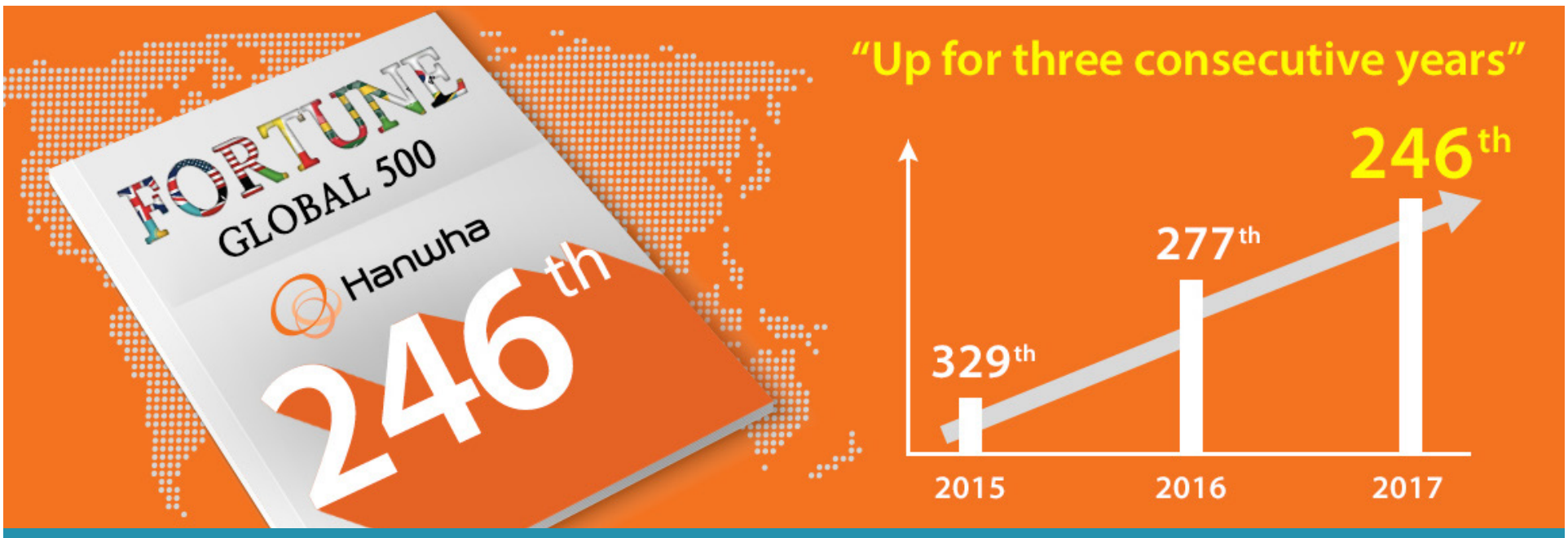
August 2017

Hanwha Newsletter

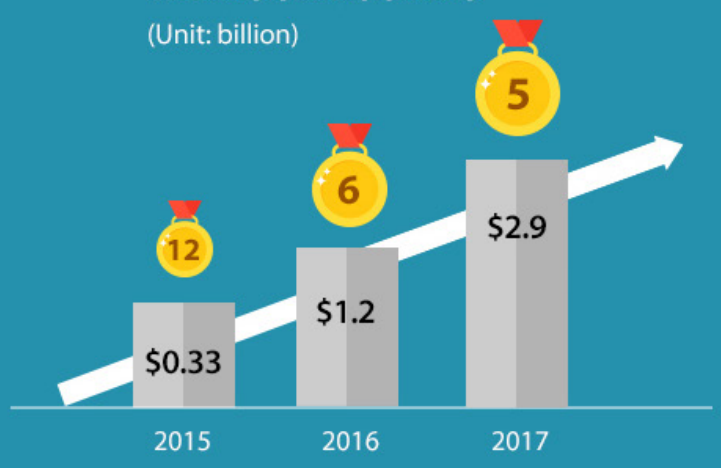
Hanwha *Corporation, Ranked 246th*

on Fortune "Global 500" List, up 31 Spots



Rise in Major Korean Corporate Rankings

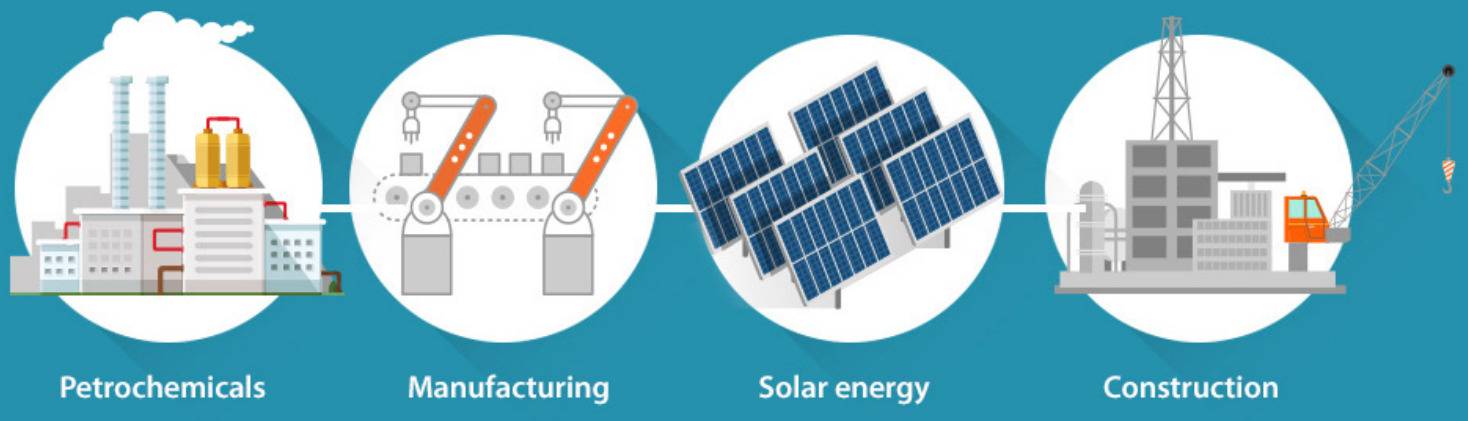
No.5
in **Net Income**
(Unit: billion)



No.8
in **Total Assets**[1]
(Unit: billion)

Currency is converted into US dollars using an exchange rate of USD 1 = KRW 1,118.80.
[1] Total Assets are determined by calculating the sum of non-financial company's assets and the maximum value of a financial company's equity or capital stock.

Improved sales performance in major businesses contributed to income increase



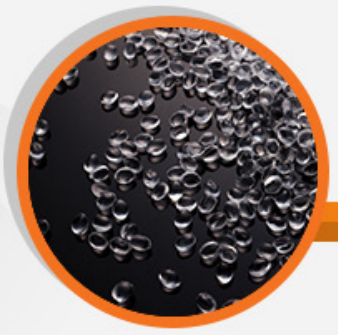
249 Global Network

(As of March 2017)

Hanwha Q CELLS
Annual cell production capacity **6.8** GW

Global No. 1

(As of 3Q 2017)



Hanwha Chemical
Hanwha TOTAL Petrochemical
Annual EVA production capacity **660,000** tons

Hanwha Advanced Materials
GMT/LWRT global market share **70**%

Total asset ($82.2 billion)

₩100 trillion

Hanwha Life

Total value of the New Bismaya City in Iraq

$10 billion

Hanwha Engineering & Construction

Hanwha Q CELLS *Celebrates One Billion Q.ANTUM Solar Cells*

· Q.ANTUM solar cell No. 1,000,000,000 was produced and celebrated in the company´s fab in Jincheon, Korea
· One billion Q.ANTUM cells equal around 5 GW of production volume since 2012
· Hanwha Q CELLS´ CEO Seong-woo Nam emphasized this milestone as an "outstanding demonstration of Hanwha Q CELLS´ industry leadership"

