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ASHRAE Hellenic Chapter

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Presentation title:	**HYFLEXPOWER: Demonstration project of power-to-H_2-to-power advanced plant concept**	

Hydrogen combustion in gas turbines is expected to become a key technology for backing up intermittent renewable generation in deeply decarbonized energy scenarios. The HYFLEXPOWER project is the first-ever demonstration of a fully integrated Power-to-H_2-to-Power full scale pilot installation at an existing plant within an industrial facility in Saillat-sur-Vienne, France. This presentation provides a comprehensive summary of the successful development, installation, and demonstration of the Power-to-H_2-to-Power advanced concept, including onsite production of green hydrogen from water electrolysis, compression, storage, and re-electrification through combustion in a Siemens Energy SGT-400 gas turbine in shares of up to 100% H_2. In addition, the technoeconomic feasibility of the overall Power-to-H_2-to-Power concept is investigated and compared to the conventional operation with 100% natural gas, based on current and anticipated energy market developments.

Short CV:

Dipl-Ing. Nikolaos Skordoulias holds a diploma in Chemical Engineering and a Master Diploma in Energy Production and Management both acquired from National Technical University of Athens. He is currently working as a research engineer and PhD Candidate at the Laboratory of Thermal Processes, School of Mechanical Engineering, in the field of renewable hydrogen production and utilization in energy systems.

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Dipl-Ing. Nikolaos Skordoulias holds a diploma in Chemical Engineering and a Master Diploma in Energy Production and Management both acquired from National Technical University of Athens. He is currently working as a research engineer and PhD Candidate at the Laboratory of Thermal Processes, School of Mechanical Engineering, National Technical University of Athens in the scientific field of renewable hydrogen production and utilization in energy systems. He has 2 and a half-year experience working as a Research and Development Engineer in a renown greek energy utility company, acting as a project manager for R&D Projects in the field of wind energy, energy efficiency in the commercial rented sector as well as renewable hydrogen production and utilization. During his work, he strongly supported the acquisition a total EU funding of 4 million Euros for the company and a strong presence in the emerging greek hydrogen market. His current research interests are primarily related to process modelling, technoeconomic analysis, dynamic simulation and multi-objective optimization of renewable hydrogen production and utilization in various energy systems and sectors (industry, mobility, energy). Up to now, he has participated as an author or co-author in 2 peer-reviewed scientific articles in Journals and Conferences in the field of Power-to-H2-to-Power modelling and technoeconomic analysis. At NTUA, he also works as a Project Manager in 4 Horizon Europe-funded R&D projects in the field of Power-to-X.