NATIONAL GEOTHERMAL DEVELOPMENT MASTERPLAN AND ITS FULFILMENT IN GERMANY

HORST RUETER[1]

[1] German Geothermal Association (GtV-BV), Schuerbankstrasse 20a, 44287 Dortmund, Germany
e-mail: horst.rueter@geothermie.de

ABSTRACT

Using geothermal resources as well for heating (and cooling) mostly with shallow heat pump applications as electricity production is in Germany a part of using renewables for longer time. After the governments decision to close all nuclear plants the installation of all kind of using renewables is accelerated. Due to the short time we have no real master plans but lots of scenarios how the nuclear power will be replaced. Besides the energy production transport (new power lines) and storage are major issues.

In many scenarios geothermal plays a smaller part or is even missing but others notice that a baseload component is needed to stabilize the net and to decrease demands for transport and storage.

In the heating and cooling market geothermal installations (mostly shallow) are widespread and have a good growth rate. Here geothermal supply will be (besides solar and micro heat and power) a major contributor in the near future.

Keywords: geothermal, heating, cooling, electricity, EGS, hydrothermal, petrothermal

1. INTRODUCTION

After closing all nuclear plants in Germany a new master plan for using renewables is needed and under development. To day lots of different scenarios are discussed. Usually geothermal contributes only a little to the electricity production but is a major contributor in the heating/ cooling market. In the electricity market the feed in law is fundamental regarding public or political support. Acceptance and here mainly induced seismicity is an issue. The gap between potential and actual usage is extremely high in geothermal compared to other renewables. For electricity production a key issue is petrothermal systems (EGS). No plant of this type exists in Germany and research is developing only slowly.

2. SITUATION IN SHALLOW GEOTHERMAL (HEATING AND COOLING)

The master plans for heating and cooling contain three major components:

- Saver energy
- More efficient use of energy
- Use of renewables.

In this market major hope is in saving energy i.e. better isolation of houses. Those programs are supported by the federal and states governments, and in good progress. The potential is still enormous.

Using shallow geothermal resources makes continuous progress in Germany. We estimate to have about 165.000 installations in private and commercial buildings. About 30.000 are new build annually. In some parts of the country more then 20% of new buildings use geothermal heating. Most of them are vertical closed systems. As the recycling rate of buildings is only 1-2% it is essential to penetrate the

market of existing buildings.

On medium and long term renewables i.e. solar-thermal, geothermal and micro heat and electricity machines will totally replace burning of fossil fuels and bio-fuels for pure heat production.

3. SITUATION IN DEEP GEOTHERMAL DIRECT USE (HEATINFG AND COOLING)

Deep geothermal is until now in Germany totally based on hydrothermal Systems. We have about xx installations for heating (and cooling). Most of them are located in the state Bavaria close to Munich. As the aquifer dips from near surface at the Danube River to several thousand meters depth at the foothills of the Alps, thermal water temperature are north of Munich below 100 degrees and south of Munich above 100 degrees. As a consequence most of the direct use plants are located in the belt around Munich at the north side.

4. SITUATION IN DEEP GEOTHERMAL DIRECT USE (ELECTRICITY)

In Germany we have actually 5 producing geothermal power plants. Two of them are very small (< 500kW). The capacity of the two bigger ones (Landau and Unterhaching) is about 6.5 MW. Both of them are hydrothermal and use deep natural aquifers. Power conversion is in Landau an ORC cycle in Unterhaching an Kalina cycle. Unterhaching is dominated by the heat production and as a consequence electricity production is reduced in winter. As a consequence the capacity factor is less then 70%, in Landau (with no heat production) it is >90%.

In addition to those 5 producing plants about 15 are under construction, most of them in Bavaria.

5. PLANS FOR 2020 AND 2050

We have no real master plan for 2020 or 2050 but scenarios and estimations. Most developed are those for the state Bavaria. We believe that in 2020 we may have about 400 MW electricity production installed in Bavaria. Using petrothermal sources (EGS) the capacity may be increased until 2050 by a factor 10.

For entire Germany the numbers can be estimated to be about 2 times those of Bavaria.

6. PUBLIC SUPPORT, LEGAL BACKGROUND

In Germany the ‘heat in place’ is regarded as a resource to be mined and owned by the state. From the state you may get licenses for exploration or for production. This is regulated by the federal mining law.

The public support is multifold. Central is the EEG (Renewables Energy Law) that basically regulated the feed in tariffs and the obligate acceptance of renewable electricity by the energy distributors. The actual tariff for geothermal electricity is 25 Eurocent/kWh.

Additional support is given by insurance schemes for drilling risk, direct drilling support etc.

For shallow geothermal regulations are different in the German states. There is as well direct financial support as soft loans. Utilities offer special (lower) tariffs for powering heat pumps. In addition Germany has a federal Renewable Heat Law.

7. RESEARCH

Beside the direct support the publicly supported research is essential. Lots of projects are mainly supported by the Ministry for Environment. Research concentrates in future on petrothermal systems (EGS) as >95% of the resources for electricity production are petrothermal.

8. SUMMARY

Also in Germany the gap between potential and actual usage of geothermal energy is much bigger as in all other renewables. Shallow (heat pumps) applications have a good growth and will be a major contributor to heating and cooling in the near future. It has to concentrate on existing houses as installations in new houses only is not enough, due to the recycling rate of only 1-2% for buildings in Germany.

LINK

www.geothermie.de