



ANNUAL CONFERENCE 2019

**21-22 OCTOBER 2019
SEOUL, REPUBLIC OF KOREA**



EXECUTIVE SUMMARY

Established in January 2012, the Green Growth Knowledge Partnership (GGKP) is dedicated to advancing the green growth agenda around the world by offering practitioners and policymakers the policy guidance, good practices, tools and data necessary to support the transition to a green economy.

The GGKP, under the leadership of the Global Green Growth Institute (GGGI) and other partner institutions—including the Organisation for Economic Co-operation and Development ([OECD](#)), United Nations Environment Programme ([UNEP](#)), United Nations Industrial Development Organization ([UNIDO](#)) and [World Bank](#)—convened leading experts, practitioners, academics from the energy sector and other relevant stakeholders for the [Seventh GGKP Annual Conference](#) in Seoul, Republic of Korea, on 21-22 October 2019, as part of the Global Green Growth Week (GGGW) 2019.

Hosted by GGGI, the two-day conference kicked off with welcoming remarks from former UN secretary-general Ban Ki-moon, who currently serves as the president and chair of GGGI. In his video address, he highlighted that the transition towards renewable energy is not only about challenges, but also presents new opportunities to modernize energy systems, accelerate and diversify economies, create green jobs, increase productivity and competitiveness, and reduce poverty.

Following his remarks, Arthouros Zervos, Chair of [REN21](#), delivered a keynote address on the potential benefits associated with energy transformation. He emphasized that achieving progress in climate and development requires not only expanding the roles of renewable energy, but also curtailing the use of fossil fuel.

A main component of the annual conference was presentations of scientific papers on a range of subjects related to sustainable energy. This year, 25 research papers were presented, highlighting key challenges, insights, and innovations and solutions for dramatically scaling up sustainable energy,



including on exploring objectives, factors and technology innovations to inform power sector decisions and financing for renewable energy projects. In addition, three high-level panels—with representatives from Denmark, the Philippines, Burkina Faso, Papua New Guinea, Colombia, Austria, the United Arab Emirates and elsewhere—discussed successful approaches to achieve national economic growth and energy security objectives by scaling up clean energy.

On day two of the meeting, International Renewable Energy Agency ([IRENA](#)) Director-General Francesco La Camera highlighted the need for countries to fully replace fossil-based energy systems with renewable energy and other sustainable energy systems. “We have to create a market that accelerates renewable energy,” he said.

During the conference, the GGKP Secretariat introduced the recently launched [Green Finance Platform](#) and [Green Industry Platform](#), as well as the refreshed Green Growth Knowledge Platform. The head of the GGKP Secretariat, Benjamin Simmons, also shared the idea of launching a new interactive online community space focusing on specific sector and thematic areas in 2020. He emphasized that urgent actions are required to rapidly transform the global energy system to green energy and committed the GGKP partnership to supporting this effort.

Following his message, Mark Radka, the chief of the UNEP Energy and Climate Branch, announced that the next GGKP Annual Conference will be hosted in Dubai, United Arab Emirates, in 2021.

The meeting concluded with an award for the best overall paper presented to Tim Reber, Project Lead for International Programs at the National Renewable Energy Laboratory (NREL), for [Green Micro-grid Business Models to Scale Up Investment: Productive Use, Financial Bundling and Tariff Strategies](#), and the best paper by a young researcher to Hemen Mark Butu, PhD Researcher at the Institute of Global Climate Change and Energy, Kyungpook National University, Daegu, Korea, for [Barriers to Financing Renewable Energy in Sub-Saharan Africa and Exploring an Innovative Crowdfunding Model: A Case of Nigeria and Cameroon](#).

The following report provides an overview of each of the conference’s individual sessions.

All papers, presentations, photos and videos from the conference can be found at: ggkp.org/ggkp7

STUDENT CONFERENCES



Global
Green Growth
Week 2019
October 21 - 25, 2019
Unlocking Renewable Energy Potential

Yerim

Chang

Global
Green Growth
Week 2019
October 21 - 25, 2019
Unlocking Renewable Energy Potential

