



SUMMARY OF THE FIFTH CLEAN ENERGY MINISTERIAL: 12-13 MAY 2014

The fifth Clean Energy Ministerial (CEM5) took place in Seoul, Republic of Korea from 12-13 May 2014, on the theme "Act Together, Think Creative." Around 250 participants attended the conference, including ministers and other high-level delegates from the 23 participating governments and one observer country.

During the conference, delegates assessed progress since CEM1 in 2010 and identified steps for accelerating the transition to a global clean energy economy, through discussions in plenary sessions and a series of public-private roundtables.

Ministers and high-level delegates also took part in closed sessions in which they discussed: strategic directions for the Clean Energy Ministerial (CEM); finance mechanisms for supporting clean energy deployment; and progress through the initiatives operational under the four focus areas of clean energy, integration, energy efficiency and human capacity. They agreed to explore three new work streams on the energy-water nexus, market accessibility of clean energy products and clean energy finance. They also agreed to encourage greater participation of women in the clean energy sector through increased support of the CEM's Clean Energy Education and Empowerment (C3E) Women's Initiative.

The meeting included several awareness-raising side events, including an award ceremony recognizing successes in key areas of energy-efficient appliances and smart grid projects, a 'Model CEM' based on the Model UN student conferences, and an off-grid 'PlugFest' display and interoperability testing of off-grid energy-efficient appliances and solar home systems.

A BRIEF HISTORY OF THE CLEAN ENERGY MINISTERIAL

The CEM is a high-level global forum involving the world's major economies in promoting policies and programmes that advance clean energy technology. The CEM has three major goals: improve energy efficiency; enhance the supply of clean energy; and expand access to clean energy around the world.

The CEM grew out of the Major Economies Forum on Energy and Climate in July 2009, which agreed to launch a global partnership to drive transformational low-carbon and climate-friendly technologies. At the Conference of Parties to the UN Framework Convention on Climate Change (UNFCCC) that took place in Copenhagen, Denmark in December that year, United States (US) Secretary of Energy Steven Chu announced that he would host the first CEM in Washington DC.



Yoon Sang-jick, Minister of Trade, Industry and Energy, Republic of Korea, opened the Ministerial

The CEM includes ministers from 22 countries and one regional group that together produce 80% of global carbon emissions and account for 90% of clean energy investments. The participating governments are: Australia, Brazil, Canada, China, Denmark, the European Commission, Finland, France, Germany, India, Indonesia, Italy, Japan, Korea, Mexico, Norway, Russia, South Africa, Spain, Sweden, the United Arab Emirates (UAE), the United Kingdom (UK) and the US.

Initiatives undertaken through the CEM have strong private sector links, building on Technology Action Plans that were released by the Major Economies Forum Global Partnership in December 2009. The CEM maintains a 'distributed leadership' approach, whereby governments involve themselves in initiatives that are of interest to them, but are not obliged to participate in all projects.

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The CEM has launched 13 initiatives to date that are categorized under four thematic areas: under clean energy supply, the Multilateral Solar and Wind Working Group, the Bioenergy Working Group, the Sustainable Development of Hydropower Initiative, and the Carbon Capture, Use and Storage Action Group (CCUS); under energy efficiency, the Super-Efficient Equipment and Appliance Deployment Initiative (SEAD) and the Global Superior Energy Performance Partnership (GSEP); under integration, the 21st Century Power Partnership, the International Smart Grid Action Network (ISGAN), the Electric Vehicles Initiative (EVI), and the Global Sustainable Cities Network (GSCN); and under human capacity, the Clean Energy Education and Empowerment Women's Initiative (C3E), the Clean Energy Solutions Center, and the Global Lighting and Energy Access Partnership (Global LEAP).

The International Energy Agency (IEA), the International Partnership for Energy Efficiency Cooperation and the International Renewable Energy Agency (IRENA) are official observer organizations of the CEM and work closely with the CEM in tracking progress on global clean energy and related investments, and on sectoral initiatives.

The first CEM took place in Washington DC, US, in July 2010. Subsequent annual meetings took place in Abu Dhabi, UAE in April 2011; in London, UK in April 2012; and in New Delhi, India in April 2013.

Ministers at CEM1 in Washington DC took part in roundtable discussions on scaling up clean energy in a time of fiscal austerity. A public forum on the second day of the meeting involved a further 500 participants from civil society and the business sector in discussions of how to make gains in energy efficiency, clean power supply and energy access.

Delegates at CEM2 in Abu Dhabi discussed policies for clean energy supply, energy efficiency, and public finance, including opportunities for expanded cooperation on renewable energy, smart grids, and research and development of electric vehicles. Many participants endorsed recommendations from the CCUS Action Group on the need for international cooperation to advance policies, financial mechanisms and regulatory frameworks for the safe, long-term geological storage of carbon.

CEM3 in London highlighted financing as one of its focus areas and strengthened links with the business sector. The meeting featured a series of eight public-private roundtables on key clean energy topics, including scaling up of electric vehicles and technologies for carbon capture and storage. Two roundtables were devoted to discussions of how to finance energy efficiency and renewable energy.

CEM4 highlighted the integration of the developing world in the global clean energy strategy. It also highlighted the leadership role of women in clean energy and included a panel discussion on this topic. UN Secretary-General Ban Ki-moon and World Bank President Jim Kim addressed delegates in video messages, highlighting progress under the CEM and under the Secretary-General's Sustainable Energy for All initiative. In closed sessions, ministers discussed progress toward national clean energy goals, noting the role of finance in expanding the supply of clean energy, and the need for greater political support for energy efficiency policies. They also requested the Secretariat to prepare a report on finance, with recommendations to ministers attending CEM5, and initiated preparation of a proposal to create an advisory group of global leaders in the clean energy sector to provide input to the CEM on how to accelerate progress.

REPORT OF THE MEETING

OPENING PLENARY

Welcome remarks and introduction: The fifth Clean Energy Ministerial (CEM5) opened on Monday morning, 12 May. Before the official start of the meeting, US Secretary of Energy Ernest Moniz invited everyone to observe a moment of silence in memory of the loss of young lives in the Sewol sea ferry disaster.



