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SUMMARY OF THE VIENNA ENERGY FORUM 2017: 9-12 MAY 2017

The Vienna Energy Forum (VEF) 2017 themed ‘Sustainable Energy for the Implementation of the SDGs and the Paris Agreement’ convened from 9-12 May 2017 in Vienna, Austria. The event brought together approximately 1,650 participants from 128 countries, including the Prime Minister of Tuvalu, and several ministers from Egypt, India, Jordan, Morocco and Swaziland, high-level dignitaries and senior representatives of international and non-governmental organizations, academia, civil society and the private sector. The event was organized by the UN Industrial Development Organization (UNIDO), the Austrian Federal Ministry for Europe, Integration and International Affairs, the International Institute for Applied Systems Analysis (IIASA), the Sustainable Energy for All (SEforALL) initiative, and the Austrian Development Agency (ADA).

The Forum consisted of a Ministerial segment and a series of high-level panel discussions from 11-12 May, and aimed at promoting dialogue on: the nexus between energy, climate, transport, food, water and health; linkages in the implementation of the Sustainable Development Goals (SDGs) and the Paris Agreement on Climate Change; and the role of innovation as a global driver for sustainable growth. The meeting concluded with the presentation of the VEF 2017 key messages.

The Forum was preceded by two days of side events, from 9-10 May, which considered a range of issues, including: attracting sustainable energy investments for small island developing States (SIDS); regional incubation networks; smart city development; clean energy for migrants; gender-inclusive energy policies; micro-grids; scaling up energy efficiency financing; and energy scenarios for sub-Saharan African cities.

During the week, “Women in Sustainable Energy” networking events were held and a number of initiatives and reports were launched, including the World Bank’s ‘*State of Energy Access Report 2017*,’ the International Resource Panel’s ‘*Green Technology Choices: The Benefits, Risks and Trade-offs of Energy Efficient Technologies*,’ Practical Action’s ‘*Poor People’s Energy Outlook 2017*,’ and UNIDO’s ‘*World Small Hydropower Development Report*.’ Spotlight Events covered the Electrification Accelerator and the Global Cleantech Innovation Index, and Special Events were also held on the sidelines of the VEF, including Clean Technology Innovation and Entrepreneurship Day and the Private Financing Advisory Network (PFAN) Clean Energy Climate Investment Forum.

A BRIEF HISTORY OF THE VIENNA ENERGY FORUM

The VEF takes place every two years. It was established in 2008 by the Austrian Government, IIASA and UNIDO. The Forum aims to explore how energy can contribute to meeting global development challenges, based on the premise that issues such as poverty, climate change, security, health and income are closely linked to the nature, accessibility and affordability of existing energy systems.

The first VEF convened in Vienna, Austria, from 22-24 June 2009 under the theme ‘Towards an Integrated Energy Agenda Beyond 2020: Securing Sustainable Policies and Investments.’ The conference served as an opportunity to: shift the debate on energy and development beyond generalities to identifying specific courses of action; initiate and advance regional and international cooperation; and present new international energy initiatives, such as the International Renewable Energy Agency. One of the Forum’s six key recommendations foresaw the creation of a SDG on energy, which aimed to achieve universal energy access by 2030.

The second VEF themed ‘Energy for All – Time for Action,’ convened in Vienna from 21-23 June 2011. The Forum was held in parallel with a Ministerial Meeting on Energy and Green Industry. The Forum focused on energy poverty and increasing energy access in developing countries in light of the SEforALL initiative, and addressed a range of issues, including: the key building blocks for developing a strategy for prioritizing the energy access agenda; energy efficiency; and reducing global energy intensity.

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The third VEF themed ‘One Year after Rio+20: The Energy Future We Want,’ took place in Vienna from 28-30 May 2013. The Forum addressed sustainable energy in the context of negotiating the post-2015 development agenda, a process initiated at the 2012 UN Conference on Sustainable Development (Rio+20).

The fourth VEF themed ‘Sustainable Energy for Inclusive Development’ was held from 18-20 June 2015 in Vienna. The Forum aimed to contribute to the Post-2015 Development Agenda and climate processes by emphasizing their multiple co-benefits, and by showcasing best practices and actions on the ground.

REPORT OF VEF 2017

VEF 2017 featured two days of side events from 9-10 May at the Vienna International Centre (VIC) and two days of high-level plenary sessions from 11-12 May at the Hofburg Palace. This report provides a summary of the high-level sessions, followed by a summary of the side events.

OPENING SESSION

The high-level segment of VEF 2017 opened on Thursday morning, 11 May 2017. Ralitsa Vassileva, Bulgarian International Television, served as master of ceremonies.

Michael Linhart, Foreign Ministry, Austria, pointed out that VEF 2017 is the first VEF since the 2030 Agenda on Sustainable Development and the Paris Agreement on climate change were agreed in 2015, and called on the Forum to consider whether or not the international community is on track to meet commitments associated with those agreements.

Maria Vassilakou, Vice Mayor, Vienna, urged a holistic approach to sustainable development and suggested focusing on the needs of children in order to create sustainable and livable cities. She also urged winning the hearts and minds of residents, stressing that “if we cannot inspire them and get them to be part of what we’re trying to achieve, we will not succeed.”

LI Yong, Director General, UNIDO, emphasized the importance of affordable, reliable, sustainable and modern energy for achieving sustainable development and combatting climate change. He underscored the need to promote innovation and develop new financial instruments if the 2030 Agenda is to be achieved.

Rachel Kyte, CEO, SEforALL, said while extraordinary progress has been made on the three main targets for SDG 7 (energy), the world is not on track, and in some cases, not even close. She suggested that the way to achieve the 2030 Agenda and Paris Agreement commitments is to decarbonize, decentralize and digitalize energy systems.

Pavel Kabat, Director General and CEO, IIASA, said achieving sustainable energy for all should be seen as a fundamental transformation, an opportunity for innovations, new economies, and social change. He urged “systems thinking,” linking sustainable energy to other issues, and called for considering the scientific community as a partner in realizing the transformation.

Christine Stix-Hackl, Austrian Ambassador to the UN (Vienna), presented a welcoming statement from Austrian Federal President Alexander Van der Bellen.

Andrä Rupprechter, Minister of Agriculture, Forestry, Environment and Water Management, Austria, noted his country will soon release an integrated climate change and energy strategy. He said achieving the SDGs will require a transformation in how energy is produced and used.

Piyush Goyal, Minister of State for Power, Coal, New and Renewable Energy and Mines, India, highlighted how the 2030 Agenda and Paris Agreement have ignited a new way of thinking about the environment and changing the global mindset in moving towards what is possible, what needs to be done and what is good for humanity. Goyal provided examples on how India is fast-tracking the goal of universal energy access and sustainable energy usage to a 2022 goal.

Amina Mohammed, UN Deputy Secretary-General, characterized the 2030 Agenda and Paris Agreement as “ground-breaking initiatives” in terms of their universality, inclusiveness and conveyance of the value of peace and partnership for achieving a better world. She said the burden of energy access falls on sub-Saharan Africa and South Asia and that the global community should work to ensure that no one is left behind. Mohammed urged re-doubling efforts if the 2030 Agenda is to be realized.

HIGH-LEVEL PANEL I: THE ROLE OF ENERGY IN THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT, WITH A FOCUS ON POVERTY

This session was chaired by LI Yong. Amina Mohammed pointed out that the goal of poverty eradication is a carryover to the SDGs from the Millennium Development Goals because it had not been achieved. She asserted that access to energy, renewable energy sources and clean energy usage is critical to achieving the goal of poverty eradication. Mohammed suggested several considerations for achieving SDG 7: improving energy access for women and girls; engaging underemployed youth in producing and sharing innovative technologies; and developing genuine cross-governmental partnerships for achieving universal energy access.

Adnan Amin, Director-General, International Renewable Energy Agency, stressed that the world is “in the middle of a fundamental clean energy transition which at its heart is an economic transformation.” He said the impact of this transition on decarbonization will be significant, but that clean energy must support entrepreneurship rather than government handouts.

Tania Rödiger-Vorwerk, Federal Ministry of Economic Cooperation and Development (BMZ), Germany, emphasized that for the German Government, sharing the national experience of sustainable energy penetration in development cooperation is a key objective. She described the Government’s “Marshall Plan for Africa” to promote decentralized energy access and basic energy needs on the continent.

Martin Ledolter, Managing Director, ADA, emphasized Austria’s focus on “cooperative and regional partnerships, which can harness the synergies to achieve SDG 7 in linkage with other SDGs.” He also stressed the importance of bringing expertise on renewable energy technologies to the private sector.

Radha Muthiah, CEO, Global Alliance for Clean Cookstoves, underscored that to achieve universal access to clean cooking by 2030, it is essential to: enable government policies that go beyond pilot projects and scale up clean energy technologies; and provide targeted financing to meet the needs of small and medium-sized enterprises (SMEs) to produce clean cookstoves.

Paula Caballero, World Resources Institute, described lessons from the SDG negotiations, including: the time required for people to understand the goals and then become ambassadors of the SDGs; the role of a participative and inclusive process; and the recognition of planetary boundaries. She emphasized that temporal linkages of the SDGs are less understood, particularly in relation to the urgency to reduce emissions by 2020 and also the risk of development lock-in from poor energy infrastructure choices.

Rachel Kyte noted that while energy access is currently a rural problem, energy access will become an urban problem by 2030, especially in informal settlements. She stressed that a combination of on-grid and off-grid solutions; targeted financing to communities for cleaner energy access; and political leadership from municipalities, will be key to overcoming this challenge.