Yolanda

Goncalves

Mozambique

DELEGATE

Wendingnec
October 21 - 25, 2019
Unlocking Renewable Energy Potential

Tiyeikhan
October 21 - 25, 2019
Unlocking Renewable Energy Potential

Huying
October 21 - 25, 2019
Unlocking Renewable Energy Potential

Yanling
October 21 - 25, 2019
Unlocking Renewable Energy Potential

Yanling
October 21 - 25, 2019
Unlocking Renewable Energy Potential

Yanling
October 21 - 25, 2019
Unlocking Renewable Energy Potential

Yanling
October 21 - 25, 2019
Unlocking Renewable Energy Potential

Yanling
October 21 - 25, 2019
Unlocking Renewable Energy Potential

Yanling
October 21 - 25, 2019
Unlocking Renewable Energy Potential

Yanling
October 21 - 25, 2019
Unlocking Renewable Energy Potential

2 KEYNOTES

3 HIGH-LEVEL
PANEL
SESSIONS

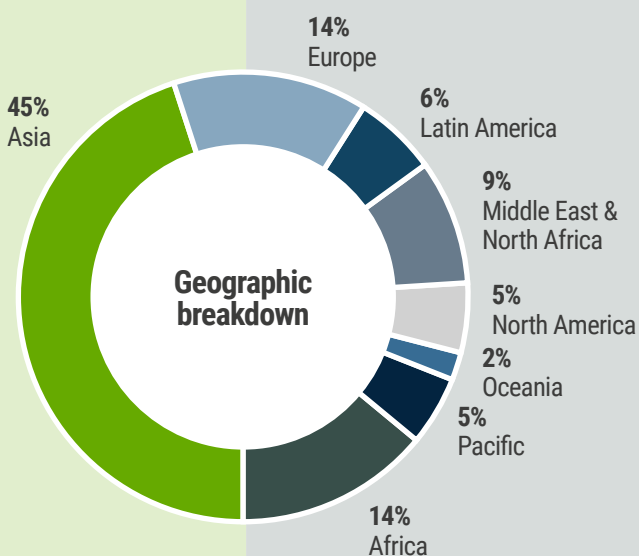
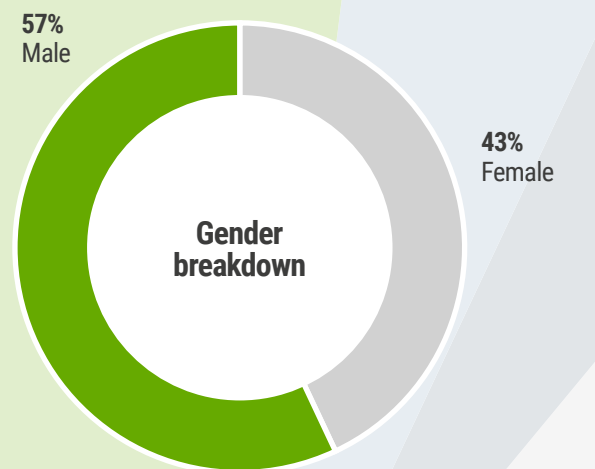
10 PARALLEL
SESSIONS

17 HIGH-LEVEL
SPEAKERS &
PANELLISTS

25 PAPERS
PRESENTED

67 COUNTRIES

300 PARTICIPANTS



PAPER SELECTION AND SCIENTIFIC COMMITTEE

In April 2019, a call for papers was issued by the GGKP and managing partners on key challenges, insights, and innovations and solutions for dramatically scaling up sustainable energy. Topics included policy and market design, finance and investment, technology and innovation, cities and industries, and social inclusion, equity, and environmental sustainability. The papers were judged by a scientific committee made up of leaders from GGKP partner organizations.

Committee co-chairs

- **Carlo Carraro**, Ca' Foscari University of Venice
- **Francesco La Camera**, International Renewable Energy Agency (IRENA)
- **Frank Rijsberman**, Global Green Growth Institute (GGGI)

Committee members

- **Orestes Anastasia**, Global Green Growth Institute (GGGI)
- **Ron Benioff**, National Renewable Energy Laboratory (NREL)
- **Nishant Bhardwaj**, Global Green Growth Institute (GGGI)
- **Sun Cho**, Green Growth Knowledge Partnership (GGKP)
- **Paul Ekins**, University College London (UCL)
- **Tareq Emtairah**, United Nations Industrial Development Organization (UNIDO)
- **Ji Yong Eom**, Korea Advanced Institute of Science and Technology (KAIST)
- **Colm Hastings**, United Nations Environment Programme (UNEP)
- **In Woo Jung**, Green Growth Knowledge Partnership (GGKP)
- **Kumi Kitamori**, Organisation for Economic Co-operation and Development (OECD)
- **Gunnar Kohlin**, Environment for Development (Efd)
- **John Maughan**, Green Growth Knowledge Partnership (GGKP)
- **Rowan Palmer**, United Nations Environment Programme (UNEP)
- **Peter du Pont**, Asia Clean Energy Partners (ACE Partners)
- **Mark Radka**, United Nations Environment Programme (UNEP)
- **Najib Saab**, Arab Forum for Environment and Development (AFED)
- **Benjamin Simmons**, Green Growth Knowledge Partnership (GGKP)
- **Arthouros Zervos**, Renewable Energy Policy Network for the 21st Century (REN21)
- **Yongping Zhai**, Asian Development Bank (ADB)



CONFERENCE PROGRAM AT A GLANCE



21 October

Welcome and Opening Remarks

- **Frank Rijsberman**, Director-General, Global Green Growth Institute (GGGI)
- **Ban Ki-Moon**, Chair, Global Green Growth Institute (GGGI) Chair (by video)

Keynote Address:

Accelerating the Energy Transformation: How Great is the Potential?

