GGGI ENERGY FORUM 2017

November 22 – 23, 2017

Organized by GGGI

Global Green Growth Institute

Sponsored by Hanwha Q CELLS Korea

Hanwha Q CELLS

OVERVIEW

On the sidelines of the World Economic Forum (WEF) in Davos, Switzerland in 2016 and 2017, the Global Green Growth Institute (GGGI) and Hanwha Q CELLS Korea, a global solar power company, organized a breakfast roundtable session under the theme of "Green Energy – Energizing A Sustainable World. The breakfast session focused on examining the importance of shifting towards a renewable energy and a low-carbon, sustainable future. The session brought together leading energy experts and policy makers from both the private and public sectors.

On November 23, 2017, under the theme of Green Energy - Energizing A Sustainable World, GGGI and Hanwha Q CELLS jointly organized the first GGGI Energy Forum 2017 in Seoul, Republic of Korea to discuss how fast the world can thrive on 100% renewable energy. Participants from the GGGI Member and partner countries, including Australia, China, Germany, the Republic of Korea, Norway and the UK gathered to share their countries' low-carbon transition journey and energy transformation experience.

The GGGI Energy Forum 2017 was organized on the back of a change in the Korean administration in May this year and reshuffle in the government structure. The new Korean administration took the initiative to close down seven of 59 coal-fired plants aged 30 years or over to mitigate air pollution, while pushing forward to expand the use of green energy production methods like solar and wind power. Korea will step up usage of natural gas and renewables in order to maintain its stance of phasing out nuclear-generated power.

At present, coal provides about 40 percent of Korea's total power generation. The move is in line with President Moon Jae-in's pledge to reduce fine dust levels. President Moon earlier temporarily suspended the construction of two new nuclear facilities as part of his pledges to shift to renewable energy.

Solar power was the fastest-growing source of new energy worldwide in 2016, outpacing the growth in all other forms of power generation for the first time. According to the International Energy Agency (IEA), on the back of a strong solar PV market, renewable energy accounted for two-thirds of new power added to the world's grid last year. In addition to this, solar energy is set to surpass nuclear power by the end of 2017.

The global momentum for 100% renewable energy has been rapidly growing. Currently, Korea's renewable energy, such as solar and wind power, accounts for just 2 percent of the country's electricity production, while coal-fired power plants generate about 40 percent and nuclear reactors 30 percent. Korean President Moon Jae-in is making a strong push for renewables, aiming to raise its share to 20 percent by 2030. WWF's Energy Vision for Korea presented recently that a phase out of coal-fired power stations in Korea and improvement in energy efficiency can cut emissions of pollution materials by half by 2030. China's aggressive zero-emission vehicle mandate is attracting electric vehicle (EV) production investments. Automakers are in rush for batteries as electric cars continue to rise. The sales of electric cars will surge and so will the demand for batteries. The government reinforced its position in September this year when it announced a system of gradually increasing quotas that will reward carmakers for producing ever more battery-powered vehicles starting in 2019.

In Australia, Canberra is powering forward to 100% renewable energy by 2020, leading national action on climate change while creating new jobs in sunrise industries. In 2016, the Australian Capital Territory (ACT) committed to net zero carbon emissions by 2050. While in the U.K., the Government has left the door open for a bigger than expected boom in offshore wind power in the next decade to power low-carbon economic growth. Offshore wind power has emerged as a key success story in the green growth agenda and the strategy outlines plans to consider further supporting the sector by rolling out more than the 10GW capacity of offshore wind initially planned for the 2020s.

Electric cars in Norway are booming. While most countries have difficulties making electric cars reach 2% or 3% of their total car sales, Norway keeps pushing the bar higher and higher. The Norwegian government offers the largest monetary incentives for plug-in electric cars. The trend toward electric cars is picking up speed all over the world, including in the biggest economies like China. Norway offers an example of what factors drive adoption of electric cars. Norway has the goal to reach 100% of new car sales being zero-emission vehicles starting in 2025.

Denmark offers the best conditions for utilizing geothermal heat because of the country's well-developed district heating. In Denmark, boilers provide heat for entire districts through a network of heating pipes – district heating. The cheaper and sustainable district heating is the most economically effective method for a city to reduce carbon emissions.

