

Distributed Solar Power Generation Market – Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Product Type (Monocrystalline (Mono-Si), Polycrystalline (p-Si), Amorphous Silicon (A-Si), Concentrated PV Cell (CVP)), By Installation (Ground Mounted, Roof-Top), By Application (Residential, Commercial, Utility-Scale), By Region, By Competition, 2020-2030F

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Abstracts

Market Overview

The Global Distributed Solar Power Generation Market was valued at USD 120.7 billion in 2024 and is projected to reach USD 171.8 billion by 2030, expanding at a CAGR of 5.9% through the forecast period. This growth is driven by the decreasing costs of solar photovoltaic (PV) panels and energy storage systems, making solar energy more accessible for residential, commercial, and industrial users. Rising electricity demand in both urban and remote areas, where centralized grids may be unreliable or absent, is further accelerating adoption. Supportive government policies—such as tax incentives, subsidies, and net metering—are also lowering financial barriers for consumers. Technological advancements, including high-efficiency panels, smart inverters, and integrated storage solutions, are boosting system performance and reliability. Distributed solar power enhances energy independence and grid resilience, especially in developing economies where modular deployment supports sustainable infrastructure. As the world shifts toward cleaner energy solutions, distributed solar is becoming a pivotal element in achieving global energy transition goals.

Key Market Drivers

Declining Cost of Solar Photovoltaic (PV) Systems and Energy Storage Solutions

The steep decline in costs of solar PV panels and energy storage systems is significantly propelling the distributed solar power generation market. Solar panel prices have plummeted by over 80% in the last decade, driven by technological progress, economies of scale, and increased global competition. Similarly, advancements in energy storage—particularly lithium-ion batteries—have improved affordability and efficiency. These trends make distributed solar installations more viable for homes, businesses, and industrial facilities. In developing regions, where grid infrastructure is often limited, cost-effective solar solutions provide a practical path to electrification and energy independence. Additionally, business models such as leasing and power purchase agreements (PPAs) further lower upfront costs, allowing broader market access. The financial and environmental benefits of adopting distributed solar systems are encouraging rapid adoption globally, especially in regions with rising electricity demand and infrastructure constraints.

Key Market Challenges

Grid Integration and Infrastructure Limitations

A major obstacle for the distributed solar power generation market is integrating decentralized solar systems into existing power grids. Traditional grids were built for centralized, one-way power flow, whereas distributed solar introduces variable, bidirectional electricity movement, complicating stability and management. Solar energy's intermittent nature—affected by weather and time of day—can cause voltage fluctuations and reliability issues if not properly managed. Upgrading infrastructure to include smart inverters, real-time monitoring, and energy management systems is costly and technically demanding. Furthermore, many developing countries face infrastructural deficiencies such as limited grid reach, outdated transmission lines, and minimal automation, which hinder solar integration. Complex interconnection procedures and regulatory hurdles also slow down deployment. Addressing these issues requires significant investment in grid modernization and streamlined policy frameworks to support large-scale distributed solar adoption.

Key Market Trends

Increasing Adoption of Hybrid Solar Systems with Energy Storage

An emerging trend in the distributed solar power generation market is the growing implementation of hybrid solar systems that combine PV generation with battery storage. These systems enable users to store surplus energy for use during non-sunny hours, enhancing energy reliability and reducing grid dependency. Lithium-ion battery prices have decreased, while performance has improved, making hybrid systems more affordable and appealing to a wide range of users. These systems are particularly beneficial in areas with unstable grids or frequent outages. Moreover, hybrid setups are compatible with evolving trends like electric vehicle (EV) integration and smart home energy management. Incentive programs and evolving net metering policies that reward stored energy usage are further encouraging adoption. Commercial and industrial users, aiming to cut peak demand charges and enhance energy efficiency, are increasingly investing in hybrid systems to improve cost savings and resilience.

Key Market Players

Suntech Power Holding Co. Ltd.