HIGH-LEVEL PANEL II: THE ENERGY, FOOD SECURITY, LAND, WATER, AND HEALTH NEXUS

This session was chaired by Pavel Kabat. Csaba Körösi, Office of the President of the Republic of Hungary, discussed three challenges in SDGs implementation: while SDGs are global, most implementation is national; governance in countries was created in a different era and does not look at development in an integrated manner; the way implementation is organized in the first couple of years will determine if targets will be met; and some trade-offs between SDGs have transboundary dimensions. He proposed reforming national institutions, focusing on the pivotal first years of implementation, and revisiting regional agreements and cooperation mechanisms to ensure they deliver sustainability across the board.

Irene Giner-Reichl, President, Global Forum for Sustainable Energy (GFSE), agreed that governance reform is needed, but stressed that such reform needs to result in greater inclusion, especially of women. She also urged that discussions about innovation focus not only on technology, but also on social innovations that improve how solutions are developed, deployed, and implemented.

Deidre Herbst, Eskom, South Africa, said Eskom is a utility that still heavily depends on coal, with a small percentage of renewables sourced through independent power producers. She described work on energy and water efficiency as well as Eskom's efforts to help improve water quality. She also discussed more recent projects aimed at getting households to transition away from using coal for their heating and cooking.

Faris Hasan, Organization of Petroleum Exporting Countries (OPEC) Fund for International Development (OFID), explained how concerns about the impact of biofuels on food security led OFID to abandon the silo approach to energy lending and gradually gravitate to the nexus approach. He noted how OFID

discusses the nexus approach with all its beneficiaries and has stepped up related assistance, including grants to establish models that employ nexus thinking, such as solar water pumps for agricultural irrigation.

Al Binger, Executive Director, Caribbean Centre for Renewable Energy and Energy Efficiency, pointed out that in 1994, the SIDS came together in Barbados to address their sustainable development, and suggested that these discussions can be seen as the forerunner for the SDGs. Binger also said that a single adverse climate event can destroy the entire GDP of a SIDS in a single day, so the linkage of SDGs with climate resilience is of crucial importance for island states.

Hans Olav Ibrekk, Ministry of Foreign Affairs, Norway, contended that the challenge remains how to operationalize the nexus approach to make it a reality. He suggested it would require: a gathering of energy experts and other sector experts; incentives for ministers to work across their sectors; and investment in education to produce more experts on nexus linkages.

In the ensuing discussions, Giner-Reichl suggested that the nexus idea is sellable at the municipal level because it is where people tangibly see impacts. Herbst emphasized that to make the nexus idea work, it should be anchored to SDG 17 (partnerships). Körösi suggested that energy proposals be vetted by various ministries, not just the energy ministry, to ensure a nexus approach is built in. He also put forth the idea to measure new bills against the existing national strategy on sustainable development and ensure targets are being reached 5-10 years down the road. Hasan said there needs to be not only a democratization of procedure but also a democratization of thoughts so that countries are willing to listen and learn from each other.

BUSINESS VOICES FOR SUSTAINABILITY (FIRST SEGMENT)

This session was chaired by Kandeh Yumkella, former CEO, SEforALL. Sally Uren, Chief Executive, Forum for the Future, described a project in Odisha, India, to create scenarios for different energy pathways to ensure an optimal blend of energy to transition from low energy access to access for all. She also mentioned that transforming the sustainability practices of multinational corporations would create “ripple effects” across supply chains.

Princess Abze Djigma, CEO, AbzeSolar, Burkina Faso, noted that while financial resources and technologies are necessary for energy transitions, it is also critical to ensure that products are designed to cater to local climates and the needs of the population.

Barbara Kreissler, Philips Lighting, said the lighting industry is currently undergoing the biggest transformation since the invention of the incandescent lightbulb, as energy efficient light emitting diode (LED) lighting is being connected with the internet, resulting in significant energy savings. She emphasized the need to integrate renewable technologies with energy efficiency approaches and to ensure a national policy environment conducive to attracting investors.

HIGH-LEVEL PANEL III: SUSTAINABLE CITIES AND COMMUNITIES

This session was chaired by Philippe Scholtès, UNIDO. Diana Urge-Vorsatz, Central European University, urged focus on innovations in three areas: replacing automobiles as the principal mobility source in cities, which would reduce greenhouse gas (GHG) emissions and free up public spaces; cut food wastage, the third largest GHG emission source in the world; and improve the efficiency of buildings, which would conserve energy, cut GHG emissions and reduce indoor air pollution.

Ahmed Badr, Executive Director, Regional Center for Renewable Energy and Energy Efficiency (RCREEE), listed challenges in promoting sustainable cities in the Arab region, including the arid or semi-arid environment, attracting private sector investment, finding technology appropriate to local conditions, capacity building, changing mindsets and managing human resources. He suggested the keys to finding solutions are commitment and consistency.

Heather Adair-Rohani, World Health Organization (WHO), said universal health coverage cannot be achieved without universal energy access, listing the many linkages, including providing reliable power sources for health facilities in developing countries and improving health through air pollution reduction from cleaner energy sources and improved building efficiency. She suggested that the WHO can help policymakers take into account the health impacts and benefits of energy policy choices.

Kamel Ben Naceur, International Energy Agency, affirmed that cities have significant opportunities to use energy sustainably. He noted that there are many rapidly growing cities like Mogadishu and highlighted the need to ensure that the design of these cities will help maximize energy efficiencies. Ben Naceur also urged the inclusion of women in generating energy as well as on the demand side.

Kari Aina Eik, Secretary General, Organization for International Economic Relations (OiER), said SDG 7 cannot be achieved without the engagement of the private sector. She stressed that many cities of all sizes are begging for support. Eik said support can be given by better integrating new technologies, establishing benchmarks or standards for smart cities, and teaching cities how to learn from each other in terms of new technology integration and financing.

Shobhakar Dhakal, Asian Institute of Technology, Thailand, pointed out that cities are already stressed with many environmental challenges, and that climate change will just add to this stress. He said the good news is that if these issues are addressed, access to energy also will be addressed, as it is a central, cross-cutting theme across many areas.

During discussions, Urge-Vorsatz raised two persistent challenges. She said it is very rare to leverage financing for integrative approaches and difficult for lenders to provide financing for retrofitting buildings in the name of health. Urge-Vorsatz added that young people are not consulted enough or invited to take part in the integrative approach, despite their interest and being future inheritors of these challenges.

HIGH-LEVEL PANEL IV: SDG 7: AFFORDABLE AND CLEAN ENERGY AND SDG 13: CLIMATE ACTION

This session was chaired by Ajay Mathur, Director General, The Energy Resources Institute, India.

Edward Mbacho Mungai, CEO, Kenya Climate Innovation Centre, stressed that the challenge to increasing absorption of clean technologies lies in “silo-thinking,” highlighting that development in health, education, agriculture and other sectors should be integrated with energy efficiency.

On clean energy solutions that address climate change and strengthen the role of women, Sheila Oparaocha, ENERGIA, underscored, *inter alia*: the role of gender-energy policies and political commitment; gender transformation in climate investments; and more focus on clean cooking.

Peter Traupmann, Managing Director, Austrian Energy Agency, discussed how his agency is identifying ways to transform production processes from fossil fuel dependence to renewable alternatives, while demonstrating ways to promote energy efficiency for companies and households.

Martin Keller, Director, National Renewable Energy Laboratory, US, stressed that the current deployment of renewable technologies will not be sufficient to decarbonize the economy without further investment in more advanced technologies.

Robert Zeiner, ADA, underlined that expanding local production, tailor-made capacity building for SMEs, and know-how on the maintenance of renewable technologies, are key for encouraging the private sector to build local supply chains for renewable energy.

Panelists then responded to questions from the audience. Radka suggested that public money is sometimes needed first for new energy technologies to prove that they are viable and profitable before banks will invest. Keller said that meeting SDG 7 targets will require game-changing technologies, whose emergence and impacts are difficult to factor into energy forecast models. Mathur suggested creating market mechanisms that reward technology providers that use resources more efficiently.

Mungai emphasized that projects for Africa should focus on SMEs. He also suggested that three factors affect scaling up sustainable energy technologies in Africa: enabling environment; capacity building; and showing ordinary people that technologies will make a real difference in their lives.

Oparaocha observed that analysis of return on investment in sustainable energy is looking beyond traditional calculations to account for other “development returns” in areas such as health, education and women’s empowerment. She also stressed innovations developed or market tested in Africa, such as pay-as-you-go (PAYG) and microfinance.

MINISTERIAL SEGMENT

This session was moderated by Tania Rödiger-Vorwerk. Enele Sopoaga, Prime Minister, Tuvalu, said the time for talk is over, and called for concrete, collective actions and international cooperation. He expressed hope that VEF 2017 would result in partnerships between parties, both big and small, toward such action.

As President of the SIDS DOCK Executive Council, Sopoaga expressed appreciation to the development partners that helped create regional centers for the Pacific and Caribbean SIDS, and hope that similar centers will be created in other SIDS regions. He noted that Tuvalu is well on its way to achieving its ambitious target of 100% power generation from renewables, but noted the country's remaining energy challenges of affordability, storage and durability, and the need to manage the demand side and to tackle maritime shipping.

Jabulile Mashwama, Minister of Natural Resources & Energy, Swaziland, said while her government would like to achieve universal energy access through the use of renewable energy sources, renewables are coming on the market at too high a price, with some technologies difficult to access and once onboard, difficult to service.

Khaled Fahmy, Minister of Environment, Egypt, said Egypt is doing its part to try to reach a 30% renewables share in power generation by 2022 through a package of policy reforms, including tariff changes, phasing out subsidies and opening the market to the private sector, but noted that the international community was not doing its part in providing the means of implementation.

