



**SolarGrid Energy Solutions**

**The world's first  
monocrystalline silicon  
photovoltaic module**



## Overview

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LONGi announced on April 11 th at its Wuhu base in Anhui Province that its independently developed Hybrid Interdigitated-Back-Contact (HIBC) crystalline silicon solar cell has achieved a groundbreaking photoelectric conversion efficiency of 27.81%, as certified by the authoritative Institute for Solar Energy Research Hamelin (ISFH) in Germany. How efficient is a crystalline silicon photovoltaic cell?

This achievement pushes the boundaries of monocrystalline silicon photovoltaic cell efficiency to new heights. In November 2022, LONGi set a world record for crystalline silicon cell conversion efficiency at 26.81%. By May 2024, the company had surpassed this mark, reaching 27.3%, and subsequently achieving 27.4%, 27.52%, and ultimately 27.81%.

What is the world record for the efficiency of monocrystalline silicon cells?

27.81%! LONGi Refreshes the World Record for the Efficiency of Monocrystalline Silicon Cells Again 27.81%! LONGi Refreshes the World Record for the Efficiency of Monocrystalline Silicon Cells Again.

Why is Longi a world record holder in monocrystalline silicon photovoltaic cell conversion efficiency?

This latest world record in monocrystalline silicon photovoltaic cell conversion efficiency not only validates LONGi's ability to focus on value creation and drive industrial progress but also reflects the company's ambition to realize global energy transformation and energy equity.

When was the first silicon solar cell invented?

Using photolithography to define the coverage fraction and controlling the doping profile in the adjacent regions in the wafer, this concept resulted in the first silicon solar cell with a 25% designated area efficiency in 1999 (ref. 55).

What are crystalline silicon solar cells?

Crystalline silicon solar cells are today's main photovoltaic technology, enabling the production of electricity with minimal carbon emissions and at an unprecedented low cost. This Review discusses the recent evolution of this technology, the present status of research and industrial development, and the near-future perspectives.

Is crystalline silicon the future of solar technology?

Except for niche applications (which still constitute a lot of opportunities), the status of crystalline silicon shows that a solar technology needs to go over 22% module efficiency at a cost below US\$0.2 W<sup>-1</sup> within the next 5 years to be competitive on the mass market.

## The world's first monocrystalline silicon photovoltaic module



### (PDF) Performance study of Monocrystalline and ...

Jan 6, 2020 · Different photovoltaic module technologies like monocrystalline and poly-crystalline were tested under the same operating conditions: autonomous ...

## Monocrystalline Silicon

The crystalline silicon (c-Si) PV technology comprising of interconnected small cells which form PV modules are considered the first generation of PV in the market.



### The difference between monocrystalline silicon ...

May 24, 2024 · The magical silicon wafer that converts solar energy into electrical energy is the core of photovoltaic technology. Today, let's take a closer look at ...

## 34.85%! LONGi Breaks World Record for ...

Apr 20, 2025 · Recently, the world leading solar technology company LONGi has made another significant breakthrough in solar cell R&D. LONGi ...



### Life Cycle Assessment of Monocrystalline Silicon Solar Cells

Feb 28, 2025 · Their study revealed that in both types of monocrystalline silicon PV modules, the production of monocrystalline silicon cells contributed the most to global warming potential, ...

### High-efficiency Module, Longi solar module

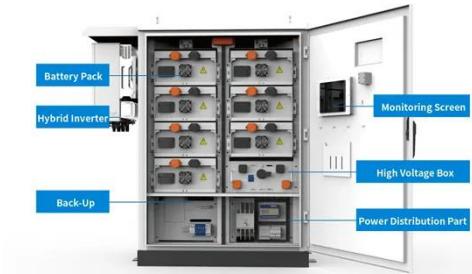
3 days ago · LONGi launched its mono-PERC modules in 2016, featuring integrated PERC technology on monocrystalline silicon and low light ...



### Crystalline Silicon Solar Cell and Module Technology

Jan 1, 2018 · The aim of this chapter is to present and explain the basic issues relating to the construction and manufacturing of PV cells and modules

from c-Si. This includes the basic ...

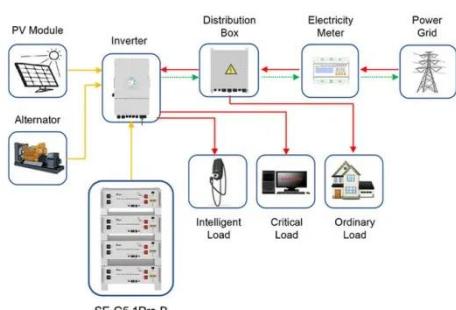


## LONGi Sets a New World Record for

...

Apr 15, 2025 · This achievement pushes the boundaries of monocrystalline silicon photovoltaic cell efficiency to new heights. In November 2022, LONGi set a

...



Application scenarios of energy storage battery products

## Life Cycle Assessment of Current Photovoltaic Module ...

Apr 15, 2020 · In this report, the environmental life cycle assessment of the current generation recycling of crystalline silicon (c-Si) and cadmium telluride (CdTe) PV modules is described.

...

## Environmental impact of monocrystalline silicon photovoltaic modules

Jun 30, 2025 · The most promising N-type TOPCon monocrystalline silicon

photovoltaic module is examined through the life cycle environmental impact assessment, and focus is placed on ...



Modular design,  
unlimited combinations in parallel  
**BUILT-IN DUAL FIRE PROTECTION MODULE**



### **Longi HiMo7 LR8-66HGD N-Type Monocrystalline Silicon PV ...**

PINERGY has a complete PV product system: solar cells, PV modules and PV systems, etc. The goal of PINERGY is to create a new first-class PV product brand, provide clean energy to the ...

