



GIA-IGA Workshop 5-6 Mai 2009 - Madrid

Geothermal : Current use and current theoretical and technical potential

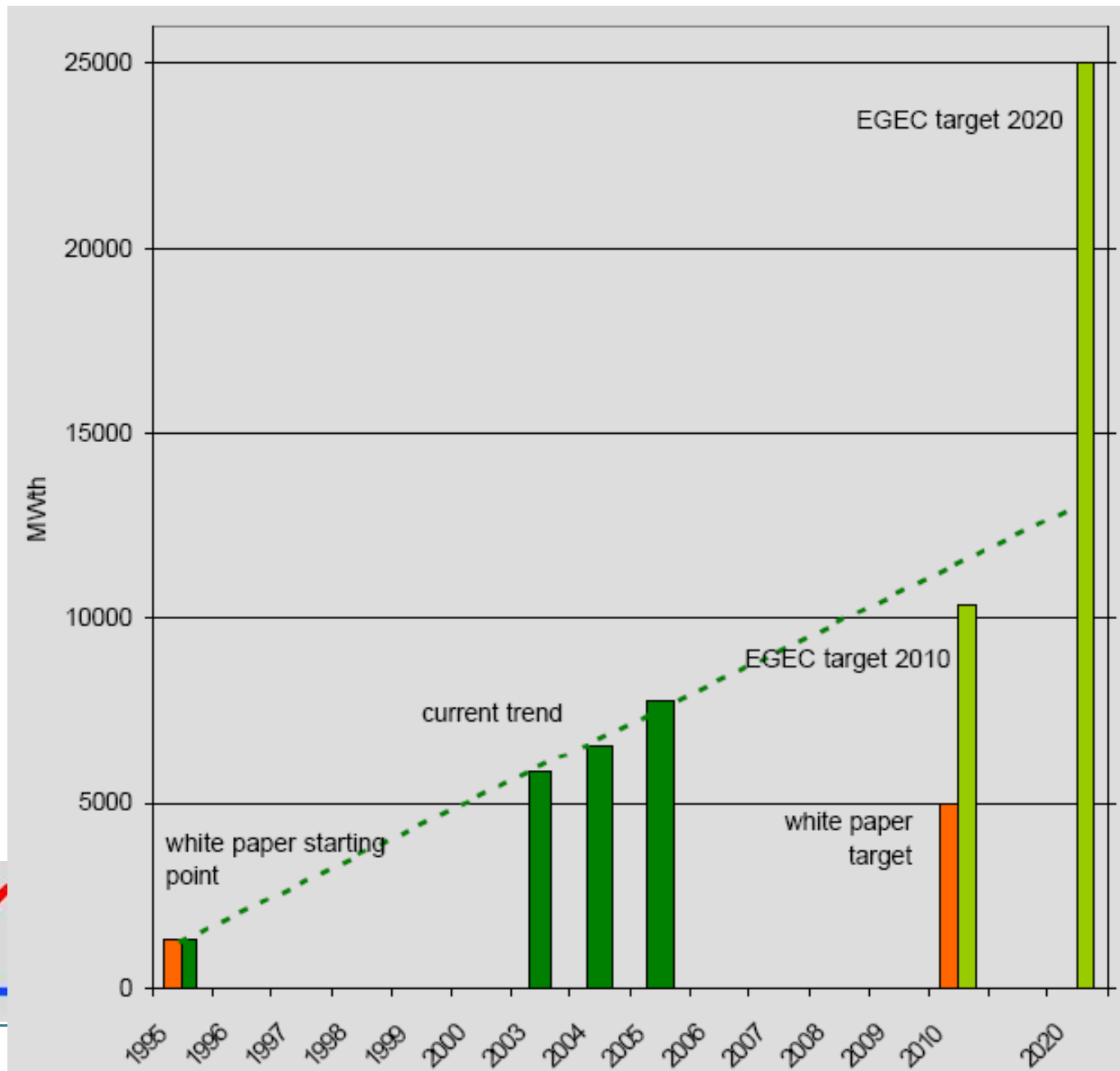


Heating : Current installed capacities : a european view

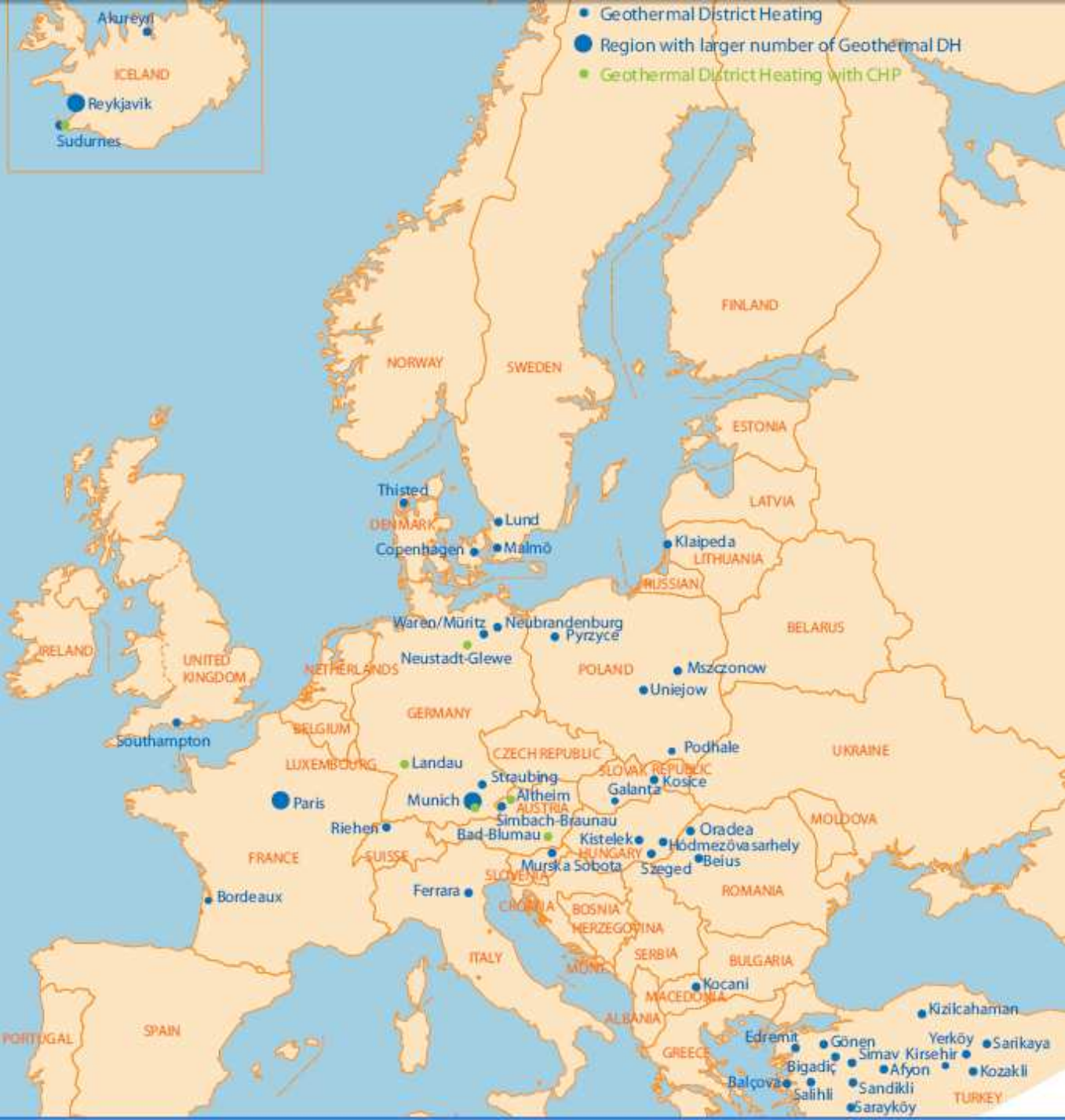
- > In 2007, a total of more than 2 Mtoe has been supplied by geothermal heating. At the end of 2007, the thermal capacity amounted to 11 000 MWth,**
- > Geothermal sector growth is on the right track for reaching the EU White Paper objectives outlined for 2010.**



