



# REPORT on the international conference on heat pumps ZEO 2016 in Ljubljana on November 21st 2016

On November 21st 2016 an **International conference on heat pumps ZEO** (Zgradbe-Buildings, Energy, Okolje-Environment) 2016 was organized in Ljubljana at Radisson Blu Plaza hotel. The conference was conducted in the organization of the company Kubus Engineering I.l.c. from Ljubljana. Moderator of the conference was Mrs Kludija Naglič from this company, and program manager of the conference was Mr. Marko Umberger. The company Kubus Engineering LLC every autumn organizes the ZEO conferences since 1998.

This year's conference on heat pumps came in the right moment, because advance in the heat pump technology is obvious, moreover, at least in Slovenia are difficulties on several levels to integrate this useful way of using renewable energy sources (RES). The conference at least partially assisted in clarifying these issues. A new generation of heat pumps allows different approaches to energy efficiency in the buildings. If we have so far argued that first the civil engineering approach is needed and then technological approach, it can now be different. Therefore, domestic and foreign lecturers presented their views and showed the achievements in the field of the heat pumps' use. The participation from the Geological Survey of Slovenia (GeoZS) in the conference was the following: Joerg Prestor, Mitja Janža, Dušan Rajver and Simona Pestotnik. All four were also the authors of our presentation, mentioned further.

The Conference Programme was as follows:

## SALUTATION

Hinko Šolinc, MSc, Eko Fund, Slovenian Environmental Public Fund

## DOMESTIC AND FOREIGN EXPERIENCES

### 9.15: A NEW APPROACH TO ENERGY RENOVATION OF BUILDINGS WITH HEAT PUMPS

Prof.Ph.D. Peter Novak, ENERGOTECH engineering LLC



10.00: HEAT PUMP MARKET IN GERMANY

Tony Kroenert, German Association for heat pumps (Deutscher Verein für Wärmepumpen)

11.00: ENERGETICALL, ECOLOGICAL AND COST-OPTIMIZED MULTI-VALENT ENERGY SYSTEM FOR HOTEL

Peter Komplet, VIESSMANN LLC

11.15: Pause

11.45: BUSINESS PRODUCTION FACILITY KRONOTERM IN BRASLOVČE

Damir Jurak, Klimada Maks I.l.c.

**PROGRAM OF CONSULTATION ZEO 2016**

12.15: HEAT PUMPS IN THE CONTEXT OF SUSTAINABLE HEATING IN SLOVENIA

Ph.D. Henrik Gjerkeš, Civil Engineering Institute ZRMK

12.45: THERMIA MEGA - A NEW MILESTONE IN GEOTHERMAL HEATING AND COOLING IN RESIDENTIAL, COMMERCIAL AND PUBLIC BUILDINGS

Andreas Johansson, THERMIA VARME - DANFOSS Heat Pumps, Sweden

13.15: POSITIVE AND NEGATIVE EXPERIENCE IN THE DESIGN AND OPERATION OF THE HEAT PUMP

Primož Praper, EUTRIP LLC, Leon Pokeržnik, FIMA LLC, Matej Kramar, RE ing LLC

13.45: Pause

15.00: FINANCIAL INCENTIVES OF THE ECO FUND FOR ENVIRONMENTAL INVESTMENTS IN 2016

Hinko Šolinc, MSc, Eko Fund, Slovenian Environmental Public Fund

15.30: WHY THE HEAT PUMP MARKET IN AUSTRIA IS STEADILY INCREASING?

Richard Freimüller, President of the Austrian Association for heat pumps (Österreichischen Verbandes Wärmepumpen), Austria

16.30: PROJECT LEGEND - EXPLOITATION OF SHALLOW GEOTHERMAL ENERGY ON THE ADRIATIC REGION

Dalibor Jovanović, MSc, Istrian Regional Energy Agency (IRENA), Croatia

17.00: POTENTIAL OF SHALLOW GEOTHERMAL ENERGY IN SLOVENIA

Dušan Rajver, MSc, Geological Survey of Slovenia

## 17.15 HEAT PUMP SYSTEM IN THE NORDIC CENTRE PLANICA

Jože Oblak, I.S.P. LLC

17.45: Pause

## 18.00: **ROUND TABLE:**

### WHAT IS THE FUTURE OF HEAT PUMPS' USE IN SLOVENIA?

H. Šolinc mentioned that the objectives in the field of renewables extended from 2020 to 2030.

P. Novak stressed the objectives and international commitments of Slovenia, and that it was unlikely that we would have in 2030 at least 50 % of the vehicles on electricity. He also noted that the biomass should serve for the cogeneration of heat and electricity, and not for use as firewood. In the long term a "decarbonization" (0 carbon) of buildings should be done using all types of heat pumps (HPs).

Fius D. and P. Novak mentioned that we were approaching the zero emissions of each building.

T. Kroenert presented the development of production and the market with HPs in Germany, as well as where and when the deadlock occurred in this growth. He mentioned the joint support for a typical complete geothermal or ground-source HP (GSHP) setting in Germany, approx. € 9,300. It is expected that growth in 2030 would amount to ca 80,000 units of HP of all types per year. The main obstacle is the price of electricity in the accelerated development of the market. He showed the ability to link industry and installers in terms of the layout of the complex monitoring of the functioning of each HP, with which important parameters can be read: Smart Grid Ready Label, Energy Label Tool, Subsidy Calculator, SPF Calculator, Noise Calculator, Geothermal Calculator, etc.. He displayed an example of the largest IKEA building in Berlin, which utilizes the waste water through the HP. He mentioned further that the HPs were installed mainly in new buildings, as 33% of new buildings mount the HPs, and these were mostly GSHPs (which should rouse our planners and installers!).