Discussion:

How fast can the world thrive on 100% renewable energy?

The world will thrive on 100% renewable energy – halting the development of fossil fueled energy generation is the necessary first step in our long-term planning

While climate change discussions often focus on the forecasted impacts on future generations, changes to the atmosphere have already been taking a toll on people today. In Mongolia, it has officially been declared that air pollution in Ulaanbaatar has reached disaster levels, exceeding 120 times the safe limit; 80% of the air pollution in the capital region originates from the burning of coal for heating in residential Ger households. Already in 2013, the top three causes of premature death in the country were air pollution-related.

Air pollution is the number one cause of bad health triggered by external environmental factors – responsible for the death of 300,000 children under the age of five every year. This is a short-term effect. Of course, the causes of air pollution today are directly linked with the longer term issue of climate change which will have wide spread impacts globally.

GGGI works with small island countries in the Pacific and the Caribbean that have witnessed extreme weather events, including hurricanes. The hurricanes that crashed through the Caribbean in September wrecked people's lives, homes and other infrastructure. The destructive winds of Hurricanes Irma and Maria that exposed vulnerabilities on the islands demonstrated how renewable energy sources that are connected to batteries and use microgrid technology can bring resilience to islands that have them.

Renewable energy is the cheapest form of new power generation. From the Emirates to India, the number of energy generation auctions being won by unsubsidized renewable bids over their fossil fueled competitors is demonstrating that solutions to exist that can tackle the pollution issues today, and the resilience to climate change for future generations. Solar PV and wind power is now the same price or cheaper than energy from fossil fuels. As solar and wind power deployment increases their costs will continue to fall. Renewable energy is not only the most economically viable option, but is also the most sustainable and environmentally friendly choices. Solar power was the fastest-growing source of new energy worldwide in 2016, outpacing the growth in all other forms of power generation for the first time. According to the International Energy Agency (IEA), on the back of a strong solar PV market, renewable energy accounted for two-thirds of new power added to the world's grid last year. In addition to this, solar energy is set to surpass nuclear power by the end of 2017.

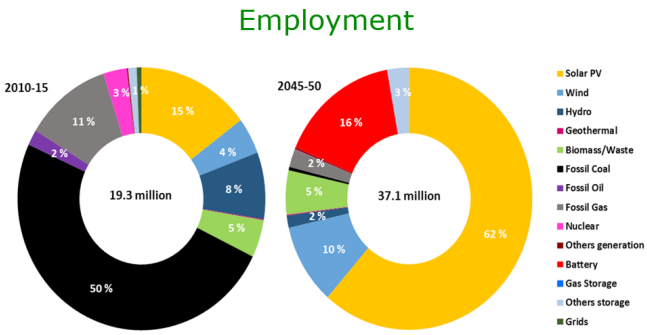
Then, what is holding back countries to reach 100% renewable energy target? Renewable energy in the Republic of Korea currently accounts for just 2% of the country's electricity production, with coal-fired and nuclear plants generating about 40% and 30% of power respectively. However, Korea has an ambitious target to achieve 20% renewables in power generation by 2030. The Korean government plans to set up a renewable energy control tower by region and secure a solar system in each village; adopt projects led by local authorities, including offshore wind turbines and secure economic

feasibility of renewable energy through large-scale renewable energy projects.

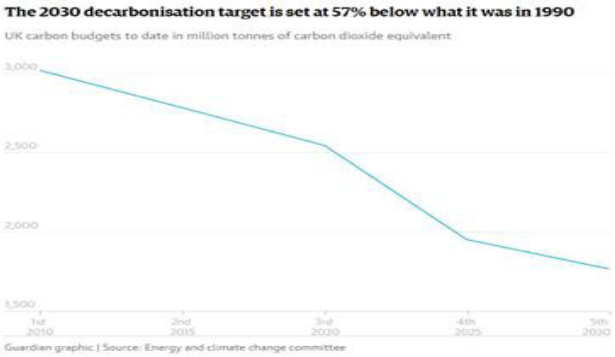
In Korea, the energy industry is expected to drive the innovative growth engine. Korea seeks to develop innovative energy supply and demand solutions in order to respond to the energy transition and the 4th industrial revolution; minimize expansion of energy supply facilities through smart energy demand management and create new markets and jobs in the new energy industries.

