CEM Bulletin

A Summary of the Seventh Clean Energy Ministerial (CEM7)

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CLEAN ENERGY MINISTERIAL
Accelerating the Transition to Clean Energy Technologies

SUMMARY OF THE SEVENTH CLEAN ENERGY MINISTERIAL: 1-2 JUNE 2016

The Seventh Clean Energy Ministerial (CEM7) took place from 1-2 June 2016 in San Francisco, California, US, in conjunction with the inaugural Mission Innovation (MI) Ministerial, and was chaired by US Secretary of Energy Ernest Moniz, who noted that San Francisco was chosen as host city because of its role in innovative technology.

The CEM met in closed-door discussions on 1 June, where CEM members reached general consensus on "CEM 2.0," including the draft CEM Framework document, and arrangements for the new multilateral CEM secretariat. Delegates agreed that the International Energy Agency (IEA) should host the Secretariat, pending approval by the IEA Governing Board. Updates were provided on CEM6 campaigns, including the Global Lighting Challenge (GLC), the Power System Challenge and the scaled-up Clean Energy Solutions Center. CEM7 campaigns were also announced, including: the Advanced Cooling Challenge; the Energy Management Campaign: A Drive to 50,001 Energy-Saving Partners; and the Corporate Sourcing of Renewables Campaign.

Four high-level roundtable discussions took place on: Innovative Mechanisms and Strategies for Investment in Energy Efficiency; Facilitating Corporate Sourcing of Clean Energy; Government Procurement and Demonstration of Clean Technology; Next Generation Wind and Solar: Getting Policies and Markets Right.

On 2 June, CEM7's Open Press Public Private Action Summit convened, during which participants heard updates on CEM6 campaigns, and the CEM7 campaigns were launched, as introduced during the closed-door discussions. Delegates watched a video message from US President Barack Obama, followed by an address by Yin Hejun, Vice Minister, Ministry of Science and Technology, China, who read a letter from China's President Xi Jinping.

Scene-setting presentations and policy perspectives were delivered by the IEA, Bloomberg New Energy Finance, REN21 and the World Energy Trilemma. The event also featured an awards ceremony, recognizing winners for energy management leadership, global efficiency in lighting, excellence in smart grid innovation and outstanding off-grid appliances. The Startups and Solutions Showcase, which had over 100 exhibits, was held in parallel to the meeting.

Bird's eye view of the CEM in session

During closing remarks, Wan Gang, Minister of Science and Technology, China, via video message, invited all to attend CEM8 in Beijing, China, in 2017.

A BRIEF HISTORY OF THE CEM

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: improving energy efficiency; enhancing the supply of clean energy; and expanding 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 15th session of the Conference of the Parties to the UN Framework Convention on Climate Change (UNFCCC COP 15) that took place in Copenhagen, Denmark, in December 2009, Steven Chu, then US Energy Secretary, announced that the first CEM would be hosted in Washington DC, US.

IN THIS ISSUE

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Ernest Moniz, Secretary of Energy, US (center), delivering his welcome remarks

The CEM includes ministers from 23 countries and one regional group that together produce about 80% of global carbon emissions and account for 90% of clean energy investments. The members of the CEM are: Australia, Brazil, Canada, China, Denmark, the European Commission (EC) on behalf of the European Union (EU), Finland, France, Germany, India, Indonesia, Italy, Japan, the Republic of Korea, Mexico, Norway, the Russian Federation, Saudi Arabia, South Africa, Spain, Sweden, the United Arab Emirates (UAE), the United Kingdom (UK) and the United States (US).

The CEM pairs the high-level political engagement of energy ministers with year-round initiatives and high-visibility campaigns to accelerate clean energy policy and technology deployment. The CEM maintains a 'distributed leadership' approach, whereby members can introduce and participate in initiatives and campaigns that are of interest to them, but are not obliged to participate in all CEM initiatives. CEM initiatives fall under four thematic areas of clean energy supply, energy demand, energy systems and integration, and cross-cutting support, and related to, *inter alia*, appliance and industrial efficiency, solar and wind, smart grids, electric vehicles, energy access and women in clean energy.

The 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 to track progress on global clean energy and on sectoral initiatives.

CEM1 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.

CEM5: This meeting took place in Seoul, Republic of Korea, from 12-13 May 2014, under the theme 'Act Together, Think Creative.' Ministers and high-level delegates came together to discuss: strategic directions for the CEM; financial mechanisms for supporting clean energy deployment; and progress through the initiatives operational under the four focus areas of the CEM. 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 Clean Energy Education and Empowerment (C3E) women's initiative.

CEM6: During this meeting, ministers considered the opportunity potentially offered by introducing a more ambitious second phase of the CEM ("CEM 2.0") and launched global efforts to address three critical technology and policy challenges – a GLC, a Power System Challenge, and a scaled-up Clean Energy Solutions Center. Ministers also established a CEM Steering Committee to provide strategic guidance to the CEM year-round. For the first time since its establishment in 2009, the CEM added a new member with Saudi Arabia officially joining the CEM, bringing total membership to 23 countries plus the EC, on behalf of the EU.

CEM7 REPORT

CLOSED-DOOR DISCUSSIONS

WELCOMING REMARKS: CEM7 opened on Wednesday morning, 1 June 2016. US Energy Secretary and CEM7 Chair Ernest Moniz welcomed ministers and delegates, highlighting CEM 2.0 as an increasingly important implementation platform on the road from COP21 in Paris, France, November 2015. He reflected on the complementarity between the CEM and MI, and the key role of innovation that ties the two together. He reminded delegates that a governance structure is essential to the success of CEM 2.0.

