



**A LEADER
IN SOLAR
ENERGY
SOLUTIONS
FOR SOUTH EAST ASIA.**

First Solar: Driving South East Asia's Solar Energy Future ●

Since 2008, First Solar has actively shaped solar electricity generation and manufacturing in the Asia Pacific region. As a trusted, reliable partner with regional headquarters situated in Singapore and gigawatt-scale manufacturing sites in both Malaysia and Vietnam, First Solar is committed to supporting South East Asia's renewable energy ambitions.

Manufacturing Leader

Kulim, Malaysia and Dong Nam, Vietnam are home to First Solar's two largest global manufacturing sites, where highly automated and continuous manufacturing processes drive strict quality controls and superior, lasting performance in the field.

Technology Innovator

As a field-proven technology, First Solar modules are innovatively designed to generate more energy over the lifetime of your photovoltaic (PV) plants as compared to crystalline silicon panels. With modules powering more than 100 projects across seven countries, First Solar is your proven partner for producing clean, competitive, and reliable solar energy generation.

REGIONAL PRESENCE

- /// **2008**
Started manufacturing in Malaysia
- /// **2018**
Started manufacturing in Vietnam
- /// **4,600+**
Employees in South East Asia
- /// **5.5GW**
Expected South East Asia annualized manufacturing capacity 2021
- /// **\$3 Billion**
Cumulative investment in South East Asia.

- 📍 **Offices**
- 🏭 **Manufacturing Plants**
- 📍 **PV Plants**





IL Solar Farm - Malaysia | 12MW DC



Prime Road Power Co-op1 Projects - Thailand | 18MW DC



Genex Power, Kidston Hub - Australia | 63MW DC



Tsukuba Mirai - Japan | 16.83 MW DC



Nakhon Ratchasima Solar Farm - Thailand | 7.5MW DC



Energetix - Singapore | 1MW DC



Sai Gon VRG - Vietnam | 0.5MW DC



Sai Gon VRG - Vietnam | 1.2MW DC

Manufacturing Leadership

First Solar is not just another PV manufacturer. In 2020, we joined RE100 and committed to powering our global operations with 100% renewable energy by 2028.

As an industry leader, we are powering excellence in manufacturing with high-quality PV modules that are designed with the customer's needs in mind. We provide access to global industry expertise and tools, and meaningful engagement when it matters most.

Local Supply

With manufacturing facilities in Kulim, Malaysia and Ho Chi Minh City, Vietnam, First Solar supplies modules to customers quickly and efficiently, allowing for simplified logistics and enhanced supply security.

Simplified Process

Unlike other PV companies, First Solar's manufacturing architecture is controlled by a single set of global specifications for Bill of Materials (BoM) components, which results in a tightly controlled, consistently manufactured, high-quality products across multiple manufacturing lines.

Each factory is built with a "Copy Smart" process ensuring when glass goes into the line and comes out as a fully functional module four-and-a-half hours later, it is done with the same process and equipment in each factory, yielding the same results no matter where the module is made.

Unrivaled Quality

First Solar understands the importance of quality and reliability, and that deviations can present significant risks to asset owners. Performance improvements to the Series 6 module are primarily driven by semiconductor innovation, not by fluctuating wafer sizes.

State-of-the-Art Technology

First Solar's thin-film PV technology produces high-volume, low-cost energy-efficient modules with the smallest environmental footprint. Because of our proprietary semi-conductor's superior performance characteristics, First Solar thin-film modules require only 1%-2% of the semiconductor material needed by traditional crystalline modules to produce a comparable amount of power. That means fewer manufacturing process steps, substantially lower process times, and less labor.

South East Asia Production

/// **5.5GW**
Regional Manufacturing Capacity

/// **~4.5 Hours**
Manufacturing Process Duration

/// **33,000+ Modules**
Regional Daily Production



First Solar Malaysia



The Kulim facility—our largest high-technology manufacturing site—produces First Solar’s advanced thin film PV modules for use around the world. The site began as a single plant in 2008 and has since grown to six fully operational plants with an expected annualized capacity of 2.8GW in 2020, and an in-house recycling facility.

