



Annex A. Study panel biographies

Co-Chairs

Steven CHU is Director of the Lawrence Berkeley National Laboratory, Professor of Physics, Molecular and Cell Biology, University of California, Berkeley. Previously, he was at Stanford and Bell Laboratories. His research includes tests of fundamental physics, the development of methods to laser cool and trap atoms, polymer physics, and single molecule biology. He has numerous awards, including the 1997 Nobel Prize in Physics. He is a member of the National Academy of Sciences, the American Philosophical Society, the American Academy of Arts and Sciences, the Academia Sinica, and a foreign member of the Chinese Academy of Sciences and the Korean Academy of Science and Engineering. At Stanford, he helped start Bio-X, a multi-disciplinary initiative linking the physical and biological sciences with engineering and medicine. He serves on the Boards of the Hewlett Foundation, the University of Rochester, NVIDIA and the Scientific Board of the Moore Foundation, Helicos and NABsys. He has served on a number of other committees, including the Augustine Committee that produced 'Rising Above the Gathering Storm,' the Advisory Committee to the Directors of the NIH and the National Nuclear Security Agency, the Executive Committee of the NAS Board on Physics and Astronomy. He received AB and BS degrees in mathematics and physics from the University of Rochester, a PhD in physics from UC Berkeley, and ten honorary degrees.

José GOLDEMBERG earned his PhD in Physical Sciences in 1954 from the University de São Paulo of which he became Full Professor and Rector. Member of the Brazilian Academy of Sciences, he has served as the President of Brazilian Association for the Advancement of Science and President of the Energy Com-

pany of the State of São Paulo (CESP). Between 1990 and 1992, he was Secretary of State for Science and Technology and Minister of State for Education of the Federal Government of Brazil. Over the years, he did research and taught at the University of Illinois, Stanford University of Paris (Orsay), and Princeton University. From 1998-2000, he served as Chairman of the World Energy Assessment. More recently, between 2002 and 2006, he was Secretary for the Environment of the State of São Paulo. He has authored many technical papers and books on Nuclear Physics, Sustainable Development and Energy.

Panelists

Shem ARUNGU OLENDE has a background in electrical engineering. From 1968 to 1971, at the University of Nairobi, he conducted research on (electrical) power systems, their (mathematical) analysis, planning, design and operation. During the years 1969 and 1970, he was a Visiting Scholar at the Department of Economics, MIT, engaged in research on the application of mathematical programming techniques to large systems; he also did research at the LTV Aerospace Corporation on spacecraft guidance systems. From 1971 to 2000 he was an expert on energy at the United Nations, New York, where he provided advice on the development and use of energy resources (fossil fuels, renewable, and nuclear). He supervised the preparation of major studies in energy, including renewable sources; electricity; and the environment. He also assisted in the organization of major meetings and conferences on energy and the environment at the UN. Furthermore, he provided technical inputs into intergovernmental committees, commissions, and councils of the UN. Currently, he is the Secretary-

General of the African Academy of Sciences. He is also the Chairman and CEO of QUECONSULT Ltd, which provides professional consultancy services in Engineering, Energy and Sustainable Development, Environment, Economic Development, Science and Technology, and Software Development to the U.N., UNDP, the African Development Bank, UNESCO, and the World Bank.

Ged DAVIS has a background in economics and engineering from London and Stanford universities. He joined the Royal Dutch/Shell in 1972 and stayed with that company for 30 years. During his time at Shell, he held positions predominantly in scenario planning, strategy and finance, including Head of Planning (Europe), Head of Energy (Group Planning), Head of Group Investor Relations, Head of Scenario Processes and Applications, Head of the Socio-Politics and Technology Team (Group Planning), and lastly as the company's Vice-President for Global Business Environment and Head of the Scenarios Team. For the last three years, he has been Managing Director of the World Economic Forum, responsible for global research, scenario projects, and the design of the annual Forum meeting at Davos. During the late 1990s, he served as Director of the World Business Council for Sustainable Development's Global Scenarios and as Facilitator and Lead Author of the IPCC's Emission Scenarios. Currently, he is Co-President of the Global Energy Assessment with the International Institute for Applied Systems Analysis (IIASA); a Director of Low Carbon Accelerator Limited; a Governor of the International Development Research Centre in Ottawa; and a Member of the INDEX Design Awards Jury.



