

WORLD
ECONOMIC
FORUM**CLEAN ENERGY**
MINISTERIAL**PUBLIC-PRIVATE
ROUNDTABLES AT
THE CLEAN ENERGY
MINISTERIAL MEETING**

Abu Dhabi, United Arab Emirates

6 April 2011



The Clean Energy Ministerial took place in the Emirates Palace Hotel in Abu Dhabi. After the sessions, participants visited the city of Masdar, constructed south-east of Abu Dhabi, which has a goal to rely entirely on solar energy and other renewable energy sources, with a sustainable, zero-carbon and zero-waste ecology.

World Economic Forum

91-93 route de la Capite
CH-1223 Cologny/Geneva
Switzerland
Tel.: +41 (0)22 869 1212
Fax: +41 (0)22 786 2744
E-mail: contact@weforum.org
www.weforum.org

World Business Council for Sustainable Development – WBCSD

Chemin des Conches 4
1231 Conches-Geneva
Switzerland
Tel.: +41 (0)22 839 3100
Fax: +41 (0)22 839 3131
E-mail: info@wbcsd.org
www.wbcsd.org

© 2011 World Economic Forum

All rights reserved.

This material may be copied, photocopied, duplicated and shared provided that it is clearly attributed to the World Economic Forum.

This material may not be used for commercial purposes.

REF: 210711



“The Clean Energy Ministerial is a unique forum for accelerating the transition to clean energy. Engaging the private sector is essential and the public-private roundtables at the second Clean Energy Ministerial gave fresh insight into the policies needed to encourage

private investment in efficiency and clean energy. I look forward to continuing our work with our international colleagues and the private sector to seize the clean energy opportunity.”

Steven Chu, Secretary of Energy, USA



“We look forward to hosting the third Clean Energy Ministerial next year in London and will be working actively with partner governments, the private sector and others over the next 12 months to make progress on the deployment of clean energy technologies. The public-

private roundtables played an important role in the Clean Energy Ministerial in April in Abu Dhabi and we will be working to build on these for CEM3.”

Chris Huhne, Secretary of State, Department of Energy and Climate Change, United Kingdom



“In the spirit of the Clean Energy Ministerial (CEM) process, we provided a unique global forum for the private sector to directly engage with energy ministers at CEM 2 in Abu Dhabi. Business leaders and experts from around the world engaged in candid dialogue on clean energy

issues that are being addressed by the various CEM initiatives. It is the private sector that will help drive the implementation of these initiatives on the ground. In Abu Dhabi we proved that both public and private sector ambitions for the CEM are united as we pursue a transition to a global clean energy economy.”

Sultan Ahmed Al Jaber, Special Envoy for Energy and Climate Change, Ministry of Foreign Affairs, United Arab Emirates, Chief Executive Officer, Masdar



“The Clean Energy Ministerial is emerging as a key annual forum for driving global progress on clean energy through peer-to-peer cooperation on best practice policies and programmes among major economies. We look forward to hosting the 2013 Clean Energy Ministerial in New Delhi and

plan to make engagement of the private sector central to the agenda.”

Montek Singh Ahluwalia, Deputy Chairman, Planning Commission, India

Foreword

Increasing access to energy is a priority for many countries. Over 1.5 billion people in the developing world still lack access to electricity. The International Energy Agency (IEA) forecasts that the world economy will demand at least 40% more energy by 2030 compared to today. Yet, under business as usual, the IEA forecasts that over 75% of the global increase in energy use to 2030 is expected to be met through fossil fuels, especially coal. By 2050, the resulting carbon emissions could lead to a concentration of carbon in the atmosphere of over 1,000 parts per million. This is more than double the level recommended by the IPCC to have a reasonable chance of holding the increase in average global temperature to within 2 degrees Celsius, a global target agreed upon by parties at the UNFCCC COP 16 in Cancun, December 2010.

Yet, the level of investment required to transform the global economy to a low-carbon path is considerable. Bloomberg New Energy Finance estimates that the required investment for a global clean energy system that limits average temperature increases to the 2 degree Celsius level without compromising economic growth would require US\$ 500 billion per year by 2020. The World Bank estimates the incremental financing needs of climate mitigation in developing countries at approximately US\$ 140-175 billion per year over the next 20 years, and a further US\$ 30-100 billion per year for adaptation over the same period.

The question of how to rapidly scale-up clean energy solutions, from a human development, technical, financial and environmental point of view remains one of the world's core economic growth challenges. To meet it will require substantive public-private collaboration and innovation across multiple geographies and sectors. It is an agenda upon which the World Economic Forum, its Industry Partners and its government, expert and civil society constituents consequently place much focus.

For these reasons, the World Economic Forum was delighted to be invited by the US Department of Energy to help convene a series of public-private roundtables at the first Clean Energy Ministerial (CEM) meeting in July 2010 in Washington DC. A report-out on the success of the first CEM at the Forum's Annual Meeting in Davos in January 2011 was also well received by business and government representatives.

The secretariat for the second CEM invited the World Economic Forum in February 2011 to continue its role as private sector convener for the process. It requested the Forum to convene and co-host with the CEM a series of four roundtable discussions on key clean energy topic areas, each requiring substantive public-private interaction to

get to scale. The summary of each of these discussions is presented in this report, together with a list of attendees and more information about the CEM and its related initiatives.

As the summaries in this report show, the roundtables at the second CEM in Abu Dhabi stimulated substantive public-private-expert conversation. The discussions were considered by all parties to be focused and practical, delivering clear business recommendations to ministers to help drive forward the public-private agenda on scaling up clean energy.