The Kulim facility is also home to the 5-acre Kulim Test Site (KTS), part of a network of state-of-the-art Research & Development installations monitoring First Solar’s advanced technology in extreme climate conditions. KTS studies the effect of hot and humid climates on First Solar’s thin film modules. The installation also conducts tests for long-term durability, improved energy prediction, and readiness of new product offerings.

Vietnam’s favorable business environment and skilled workforce were considerable factors in First Solar’s decision to expand operations in the region. Our commitment to establishing a manufacturing presence in Vietnam is a critical element of our strategic imperative to offer a high quality, cost-competitive product to the global renewable energy industry.

The Dong Nam facility became fully functional in 2019 and includes two high tech Series 6 manufacturing plants with an annualized manufacturing capacity of 2.7GW. The location also houses a recycling facility and administrative and support functions.

First Solar Vietnam



Sustainability Advantage

Lowest Carbon Solar PV

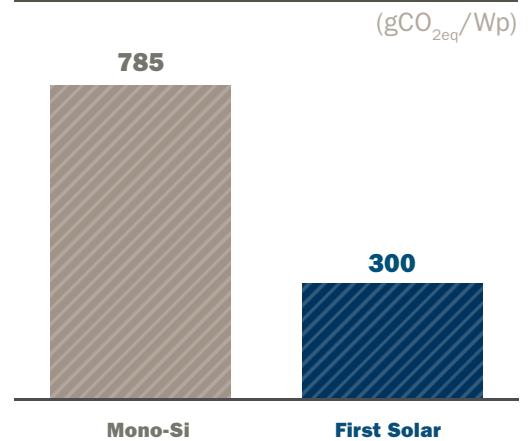
First Solar thin film PV modules are manufactured using less energy, less water and less semiconductor material, resulting in an up to 2.5x lower carbon footprint and up to 3x lower water footprint than mono-crystalline silicon solar panels on a life cycle basis. With the smallest carbon footprint, lowest life cycle water use in the industry and fastest energy payback time, First Solar modules generate cleaner solar electricity than conventionally manufactured solar panels.

Contributing to a Circular Technology

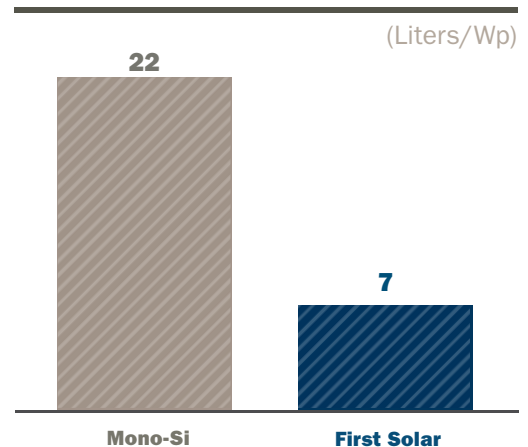
First Solar is committed to a fully sustainable product through the use of byproducts from mining processes, resource efficient manufacturing, and industry-leading recycling processes. These strategies lead to PV energy solutions that address the energy needs of today and result in reliable, sustainable, and profitable solar solutions for tomorrow.



