



# LESC Bulletin

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## LOW-EMISSIONS SOLUTIONS CONFERENCE: 14-16 NOVEMBER 2016

The Low-Emissions Solutions Conference (LESC) convened in Marrakech, Morocco, from 14-16 November 2016. Held during the 22nd session of the Conference of the Parties (COP 22) to the UN Framework Convention on Climate Change (UNFCCC), the event was attended by over 700 participants from business and industry, academia, nongovernmental and intergovernmental organizations, and governments.

The LESC provided a platform for participants to identify bottlenecks, discuss best practices, and exchange knowledge on solutions and pathways for attaining a decarbonized economy. Over the course of the three days, participants took part in a number of panel discussions under a series of themes, including: national and regional low-carbon strategies; Mission Innovation; information and communication technologies (ICT); sustainable cities and built environments; low-carbon transport; sustainable power systems; sectoral mitigation opportunities; and low-carbon policies.

The outcomes of the conference are expected to feed into the broader global climate agenda.

## LOW-EMISSIONS SOLUTIONS CONFERENCE REPORT

### WELCOME AND GENERAL INTRODUCTION

The LESC opened on Monday morning with statements from dignitaries. Noting that humankind has been able to innovate every time challenges arise, Hakima El Haité, Minister for the Environment, Morocco,



**Hakima El Haité**,  
Minister of Environment, Morocco

stressed the role of innovation in finding solutions to decrease the emissions gap, making COP 22 the “COP of action, solutions and hope.”

Underscoring that since the Paris Agreement momentum for climate action is growing, Laurence Tubiana, Founder, Institute for Sustainable Development and International Relations, stressed the need to, *inter alia*: alter business

models; potentially eliminating unsustainable ones; transform the value chain; and mobilize business in a transparent way.

Paul Polman, Chief Executive Officer (CEO), Unilever, and Chairman, World Business



**Jeffrey Sachs**, Special Advisor to the UN Secretary-General and Director, UN Sustainable Development Solutions Network (SDSN)

Council for Sustainable Development (WBCSD), focused on the role of business leadership to accelerate the climate agenda. Noting the need to “step up the pace as time is running out,” he highlighted accountability and transparency that go with oral commitments and stressed the need to: redefine values, including carbon pricing; address land use; and involve the finance sector.

Chang Beom Kim, Ambassador of International Relations, Seoul Metropolitan Government, and Representative of President Park Won-soon, ICLEI – Local Governments for Sustainability (ICLEI), spoke on the efforts cities are making to

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(L-R): **Jim Williams**, Director, DDPP, SDSN; **Chris Bataille**, Institute for Sustainable Development and International Relations (IDDRI); **Georgy Safonov**, Director of the Center for Environmental Economics, Higher School of Economics, Russian Federation; **Liu Qiang**, Director of Strategy and Planning Department, National Center for Climate Change Strategy, China; and **Daniel Buira**, General Director in Charge of Low Carbon Development, National Institute of Ecology and Climate Change, Mexico

reduce emissions, highlighting the Seoul Mayor's Conference, which resulted in the Mayors' Covenant. This, he said, can help galvanize city-level action on climate change.

Jeffrey Sachs, Special Advisor to the UN Secretary General and Director, UN Sustainable Development Solutions Network (SDSN), said the problems being discussed are solvable and countries need to maintain momentum for national policy, underscoring that it is not just an issue of political will. Emphasizing that long-term plans are needed for zero net carbon economies, he underscored that governments can create enabling environments through policies and technology transfer.

### **NATIONAL AND REGIONAL LOW-CARBON STRATEGIES**

**MID-CENTURY STRATEGIES FOR DEEP DECARBONIZATION AT CONTINENTAL, NATIONAL AND SUBNATIONAL SCALES:** This session took place on Monday morning and was composed of a number of panel discussions addressing the question: "What does it mean to create a mid-century that incorporates global emission trajectories out to 2050?"

The first panel, moderated by Guido Schmidt-Traub, Executive Director, SDSN, focused on the North America Climate, Clean Energy and Environment Partnership.

Noting that deeply integrated processes cannot be stopped by walls, Rodolfo Lacy Tamayo, Undersecretary for Environmental Policy and Planning, Mexico, highlighted the need for early action, engaging non-state partners and the private sector and incorporating the whole spectrum of climate forces, including short-lived climate pollutants (SLCPs). He underscored carbon pricing and national efforts to build carbon markets and stimulate the private sector.

Stressing that no country on its own possesses the answers to the emerging questions, Jonathan Pershing, US Special Envoy for Climate Change, emphasized the need for collective work to reduce emissions in an economically efficient manner, while simultaneously fostering economic development. He stressed

that the private sector is looking for signals that reveal market direction and called for developing a series of scenarios, rather than a single one, that frame the solution.

Stephen Lucas, Senior Associate Deputy Minister at Environment and Climate Change, Canada, highlighted important focus areas, including non-emitting electricity generation, low-carbon fuels, energy conservation and efficiency, carbon sequestration by forests and SCLPs. He underscored that long-term strategies inform investment decisions and regulatory frameworks, supporting long-term, low-carbon growth, attracting private sector capital and enabling business opportunities, and allowing research and development (R&D) to focus on needed technological improvements.

Urging for not pushing fossil fuels to the rest of the world while decarbonizing national economies, Sachs cautioned against building the Keystone XL pipeline.

Jim Williams, SDSN, moderated the second panel, highlighting, among others, that: the task of transformation has less to do with measuring tonnes and more to do with powerplants, buildings and industrial boilers; deep decarbonization pathways (DDP) can be achieved simultaneously with sustainable development and are within reach, from an economic perspective; and greater energy efficiency, complete decarbonization of electricity generation, and widespread electrification of transportation are necessary for deep decarbonization.

Chris Bataille, Institute for Sustainable Development and International Relations, said that DDPs can have multiple pathways that look at a variety of policy packages, which, he noted, should include: all emissions; long-term schedules for each sector; short-term policies to drive innovation; and sensitivity to national circumstances. He emphasized that DDPs are doable and affordable.

Daniel Buira, Tetra Tech, Mexico, said that DDP analysis is key to help form strategies and policies for deep decarbonization, particularly for emerging economies. He stated that DDP analysis provides both the problem and the solution, noting that asking the same questions of the same data from different perspectives gives different results. He underscored international

cooperation's importance for emerging economies, particularly with providing tools and skills, and allowing for knowledge transfer.

Liu Qiang, National Center for Climate Change Strategy and International Cooperation, China, said that the DDP project provided a strong signal for and information on what China can achieve by 2050. He said that, while DDPs are long-term, short- to medium-term actions need to be taken, including on what market-based mechanisms may be needed for transition pathways.

Georgy Safonov, Higher School of Economics, Russian Federation, described his country as "a huge ship of oil and coal going in the wrong direction, away from the climate goals." He said the scenarios for deep decarbonization investigated the potential for emission reductions, noting that analysis has shown that a reduction of 87% might be possible. He stated that when forests' sequestration abilities were taken into account, the Russian Federation could become an almost carbon-free economy. He also noted that carbon pricing is justified by the DDP analysis.

