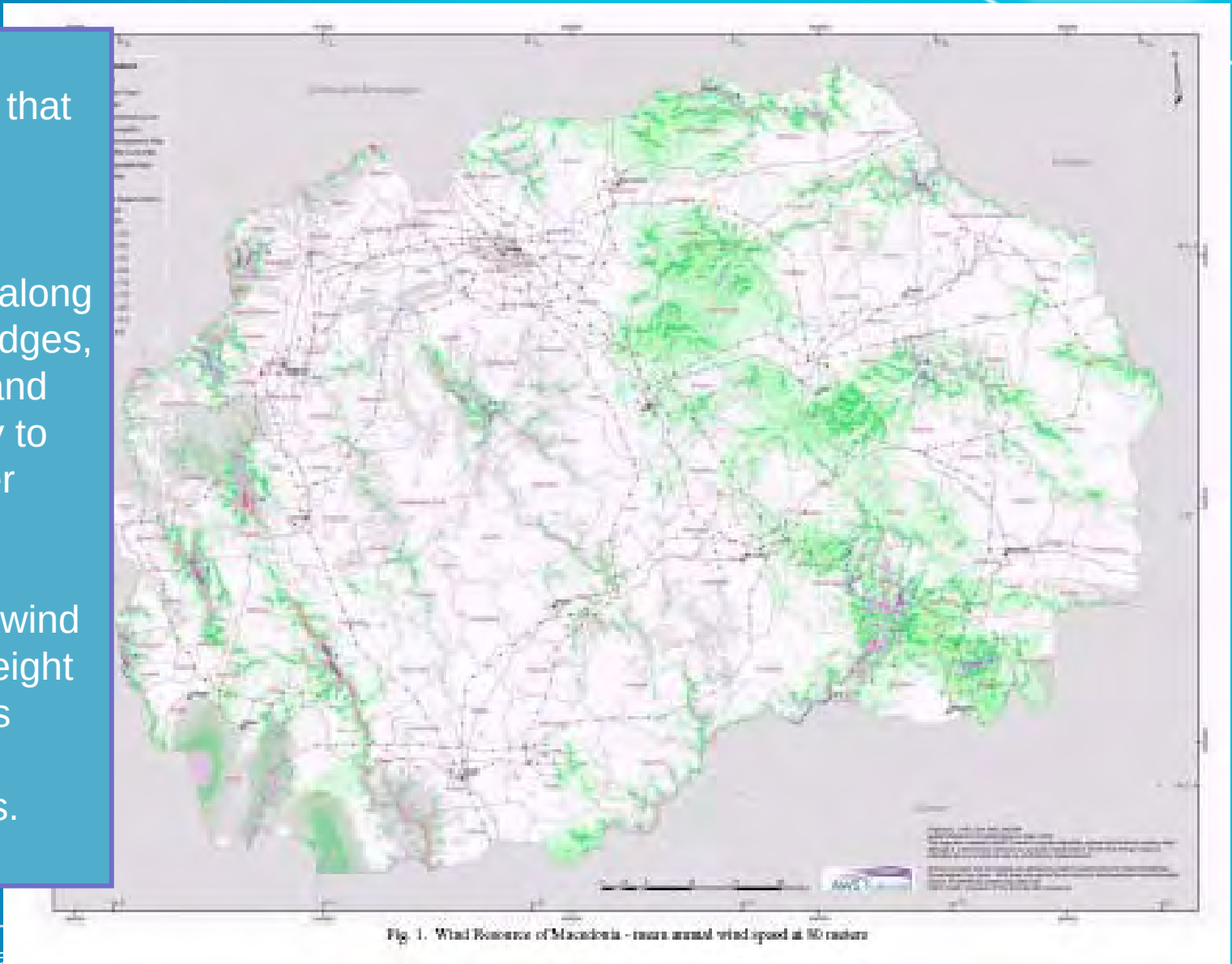

Fig. 1. Wind Resource of Macedonia - mean annual wind speed at 80 meters


14-Jun-06 16:22


14-Jun-06 16:23

Bio energy

- Biomass and Biogas, mostly for heating
- 10,67 % from total energy consumption is for biomass (Official statistic from 2001)
- 49,81 % from bio-energy potential might be used
- Total unused bio-energy is 38,95 % from consumption
- Projects with short pay back period have been identified:
  - ✓ replacement of electricity and liquid fuel boilers by biomass firing boilers
  - ✓ utilization of available biomass wastes in industry and agricultural farms for heating

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Biomass energy

Economic area	Energy value TJ	Participation %	Use %
Agriculture	19776,00	73,81	35,52
Forestry and wood processing	7018,00	26,19	90

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Geothermal energy

- Geothermal resources in RM
  - Geothermal wells (7 main fields with 18 localities)
  - East and North East part of the country, registered above 50 sources and appearances of minerals and term mineral waters with total abundant of more than 1.400 l/sec
  - Temperatures of the flows vary in the range from 24-27 ^{o}C to 70-78 ^{o}C (mean temperature is 60 ^{o}C)
  - Heating: greenhouses, residential buildings, swimming pools
  - No electricity production
- Ongoing project
  - Ecology Sanitation and Energy Rationalization of the Geothermal System Geotherma – Kocani (supported by Austrian Development Agency)
    - Efficient usage of geothermal energy and protection of the environment by re-injection of already used geothermal water

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Solar energy

- Macedonia is area with a large number of sunshine hours
- The total annual solar radiation varies from a minimum of 1250 kWh/m^2 in Northern part to a maximum of 1530 kWh/m^2 in the South Western part
- Actual irradiation / total possible irradiation 50%
- Flat plate collectors systems
- Heating
- Less than 1% from total energy consumption
- 300-500 % more expensive than fossil fuel

Solar thermal in Macedonia

- From 1995 to 2005, around 14.000 m^2 installed solar thermal collectors ~ 9.800 kW
  (*IEA conversation factor is* 0,7 kW *per* m^2 *of solar collector*)
- Ongoing project
  - Solar Water Heaters
    (supported by Austrian Development Agency)
    - Capacity building for policy experts – administrative
    - Training for producers of solar thermal systems and components – transfer of know-how production technology
    - Improvement the technology of production of solar thermal components and systems,
    - Two years monitoring of five already installed solar systems
    - Support for preparation coherent regulatory policy framework
    - Design and supply of improved solar thermal systems - pilot plants
    - Establishment of national labeling scheme for solar installations
    - Awareness and public relation champagne

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Solar thermal - government support

- Government programme for support of using solar thermal energy in households
  - on 08.02.2007 public announcement:
    - Ministry of Economy will provide repayment in amount of 30 % (not more than 300 EUR) of costs for the first 500 buyers of solar thermal collector systems, who have properly installed it in their homes, in order to stimulate the usage of solar energy in Republic of Macedonia.
    - Until now the Ministry receive much more than 500 applications for this program.

GEF - Sustainable Energy Project

The main objective of this project is stimulation of investments in energy efficiency and renewable energy sources by removal of institutional and financial barriers. The project will be supported by GEF grant in amount of US$5.500.000

Component 1 - Market Framework (US$1.0 million GEF grant)

implementation - the Energy Agency of the Republic of Macedonia

1.1 Capacity Building, Strategic/Legislative/Institutional

1.2 Capacity Building, Technical/Advisory

1.3 Monitoring, Information Dissemination and Administration

Component 2 – Support to Utility-based ESCO (US$0.8 million GEF grant)

implementation - MEPSO and Toplifikacija – Skopje

The ESCO will help to stimulate the market for energy services by providing turnkey and performance-based contracting for energy efficiency, and by demonstrating the financial performance of such projects using third-party financing for publicly-owned buildings

Component 3 – Sustainable Energy Financing Facility (US$3.7 million GEF grant)

implementation - Macedonian Bank for Development Promotion

Providing financial mechanisms - guarantee and a loan facility for co-financing EE and RE projects

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Conclusions

- In the past 5 years Macedonia is removing barriers for RES penetration
- The new Energy law completes regulations and supporting documents for RES as Energy Agency, Green certificates etc.
- Energy market is opening. From 2007 industrial costumers will be free to purchase electric energy on the market, until 2015 all costumers

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Conclusions

- Macedonia is open for national and international investments in energy area
- Government supports capital investments (HPP Sv. Prtka, mine Brod-Gneotino)
- Public competition for 60 sHPP
- Support programme for solar thermal energy
- GEF – sustainable energy project

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Thank you for your attention!

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Possibilities of renewable energy sources and pricing in Bosnia and Herzegovina

Prof. Dr. Suad Halilčević
University of Tuzla
Faculty of Electrical Engineering
Bosnia and Herzegovina

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REGULATORY FRAMEWORK FOR RENEWABLE ENERGY SOURCES PENETRATION SUPPORT IN BOSNIA AND HERZEGOVINA – DISTRICT HEATING CASE

- air pollution,
- untenable current energy sources are growing,
- Unstable political and economical situation

turning to clean and renewable energy sources is necessary

Dr. Suad Halilčević

Dr. Vlado Madžarević

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Best practice of regulatory framework for renewable energy sources

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Should be based on:

- ✓ ***Strong support from central authorities***
- ✓ ***Strong support from municipalities***
- ✓ ***Consumer ownership***
- ✓ ***Efficient financing***
- ✓ ***Variety of technical solutions***
- ✓ ***Simple technical solutions***
- ✓ ***Dynamic development and co-operation***

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Strong support from central authorities:

- ***National least-cost energy planning***
- ***Monitoring of the least-cost urban energy planning***
- ***Encouragement of local authorities and utilities to implement least cost projects***
- ***Implementation of legal measures that enforce building owners to connect and remain connected to energy sources based on RES***

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Strong support from central authorities:

- *taxation of fossil fuels*
- *Investment subsidies to whomes which rehabilitate and complete RES*
- *Investment subsidies to consumers who install RES*

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Strong support from municipalities

- **The municipalities have a natural interest in developing a good local district energy system for the benefit of the inhabitants**
- **The district energy network is regarded as a natural part of the urban infrastructure,**
- **Energy planning is an integral part of urban planning**
- **Urban development areas should be provided with RES as well as water, sewage and other services**

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Consumer ownership

- For example, district heating companies based on RES can be owned by the consumers,
  either directly as consumer co-operatives or
  indirectly as municipally owned companies

✓ This gives certain benefits:

- All company profit is given back to the consumers
  at the end of the year or
  is transferred to the next year to lower the energy price

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Consumer ownership

- **Management will be encouraged to work for good consumer services at the lowest possible price**
- **All budgets and prices will be transparent for the consumers**
- **Consumers will be more motivated to pay the bills, i.e. only the consumers will make profit on the energy supply - or suffer possible losses**

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Efficient financing

- Financing is a problem in many countries
- Most companies finance their investments in networks and CHP plants 100% by international credits at the lowest market based interest rate
- Banks compete to offer the best conditions as long as they can see that the security is high
- And security is high, due to following reasons:

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- *The national energy policy is stable*
- *The municipalities guarantee for loans, also the consumer co-operatives*
- *The consumers are obliged to remain connected and to pay at least the fixed tariffs*
- *The proven RES technology and maintenance management ensure long life-time*
- *The consultants provide know-how on feasibility studies and project implementation*
- *There are clear roles of responsibility and efficient decision-making in the companies*
- *Therefore other private investors boot concepts and the like offer no real competition.*

The security of financing is high

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Variety of technical solutions

- There are RES technologies that are typical for the one state approach today
- However, there are no obligatory norms and standards that specify detailed technical solutions and design criteria which have to be followed
- On the contrary, the technological development is very dynamic and it can be find a huge variety of technical solutions adjusted to the local conditions and the opinion of the local decision makers

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Simple technical solutions

Simple and cheap solutions could be more important than the advanced ones for the further market development of RES in the South-East Europe countries and for the survival of their small local distribution systems

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Dynamic development and co-operation

The following factors have been important for this development:

- **Norms and standards are based on prescribed functions (not on specific details) and therefore they allow a huge variety of solutions (as described above) which stimulate a competitive development**
- **This development creates a good environment for co-operation between RES companies, suppliers of equipment and consultants**
- **Many small enterprises in the private sector work in a competitive environment**

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Dynamic development and co-operation

- **The government supports the development of energy efficient technology by investment subsidies to individual projects in the initial phase**

- **The State District RES Association should be organized which will offer support and advice to all its member-companies and acts as interest-organisation for the sector**

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Bosnia and Herzegovina circumstances regarding RES

The Bosnia and Herzegovina RES specific project potentials have to be studied through the next several questions:

- **who were the entrepreneurs for RES?**
- **what motivated them?**
- **what institutional settings did they face?**
- **what policies and programs did they initiate?**
- **what factors facilitated or constrained RES innovation?**

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The whole process of campaign to use the RES should be organized through the next segments:

- ***Legal framework for RES installations***
- ***Financing of RES installations***
- ***Standards and Rules***

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Legal framework for RES installations

Measures such as aid for investment in co-production, renewable energy sources and energy saving systems should take into account the next measures:

- **Diversification of energy sources and reduction of the dependence on imported energy sources**
- **Decrease of operating cost in industrial and public services sector**

