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Presentation title:	**Techno-Economic Analysis of Deep Renovation for a Typical Residential Multi-Storey Building**	

The present study treats energy and techno-economical aspects of the deep renovation of an existing typical residential building. The examined building is a typical five storey building, located in Munich, with 20 apartments, 75m^2 each. The renovation concerns the total refurbishment of the building envelope and the technical building systems (HVAC and DHW). Two renovation scenarios were examined: a) an advanced renovation and b) a deep renovation. Both cases were evaluated through dynamic energy simulation using the EnergyPlus software. The techno-economic analysis is performed using the Payback Period method considering all costs involved.

In the existing state of the building, the envelope is not insulated. For the advanced renovation scenario, insulation is installed at the external side of the building envelope. The HVAC system is replaced by a biomass central heating system and mechanical ventilation with heat recovery. The DHW production is achieved with a combination of the biomass boiler and solar panels. In the deep renovation scenario, the external walls are replaced by prefabricated lightweight envelope components with drywall materials. The HVAC system is replaced with a natural gas condensing boiler, mechanical ventilation with heat recovery and an advanced Building Energy Management Systems (BEMs) with forecasting algorithms. Moreover, an extended PV system is assumed on the roof of the building. The results showed that the primary energy consumption is reduced by ca. 70% and85% for the advanced renovation and the deep refurbishment, respectively. The payback period for the deep renovation is approximately one year less than the advanced renovation.

CV:	

Mr. Aris Manolitsis graduated from the Technological Educational Institute of Piraeus and from National Technical University of Athens with specialization in energy technology. He also intends to have his master degree in control and automation engineering from NTUA during 2017. His first diploma thesis was related with the experimental and analytical techniques for estimating thermal conductance in composite structural elements while his second diploma thesis in NTUA was titled "Thermal performance of dry constructions buildings with lightweight metal frames incorporating on their insulation Vacuum Insulation Panels (VIPs). Since 2016 he cooperates with the Laboratory of Heterogeneous Mixtures & Combustion Systems of the School of Mechanical Engineering in NTUA, in the area of energy savings in building sector.