



Prospects for Development of Solar, Wind, Biomass and Geothermal energy in Albania

National Agency of Natural Resources
Tirana 15 January

Overview

Political important processes in Energy sector are:

- EU Accession,
- Stability Pact,
- Energy Community for South East Europe,

Lessons learnt from EU countries;

Opportunities for renewable energy use in Albania

Legislation regarding renewable energy sources

- Albania transposed in national legislation the provisions of:
- **Directive 2001/77/CE** regarding promotion electricity produced from renewable energy sources
- **Directive 2003/30/EC** for promoting the use of bio-fuels and other renewable fuels for transport

Renewable energies

- considerable energetic potential
- improvements in the security of supply
- offers unlimited resources of use on local and national plan
- reduce air pollution and greenhouse gas emissions
- improvement in the economic and social prospects of country

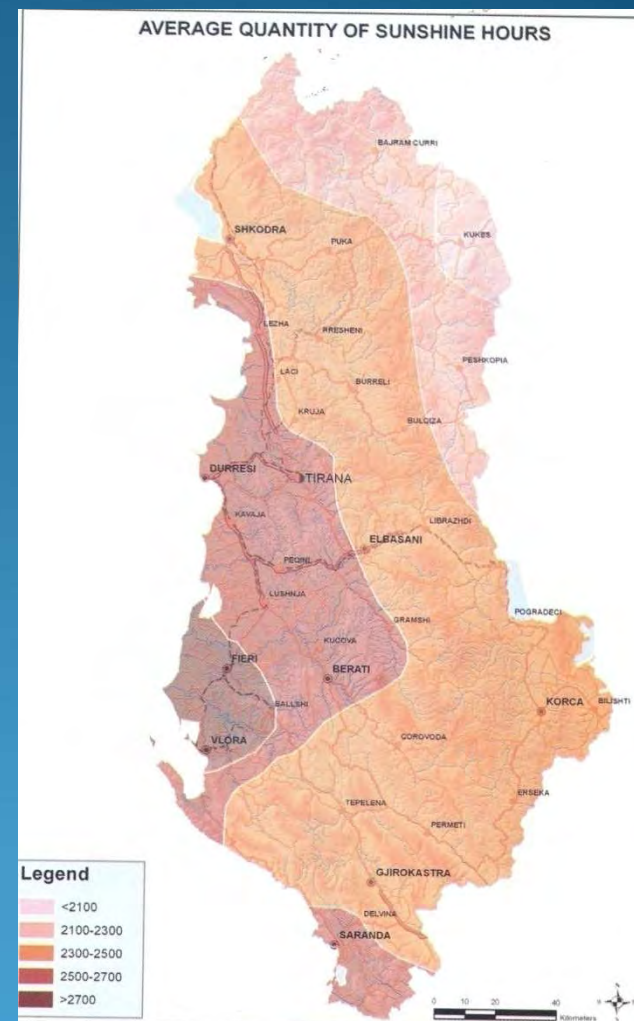
Legislation regarding renewable energy sources

- In 2008 we drafting law “On Renewable Energy Resources”
- This law promote the production of electricity from renewable energy sources in order to:
- Enhance energy security supply;
- Protection of the climate and protection of the environment;
- Increase of the share of renewable sources in consumption of primary energy sources;
- Establishment on a preferential basis on the internal electricity market the production of electricity from renewable energy sources and high-efficiency cogeneration plants on the basis of rules and principles.

