



## SUMMARY REPORT- Croatian Japanese workshop on Geothermal energy

*University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Zagreb, CROATIA*

Organization of the workshop on geothermal energy was joint effort of University of Zagreb - Faculty of Mechanical Engineering and Naval Architecture (FMENA), Croatian Geological Survey and Akita University of Japan. Workshop was organized on 12<sup>th</sup> of January 2016.

All attendees were greeted and welcomed by FMENA dean, prof. Zvonimir Guzović, who presented Croatian potential for geothermal power generation.

First workshop section was dedicated to the results of project *Research and the promotion of the use of shallow geothermal potential in Croatia*. Project leader, prof. Vladimir Soldo, presented the activities and key findings gathered during project implementation. Member of Croatian Geological Survey, Staša Borović, showed shallow geological environments in Pannonian and Dinaric parts of Croatia, while Luka Boban presented ground thermal properties obtained by application of distributed thermal response test.

Second section of the workshop was devoted to the research activities of Japanese delegation members. Prof. Hikari Fuji from Akita University showed basis of distributed thermal response test, method first proposed by himself, together with investigation of horizontal ground heat exchangers, both experimental and numerical. Mayumi Yoshioka from Japan's National Institute of Advanced Industrial Science and Technology presented her research on evaluation of suitable area for aquifer thermal energy storage. Last presentation of Masahiko Katsuragi, from Japan Groundwater Development Company, showed use of geothermal energy and other renewable sources in snow melting process for public roads.

After the presentations, all participants visited new geothermal heat pump system installed at FMENA location. It is experimental system consisting of propane heat pump used for conditioning of two classrooms and connected to 130 m deep borehole heat exchanger. Whole system is equipped with advanced monitoring system that will be utilized for future research work.

Workshop attended around 40 participants including academic members, young researchers, professionals dealing with heat pumps and geothermal energy and students, with significant number of them being active participants in discussions.

This workshop was a great opportunity to exchange knowledge and experience between *Geothermal Mapping* project team and members of Japanese delegation. Since prof. Fuji is leading expert in technology first used during mentioned project and Mayumi Yoshioka's project is similar to potential future research field, their visit, shared knowledge and possible connections for future collaboration are highly regarded.

Day before organized workshop, Japanese delegation was officially welcomed on faculty by Dean of FMENA and led by prof. Soldo in tour around faculty facilities and laboratories where research activities of Thermal and Process Engineering Department were presented. During stay in Croatia, delegation members visited one borehole heat exchanger drilling site in Zagreb and Croatian Geological Survey where they were welcomed by Mr. Josip Terzić and got introduced to CGS's main activities and laboratories.

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Being able to welcome and share the research experiences with Japanese delegation, led by professor Hikari Fujii from Akita University, was a great honor for whole project team and to all of those who participated in the workshop and related activities.

on behalf of the Project team

prof. dr. sc. Vladimir Soldo, project manager



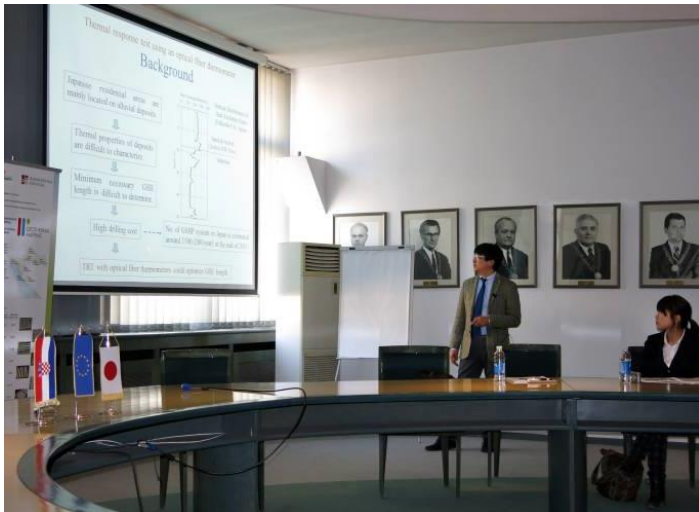
Dean reception, FMENA, 11<sup>th</sup> January 2016



Japanese delegation (Masahiko Katsuragi, Mayumi Yoshioka, prof. Hikari Fujii)



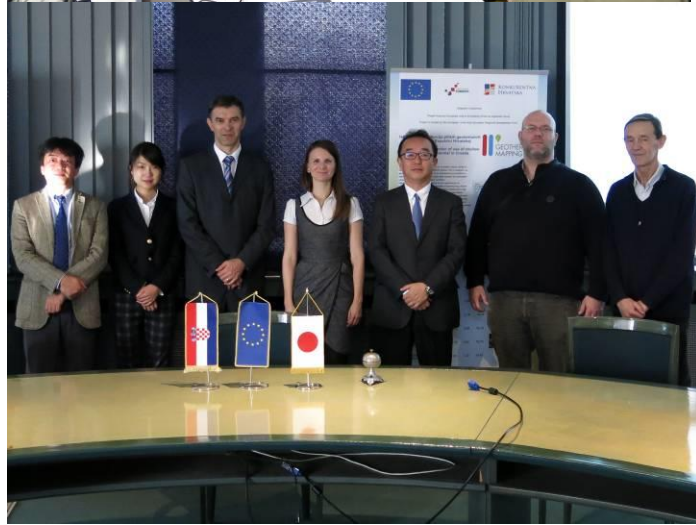
Croatian presenters (Section 1) - Workshop, 12<sup>th</sup> January 2016



Japanese presenters (Section 2) - Workshop



Workshop participants



Study visit of the new monitored test system with GSHP at FMENA



Reception at the Croatian Geological Survey, 13<sup>th</sup> January 2016

Visit of the drilling site with BHEs and GSHP