- **Arthouros Zervos**, Chair, REN21

High-Level Panel I:

Country Perspectives in Achieving Sustainable Economic Growth and Energy Security through Energy Transformation

- Chair: **Frank Rijsberman**, Director-General, Global Green Growth Institute (GGGI)
- **Einar H. Jensen**, Ambassador-designate of Denmark to the Republic of Korea
- **Romell Antonio Cuenca**, Deputy Executive Director, Climate Change Commission, Philippines
- **Arab Hoballah**, Team Leader, SWITCH-Asia SCP Facility
- **Kumi Kitamori**, Head, Green Growth and Global Relations Division, OECD Environment Directorate, and Green Growth Knowledge Partnership (GGKP) Steering Committee

Parallel Sessions A

- A.1:** Pathways to the Green Energy Transition
- A.2:** Socially Inclusive Energy Transitions
- A.3:** Integrated Approaches to Clean Energy Infrastructure (GGKP Partner Presentations)



22 October

Plenary Sessions

Keynote Address:

Accelerating the Energy Transformation: The Inspiration of Country Leadership, Drive and Innovation

- **Francesco La Camera**, Director-General, International Renewable Energy Agency (IRENA)

High-Level Panel II:

Country Perspectives on Achieving Inclusive Social Development Goals through Green Energy Transformation

- Chair: **Hyoeun Jenny Kim**, Deputy Director-General, Global Green Growth Institute (GGGI)
- **Geoffery Kama**, Minister of Environment, Conservation and Climate Change, Papua New Guinea
- **Bachir Ismaël Ouédraogo**, Minister of Energy of Burkina Faso
- **Juan Carlos Caiza Roesero**, Ambassador of Colombia to the Republic of Korea
- **Irene Giner-Reichl**, President, Global Forum for Sustainable Energy (GFSE)
- **Alice Kaudia**, Co-Chair, GGKP Advisory Committee; Co-Founder and Executive Director, Eco-Entrepreneurs; former Environment Secretary, Ministry of Environment and Mineral Resources, Kenya

GGKP Platform Launch

High-Level Panel III:

Business and Financial Perspectives on Transforming our Energy Future

- Chair: **Susanne Pedersen**, Assistant Director-General, Investment and Policy Solutions Division, Global Green Growth Institute (GGGI)
- **Fahed Al Hammadi**, Assistant Undersecretary for Climate Change and Green Development, UAE
- **Stefan Gsänger**, Secretary-General, World Wind Energy Association and REN21 Vice-Chair
- **Ian de Cruz**, Global Director, P4G
- **Mark Radka**, Chief, Energy and Climate Branch, Economy Division, United Nations Environment Programme (UNEP)
- **Rana Ghoneim**, Chief of Energy Systems, Department of Energy, United Nations Industrial Development Organization (UNIDO)

Parallel Sessions B

- B.1:** Policy and Planning Approaches for the Green Energy Transition
- B.2:** Finance and Investment
- B.3:** Decentralized and Small-Scale Applications
- B.4:** Technology and Innovation

Parallel Sessions C

- C.1:** Policy and Planning Approaches for the Green Energy Transition
- C.2:** Innovative Business and Market Approaches
- C.3:** Transforming Energy in Cities

Plenary Sessions

GGKP Annual Conference Awards and Closing Remarks

- Chair: **Susanne Pedersen**, Assistant Director-General, Investment and Policy Solutions Division, Global Green Growth Institute (GGGI)

Awards of Best Overall Paper and Best Paper by a Young Researcher

- **Francesco La Camera**, Director-General, International Renewable Energy Agency (IRENA)
- **Susanne Pedersen**, Assistant Director-General, Investment and Policy Solutions, Global Green Growth Institute (GGGI)
- **Benjamin Simmons**, Head, Green Growth Knowledge Partnership (GGKP) Secretariat

Closing Remarks

- **Benjamin Simmons**, Head, Green Growth Knowledge Partnership (GGKP) Secretariat
- **Mark Radka**, Chief, Energy and Climate Branch, Economy Division, United Nations Environment Programme (UNEP)
- **Susanne Pedersen**, Assistant Director-General, Investment and Policy Solutions Division, Global Green Growth Institute (GGGI)



1
DAY



WELCOME AND OPENING REMARKS

FRANK RIJSBERMAN

DIRECTOR-GENERAL, GGGI

Dr. Frank Rijsberman, Director-General of the Global Green Growth Institute (GGGI), opened the Seventh Green Growth Knowledge Platform Annual Conference. He noted GGGI's strong support of the GGKP initiative since its beginning in 2012. He noted that the conference was being held in conjunction with the Renewable Energy Policy Network for the 21st Century (REN21), Korea International Renewable Energy Conference (KIREC) and GGGI's Global Green Growth Week (GGGW).

Dr. Rijsberman noted that it would be impossible to meet the targets of the Paris Agreement without an acceleration of the adoption of renewable energy. The world, he said, is in the middle

of a renewable energy disruption, noting that in India the price of new installation of solar PV had fallen below that of coal; Vietnam in 2019 was marked by rapid adoption of solar generation. However, he noted, other countries continued to lag behind, showing the need for further policy work and innovations to push more national transitions.

Dr. Rijsberman also noted the progress of the GGKP in 2019, which included the launch of two new platforms—Green Industry Platform and Green Finance Platform—and steady growth in users, up 60% from the prior year.



