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Takeshi Yao
Editor

Zero-Carbon Energy Kyoto 2011

Special Edition of Jointed Symposium
of Kyoto University Global COE
“Energy Science in the Age of Global
Warming” and Ajou University BK21

Editor

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Preface

The Great East Japan Earthquake with a magnitude of 9.0 hit east Japan and brought about an unprecedented disaster on March 11, 2011. The tsunami that followed caused great damage. The Fukushima Dai'ichi Nuclear Plant lost all electric power and lapsed into an uncontrollable state. The nuclear plant accident has had a major impact on the energy strategy of Japan and the world. Approach to the energy issue is becoming more and more important.

Since 2008, four departments of Kyoto University, Japan—the Graduate School of Energy Science, the Institute of Advanced Energy, the Department of Nuclear Engineering, and the Research Reactor Institute—have joined forces, and with the participation of the Research Unit for comprehensive activities on local area survivability, they have been engaged in a program entitled “Energy Science in the Age of Global Warming—Toward a CO₂ Zero-Emission Energy System” as the Global Center of Excellence (COE) Program of the Ministry of Education, Culture, Sports, Science and Technology of Japan, with the support of university faculty members. This program aims to establish an international education and research platform to foster educators, researchers, and policy makers who can develop technologies and propose policies for establishing a scenario toward a CO₂ zero-emission society no longer dependent on fossil fuels by the year 2100.

The Global COE is fully in action. The Scenario Planning Group is setting out a CO₂ zero-emission technology roadmap and establishing a CO₂ zero-emission scenario based on analyses from the standpoints of social values and human behavior. The Advanced Research Cluster is promoting a socio-economic study of energy, a study of new technologies for renewable energies, and research for advanced nuclear energy by following the roadmap established by the Scenario Planning Group. At the GCOE Unit for Energy Science Education, the students are planning and conducting interdisciplinary group research on their own initiative, combining social and human science with natural science, and working toward CO₂ zero emission. At the same time, the students are acquiring the skills to survey the whole energy system by participating in scenario planning and through interaction with researchers from other fields, and are applying the experience to their own research. The Global COE is striving to foster young researchers who will be able to

employ their skills, knowledge, and expertise in their field of study, along with a broad international perspective, to respond to the needs of society in terms of energy and the environment.

The Global COE, in order to transmit the achievements of this platform to the public, posts information on a website, publishes annual reports, quarterly newsletters, books, self-inspection and evaluation reports, hosts domestic and international symposiums and activity reports on meetings, hosts an industry–government–academia collaboration symposium and citizen lectures, and co-hosts related meetings both domestically and internationally.

The Third International Symposium of the Global COE titled “Zero-Carbon Energy, Kyoto 2011” was held jointly with the BK21 Program of Ajou University at Suwon, Korea, August 18–19, 2011, succeeding the International Symposium “Zero-Carbon Energy, Kyoto 2009” at Kyoto University Clock Tower and “Zero-Carbon Energy, Kyoto 2010” at Kyoto University Oubaku Plaza. The international cooperation made the discussions more meaningful and the information exchange more dynamic. Many important lectures and discussions by invited speakers and members of the Global COE, and interesting presentations by students of the GCOE Unit for Energy Science Education, were given. This book is a compilation of the lectures and presentations.

It is very important to promote a wide range of studies in order to cope with the complex and delicate energy and environment problems. The Global COE continues to promote the establishment of a “Low-carbon Energy science,” as an interdisciplinary field integrating social science and human science with the natural sciences, for securing energy and conserving the environment, which are the most important issues for the sustainable development of human beings.

Takeshi Yao
Program Leader
Global COE “Energy Science in the Age of Global Warming
—Toward a CO₂ Zero-emission Energy System”

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