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GEOthermal Technology for economic Cooling and Heating



GEOTeCH

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Collaborative Project

Central System Controller Executive Summary

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Task	T4.3 – Development of the central system controller
Lead beneficiary	Groenholland
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CI	Classified, information as referred to in Commission Decision 2001/844/EC.	

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1. PUBLISHABLE EXECUTIVE SUMMARY

This deliverable concerns the main Plug and Play systems controller. In this task the computing platform (Beaglebone black Rev C) and software suite (Ubuntu 16.04.2, Python 3.4 and associated modules) have been selected and configured. An electronic prototype board has been developed that provides the interface with the heat pump as well as the control of the P&P system regulating valves and additional sensors. The central system controller is intended to provide the main control for the heat pump and associated functions such as free-cooling and borehole regeneration as well as data-logging facilities.

The general control functions for the dual source heat pump system and demo site installations has been based on the deliverable D4.2 / D4.4 (prototype heat pumps), D4.6 (Global system model Plug & Play Installation and the progress report on task 6.1.1 (Demo site design).

In summary the main control functions to be implemented in the central system controller are:

- 1) Selection of user mode: Space heating, Space cooling or DHW production
- 2) Associated with selection of user mode: temperature set points for heating, cooling and DWH production
- 3) Selection of source mode: air-source or ground source
- 4) Selection of cooling mode: free cooling or mechanical cooling
- 5) Control of regulating valves during different operating modes
- 6) Control of source pump during times of heat pump inactivity

Furthermore the central system controller (P&P_CSC) will implement system alarm functions and provide data logging facilities. The central system controller is intended to provide the main control for the heat pump and associated functions such as free-cooling and borehole regeneration as well as data-logging facilities. To support the development of the system controller partner Hiref has made available the technical details of the heat pump controller logic as well as a Carel PCO5+ that has been used for testing.

The relations to other activities in the GEOTeCH project:

Inputs:

The definition of the control system depends on the design of the heat pump, the result of WP4, Task 4.1 (Deliverable 4.2, 4.4) and on the design of the general demo-site systems, the result of WP6, Task 6.1.

The description of operation (DesOPS) of the central controller has been given in D4.6 (Global system model Plug & Play Installation).

The final advanced control strategies that will be implemented are a result of the ongoing work in WP4, Task 4.2 (Modelling the heating and cooling system for plug & play installations, and development of an effective control strategy for their optimal operation).

Outputs:

The output of this task is the prototype physical system controller that will be installed with the dual source heat pump at the three demo sites.

The results of Task 4.2, the modelling of the P&P system and identification of optimized control strategies, will be used to implement an advanced control strategy for the P&P dual source heat pump system.