Aziz Rabbah, Minister of Energy, Mining and Sustainable Development, Morocco, stated that his king has set a target of 52% renewables share in the power generation mix by 2030. He said meeting the goal will require attracting more investors and forming public-private partnerships (PPPs) as well as partnerships with other countries.

Ibrahim Saif, Minister of Energy and Mineral Resources, Jordan, stated that by 2018-19, Jordan will have achieved 40% of its commitments to the Paris Agreement. He said for Jordan, the nexus of energy with other sectors is particularly acute given that Jordan is one of the most water-scarce countries in the world.

In the ensuing discussions, ministers identified remaining challenges for their countries. Sopoaga stressed the need for ownership within communities. He said the government must effectively communicate the benefits of alternative sources of energy, and disseminate information to the public with the private sector to develop solutions. He also found training is required within communities to manage new off-grid technologies. Mashwama discussed the value of engaging the private sector. Rabbah identified two challenges for his country: winning the confidence of funders to invest in solutions and choosing a technology which is both economical and accessible to users. Saif stressed the need to align the international agenda with national agendas and the importance of capacity building. Fahmy called for building trust and transparency and new mechanisms for co-financing solutions.

HIGH-LEVEL PANEL V: THE PIONEERING ROLE OF INNOVATIVE TECHNOLOGIES

This session was moderated by Christine Lins, Executive Secretary, Renewable Energy Policy Network for the 21st Century (REN21).

Helga Prazak-Reisinger, Austrian Institute of Technology, stated she has been in the energy industry for 30 years but has witnessed an unprecedented acceleration in energy technology development since the Paris Agreement into force. However, she warned that the “last mile” is always the most difficult and urged for faster return on investment in new energy investments to make financing more lucrative. She also drew attention to not just developing new technologies for more efficient electricity but new technologies to produce low-heat usage.

Jaideep Prabhu, University of Cambridge, UK, emphasized that encouraging sustainable energy requires the cooperation of entrepreneurs, large companies and government. He said entrepreneurs have the solutions but lack the scale that large companies possess to apply these solutions. Prabhu added that governments need to introduce simple and transparent policies that support entrepreneurs.

Yoichi Kaya, President, Research Institute of Innovative Technology for the Earth, Japan, noted the importance of energy efficiency and decarbonization as key for future energy systems and illustrated the potential of co-generation through fuel cells as being appropriate for households.

Solomone Fifita, Pacific Centre for Renewable Energy and Energy Efficiency, discussed key recommendations that ministers of Pacific Island states had recently made regarding the energy transition, including, the need to repeal old legislation and adopt new ones to encourage PPPs; reforming capacity building to ensure accredited training; and on improving the energy efficiency of fuel for the transport sector.

Santiago Creuheras, Energy Secretariat, Mexico, discussed ways in which his country is working to promote sustainable energy reform, including: research and development (R&D) on improving energy storage; using the internet as a tool for increasing energy efficiency; and developing a toolkit to encourage innovative financing opportunities.

Getahun Moges Kifle, Director-General, Ethiopian Energy Authority, stressed that “energy efficiency can and should finance itself.” He noted the importance of an adequate enabling policy for encouraging the private sector to proliferate clean technology prototypes to better penetrate the market. He also highlighted an initiative by his country to establish a common platform for matching innovative technologies with regional standards, rather than strictly national standards.

Tom Delay, CEO, Carbon Trust, underscored the importance of adopting a “business mindset” to accelerate the pace of renewable energy deployment. In building a bigger business case, he said that collaboration should come first before competition in order to drive down costs through economies of scale and to foster a commonality of purpose.

In the ensuing discussion, participants and panelists identified the influence of carbon pricing in renewable energy development; whether national plans and policies are prepared for an energy transition towards fully renewable energy systems; and how technological innovation in energy systems can ensure greater gender parity in the energy sector.

HIGH-LEVEL PANEL VI: FINANCING INNOVATIVE BUSINESS MODELS

This session was moderated by Mafalda Duarte, Manager, Climate Investment Funds (CIF).

Barbara Buchner, Executive Director, Climate Policy Initiative, Inc., said the latest edition of her organization's annual "landscape" of climate finance found US\$392 billion annually being spent, mostly on climate actions by the private sector, with the public sector being the engine behind the climate finance architecture. She noted many "positive signs," including an exploding green bond market, shareholder initiatives to get businesses to take climate risks into account, and heavy investments in renewable sources by China and India. She pointed out, however, that the investment still falls short of the one trillion dollars per year estimated as needed to achieve a low-carbon future. She called for actionable and innovative financial solutions and technologies to fill that gap.

Aaron Leopold, Practical Action, UK, explained that his organization advocated for achieving universal energy access before the 2030 target because achieving the rest of the SDGs is dependent on achieving SDG 7 first. He said many of the models needed to make that happen already exist, but just need time and "patient capital" to prove their case. He also suggested a change of mindset is needed in multilateral lenders so that they will work with small companies that deliver on a small scale and help local banks lend to such companies through use of guarantee funds.

Christoph Frei, Secretary General, World Energy Council, said that in order to achieve the SDGs and Paris Agreement commitments, a "grand transition" in the energy sector is required, and that the drivers for this transition are climate, decarbonization, new business models, digitalization, and developing risk resilience. He provided examples of how capital can be made available, but that inappropriate regulatory frameworks on the "internet of things," PAYG and other digital products, can impede progress toward the transition.

Miriem Bensalah-Chaqroun, President, General Confederation of Moroccan Enterprises, cited Morocco's commitment to have renewable energy account for 52% of its energy sources by 2030. She explained that Morocco intends to achieve this by strengthening PPPs.

Kudakwashe Ndhlukula, Executive Director, Southern African Development Community (SADC) Centre for Renewable Energy & Energy Efficiency, shared South Africa's experience in engaging the private sector in achieving universal access to energy. He contended that government cannot do it alone, saying that both the public sector and private sector must work together. Ndhlukula stressed that universal access to energy is not feasible "if we do not address economic value, since there are communities who cannot afford to pay for these services."

Andrea Hagmann, Development Bank of Austria, also suggested that private sector engagement will drive the achievement of the SDGs. However, she found that despite

having ample funds to invest, the private sector lacks the confidence to work in this market and therefore urged that governments provide risk mitigation solutions. She also suggested that energy access projects must include development experts as well as local experience to make policies work.

During the subsequent discussion, Buchner promoted the idea of working with different partners across the financial system to attract scalable and replicable solutions for investments in energy. Leopold described how his organization is conducting gender audits to demonstrate to governments how energy policies impact women and men differently.

HIGH-LEVEL PANEL VII: CATALYSTS FOR INNOVATION

This session was moderated by Martin Hiller, Director General, Renewable Energy and Energy Efficiency Partnership.

Maria Sandqvist, Executive Director, Swedish Smart Grid, said the most important drivers for innovation are: political commitment, principally in the form of setting ambitious targets and providing incentives to reach them; support for research and cross-sectoral innovation; and development of an energy system that includes information and communications technologies (ICTs) and small-scale renewables.

Kazuo Furukawa, Chairman, New Energy and Industrial Technology Development Organization (NEDO), Japan, explained how NEDO was created in 1980 after the 1970s oil import crises to act as an energy technology accelerator, primarily through matching ideas with funding and providing project management services.

Reinhard Haas, Vienna University of Technology, Austria, explained that he works at an institute for energy economics that seeks ways to integrate renewable energy and energy efficiency technologies with minimum monetary input. He opined that nobody knows what the final results of innovation will look like, but the government can set clear targets while industry and its partners develop optimal energy mixes tailored to each country's conditions.

Noting that his company has been in the energy business for 100 years, Bazmi Husain, ABB, said the sector is undergoing major changes in power production, transport, distribution and use, with greater choices than ever before and an increasing rate of innovation. He said ABB collaborates with 70 universities around the world, has started investing in cutting edge start-up companies, and is partnering with established fields, such as ICTs, because of how they will change the sector.

Asserting that Paris Agreement goals cannot be reached without using nuclear power, Mikhail Chudakov, Deputy Director General, International Atomic Energy Agency (IAEA), explained how the IAEA assists member states in safe nuclear power generation and in safe applications of nuclear technologies in sectors such as medicine and agriculture.

David Walker, DNV GL Group, stressed the importance of seeing sustainable energy opportunities in the developing world as chances to leapfrog and avoid the mistakes of the past. He described how his company has worked with the Climate

Technology Centre & Network (CTCN) to promote renewable energy and energy technology in Africa, through market studies, developing bankable projects and certifying that technologies meet required standards.

In discussions, Sandqvist emphasized how energy technologies are allowing consumers to be more independent from the existing energy system and empowering them to better manage their electricity use. Haas declared that “the time of huge power generators is over” and noted some customers are now selling electricity to the grid. Furukawa cautioned that tackling climate change has to be a global operation, and said NEDO is responding to this by disseminating technology to African markets with the aim of achieving SDG 17 (partnerships).

Walker asserted that it is important to think realistically about energy distribution and not focus on one solution, but rather a hybrid system of energy. Sandqvist stated that she is confident that new technology will decrease the cost of maintenance, which will result in fewer disruptions and greater cost-effectiveness. Haas added that it is not just about creating new technologies but rather ensuring the market forces are working so that supply is meeting demand.

BUSINESS VOICES FOR SUSTAINABILITY (SECOND SEGMENT)

This session was chaired by Kandeh Yumkella.