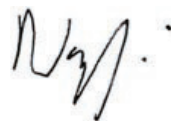
The World Economic Forum would like to offer its sincere thanks to those industry partners who co-chaired each roundtable, as well as to the ministers and officials who co-chaired alongside; to the expert moderators who facilitated each discussion; and to all of the industry representatives and officials who took part in the discussions in Abu Dhabi and helped to make the public-private roundtables at the second CEM a success.

The World Economic Forum was delighted to invite the World Business Council for Sustainable Development (WBCSD) to collaborate in the delivery of the public-private roundtables at the second CEM, to provide a comprehensive and coordinated business input. With the United Kingdom agreeing to host the third CEM in 2012 and India and South Korea the fourth and fifth in the subsequent years, the Forum looks forward to reprising and deepening its role with the CEM and to continuing its successful collaboration with the WBCSD.

Finally, may we offer a note of deep gratitude to all of those staff members from the CEM secretariat, the US Department of Energy, the WBCSD and the World Economic Forum who worked hard to co-design and co-deliver the roundtable sessions for the meeting in Abu Dhabi.

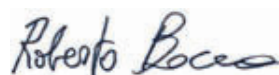
We look forward to working together on the third Clean Energy Ministerial in the United Kingdom in the spring of 2012 and to the continued success and impact of the Clean Energy Ministerial process in the years ahead.

Sincerely



Dominic Waughray

Senior Director, Head of Environmental Initiatives
World Economic Forum



Roberto Bocca

Senior Director, Head of Energy Industries
World Economic Forum

Introduction

The Clean Energy Ministerial (CEM) was launched in 2010 as a high-level global forum to promote policies and programmes that advance clean energy technology, to share lessons learned and best practices, and to encourage the transition to a global clean energy economy. The first Clean Energy Ministerial was held in Washington DC in July 2010 and included the launch of several new initiatives designed to improve energy efficiency, enhance clean energy supply and expand clean energy access. The second Clean Energy Ministerial was hosted by the United Arab Emirates in Abu Dhabi in April 2011. The third CEM is scheduled for spring 2012 in London, and India and Korea have offered to host future meetings in 2013 and 2014. It is clear that the CEM has become an important forum for international clean energy discussions since its launch last year.

The Abu Dhabi meeting included four public-private roundtables facilitated by the World Economic Forum and the World Business Council for Sustainable Development (WBCSD). Representatives from each roundtable also provided readouts to the ministers and high-level government representatives from 24 governments¹ in attendance on priorities for action. The ministers then spent the next day and a half discussing policy and technology solutions to advance clean energy technologies, including energy efficiency, renewable energy, electric vehicles, CO₂ capture and storage and smart grids. Their work was also informed by the International Energy Agency (IEA), *Clean Energy Progress Report*.

IEA Reports That Clean Energy Has Seen Mixed Progress

The IEA released a new *Clean Energy Progress Report* at the Abu Dhabi Ministerial. The report concludes that the past decade has seen tremendous progress in clean energy deployment, with solar photovoltaic and wind leading the way with 50% average annual growth. This growth has been driven by cost reductions that are the direct result of targeted, long-term government support policies. Other technologies – such as energy efficiency and biofuels – have also seen strong advances, and governments are making important new commitments to key technologies like electric vehicles and smart grids. However, the IEA's conclusion was that despite these positive developments, fossil fuels continue to grow globally, with coal outpacing all forms of energy. This means that government commitments to large-scale CCS plants must be funded. Further action is also needed to advance energy efficiency through greater customer awareness campaigns and the creation of positive incentives for utility investment. Finally, the IEA concluded that while announcements on electric vehicle targets are positive, governments must ensure their success through investments in infrastructure and incentives for consumer purchase. The Progress Report can be downloaded at http://www.iea.org/papers/2011/CEM_Progress_Report.pdf

The CEM process recognizes that private sector participation is essential for the development and implementation of effective and sustainable policies and solutions to transition to a clean energy future. Building on the successful input of World Economic Forum member companies to the first CEM meeting, the Forum was asked to convene public-private roundtables for the second ministerial. The Forum reached out to the World Business Council for Sustainable Development and together organized four roundtables that involved a robust exchange of views on priorities for action, successful models to build from and opportunities for international collaboration. The roundtable conversations included:

- Policies in Support of the Global Scale-Up of Renewable Energy
- Innovative Technologies and Business Models for Energy Efficiency
- Sustainable Cities as Drivers of Sustainable Economic Growth and Clean Energy Deployment
- Regulatory Strategies to Accelerate Utility-Scale Energy Efficiency

The roundtables increased the private sector's understanding of policy-makers' perspectives on important priorities for government support for clean energy scale-up. The sessions allowed governments to discuss with businesses their needs for market and regulatory frameworks to increase corporate investments in clean energy. Participants identified key areas where public-private initiatives and partnerships can be used to unblock issues and further the agenda. The dialogues resulted in a number of recommendations that were communicated to ministers immediately prior to the beginning of the ministerial discussions, including:

- Accomplish renewable energy scale-up through the design of more effective policies that are stable, long-term and respond to the market
- Address the variability of renewables through more concerted design and management of electricity grid integration
- Accelerate efforts to implement national minimum energy efficiency standards
- Encourage competition among manufacturers to produce the most efficient products

¹ Governments participating in the second Clean Energy Ministerial included Australia, Brazil, Canada, China, Denmark, the European Commission, Finland, France, Germany, Hungary, India, Indonesia, Italy, Japan, Korea, Mexico, Norway, Russia, South Africa, Spain, Sweden, the United Arab Emirates, the United Kingdom, and the USA. The US Department of Energy hosts the CEM Secretariat.