RENEWABLE ENERGY RESOURCES

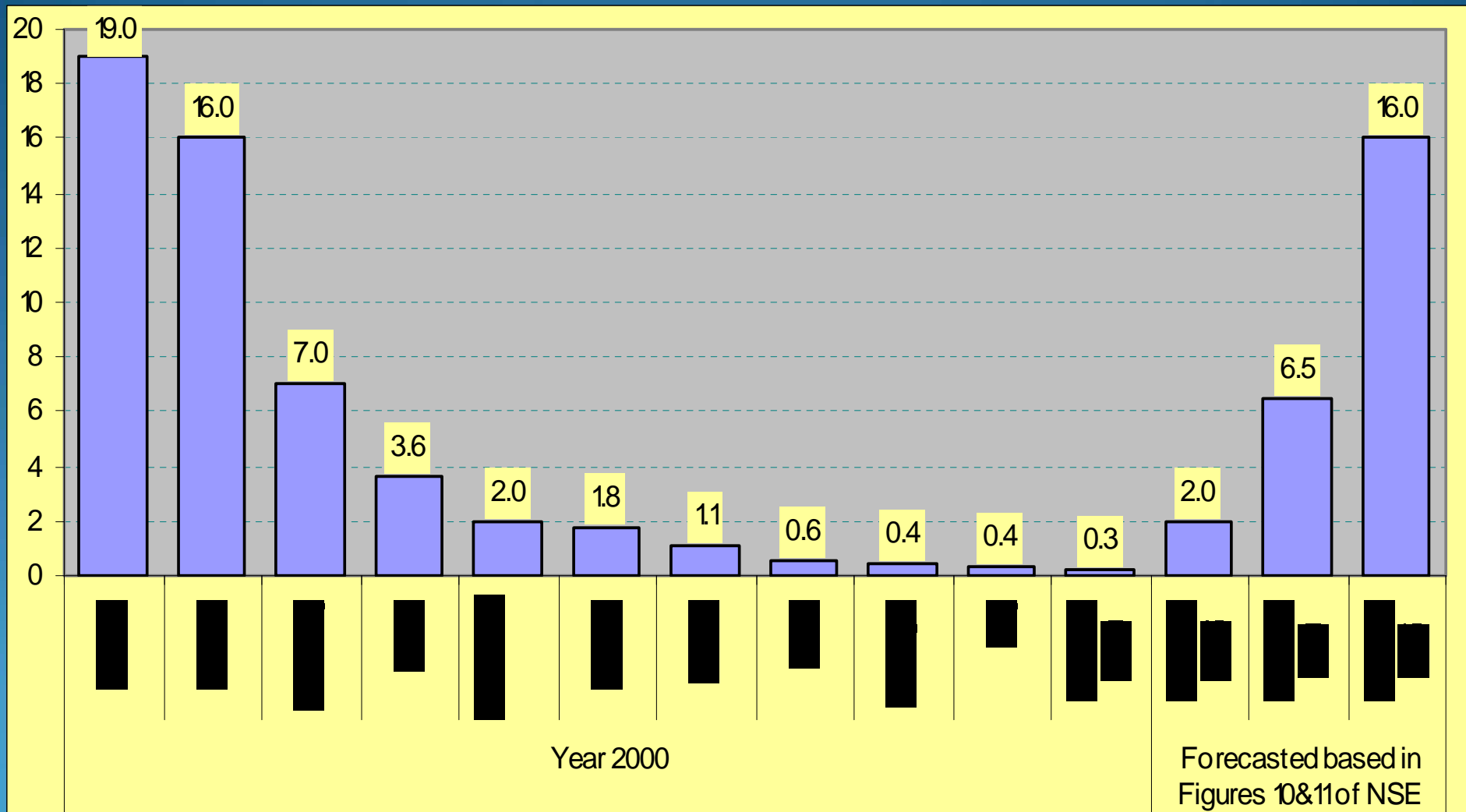
Solar

- In Albania, average solar radiation is 1500 kWh/m² per year,
- Maximal radiation is 2200 kWh/m² per year
- The annual sunshine of the whole territory of Albania is about 2400 hrs per year
- The western coastal part and southwestern sunshine duration is about 2815 hours per year

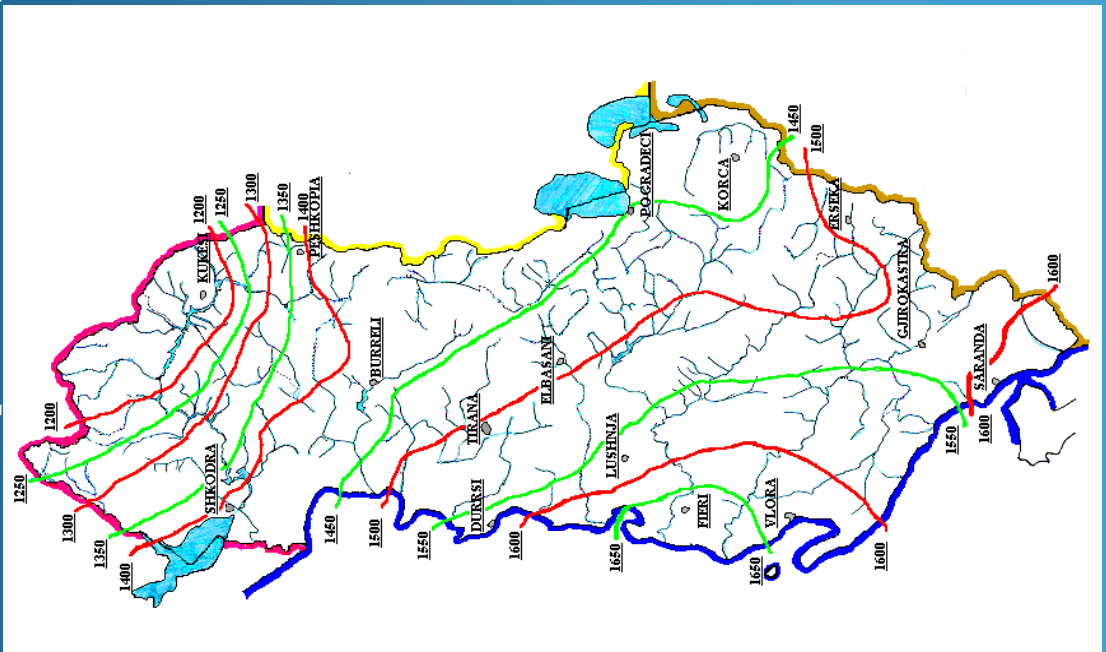


Average quantity of sunny hours

Solar Water Heating Systems Penetration in Different Countries (m²/1000 inhabitants)

