

**Energy Efficiency and Climate Change: Conserving Power for a Sustainable Future.** B. Sudhakara Reddy, Gaudenz B. Assenza, Dora Assenza and Franziska Hasselmann. Sage Publications India Pvt Ltd, B1/I-1, Mohan Cooperative Industrial Area, Mathura Road, New Delhi 110 044. 2009. xiv + 349 pp. Price: Rs 750.

Climate change is today's buzzword for varieties of reasons. It is due to the inevitable catastrophic events predicted to happen in the next 50–100 years, despite being distant in the realm of current decision making and planning processes. It has become popular owing to recent controversies associated with errors in predictions. Also due to indecisiveness with regard to who needs to take action to mitigate climate change and who has to pay for it. Science of global warming is well established, however, the resulting impacts are still probabilistic. Thus, scientific, political, economic and social reasons have contributed to make climate change a popular term. Global warming is caused by indiscriminate use of resources for a variety of human needs and is largely responsible for climate change. Past actions of greedy mankind and continued desire to pursue the same path has resulted in such an outcome. The current definition of progress is largely confined to economic well being of humankind dictated by access to modern technologies, which are driven by modern energy carriers. While meeting development needs of humankind, the production and use of energy has also contributed to the degradation of the environment. Thus, energy production and use are the main causes of global warming. Among the greenhouse gases (GHGs),

which are responsible for global warming, CO<sub>2</sub> is the most prominent one. According to World Energy Outlook 2009 of the International Energy Agency (IEA), the energy sector contributes 84% of global CO<sub>2</sub> emissions and 64% of the world's GHG emissions. If no action is initiated, the contributions will increase to about 91% of the global CO<sub>2</sub> emissions by 2030 and the share in GHG emissions is likely to reach 71%. In absolute sense, energy-related emissions are expected to increase from 28.8 Gt in 2007 to 40.2 Gt in 2030. To limit the global average temperature increase of 2°C, the concentration of GHGs in the atmosphere has to be stabilized at a level of around 450 ppm CO<sub>2</sub>e. The energy sector contribution is expected to be very significant to achieve this target. According to the IEA, in this scenario, the global energy-related CO<sub>2</sub> emissions are expected to peak at 30.9 Gt by 2020 and decline thereafter to 26.4 Gt in 2030, a reduction of 2.4 Gt from the 2007 level and 13.8 Gt below that in the business-as-usual scenario in 2030. Energy efficiency is expected to be the largest contributor to abatement of CO<sub>2</sub> emissions till 2030, accounting for more than half of total savings in the 450 scenario, compared with the baseline scenario.

Traditionally, energy planning and policy was limited to supply-side aspect of the energy systems. The typical strategy adopted used to be enhancing supply capabilities to meet the growing and uncertain demand for energy. Demand-side-management (DSM) dealing with efficient utilization of energy was never a priority of the planning community. During later periods resource constraints, both capital and energy resource, began to put impediments in uninhibited expansion of supply capacities. In addition, concerns related to local pollution and need to control it brought some more focus on DSM methods like waste minimization. The two concerns resulted in a large number of half-hearted attempts to adopt energy efficiency measures in various sectors of the economy. Climate change became the newest concern of the global community and with energy being the largest contributor to the global warming, energy efficiency received greatest impetus. As explained here, energy efficiency has the largest role to play in mitigating climate change.

The strongest link that energy has with climate change and with energy effi-

ciency expected to take a leading role in mitigation of climate change, any new understanding on the related issues would always be a welcome step. Considering this, the book under review is an apt addition to the knowledge bank on the subject.

The book contains innovatively developed 10 chapters tracking every aspect of linkages between energy and its efficient production and utilization, climate change and economic development. The flow of thought process is unique. The book begins with the conceptualization of linkage between energy, economy and environment, mainly focusing on the aspect of climate change. The huge challenges posed by the need for development, high magnitude of future investment requirements in energy infrastructure and climate change imperatives are eloquently summarized. Then, taking a neutral position, the authors delve on the controversies related to climate change both from the perspectives of supporters and sceptics. The content of the subsequent chapters to a large extent reflects the position taken by the authors in this debate. They prefer to wear the shoes of the climate realists with a view that climate change is a realistic concern but the currently pursued solutions are ineffective and non-inclusive in the sense that they largely ignore the concerns of the developing countries and poorer sections of the society. The next seven chapters are the outcomes of this thought process. They recommend adoption of win-win climate policies catering to the needs of mitigation, development and social acceptance. Energy efficiency, the universally accepted win-win solution for tackling the problems thrown up by climate change takes the centre stage of the book. This is the theme for the next seven chapters.

