

# Preface

Energy demand has been rising remarkably due to increasing population and urbanization. Global economy and society are significantly dependent on the energy availability because it touches every facet of human life and activities. Transportation and power generation are major examples of the energy. Without the transportation by millions of personalized and mass transport vehicles and availability of  $24 \times 7$  power, human civilization would not have attained contemporary living standards.

An international workshop, 3rd ISEES Workshop on “Sustainable Energy, Environment & Safety with Railway Centric Theme”, was held at Research Designs and Standards Organisation (RDSO), Lucknow, India during December 21–23, 2015 under the aegis of International Society for Energy, Environment and Sustainability (ISEES). This workshop provided a platform for discussions between eminent scientists and engineers from various countries including India, USA, South Korea, Thailand, and Austria. In this workshop, eminent speakers presented their views related to different aspects of combustion, and alternative energy resource for sustainable development and cleaner environment. This workshop laid the roadmap for technology development, opportunities and challenges in this technology domain. At this stage of technology development, transportation and power generation systems are dependent on IC engines and gas turbines to a great extent. Fundamentals of combustion and pollutant formation are coupled to each other and need to be explored in order to design energy-efficient and environment-friendly combustion systems for power generation sector, and transport sector. Besides changing the existing design of combustion systems, application of different alternative fuels such as biofuels, other renewable fuels, alcohols and synthetic fuels needs to be explored for sustainable global development. Fundamental and applied studies can be carried out using the state-of-the-art optical diagnostic systems and advanced numerical models for turbulent combustion. Such fundamental investigations would result in optimized design of these combustion systems, which would be more efficient and environment friendly.

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This monograph is intended for combustion practitioners and we hope that the book would be of great interest to the professionals, postgraduate students involved in advanced combustion techniques, experimentation and numerical simulation of combustion and environmental aspects. The main objective of this monograph is to promote a better and more accurate understanding of combustion in IC engines and gas turbines, besides recent advances and challenges in clean combustion systems and technology.

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