Current installed capacities : a european view



Current installed capacities : a european view



Breakdown per country : direct use

	2006		2007	
	Puissance/Capacity (MWth)	Énergie prélevée Energy Using (ktep/ktoe)	Puissance/Capacity (MWth)	Énergie prélevée Energy Using (ktep/ktoe)
Hungary	715,0	189,1	694,2	189,6
Italy	500,0	176,7	500,0	176,7
France	307,0	130,0	307,0	130,0
Slovakia	186,3	72,2	186,3	72,2
Romania	144,9	67,9	145,1	67,9
Germany	95,0	13,8	120,0	17,4
Poland	92,9	12,8	110,0	10,5
Bulgaria	109,3	39,8	109,6	39,8
Austria	97,0	13,4	97,0	12,3
Greece	69,8	12,5	69,8	12,5
Slovenia	44,7	14,7	44,7	14,7
Portugal	30,4	9,2	30,4	9,2
Spain	22,3	8,3	22,3	8,3
Lithuania	17,0	8,7	17,0	8,7
Czech Rep.	4,5	2,1	4,5	2,1
Belgium	3,9	2,6	3,9	2,6
United Kingdom	3,0	1,9	3,0	1,9
Ireland	0,4	0,5	0,4	0,5
Total EU	2 443,5	776,2	2 465,3	777,0

* Estimation.

Les décimales sont séparées par une virgule. Decimals are written with a comma. Source EurObserv'ER 2008

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Shallow Geothermal Energy



Ground Source Heat Pump market and deployment in Europe

(base map showing geothermal DH)



Breakdown per country : heat pumps

	2006		2007	
	Nombre/Number	Puissance/Capacity (MWth)	Nombre/Number	Puissance/Capacity (MWth)
Sweden	270 111	2 431,0	298 067	2 682,6
Germany	88 926	978,2	115 813	1 273,9
France	83 856	922,4	105 056	1 155,6
Denmark	48 252	876,2	53 252	931,2
Finland	33 612	721,9	38 912	827,9
Austria	40 151	664,5	48 439	772,2
Netherlands**	11 719	298,0	15 230	392,0
Italy	7 500	150,0	7 500	150,0
Poland	8 300	106,6	10 000	133,0
Czech Rep.	5 173	83,0	6 965	112,0
United Kingdom	2 350	36,1	5 100	92,2
Ireland	1 871	40,2	4 014	84,3
Belgium	7 000	69,0	7 000	69,0
Estonia	5 000	49,0	5 000	49,0
Hungary	350	15,0	350	15,0
Greece	400	5,0	400	5,0
Slovenia	420	4,6	420	4,6
Lithuania	200	4,3	200	4,3
Romania	40	2,0	40	2,0
Slovakia	8	1,4	8	1,4
Bulgaria	19	0,3	19	0,3
Latvia	10	0,2	10	0,2
Portugal	1	0,2	1	0,2
Total EU	615 269	7 459,0	721 796	8 758,0

17% growth !