Libby Ferguson, The Climate Group, moderated the third and final panel discussion of this segment, saying that all participants are signatories to the Under2 Memorandum of Understanding (MOU), which commits signatories to reduce their greenhouse gas (GHG) emissions by 95% based on 1990 levels, or limit their per capita emissions to two metric tonnes CO<sub>2</sub>-equivalent, by 2050.

Ken Alex, Director, Governor's Office of Planning and Research, California, said that reducing carbon will affect the economy, saying that the Under2 MOU creates a new way to look at this issue and the affected sectors, noting that they can be interrelated. He suggested that to meet these targets, California will require a doubling of energy efficiency.

Stuart Hocking, Deputy Chief Executive, Department of Treasury and Finance, South Australia, noted his state established climate targets in 2015, including achieving net zero emissions by 2050. He advocated for mainstreaming low-carbon investments and related policies.

On opportunities for collaborating under the MOU, Safonov highlighted collaboration with academia, including on planning, implementation and business models. Alex encouraged collaboration with other jurisdictions that have signed the MOU, to share experiences and lessons learnt. Hocking noted the importance of collaboration among sub-national governments.

## MISSION INNOVATION

### OPENING AND STATUS OF MISSION INNOVATION:

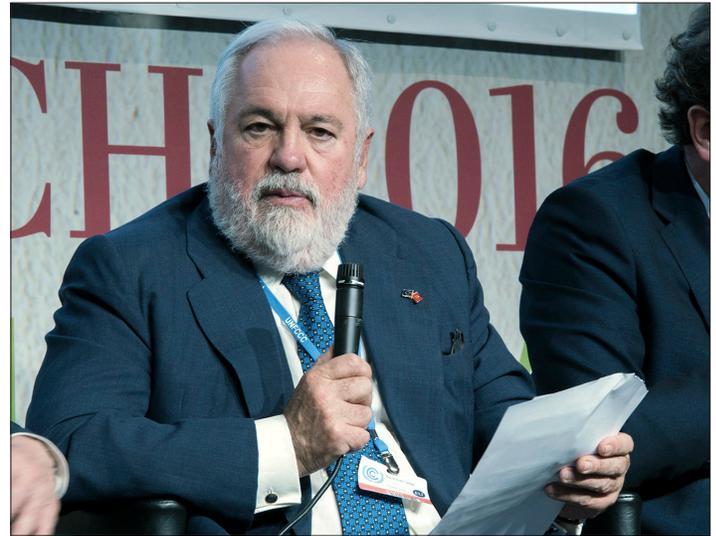
This session, which took place on Monday afternoon, was moderated by Felicity Glennie-Holmes, WBCSD, and showcased the momentum of the Mission Innovation a year after its launch in Paris, emphasizing the critical role of innovation in achieving cost reductions and breakthroughs needed to deliver on deep decarbonization targets globally.

Underscoring the role of scientists and engineers in a world of systems, Jeffrey Sachs underscored the pivotal role of Ernest Moniz, US Secretary of Energy, on pushing forward technologies for decarbonization.

Stressing that the Paris Agreement is a significant first step, Secretary Moniz emphasized that deep decarbonization will require increased ambition, innovation and private investment, as well as the incorporation of the industrial sector, the transport sector and large-scale carbon management. Moniz underscored

that regarding Mission Innovation, significant progress has been made in mapping out scientific and technological challenges, and forging links with the private sector.

Miguel Arias Cañete, European Commissioner for Climate and Energy, stressed that the European Union (EU) plans to invest 35% of its total budget in climate-related activities, and called for concrete engagements regarding progress in innovation.



**Miguel Arias Cañete**, European Commissioner for Climate and Energy, European Commission

Noting that more public support on climate change and the energy revolution is needed to move towards a new economy based on green growth, Sharon Dijksma, Minister for the Environment, the Netherlands, highlighted the "golden triangle" approach that aims to ensure that new energy innovations are developed to their full market potential, and provided information on off-shore wind turbine developments in the Netherlands.

Anne Vasara, Ambassador of Finland to Morocco, on behalf of Olli Rehn, Minister of Economic Affairs, Finland, highlighted the need for partnerships, and sharing lessons learned from national experiences, methods and tools. She stressed that the smaller the economy, the more important international cooperation and public-private partnerships become.

Noting that long-term objectives to 2050 will require radical innovation and a total shift in energy and transport systems, Nick Hurd, Minister of State for Climate Change and Industry, United Kingdom, highlighted the seven core Innovation Challenges, identified by Mission Innovation, namely those related to: smart grids; off-grid access to electricity; carbon capture; sustainable biofuels; converting sunlight; clean energy materials; and affordable heating and cooling of buildings.

Noting his country is at the forefront of developments regarding innovation, Josh Frydenberg, Minister for the Environment and Energy, Australia, focused on off-grid work, presenting examples that bring environmental, cost-saving and logistics-related benefits.

Khalid Al-Falih, Minister of Energy, Industry and Mineral Resources, Saudi Arabia, stressed the reshaping of Saudi Arabia from an oil to an energy country. He highlighted: the Carbon



**Khalid Al-Falih**, Minister of Energy, Industry and Mineral Resources, Saudi Arabia

Sequestration Leadership Forum; the catalytic role of his country in bringing on board industry leaders; and national efforts under the Saudi Basic Industries Corporation (SABIC) and Saudi Aramco on, *inter alia*, carbon capture, up-to-scale oil recovery and carbon conversion into polymers.

Noting that electric grids will need to be redesigned to move towards a cleaner future, Virginie Schwarz, Director of Energy, Ministry of Environment, Energy and the Sea, France, focused on smart grids, highlighting demonstration projects, and a combination of innovative solutions that have decreased electricity consumption by up to 30%. She stressed that Mission Innovation can contribute in mobilizing researchers, public authorities, private companies and investors.

Matar Hamed Al Neyadi, Undersecretary, Ministry of Energy, United Arab Emirates (UAE), stressed that Mission Innovation will play an important role in transforming the energy sector. He emphasized great potential for action and innovation by making heating and cooling more sustainable and efficient, stating that the UAE is creating guidelines for the building industry in this regard.

Peter Bakker, President and CEO, WBCSD, said the Paris Agreement provides the necessary commitments and goals to incentivize the private sector to act, stressing businesses will be key implementation partners to Mission Innovation. He asked “what can we do with technology today if we are able to scale up fast?”

Catherine McKenna, Minister of Environment and Climate Change, Canada, lauded the great climate achievements this year, but said that Mission Innovation is the “untold” success story, stating that it “gets governments to step up and work in cooperation with the private sector.” She said that investing in R&D is key to finding the next “game changer” for clean energy and low-carbon growth. She said all provinces in Canada will put a price on pollution by 2018, stressing that such pricing leads to innovation.

Noting enthusiasm for Mission Innovation, Secretary Moniz said that the innovation agenda will remain at the heart of everything, despite the prevailing politics. He further stated that Mission Innovation will drive the need for innovation in business models.