P. Komplet presented the Viessmann Slovenia l.l.c. and displayed the equipment for one of the hotels in Slovenia, in which the space heating and domestic hot water (DHW) are in operation, as well as the need for electricity and cooling. The real solution is a multivalent energy system: boiler + HP + waste heat.

D. Jurak outlined how the business-production building company Kronoterm (Termotehnika) in Braslovče implemented the system for heating and cooling, and DHW heating with a GSHP system using a water-water (doublet wells) and 10 borehole heat exchangers (BHEs) and an air-water HP for DHW preparation.

H. Gjerkeš stressed the benefits of nearly zero-energy buildings (N-ZEB), which have a cost-optimized, environmentally friendly and socially responsible method of heating and cooling. Sweden

produces 60% of its electricity from renewable sources. To use the HP for individual houses the best way is a monovalent system (?).

A. Johansson presented the company Thermia HP, a HP manufacturer in Sweden, which is part of the large Danish Danfoss Group since 2005. The latest HPs are the so-called Thermia Mega, which can simultaneously produce heat for heating, cold and DHW.

P. Praper had a very interesting presentation by showing many examples of good and bad practice in the design and operation of the HPs in Slovenia. He stressed the need for correct directions (policies) which properties should be compared in tenders for public buildings.

H. Šolinc mentioned that ENSVET now has 56 consultancy offices (firms), and how many financial resources were devoted to individuals as grants from 2008 to the end of 2015 (138 million €).

R. Freimueller presented the HP market situation in Austria, particularly from 2012 onwards, however he gave a historical overview of the market growth there, which began already in 1856 with the first HP. In Austria are as many as 39 manufacturers of HPs (many of these local and smaller). Austrian Association of HPs consists of manufacturers and other companies, institutes, etc. At the end of 2016 in Austria will be 267,000 HP units of all types, 2/3 of them are the air-water HPs. In 2030 this number will rise to 620,000 units. The climate in Austria has become warmer by 21% during the period 1980-2015. For a complete system with a HP for single family house of 150 m<sup>2</sup> in Austria the price is 18,000 to 20,000 €. Till 2020 in Austria the greenhouse gas (GHG) emissions will be reduced by 20%, and till 2030 by as much as 40%. Austria produces 89% of its electricity from renewable sources (the lucky ones, but when they have so much hydropower!).

D. Jovanović showed some results of the LEGEND project, which was completed last year, and in this sense particularly what were useful sides of the GSHP system layout for both buildings in Labin, that is for kindergarten (old and new building) and the secondary technical school center (energy baskets with various fillings) .

D. Rajver (in the name of researchers from GeoZS) presented "The potential of shallow geothermal energy in Slovenia", emphasized the difference between shallow and deep geothermal, explained the concepts of open and closed systems, direct and indirect use of shallow geothermal energy (GE), of the importance of the Earth's heat flow, showed the importance of a preferred decision-making in the exploitation of natural (geological, geographical) and other features, emphasized the geological potential and the advantages and peculiarities of GSHPs. He showed a growth market of GSHPs in Slovenia and finally mentioned the 2 new projects, GRETA and GeoPLASMA-CE, both three-year, where GeoZS is also involved. The first one started in March 2016 and the second will be launched in Jan. 2017. The project GRETA is aimed in defining the potential of shallow GE in the Alpine region and the formulation of appropriate guidelines based on regulations and best practices in the exploitation of shallow GE. The aims of GeoPLASMA are to increase the share of shallow GE for heating and cooling in the area of Central Europe. Pilot area in Slovenia is the area of the Municipality of Ljubljana as an example of the urban environment. In this area, our intention is to evaluate natural conditions (geothermal potential) and restrictions on the use of GE and include this information in the energy (LEK) and spatial plans of the city.

J. Oblak showed a system of HPs in the Nordic Centre Planica, where there are two service facilities (Kavka and Čaplja), a central facility, a heating installation and garages where they can carry out heating and cooling in such a way that even in summer snow for cross-country training is available. The Viessmann HPs are installed with 2 units by 74 kW and 3 units with a total of 115 kW of thermal power.

A round table followed with the following conclusions: H. Šolinc mentioned that they were nowadays installed in Slovenia probably between 2000 and 3000 heating HP units (in my opinion at least 3000, perhaps between 3000 and 4000, because this number cover also all the GSHP units, and the latter are ca 850-950 per year in the last 2-3 years, remarks D. Rajver). He stated that with the ECO Fund ca 2500 heating HP units were installed nowadays. The PETROL Co. founded the private-private partnership offering the HPs on credit in 7 years. PURES 10 is innovated. B. Dukić (already I do not know how many times) mentioned the need to exploit the deep abandoned (oil and geothermal) wells as possible maxi probes (BHEs).

Ljubljana, Nov. 28, 2016

Compiled by:

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Simona Pestotnik



Figure 1. Hinko Šolinc, MSc, Eko Fund, Slovenian Environmental Public Fund.



Figure 2. Prof.Ph.D. Peter Novak, ENERGOTECH engineering LLC and Mr. Marko Umberger, Kubus Engineering LLC.



Figure 3. Dušan Rajver, MSc, Geological Survey of Slovenia.



Figure 4. The audience of the conference.



Figure 5. The audience of the conference.



Figure 6. The audience of the conference.