VIDEO ADDRESS **BAN KI-MOON** PRESIDENT AND CHAIR, GGGI

In a recorded video address, Ban Ki-moon, President of the Assembly and Chair of the Council of the Global Green Growth Institute (GGGI) greeted conference participants. He stressed the importance of the topic, noting that in order to achieve the emissions reduction ambitions of the Paris Climate Agreement or the Sustainable Development Goals, the international community will need to adopt resolute measures to transform fossil fuel-based energy systems.

He urged governments to adopt bolder national strategies and more ambitious targets for renewable energy adoption and

take advantage of the rapidly falling cost of solar, wind and other renewable energy sources and energy storage. He also underscored GGGI's dedication to improving multidirectional knowledge-sharing for poverty eradication, social inclusion, environmental sustainability and economic growth, which lead to the launch the Green Growth Knowledge Partnership in 2012. GGKP now offers unparalleled access to the latest knowledge for green policy, green business and green finance.

KEYNOTE ADDRESS: ACCELERATING THE GREEN ENERGY TRANSFORMATION—HOW GREAT IS THE POTENTIAL?

Dr. Arthouros Zervos, Chair, REN21, gave an overview of the latest developments in renewable energy, underscoring that renewable energy plays a key role in achieving both the Paris Agreement and the 2030 Agenda for Sustainable Development. This, he said, is because energy is central to well-being and development. He added that there is a broad international consensus to radically reconsider how energy is produced and consumed.

Encouragingly, wind and solar have been a success story in recent years and have become a fully mainstream element in global electricity needs. Meanwhile, falling costs have increased investments and spurred innovative business model. Two-thirds of global investment in power generation are for renewables; renewable energy makes up more than a third of global capacity. Non-hydro renewable energy has grown more than tenfold since 2000, and more than 180 gigawatts (GW) were installed in 2018 (excluding hydro). Furthermore, renewable energy no longer depends on just a few countries. There are 30 countries that have more than 10 gigawatts of capacity.

However, while the power sector has excelled, it will not alone deliver the needed emissions reductions. Heating, industrial fueling, and transport—80% of global total energy demand—are lagging behind. For instance, today, renewable energy provides only 10% of energy in heating and cooling.

Policies are necessary, but not sufficient. Governments have key role to play in shaping fiscal and regulatory policy. Supporting proven technologies, renewable energy can reach full potential across sectors. Renewable energy, however, is not competing on a level playing field—what is needed is effective carbon pricing and an end to fossil fuel subsidies; aligning policies and regulations will bring broader societal benefits. The transition to renewable energy is now unstoppable, but without broader government action, it will not happen within the timeframe that is needed.





HIGH LEVEL PANEL I: COUNTRY PERSPECTIVES IN ACHIEVING SUSTAINABLE ECONOMIC GROWTH AND ENERGY SECURITY THROUGH GREEN ENERGY TRANSFORMATION

Chair

Frank Rijsberman, Director-General, Global Green Growth Institute (GGGI)

Panellists

Einar H. Jensen, Ambassador-designate of Denmark to the Republic of Korea

Romell Antonio Cuenca, Deputy Executive Director, Climate Change Commission, Philippines

Arab Hoballah, Team Leader, SWITCH-Asia SCP Facility

Kumi Kitamori, Head, Green Growth and Global Relations Division, OECD Environment Directorate and GGKP Steering Committee



Chaired by Dr. **Frank Rijsberman**, Director-General of Global Green Growth Institute (GGGI), the first of three high-level panels saw participants share experience and exchange perspectives on successful approaches in achieving national economic growth and energy security objectives by focusing on the role of scaling up clean energy. Panellists described key approaches as part of national and sub-national efforts to transition their energy systems from fossil fuel-based to clean energy. This includes modernizing their economies by establishing and implementing clean energy strategies, policy incentives and targets, increasing productivity and production, promoting technology transfer and deployment, stimulating development of new and existing sectors and industries, strengthening energy security and energy independence, and building up a skilled workforce capable to support new clean energy systems and infrastructure.

Romell Antonio Cuenca, Deputy Executive Director, Climate Change Commission, explained that his team's largest challenge was not creating policies, but operationalizing them. His team works across many different government ministries in the Philippines in order to implement the 2008 Renewable Energy Act. This is a particular challenge because it means working across government ministries with diverse mandates.

Einar H. Jensen, Ambassador-designate of Denmark to the Republic of Korea, highlighted that Copenhagen had made the commitment to become the world's first zero-carbon city by 2025. This, in part, was framed by the city's memory of the oil crisis in the 1970s. In response, the Danish government developed a renewable energy very early. By the mid-1990s, only 4% of electricity generation was renewable, while today it is 70%. On a windy

day, Denmark can receive 100% of electricity from renewables while links to the other Nordic countries keeps the system in balance.

Kumi Kitamori, Head, Green Growth and Global Relations Division, OECD Environment Directorate, noted that one of the largest challenges is hard-to-abate sectors such as heavy industries. As a result, the OECD is working with governments to find policy solutions for those sectors. Fiscal policy is another focus of the OECD. Despite widespread international consensus, most emissions remain undertaxed, with 70% of energy-related CO₂ emissions not taxed at all. Kitamori called on finance ministries to become leaders of green growth, as they are a necessary part of the solution.