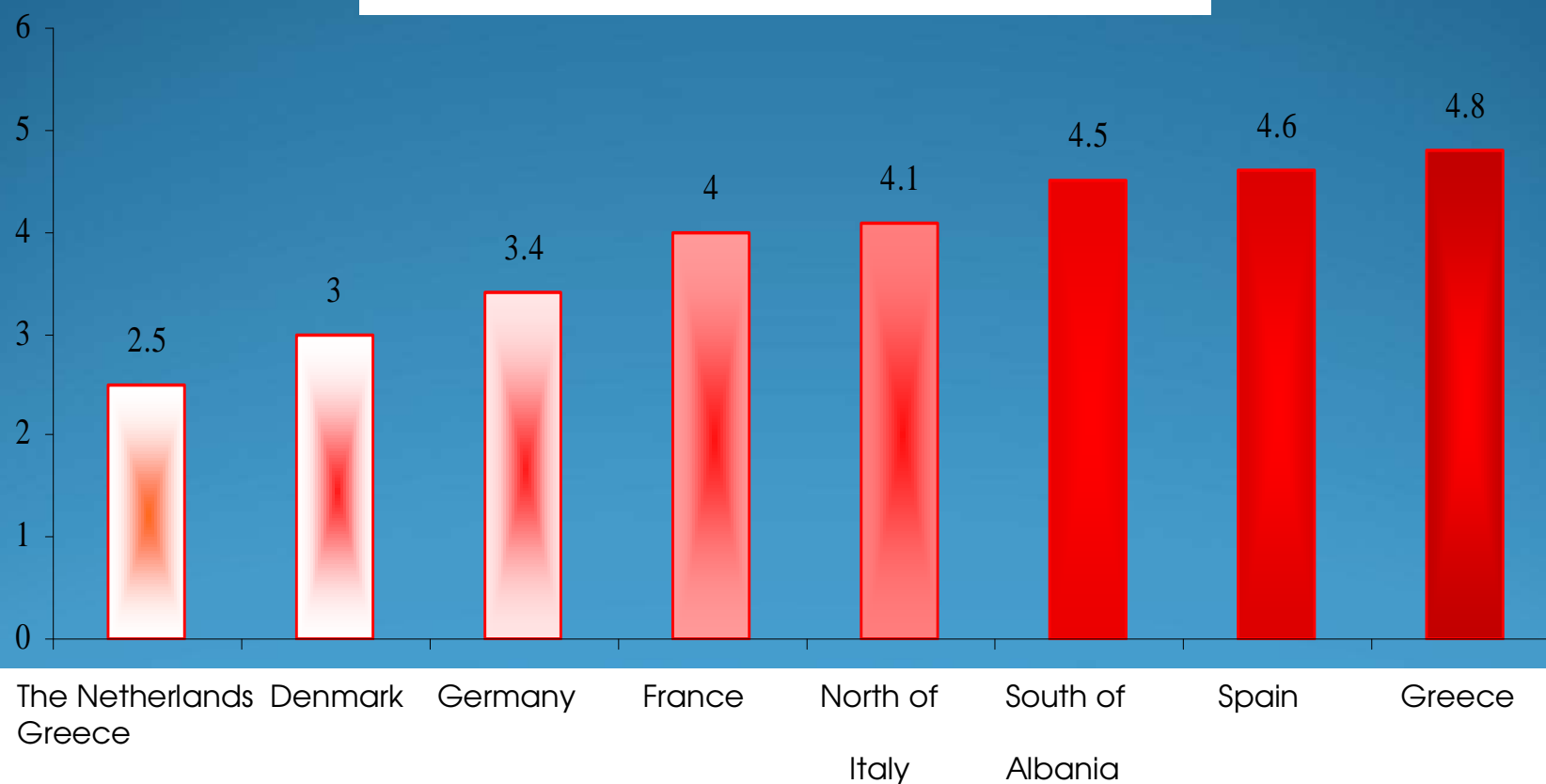


Average Annual Solar Radiation in Albania (kWh/m² year)



Average Daily Solar Radiation for some European Countries and Albania (kWh/m² per day)

Kwh/m2 day

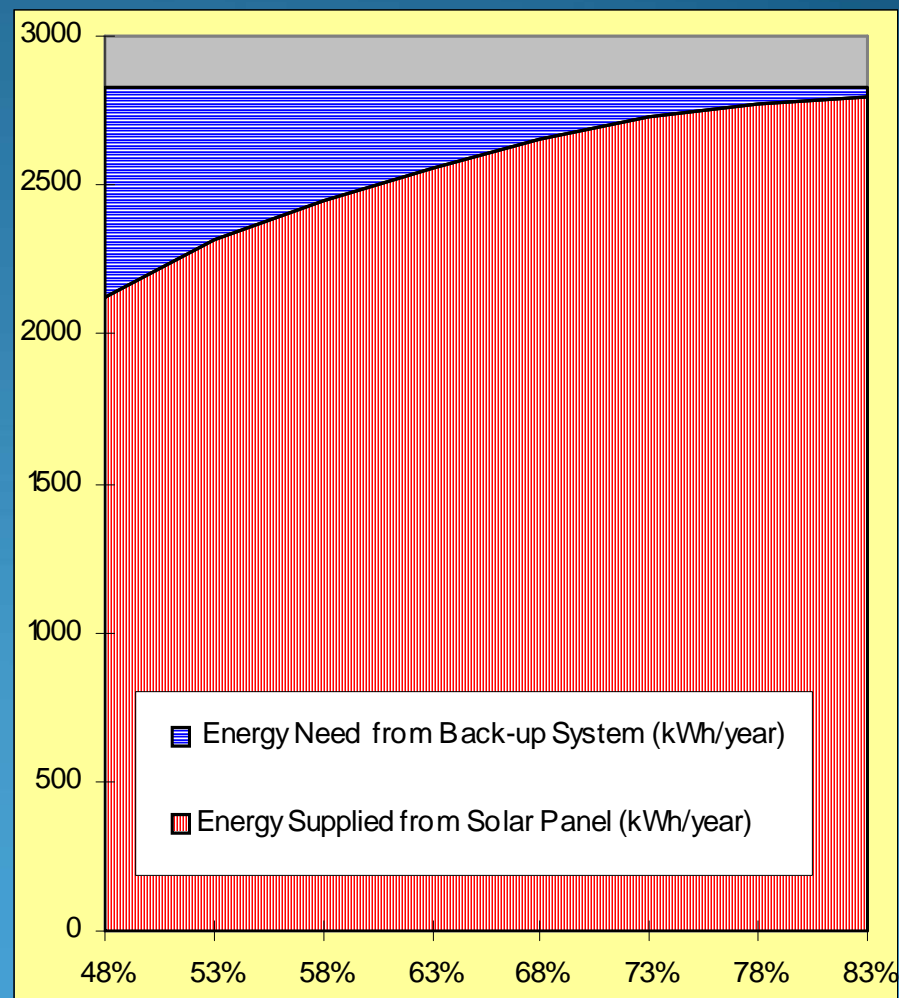
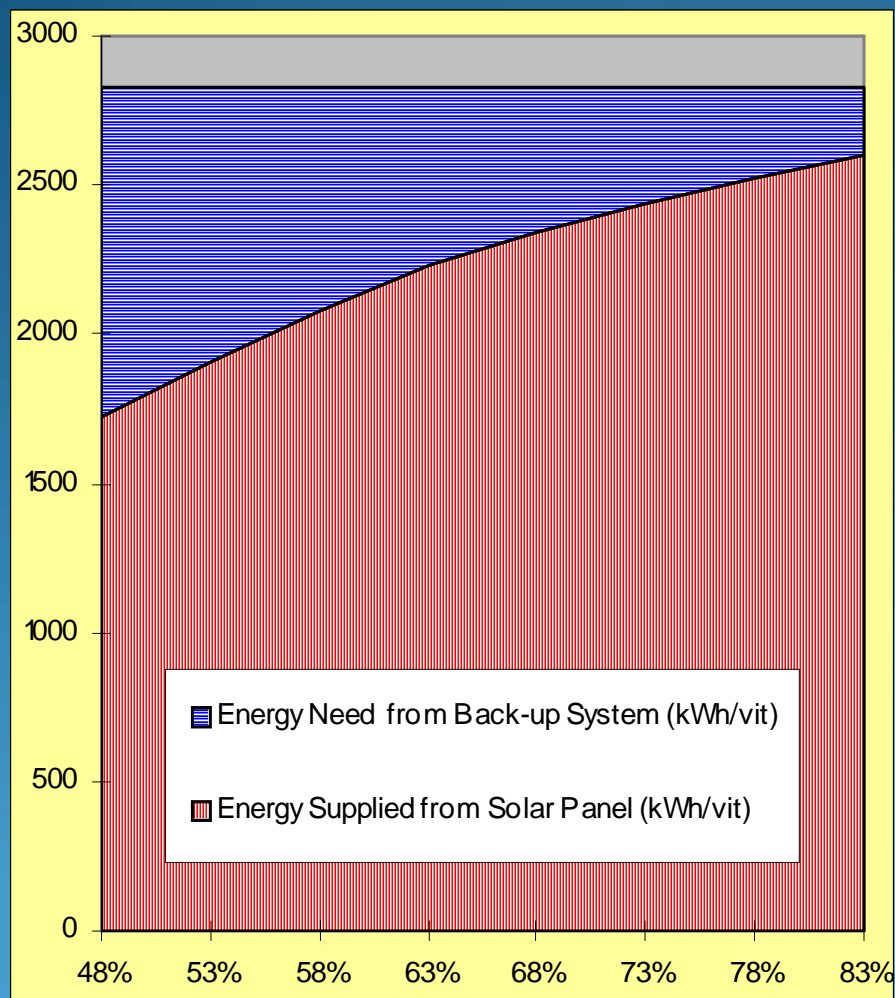


