SHORT COURSE 3: Utilization of Low- to Medium-Temperature Geothermal Resources – The Icelandic Example

Length: 2 days
Location: Reykjavik University – M104
Dates: October 23-24, 2021
Convenor: *Dr. Páll Valdimarsson*, pvald ehf engineers
Other main lecturer: *Eng. Thorleikur Jóhannesson*, Business Manager, Verkís Eng.

Scope of the course

The short course aims at introducing the successful utilization of low- to medium-temperature geothermal resources in Iceland, which is an important pillar for the good living conditions in Iceland today. Thermodynamics are introduced and source temperature dependent utilization. Design of the different types of utilization discussed through thermal calculations and design, including district heating, geothermal baths, agri- and aquaculture, drying, heat pumps for heating and cooling, etc. Binary power production from low-temperature waters is discussed, economics and cascaded use.

Course outline:

October 23		
Introduction	08:00-09:00	Registration and coffee.
	09:00-09:30	Aim of SC, organization and practical matters.
	09:30-10:00	Source temperature dependent utilization.
Wells and pumps	10:00-10:30	Geothermal low-temperature wells and pumps.
	10:30-11:00	*Coffee/tea break.*
District heating	11:00-11:30	Design of geothermal district heating systems.
	11:30-12:00	Economics and operation of district heating systems.
	12:00-12:30	Space heating – building installations.
	12:30-13:30	*Lunch.*
Mathematics and numerics	13:30-14:30	Scilab and Coolprop for thermal calculations.
	14:30-15:30	Weather data analysis exercise.
	15:30-16:00	*Coffee/tea break.*
	16:00-17:00	District heating system design exercise.
October 24		
Other direct use	09:00-09:30	Geothermal baths, swimming pools and spas.
	09:30-10:00	Geothermal energy and agri- and aquaculture.
	10:00-10:30	Drying and industrial use of geothermal energy.
	10:30-11:00	*Coffee/tea break.*
	11:00-11:30	Heat pump systems – for heating or cooling.
Power from low temperature	11:30-12:00	Design and selection of binary power plants.
	12:00-12:30	Thermoeconomics, exergy and efficiency.
	12:30-13:30	*Lunch.*
Mathematic and numerics	13:30-14:15	Heat loss calculation exercise (pipe, greenhouse, aquaculture pond, swimming pool).
	14:15-15:00	Candy dryer design exercise.
	15:00-15:30	Thermoeconomic analysis exercise.
	15:30-16:00	*Coffee/tea break.*
	16:00-17:00	Closing and final discussion.

Both on-site and virtual participation possible.