REPORT FROM THE STEERING COMMITTEE: Mexico reported on behalf of the Steering Committee, focusing on progress made on CEM6 campaigns: the GLC, the Power System Challenge and the scaled-up Clean Energy Solutions Center. He announced that Mexico will provide a secondee to serve in the CEM's new multilateral secretariat.

CEM 2.0 DISCUSSIONS AND DECISION-MAKING: Secretary Moniz requested general comments on CEM 2.0. The EC, for the European Union (EU), reiterated the need to accelerate the global clean energy transition. India highlighted initiatives on clean energy, including its LED lighting programme. China outlined its efforts in promoting a green and open economy with innovation at its core, and said it will host CEM8.

Japan noted the evolution of the global power sector and reported that the G7 Energy Ministerial Meeting, held in May 2016 on the sidelines of the G7 2016 Summit, focused on a new energy system combining the electricity and transportation industries, which account for the majority of energy consumption.

Chair Moniz then presented the CEM Framework document for comment, emphasizing that, while it provides more structure to ensure the CEM's longevity, it is non-legally binding.


Laurence Tubiana, France

Japan, France, Canada, Finland, Italy, the US, the Republic of Korea and Brazil supported the document. Australia abstained due to its impending national election. The Russian Federation asked for a few days for discussions with his ministers.

Chair Moniz announced a general consensus for adopting the Framework document, subject to full confirmation by a few countries.

CEM members then agreed to house the Secretariat at the IEA, with Brazil underscoring the evolution of energy challenges since the IEA was established in the 1970s. Finland pledged financial support, and Italy pledged €300,000 for 2016-2018.

Denmark, for the subgroup that drafted the Framework document, stressed the need for startup financial support and noted pledges by Norway, Sweden, Denmark, Finland, the US, Japan and Italy. He called for all member countries to provide substantial financial or in-kind contributions to the CEM secretariat. Sweden encouraged others to contribute and Canada announced its financial support. China pledged to provide human resources, host meetings and support CEM initiatives, and requested a budget from the IEA in preparation for making a US$600,000 cash contribution. Moniz indicated that Denmark would provide details on the budget estimates.

The IEA thanked the CEM for its decision on the secretariat, noted compatibility with the IEA's new missions to welcome emerging countries and become a clean energy hub, and said he would present the CEM's decision to the IEA Governing Board on 15 June 2016.


Fatih Birol, Executive Director, International Energy Agency

Chair Moniz reported that the administrative arrangements for the secretariat will be finalized imminently and approval will be sought from CEM countries and the IEA Governing Board.

The EC on behalf of the EU announced its desire to host CEM9 jointly with an EU member state in 2018.

CEM6 CAMPAIGN UPDATES: On Wednesday morning, the CEM heard updates on CEM6 campaigns.

Global Lighting Challenge: Sweden provided an update on this CEM6 campaign, which aims to distribute 10 billion high-efficiency lightbulbs. He noted progress in implementation, including the recently announced Sweden's GLC "Belysningsutmaningen," which aims to increase the share of energy efficient lighting by 2020. India noted its successful implementation of the world's largest LED lighting programme, which has helped reduce peak energy demand, greenhouse gas (GHG) emissions and household bills. The UAE and Canada expressed their desire to join the campaign.

Clean Energy Solutions Center: Australia provided an update on this campaign and announced a further commitment of US$1 million, which he said will support the "Ask an Expert" programme, among others. He further reported on the establishment of the Clean Energy Finance Solutions Center and recommended utilizing it to better leverage investments in the clean energy sector.

Delegates also watched a video on the Clean Energy Solutions Center, which provided an overview of the resources available to users.

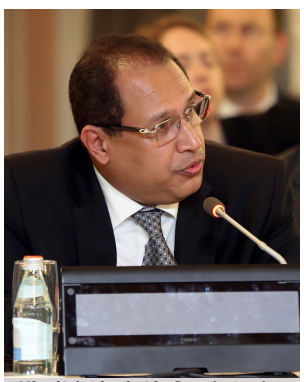
Sustainable Energy for All (SE4All) noted its collaboration with the "Ask an Expert" programme and its work with numerous developing countries to provide advice and input on investment plans. The UN Industrial Development Organization (UNIDO) said it has collaborated with SE4All to create an energy efficiency global platform and has supported a number of countries in implementing energy management systems.

Sweden announced the preparation of an additional US$200,000 contribution to support the Solutions Center. The UN Environment Programme noted its collaboration with the National Renewable Energy Laboratory in the US, which acts as the operating agent for the Solutions Center, including delivering webinars. He said the Clean Energy Solutions Center "is a gem yet to be discovered and used widely enough."

Power System Challenge: Germany said this campaign aims to transform power systems to achieve clean, reliable, resilient and affordable power for all. He said the "one-model-fits-all" approach does not apply, and that energy mixes, power system characteristics and degrees of interconnectivity should be established in order to assess which model is most applicable. He underscored the importance of flexibility in power system designs, and said power system transformations include establishing markets, noting that these could include markets operating on price signals alone. He cautioned that this methodology must also explicitly exclude government intervention.

CEM7 CAMPAIGNS: On Wednesday afternoon, ministers and delegates discussed and made commitments to join new proposed campaigns.