Average Daily Solar Radiation for some European Countries and Albania (kWh/m² per day)

- Compared with the average daily solar radiation in The Netherlands of 2.5 kWh/m² per day, in Denmark less than 3 kWh/m² per day, in Germany 3.0 - 3.8 kWh/m² per day, in France and North of Italy 3.8-4.6 kWh/m² per day, in Spain 4.6 kWh/m² per day, and in Greece more than 4.8 kWh/m² per day, Albania has the average daily solar radiation of 4.0 kWh/m² per day and in South of Albania 4.5 kWh/m² per day.
- The comparison of the average daily solar radiation ratio for the above mentioned European countries and Albania is summarized in the Figure. As we can see from this Figure, Albania must be considered as a country with a good solar energy potential.

Energy Supplied from Solar System and Energy Need from Back-up System versus Solar System Efficiency for Peshkopi and Saranda region

(kWh/year)



Energy Supplied from Solar System and Energy Need from Back-up System versus Solar System Efficiency for Peshkopi and Saranda (kWh/year)

As it is shown on the above Figures, by considering the average efficiency of solar water heating systems installed in Albania (55 %), the SWHS covers for the district of Peshkopia 68 % of yearly energy demand required for the hot water preparation, meanwhile it covers 86 % for the district of Saranda.

Promotion of solar energy for preparation of hot water

a) In 2007, a total of 7000 m² were installed (60% by services, 40% by households), bringing total installations to 15,000 m² (equivalent to around 55 GWh/y or 1.1% of electricity consumed by households in 2007).

b) Installation of solar panels systems in public and private service. EU through EEC and Two German Foundations instalment 168 m² SHWS and 28 m² PV .

f) Include of solar panels for domestic hot water on the fiscal facilities law.

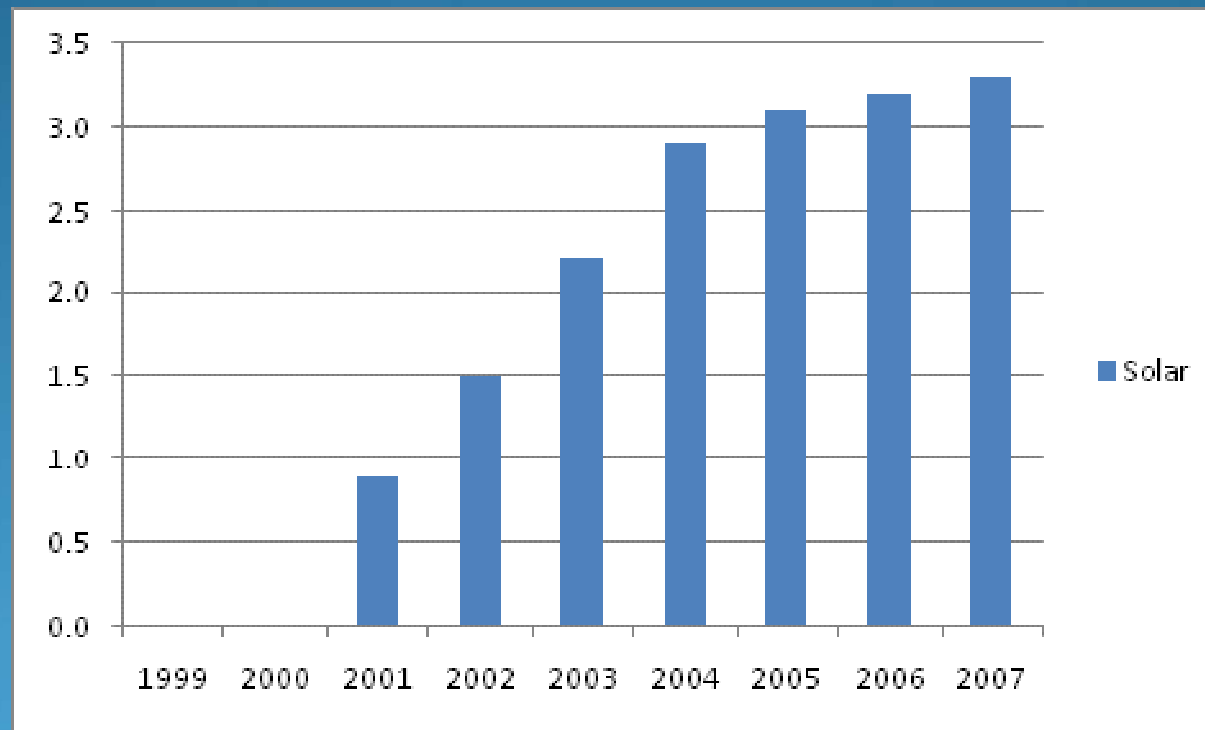
g) Organization the awareness campaigns in Tirane, Shkoder Kukes, Fier and Gjirokaster for installation of solar panels in service sector during 2008.

The barriers for solar water heating systems

- The current cost of solar systems of sufficient capacity to meet the domestic hot water needs of a typical Albanian household is higher, that represents approximately 50% of the annual income of that household.
- The relatively low capital costs for the commonly used electrical hot water equipment in the household sector make it difficult for the solar systems to compete on either a capital cost or a life cycle cost.
- Cost of electricity used in this sector is still low, making the situation more favourable for the electrical water heaters.
- Low electricity prices and non-payments are obstacles.
- The existence of operational water supply networks is a vital precondition for a broad scale utilisation of solar energy for hot water preparation.