According to Hans-Josef Fell, President of Energy Watch Group, the global energy transition to a 100% renewable electricity system can create 37 million jobs by 2050, which will be up by more than 90% from 2015. As costs of solar and wind power keep falling, a global transition to 100% renewable energy is becoming a reality. Disruptive technology improvements in the renewable energy sector as well as the search for real solutions to climate change, air pollution, poverty and refugee crises will accelerate the process.

In the UK, the speed of the energy transition is striking. The UK government has adopted targets that will require a 57% reduction in greenhouse gas emissions by 2030. The UK is committed to playing its part in dealing with climate change to ensure its long-term economic security and prosperity. Establishing energy efficiency is a top priority for the UK. The UK's Climate Change Act plans to reduce



Phasing-out all state subsidies to fossil fuel and nuclear energy generation; exempting taxes for investments in renewable energy and replacing emission trading system with carbon and radioactivity taxes are some ways to help accelerate the global energy transition to 100% renewables.



greenhouse gas emissions by at least 80% of 1990 levels by 2050.

In Australia, Canberra is powering forward to 100% renewable energy by 2020, leading national action on climate change while creating new jobs in sunrise industries. In 2016, the Australian Capital Territory (ACT) committed to net zero carbon emissions by 2050. The ACT government is leading the green technology revolution in Australia with the full support of its citizens. The ACT government announced its plans to legislate a target of sourcing 100 percent renewable energy by the end of this decade. With this, residents of Canberra will be able to get clean power from wind and solar sources. The development will also create jobs and economic benefits from a local investment of $400 million. According to statistics, one home in 10 is equipped with solar on their roof. The costs of large scale solar has halved in just the last few years here in Australia. Over the next couple of years, it will reduce the cost to a point that it is the lowest cost form of renewable generation in the country.

Plans for further expansion of coal, nuclear, gas and oil must be stopped. More investment needs to be channeled into renewable energies and the necessary infrastructure. For investors looking for sustainable investment opportunities, the smart money is on renewable energy in emerging markets and this is where GGGI can play an important role. Energy transition is not a question of technical feasibility or economic viability, but of political will. Governments need to show commitment to clean and renewable energy to instill confidence in investors and political stability.

PROGRAM

Date Thursday, November 23, 2017
Time 7:30 a.m. – 9 p.m.
Venue Ruby Hall, 22nd Floor, The Plaza Hotel, Seoul
Theme Green Energy – Energizing A Sustainable World
Organizer GGGI / Sponsor: Hanwha Q CELLS

Participants

- Park Jaeyoung, Director, Division of Energy and Resource Policy Division, Ministry of Trade, Industry and Energy (MOTIE)
- Hans-Josef Fell, President of the Energy Watch Group (Member of German Parliament 1998 -2013)
- Representatives of GGGI Member and partner countries
- Professors and scholars of energy and economic development

Wednesday, November 22, 2017

Time	Speech	Speaker
18:30 – 21:00	Welcome Dinner	Taoyuen Pine Room, 4th Floor, The Plaza Hotel

Thursday, November 23, 2017

Time	Speech	Speaker
7:30 – 8:00	Welcome Coffee	Ruby Hall, 22nd Floor, The Plaza Hotel
8:00 – 9:00	Breakfast	Ruby Hall, 22nd Floor, The Plaza Hotel
9:00 – 9:10	Welcome Speech	Cho Hyun-Soo, CEO of Hanwha Q CELLS Korea
9:10 – 9:20	Opening Speech	Dr. Frank Rijsberman, Director-General of GGGI
9:20 – 9:45	Keynote Speech	Park Jaeyoung, Director, Division of Energy and Resource Policy Division, Ministry of Trade, Industry and Energy (MOTIE)
9:45- 10:10	Keynote Speech	Hans-Josef Fell, President of the Energy Watch Group (Member of German Parliament 1998 -2013)
10:10 – 11:10	Discussion	Moderator: Frank Rijsberman, Director-General of GGGI
11:10 – 13:00	The Plaza Hotel → Hanwha Q CELLS' Jincheon Plant	A solar factory in Jincheon County
13:00 – 14:00	Lunch	Jincheon County
14:00 – 16:00	Jincheon Plant: Visit to a solar cells manufacturing facility in Jincheon	
16:00 – 18:00	Jincheon Plant → 63 Building, Seoul	
18:00 – 21:00	Networking Dinner	Touch The Sky, 63Restaurant 63 Building, Seoul

Discussion:

How fast can the world thrive on 100% renewable energy?

