About Wind in Romania

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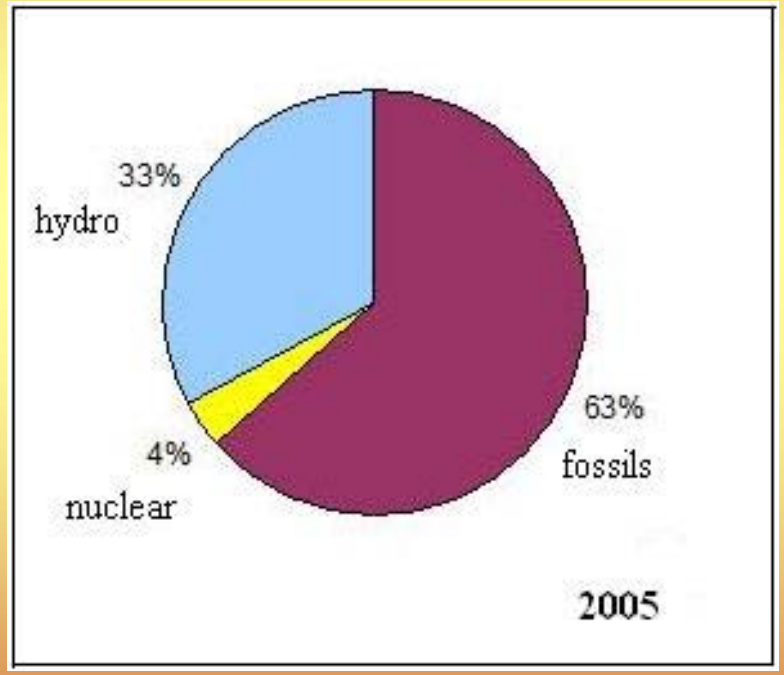
- An energetic view of Romania
- The wind potential in Romania & Moldova
- How is the renewable energy treated?
- What’s going on in this field?
- Are there other opportunities which are not so visible yet?

