



Shining Star – The Role of Photovoltaics in the U.S. Energy Transition

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2021 U.S. DOE Solar Futures Study

- “Blueprint for a zero-carbon U.S. grid”
- Quantifies required investments in photovoltaics (PV) installations
 - 95% decarbonization scenario by 2035: up to 1000 GW PV \approx 40% of electricity demand
 - Wind, nuclear, hydropower will meet remainder of electricity demand
 - Compare to 2020: total of 80 GW PV \approx 3% of electricity demand
 - => U.S. must ramp up PV installations from \sim 25GW/year today to 60 GW/year by 2025
- Solar PV global supply chain
 - 95% of PV panels are silicon technology (largely controlled by Chinese companies)
 - 75% of solar-grade silicon produced in China, 45% in Xinjiang Autonomous Region

First Solar, Inc.

- First Solar: the only significant, vertically-integrated PV manufacturer outside China
 - Western Hemisphere's largest manufacturing footprint in Ohio
 - Production capacity of 8 GW in 2021 => 16 GW in 2024 (new factories in US and India)
- Only significant manufacturer of non-silicon, thin-film PV
- \$90M R&D investments in 2021



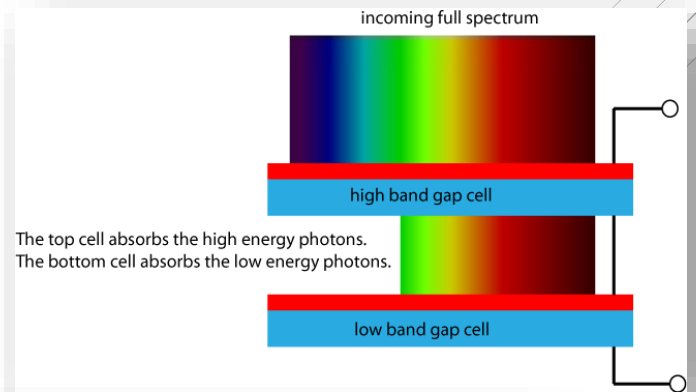
Next-Generation PV Module Technologies

- **Dual-junction (tandem) technology**

- Two cells, stacked on top of each other, that together **produce more power** than each individual cell
- Potential: very high module efficiency

- **Thin-film perovskite technology**

- A newly discovered class of **printable semiconductor inks**
- Potential: low cost, flexibility in manufacturing





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