

# Hanwha Newsletter

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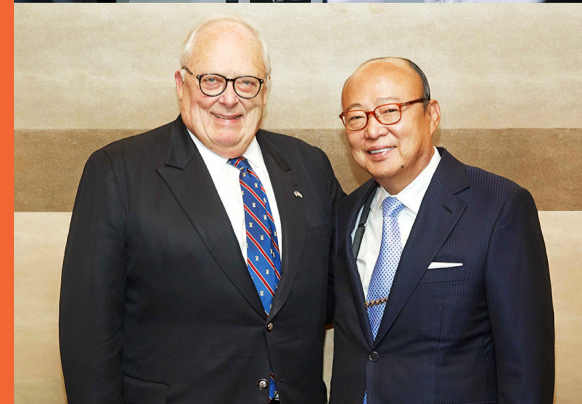
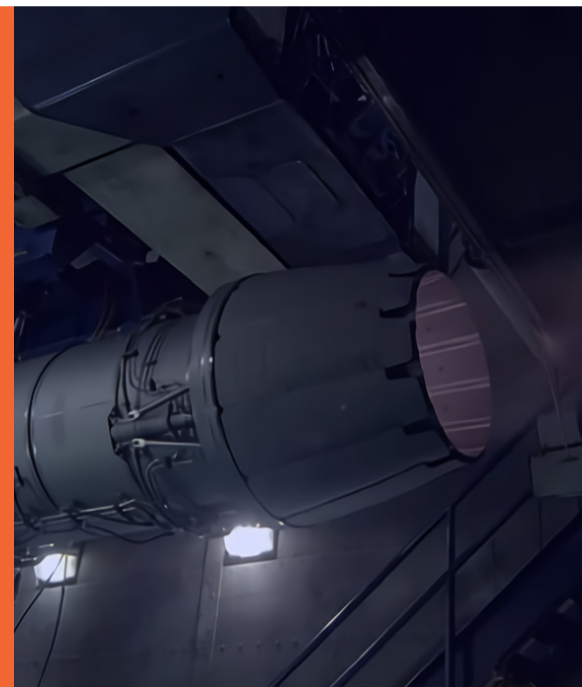
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To the Sky and Beyond

# Hanwha Takes to the Skies and Beyond

Hanwha looks to the  
**HORIZON**



To watch the video, please go to :  
[www.hanwha.com/en/aerospace-overview](http://www.hanwha.com/en/aerospace-overview)

The aerospace industry is thriving. On a global scale, the commercial aircraft market alone is expected to reach \$209 billion by 2022 and Airbus, in partnership with Boeing, predicts that some 42,700 aircraft will be required over the next 20 years. The era of commercial space travel is also dawning, as companies such as Boeing and SpaceX have joined forces to accelerate the process.

## A dramatic rise

Since its first foray into the aerospace industry in the 1970s, Hanwha has become a trusted partner to the world's top aircraft manufacturers. Hanwha provides precision-made components, machineries, sensors, radars, and even network-based systems not just for aircraft, but also satellites and rockets.

## Decades of trust leads to partnerships

In the past five years, Hanwha has signed deals to deliver aircraft components and services worth over USD 12 billion to the world's top aircraft engine manufacturers, and even acquired a 30% stake in a Pratt & Whitney manufacturing plant in Singapore.

Hanwha provides customers with aircraft components that comply with strict global standards for quality. For example, all gas turbine engines assembled at Hanwha's flagship plant in Changwon, South Korea go through a qualifying test to demonstrate and ensure durability.

## Reaching for the stars

Hanwha's cutting-edge manufacturing technology was also demonstrated through the successful launch of the Naro, or Korea Space Launch Vehicle-I, in 2013. The patented kick motor - developed in-house by Hanwha - was the first space launch vehicle rocket engine made in South Korea that could put a satellite in orbit 300 kilometers above Earth.

Stepping up its game, Hanwha will heavily invest to further expand its global aerospace presence over the next five years. An increasing amount of focus and investment is being put into R&D and high-precision engineering. Manufacturing capabilities will also be greatly expanded through a second full-scale plant in Vietnam that will become operational in December of 2018.

Through challenge, dedication, and integrity, Hanwha will drive progress and innovation – in the skies and among the stars. ■



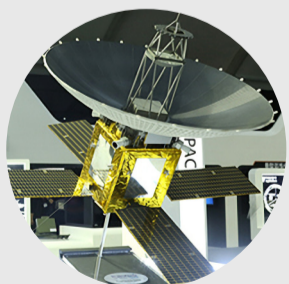
## Strategic Partners

of OEMs - GE, P&W, Rolls-Royce



## 8,600

Aircraft engines produced



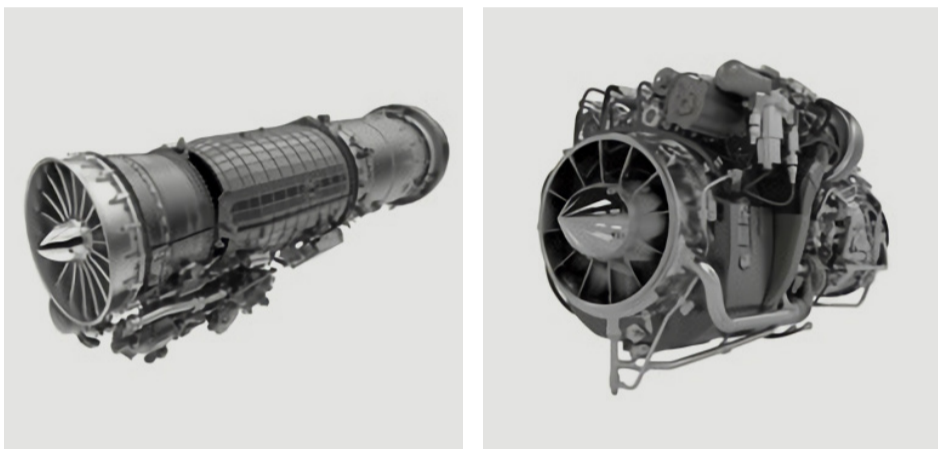
## \$780million

Investment over next 5 years

To the Sky and Beyond

# Hanwha Aerospace - A Trusted Partner of the World's Top Aircraft Engine Manufacturers

Hanwha Aerospace provides engine components and modules for the three major global aircraft engine manufacturers: Pratt & Whitney, General Electric, and Rolls-Royce. Having entered the aircraft engine market in the late 1970s, the company has grown to become a USD 400 million business, with little competition to speak of, and is looking to become the global number one partner for all three major customers.