Hanwha Q CELLS Co., Ltd. ("Hanwha Q CELLS" or the "Company") (Nasdaq: HQCL), announced they celebrated the commercial mass production of Q.ANTUM solar cell No. 1,000,000,000. The record cell was produced in the company´s manufacturing facility in Jincheon, Korea, on Monday, July 10, 2017. Q.ANTUM is Hanwha Q CELLS´ proprietary cell technology. It is based on the passivation of the solar cell´s rear side (PERC) and a number of additional technological features for higher yields and lower levelized cost of energy(LCOE)[1] under real life conditions. Q.ANTUM has been developed in the company´s Center for Technology, Innovation and Quality in Germany, where it since has been improved continuously. The technology has been in commercial mass production since 2012. As of today, Hanwha Q CELLS has commercially mass produced a total volume of around 5 gigawatts of Q.ANTUM solar cells.

Seong-woo Nam, CEO of Hanwha Q CELLS, commented: "Having achieved one billion of commercially mass produced Q.ANTUM solar cells is an outstanding milestone for our company and a powerful demonstration of Hanwha Q CELLS´ leadership in solar industry." Looking to the future, CEO Nam said: "As our core technology platform, we will continue to develop and push Q.ANTUM technology to achieve even higher yields and lower LCOE for our customers."

[1] **Levelized Cost of Energy(LCOE)**
Levelized Cost of Energy (LCOE) is a concept used to calculate the present value a system's lifetime costs by combining all costs that go into the development, construction and operation of different energy generation systems.

Q.PEAK-G4: MONOCRYSTALLINE Q.ANTUM RANGE

The monocrystalline Q.ANTUM module range Q.PEAK-G4 is the flagship module line of Hanwha Q CELLS and was introduced to global solar markets in early 2017. It offers high-end performance, top yields in real life conditions and low LCOE. It comes in different product specifications suited to various local markets around the globe. Q.PEAK modules also feature excellent stability and are tested for wind loads up to 4,000 Pa and snow loads up to 5,400 Pa. At the same time the frame design has been optimized with a frame height of 32 mm, leading to a 10 % reduction in logistics and storage costs.

Q.ANTUM TECHNOLOGY: MORE THAN JUST PERC

Q.ANTUM is the proprietary solar cell technology platform of Hanwha Q CELLS. While being based on the rear side passivation of the solar cell (PERC), Q.ANTUM offers many additional features that differentiate it from conventional PERC technologies. It combines PID resistance (potential induced degradation), Hot-Spot-Protection and Tra.Q laser marking for 100 % traceability of any cells produced. Moreover, all Q.ANTUM products comply with the strict Hanwha Q CELLS quality standards, including much harsher criteria than regular certification, frequent and repeated testing of samples from running production. The most notable feature of Q.ANTUM technology is, that it controls the degradation effects LID (light induced degradation) and LeTID (light and elevated temperature induced degradation), which can severely reduce the performance of conventional PERC solar modules not only in the first phase, but also throughout the lifetime of operation. Therefore, it is critical for PV customers to select a module manufacturer who understands and controls these effects. While LID mainly appears on monocrystalline solar cells, the LeTID effect was long believed to only appear on multicrystalline wafers. However, this is not the case. Hanwha Q CELLS featured a presentation at the R&D conference 'Silicon PV' in Germany in April, showing that LeTID can also significantly reduce the energy yield of monocrystalline PERC solar cells in the early stages of operation. Hanwha Q CELLS is the only manufacturer that not only understands the effect, but has also implemented processes to test and effectively control it. This is reflected in the excellent performance warranties of all Q.ANTUM products.

CURRENT MONOCRYSTALLINE Q.ANTUM PRODUCTS

· Q.PEAK - G4.1
monocrystalline 60-cell Q.ANTUM solar module, power ratings of up to 310 Wp, maximum yields in residential applications, available in North America, Europe, Northern Asia, and Oceania

· Q.PEAK BLK - G4.1
All black monocrystalline 60-cell Q.ANTUM solar module, power ratings of up to 300 Wp, top yields and intriguing aesthetics, available in North America, Europe and Northern Asia

· Q.PEAK S - G4.1
monocrystalline 48-cell Q.ANTUM solar module, power ratings of up to 240 Wp, for small and angled roofs, available in Northern Asia