SOLAR ENERGY PRODUCTION

- Solar energy production for 2007 has been about 3.3 ktoe



Steps to further development of solar thermal market in Albania

- Incentives in the form of tax credits or soft loans for solar thermal system applications in new and existing buildings should be established as soon .
- Efforts for developing and local manufacturing of solar water heating systems. This would contribute to a significant reduction on the price of a domestic system, since reductions are not easy to achieve on imported products.
- Incentives towards demonstration projects i.e. co-financing of the Government in the demo-projects aiming to promote solar thermal applications in the country should be available.
- Information and education campaigns which have been proved to be effective in other Mediterranean countries , must be applied.
- A greater participation of the Albanian institutions in research and demonstration of solar technologies is expected. Funds to promote feasibility studies and demonstration projects as well as to allow for participation in international exchanges of information on solar technologies should be available.

WIND ENERGY RESOURCES

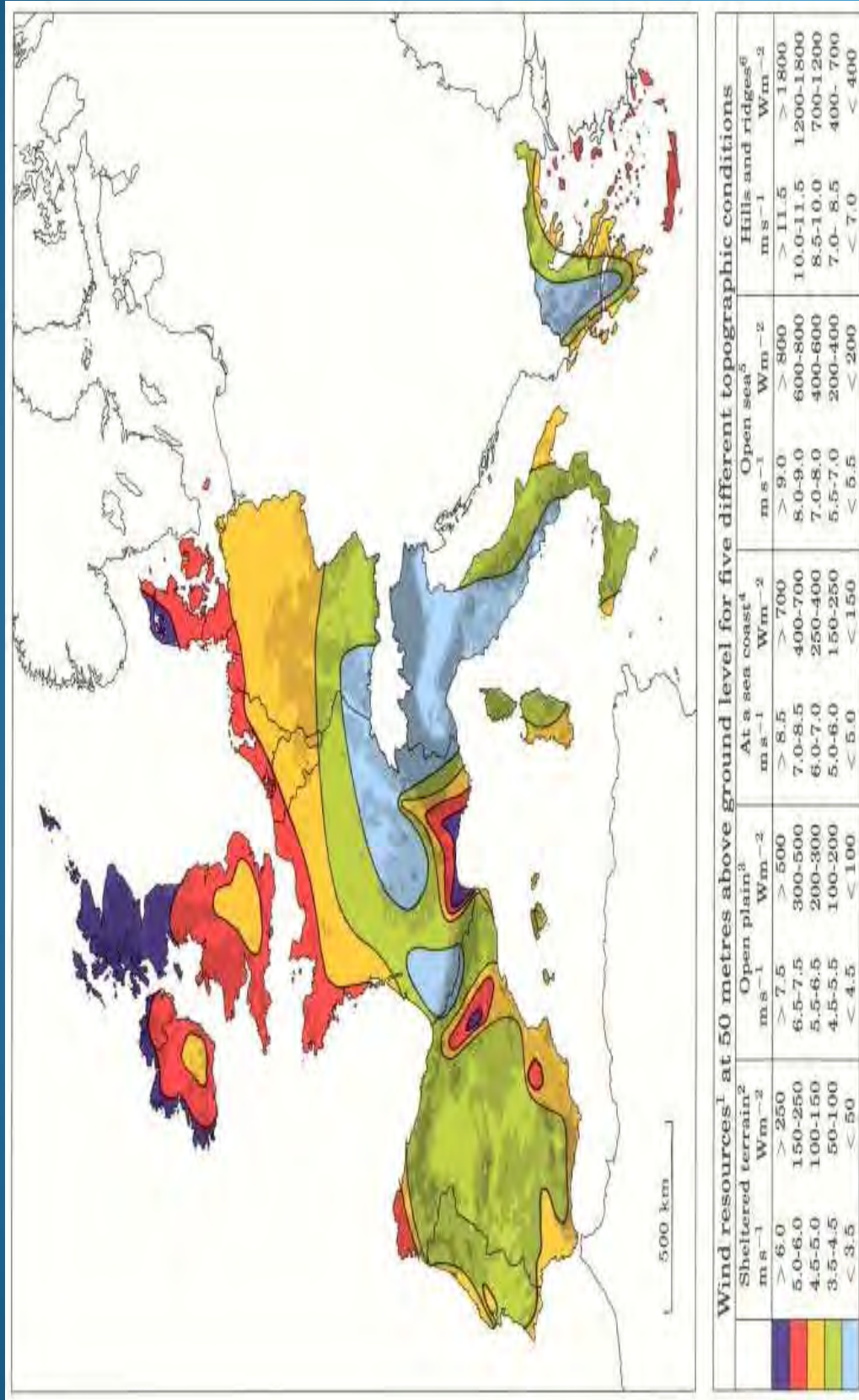
- The wind regime in Albania is closely connected with the regime of baric centres, with its position relating to these centres, with the direct influence of Adriatic and Ionian Seas.
- Wind Energy is a potential possibility for power generation use in Albania.
- The average speed of wind, throughout the year, is around 4-6 m/s (10 m height), and the average energy density is 150 W/m².
- In Albania we have average 4200 hours with wind per year.



Annual average wind speed

European wind resources at 50 meters

a.g.l.

