

T@W Good Practice Form

Setting

Title: Construction of geothermal heat pump heating system in a mountain and ski resort hotel
 Country: Bulgaria
 Location: Bansko
 Start date: July 2004
 End date: December 2004
 Technology keyword(s): Geothermal energy
 Host sector: tourist industry

General description

Summary: The project is implemented in a hotel with total heated volume of 17 298 m³ and total area of 6645 m². It consist of construction of geothermal heating and air-conditioning system with geothermal heat pumps using low temperature ground thermal water.

Aims: To replace expensive and polluting solution on burning diesel oil with use of RES.

Summary of Results: Energy produced from RES thus leading to costs reduction and reduction of GHG emissions from substitution of diesel oil oil with geothermal energy

Planning Time: -

Planning issues: The geothermal heating is operational.

Operation Time: 25 years

Feasibility Study: done

Technical details

Technical details: The project consists of installation of geothermal heat pumps using low temperature thermal energy from the ground to provide the heating and air conditioning of the hotel. The system consists of the following four interconnected heat pumps:

1. Geothermal heat pump feeding hot water system with capacity 160 kW;
2. Geothermal heat pump for ventilator convector and conventional heating boilers with 230 kW heating and 180 kW cooling capacity.
3. Geothermal heat pump for the sectional air-conditioning with heating capacity 160 kW and cooling capacity 60 kW;
4. Geothermal heat pump for the swimming pool with heating capacity 40 kW.

During summer 2 and 3 are operational on cooling regime with total capacity of 240 kW while pumps 1

and 4 operate on heating regime of 200 kW capacity. During winter time all four operate on heating regime with total heating capacity 590 kW. The heat pumps are water cooled with 30 l/s water at 7° min. temperature.

An open heat pump system with 390 kW capacity is constructed with existing waters including pumps 2 and 3. For the additional capacity up to 590 kW Artesian wells are built.

The heat pumps are produced by MULTI CLIMA.

Energy data

Energy data:

The estimated energy production by type of consumer is as follows:

Swimming pool - 34 436 kWh/year;

Hot water - 119 795 kWh/year;

Heating and ventilation - 230 200 kWh;

Air conditioning - 60 000 kWh;

447,4 MWh/year or 1609 GJ/year

Energy generated:

Monitoring:

-

Environmental data

Environmental data:

The geothermal energy generated will replace 154 tonnes of diesel oil and 98 182 kWh electricity per annum. Due to replacement of the diesel combustion process in the baseline option with geothermal heat CO₂ emissions will be reduced by 1 309 tons for the period 2004-2012.

Project GHG-emissions:

GHG-emission reductions:

CO₂ emissions will be reduced by 1 309 tons for the period 2004-2012

“EAU, CER, ERU, AAU”:

In addition SO₂ emissions will be reduced by 10,7 tons for the period 2004-2012 and NO_x emissions - by 3,3 tons

As the project didn't apply for financing through Kyoto flexible mechanisms or EET scheme, no other calculations have been made.

Methodology:

The methodology for calculation of emissions reductions is that given in Operational Guidelines for Project design documents of JI Projects of Dutch Ministry of Economics as of May 2004.

Baseline

Baseline scenario consist of diesel oil fired boiler (capacity 590 kW) for swimming pool heating, space heating and ventilation (winter) and hot water production with annual consumption of 154 tons/year and annual consumption of electricity (summer air conditioning) - 98 182 kWh.

Monitoring: Monitoring to be done by EnCon Services, validation to be done by ESBI

Contribution to Sustainable Development: By substitution of diesel oil from fossil fuels with geothermal renewable energy the project contributes to emission saving targets and environmental protection goals.

Economic data:

Economic data: The project cash-flow is generated by the decreased operational costs of geothermal heat pumps option compared to diesel fired boiler. The project is financed through EBRD Bulgarian Energy Efficiency and Renewable Energy Credit Line (BEERECL) and as such received 20 % grant of the total capital costs after project completion. Part of capital costs is provided as a loan from UBB (one of the banks operating the credit line in Bulgaria) and part is project host equity.

Financing: 90 % UBB loan and 10% own investors equity
Capital cost: 539 452 Euro (VAT excluded)
Operational Costs: n.a.
Payback: 3,85 years
Energy Production costs: n.a.
Other savings: no other savings are observed

Additional Information

Printed or electronic reports or other literature available:

Title:	"	Cost: -
Address for download of electronic document:		n.a.

Project Web site: n.a.

Photo Library

Pictures: Each one should have a caption. The provider must own the copyright (should be confirmed)

Contact information (to be duplicated for each contact for this project):

Type of Organisation: Consultancy Company, project management
(e.g. technology supplier, service provider, host company, financing body, project management)

Technology keyword(s) specific to this organisation:

Organisation / Agency: EnCon Services

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Description of the Organisation for inclusion in the database of Technology and Service Providers: Consultancy company approved by EBRD to manage and operate the BEERECL

Other contacts:

#please only give full contact details (name, address, email, telephone) if you have confirmed that they are willing to respond to enquiries and want to be included in the database of Technology and Service Providers. These could for example be: host organisation, equipment manufacturers, financial organisations, etc.#

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