Advanced Cooling Challenge: Saudi Arabia introduced this proposed campaign, which aims to develop and deploy advanced cooling technologies at scale, and emphasized efficient and smart climate-friendly technologies. He mentioned five district cooling projects in Saudi Arabia, including in Mecca and Medina, and underscored the importance of efficient cooling systems moving forward.


Khalid Abuleif, Saudi Arabia

Moniz pointed to potentially revolutionary new cooling cycles that are not just alternatives to

Joan MacNaughton, Executive Chair of the World Energy Trilemma, World Energy Council

HFCs, and said the Department of Energy will contribute US$5 million to look at updating standards. The US, Canada, China, India and Saudi Arabia joined the challenge.

Energy Management Campaign: A Drive to ISO 50001 Energy-Saving Partners: Mexico introduced this proposed campaign, which aims to achieve 50,001 global certifications of the international energy management standard, ISO 50001, by 2020. He noted that in the case of North America, the US, Canada and Mexico have been fostering cooperation through an information platform to share results and best practices. Mexico, Canada, Germany, Denmark, Indonesia, Japan, Finland, the Republic of Korea, UAE and the US expressed interest in joining this campaign.

Canada stressed the need to: identify areas of cooperation to meet regional targets; expand pilot projects in key industrial sectors; and help companies improve efficiency and reduce energy use.

Germany highlighted the importance of networks, and mentioned the objective of forming an energy efficiency network of 500 companies by 2020, in which the companies are not in competition, but can, rather, learn from each other.

Indonesia noted progress in certifying and training hundreds of energy managers and said 50 of its companies are certified for ISO 50001. Finland, US and UAE joined this campaign.

Corporate Sourcing of Renewables Campaign: Germany expressed his optimism about the direction of this new campaign, highlighting the need for public and private partnerships in order to help public companies why they should utilize renewables.

IRENA underlined the importance of corporate sourcing but noted the need for in-depth discussion on how to scale it up. He reminded the CEM, and the EC and the US agreed, that small to medium enterprises should also be considered for their significant potential.

Brazil said his country will consider joining the campaign, but noted the regulatory issues relating to different energy sources, which are dependent on the circumstances of the city, country or system.

The US, Germany, Denmark, EC, UK, Mexico, Sweden and China joined this campaign.

Other Strategic Priorities: Ministers also discussed other CEM strategic priorities, including the CEM's C3E women in clean energy initiative.

Saudi Arabia urged the CEM to look at CCS in the industrial sector, urging that more resources be directed toward this area.

Moniz said the US is working with China on the Electric Vehicles Initiative to elevate it in importance and underscored the energy access issue for underserved people as another general area for consideration.

SUMMARY AND NEXT STEPS: Moniz presented a summary of the day's proceedings, reiterating consensus on the Framework Agreement and announcing agreement on the administrative arrangements for the CEM Secretariat at the IEA.

PUBLIC-PRIVATE ROUNDTABLES

Four high-level roundtable discussions convened in parallel on Wednesday afternoon.

ROUNDTABLE 1: INNOVATIVE MECHANISMS AND STRATEGIES FOR INVESTMENT IN ENERGY EFFICIENCY: Dan Reicher, Executive Director, Steyer-Taylor Center for Energy Policy and Finance, Stanford University, moderated this discussion, which focused on: the nexus of policy and finance in energy efficiency deployment, particularly on emphasizing recent financial innovations; and how these may be applied across country and market contexts.

Roundtable discussions on Innovative Mechanisms and Strategies for Investment in Energy Efficiency

Delegates discussed a diverse range of issues, including: financing of energy efficient equipment and technologies; policy interventions at the national level to promote energy efficiency; solutions focused on private sector engagement; and lessons learned from successful case studies on energy efficiency initiatives internationally.

Participants also shared ideas on, *inter alia*, venture capital funding for energy efficiency, lowering transaction costs, incentivizing policy interventions, and sector approaches on energy efficiency. Several delegates discussed the role of government in incentivizing the private sector to adopt energy efficiency measures. Others spoke on the need to adopt policies with multiple benefits for both the public and private sectors.

ROUNDTABLE 2: FACILITATING CORPORATE SOURCING OF CLEAN ENERGY: Adnan Amin, Director-General, IRENA, moderated this roundtable, which focused on drivers and challenges in corporate sourcing of renewable energy, as well as potential solutions, in preparation for the proposed new CEM campaign in this area.

The roundtable opened with several participants explaining their companies' shift toward 100% renewable energy and the business case for corporate sourcing of renewable energy. Discussion then ensued on drivers for, and obstacles to, selling, investing in, or buying renewable energy.

Participants identified drivers, including: the increasing cost effectiveness and competitiveness of renewable energy; the growth of renewable options; increasing user demand, particularly that of "consequential" large-scale users; evolving core values among consumers and corporations, particularly corporate social responsibility; the signaling and marketing value of a "green" label; the desire to hedge corporate costs; the aim for leadership in providing a model that others can replicate; and the value of a healthy atmosphere.

Challenges discussed included: lack of control over supply chains; regulations that inhibit market access to purchase renewable energy; market volatility; lack of understanding of risk management; lack of capacity; costs for first movers; lower motivation to procure renewable energy among energy-intensive industries, companies with thin profit margins, and other users of fossil fuel energy; and obstacles related to cross-border electricity grids.