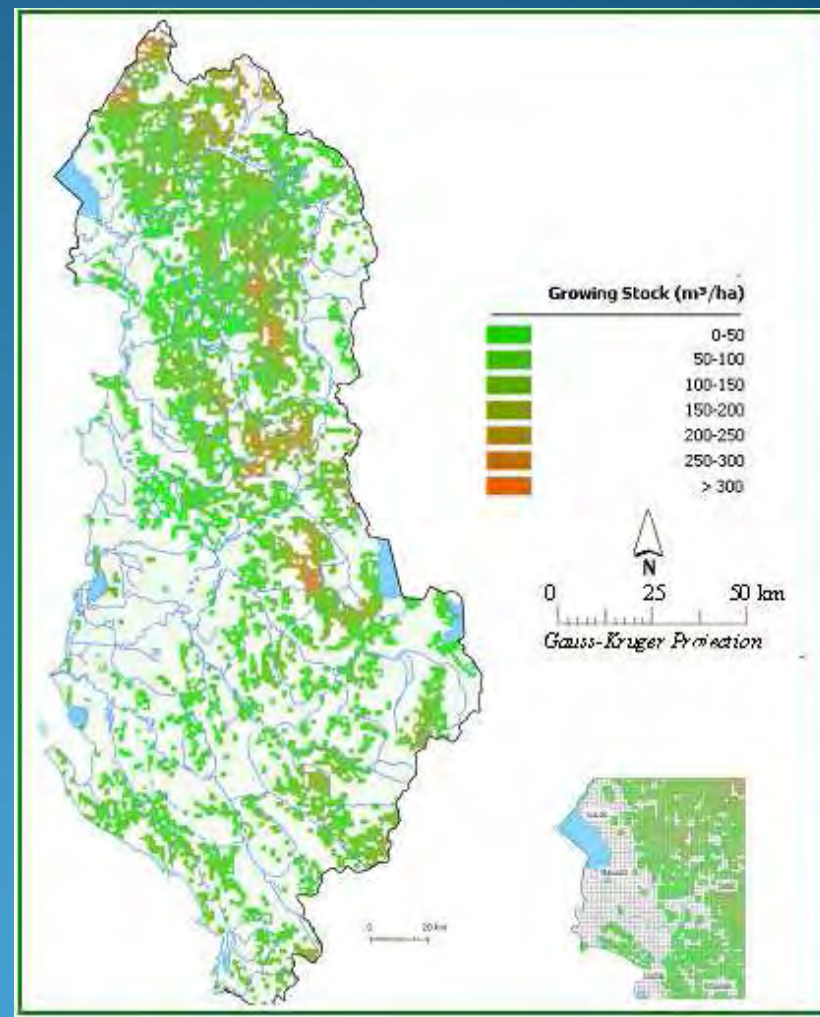


Potential of biomass in Albania

- Biomass as an energy source is closely associated to *forestry, agriculture, livestock breeding, agrofood industries and urban waste*.
- The situation of these sectors and the policy followed from the government is important for assessing the future of biomass in Albania.
- Potential of energy from biomass is 14.3 Mtoe

WOOD RESOURCES

- Total proven reserves on wood as fuel is about 6 Mtoe
- Wood production for 2007, is 215 Ktoe/year
- Wood resources are classified in :
 - high forests which represent 47-50% of the total wood resources,
 - cropses which are 29-30% of total resources
 - bushes which are 24-25% of total wood resources



Energy from Agro residues

- Land cultivation was abandoned during the first transition period and now is gradually recovering. One should note the small size of holdings, the absence of capital investments, the deficit in agricultural products and the large portion of non yet cultivated land.
- The consequence is that active farmers will strive for cultivating more land or use more intensive methods of cultivation in order to increase their production and ameliorate their income.
- Both actions seem far more promising than the exploitation of agricultural biomass.

Energy from animal residues and Energy from Solid and Urban Waste

Energy from animal residues

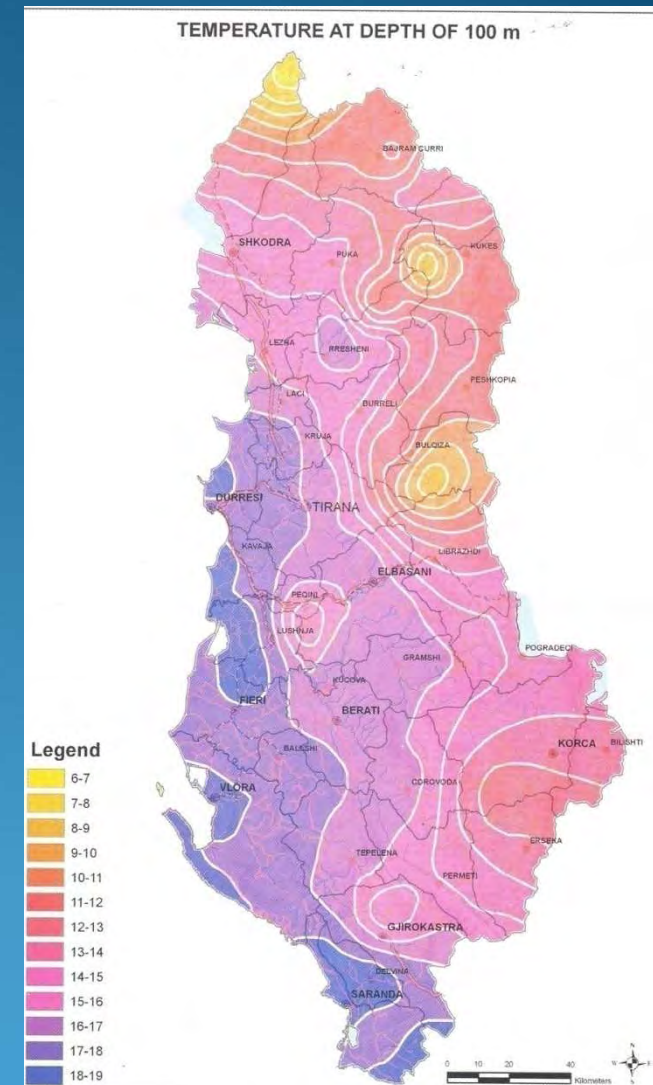
- Dispersion is also the problem in the livestock breeding sector. The absence of modern units for intensive breeding renders collection of significant quantities of manure impossible. It is clear, as in agriculture, that there are higher priorities than biomass exploitation.
- We assess energy from agricultural residues about 130 toe.

Energy from Solid and Urban Waste

- Up to now nothing concrete exists, except an increasing interest in the municipalities to cooperate and profit from the experience of EU companies specialised in urban waste treatment.