Ernest Moniz, US Secretary of Energy

Yoon Sang-jick, Minister for Trade, Industry and Energy, Republic of Korea, opened CEM5 with a welcome to delegates and applauded the success of the CEM as a forum for consultation

and discussions on clean energy, and for developing 13 initiatives in the past five years. He however expressed disappointment with recent declines in the level of new clean energy technology investment and called for deepening global efforts in: accelerating technology innovation and deployment; engaging the private sector in accelerating investments in clean energy; and enhancing market accessibility for clean energy technologies by strengthening the enabling environment for clean energy technology development and commercialization.

Yoon also welcomed youth from the CEM member countries who were present to take part in the 'Model CEM' that was organized as part of the CEM's broader public engagement to build a clean and sustainable society.

Moniz highlighted successful policies and achievements of CEM countries, introducing performance standards for LED lights in India and a national smart grid programme in the Republic of Korea, among several examples. He noted, however, that renewable energy makes up only 18% of the global energy mix, and that over one billion people worldwide still do not have access to electricity.

Moniz called on delegates to consider what should be the CEM's future focus areas, noting that the meeting would discuss financing of clean energy, enhancing energy security as a 'second track' of the clean energy discussion and expanding energy access. He underscored that clean energy solutions must be delivered at the scale needed to make a difference.

UN Secretary-General Ban Ki-moon, in a written message to delegates, said the meeting would help shape the post-2015 development agenda and a new global agenda on climate. He highlighted the forthcoming Sustainable Energy for All (SE4ALL) Forum scheduled to take place from 4- 6 June 2014.

Keynote speeches: Maria van der Hoeven, Executive Director, International Energy Agency (IEA), presented recent developments in clean energy deployment and trend projections to 2050, drawing on the content of the IEA's Tracking Clean Energy Progress 2014 (TCEP 2014) report to be launched later that day.



Maria van der Hoeven, Executive Director, IEA

Van der Hoeven conveyed the IEA's concerns that global political and industrial leaders have been reactive rather than proactive in advancing the uptake of clean energy technologies. She noted that short-term economic pressures have slowed down the previous strong growth of

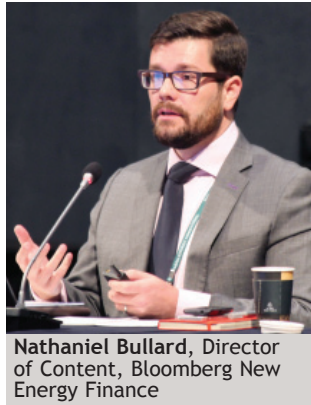
clean energy, and that deferring investment will involve higher long-term costs. She said TCEP 2014 had concluded that clean energy investment costs would be more than offset by the resulting savings and that leadership is needed to realize these long-term savings.

Van der Hoeven noted that progress is being made in introducing renewable energy generation technologies whereas other forms of clean energy technology are lagging behind the levels needed to limit global warming to 2°C. She added that emerging economies are now contributing significantly to renewable energy uptake but that they are also investing significantly in fossil fuel technologies.

Van der Hoeven called for rapid progress on the uptake of carbon capture and storage. Recognizing the CEM's smart grid initiative, she also observed that under a low-carbon scenario, electricity will overtake oil use in the coming decades, and that integrating smart energy systems into electricity grids will be vital to optimizing clean energy outcomes.

Van der Hoeven further urged political and industrial leaders to take proactive steps to accelerate a clean energy transformation. She said that enhanced private sector investment and better government management of policy risk will be vital to bringing about a successful outcome to multilateral climate change discussions in 2014 and 2015.

Nathaniel Bullard, Director of Content, Bloomberg New Energy Finance, presented on global clean energy investment trends and change agencies. He said global investments reached US\$254 billion in 2013 after plateauing in 2011, and that Asia-Pacific appears to be the only region with continuous investment growth in renewables. He highlighted green bond issuance, which he said is anticipated to reach an all-time high in 2014, as a potential new way to create investment capacity in the clean energy sector.



Nathaniel Bullard, Director of Content, Bloomberg New Energy Finance

Noting emerging trends in the growth of wind and solar energy share in Germany and California, and the potential impacts of China's 'war on pollution' on investments and greenhouse gas emissions, Bullard observed that global liquefied natural gas capacity will double by the end of the decade. He further observed that energy efficiency is slowing power utility growth, in addition to its impacts on power generation and total emissions.

Bullard presented examples of businesses that are deploying information and communication technologies (ICTs) in the energy sector. Finally, he encouraged participants to consider the impacts of fossil fuel divestment campaigns on the behavior of institutional investors.

Ahn Nam-sung, President, Korea Institute of Energy Technology Evaluation and Planning, introduced 10 clean energy technologies that are expected to be widely deployed in the near future, with the potential to transform energy systems worldwide. He mentioned: high-voltage direct current (HVDC) that can transport electricity over long distances, including over water; advanced energy storage systems; advanced biofuels used in transport; micro-grids that will link into smart grid systems; and technologies to convert carbon dioxide (CO₂) to saleable goods, such as through mineral carbonization.

Ahn also outlined breakthroughs in: ultra-efficient solar power; offshore wind turbine technology; hybrid renewable energy systems; energy management systems that will link home and office appliances through the 'internet of things'; and advanced thermal storage systems. He encouraged ministers to introduce a range of policy initiatives to advance renewable energy deployment, comparing their work with that of orchestra conductors who produce music by harmonizing different instruments.



Ahn Nam-sung, President, Korea Institute of Energy Technology Evaluation and Planning



CEM5 delegates gathered for a group photo after the opening session



Roundtable on Energy-efficient Cooling and Demand Response



Roundtable on Renewable Energy for Sustainable Growth and Employment

PUBLIC-PRIVATE ROUNDTABLE DISCUSSIONS

CEM5 included six roundtables on: energy-efficient cooling and demand response; renewable energy for sustainable growth and employment; energy storage systems (ESS) - challenges and opportunities; electric vehicle (EV) integration in power systems; facilitating access to low-cost capital to scale up renewables; and the energy-water nexus – overview and relevance for the CEM.

Energy-efficient Cooling and Demand Response:

Thomas Catania, University of Michigan, moderated this roundtable, inviting views from government and industry delegates. Participants reflected on the growing demand for air-conditioning in countries as different as Saudi Arabia and Finland, and in many developing country economies. They noted that cooling is not just a luxury but is linked to positive health impacts and work productivity, but that it however produces heat island effects.

They concurred on the need to change consumer behavior, for example, to encourage them to: invest in energy-efficient products including those with longer payback periods; and discard old, inefficient household appliances. They also discussed the potential of: net zero buildings; district cooling systems; a service approach to ensuring optimal installation, programming and use of energy-efficient appliances; and engaging consumers in reducing peak demand loads.