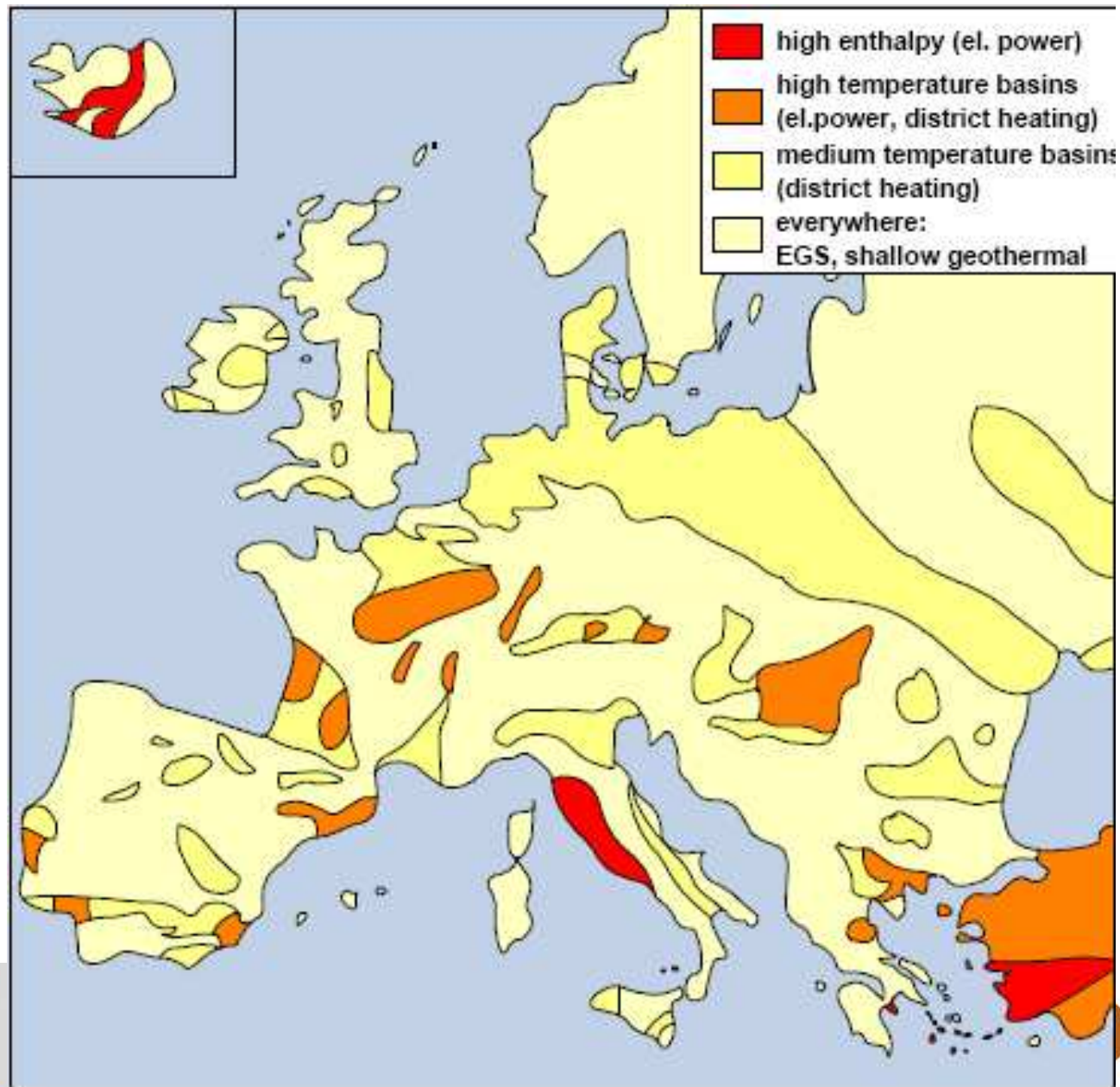
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* Estimation. ** 18 PACG mises hors service en 2007 pour une puissance de 3 MWth aux Pays-Bas. 18 geothermal heat pumps decommissioned in 2007 in the Netherlands corresponding to a capacity of 3 MWth.

Les décimales sont séparées par une virgule. Decimals are written with a comma. Source EuroObserv'ER 2008

European Potential



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Potential capacities : The case of shallow geothermal

- > **With HP, geothermal energy is used for heating and for cooling :**
 - ⇒ **Seasonal regeneration**
 - ⇒ **artificial recharge through hybrid systems (solar heating...)**
 - ⇒ **Possibility to have a balanced extraction of heat and cold from the ground.**

- > **The underground is used as a storage of energy**

- > **The potential capacities :**
 - are relatively independant of a geological resource
 - are directly linked with the use that will be done in buildings