· Q.PEAK XS - G4.1
monocrystalline 32-cell Q.ANTUM solar module, power ratings of up to 165 Wp, for even the smallest and sharply angled roofs, available in Northern Asia

· Intersolar Award winner– Q.PEAK RSF L - G4.1
monocrystalline 72-cell Q.ANTUM solar module with an innovative reinforced steel frame and a decentralized junction box for utility scale applications. Power ratings of up to 375 Wp for lowest LCOE and optimized manageability. The module was first presented at Intersolar Europe 2017 where it immediately won the Intersolar Award 2017 in the category photovoltaics. It will first be installed in large-scale projects with dedicated customers before release on the open market.

Award Winners Discuss Hanwha *Core Values*

How are Hanwha's core values -- Challenge, Dedication and Integrity -- integrated into the lives of Hanwha's employees across the world?

The Hanwha Core Value Essay Contest was held in order to provide an opportunity for employees around the world to share their stories about how they live out Hanwha's core values. The winners' stories were recently shared through the company's internal broadcasting channel, Channel H. Let's take a look at the winners' thoughts on the importance of Hanwha's core values as well as their excitement at winning the contest.
To see the video, please go to www.hanwha.com/en/corevaluestory

Osama Ayad

Hanwha Engineering
& Construction BNCP

"After joining Hanwha, I learned about Hanwha's core values, challenge, dedication, and integrity. I also learned how to be self-confident and how to take on challenges without fear. Facing challenges through hard work and dedication while maintaining my sense of integrity in everything I do has become central to my way of life."

"Hanwha's core values motivate talented people from diverse areas to work in harmony, achieve their dreams and overcome challenges."

Viktoria Eizenhofer

Hanwha Europe GmbH

Zhou Wen Juan

Sino-Korea Life

"For me, Hanwha's 'challenge' value has helped me determine what ventures I can and should pursue. It inspires me to proactively take on challenges, trying my best at all times. Meeting different challenges every day requires a positive attitude. Because it is necessary for both my professional and personal dignity, I strive to deeply internalize Hanwha's values at all times."

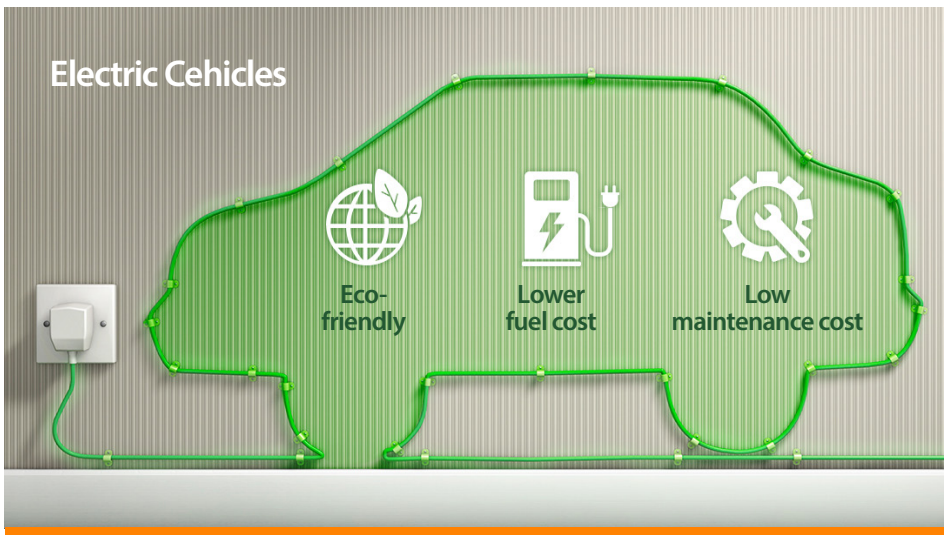
"My entire team is dedicated to outlining goals and meeting them. As part of Hanwha's belief in the importance of challenging ourselves, I hope that my local Ningbo branch will play an important role in helping Sino-Korea Life to prosper."