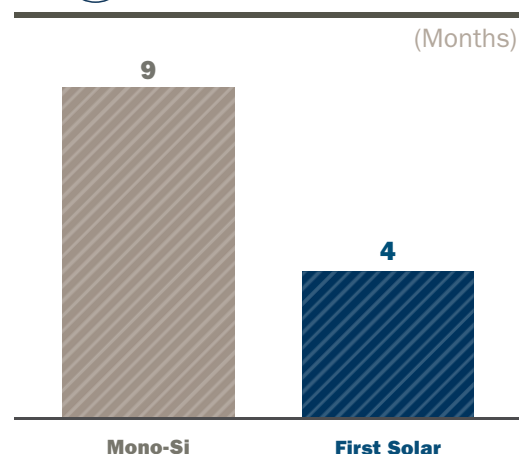
LOWEST CARBON FOOTPRINT



LOWEST WATER FOOTPRINT



FASTEST ENERGY PAYBACK TIME





EPEAT Silver Registered

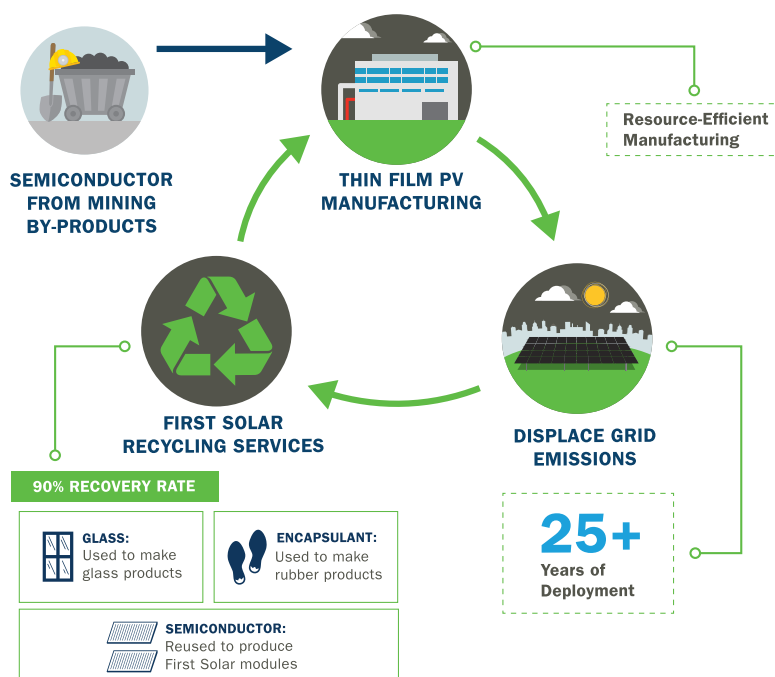
First Solar Series 6 modules are the world's first PV product to be included in the Electronic Products Environmental Assessment Tool (EPEAT) registry for sustainable electronics. Our Series 6 modules were awarded an EPEAT Silver rating, giving customers confidence that they are purchasing an environmentally-leading product from a socially-responsible company. EPEAT is the leading life-cycle based Type-1 ecolabel used by public and private sector institutional purchasers globally.



Industry-Leading Recycling

First Solar is the only PV manufacturer operating its own network of module recycling centers, which can be found in both our Kulim and Dong Nam facilities. Our industry-leading recycling technology efficiently recovers ~90% of the semiconductor and ~90% of the glass available for reuse in new modules and glass products. First Solar's long-standing leadership in high-value PV recycling gives system owners confidence in knowing their modules will be managed to sound and responsible global standards.

The Value Loop



TYPICAL RECYCLING RATES



Technology Advantage ●

Our Series 6 modules represent the latest technological achievement in our long history of industry advancements. The modules deliver the highest lifetime energy for large-scale solar projects. For asset and power generation owners, engineers, and installers, this new technology provides reduced balance of system costs and a lower Levelized Cost of Electricity for a superior return on investment.

Innovative Design

The Series 6 module is the result of more than \$1.4 billion USD in cumulative research and development investment, among the highest in the industry. The Series 6 module was designed in collaboration with our customers and our ecosystem partners, ensuring that it is compatible with a broad range of mounting structures and components produced by other leading companies.