The authors introduce the readers to the fundamentals of energy efficiency in the fourth chapter. Energy efficiency is largely perceived as a technological intervention to enable reduction in the amount of input energy required to deliver same or better energy service. This requires individuals or organizations making current investments to reap future benefits. Thus, the extent of investments in energy efficiency is largely influenced by the understanding of various stakeholders on aspects like how expensive is current investment or capital, how large are the discounted future bene-

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fits, does it contribute to significant cost savings or profit maximization, etc. Many actors need to play roles to make the energy interventions happen. The actors at multi-level play roles as enablers, supporters, implementers, managers, beneficiaries and pressure groups. The next chapter delves on how these actors in the domain of government, business, society and consumers perceive the benefits and drawback of energy efficiency. The actions and inactions of these actors also result in emergence of barriers, which prevent implementation of energy efficiency. Removal of these barriers is essential and this is typically done through adoption of strategies related to effective policies, economic incentives, market transformation and capacity development. The authors, in chapter 6, introduce the concept of barriers and elaborate on the existence of different types of barriers at the macro, meso and micro level of the economy. Importantly they contribute to the development of a detailed analytic taxonomy of barriers to energy efficiency.

Climate change and energy efficiency as a technological option to mitigate it is largely perceived as a new investment without any corresponding benefits, either public or private. This prevented the governments, public and private sector organizations from taking any actions and the international community felt the need for framing of binding international laws to force countries to participate in climate change mitigation and private sector to make contributions to such efforts. Chapter 7 contains a detailed discussion on the availability of many types of international conventions, laws and mechanisms. Some of the important ones discussed are the United Nations Convention on Climate Change, Kyoto Protocol and Marrakech Accords, emissions trading, etc. In the presence of long serving and preferred, though inefficient, energy technologies, the newly introduced energy efficient technologies as substitutes are bound to fail because of the unfair competition. Also, lack of market pull forces and non-availability of private capital prevent emergence of such technologies from the R&D labs into the broader market. This process, commonly called as commercialization of technologies, is an important step in diffusion of energy-efficient technologies. The authors have dealt in detail the process of commercialization and the

enabling mechanisms in Chapter 8. Commercialization requires financial resources but they are hard to come by. In the context of energy-efficient technologies, the financing mechanisms need to be innovative, the financial institutions should be risk taking and governments and international organizations have to be taking active roles, and only then the process can become successful. Chapter 9 elaborates on factors influencing financing energy efficiency and many types of financial institutions that have invested and forthcoming to invest in energy efficiency. The title of chapter 9 has terms 'transition economies' which are unclear and could have been avoided.

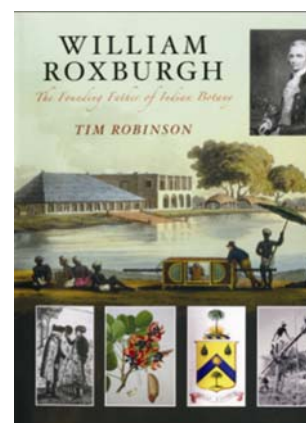
Institutional support is very much essential for transforming the initial scientific idea into fully commercialized energy efficiency product and making it available for the larger community at affordable prices. Chapter 10 has a good discussion on role of institutions like government, R&D labs, utilities, industries and financial institutions in facilitating this process. Uniqueness in this effort is that the authors have gone beyond just explaining the roles of various institutions by including the issue of performance analysis of these institutions. Authors have dealt in detail on the aspect of selection of performance standards, evaluation methods and factors influencing success or failure of an institutional approach. The book ends with an epilogue by giving the dichotomy of the issues related to climate change and energy efficiency. It is a herculean task to internalize the so-called unwanted externalities. In other words, the attempt is to present an environmentally and socially desirable action as most profitable for the government, private sector and individuals to act upon. Overall, the book is a significant contribution towards enhancing this understanding.

This book would be of immense use to both students and professionals specializing in energy and environmental planning and policy, climate change, sustainable development, energy management, etc. It is recommended as a reference book for students of energy and environment management, public policy, and development economics and studies. It will also be useful to professionals who would like to become trained energy and environmental auditors, energy managers, international consultants, etc. It serves as a reference source in energy ef-

ficiency and climate change, and best purchased by libraries.

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**William Roxburgh: The Founding Father of Indian Botany.** Tim Robinson. Phillimore & Co. Ltd, England in association with Royal Botanic Garden, Edinburgh. 2008. xviii + 286 pp. Price: £ 50.00.

This treatise is an outcome of dedicated research and in-depth analysis done by Tim Robinson on the life and scientific contributions of 18th century botanist, William Roxburgh (1751–1815) who is aptly referred to as father of Indian botany. Roxburgh's nearly 40 years of sojourn in India and stunning contributions has laid firm foundation and opened new vistas in botanical studies. His pioneering investigations in unravelling the economic potentials and cultivation practices of plant species yielding fibres, dyes, spices, etc. have immense bearing in augmenting the agrarian practices and economy of the country. The scholarly account well organized in 3 parts and 15 chapters, followed by 10 appendices, notes, bibliography, glossary and index, coupled with 129 figures and 26 tables evinces keen interest of the lay and professional reader.

Part 1 spread in 5 chapters deals with 'The Life of William Roxburgh'. In chapter 1, his childhood, education, influence by his teacher, John Hope and arrival to India are presented. In chapters 2 and 3, the author provides in-depth