Xie Lingyi

Sino-Korea Life

What do challenge, dedication and integrity mean to you in your daily life? We hope that all members of the Hanwha family are able to understand the meaning of these core values, integrating them at work as well as in their lives to create their own meaningful stories.

Hanwha's *Advanced Materials are Shaping the Development of EVs*



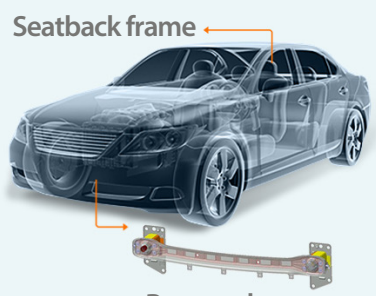
The entire auto industry is abuzz with the prospect of Electric Vehicles (EVs) becoming mainstream. These 'green' cars are widely regarded as the key to a future where all cars will have zero emissions. And EVs' low cost to operate and maintain make them more attractive to own than traditional gasoline and diesel vehicles.

Hanwha Advanced Materials is at the forefront of high-strength, super-lightweight materials for automotive parts

The lighter electric vehicles are, the futher they travel

An EV can drive over 300 miles on a single charge but this range is still shorter than that of gasoline cars. Hanwha, like the rest of the manufacturers in the EV industry, believe the key to increasing distance per charge is to reduce the weight of the car. With this understanding, Hanwha has embarked on a pursuit to develop high-strength, super-lightweight materials for automotive parts. And we have been met with success.

Hanwha's lightweight materials used in EVs: Continuous Fiber Reinforced Thermoplastics



Compared to metal frames

Weight reduced by 30%

Rigidity enhanced by 300%

One of the lightweight materials developed by Hanwha Advanced Materials is the advanced compound known as Continuous Fiber Reinforced Thermoplastics (CFRTPC). Hanwha Advanced Materials initially began mass producing them at the beginning of 2015, CFRTPC is widely utilized in a variety of interior and some exterior EV components. The popularity of CFRTPC is largely due to its ability to reduce weight by approximately 30 percent while simultaneously enhancing rigidity by 300 percent over conventional metal frames.

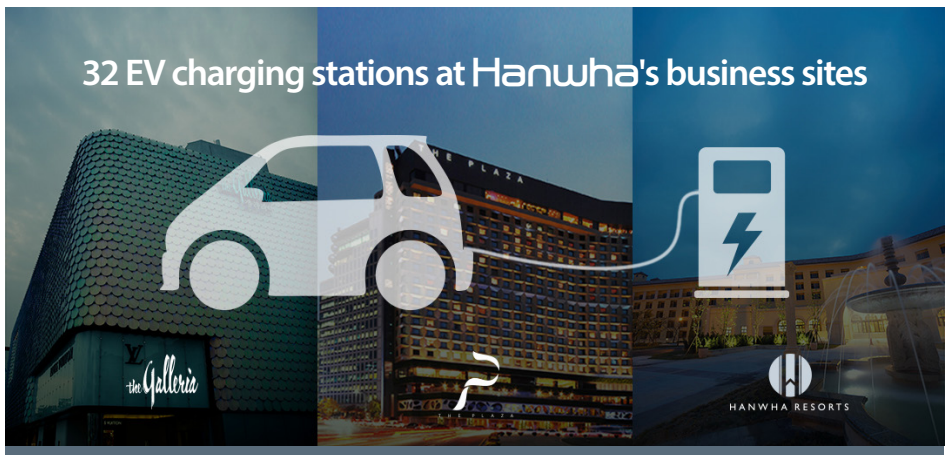
Hanwha's lightweight materials used in EVs: Sheet Molding Compound

Light weight | High strengh | Resistant to scratching | High insulation resistance

optimized for EV battery cases

Later in 2015, Hanwha Advanced Materials developed the Sheet Molding Compound (SMC), a composite material with enhanced mechanical properties that is highly stable, scratch resistant, durable, and watertight. And like the CFRTPC, the SMC is stronger and 30% lighter than metal but has greater interior and exterior applications than CFRTPC. The compound also has outstanding electrical insulating properties, making it ideal for use as battery cases in EVs.