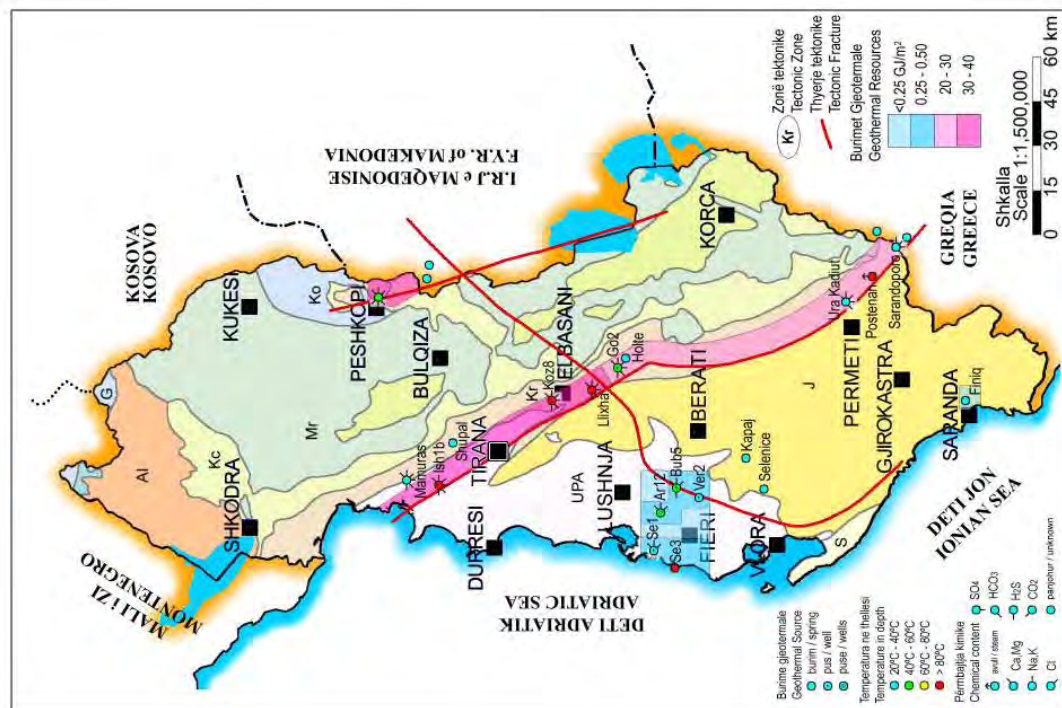
GEO THERMAL ENERGY RESOURCES

- Albania, actually is in the feasibility phase of assessment of the geothermic energy use potential
- Energy heating flows is from 40 mW/m² to 61.8 mW/m²
- The geothermic situation of Albanides presents two directions for use of geothermic energy:
 - The thermal sources with low enthalpy
 - The usage of the depths of the abandoned wells



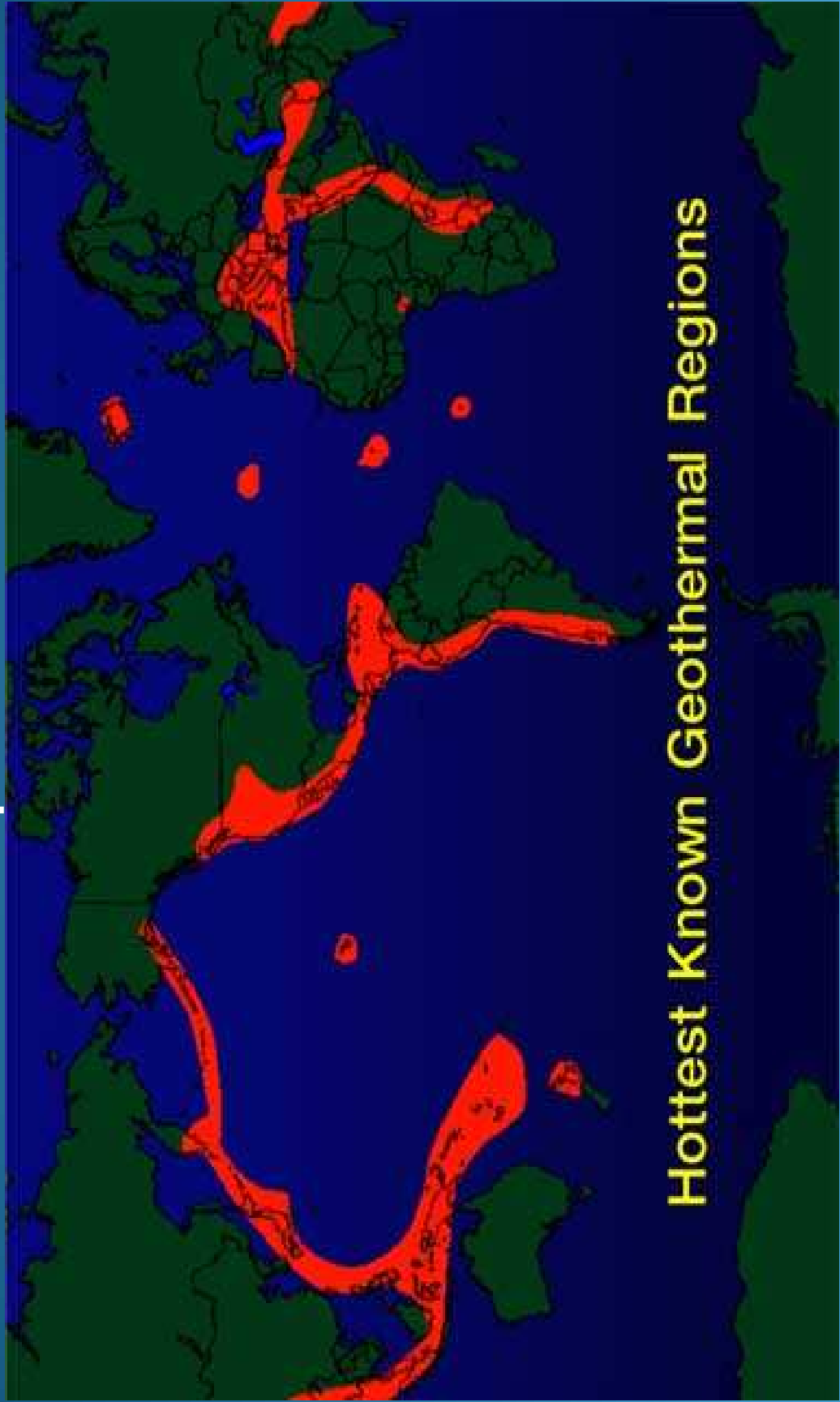
Temperature at depth of 100 m

GEO THERMAL MAP OF ALBANIA



Harta tematike gjeotermale
Geothermal Thematic Map

Position of Albania versus world Geothermal potential area



Thermal water sources and wells in Albania

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The water from natyral spring in Tirana, Elbasan, Gramsh, Peshkopi, Permet, Leskovik and Saranda have temperatyre from 21 to 60 degree celcius.

