Geothermal Energy Use, Country Update for Estonia

Alvar Soesoo[1], Uku Sukles[1]

[1] Estonian Geothermal Association (Ehitajate tee 5, Tallinn, Estonia)

E-mail: us@geothermal.org.ee -- www.geothermal.org.ee/eng

Keywords: Estonia, geothermal energy, GSHP

ABSTRACT

By the end of 2012 there were about 7500-8000 ground source heat pump (GSHP) installations in Estonia. There are no deep geothermal installations in operation, but first steps in creating the roadmap for further research and analysis of potential have been taken by the Estonian Geothermal Association by combining the action plan with proposed activities on national level.

1. MARKET INTRODUCTION

The potential for renewable energy in Estonia, according to official viewpoint, is strongest in wind power and bioenergy-based combined heat and power generation, and also in small-scale hydropower. To date geothermal energy is not regarded as an option, but this is mostly due to lack of information and basic knowledge among policy-makers.

GSHP systems have been installed since the beginning of 1990's. Most companies active in the field are members of the Estonian Heat Pump Association. In previous years one of the drivers for the adoption of heat pumps have been financial incentive funds (Kredex, KIK, PRIA, e-auctioning of CO_2, etc.), which specifically encourage renewable energy alternatives. However, direct support for shallow geothermal heat pumps has not been available; there have been funds for complete installations, e.g. including heat pumps with insulation, ventilation and heating. Still, GSHP support funds allocated whether for new housing or renovation sector have been limited (about 300 supported systems in total to date).

Estonia's approach towards research and analysis for shallow and deep geothermal energy potential began with establishment of the Estonian Geothermal Association (EGA) in 2011. In May 2012, the Minister of Environment, Ms. Keit Pentus-Rosimannus informed the wider public of the need for geothermal energy potential to be studied in Estonian conditions for "*practical, affordable and environmentally friendly solutions for the future*".

2. MARKET DEVELOPMENT

Preliminary analysis of necessary actions to be taken for development of Estonian deep geothermal market was summarized in a document prepared by EGA, titled "Estonian Action Plan for Geothermal Application 2013-2020". Some of the mapped actions put forward geological study of the Estonian geothermal potential, mapping of potential structures and creating a preliminary geothermal database. It is also important to define geothermal energy in Estonian legislation as RES as well as to work out economic stimulus packages for promoting private sector interest.

Similar actions were proposed in a policy document, as an output of INTERREG IV-C project GEO.POWER, focusing on GSHP and energy efficiency for residential and industrial housing. Main initiatives proposed were to include GSHP as RES in future incentive schemes (including industrial scale, e.g. district heating) as well as to develop a curriculum dealing with this area of expertise to provide a sustainable outlook for the sector in general.

An important part of the local market development is learning from more developed European markets and disseminating this information at local level within different interest groups. During 2011-2012 EGA has organized several forums and a 2-day seminar with workshops aimed at communicating geothermal potential to interest groups and leading government officials and decision-makers. Keeping present market developments in Europe and Estonia in mind, the communication activities are seen as one of the most important pillars of successful establishment for geothermal research and application in the country.

3. CONCLUSIONS

Estonian GSHP market has been developing without any direct subsidies for the past 20 years. Given that GSHP systems are economical and one of the most attractive options for energy efficient heating and cooling, new support mechanisms for further market development (to be competitive with other RES which are supported) are expected, including defining GSHP as RES according to European Union standards.

The deep geothermal market is still undeveloped due to lack of information among policy makers and lack of modern geological knowledge. However, since the establishment of EGA in 2011 this situation has started to improve. Actions within the next few years will focus on research and analysis of Estonian geothermal potential, which can pave the road to new horizons.

Tables A-G

Table A: Present and planned geothermal power plants, total numbers

	Geothermal Power Plants		Total Electric Power in the country		Share of geothermal in total	
	Capacity (MW_e)	Production (GWh_e/yr)	Capacity (MW_e)	Production (GWh_e/yr)	Capacity (%)	Production (%)
In operation end of 2012	0	0	3000	9000	0	0
Under construction end of 2012	0	0	No info	No info	0	0
Total projected by 2015	0	0	No info	No info	0	0

Table B: Existing geothermal power plants, individual sites*

*Geothermal power plants are not available in the country.

Table C: Present and planned geothermal district heating (DH) plants and other direct uses, total numbers*

*Geothermal district heating or direct use plants are not available yet in the country.

Table D: Existing geothermal district heating (DH) plants, individual sites*

*Geothermal district heating plants are not available in the country.

Table E: Shallow geothermal energy, ground source heat pumps (GSHP)

	Geothermal Heat Pumps (GSHP), total			New GSHP in 2012		
	Number	Capacity (MW_{th})	Production (GWh_{th}/yr)	Number	Capacity (MW_{th})	Share in new constr. (%)
In operation end of 2012	7500	240	660 (total, calculatory)	1150	14	50
Projected by 2015	10 000	320	875 (total, calculatory)			

All data based on estimation

Table F: Investment and Employment in geothermal energy

	in 2012		Expected in 2015	
	Investment (million €)	Personnel (number)	Investment (million €)	Personnel (number)
Geothermal electric power	0	0	0	0
Geothermal direct uses	0	0	0	0
Shallow geothermal	0,6	100	0,8	120
total	**0,6**	**100**	**0,8**	**120**

Table G: Incentives, Information, Education

	Geothermal el. power	Geothermal direct uses	Shallow geothermal
Financial Incentives – R&D	NO	NO	NO
Financial Incentives – Investment	NO	NO	DIS* * very limited funds
Financial Incentives – Operation/Production	NO	NO	NO
Information activities – promotion for the public	NO	YES, by Estonian Geothermal Association	YES, by Estonian Heat Pump Association and Estonian Geothermal Association
Information activities – geological information	NO	YES*, by Estonian Geothermal Association * very limited information available due to lack of national research	YES, by Estonian Geothermal Association
Education/Training – Academic	NO	NO	YES, by Estonian Heat Pump Association in co-operation with Tallinn University of Technology
Education/Training – Vocational	NO	NO	YES, by Estonian Heat Pump Association

Key for financial incentives:					
DIS	Direct investment support	RC	Risc coverage	FIP	Feed-in premium
LIL	Low-interest loans	FIT	Feed-in tariff	REQ	Renewable Energy Quota