Various solutions were mentioned, including: simplified and standardized processes; third-party cost-based construction of facilities and infrastructure; predictable incentives; deregulation of markets to allow customers to go off-grid and source their own energy; pooling of small and medium enterprises (SMEs) to make procurement more cost-effective; new contract structures that allow pooling; organizations such as the new Renewable Energy Buyers Alliance; alliances between NGOs and business to scale up the procurement of renewable energy globally; new and clear policies and regulatory frameworks; clear and stable transmission prices; green tariffs; wheeling; standardized and verified reporting of power purchase agreements (PPAs); a consumer label or corporate index to identify which companies source renewables; engagement with utility companies; transparency of markets; true pricing of resources; legal rights for grids to cross borders; and help for companies with high transaction costs, costs and small players to develop renewable energy strategies or negotiate PPAs.

Roundtable discussions on Facilitating Corporate Sourcing of Clean Energy

Roundtable discussions on Government Procurement and Demonstration of Clean Technology

ROUNDTABLE 3: GOVERNMENT PROCUREMENT AND DEMONSTRATION OF CLEAN TECHNOLOGY: Joan MacNaughton, Executive Chair of World Energy Council Trilemma Study Group, moderated this roundtable, which addressed, *inter alia*, the role of government, green procurement programmes and clean energy testbeds. Participants from government and the private sector discussed: the importance of public agency involvement in driving clean energy innovation; the need for governments to be "bold and brave"; government's role in R&D, and the success of university and government partnerships in this regard; lack of incentives to innovate on the part of those public utilities that hold a monopoly; and the need for governments to set clear goals, but not be overly prescriptive, and create the right incentives for investing in renewable energy to ensure revenues for companies.

Participants discussed how government can create markets through procurement policies and regulation, and the government's role in creating standards to reduce uncertainty and cost. Some participants lamented delays in government decision-making, noted a lack of regulatory frameworks, particularly for the electricity sector, and discussed various ways to characterize financial benefits, highlighting longer-term payoffs instead of short-term gains.

The group also noted that: all decisions involve risk, and broadened the discussion beyond just financial risk to include, for example, political risk; and procurement must also be used to support overall goals, such as climate change mitigation and combating climate impacts.

ROUNDTABLE 4: NEXT GENERATION WIND AND SOLAR: GETTING POLICIES AND MARKETS RIGHT: This roundtable was moderated by Fatih Birol, Executive Director, IEA. He opened the session with key messages to frame the roundtable's discussions, saying that a new phase of renewable energy deployment is underway as a result of major cost reductions. He said that consequently, challenges, such as grid integration and "next gen" policies for "next gen" solar and wind technologies, must be discussed and addressed.

Roundtable discussions on Next Generation Wind and Solar: Getting Policies and Markets Rights

Delegates noted that the Paris Agreement on climate change necessitates concrete action and underscored the potential of renewable energy, especially in light of its decreasing costs. They discussed opportunities created by growing energy demand in developing economies that lack sufficient infrastructure. Participants highlighted integration with the grid and debated various policies for facilitating grid integration, with many underscoring the importance of flexibility. Some underlined the sharing of experiences in this regard. They stated that new technologies that will lead to efficiency gains and paradigm shifts in policymaking will be essential.

Birol closed the session, reflecting on key points from the discussion, such as the need to: ensure governments and utilities work more harmoniously; include system operators in future discussions; and require new policy tools for issues related to grid integration.

OPEN PRESS PUBLIC-PRIVATE ACTION SUMMIT

WELCOMING REMARKS: Kevin Knobloch, Chief of Staff, US Department of Energy and Master of Ceremonies, opened the day's deliberations.

Kevin Knobloch, Chief of Staff, US Department of Energy

CEM7 Chair Moniz stated that formalizing the CEM's institutional arrangements has accomplished much to solidify the future of the CEM, and that public-private partnerships will be crucial for tangible, on-the-ground progress.

Dan Utech, Deputy Assistant to the President for Energy and Climate Change, US, lauded the CEM's focus on the deployment of technology at scale. US President Barack Obama spoke via video message, saying clean technology R&D is essential to combat the threat of climate change and global emissions. He said cooperation between governments, the private sector and other key stakeholders is crucial and emphasized that the Paris Agreement must enter into force as soon as possible.

CEM participants heard a video message from US President **Barack Obama**

Yin Hejun, Vice Minister for Science and Technology, China, underscored the Chinese Government's support for the CEM. He read a message from Chinese President Xi Jinping, who highlighted Chinese efforts to create enabling environments for clean technology development and adoption through policies and incentives, noting that harmony between man and nature is essential.

Edmund G. Brown Jr., Governor of California, underscored the need for urgent action, both political and financial, in order to meet climate targets. He said the political and business environments are not yet at the level necessary to meet the challenge. Highlighting the cross-sectoral nature of clean energy, he underlined the need for strengthened commitment from all stakeholders and segments of society to mobilize support for action on climate change.

SCENE SETTERS PRESENTATIONS: IEA Executive Director Birol presented aspects of the 'Tracking Clean Energy Progress Report,' and outlined key data on energy in the past year, highlighting the decoupling of economic growth and emissions. He said accelerating innovation is critical in order to reach climate targets, and that effective policies can address the climate challenge. He referred to renewables, energy efficiency, CCS and nuclear power as potential policy options. While highlighting that solar PV, wind, and electric vehicles saw good progress in 2015, he also noted that CCS, more efficient coal-powered plants and biofuels are lagging behind. On future directions, he encouraged the CEM to focus on cities, as they are responsible for over 70% of emissions, referring in particular to building codes and energy efficient transport.