- Advance consumer information on energy use and energy efficiency opportunities by supporting improved access to data and smart grid test pilots
- Leverage the leadership of cities on clean energy by involving industry and other stakeholders in holistic, strategic discussions on priorities and implementation options
- Develop and implement positive incentives for utilities to invest in energy efficiency
- Use the Clean Energy Ministerial as a platform to map existing efforts, share lessons learned, agree on priorities for international collaboration and make new pledges/commitments for clean energy policies and financing

The following sections highlight specific discussion items and recommendations for each of the roundtables.

Policies in Support of the Global Scale-Up of Renewable Energy

According to the International Energy Agency's *Clean Energy Progress Report*, renewable energy capacity has nearly doubled over the past five years from 160 gigawatts (GW) in 2004 to 305 GW in 2009 (excluding large hydropower). As of 2010, more than 100 countries had targets and/or policies and incentives for renewable energy. The IEA noted, however, that a number of countries were changing or scaling back policy support as a result of the solar and wind "boom" that we have seen globally.

The roundtable on scaling up renewable energy at the second Clean Energy Ministerial in Abu Dhabi in April 2011 provided insights and guidance as to possible pathways for ensuring sustained rapid deployment of renewable energy internationally. The discussion covered four dimensions: (1) lessons learned, good practice and requirements for effective (and low-cost) national policy; (2) technology developments and the need for an integrated approach that places renewable energy at the heart of energy and broader industrial strategies; (3) policy and technology needs and solutions for effective grid integration of renewable electricity; and (4) areas of potential international cooperation.



"The CEM is an extraordinary forum which brings together the most elite participants from the private and public sector. The roundtable discussions were very progressive and I am certain will result in definitive steps towards desired changes required for a greener tomorrow."

Tulsi Tanti, Chairman and Chief Executive Officer, Suzlon, Private Sector Co-Chair for the session.



"The session clearly showed that it is critical to create a better regulatory framework that can drive industry investments in renewable energy. There was above all a strong appeal to the politicians to develop a long-term regulatory framework."

Anders Eldrup, Chief Executive Officer, Dong Energy, Denmark; Private Sector Co-Chair

- 1. Ensuring predictability, stability and transparency in national enabling policies** is important given that renewable energy deployment is strongly policy-driven. Policies are needed that provide a framework to support a long-term planning horizon, as well as clarity and progress in the short and medium term. There is a need to create discipline in the effective implementation of stated policies.
- 2. Market mechanisms need to be encouraged and designed to ensure long-term viability of the sector.** Coherent and integrated approaches to energy (and related carbon) pricing that make optimal use of diverse instruments such as feed-in tariffs, taxes and carbon pricing are needed. Effective pricing encourages accelerated scaling and, ultimately, more rapid technology cost reductions.
- 3. Financing is a major hurdle.** Innovation in public financing is needed to enable rapid renewable energy scaling. The cost of capital is a major driver of incremental costs and new sources and mechanisms provide considerable opportunity (sovereign wealth funds, green bonds and DFI balance sheets). These need to be advanced as a means of leveraging private finance, especially institutional finance. Better international cooperation on blended financing approaches and associated international platforms for collaboration need to be explored. Key public and private players are still not effectively engaged and active.
- 4. Building flexible energy systems is a crucial aspect of advancing "variable supply" renewable energy as a core energy source,** including increased grid interconnectivity, demand flexibility, mixing sources and focusing on storage to achieve greater supply stability. There is a need to share methods and experience in how to advance planning for integrated, flexible systems that would allow for renewable energy to be placed at the core of energy planning and generation.
- 5. Renewable energy is an enabler for the ambitious and rapid growth of a low-carbon transition and green growth.** Governments have a key role in promoting renewable energy as a consumer choice. Shared experience and practice in technology development and deployment is a key means of increasing institutional capabilities and leveraging the means to drive down deployment costs. International cooperation is an important element to advance the scaling of renewable energy, especially in developing and emerging economies.

Next steps

These recommendations will be carried forward for consideration by the Clean Energy Ministerial's Multilateral Solar and Wind Working Group, the International Smart Grid Action Network and the Solar and LED Energy Access Program. They will also be taken up during further discussions on financing leading up to the next CEM in London.

Innovative Technologies and Business Models for Energy Efficiency

Governments have achieved significant success in energy efficiency through policies such as product standards, procurement programs and research, development and demonstration of integrated approaches. Rapid advances in electronics and information technology, including smart grid technologies, are enabling a variety of new energy saving opportunities. As new opportunities arise, companies are developing creative business models to tap this potential. However, the diverse array of market actors and efficiency opportunities, coupled with the lack of strong incentives for key actors, such as electricity utilities, to invest in energy efficiency, present tremendous challenges in achieving the potential for energy efficiency.

There are a number of opportunities for public-private cooperation and government policy to enable private-sector driven progress on efficiency. Technological change, innovative business models, and government policy are critical elements of the push for greater energy efficiency. The roundtable discussed linkages between activities in these areas and opportunities for synergistic action to accelerate progress.