Trina Solar Ltd

Canadian Solar Inc.

Yingli Green Energy Holding Co. Ltd.

Schott Solar Ag

Leonics Company Limited

Hanwha Group

Sharp Corporation

Report Scope:

In this report, the Global Distributed Solar Power Generation Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

Distributed Solar Power Generation Market, By Product Type:

- Monocrystalline (Mono-Si)
- Polycrystalline (p-Si)
- Amorphous Silicon (A-Si)
- Concentrated PV Cell (CVP)

Distributed Solar Power Generation Market, By Application:

- Residential
- Commercial
- Utility-Scale

Distributed Solar Power Generation Market, By Installation:

- Ground Mounted
- Roof-Top

Distributed Solar Power Generation Market, By Region:

- North America
 - United States
 - Canada
 - Mexico
- Europe
 - Germany
 - France

United Kingdom

Italy

Spain

Asia Pacific

China

India

Japan

South Korea

Australia

South America

Brazil

Colombia

Argentina

Middle East & Africa

Saudi Arabia

UAE

South Africa

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global

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Distributed Solar Power Generation Market.

Available Customizations:

Global Distributed Solar Power Generation Market report with the given market data, TechSci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional market players (up to five).

Contents

1. PRODUCT OVERVIEW

- 1.1. Market Definition
- 1.2. Scope of the Market
 - 1.2.1. Markets Covered
 - 1.2.2. Years Considered for Study
 - 1.2.3. Key Market Segmentations

2. RESEARCH METHODOLOGY

- 2.1. Objective of the Study
- 2.2. Baseline Methodology
- 2.3. Key Industry Partners
- 2.4. Major Association and Secondary Sources
- 2.5. Forecasting Methodology
- 2.6. Data Triangulation & Validation
- 2.7. Assumptions and Limitations

3. EXECUTIVE SUMMARY

- 3.1. Overview of the Market
- 3.2. Overview of Key Market Segmentations
- 3.3. Overview of Key Market Players
- 3.4. Overview of Key Regions/Countries
- 3.5. Overview of Market Drivers, Challenges, and Trends

4. VOICE OF CUSTOMER

5. GLOBAL DISTRIBUTED SOLAR POWER GENERATION MARKET OUTLOOK

- 5.1. Market Size & Forecast
 - 5.1.1. By Value
- 5.2. Market Share & Forecast
 - 5.2.1. By Product Type (Monocrystalline (Mono-Si), Polycrystalline (p-Si), Amorphous Silicon (A-Si), Concentrated PV Cell (CVP))
 - 5.2.2. By Application (Residential, Commercial, Utility-Scale)
 - 5.2.3. By Installation (Ground Mounted, Roof-Top)