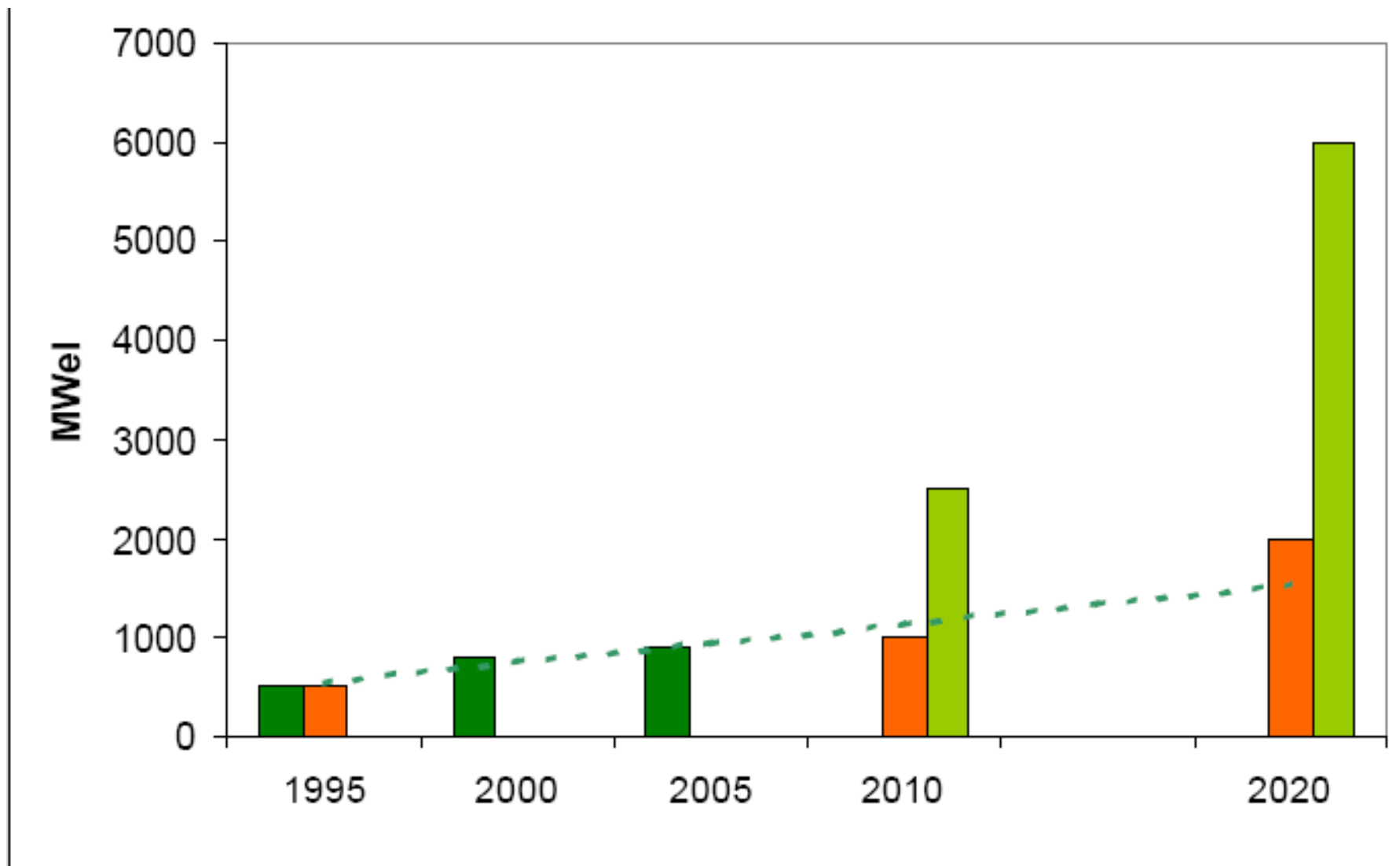


Electricity : Current installed capacities : a european view

- > Concerning geothermal power production, the installed electrical capacity in the European Union alone totalled about 850 MWe, in 2007, producing more than 5800 GWh of electricity (with an excellent average load factor of more than 90 %!)**