Questions

The UK's low carbon transition journey.

1. Can you share your insights on the UK Government's ambitious strategy to drastically cut carbon emissions and tackle climate change and how the Government is putting clean growth at the heart of its Industrial Strategy by investing in low-carbon innovation?
2. Please elaborate on how the UK is focusing on supporting the development and creation of new technologies and businesses while meeting the country's national climate change targets.

Introduction to offshore wind power in the UK

3. Please share your insights on how offshore wind power has emerged as a key success story in the green growth agenda in the UK?
4. What is the future outlook for the offshore wind sector? Please give an overview of the current market by illustrating the current cost reduction in the sector. And how has this cost reduction been achieved so far?

China's aggressive zero-emission vehicle mandate

5. Can you share your insights on how China's aggressive zero-emission vehicle mandate is attracting electric vehicle (EV) production investments? Is it true that automakers are in rush for batteries as electric cars continue to rise and the sales of electric cars will surge and so will the demand for batteries? Can you elaborate on this?
6. Will the government's recent announcement on establishing a system to gradually increase quotas - that will reward carmakers - help produce more battery-powered vehicles starting from 2019?

Electric cars in Norway

7. Can you share your insights on how electric cars are booming in Norway?
8. Please elaborate on Norway's goal to reach 100% of new car sales being zero-emission vehicles starting in 2025 and the Norwegian government's plan to offer the largest monetary incentives for plug-in electric cars.

ACT commits to 100% renewable energy

9. Can you share your insight on Canberra's push to 100% renewable energy by 2020?
10. Can you elaborate on the ACT Government's commitment to net zero carbon emissions by 2050?

Korea's new focus on renewable energy

In June 2017, Korean President Moon Jae-in said the country will halt plans to build new nuclear power plants and will not extend the lifespan of existing plants, in a bid to phase out nuclear power. He pledged to withdraw existing plans to build new nuclear power plants and not extend the lifespan of nuclear power plants. Public support for nuclear power has been undermined by a local scandal in 2010 over forged certificates for spare parts and the 2011 Fukushima meltdown in neighboring Japan.
Korea is seeking to scale back reliance on nuclear, and President Moon has said he will support renewables and liquefied natural gas sectors in a bid to boost clean and safe energy. The new government plans to increase the use of renewables to 20 percent of the country's total power generation by 2030.

11. Could Korea go 20% renewable by 2030?
12. According to WWF's Energy Vision for Korea, a phase out of coal-fired power stations and improvement in energy efficiency can cut emissions of pollution materials by half by 2030. What are your thoughts on this?

Blog by Dr. Frank Rijsberman, Director-General of GGGI
http://www.ipsnews.net/2017/12/can-korea-power-past-coal-a-new-world-in-which-solarbatteries-becomes-the-cheapest-form-of-energy/

INTER PRESS SERVICE
News Agency

Can Korea Power Past Coal? A New World in Which "Solar+Batteries" Becomes the Cheapest Form of Energy

GGGI Energy Forum 2017, November 23, 2017, Seoul. Credit: GGGI

SEOUL, Dec 13 2017 (IPS) - Renewable energy became the cheapest form of electricity in 58 emerging economies last year. This year, the 11th Lazard's Levelized Cost of Energy Analysis (LCOE 11.0) showed that solar and wind energy generation costs (at $46 to $53 per megawatt-hour of generation) easily beat coal and gas (at $60-68).

Solar power was the fastest-growing source of new energy worldwide in 2016, outpacing the growth in all other forms of power generation for the first time. According to the International Energy Agency (IEA), on the back of a strong solar PV market, renewable energy accounted for two-thirds of new power added to the world's grid last year. In addition to this, solar energy is set to surpass nuclear power by the end of 2017.