Sami Haddadin, Leibniz University Hannover, Germany, highlighted the role of his business in the creation of affordable robots “for everyone.” He noted that robotics represent the next big innovation for the creation of new markets and will result in a drop in the cost of energy-efficient technologies.

Maher Ezzeddine, CEO, Ideanco, said that his company provides corporate strategies to integrate sustainability into the core operations of businesses and within the public sector. He stressed that a knowledge-based economy is one in which sustainability is reinvented as “creating value” to guide the way towards profitable outcomes.

Adolfo Larach-Foster, CEO, Honduran Renewable Energy Company, illustrated the potential of establishing business interest for renewable energy in Honduras, noting the importance of a clear legal framework in fostering a PPP to emerge which has increasingly shifted energy generation in the country from thermal to renewable energy production.

HIGH-LEVEL PANEL VIII: INNOVATION FOR APPROPRIATE AND SUSTAINABLE SOLUTIONS

This session was moderated by Kandeh Yumkella. Virachai Plasai, Permanent Representative of Thailand to the UN, said policies formulated to support SDG 7 must encompass broad public support and local engagement. He also stated that energy R&D must be encouraged and policies must be enhanced through regional and international cooperation.

Vivien Foster, World Bank, noted: the need for greater efficiency improvements in the heating and transport sectors; simpler regulatory measures that could have a real impact on rural electrification in developing countries; and greater

emphasis on energy efficiency policies, including labelling consumer appliances and establishing energy codes for new buildings.

Meagan Fallone, CEO, Barefoot College International, described a “human-centric design” for technological innovation which focuses on the needs, values and aspirations of people at the start of a technology’s trajectory.

Mahama Kappiah, Executive Director, Economic Community of West Africa States (ECOWAS) Centre for Renewable Energy and Energy Efficiency (ECREEE), echoed Foster’s emphasis on policy innovation and emphasized the role of targeting policies at a regional level as a way to establish “clean energy corridors” in achieving SDG 7.

Fiona Wollensack, European Union Energy Initiative Partnership Dialogue Facility (EUEI-PDF), presented key findings of a recent study examining the role that energy access can play for migrant and refugee settings, including a focus on livelihood contexts and the potential for PPPs to create sustainable greening operations in humanitarian settings.

Anda Ghiran, Johnson Controls, identified ways in which energy-efficient buildings can help citizens and businesses become resilient to climate change, such as offering flexible solutions for tough weather conditions and improving indoor air quality.

CLOSING SESSION

Philippe Scholtès began the closing session by presenting the “key messages” of VEF 2017. He said the final versions of these messages will be posted online. These key messages:

- Warn that the deadline set for the SDGs highlights the need for urgent action in order to achieve tangible milestones by 2020, 2030 and 2050, and that the vision to 2050 must shape the decisions made today;
- Observe that much of the capital investments made today have very long replacement times, so energy choices made today will lock in to development paths for decades to come;
- Declare that energy is the key enabler for food security, health and water, and that the urgency of the implementation phase of the SDGs and the Paris Agreement highlights the need for a holistic nexus approach which mitigates the trade-offs while positively enhancing the numerous interlinkages between these sectors;
- Note that cities are calling for innovative approaches to urban design and transformative change, and suggest as a solution, innovative infrastructure that uses renewable energy as an efficient way to cope with rising energy demand without detrimentally impacting the climate and environment;
- Declare that affordable and clean energy represents the biggest opportunity to mitigate and adapt to climate change, and state that technology, investment, capacity building and institutions will help energy play its role in fighting climate change;
- Declare that technological innovation is a central piece of sustainable energy development, and that new concepts and game-changing technologies are being introduced, but their level of readiness is still uncertain;

- Declare that this is the first generation that has the technology to solve climate change and related issues of sustainability and call for development strategies to be continuously updated to reflect the new available technological innovation;
- Observe that sustainable solutions depend on innovative and inclusive business models that can be scaled up, replicated and are self-sustaining, and assert that such models already exist and are ripe for financing;
- State that the financial resources necessary to accomplish SDG 7 and the Paris Agreement exist, but that the appropriate instruments are not being applied in a way that enables new businesses to blossom and large-scale projects to move forward;
- Note that governments stimulate innovation through three drivers: demonstrating political commitment by setting ambitious targets and plans and providing the incentives to realize those goals; supporting R&D in cross-sectoral innovation and providing platforms to deliver technologies and integrated solutions that differentiate needs of users; and developing the energy system, building on an integrated network approach rather than a top-down approach;
- From the Ministerial Segment, declare that: energy is a crucial component for the implementation of the 2030 Agenda and the Paris Agreement, but also in meeting the energy security needs of countries; elements of trust, confidence and transparency are essential enablers for the means of implementation; and tailoring sustainable solutions according to specific national needs are vital to ensure success in meeting the Agenda and Agreement; and
- From the Business Voices for Sustainability segment, state that: the role of the private sector in implementing the 2030 Agenda and Paris Agreement is growing, and the public sector should embrace it as the driver of innovation; and the design of policy should incorporate the needs of SMEs in developing countries and be carried out alongside the creation of frameworks that enable new entrepreneurs to create quality and cost-effective solutions, which can address energy and sustainability demands simultaneously.

Zeiner shared his excitement about the innovation and actions taking shape at the technological, financial and social levels to inform the agenda. He pointed out that the central objective of these discussions should be the eradication of poverty and urged everyone to continue the partnerships developed over the course of the week.

Monika Weber-Fahr, Chief Operating Officer, SEforALL, applauded the hundreds of conversations she witnessed taking place at the Forum and expressed hope that these new connections will amplify the voices of the poor. She urged participants to continue the knowledge sharing and remember three key numbers: “one” for the one billion people without access to electricity; “three” for the three billion people without access to clean cooking; and “13” for the 13 years left to reach the goals.

Luis Gomez-Echeverri, IIASA, noted that the VEF is getting stronger and stronger in each iteration and expressed his hope that it will one day become “the Davos for energy.” He observed that this Forum is unique in its recognition of energy as a cross-cutting issue and that this was reflected in the diverse experts who took part in the VEF.

Vassileva thanked the participants for the rich discussion and brought VEF 2017 to a close at 6:43 pm.

REPORT OF VEF 2017 SIDE EVENTS

The two days of side events for VEF 2017 opened on Tuesday morning, 9 May. The following summarizes a selection of these side events.

MEETING ENERGY GOALS BY 2030. WHAT NEEDS TO HAPPEN?

This event was organized by the World Bank and chaired by Malcolm Cosgrove-Davies, World Bank. LI Yong, Director General, UNIDO, opened the event noting that VEF 2017 will serve as a platform to discuss important linkages between energy, climate, development, and synergies among the SDGs. Malcolm then introduced two of the knowledge products that the World Bank has produced as a knowledge hub for the SEforALL Initiative: the Global Tracking Framework (GTF), which measures global- and national-level progress towards sustainable energy goals, and the Regulatory Indicators for Sustainable Energy (RISE), which assesses policy frameworks supporting sustainable energy.

Elisa Portale, World Bank, presented the GTF for the period 2012-2014, stressing that: electrification is projected to reach 91% by 2030, with all regions except Africa showing convergence towards universal access; access to clean cooking is lagging behind in Africa and in the Asia-Pacific region; energy efficiency is the closest of the SEforALL pillars to achieve the 2030 objectives; and most of the growth in renewable energy consumption comes disproportionately from the electricity and transport sectors over the heating sector.

Vivien Foster, World Bank, presented the RISE framework, stating that it is essentially a “policy scorecard” with breadth and depth into national policy development on energy access, energy efficiency and renewable energy uptake as a means to compare trends across countries and identify priority areas. Among the findings of the framework, she stressed that many countries with low energy access lack policies to encourage households to adopt solar power. Foster concluded by emphasizing that renewable energy policies “must shift from scaling up construction to ensuring integration” and that RISE indicators will be adapted to reflect policy innovation, but also to compare trends over time.

Christine Lins, Executive Secretary, REN21, offered comments on the presentations, noting that emerging economies are more invested in renewable energy than industrialized countries and emphasized the work of UNIDO in developing regional renewable energy centers as regional “accelerators” to generate action and investment on the ground.

Frank van der Vleuten, Ministry of Foreign Affairs, Netherlands, offered additional comments on the presentations, stressing that planning for achieving the SEforALL pillars is ultimately a task of national institutions, with the goal being to benchmark GTF and RISE data within domestic political economies of each country. He also stressed that “we shouldn’t misuse global statistics to come up with global solutions” and that a cultural change is needed before scaling up energy efficient solutions, particularly in the case of clean cooking.

In the ensuing discussion, participants raised, *inter alia*, whether the renewable energy and energy efficiency gap is a communication gap between policy-maker and end-user; the tendency of national governments to buy-in to renewable energy infrastructure at the expense of meeting basic needs such as clean cooking, and the effectiveness and enforcement of energy access and efficiency policies assessed by the RISE framework.

BUILDING THE EVIDENCE: GENDER INCLUSIVE ENERGY POLICIES ENABLING PROGRESS TOWARDS THE SDGS

This event was organized by UNIDO and ENERGIA and chaired by Sheila Oparaocha, ENERGIA.

Debjit Palit, The Energy Resources Institute, India, described a project involving India, Kenya and Nepal that explores the factors that enhance and restrict women’s empowerment through electrification. He noted that while electrification has gender impacts, it is not yet clear from research why and whether it really empowers women politically or socially. He suggested that often empowerment can only come through wider gender equality legislation and grassroots pressure.

