

# Hanwha Newsletter

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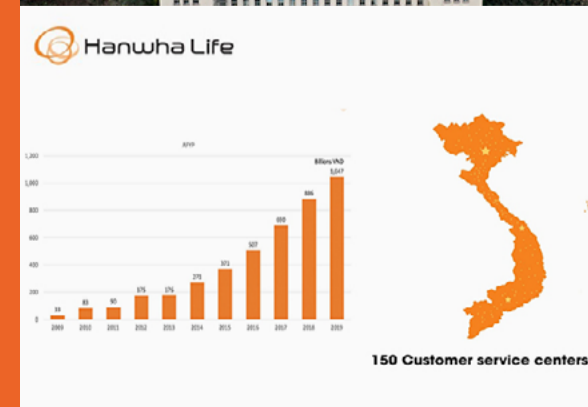
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## Solutions for a Better Tomorrow

# A Vital Springboard: Hanwha Life's DREAMPLUS Incubator Launches Start-ups Toward Global Success

New beginnings can be rough — especially for start-ups.

Most fail in their first few years, struggling to find resources while trying to make sense of constantly shifting market demands.

However, survival rates improve dramatically when start-ups receive support during their formative years, whether it be financing, mentorship, networking or even just a dedicated workplace.

Since 2016, Hanwha Life's DREAMPLUS incubator has been fostering start-ups and talented individuals so they can bring their disruptive ideas to a wide audience. DREAMPLUS taps into Hanwha's large global network to help start-ups make vital industry and business connections that spur growth and innovation. Because of this, many early stage start-ups have flocked to DREAMPLUS in Korea and created a thriving start-up community.

Now, DREAMPLUS is expanding overseas to give start-ups even more growth opportunities.

### Opening new Asian opportunities

DREAMPLUS' Global Expansion Program (GEP) accelerates Korean start-ups' entry into global markets such as USA, Japan, Vietnam and China. Through the GEP, start-ups take advantage of Hanwha's global network to secure overseas partnerships and sales.

Among the 2019 GEP applicants, four Korean companies were given the opportunity to pitch themselves to potential Vietnamese investors and business partners.



DREAMPLUS' GEP provides vital assistance to start-ups taking their first steps onto the world stage

The meetings were fruitful, for FreecN, a mobile multimedia platform developer, and SmartMD, a mobile-based microscopic diagnostic tool developer, planning to open Vietnamese offices this year. FreecN also received a USD 2.5 million investment from Hanwha Investment & Securities at the beginning of 2020.

Building on its experience with DREAMPLUS and the GEP, FreecN will begin developing start-up-targeted content to help other companies looking to accelerate their growth. Current DREAMPLUS-supported start-ups will create video lectures to share their own stories and business tips. These lectures will then be posted on AfreecaTV's video-streaming service as well as on FreecN's AfreeCollege channel. With DREAMPLUS' help, FreecN hopes to distribute this content to a global audience.

### Korean start-ups launch in Japan with LAUNCHPAD

DREAMPLUS is working with LAUNCHPAD, Korea Creative Content Agency's (KOCCA) own accelerator program, to help content-focused start-ups explore Japanese business opportunities. Since July of 2019, DREAMPLUS has provided LAUNCHPAD start-ups with office space, administrative support, and lessons on how to navigate the Japanese business world from Hanwha Life's office

in Fukuoka, Japan. DREAMPLUS also organizes networking events and matches LAUNCHPAD start-ups with local mentors, accelerators, and venture capitalists.

Thanks to LAUNCHPAD and DREAMPLUS, there are three start-ups currently looking to expand into Japan: Marvrus, a virtual, augmented, and mixed reality-based edutech company; Voithru, an AI-based crowdsourcing platform for automated subtitle production; and xSync, an event-management platform.



xSync is taking steps to enter the Japanese market thanks to DREAMPLUS and LAUNCHPAD

xSync recently signed a memorandum of understanding (MOU) with Global Connect Kyushu, a grassroots network that provides globalization services to companies from the Japanese island of Kyushu. Meanwhile, Voithru is attracting attention and investment from a Japanese venture capitalist on top of the investment it has already received from DREAMPLUS.

### Crossing America, from NY's Silicon Alley to CA's Silicon Valley

For Korean start-ups seeking American investments and business opportunities, the Korea International Trade Association (KITA) opened "Startup Branch New York" in midtown Manhattan. It provides start-ups with video-conferencing systems, coworking spaces, and a business center and lounge. DREAMPLUS signed an MOU with KITA for its start-ups to use Startup Branch New York's facilities.



