

# TERI ENERGY & ENVIRONMENT DATA DIRECTORY AND YEARBOOK

2013/14



The Energy and Resources Institute



with complimentary CD

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## Preface

As India moves along the path of economic growth, environmental issues are assuming increasing importance. So is the objective of attaining sustainability in the pattern of development that the country pursues. Among all the sectors of the economy, the energy sector deserves special focus, because not only is fossil fuel energy in particular a source of pollution along its entire cycle, but emissions of carbon dioxide and other greenhouse gases are leading to climate change, the impacts of which are becoming progressively more serious globally. There are also issues of energy access, because, for instance, there are 1.3 billion people in the world who have no access to electricity and over twice that number are dependent on burning of biomass for cooking purposes using inefficient cookstoves, the emissions from which are a serious health hazard. Women and children in particular who receive maximum exposure to this form of indoor pollution are particularly vulnerable. At this stage, as we move well into the 21st century, the deprivation of large numbers of people to modern forms of energy is an aberration which continues largely unresolved.

It is evident from the global consultations on energy which culminated in the 'Oslo High Level Meeting on Energy in the post-2015 Development Agenda', that a consensus is emerging on the need for energy to be explicitly integrated into the new development agenda. This reiterates the importance of increasing the availability and affordability of, and access to cleaner forms of energy and other essential resources across all sections of society in an equitable manner. In terms of economic growth and environmental sustainability, green growth is considered to have the potential to promote inclusiveness. This is well reflected in the Report of the Thirteenth Finance Commission of India (paragraph 3.15), which articulates green growth as "rethinking growth strategies with regard to their impact(s) on environmental sustainability and the environmental resources available to poor and vulnerable groups".

The importance of green growth in the context of sustainable development is now being seen by many

as a global imperative. All over the world, countries are adopting sustainable development policies and are factoring climate change risks to build resilient societies. A transition to clean energy is being witnessed across many countries. The major global initiative of Sustainable Energy for All, launched by the Secretary General of the United Nations and the President of the World Bank, has been able to galvanize commitments and country-level action. This programme includes provision of universal energy access, doubling the share of renewables and improving energy efficiency across the economy. In India, in particular, an understanding has been reached that choices made today in the energy sector and towards allocation of our environmental resources are bound to define the course of development in the coming decades.

TERI takes pride in presenting the twenty-eighth edition of its flagship publication *TEDDY (TERI Energy & Environment Data Directory and Yearbook)*, which provides the latest updated information and statistics on the energy sector and the environment in India. Energy supply and energy demand both have been discussed in great detail within the energy sector. *TEDDY* has been a frequently used reference document for several international peer reviewed journals and reports. The publication provides a review of government policies that have implications for energy-related sectors of the Indian economy. Energy supply has been discussed through chapters on coal and lignite, petroleum and natural gas, power, and renewable energy sources and technologies. The section on energy demand covers extensively the major energy consuming sectors of agriculture, industry, transport, and domestic entities. The section on local and global environment examines local environmental issues and their impacts on society; and also discusses various facets of climate change. Topics including forestry and biodiversity, global and India-level emissions and climate change trends over India have been discussed within this section. The Green Focus at the end of each chapter highlights in particular successful initiatives or sustainable practices, which are of current interest within each sector. This

publication for the first time is also featuring a section with a discussion on developing metrics to inform sustainable development goals around sustainable energy and environmental sustainability.

At TERI, we attempt to bring constant refinement to *TEDDY* and I am hopeful that like all the previous editions, *TEDDY 2013/14* will also be of immense value to policy makers, business organizations, academic institutions, and research scholars. Comments and

suggestions from the readers shall be welcomed and appreciated highly as these will help us in improving subsequent editions of this publication.



R K Pachauri, PhD  
Director-General, TERI

## ACKNOWLEDGMENTS

The twenty-eighth edition of *TERI Energy & Environment Data Directory and Yearbook* (TEDDY) is a product of collective effort by the research and publishing team at The Energy and Resources Institute (TERI). The publication provides the latest updated information and statistics about the energy and the environment in India.