*Hanwha Aerospace produces a broad range of individual components that make up an aircraft engine*

## Developing implicit trust

As part of achieving that goal, Hanwha Aerospace entered into a USD 10 billion revenue sharing partnership (RSP) with Pratt & Whitney in 2015 and 2016. The aerospace industry works in decades-long cycles so an RSP that lasts at least 40 years is a long-term partnership which symbolizes trust.

By entering into this partnership, Hanwha Aerospace was able to greatly diversify its product portfolio, going from manufacturing static engine components to rotative components such as fan blades, fan disks, as well as cutting edge Integrated Bladed Rotors (IBRs), which combine the blade and disk into a single part.

As another sign of the deep trust between Hanwha Aerospace and Pratt & Whitney, the two companies entered into an agreement in 2016 where Hanwha acquired 30% equity interest in a Singaporean Pratt & Whitney plant that specializes in parts and components for PurePower Geared Turbofan engines. This gives Hanwha Aerospace the opportunity to work alongside Pratt & Whitney to develop and manufacture new products and further expand its portfolio.

## Focusing on future growth

In 2018, Hanwha Aerospace moved its global headquarters from Seoul to



*Hanwha Aerospace HQ in Changwon is a one-stop shop for aircraft engine modules*

Changwon, South Korea. With this re-location, Hanwha Aerospace HQ now boasts the end-to-end capability to design, custom-build, test, manufacture, and assemble components in a highly automated environment, as well as develop and produce high-value parts and components that require high-precision engineering.

Hanwha Aerospace has set an ambitious goal to double its business every five years and is well on its way to doing just that with its flagship Changwon plant operating at full capacity. To keep up with this growth rate, the company is making investments to expand its R&D and production capabilities in Korea and overseas.

A second full-scale plant in Vietnam is due to begin operations in December of 2018. With the workers at this plant trained up to the same stringent standards as those in Changwon, the Vietnamese plant will be a second base of operations to help Hanwha Aerospace meet customer needs, while also providing a significant competitive edge in regards to pricing.

## Interview with Jun Ji, Hanwha Aerospace VP, Commercial Engine Business



*Jun Ji holds a model A320neo, one of the many types of aircraft that use engines and components assembled and manufactured by Hanwha Aerospace*

### What sort of changes do you see happening in the aircraft engine market?

One huge change that is happening right now is the adoption of alternate materials. Composite materials are used to manufacture fan blades and fan cases to deliver significant weight savings. The industry is also looking into ceramics and how they apply to aircraft engine components.

A lot of attention is also being given to 3D printing at the moment. With 3D printing, powdered material and lasers are used to manufacture components in single pieces, rather than components being assembled from multiple smaller pieces. This would save on weight and labor.

We're very interested in the potential of 3D printing, but the technology is still in its early stages. For the full rate production of 3D parts, it requires huge investment in set up machines and it takes much more time than traditional manufacturing. We'll have to wait and see how the technology develops. ■

To the Sky and Beyond

# Hanwha Thrusts Korea into the Space Age

The Korean aerospace industry is a relatively young one, with domestic development only having started in earnest in the 1990s.

Hanwha was there from the very beginning, producing components for the first aircraft assembled in the country. Since then, the company has quickly grown to lead the market in mass production of components and parts as well as playing a major role in the development and production of Korea's first fully homegrown aircraft.



Hanwha produces components for a wide variety of aerospace applications

## Blasting off to orbit

Now, Hanwha is providing the push for Korea's space program to reach orbit. Working with the Korean Aeronautical Research Institute (KARI), Hanwha is building components for the Korea Space Launch Vehicle (KSLV) program.

When Korea's first orbital rocket, the KSLV-I (Naro), was successfully launched in 2013, it was the Thrust Vector Control (TVC) actuation system produced by Hanwha Corporation/Machinery that kept the rocket's second stage on course. The company's homebuilt kick motor also took the rocket's satellite payload into orbit.



Hanwha Corporation/Machinery conducts an ignition test for a KSLV rocket engine

## Stepping up to the challenge

KARI is now in the midst of development and testing of components that will go into KSLV-II (Nuri), which is planned to launch in 2021. Designed to take payloads weighing up to 1,500 kg into orbit, KSLV-II is a much larger and more complex rocket than KSLV-I, with the first stage alone needing four 75-ton engines just to take it part of the way up.

Throughout the rocket, in the drive controls and thruster systems, are valve components produced by Hanwha. These will keep the rocket flying while

withstanding the extreme stresses of launch. The Hanwha-produced TVCs, meanwhile, will physically adjust the direction of thrust of the rocket's powerful engines during its trip to space.

Through its contributions to the rocket program, Hanwha is aiming to help KARI move forward in its long-term goal of turning Korea into an Asian hub for orbital launches.



Hanwha is working with KARI to test the engines that will take KSLV-II, Korea's most advanced rocket, to low orbit

## Interview with Sangjoon Park, Head of Hanwha Corporation/Machinery's Aerospace Division Asan Plant #1



Sangjoon Park showcases components produced for the KSLV rocket program

## How do you see the aerospace industry developing in the future

There is a term that's being used throughout the global aerospace industry: More Electric Aircraft (MEA).

In theory, electric aircraft are much simpler designs. Traditional planes require complex tubing, combustors, and pumps for their fuel systems. This usually translates to more weight and a lot more moving parts where something might fail.