Delegates distinguished between the use of energy-efficient appliances and overall energy systems saving aims. They agreed on the need for scalable, holistic, system-wide solutions in order to maximize energy savings, with the ultimate goal of increasing overall comfort, including management of aspects such as humidity.

Renewable Energy for Sustainable Growth and Employment: Adnan Amin, Director-General, International Renewable Energy Agency (IRENA), moderated the roundtable.

Participants heard presentations on the progressive development of wind and solar energy in Germany, and the employment effects of renewables worldwide. Representatives of governments and the renewable energy sector in CEM member countries, including industry groups and international organizations, underlined key components for realizing sustainable growth and creating employment through renewables, including: implementing a time-bound policy mix and enriching the portfolio of renewables adapted to local conditions; guaranteeing investors market and grid access in order to reduce investment risk and avoid market monopolies; synchronizing both the ecological and economic gains of renewables through incentives that go beyond feed-in tariffs, such as capacity markets; and closing the skills gap by identifying, anticipating and providing skills training and formulating long-term education and skills strategies.

Participants also emphasized the importance of cost reductions while noting that changes in fossil fuel energy prices will also impact on competitiveness.

Energy Storage Systems (ESS) - Challenges and opportunities: Ahn Nam-sung moderated the roundtable.

Discussions addressed a range of topics, including: the need to bolster market confidence in ESS technology, as well as the potential contribution of ESS in managing renewable energy



Roundtable on Energy Storage Systems (ESS) - Challenges and opportunities



Roundtable on EV Integration in Power Systems

fluctuations in the grid; the importance of scaling up to reduce costs; the value of ESS in addressing existing technical issues, such as managing blackouts and deferring system upgrades in response to increases in peak demand; the need to raise awareness of the full range of different ESS technologies, such as thermal energy storage for district-wide heating, as well as established ESS technologies such as hydropower; pushback from incumbent electricity generators; the need for systems to be ‘agnostic’ in relation to ESS technology type; the potential for smart grids to optimize the contribution of ESS; and the value of developing international certification approaches for maintaining technical quality.

Participants considered ESS as a valuable topic for the CEM to continue to address, given the rapid growth projections to 2020.

Electric Vehicle (EV) Integration in Power Systems:

David Sandalow, Columbia University Center on Global Energy Policy, moderated the roundtable. Discussions centered on the need to: expand and standardize the profiles of charging stations; integrate EVs with utilities and grids; and engage with regulators to optimize the EV and power system interface.

Participants identified emerging opportunities for EVs, such as: linking with car-sharing schemes; using second-life batteries; integrating with smart grids; developing universal

charging standards to overcome transmission and distribution constraints; linking with multiple platforms of artificial intelligence; leveraging public and private collaboration, particularly in the case of public transport; and providing concrete solutions to combat environmental issues such as air pollution.

Participants further noted that EVs provide both mobility and electricity services, and agreed to consider the development of EVs in a broader context of energy infrastructure. They highlighted that EVs compare favorably with traditional vehicles in terms of emissions intensity, even when recharged using fossil fuel electricity.

Facilitating Access to Low-Cost Capital to Scale Up Renewables: Joan MacNaughton, Executive Chair, World Energy Council, moderated the roundtable, which considered: principles for reducing risk and facilitating uptake of clean energy; options for accessing low-cost capital across CEM countries; and the next steps for facilitating finance flows.

Delegates also noted that action would need to take place in a non-‘business-as-usual’ environment and that the commitment to massively scale up financial flows to developing countries by 2020 stands in marked contrast to the decline in clean energy investment over the last two years.



Roundtable on Facilitating Access to Low-Cost Capital to Scale Up Renewables

Discussions addressed a range of topics, including: how to get financial markets to view renewable energy investments in the same way they view other major infrastructure investments, including by developing robust data sets and risk metrics; the long timeframes it currently entails for developing countries to access clean energy finance; the higher cost of capital in developing countries for clean energy projects than for other infrastructure projects; the scope to bundle projects to scale to meet major finance providers' requirements; and the potential to blend finance from different public and private sources.

The group noted that political and technical risk factors, including those common to many infrastructure projects in developing countries, need to be addressed in order to make clean energy projects more attractive to investors.

Participants also noted that late delivery of multilateral development bank (MDB) financing meant many projects did not proceed. They urged MDBs to play a 'risk bridging' role to encourage more conventional private finance to invest, giving the example of a project in which revenue flows had been split innovatively to allow the private sector to bear less risk at the outset.

The Energy-Water Nexus – Overview and Relevance for the CEM: S. Vijay Iyer, World Bank, moderated the roundtable.

Delegates discussed water needs for energy production, as well as energy needs for water treatment and distribution. They noted that the energy sector is responsible for 15% of water use and that water scarcity is a threat to power system reliability. They recognized that many people do not have reliable supply of both water and energy.

Participants argued for increased priority to be given to water conservation and building awareness of 'water footprints,' in addition to carbon footprints. They concurred that not all forms of clean energy are water-efficient, and they considered issues related to water use in energy production, including: the high cost of transporting large amounts of water for hydraulic fracking operations; reduction in water quality due to water withdrawals for thermal power plants; and high levels of water use for biofuels.

Participants called for stronger efforts to research water use and availability, and increased investment in technologies for reuse and recycling of water. They acknowledged the political dimensions of water pricing and customary arrangements around water use. They considered how to incentivize water stakeholders to participate in clean energy pathways, noting that many energy reduction opportunities are water-related. Participants also agreed that the CEM should undertake further work on the energy-water nexus, in particular sustainability considerations and issues around the production and consumption of energy.



Roundtable on The Energy-Water Nexus - Overview and Relevance for the CEM

REPORTS-BACK FROM THE ROUNDTABLE DISCUSSIONS

Later on Monday afternoon, delegates met again in plenary to hear reports-back from the six roundtable sessions. Moderators from each session presented the main themes emerging from their sessions and then invited participants from their roundtables to comment further.

Energy-Efficient Cooling and Demand Response: Thomas Catania said the rapid increase in demand for air-conditioning and cooling services relates not only to personal comfort but also to societal objectives, including productivity and health. He noted the need for holistic solutions and leadership to achieve the appropriate balance of regulation with market-based solutions. Catania highlighted that roundtable participants had called for engaging and informing consumers appropriately to modify consumption behavior. He then invited three other participants to present their views of the roundtable discussions.