5.2.4. By Region (North America, Europe, South America, Middle East & Africa, Asia Pacific)

5.3. By Company (2024)

5.4. Market Map

6. NORTH AMERICA DISTRIBUTED SOLAR POWER GENERATION MARKET OUTLOOK

6.1. Market Size & Forecast

6.1.1. By Value

6.2. Market Share & Forecast

6.2.1. By Product Type

6.2.2. By Application

6.2.3. By Installation

6.2.4. By Country

6.3. North America: Country Analysis

6.3.1. United States Distributed Solar Power Generation Market Outlook

6.3.1.1. Market Size & Forecast

6.3.1.1.1. By Value

6.3.1.2. Market Share & Forecast

6.3.1.2.1. By Product Type

6.3.1.2.2. By Application

6.3.1.2.3. By Installation

6.3.2. Canada Distributed Solar Power Generation Market Outlook

6.3.2.1. Market Size & Forecast

6.3.2.1.1. By Value

6.3.2.2. Market Share & Forecast

6.3.2.2.1. By Product Type

6.3.2.2.2. By Application

6.3.2.2.3. By Installation

6.3.3. Mexico Distributed Solar Power Generation Market Outlook

6.3.3.1. Market Size & Forecast

6.3.3.1.1. By Value

6.3.3.2. Market Share & Forecast

6.3.3.2.1. By Product Type

6.3.3.2.2. By Application

6.3.3.2.3. By Installation

7. EUROPE DISTRIBUTED SOLAR POWER GENERATION MARKET OUTLOOK

7.1. Market Size & Forecast

7.1.1. By Value

7.2. Market Share & Forecast

7.2.1. By Product Type

7.2.2. By Application

7.2.3. By Installation

7.2.4. By Country

7.3. Europe: Country Analysis

7.3.1. Germany Distributed Solar Power Generation Market Outlook

7.3.1.1. Market Size & Forecast

7.3.1.1.1. By Value

7.3.1.2. Market Share & Forecast

7.3.1.2.1. By Product Type

7.3.1.2.2. By Application

7.3.1.2.3. By Installation

7.3.2. France Distributed Solar Power Generation Market Outlook

7.3.2.1. Market Size & Forecast

7.3.2.1.1. By Value

7.3.2.2. Market Share & Forecast

7.3.2.2.1. By Product Type

7.3.2.2.2. By Application

7.3.2.2.3. By Installation

7.3.3. United Kingdom Distributed Solar Power Generation Market Outlook

7.3.3.1. Market Size & Forecast

7.3.3.1.1. By Value

7.3.3.2. Market Share & Forecast

7.3.3.2.1. By Product Type

7.3.3.2.2. By Application

7.3.3.2.3. By Installation

7.3.4. Italy Distributed Solar Power Generation Market Outlook

7.3.4.1. Market Size & Forecast

7.3.4.1.1. By Value

7.3.4.2. Market Share & Forecast

7.3.4.2.1. By Product Type

7.3.4.2.2. By Application

7.3.4.2.3. By Installation

7.3.5. Spain Distributed Solar Power Generation Market Outlook

7.3.5.1. Market Size & Forecast

- 7.3.5.1.1. By Value
- 7.3.5.2. Market Share & Forecast
 - 7.3.5.2.1. By Product Type
 - 7.3.5.2.2. By Application
 - 7.3.5.2.3. By Installation

8. ASIA PACIFIC DISTRIBUTED SOLAR POWER GENERATION MARKET OUTLOOK

- 8.1. Market Size & Forecast
 - 8.1.1. By Value
- 8.2. Market Share & Forecast
 - 8.2.1. By Product Type
 - 8.2.2. By Application
 - 8.2.3. By Installation
 - 8.2.4. By Country
- 8.3. Asia Pacific: Country Analysis
 - 8.3.1. China Distributed Solar Power Generation Market Outlook
 - 8.3.1.1. Market Size & Forecast
 - 8.3.1.1.1. By Value
 - 8.3.1.2. Market Share & Forecast
 - 8.3.1.2.1. By Product Type
 - 8.3.1.2.2. By Application
 - 8.3.1.2.3. By Installation
 - 8.3.2. India Distributed Solar Power Generation Market Outlook
 - 8.3.2.1. Market Size & Forecast
 - 8.3.2.1.1. By Value
 - 8.3.2.2. Market Share & Forecast
 - 8.3.2.2.1. By Product Type
 - 8.3.2.2.2. By Application
 - 8.3.2.2.3. By Installation
 - 8.3.3. Japan Distributed Solar Power Generation Market Outlook
 - 8.3.3.1. Market Size & Forecast
 - 8.3.3.1.1. By Value
 - 8.3.3.2. Market Share & Forecast
 - 8.3.3.2.1. By Product Type
 - 8.3.3.2.2. By Application
 - 8.3.3.2.3. By Installation
 - 8.3.4. South Korea Distributed Solar Power Generation Market Outlook