Arab Hoballah, Team Leader, SWITCH-Asia SCP Facility, said that while most countries already have a policy framework, implementation remains a major gap. This can be a problem of overambitious target-setting, and many governments are failing to account for the impact of their rising middle class. Additionally, Hoballah finds that many governments are focusing on the wrong metrics. For instance, they will only count the number of green buildings, but miss the impact on how those buildings are working towards climate goals.

DAY 2



Global
Green Growth
Week 2019

Unlocking Renewable Energy Potential



PARALLEL SESSIONS A

A.1 Pathways to the Green Energy Transition

Moderator

Peter du Pont, Managing Partner and Co-Chair of the Asian Clean Energy Forum, Asia Clean Energy Partners

Presenters

Tim Reber, Project Lead, International Programs, US National Renewable Energy Laboratory

Low Carbon Power Sector Transformation Pathways: Exploring Objectives, Factors and Technology Innovations to Inform Power Sector Decisions

Vijay CS, PhD Scholar, National Institute of Advanced Studies India

Impact Assessment of India's Coal Fleet's Operations Caused by Large-Scale Renewable Integration

Fabian Stöckl, DIW Berlin and TU Berlin

Clean vs. Dirty: Is Substitutability the New Efficiency?

Discussant

Pranab Jyoti Baruah, Qatar Country Representative, Global Green Growth Institute (GGGI)

A.2 Socially Inclusive Energy Transitions

Moderator

Glenn Pearce-Oroz, Director of Programmes and Policy, SEforAll

Presenters

Olivia Muza, Economist, African Centre of Excellence, Energy for Sustainable Development

Disruptive Systems: The Role of Community needs and Gender in Renewable Energy for African Rural Populations: What are the Priorities, Challenges and Opportunities

Andy Logan, Lead Consultant, Xodus Group

How Do We Make the Proliferation of Renewable Both Economic and Fair?

Ulaiasi Butukoro, Program Officer, Global Green Growth Institute (GGGI)

Electrification of Fiji's Land Transport Sector: Data Management Assessment and Data Audit of the Transport Sector and Grid Requirements for Electric Vehicles

Discussant

Mark Whitaker, Assistant Professor, State University of New York

A.3 Integrated Approaches to Clean Energy Infrastructure (GGKP Partner Presentations)

Moderator

Benjamin Simmons, Head, Green Growth Knowledge Partnership (GGKP)

Discussants

Fulai Sheng, Head, Sustainable Infrastructure Partnership, Economic and Fiscal Policy Unit, United Nations Environment Programme (UNEP)

Kumi Kitamori, Head, Green Growth and Global Relations Division, OECD Environment Directorate

Nishant Bhardwaj, Head of Energy, Global Green Growth Institute (GGGI)



KEYNOTE ADDRESS: ACCELERATING THE ENERGY TRANSFORMATION: THE INSPIRATION OF COUNTRY LEADERSHIP, DRIVE AND INNOVATION

In his keynote address, **Francesco La Camera**, Director-General of the International Renewable Energy Agency (IRENA), emphasized that the demand for energy is increasing across the world and that this demand needs to be satisfied a way that is inclusive of all countries and people, as well as good for the planet. He stated that the favourable option for accomplishing this is by focusing on, and investing in, renewable energy, both through private and public institutions.

La Camera went on to highlight the work that IRENA has been doing to address the most pressing challenges in renewable energy development. Additionally, he mentioned the memorandum of understanding that was signed this year between IRENA and GGGI regarding collaboration and joint projects in the area of renewable energy green growth.



HIGH-LEVEL PANEL II: COUNTRY PERSPECTIVES ON ACHIEVING INCLUSIVE SOCIAL DEVELOPMENT GOALS THROUGH GREEN ENERGY

Chair

Hyoeun Jenny Kim, Deputy Director-General, Global Green Growth Institute (GGGI)

Panellists

Geoffery Kama, Minister of Environment, Conservation and Climate Change, Papua New Guinea

Bachir Ismaël Ouédraogo, Minister of Energy, Burkina Faso

Juan Carlos Caiza Roesero, Ambassador of Colombia to Korea

Irene Giner-Reichl, President, Global Forum for Sustainable Energy (GFSE)

Alice Kaudia, Co-Chair, GGKP Advisory Committee; Co-Founder and Executive Director, Eco-Entrepreneurs; former Environment Secretary, Ministry of Environment and Mineral Resources, Kenya

Hyeoun Jenny Kim, Deputy Director-General, Global Green Growth Institute (GGGI) said that the objective of the panel was to highlight the opportunities and challenges that have been encountered and addressed in the linkage between the global energy transition and the global social development goals. She also highlighted the diversity of the panel in terms of ethnicity and gender. The panel concluded that an inclusive renewable energy transition is possible and necessary to achieve the goal of implementing the Paris Agreement and the SDGs. The panel also agreed that in addition to governments playing a leading role, the capacity of local communities must be built up, including the capacities of women and youth. As a result, energy transitions at a national, regional and local level must go hand in hand with social inclusion.

