

III. Geothermal- Current Use and Current Theoretical and Technical Potentials

A. Low Temperature Resources

(Chair: Rybach; Panel: Boissier, Lawless, Lund, Muraoka, Ragnarsson)

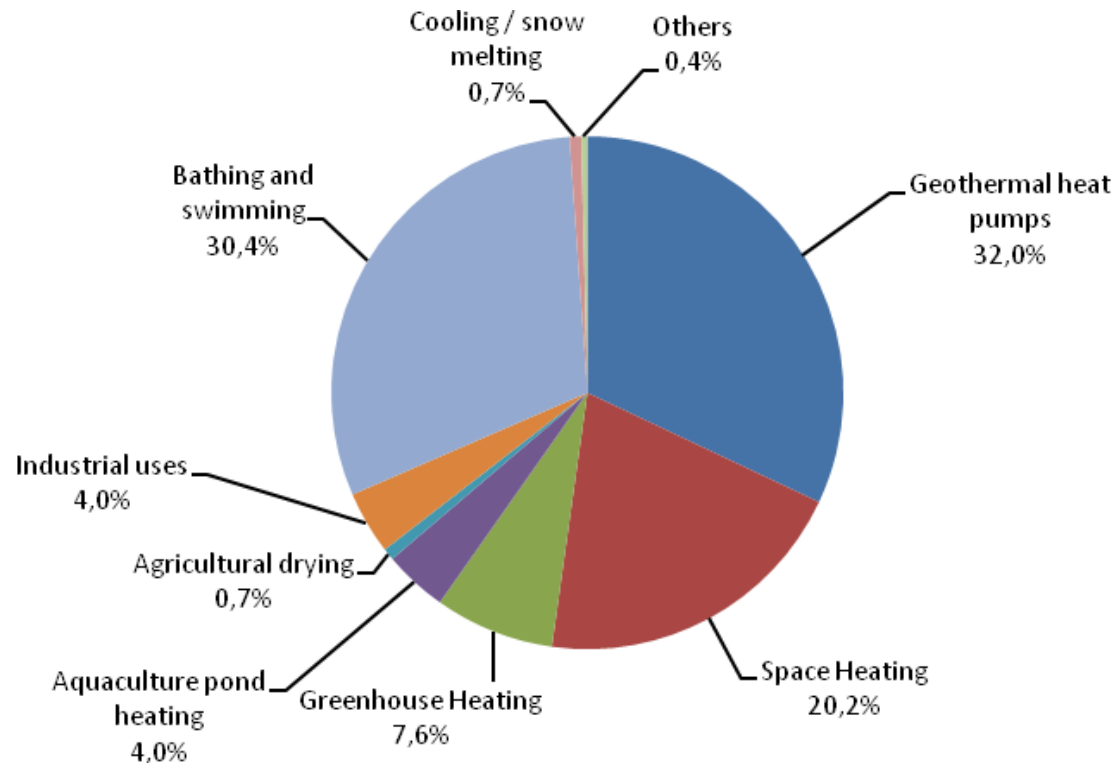
- i. Direct Uses
 - Current installed capacities and use (most recent data)
(Heat pumps, district heating, pools/spas, desalination, greenhouses, industrial, other)
 - Potential (theoretical and technical) capacities by application and in total

- ii. Electricity generation (binary, other)
 - Current installed capacities (most recent data)
 - Potential (theoretical and technical) capacities and in total

Issues to discuss

- Boundary high / low temperature (150 °C? 180 °C?)
- Current status of direct use
- Potentials (theoretical, technical)
- What & how to report

Direct use distribution *(from Lund et al. 2005)*



Largest shares: bathing & swimming; geothermal heat pumps

Direct use statistics: comments of caution

- **Great lack of up-to-date information**
 - **GHP numbers are often rough estimates**
 - **For GHPs often total heating capacity is reported; geothermal proportion is only about 2/3 (depends on COP)**
 - **No reporting standards for balneologic use (often thermal springs, too hot.....
well outflow power reported, with 100% capacity factor)**
- **Reported numbers too high**

Country	2005*	2009**
	MWth	MWth
China	3687	6000
Sweden	3840	3840
USA	7817	10000
Turkey	1177	1365
Iceland	1791	1791
Japan	413	413
Hungary	694	320
Italy	607	650
New Zealand	308	600
Brazil	360	365
Georgia	250	250
Russia	308	308
France	308	308
Denmark	309	309
Switzerland	581	880
Germany	505	1000
Italy	607	650
Austria	352	600
Poland	171	300
Ireland	20	250
Norway	450	240
Bosnia	-	240
Croatia	114	116
Greece	75	115
S.Korea	17	100
Total	24761	31010

Current direct use capacity status

for countries with > 100 MWth

*) from Lund et al. WGC2005

***) bold numbers from Country Report Abstracts
submitted to WGC2010

compiled by L. Rybach April 2009

Potentials.....

Inputs from IPCC geothermal authors (Muraoka, Ragnarsson:..)

ii. Electricity generation (binary, other)

- Current installed capacities (most recent data)
- Potential (theoretical and technical) capacities and in total