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Legal framework for RES installations

- **Environmental protection via the reduction of fuel consumption in order to comply with the Kyoto Commitment protocol**
- **Support of local development via RES installation**
- **Increase of local employment at the RES installation sites**

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Legal framework for RES installations

The research priorities to support the legal framework follow:

- ***Information, support and promotion of RES***
- ***Expansion of infrastructure in RES***
- ***Financial incentives for private investments in RES***
- ***Investment in RES systems of Public sector, like Schools, Hospitals etc.***

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Legal framework for RES installations

The legal framework may consist of:

- ***Replacement of conventional fuels infrastructure with natural gas, biomass based fuels, etc.***
- ***Energy efficiency measures***
- ***RES installations to produce electricity additionaly***
- ***Heating systems based on RES for public buildings of Bosnia and Herzegovina***

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Financing of RES systems

The financing support should cover the next points:

- *Technical solutions combining old and new installations*
- *Institutional solutions*
- *Operation management*
- *Tariffs*

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Standards and Rules

The following standards and rules should be applied to RES installations based in Bosnia and Herzegovina:

- ***Utility Technical Guideline***
- ***technical conditions***
- ***Issues***
- ***Distribution Network Code***

Principles for the operation, maintenance, planning and expansion of the RES in existing energy network

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Standards and Rules

- *Other Technical Guidelines*
- *Technical policies implemented by engineers in a great variety of network issues, including many affecting RES installations*
- *Extensive set of legal documents (laws, decrees etc.) that regulate the RES in Bosnia and Herzegovina after recent deregulation in electricity sector*
- *Licencing procedure should be quickly and transparence based on necessary permissions of local community, Regulatory Commission and Ministry of Energy*

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SUBCONCLUSION

Effective co-operation of the local authorities with the investors is the key factor for speeding-up the RES penetration

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The different influences such as ownership, support mechanisms, etc. in the framework of RES support directly determine the rates of RES in existing energy sector

Acceptable average rates for RES in Bosnia and Herzegovina depend on the type of RES and consumers (households, industry, public buildings), respectively, and of the current economical and energy situation

Price ?! – The heat energy from RES is accepted if its price is in to the range of 0,015 to 0,055 euro/kWh.

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Current situation in B&H

- In 2002 the government adopted a resolution to promote the generation of electricity from renewableenergy sources.
- In this, the electricity suppliers or grid operators are obliged to accept electricity from renewable energy sources in their grids and to pay a fixed rate for it.

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Regulatory framework

– **State level**

- •STATE ELECTRICITY REGULATORY COMMISSION (SERC)

– **Entity level**

- •REGULATORY COMMISSION FOR ELECTRICITY IN THE FEDERATION OF BIH
- •REGULATORY COMMISSION FOR ELECTRICITY OF THE REPUBLIKA SRPSKA

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State Electricity Regulatory Commission

- •Independent and non-profitable institution of Bosnia and Herzegovina, which acts in accordance with the principles of objectivity, transparency and equality
- Jurisdictions and responsibilities for transmission of electricity, transmission system operation and international trade
- Established by the Parliamentary Assembly of BIH by adopting the Act on Transmission of Electric Power, Regulator and System Operator(2002), and
- appointing Members of the Commission(2003)

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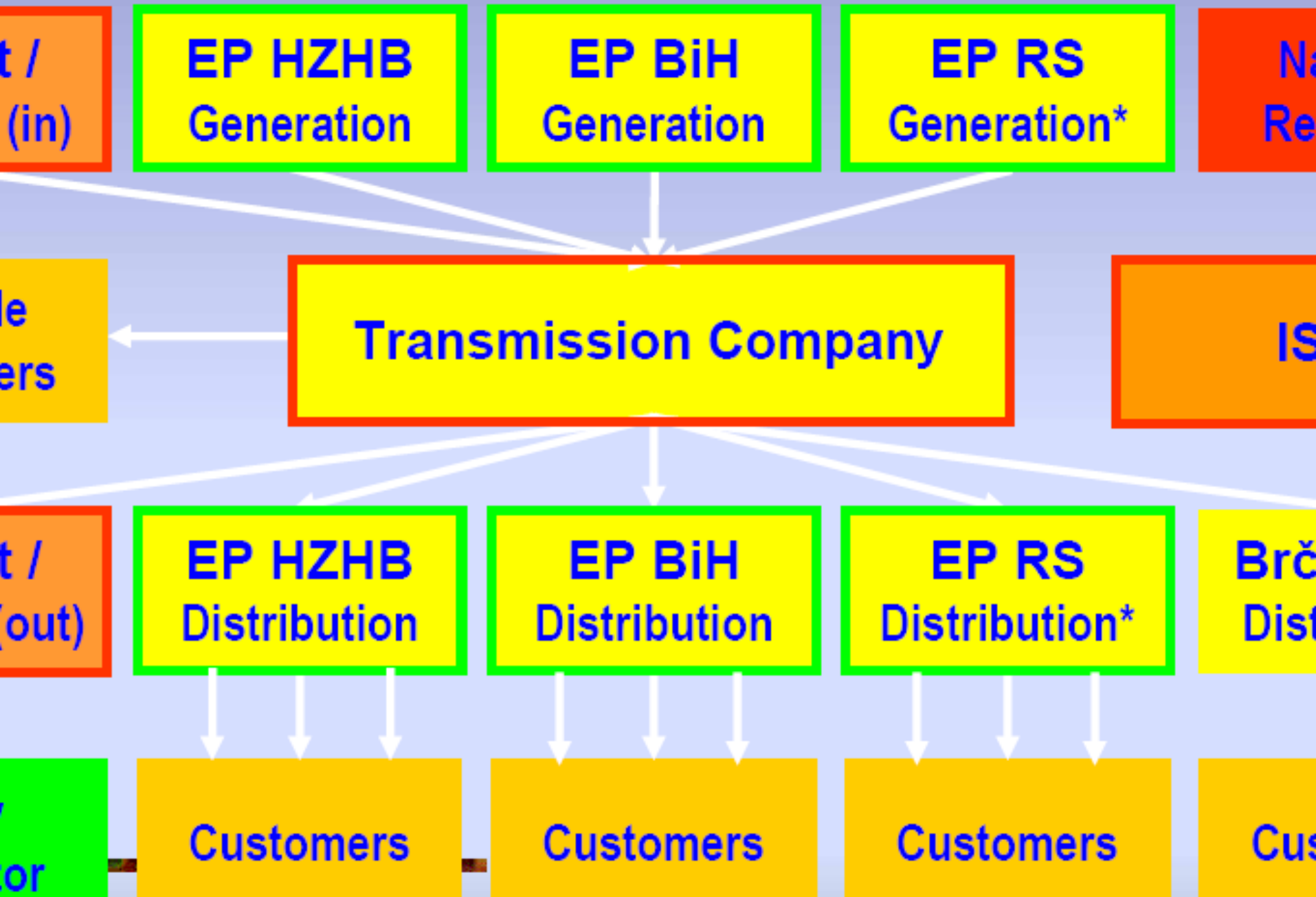
Sector structure



- **Legal Framework**

- Entity Governments Decisions on the Methodology for setting of purchase prices of electricity from renewable sources with installed capacity of 5 MW
- “Official Gazette of the Federation of BIH”32/2002
- “Official Gazette of the RS”71/2004

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- **Definition of Green Energy**

- "Electricity from renewable sources"shall mean electricity generated from renewable non-fossil sources, which are renewable in total or in part, including, but not limited to, energy from water, wind, sun, geothermal, wave and tidal sources as well as bio-gas and bio-mass.

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- **Renewable energy sources**

- HYDRO power
mini hydro(<5 MW)

- BIOGAS (gas of industrial and municipal waste)
-

- WIND power (under construction)

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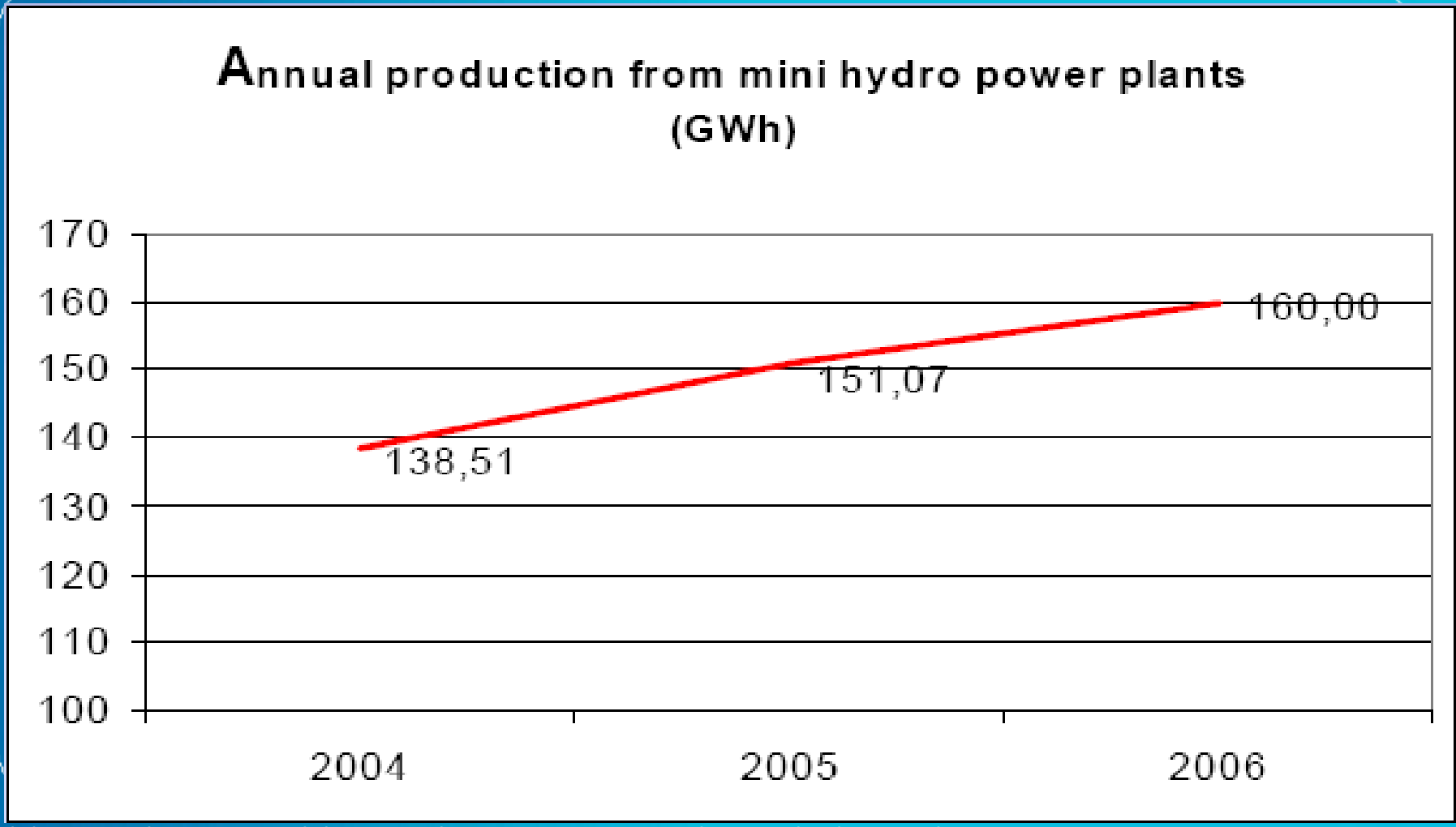
Small hydroplants (< 5 MW)
-10 plants (total capacity cca 10 MW)



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Small hydro power plants

- The potential for small-scale hydropower plants is put at 2,500 GWh/a. At present there are about ten plants with a total capacity of 31 MW;
- several other plants are under construction, and 20 plants with a total capacity of 28 MW are planned.
- In addition, a study by the Federation of Bosnia and Herzegovina lists a further 42 locations for small-scale hydropower plants with a total capacity of 51 MW which could be built at existing weirs.

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VIRTUAL BALKAN POWER CENTRE

RENEWABLE ENERGY SOURCES IN WESTERN BALKANS

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Biogas

One plant built in 2001
(gas from industrial and municipal waste)

Installed capacity 0,3 MW

Annual electricity production 600 MWh

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Biomass

- There is considerable potential for the use of biomass for energy generation in the forestry sector (roughly 50% of the land area of Bosnia and Herzegovina is wooded) and in agriculture.

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Wood residues

- There is an unexploited potential of approximately 1 million m3/a of residual wood, wood waste etc. which could be used to provide heat to 130,000 residences or 300,000 inhabitants.

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Practical use of wood residues

- One field where wood residues are already used in Bosnia and Herzegovinais where wood waste is converted into electrical energy in steam power plants, such as in the state-owned Krivaja factory in Zavidovici, manufacturing furniture and timber houses.
- With a maximum thermal output of 15 MW, peak electricity outputs of 4.5 MW are generated for the factory's on-site power needs.