Nestor Batio Bassiere, Minister of the Environment, Green Economy and Climate Change of Burkina Faso, highlighted from the audience that solar energy in development is critical in his country, particularly for rural agricultural development. This process is empowered by falling costs for renewable energy; efforts include solar-based refrigeration and water pumping. Sustainable energy he added, is critically connected to economic opportunities, and that solar power in Burkina Faso could make it to a net exporter of power in West Africa.

Geoffery Kama stated that social development and renewables must go hand in hand. He then moved on to describe the situation in Papua New Guinea where 70% of the population live in rural communities, and less than 30% of those individuals have access to electricity. He also underscored the progress made in his country, including an offsetting effort led by the national oil company. The Government of Papua New Guinea has moved rapidly towards clean energy development, creating a new Ministry of Energy in 2017 and approving a new National Energy Policy in 2019. The new policy covers a wide range of areas including climate change, electricity, energy security and renewable energy.

Bachir Ismaël Ouédraogo, Minister of Energy of Burkina Faso, described how his country is looking to better provide energy and new technologies for the entire population, specifically youth and those residing in rural areas. This is of critical importance to the country, as only 30% of the population has access to electricity; in rural areas this is less than 5%. Meanwhile, 80% of the population is living in rural areas and dependent on agriculture. Energy services for agriculture are therefore of critical importance. These newly possible solutions include solar-powered irrigation and crop refrigeration. On a system-wide level, Burkina Faso is working actively with the West Africa Power Pool (WAPP) with the aim of connecting all 15 West African countries to improve reliability and provide electricity for all.

Juan Carlos Caiza Roesero, Ambassador of Colombia to the Republic of Korea, noted that in Colombia, 46 million of the country's 48 million population live in on-grid electrified areas, while the remaining 2 million live in an area that makes up nearly half of the landmass. He also noted a number of new initiatives undertaken by the Government of Colombia to close this gap. This includes two new funds geared towards alternative energy and off-grid connections, providing new tax incentives to invest in underdeveloped regions and developing new public-private partnership models.

Irene Giner-Reichl, President, Global Forum for Sustainable Energy, highlighted women's role in the energy transition. Women, she said, tend to not benefit sufficiently from the energy transition and are not able to contribute fully because of a variety of issues that differ from one society and culture to another. Many of these issues stem from an unconscious bias's that women are not suitable for working in technical areas. With the support of the German Federal Ministry for Energy, a study was commissioned on strategies for increased inclusion of women in the sustainable energy structure. The main results confirm that when more women join the workforce, everyone benefits. This is especially true for the sustainable energy sector. The energy transition, Giner-Reichl said, is going to be a major transformation of all societies, and it needs to draw on the potential of all available talent and that talent needs to be young, old, male, female and from all ethnic backgrounds.

Alice Kaudia, former Environment Secretary of the Ministry of Environment and Mineral Resources of Kenya, gave two recommendations for governments on what to do to achieve the SDGs through the energy transition. The first is for African governments to focus, from the beginning, on rural-level renewable energy, and the second is to look at the energy transition through the lens of reducing air pollution, a goal that is more immediately tangible and has easily understood benefits to citizens.

PARALLEL SESSIONS B

B.1

Policy and Planning Approaches for the Green Energy Transition

Moderator

Takeo Harada, CEO and Representative, Institute for International Strategy and Information Analysis; President, Research Institute for Japan's Globalization

Presenters

Shubham Sharma, PhD Student, Hong Kong University of Science and Technology

Climate Change and Technology Transfer—Barriers, Technologies and Mechanisms

David Mensah Sackey, Project Coordinator, Green Communities International

Analysis of Principal Barricading Factors to Solar Photovoltaic Investment in Ghana

Discussant

Inchul Hwang, Senior Energy Specialist, The World Bank

B.2

Finance and Investment

Moderator

Lasse Ringius, Director and Head of GIS, Global Green Growth Institute (GGGI)

Presenters

Ria Sinha, Senior Manager, Development Alternatives Group

Financing for Renewable Energy Projects: A Case Study of India

Akanchukwu Okafor, Principal Partner, Change Partners International

Sustainable Models for Financing Renewable Energy Solutions in Nigeria's Oil Driven Economy

Discussant

Enrico Botta, Policy Analyst, Organisation for Economic Co-operation and Development (OECD)

B.3

Decentralized and Small-Scale Applications

Moderator

Mahamadou Tounkara, Director of Strategy, Partnerships and Communications, Global Green Growth Institute (GGGI)

Presenters

Innocent Chirisa, Urban and Regional Planner, University of Zimbabwe

Decentralized Energy Systems for Zimbabwean Cities: Dilemmas in Going Back to Where We Came From

Esabu Anthony, Agricultural Extension Officer, Farm Africa

Factors Influencing the Adoption of Small-Scale Biogas Digesters in Katak-wii District, Uganda

Adejokun Hakeem, Business Developer, Floral Idea Limited

Powering with Renewables: Minigrid and Stand-Alone Systems Including Consumptive and Productive Uses and Financing

Discussant

Mark Radka, Chief, Energy and Climate Branch, Economy Division, United Nations Environment Programme (UNEP)

B.4

Technology and Innovation

Moderator

Joe Grice, Chairman, UK Office for National Statistics Economic Experts; Member, GGKP Advisory Committee

Presenters

Ashenafi Tesfaye, Lecturer, University of Gondar

Design and Development of Low-Power Output Solar Chimney Power Plant

Bishal Baniya, PhD Candidate, UTS Institute for Sustainable Futures

Can a Solar Water Heating (SWH) System be Useful for the Nepalese Textile Industry to Achieve Resource Efficiency and Green Energy Transition?