An electric plane wouldn't need any of that. A power source can plug directly into the engines. Electric planes are theoretically simpler to build and maintain as well as significantly lighter. ■

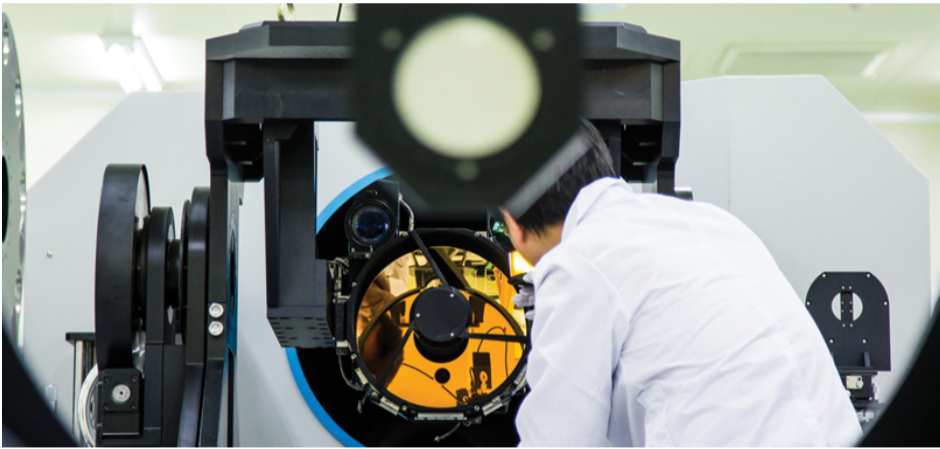
**That seems like an exciting opportunity.**

It is. And it's one that's almost completely unexplored. A lot of research and development is necessary before an electric aircraft can become feasible for the commercial market. Hanwha is ready and up for the challenge. We're looking into what needs to be done. Right now, the market is wide open and there's an incredible opportunity for whoever can first realize the concept.

To the Sky and Beyond

# Hanwha Systems Helps Planes to See Further and Wider

Hanwha Systems provides integrated digital solutions for land, air, and naval defense focusing on radar, optics, and communication and command systems. With best-in-class R&D capabilities and over 1,500 patents, Hanwha Systems is now looking to go global and expand its overseas business by 30% by 2025.

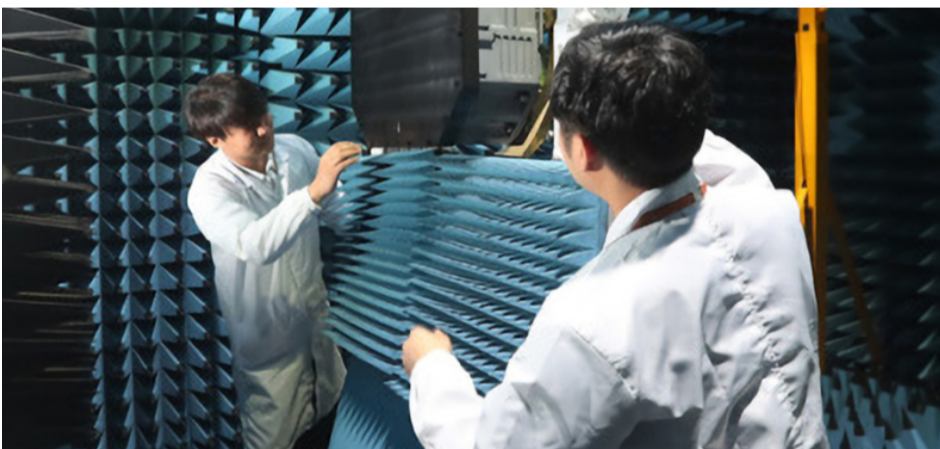


*Hanwha Systems boasts strong R&D and production capabilities and is looking to expand its business overseas*

## Providing aircraft with better 'sight'

Within the Korean aerospace industry, Hanwha Systems is the leading developer of avionics technology. For example, its Active Electronically Scanned Array (AESA) radar system is a major step forward from a traditional radar.

Older airplane nose radar use a mechanical antenna to steer the radar signal, so they have a fairly narrow field-of-view and can only track one object at a time. AESA's all-digital radar system provides a much wider field-of-view and can track multiple objects simultaneously.



*Hanwha Systems researchers prepare an AESA radar for testing*

## Taking a closer look from up above

Hanwha Systems is also developing systems and components for the Korean space program. The Korean Multi-purpose Satellite (KOMPSAT)-3A that is currently orbiting earth has an infrared sensor system on board that is from Hanwha Systems.

This is the first high-resolution infrared sensor system ever installed on a civilian satellite. With its spatial resolution of 5.5 meters, making it the highest resolution infrared sensor currently in orbit, it can conduct clear nighttime ground surveys, even though the satellite is 528 kilometers above the earth's surface.

Although Hanwha Systems only began its foray into space-based products in 2009 and took its first firm step into space with KOMPSAT-3A, Hanwha Systems is confident in being able to take a leading role in Korea's trek into the space age.



*Hanwha Systems provided the infrared sensor system Korea Multi-purpose Satellite (KOMPSAT) 3A uses for nighttime global surveys*

## Interview with Soojae Lee, Head of Radar and Avionics Division at Hanwha Systems



*Soojae Lee speaks about how the company helps aircraft operators get the full picture of what is happening in the sky*

### What sort of systems or components have Hanwha Systems sent into space?

Right now, KOMPSAT-3A is orbiting Earth and it has a high-resolution infrared sensor system on board that is from Hanwha Systems. Even though the satellite is 528 kilometers over the Earth's surface, has a spatial resolution of 5.5 meters, which is the highest of any infrared sensor currently in orbit.

### What other space projects is Hanwha System currently engaged in?

Beginning with high-precision scientific payloads for mid-sized satellites, we have just dipped our toes in the water in regards to space-based products. There's a lot that needs to be done before that segment of our business is up and running.

Working in space also comes with the pressure of having an extremely small margin of error. In fact, we have to be practically perfect. So, we're all working hard to level up our capabilities even further.