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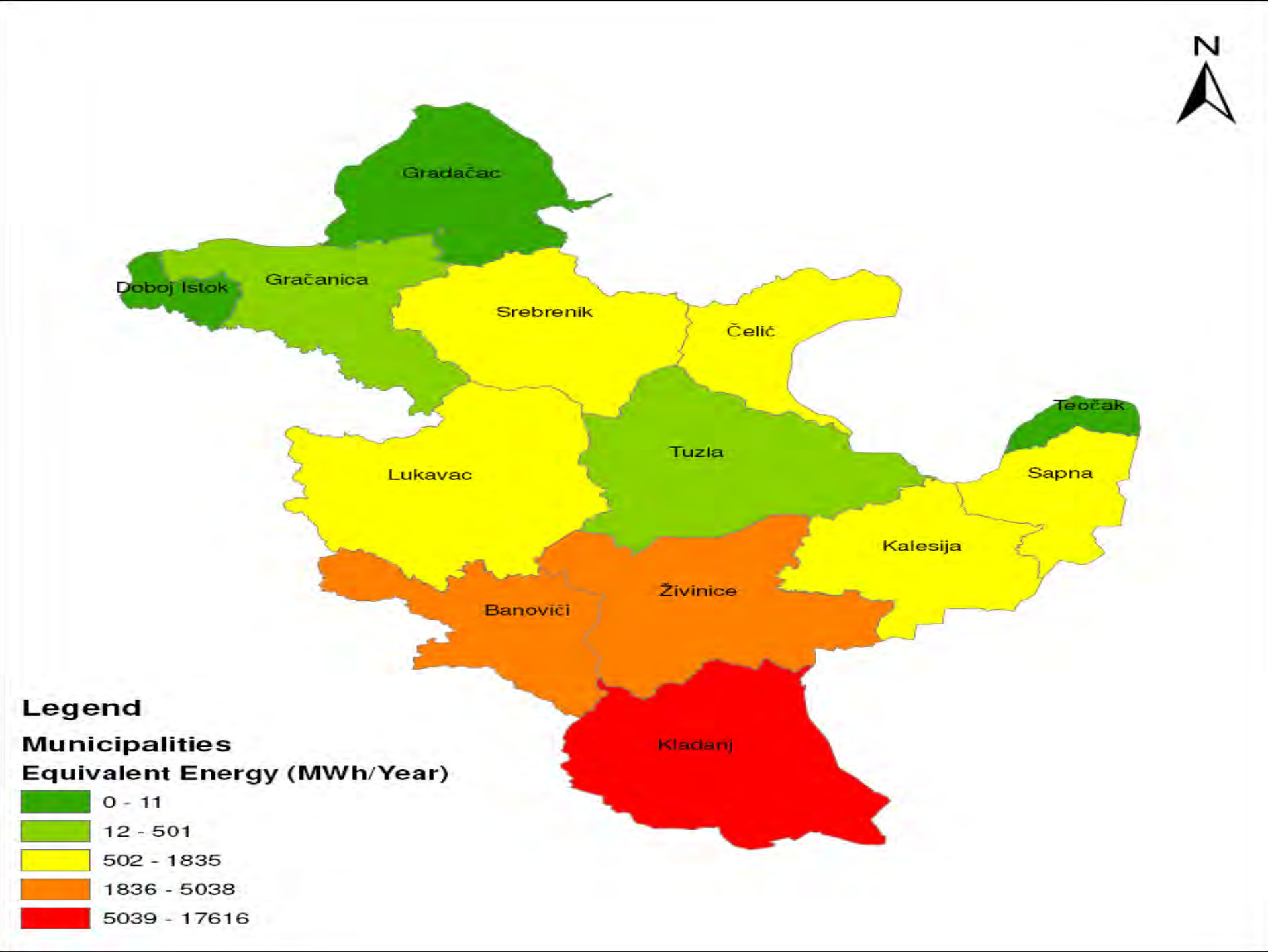
N
Gradačac
Doboj Istok
Gračanica
Srebrenik
Čelić
Teočak
Tuzla
Lukavac
Sapna
Kalesija
Živinice
Banovići
Kladanj
Legend
Municipalities
Equivalent Energy (MWh/Year)
0 - 11
12 - 501
502 - 1835
1836 - 5038
5039 - 17616

Solar energy

- With regard to solar irradiation, Bosnia and Herzegovina can be counted among the more favourable locations in Europe with solar irradiation figures of 1,240 kWh/m2/a in the north of the country and up to 1.600 kWh/m2/a in the south.
- Despite this, the use of solar energy can only be described as insignificant.
- The thermal exploitation of solar energy with flat-plate collectors is also practised to only a limited extent.

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Geothermal energy

- Bosnia and Herzegovina has a geothermal potential of 33 MWth. It must be said, though, that the temperature at the three known locations in Bosanski Samac (85°C), Kakanj (54°C) and Sarajevo (58°C) is too low for electricity generation, which is why the reserves are currently only under consideration for thermal exploitation.
- Under a new technology (ORC) it is possible to use even low temperatute wells

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Wind energy

- There is an economic potential of approximately 600 MW that could be developed by 2010, on the assumption that an appropriate incentive system to build wind power installations is set up.
- Sufficiently suitable geographical locations appear to be available.
- For example, there are promising wind values shown by measurements taken before the war for the region of Trebinje through Mostar to Bugojno, and more up-to-date measurements from meteorological stations and airports which reveal large areas of the country with wind velocities of over 10 m/s at a height of 10 m on 150 days in the year.

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Područja s respektabilnim potencijalima vjetra
Stupovi 50 m
Stupovi 10 m
SARAJEVO
BUGOJNO
MOSTAR
SPLIT
DUBROVNIK
TREBINJE
Livno
Tomislavgrad
Konjic
Posušje
Grude
Čitluk
Ljubuški
Metković
Makarska
Sinj
Knin
Drniš
Trogir
Solin
Omiš
Imotski
Ploče
Stolac
Nevesinje
Bileća
Jablanica
Prozor
Visoko
Pale
Hadžići
Hrasnica
Vogošća
Fojnica
Kupres
Glamoč
ŠOLTA
BRAČ
HVAR
VIS
KORČULA
LASTOVO
MLJET
ŠIPAN
ŠCEDRO
ČIOVO
PAKLENI OTOCI
LASTOVNJACI
DALMATINSKA
SPLITSKO
ŽUPANIJA
DUBROVAČKO
NERETVANSKA
Bračk kanal
Hvarski kanal
Korčulanski kanal
Neretvanski kanal
Lastovski kanal
Mljetski kanal
Viški kanal
Splitski kanal
Biokovo
Mosor
Kozjak
Svilaja
Kamešnica
Cincar
Vran
Čvrsnica
Čabulja
Prenj
Velež
Bjelašnica
Visočica
Treskavica
Zelengora
Radoša
Vranica
Ljubuša
Popovo polje

Wind energy

Name	Number of generating units and capacity	Instaled capacity	Annual production (MWh)	Year
VE Kamena	21x2	42	90,300	2008
VE Merdžan Glava	30x2	60	133,500	2010
VE Merdžan Glava	6x2	12	27,670	2007
VE Sv, Gora, Mali Grad and Poljice	24x2	48	114,670	2008
VE Velika Vlajna	16x2	32	89,356	2008/9
VE Mesihovina	22x2	44	128,527	2008/9
VE Livno (Borova Glava)	26x2	52	149,617	2008/9
VE Debelo Brdo	34x2	68	178,704	2010/11
VE Mokronoge	35x2	70	197,400	2009/11
VE Srđani	50x2	100	290,000	2009/12
VE Poklečani	20x2	40	115,632	2011/12
VE Planinica	21x2	42	123,340	2011/12

Sixth Framework Programm
Contract: INCO-CT-2004-50

VIRTUAL BALKAN POWER CENTRE

RENEWABLE ENERGY SOURCES IN WESTERN BALKANS

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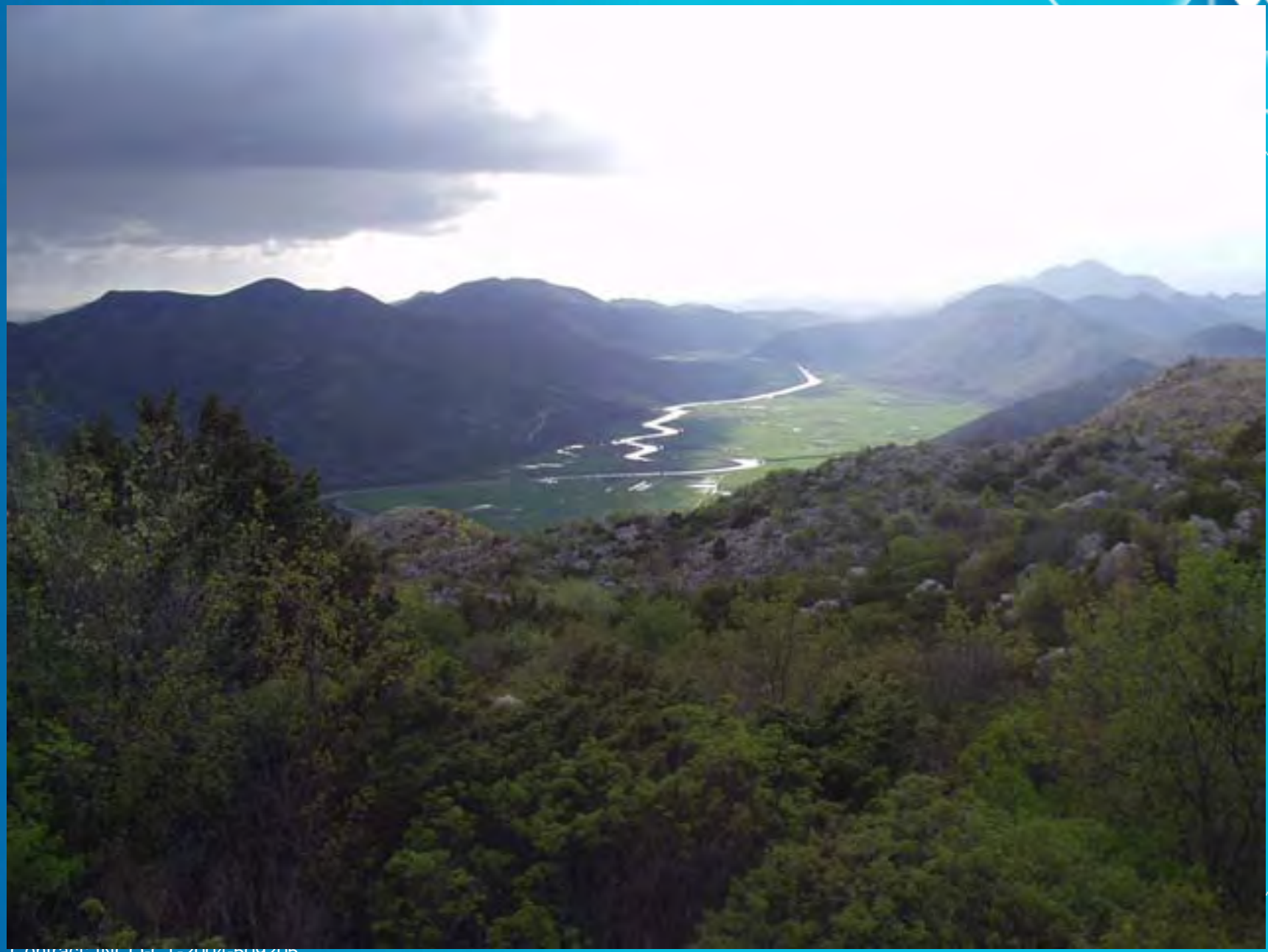
Contract: INCO-CT-2004-509205