32 EV charging stations at Hanwha's business sites



Aside from developing advanced materials that is moving the EV industry forward, Hanwha has been doing its part to promote EVs in a smaller way, by installing Tesla charging stations in South Korea. Hanwha has built 20 EV charging stations at its Hanwha Resort alone and more stations at its other business sites including the Galleria department store and THE PLAZA hotel. They were built to proactively meet emerging demand anticipated in the domestic market as in the global automotive market.

Hanwha will continue to increase its investment and its presence in the EV market by developing more automobile parts using high strength, super lightweight and thermoset materials.

[1] **GMT :** Glass Fiber Mat Reinforced Thermoplastics
[2] **LWRT :** Low Weight Reinforced Thermoplastics
[3] **EPP :** Expanded Polypropylene

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

China

Hanwha Advanced Materials

Hanwha Advanced Materials Beijing

On July 3rd, Hanwha Advanced Materials Beijing conducted a fire safety training with Beijing's Changping district fire department to commemorate Fire Safety Month. During the training exercise, the Hanwha Advanced Materials employees were taught how to cope with fire emergencies and given training in general fire safety awareness.

Germany

Hanwha TOTAL petrochemical

Hanwha Total Petrochemical Europe

Hanwha Total Europe Opens a New Branch in Frankfurt, Germany

On June 28th, Hanwha Total Europe opened a branch in Frankfurt, Germany. Along with the employees of the Polymer Export Division of Hanwha Total, Total Group executives attended the opening ceremony and celebrated the successful launch of the latest Hanwha Total Europe branch. Hanwha Total Europe in Germany is aiming to become the leading supplier of polymer products throughout Europe.

Japan

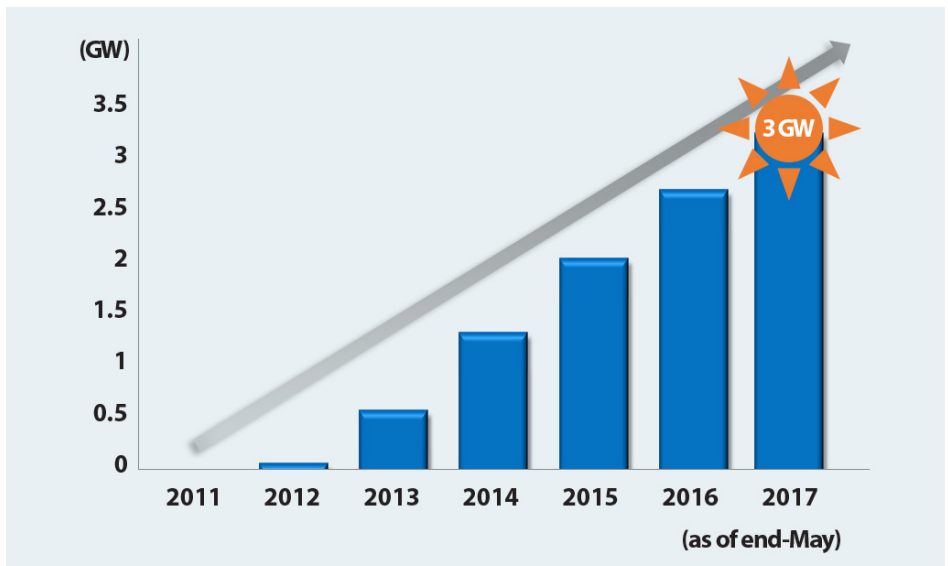
Hanwha Q CELLS

Hanwha Q CELLS Japan Co., Ltd.

Hanwha Q CELLS Japan Reaches Number One in Domestic 3 GW Solar Modules

In May 2017 Hanwha Q CELLS Japan exceeded the total shipment of 3 GW solar cell modules in Japan's domestic market just six years after its entry back in August 2011.

According to the International Energy Agency (IEA), the total amount of solar modules installed in Japan by the end of 2016 was 42.8 GW of which 7% was supplied by Hanwha Q CELLS Japan. At the same time, the company's share of Japan's solar module market was over 10%. Hanwha's market share in Japan then



climbed to 12% in the first quarter of 2017 before jumping to 16% in April.
In 2016, strategies were employed targeting 3 customer segments:
1) large commercial businesses
2) small commercial businesses
3) residential customers.

