

Hanwha Newsletter

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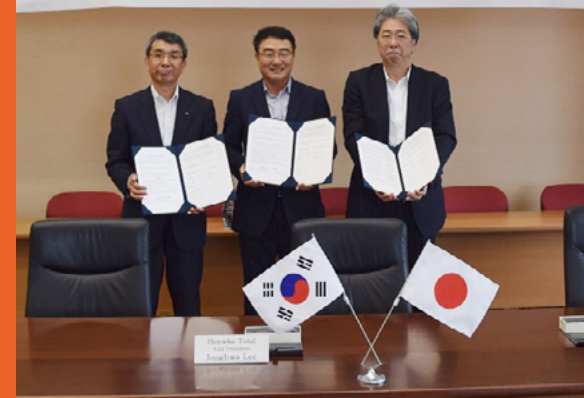
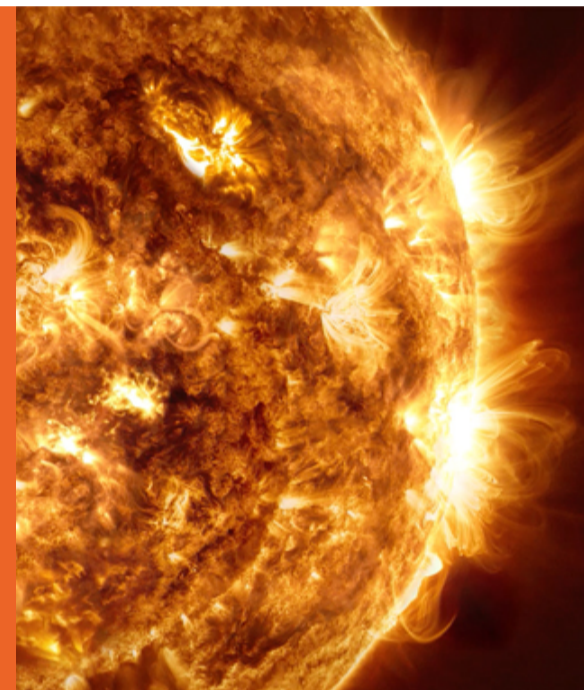
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Setting the **Global Solar Standard**

Hanwha Commercial Video -Sustainable Solar Energy-



The light of the sun that reaches the Earth over the next 30 seconds of this video can become 48 hours worth of energy for the whole planet to use Without carbon emissions, without resource depletion unlimited, for all 7.7 billion people on earth

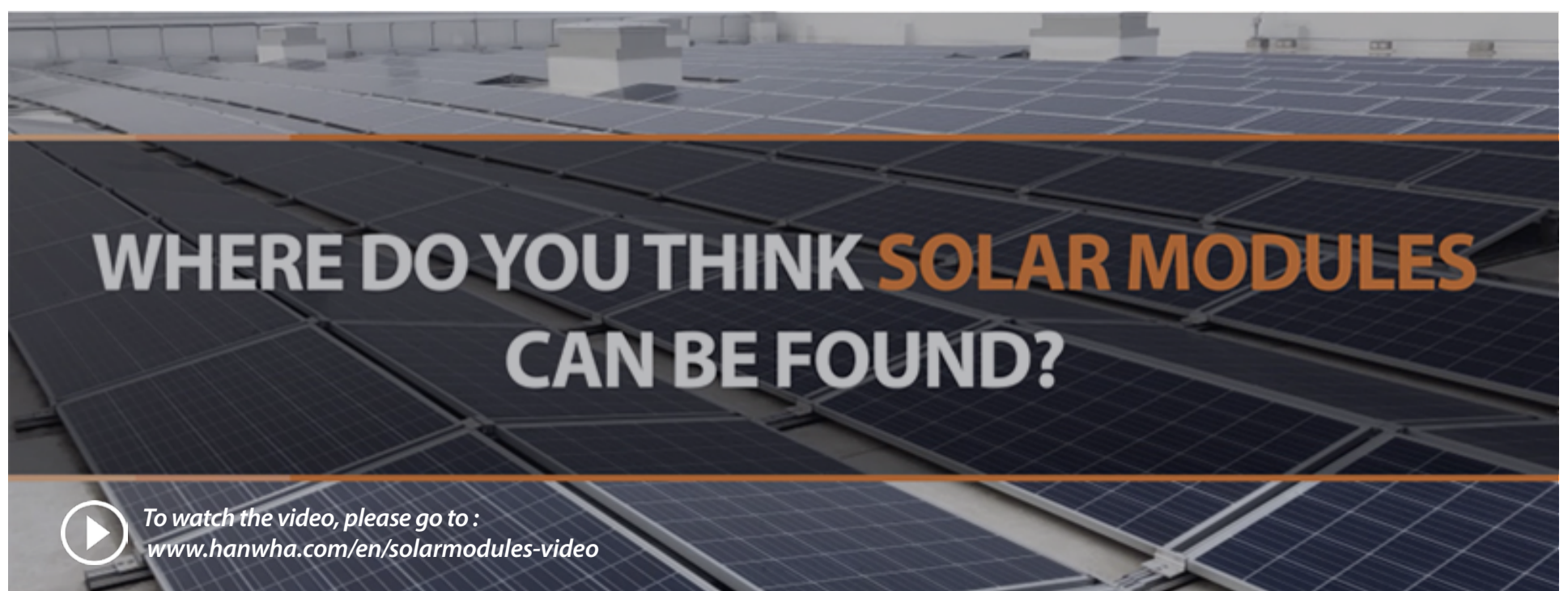
Hanwha, Setting The Global Standard
For Sustainable Solar Energy Technology