Francis Sakato, Principal Technical Analyst, Independent Consumer and Competition Commission

Sustainability of PV System for Isolated and Fragmented Communities in Papua New Guinea

Discussants

Gerald Stokes, Research Professor, Stony Brook University

Jin Young Kim, Director, Asia-Pacific, Global Green Growth Institute (GGGI)



GGKP PLATFORM LAUNCH

During the conference, participants were introduced to several new products from the Green Growth Knowledge Partnership. **Benjamin Simmons**, Head of the Green Growth Knowledge Partnership Secretariat, co-hosted by UNEP and GGGI, shared GGKP's strategy to build a global network of actors working towards green growth. **Benjamin Smith**, GGKP Senior Knowledge Management Officer, then took participants through some of the new sites and features produced by the GGKP.

Green Growth Knowledge Partnership launched the refreshed look and navigation of the GGKP website. With the new website structure, GGKP is looking to continue its growth as the best source of information for policy community across the world. Participants were also introduced to the recently launched Green Finance Platform and Green Industry Platform, two sites dedicated to the industry and finance communities.

The GGKP Secretariat also provided a preview of The Green Forum, which is scheduled for launch in Q1 2020. The event included a live demonstration of the new platforms from a user perspective, and information on how experts can join the growing network and interact with The Green Forum.



HIGH-LEVEL PANEL III: BUSINESS AND FINANCIAL PERSPECTIVES ON TRANSFORMING OUR ENERGY FUTURE

Chair

Susanne Pedersen, Assistant Director-General, Investment and Policy Solutions Division, Global Green Growth Institute (GGGI)

Panelists

Fahed Al Hammadi, Assistant Undersecretary for Climate Change and Green Development, United Arab Emirates

Stefan Gsänger, Secretary-General, World Wind Energy Association, Vice Chair, Renewable Energy Policy Network for the 21st Century (REN21)

Ian de Cruz, Global Director, Partnering for Green Growth and the Global Goals 2030 (P4G)

Mark Radka, Chief, Energy and Climate Branch, Economy Division, United Nations Environment Programme (UNEP)

Rana Ghoneim, Chief of Energy Systems, Department of Energy, United Nations Industrial Development Organization (UNIDO)

The private sector, which has considerably more financial resources than public sources, has a critical role to play in the green energy transformation. Yet the huge opportunity that renewable energy, energy efficiency and clean transport present still require national and subnational efforts to remove policy barriers, introduce incentives, promote innovative business models, and facilitate financing to increase clean energy adoption and deployment. Panellists shared their experience and insights into what the business and financial communities need and what governments and innovators are doing in order for clean energy investments to be seen as commercially viable and attractive, and to start investing more aggressively in these technologies, projects and infrastructure.

Susanne Pedersen, Assistant Director-General and Head of the Investment and Policy Solutions Division at the Global Green Growth Institute (GGGI), framed the conversation by noting that the demand for energy will be increasing in the coming years. There have been great achievements in the energy transition, but foreseen demands require the world to speed up the transition. One key area will be mobilizing finance for the energy transition; it is estimated that \$1.7 trillion per year is needed between now and 2050. However, if these investments are implemented in full, there will be a savings of \$6 trillion per year.

Fahed Al Hammadi, Assistant Undersecretary for Climate Change and Green Development for the United Arab Emirates, noted that his government has been working to make the business case for scaling up investments in renewable energy, energy efficiency and transport. The Government of the United Arab Emirates provides key initiatives and strategic direction, and provides private sector with goals and stability. Notably, the 2017 UAE 2050 Energy Strategy sets out the goal of renewable energy making up 40% of the energy mix. Meanwhile, long-term power purchase agreement are reducing the prices of renewable energy to 1.7 cents USD per kilowatt hour. The UAE government plans to expedite the process further through various initiatives, such as a training institute and by building capacity of the financial sector, and of energy engineers. Nevertheless, he sees the lack of awareness around the benefits of renewable energy as a substantial stumbling block.

Stefan Gsänger, Secretary-General of the World Wind Energy Association, stated that the business case has, in recent years, become very clear: low-risk technologies are supporting the business case, but investment not taking place as broadly as expected. Globally, there is not a lack of money; it is not a scarcity of investors but of ready investment opportunities. Developers must be sure that they can sell the electricity at the price where you can recover your investment. Long-term power purchase agreements (PPAs) are a way to achieve this as are feed-in tariffs. Governments should be working harder to mitigate revenue risk in order to spur renewable energy.