Martin Townsend, BRE Global, said that high-performance products that are commercially viable are needed, and highlighted the importance of close cooperation among organizations in order to develop solutions.

Douglas Arent, Joint Institute for Strategic Energy Analysis, said the discussion had identified the need to: develop public-private partnerships based on advancing technologies, policies and finance mechanisms to make cooling solutions affordable; find a balance between regulatory approaches and market incentives; and adopt a systems perspective.

Ron Binz, Principal, Public Policy Consulting, said that regulatory reform is key to incentivizing smart cooling.



Ron Binz, Principal, Public Policy Consulting

Renewable Energy for Sustainable Growth and Employment: Adnan Amin said participants had heard presentations on Germany's experience of renewables, followed



Adnan Amin, Director-General, IRENA

by a presentation on an IRENA study on the socio-economic benefits of renewable energy. Noting that 6.5 million people are directly and indirectly employed in the renewable energy sector, he said job creation potential is one of the strong positive gains for deploying renewables. Amin recommended rethinking policy instruments to further increase the share of renewables and suggested focusing on capacity markets, skills training and capacity building.

Noting the cost reduction in renewables in recent years, Kevin Nassiep, South African National Energy Development Institute, said besides mature renewable technologies such as wind and solar, sub-Saharan Africa should also concentrate on the deployment of biomass energy. Upendra Tripathy, Secretary, Ministry of New and Renewable Energy, India, stressed the importance of policy stability and the setting of practical and acceptable pricing for renewables.

While noting the positive employment impact of renewables presented in the IRENA econValue report, Steve Sawyer, Secretary General, Global Wind Energy Council, highlighted that wind energy faces conflicting imperatives to deliver clean energy at a competitive price while creating jobs and local

industries. He called for flexibility and dialogue about local content requirements in the wind industry and reiterated the importance of investing in training to create a local skilled workforce.

Energy Storage Systems (ESS):

Ahn Nam-sung said the group had focused on the need to: reduce ESS costs; keep in mind the wide range of technologies involved; and standardize approaches to attract cost-effective financing of storage technologies.

Chris Edgette, California Energy Storage Association, said that ESS should play various roles in enabling: distributed aggregated systems; better frequency regulation; deferral of electricity infrastructure investment; load-shifting; and micro-grid and off-grid applications. He called for policies to support this flexibility and for utilities to recognize that ESS can cut across organizational boundaries. He added that scaling up will reduce both technology costs and balance of systems costs.

Sandra Metzger, Yunicos AG, said the group's discussion had highlighted system integration as a key driver for ESS success. She noted concerns that incumbent electricity generators are resisting increased renewable energy and storage uptake, and called for regulatory policies to recognize the value contributed by ESS. She welcomed Samsung's indication that by 2017, it could halve current ESS costs and thereby boost market confidence in ESS.

Daniel Johansson, State Secretary, Ministry of Enterprise, Energy and Communications, Sweden, discussed the importance of price signals for influencing demand. He predicted that smart displays could lead to household end users being the biggest winners from the introduction of ESS. He also noted the importance of existing storage technologies, such as hydropower.

Electric Vehicle Integration in Power Systems: David Sandalow said roundtable participants had reported low utilization of public charging points and low levels of grid deployment for EVs. He underlined the synergies between deploying renewable energy and EVs, including the potential for selling power stored by EVs back to grids.

Kay Segler, BMW, called for EV technologies and incentive schemes to facilitate linking EVs with power systems, in particular charging stations, and to include EVs in car-sharing. He stressed the need for standardization and cautioned against monopoly, saying a joint platform must be formed to enable further discussion on these issues.

Ron Binz, Principal, Public Policy Consulting, highlighted the central role of regulators in the roll-out of EVs. Noting the ability of EVs to absorb renewable energies such as wind and solar, he suggested that EVs be considered part of smart grid development, and called for incentives for customers.

Sindhushree Khullar, Secretary, Planning Commission, India, underlined the demand for EVs for public transport use in emerging economies. Noting the employment creation opportunities of EVs, she suggested raising public support for EVs through city initiatives to reduce pollution levels.



Steve Sawyer, Secretary General, Global Wind Energy Council

Facilitating Access to Low-Cost Capital to Scale Up Renewables: Joan MacNaughton said the group believed momentum for financing renewables is building but needs to accelerate, and that this requires stable policy frameworks and support for developing countries' absorptive capacity. She proposed drawing up a charter of best practices for project steps, which countries and MDBs could sign up to in order to expedite financing approvals.

Sumat Sinha, Renew Power, outlined the group's discussion of a range of risks around renewable energy uptake that affect access to low-cost capital: currency risk, particularly with the recent foreign exchange volatility; political risk where some countries face unexpected changes in governments; regulatory risk where legal frameworks are neither lasting nor predictable; and execution risk where delays in project implementation can drive up costs, particularly if regulations change in the course of the project lifetime. He said multilateral agencies need to move faster in approving project finance and that the private sector could be more involved in policy decision-making.

Emeka Ngwube, Credit Agricole Securities, said a viable platform has emerged in the US for long-term, low-cost capital for large-scale wind and solar projects, but not yet in other countries. He called on MDBs to play a 'risk bridging' role to attract more private sector finance in developing countries.

Trevor D'Olierhus, Standard and Poor's, noted the group had discussed the positive impacts of the Solar Access to Public Capital (SAPC) initiative, which had involved many global companies and laid a platform for successful capital-raising initiatives in the US. He said SAPC has helped address several credit risks by encouraging: more standardized power purchase agreements; strengthened contracts to reduce risk of consumer default; minimum performance standards for technologies; and establishment of a database on solar operational costs.

The Energy-Water Nexus: S. Vijay Iyer said there is still a paucity of evidence on the trade-offs between energy and water usage. He noted that infrastructure resilience had emerged as an important theme of discussions, giving the example of hydropower systems that are dependent on water flows.

Iyer underscored that water decisions tend to be handled at the local level, whereas energy policy is made at the national level, and it is therefore important to consider how trade-offs can be handled. He highlighted that many strategic business opportunities exist in optimizing water and energy use in cities, as both water and energy are needed for distributing the water supply.

Christophe Frei, Secretary-General, World Energy Council, said around 15% of freshwater withdrawals are for energy purposes, and that further research is needed to assess the energy requirements for ensuring water supply. On energy infrastructure, he stressed the importance of planning as part of overall urban development.