Michael Liebreich, Chairman of the Advisory Board, Bloomberg New Energy Finance, discussed the New Energy Outlook 2016, highlighting progress made internationally on meeting the climate challenge. He said investment in renewable energy and other clean energy power sources reached a new record in 2015, despite the financial crisis and fall in oil and gas prices. He noted that investment in renewables is higher than in fossil fuels and other energy sources. Liebreich pointed to data showing that the cost of wind and solar power has consistently dropped, and said that over half of all new cars will be electric by 2040.

APPLIANCE EFFICIENCY: The new Advanced Cooling Challenge, which is a drive to deploy at scale, super-efficient, climate friendly cooling technologies, was launched during this session, which also included a panel discussion on super-efficient appliances for prosperous and healthy societies. Kateri Callahan, President, Alliance to Save Energy, US, moderated this session, noting that appliance and equipment efficiency is very cost effective.

Harsh Vardhan, Minister of Science and Technology and Earth Sciences, India, described India's mass market deployment of super-efficient products through focusing on new and emergent technologies, incentive options, demand aggregation, bulk procurement and awareness-raising of benefits. He noted that India's LED programme has driven 12%

Appliance Efficiency (L-R): **Dave Regnery**, President of HVAC of North America, Europe, Middle East, and Africa, **Ingersoll Rand**; **Bill Bien**, Head of Strategy & CMO, **Philips Lighting**; **Kateri Callahan**, President, Alliance to Save Energy; **Kate Hampton**, CEO, Children's Investment Fund Foundation; and **Harsh Vardhan**, Minister, Ministry of Science & Technology and Earth Sciences

Commercial and Industrial Efficiency (L-R): **Li Yong**, Director General, United Nations Industrial Development Organization; **Helen Burt**, SVP of External Affairs and Public Policy, PG&E **Mark Kenber**, CEO, The Climate Group; **James Gordon Carr**, Minister, Natural Resources Canada; and **Jennifer Rumsey**, CTO, Cummins

of global demand and that this model will be replicated for the Advanced Cooling Challenge, to achieve perceptible and measurable results by CEM8.

Kate Hampton, CEO, Children's Investment Fund Foundation (CIFF), UK, said her organization focuses on child health, child protection and climate change, and announced a commitment of US$12.5 million over five years to improve the efficiency of air conditioners while eliminating HFCs, focusing specifically on China and India. She also highlighted the CIFF's support for an amendment to the Montreal Protocol to phase out HFCs.

Dave Regnery, President, HVAC North America, Europe, Middle East, and Africa, Ingersoll Rand, announced his company's commitments to, by 2020: reduce the GHG footprints of its products by 50%, through innovating highly-efficient products using next generation refrigerants; invest US$50 billion in this effort; and reduce the GHG emissions of his company's global activities by 35%.

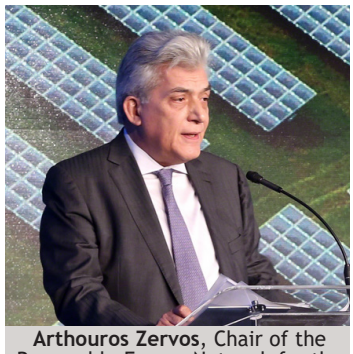
This session also included an update on the CEM's GLC, including the announcement of new commitments. Callahan updated participants on the GLC to achieve global sales of 10 billion high-efficiency and high-quality lighting products. She noted that lighting accounted for 15% of electricity consumption and 5% of GHG emissions globally in 2014 and that transitioning from inefficient lighting to LEDs can improve life generally. She announced that Canada and the UAE had just joined the GLC, and read a letter from the Vatican announcing it was also joining the GLC.

Bill Bien, CEO and Head of Strategy, Philips Lighting, shared that his company, *inter alia*: aims to meet the challenge by making lighting products that provide more benefits than traditional bulbs, which will spur their adoption; has committed to 100% carbon neutrality by 2020, by achieving 100% renewable energy purchasing by 2016; and is reducing its manufacturing footprint globally by moving from fossil fuels to renewable energy, and purchasing carbon offsets as necessary.

Lisa Jackson, Vice President of Environment, Policy and Social Initiatives, Apple

Moderator Callahan called on participants to join the GLC and the Advanced Cooling Challenge and closed the session.

KEYNOTE REMARKS: Lisa Jackson, Vice President of Environment, Policy and Social Initiatives, Apple, said that in order for the Paris Agreement to be effective, cooperation is essential. She underscored that while governments need the private sector to decrease their energy use, the private sector looks to government to provide policy environments that incentivize the adoption of low-carbon practices. She provided an overview of Apple's drive towards ensuring 100% renewable energy use for their global operations and their expanded focus on their supply chain.



Arthouros Zervos, Chair of the Renewable Energy Network for the 21st Century

POLICY PERSPECTIVES: Arthouros Zervos, Chair, Renewable Energy Network for the 21st Century (REN21), presented REN21's '2016 Renewables Global Status Report.' He highlighted that 2015 saw the largest adoption of global renewable power capacity to date and that, relative to GDP, the biggest adopters were Mauritania, Honduras, Uruguay, Morocco and Jamaica, which highlights the rapid advancement of renewable energy in developing countries. He: said that renewable energy adoption tends to focus on wind and solar power; emphasized that renewable energy deployment must be accelerated; and stated that smart, flexible systems are needed for scaling up renewable energy.