In the ensuing discussion, delegates addressed, among others, the role of nuclear power in the future and financial engineering.

## INFORMATION AND COMMUNICATIONS TECHNOLOGIES

**THE CONTRIBUTION OF ICT TO CLIMATE ACTION IN OTHER SECTORS:** This session, which took place on Monday afternoon and was moderated by Philipp Buddemeier, Accenture, focused on ICT’s potential to help other sectors reduce their emissions by up to 15% by 2030, and explored approaches that can maximize the integration and benefits of ICT across different sectors.

Presenting the main findings from the third report of the Global e-Sustainability Initiative, Joan Krajewski, Microsoft, stressed, *inter alia*, that ICT: can decrease global carbon emissions, stimulate economic growth and deliver benefits to society; can realize a benefit 9.7 times higher than its own emissions in 2030, while its own footprint is expected to fall; has the potential to decouple economic growth from emissions growth; will connect 2.5 billion more people with multiple benefits, including e-health and e-learning; and offers further environmental benefits, from better yields to reduced consumption of scarce resources.

Noting that access to energy is a basic right and that energy generation is currently unsustainable, Caspar Herzberg, Schneider Electric, focused on buildings, saying they represent 40% of energy consumption worldwide and underscored that 82% of the economic potential for energy efficiency in the sector is still untapped. He stressed that, with the use of sensors, Schneider Electric has decreased energy consumption in its headquarters by 75%.

Eric Rondolat, CEO, Philips Lighting, stressed that staying below 2°C with only 1.5% improvement in energy efficiency is an equation that cannot be solved, urging for raising ambition to 3%. He emphasized that lighting represents 15% of worldwide energy consumption, noting that technology can help save 80% of that consumption, half through LED technology and half with the use of ICT. He further discussed the commitment of the lighting business to reduce its footprint, including by selling two billion LED lamps in five years, as well as Philips Lighting commitment to become carbon neutral by 2020.

Vijay Modi, Professor of Mechanical Engineering, Columbia University, outlined projects for developing smart minigrids in developing countries. He said that one of the aspects of lessons learned is that customers generally want to only pay for what they use. Based on this, Modi said that what is needed is an ability to pay with low-to-no transaction costs. He called for a non-proprietary system, which will benefit the poor. He noted that this is key for utility payments, stating that, in general, the customer is credit worthy whereas in many cases the local utility is not.

Neil Gerber, Director, New Energy & Environment, IBM, said that data is the key to achieving deep decarbonization. He outlined key innovations going forward, including: artificial intelligence, so “humans do not need to programme every command”; and autonomous agents that allow for analytics, knowledge and capability to react for you. He said autonomous agents can react, for instance, to price changes and can be used effectively in energy markets

Youssef Zafri, Ericsson, on behalf of Matilda Gennvi Gustafsson, Sustainability Director, Ericsson, highlighted the sharp increase in mobile traffic after 2010, underscoring that there was no concomitant electricity increase, as smaller screens and smaller devices consume less energy. He provided an overview of Ericsson’s initiatives to drive low-carbon economies, saying that the company is focused on achieving a 15% decrease in GHG emissions.

In the ensuing discussion, participants addressed: investment in R&D, and the many solutions companies have to offer; cyber security; the digital divide; destruction of natural resources due to the expansion of networks; and the use of partnerships to overcome barriers.

#### ICT INNOVATIVE APPROACH TO RAISING

**COMMITMENTS TOWARDS CLIMATE:** This session was moderated by Cristina Bueti, International Telecommunication Union (ITU), on Monday afternoon. Malcolm Johnson, Deputy Secretary-General, ITU, explained ITU's efforts in trying to encourage the use of ICT in climate action, noting the launch of a coalition to recognize the ICT sector's role in climate mitigation and adaptation. He said developments that will have an impact include the Internet of Things and 5G. He also noted that ITU has been emphasizing the importance of energy efficient access to knowledge and society.

Frances Way, Chief Operating Officer, CDP, said that ICT companies have generally reported a decrease in emissions. She highlighted an increase in reduction targets being adopted and said that changes in consumer behavior remain a risk. She also underscored an increased interest in renewable energy initiatives.

Thierry Valette, Huawei, highlighted Huawei's Energy 2020 programme, which focuses on energy efficiency. He stated that assessing "what is working, what is not working" should occur daily, and underscored the value of having "the right tech in the right place at the right time."

Clarifying that Facebook's use of energy is mainly related to its servers, Bill Wehl, Director of Sustainability, Facebook, focused on his company's efforts to use clean energy and achieve energy efficiency. Wehl noted Facebook's aggressive path towards carbon emission reductions, calling for opening up market access as clean energy is currently cost-competitive.

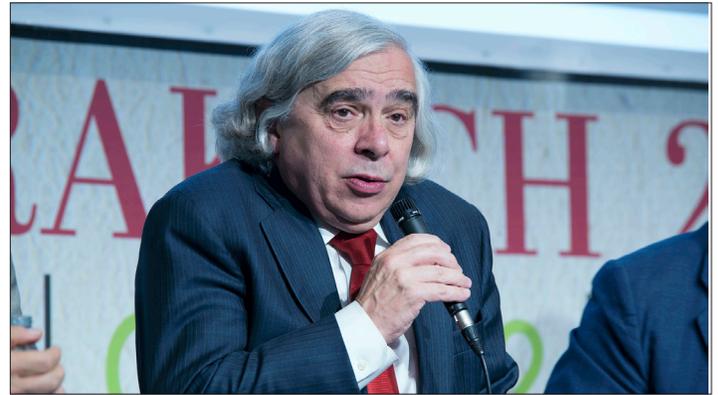
Recalling that since US President Barack Obama's first term, the price of wind and solar power has decreased by 62% and 80%, respectively, David Hochschild, Commissioner, California Energy Commission, outlined three myths around clean energy that were proven wrong in California, namely that it would: crash the economy when in fact it grew faster than the US average; increase unemployment, when unemployment was cut by half; and create rolling blackouts, which have, in reality, not occurred for the last 15 years. He stressed that California has attracted more clean technology venture capital than Europe and China combined.

Noting that collaboration is key to address the challenges, Gabrielle Ginér, Head of Sustainable Business Policy, BT Group, underscored actions that BT has taken turning ambition regarding climate change into implementation. She highlighted the company's achieved goal to cut emissions by 80% compared to the 1996-97 baseline, and focused on efforts to share best practices on product design and the circular economy, as well as to engage their suppliers and consumers.

In the ensuing discussion, participants addressed, *inter alia*: whether the emissions of companies' employees enter the calculations; the volatility of carbon markets; the potential of scaling up corporate purchasing of renewables; and ways that ICT can help the agricultural sector to reduce emissions.