Bindu Lohani, Asian Development Bank (ADB), questioned how to encourage government ministers to adopt integrated thinking on water and energy policy, highlighting potential gains in efficiency and environmental impacts. He called for conducting water audits in addition to energy audits.



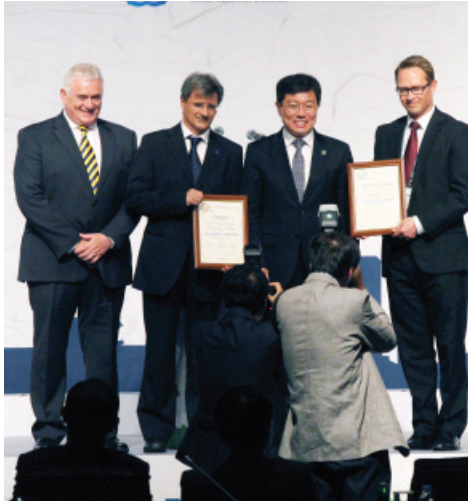
Joan MacNaughton, Executive Chair, World Energy Council



Sindhushree Khullar, Secretary, Planning Commission, India



Global Lighting and Energy Access Partnership Award winners with Ernest Moniz, Secretary of Energy, United States



International Smart Grid Action Network Award winners with Yoon Sang-jick, Minister of Trade, Industry and Energy, Republic of Korea



Super-efficient Equipment and Appliance Deployment Initiative Award winners with Leonardo Beltrán Rodríguez, Undersecretary of Planning and Energy Transition, Ministry of Energy, Mexico

Odón de Buen, Mexico, emphasized the value of knowledge sharing to optimize water withdrawals and energy consumption, highlighting the importance of the World Bank's 'Thirsty Energy' initiative.

Summing up, Iyer proposed that the CEM establish a work stream to elaborate on the energy-water nexus in time for CEM6.

MODEL CEM AND AWARD CEREMONIES

Youth delegates at the first Model CEM reported back to the plenary on their discussions, which had taken place concurrently with the roundtables. They said the Model CEM had discussed: the challenges facing renewable energy development; the need to increase public awareness and engagement; challenges and benefits of developing self-sufficient cities; and the role of the young generation, as future leaders, in promoting clean energy and reducing carbon emissions.

Young leaders recommended that all CEM countries should: create communities of youth to disseminate information after CEM conferences; support research and collaboration among youth on renewable energies at international and local levels; and deploy local renewable energies to support self-sufficient towns.

At the end of the day on Monday, award programmes for three CEM initiatives - Global LEAP, SEAD, and ISGAN - recognized companies that have created innovative smart grid projects and energy-efficient products, including LED lights, off-grid televisions and computer monitors.



A view of the room during the Ministerial

TUESDAY MORNING PLENARY

Yoon Sang-jick opened the second day of CEM5, outlining closed-door discussions about the CEM and its 13 initiatives.



Yoon Sang-jick, Minister for Trade, Industry and Energy, Republic of Korea

Finance Focus Area Presentation: Greg Barker, Minister of State, Department of Energy and Climate Change, UK, gave a presentation on innovative energy finance mechanisms, noting that genuinely additional private capital investment is essential to meeting the Copenhagen

commitment on scaling up climate finance. He further noted that public finance needs to be well targeted in order to catalyze private capital.

Barker outlined a new initiative, the Global Innovation Lab for Climate Finance (the Lab). He noted that the Lab will build on a previous British public-private investment initiative, the Capital Markets Climate Initiative, and will involve other countries, including Germany, Norway and Denmark. He explained that it will be an incubator for private finance ideas, involving senior



Greg Barker, Minister of State, Department of Energy and Climate Change, UK

executives from major institutional investors, project developers and MDBs, and that this high-level public-private cooperation will enable the Lab initiative to shortlist innovative projects that are most likely to succeed and generate appropriate returns. He flagged that the inaugural meeting will be held in June 2014.

Barker sought the CEM's endorsement of this process and undertook to report back to the CEM on the Lab's findings. He added that he was positive about the potential for outcomes in Paris in 2015 and that a profound shift in the finance sector since Copenhagen, moving towards effective climate finance provision, will facilitate that.

Nathaniel Bullard introduced Finance for Resilience (FiRe), an open, action-oriented platform that aims to catalyze private capital investment in clean energy. He said building on the knowledge generated in the clean energy sector, FiRe selects

and supports ideas that have a private sector champion and the potential to raise genuinely additional finance of at least US\$1 billion annually.

Stressing that the initiative is a market and need-oriented 'lab' designed to reach people in finance, Bullard said measurement and verification is an important element in the FiRe process to ensure that investments happen. He outlined the progress made so far, saying among the 41 ideas solicited worldwide, six were shortlisted as FiRe priorities addressing three broad areas: securitization; scale and aggregation; and risk management.

Delegates noted that financial products that could support clean energy projects have an affinity with insurance products, as they represent risk-bridging finance. They discussed the need for financial instruments that can facilitate investments in areas with high political risk and help deliver clean energy projects that may not be commercially viable otherwise. A developed country delegate suggested that the CEM should help establish links between insurance companies interested in developing such products. A developing country delegate expressed support for the move, stressing that the lessons learned would benefit emerging economies.

Discussion of CEM Strategy: Delegates reflected on how the CEM intersects with international climate discussions. They recognized that while the CEM does not deliberate on climate policy, some of its decisions are relevant to that discussion. They noted that 2015 will be 'a watershed year' in terms of setting targets under the post-2015 development agenda and reaching a climate agreement at the 21st Conference of Parties to the UN Framework Convention on Climate Change (UNFCCC COP21) in Paris, France. A developed country delegate noted that political events in Eastern Europe have highlighted the issue of energy security, which includes clean energy.

Delegates discussed having the CEM Secretariat work further with countries on the energy-water nexus and identify which current initiatives have reached their targets and could be phased out.

A developed country delegate welcomed the clustering of CEM initiatives under the four thematic areas and suggested streamlining activities, noting that resource constraints need to be kept in mind. The Chair welcomed this streamlining approach and suggested that other countries could also look to focus their participation in selected CEM initiatives.

Several delegates expressed support for the CEM as the only high-level meeting focused on clean energy technology and related policy issues. Delegates considered that it would be essential for the CEM to evolve to continue to be useful to stakeholders.