Current installed capacities : a european view



Breakdown per country

	2006		2007	
	MWe	GWh	MWe	GWh
Italy*	810,5	5 527,0	810,5	5 569,1
Portugal	28,0	85,0	28,0	178,0
France**	14,7	78,0	14,7	95,0
Austria	1,2	3,0	1,2	3,0
Germany	0,2	0,4	2,4	0,4
Total	854,6	5 693,4	856,8	5 845,5

** Dont 711 MWe en fonctionnement. Including 711 MWe in running.*

*** En Guadeloupe. In Guadeloupe island.*

Les décimales sont séparées par une virgule. Decimals are written with a comma.

Source EurObserv'ER 2008

Geothermal Electric Power

EGS: Enhanced Geothermal Systems

Status 2008:

- Power production in Soultz inaugurated in June 2008
- DHM-project in Basel (CH) still on halt after seismic events Dec. 2006 and Jan. 2007
=> Research on induced seismicity
- New activities in Germany, England,
- and in Spain
- EGS is crucial for achieving 2020 targets for geothermal power
- Transferring EGS from Soultz to other sites will be a strategic technology step !



Soultz wellheads in June 2008

European Geothermal Energy Council



Geothermal CHP

New Plant in Landau, Germany

2 wells each 3300 m

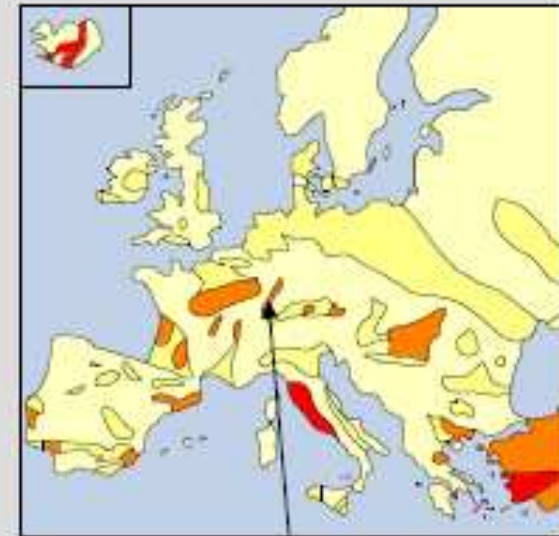
Water temperature ca. 160 °C

Flow rate up to >250 m³/h

ORC-turbine ca. 3 MW el. Output

Inaugurated
21.11.2007

NB: Geothermal
power in Germany
economically
feasible through
feed-in tariff!



(Photos: Geo-x)

European Geothermal Energy Council



Geothermal CHP

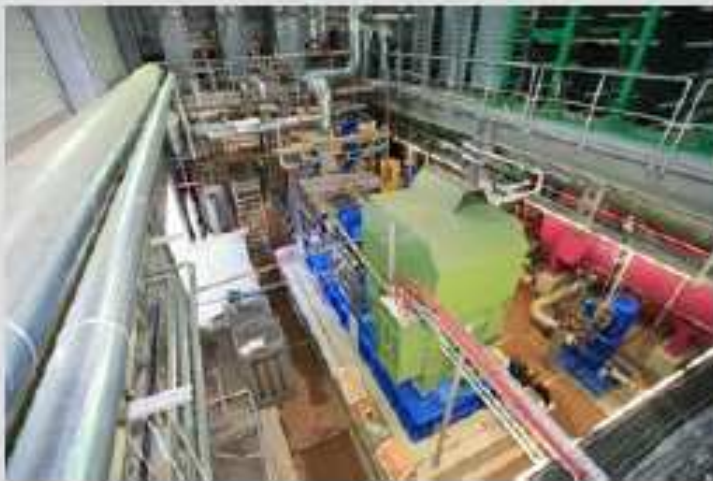
New Plant in Unterhaching, Germany

DH operational, power Jan. 2008

2 wells each 3200 m

Water temperature ca. 122 °C

Kalina-Cycle-Powerplant 3,6 MW



(Photos: Gem. Unterhaching)

European Geothermal Energy Council