“It was a unique opportunity to have a frank discussion with energy ministers on how to coordinate policies across countries to accelerate the deployment of new and innovative energy efficiency technologies. We advised ministers that they should closely examine smart grid

policies on data access, privacy and customer engagement, which will be essential to provide the private sector with the tools and clarity it needs to unlock the full energy savings potential of the grid.”

Daniel Yates, Chief Executive Officer, Opower, USA

- 1. Accelerated progress on minimum efficiency standards should be pursued pragmatically and coordinated through the CEM process where appropriate.** Minimum efficiency standards for equipment and appliances are key drivers of energy efficiency innovations. Countries should consider coordination of standards implementation to help transform the bottom end of the global market for these goods. At the same time, a range of other policies such as procurement and awards can be implemented to encourage continuous improvement and competition at the top end. Though different product designs and national circumstances can make coordination challenging in some areas, sharing data and expert analysis among governments can accelerate progress in others. Looking beyond end use, performance standards implemented for the entire energy value chain – including energy supply, transmission and generation – could be effective as well.
- 2. Value will be created for energy efficiency from new technologies and business models like smart grids.** For example, software powered by energy use data can empower consumer behaviour changes to achieve verifiable efficiency savings. Governments need to invest in smart grid pilots and provide regulatory frameworks to allow businesses to innovate and find solutions. Public-private dialogues can help steer the private sector to develop new business models that capitalize on new data and information on consumer energy use. A starting point is to map existing and planned smart grid efforts through the CEM “International Smart Grid Action Network” (ISGAN) initiative to improve understanding of opportunities for collaboration.
- 3. Electricity utilities are not incentivized to make significant investments in efficiency,** with the exception of a few jurisdictions. The efficiency challenge for the sector needs to be looked at across the whole value chain, identifying how to drive behaviour on the supply side, as well as the demand side. This will drive changes in the business models for the sector and will also mean that the regulatory policy framework needs to adapt to keep up with this. Consumer engagement and education are a critical part of the solution and an area where collaboration across industries and stakeholders is needed to understand better lessons learned.

Next steps

These recommendations will be considered by the Clean Energy Ministerial’s Global Superior Energy Partnership, the Super-Efficient Equipment and Appliance Deployment Initiative and the International Smart Grid Action Network during their work in the coming year.

Sustainable Cities as Drivers of Sustainable Economic Growth and Clean Energy Deployment

Today, cities cover 2% of the earth's surface, but contain 50% of the global population and generate 75% of the emissions of carbon dioxide. Urbanization is accelerating globally and cities are expected to account for 75% of the global population by 2050.

Greening cities is a complex challenge that requires collaboration across stakeholders. Local governments play a critical role in supporting the creation of urban planning functions that integrate – and have authority over – a range of cross-cutting sustainability issues (e.g. building codes, smart grids, land use, water use and transportation).



“By focusing on delivering sustainable cities, we have an opportunity to infuse global best practices that have evolved from existing cities, using the latest technologies, and see the synergies of implementing them in new, smart cities. We look forward to many innovations coming out of this approach.”

Anders Lindblad, President and Head, Ericsson Middle East, United Arab Emirates

- 1. Cities are complex systems and require a holistic approach to manage sustainability challenges.** Local sustainability issues are interconnected and cover a wide range of energy and environmental issues, including transport, power generation, smart grids and water and waste management. They require the involvement of many sectors from the business community working together to create holistic solutions.
- 2. Cities should collaborate with partners from business and civil society at an early stage in the planning process.** Early business engagement in the urban planning process can help to understand the economic viability of proposed pathways and identify opportunities such as green jobs. Business should be able to share rewards and risks of new urban clean energy investments.
- 3. Investment criteria should look at life cycle costs for cities, not just capital costs.** By excluding life cycle costs from contracting decision-making can lead to selection of less optimal economic solutions. Governments should consider adopting a life cycle costing approach to decision-making.
- 4. Create a ministerial network to share knowledge and best practice on sustainable cities.** This will support a sustained political commitment to communicate the business case and economic justifications for investment. It would also encourage a link between successful local strategies and broader national plans/legislation.

Next steps

These recommendations will be considered by a new Sustainable Cities Network that was announced at the second Clean Energy Ministerial and that will interact with a number of the other CEM initiatives.

Regulatory Strategies to Accelerate Utility-Scale Energy Efficiency

Electricity utilities are major players in driving energy efficiency at scale in all major economies, particularly given their interface with end-users. They also form a large and important pool of capital, provided the appropriate incentives and regulatory drivers exist. However, under conventional regulatory systems, these utilities are not incentivized to invest in efficiency but are given incentives to sell more power. The utilities sector is therefore an important sector on which the CEM can focus.



“Where policy-makers and utilities treat energy efficiency as a true energy resource, on par with generation, investment in and deployment of energy efficiency is both substantial and sustained over time. It is my hope that the CEM will be where the world’s energy policy leaders collaborate on an action plan to make

this common sense policy the standard practice for energy resource planning and procurement around the world.”

Gene Rodrigues, Southern California Edison, USA



“There is an imperative to articulate a “value proposition” that unites disparate interests but yet accommodates the customers, governments and energy providers. The immense value of energy efficiency if conveyed to stakeholders would propel alignment of interests of regulated utilities with energy efficiency and

demand side management programmes.”

Marc Spitzer, Commissioner, Federal Energy Regulatory Commission, USA

1. Regulators can learn through comparing experiences on approaches for incentives for electricity utilities to promote energy efficiency.

While regulatory approaches vary considerably across geographies, there are a growing number of examples where regulators have taken action to align utilities’ interests with the public purpose of pursuing energy efficiency.