Lucy Kitson, International Institute for Sustainable Development (IISD), discussed IISD’s four-year study of fossil fuel subsidies reform and how it might impact women. Noting a huge knowledge gap concerning energy policy choice impacts on women, she stressed that until those impacts are understood, any subsidies designed, or any subsidies reform undertaken, “may cause serious damage” to women’s access to energy.

Nthabiseng Mohlakoana, University of Twente, the Netherlands, outlined a research project, under the ENERGIA Gender and Energy Research Programme, on productive uses of energy in the informal food sector in Rwanda, Senegal and South Africa. She explained that the sector was picked because it is energy-intensive, involves micro-enterprise and has a strong involvement of women. She said the project has revealed dimensions of the sector often not taken into account in national and local development policies.

Jossy Thomas, UNIDO, described the evolution of UNIDO’s Gender Framework, including the 2016-2019 Strategy and the recently revised Policy on Gender Equality and Women’s Empowerment, and UNIDO’s efforts to build evidence on energy-gender dimensions during the UNIDO project cycle. He also provided examples of energy projects in Burkina Faso, Chad, Malaysia, Pakistan, Tanzania and Turkey promoting gender mainstreaming, women’s empowerment and/or women’s entrepreneurship.

Ana Victoria Rojas, International Union for Conservation of Nature (IUCN), introduced key findings from the Environment and Gender Information (EGI) platform, launched in 2013, to convey the value of gender-responsive environmental conservation and sustainable development through data and analysis.

She said EGI found gender is addressed in 82% of documents surveyed with strong emphasis on increasing rural access to energy. She noted, however, that there is less attention paid to urban areas without taking into account that urban energy poverty is prevalent as well. Rojas also noted that other gaps identified by EGI include the disparities in access to technology between women and men, and the missed opportunities in employing women in the energy sector.

In the ensuing discussions, participants highlighted the need to ensure energy access that not only leads to the economic empowerment of women but also political and social empowerment in parallel. Panel members suggested that country-level analysis is not enough and that it is necessary to identify concrete strategies to recommend how equitable energy access can be achieved.

INNOVATIVE BUSINESS MODELS TO ATTRACT SUSTAINABLE ENERGY INVESTMENT FOR SIDS AND LDCS

This event was organized by the Global Environment Facility (GEF) and moderated by Ming Yang, GEF.

Enele Sopoaga, Prime Minister, Tuvalu, said energy for sustainable development is very important for SIDS, since it is intimately linked to climate change, which for SIDS, is a question of surviving on their home islands.

Monica Maduekwe, ECREEE, discussed her Centre’s efforts to empower women in energy production. She told participants how the ECOWAS Women’s Business Fund built seven furnaces to dry and process fish with a revolving microcredit fund established to support women in accessing funds. She further explained that the women were provided training on financial, business and environmental management.

Hartlieb Euler, German Corporation for International Cooperation (GIZ), discussed how the “Energising Development” platform (EnDev) utilizes ICTs to help EnDev countries coordinate and cooperate through a website. He explained that this can be combined with a phone app that installers and NGOs at rural sites use to feed data into the system, creating a geospatial historical memory on what energy source is installed remotely where, who installed it, how it is financed, which ones require maintenance, when, and so on.

Isabel Cancela de Abreu, Executive Director, Climate Technology Centre & Network (ALER), explained how ALER facilitates projects in six African member countries and East Timor in both grid-connected and off-grid business models, providing examples of each. She attributed success in the former to government support, stable macroeconomic growth, risk management, stable policy and regulatory framework, and performance guarantees. For off-grid models, she highlighted a project in Guinea-Bissau that relied on a public-community

partnership (PCP) instead of the traditional PPP due to the weakness of the local private sector. In response to a question, she said the critical success factor for PCPs is the presence of a strong community association, while the key challenge is training community members.

Vincent Monteux, Founder, E-Longlife, explained how his firm has produced and is deploying in Africa, standalone, self-contained, mobile, long-lived lithium ion storage battery systems designed to operate in the most severe environments and can be installed in just 30 minutes. He explained that when the battery unit is connected to solar panels it forms a “solar home system” to power household appliances, or small workshops, commercial businesses, or farms.

ENERGY ACCESS REDEFINED: EMERGING FINDINGS FROM THE GLOBAL MTF (MULTI-TIER FRAMEWORK) SURVEY

This event, organized by the World Bank and moderated by Vivien Foster, World Bank, discussed preliminary results of the MTF in Rwanda and Kenya.

Dana Rysankova, Energy Sector Management Assistance Program (ESMAP), emphasized that current data on energy access concentrates on physical aspects of connection, but less on the quality attributes of peak capacity, availability, affordability, legality, and safety, which form the key attributes of the MTF. She described differences between the five tiers of the framework and stressed that the MTF serves to measure nuances in energy attributes with the objective of identifying major barriers to energy access.

Peace Kaliisa, Ministry of Infrastructure, Rwanda, highlighted the preliminary results of MTF implementation in her country. She noted that: the MTF raises electrification to 27% of the population by including off-grid solar solutions; a larger share of households in rural areas do not have electricity access; affordability, voltage problems and outages were key problems among grid-connected households; and high connection costs and distance to grids are the main barriers for households accessing the grid.

Murefu Barasa, Managing Partner, EED Advisory Limited, Kenya, presented the surveying strategy for MTF implementation in Kenya, noting that over 7,000 interviews were completed considering grid-based and non-grid based electricity, energy for cooking, energy consumption and costs, and household consumption among other data. He also emphasized lessons for survey collection for the MTF, including training approaches and standardizing questions according to local context.

Rodney Sultani, Ministry of Energy, Kenya, explained that the connectivity situation in Kenya has a limited corridor running between the southeastern part of the country to the northwestern part. He said that the country has established a target for universal connectivity by 2020. Sultani also mentioned that 650,000 Kenyan households use off-grid connections such as solar lanterns, solar lighting systems and solar home systems and that 70% of these solar devices were acquired in the last three years, with a sizeable portion of users having indicated they are satisfied or very satisfied with these devices. He noted

that access to solar devices used to charge mobile phones has resulted in multiple mobile phone applications including the use of mobile money to transfer funds and pay bills.

Zhihong Zhang, CIF, introduced the Scaling Up Renewable Energy in Low Income Countries Program (SREP). He emphasized that the US\$830 million programme seeks to empower transformation in developing countries by demonstrating the economic, social and environmental viability of renewable energy.

Carsten Hellpap, GIZ, promoted the focus on off-grid areas in rural communities and asserted that off-grid solutions are often not sufficiently taken into consideration despite major contributions made by numerous countries. Hellpap also stressed the gap in regular reporting and gathering data and that more routine information and analysis is needed to examine which sector is moving forward and which is not.

Johanna Diecker, Global Off-Grid Lighting Association, echoed Hellpap’s comments, advising not to underestimate off-grid solutions, which are clearly working. She also suggested greater communication between the various stakeholders so that users, companies, and policy-makers are aware of users’ different needs and to ensure that more education is provided regarding electrification.

CLEAN ENERGY FOR MIGRANTS AND VULNERABLE GROUPS

This event was organized by UNIDO, EUEI PDF and the Austrian Federal Ministry for Europe, Integration and International Affairs. The event was chaired by Gerardo Patacconi, UNIDO, who underscored the role that energy and security plays on drivers of migration.

Michael Spindellegger, Director-General, International Centre for Migration Policy Development (ICMPD), stressed that regular migration is “only possible if people are not forced to migrate, but have migration as a choice of livelihoods among many.”

Daniel Werner, EUEI PDF, presented the results of an analytical matrix to assess the role of energy on migration. He noted that energy access provides economic drivers to curtail migration before it occurs by upgrading value chains, improving food security and enhancing business productivity. He suggested that the electrification of informal settlements, where refugees reside, may prevent further migration as well as provide opportunities to improve livelihoods for migrants and host communities. He emphasized the potential to turn political issues regarding migration into economic opportunities for host countries, including through new local energy markets.

Paul Quigley, Office of the UN High Commissioner for Refugees (UNHCR), acknowledged that “from day 1, the refugee crisis is as much a development issue as a humanitarian issue” and noted that development priorities for refugees are often the same that host communities have. He identified the need to increase refugees’ access to energy for productive processes, including for education and business development, as well as to support initiatives which provide refugees the access to work and the right to move within the host country.

Sarah Rosenberg-Jansen, Practical Action, UK, emphasized the need for holistic planning tools which focus on a bottom-up and inclusive understanding of the “lived experiences” of refugees, whose energy needs may differ from one part of a refugee camp to another.

Tanja Dedovic, International Organization for Migration (IOM), stated that while traditionally the issue of migration has been separate from access to energy, member countries are requesting regular updates on energy, migration and development. Dedovic noted that it is essential to engage the diaspora community with energy solutions and regard migrants as formidable partners.

Subsequent discussions touched upon effective ways migrant communities and access to energy can be achieved. Spindelegger pointed out that work at the regional level may prove more impactful to promote energy connectivity and is less fiscally-driven than private sector efforts. He said regional governments are much more interested and dedicated to find concrete ways for people to gain access to energy for the long-term benefit of the region itself.

Rosenberg-Jansen noted that smaller scale decentralized solutions like solar lamps, solar hybrid mini-grids and solar home systems technologies are viable options for enabling local schools, hospitals and community centers to gain access to energy.

Quigley supported statements made by other panel members, adding that solutions must be context-specific to understand which technology is needed for each community.

TECHNOLOGY TRANSFER TO FOSTER INCLUSIVE AND SUSTAINABLE INDUSTRIALIZATION

This event was organized by UNIDO and chaired by Kazuhiko Hombu, Advisory Board, CTCN.

