


Event:
Date:
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#	<p>Alexandra Bonou Civil Engineer, PhD</p>	
Title:	<p><i>Post Doctoral Researcher, School of Mechanical Engineering, Lab. of Heterogeneous Mixtures and Combustion Systems, Zografou, Athens, Greece</i></p>	
email:	<p>bonou@central.ntua.org</p>	
Presentation title:	<p>Deep Renovation of a Residential Building - a Life Cycle Perspective</p>	
<p>The environmental impacts related to energy renovation of an existing multi-storey building, located in Athens, Greece were investigated. Three scenarios were developed: a) reference one which corresponds to the existing state of the building, b) an advanced case which includes all the basic energy renovation interventions according the KENAK regulation and c) a deep renovation scenario which includes not only the upgrade of the building's energy systems but also a total refurbishment of its envelope by prefabricated lightweight components with drywall materials. For all three scenarios, the energy efficiency of the building was based on the total annual energy consumption. Life cycle assessment (LCA) was additionally employed to complement the typical energy performance evaluation. The LCA results for climate change for the reference building were approx 50 kgCO₂eq/m²GFA/y. Compared to the reference case, the advanced renovation scenario was found to perform 73% better and the deep renovation 76% better. Similar was the performance in terms of primary energy demand. The results signified the need to shift the focus upstream the life cycle of the building, to the "materials" stage. The novel materials in the deep renovation and specifically the VIPs in the outer wall were found to account for 60% of the total life cycle impact of the building. The adopted approach allowed to estimate the building's environmental footprint, to identify tradeoffs between impact categories and to highlight parts of the system that are typically not assessed such as the end-of life of demolition waste.</p>		
CV:	<p>Dr. Alexandra Bonou is a Post Doctoral Researcher participating in the Lie Cycle Assessment/ Life Cycle Costing (LCA/LCC) group of the Lab. of Heterogeneous Mixtures and Combustion Systems, School of Mechanical Engineering, National Technical University of Athens (NTUA). She has studied Civil Engineering in NTUA (MSc received in 2008) and Environmental Engineering in DTU (MSc received in 2010). She received her PhD (2016) from DTU on Life Cycle Based ecodesign applied on Wind Energy Technologies, which was an industrial collaboration with Siemens A/S. Her scientific activities focus on life cycle management for sustainable product development. She uses approaches such as environmental and social LCA together with participatory design research to develop ecodesign solutions for various sectors such as energy, transport, food and consumer products. She has worked as a researcher in 5 EU and national funded research projects. The results of her scientific activities have been published in 12 journals and conference proceedings. Beyond research, she has experience from the private sector, acting as an LCA consultant (bobagroup.dk), and she is vice president of the Danish-based NGO InnoAid (innoaid.org) working on sustainable development projects.</p>	