2. Consumer behaviour can be shaped through education and labelling.

Sharing best practices in demand side management will help inform new electricity utility energy efficiency measures. Governments can facilitate cooperation among utilities for the design of effective utility-delivered energy efficiency programmes.

3. Focus on the emerging markets as well as traditional markets.

With over 85% of new capacity outside the OECD and half of it in the BRICS, these markets are equally important as developed country markets. Demand side management and consumer education is not just a developed country issue.

4. Electricity utility-scale energy efficiency should be ramped up in CEM countries.

The electricity utilities sector will explore expanded partnerships among electric utilities that can serve to provide lessons learned, best practices and priorities for action to future CEM meetings.

Next steps

These recommendations will inform the work of the Clean Energy Ministerial’s Global Superior Energy Partnership, the Super-Efficient Equipment and Appliance Deployment Initiative and the International Smart Grid Action Network. They will also feed into the Global Co-operation on Utility Delivery on Energy Efficiency (GCUDEE) work under International Partnership for Energy Efficiency Cooperation (IPEEC) and additional work led by the United Kingdom.

Continuing the public-private dialogue on clean energy

The tremendous growth we have seen in renewable energy over the past two decades is evidence that when governments provide a strategic framework, the private sector will respond and make significant, rapid investments. The roundtable discussions in Abu Dhabi highlighted the value of engaging the private sector early in government strategy/policy making processes to add business models, perspectives and ideas about priorities for accelerating the progress of energy efficiency and low carbon technologies.

Expanded international public/private cooperation can help further identify the investment, technology, skills and experience that are required to enable an effective transition to a lower carbon future. A continued multi-stakeholder dialogue is essential to maintain and accelerate momentum that has been successfully started by the Clean Energy Ministerial process.

The CEM public-private roundtables have offered engagement at the highest level in a setting that allows a frank exchange of views. These roundtables will continue to be an important platform where governments and businesses can build on these discussions to develop policies and initiatives that tackle the key issues.

In addition to expressing enthusiasm for collaborating on future CEM roundtables, the private sector is ready to provide ideas, priorities and resources to help advance the CEM initiatives and to use the work from these initiatives to inform and focus the ministerial dialogue at future meetings.

These discussions will be taken up in the coming months at events hosted by CEM countries, the World Economic Forum's annual calendar of events including the Annual Meetings in Davos and China, other regional events and the series of informal dialogues between business and governments hosted by the World Business Council for Sustainable Development. There will be a particular focus on specific sectors going forward.

The contacts at the end of this report can tell you how to participate in any of the relevant events and initiatives.

Annex I: List of Participants

POLICIES IN SUPPORT OF THE GLOBAL SCALE-UP OF RENEWABLE ENERGY

Co-Chairs

Anders Eldrup, Chief Executive Officer, DONG Energy, Denmark

Lykke Friis, Minister of Climate and Energy of Denmark

Fabricio Hernández, Secretary of State for Energy, Ministry of Industry, Tourism, and Commerce, Spain

Dipuo Peters, Minister of Energy of South Africa

Tulsi Tanti, Chairman and Managing Director, Suzlon Energy, India

Moderator

Simon Zadek, Senior Fellow, Global Green Growth Institute; Non-Resident Senior Fellow, J. F. Kennedy School for Government, Harvard University; USA

Participants

Eli Aamot, Vice-President, R&D NEW Energy and HSE, Statoil, United Kingdom

Adnan Amin, Interim Director-General, International Renewable Energy Agency (IRENA), Abu Dhabi

Miguel Arrarás, Managing Director, Solar PV Development, Acciona, Spain

Henri Backman, Ministerial Advisor, Ministry of Employment and the Economy, Finland

Alex Bettencourt, Managing Director, SmartGrid Canada, Canada

Christopher Burghardt, Vice-President, Government Affairs, Europe, Middle East and North Africa, First Solar, Belgium

Willie Donaghy, Executive Director, SmartGridIreland, Ireland

Paolo Frankl, Head of Renewable Energy Division, International Energy Agency (IEA), Paris

Esa Harmala, Director-General, Energy Department, Ministry of Employment and the Economy, Finland

Per Rune Henriksen, State Secretary, Ministry of Petroleum and Energy, Norway

Martin Hoffman, Deputy Secretary, Department of Resources, Energy, and Tourism, Australia

Lars Josefsson, President, EURELECTRIC; Former Chief Executive Officer, Vattenfall, Sweden

Daniel Kammen, Chief Technical Specialist for Renewable Energy and Energy Efficiency, The World Bank, Washington DC

Namhoon Kang, Director-General for Energy Policy,

Ministry of Knowledge Economy, Republic of Korea

Helen Mountford, Deputy Director of the Environment Directorate, Organisation for Economic Co-operation and Development (OECD), Paris

Mary O’Kane, Chair, Australian Centre for Renewable Energy, Australia

Jeremy Oppenheim, Director, McKinsey & Company, United Kingdom

Gene Rodrigues, Director, Customer Energy Efficiency and Solar, Southern California Edison, USA; Chair, Consortium for Energy Efficiency

Iñigo Sabater, Vice-President for Government Relations South Europe, Middle East, and Africa, Vestas Mediterranean, Spain

Gus Schellekens, Director, Sustainability and Climate Change, PwC, United Kingdom

Ashok Sethi, Vice-President, The Tata Power Company, India

Song Dengyuan, Chief Technology Officer, Yingli Group, People’s Republic of China