I am hopeful as there are a lot of resources that Hanwha Systems can leverage. Two-thirds of our workforce is dedicated towards R&D and they are among the brightest minds in the world. Sending objects up into space and making sure they work perfectly is a challenge that we're eager to take on. ■

# Hanwha Group Chairman Meets with Leading US Expert on Asia to Discuss Global Socioeconomic Issues

- Hanwha Group Chairman, Seung Youn Kim and the Chairman of the Heritage Foundation's Asian Studies Center, Dr. Edwin J. Feulner Jr. meet and discuss Korea-US relations
- The two leaders hope that strong Korea-US relations will continue to drive progress in inter-Korea negotiations



Dr. Edwin J. Feulner, Jr., Chairman of the Heritage Foundation's Asian Studies Center (left) and Seung Youn Kim, Chairman of Hanwha Group (right)

Hanwha Group Chairman Seung Youn Kim recently met with the Chairman of the Heritage Foundation's Asian Studies Center, Dr. Edwin J. Feulner, Jr., over dinner at THE PLAZA hotel in Seoul, Korea. The two men spoke in depth for over two hours on various global socioeconomic issues, including citizen diplomacy, Korea-US relations, and inter-Korea relations.

"The strong Korea-US alliance was key to bringing North Korea to the international negotiating table," said Chairman Kim. Chairman Kim urged Dr. Feulner to continue leveraging his extensive experience and personal network to help bring lasting peace to the Korean Peninsula.

"The alliance between our two countries has been a cornerstone in successful negotiations with the North," said Dr. Feulner and added, "It is important that Korea and the US continue to maintain close cooperation."

Chairman Kim, the leader of one of the largest companies in Korea, and Dr. Feulner found common ground on how promoting trade and business development between Korea and the US would be mutually beneficial to both nations.

From 1973 to 2013, Dr. Feulner served as President of the Heritage Foundation, a leading conservative American think tank. He also served on US President Donald Trump's transition team. Dr. Feulner now chairs the Heritage Foundation's Asian Studies Center and is a highly respected voice in the American conservative movement.

Dr. Feulner is also regarded as a leading expert on Asia and is well-versed in Korean politics, economics, and society.

Chairman Kim and Dr. Feulner have known each other for 30 years. Whenever they meet, they extensively discuss issues that include Korea-US relations, the global economy, and international politics.

In 2011, the Heritage Foundation named the second-floor conference center at the Heritage Building in Washington DC the Kim Seung Youn Conference Center in recognition of Chairman Kim's support for non-governmental exchanges between South Korea and the US. ■

# Hanwha Global Reporters Work it at the Workshop



To watch the video, please go to :  
[www.hanwha.com/en/2018globalworkshop](http://www.hanwha.com/en/2018globalworkshop)

*The Hanwha Newsletter and Hanwha Global Reporters bring you the latest and greatest in Hanwha News faster than anyone else!*

*This past October, Hanwha Global Reporters from 19 locations around the world came together in Seoul to participate in the 2018 Hanwha Global Communications Workshop.*

*They dived into Hanwha's history, trained in their roles, learned how to build internal branding, and, to commemorate the Hanwha Newsletter's third year, how to promote CSR!*

*Come check out the workshop and learn more about the responsibilities of those who will build and maintain Hanwha's global reputation and internal branding in the future.*





Press Release

# Hanwha Q CELLS Bolsters Advocacy for Global Adoption of Renewable Energy at GGGI Energy Forum 2018

- Hanwha Q CELLS hosted the Global Green Growth Institute for a discussion on the theme of “Renewable Energy Potential on the Korean Peninsula”
- Experts spoke extensively on ongoing progress of global transition towards renewable energy at the forum



Hanwha Q CELLS hosted the Global Green Growth Institute's Energy Forum 2018

Hanwha Q CELLS Co., Ltd. (“Hanwha Q CELLS”) jointly hosted the GGGI Energy Forum 2018 with the Global Green Growth Institute (“GGGI”), on October 30 at the Plaza Hotel in Seoul, which saw more than 80 key energy experts from Korea and around the world in attendance.

The GGGI is an international organization headquartered in Seoul with 28 member countries, including Denmark, Australia, and the United Kingdom. Founded in 2010 to support sustainable development around the world, its activities directly relate to the United Nation’s Sustainable Development Goals (SDGs).

Participants of this year’s GGGI Energy Forum spoke extensively about ongoing global efforts to adopt more renewable energy sources. They also discussed recent progress of Korea’s “Renewable Energy 3020” implementation plan, and the lessons the Korean government can learn from other countries’ energy transition experience.

“We should bust the myth that green growth is an expensive option. Solar energy, even with battery storage, is already commercially attractive where diesel energy is the alternative such as in small islands and off the grid,” said Dr. Frank Rijsberman, Director-General of the GGGI, during his opening keynote speech at the GGGI Energy Forum. “Green growth is the only viable option for a sustainable future, and it is already commercially attractive in many cases.”

This is the second annual GGGI Energy Forum in Seoul since November of 2017 jointly hosted by Hanwha Q CELLS. It is the ideal forum for experts to gather and discuss international renewable energy policies as well as the state of renewable energy adoption in Korea. The forum is also an opportunity for Hanwha Q CELLS to lead the global conversation on renewable energy and demonstrate its staunch support for the UN’s SDGs and the global effort to combat climate change and energy poverty through clean and affordable energy sources.



Dr. Frank Rijsberman, Director-General of the GGGI, stressed the economic importance of adopting renewable energy, including solar power



Joo Yoon, Senior Vice President of Global Sales Planning and Strategy at Hanwha Q CELLS, urged Forum participants to act today for those who will come tomorrow

Hanwha Q CELLS previously hosted the forums with the GGGI in 2016 and 2017 during the World Economic Forum in Davos, Switzerland, in order to lead the discussion on the importance of energy transition with other leading figures and organizations.

“In today’s world, the pollution we make today will certainly harm future generations to come. I want to call this an environmental debt,” said Joo Yoon, Senior Vice President of Global Sales Planning and Strategy at Hanwha Q CELLS, at the GGGI Energy Forum’s opening. “Hanwha Q CELLS, a world leader in the solar energy will also contribute to energy conversion via solar energy, a clean energy source, and will strive to overcome future challenges ahead.”