VIRTUAL BALKAN POWER CENTRE

RENEWABLE ENERGY SOURCES IN WESTERN BALKANS

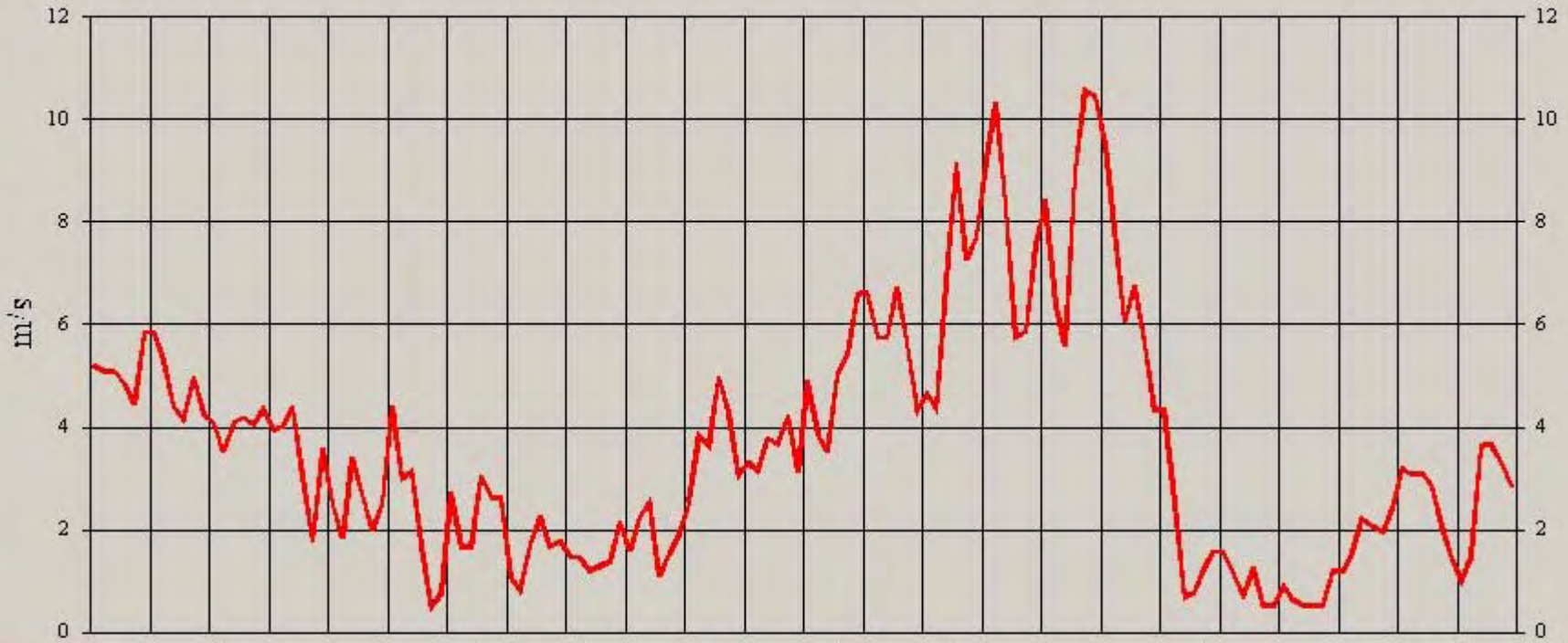


Contract: INCO-CT-2004-509205

Contract: INCO-CT-2004-509205

Interpreted Data - \\Mario\vjetar\mjerenja\Mesihovina0506\050620050722019.rwd

File View



Averages	22.07.2005 00:00:00	22.07.2005 00:10:00	22.07.2005 00:20:00	22.07.2005 00:30:00	22.07.2005 00:40:00	22.07.2005 00:50:00	22.07.2005 01:00:00	22.07.2005 01:10:00	22.07.2005 01:20:00	22.07.2005 01:30:00	22.07.2005 01:40:00
NRG #40 Anem. mph	12,4	11,1	9,3	9,5	10,9	13,4	13,6	14,4	9,4	7,1	10,5
NRG #40 Anem. m/s	5,2	5,1	5,1	4,9	4,4	5,8	5,8	5,3	4,4	4,1	5,0
NRG #40 Anem. m/s	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
No SCM Installed											
No SCM Installed											
No SCM Installed											
#200P Wind Vane	4	8	10	14	15	8	4	1	3	0	1
#200P Wind Vane	1	2	3	9	14	7	2	2	2	359	359
No SCM Installed											
No SCM Installed											
No SCM Installed											
NRG #110S Temp C	16,5	16,5	16,6	16,4	16,2	15,9	15,8	15,7	15,6	16,0	16,0

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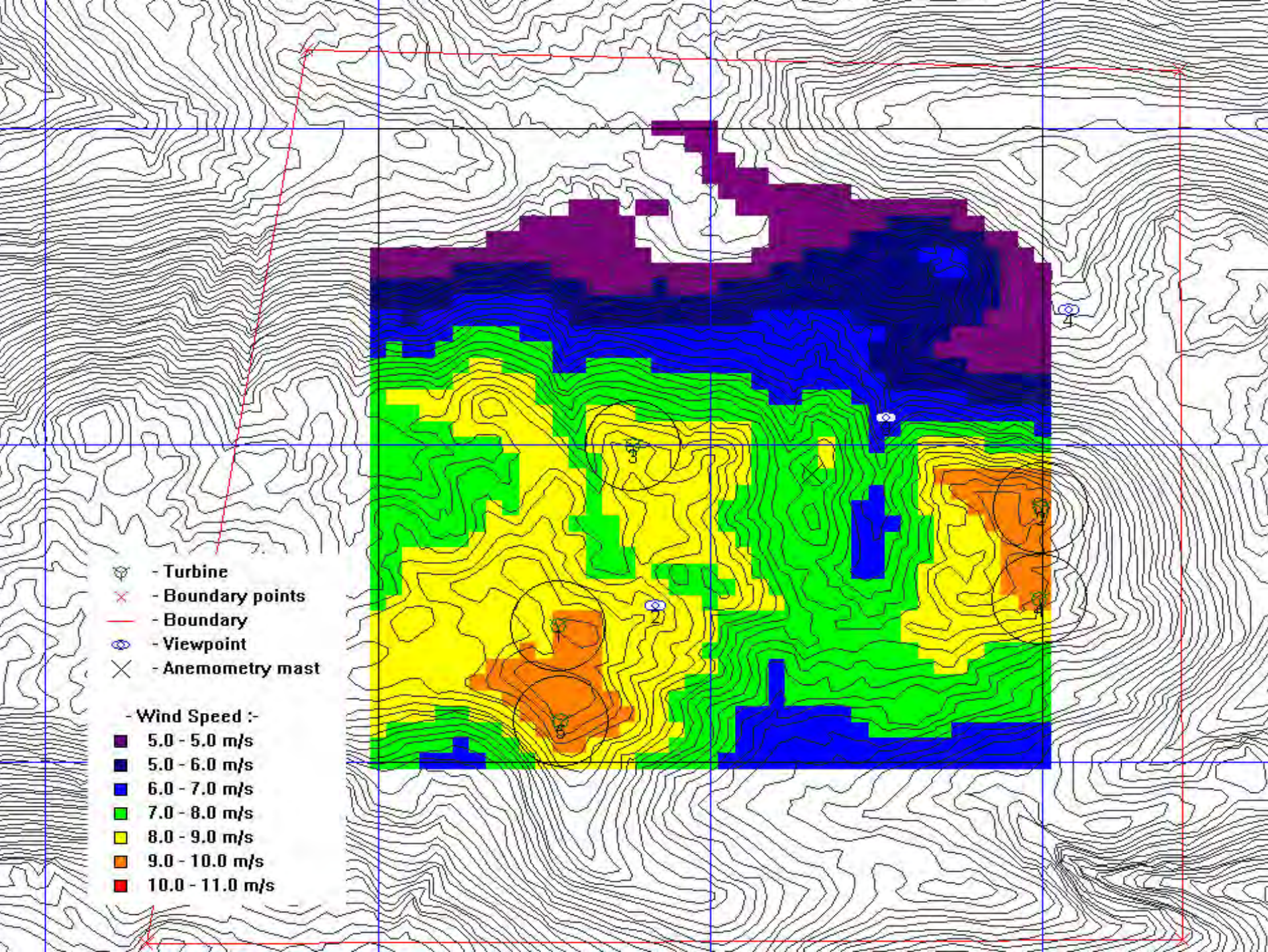
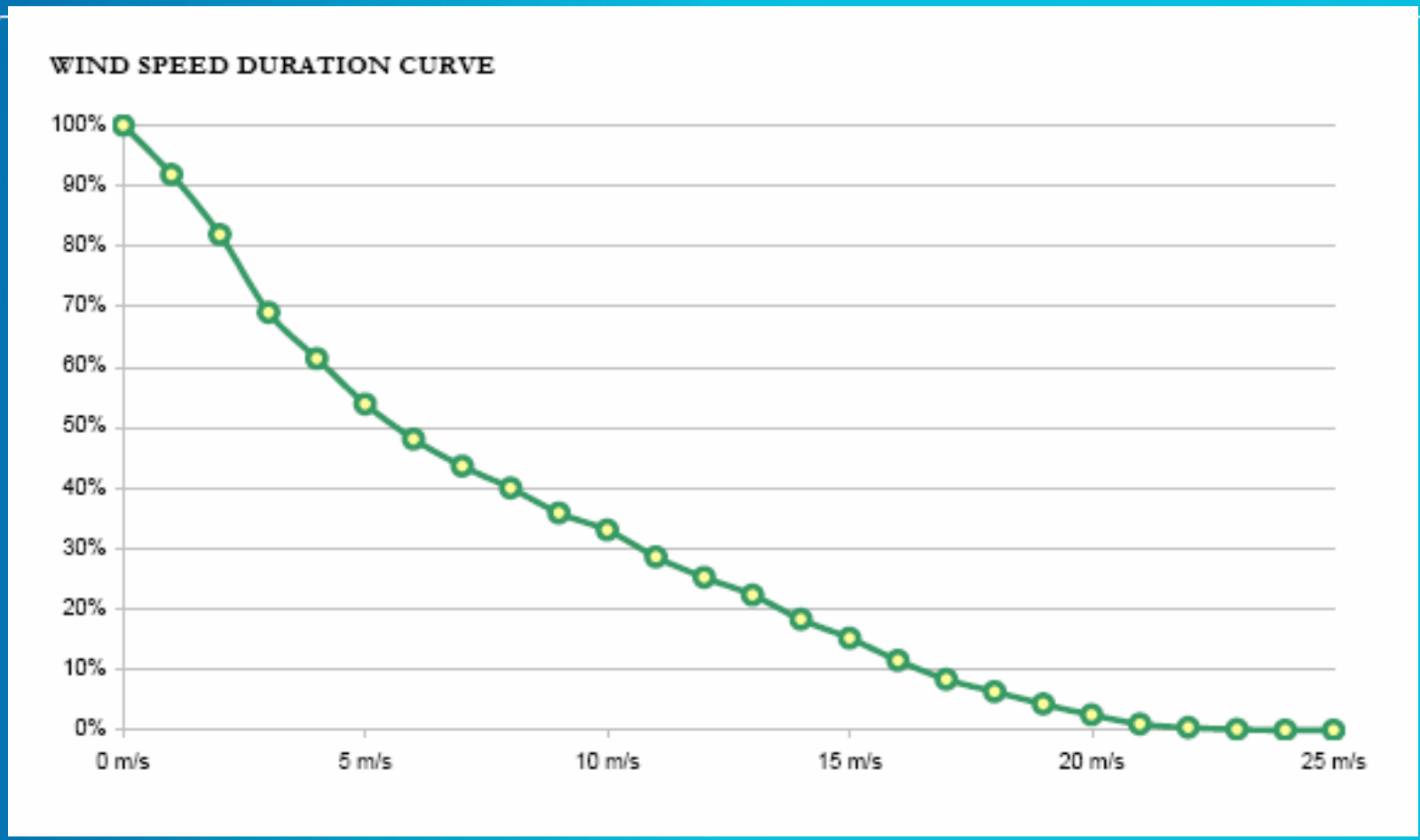

- Turbine
- Boundary points
- Boundary
- Viewpoint
- Anemometry mast
- Wind Speed :-
5.0 - 5.0 m/s
5.0 - 6.0 m/s
6.0 - 7.0 m/s
7.0 - 8.0 m/s
8.0 - 9.0 m/s
9.0 - 10.0 m/s
10.0 - 11.0 m/s
1
2
3
4
5
6