Marc Spitzer, Commissioner, Federal Energy Regulatory Commission, USA

Sun Haiyan, Vice-President, ChangZhou Trina Solar Energy Co., People’s Republic of China

Graeme Sweeney, Executive Vice-President, CO₂, Shell International Petroleum Company Limited, Netherlands

Wan Gang, Minister of Science and Technology of the People’s Republic of China

Frank Wouters, Director, Masdar Power, Abu Dhabi

Zhang Zhihong, Deputy Director-General, Department of High and New Technology Development and Industrialization, Ministry of Science and Technology, People’s Republic of China

INNOVATIVE TECHNOLOGIES AND BUSINESS MODELS FOR ENERGY EFFICIENCY

Co-Chairs

Guido Bartels, General Manager, Global Energy & Utilities Industry, IBM, USA; Chairman, Global Smart Grid Federation

Steven Chu, Secretary, Department of Energy, USA

Joan MacNaughton, Senior Vice-President, Power and Environmental Policies, Alstom Power Systems, United Kingdom

Daniel Yates, Chief Executive Officer, OPOWER, USA

Moderator

Bernice Lee, Research Director, Energy, Environment and Resource Governance, The Royal Institute of International Affairs, Chatham House, United Kingdom

Participants

Edward Abbo, Chief Executive Officer, C3, USA
Kateri Callahan, President, Alliance to Save Energy, USA
Sheryl Carter, Co-Director, Energy Program, Natural Resources Defense Council (NRDC), USA
Amit Chatterjee, Founder and Chief Executive Officer, Hara, India
Bo Diczfalusy, Director, Directorate of Sustainable Energy Policy and Technology, International Energy Agency (IEA), Paris
José María Figueres, Managing Partner, IJ Partners, Switzerland; President of Costa Rica (1994-1998)
Livio Gallo, Networks and Infrastructures Director, Enel, Italy
Enrique Gomez-Junco, President, Optima Energía, Mexico
Hal Harvey, Chief Executive Officer and President, ClimateWorks Foundation, USA
Mayur Karmarkar, Director, Sustainable Energy – Asia, International Copper Association Ltd, USA
Ja-Kyun Koo, Chief Executive Officer and President, LS Industrial Systems, People's Republic of China; Chairman, Korea Smart Grid Association
Ajay Mathur, Director-General, Bureau of Energy Efficiency, Ministry of Power, India
Pedro Miranda, Corporate Vice President, Siemens, Germany
Roland Risser, Program Manager, Building Technologies Program, Energy Efficiency & Renewable Energy, Department of Energy, USA
David Sandalow, Assistant Secretary, Office of Policy and International Affairs, Department of Energy, USA
David Scott, Executive Director, Economic and Energy Affairs, Executive Affairs Authority, Abu Dhabi
Rahul Tongia, Senior Systems Scientist, Carnegie Mellon University, USA; Principal Research Scientist, Center for Study of Science, Technology and Policy (CSTEP)
Gerard Wolf, Senior Executive Vice-President, International Development, EDF, France
Tracy Wolstencroft, Advisory Director, Goldman Sachs, USA
Xie Ji, Deputy Director-General, Department of Resource Conservation and Environmental Protection, National Development and Reform Commission, People's Republic of China
Nejib Zaafrani, Secretary-General and Chief Executive Officer, Dubai Supreme Council of Energy, United Arab Emirates

CITIES AS DRIVERS OF CLEAN ENERGY DEPLOYMENT AND SUSTAINABLE ECONOMIC GROWTH

Co-Chairs

Sultan Al Jaber, Special Envoy for Energy and Climate Change, Ministry of Foreign Affairs, United Arab Emirates; Chief Executive Officer, Masdar
Anders Lindblad, President, Ericsson Middle East, United Arab Emirates
Pedro Miranda, Corporate Vice President, Siemens, Germany
Maud Olofsson, Minister of Energy, Enterprise and Communications of Sweden

Moderator

José María Figueres, Managing Partner, IJ Partners; President of Costa Rica (1994-1998)

Participants

Edward Abbo, Chief Executive Officer, C3, USA
Falah Al Ahbabi, General Manager, Abu Dhabi Urban Planning Council, United Arab Emirates
Svante Bengtsson, Chief Executive Officer, REHACT, Sweden
Alessandro Filippi, Chief Executive Officer, AQUASER, KYKLOS, and SOLEMME, Acea SpA
Lykke Friis, Minister of Climate and Energy of Denmark
Alan Frost, Director, Masdar City, United Arab Emirates
Enrique Gomez-Junco, President, Optima President, Optima Energía, Mexico
Charlotta Lundell, Senior Vice-President Operations, Swedish Trade Council, Sweden
Tim Makower, Partner, Allies and Morrison, United Kingdom
Ajay Mathur, Director-General, Bureau of Energy Efficiency, Ministry of Power, India
Janey Mehks, Director Environmental Affairs, Stockholm Business Region/City of Stockholm, Sweden
Helen Mountford, Deputy Director of the Environment Directorate, Organisation for Economic Co-operation and Development (OECD), Paris
Mary O'Kane, Chair, Australian Centre for Renewable Energy, Australia
Luciano Piacenti, Head of the Environment Department, Acea SpA, Italy
James Pringle, Acting Chief Executive Officer and Executive Director, Development, Tourism Development & Investment Company (TDIC), United Arab Emirates
Peter Rathje, Chief Executive Officer, ProjectZero, Denmark
Joel Riciputi, Vice-President of Marketing, Hara, India
Graham Russell, Chief Executive Officer, United Arab Emirates and GCC States, Cemex, United Kingdom
Iñigo Sabater, Vice-President for Government Relations South Europe, Middle East, and Africa, Vestas Mediterranean, Spain