### **Monocrystalline silicon solar cells applied in ...**

Jul 1, 2012 · Purpose: The aim of the paper is to fabricate the monocrystalline silicon solar cells using the conventional technology by means of screen ...



### **Monocrystalline VS Polycrystalline Solar PV ...**

Feb 2, 2022 · Listed below is the main disadvantage of the Monocrystalline solar panels: Cost Ineffective Solar panels with monocrystalline crystals are

more ...



### **Jinko Solar-????**

Apr 27, 2022 · JinkoSolar has set a new world record again with the maximum solar conversion efficiency of 25.7% for its large-size monocrystalline silicon TOPCon solar cell. This result has ...



### **Performance Investigation of Monocrystalline and Polycrystalline PV**

Nov 13, 2024 · Crystalline silicon PV module dominates PV technology worldwide and are constantly emerging with innovative PV designs. Passivated Emitter and Rear Cell PV ...

### **27.81%! LONGi Refreshes the World Record for ...**

Apr 17, 2025 · In November 2022, LONGi set a world record for the conversion efficiency of crystalline silicon cells at

26.81%. And then, LONGi increased this

...



## LONGi Sets a New World Record for

...

Apr 15, 2025 · LONGi announced on April 11 th at its Wuhu base in Anhui Province that its independently developed Hybrid Interdigitated-Back-Contact ...

## An introduction to solar Monocrystalline ...

Feb 22, 2012 · Monocrystalline solar modules are made from many smaller solar cells, each from a single wafer of silicon, so they appear smooth and even.

...



## Status and perspectives of crystalline silicon photovoltaics in

Mar 7, 2022 · Over 125 GW of c-Si modules have been installed in 2020, 95% of the overall photovoltaic (PV) market, and over 700 GW has been

cumulatively installed. There are some ...



### **Material intensity and carbon footprint of crystalline silicon module**

Feb 1, 2024 · The solar photovoltaics (PV) market has been booming to meet the global energy demand and to reduce the carbon emissions from energy production. Among all the PV ...



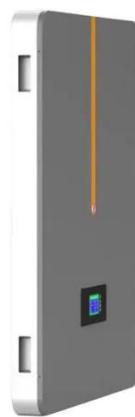
### **Manufacturing of Silicon Solar Cells and Modules**

Jun 13, 2023 · Silicon-based solar cells (and consequently modules) still dominate the PV market (more than 85%) compared to other commercially available thin film and third-generation ...

### **5GW! Sany's Monocrystalline Silicon Project ...**

Jul 10, 2023 · In November of that year, Sany Silicon Energy, a subsidiary of Sany

Group, manufactured its first batch of monocrystalline silicon rods. In ...



### **Advances in crystalline silicon solar cell technology for ...**

Jul 22, 2010 · Crystalline silicon photovoltaic (PV) cells are used in the largest quantity of all types of solar cells on the market, representing about 90% of the world total PV cell production in ...

### **Sany Group entered the photovoltaic industry ...**

On May 4, 2023, Sany Group's official Weibo posted a post "The Future Has Come!" Sany is steadily entering the photovoltaic industry! "The article shows

...



### **Review of silicon recovery in the photovoltaic industry**

Dec 1, 2023 · Figure 1 illustrates the value chain of the silicon photovoltaic industry, ranging from industrial silicon through polysilicon, monocrystalline

silicon, silicon wafer cutting, solar cell ...



## **Mono-crystalline silicon photovoltaic cells under different ...**

Dec 1, 2020 · In this research, partial shading influences on the efficiency of photovoltaic modules are explored. First, mathematical modeling of the Mono-crystall...



## **Understanding Crystalline Silicon PV Technology ...**

Mar 6, 2023 · The basic principle behind crystalline silicon PV technology is the conversion of sunlight into electrical energy using semiconductor materials.

...

## **Future material demand for global silicon-based PV modules ...**

Nov 1, 2024 · A dynamic material flow analysis model has been developed for silicon-based PV modules, emphasizing annual dynamics in PV deployment

capacity, module efficiency, ...



### High-efficiency Monocrystalline Silicon Solar Cells: ...

In this paper, the typical high-efficiency c-Si solar cells with conversion efficiencies of 25% or above are firstly summarized. The corresponding device structure, key technology and ...

### 27.81%! LONGi Refreshes the World Record for ...

Apr 20, 2025 · In November 2022, LONGi set a world record for the conversion efficiency of crystalline silicon cells at 26.81%. And then, LONGi increased this

...



### 27.81%! LONGi Refreshes the World Record for ...

Apr 17, 2025 · This breaking of the world record for the conversion efficiency of monocrystalline silicon photovoltaic cells not only verifies LONGi's ability to ...



## Environmental impact of monocrystalline silicon photovoltaic modules

Download Citation , On Jun 1, 2025, Xuerou Sheng and others published Environmental impact of monocrystalline silicon photovoltaic modules , Find, read and cite all the research you need on



## The weekend read: Secrets of monocrystalline ...

Nov 24, 2018 · Monocrystalline cells and modules are rapidly overtaking multi as the dominant technology in solar markets globally. To understand why, you ...

## Monocrystalline VS Polycrystalline Solar PV Modules

Jun 20, 2024 · Choosing between Monocrystalline and Polycrystalline PV modules is a huge dilemma. Read this

article to quickly compare the cost, efficiency, and lifespan of the two to ...



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## ESS



## Silicon Solar Cell

Silicon is also useful in manufacturing solar PV technologies, such as mono-crystalline and poly-crystalline silicon PVs. Silicon has been proven to have field stability; hence, crystalline silicon ...

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