An energetic view of Romania

2005

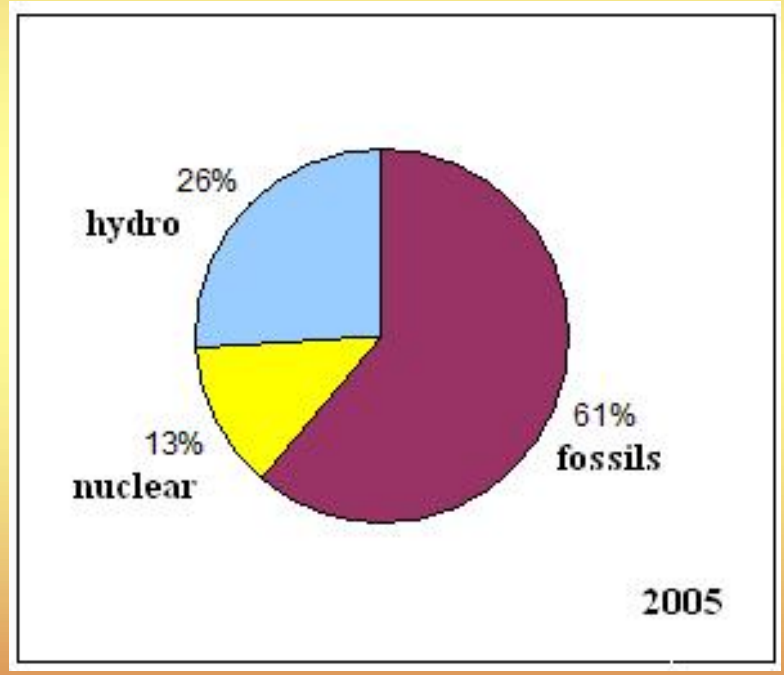
E. power capacities after origin

20 GW



Electric Production after origin

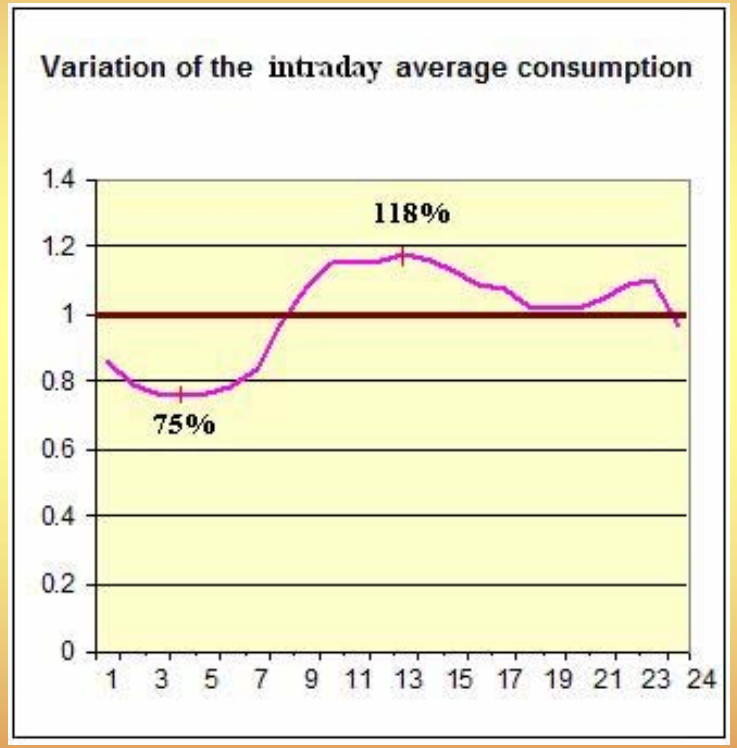
80 TWh



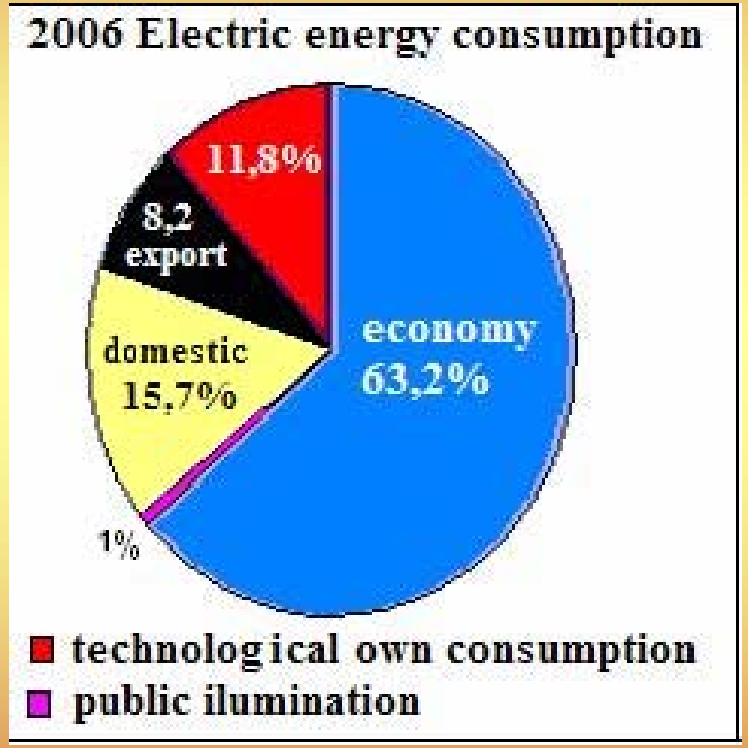
An energetic view of Romania

2005

Variation of Intraday electrical energy consumption June 2008



