

Causes, Impacts and Solutions to Global Warming

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Editors

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 Springer

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Preface

Global warming is considered an average increase in the Earth's temperature due to greenhouse effect as a result of both natural and human activities. In common usage, "global warming" often refers to the warming that can occur as a result of increased emissions of greenhouse gases from human activities, e.g., carbon dioxide, methane, water vapor, and fluorinated gases, which act like a greenhouse around the earth, trapping the heat from the sun into the earth's atmosphere and increasing the Earth's temperature.

Catastrophic events around the world have brought a desperate picture to the forefront! The Global Conference on Global Warming 2012 (GCGW-12) brought all disciplines together for local and global solutions to combat global warming. This conference is a multidisciplinary global conference on global warming (and climate change), not only in engineering and science but also in all other disciplines (e.g., ecology, education, social sciences, economics, management, political sciences, and information technology). It covers a broad range of topics on energy and environment policies, energy resources, energy conversion technologies, energy management and conservation, energy security, renewables, green technologies, emission reduction and abatement, carbon tax, sustainable development, pollution control and measures, policy development, etc. Intensifying global environmental problems require internationally coordinated responses, which must balance the goals of energy security, environmental protection, and economic growth. The adoption of a comprehensive approach to energy and environment issues and the integration of energy and environment policies have become central activities of several countries. National and global solutions to reduce pollutants and greenhouse gas emissions have implications for energy security, energy trade, economic growth, etc. The issue that global climate change poses for energy policymakers is the focus of continuing international debate. For example, despite the policy measures taken to date, unless the rapid establishment and implementation of further effective policies and programs to reduce emissions are conducted, greenhouse gas emissions would continue increasing unless the right cure is underway. Of course, this requires the full range of possible areas for action and policy instruments.

This book is a unique collection of 62 selected papers out of the papers presented in the GCGW-12 in Istanbul, Turkey, on July 8–12, 2012, to cover a wide variety of topics on the causes, impacts, and solutions to global warming. There is a diverse coverage of global warming in this book from climate change modeling to forecasting weather events, from sustainable energy technologies and resources to waste management, and many more to serve as a sustainable source of knowledge and information for researchers, scientists, engineers, practitioners, etc.

As mentioned above, global warming is one of the major concerns of the human beings in this century. A significant part of global warming comes from the human activities, such as consuming fossil energy sources, e.g., oil, coal, and natural gas. In the solution of global warming, engineering approaches play a key role. These approaches are linked to many areas including energy and environment policies, energy conversion technologies, energy management and conservation, energy saving, energy security, renewable and sustainable energy technologies, emission reduction, sustainable development, pollution control and measures, policy development, global energy stability and sustainability, carbon tax, and waste management. Innovative engineering solutions are needed to reduce the effects of global warming and also to obtain better efficiency, better cost-effectiveness, better use of energy and resources, better energy security, better environment, and better sustainability. In this book, several engineering approaches and potential solutions from renewables to hydrogen, including data analysis, modeling, simulation, assessment, optimization studies, that reduce the effects of global warming are discussed in detail. Incorporated through this book are many wide-ranging practical examples, case studies, and policy and strategy development which provide useful information for practical applications. Complete references are included with each chapter to direct the curious and interested reader to further information.

We hope this edited book provides a unique source of potential solutions for combating global warming to be more widely applied and the benefits of such efforts more broadly derived, so that the future can be made more efficient, clean, and sustainable. We sincerely appreciate the help and assistance provided by various individuals who deserve a clear acknowledgement. Dr. Dincer acknowledges the support provided by the Turkish Academy of Sciences.

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