#### CLEAN ENERGY MINISTERIAL

**DRIVING NDC IMPLEMENTATION THROUGH THE CLEAN ENERGY MINISTERIAL (CEM):** This session took place on Monday afternoon and included two panel discussions. US Secretary of Energy Moniz moderated the first panel, noting that with the ratification of the Paris Agreement, there will be



Ernest Moniz, Secretary of Energy, United States

an acceleration of multi-trillion dollar clean energy markets. He said that while there is significant overlap with Mission Innovation, the CEM focuses on the short- and medium-term and will assist with Nationally Determined Contribution (NDC) implementation. He underscored that the trajectory that is being embarked upon will lead to deep decarbonization.

Lars Christian Lilleholt, Minister of Energy, Utilities and Climate, Denmark, said that the CEM can be a "megaphone to the world" regarding the potential role of clean energy. He stated that the CEM provides value added services, and, noting that its members total over 75% of emitters, remarked that it can unlock a potential role for companies in implementing NDCs.

Minister Al-Falih, Saudi Arabia, underscored the collaborative nature of the CEM, stating that the CEM can scale deployment, and share technology and best practices. He provided an overview of the initiatives on which his country collaborates, including energy management, and solar and wind initiatives. He noted the advent of the advanced cooling challenge in June 2016, saying that by calling on governments to join, the global base of those working to further progress in clean energy is expanded.

Minister McKenna, Canada, called for pursuing low-hanging fruit and using available technology to pursue the climate goals. She noted the CEM enables closer collaboration with industry, which she described as key as the solutions for low-carbon economies will come from public-private collaboration. She highlighted the Clean Energy Education & Empowerment (C3E) women's initiative and called for greater effort to engage more women in climate action.

Referencing the Clean Energy Solutions Center, including its data library and helpline, Minister Frydenberg, Australia, noted the Center provides technical expertise, policy advice and financial assistance to enable countries to reduce their emissions. He further underscored the CEM's role regarding energy efficiency, providing examples, including on air-conditioning standards and LED lighting.

Dominique Ristori, Director General for Energy, European Commission, noted the complementarity between the CEM and Mission Innovation regarding implementation of innovations in a practical way, and discussed off-shore wind turbines and smart grids for transmission and distribution.

The second panel, moderated by Ajay Mathur, Director General, The Energy and Resources Institute, focused on how governments, organizations and the private sector are actively using the CEM platform. Mathur stressed that the CEM pairs governments and the private sector, through high visibility programmes that offer mutual benefits. He highlighted the

CEM's involvement in adopting LED standards in India, as well as in the Advanced Cooling Challenge, which aims to promote super-efficient air-conditioning systems.

Discussing the role of women in energy initiatives, Matar Hamed Al Neyadi, UAE, stressed that the energy sector has historically been dominated by men, but this is gradually changing, pointing to national examples, including in the nuclear energy sector.

Focusing on the Clean Energy Solutions Center, Mahama Kappiah, Executive Director, Economic Community of West African States (ECOWAS) Centre for Renewable Energy and Energy Efficiency (ECREEE), noted the Solutions Center was the basis of all ECOWAS member states' NDCs. He further addressed ways to support ECOWAS members to attain their NDC targets, and develop measurement, reporting and verification (MRV) systems to monitor the NDC implementation.

Paul Simons, Deputy Executive Director, International Energy Agency (IEA), referred to IEA's hosting of the CEM Secretariat, underscoring, among others, analytical products like publications and reports, and CEM initiatives, including on smart-grid systems, electric vehicles, solar and wind energy, and energy efficient equipment and appliances.

Calling for transformation as "we run out of time," Peter Bakker, WBCSD, underscored the role of the private sector in pushing forward CEM initiatives. He highlighted ongoing collaborations, including the Low Carbon Technology Partnership initiative (LCTPi), under which the below50 campaign was launched to support market growth of sustainable fuels.

## **SUSTAINABLE CITIES AND BUILT ENVIRONMENTS**

**LOCAL CLIMATE ACTION: STRATEGIES AND IMPLEMENTATION:** Felicity Glennie-Holmes, WBCSD, opened the session on local climate action on Tuesday morning. Gino Van Begin, Secretary General, ICLEI, underscored the "crucial role" cities and regions play in implementing the Paris Agreement. He said almost 700 cities have reported their



**Gino Van Begin**, Secretary General, ICLEI

political commitments to address climate change, totaling approximately one gigatonne (Gt) of emission reductions by 2020.

Noting discussions on MRV at COP 22, Maryke Van Staden, ICLEI, introduced the carbonn Climate Registry, which supports local, voluntary MRV. She presented several ICLEI-supported alliances, such as the Cities Climate Finance Leadership Alliance, and underscored how multilevel and multiscale partnerships support holistic local climate action.

Stating that Warsaw has a commitment to cut its GHG emissions in half, Leszek Drogosz, Director, Infrastructure Department, City of Warsaw, highlighted the importance of city networks for learning and sharing. He noted a high rate of car usage in Warsaw, and efforts to address this, including a bike-sharing system, the provision of cycling lanes, and a move towards electric trams and buses.

Calling for mitigation actions to be woven into urban resilience, Antoine Faye, Chief Resilience Officer, City of Dakar, suggested prioritizing energy efficiency in local climate action, especially as it relates to rapid urbanization. He called for COP decisions to be translated into local action to support local authorities in Senegal to act.

Gao Xiang, Energy Research Institute, National Development and Reform Commission, China, discussed China's Alliance of Peaking Pioneer Cities, which was launched in 2015 and has seen individual cities commit to peak their emissions on or before 2030. He stated that close partnerships with local and international organizations are essential to reaching China's targets.

William Sisson, United Technologies Corporation, queried how to involve the private sector in local level climate action. He underscored the need for implementation platforms to oversee leadership, workforce and capacity, financing, policy and support. He stated that "the private sector is here and ready to work on change," underscoring the role of business as a catalyst to overcome market barriers, create demand, and achieve ambitious energy savings and targets.

In the ensuing discussion, participants addressed frameworks for implementation, and sectors best placed to implement policies.

**SMART LOW-CARBON & SUSTAINABLE CITIES:** Roman Mendle, ICLEI, moderated this session on Tuesday morning.

Michèle Pappalardo, Vivapolis, highlighted how networks can build bridges between digital and practical aspects of life in the "smart city." Stating that a smart city can improve conditions for its citizens, she suggested such cities should: provide more efficient services, including via mobility and smart grids; consume fewer natural resources; and improve citizen participation.

Haron Idris, Chief Minister of Melaka, Malaysia, presented Melaka's green action plan on, *inter alia*: water management, energy efficiency, renewable energy, green transportation, tourism and urban forestry. He highlighted stakeholder engagement strategies, such as smart meter installations in 800 residences, and a project with the Government of Denmark on energy efficiency in public and private buildings.

Commenting that city representatives are now being included within national delegations, Don Iveson, Mayor of Edmonton, Canada, lauded how far cities and local governments have come to be included in the official dialogue at COP 22. Saying city data can show "what is actually being done," he pointed to Edmonton's Open City Data Platform and a friendly competition, using data, to catalyze energy reduction.

Referring to the 2011 Sendai earthquake and the Fukushima nuclear catastrophe that followed, Akiko Miura, Bureau of Environment, Tokyo Metropolitan Government, explained how this triggered a move towards smart technology, and a renewable energy target of 30% by 2020. She explained that five years later, GHG emissions are still declining.