#### The global march towards 100% renewable energy independence



*Hans-Josef Fell, President of Energy Watch Group, spoke of how 100% renewable energy independence is a viable and prudent option*

The Energy Forum’s first session was led by Hans-Josef Fell, Founder and President of the Energy Watch Group. Speaking passionately at length about the transforming global energy landscape, Mr. Fell stressed how renewable energy can help solve various social issues. In particular, he highlighted that agrophotovoltaics in China’s Gobi Desert helped to address food supply problems in the region.

“In addition to many countries, such as Denmark and Sweden, cities such as San Francisco and Copenhagen and corporations like Coca-Cola have also set ambitious goals for 100% renewable energy conversion,” said Mr. Fell during his talk. “In Republic of Korea, there should be an institutional strategy and government support on R&D to make ‘100% renewable energy transition’ a reality.”

#### Japan’s perspective on driving holistic renewable energy policies



*Izumi Kaizuka, Director of Research Division at RTS Corporation, spoke of how changing attitudes led to Japan’s accelerating solar power adoption*

Taking the lead during the Forum’s second session, Izumi Kaizuka, Director of Research Division at RTS Corporation, a Japanese solar energy research firm, spoke about the energy transition policies in Japan.

“The amount of renewable energy production in Japan greatly increased after the Great East Japan Earthquake in 2011 that triggered the Fukushima Nuclear Disaster. Japan rapidly increased its share of renewable energy in its mix from only 1% in 2010 to 7% in 2016, as the country abandoned nuclear power,” said Ms. Kaizuka. “Japan could only achieve this rapid renewable energy growth because the government set up a long-term specific goal that has been carried out step-by-step.”

“It’s important for people to be aware of the importance of renewable energy in order to make it the primary energy source of the future,” she added. “In Japan, the government, businesses, and the people have all come together to become better informed and are driving the country’s conversion towards renewable energy forward.”

#### Preparing for a Korean clean energy future



*Kyung-ho Lee, of the Korean Ministry of Trade, Industry, and Energy, laid out how the Korean government intends to make power generation in Korea more environmentally friendly*

Closing out the session was Kyung-ho Lee, Director of the New and Renewable Energy Policy Division at the Korean Ministry of Trade, Industry, and Energy, who spoke of the energy transition issues Korea faces and steps that the government plans to take in the future. These include the eventual phase-out of nuclear power plants and the reduction of carbon emissions from coal-fired power plants.

“We must focus on creating a sustainable environment for future generations rather than thinking of short-term financial gains and losses,” said Mr. Lee. “We will continue our policy of developing a competitive renewable energy industry and work towards becoming a net exporter of energy through ministerial cooperation, increasing the number of joint projects, and obtaining the necessary strategic technologies.”

Mr. Lee also announced plans to implement nationwide smart energy management to minimize the demand on existing power plants as well as plans to accelerate Korea’s adoption of renewable energy in the Fourth Industrial Revolution, to spur development of new local industries and creation of new jobs.



Press Release

# Hanwha Shows Off Its Green Thumb by Planting Trees

- Hanwha has planted its 7th Solar Forest to combat atmospheric dust that blow from overseas onto the Korean Peninsula
- The saplings have been raised in a nursery using solar energy generated from Hanwha Q CELLS solar modules

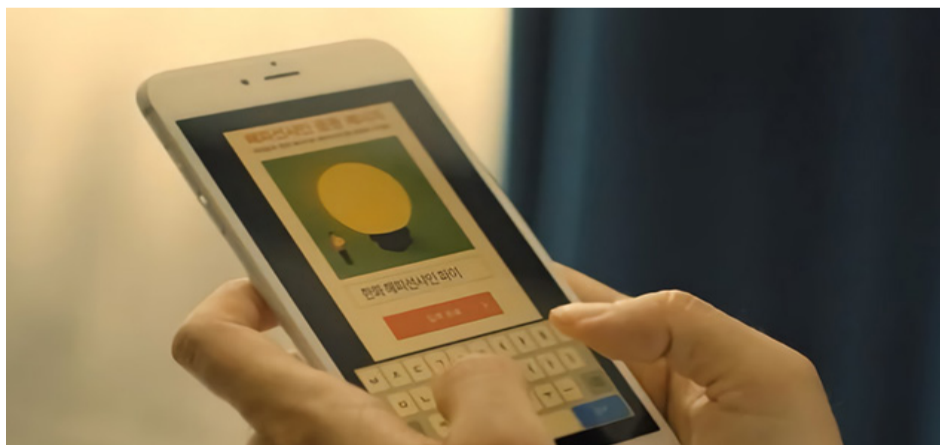


Participants celebrated after a day of planting trees for Hanwha Solar Forest No. 7

Over 100 Hanwha employees and volunteers from the general public came out on a chilly October morning in the outskirts of Incheon, Korea to help plant the seventh Hanwha Solar Forest. The cold weather was soon forgotten, as everyone got absorbed in their work to dig, plant and tamp down the soil.

The day marked the beginning of Hanwha’s month-long project to plant over 6,000 trees atop a municipal landfill in an area the size of three football fields. The location for the seventh Hanwha Solar Forest was specifically chosen because it lies directly along the path of atmospheric dust that have annually made their way across Korea from deserts overseas. The atmospheric dust contains pollutants and have progressively gotten worse over the years. The forest’s trees, once fully grown – including zelkova, pine, and oak trees – will play a vital role in reducing the dust that have been plaguing the capital city of Seoul.

### Joining forces for a greener future



An overwhelming number of messages supporting Hanwha’s fight against atmospheric dust were received through the campaign’s website and social media

Leading up to the tree planting, people were invited to send supportive messages through the campaign’s website and social media. For each message received, Hanwha donated 3Wh of solar energy to power the forest’s nursery. Over 55,000

messages were received. This was more than ten times the number of messages expected.