A developing country delegate pointed out that while it is important to develop technologies, commercialization is also critical. He said the CEM needs to think about how to address commercialization barriers, as its research shows that the regulatory environment is not keeping up with the speed of technology development. He advocated for clean energy finance to become an official CEM work stream. He also proposed for CEM6, an official work stream on what can be done to build market accessibility for clean energy products and technologies.

A developing country delegate suggested that, besides establishing new initiatives, the CEM could endorse and enhance existing efforts that are in harmony with its aims, such as the World Bank's Thirsty Energy initiative.

A developed country delegate noted that the global energy scenario is still fragmented and uncertain, and that Western countries are experiencing slumps in investment and consumption. He stressed the importance of a strong international framework that will enable countries to access energy at low cost and with low environmental impacts, saying that global clean energy is a key factor for resuming sustainable growth from both the economic and environmental perspectives.

MINISTERIAL DISCUSSIONS

Clean Energy - Solar and Wind, Bioenergy, Hydropower, CCUS: *On clean energy* in general, a developing country delegate noted that technology and finance are key to the discussion, and called for transfer of clean technologies and products at low cost. She stressed the importance of standardization and benchmarking of clean energy products to create confidence and enable technology transfer.

A developed country delegate proposed that CEM discussions should focus on two objectives: reaching an international binding agreement on climate change in Paris in 2015; and prioritizing and deepening CEM initiatives with the broader participation of NGOs and the business sector.

On wind and solar power, a developing country delegate stressed that trade barriers have affected millions of jobs in his country. He said market drivers are key to making clean energy initiatives and financing policies actionable. He expressed willingness to join the efforts to create a bigger clean energy market.

A developed country delegate highlighted the IRENA econValue report's analysis of policy measures for maximizing the economic benefits of renewables. He outlined the rapid transition of the energy sector in his country and how policy measures have effectively brought down wind and solar energy costs. He said that to increase the clean energy share in the total energy mix from the current 25% to 50% by 2030, his country will need to rely on solar and wind energy sources. He also noted, concerning the high energy prices in his country, that the government is working on raising and distributing surcharges to protect the competitiveness of the economy, in particular the energy-intensive industries.

A developing country delegate highlighted his country's commitment to accelerating renewable energy deployment, including the introduction of feed-in tariffs in 2012, which has driven an 8 GW or 40% increase in use of clean energy. He said challenges included the cost burden for consumers, grid power fluctuation and limited availability of suitable locations.

On bioenergy and hydropower, a developed country delegate said solutions should consider natural resource constraints and endowments at country and regional levels. She highlighted the importance of sustainable use of bioenergy and hydropower to complement and balance solar and wind energies, and to foster socio-economic developments especially for local communities.

A developing country delegate outlined a proposal for a bioenergy atlas that will examine bioenergy resources across many countries, and invited funding contributions. She also introduced ongoing cooperation with the IEA on developing a hydropower technology roadmap. She noted work done to assess greenhouse gas emissions from hydropower reservoirs, which were found to be only in the order of 3-4% of those from coal-fired power plants. She proposed developing guidelines on sustainability best practice, possibly including case studies of accessing project finance in developing countries.

A delegate proposed clarifying the relationship between the CEM and the Food and Agriculture Organization of the UN, noting that they already work together in the Global Bioenergy Partnership.

Delegates proposed that those involved in the bioenergy and hydropower groups evaluate their progress, and consider if their work could be integrated into a new programme of work on the energy-water nexus. A group member suggested seeking out synergies with the SE4ALL initiative.

On CCUS, several delegates expressed support for the use of carbon capture, use and storage (CCS) technology and presented examples of its use in their respective countries. A delegate from a developed country noted the importance of considering energy pricing issues and options for reducing renewable energy costs, including for storage.

A delegate representing the CCUS Action Group introduced its study, *Global Action to Advance Carbon Capture and Storage: A Focus on Industrial Applications*. He highlighted that CCS will be a crucial part of the energy mix in his country and an integral part of their national de-carbonization plan. He noted existing CCS projects focus mainly on the use of CO₂ in enhanced oil recovery, whereas more needs to be done on storage.

The CCUS Action Group delegate introduced the recent development of guidance on CO₂ storage methodologies complementing the IEA's work in this area. He suggested carrying out joint storage analysis at regional levels and encouraged the ratification of marine treaties to enable cross-border transfer of CO₂. He presented arrangements on transferring the CCUS Action Group to the Carbon Sequestration Leadership Forum (CSLF), noting that the Action Group will provide regular reports to the CEM on its work under the CSLF.

Integration - the 21st Century Power Partnership (21CPP), the International Smart Grid Action Network (ISGAN), the Electric Vehicles Initiative (EVI) and the Global Sustainable Cities Network (GSCN): *On the 21CPP*, a developing country delegate outlined its own initiative to provide a renewable energy roadmap, involving a broad stakeholder partnership. She indicated that her country has developed a powerful web tool for predicting scenarios on energy use and technology pathways to 2047, which has helped establish the range of government, private sector and civil society contributions that will be required to constrain carbon emissions effectively. She offered to share information about the progress of this work with the 21CPP.

A delegate from a developed country proposed exploring synergies between this initiative and his country's bilateral partnerships with a number of emerging economies on renewable energy, energy efficiency, energy scenario modeling and potential for coal generation. He also introduced work carried out in the Global Green Growth Forum (3GF), in particular the public and private dialogue in an upcoming 3GF meeting.

On the ISGAN, a developing country delegate noted that the group's membership has grown from 14 to 25 countries. He reported that the ISGAN is looking to contribute to deployment of smart grids.

A delegate from a developed country highlighted that his country has a strong focus on integration, as developing smarter grids has helped it to adapt to rapid uptake of renewable energy.

He emphasized the importance of cost-benefit analysis. Another delegate from the same region highlighted the importance of the ISGAN's work in empowering consumers. He noted the value of sharing country experiences of smart grid introduction and supported expanding the initiative's scope, geographic coverage and links to other international actions.

Other delegates also expressed support for work carried out under the ISGAN. A delegate emphasized action by a regional group to collaborate with research institutions on interoperability issues, including the dedication of around US\$1.1 billion for research and development of smart grids and ESS.

A developing country delegate highlighted that it was very important to make the grid work more intelligently, explaining that a large share of its power sources are on the opposite side of the country to the bulk of its population.