Michèle Pappalardo, Coordinator, Vivapolis

Sylvia Parienté, CEO, Exochems Environment, said her company aims to improve the wellbeing and economic productivity of local communities. She said the key to success is quick, easily implementable technology that provides noticeable results and can be a part of infrastructure plans. Regarding smart cities, she said the definition has not been discussed in the context of the Global South, and that the smart city model there would likely be different to that of other regions.

In the ensuing discussion, participants addressed: ways to inform citizens on their resource use and consumption; definitions of smart cities; Sustainable Development Goals (SDGs) affecting the market; carbon pricing and carbon taxes; mitigation and adaptation in smart cities; and scaling technology and initiatives to address climate change.

**SUSTAINABLE CONSTRUCTION: ENERGY EFFICIENCY AND SUSTAINABLE MATERIALS:** On Tuesday morning, Jennifer Layke, World Resources Institute, moderated this session on potential challenges and solutions to sustainable construction. Peter Moonen, Canadian Wood Council, underscored the importance of wood in sustainable buildings and that a more commonplace understanding of wood as a sustainable building material is needed.

Sharing his love of surfing, Nev Hyman, Founder, Nev House, said that the problem of ocean plastic inspired him to start his company, which removes ocean plastics, using them as building materials in low-income areas. He said that one house can remove between 2-3 tonnes of plastic from the ocean.

Stating that in many circumstances concrete cannot be replaced by alternatives, Karen Scrivener, École Polytechnique Fédérale de Lausanne, explained efforts to develop more “sustainable cement.” She underscored significant mitigation potential by using different technologies, pointing to research on calcined clay and fillers, developed in collaboration with partners.

Stating that the building sector has the largest potential to deliver on GHG reductions, Marcel Cobuz, CEO, LafargeHolcim Maroc, pointed to his company’s commitment to reduce GHG emissions by 40% by 2050, compared to 1990 levels. Expressing

hope that this will encourage other construction companies to do the same, he highlighted the value of partnership, including on materials development.

Cautioning that there are many barriers to the roll out of new technologies, John Thwaites, Director, Green Building Council of Australia, called for both smart technology and a smart policy environment. He suggested the need for, *inter alia*: a national plan to coordinate action; mandated minimum building standards; and targeted incentives.

The ensuing discussion considered: innovation in the face of standards and codes; lack of clarity on what building codes are trying to achieve; retrofitting old building stock that is sub-code; and other barriers to “getting it done.”

## LOW-CARBON TRANSPORT

**INTRODUCTION TO MOBILITY CHALLENGES AND INNOVATION IN THE TRANSPORT SECTOR:** On Tuesday afternoon, Patrick Oliva, Senior Vice President of Sustainable Mobility and Energy Transition, Michelin Group, introduced a discussion paper ‘An Actionable Vision of Transport Decarbonization: Implementing the Paris Agreement in a Global Roadmap Aiming At Net-Zero Emissions Transport,’ which was prepared by the Paris Process on Mobility and Climate. He stated the paper identifies a number of priority areas for action, including: synergistic urban transformation; low-carbon energy supplies; improved modal and system efficiencies; defragmented and shortened supply chains; tailored solutions for rural populations; and investments in adaptation.

Peter Bakker, WBCSD, said that sustainable transport must consider consumer demands and assess the impacts on job creation, as the sector is traditionally labor intensive. He also, *inter alia*, questioned what could be done to improve the efficiency of current car stocks.

Ahmed Baroudi, Director General, Société d’Investissements Energétiques (SIE), provided an overview of the establishment of the African Association for Sustainable Road Transport. He noted support from the Government of Morocco, and said that the Association disseminates and exchanges information to highlight the best models and examples of sustainable road transport.

**ELECTRIC AND HYDROGEN MOBILITY:** Alexis Gazzo, Climate Change and Sustainability Services, moderated the event, highlighting that for the first time at a COP, the issues of electric and hydrogen mobility have considerable visibility.

Underscoring the need for partnership to develop sustainable transport modes, Christian Girardeau, Vice President, Schneider Electric, also discussed the African Association for Sustainable Road Transport, which, he added, focuses on, *inter alia*: developing road infrastructure and charging stations; recruiting funding sources; and addressing final disposal.

Pointing to the electric buses designed specifically for COP 22, Sylvain Allano, PSA Peugeot Citroën, questioned whether this could be the beginning of a new industry. He said “sustainable mobility implies sustainable infrastructure,” acknowledging that a major hurdle is inadequate road infrastructure in Africa, particularly in rural communities.

Toshifumi Kokubun, innovator, addressed how hydrogen technology could support the expansion of renewable energy and increase fossil fuel efficiency. He explained how hydrogen and CO<sub>2</sub> combined make natural gas, which is less carbon intensive.

Highlighting that the City of Oslo adopted targets to reduce emissions by 50% by 2020 and by 95% by 2030, compared to 1990 levels, Lan Marie Nguyen Berg, Vice Mayor for



(L-R): **John Thwaites**, Director, Green Building Council of Australia; **Jennifer Layke**, World Resource Institute; **Peter Moonen**, Canadian Wood Council; **Nev Hyman**, Founder, Nev House; **Karen Scrivener**, École Polytechnique Fédérale de Lausanne; and **Marcel Cobuz**, CEO, LafargeHolcim Morocco

Environment and Transport, City of Oslo, acknowledged that 61% of Oslo's emissions come from transportation. She listed policy incentives to support electric vehicles, *inter alia*: tax-free new electric vehicles; free parking in public spaces; access to bus lanes; and 1,300 public charging points.

In the ensuing discussion, participants deliberated on: what lessons could be applied for electric vehicle deployment in Africa; technology to enable electric vehicles to be long-range vehicles; incentives to encourage large-scale deployment, market growth and electric vehicle manufacturing in national industries; moving from gas stations to "energy stations"; ride sharing; and the decarbonization of mass transport.

**KEYNOTE AND NETWORKING BREAK:** Dario Piselli and Anastasia Kostamarova, SDSN Youth, presented on the Youth Solutions Report, which will be launched in 2017. The Report is expected to provide a platform to access innovative solutions and initiatives that will aid in implementing the SDGs and tackling climate change.

**LOW-CARBON FUELS:** Rachel Kyte, CEO, Sustainable Energy for All (SE4ALL), and Special Representative of the UN Secretary-General for SE4ALL, stated that low-carbon fuels provide vast growth potential and possible solutions to reach the goal of zero net emissions. She said that to fulfill international agreements, the sector will provide a way to better meet more peoples' needs. Noting SE4ALL's role in making the business case for sustainable energy solutions, the investment case and the investment pathway, she underscored the role of energy efficiency and bioenergy to make progress on these issues.

Gerard Ostheimer, SE4ALL, moderated the event, introducing the below50 campaign where companies publicly commit to support sustainable fuels in order to scale up and accelerate the adoption of low-carbon fuels.