The rate of electrical energy consumption 2006

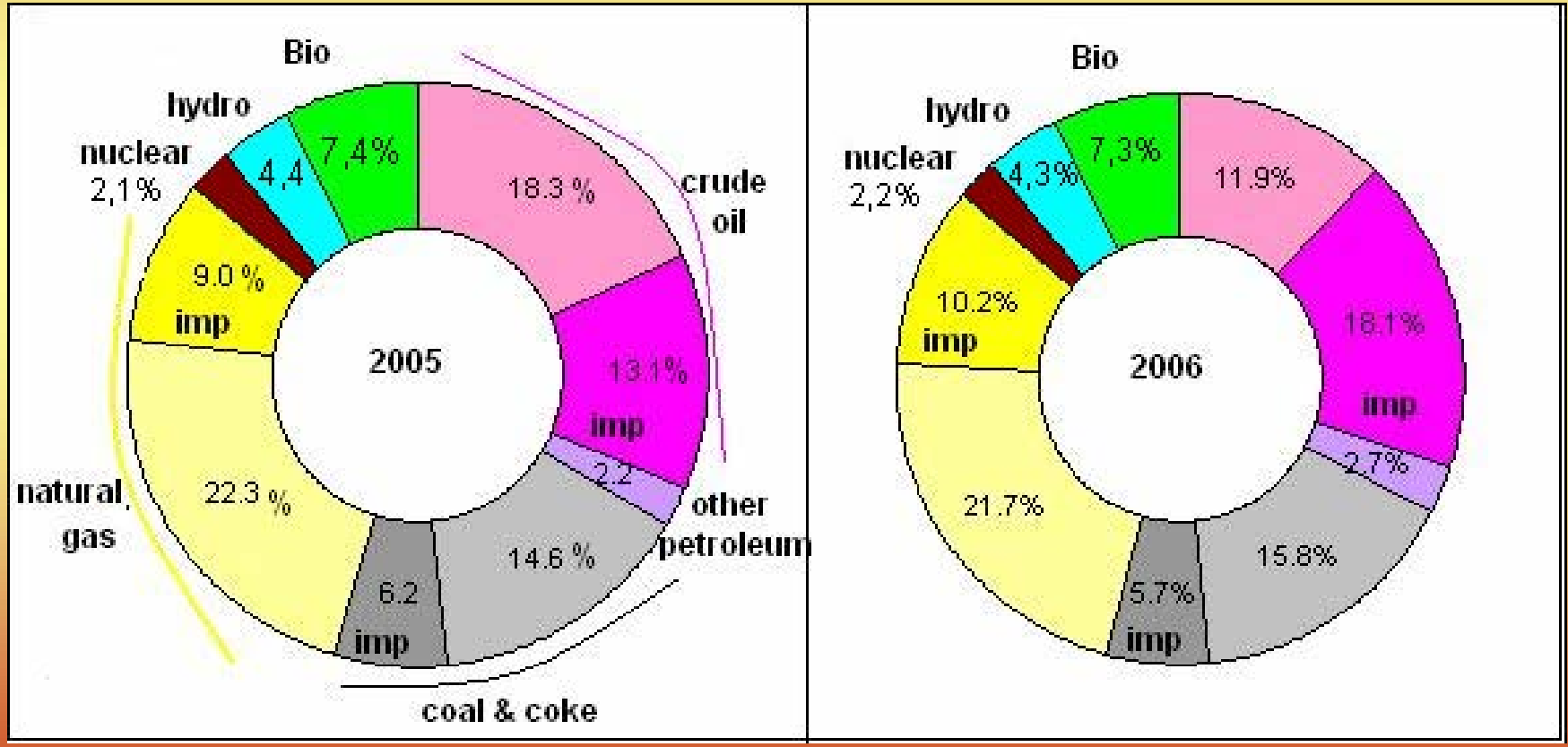


An energetic view of Romania

2005

In the EU Energetic strategy Romania is pointed, for 2005, at 17,8% green energy. The real figure, for 2005, is 11,8%

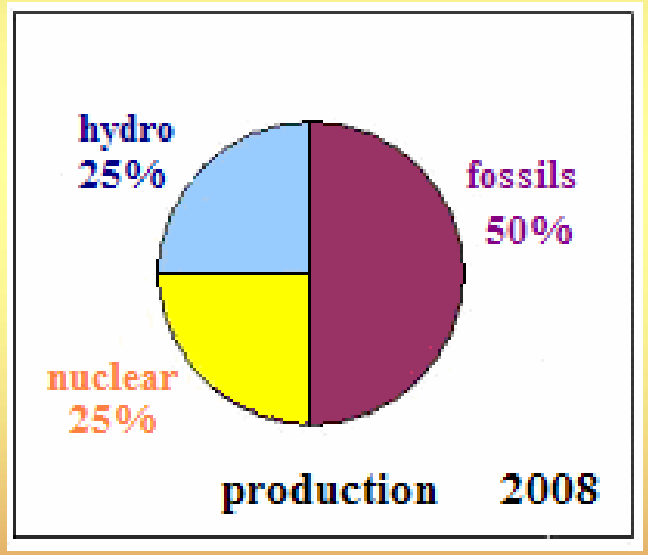
In this EU strategy Romania must reach 24% green energy in 2020!