Chosen locations



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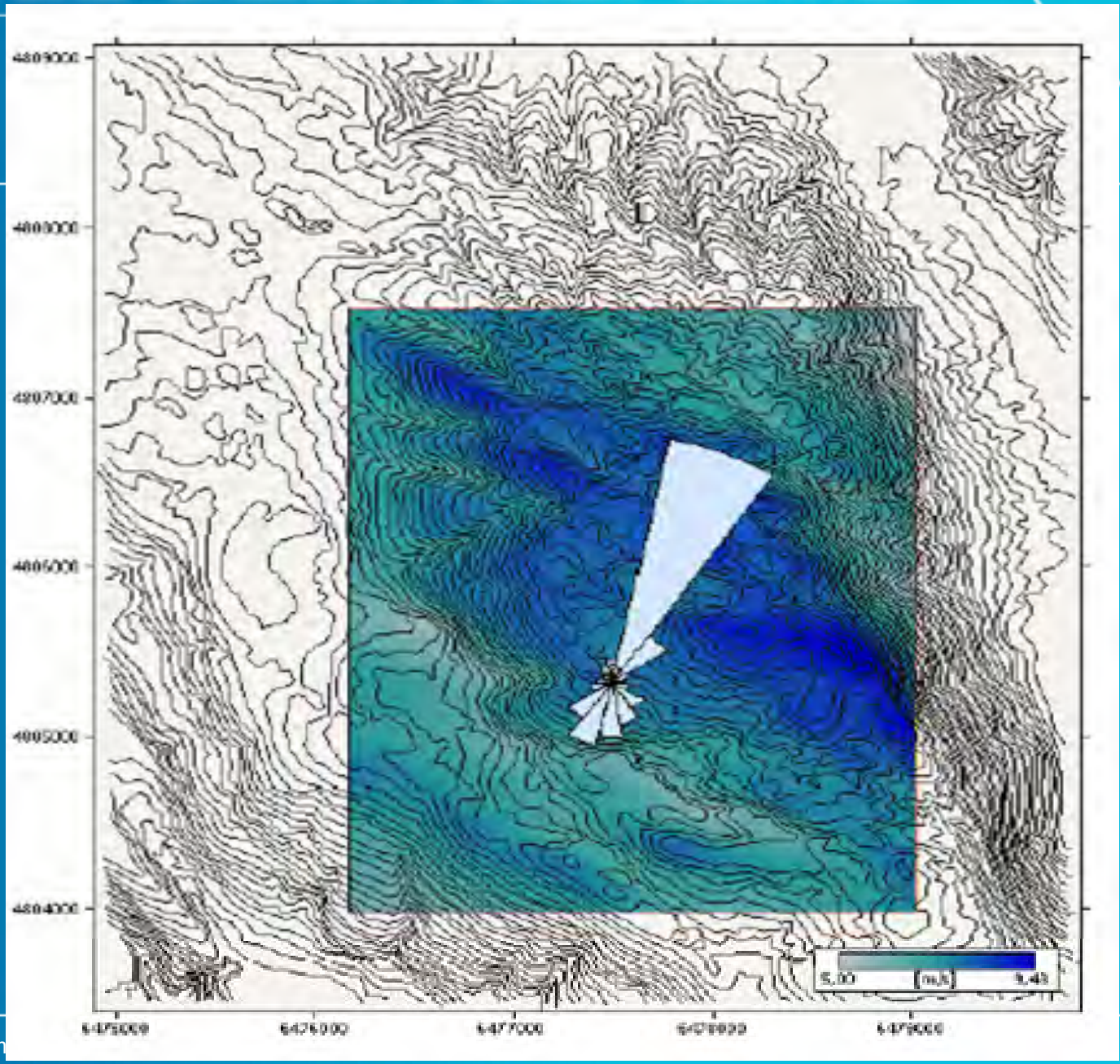

Sixth Fram
Contract: INCO-CT-2004-509205

Current Price Setting/Calculation Method

- Legislation treats energy from renewable sources (by government decision)
- Tariffs for this energy are defined by correction factors according to the tariff for electricity on 10(20) kV level,
- Tariff for electricity 10(20) kV: 5.06 €cents per/kWh

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This tariff is multiplied by a correction coefficient depending on the type of renewable energy involved in order to obtain the applicable infeed tariff.

Plant Type	Correction Factor
Small hydro plants	0.80
Plants using biogas	0.77
Wind plants	1.00
Solar (photovoltaic) plants	1.10

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Current prices in force (€cents/kWh)

Tariff for electricity 10(20) kV: **5,06 €cents/kWh**

Plant Type	Purchase Tariffs € cents/kWh
Small hydro plants	4,04
Plants using biogas	3,90
Wind plants	5,06
Solar plants	5,56

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Obligation to purchase electricity from renewable sources

- According to this Decision,distribution companies purchase all energy produced from renewable sources.

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Current System: Advantages and Disadvantages

- **Advantages: The entire energy generated from the renewables is bought off,**
- **Disadvantages: Prices are regulated by the decisions of the entity governments,**

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Green Energy Pricing in the Future

- Prices shall be formed according to the electricity market
- Obligation to purchase electricity generated from renewable sources
- Trade with **Green Certificates**

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Ongoing activities

- Article 20 of the Treaty establishing the Energy Community specifies that each Contracting Party shall provide to the European Commission within one year of the date of entry into force of the Treaty:

- a plan to implement **Directive 2001/77/EC** on the promotion of electricity produced from renewable energy sources in the internal electricity market and
- a plan to implement **Directive 2003/30/EC** on the promotion of the use of bio-fuels or other renewable fuels for transport,

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Kyoto – B&H

- Bosnia and Herzegovina ratified the UN climate change agreements in September 2000; it has not yet signed or ratified the Kyoto Protocol.
- The latter step is a prerequisite for participation in the Clean Development Mechanism (CDM), by means of which industrialised countries could transfer parts of their obligation to reduce greenhouse gases to Bosnia and Herzegovina.
- Austria has already expressed its interest in this connection to undertake projects in the country.

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Conclusions

- BIH does not have a national strategy. We expect solutions through the project “The Strategy of the Energy Sector in BiH”.
- There is an ongoing regulatory reform of the power sector in BIH. We expect the issuance of new regulations accordingly, which shall be harmonized with the EU Directives.

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THANK YOU FOR YOUR ATTENTION, AND GOOD WORK AND LUCK IN RES

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The Pellets Market

VBPC Local Workshop, Tirana, 25.May 2007

Andrej Hrabar, Istrabenz Gorenje
Nova Gorica, Slovenia
andrej.hrabar@istrabenz.si

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Introduction

- Company overview
- Pellets and standards
- Distribution and Usage
- Overview of Markets
- Market Specifics and Cases
- Price Fluctuations
- Opportunities for Western Balkans

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Istrabenz Gorenje

- Electricity trading and electricity delivery
- Biomass trading and biomass production (briquettes, pellets, charcoal)
- Energy services – heating systems, contracting (heat delivery)
- 16.000 t of biomass delivered in 2006
- 45.000 t of biomass planned for 2007

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What is a Pellet?

1 l of Heating Oil

=

ca. 2 kg of Pellets

Wood pellets are a densified biomass fuel made **exclusively** out of wood

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Fuel Quality Standards

	O-NORM	DIN 51731	DIN Plus
Heat content	18 MJ/kg	18 MJ/kg	18 MJ/kg
Density	1,12 kg/dm^3	1,1 – 1,4 kg/dm^3	1,12 kg/dm^3
Water content	max 10,0 %	max 12,0 %	max 10,0 %
Ashes	max 0,5 %	max 1,5 %	max 0,5 %
Diameter	4 - 10 mm	4 - 10 mm	4 - 10 mm
Lenght	max 5×Ø	max 50 mm	max 5×Ø
Content	Wood	Wood	Wood

- Austria O-NORM
- Germany DIN 51731, DIN Plus
- Sweden SS187120

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Pellet Distribution

- by truck-tank
- in small 15 kg bags
- in big bags (ca 1 t)

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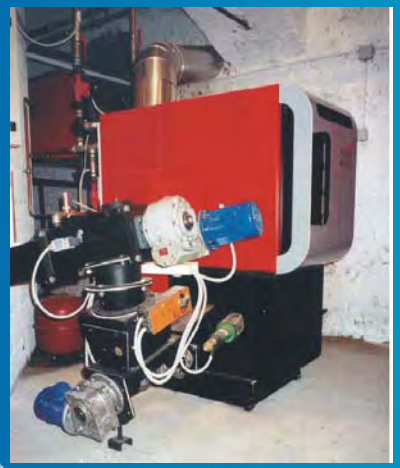
Pellet Usage

- Pellets are used in special pellets boilers and stoves:
  - combustion is of high quality,
  - environmental emissions are low,
  - fuel charging is fully automatic,
  - ash removal is easy.



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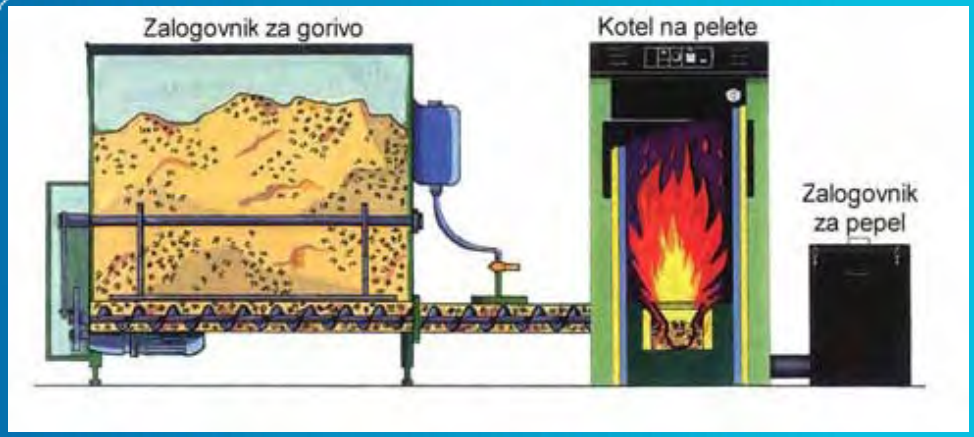
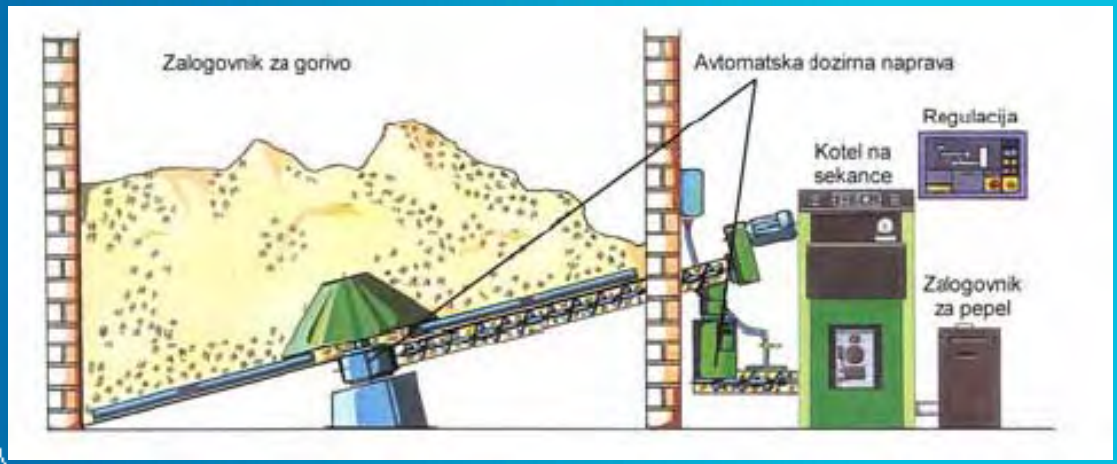
Wood pellet heating





Single familly house:

- storage
- water based central heating system

Bulk material delivery in a tanker and pneumatic filling of storage

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Wood Fuel and Trade

- In Europe 23% of wood removals was used for energy purposes in 2002.
- Share of fuel wood in total energy supply
  - Europe - 1,2%.
  - Sweden and Finland - 12-18%
  - Worldwide 5% of total primary energy supply and 34,8% of total renewable sources supply

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Energy Statistics

Solid fuel production (wood pellets)

- Canada 3,6 PJ
- Denmark 2,2 PJ
- Finland 1,8 PJ

Present use of woodfuel in WB countries

- Albania 0,3 PJ
- Bosnia and Herzegovina 0,5 PJ
- Croatia 0,9 PJ
- Republic of Macedonia 0,5 PJ

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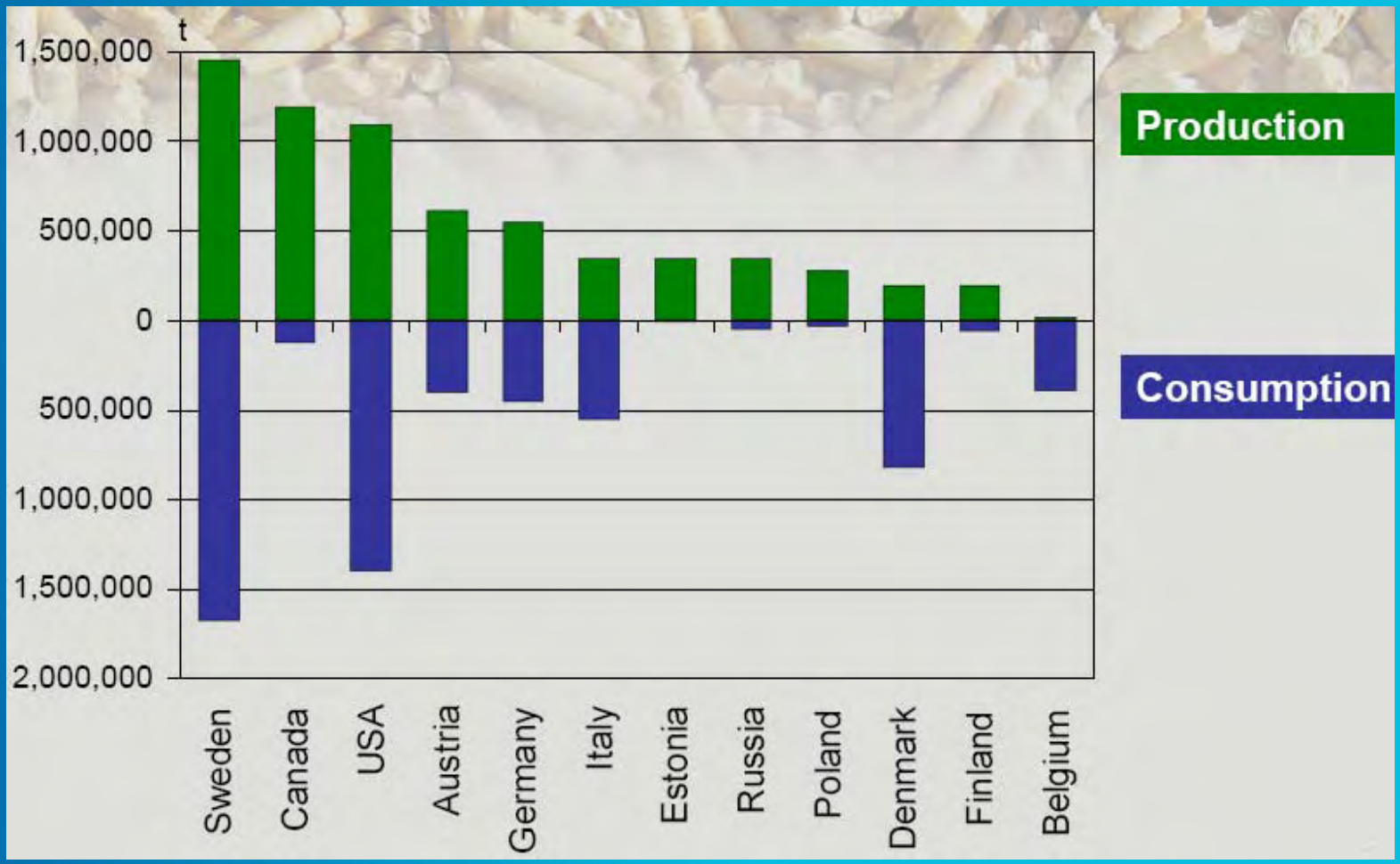
Large Producers, Large Consumers