Asking how to reach the 14Gt gap to achieve the 2°C target, William Brandt, Arizona State University, called for "restoring the carbon balance" by collecting waste carbon and using it as a resource. He shared an example of producing synthetic fuel from carbon captured from the air.

Sean Simpson, Chief Scientific Officer and Co-Founder, LanzaTech, explained that the capture of industrial byproducts is not considered biofuel feedstock, and called for policy changes to recognize these byproducts as feedstock, pointing to LanzaTech's ability to capture carbon.

David Burns, National Wildlife Federation, US, spoke on behalf of the Roundtable on Sustainable Biomaterials (RSB). Stating that RSB "implicitly recognizes biofuels as neither categorically good, nor categorically bad," he explained how RSB reviews and rates biomaterials based on, *inter alia*, social, environmental and technical principles, and offers advice to governments.

Nour Amrani, Novozymes, spoke on the potential and diversity of biofuels around the globe, noting different countries having different biomass sources. She pointed to the expected growth in vehicles, underscoring the need for renewable ethanol and noted the reduction in European GHG emissions, due to ethanol conversion in vehicles.

**LOW-CARBON FREIGHT & SHIPPING:** On Tuesday afternoon, Vincent Benezech, Organisation for Economic Co-operation and Development, moderated this panel. He noted two broad areas for solutions in this sector, namely technology innovation and supply chain innovation.

Martin Rapos, Energy and Mobility Director, Route Monkey, presented on the concept of freight sharing to reduce CO<sub>2</sub> emissions. He said that his company is working on freight-share – a platform that is expected to reduce emissions by 25%. He underscored that across a single fleet, potential efficiency gains are approximately 12.5%, but with true freight sharing, efficiency gains could be up to 85%. He said that transporting products that "do not compete on the road" is critical so that freighting can be done non-competitively in an optimal framework.

Tristan Smith, University College London Energy Institute, presented on the shipping sector, noting that, for deep decarbonization, the carbon intensity of ships must be reduced by 60-90% by 2050. He said, however, that the sector is discussing net-zero emissions by 2050. He cited difficulties, however, including that shipping generally relies on high intensity fuel. Noting that emissions should be regulated by the International Maritime Organization, he said that possible solutions include batteries for short-sea shipping or wind energy for slow-moving ships. Levers for change, he suggested, include financing.

Rachid Tahri, International Federation of Freight Forwarders Associations, introduced the Less Carbon Loaded Initiative, which, *inter alia*: encourages freight forwarders to adopt and train efficient practices in sustainable logistics; promotes R&D to reduce carbon impact; and encourages freight forwarders to promote green logistics flows.

Sébastien Bougon, Founder, Flying Whales, explained the Flying Whales initiative, which aims to connect landlocked countries to the global economy using a giant airship. He explained this can prevent the need to build more roads and is more efficient for the delivery of humanitarian goods, when compared to helicopter delivery.

The discussion addressed, *inter alia*: the possible use of low-grade biofuels in the freight sector, with the source depending on the region; difficulty of railway use by freight forwarders due to administrative reasons; and the need for a macroeconomic view to understand advanced biofuels.

## **SUSTAINABLE POWER SYSTEMS**

### **CLEAN ENERGY: LEADING THE TRANSITION:**

Philippe Joubert, World Energy Council, moderated this session, which convened on Wednesday morning, providing an overview of the history and evolution of the global energy mix by technology and by region. He said “old types” of power have always been at the forefront, and although the mix changes, new technologies are not always taken up. He said that for changes to take place, “policy matters.”

Jordan Sturdy, Parliamentary Secretary for Energy Literacy and the Environment, British Columbia, Canada, stated that 98% of grid energy in British Columbia comes from renewables. He said that the province is mandated to achieve 100% renewably energy for grid energy. He also underscored the adoption of a carbon tax, which he said helps drive innovation.

Mandy Rambharos, Eskom, said South Africa’s electricity is largely generated by coal-fired power stations. She said that since the natural resources for energy production in South Africa are primarily coal and uranium, the challenge is to balance the need for economic growth with environmental needs. She stated that nuclear is being assessed as a baseload option.

Carlos Sallé, Iberdrola, presented several “levers” to address climate change, *inter alia*: anticipating and innovating, acknowledging his company’s involvement in addressing renewable energy for 15 years; investing; recognizing that compromises will be made; ensuring transparency and honoring disclosure requests; and supporting awareness internally and externally.

Juan Ramon Silva Ferrada, Acciona, acknowledged a “growing appetite for renewable energy” to, among others, fight climate change, support energy security, keep investments “at home” and anticipate future carbon prices. He underscored that the prices for renewables continue to decline, stating the price for off-shore wind has declined by 50% since 2009 and for solar PV by 80% since 2008.

Eric Maucort, Deputy Vice President, Électricité de France, recognized challenges to: provide low-carbon electricity right now; improve energy efficiency; develop new uses for electricity; and improve access to electricity. He called nuclear the “only large-scale solution today” to address low-carbon energy.

The ensuing discussion addressed, *inter alia*, carbon pricing, fourth-generation nuclear reactors, decarbonization plans in Canada, and policy coherence between renewables and fossil fuel energies.

**KEYNOTE AND NETWORKING BREAK:** Paulette van Ommen, DSM, presented on the Bright Minds Challenge, saying that it is an opportunity for scientists to submit innovative ideas to meet the low-carbon challenge. She said that three winners will be selected and given assistance to bring their solutions to the market.

Francis Farley, University of Southampton, presented on new wave energy solutions, saying that previous attempts failed due to “too many moving parts.” He underscored the enormous wave energy potential along, among others, the Moroccan coastline, saying that this potential should be taken advantage of.

**SMART GRIDS:** On Wednesday morning, Vijay Modi, Columbia University, moderated this session. He described the application of smart grids in areas: with no or poor grid settings; where infrastructure is being built; and where renewable energy is being integrated. He described applications in both developed and developing countries, stating that issues to consider when implementing microgrids include incremental installment, low-cost innovation, design and system integration.

Maxine Ghavi, ASEA Brown Boveri (ABB), spoke on new technologies in microgrids and integration of renewables in smart grids. She noted the need for modern grids to be able to handle multi-directional power flows and ability and intermittency from renewable energy generation. She said microgrids are generally low- or medium-sized grids without transmission capability. She said that, while they can be connected to the national grid, microgrids can be an “island” as well. Microgrids, she outlined, can maximize reliability, be resilient in severe weather, meet environmental targets and be energy independent.

Terry Boston, Former President and CEO, PJM Interconnection, called renewable energy storage a “silver bullet” and suggested it be optimized by smart technology. Stating that 26% of carbon emissions in the US comes from transportation and that within two years, transportation will exceed US power plants in terms of emissions, he called for better electrification in transportation.

Anjan Bose, Washington State University, said that the mix of renewable energy is determined by geography. Acknowledging that additional renewables production requires transmission, he stated that “without the grid, there is no market.” He stressed the role of ICT, and noted that installing measuring units initially, where possible, is more affordable than grid retrofitting.