Throughout the preparation of the publication, the team gained guidance and support from Dr. R K Pachauri, Director General, TERI; without his leadership this publication would not have been possible. We especially thank Mr. R K Batra for his guidance for this publication. We gratefully acknowledge Dr. Prodipto Ghosh, Distinguished Fellow, TERI for his support in improving and strengthening the publication. We thank Department for International Development (DFID) for providing support for a separate project on energy and environment indices, which we hope will become a regular feature of *TEDDY*.

We extend our gratitude to all the authors and reviewers of the publication who have done due fact checking and have put together research narratives for the chapters. We thank Ms. Anjali Ramakrishnan and Mr. Arnab Bose for their valuable inputs in the chapters on Coal and Climate Change, respectively. We greatly acknowledge the colleagues at TERI Press for their constant support in bringing out the publication. The work on energy and environment indices has benefitted immensely from support received by our colleagues Dr. Ritu Singh, Ms. Supriya Francis and Dr. Prasun Gangopadhyay. Finally, we thank Mr. P D Tiwari and Mr. M K Bineesan for extending all possible executive support.

We are confident that this publication meets the highest standards of scholarship and will be immensely useful to policy makers, business organizations, academic institutions, and research scholars working in areas of energy and environment.



# About TEDDY 2013/14

*TERI Energy & Environment Data Directory and Yearbook (TEDDY)* is an annual publication brought out by The Energy and Resources Institute (TERI) since 1986. The publication provides updated information on the energy supply sectors (coal and lignite, petroleum and natural gas, power, and renewable energy sources), energy consuming sectors (agriculture, industry, transport, residential, and commercial sectors), and environment (local and global). Recent advances made in the energy sector and environment are shown with the help of maps, tables, and self-explanatory figures. The publication also provides a review of the government policies that have implications for energy and environment.

The data in the yearbook provides the latest available information at the time of compilation of the chapters. The analytical narrative supporting the data has been well researched by sector experts at TERI. Care has been taken to ensure that continuity of information is maintained so that the readers can understand and analyse the trends and patterns of change in the energy and environment sector over a period of time.

Last year *TEDDY 2012/13* was launched by Shri B K Chaturvedi, Member, Planning Commission, Government of India and Dr. R K Pachauri, Director General, TERI. The event also witnessed the presence of eminent people including Shri Ratan Wattal, Secretary, Ministry of New and Renewable Energy, Mr. Krishan Dhawan, Chief Executive Officer, Shakti Sustainable Energy Foundation, Ms. Meher Pudumjee, Chairperson, Thermax Limited, and Mr. R K Batra, Distinguished Fellow, TERI

The overall structure of this year's *TEDDY* is the same as the previous editions, with some changes. For the reference of our readers, the following table lists the chapters of the publication.

Chapter 1	: Energy and environment: an overview
Chapter 2	: Organization of the energy sector in India
Chapter 3	: Commercial energy balances and conversion factors
Chapter 4	: Coal and lignite
Chapter 5	: Petroleum and natural gas
Chapter 6	: Power
Chapter 7	: Renewable energy sources and technologies
Chapter 8	: Agriculture
Chapter 9	: Industry
Chapter 10	: Transport
Chapter 11	: Domestic
Chapter 12	: Environment
Chapter 13	: Climate change
Chapter 14	: Conceptual issues for goals around energy and environment

The twenty-eighth edition of *TEDDY 2013/14* seeks to better the publication through new features which includes a "Green Focus" for the chapters on energy supply, energy demand, and local and global environment. The publication for the first time also features a section on conceptual issues for goals around energy and environment. This would seek to inform discussions around the sustainable development goals.