COMMERCIAL AND INDUSTRIAL EFFICIENCY: Mark Kenber, CEO, The Climate Group, moderated this session, highlighting the importance for corporations to have energy management systems and commitments to transform and increase clean energy use.

James Gordon Carr, Minister of Natural Resources, Canada, announced the launch of the Energy Management Campaign: A Drive to 50,001 Energy-Saving Partners, which issues a call to action to double or triple the rate of adoption and certification of ISO 50001 by 2020. He announced the endorsement of the Campaign by Canada, Chile, the EU, Mexico, Finland, Germany, the Republic of Korea, China, Indonesia, Japan, South Africa, US, the UAE, the Russian Federation and Sweden, supported by companies and corporations, including Climate Works, Cummins, PG&E, LG Chem, Samsung Electronics, Schneider Electric and others.

Carr also reiterated that his country, in partnership with Mexico and the US, is working on identifying technical areas of cooperation to meet regional targets, including training, pilot projects and coordination of technical assistance to industry.

LI Yong, Director General, UNIDO, underscored the role of his organization in promoting renewable energy and energy efficiency in governments' industrial development policies. Noting the importance of energy in the industrial sector, he highlighted UNIDO's active promotion of appropriate technology and low-emission measures. He announced UNIDO's support for the Campaign.

Scaling Corporate Access to Renwable Energy (L-R): **Rob Bernard**, Chief Environmental Strategist, Microsoft; **Thorsten Herdan**, Director-General for Energy Policy, Federal Ministry of Economics and Technology (BMWi), Germany; **Adnan Amin**, Director-General, IRENA; **Tristan Grimbert**, CEO, EDF RE; and **John Woolard**, Vice President of Energy, Google

Jennifer Rumsey, Vice-President and Chief Technology Officer, Cummins, announced her company's commitment to have ISO 50001 certification for 40 sites by 2020. She reiterated the support of Cummins to the Campaign and emphasized her company's continued commitment to environmentally responsible products and facilities.

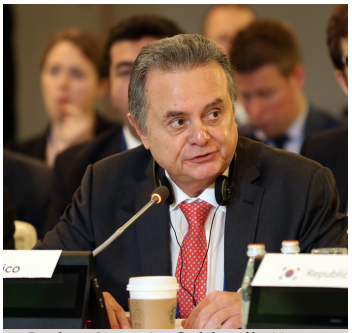
Helen Burt, Senior Vice President, External Affairs and Public Policy, Pacific Gas & Electric (PG&E), pledged support through partnership with companies to drive sensible energy management and tangible energy savings, adding that incentive alignment in policy can make a difference in clean energy.

SCALING CORPORATE ACCESS TO RENEWABLE ENERGY: This session included the launch of the Corporate Sourcing of Renewables Campaign, which will work to enable more companies around the world to power their operations with renewables. It also featured a panel discussion on 'Partnering to Drive Faster Deployment of Renewables through Corporate Procurement," as well as updates on the CEM6 campaign on the Power System Challenge.

Adnan Amin, Director General, IRENA, moderated this session, stressing that autonomous actors can push change. He reported that the 1 June roundtable on Facilitating Corporate Sourcing of Clean Energy highlighted the visionary approaches of some companies, which are demonstrating a business case for renewables. He highlighted IRENA's new report 'The Power to Change: Cost Reduction Potential of Solar and Wind Technologies,' which shows significant movement to these renewables, saying that investments in future technologies will be smart business decisions.

Rasmus Abildgaard Kristensen, Head of International Department, Ministry of Energy, Utilities and Climate, launched the CEM's Corporate Sourcing of Renewables Campaign. He noted the: diverse stakeholders involved; added value of the CEM's involvement in this issue; and attention given to cost reductions. He predicted that the campaign will break down policy barriers and advance the cost effectiveness of renewables. The campaign includes Germany, Denmark, China, the EU, Mexico, Sweden, the UK and the US.

Noting that demand is pulling global change and creating opportunities, Amin introduced a panel discussion on 'Partnering to Drive Faster Deployment of Renewables through Corporate Procurement.'



Pedro Joaquin Coldwell, Mexico

Thorsten Herdan, Director General, Energy Policy, Federal Ministry for Economic Affairs and Energy, Germany, highlighted Germany's renewable energy business model, citing huge decreases in costs since its deployment 20 years ago.

John Woolard, Vice President of Energy, Google, said his company initiated its aim to achieve 100% renewable energy by 2011 because it was "the right thing to do" and Google had the capability. He praised other companies for joining the initiative and noted the desire to work together to address market flaws and drive change.

Amin queried how to overcome constraints, including on SMEs, in the push for change.

Tristan Grimbert, CEO, EDF RE, said the renewable energy market has shifted over 30 years, and is increasingly including utilities. He cited market limits, noting that while energy from renewables is free, 100% of infrastructure costs are upfront, necessitating certainty on future revenue flows.

Rob Bernard, Chief Environmental Strategist, Microsoft, said early entrants develop business models, and if these are attractive, others will enter the business. He noted that early entrants drive the velocity and acceleration of change for themselves and others.

Grimbert said EDF RE works with local utilities, which can invest in renewable energy if their regulatory frameworks allow.

Herdan stressed that utilities can find a space in the renewable energy market, even though they are latecomers. Grimbert said policymakers must ensure access to revenue streams for different actors.