Mohamed EL-ASHRY was educated and trained as a geologist. He pursued a successful scientific career for many years. During the 1990s, he served as the Chief Environmental Adviser to the President and as the Director of the Environment Department at the World Bank, as Senior Vice President of the World Resources Institute (WRI), as Senior Environmental Adviser to UNDP, as Special Adviser to the Secretary General of the 1992 U.N. Conference on Environment and Development (UNCED), and as a member of the World Water Commission and the International Task Force on Global Public Goods. He joined the Global Environment Facility (GEF) in its pilot phase in 1991 as Chairman, and led the GEF as CEO and Chairman from 1994 to 2003. He is a member of the Academy of Sciences for the Developing World (TWAS) and the African Academy of Sciences.

Thomas B. JOHANSSON is a nuclear physicist by training. He is a Professor of energy systems analysis and Director of the International Institute for Industrial Environmental Economics (IIIEE) at Lund University, Lund, Sweden. He previously served as Director of UNDP's Energy and Atmosphere Programme, and as a Member of the Editorial Board of the World Energy Assessment. He has published widely in the area of energy for sustainable development. Currently, he is Co-Chair of the Steering Committee of the Global Network on Energy for Sustainable Development (GNESD), Co-Chair of the Executive Committee of the Global Energy Assessment, and Chairman of the Board of the International Energy Initiative (IEI).

David KEITH (Canada) holds the Canada Research Chair in Energy and the Environment at the University of Calgary. He is Professor, Department of Chemical and Petroleum Engineering and Department of Economics, University of Calgary; and Adjunct Professor, Department of Engineering and Public Policy, Carn-

egie Mellon University. He is the Director of ISEEE Energy and Environmental Systems Group. His technical and policy work addresses the capture and storage of carbon dioxide, the economics and climatic impacts of large-scale wind power, the use of hydrogen as a transportation fuel, and the technology and implications of geoengineering. He serves on Canada's Capture and Storage Task Force. He has served as a member of Canada's *Panel on Sustainable Energy Technology* and on committees of the U.S. National Academy of Sciences. As an undergraduate, he took first prize in Canada's national physics prize exam. As a graduate student, he won MIT's biennial departmental prize for excellence in experimental physics, and was named environmental scientist of the year by Canadian Geographic in 2006.

Li Jinghai was trained as a chemical engineer. From 1987 to 1990, he conducted research at the City University of New York and the Swiss Federal Institute of Technology. From 1990 onwards, he continued his scientific career at the Institute of Process Engineering (IPE) of the Chinese Academy of Sciences as a professor, and from the mid-1990s onwards took the lead, first as vice director then as director, of the IPE. In 2004, he was appointed as Vice President of the Chinese Academy of Sciences. He served as Chairman of the Expert Committee on Energy under the 863 Program in China from 2001-2006, and as President of the Chinese Society of Particology from 2002 to present. He serves several international journals as editor or advisory member.

Nebosja NAKICENOVIC is Professor of Energy Economics at the Vienna University of Technology (TU Wien), Leader of the Energy and Technology Programs at the International Institute for Applied Systems Analysis (IIASA), and Director of the Global Energy Assessment (GEA). He is Associate Editor of the *Internation-*

al Journal on Technological Forecasting and Social Change; Editor of *International Journal on Climate Policy*; Member of Editorial Board of the *International Journal of Energy Sector Management*; a Coordinating Lead Author of the Intergovernmental Panel of Climate Change (IPCC), Fourth Assessment Report; Coordinating Lead Author of the Millennium Ecosystem Assessment; and Director of Global Energy Assessment. He holds bachelor's and master's degrees in economics and computer science from Princeton University and the University of Vienna, where he also completed his PhD. He also holds an Honoris Causa PhD degree in engineering from the Russian Academy of Sciences.

R.K. PACHAURI has been the Chief Executive of The Energy and Resources Institute (TERI) since 1981, designated initially as Director and since April 2001 as Director-General. In April 2002 he was elected as Chairman of the Intergovernmental Panel on Climate Change (IPCC), which was established by the World Meteorological Organization and the United Nations Environment Programme in 1988. He has a PhD in Industrial Engineering and a PhD in Economics. He has taught on the faculty of Yale University, West Virginia University, North Carolina State University and the Administrative Staff College of India in Hyderabad. He has been active in several international forums dealing with climate change and its policy dimensions. He was awarded the *Padma Bhushan* in 2001 by the President of India and was bestowed the *Officier De La Légion D'Honneur* by the Government of France in 2006.