Global No.1 in Solar Cells Production
The Market Leader in Germany, the UK, and Japan
Solar Energy Top Brand Awards Winner for 6 Consecutive Years

Sustainable solutions for Earth, for life
Hanwha ■

Setting the **Global Solar Standard**

Where Can Solar Panels Be Found?



See how Hanwha Q CELLS is helping to bring sustainable solar energy to diverse locations and climates all around the world. ■

Setting the **Global Solar Standard**

Bringing Solar Power Close to Home

If you were to stop a random passerby on the street and asked them how solar energy works, they would probably guess that it's a simple process - find a spot that gets a decent amount of sunlight, install some solar modules, and enjoy free and clean energy.

The reality, however, is a bit more nuanced than that.

After all, not every location on Earth is blessed with steady amounts of sunshine year-round.

Taking advantage of what's already there

On the flipside to Great Britain's situation are locations that receive a surfeit of sunlight. Australia, for instance, is so sunny that a 50 km by 50 km patch of land, or just 0.03% of its landmass, receives enough solar radiation to power the entire country.

Yet, there are drawbacks to receiving so much sunlight. The country is struggling with record-breaking heatwaves and its aging traditional energy grid is straining to meet the energy needs of a suffering population trying to stay cool. The people, meanwhile, must contend with skyrocketing utility prices.

Now, in a somewhat ironic twist, many Australians find themselves embracing the sun—the cause of much of their suffering—to find relief.



Hanwha Q CELLS' proprietary Q.ANTUM technology allows solar modules to produce consistent amounts of energy in a wide array of environments, even under London's famously overcast skies

Advanced solar cell technology, like Hanwha Q CELLS' innovative and proprietary Q.ANTUM technology, allows solar modules to produce large amounts of energy consistently while minimizing the effect of overcast skies and harsh environments.

In fact, Hanwha Q CELLS' Q.PEAK DUO residential solar module, which incorporates Q.ANTUM technology, is even able to produce usable amounts of energy even when partially obscured by shadows.

In London, these capabilities gave the Q.PEAK DUO the winning edge when it was selected as the solar module to be used in the **Solar Together London group-buying scheme**. Now, hundreds of households and small businesses in five London boroughs have access to affordable clean energy.

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In Australia, adopting all-in-one solutions like Hanwha Q CELLS' Q.HOME system allows homeowners to take advantage of the country's abundant sunlight and ease the strain on its aging energy grid

All-in-one solar solution packages like Hanwha's Q CELLS' Q.HOME+ system, which incorporate solar modules, inverters, and energy storage systems, are the ideal solution for Australian homeowners. They produce electricity throughout the day and store the surplus in batteries for use throughout the night.

Bigger isn't always better

Let's go back to the random passerby we stopped earlier. If you were to ask them how big a solar module should be, she would most likely say it would be best to make it as big as possible to take in as much solar radiation as possible.

However, what if there is a shortage of available space?



When space is at a premium, smaller solar modules, like the Japan-exclusive 32-cell and 48-cell Q.PEAK residential solar module allow environmentally conscious homeowners to adopt solar power

The people of Japan face this issue as their government's Zero Energy House directive requires a majority of new homes built by 2020 to have zero carbon emissions.

One of the most economical ways to achieve carbon neutrality is to adopt solar energy, but Japanese homeowners are finding themselves hitting a snag. Because Japanese homes tend to be on the smaller side, installing standard-sized 60-cell and 72-cell solar modules wouldn't be an efficient use of the available space.