Woolard said Google garners many benefits from renewable energy, including a hedge to volatility and customer belief in Google's values. He noted that benefits foster corporate procurement and create corporate willpower to meet challenging obstacles.

Bernard added that renewable energy developments create possibilities for further technological innovation and product development.

Transitioning to an update on the Power System Challenge, Amin queried the power sector's role in energy transformation.

Pedro Joaquín Coldwell, Secretary of Energy, Mexico, provided an update on the Power System Challenge, saying that Mexico's work on deep energy reform includes long-term auctions for solar and PV energies and research on different scenarios for integrating renewable energy into the grid.

Charlotte Pera, President and CEO, ClimateWorks Foundation, said her foundation's philanthropy includes support for the Clean Energy Solutions Center and other initiatives, in addition to support for decarbonizing power systems in several countries.

Amin commented that a push by the CEM community of diverse like-minded individuals can push corporate demand for renewables, which can be a game changer.

POLICY PERSPECTIVES: Joan MacNaughton, Executive Chair, World Energy Council Trilemma Study Group, presented the outcomes of the '2016 World Energy Trilemma Report.' She said the report addresses the need to balance the energy trilemma of energy equity, energy security and environmental sustainability, and deliver on all three. MacNaughton highlighted focus areas, including: transforming the energy supply to clean energy; advancing energy access; addressing affordability; improving energy efficiency and managing demand; and decarbonizing the energy sector. She stressed the imperative of sound policy and sufficient time to address these focus areas.

Participants at the CEM session

TOWARDS A CLEAN ENERGY ECONOMY: This lunchtime session was moderated by Arun Majumdar, Jay Precourt Professor at Stanford University, who reiterated the need for models of excellence in clean energy that can be replicated.

Janet Napolitano, President, University of California, emphasized the fundamental importance of research in new science and technology in education. As the largest public university in the US, she said the University of California is aiming for its campuses and facilities to be carbon neutral by 2025 and emphasized the need for energy preparedness in times of natural disasters.

Tom Steyer, Founder, NextGen Climate, underscored the need to consider the community level of progressive energy, and said clean energy initiatives must be centered on the human aspect. Steyer said that financing for new technology should be made available quickly or it will hinder progress.

George Shultz, former US Secretary of State, highlighted key factors to promote clean energy, including sustained significant support for R&D and incentivizing carbon neutrality through such initiatives as a revenue-neutral carbon tax.

KEYNOTE: Former US Energy Secretary Steven Chu, Stanford University, presented on clean energy options as they relate to historical data. He highlighted the need for decarbonizing electricity generation by using nuclear power, switching fuel in transportation and finding alternatives for processing heat for steel. He referred to the significant emissions from land use, such as methane from agriculture, and encouraged the CEM to focus on this area.

ROAD FROM PARIS AND THE CEM: David Sandalow, Inaugural Fellow, Columbia University, Center on Global Energy Policy, moderated the panel discussion.

Laurence Tubiana, French Ambassador and Special Representative for COP21, said that the CEM can play a key role in operationalizing Nationally Determined Contributions.

Jonathan Pershing, US Special Envoy for Climate Change, said COP21 provided a vision and pathway for decarbonization, and stressed the CEM's role as an implementer and active partner in operationalizing the Paris Agreement.

Aziz Mekouar, Moroccan Ambassador for Multilateral Negotiations, said that while COP22 will follow the "negotiating track," concrete actions and initiatives are needed. He underscored the CEM's role in achieving the latter.

Pershing said that while COP22 will elaborate and provide specificity on the Paris Agreement, it will be even more successful if it addresses implementation.

Tubiana noted that a key aspect of the success achieved at COP21 was working with the previous COP presidency, stating that this approach will also be important for COP22. She highlighted the need to build momentum towards 2018, when the "global stocktake" under the UNFCCC process will be held.

In closing, Sandalow asked participants for their "best guess" as to when the Paris Agreement will enter into force. Pershing suggested that entry into force in 2016 is possible, given that many countries already have their ratification paperwork in order. Tubiana said as soon as possible, noting that there are many positive signals from countries but cautioned that ratification processes can be lengthy and differ greatly among countries. Mekouar said that the entry into force of the Paris Agreement in 2016 will send a "strong signal that we are ready for action" and hoped it would happen before COP22 in Marrakesh.

ENERGY ACCESS: ACHIEVING UNIVERSAL ACCESS TO CLEAN AND AFFORDABLE ENERGY: Rachel Kyte, CEO, SE4All, and Special Representative of the Secretary-General for Sustainable Energy for All, moderated this panel, saying that closing the energy access gap by 2030 requires shifting mindsets.

Shri Tarun Kapoor, Joint Secretary, Ministry of New and Renewable Energy, India, said India will connect thousands of households to the grid by 2022. He noted challenges including quality, unpredictability, and the need for entrepreneurs and low-cost technologies.

Cathy Zoi, CEO, Axess Energy, called for private capital to meet IEA estimates of the investment needed and said her company's minigrid-in-a-box cut costs by 30-50%.

Lord Bourne of Aberystwyth, Parliamentary Under Secretary of State for Energy and Climate Change, UK, said the UK's 0.7% GDP goal for its international development assistance focuses on achieving universal energy access in 14 African partner countries.

Paul Bunje, Principal and Senior Scientist for Energy and Environment, XPrize Foundation, said his foundation targets a problem and offers prizes for solutions, such as its competition to convert carbon dioxide emissions into marketable products. He stressed the feasibility of the competition's aims.