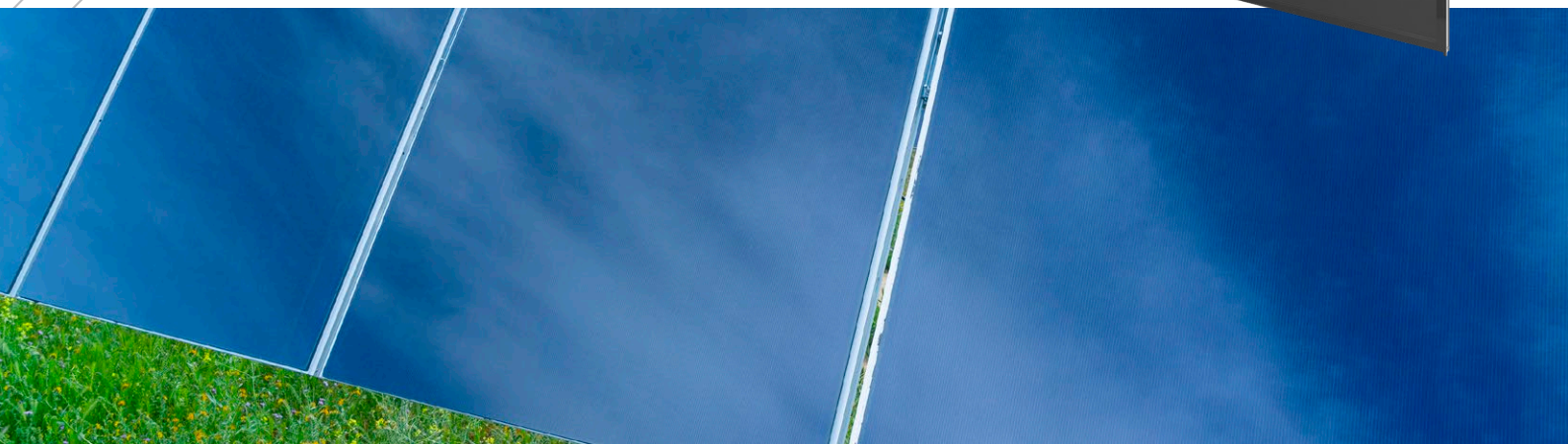
Inherent Immunity to Cell-Cracking, LID and LeTID