An energetic view of Romania

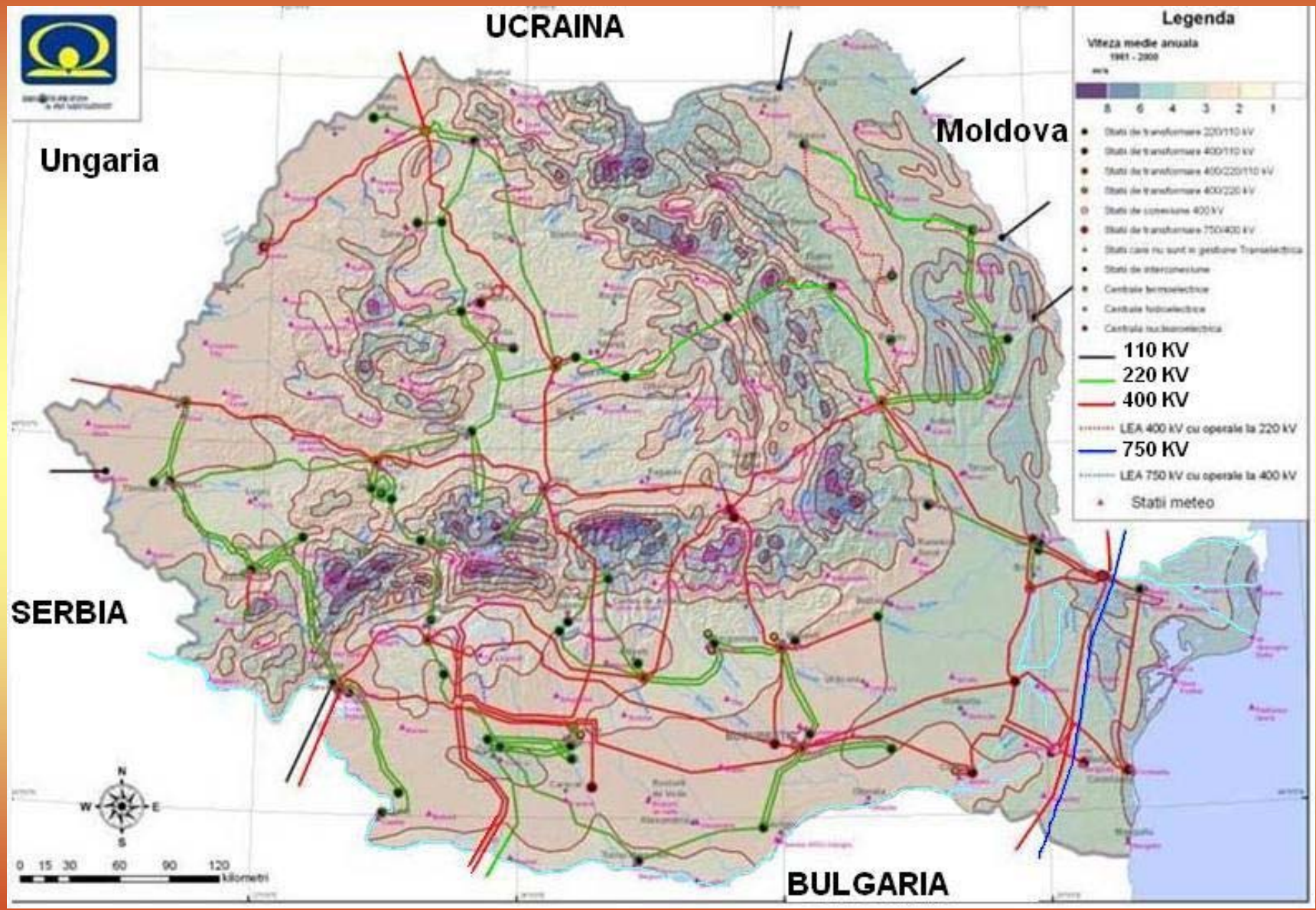
- today -

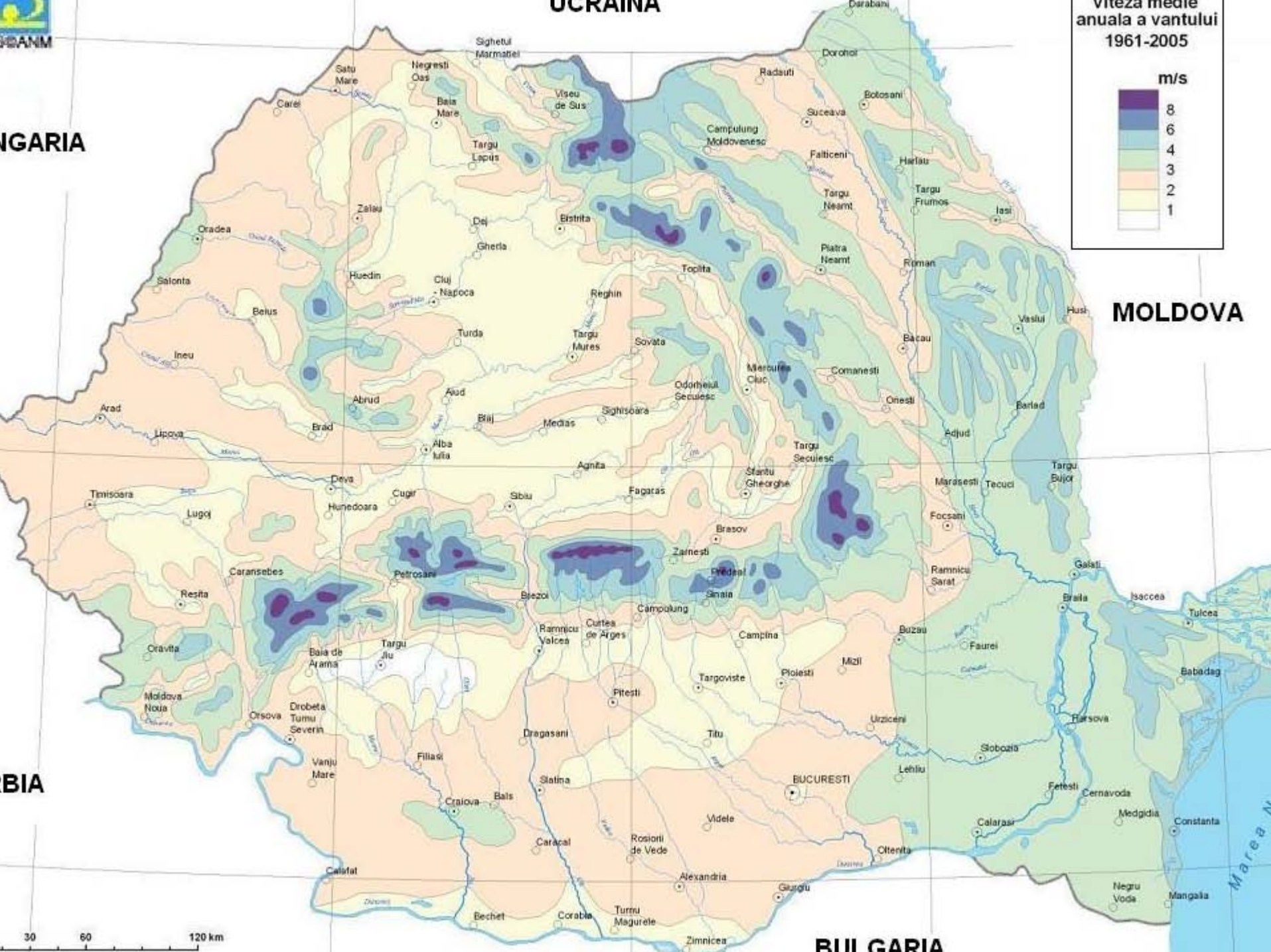
1. The electrical energy consumption fell down, today, to half (as compared to before 1989)
2. The nuclear capacity was doubled in 2007
3. We can estimate that in 2008 electrical energy produced was:



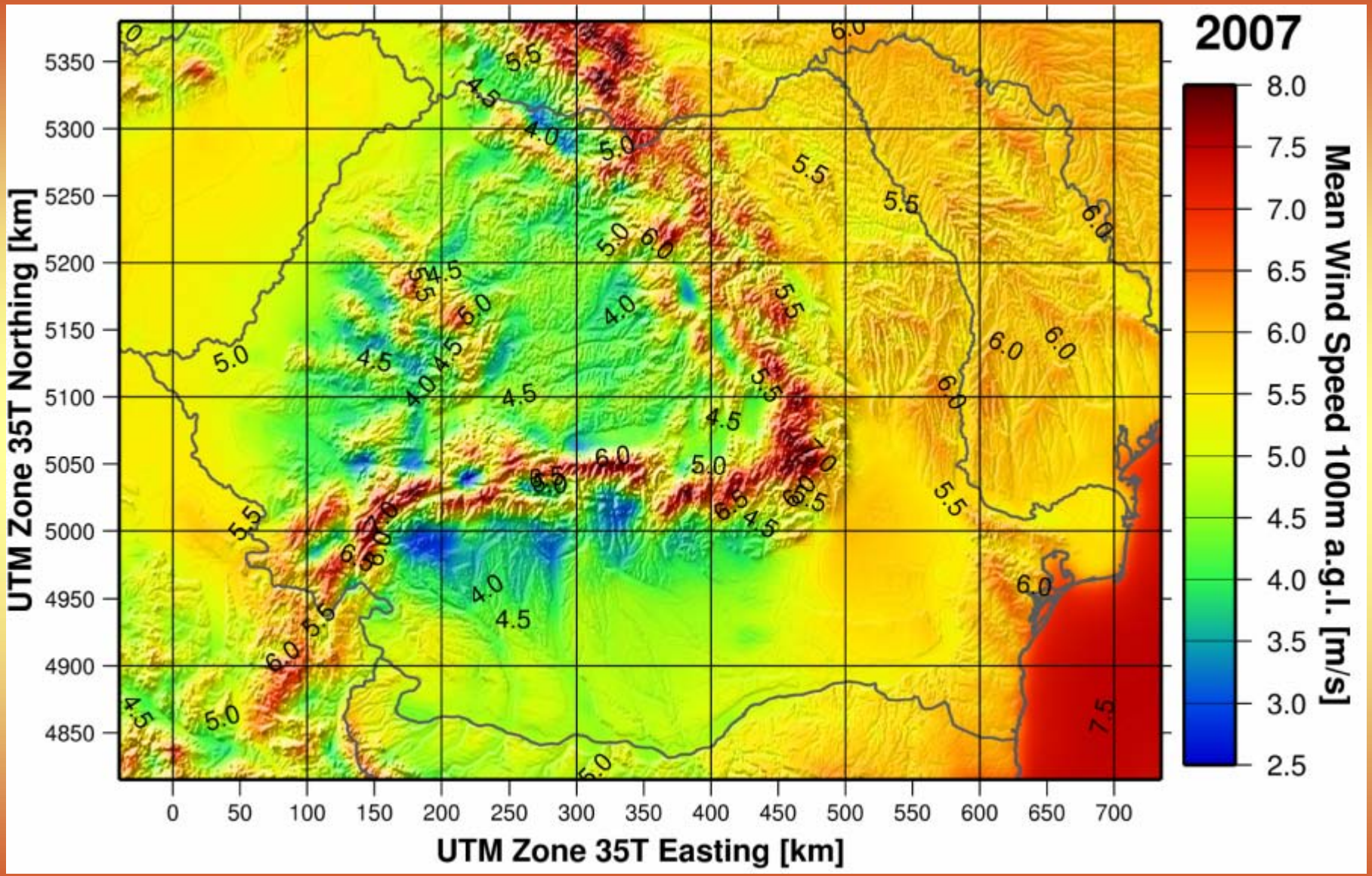
4. There is a difference between the 17,8% green energy for 2005 stated in UE documents an the real figure 11,8%. This gap must be fulfill in the next future by green energy!