The volunteers who planted trees to build the 7th Hanwha Solar Forest were a diverse group. They included Sun-Mok Choi, President & Head of the Hanwha Communications Committee, Hyungsoo Kim, CEO of social venture Tree Planet, employees from Hanwha, and families with young children from the general public.



A young boy is writing a message for future visitors next to the oak tree sapling he had just planted at Hanwha Solar Forest No. 7

“I used to think that the strength of the Hanwha Solar Forest campaign was in its environmentally-friendly reforestation efforts,” said President Choi. “But seeing everyone out here in the cold and on a weekend, made me realize that its true strength is in the passion and enthusiasm that they elicit from people.”

### Sustainable reforestation on a global scale

Hanwha Solar Forest is a global campaign that began in partnership with Tree Planet (a social venture company in S. Korea). Its mission is to raise public awareness of environmental problems that lead to climate change, deforestation,

desertification, and air pollution.

The goal of the campaign is to rejuvenate deforested areas and at the same time, help reverse global warming. By the end of November 2018, Hanwha Solar Forest will have planted over 499,000 trees, covering over 1.33 million square meters across Korea, China, and Mongolia.



*With the completion of the seventh forest, Hanwha Solar Forest will have planted over a million square meters of trees*

What makes Hanwha Solar Forest truly impressive is that it's more than just planting trees. As ironic as it may sound, the electricity needed to power watering systems at tree nurseries would've normally come from fossil fuels, if not for Hanwha. Hanwha, however, grows its forest's saplings in a nursery powered by solar modules provided by Hanwha Q CELLS, making it a truly eco-friendly project.

This is not the first time that Hanwha has applied its clean energy technology to combat problems arising from climate change and energy poverty. One example is through Hanwha Happy Sunshine campaign where renewable energy independence is promoted. Through this program, Hanwha donates solar panels and power systems to welfare facilities, remote villages, and islands. Since 2011, Hanwha Happy Sunshine has donated solar panels and power systems to 254 community development projects across East Asia.

#### **A forest that saves lives**



*Volunteers at Hanwha Solar Forest No. 7 smile after planting a pine tree*

Hanwha Solar Forest operates tirelessly in support of the United Nations' Sustainable Development Goals and the far reaching positive effects reforestation efforts have. Beyond environmental conservations, Hanwha Solar Forests also have a positive social impact. The people of Tujin Nars Nature Reserve in Mongolia were originally forced to abandon their homes due to encroaching desertification caused by illegal logging and arson. However, when Hanwha planted 230,000 trees, air and water quality of Tujin Nars improved and its people were able to return home and rebuild their lives.

Hanwha's constant efforts were recognized by the United Nations. Its Solar Forests were cited as a model example of reforestation at the United Nations Convention to Combat Desertification in 2011. And in July of 2018 at a UN High-Levels Political Forum on sustainable development, the Hanwha Solar Forests were praised again as an example of how corporate partnerships can contribute to sustainable development. ■

# Hanwha Energy Kicks Off Construction of Landmark Laguna Solar Power Plant in Mexico

- Momentous ceremony held to celebrate the new construction on the 125MW Laguna Solar power plant in the Mexican state of Coahuila
- The Laguna Power plant represents Hanwha Energy's latest step to become the world's leading generator of solar energy by 2020



*Dignitaries of S. Korea and Mexico celebrate the construction on the Laguna Solar power plant*

Hanwha Energy held a commencement ceremony on October 17 to mark the construction of its latest power plant in Torreón, Coahuila, Mexico. Among the dignitaries in attendance to officiate the ceremony were Duhyoung Ryoo, CEO of Hanwha Energy, Efrain Villanueva Arcos, the General Director of Clean Energy at SENER, Juan Carlos Ayup, Mayor of Matamoros Coahuila, and Jaime Guerra Perez, the Secretary of Economy and Tourism from the state of Coahuila.

The Laguna Solar power plant will be an investment through Hanwha Energy's wholly owned subsidiary 174 Power Global Corporation and represent Hanwha Energy's next landmark project in the North American region. The cost of the project will be almost USD 115 million of which approximately 60% will be financed by Korea Development Bank and a bank in Mexico.

The Laguna Solar power plant will have an estimated production capacity of 125MW and is expected to come on line in March of 2019. It will produce enough electricity to power more than 25,000 homes in the Mexican state of Coahuila. The plant's electricity will be sold under a 15-year power purchase agreement (PPA) signed by Mexico's Federal Electricity Commission.

The Laguna Solar power plant will be the perfect opportunity for Hanwha Group to showcase the strength and benefits of a corporate synergy that exists among its solar energy arms. Hanwha Q CELLS, a leading global solar energy solutions provider, will supply 360,000 high quality solar modules that will produce the plant's electricity. Hanwha Q CELLS will also oversee the plant's construction.

"The construction of the Laguna Solar power plant is an opportunity for us to gain a foothold in Mexico from which we can pursue further business development opportunities in the region," said Duhyoung Ryoo, CEO of Hanwha Energy. "The knowledge and experience we gain through this plant will be invaluable as we become a comprehensive energy solutions provider."

Through its 174 Power Global subsidiary, Hanwha Energy will be involved in all aspects of the North American solar energy market – from conception, development and financing to construction and power plant operations. 174 Power Global is quickly establishing itself as a strong player within the North American solar energy market with current purchase agreements for plants that will generate 1.1GW of power (including the Laguna Solar PPA project) and agreements amounting to 8.4GW of future projects.

All combined, the projects when complete, will go online to generate more than 10GW of power by 2020. It is a telltale sign that Hanwha Energy is on a solid trajectory to be the world's No. 1 generator of solar energy. In parallel, Hanwha Energy is also working to become a comprehensive energy solutions provider specializing in solar energy-related services, such as plant Operations & Management and Energy Storage Systems. ■

# Explore This Month's News of Hanwha and Its Affiliates, Taking the Initiative in All Corners of the World



## Australia



### Hanwha Q CELLS Australia Pty. Ltd.

#### Q CELLS FINANCE is a Brighte Spot in the Australian Solar Landscape

Hanwha Q CELLS Australia is excited to be able to announce the launch of Q CELLS FINANCE, the first ever consumer finance product offered by Hanwha Q CELLS.