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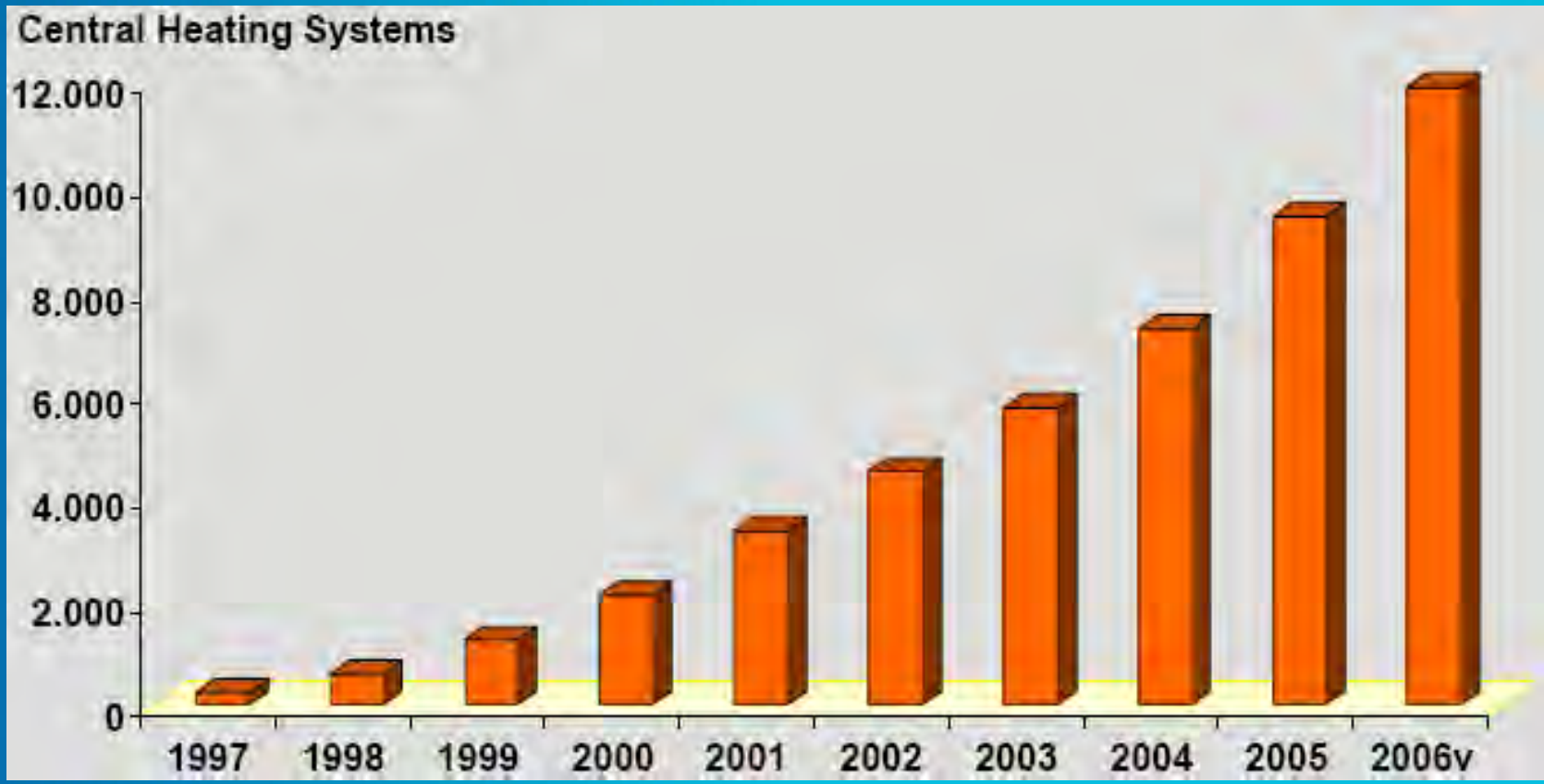
Example of Upper Austrian Market Development



Source: O.O. Energiesparverband

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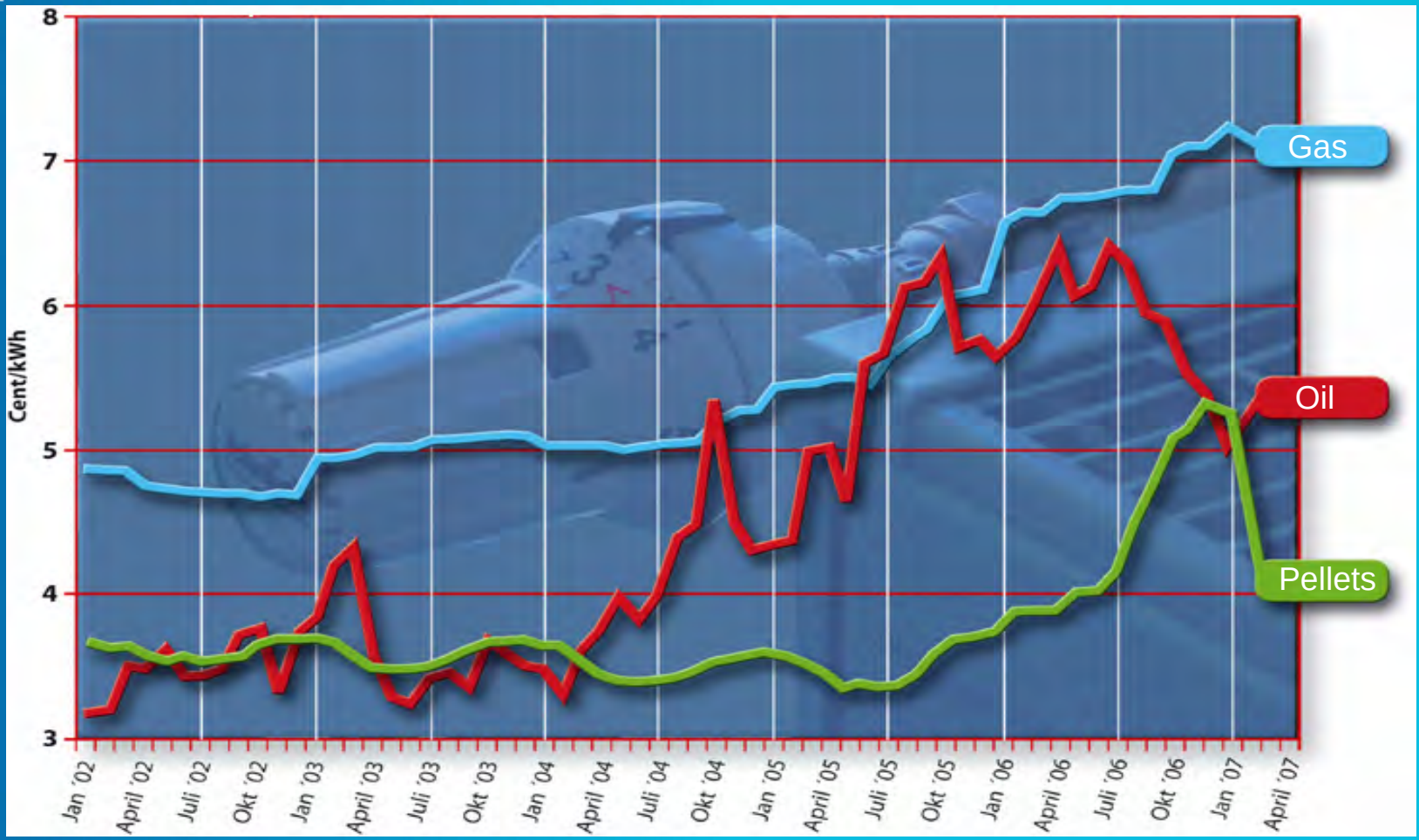
Market Situation in Germany – Comparison to Heating Oil



Source: www.pelletinfo.de

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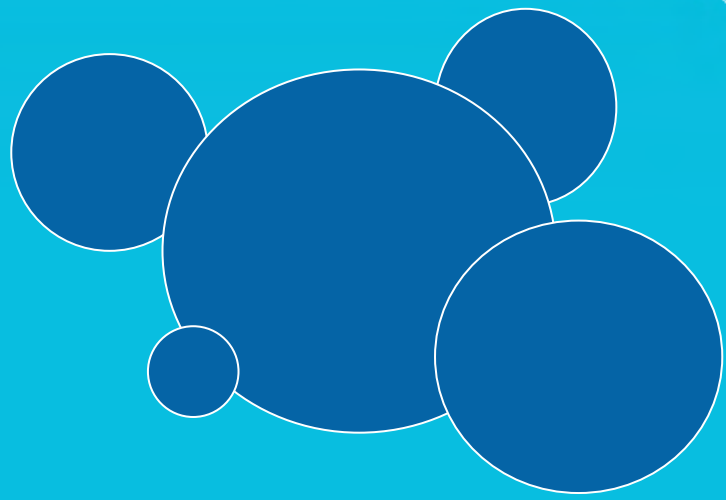
Young Industry, Young Market

- Price very transport cost sensitive
  - **Local and Regional influence of pellets**
- Economy of Scale
- Production is not following the demand
- Seasonal price fluctuations



Radius of producing plant impact

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Opportunities for the Western Balkans

- Usage of pellets:
  - heating
  - combined heat and power production
  - other?
- pellet production
- production of boilers and stoves
- Promising local energy source

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Is this the solution to our oil problems??

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Thank you!

ISTRABENZ GORENJE

For more information:

Istrabenz Gorenje, d.o.o.
Tumova ulica 5
5000 Nova Gorica
Slovenia

andrej.hrabar@istrabenz.si

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Contract: INCO-CT-2004-509205

PERDORIMI I IMPIANTEVE FOTOVOLTAIKE NE SHQIPERI

Prof. Nako HOBDARI
Prof. Raimonda BUALOTI

Trane, MAJ 2007

SHQIPERIA

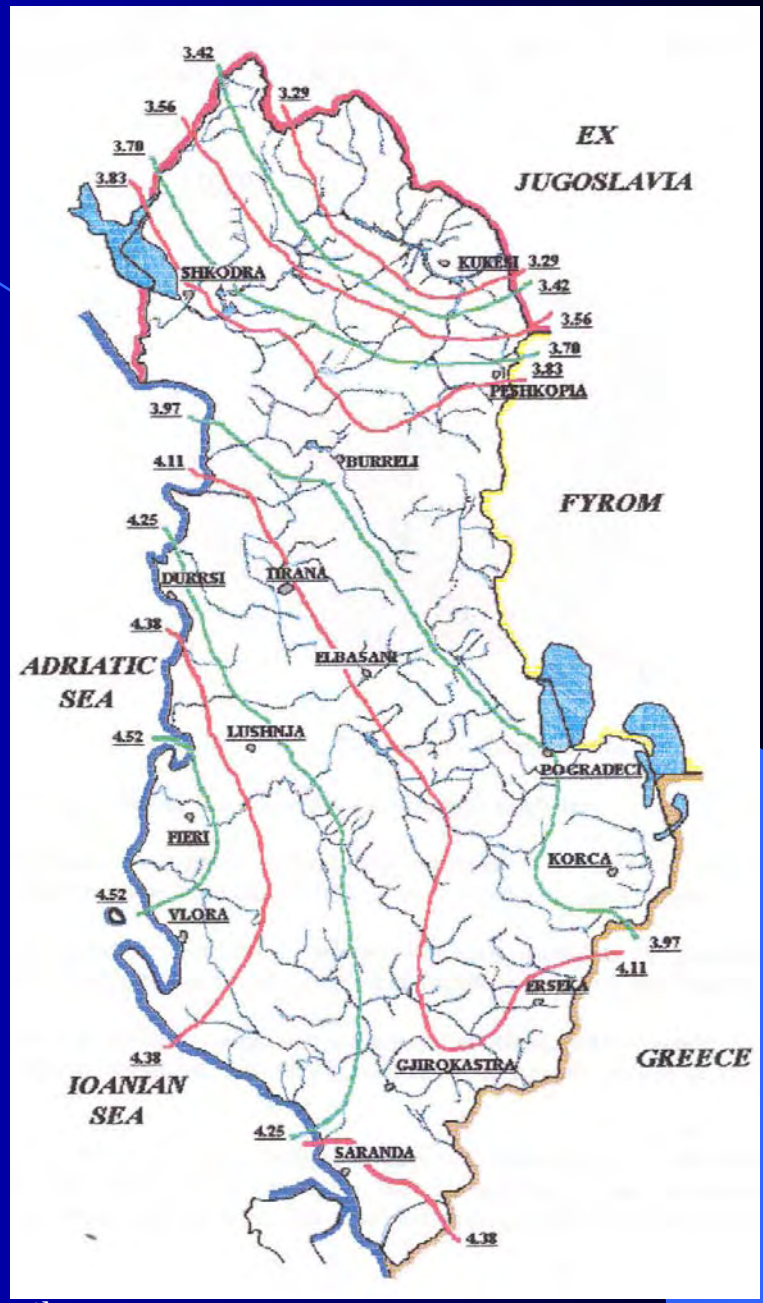
Orë me diell në vit (mes.)