DREAMPLUS operates an incubator in San Francisco for US-based start-ups looking to enter the Asian market

Correspondingly, on the West Coast, DREAMPLUS provides incubator space at Hanwha Life's San Francisco office for American start-ups looking to expand into Asia. From here, these start-ups can participate in networking events and pitch opportunities. DREAMPLUS also hopes that the SF incubator — through its proximity to Silicon Valley — will become an important innovation hub that will identify and explore global fintech trends.

### An innovative ecosystem where start-ups bloom

It takes great bravery for any start-up to turn an idea into reality. Knowing that young companies are taking huge risks to succeed, DREAMPLUS provides them with a safer framework from which they can find mentors and investments, guiding them toward success.

Now, as it expands globally, DREAMPLUS is helping more start-ups grow. As a lively start-up ecosystem, it encourages open innovation, fosters future talent, and nurtures an entrepreneurial culture. Yet, DREAMPLUS is more than an incubator; by partnering with start-ups, DREAMPLUS not only helps them achieve their ambitions step by step, but it also shares in their successes. ■

## Solutions for a Better Tomorrow

# Solar Power Enters the Information Age

Reducing the environmental impact of energy-hungry industries has been high on the agenda for many years now. The IT sector is a particularly ravenous one, representing at least 7% of the world's energy usage. Much of this is driven by rising mobile-data usage, the move to cloud computing, and the need for hyperscale data centers.

In their ongoing efforts to reduce their carbon footprints, the world's leading technology companies are accelerating their adoption of renewable energy sources to power their entire operations through renewable energy by the next decade.

### Solar powered social media



Data centers require an enormous and reliable supply of energy in order to operate around the clock

Social media giant Facebook is at the forefront of adopting more renewable energy sources. It currently has nine sustainably powered data centers in the United States. The ninth data center, located in Newton County, Georgia, opened in December of 2019 and is 100% solar-powered. Most of its power comes from a solar farm in nearby Early County, made up of more than 350,000 Hanwha Q CELLS' Q.PEAK DUO L-G5.2 solar modules.

What's more, the solar modules were produced a stone's throw away at Hanwha Q CELLS' production plant in Whitfield County, Georgia. The short transport distance meant fewer carbon emissions by fossil-fuel-burning trucks.

### Efficiency is key

With the need for high-speed data connectivity increasing at a breakneck pace, solar power is an ideal solution for powering hyperscale data centers all over the world. Advances in photovoltaic technology mean that solar power systems are more efficient, reliable, and able to produce consistent amounts of electricity even in places with fluctuating levels of sunlight. Surplus energy produced during daylight hours can be stored to provide data centers with power overnight.

Further driving solar power's popularity for data-center power solutions is its cost efficiency. The purchase, installation, and maintenance of solar power equipment have become increasingly affordable with each new generation of solar technology. Not only that, the sunlight necessary to produce solar power is freely and consistently available, allowing for more manageable operating costs.



*Hanwha Q CELLS is dedicating significant resources to continue developing the world's most efficient and reliable solar energy solutions*

Hanwha Q CELLS provides customers with outstanding solar energy products as one of the world's leading solar energy solutions providers. On the cutting edge of solar technology, Hanwha Q CELLS' Q.ANTUM technology—which includes Anti LID/LeTID, Anti PID, and other unique features—helps make solar

modules more efficient so they can deliver clean energy and enormous carbon reductions to customers all over the world.

### Committing to a renewable energy future

Renewable energy sources like solar power allow for carbon-free electricity production. When used on a large scale by major tech companies, renewable energy results in significant reductions in overall carbon emissions. Facebook is currently transitioning towards relying 100% on renewable energy and expects to shrink its global carbon footprint by an amazing 75% once the transition is complete in 2020.

And Facebook isn't alone in its commitment to renewable energy. It's one of over 100 of the world's leading companies, including Apple and Google, that have joined the RE100. Companies participating in RE100 have transitioned, or are transitioning, toward relying 100% on renewable energy and cutting down their worldwide carbon emissions.



*Solar energy is vital in ensuring a greener future*

For smaller companies that can't afford to invest in dedicated renewable energy sources, a vast array of alternative options – including joint investments, power purchasing partnerships, and renewable energy brokers – exist to help them better manage their sources of energy.