Obaid Amrane, Moroccan Agency for Sustainable Energy (MASEN), discussed his Agency’s development and experience in its efforts to realize Morocco’s target of 42% renewable energy contribution to power generation by 2020. He explained that MASEN’s work rests on four pillars: power generation, including concentrated solar and a concentration/photovoltaic hybrid; industrial integration, including creation of “solar clusters” and incubators for innovative projects; local development; and R&D, with a view to reducing dependence on foreign technologies.

Hiroyuki Kobayashi, Japan International Cooperation Agency (JICA), explained that JICA is required to work on SDGs 7 (energy) and 13 (climate) simultaneously. He said that while innovation and technology can find breakthrough solutions in developing countries, these countries continue to face institutional and human resource capacity building problems. He noted therefore that JICA always features this component in its development assistance projects.

Mari Yoshitaka, Mitsubishi UFJ Morgan Stanley Securities, explained the global architecture of climate finance and technical support for financing, including the GEF, Green Climate Fund (GCF), the Joint Crediting Mechanism (JCM), and CTCN. She discussed issues with low-carbon technology

transfer for attracting private sector involvement, such as lack of long-term finance, high interest rates and low electricity prices. She provided examples of GCF funded projects and CTCN technical assistance in Africa.

Inhee Chung, Global Green Growth Initiative (GGGI), explained that the GGGI does not look at energy in isolation, but together with other sectors, since all four “E’s” are considered critical: economics, environment, environment and equity. She said all GGGI energy projects are rooted in the country’s national development plan and aim to expand access to affordable, sustainable energy services.

REGIONAL INCUBATION NETWORKS TO ACCELERATE SUSTAINABLE ENERGY INNOVATION, ENTREPRENEURSHIP AND INDUSTRIAL DEVELOPMENT

This event was organized by UNIDO and chaired by Philippe Scholtès, UNIDO. Giordano Dichter, European BIC Network (EBN), explained that the EBN is a network of 150 certified business and innovation centers (BICs) that support some 1,200 companies annually involved in the energy sector. He discussed some of the problems found in energy sector incubation, including lack of harmonized policies and long lead times required to get to market.

Ashraf Kraidy, on behalf of Ahmed Badr, Executive Director, Regional Center for Renewable Energy and Energy Efficiency, said his Centre focuses on renewable energy and energy efficiency and recently has tackled how to promote the development of SMEs in energy services, private sector participation, and decentralization of the power sector.

Al Binger, Executive Director, Caribbean Centre for Renewable Energy and Energy Efficiency, discussed the difficulties faced by Caribbean SIDS, including high debt, petroleum import dependency, economies dependent on tourism and agriculture, and climate vulnerabilities. He said that while Caribbean SIDS have strong potential in geothermal, solar, wind and even ocean thermal energy conversion, they still have difficulty attracting investors.

Solomone Fifita, Interim Director, Pacific Centre for Renewable Energy and Energy Efficiency, explained that Pacific SIDS have set very ambitious energy targets, and have asked the Centre to assist them in: drafting and adopting energy sector laws providing legislative authority for national energy offices; developing new approaches to capacity building and training that lead to industry-recognized accreditation; placing more emphasis on energy efficiency, especially in land and maritime transport; and maximizing opportunities under climate financing.

Mahama Kappiah, Executive Director, ECREEE, explained that the Centre’s main mandate is to develop new energy markets and energy efficiency markets through work on policies, capacity building, awareness raising and investment promotion. He said ECREEE has helped develop ECOWAS regional policies on renewable energy and energy efficiency, introduced two centers to support entrepreneurs through mentorship, and provided certification training for installers.

Kudakwashe Ndhlukula, Executive Director, SADC Centre for Renewable Energy & Energy Efficiency, explained that his region is dominated by government-connected utilities, with heavy coal use, and has countries with very different levels of industrialization. He said regional challenges include rural electrification, promoting greater private sector participation, capacity building, linking projects with financing, and promoting gender in energy entrepreneurship.

Chair Scholtès noted six basic types of services that the regional centers provide: information sharing and awareness raising; skills development, entrepreneurship development and coaching; fostering uptake of renewable energy and energy efficiency technologies; policy work, institution building and certification; and finance and access to finance.

POLICY AND INNOVATION FOR ENERGY AND CLIMATE CHANGE: ACHIEVING A LOW-CARBON SOCIETY

This event was organized by UNIDO, the New Energy and Industrial Technology Development Organization (NEDO), Japan, and the Innovation for Cool Earth Forum (ICEF), Japan. The session was chaired by Stephan Sicars, UNIDO.

Hiroyuki Tezuka, Keidanren, Japan, described Japan's plan for developing and disseminating low-carbon technologies using the case of Japan's crude steel industry. He also shared lessons from the Japanese industry for promoting low-carbon technology, including the provision of tax incentives to encourage R&D, the need for numerical targets to raise public investment in R&D, and building an international framework for the development of innovative technologies.

Sumiko Takeuchi, Director, 21st Century Public Policy Institute, presented on Japan's energy and environmental policy, noting that the country's power generation capacity has reduced by 30% following the tsunami in 2011. She recognized the need to share experiences on voluntary emissions reduction efforts of Japanese industry sectors; contribute to the emissions reduction of other countries through technological transfer of Japanese technologies, and advocate for international R&D.

André Faaij, University of Groningen, stressed that "massive investments" are required to enable the global energy transition for rapid cost reductions in renewable energy technologies, reduced pressure on fossil fuel supplies, and a more secure global energy supply. He noted that progress in solar and wind energy has exceeded expectations in recent years, leading to increasing market penetration, but that more efforts are needed to promote bio-based economy options and carbon capture and storage (CCS).

George Erdmann, ICEF, explained that his organization was launched by Japanese Prime Minister Shinzo Abe in 2014, and that possible themes up for discussion during the fourth annual meeting slated for October 2017 will be social system innovation, energy storage, grid operation, and business action to tackle climate change.

During subsequent discussions panelists agreed that in order for successful commercialization of carbon dioxide technologies to occur, there must be an interface between government,

researchers, industry and the market. Chair Sicars noted that governments must be willing to fund and trust in innovative research with the understanding that technologies being developed will not be market-ready for another 10-20 years. Tezuka emphasized that a single company must work together with others to streamline innovative ideas.

Chair Sicars concluded by noting that there is optimism that technological innovation can achieve a low-carbon society, but that it is also important to incorporate the contributions of developing countries, which are often consistently seen as technology "takers."

TRENDS AND CHALLENGES IN SMART CITY DEVELOPMENT: EXPERIENCES FROM VIENNA

This event was organized by GFSE, TINA Vienna GmbH, the City of Vienna, ADA, and the Austrian Ministry for Agriculture, Forestry, Environment and Water Management (BMLFUW). The event was chaired by Irene Giner-Reichl, President, GFSE. She noted significant challenges for urban life to ensure clean air, clean water and uncontaminated soil.

Ina Homeier, City of Vienna, presented the smart city strategy for Vienna, noting that it is Europe's first legally binding plan. Homeier asserted that the main objective of the plan is resource protection, while preserving the quality of life for citizens through social and technological innovation.

Lukas Lang, wien3420, introduced the wien3420 development plan intended to create the Seestadt neighborhood, on the outskirts of Vienna, which caters to a smart city framework strategy of: high quality of life, sustainable energy usage and innovation.

Carel Snyman, South African National Energy Development Institute, addressed how South Africa is moving towards creating smart cities where energy efficiency will produce an environment conducive to the movement of people rather than the traditional focus on the movement of vehicles.

Edison Masereka, Kampala Capital City Authority, Uganda, described how Kampala is making efforts towards sustainable urban planning as the city continues to grow. He identified "smart" municipal services the city is planning as well as governance challenges in coordinating mandates between municipalities and the central government.

Richard Woschitz, CEO, Woschitz Group, spoke about the world's highest wooden hybrid skyscraper currently under construction in Vienna, as a mixed residential and commercial building. He mentioned the energy savings associated with incorporating wood in building construction, noting considerable CO₂ savings in comparison to a fully concrete building.

In the subsequent discussion, panelists discussed the challenge of coordinating urban planning mandates for sustainability and ensuring that innovative technologies are showcased and linked to urban residents' needs. Panelists also discussed the key role of gender considerations in "smart" urban planning, including by supporting women entrepreneurs in designing sustainable transport systems and in linking clean cooking to the health considerations and "lived experiences" of women for improving their well-being.

SCALING UP ENERGY EFFICIENCY FINANCING: LESSONS LEARNED FROM THE CLIMATE INVESTMENT FUNDS (CIF)

This event was organized by the CIF, and chaired by Zhihong Zhang, CIF. Neeraj Verma, Small Industries Development Bank of India (SIDBI), discussed the Partial Risk Sharing Facility (PRSF) project in India supported by the World Bank and the GEF. He explained that the PRSF provides guarantees to sub-financers to fund energy efficiency projects in large companies, micro and small enterprises, and municipalities. He detailed the technical assistance SIDBI provides to overcome barriers, such as developing standard appraisal and transaction documents, reporting templates, and marketing tools.

Among lessons learned, Verma cited the need for: building capacity of loan officers and building a culture of cash flow-based lending; creating an association of energy service companies (ESCOs); a policy push to upscale the ESCO market in India; digitalization and standardization of the energy audit process and its reporting; and a credible source of energy efficiency vendors, suppliers and manufacturers.

Mohit Kkarti, Energy Efficiency Services Limited (EESL), India, described the work of EESL, which he characterized as a “Super ESCO” that aggregates demand for energy efficiency projects, provides cost reduction and ensures quality of products and services with payments made using the PAYG model. She described projects involving LED bulbs, LED tubes, more efficient water pumps for agriculture and municipal waste/sewage services, and improving building efficiency. He said EESL plans to embark on appliance replacement with efficient models.