2300 - 2700

SHQIPERIA

Energjia e përftuar nga Rrezatimi diellor

4.5 - 5 kWh / m^2



PERPARESITE

Panelet FV transformojne driten diellore direkt ne energji elektrike.

Shpenzime vjetore shume te vogla dhe jetegjatesi te madhe, 20 deri 30 vjet

Prodhojne energji elektrike pa ndotur mjedisin me papasterti dhe zhurma.

TE METAT

Sot per sot kane kosto te larte
dhe te paperballueshme nga shumica dermuese
e banoreve te botes

APLIKIMET E ENERGJISË FOTOVOLTAIKE.

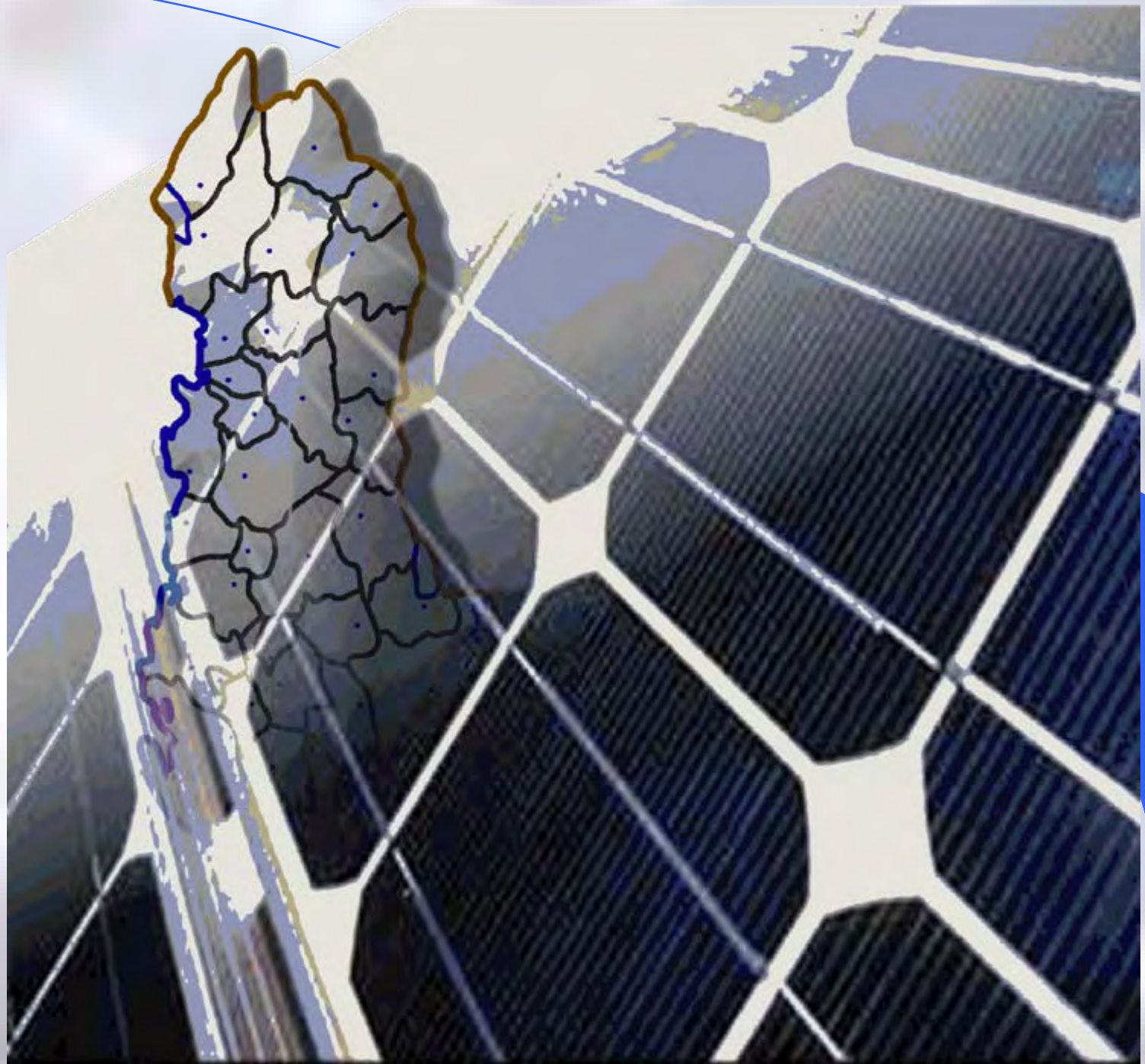
APLIKIMET

- SISTEME AUTONOME
- SISTEME TE LIDHURA ME RRJETIN ELEKTRIK

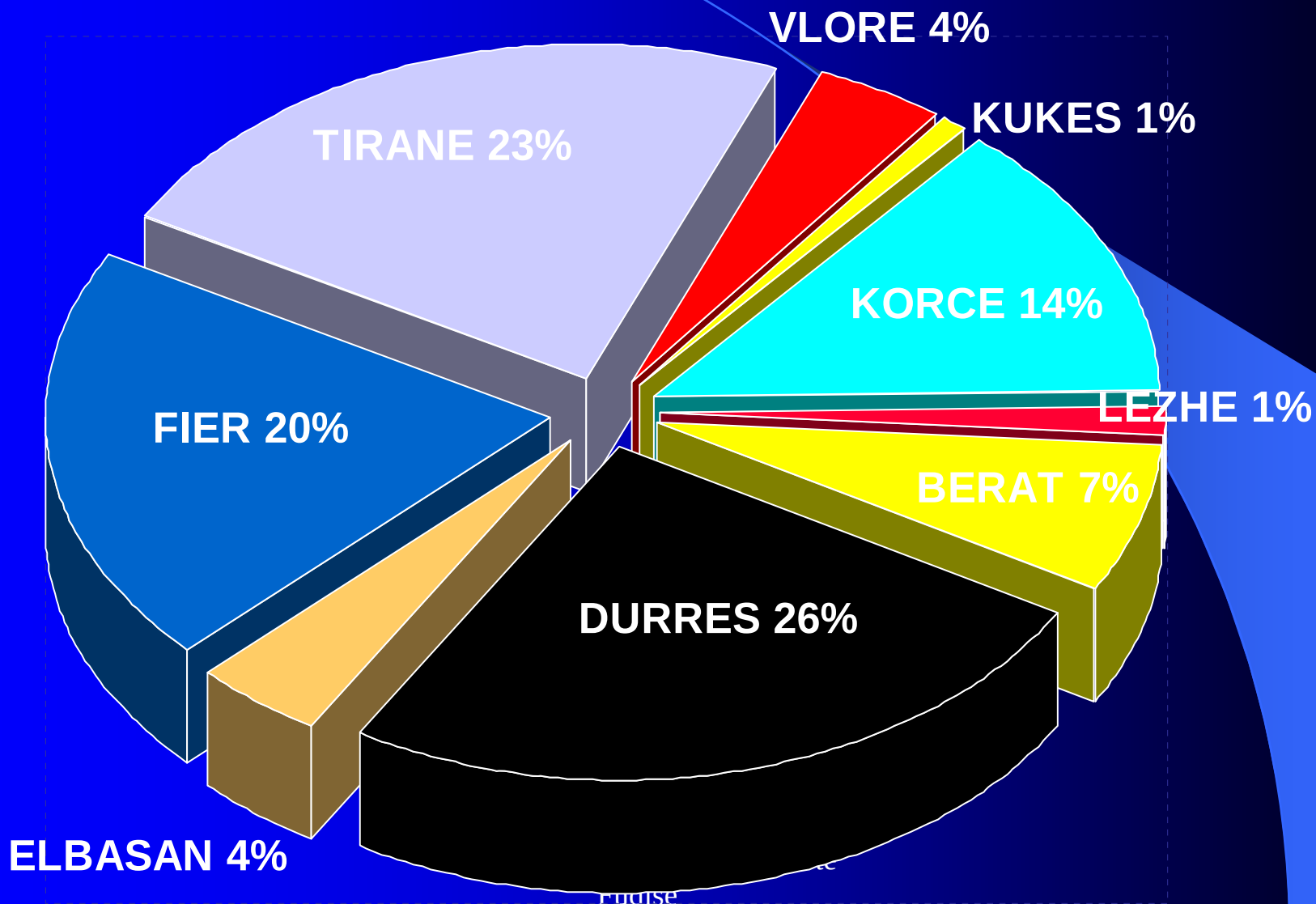
Centrale fotovoltaike
Sisteme te integruar ne ndertesat