### Hanwha's commitment

Hanwha is dedicated to bringing about a greener and more sustainable future and helping customers worldwide reduce their environmental impact by providing the best solar energy solutions available. Hanwha Q CELLS' solar cells and solar modules set the global standard for productivity, efficiency, and durability and are the ideal products to use in reducing the world's reliance on fossil fuels. ■

## Meet the team

# Hanwha Solutions' Kitaeg Jung

Principal research engineer Kitaeg Jung describes himself as a problem solver who is always looking for the best solution, not just any solution.

When consumers began demanding safer plastics, produced without plasticizers<sup>1</sup> containing phthalates<sup>2</sup>, the chemical industry struggled to find suitable solutions. Kitaeg and his team dedicated themselves to developing a breakthrough: **ECO-DEHCH<sup>3</sup>**, an environmentally sustainable plasticizer that is non-toxic, without sacrificing product quality.

Kitaeg reflects on the challenges he and his team faced during development, efforts they made to address problems along the way, and gratification he felt when he received one of Korea's most prestigious industrial research awards.



### Q1. Could you please introduce yourself?

My name is Kitaeg Jung and I'm a principal research engineer overseeing chemical processes at Hanwha Solutions. I joined Hanwha 15 years ago in 2005.

I'm currently in charge of ECO-DEHCH development. I also conduct research on new products and processes here at the lab.

### Q2. What sort of research have you been conducting?

My focus is on developing sustainable production processes that can reduce waste and are more efficient. For instance, my team and I developed ways to reduce wastewater output down to 1/50th, or even 1/100th, of that of current production techniques.

We're also working on ways to recover organic compounds from wastewater and looking into next-generation energy sources like fuel cells.



Kitaeg Jung at work in his lab

### Q3. Have you always been concerned about the environment?

I've been interested in the environment since I was a child. So, it's great to see people becoming more aware of environmental issues.

Now, I take my children out to nature parks and volunteer for clean-up activities to show them the importance of preserving the environment.

### Q4. How did you develop an environmentally sustainable plasticizer?

To be frank, there were concerns over the toxicity of traditional phthalate plasticizers in Korea and other developed nations. Alternatives needed to be found.

It took us about eight years of continuous research to develop ECO-DEHCH. Because existing plasticizers were showing high performance, people were asking questions such as, "Is there space for ECO-DEHCH in the market?" As development progressed, however, the market for environmentally sustainable products grew much faster than anyone had anticipated.

Our biggest challenge was keeping manufacturing costs down. We managed to reduce those costs by about 50% in the end. By then, we were all optimistic about successfully commercializing ECO-DEHCH.



ECO-DEHCH is environmentally sustainable and safe for humans to handle

### Q5. What do you most remember from the eight years you spent working on ECO-DEHCH?

During the research phase, one major issue we had was the short shelf life of our catalyst.

This was a dilemma because we were just about ready to put it on the market. I didn't give up and began digging deeply into where things might have gone wrong. While I was doing this, I found a pattern in our past findings. By examining that pattern and making changes to the details we had overlooked, I was able to improve the catalyst's shelf life significantly.

Being able to experiment and collaborate with my colleagues to solve a major problem was an exhilarating one that I'll never forget.

#### **Q6. Was there ever a moment when you wanted to abandon the project?**

Research always includes unwanted results. I'm able to work through those frustrations thanks to my faith in my colleagues. They were all so supportive and encouraging throughout the eight years we worked on ECO-DEHCH, so I never gave up and was able to see it through to completion.



#### **Q7. What was key to the successful development of ECO-DEHCH?**

I think there is one key, which is the "question mark" that we put on the end of everything that we do.

What I mean is that we never simply accepted satisfactory results and moved on. We kept asking questions and strived to get even better results. By doing this, we discovered a lot of unexpected issues that needed to be addressed.

One of my key beliefs is that every problem has a solution. We were able to make ECO-DEHCH a success by constantly questioning and searching for problems and their solutions.

#### **Q8. How did it feel when the Korea Industrial Technology Association presented you with the "IR52 Jang Young-shil Award" for developing ECO-DEHCH?**

As a researcher working on environmentally sustainable projects, it was a dream come true to receive such a prestigious award. I felt that it wasn't just in recognition of our successful research, but also the growth and necessity of environmentally sustainable industries in Korea.

It was gratifying to see how excited everyone else was about the award, especially my colleagues and all the staff at the lab who trusted us to the very end.