Deepak Divan, Georgia Institute of Technology, explained the difficulty of integrating renewables due to, *inter alia*, system variability, the concept of “prosumers” where entities both produce renewable energy to sell to the grid and occasionally consume from the grid, and the complexity of distributed renewables. He said that incorporating smart grids requires a



**Peter Bakker**, President and CEO, WBCSD, and **David Oren**, Solarly, during the Innovation Award Ceremony



(L-R): **Juan Ramon Silva Ferrada**, Acciona; **Jordan Sturdy**, Parliamentary Secretary for Energy Literacy and the Environment, British Columbia Government, Canada; **Carlos Sallé**, Iberdrola; **Eric Maucort**, Deputy Vice President, Électricité de France (EDF); and **Mandy Rambharos**, Eskom

“whole new language” moving from centralized to distributed, and from planning to flexible, and cautioned that “we are trying to make the same infrastructure do new things.”

In the ensuing discussion, participants addressed: the potential of wind power in Morocco; microgrid applications in Morocco; power loss during transmission; institutionalization of knowledge; and development of standards to enable the use of new technologies.

#### **SECTORAL MITIGATION OPPORTUNITIES**

**INDUSTRY CLIMATE ACTION AND CARBON CAPTURE UTILIZATION AND STORAGE (CCUS):** On Wednesday afternoon, Julio Friedmann, US Department of Energy, moderated the session, stating that “if you believe in climate science, you should believe in climate math” and asked whether zero emission options were possible?

Eric Masanet, IEA, highlighted that in 2015 there was a decoupling of economic growth and GHGs, indicating the beginning of a transition towards renewables. Recognizing that challenges remain, he pointed to the role of industry to meet commitments on the 2°C target, including via carbon capture and storage (CCS).

Manuela Ojan, HeidelbergCement, explained an MRV system in the cement industry to reduce CO<sub>2</sub> and improve energy performance. She explained four levers to reduce emissions: energy efficiency; alternative fuels replacing fossil fuels; clinker substitution; and CCUS, such as using municipal solid waste heat.

Valérie Quiniou, Deputy Vice President, Climate and Energy, Total, explained her company’s efforts to be the “sustainable energy company of the future” by, *inter alia*: addressing climate constraints early on, by merging the climate and strategy teams; benchmarking progress; cancelling routine flaring by 2030; and collaborating with industrial partners.

Julien Perez, EY Climate Change and Sustainability Services, underscored the need for a business-oriented 2°C strategy, highlighting that investors are putting pressure on decarbonization.

The ensuing discussion addressed, *inter alia*: barriers to moving quicker; the need for clear policies, stronger principles and demonstrating win-wins; specific challenges in emerging markets; and the need for more critical carbon pricing.

Issam Dairanieh, CEO, CO<sub>2</sub> Sciences, addressed the concept of CCUS, saying that there has been some progress in CO<sub>2</sub> mitigation, but it has been insufficient. He remarked on a study undertaken which shows significant environmental impact and market opportunity for CO<sub>2</sub>-based products. In order to commercialize products, he urged working collaboratively, stating that CCUS will help achieve the climate goals.

Charlotte Wolff-Bye, VP Sustainability, Statoil, said that Statoil is a pioneer in CCS. She noted a Norwegian initiative to develop a CCS product that aims to ensure it has a positive climate impact and is cost effective. She highlighted the potential for a European storage hub.

Alan Knight, ArcelorMittal, said that CO<sub>2</sub> is part of the steel making process, so carbon capture and usage (CCU) is an “exciting” opportunity. He noted cooperation with LanzaTech to convert CO<sub>2</sub> into raw materials, and a trial due to begin in 2017 to convert CO<sub>2</sub> to biofuels. He said such projects challenge conventional business models, but lamented that policies to support such initiatives do not currently exist.

K-C Tran, Co-Founder, Carbon Recycling International, said that carbon pricing needs to be backed up by good policy and regulation. He stressed the need for consistency and certainty to develop viable models, saying that “uncertainty is a killer for business.” He urged formulating policies to harmonize the development of fuel from all sources.

Michel Bande, Vice President, Sustainability, Solvay, said that in 2015, Solvay committed to reducing its carbon intensity by 2025. He presented on an LCTPi on CCU, which is a collaborative initiative with other energy-intensive industries. He encouraged others to join the initiative saying that more R&D breakthroughs can be achieved through collaboration.

Friedman asked what signals are needed to activate the market. Wolff-Bye said the Paris Agreement was the signal. Dairanieh said business opportunities are available to make money and reduce carbon emissions, but this needs to be approached carefully. On barriers to deployment, Bande cited insufficient capacity. Knight stressed policy was key.

**CLIMATE SMART AGRICULTURE AND INNOVATION:** On Wednesday afternoon, panel discussions convened to address this issue. Sonja Vermeulen, Consortium

of International Agricultural Research Centers (CGIAR), moderated, pointing to WBCSD's Climate Smart Agriculture (CSA) partnership.

Highlighting that agriculture is responsible for around one-quarter of CO<sub>2</sub>, Gabriela Burian, Monsanto, described efforts to increase food production by 50%, while reducing emissions by 50%, including by sequestering carbon, improving efficiency and halting deforestation. She said that Monsanto is working with farmers on these goals.

Chris Brown, Vice President, Corporate Responsibility and Sustainability, Olam, said that most of Olam's GHGs emissions and water consumption are in the supply chain. He explained efforts to support smallholder farmers, *inter alia*, through: the farmer information system; farmer management plans; transparent information; and institutional partnerships.

Calling food security core to her business, Diane Holdorf, Chief Sustainability Officer, The Kellogg Company, said that she has seen food system failures firsthand, due to climate change. She acknowledged that while The Kellogg Company can source from other suppliers, farmers do not have the same options, stressing this made CSA resonate for The Kellogg Company.

Underscoring that 50% of New Zealand's GHG emissions come from agriculture, namely from animal husbandry, Abbie Reynolds, Executive Director, Sustainable Business Council, New Zealand, explained GHG mitigation innovations, *inter alia*, on: productivity, including removing subsidies and addressing farm management; farms, including feed-pads and destocking farms; and research, including developing a methane vaccine.

In the ensuing debate, participants discussed: that alternative wetting and drying in rice can reduce emissions; how growers can receive compensation for their efforts; and how to address nitrous oxide emissions.

Varun Vats, Syngenta International, said that, in addressing climate change, his company tries to help farmers stabilize their crop yields using fewer resources. He noted a number of herbicides, resilient seed varieties and crop stimulant products to ensure sustainable yields. He said that they also encourage farmers to practice sustainable farming techniques. Regarding adaptation, which he said is more crucial for farmers, Vats noted fungicides to protect from a higher intensity of diseases, and practices to improve soil water-carrying capacity and ensure underutilized lands are used for biodiversity and other benefits. Responding to a question on what incentivizes adoption of these products and techniques, Vats said that the right technology used at the right time on the right crops will lead to success.