Ashok Sarkar, World Bank, observed that the biggest challenge in India has been access to financing, noting that India already has appropriate policies and targets in place. He said the key to success was getting Indian banks to mainstream energy efficiency lending, since public funding is limited.

Santiago Creuheras, Energy Secretariat, Mexico, discussed scaling up energy efficiency finance in Mexico, including programmes to: promote energy-efficient housing; replace incandescent light bulbs with compact fluorescents in rural zones; promote replacement of commercial equipment, such as commercial refrigerators and electrical power substations with more efficient models; promote energy efficient equipment in agro-industry; identify energy efficiency opportunities in municipal transport, building, public lighting, water and wastewater, power, heating and waste management sectors; and undertake energy efficiency upgrades in hospitals and public schools.

Noting the importance of Mexico’s agro-industrial sector to energy and water consumption and GHG emissions, Ernesto Fernández Arias, Trust Funds for Rural Development (FIRA), explained how FIRA is seeking to modernize the sector through an innovative risk mitigation mechanism that seeks to reduce uncertainty as the main risk to energy efficiency uptake. He said the programme is targeting six technologies commonly

used in the sector: engines; solar pre-heaters; air compressors; cogeneration systems; cooling and refrigeration systems; and boilers.

Omar Villacorta, Inter-American Development Bank (IDB), said the IDB intends to increase its climate change financing, including for sustainable energy and energy efficiency, to 36% of the bank’s portfolio in coming years. He reported that the bank is working with other Latin American countries to adapt and adopt the tools used by FIRA to improve efficiency in their agro-industry sector.

Ahmet Tohma, Garanti BBVA Group, Turkey, noted Turkey has enormous energy efficiency potential, but several challenges prevented its realization until a programme supported by the European Bank for Reconstruction and Development (EBRD) and the CIF provided a credit line to support on-lending by Turkish banks to private sector borrowers for energy efficiency and small-scale renewable energy investments. Tohma reported that the facility has helped close the funding gap, and that the programme will attempt to address other barriers such as legal issues, transparency and incentives.

Adonai Herrera-Martínez, European Bank for Reconstruction and Development (EBRD), remarked that the secret to the success of the Turkey programme was that the credit line mechanism used was mature and well-understood and that Turkey was “hungry” for improving energy efficiency.

FUTURE ENERGY SCENARIOS FOR SUB-SAHARAN AFRICAN CITIES: UNLOCKING OPPORTUNITIES FOR CLIMATE RESPONSIVE DEVELOPMENT

This event was organized by EUEI-PDF and ICLEI - Local Governments for Sustainability, and chaired by Belinda Mills, ICLEI Africa.

Tania Rödiger-Vorwerk, BMZ, stressed that the substantial infrastructure demands required for growing African cities pose challenges but also provide opportunities for leapfrogging path-dependent scenarios of energy poverty. She noted that her ministry is advising on regulatory frameworks at both national and municipal levels to develop capacities for renewable energy development to accelerate an energy transition.

Silvia Escudero, EUEI-PDF, presented a study which identified megatrends that will shape the future of African cities, including: population growth and demand for energy; and classified drivers that will influence urban development and “wild cards” of potential risks in avoiding unsustainable futures. She presented four possible scenarios developed by the study, which compare reliance on a centralized energy model and weak implementation capacity of municipalities in urban planning with a decentralized energy model coupled with technological innovation. She emphasized key messages of the study, including growing informal settlements, lack of energy access and limited financial and human resources for municipalities.

Chair Mills then posed several questions to panelists regarding challenges to providing energy access in sub-Saharan African cities. David Hees, Sustainability Institute, stressed the potential of PPPs and that a multi-pronged approach is required to assure affordable housing, water, sanitation and electricity in relation

to growing populations. He noted that municipalities will need to not only streamline their services, but also increase their rates of service provision. Edison Maserekwa, Kampala Capital City Authority, stated that coordination between national and municipal governments will be a key development challenge, given traditionally centralized management decisions in African cities. Felix Akrofi-Atitianni, ICLEI, emphasized that capacity is a significant concern for urban municipalities and that capacity building efforts must be closely linked to access to finance. He said this financing should be suited to the needs and concerns of individual municipalities through a mix of subsidies, grants and green bonds.

WORKING WITH BUSINESS LEADERS TO CATALYZE ACTION ON ENERGY EFFICIENCY AND CHANGE

This event was organized by UNIDO and Carbon Trust, and chaired by James Wilde, Managing Director, Carbon Trust. Rana Ghoneim, UNIDO, introduced the Global Industrial Energy Efficiency Accelerator platform, explaining that this platform brings together like-minded partners to drive productivity, create jobs, lower utility costs and improve health. Ghoneim stressed that private sector engagement is important to ensure that there is a market pull for the programme.

Mohamed El Haouari, Moroccan Energy Efficiency Agency, offered a country-level perspective on working towards more energy efficiency in industry. He said that in 2008, Morocco set up a new strategy on renewable energy, noting that challenges and barriers include communicating with industries throughout the country and monitoring and verifying the impacts of new measures.

Milind Deore, Bureau of Energy Efficiency, India, detailed outcomes of India's 2008 adoption of a national mission for enhanced energy efficiency. He said US\$3.8 billion was invested to encourage investments for energy-efficient technologies for domestic manufacturing.

Olga Victoria González González, Energy and Mining Planning Unit (UPME), Colombia, reported on her country's new national energy efficiency plan for 2017-2022, which sets indicative targets and includes innovations such as: new institutional arrangements and rules; the development of markets for energy efficiency products and services, through incentives; stringent and clear energy savings targets and actions for energy-intensive sectors in industry and transport, based on a detailed assessment of their energy use and energy savings potential; an energy labeling programme for appliances; and energy audits for SMEs.

GLOBAL RESEARCH INITIATIVES IN SUPPORT OF THE 2030 DEVELOPMENT AGENDA AND THE PARIS AGREEMENT

This event was organized by IIASA, and chaired by Barbara Willaarts, IIASA. Nebojsa Nakicenovic, IIASA, drew examples of how climate action, energy use and sustainable water usage are interlinked and the importance of taking an integrated and cross-sectoral view of how to address the SDGs.

Keywan Riahi, IIASA, presented on the linkages between climate and development policies. In addition to maximizing synergies between SDGs, he pointed out that local contexts must be taken into account when forming policies.

Simon Langan, IIASA, emphasized the importance of "nexus thinking" in ensuring that society uses land sustainably to produce energy, with minimal impacts on water provisioning and food security. He described shared socioeconomic pathways and systems-approach modelling which focus on resource-use efficiency and which seek multidimensional solutions that go beyond simply bringing together ministries of water, energy and land.

Pradeep Monga, Deputy Executive Secretary, UN Convention to Combat Desertification (UNCCD) Secretariat, emphasized that the SDGs cannot be addressed in silos and highlighted the potential for investing in sustainable land-use management as a direct link between sustainable energy production, water and food security, reducing pressures for migration, and for climate change adaptation. He also noted the need to adopt a "business-model approach" in administering public financing to ensure a focus on land degradation hotspots.

In the ensuing discussion, participants spoke about scenario modelling and narratives for achieving the SDGs in the long-term; the potential for renewable technologies in promoting clean cooking strategies; the governance and implementation challenges of developing a water-energy-land management policy nexus; and the interaction of integrated climate change policies with the role of women as agents of change.

SHOWCASING INNOVATIVE AUSTRIAN CLEAN ENERGY TECHNOLOGIES

This event was organized by GFSE, Austrian Economic Chamber (WKO), BMLFUW, and ADA. The event was chaired by Cornelia Schenk, ADA.

Franz Bachleitner, WKO, noted that Austria is seeking to reach 100% energy self-sufficiency and that Austrian companies are active in energy-related research, start-ups and the export of related products and services. He offered WKO's help, together with that of ADA and other Austrian government agencies, in helping to overcome any market barriers to innovative energy technology.

Federico Villatico-Campbell, CTCN, explained how CTCN functioned as an operational arm of the UN Framework Convention on Climate Change's Technology Mechanism and its services in: technical assistance; capacity building, including an incubator for least developed countries, soon to expand to SIDS; and knowledge management and networking. He noted that the highest demand for CTCN services was for technical assistance, including technology identification and prioritization, strengthening of technology policies and regulations, enhancing project readiness and facilitating financing.

Robert Söll, SOLID, Austria, described his firm's turnkey solutions for solar thermal systems are larger than one megawatt, including engineering and plant construction, ESCO services, R&D, and consulting. He said his target markets were large buildings, complexes, and certain industries such as food

processing. He highlighted a recently completed solar air conditioning and hot water production system installed for a large hospital in Nicaragua.

Andreas Feichtinger, Gildemeister Energy Solutions, said his company provided energy storage batteries with lifespans of about 20 years, and that it was seeking projects in emerging countries, especially with renewable energy systems such as solar or wind turbines.

Manfred Stockmayer, Likano Climate Protection Projects, said his firm provided know-how, rather than hardware technology, with a focus on two types of projects: highly-efficient affordable cookstoves and clean water. He identified company projects seeking to distribute cookstoves around national parks in developing countries so that less wood is collected and consumed, reducing impacts on the parks.

Robert Buchinger, CEO, Sunlumo Technology, said his company seeks to make small-scale solar energy systems affordable to everyone, particularly in rural areas with poor people and in the off-grid sector more generally. He said Sunlumo systems sell for only €180, using a PAYG model so that people can pay for the system in installments when they pay their phone bill.