Kitaeg Jung received one of Korea's most prestigious industrial research awards for his work on ECO-DEHCH

#### **Q9. How do you see your achievements contributing to sustainability?**

The commercialization of ECO-DEHCH is important in several ways. The most important thing is that chemical companies now must think of environmental sustainability on top of product performance. Because of this, I believe Hanwha Solutions and ECO-DEHCH kicked off an environmentally sustainable transformation in the chemical industry.

#### **Q10. What do you think the future of plastics will be?**

In the future, I believe we'll see regulations put into place that will require plastics manufacturers to dedicate a portion of their output to environmentally sustainable products.

Chemical companies are already required to meet environmentally sustainable product quotas. I expect that this practice will have a huge impact on how chemical companies implement sustainable policies.

#### **Q11. Are you working on any other environmentally sustainable projects now?**

We've begun researching biochemistry and biodegradable polymers, which are two environmentally sustainable areas that are getting a lot of attention in the chemical industry.

ECO-DEHCH was just the beginning for us. We're going to keep improving our technical capabilities and commercial viability to make sure environmentally sustainable products are more widely used.

#### **Q12. What is the "spark" that drives you?**

I'm driven by perseverance and passion to continue discovering problems that need solutions. As I said before, every problem has a solution. You may already have a solution, but it might not be the best one. There may be a better solution if you dig a little deeper.

Also, I think that the compulsion to keep looking for the best solutions is another spark that drives me.

#### **Q13. And what lights that "spark"?**

Research isn't something you do alone. ECO-DEHCH succeeded because of the amazing support I received from my colleagues and the company.

It was because I received this support that I was able to find the passion to complete this project.

- **<sup>1</sup>Plasticizers** : Substances used in plastics manufacturing to improve flexibility and reduce brittleness in the final material.
- **<sup>2</sup>Plasticizers** : Commonly used plasticizers. Their usage was substantially curbed by governments around the world because of concerns about their toxicity to humans.
- **<sup>3</sup>ECO-DEHCH** : Hanwha Solutions' proprietary phthalate-free plasticizer. It is non-toxic and environmentally sustainable and can be used in everything from construction materials to food-grade plastic wraps. ■

# Hanwha Q CELLS secures EuPD Research 'Top Brand PV' seal accolade for record seventh consecutive year

In securing this award, Hanwha Q CELLS becomes one of only three module manufacturers to receive the EuPD seal for seven years running in Europe. Hanwha Q CELLS has also secured the same 'Top Brand PV' seal in Australia for the fifth year in succession; a testament to the brand's consistency and reliability across 20 years in solar industry.



Hanwha Q CELLS, a renowned total energy solution provider in solar, energy storage, downstream project business and energy retail, has become one of only three solar brands to be awarded the EuPD Research 'Top Brand PV' seal for a record seven consecutive years in Europe. Hanwha Q CELLS has also been recognized as a leading solar brand in Australia for the fifth year in a row.

The 'Top Brand PV' seal is awarded by internationally renowned research institute EuPD Research to companies that receive excellent feedback and ratings in its Global PV InstallerMonitor survey, which compiles the opinions of participating solar installers located across a number of leading solar markets.

In securing the 'Top Brand PV 2020' seal for modules, Hanwha Q CELLS was once again ranked highly for its commitment to product quality and service, built upon a solid brand recognition that has come to stand for consistency and reliability across 20 years in the solar industry.

## A new decade for raising the bar even higher

The Hanwha Q CELLS brand is now thriving into its third decade, and begins the 2020s as it ended the 2010s – intent on steering solar energy towards even wider mainstream acceptance and importance across the globe. To achieve this, accolades such as the EuPD Research seal are a vital component in ensuring and maintaining high standards, transparency and trust within the industry.

The EuPD Research Global PV InstallerMonitor surveys more than 100 installers in each nation to impartially gauge which solar companies – module, inverter, wholesalers and storage – regularly surpass expectations in terms of service and product performance. Such a process helps to drive standards higher each year, engendering greater conviction in solar energy's ability to provide higher return of investment with enhanced quality and reliable products.

For Hanwha Q CELLS, pursuing and securing excellence in module performance and brand recognition will continue to play a vital role in the company's strategy moving forward. Since 2018, Hanwha Q CELLS has also pivoted towards becoming a total energy solution provider, and offers both a flexible storage solution – in the form of its Q.HOME+ ESS AC-G2 AC-coupled battery – and also the Q.HOME+ ESS HYB-G2, which is a modular system that can be scaled to meet the specific storage needs of the customer. These products – available in a number of European markets – are complemented in Germany by Q.ENERGY, which offers customers 100 % green electricity, regardless of whether they have their own solar system installed or not. In Australia too, Hanwha Q CELLS has boosted its ESS business with the launch of its Q.HOME package as the company widens its portfolio of fully integrated energy solutions that enable homeowners and small businesses to take complete control of their energy destiny.

