Institut für Energetik und Umwelt

Institute for Energy and Environment

Forschung, Entwicklung, Dienstleistung für
- Energie
- Wasser
- Umwelt

WP5 „Exploitation, economic, environmental and social impacts“

2nd Meeting, Strasbourg 14th September 2006

in cooperation with
Institute for Environmental Technology and Energy Economics
Technische Universität Hamburg-Harburg

Institut für Energetik und Umwelt gGmbH, Torgauer Str. 116, D-04347 Leipzig, info@ie-leipzig.de

Agenda

- Opening address
- Article “Economic Approach of Geothermal Energy“
- Work-sharing for deliverables
- Article “Socio-Economic Benefits”
- Time table
- Miscellaneous

Article „Economic Approach of Geothermal Energy“

Table of contents

29. September 2006
www.ie-leipzig.de

Article „Economic Approach of Geothermal Energy“

1. Introduction

- European primary energy demand; contribution of renewable energies
- Present contribution of geothermal energy versus still exploitable geothermal potential for heat and electricity generation in Europe
- Aim of the article:
  - To point out present restrictions and possibilities for geothermal energy generation under the different geological, economic and energy political circumstances.
  - Therefore an economic approach of different countries is analyzed.
  - Comparison of the different approaches and drawing of conclusions what a future economic promotion of geothermal energy could look like.

Article „Economic Approach of Geothermal Energy“

2. Status of geothermal heat and power generation in Europe

- Short characterization of different geothermal resources in Europe
- Status of geothermal heat and power production:

  Present and planned projects for heat, electricity generation and other types of utilizations (balneology, drying, mineral extraction, ...) from geothermal energy

3. Case studies of geothermal heat and power production

- The aim of the case studies is to show under which geological and energy political circumstances which geothermal projects established. In an economic approach representative geothermal heat and/or power project from different countries, which should represent the European spectrum, are analyzed and described following the same course.

29. September 2006
www.ie-leipzig.de

Article „Economic Approach of Geothermal Energy“

Questionnaire for case studies

1. Status
   a. Geology
   b. Deep geothermal supply potential
   c. Deep geothermal projects
2. Economic approach
   a. Definition of representative projects
   b. Investment, operational and energy production costs
   c. Economic and energy political circumstances
3. Reasons for success

Article „Economic Approach of Geothermal Energy“

	Heat Project	Power Project	Heat and Power Project
Exploration concept	Doublette	Doublette	Doublette
Geothermal capacity in MW_{th}	3.2	8.2	9.9
Electrical capacity in MW_{el}		1.0	1.0
Thermal capacity in MW_{th}	5		1.8
Annual electricity production in MWh/a		7,500	7,500
Annual heat production in GJ/a	27,400		19,440
Production temperature in °C	100	140	140
Injection temperature in °C	60	70	55
Mean flow rate in m^3/h	70	100	100
Production / injection well depths	2,450 / 2,350	4,000	4,000
Peak load heating	Gas burner 5MW		None
Auxiliary units[a]	None		None

[a] e.g. heat pumps

29. September 2006
www.ie-leipzig.de

Article „Economic Approach of Geothermal Energy“

	Heat Project	Power Project	Heat and Power Project
Investment costs			
Subsurface installation in Mio. Euro[a]	6,74	10.86	10.86
Power plant in Mio. Euro		2.4	2.4
Geothermal heating station in Mio. Euro	0.23		0.23
Peak load heating station in Mio. Euro	0.45		0
Auxilary units in Mio. Euro	0		0
Heating network in Mio. Euro	2.32		0
Miscellaneaous in Mio. Euro	0	0.66 (planning)	0.66 (planning)
Annual operation costs in Mio. Euro/a	0.19	0.34	0.34
Annual credit for heat in Mio. Euro/a			0.22
Heat production costs in Euro/kWh	0.16		
Electricity production costs in Euro/kWh		0.17	0.14

[a] including Borehole, brine cycle, feed pump, slop and filter systems…

Article „Economic Approach of Geothermal Energy“

4. Conclusions

- Which geothermal development is to be expected under the different circumstances existing in Europe
- Which measures need to be carried on resp. implemented to achieve a optimal development in each European country

29. September 2006
www.ie-leipzig.de

Work-sharing for deliverables

	Articles			Workshop	Reports of study	Scientific dissemination	
	Socio-economic benefits	Environ-mental Impacts	Policy makers awareness	Policy makers awareness		Economic, environmental and social impacts	Development and management of exploitation
exploitation							
economics							
environmental aspects							
araising policy makers awareness							
miscalleneous							

Article „Socio-Economic Benefits of Geothermal Exploitations“

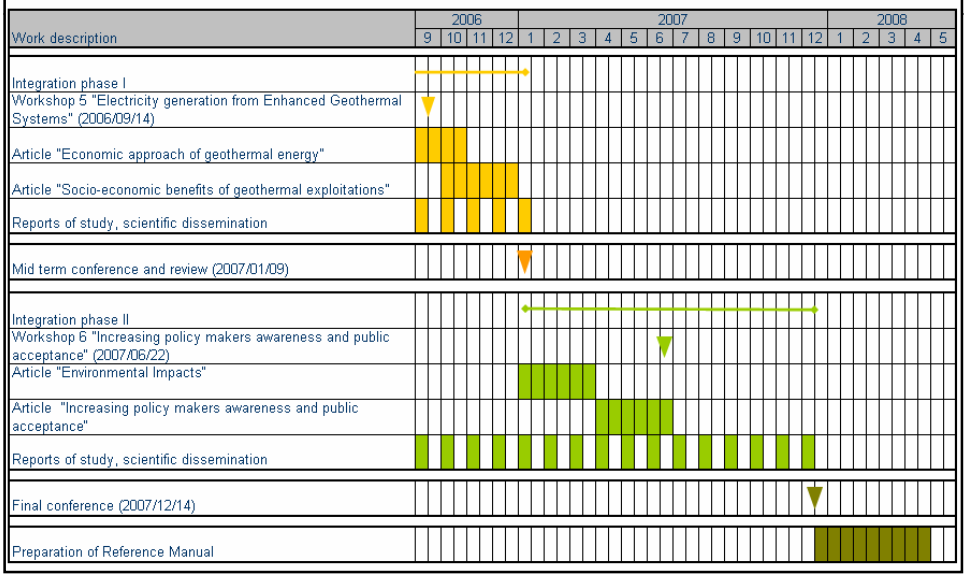
Socio-economic effects
- Effects on employment
- Value added
- Incomes

Engergy political targets
- Security of supply
- Environment-friendliness
- Profitability

Aim of the article:
- To point out socio-economic benefits of geothermal energy generation within Europe.
- Therefore an socio-economic approach of different countries is analyzed.

29. September 2006
www.ie-leipzig.de

Timetable



Miscellaneous ?