

From the Guest Editor

This issue is prepared primarily to enlightenment of the recent scientific achievements in the field of Thermal Energy Modelling for Renewable Energy Applications that was supported by Hong Kong Information Technology & Industrial Engineering Research Center.

Heat remains the largest energy end-use, constituting 50% of global energy consumption in 2018, which contributed to 40% of the global CO₂ emissions according to the International Energy Agency. That heat was mainly used for industrial processes (50%), buildings space and water heating (46%), and to a lesser extent for agriculture use and cooking. Despite the larger penetration of renewable energy, only 10% of the total heat demand is being covered by renewable sources (excluding biomass). Regarding the electricity share of energy resources, thermo mechanical energy conversion is still predominant regardless of whether it comes from traditional fossil fuel power plants, nuclear energy or renewables such as biomass, solar thermal energy and geothermal. Projected scenarios on worldwide energy demand estimate an extensive penetration of renewable energy sources seeking to mitigate climate change consequences. In that context, developing highly efficient heat and power thermal energy systems will be crucial for sustainable development.

Noting all these exciting developments, it has never been more pertinent to launch a *Special paper selection* in this issue that seeks to capture the latest research in thermal energy modelling with a clear interest in thermodynamics optimization, advanced thermal conversion systems, buildings' energy efficiency and heat transfer characterization, regardless of whether it is for heat generation or electricity production for renewable energy applications.

The 40 original scientific papers selected among large amount of manuscripts, after careful peer review process according to criteria of *Thermal Science* journal.

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