Having gone live in September 2018, Q CELLS FINANCE is an innovative system that allows vendors to be paid up front for their effort while allowing customers to shop around for flexible payment plans so they can switch to solar energy as soon as possible. By catering to both sides of the solar power marketplace, Hanwha Q CELLS is making its high-performance solar modules and energy storage systems more accessible to more Australians.

Q CELLS FINANCE is powered by Brighte, a multi-award-winning Australian finance platform for solar power. The partnership between Hanwha Q CELLS and Brighte was a natural one. With Australian energy prices are soaring at astronomical rates, Hanwha Q CELLS and Brighte believe that all Australians deserve access to products aimed at reducing the cost of living, and to harness the benefits of solar today with the ability to pay off the system over time.



"Q CELLS is proud to partner with Brighte because we both share the same mission of trying to make quality solar more affordable and accessible to everyday Australians," says Patrick Duignan, Managing Director for Hanwha Q CELLS Australia Pty.



## China



### Hanwha Advanced Materials (Beijing) Co., Ltd.

#### Hanwha Advanced Materials Beijing Marches Again for Harmony

Employees of Hanwha Advanced Materials Beijing recently had the chance to enjoy the autumn weather during their second annual "March for Harmony" event in October. It was inspired by Hanwha's annual "March for Love" that takes place in Seoul, Korea.

During the event, employees spent the day learning about Hanwha Advanced Materials Beijing's corporate vision, walked together as a group, and also took part in a tea reception. The employees walked through two different courses, five kilometers and ten kilometers long respectively, that took them around a beautiful blue lake and a park where the leaves were taking on a brilliant orange tinge.



All participants felt that the walk with their colleagues through the beautiful surroundings and pleasant weather helped them relieve a lot of the stress they'd been internalizing. The walk also helped everyone at the first foreign affiliate of Hanwha Advanced Materials develop a stronger and more unified bond that will allow the company to go further together through this shared experience.



## Hanwha Chemical (Ningbo) Co., Ltd.

### Hanwha Chemical (Ningbo) Receives a Mayoral Visit

Qiu Dongyao, the Mayor of Ningbo, paid a visit to Hanwha Chemical (Ningbo) on October 19 and received a grand tour of the facility and its production capabilities. During the tour, Mayor Qiu was duly impressed at the pride and dedication that the employees showed for their jobs.

Speaking to the employees after his tour, Mayor Qiu stressed how important it is for everyone to remain vigilant about safety and making it their top priority, saying: "Hanwha Chemical must always think of production, fire, logistics and environmental safety."

Hyun Gyu Lee, Managing Director of Hanwha Chemical (Ningbo), thanked Mayor Qiu for taking the time for his visit and said that the company will do their best to keep the workplace safe. He added that they will always be on the lookout for potential problems, and constantly revamp and upgrade equipment and processes to ensure that operations will run smoothly and safely while still producing products of the highest quality.

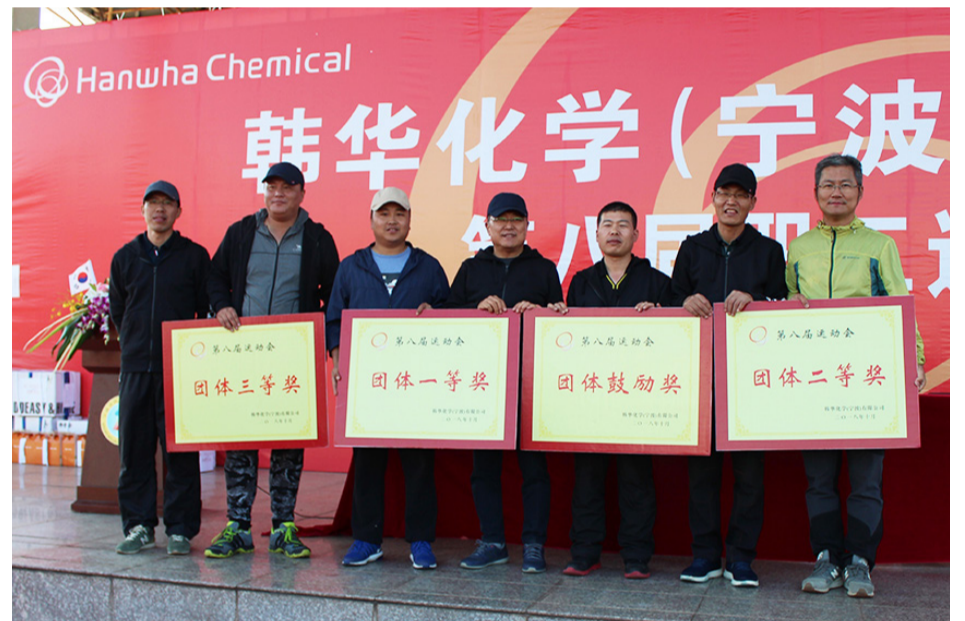


## Hanwha Chemical (Ningbo) Co., Ltd.

### Hanwha Chemical (Ningbo) Employees Give Their All on the Field for Unity

There was much running and cheering throughout Hanwha Chemical (Ningbo)'s 8th annual Field Day on October 27. Held under the theme of "Exercise, Health and Fun," employees formed teams and engaged in friendly rivalry as a way of encouraging cooperation, competitiveness, and pride.

Everyone finished the day hot and sweaty, but happy in the knowledge that their camaraderie was strengthened by the field day's activities. They are looking forward to the next Field Day and the opportunity to show off more of their athletic prowess.



## Hanwha Q CELLS (Qidong) Co., Ltd.

### Hanwha Q CELLS Qidong Takes the Fast Track to Business Growth

Hanwha Q CELLS Qidong has harnessed the rapidly rising popularity of high-speed rail in China to launch a new strategic commercial campaign to encourage solar power adoption. Taking advantage of October's "Golden Week", when the number of travelers dramatically spikes, Hanwha Q CELLS advertising was rolled out across three major stations along China's high-speed rail network.