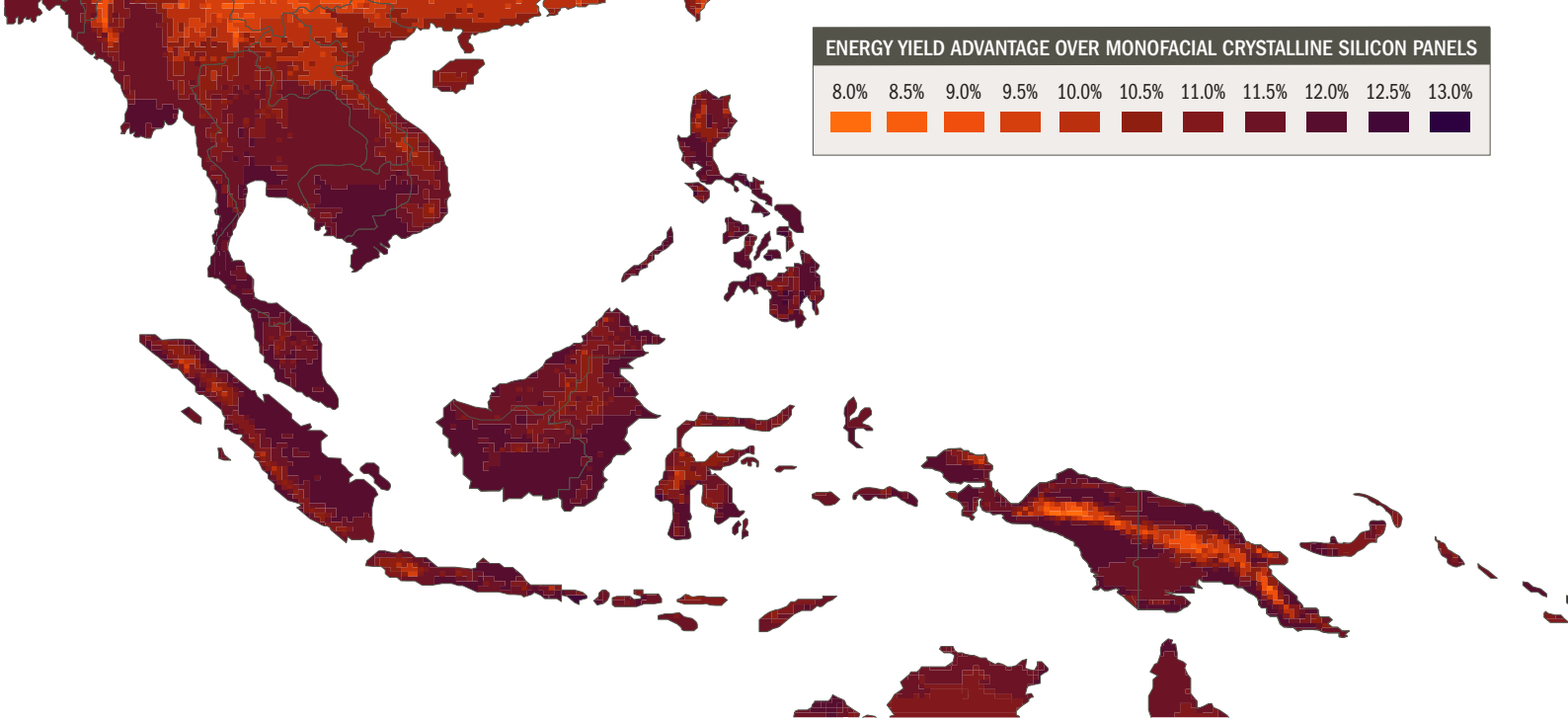
Extreme weather events are on the rise due to climate change. Hail, typhoons, cyclones, and other high-wind events can cause glass and cell cracks in c-Si panels.

First Solar's thin film modules are made with durable glass/glass construction and are inherently immune to cell-cracking. These advantages are backed by the industry's first and only product warranty specific to power loss from cell cracking. Plus, our advanced thin-film technology has inherent immunity to Light Induced Degradation (LID) and Light and Elevated Temperature Induced Degradation (LeTID) failure modes that affect c-Si modules.

Superior Lifetime Energy

First Solar's modules offer a clear energy yield advantage over silicon-based modules, producing more energy, more consistently. During the lifetime of your plant, our modules deliver competitive efficiency, higher real-world energy yield, and long-term reliability. First Solar's proven technology generates significantly more usable energy per nameplate watt than competing technologies, with a record of reliable plant performance.



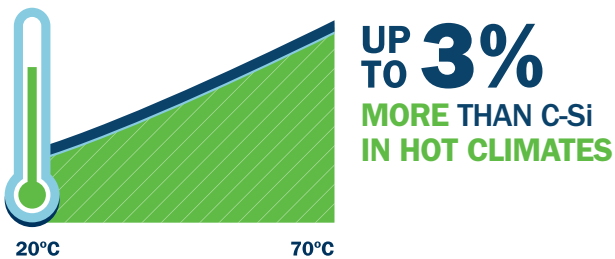


Energy Yield Advantage in South East Asia

While most c-Si PV module manufacturers promote high module wattage and efficiency, First Solar recognizes the true measure of module performance is how much useable energy (energy yield) is produced over its lifetime, after all applicable loss factors have been taken into account. With benchmark-setting degradation rates and lifetime energy generation, First Solar's proprietary thin film PV modules maximize return on investment for our customers in South East Asia.

First Solar's module technology is independently certified for reliable performance that exceeds IEC standards in high temperature and high humidity climates commonly found in the extreme tropical and coastal environments of South East Asia. This advantage delivers between 8 to 13% more useable energy per nameplate watt than traditional crystalline silicon panels over the lifetime of your project, depending on project characteristics and location.

