

Event:  
Date:  
Place:

**ENERGY in BUILDINGS 2017**  
Saturday October 21, 2017  
Athens, Hellas



<b>#</b>	<b>Evangelos Bellos</b> (Mechanical Engineer, PhD)	
Title:	Post-doctoral researcher in the School of Mechanical Engineering at National Technical University of Athens	
email:	bellose@windowlive.com/bellose@central.ntua.gr	
Presentation title:	<b>Thermodynamic investigation of an innovative solar driven trigeneration system ideal for the building sector</b>	
<p>This work presents an innovative solar driven trigeneration system which is able to produce electricity, cooling and heating which different proportions in order to cover the variable loads of the buildings. This system is based on the absorption heat pump technology and it includes an absorption heat pump operating with LiBr/H<sub>2</sub>O and a steam turbine. More specifically, the produced superheated steam from the generator is separated into two quantities: the first one goes to the condenser (heating production) and to the evaporator (cooling production), and the other to the turbine in order electricity to be produced. The basic thermodynamic analysis of this system has also presented recently in literature, but this study examines the combination of this system with a solar collector loop. Parabolic trough collectors of 100 m<sup>2</sup> collecting area are coupled to a storage tank of 5 m<sup>3</sup> and this sub-system feeds the generator with heat. The final results of this analysis prove that the exergetic efficiency of the system is close to 10% and significant amounts of electricity, heating and cooling can be produced. For the case of 80% steam fraction to the turbine and steady state conditions, the electricity production is 7.16 kW, the heating production is 9.35 kW, the cooling production is 8.55 kW and the system exergetic efficiency is 9.80%. These results show that different steam fractions to the turbine can regulate the operation of the system according to the energy needs of the building. The daily analysis proved that the electricity, the heating and the cooling productions are 48.3 kWh, 62.9 kWh and 57.7 kWh respectively, for a sunny day and 80% steam fraction. Moreover, it is important to state that this system is analyzed parametrically with a developed model in EES (Engineering Equation Solver) under steady state and time dependent conditions.</p>		

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CV:

### Dr. Evangelos Bellos

email: [bellose@windowlive.com](mailto:bellose@windowlive.com) / [bellose@central.ntua.gr](mailto:bellose@central.ntua.gr)

#### Education:

- Diploma in Mechanical Engineering, National Technical University of Athens, 2012, Grade: 9.61/10
- Ph.D. in the School of Mechanical Engineering, National Technical University of Athens, 2016. Title: Exploitation and optimization of solar thermal systems in buildings

#### Experience

- Post-doctoral Researcher in School of Mechanical Engineering at National Technical University of Athens (January 2016 - Today)
- Teaching assistance at the following course in in School of Mechanical Engineering at National Technical University of Athens from 2013: "Refrigeration basic principles" and "Thermal Behavior".
- Internship in PPC Renewables (Ma-July 2012).

#### Research interests

- Thermal and optical analysis of concentrating solar collectors
- Optimization of solar thermal systems for building applications with emphasis in trigeneration systems
- Investigation of refrigeration, HVAC, electricity production system with emphasis in absorption chillers, heat pumps and Organic Rankine Cycle.

#### Scientific work

- 42 Publications in scientific journals and 22 publications in conference proceedings.
- Reviewer in 30 Journals with totally 250 reviews.
- Assistance in the supervision of 23 diploma thesis in School of Mechanical Engineering at National Technical University of Athens under the main supervision of C. Tzivaidis

#### Programming/Software knowledge

SolidWorks, SolidWorks Flow Simulation, TRNSYS, EES, FORTRAN, Microsoft Office, eQUEST, EES, COMSOL, Matlab

#### Scholarships/Awards

- Scholarship for post-doc research from Bodossaki foundation
- Dimitrios Chorafas Prize for the best PhD in year 2016 at National Technical University of Athens
- Scholarship for Ph.D studies from Onassis foundation
- 7 Awards for the performance as student at Mechanical Engineering.

#### Other information:

Member of ASHRAE, Member of Greek Technical Chamber, Member of ISES