

Emerging Energy Resources in India

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The modern civilisation is dependent on energy and dealing with it, in the form of the energy consumption, transformation and even its wastage (in economic terms). The mankind with ever increasing population are the top most consumers of extrinsic energy owing to the technological innovations in the present times. Sun is probably the only source that provides the base for all our energy demands, though a distinction is made between the easily accessible conventional and natural non-conventional sources of energy (NCES). Since the deposits of the former type like coal, oil and gas are fast depleting there is a shift to explore the latter mode of energy. When we are jostling with the energy demands in the world, India also has similar yet huge demand of energy as it hosts one of the largest populations of humans in the world.

At this juncture, the publication '**Emerging Energy Resources in India**' by the Geological Society of India has been introduced at an apt time. The publication is incisive over a host of domains of non-conventional energy sources in India and is presented in a lucid manner. The publication transects through some important NCES like gas hydrates, geothermal energy, ocean energy, solar energy, coalbed methane and underground coal gasification, shale gas, hydrogen and bioenergy as non-conventional energy resource base for India.

An in-depth analysis of gas hydrates, a very clean source of energy, their presence, along with the futuristic technological demands for development presented in a concise manner is probably the summary of a lifetime work of the authors. Though not exploited commercially, the resource has been projected as one of the important NCES with huge potential for India. The requirements on technological fronts for exploitation of such huge resources adds flavour to the subject. The chapter on geothermal energy is an exhaustive account of the work carried out by different agencies and scientific fraternity while providing the data on potential places for exploitation of such energy in Indian context along with its resource assessment, utilization prospects and uses.

The ocean energy sources have been categorized into different forms like ocean current energy, wind energy, salinity gradient energy, ocean thermal energy, which have been explained in detailed along with constraints in harnessing the ocean-based energy and salient details of important field deployed projects like OTEC – explained. The chapter on solar energy is more focussed on types of photovoltaics and the method of solar power generation, its evolution and analysis

of deployment potential. Additionally, an important aspect that has been brought out is the environmental aspect of waste and scrapped material.

Coal bed methane, underground coal gasification and carbon sequestration presents an in depth requisites for the site selection of such energy reservoir. National and state resources and activities for harnessing these resources have been nicely presented along with the processes, recovery techniques, environmental aspects, particularly the underground water regime and some technical difficulties in recovery of the resources, are dealt in good detail. The chapter on shale gas describes its potential and basin identification, challenges and future requirements for its exploitations.

Hydrogen producing technologies presents a huge cross section of resources like that from hydrocarbons, steam methane reforming, partial oxidation, auto-thermal reforming, plasma assisted reforming; biomass, thermochemical, pyrolysis, gasification, direct and indirect photo biolysis and many other such methods that have been explained.

The use of waste from agriculture, pulp and paper, oil-seed, sugar industry and other sources to generate energy is introduced nicely with lot of information on world scenario. The evaluation of potential and future prospects from this source could have added value.

Most of the chapters provide information not only on the several aspects of the NCES with their energy potential in India, but generate a lot of enthusiasm in futuristic opportunities to explore and develop technologies and take them to a commercial level, also. The national requirements for up scaling of several non-polluting, less carbon intensive sources is of specific interest to policy planners, industrialists and future industrialists in this discipline of energy.

However, a comparative analysis and potential of NCES technologies could have been an added advantage and hope that it will be addressed in future editions. Though the book is a treasure of citations on NCES and for a researcher, a critique would have been a welcome step, but the publication presents an opportunity for all concerned to look into the subject in depth.

In summary the publication is thoughtfully evolved, designed and structured with nicely referenced articles and information on host of people and institutes working in the NCES, which is rather difficult to find at a place. This can be a good resource of information to the teachers, scientists, academicians, technologists, students and policy planners and will be an indispensable resource and hence a must read.