Ian de Cruz, Global Director of P4G, outlined his organization's work examining the financial and business models of green growth projects. He cited the case of rapid electric bus transit in Latin America as an example. For each business case, P4G identifies three key components: demand, the technical model and the financial model. This requires organizations that can take on these complexities in order to bring projects to fruition, and working with local officials, multilateral finance institutions and investors from the start.

Mark Radka, Chief of the Energy and Climate Branch at UNEP, spoke about his work bringing together insurance, banks and investment institutions to green the finance sector. In his view, energy efficiency remains problematic, and whether clean transport is a good business case remains to be seen. However, there are reasons to be optimistic about the future. For instance, the Climate Action Summit brought together 130 banks from 49 countries to commit to aligning business strategies with the SDGs more broadly, setting impacts, working with stakeholders actively, and reporting towards targets and accountability. Additionally, pension funds are an underutilized resource for green investments as they have long time horizons for return on investment, the timescale needed for large-scale sustainability project. Globally, 600 million people still lack access to energy. Finding successful models that can be shared and scaled is the next step.

Rana Ghoneim, Chief of Energy Systems at UNIDO, said the issue preventing widespread energy transformation is not financing, but rather institutional capacity and the capacity of industry and private players. This challenge has spurred UNIDO's response. For instance, a UNIDO project in Egypt has shown the importance of the role of champions in industrial energy efficiency programmes. However, the solutions, she said, varied substantially within the country context, increasing the importance of experimenting with different ways to spur investment by country.



PARALLEL SESSIONS C

C.1

Policy and Planning Approaches for the Green Energy Transition

Moderator

Orestes Anastasia, Head of Thought Leadership, Global Green Growth Institute (GGGI)

Presenters

Ibrahim Elsayed Kshan, Director, Egyptian Petrochemicals Holding Company

Fuzzy Analytic Hierarchy Process (FAHP) Model of Renewable Energy Sources Planning for Sustainable Development Egypt Case Study

Joydeep Ghosh, Director, Institute for Economic Modeling Studies

An Assessment of Potential Drivers of India's Sustainable Energy Transformation

Stanislav Shmelev, Director, Environment Europe

Green Fiscal Reform in Sweden: Econometric Assessment of the Carbon and Energy Taxation Scheme

Discussant

Jiyong Eom, Associate Professor, Korea Advanced Institute of Science & Technology (KAIST)

C.2

Innovative Business and Market Approaches

Moderator

Morten Blomqvist, Chief Advisor, Ministry of Foreign Affairs, Denmark

Presenters

Tim Reber, Project Lead, International Programs, US National Renewable Energy Laboratory

Green Micro-grid Business Models to Scale Up Investment: Productive Use, Financial Bundling and Tariff Strategies

Elior Bliha, Economist, Ministry of Environmental Protection

Encouraging the Commercialization of Israeli Cleantech

Discussant

Gulshan Vashistha, Senior Officer, Global Green Growth Institute (GGGI)

C.3

Transforming Energy in Cities

Moderator

Donovan Storey, Head, Green Cities, Global Green Growth Institute (GGGI)

Presenters

Ayham Alrabee, Engineer, Cowater

Improving the Energy Efficiency of the Residential Buildings in Jordan

Elena Reshetova, Research Fellow, National University of Singapore

Does Accountability Matter for Sustainability? Urban Energy Transitions in Southeast Asia

Ama Kissiwa Boateng, PhD Candidate, National University of Public Service

Energy Efficient Buildings: Policy and Practice Landscapes in Ghana

Discussant

Fulai Sheng, Head of Economic Research Unit, United Nations Environment Programme (UNEP)



GGKP ANNUAL CONFERENCE

AWARDS AND CLOSING REMARKS

Chair

Susanne Pedersen, Assistant Director-General, Investment and Policy Solutions Division, Global Green Growth Institute (GGGI)

Awards of Best Overall Paper and Best Paper by a Young Researcher

Francesco La Camera, Director-General, International Renewable Energy Agency (IRENA)

Closing remarks

Benjamin Simmons, Head, Green Growth Knowledge Partnership (GGKP)

Mark Radka, Chief, Energy and Climate Branch, Economy Division, United Nations Environment Programme (UNEP)

Susanne Pedersen, Assistant Director-General, Investment and Policy Solutions Division, Global Green Growth Institute (GGGI)

The meeting concluded with Francesco La Camera, Director General of IRENA and Co-Chair of the GGKP Conference Scientific Committee, presenting the award for the best overall paper, which was presented to **Tim Reber**, Project Lead for International Programs at the United States National Renewable Energy Laboratory. Reber's winning research paper was titled "Green Micro-grid Business Models to Scale Up Investment: Productive Use, Financial Bundling and Tariff Strategies".

The best paper by a young researcher was also presented in absentia to **Hemen Mark Butu**, PhD Researcher at Kyungpook National University, for his research "Barriers to Financing Renewable Energy in sub-Saharan Africa and Exploring an Innovative Crowdfunding Model: A case of Nigeria and Cameroon".

Mark Radka, Chief of the Energy and Climate Branch at UNEP, announced that the 8th GGKP Annual Conference would take place in coordination with the UN's Partnership for Action on a Green Economy in Dubai, United Arab Emirates, in March 2021.