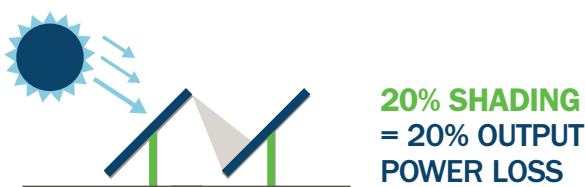
SUPERIOR TEMPERATURE COEFFICIENT



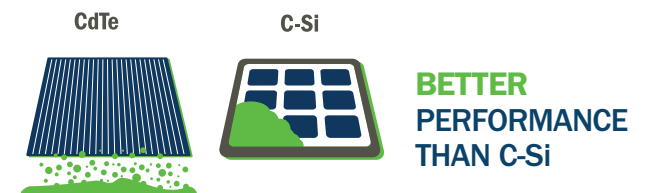
BETTER SPECTRAL RESPONSE



LINEAR RESPONSE IN ROW-TO-ROW SHADING



REDUCED SOILING



Social Responsibility ●

As a long-time partner in the South East Asia region, we value the authentic, lasting connections formed with the communities where our employees live and work.

Safety First

First Solar takes safety and training seriously. “Safety First” is a core value and our facilities are managed to the strictest levels of ISO 14001 and ISO 45001. Our employees are encouraged to participate in cross-functional safety committees and receive frequent training and refresher courses to ensure all work is performed as safely as possible.

Associate Training

We value all employees who work for First Solar. Each and every associate plays an important role in our dedication to better the environment and support local communities.

Our leadership team is committed to a diverse and inclusive workforce where all employees are provided with continuous job training and career development opportunities. We then encourage our associates to bring their newly acquired experiences and skills back to their local communities.

First Solar also supports local students with practical, hands-on business and entrepreneurial experience through internship and graduate employability programs. We are a proud supporter of American Chamber of Commerce Young Enterprises programs and scholarships in both Vietnam and Malaysia, including a scholarship that specifically supports female engineering in the Vietnam region. First Solar is also driving Vietnam’s next generation of engineers through specially-designed Automation Training Programs.

Community Outreach

First Solar associates in our Vietnam and Malaysia factories regularly participate in local volunteer work, community events, and holiday celebrations, and have contributed more than \$265,000USD to local orphanages, school programs, and the supply of personal protective equipment and food to first responders and underprivileged communities.



AON®

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MALAYSIA | 2016



PMHA
Prime Minister's
Hibiscus Award



Global Expertise ●

Delivering Value

As the partner of choice for leading utilities and global energy companies, First Solar brings the financial stability and bankability to take energy forward. When evaluating the combination of First Solar's market-leading technology, low risk profile, and strong financial standing, the world's leading PV investors and financial institutions see a pattern of more value and less risk than competing alternatives.

International Reach

Our successes have propelled First Solar to become a leading strategic partner in the development and operation of utility-scale solar energy projects. With customers served in more than 45 countries, our module technology has been deployed across a range of segments and applications, reliably generating clean solar electricity, while maximizing the profitability of asset owners and operators.

Customer Collaboration

First Solar understands that its commitments are essential to a customer's project execution timeline and asset profitability. As a result, customers working with First Solar can remain confident that we take our obligations seriously and deliver on our promises over the lifetime of your PV power plant.

Contact First Solar at
Asia@firstsolar.com to learn more.

FACTS & FIGURES

/// **30GW+**
Shipped

/// **7.9GW**
Annualized
Global Series 6
Manufacturing
Capacity

/// **45+**
Countries Shipped To

/// **\$2.7B**
2020 Revenue

/// **100%**
Renewable Energy
Powered by 2028

RE 100



**CONTACT FIRST SOLAR AT
ASIA@FIRSTSOLAR.COM
TO LEARN MORE.**



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