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#119	**Dimitrios Koubogiannis** Associate Professor Department of Naval Architecture School of Engineering University of West Attica	

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Paper/Presentation:	"Scientific Paper"	•
Present. duration:	20 min (including a 5 min Q&A)	•
PC/Mac	PC	•
Requirements:	Provide any additional requirements	•
Presentation title:	**Embodied Energy of Building Materials in Hellenic Dwellings: Quantifying the Effect of Construction Date**	

Since buildings are responsible for a significant percentage of total energy consumption worldwide, special attention is paid nowadays in their design and construction so as to minimize their total energy consumption during its life cycle; this consists of the operational energy and the Embodied Energy (EE) of the building. In previous papers by the authors, the EE and embodied CO2 emissions (ECO2) impact of typical Hellenic dwellings constructed in the period 2000-2010 was quantified. The fact that the dominant building materials are concrete and steel was also validated. Due to serious earthquake events in the past, the Greek legislation concerning antiseismic requirements for Hellenic residential buildings has undergone various modifications. As a consequence, the amounts of the basic materials and thus their EE and ECO2 are expected to deviate for buildings of a different construction period. In the present study, an attempt is made to quantify the effect of the construction date of Hellenic buildings to their EE and ECO2, as a consequence of more strict regulations due to seismic risk reassessment. This is accomplished by means of test cases referring to typical Hellenic residential buildings of the same seismic zone, each of which has been constructed in a different period in the past. Through the definition of appropriate metrics for the sake of comparison among the buildings of different typology, the results are proved to support the qualitative expectation that the EE and ECO2 impact generally grew over successive construction periods and also provide relevant quantitative information on this fact.

CV:	

Dr Dimitrios Koubogiannis is an Associate Professor at the Department of Naval Engineering (School of Engineering) of the University of West Attica (UWA). He received his diploma in 1992 from the School of Mechanical Engineering at the National Technical University of Athens (NTUA). He also obtained his PhD from NTUA in 1998 (defending the thesis "Numerical Solution of the Navier-Stokes Equations on Unstructured Grids in a Parallel Processing Environment"). He accomplished his military service during 1998-1999 and returned at NTUA as a post-doctoral researcher at the Laboratory of Thermal Turbomachines from 1999-2002. In the course of his doctoral thesis, as well as a researcher, he participated actively in a number of aeronautical research projects (financed either by EU or national funds or by companies). He then worked at the Hellenic Aerospace Industry, at the Electronics Department (2002-2005). In 2005, he joined the Energy Technology Engineering Department (School of Technological Applications) of the Technological Educational Institute of Athens as an Assistant Professor, where he was responsible for the Laboratory of Steam Boilers & Thermal Turbomachines. With the founding of the University of West Attica and the abolition of his former Department, he joined the Naval Architecture Department in 2018, where he is an Associate Professor since 2018. His teaching activities in both Departments include undergraduate courses (Thermodynamics, Heat Transfer, Steam boilers, Thermal Turbomachines, Heating-Ventilation- Air Conditioning), and postgraduate ones (Ventilation and Air Conditioning, CFD at the MSc in Energy Technology in his former Department in the context of a joint TEI Athens–Herriot Watt University postgraduate program for about a decade). He is the author of 12 publications in scientific journals and 45 conference papers and has about 80 citations. His research areas include the development and application of CFD methods (flow and heat transfer simulations, optimum aerodynamic design, aeroelasticity, reduced order modeling, flow control), modelling and optimization of gas turbine and steam boiler power plants, refrigeration and air conditioning methods and applications, design and assessment of energy harvesting devices, life-cycle assessment and embodied energy issues in buildings.