PROMOTING WOMEN TO ADVANCE THE GLOBAL ENERGY TRANSITION

This event was organized by REN21 and UNIDO, and chaired by Irene Giner-Reichl, GFSE, who stated that one effective way to accelerate the global energy transition would be to address the under-representation of women in the energy sector.

Philippe Scholtès, UNIDO, reiterated UNIDO's commitment to incorporate equitable gender inclusiveness in its operations and the programmes it funds. Inga Rhona King, Island Women Open Network (IWON), pointed out that "stubborn" pockets of poverty persist in SIDS regions for women and that IWON sees opportunities within the energy sector to remedy this.

Tania Rödiger-Vorwek, BMZ, discussed how EnDev promotes sustainable access to modern energy services to poor communities in several African countries. She explained that this programme has helped 70 million people gain access to energy and safe cooking tools and is also important in engaging women in these regions at the policy-making level.

Mahama Kappiah, Executive Director, ECREEE, stated that ECREEE has received a US\$1 million project grant that will ensure West African women entrepreneurs have universal access to energy by 2030, with a 25% increase in women participation in energy-related fields in the private sector by 2020.

Emily Koulouvaris, Managing Director, Revelle Group, Belgium, shared a personal story of the challenges she faced as an immigrant and woman entrepreneur in the energy sector, noting the role of both education and self-confidence in promoting women in the workplace.

Thelma Venichand, General Manager, ZOE Enterprise, Lda., Mozambique, described her efforts in creating jobs for women in the energy sector in Mozambique and presented a video of

her company's ethanol-based cooking fuel, which illustrated its health, safety and affordability in relation to charcoal-based fuel that exacerbates deforestation and climate change.

Christine Lins, Executive Secretary, REN21, noted the gender gap in the renewable energy sector and stressed the importance of attracting young women into science and math education to promote women in advancing the global energy transition.

In discussion, participants identified the need for: men as gender champions; more support systems for women in the sector; and harnessing the multiplier effect of gender mainstreaming within civil society and the private sector.

UPCOMING MEETINGS

UNGA High-Level Event on Innovation: Building on the Multi-Stakeholder Forum on Science, Technology and Innovation for the Sustainable Development Goals (STI Forum), the UNGA President is convening a High-Level Event on Innovation and Connectivity. Leading innovators from major corporations will interact with Member States on how emerging technologies can transform efforts aimed at the successful implementation of the 2030 Agenda for Sustainable Development. The event is part of a series of 'High-Level SDG Action Events' that will be convened to advance the theme of the 71st UNGA session, to deliver a universal push for implementation of the SDGs. **date:** 17 May 2017 **location:** New York City, US **contact:** Office of UNGA President **www:** <http://www.un.org/pga/71/event-latest/high-level-event-on-innovation/>

Asia Clean Energy Forum: This is a networking and knowledge-sharing event dedicated to clean energy and energy access in Asia. Participants will take part in plenary sessions, deep dive workshops, technical seminars, and other chances for learning and networking. **dates:** 5-8 June 2017 **location:** Manila, Philippines **contact:** Connie Sayon, Forum Secretariat **phone:** +63 2 632 4444 **fax:** +63 2 636 2444 **e-mail:** cleanenergy@adb.org **www:** <http://www.asiacleanenergyforum.org>

Clean Energy Ministerial 8 (CEM8): CEM is a high-level global forum to promote policies and programmes that advance clean energy technology, to share lessons learned and best practices, and to encourage the transition to a global clean energy economy. Initiatives are based on areas of common interest among participating governments and other stakeholders. **dates:** 6-8 June 2017 **location:** Beijing, China **contact:** Wang Mu, Chinese Wind Energy Association **email:** liaison-office@cwea.org.cn **phone:** +86 10 59796665 **fax:** +86 10 64228215 **www:** <http://bjcem8.mi2.medcon.org.cn/en/>

Expo 2017: Future Energy: The Expo, organized under the theme 'Future Energy' and the sub-theme 'Solutions for Tackling Humankind's Greatest Challenge,' will address future energy from several perspectives, including: exploration of strategies, programmes and technologies for sustainable energy development; promotion of energy security and efficiency; and the encouragement of renewable energy use. **dates:** 10 June to 10 September 2017 **location:** Astana, Kazakhstan **contact:** Expo 2017 Press Office **phone:** +7 7172 91 94 63 **e-mail:** info@expo2017astana.kz **www:** <http://www.expo2017astana.com/en>

Ministerial Conference and the Eight International Forum on Energy for Sustainable Development: The Forum will combine a ministerial meeting followed by a high-level plenary session with parallel workshops and site visits. The Forum is organized by the Government of Kazakhstan and the UN Regional Commissions. The event builds off of the Seventh Forum, which defined challenges and developed a concrete roadmap for the international community to achieve common goals. **dates:** 11-14 June 2017 **location:** Astana, Kazakhstan **contact:** Zafar Samadov **email:** zafarsamadov@hotmail.com **phone:** +32 497635608 **www:** <http://www.energyministerial.kz>

EU Sustainable Energy Week: The conference is dedicated to sustainable energy policy issues. Sessions organized by the European Commission and energy stakeholders debate new policy developments, best practices and sustainable energy ideas, while networking events forge alliances. **dates:** 19-25 June 2017 **location:** Brussels, Belgium **contact:** European Commission **www:** <http://www.eusew.eu>

III Ministerial Meeting of the Energy and Climate Partnership of the Americas (ECPA): The ECPA convenes energy ministers, national authorities and others, to provide an opportunity to sharpen priorities, strengthen cooperation, and deepen commitment to a transition to sustainable energy. **dates:** 7-8 September 2017 **location:** Viña del Mar, Chile **contact:** Juan Cruz Monticelli, ECPA Technical Coordination Unit Manager **email:** jmonticelli@oas.org **www:** <http://ecpamericas.org/Ministerial-Meetings/ECPA-2017-Ministerial.aspx>

2017 International Renewable Energy Conference (IREC): IREC 2017 will focus on global renewable energy development with a special focus on Latin America. Initiated at the renewables2004 conference in Bonn, IREC is a high level political conference series dedicated to renewable energy policy worldwide. IRECs are hosted by alternate governments every two years and convened by REN21. **dates:** 11-14 September 2017 **location:** Mexico City, Mexico **contact:** REN21 Secretariat **email:** secretariat@ren21.net **phone:** +33 1 44 37 50 91 **fax:** +33 1 44 37 50 95 **www:** <http://www.ren21.net/irecs/mexirec-2017/>

Fifth Annual International Conference on Sustainable Development (ICSD): The Fifth Annual International Conference on Sustainable Development (ICSD) will take place on the theme, ‘The World in 2050: Looking Ahead for Sustainable Development.’ The 27 conference topics will cover all 17 SDGs and a number of cross-cutting issues, including data, the role of universities in achieving the SDGs, and the arts as a tool to raise awareness of the SDGs. **dates:** 18-20 September 2017 **location:** New York City, US **email:** info@ic-sd.org **www:** <http://ic-sd.org>

Innovation for Cool Earth Forum (ICEF) 4th Annual Meeting: ICEF aims to address climate change through innovation by investigating what innovative measures should be developed, how innovation should be promoted and how cooperation among stakeholders could be enhanced. **dates:** 4-5 October 2017 **location:** Tokyo, Japan **contact:** ICEF Secretariat **email:** icef-reg@congre.co.jp **www:** <http://www.icef-forum.org/>

UNFCCC COP 23: The 23rd session of the Conference of the Parties (COP 23) to the UNFCCC will be organized by Fiji and hosted at the headquarters of the UNFCCC Secretariat in Bonn, Germany. **dates:** 6-17 November 2017 **location:** Bonn, Germany **contact:** UNFCCC Secretariat **phone:** +49 228 815 1000 **fax:** +49 228 815 1999 **e-mail:** secretariat@unfccc.int **www:** http://unfccc.int/meetings/unfccc_calendar/items/2655.php?year=2017

World Future Energy Summit: The World Future Energy Summit (WFES) is the world’s leading global exhibition dedicated to advancing future energy, energy efficiency and clean technology. WFES brings together over 30,000 visitors from 175 countries attracting government leaders, policy makers, entrepreneurs and thought leaders. **dates:** 15-18 January 2018 **location:** Abu Dhabi, United Arab Emirates **contact:** Afrina Nasrin **phone:** +971 2 4090387 **email:** afrina.nasrin@reedexpo.ae **www:** <http://www.worldfutureenergysummit.com>

GLOSSARY

ADA	Austrian Development Agency
BMZ	Federal Ministry of Economic Cooperation and Development
CIF	Climate Investment Funds
CTCN	Climate Technology Centre & Network
ECOWAS	Economic Community of West African States
ECREEE	ECOWAS Centre for Renewable Energy and Energy Efficiency
EUEI PDF	European Union Energy Initiative Partnership Dialogue Facility
GEF	Global Environment Facility
GFSE	Global Forum for Sustainable Energy
GHGs	greenhouse gases
GTF	Global Tracking Framework
ICEF	Innovation for Cool Earth Forum
ICT	information and communications technologies
IIASA	International Institute for Applied Systems Analysis
MTF	Multi-Tier Framework
PAYG	pay-as-you-go
PPP	public-private partnership
REN21	Renewable Energy Policy Network for the 21st Century
RISE	Regulatory Indicators for Sustainable Energy
SDGs	Sustainable Development Goals
SEforALL	Sustainable Energy for All
SIDS	Small Island Developing States
SMEs	small and medium-sized enterprises
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
VEF	Vienna Energy Forum