8.3.4.1. Market Size & Forecast

8.3.4.1.1. By Value

8.3.4.2. Market Share & Forecast

8.3.4.2.1. By Product Type

8.3.4.2.2. By Application

8.3.4.2.3. By Installation

8.3.5. Australia Distributed Solar Power Generation Market Outlook

8.3.5.1. Market Size & Forecast

8.3.5.1.1. By Value

8.3.5.2. Market Share & Forecast

8.3.5.2.1. By Product Type

8.3.5.2.2. By Application

8.3.5.2.3. By Installation

9. MIDDLE EAST & AFRICA DISTRIBUTED SOLAR POWER GENERATION MARKET OUTLOOK

9.1. Market Size & Forecast

9.1.1. By Value

9.2. Market Share & Forecast

9.2.1. By Product Type

9.2.2. By Application

9.2.3. By Installation

9.2.4. By Country

9.3. Middle East & Africa: Country Analysis

9.3.1. Saudi Arabia Distributed Solar Power Generation Market Outlook

9.3.1.1. Market Size & Forecast

9.3.1.1.1. By Value

9.3.1.2. Market Share & Forecast

9.3.1.2.1. By Product Type

9.3.1.2.2. By Application

9.3.1.2.3. By Installation

9.3.2. UAE Distributed Solar Power Generation Market Outlook

9.3.2.1. Market Size & Forecast

9.3.2.1.1. By Value

9.3.2.2. Market Share & Forecast

9.3.2.2.1. By Product Type

9.3.2.2.2. By Application

9.3.2.2.3. By Installation

9.3.3. South Africa Distributed Solar Power Generation Market Outlook

9.3.3.1. Market Size & Forecast

9.3.3.1.1. By Value

9.3.3.2. Market Share & Forecast

9.3.3.2.1. By Product Type

9.3.3.2.2. By Application

9.3.3.2.3. By Installation

10. SOUTH AMERICA DISTRIBUTED SOLAR POWER GENERATION MARKET OUTLOOK

10.1. Market Size & Forecast

10.1.1. By Value

10.2. Market Share & Forecast

10.2.1. By Product Type

10.2.2. By Application

10.2.3. By Installation

10.2.4. By Country

10.3. South America: Country Analysis

10.3.1. Brazil Distributed Solar Power Generation Market Outlook

10.3.1.1. Market Size & Forecast

10.3.1.1.1. By Value

10.3.1.2. Market Share & Forecast

10.3.1.2.1. By Product Type

10.3.1.2.2. By Application

10.3.1.2.3. By Installation

10.3.2. Colombia Distributed Solar Power Generation Market Outlook

10.3.2.1. Market Size & Forecast

10.3.2.1.1. By Value

10.3.2.2. Market Share & Forecast

10.3.2.2.1. By Product Type

10.3.2.2.2. By Application

10.3.2.2.3. By Installation

10.3.3. Argentina Distributed Solar Power Generation Market Outlook

10.3.3.1. Market Size & Forecast

10.3.3.1.1. By Value

10.3.3.2. Market Share & Forecast

10.3.3.2.1. By Product Type

10.3.3.2.2. By Application

10.3.3.2.3. By Installation

11. MARKET DYNAMICS

11.1. Drivers

11.2. Challenges

12. MARKET TRENDS AND DEVELOPMENTS

12.1. Merger & Acquisition (If Any)

12.2. Product Launches (If Any)

12.3. Recent Developments

13. COMPANY PROFILES

13.1. Suntech Power Holding Co. Ltd.

13.1.1. Business Overview

13.1.2. Key Revenue and Financials

13.1.3. Recent Developments

13.1.4. Key Personnel

13.1.5. Key Product/Services Offered

13.2. Trina Solar Ltd

13.3. Canadian Solar Inc.

13.4. Yingli Green Energy Holding Co. Ltd.

13.5. Schott Solar Ag

13.6. Leonics Company Limited

13.7. Hanwha Group

13.8. Sharp Corporation

14. STRATEGIC RECOMMENDATIONS

15. ABOUT US & DISCLAIMER

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