Mr. Hee Cheul (Charles) Kim, CEO of Hanwha Q CELLS, said: "Hanwha Q CELLS is proud to have received the 'Top Brand PV' seal for seven consecutive years and we will continue this legacy of reliability, quality and trust into the next decade. The 2020s will see a massive evolution in the way the world generates, consumes and shares energy, and Hanwha Q CELLS hopes to play a major role in this transition as we move towards becoming a total renewable energy solutions provider."

"The winning of this award for module brand quality is nevertheless a reminder of the excellent standards that Hanwha Q CELLS sets, and upholds, in the field of solar module technology. As the company evolves, expect to see even greater innovation and quality emerging from our world-class solar cell and module R&D facilities over the coming months and years." ■

# Hanwha Q CELLS completes photovoltaic systems for leading German football club RB Leipzig

· RB Leipzig and its official partner Hanwha Q CELLS have installed two photovoltaic systems that provide clean electricity to the Red Bull Arena and the Red Bull Academy, both in Leipzig, Germany



Hanwha Q CELLS, a renowned total energy solution provider in solar, energy storage, downstream project business and energy retail, has recently completed installation of two photovoltaic systems for its official partner RB Leipzig.

Having reached the last 16 of this season's UEFA Champions League, and a serious challenger for this year's Bundesliga title in Germany, RB Leipzig is also shining off the pitch. The football club will feed the sustainable energy generated by its 71.5 kWp Q.FLAT-G5 flat roof solar system atop the Red Bull Arena's administrative section completely into powering the stadium and – like star striker Timo Werner – will use that energy to illuminate the pitch. Thus, the solar system from Hanwha Q CELLS will ensure that the sun continues to shine on the high-octane football action, even if the actual playing field is cast in shadow.

The second solar system will deliver clean electricity to the operation of the modern RBL Football-Academy. The training facility is regarded as one of the most sophisticated in Europe and is used by both the first team and the many youth teams of RB Leipzig.

"We are delighted to have completed the first two projects of this kind with world-leading energy company Hanwha Q CELLS," emphasized Oliver Mintzlaff, CEO of RB Leipzig. "We as a club always strive to shape our partnerships holistically. That's why it was obvious for us to discuss the opportunities of producing and self-consuming solar electricity with our official partner Hanwha Q CELLS. What convinced us in the end was the quality and performance of the complete solutions from Hanwha Q CELLS."

Maengyoon Kim, Head of Sales Europe at Hanwha Q CELLS, added that he was delighted by the successful cooperation of the two partners. "RB Leipzig always aims for the utmost performance and success," Yoon said. "First and foremost, in the UEFA Champions League and the Bundesliga of course, but also when it comes to infrastructure projects. Hanwha Q CELLS is more than happy to support RB Leipzig with just that: peak-performing and tailor-made clean energy solutions, infused with Hanwha Q CELLS' solar DNA." ■



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## Korea



### Hanwha TOTAL Petrochemical Unveils New Vision Statement and Promotional Strategies

Hanwha Total Petrochemical is taking proactive measures in a rapidly changing business environment and the Fourth Industrial Revolution. Expressing its aim to become a world-class globally competitive company, the company changed its vision statement and promotional strategy.

The new vision statement, "Responsible Chemical & Energy Leader," represents the responsibility the company is taking as an industry leader in chemicals and energy. It is committed to delivering business value while maintaining stringent safety, health, and environmental standards to benefit customers, shareholders, and local communities.

To carry out the vision statement, Hanwha Total Petrochemical has established new goals and promotion strategies based on Hanwha's philosophy of trust and loyalty and code of conduct. By becoming the number one in health and safety through Triple Zero (zero shutdowns, troubles, and accidents) activity, operational excellence, and product leadership, the company hopes to be reborn as a global



leader. To achieve this, its promotional strategies were revised to include focusing on digital technologies, making the company's products and core business more competitive, and innovation.

Hanwha Total Petrochemical looks forward to having all employees take part in these changes and committing themselves to make the new vision statement a reality.



