

## What's New with Solar?

**The International Energy Agency (IEA) expects that by 2050, the sun could be the world's largest source of electricity.** This is due to a significant decrease over the last few years in the cost of photovoltaic (PV) modules which convert sunlight directly into electricity. IEA roadmaps show how solar PV could generate 16% of the world's energy by 2050 while solar thermal energy (STE) from concentrating solar power could generate an additional 11%. 137 Gigawatts (GW) capacity of solar PV were installed worldwide at the end of 2013. Deployment of PV has been much faster than STE, but it is expected by 2030 that STE will start taking off and PV will lose some of its market shares to STE. China is expected to be the leading country in solar PV, with the USA as a close second. STE will expand and be successful in sunny areas of the world such as Africa, India, the Middle East, Australia and the US.

Since 2008, installed solar energy in the United States has grown from 1.2 GW to 20 GW today. This can power up to 4 million homes and the market is expanding rapidly. Since 2010 solar PV panel costs have dropped by 60% and the cost of the overall solar electric system has dropped by 50%. Jobs in solar power have increased 22% in the United States since 2013 and 1 out of every 78 jobs created over the past 12 months is in the solar energy industry.

As emergent technologies, two new solar technologies are capturing interest. These technologies are building-integrated photovoltaics (BIPV) and thin-film solar cell (TFSC). BIPV are photovoltaic materials that are used to replace conventional building materials in parts of the building envelope. There are

several available forms of BIPV for use on flat or pitched roofs, on facades, and in glazing. BIPV is increasingly being used in newly constructed buildings as a primary or ancillary source of electrical power. The advantage of integrated PV is that the initial cost is offset by reducing the amount spent on building materials and labour that would normally be used to construct the part of the building that the BIPV modules replace. Incentives are currently being offered by many governments for using BIPV. As of 2006 France has offered the highest incentive at 0.25 Euros/kWh. Similar incentives exist in other countries in the EU, as well as in the United States and China.

TFSC is a solar cell that is made by depositing one or more thin layers of PV on a substrate such as glass or metal. Although they are inexpensive, they have always been less efficient than conventional silicon cells. Improvements however have been made over the years and lab cell efficiency is now beyond 21% allowing solar cells to outperform multi-crystalline silicon. Based on lab testing TFSC have the potential to have a lifespan of 25 years.

**Solar production in China has grown by a multiple of 17 in the past 4 years. China installed 10GW in 2014 and 18 GW of solar PV energy in 2015. For perspective, the Three Gorges Dam, the largest hydro-electric project in the world generates 22.5GW took 27 years to build. Investment in solar technologies is ramping up rapidly. It is important to stay informed of these changes as they present potential profit opportunities and disruptive impacts on specific industry sectors.**



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