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## Editorial

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**Biographical notes:** Dhayalan Velauthapillai is a Professor of Physics and Technology. He holds expertise in the area of enhancement of power conversion efficiency of new generation of solar cells. His fields of interest include electromagnetic modelling, thin films, simulation of nano-materials and solar energy technologies.

Madhu Ganesh is a Professor of Mechanical Engineering with wide experience in technology and product development, synergistic use of theoretical and experimental techniques for engineering problems. His specialisations include computational and analytical heat transfer in various industrial applications, thermal design of electronic equipment, design of screw compressors and design of waste to energy plants.

Senol Baskaya is a full-time Professor specialised in area of heat transfer and fluid flow. His research interests include experimental investigation and numerical modelling of heat and fluid flow, electronic equipment cooling, renewable energy sources, HVAC/R.

A.S. Krishnan is an Associate Professor working in the area of thermal sciences. His research interests include thermal management of electronic equipment, energy storage and alternate fuels for internal combustion engines, sensible heat storage and performance augmentation of recuperative heat exchangers.

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The field of energy is vital and has evolved with time. The change has been more radical in the near past and is expected to be so in the future owing to compelling demand and even more so because of environmental constraints. Any technological advancement in the field of energy and environment should be engineered to provide sustainable development. While the initial phase of energy research was more on non-fossil fuel technologies, it has now grown to a much larger domain of identifying and adopting sustainable technologies in renewable energy systems, necessitating for inter-disciplinary collaboration with vanishing boundaries amongst them.

The articles in this issue were initially presented at the International Conference on Energy and Sustainability in Engineering Systems 2014, held at Coimbatore Institute of Technology, Coimbatore (INDIA). Eight out of the sixty one papers accepted for the presentation at the conference were shortlisted. Author(s) of the shortlisted papers were requested to submit revised version and recommended for peer review for possible publication in this special issue. Four of these were finally accepted after rigorous review. Two of these report a discussion on production and utilisation of bio-fuels. The other two discuss about dehumidification, using solar energy and liquid desiccants.

Tamilvanan and team have explored the production of bio-diesel from non-edible oil. They have reported the performance and emission behaviour of a compression ignition engine using diesel-biodiesel blends with biogas as an inductive fuel. Biogas offers double end advantage in that it can be produced from industrial wastes and its use reduces NO<sub>x</sub> and smoke. Their results indicate that the blend of B80 and biogas offers good brake thermal efficiency and consequently low specific fuel consumption and low opacity. However, this blend does not fare well as far as emissions of CO and UBHC under certain loading conditions. This could however be overcome by using different blends like B100 and biogas or B60 and biogas for such loading conditions, with acceptable changes in other parameters.

Madhu and team have presented a discussion on conversion of cotton residues to bio-oil through flash pyrolysis, which is one of the promising solutions for mass conversion of biomass to fuel. The authors have chosen *Gossypium arboreum* commonly called tree cotton, a cotton species found in India, Pakistan and other tropical and sub-tropical regions of the world. The authors have justified studies on cotton shell waste based on the fact that they contain char, liquid and non-condensable gases and that they cannot be used as cattle feed and generally are being dumped or burnt. The authors have reported pyrolysis of waste cotton shell at atmospheric pressure under inert conditions in a fluidised bed and analysed effects of parameters like sand particle size, operation temperature, etc. The maximum bio-oil yield was reported to be 51% by weight. The

physical and chemical analysis done by GC-MS techniques indicated significant presence of oxygenated aromatic compounds of wide use in chemical industries.

Kesavan and Arjunan have elaborated on experimental studies on a compact and simple design of a solar heater with energy storage for drying of mint leaves. The authors have constructed and experimented with a triple pass flat plate collector with an integrated sensible heat energy storage system. The study has reported the temperature of hot air from solar heater to be reasonably constant for more than 12 hours. The moisture content of the mint leaves, arranged in four numbers of trays in the drying chamber exhibited a decrease from 80% to about 10%. This was achieved in about three hours for first two trays and while the last two have been reported to take five hours for a similar change. The use of thermal energy storage has been reported to increase performance by increasing the rise in temperature across the heater between 12°C to 17°C.

Seenivasan et al. have presented an experimental analysis on performance of a dehumidifier with liquid desiccant, with air conditioning system as a possible application. The study has considered single and double stage dehumidification with and without the use of an intercooler. The authors have reported effects of parameters such as temperature and concentration of desiccant, flow rates of air and desiccant, on the performance of calcium chloride as a liquid desiccant and quantified the performance augmentation by means of an indirect evaporative cooler as an intercooler. A decrease of more than 30% in the power consumption for unit mass flow, over the single stage dehumidifier rate has been reportedly achieved by the double stage dehumidifier with indirect evaporative cooler.

The authors of this special issue have contributed in one way or the other in addressing concerns on energy and environment and offered solutions of a sustainable nature, in the areas of production and/or consumption of bio-fuels, solar thermal energy and dehumidification. Some of these address regional concerns, while others are applicable more generically. It is hoped that these studies initiate further research in these areas and add value to the existing literature on energy, environment and sustainability.

We would like to express our sincere thanks to the reviewers of these articles and the authors for their valuable time and effort in improving the quality of the manuscript. Our heartfelt gratitude goes to Professor Tugrul Daim, the Editor-In-chief of *International Journal of Energy Technology and Policy* for giving us the opportunity to guest edit this issue, and Ms. Janet Marr, the Journal Manager for her enduring support.