Majid SHAFIE-POUR was trained in mechanical engineering in the U.K., with specializations in the application of alternative sources of energy for heavy-duty engines, and in environmental and air pollution engineering. He spent the early part of his academic career in various faculty positions at universities in the U.



K (Bath and Brunel) and at the University of Tehran. He is a member of the Board of the Faculty of Environment of the University of Tehran. He is a former member of the Governing Council of the Iranian Department of the Environment since 1998. He has served as an Executive Director in a number of World Bank-sponsored projects on environmental issues in Iran, and advised on or headed numerous national, regional, and city projects on air pollution, climate change, waste recycling & composting, and general environmental management. He represented his country as Head of the Iranian Delegation to the UNFCCC (COP8) in 2002 and was a National Consultant of the UNDP/UNEP/Department of the Environment of Iran International Project on Climate Change in Iran. He is a member of the National Committee on Sustainable Development of Iran and is currently Professor of Environmental Engineering (Energy, Air Pollution and Climate Change) Faculty of Environment at the University of Tehran.

Evald SHPILRAIN was trained as thermal and power engineer and as a thermophysicist. He spent a long career as a Professor in some of Russia's most prominent universities and research institutes, and has published over 350 articles in scientific journals and 12 monographs. In recent times, he has been the Head of the Department of Energy and Energy Technology at the Institute for High Temperatures (IVTAN) of the Russian Academy of Sciences, Chairman of the Scientific Council for Non-traditional, Renewable Sources of Energy, Russian Academy of Sciences, Executive Director of the Moscow International Energy Club & Representative of Russia in the IEA Implementing Agreement 'SolarPACES.' Currently he is Chairman, Scientific Committee for New and Renewable Sources of Energy, State Committee for Science and Technology, Russian Academy of Sciences (RAS); and Advisor for RAS.

Robert SOCOLOW, Professor of Mechanical and Aerospace Engineering at Princeton University, teaches in both the School of Engineering and Applied Science and the Woodrow Wilson School of Public and International Affairs. With ecologist, Stephen Pacala, Socolow leads the University's Carbon Mitigation Initiative. His research focuses on technology and policy for fossil fuels under climate constraints. He was awarded the 2003 Leo Szilard Lectureship Award by the American Physical Society: 'For leadership in establishing energy and environmental problems as legitimate research fields for physicists, and for demonstrating that these broadly defined problems can be addressed with the highest scientific standards.' He earned a BA in 1959 (summa cum laude) and PhD in theoretical high energy physics in 1964 from Harvard University.

Kenji YAMAJI is Professor of Electrical Engineering, School of Engineering at the University of Tokyo. He is a member of Science Council of Japan, Vice-Chair of the Council of the International Institute for Applied Systems Analysis (IIASA), and Chairman of the Green Power Certification Council of Japan. During the earlier part of his career, he has been extensively involved in the research and analysis of energy systems, mainly at the Central Research Institute of Electric Power Industry (CRIEPI) in Japan. He is serving on many advisory bodies on energy and environmental policy for the Japanese Government. During the mid-1990s, he served as Director of the Technical Program Committee of Tokyo Congress for the World Energy Council (WEC).

Luguang YAN was trained as an electrical engineer at the Moscow Power Institute (Russia). His research has dealt with the development of special electrical equipment and on the development of new technologies in electrical engineering. Main areas include high-pulse power, fusion electrical engineering, su-

perconducting electrical engineering, magneto-hydrodynamic power, renewable energy, and magnetic levitated train. He is a Research Professor and Chairman of the Scientific Committee of the Institute of Electrical Engineering of the Chinese Academy of Sciences, Honorary President of Ningbo University, Deputy Head of Technological Sciences and Vice Chairman of the Energy Research Council of the Chinese Academy of Sciences, President of the Chinese Solar Energy Society, Vice-President of the China Electro-technical Society and of the China Energy Research Society.