The wind potential in Romania



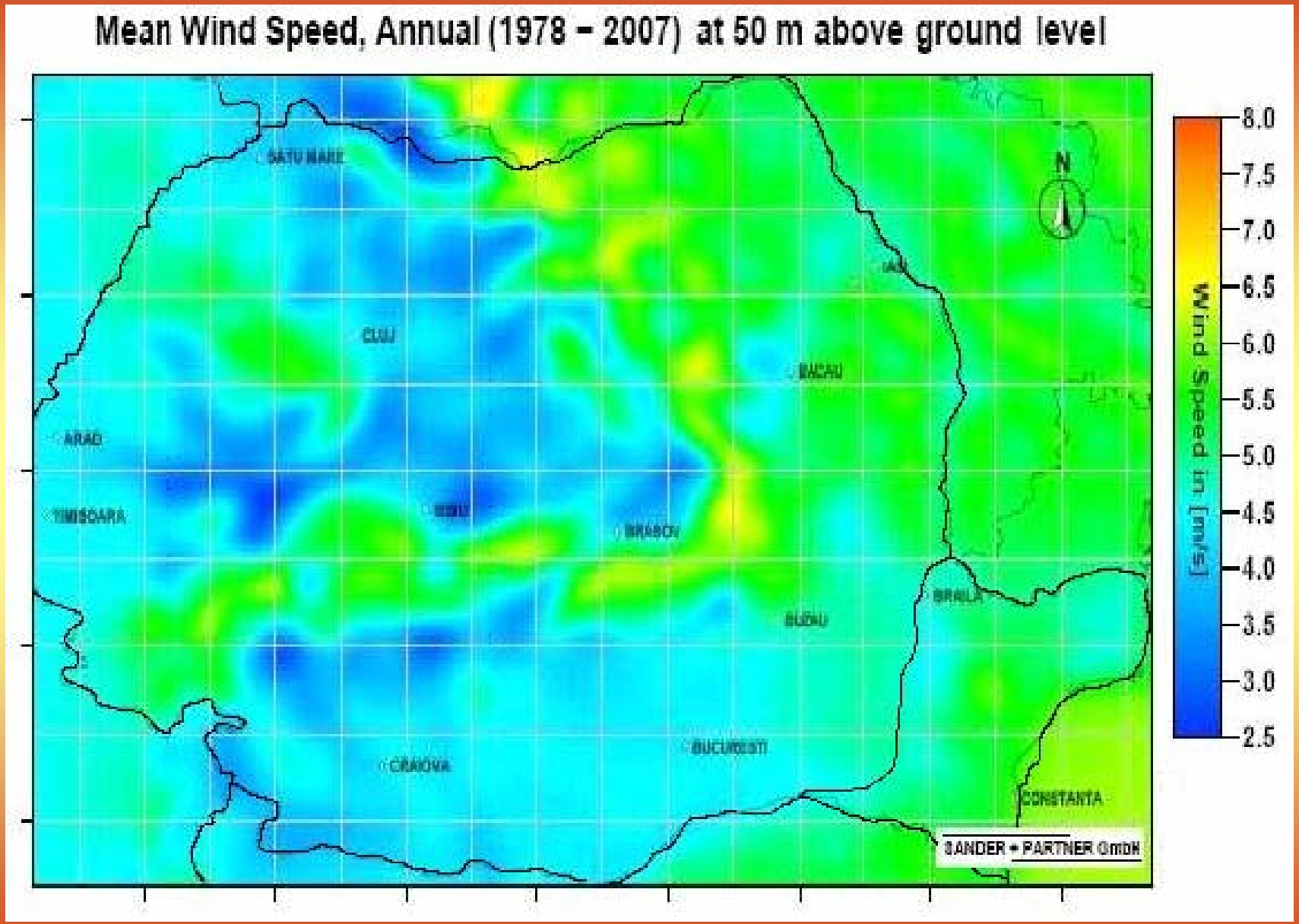

UCRAINA
MOLDOVA
BULGARIA
Viteza medie anuala a vantului 1961-2005
m/s
8
6
4
3
2
1
Sighetul Marmatiei
Satu Mare
Negresti Oas
Viseu de Sus
Baia Mare
Carei
Radauti
Dorohoi
Botosani
Suceava
Campulung Moldovenesc
Falticeni
Harlau
Targu Lapus
Targu Frumos
Iasi
Targu Neamt
Zalau
Bistrita
Dej
Gherla
Oradea
Piatra Neamt
Roman
Toplita
Huedin
Cluj - Napoca
Reghin
Salonta
Beius
Turda
Targu Mures
Sovata
Vaslui
Husi
Bacau
Ineu
Mercurea Ciuc
Comanesti
Odorheiul Secuiesc
Onesti
Arad
Abrud
Aiud
Sighisoara
Barlad
Brad
Blaj
Medias
Adjud
Lipova
Alba Iulia
Targu Secuiesc
Agnita
Deva
Marasesti
Tecuci
Targu Bujor
Timisoara
Hunedoara
Cugir
Sibiu
Fagaras
Stantu Gheorghe
Lugoj
Focsani
Brasov
Zarnesti
Caransebes
Petrosani
Predeal
Ramnicu Sarat
Galati
Resita
Brezoi
Sinaia
Campulung
Braila
Isaccea
Tulcea
Ramnicu Valcea
Curtea de Arges
Buzau
Oravita
Campina
Faurei
Baia de Arama
Targu Jiu
Mizil
Targoviste
Ploiesti
Babadag
Moldova Noua
Pitesti
Orsova
Drobeta Turnu Severin
Urziceni
Harsova
Dragasani
Titu
Slobozia
Vanju Mare
Filiasi
Lehliu
Slatina
BUCURESTI
Fetesti
Cernavoda
Craiova
Bals
Videle
Medgidia
Constanta
Calarasi
Caracal
Rosiori de Vede
Oltenita
Calafat
Alexandria
Giurgiu
Negru Voda
Mangalia
Bechet
Corabia
Turnu Magurele
Zimnicea
30
60
120 km

The wind potential in Romania & Moldova



ANEMOS (Germany, horizontal resolution is 5Km, the data period since 1990 was 30 min)

The wind potential in Romania & Moldova



SANDER & PARTNER (Swiss Horizontal resolution 8km, data period since 1978, 10min)

How is the problem of renewable energy treated ?

In Nov. 2007 was officially adopted the

Energetic Strategy of Romania between 2007-2020.

- The development of a 1000Mw reversible hydro power plant (generator and pump).

Such reversible hydropower plant will help large wind power integration as well as nuclear new capacities

How is treated the problem of renewable energy ?

Law no. 220/2008

- The facilities are valid for 15 years if the new green energy power plants are put into operation before 2016