Gus Schellekens, Director, Sustainability and Climate Change, PwC, United Kingdom

Shen Jinxiang, President, Zhejiang Sheng Hui LED Co., People's Republic of China

Song Dengyuan, Chief Technology Officer, Yingli Group, People's Republic of China

Sun Haiyan, Vice President, ChangZhou Trina Solar Energy Co., People's Republic of China

Graeme Sweeney, Executive Vice President, CO2, Shell CO2, Shell International Petroleum Company Limited, Netherlands

Jonas Törnblom, Director Corporate Marketing & Information, Envac AB, Sweden

Wan Gang, Minister of Science and Technology of the People's Republic of China

Wu Ling, General Secretary, China Solid State Lighting Alliance, People's Republic of China

Simon Zadek, Senior Fellow, Global Green Growth Institute; Non-Resident Senior Fellow, J. F. Kennedy School for Government, Harvard University, USA

Zhang Zhihong, Deputy Director-General, Department of High and New Technology Development and Industrialization, Ministry of Science and Technology, People's Republic of China

REGULATORY STRATEGIES TO ACCELERATE UTILITY-SCALE ENERGY EFFICIENCY

Co-Chairs

B. K. Chaturvedi, Member (Energy), Planning Commission, India

Steven Chu, Secretary, Department of Energy, USA

Chris Huhne, Secretary of State, Department of Energy and Climate Change, United Kingdom

Lars Josefsson, President, EURELECTRIC; Former Chief Executive Officer, Vattenfall, Sweden

Gene Rodrigues, Director, Customer Energy Efficiency and Solar, Southern California Edison, USA; Chair, Consortium for Energy Efficiency

Marc Spitzer, Commissioner, Federal Energy Regulatory Commission, USA

Gerard Wolf, Senior Executive Vice President, International Development, EDF, France

Moderator

Kateri Callahan, President, Alliance to Save Energy, USA

Participants

Guido Bartels, General Manager, Global Energy & Utilities Industry, IBM, USA; Chairman, Global Smart Grid Foundation

Alex Bettencourt, Managing Director, SmartGrid Canada, Canada

Sheryl Carter, Co-Director, Energy Program, Natural Resources Defense Council (NRDC), USA

Amit Chatterjee, Founder and Chief Executive Officer, Hara, India

Anders Eldrup, Chief Executive Officer, DONG Energy, Denmark

Hal Harvey, Chief Executive Officer and President, ClimateWorks Foundation, USA

Daniel Kammen, Chief Technical Specialist for Renewable Energy and Energy Efficiency, The World Bank, Washington DC

Namhoon Kang, Director-General for Energy Policy, Ministry of Knowledge Economy, Republic of Korea

Joan MacNaughton, Senior Vice-President, Power and Environmental Policies, Alstom Power Systems, United Kingdom

Jeremy Oppenheim, Director, McKinsey & Company, United Kingdom

Marianne Osterkorn, Director-General, Renewable Energy and Energy Efficiency Partnership (REEEP), Vienna

Roland Risser, Program Manager, Building Technologies Program, Energy Efficiency & Renewable Energy, Department of Energy, USA

David Sandalow, Assistant Secretary, Office of Policy and International Affairs, Department of Energy, USA

Ashok Sethi, Vice-President, The Tata Power Company Ltd, India

David Struhs, Vice-President of Sustainability Strategy, C3, USA

Tulsi Tanti, Chairman and Managing Director, Suzlon Energy, India

Rahul Tongia, Senior Systems Scientist, Carnegie Mellon University, USA; Principal Research Scientist, Center for Study of Science, Technology, and Policy (CSTEP)

Tracy Wolstencroft, Advisory Director, Goldman Sachs, USA

Xie Ji, Deputy Director-General, Department of Resource Conservation and Environmental Protection, National Development and Reform Commission, People's Republic of China

Daniel Yates, Chief Executive Officer, OPOWER, USA

Nejib Zaafrani, Secretary-General and Chief Executive Officer, Dubai Supreme Council of Energy, United Arab Emirates

Annex II: Clean Energy Ministerial Technology Initiatives

1. CCUS - Carbon Capture Use and Storage Action Group
2. C3E - Clean Energy Education and Empowerment Women's Initiative
3. EVI - Electric Vehicles Initiative
4. GSEP - Global Superior Energy Performance Partnership (Utilities)
5. ISGAN - International Smart Grid Action Network
6. SEAD - Super-Efficient Equipment and Appliance Deployment Initiative
7. SLED - Solar and LED Energy Access Program
8. Bioenergy Working Group
9. Clean Energy Solutions Center
10. Sustainable Development of Hydropower Initiative
11. Multilateral Solar and Wind Working Group