We are hopeful that like all the previous editions of the publication, *TEDDY 2013/14* would be of immense value to our readers including policy makers, business organizations, academic institutions, research scholars, and development practitioners. Suggestions and comments from the readers shall be highly appreciated as these will help us in improving subsequent issues of this publication.



# Contributors

## Overall guidance

R K Pachauri  
R K Batra

## Editors

Shailly Kedia  
Aparna Vashisht  
Rinki Jain

## Chapter Authors and Reviewers

### *Energy and environment: an overview*

Author : Aparna Vashisht and Shailly Kedia  
Reviewer : Rinki Jain

### *Organization of the energy sector in India*

Author : Rinki Jain  
Reviewer : Shailly Kedia

### *Commercial energy balance tables and conversion factors*

Author : Ilika Mohan  
Reviewer : Atul Kumar

### *Coal and lignite*

Author : Jonathan Donald Syiemlich  
Reviewer : Nitya Nanda

### *Petroleum and natural gas*

Authors : Anmol Soni and Noble Varghese  
Reviewer : R K Batra

### *Power*

Authors : Ankita Gupta  
Reviewer : K Ramanathan

### *Renewable energy sources and technologies*

Authors : Ashish John George, Sudhakar  
Sundaray, Rohit Sen, Nagendra Kumar,  
and Lovedeep Mann  
Reviewer : Shirish Garud

### *Agriculture*

Author : Manish Anand and  
Shilpanjali Deshpande Sarma  
Reviewer : Nutan Kaushik

### *Industry*

Authors : Sachin Kumar  
Reviewer : Prosanto Pal

### *Transport*

Author : Sangeetha Ann Wilson  
Reviewer : Shri Prakash

### *Domestic*

Authors : Martand Shardul, Shiwani Wadhwa,  
and Sarena Arshad  
Reviewer : Abhishek Kar and Arijit Das

### *Environment*

Authors : Richa Mahtta, Siddhart Edake, and  
Rohit Pathania  
Reviewer : Sumit Kumar Gautam

### *Climate change*

Authors : Swati Agarwal and Saurabh Bhardwaj  
Reviewer : Neha Pahuja

### *Conceptual issues for goals around energy and environment*

Authors : Shailly Kedia, Rinki Jain, and Aparna  
Vashisht  
Reviewer : G Ananda Vadivelu

## Maps

R K Joshi

## Data compilation

M Jayaraman

## Executive support

P D Tiwari  
M K Bineesan

## Documentation

Library and Information Centre, TERI

## Publishing: copy edit, graphics, and production

Aman Sachdeva  
Anupama Jauhry  
Arun Kumar Paul  
R K Joshi  
Santosh Gautam  
Shilpa Mohan  
Sushmita Ghosh  
Vijay Kumar

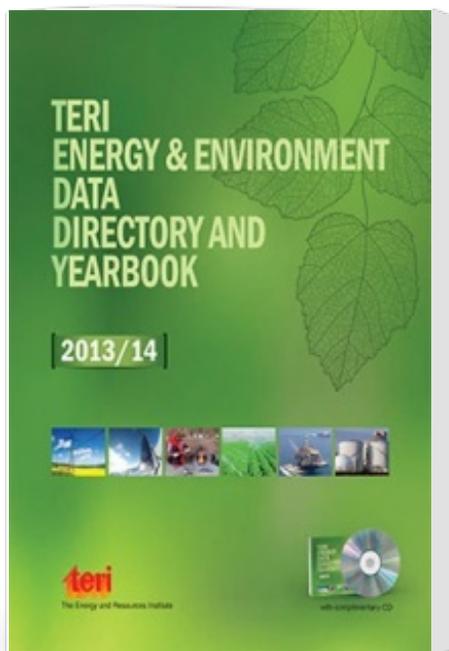
## Information dissemination

Kakali Ghosh  
Sangeeta Gupta  
Sanjeev Sharma  
Yogesh Chander

## CD publishing

Rajiv Sharma  
Raman Kheterpal

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