Margaret Torn, Lawrence Berkeley National Laboratory, noted an initiative to enhance the global carbon sink and protect it from drought and land-use change, adding that the laboratory is also addressing how to include working land into climate policies. She said that, on soil carbon research, microbes are proving more effective than other measures to ensure carbon storage. She said that with deep decarbonization, the share of non-energy GHGs will increase dramatically, and farm and working land emissions will be at the forefront, but how much carbon soils can actually hold remains a mystery.

Michael Obersteiner, International Institute for Applied System Analysis, discussed algae uses, including for feedstock, saying that this would free up land for other uses. He said algae is reasonably cost effectiveness, and underscored that it could be an "amazing silver bullet," but more work needs to be done in this area.

Virgilio Viana, Superintendent-General, Amazonas Sustainable Foundation, said that agriculture is one of the main drivers of deforestation in the Amazon. He said incentives to make deforestation unattractive must be improved. He also underscored the importance of monitoring deforestation. He said resilience should be built into the system, and urged combining REDD+ into other goals and targets. He also called for valuing the knowledge of indigenous peoples to enable the design of adequate solutions.

The ensuing discussion addressed: restoration of marginal lands; a global vision for land restoration to encourage ecosystem restoration; landscape planning; dietary trends and their impact on emissions; and demand side drivers of agricultural emissions.

### LOW-CARBON POLICIES

Maria Mendiluce, WBCSD, moderated the session on Wednesday afternoon, noting that the LESC placed a lot of emphasis on solutions, while recognizing that policies can help scale these up.

Lance Pierce, CEO, CDP, said CDP has moved beyond tracking only carbon to, *inter alia*, tracking energy, water, forestry and city emissions. He emphasized how disclosure can benefit businesses, including: helping companies finance R&D; improving efficiency; and working within a changing policy landscape.

Thomas Kerr, International Finance Cooperation, said there is an increase in the implementation of carbon pricing by businesses and governments, despite political challenges. He highlighted that 13% of global GHGs are priced in some way, with this anticipated to expand considerably after China's development of a national scheme.

Calling fossil fuel subsidies "bad for the environment and a waste of resources," Mark Sinclair, Climate Change Ambassador, New Zealand, said roughly US\$500 billion are spent on fossil fuel consumer subsidies, which is five times greater than the amount dedicated to subsidies for renewables, or the climate finance pledge of US\$100 billion made at COP15 in Copenhagen, Denmark.

Carlos Gentile, Undersecretary of Climate Change, Argentina, described the process of revising the Argentinian NDC to be more ambitious. He said the NDC was the result of a cross-sectoral approach that included consultations with the private sector, academia, and all provinces and regions. He noted that this resulted in

being able to adopt a goal that is 10% more ambitious. He said more work is needed as all potential savings have yet to be calculated.

David Turk, IEA, said that we are in the solutions phase, as we now have "paper



Jean-Pierre Clamadieu, CEO, Solvay

ambition” and need to have real world ambitions and solutions. He said the analysis of NDCs is difficult as metrics between NDCs differ.

The ensuing discussion addressed, among others: the need for legal and institutional frameworks to scale up business solutions, even when they are unpopular; that companies are “waking up,” realizing that climate change poses significant risks to their business, and banding together to act; how non-state actors can aggregate data, in particular since different studies use different baselines; and how to streamline learning.

### CLOSING CEREMONY

**LESSONS LEARNED AND PATHWAYS AHEAD:** Peter Bakker, WBCSD, said this was the first time the LESC was held within the COP venue, allowing presentations and dialogue with 100 speakers, including ministers, mayors, energy experts and innovators. Saying “the challenges are clear,” he called for leadership, economic incentives and the right political signals for businesses and cities to drive forward “the climate actions we need.”

Jeffrey Sachs, SDSN, lauded the “remarkable array of solutions at the LESC,” stating this is the first time the world’s top minds are focused on achieving zero emissions. He called WBCSD the “most important business organization for getting this right,” highlighting, *inter alia*, the important discussion of the LESC on grid management, which, he said, is more complicated and more critical than ever before.

ICLEI Secretary-General Van Begin called cities and local governments critical to address climate change, acknowledging, *inter alia*: the unprecedented growth of cities and their infrastructure demands; the GHG emissions associated with cities, together with visionary policies to transform them to carbon-neutral cities; and the impacts of climate change in cities. He called for “human cities” focused on, among other things, access to health care, education and transportation, with open-source and do-it-yourself solutions.

Jean-Pierre Clamadieu, Solvay, said the LESC offered opportunities to learn strategies and bring solutions. He identified several “clear messages,” *inter alia*: long-term willingness to achieve the fight against climate change; the development of 2050 roadmaps; NDCs turning into action plans, which could influence investment decisions; and the importance of carbon pricing. He underscored business leadership in the transition to the low-carbon economy.

The LESC was closed at 6:39 pm.

### LESC PRESS CONFERENCE

On Thursday, 17 November, at a press conference marking the end of the LESC, representatives from the World Business Council for Sustainable Development (WBCSD), the UN Sustainable Development Solutions Network (UNSDSN), and ICLEI - Local Governments for Sustainability lauded the efforts made at the Conference to put innovative technological solutions at the heart of COP22 and the global climate action agenda. Calling the LESC a milestone, Jeffrey Sachs, Director,

UNSDSN, noted that for the first time, governments, business, and technologists had convened at a COP to explore the potential of new technologies to achieve the objectives of the Paris Climate Agreement which will help countries to move more quickly towards decarbonizing their economies and achieving the SDGs.

Stressing that the LESC has been an important opportunity to solidify discussions on how to bring technological and policy innovations to the next level, Gino Van Begin, Secretary General of ICLEI – Local Governments for Sustainability, pointed to local governments as key players in implementing and taking up new technologies that facilitate low-emission, resilient development.

Calling on partners to work together to seize the opportunities presented by the LESC to scale up the implementation of the Paris Agreement and accelerate the transition to the low-carbon economy, Peter Bakker, President and CEO, WBCSD, underscored that Business is the key implementation partner for governments around the world as they strive to hit their NDC targets.

### GLOSSARY

CCS	Carbon capture and storage
CCU	Carbon capture and usage
CCUS	Carbon capture, utilization and storage
CEM	Clean Energy Ministerial
CEO	Chief Executive Officer
COP	Conference of the Parties
CSA	Climate smart agriculture
DDPs	Deep decarbonization pathways
EU	European Union
GHG	Greenhouse Gas
Gt	Gigatonne
ICT	Information and communications technologies
IEA	International Energy Agency
ITU	International Telecommunication Union
LCTPi	Low-Carbon Technology Partnership initiative
LESC	Low-Emissions Solutions Conference
MOU	Memorandum of understanding
MRV	Measurement, reporting and verification
NDC	Nationally Determined Contribution
RSB	Roundtable on Sustainable Biomaterials
SDGs	Sustainable Development Goals
SDSN	Sustainable Development Solutions Network
SE4ALL	Sustainable Energy for All
SLCPs	Short-lived climate pollutants
UNFCCC	UN Framework Convention on Climate Change
WBCSD	World Business Council for Sustainable Development