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Department of Electrical and Computer Engineering

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Title: ***«The role of RES self-consumption and net-metering in NZEBs»***

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Abstract:

The European Commission has identified since the early 2000's the need to focus on improving the energy performance of the EU's building stock and took action by issuing a number of directives. This was deemed necessary since buildings account for almost 40% of the total primary energy consumption in the EU. This situation along with the explicit targets stemming out of the Kyoto arrangement for the EU countries, influenced the adoption of specific targets for the year 2020. The general adopted targets for 2020 was condensed into the motto 20-20-20 by 2020, which implied a reduction of energy consumption by 20%, an increase in the share of renewables by 20% and a reduction by 20% of the Greenhouse Gases (GHG) emissions. These targets were revised later to form the 2030 EU strategy, with the 3 previous pillars having set targets at 40%, 27% and 27% respectively. In order to be able to achieve such ambitious targets, the energy consumption in buildings is a first priority. A major development was the introduction into the EU legislation of the notion of Nearly Zero Energy Buildings (NZEB), in the Recast of the Energy Performance Building Directive in 2010. Although a common consensus is still absent in the EU about the definition of an NZEB, it is generally considered to be a building of very low energy demand that is met to a large extent by energy produced from renewable energy sources (RES). In fact this directive introduced the requirement that all new buildings should be NZEB ones from 2020.
While traditionally building engineer professionals were identified mainly to be civil or mechanical engineers, along with architects, with the advent of the Smart Grids, this has changed dramatically. In fact, having in mind the NZEBs, a building should be better described as a "system" that "communicates" and exchanges energy with other systems, the various energy grids. This is further complicated if a Net-ZEB building is considered. In this case, the interaction of the building system with the external energy grids should be almost net zero inside a certain time step. In this context, procedures like net-metering or self-consumption of RES electricity in a building have become integral with the NZEB. Obviously all the above mean that the role of electrical engineers in the design, construction and retrofit of the NZEBs is already crucial.
This lecture provides an overview of the status and definitions concerning NZEBs in Europe and goes on to deal with the issues of self-consumption and net-metering. Since the cost parameter is fundamental with NZEB as well, a generalized methodology is presented that enables the determination of the economic attractiveness of certain self-consumption of net-metering schemes and various policies. In order to do that, a case study involving a sample of 40 residential consumers from Greece is considered and policies going beyond the current ones are examined.

Biography:

Georgios C. Christoforidis was born in Thessaloniki, Greece. He received his Dipl. Eng. degree and Ph.D. degree from the Department of Electrical & Computer Engineering at the Aristotle University of Thessaloniki in 1998 and 2004 respectively and his M.Sc. degree in Power Electronics & Drives with distinction from the University of Birmingham, UK, in 1999. In 2010 he joined the Electrical Engineering Department of the Technological Education Institution of Western Macedonia, at Kozani, Greece, where he is currently an Associate Professor. He has coordinated or participated in more than 10 European and national research projects and has co-written more than 50 papers in scientific journals and international conferences. His current research interests include energy efficiency and policy, power systems analysis, distributed energy sources, power quality and EMC.