On the EVI, a developing country delegate cited the IEA study, *Global Transport Outlook to 2050*, highlighting that promoting EVs is one of the most promising pathways to reducing greenhouse gas emissions in the transport sector. He said the development and mainstreaming of EVs will need policy support that is smart and data-driven, especially in optimizing the location of charging points and developing sustainable business models for EVs, without over-dependence on government subsidies. Outlining a huge gap between his country's current EV penetration rate and the 2015 target, he called for collaboration on standardization, leveling the playing field for market competition, and developing viable business models for grid and EV integration.

Another developing country delegate highlighted the important role of EVs in public transport and car sharing. Noting consumer preferences for two and three-wheelers as light-duty vehicles in her country, she said these transport modes should be incorporated in the EV initiative. She said governments should play an active role in creating open markets for EVs, and suggested making upstream interventions in policy and regulation rather than subsidizing the products.

A developed country delegate highlighted the need for charge-point infrastructure, international standards and dynamic pricing to promote the use of off-peak electricity to recharge EV batteries. He suggested creating linkages between EV development and innovative partnerships on smart cities.

On the GSCN, some delegates noted the rapid pace of urbanization in their countries, highlighting the role of the GSCN as an enabler of effective policies. They asked how to raise the level of ambition around sustainable cities and ensure that the GSCN adds value to the work of similar networks. A developed country delegate supported taking a holistic systems approach and benchmarking their policies with those of other countries.

Energy Efficiency – the Super-efficient Equipment and Appliance Deployment (SEAD) initiative and the Global Superior Energy Performance Partnership (GSEP): *On the SEAD initiative*, delegates questioned whether governments associated with the CEM are doing enough to realize energy efficiency standards. Several delegates highlighted their countries' policies and achievements, including: energy efficiency labels and star ratings; incentives for energy-

intensive industries to reduce their energy consumption; and standards for new buildings and household appliances such as refrigerators, televisions and water heaters.

Delegates heard that some governments have encouraged companies to share information on how they achieved reductions in energy use and have established agencies to focus specifically on energy efficiency aims.

On the GSEP, a delegate presented the GSEP's progress in sharing knowledge and technical expertise, developing case studies, improving business practices, and promoting the energy management and ISO 50001 certification scheme.

Delegates raised questions about how to expand private sector involvement in the initiative, and how input can be provided to other international processes such as the UNFCCC. Some delegates reported on their domestic initiatives, including the development of voluntary standards for 'cool roofs,' retrofitting of buildings, and the introduction of solar water heaters, including training of maintenance staff. They discussed the potential of combined heat and power for energy savings and encouraged the setting of minimum efficiency standards through domestic policies.

One developing country delegate proposed mobilizing the GSEP as a communication channel, and another noted that the challenge remains of how to heighten public awareness of new technologies and approaches for achieving greater levels of energy efficiency.

Human Capacity – the Clean Energy Solutions Center, the Clean Energy Education and Empowerment women's initiative (C3E), the Global Lighting and Energy Access Partnership (Global LEAP): On the Solutions Center initiative, delegates heard that the initiative has delivered high-impact policy assistance to countries to implement clean energy policies and programmes with the support of over 35 international experts. Noting the need to extend areas of work, the chair introduced new collaboration forged between the Solutions Center and IRENA to assist renewable energy readiness assessment, and work with the World Bank to provide policy assistance and develop joint training programmes.

On the C3E initiative, delegates heard that the C3E has helped to bring more women into energy careers through identifying C3E ambassadors in CEM countries, and recognizing accomplished and senior women for their mid-career leadership and lifetime achievements. Noting C3E is working with CEM governments to build and expand an international C3E Ambassador Corps, the chair encouraged partner governments to consider creating an international cohort by nominating women in their country and hosting an international C3E symposium.

A developing country delegate commented on the effectiveness of the C3E in empowering women in different economic sectors related to clean energy in her country and region. She suggested linking C3E with other gender initiatives to forge a global mentorship group for women. Several other delegates expressed support for expanding the initiative.

On Global LEAP, the chair commented on the success of the approach in creating a quality assurance framework for solar lighting devices, saying it has led to remarkable growth in the solar lighting market. He applauded the partnership with the SE4ALL initiative, and with the World Bank and International Finance Corporation's Lighting Africa programme. He presented a proposal for Global LEAP to expand the product



The CEM held a press conference after the close of the meeting. L-R: **Leonardo Beltrán Rodríguez**, Undersecretary of Planning and Energy Transition, Ministry of Energy, Mexico; **Yoon Sang-jick**, Minister of Trade, Industry and Energy, Republic of Korea; and **Ernest Moniz**, Secretary of Energy, United States.

categories in its award competitions to include super-efficient DC-powered fans, and to broaden the scope of its market-catalyzing activities into the mini-grid space.

A number of developed and developing country delegates endorsed these initiatives, and noted plans to nominate women ambassadors and organize symposiums in their countries.

CLOSING PLENARY

Yoon thanked everyone for their participation, urging them to maintain a high level of ambition on clean energy.

Moniz thanked the meeting hosts and summarized delegates' agreement to review the existing initiatives with a view to streamlining the CEM's work. He noted that delegates had agreed to set up three new work streams on finance, market accessibility of clean energy products and the energy-water nexus, and that they had also agreed to encourage greater participation of women in the clean energy sector, through increased support of the C3E.

Leonardo Beltrán Rodríguez, Undersecretary of Planning and Energy Transition, Ministry of Energy, Mexico, thanked Minister Yoon for the impeccable arrangements at CEM5, and looked forward to hosting CEM6 in Mexico City in 2015.

CEM5 was brought to a close at 1.30pm.

