

Off-grid solar north korea

Think of it as a North Korean Best Buy -- a shop stuffed with refrigerators, karaoke machines, laptop computers and flat-screen TVs. But with a square footage closer to a typical American 7-Eleven than a big-box store, the Pothonggang Information Technology Center has to be selective about what products it puts on its shelves.

Beset by crippling power shortages for decades, North Koreans are turning to solar power in a major way. With cheap panels readily available in neighboring China, a gray market expanding in North Korea, and a green-energy drive endorsed by supreme leader Kim Jong Un, there's been a remarkable flowering of photovoltaic panels across the insular country.

Though North Korea has not published any figures, the panels can be seen on the balconies of nearly every apartment building in the capital, Pyongyang, and many streetlights are powered by the sun. Larger arrays, along with solar water heaters, have been affixed to industrial sites such as the Kim Jong Suk Pyongyang Silk Factory and the Jangchon collective farm on the southeastern outskirts of the capital. A large solar field was installed last fall on Pyongyang's Ssuk Island near a new showcase complex called the Sci-tech Center, a sort of exploratorium/library/research hub, which also boasts of having geothermal technology.

To be sure, solar power is nowhere near being a cure-all for North Korea's overall energy needs; hydropower and coal-fired plants are the overtaxed workhorses of the socialist state's crumbling grid. David Von Hippel, a researcher with the Nautilus Institute in Berkeley who has been studying the country's power infrastructure since the 1990s, estimates solar accounted for just 0.1% of all electricity generated in the country in 2015.

Nevertheless, solar is having an outsized effect on ordinary people's lives. "It may be a small amount of electricity but it's used for things that really matter a lot," he says. "You can't use it very well to run a factory or light a whole office building, at least with the number and size of solar panels they're using. But if it gives you access to charging your phone or using your computer or DVD player or having some lights at night, it's a great thing."

An analysis based on Chinese customs data and other information by Von Hippel and another researcher, Peter Hayes, estimates that 100,000 or more North Korean households in the country of 24 million had acquired solar panels through the end of 2014. Von Hippel says the country has imported roughly 15 megawatts of photovoltaic systems through last year-- a third of that in 2015 alone.

"Probably more North Koreans have electricity now than they have since the 1990s, because of solar panels," says Curtis Melvin, a researcher at the U.S.-Korea Institute at Johns Hopkins University who is known for his analysis of satellite imagery of North Korea. Kim Kyong Il, a senior researcher at Pyongyang's Academy of Social Sciences, told the Associated Press last year that up to half of power in some rural areas may be coming



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from solar.

The largest solar farms in the secretive country, Melvin said, are at an air force facility on the west coast (about 1.3 acres of panels) and at a casino in the Rason Special Economic Zone in the northeast (1.2 acres), though he hasn't yet been able to calculate the size of the one at the Sci-tech complex in Pyongyang.

Although the grass-roots adoption of solar has been rapid in North Korea, the installed capacity is still minuscule compared with industrial-sized projects elsewhere. Riverside County's Desert Sunlight Solar Farm, by contrast, is a 550-megawatt project-- 36 times bigger than all of North Korea's estimated capacity. But it fully powers roughly the same number of U.S. households -- 160,000 -- because Americans consume so much more electricity, whereas North Koreans use their panels for one or two appliances.

The vast majority of the solar equipment being used in North Korea is Chinese-made, but the country claims to have several facilities that are producing solar equipment.

This spring, the state-run Korean Central News Agency said in a video report that the country was now producing its own indigenously designed solar panels based on research at Pyongyang's Kim Il Sung University. The Pyongyang Times said the panels were being made at a place called the Jinheung Solar Energy Battery Plant.

State-run media have also mentioned a Kwangmyong LED and Solar Cell Factory. At the Pothonggang Information Technology Center in Pyongyang, the clerks selling solar panels said some were produced in North Korea -- and boasted that they were superior to their Chinese rivals.

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Web: <https://kary.com.pl/contact-us/>

Email: energystorage2000@gmail.com

WhatsApp: 8613816583346