FUSHAT E APLIKIMIT TE DERITANISHEM NE SHQIPERI

- TELEKOMUNIKACION
- HEKURUDHA
- AVIACION
- SINJALIZIME
- STUDIME
- OBJEKTE SOCIALE
- BANESA
- FURNIZIM ME UJE
- VADITJE

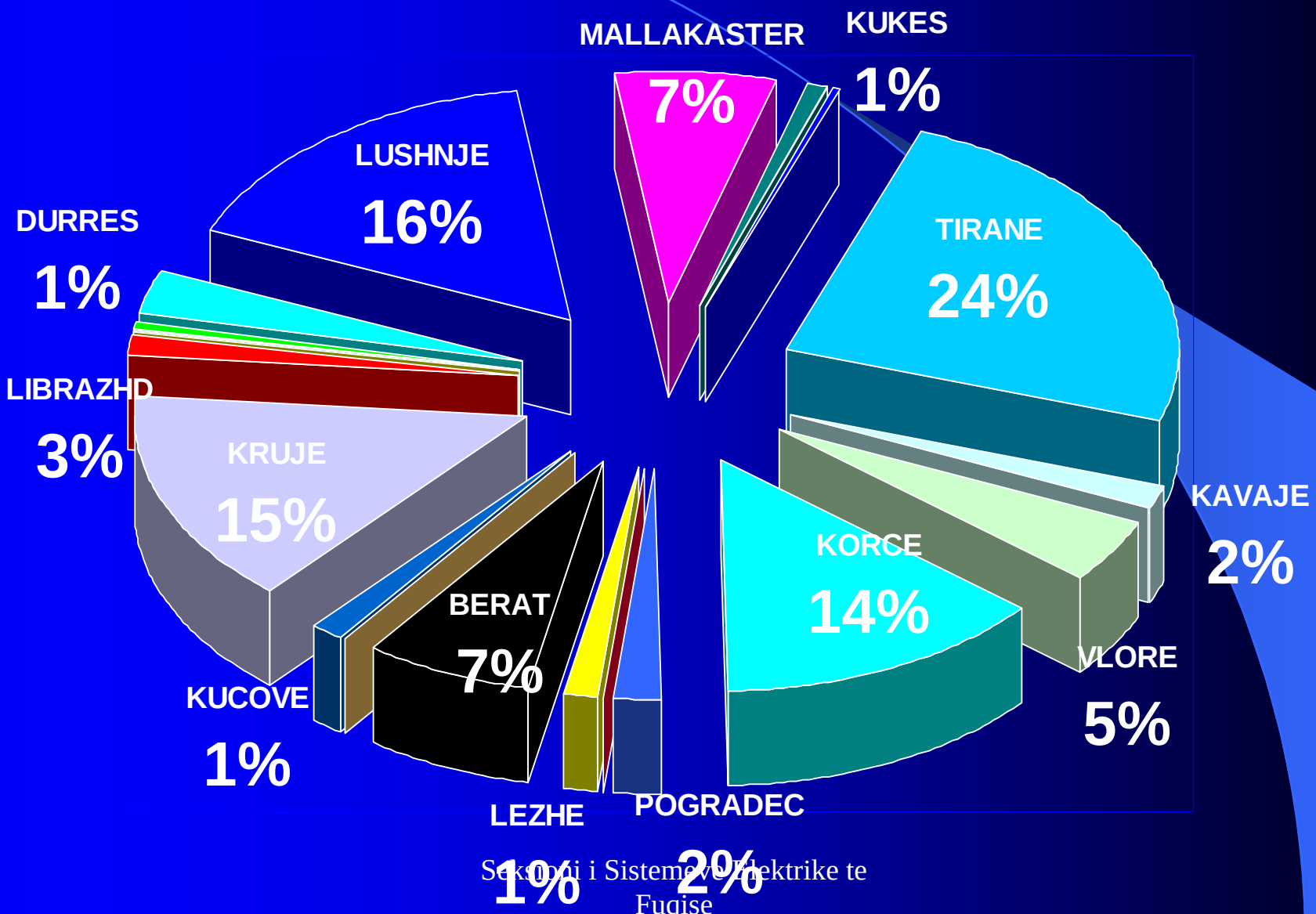


SHPERNDARJA NE % SIPAS QARQEVE

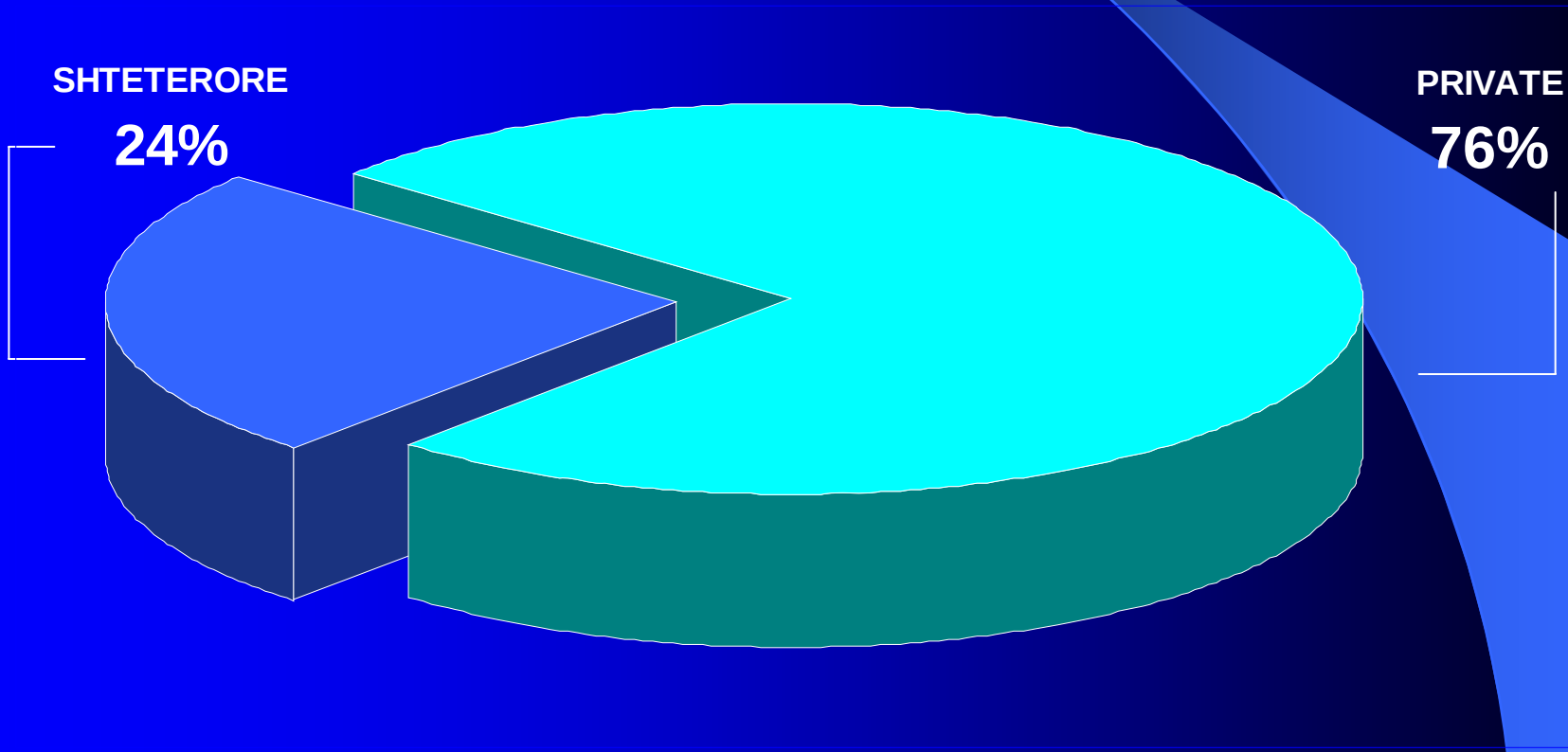


Puqise

SHPERNDARJA NE % SIPAS RRETHEVE



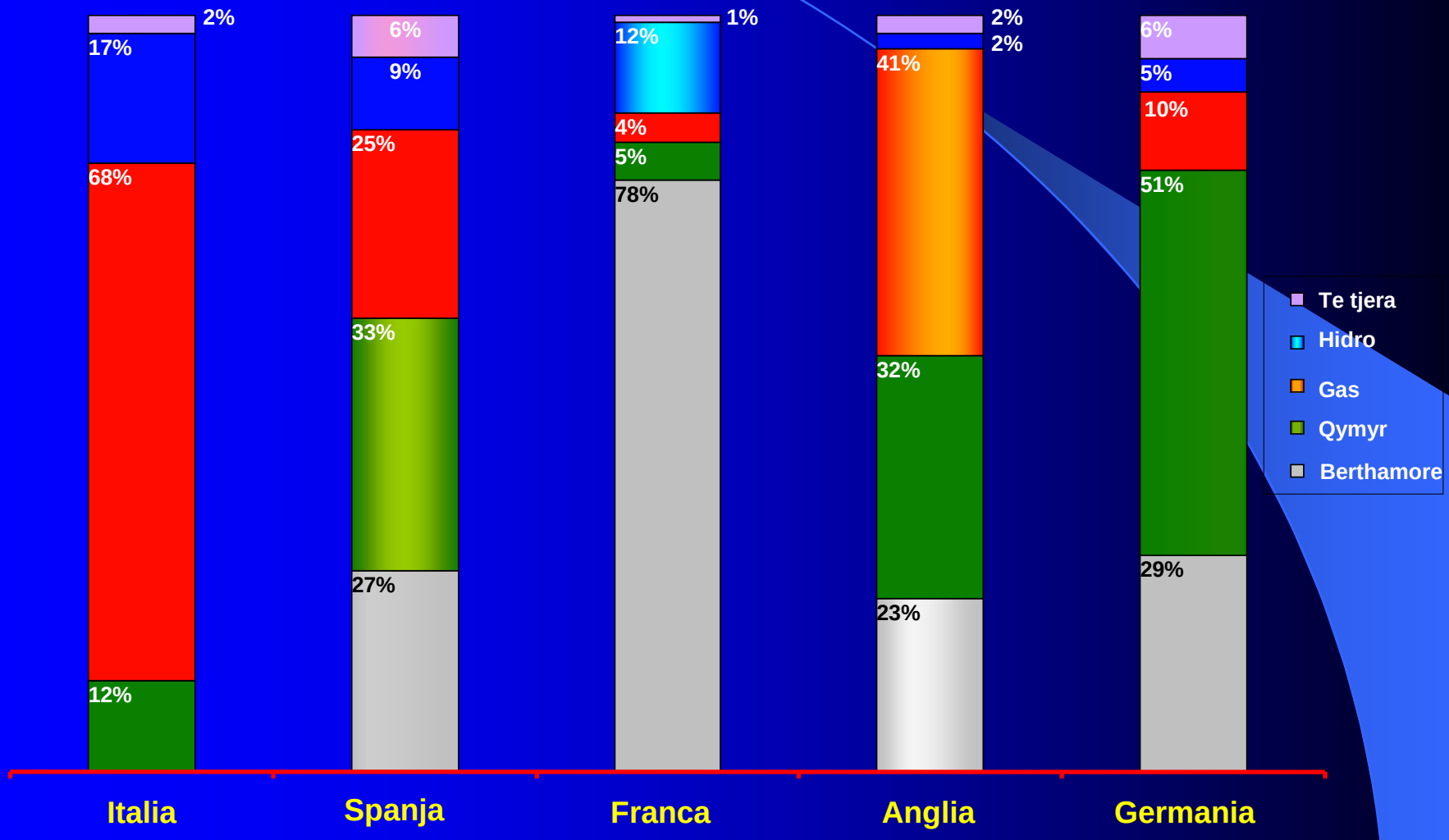
SHPERNDARJA NE % SIPAS PRONESISE



SHQIPERIA

89180Wp

PRODHIMI I ENERGJISE ELEKTRIKE NE DISA VENDE ZHVILLUARA TE EVROPES



POLITIKAT NXITESE PER PERDORIMIN TE IMPIANTEVE FOTOVOLTAIKE NE EVROPE

Austria	Kontrate 20 vjecare per shitjen e energjise me tarife 0.6 €/kWh per impiantet me fuqi deri 20 kW dhe me tarife 0.47 €/kWh per impiantet me fuqi me te medha
Belgjika	Kontrate per shitjen e energjise me tarife 0.15 €/kWh
Franca	Kontrate 20 vjecare per shitjen e energjise me tarife 0.15 €/kWh per impiantet me fuqi deri 1 MW
Gjermania	Kontrate 20 vjecare per shitjen e energjise me tarife minimale 0.46 €/kWh deri 0.57 €/kWh
Greqia	Shitjen e energjise me tarife 0.07 dhe 0.08 €/kWh Financohet me 40 – 50% investimet per impiantet per perdorime komerciale me fuqi mbi 5kW

Portugalia	Llogaritja e energjise me tarife 0.41 €/kWh per impiantet me fuqi deri 5 kW dhe 0.224 €/kWh per impiantet me fuqi mbi 5 kW
Spanja	Llogaritja e energjise me tarife 575 % e vleres mesatare vjetore te tarifes se en. el. per impiantet me fuqi deri 100 kW dhe me 300 % per fuqi me te medha me kontrata 25 vjecare e cila mund te reduktohet duke ndryshuar tarifat (0.41 – 0.22 €/kWh ne vitin 2004)
Italia	Kontrate 20 vjecare per shitjen e energjise me tarife 0.445 €/kWh per impiantet me fuqi 1 deri 20 kW; 0.46 €/kWh per impiantet me fuqi deri 50 kW dhe me tarife 0.49 €/kWh per impiantet me fuqi me te medha Per impiantet FV te integruara ne arkitekturen e godinave, tarifat rriten me 10 %. (Dekdreti Ministror I dates 06.02.2006)

Ne vitin 2005 fuqia e FV te instaluara ne bote u rrit me 40% kundrejt nje viti me pare.

Ne vitin 2005 jane instaluar 1.727 MW FV, kundrejt 1.200 MW ne vitin 2004.

Sipas publikimit te revistes amerikane PV News, Europa eshte vendi ku eshte rregjistruar rritja me e madhe ne sektorin FV, me shume se edhe ne Japoni.

Shtetet e Bashkuara te Amerikes kane patur gjate vitit 2005 nje rritje vetem me 10% kundrejt vitit 2004.

MBAS DALJES SE DEKRETIT MINISTROR NE ITALI

Deri ne fund te muajit Mars 2006:

U bere 15.290 kerkesa, per nje fuqi prej 1.274 MWp,

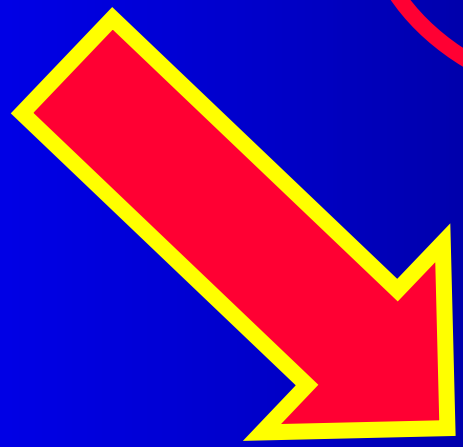
Nga te cilat:

1-50 kWp ..... 13.827 kerkesa per gjithsej 365 MWp, kundrejt fuqise vjetore parashikuar per tu nxitur prej 60 MWp

50-1000 kWp ..... 1.463 kerkesa per gjithsej 909 MWp, kundrejt fuqise vjetore parashikuar per tu nxitur prej 25 MWp

PRA:

PLANIFIKUAR **390 MWp**



KERKESA **1274 MWp**

DERI TANI NE SHQIPERI NUK KA ASNJE VENDIM PER NXITJE MATERIALE PER PERDORIMIN E BURIMEVE FOTOVOLTAIKE


Faleminderit !