## United States of America



### Hanwha Q CELLS America Inc.

#### Hanwha Q CELLS America Inc. Tops Out US Residential Solar Energy Market

Hanwha Q CELLS America Inc. had plenty to celebrate the new year. It had just closed out 2019 by claiming the top spot for residential solar module manufacturers on the US PV Leaderboard compiled by Wood Mackenzie, a global research and consultancy group.

Wood Mackenzie's US PV Leaderboard is a quarterly report that organizes solar industry ranking in various categories, including installers, financiers, inverter manufacturers, and module manufacturers.

According to the latest Leaderboard, Hanwha Q CELLS America Inc. made up a remarkable 26.8% of the US residential solar market in 2019. This was a significant leap from the 14.5% market share the company had throughout 2018. It is also the largest market share held by any company since Wood Mackenzie



began keeping records.

Hanwha Q CELLS America Inc's success is a testament to its dedication to the American residential solar market. Everyone at the company feels immense pride at how solar industry experts recognize their strong brand and commitment to quality.



## United Kingdom



### Hanwha Techwin Europe Ltd.

#### Wisenet Cameras Keep a Watchful Eye on Traffic in Bologna, Italy

The city of Bologna, Italy, selected Hanwha Techwin's Wisenet surveillance cameras to form the backbone of a much-needed traffic monitoring system. Eighty-nine Wisenet cameras are now tallying incoming and outgoing vehicle traffic at Bologna's vehicle access gates.

The cameras use high-definition video capture and automatic number-plate recognition for the vehicles moving in and out of Bologna in real time. City officials use the information to strategize traffic management and effectively redistribute vehicles along Bologna's road network.

"We are delighted with how easy it has been to integrate the Wisenet cameras



successfully with our existing platform and systems," said Alberto Nuzzo, the head of Bologna's Office of Digital Infrastructure and Telecommunications. "The captured data allows us to manage the existing levels of traffic more efficiently. We will be able to analyze that data to assist us in future traffic planning."



## Vietnam



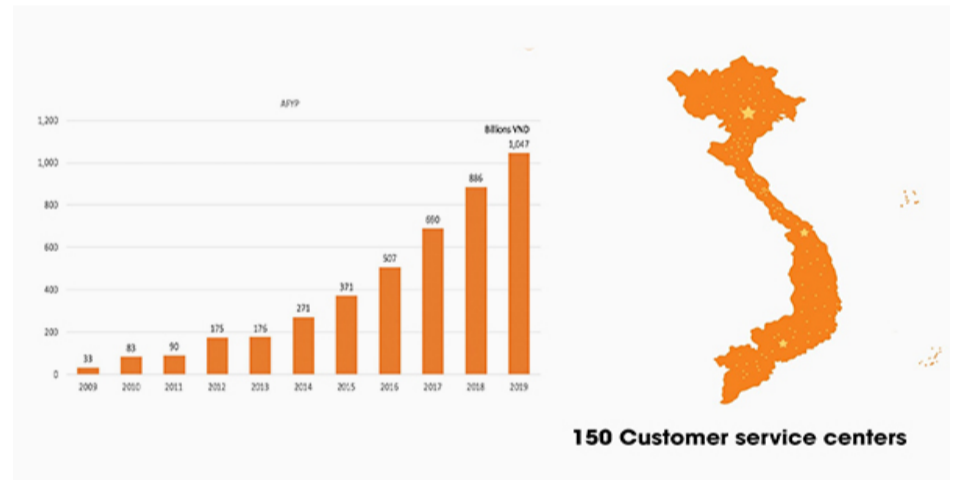
### Hanwha Life Insurance (Vietnam)

#### Hanwha Life Vietnam Crosses Trillion-Dong Threshold

Hanwha Life Vietnam ended 2019 on an amazing high when it recorded more than VND 1 trillion in revenue. This achievement places the company in the top tier of Vietnamese insurance providers.

The VND 1 trillion milestone is the latest in Hanwha Life Vietnam's remarkable growth story. It began operations in 2009 with VND 100 million in charter capital. The company pursued an aggressive growth strategy that placed great emphasis on hiring local talent and expanding its distribution channels. Now, the company has 400 Vietnamese employees, 42,000 financial planners, and a network of customer service centers throughout Vietnam.

Back Jong Kook, Chairman and General Director of Hanwha Life Vietnam, has



declared that the company will seek out new strategies to continue its fast track growth. This includes collaborating with fintech companies to create solutions for customers by finding insurance products that meet their needs.

As Hanwha Life Vietnam continues to grow and innovate, it is now prepared to become the leading insurance provider in Vietnam and Southeast Asia. ■