Wolfgang D'Innocenzo, Special Advisor on Energy Ministry of Economic Development, Italy, described the CEM's Energy for Access Coalition. He said the original US$30 million investment had leveraged US$150 million from the private sector since 2010. He noted over 50 million people were given access to energy, and invited all CEM participants to consider funding the initiative.

Energy Access: Achieving Universal Access to Clean and Affordable Energy: L-R: **Cathy Zoi**, CEO, Axess Energy; **Lord Bourne** of Aberystwyth, Parliamentary Under-Secretary of State for Climate Change, UK; **Tarun Kapoor**, Joint Secretary, Ministry of New and Renewable Energy, India; **Rachel Kyte**, Special Representative of the Secretary-General and Chief Executive Officer, Sustainable Energy For All, **Paul Bunje**, Principal and Senior Scientist for Energy and Environment, XPrize Foundation; and **Wolfgang D'Innocenzo,** Special Advisor on Energy Ministry of Economic Development, Italy

In closing, Moderator Kyte noted that such leveraging shows that access is achievable.

CEM7 CLOSING REMARKS: At the closing of CEM7, Yin Hejun, Vice Minister for Science and Technology, China, introduced a video message from Wan Gang, Minister for Science and Technology, China, who thanked the US for hosting CEM7 and reiterated that China will host CEM8 in Beijing in 2017.

Yin Hejun, Vice Minister for Science and Technology, China

Moniz thanked partners, sponsors and participants and closed the meeting at 3:30 pm.

UPCOMING MEETINGS

Asia Clean Energy Forum 2016: The 11th Asia Clean Energy Forum (ACEF) will provide the opportunity to: share best practices in policy, technology and finance to meet the region's climate and energy security challenges, and knowledge exchange through discussions about clean energy. The ACEF aims to: facilitate knowledge sharing among clean energy practitioners in Asia; highlight innovative approaches to packaging and scaling up clean energy initiatives; and take stock of progress made in advancing the clean energy agenda in Asia. **dates:** 6-10 June 2016 **venue:** Asian Development Bank headquarters **location:** Manila, the Philippines **contact:** Connie Sayon **phone:** +632 632 4444 ext. 70388 **www:** http://www.adb.org/news/events/asia-clean-energy-forum-2016

EU Sustainable Energy Week 2016: The EU Sustainable Energy Week 2016 will promote energy-saving initiatives and the generation of power from clean, secure, efficient and renewable sources. The event includes a Policy Conference, to be held from 14-16 June 2016, during which approximately 60 sessions on sustainable energy policy will take place, with stakeholders debating new policy developments, best practices and sustainable energy ideas. **dates:** 13-17 June 2016 **location:** Brussels, Belgium **contact:** European Commission's Executive Agency for Small- and Medium-Sized Enterprises **www:** http://eusew.eu/

G20 Energy Ministers Meeting: The Energy Ministers Meeting under the Group of 20 (G20) Chinese Presidency will meet to discuss sustainable energy issues on the agenda, including advancing the implementation of the G20 Principles of Energy Collaboration and strengthening cooperation on energy access, renewable energy and energy efficiency. **dates:** 29-30 June 2016 **location:** Beijing, China **contact:** G20 **email:** webmaster@g20chn.org **www:** http://www.g20.org/English/G20Calendar/201512/t20151231_2098.html

Third Innovation for Cool Earth Forum: The Forum aims to provide a global platform to promote discussions and cooperation among researchers, business representatives and policymakers from around the world in order to address climate change through innovation of energy and environmental technologies. **dates:** 5-6 October 2016 **location:** Tokyo, Japan **contact:** Innovation for Cool Earth Forum **email:** icef-reg@congre.co.jp **www:** https://www.icef-forum.org/

23rd World Energy Congress: The 23rd World Energy Congress will provides a platform for dialogue to investigate options for delivering sustainable energy systems on national, regional and global levels during dedicated sessions, including the World Energy Leaders', the Future Energy Leaders' and the Energy Trilemma Summits. **dates:** 9-13 October 2016 **location:** Istanbul, Turkey **contact:** World Energy Council **email:** info@wec2016istanbul.org.tr **www:** http://www.wec2016istanbul.org.tr/

UNFCCC COP22: COP22 is scheduled to take place from 7-18 November 2016. During COP22, parties will, *inter alia*, begin preparations for entry into force of the Paris Agreement. **dates:** 7-18 November 2016 **location:** Marrakesh, Morocco **contact:** UNFCCC Secretariat **phone:** +49-228 815-1000 **fax:** +49-228-815-1999 **email:** secretariat@unfccc.int **www:** http://unfccc.int/

Eighth Clean Energy Ministerial: CEM8 will be held in Beijing, China, in 2017. **dates:** TBD, 2017 **location:** Beijing, China **contact:** CEM Secretariat **email:** CEMSecretariat@hq.doe.gov **www:** http://www.cleanenergyministerial.org/

GLOSSARY

CCS	carbon capture and storage
CEM	Clean Energy Ministerial
C3E	Clean Energy Education and Empowerment
COP	Conference of the Parties
GHG	greenhouse gas
GLC	Global Lighting Challenge
IEA	International Energy Agency
IRENA	International Renewable Energy Agency
MI	Mission Innovation
R&D	research and development
SMEs	small and medium sized enterprises
SE4All	Sustainable Energy for All
UNIDO	United Nations Industrial Development Organization
UNFCCC	United Nations Framework Convention on Climate Change