For this, cut-down solar modules provide the answer. Hanwha Q CELLS' Japan-exclusive 32-cell and 48-cell Q.PEAK residential solar modules provide optimum performance while also maximizing energy production by allowing for more solar cells overall to fit on small Japanese rooftops.

Flexibility is key

As solar energy becomes more mainstream, people are now looking for solutions best-suited for their homes.

In order to harness the sun's rays to produce clean energy, solar energy solutions providers like Hanwha Q CELLS have to take each locale's unique requirements into account when developing and presenting their product lines.



When attending solar energy trade shows around the world, Hanwha Q CELLS always makes sure to present solutions that address the unique requirements of each location

Those who find success in the growing solar energy market are the ones who don't ask their customers to compromise and settle for what's available. Instead, they adjust their products so that customers enjoy more benefits from them.

With a steady stream of innovative new products in the pipeline, Hanwha Q CELLS is constantly looking to deliver both clean solar energy and value to customers around the world, no matter the challenge. ■

Press Release

Hanwha Q CELLS to Showcase High Performance Solar Modules at Intersolar South America 2019



Hanwha Q CELLS (or "The Company"), one of the largest solar cell and module manufacturers in the world, once again showcased its high performance solar modules at Intersolar South America, which was held in São Paulo, Brazil from August 27 to 29, 2019. With over 260 exhibitors and more than 20,000 visitors, Intersolar South America, one of the highlights of the Intersolar global calendar, is known as the largest solar industry exhibition and conference in South America.

In 2018, Hanwha Q CELLS participated in this exhibition for the first time to establish a solid foundation for successful market entry into South America. The Company, which successfully focused on the Brazilian market in the first year of entry, once again participated in the exhibition to secure a stronger position in the dynamic South American market.

With more than 2.5 GW of installed capacity at the end of 2018, Brazil has become the largest solar market in South America, according to the Brazilian solar association ABSOLAR. In particular, the distributed generation segment, which includes installations up to 5 MW in size, has recently undergone remarkable growth thanks to the nation's popular net metering scheme.

Hanwha Q CELLS to showcase broad monocrystalline portfolio

To meet growing customer demand for high performance products in South America, Hanwha Q CELLS used the occasion of Intersolar South America to focus on its monocrystalline solar module series. This included the Q.PEAK and Q.PEAK DUO. Q.PEAK L-G5, which uses 72 full-cells with 6 bus-bars, has a maximum output of 380 Wp, while the new Q.PEAK DUO L-G7, which uses 144 half-cells with 12 bus-bars, provides up to 405 Wp of power output.

Both modules are manufactured using Hanwha Q CELLS' patent-protected passivation technology, which is a key ingredient in the Company's Q.ANTUM Technology. Q.ANTUM Technology also provides long-term reliability based on additional features, including Anti-LeTID (light and elevated temperature induced degradation), Anti-LID (light induced degradation), and Anti-PID (potential induced degradation) performance, as well as Hot-Spot Protect and traceable quality with Tra.Q laser identification to protect against counterfeiting.

Hee Cheul (Charles) Kim, CEO of Hanwha Q CELLS, said: "South America is a strategically very important market as it has a climate favorable to solar power generation, as well as high market growth potential. With our high performance solar modules, Hanwha Q CELLS will continuously strengthen our brand recognition throughout South America." ■

Hanwha Corporation Accelerates Its Global Mining Business

- Hanwha signs a USD 8.3 million mining service contract in Indonesia
- LDE Corporation Australia posts orders in excess of USD 330 million since it was acquired by Hanwha just 5 years ago
- For the first time, Hanwha showcases its mining products including industrial explosives and electronic detonators at AIMEX, the largest Asia-Pacific mining exhibition



Hanwha welcomed visitors to its booth at AIMEX 2019

Hanwha Corporation is kicking into high gear to keep up with a growing global demand for its mining products. Hanwha recently signed a USD 8.3 million contract to supply an Indonesian mining company with industrial explosives. This year alone, the company posted six orders of USD 22.3 million and expects total overseas sales to exceed USD 165 million by Q4 2019. To put things in perspective, in terms of sales, Hanwha's mining business has grown elevenfold since 2014 when the company began selling its products internationally.

Targeting overseas markets and contracts totaling more than USD 330 million

Hanwha's global mining business is doing particularly well in Australia and Indonesia. Low Density Explosives (LDE) Corporation Australia was worth USD 19 million when it was acquired by Hanwha in 2015. This year, LDE's sales are expected to grow by USD 66-74.2 million. This is due to local mining companies turning to Hanwha products through word-of-mouth referrals that Hanwha's blasting efficiency reduces operational costs.