The successful execution of these strategies led to increased sales. The small commercial businesses and residential segments responded best and as a result, the total shipment volumes to these two customer segments increased 25% and 5% respectively over the prior years.

The dramatic sales increase to the small commercial businesses was attributed to the popularity of the Q.MAX series – an assortment of devices including power conditioners, frames and racks whose adoption lowered the barrier to entry into solar power systems and also served to show the commercial value of solar power. For the residential segment, it was the Q.PARTNERS sales support program for sales agents that contributed to the higher sales.

The products Hanwha Q CELLS Japan is selling are high-end products developed in Germany. These products have improved long-term power generation and durability that translates to lower costs to the customers. And coupled with a proven sales strategy for each of its target segments, Hanwa Q CELLS Japan is now well on its way to reach its longer-term goal of achieving its 30~40% increase in total shipment volume.

Saipan

Hanwha Hotels & Resorts

Saipan World Resort

Hanwha Saipan World Resort Starts "Take A Break" Program

On July 7th, 2017, Hanwha Saipan World Resort launched its "Take A Break" employee care program. The objectives of the program are to:
1) reward hard-working team members for high performance and
2) boost employee morale and their efforts to increase customer satisfaction.

Thanks to the hard work of the employees, the room occupancy rate hovered around 108%. Their achievement did not go unrewarded. Through the employee care program, these employees, their families and friends were treated to a free night accommodation with meals and water park passes at the Hanwha Saipan World Resort. Rejuvenated and back from "break," the employees returned to work, all smiles.

United States of America

Hanwha Advanced Materials

Hanwha Advanced Materials America

To celebrate Independence Day at work, On June 29th, Hanwha Advanced Materials America held a barbeque party in advance of July 4th. During the event, the management expressed their gratitude to all the employees for their hard work and dedication.

Press Release

Hanwha Q CELLS *Becomes International Partner of RB Leipzig*

· Partnership over two years with option for renewal
· Sponsoring commitment to support the company's growth targets

Daniel JW Jeong, CTO and head of Hanwha Q CELLS GmbH (third from left) and Matthias Reichwald, CCO of RB Leipzig (fourth from left)

The globally leading solar module manufacturer Hanwha Q CELLS has become international partner of the football club RB Leipzig starting this 2017/18 season. The partnership is contracted for two years and includes an option for renewal. Hanwha Q CELLS, with its product brand Q CELLS, will be present as a partner of the Red Bulls for national and international advertising measures among other things, including LED perimeter ads and cam-carpets positioned next to the goals as well as the coaching benches of the Red Bull Arena.

Hanwha Q CELLS is expanding its business activities worldwide. Therefore, strong growth is planned in the market segments of commercial rooftop installations, solar solutions including storage for private households, and utility scale systems. The partnership with RB Leipzig will promote Hanwha Q CELLS to increase its brand awareness among power consumers in Germany, Europe, and the rest of world, and to expand the company's customer base as well as its partnership network.

Matthias Reichwald, CCO of RB Leipzig, said: "RB Leipzig and Hanwha Q CELLS share a passion for energy, high performance, and quality, and therefore perfectly match each other because of their goals, dynamism, mission, and values. We are pleased to have expanded our partner portfolio with another strong brand."

Seong Woo Nam, CEO of Hanwha Q CELLS Co., Ltd. commented: "Hanwha Q CELLS is proud to become an international partner and exclusive solar partner of RB Leipzig. We are firmly convinced we are entering into a win-win partnership, which offers enormous potential for both parties. While we have both grown in parallel so far, we are now looking forward to growing together, side by side."

Daniel JW Jeong, CTO and head of Hanwha Q CELLS GmbH in Germany, said: "Our global center for technology, innovation, and quality is located in Thalheim, Saxony-Anhalt, which is only 50 kilometers from Leipzig. We have thus a solid close regional relationship with RB Leipzig, despite the fact we are a global company. Furthermore, as the exclusive solar partner, we are also planning to jointly develop the possibilities of solar energy for the club."