Passengers going through Hangzhou East Rail Station, Guangzhou South Rail Station, and Jinan Rail Station will get to see a short ten second video playing on the stations' screens. The videos feature three key messages that foster confidence in Hanwha Q CELLS: "Make solar your better choice", "German quality, worthy of your trust" and "A Fortune Global 500 company, providing security for Q.Partners".

Hanwha Q CELLS messaging will also be on full display on trains running from Shanghai Hongqiao Station to Zhengzhou East Station, as they stop at major Chinese solar energy markets along the way. Advertisements have been strategically placed on seat headrests with the Q CELLS logo, Q.Partners hotline number, and a QR code prominently visible so that passengers will not be able to miss them on their journey.



This advertising campaign will run from October to December of 2018. It is the first time Hanwha Q CELLS Qidong has targeted high-speed rail travelers, and the company is looking forward to expanding its customer base in China through this campaign.



## Germany

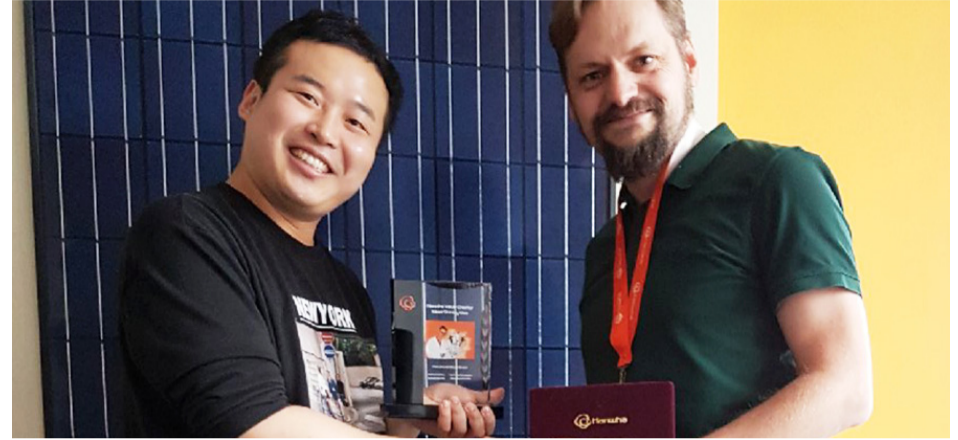


### Hanwha Q CELLS GmbH

#### The Mad Scientist of Thalheim Receives Gold

The beaming face of Michael Mette, of Hanwha Q CELLS Germany, brought much merriment to Hanwha around the world during the Tricircle Photo Contest that was held earlier this year. In October of 2018, he was recognized and rewarded for his contribution to the Hanwha Spirit with a gold medal presented by Albert Park, Assistant Manager of Global Marketing and Communications at Hanwha Q CELLS.

Michael's winning submission, in which he takes the role of a cackling mad scientist as three of his teammates form the Hanwha Tricircle with orange hula hoops, creatively juxtaposed levity and technology to encapsulate the dedication and camaraderie that is abundantly present at Hanwha Q CELLS in Thalheim,



Germany. The gold medal serves as a perfect complement to the trophy Michael received earlier in the year in acknowledgement of his winning photo.

Upon receiving the medal, Michael thanked all the judges who voted for his entry and said that he is now pouring his creative energy into an entry for the Hanwha PROUD. campaign that is running from November of 2018.



## United States of America



### Hanwha Q CELLS America Inc.

#### Hanwha Q CELLS Features Solar Products from its Dalton, Georgia Factory at Solar Power International 2018

Hanwha Q CELLS was in sunny California recently to participate in Solar Power International (SPI) 2018, America's largest solar event. Held at the Anaheim Convention Center from September 25 to 27, SPI 2018 featured 750 exhibitors and saw over 20,000 visitors – many of whom flocked to Hanwha Q CELLS' booth, the largest at the event.

Visitors to Hanwha Q CELLS' booth were impressed by the bright and modern exhibition design, which won SPI 2018's Best Booth Design Award. Many were impressed by the collection of products on display, including the Q.PEAK DUO L-G5.3/BF, a prototype bifacial solar module that can produce electricity from sunlight hitting both its front and back sides, giving it an advantage over traditional monofacial modules. Of particular interest to the American audience were the three solar modules (Q.PEAK DUO BLK-G6, Q.PLUS DUO L-G5.2 and Q.PEAK DUO L-G5.2) from the new Georgia factory, which is expected to finish construction by January 2019.



Once live, the Dalton plant will be the largest solar module manufacturing facility in the Americas. Those interested in getting up close and personal with Hanwha Q CELLS' manufacturing processes could strap on a virtual reality headset and take a tour of the company's smart manufacturing system and module testing procedures.

Visitors also got a peek at the Q.HOME energy storage system currently available in Europe as a preview of other types of solar energy products that are being readied for launch in the United States. A special golf event, featuring the Hanwha Q CELLS golf team, also took place during the first two days of SPI 2018. Visitors were able to meet and receive golf lessons from Eun-hee Ji, Jenny Shin, and Nelly Korda, in addition to winning prizes such as autographed balls, golf umbrellas, and more!



### Hanwha Azdel Inc.

#### Hanwha Azdel Has an Un-fore-gettable Day at the Links

Hanwha Azdel's annual golf tournament is a popular way for employees to relax while building teamwork and camaraderie. This year's event had a philanthropic angle with a fun additional twist. Players were allowed to purchase mulligans for ten dollars apiece with all proceeds going to support the Special Olympics of Virginia. A total of USD \$440 was donated at the end of the tournament.

Roger Johnson, a Special Olympics golfer coached by Hanwha Azdel's Gary Verser,



came out to the tournament in his role as a Special Olympics Global Messenger. Roger spoke to Hanwha Azdel employees about the importance of the Special Olympics and thanked them for their support.

(Picture, Left to Right: Roger's wife, Roger Johnson, Gary Verser) ■