In 2016, LDE Corporation Australia signed a five-year extension contract to manufacture industrial explosives and supply them to Whitehaven Coal, an Australian mining company. LDE Corporation Australia also signed a contract to provide Glencore, a British-Swiss commodity and mining company, with mining services until 2020.

In response to strong local demand in Western Australia, Hanwha is constructing an industrial explosives manufacturing facility that will have the capacity to

produce 50,000 tons annually. This will be Hanwha's third 50,000-ton production facility built in Australia. Once the latest production facility is completed in 2020, Hanwha will have the combined capacity to produce at least 150,000 tons of industrial explosives annually in Australia alone. This is double the production capacity of all Hanwha's plants in Korea combined.

Growth in Indonesia is also strong. In 2012, after Hanwha began supplying non-electrical detonators to PT Dahana, Indonesia's state-run gunpowder company, it opened a local subsidiary in 2013 and then another in 2014. Since then, Hanwha has remained active in the local mining industry, providing high quality mining products and services to the Indonesian market. Hanwha has built a production facility capable of producing 23,000 tons of industrial explosives annually.

At the beginning of 2019, Hanwha began construction on a tube production plant in Indonesia to provide the local market with a consistent supply of high-quality priming tubes. Priming tubes are the main components in detonators that ignite gunpowder.

Hanwha currently has more than USD 57.8 million in orders in Indonesia. It expects to grow to more than USD 90.8 million in orders by 2025.

Hanwha makes its international mining trade show debut, showcasing products packed with technology

From August 27 to 29, 2019, Hanwha attended AIMEX (Asia Pacific's International Mining Exhibition), an annual mining trade show held in Sydney, Australia, for the last 50 years. This was the first time Hanwha displayed its products to an international audience.

AIMEX 2019 was organized jointly by five major Australian mining companies including Hanwha customers Glencore and Whitehaven Coal. More than 500 companies had booths at the exhibition, and more than 6,000 people attended.

The products Hanwha showcased at AIMEX 2019 included the Hanwha Electronic Blasting System (HEBS) that uses the newly developed Hytronic 2 electronic detonator. Hanwha also introduced its XLOAD, an eco-friendly bulk emulsion explosive and a prime example of Hanwha's superior product quality.

At its AIMEX booth, Hanwha offered visitors a VR tour to showcase its advanced technology and product quality. The virtual tour took visitors around Hanwha's manufacturing plant in Boeun, Korea, and provided an up-close look at electronic detonator production and product testing.

Establishing a foothold in Australia with a state-of-the-art electronic detonator



Hanwha Corporation produces electronic detonators at its automated production facility in Boeun, Korea

Hanwha produces automated Hytronic 2 detonators on automated lines at its Boeun plant. The company is confident it will show the efficiency of the Hytronic 2 to the Australian market known to have many large mines.

Due to the high cost of renting equipment and labor, more efficient blasting work is becoming increasingly important. For large-scale mining operations or international mining companies seeking to reduce the time to extract minerals, Hytronic 2 can reduce the number of times a site needs to be blasted, thereby greatly reducing mining costs.

In recent efficiency tests conducted by KIDECO in Indonesia, the Hytronic 2, when compared to non-electronic detonators, proved to have better crushing power with less vibrations and shorter excavation time.

Additionally, Hanwha's mining products stand apart from the others on the market because they release a lower amount of toxic fumes during blasting. The release of toxic gas and fumes during mining is a constant concern for miners and is closely monitored by the Australian government, local communities, and environmental groups.

Health and safety are top priorities for Hanwha and they are why the company continuously works to improve its products to become even more efficient and safer during blasting. For Hanwha, product excellence is determined by the benefit it can provide to its users and the environment.

Becoming the best in a growing market with superior product quality and technology

Hanwha has been active in Australia and Indonesia since it first entered the global mining market in 2014. Currently, the market is growing at a rate of 2.1%, or USD 15 billion, annually. The market for electronic detonators is growing by more than 10% annually as newer, more efficient products are replacing older electronic and non-electronic detonators.

Hanwha plans to expand its global mining business footprint by entering the US and Chilean markets with competitive pricing as it continues to reduce costs without compromising on quality.

"We are currently one of the top 10 global mining companies," says a Hanwha spokesperson. "But we're going to narrow the gap between us and our higher ranked competitors and then take a great leap forward with higher product quality and innovations using our advanced blasting systems and state-of-the-art production facilities." ■

Explore this month's news of Hanwha and its affiliates, taking the initiative in all corners of the world.



