Introduction

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Biographical notes: Panagiotis Grammelis is the Director of the Laboratory of Alternative Fuels and Technologies; member of CPERI's Scientific Council and guides a team of 25 researchers since May 2011. The scope of his research is the exploitation of solid fuels, i.e., biomass/waste and coal, with emphasis on the thermochemical conversion technologies. He is a national expert for the standardisation of solid biofuels and heating and cooling applications, related to the bioenergy and district heating sectors. He is a member of the editorial board in *IJER*, *IJGW* and the scientific committees of international conferences (GCGW, EUBCE and WSED). He is the co-author in numerous publications in scientific journals, conferences, workshops, books and chapters in books and his H-index is 22 (according to Scopus).

This special issue relates to energy, transport, and the green house effect, i.e. their role and impact on global warming and climate change. It is associated with the Global Conference on Global Warming, held in Athens in May 24–27th, 2015. At the Conference, a total of 75 presentations and nine keynote speeches in three days were realised, while two parallel sessions were held, attended in total by 150 delegates from 37 countries. In addition, the poster exhibition was particularly interesting, where 36 works of special scientific interest were presented.

Selected papers with high-quality research results and new scientific developments on the aforementioned topics are published in this issue, providing an in-depth knowledge on recent aspects of the global warming phenomenon and assisting the reader in obtaining a comprehensive understanding. Specific test cases around the world are presented, providing a holistic view on general aspects related to current policies and emissions from transport as well as on the environmental impact from fossil and renewable fuels usage in energy or hydrogen production. Novel carbon capture and storage technologies are investigated along with process/systems analysis and optimisation for cost effective CO_2 capture. Specialised studies are presented for the driving factors of CO_2 emissions from electricity generation. The case of Greece is interesting for the high number of inhabited islands, and the potential environmental and economic benefits from the grid interconnection. Apart from power generation, which is the main contributor to the greenhouse effect, the introduction of alternative fuels in energy intensive industries is investigated, such as power plants for off-grid mines and feedstock for refineries. In addition, the performance of a hybrid renewable ground source heat pump (GSHP)/photovoltaic thermal (PVT) microgeneration system is investigated for cases in Canada and South Korea, trying to increase the renewables contribution in the building's energy mix. As far as global warming impact is concerned, the case of Izmir, Turkey is explored as regards the rise of sea level, as well as the effect of the rising atmospheric CO_2 level on whiting in an Arabian semi-enclosed gulf.