In November this year, the Global Green Growth Institute (GGGI) organized its first energy forum in Seoul at which GGGI Member countries shared their energy transformation experience.

In Germany, on one sunny breezy Sunday last summer, solar and wind broke a record 85% of all energy used in the country.

The rapidly growing renewable energy sector is quickly replacing nuclear energy in Germany – while coal is still playing a key role in the energy mix. In the UK, on the other hand, the use of coal in the energy mix has rapidly fallen from 50 to 9% in just ten years, replaced by cheap solar and offshore wind energy – while nuclear energy is maintaining a key role.

The Australian capital city, Canberra, has rapidly achieved the solar and wind investments to shift to 100% renewable energy by 2020, and is now moving to zero emissions by 2030, while the national targets are much more modest.

In the Republic of Korea, renewable energy currently accounts for just 2% of the country's electricity production, with coal-fired and nuclear plants generating 40% and 30%, respectively. However, Korea's new Moon Jae-in government has recently increased the target for the share of renewables in power generation to 20% by 2030.

The Korean government plans to set up a renewable energy coordination center in every region; secure a solar system in each village; adopt projects led by local authorities, including offshore wind turbines; and secure economic feasibility of renewable energy through utility-scale renewable energy projects. Is the 20% target too ambitious to achieve in Korea – or is it too modest to deal with the environmental and climate challenges?

The new government's twin objectives for Korea to become a nuclear free society while also solving the "fine dust" air pollution problems is now actively debated in Korea. Doing both requires reducing nuclear energy, as well as the use of coal and diesel fuel for electricity and transportation. Truly an ambitious, even daunting, set of challenges – but not impossible during a time when both the energy and transportation sectors are experiencing very, very rapid transition.

The speed and depth of the ongoing energy transformation, to renewable energy and to electric mobility, is certainly surprising many around the world. It is a top priority for many governments – making and breaking coalitions – and it is causing disruption in traditional sectors of the economy and employment.

As one country after the next sees record breaking low prices for solar and wind in auctions for utility scale renewable energy, the conventional fossil-fuel powered energy companies pay the price.

Frank Rijsberman.

E.ON, Germany's largest utility, for example, had to write off $9Bn in losses last month, half of its remaining market capitalization. No wonder the renewable energy transformation scares the conventional power players and has governments consider whether to protect them.

Countries with large investments in conventional power plants – particularly coal and nuclear – do indeed have a big bill to pay for their stranded assets. Coal-fired power plants that were the cheapest form of energy when constructed only a few years ago risk become albatrosses around energy companies' necks.

In Bonn, at COP23, a new Power-Past-Coal Alliance of twenty countries announced that they will completely phase out coal from their energy mix before 2030. The Alliance hopes to have fifty members before the 2018 UN COP24 climate change conference. That requires a real change in mindset. Is it imaginable that Korea Powers Past Coal by 2030?

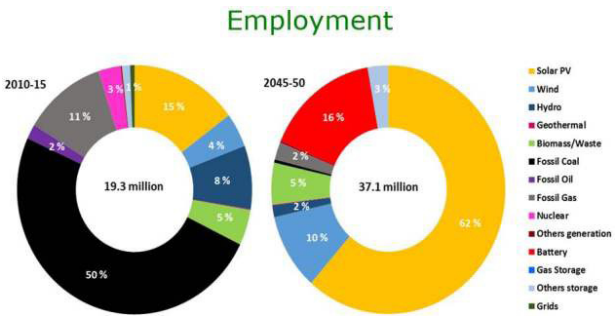
It may seem unrealistic today, but remember that a similar change in the UK just happened, over a shorter period, during a time when renewables were more expensive than today. So why not in Korea?

There are some challenges of course. For example, will this energy transition lead to job losses? Jobs are indeed being lost rapidly in the fossil fuel industry, particularly coal. In Germany, for example, most coal related jobs have already been lost – but at the same time, many more jobs were created in the renewable energy industry.

According to Hans-Josef Fell, a former German parliamentarian for the Green party and current President of Energy Watch Group, the global energy transition to a 100% renewable electricity system can create 37 million jobs by 2050, up by more than 90% from 2015.