UPCOMING MEETINGS

International Conference on Sustainability in the Water-Energy-Food Nexus: This conference will address linkages between water, energy and food security, seeking to assess available information, identify knowledge and gaps, share lessons, facilitate networks, and contribute to consensus on priorities, in order to consider joint improvement in efficiency as a win-win strategy for human development and environmental sustainability. **dates:** 19-20 May 2014 **location:** Bonn, Germany **contact:** Global Water System Project International Office **phone:** +49-228-73-6188 **email:** gwsp.ipo@uni-bonn.de **www:** <http://wef-conference.gwsp.org/>

UNFCCC 40th Sessions of the Subsidiary Bodies: The 40th sessions of the Subsidiary Bodies to the UNFCCC and the June session of the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) will take place in June 2014. **dates:** 4-15 June 2014 **location:** Bonn, Germany **contact:** UNFCCC Secretariat **phone:** +49-228-815-1000 **fax:** +49-228-815-1999 **email:** secretariat@unfccc.int **www:** http://unfccc.int/meetings/bonn_jun_2014/meeting/8031.php

Sustainable Energy for All Forum: The Forum will assess progress on sustainable energy since Rio, showcase success, share best practice, present new commitments, catalyze action and help shape the global energy debate for the next decade. **dates:** 4-6 June 2014 **location:** UN Headquarters, New York, US **contact:** Office of the Special Representative of the

Secretary-General, Global Facilitation Team, SE4ALL, UN
email: forum@se4all.org **www:** <http://www.se4all.org/se4all-forum/>

Second International Off-grid Renewable Energy Conference and Exhibition: IRENA, ADB and the Alliance for Rural Electrification are organizing this conference to convene off-grid renewable energy stakeholders to: gain insights into the current status of electricity access in Asia and gather stakeholder perspectives on improving access to modern energy services; discuss barriers faced in scaling up off-grid renewable energy deployment; identify solutions for overcoming barriers; and share best practices and lessons about design and implementation of policies and financing solutions. The meeting will mark the beginning of the Asia Clean Energy Forum, taking place from 16-20 June 2014 at the same location. **dates:** 16-17 June 2014 **location:** Manila, Philippines **contact:** IRENA Secretariat **phone:** +971-2-4179000 **email:** offgridconference@irena.org **www:** <http://www.ioec.org>

Asia Clean Energy Forum 2014: The Asia Clean Energy Forum is being organized by ADB, the US Agency for International Development and the World Energy Council, and will gather stakeholders from academia, industry, civil society, government and multilateral institutions to discuss clean energy in Asia. **dates:** 16-20 June 2014 **location:** Manila, Philippines **contact:** Aiming Zhou, ADB **phone:** +632-632-5602 **fax:** +632-636-2444 **email:** azhou@adb.org **www:** <http://www.asiacleanenergyforum.org>

2014 CIF Partnership Forum: The Climate Investment Funds (CIF) and the Inter-American Development Bank are jointly convening the 2014 CIF Partnership Forum, hosting participants from civil society, the private sector, governments, indigenous peoples and academia. During the conference, panel discussions will address a variety of topics, including managing climate change programmes and unlocking private finance from mini-grids to REDD+. **dates:** 23-24 June 2014 **location:** Montego Bay, Jamaica **contact:** CIF Admin Unit **phone:** +1-202-458-1801 **email:** CIFAdminUnit@worldbank.org **www:** <https://www.climateinvestmentfunds.org/cif/event-partnership/2014>

Tenth International Energy Conference: This biennial conference, organized by the Iranian National Energy Committee, will focus on the theme, "Efficiency in Resource Management, Excellency in Energy Industry." **dates:** 26-27 August 2014 **location:** Tehran, Iran **contact:** UNFCCC Secretariat **phone:** +98-21-42917000 **fax:** +98-21- 42917100 **email:** info@iranec.com **www:** <http://www.iranec.com/English/>

2014 Climate Summit: This event is being organized by UN Secretary-General Ban Ki-moon with the aim to mobilize political will for an ambitious legal agreement under the UNFCCC process. **date:** 23 September 2014 **location:** UN Headquarters, New York, US **www:** <http://www.un.org/climatechange/summit2014/>

Global Green Growth Forum: Under the working theme of 'Changing Production and Consumption Patterns through Transformative Action', the forum will focus on innovative and evidence-based solutions which may foster transformative action from both producers and consumers, including financing of green solutions. Participation is by invitation. **dates:** 20-21 October 2014 **location:** Copenhagen, Denmark **contact:** 3GF Secretariat, Ministry of Foreign Affairs, Denmark **phone:** +45 3392 0000 **email:** 3gf@um.dk **www:** <http://3gf.dk/en/2014/>

Local Renewables 2014 Conference: Themed "Shaping your solar city and region-practical solutions from planning to implementation," this conference will offer an international forum for policy-makers, energy experts, energy services providers, researchers and business representatives to gather to discuss the future of local renewable energy. **dates:** 22-24 October 2014 **location:** Freiburg, Germany **contact:** ICLEI **email:** lr2013@iclei.org **www:** <http://www.local-renewables-conference.org/>

UNFCCC COP 20/CMP 10: The 20th session of the Conference of the Parties, 10th session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol and the UNFCCC Subsidiary Bodies will meet in December 2014. Venezuela has offered to host a pre-COP ministerial meeting. **dates:** 1-12 December 2014 **location:** Lima, Peru **contact:** UNFCCC Secretariat **phone:** +49-228 815-1000 **fax:** +49-228-815-1999 **email:** secretariat@unfccc.int **www:** http://unfccc.int/meetings/lima_dec_2014/meeting/8141.php

Fifth Session of the IRENA Assembly: The fifth session of the IRENA Assembly is scheduled to take place in January 2015. **dates:** 18-19 January 2015 **location:** Abu Dhabi, UAE **contact:** Adnan Amin, Director-General **phone:** +971-2-4179001 **email:** secretariat@irena.org **www:** <http://www.irena.org>

Sixth Clean Energy Ministerial: The sixth session of the Clean Energy Ministerial (CEM 6) will take place in 2015. **dates:** TBD **location:** Mexico **contact:** CEM secretariat **phone:** +1-202-586-4131 **email:** CEMSecretariat@hq.doe.gov **www:** <http://www.cleanenergyministerial.org>

GLOSSARY

21CPP	21st Century Power Partnership
C3E	Clean Energy Education and Empowerment Women's Initiative
CEM	Clean Energy Ministerial
CCUS	Carbon Capture, Use and Storage Action Group
CSLF	Carbon Sequestration Leadership Forum
ESS	energy storage systems
EV	electric vehicles
EVI	Electric Vehicles Initiative
FiRe	Finance for Resilience
Global LEAP	Global Lighting and Energy Access Partnership
GSCN	Global Sustainable Cities Network
IEA	International Energy Agency
IRENA	International Renewable Energy Agency
ISGAN	International Smart Grid Action Network
MDB	multilateral development bank
SE4ALL	Sustainable Energy for All
SEAD	Super-efficient Equipment and Appliance Deployment Initiative
SAPC	Solar Access to Public Capital
UNFCCC	UN Framework Convention on Climate Change