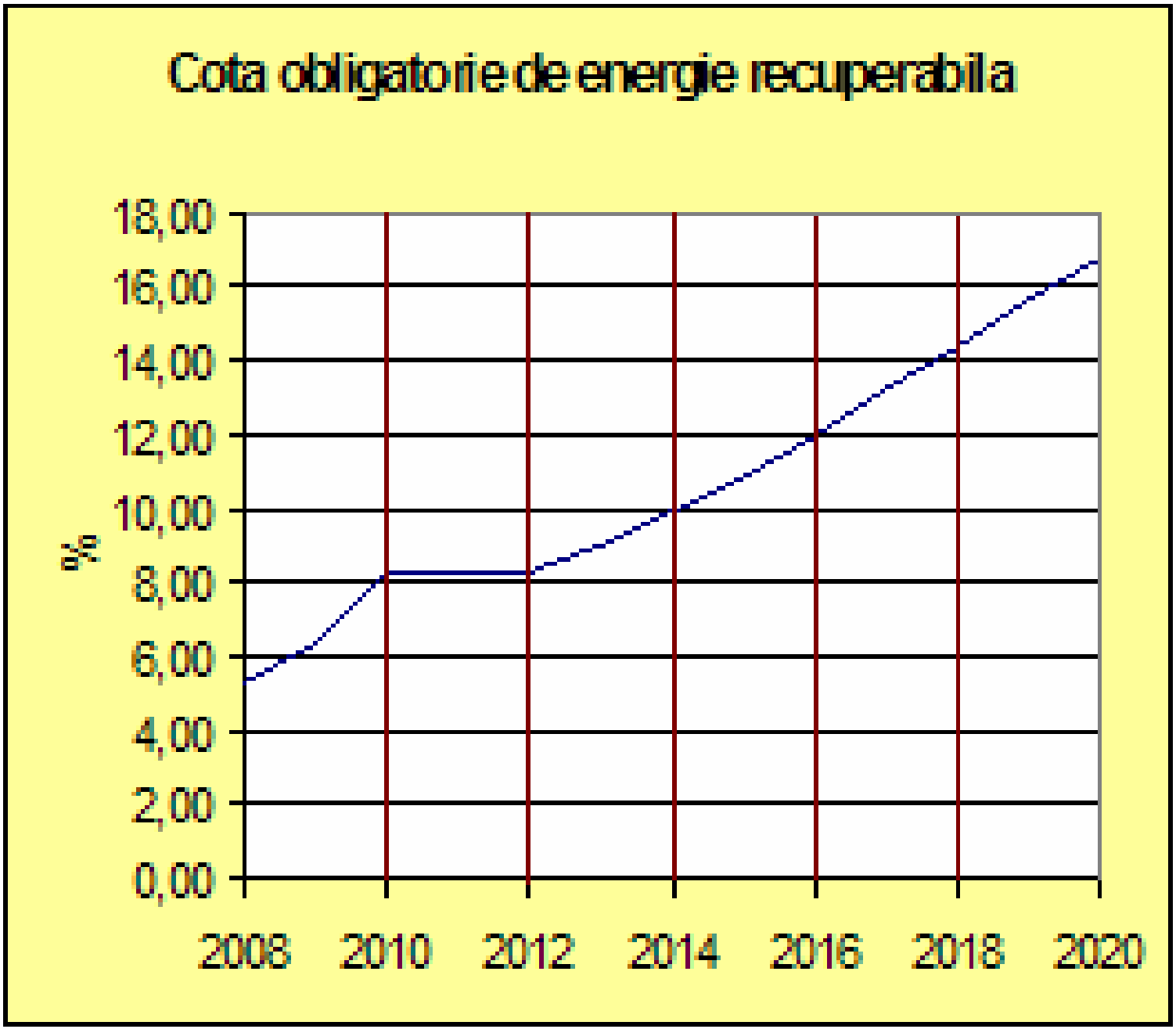
- Green certificate value could be in the range (27 euro – 55 euro)

  2 GC for 1MWH produced in small hydro <1MW
  2 GC for 1MWh produced by wind before 2016 and 1 GC after
  3 GC for 1MWH produced by bio ...
  4 GC for 1MWH produced by solar

- The electrical distributor is bound to acquire GC. They didn't acquire have to pay 70 euro fee
- No. GC acquired by the distributor = mandatory quota x delivered energy

- **Other facilities**

  - Guarantees for 50% of the sum loaned for the investment.
  -Green energy producers have priority to grid connexion
  -The grid connexion responsability is divided between GEP & TSO
  - Infrastructure development or modifications are done by the state for strategical projects
  - Financial compensation for the job openings created


Cota obligatorie de energie recuperabila
18,00
16,00
14,00
12,00
10,00
8,00
6,00
4,00
2,00
0,00
%
2008
2010
2012
2014
2016
2018
2020

What is going on in this field?

At the end of 2007 were 6Mw wind capacities connected to grid from 11 company

1. **IBERDROLA Renovables SA** Madrid is developing a 1500Mw wind farm in Dobrogea
2. **CEZ** (Czech electricity) is developing a 345Mw (600Mw) wind farm near Megidia
3. **Martifer** (Portugal) made a grant on 260ha near Babadag (Dobrogea) and is ready to start producing 48Mw in the first phase, planning to go by 2012 to 400Mw. They plan to develop a new wind-energy park on the hills in Moldova.
4. **Enel** (Italia) is developing a 200Mw wind farm
5. **Energobit** is developing a 60Mw (25Mw / 2010,) park near Tulcea (Dobrogea)
6. **Ramina eol** is developing a 45Mw park in Apuseni mountains at near 1230m high

WARNING

It is possible, during the next years, to produce more wind power than we can handle! So some issues must be in our attention: conservation, export, rethinking the entire consumption in order to reduce natural gas heating.

However is a good opportunity to cut down fossils power plants

Are there other opportunities which are not so visible?

1. Wind resources are in the mountains.

In the Romanian mountains there are large hydropower plants and there are high voltage lines and roads. Developing large wind turbine for the mountains could be a new challenge, that could follow today's trends in off shore wind turbine.
That could mean modular towers, modular blades and of course stronger equipment at the same volume

2. Small class wind turbine

Another opportunity is in the small class wind turbine for individual and isolated mountain farms.

3. Heating water for domestic usage in towns with extra wind power as a conservation facility

Final . . .

Obviously, all the suggestions were made, in the frame of today rules, that investments in wind energy should be done now or as soon as possible, for a higher profitability.

The first “surprise” could be, in the future, that our TSO, “Transelectrica”, could conditioning that the new wind power should come in the energetic system with its own conservation facility.

Thanks for your attention!

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