As in any rapid technology transition, jobs will indeed be lost, but more new, green jobs are being created, requiring education and re-training of the workforce, but ultimately leading to many new opportunities for businesses and individuals.

Another question is whether renewable energy is too expensive and whether citizens will support a rapid transition to renewables. In Australia, Canberra has powered forward to 100% renewable energy by 2020, leading national action on climate change while creating new jobs in sunrise industries.



The ACT government is leading this green technology revolution in Australia with the full support of its citizens. When the ACT government first announced its plans to legislate a target of sourcing 100 percent renewable energy by the end of this decade, it was careful to engage the community.

The first programs focused on subsidies for rooftop solar for schools, churches, community centers and residences. As a result, all schools and one home in 10 are now equipped with solar on the roof.

Subsequently, and with full community awareness created, ACT government turned to utility scale wind and solar investments, and batteries to stabilize the grid. The costs of large scale solar in Australia has halved in just a few years. While the introduction of renewables did indeed initially raise energy prices for Canberra, surveys of residents show that as awareness increased, so did the willingness of the citizens to pay more for sustainable energy.

Going forward, the price of energy in Canberra will be among the lowest in the nation. Following the success of the 100% renewables strategy, in 2016 Canberra went a step further and committed to net zero carbon emissions by 2050.

For countries that could not provide electricity to all their citizens with fossil fuel and a centralized power grid – such as most African countries and most small island states in the Pacific with coverage rates as low as 10-20% – the renewable energy transition is a wonderful opportunity.

When the alternative is expensive diesel-generated electricity, either powering the grid or as back-ups during power outages, solar energy combined with battery storage is already the cheapest form of energy, as documented in Lazard's 11th levelized cost of energy report that came out last month.

That means that for countries in Africa and the Pacific, off-grid, or mini-grid electricity based on "solar+batteries" is a revolution that can bring affordable energy to all citizens, just like the mobile phone revolution did less than ten years ago.

The energy transition is undoubtedly challenging for countries like the Republic of Korea that have fully developed conventional energy sectors – particularly for the owners and operators of the nuclear and fossil fuel power plants, equipment and machinery.

At the same time, Korea has some very significant advantages, such as an excellent national power grid, advanced smart grid technology, and some of the world's most advanced producers of solar cells and batteries.

During times of disruption our perspectives change very rapidly. Targets such as the Korean 20% renewables by 2030, that appear so challenging today, will probably be seen as only a first step in the right direction in just five years from now.

Eco-Business

A new world in which solar and storage becomes the cheapest form of energy

Here's why a combination of solar power and energy are the best bet for a future energy supply that is clean, renewable, and affordable.

Solar photovoltaic is one of the biggest employers in the renewable energy sector, according to a report by the International renewable Energy Agency. : Image: Shutterstock

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By Frank Rijsberman

Participants List

- Frank Rijsberman, Director-General, Global Green Growth Institute (GGGI)
- Cho Hyun-Soo, CEO, Hanwha Q CELLS Korea
- Park Jaeyoung, Director, Division of Energy and Resource Policy Division, Ministry of Trade, Industry and Energy (MOTIE)
- Jan Matthiesen, Director, Carbon Trust
- Geoffrey Rutledge, Deputy Director-General, Australian Capital Territory (ACT) Government
- Hans-Josef Fell, President, Energy Watch Group
- Jack Yan, Doctor & Vice Manager, Gotion Inc.
- Matthew Webb, Senior Associate, E3G - Third Generation Environmentalism
- Elin Sagbråten, Commercial Counsellor, Royal Norwegian Embassy in Seoul
- Sang-Hyup Kim, Director, Center for Sustainable Development; Visiting Professor, KAIST Graduate School of Green Growth and Chairman, Coalition for Our Common Future
- Kang Nam-Hoon, President, Korea Energy Agency
- Whang, Jintaek, President, Korean Energy Technology Evaluation and Planning, KETEP
- Kwak, Byong-Sung, President, Korea Institute of Energy Research (KIER)
- Yang Yi Won-Young, Vice Secretary-General, Korea Federation of Environmental Movements (KFEM)
- Lee Sanghoon, Chief, Green Energy Strategy Institute
- Park Chinho, Professor, Yeungnam University