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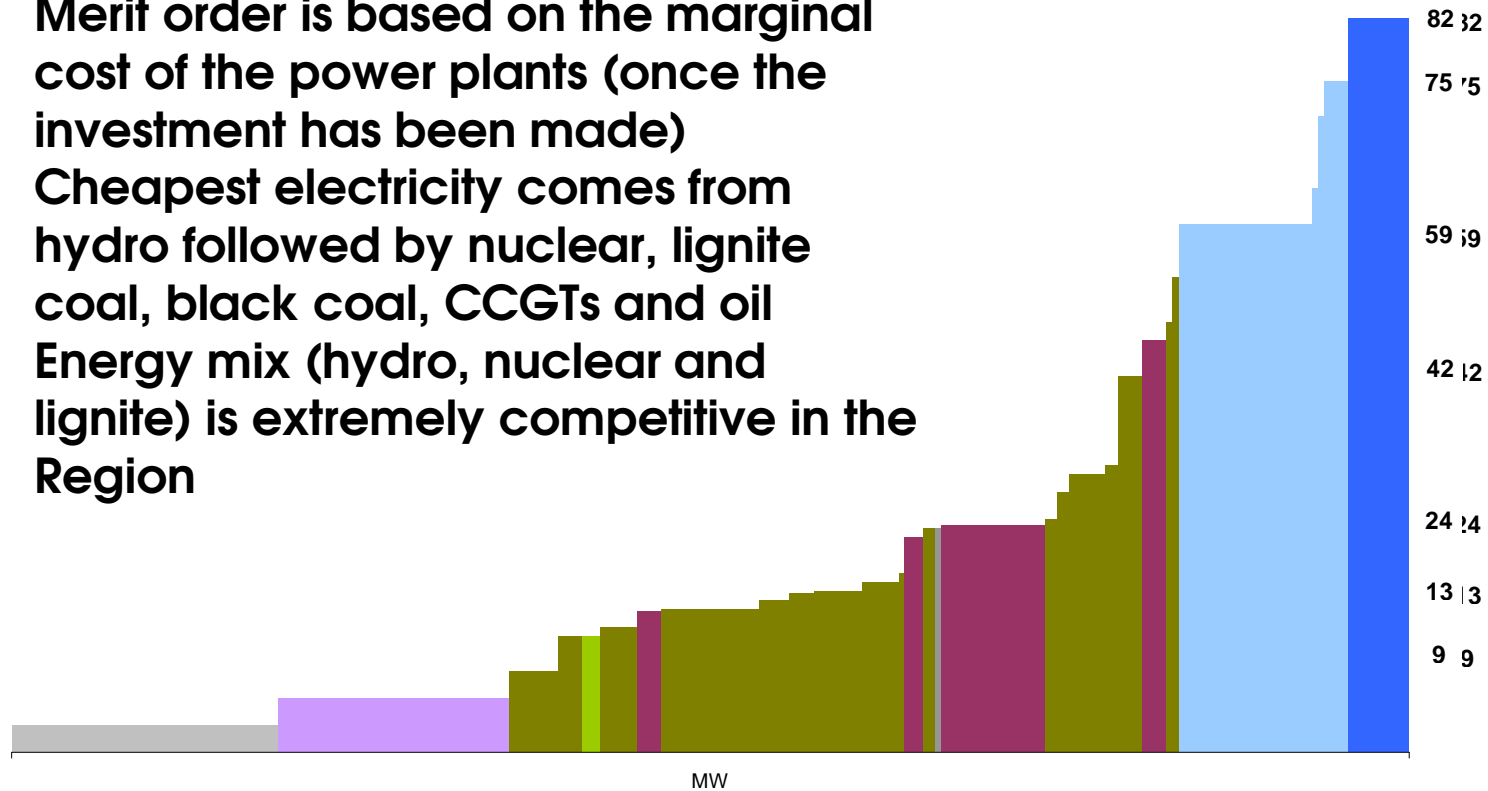
The water from deep wells in Elbasan (Kozan), Gramsh (Galigat), Durres (Ishem), Fier (Ardenice, Seman) have temperatyre from 29.3 to 65.5 degree celcius.

Our preliminary assessment in this fild determinate:

- 1.- 4700 kw potential in Elbasan
- 2.- 1600 kw potential in Peshopi
- 3.- 644 kw potential in wells of Ishmi (Tirana)

Regional energy market merit order

Merit order is based on the marginal cost of the power plants (once the investment has been made)
Cheapest electricity comes from hydro followed by nuclear, lignite coal, black coal, CCGTs and oil
Energy mix (hydro, nuclear and lignite) is extremely competitive in the Region



Res in Albania

- Till now no wind installations in country.
- No reliable data. Eight projects are in process with 1500 MW power installed capacity
Promising site along the Adriatic coast:
 - average speed 4-6 m/sec (10m height)
- Biomass : Till now no installations
- No reliable data. One project is in process with 140 MW power installed capacity
 - ~ 6 Mtoe of wood
 - ~130 toe agricultural residues
 - ~340 toe biogas from animal waste



SOME ENERGETIC DATA AND COMPARISONS FOR NEIGHBOR COUNTRIES

ALBANIA (3.2 miln)	MACEDONIA (2.1 miln)	GREECE (10.6 miln)	INDICATOIRES (Total per Annum) (per Capita)
1 537 000 0.48	2 856 000 1.36	29 998 000 2.83	TPES Energy Consum.total brutto.....(TOE)
4 800 000 1.50	1 050 000 0.50	6 042 000 0.57	Hydroelectricity+RES Domest.Product...(MWh)
400 000 0.125	0.0 0.0	117 000 0.011	CrudOil+Gas natural Domest.Product....(TOE)
214 400 0.067	92 400 0.044	123 200 0.012	FireWood Domest.Product.=Use.....(TOE)
32 000 0.01	7 500 000 3.57	71 000 000 6.70	Lignit LCV-0.2 Domest.Product.=Use.....(Ton)
1 600 000 0.50	252 000 0.12	2 014 000 0.19	Electricity Imported netto.....(MWh)
384 000 0.12	840 000 0.40	19 080 000 1.80	CrudOil+Byproducts Imported netto.....(TOE)
0.0 0.0	86 000 0.041	2 320 000 0.22	Gas natural Imported netto.....(TOE)
80 000 0.024	4 700 000 2.24	52 046 000 4.91	Electricity, from Fosil fuels(MWh)
2 361 000 0.738	8 287 000 3.946	31 000 000 2.925	Emissions of CO₂(Ton)

Res opportunities in Albania

- Good potential for solar thermal, promising for wind and biomass
- Green certificates (for eligible countries)
- Kyoto mechanisms (for eligible countries)
- More economic stability and good environment for foreing investments
- RES market in its beginning – Time for dynamic entry



Thank you for your attention !