Participation in Clean Energy Ministerial Initiatives
April 2011

	AUSTRALIA	BRAZIL	CANADA	CHINA	DENMARK	EUROPEAN COMMISSION	FINLAND	FRANCE	GERMANY	INDIA	INDONESIA	ITALY	JAPAN	KOREA	MEXICO	NORWAY	RUSSIA	SOUTH AFRICA	SPAIN	SWEDEN	UNITED ARAB EMIRATES	UNITED KINGDOM	UNITED STATES
Appliances (SEAD)	●	●	●		●		●	●	●			●	●	●	●	●	●	●	●	●	●	●	●
Bioenergy		●			●						●									●			
Buildings and Industry (GSEP)			●		●	●	●		●			●	●	●		●	●		●				●
Carbon Capture, Use, and Storage (CCUS)	●		●	●				●	●				●	●	●	●		●			●	●	●
Clean Energy Solutions Center	●						●		●		●	●			●			●			●		●
Electric Vehicles (EVI)				●	●		●	●	●	●			●					●	●	●			●
Hydropower		●					●								●	●							●
Off-Grid Lighting (SLED)												●											●
Smart Grid (ISGAN)	●		●	●		●		●	●	●		●	●	●	●	●	●			●		●	●
Solar and Wind	●	●			●			●	●	●			●	●	●	●			●			●	●
Women in Energy (C3E)	●				●										●	●		●		●	●	●	●

Source: <http://www.cleanenergyministerial.org/initiatives.html>

Annex III: Related Initiatives of the World Economic Forum and WBCSD

World Economic Forum Initiatives

- The World Economic Forum's **Retrofit Finance & Investing** project explores creative energy efficiency financing solutions that allow real estate portfolio holders to access capital and recommends policy tools that jump-start the investment market. The project involves three work streams: creating a global "Heat Map" of retrofit opportunities; identifying and documenting alternative financing mechanisms; and creating financial metrics to track progress in the sector.
- The World Economic Forum's **dialogue series on Energy Efficiency** in 2011 will address key barriers through discussions among regional and sector-based stakeholders in energy, engineering, mining, chemicals and information technology at the Forum's events.
- The World Economic Forum's **Sustainable Transportation Ecosystem** project is supported by the Aviation, Travel & Tourism, Automotive, and Logistics & Supply Chain Industry Partners. This initiative is a continuation of the Forum's previous work that identified game-changing technologies and challenges in energy sources, infrastructure, and demand and information systems. The project aims to address intermodal policy challenges and to catalyse initiatives in aviation biofuels, road transport electrification and carbon reporting.
- The Forum's **Green Growth Partnerships (GGP)** initiative is a unique advisory platform that leverages private finance into low-carbon investments in emerging countries. The GGP will deliver several significant new national or sector-specific case studies that tangibly illustrate how governments can draw private capital into low-carbon investment.
- The World Economic Forum's **New Energy Architecture** project will develop a new methodology to assess critical actions to increase the effectiveness and speed of the transition to energy systems of tomorrow that balance the need to underpin environmental sustainability, economic competitiveness and energy security. Country studies and issue deep-dives will be developed together with engaged partner companies, governments and experts.

WBCSD Initiatives

- Since its inception in 2001, the WBCSD's **Electricity Utilities** has been delivering thought leadership on sustainability in the power sector, with two seminal publications on Sustainability in the Electricity Utility Sector and Power to Change. Fifteen utilities make up the group, which focuses on universal access to electricity, decarbonized electricity generation and security of supply. Three workstreams were selected to respond to that vision: efficiency, electricity frameworks and sustainable development in the sector.
- The WBCSD's **Urban Infrastructure Initiative (UII)** brings together a diverse group of companies that are collaborating to help urban authorities develop realistic, practical and cost-effective sustainability strategies. Working with city authorities, the UII will help create transformation plans and translate strategic concepts into a feasible landscape solution for sustainable urban development. Collectively, WBCSD member companies can provide the research and analysis that will inform strategy, but crucially also bring the mindset and the ability to make things happen on the ground.

Annex IV: Contacts

Thomas Kerr

Director, Head of Climate Change Initiatives
World Economic Forum
E-mail: thomas.kerr@weforum.org

Dominic Waughray

Senior Director, Head of Environmental Initiatives
World Economic Forum
E-mail: dominic.waughray@weforum.org

Roberto Bocca

Senior Director, Head of Energy Industries
World Economic Forum
E-mail: roberto.bocca@weforum.org

John Moavenzadeh

Senior Director, Head of Mobility Industries
World Economic Forum
E-mail: john.moavenzadeh@weforum.org

Matthew Bateson

Managing Director, Energy and Climate 2010-2011
World Business Council for Sustainable Development
E-mail: bateson@wbcsd.org

Thierry Berthoud

Managing Director, Energy and Climate 2011-
World Business Council for Sustainable Development
E-mail: Berthoud@wbcsd.org

CEM Secretariat

CEMSecretariat@Hq.Doe.Gov
CEM website: www.cleanenergyministerial.org

Terry Carrington

International Energy Technology Policy
Department of Energy and Climate Change
E-mail: terry.carrington@decc.gsi.gov.uk







The World Business Council for Sustainable Development (WBCSD) brings together some 190 international companies in a shared commitment to sustainable development through economic growth, ecological balance and social progress. Its members are drawn from more than 30 countries and 20 major industrial sectors. The organization also benefits from a global network of 60+ national and regional business councils and partner organizations.

Its mission is to provide business leadership as a catalyst for change towards sustainable development, and to support the business license to operate, innovate and grow in a world increasingly shaped by sustainable development issues.



COMMITTED TO
IMPROVING THE STATE
OF THE WORLD

The World Economic Forum is an independent international organization committed to improving the state of the world by engaging business, political, academic and other leaders of society to shape global, regional and industry agendas.

Incorporated as a not-for-profit foundation in 1971, and headquartered in Geneva, Switzerland, the Forum is tied to no political, partisan or national interests.