



2016 Top Markets Report **Renewable Energy** Sector Snapshot

Solar Energy

ITA expects the solar sector to install more capacity through 2017 worldwide, and account for more U.S. exports, than any other renewable energy technology. The industry's economics continue to improve, dovetailing with the movement towards reverse power auctions. Unfortunately, the United States' share of the global import market continues to be severely hampered by a lack of domestic manufacturing capacity.

Industry Overview

Since 2008, the solar industry has grown rapidly as a source of energy and economic activity, both in the United States and around the world. Residential use of photovoltaic (PV) panels could increase by an impressive 20GW worldwide over the 2016-2017 time frame. But the rise of utility-scale solar power, in addition to rapidly increasing commercial rooftop deployment, will be the major contributors, accounting for nearly 79 percent of solar installations by the end of 2017.¹ Combined with the sector's evolving cost competitiveness and continued technological improvements, it is clear that growth in solar will be supported well into the future.

The industry, which is decidedly global, involves a wide range of companies, each with different needs, opportunities, and challenges. Companies are often headquartered in one country but operate worldwide, shipping products easily across borders. Large manufacturers typically have supply chains in several countries at once, importing components from many different suppliers at once.

Of the solar manufacturing firms operating in the United States, more than 90 percent of their production capacity resides outside the U.S. market.² As a result, the United States maintains only a small share of global manufacturing capacity

in the sector – roughly five percent, despite inventing or innovating most solar technologies

Solar Export Markets (2016-2017)

- 1. Japan**
large market; small share
- 2. India**
large market; small share
- 3. Canada**
large market; large share
- 4. Chile**
large market; small share
- 5. France**
large market; small share
- 6. China**
large market; small share
- 7. Turkey**
large market; small share
- 8. Brazil**
large market; small share
- 9. Mexico**
small market; large share
- 10. El Salvador**
small market; large share

deployed globally over the last three decades. Unless losses in manufacturing capacity are reversed, this lack of market share will decline further.

While falling prices in solar have helped bring it closer to grid parity compared to fossil fuels, there is a negative impact as well. The volatility has resulted in many closures, mergers, and acquisitions – both in the United States and around the world.

Competition for investors, projects, and market share, however, remains fierce. On the other hand, the industry's consolidation, as well as improvements in processes, has left the remaining solar manufacturers more financially secure.

Based on forecasts from Bloomberg New Energy Finance and Business Monitor International, ITA projects the solar industry will install an astounding 107 GW of new capacity outside the United States in 2016-2017 – more than any other clean energy technology.

Over the next two years, however, foreign suppliers will meet much of this growth, as the United States is expected to capture just 4.1 percent of the global solar import market. The small U.S. market share is limited by a general lack of domestic manufacturing capacity and the United States' status as a net importer of solar technologies.

Export Opportunities

Through 2017, ITA expects Japan to account for nearly one-third of all U.S. exports in the sector – more than any other country. Despite installing about 15 GW less solar capacity than China, U.S. exporters are expected to be far more competitive in Japan. In the wake of the Paris climate agreement, China has increased its 2020 goal to 143GW of solar power.³ Imports of solar cells to China are substantial in recent years, but according to trade data these have come almost entirely from Asian suppliers, and the U.S. share of those imports is expected to continue being low compared to its market share in other countries.

While much smaller markets, U.S. exporters enjoy considerably better market share in the Western Hemisphere. Five markets in the hemisphere rank in the top 20 projected export markets, including

Canada (3rd), Chile (4th), Mexico (9th), El Salvador (10th) and Ecuador (12th).

France makes a surprising leap in the solar rankings this year, despite Europe being a historically difficult market for U.S. suppliers to penetrate. This may reflect France's renewed interest in clean energy following landmark reforms in July 2015. As one example, the government has announced a quarterly solar auction schedule until 2019 for 9GW of projects greater than 100kW.⁴ U.S. suppliers have averaged a healthy 7 percent share of France's imports of solar PV cells, according to trade data from 2013-2015, so they are well positioned for the expected surge of deployment.

One important opportunity in the near-term will likely be the export of services, particularly financial and other consultancy services that have changed the way solar power is delivered to customers in the United States. Solar leasing, crowd sourcing, and the use of on-bill repayment, for example, should all improve the attractiveness of distributed PV for customers, with U.S. companies providing the know-how and expertise to finance these projects around the world.

Challenges

Despite the positive outlook for cost competitiveness, U.S. suppliers will continue to find steep competition from lower-cost manufacturers, particularly Asian suppliers. Recent announcements of U.S. manufacturing capacity expansion from several solar equipment manufacturers indicates a strengthening of the domestic industry. However, with the extensions of the Production Tax Credit and Investment Tax credit provided in December 2015, most of the components are probably destined for U.S. solar projects rather than exports. In fact, an increase of as much as 45 percent in new U.S. solar capacity over the time frame of the tax credit extensions is expected.⁵

As the solar industry approaches and eventually surpasses grid parity, long-term performance and efficiency should become key differentiating factors between module manufacturers. If the United States can maintain, or even expand, its share of global solar manufacturing, this dynamic should signify increased in U.S. export competitiveness.

¹ Bloomberg New Energy Finance, Market Size database.

² Goodrich, Powell, et al., Journal of Energy and Environmental Science, "Assessing the drivers of regional trends in solar photovoltaic manufacturing" pp. 2812.

³ Bloomberg New Energy Finance, "China to More Than Triple Solar Capacity in Five Years," March 21, 2016.

⁴ Bloomberg New Energy Finance, France Country Profile.

⁵ Bloomberg New Energy Finance, "Q1 2016 PV Market Outlook," February 18, 2016, p.19.