Korea

Hanwha TOTAL Petrochemical

Hanwha Total Petrochemical Signs MOU to Fuel Strategic Alliance

In August of 2019, Hanwha Total Petrochemical signed a Memorandum of Understanding (MOU) with Japan's ZEN-NOH and Mitsubishi Corporation, reaffirming the strong partnership that currently exists among the three companies. Under the terms of this MOU, Mitsubishi Corporation will act as a conduit between Hanwha Total Petrochemical and ZEN-NOH. The companies will cooperate in selling petroleum products in Japan, including gasoline, kerosene, diesel/heating oil, and Bunker A fuel oil. The two companies also agreed to convene for regular annual meetings in the future.

ZEN-NOH is Japan's largest petroleum supplier with six tank terminals and an extensive transportation infrastructure. Its products are in high demand throughout Japan.



Iraq

Hanwha Engineering & Construction

Iraq Family Rebuilds with Hanwha Engineering & Construction Assistance

In September of 2019, Hanwha Engineering & Construction held a welcome home ceremony for a family living in Bismayah, Iraq. The family, which includes several elderly relatives, had been rendered homeless the previous April when an electrical fire destroyed the interior of their apartment and all their belongings. When senior management of Hanwha Engineering & Construction in Iraq heard of the incident, they immediately pledged to rebuild the family's home at no cost.

The decision to assist the family came about because Hanwha Engineering & Construction is planting deep roots in Iraq. Beyond assisting in the country's physical reconstruction with the Bismayah New City Project, Hanwha Engineering & Construction seeks to help Iraqis rebuild their lives and dream of brighter futures.

The project proved to be a challenge. Repairing the apartment's floors and ceilings was particularly difficult because of their proximity to the building's load-bearing structure. However, Hanwha Engineering & Construction was not deterred.

Many personnel and resources were allocated to the rebuilding project so it would progress as quickly as possible. Due to the speed at which the project progressed, each step needed to be closely monitored and supervised to make



sure everything was done perfectly and passed inspection.

Senior members of Hanwha Engineering & Construction, including Won Joo Lee, Executive Vice President of Overseas Business Division and Iraq Construction Unit at Hanwha Engineering & Construction, also volunteered their time in rebuilding the apartment.

"We're sparing no effort in Iraq," said a Hanwha Engineering & Construction spokesperson. "Whether it's building an entire city or rebuilding a single home, everyone at Hanwha Engineering & Construction, from staff to senior directors, will do everything we can to create hope in Iraq."



United Kingdom



Hanwha Techwin Europe Ltd.

Hanwha Techwin Europe Ltd. Goes Platinum

Hanwha Techwin Europe Ltd. recently received Platinum Technology Partner accreditation from Milestone Systems, a global leader in open platform video management software. This formalizes the cooperation between the two parties and allows them to ensure that end-user clients will receive maximum value from their video surveillance systems.

Milestone System’s Milestone Technology Partner Program has three levels of cooperation. Platinum is the highest level and comes with a rich set of benefits for participants like Hanwha Techwin Europe Ltd.

“We are delighted to be acknowledged by Milestone in this way,” said Uri



Guterman, Head of Product & Marketing for Hanwha Techwin Europe Ltd. “The Platinum Partner accreditation reflects our ability to cooperate with Video Management Software developers and provide end-users with easy-to-use integrated video surveillance solutions.”



Vietnam



Hanwha Techwin Takes the Spotlight at SECUTECH VIETNAM 2019

Hanwha Techwin rolled out an array of attention-grabbing products at SECUTECH VIETNAM 2019, Vietnam’s largest security trade show, in Ho Chi Minh City. These products are intended to service several major verticals – including smart factories, smart cities, retail and seaports.

Front and center were Hanwha Techwin’s smart city solutions targeting the Vietnamese government’s active interest in developing new smart cities. Products that help manage hectic urban streets were of particular interest, including multi-directional cameras, AI monitoring solutions, and Hanwha Techwin’s proprietary integrated management software.

As Vietnam has a lengthy coastline, Hanwha Techwin’s seaport solutions also attracted the audience’s attention. The company’s seaport cameras feature stainless steel construction that is highly resistant to corrosion from salty and humid sea air. Meanwhile, the cameras’ image stitching feature allows operators to merge multiple images together, which helps to track and monitor container trucks coming in and out of seaports better.

The company also drew rave reviews by demonstrating how AI monitoring can be used to greatly improve industrial safety. Hanwha Techwin’s monitoring software



can immediately identify dangerous behavior (such as workers not wearing hard hats in designated areas) as well as hazards and accidents that require immediate responses.

A source at Hanwha Techwin said, “We are highly interested in Vietnam as Hanwha is running diverse businesses in the country.” The employee added, “Hanwha Techwin will do our best to build smart video surveillance solutions tailored to Vietnam.” ■