

Copper: Essential in PV Solar Power Growth



Copper Development Association Inc.
Copper Alliance

www.copper.org

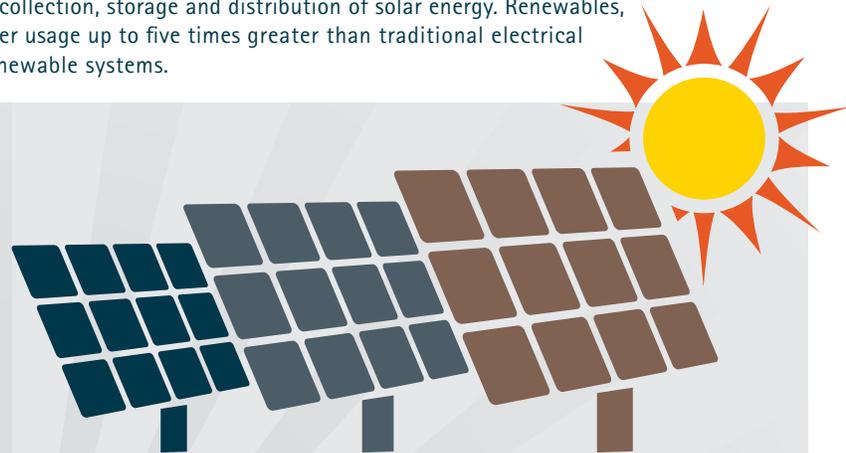
Copper is a key component of solar energy systems, increasing the efficiency, reliability and performance of photovoltaic cells and modules. Copper's superior electrical and thermal conductivities are vital in the collection, storage and distribution of solar energy. Renewables, which have copper wiring, tubing, and cable, offer a potential for copper usage up to five times greater than traditional electrical generation. There are approximately 5.5 tons per MW of copper in renewable systems.

12.1%

8.3%

2008 2009 2010 2011 2012

8.3 to 12.1 percent: the amount of growth in renewable energy generation between **2008** and **2012** including wind, solar, geothermal and hydropower.



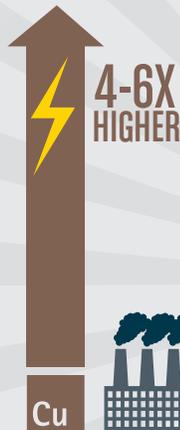
PV Solar Power Projects

Residential and Commercial: **60 – 70%** compounded annual growth

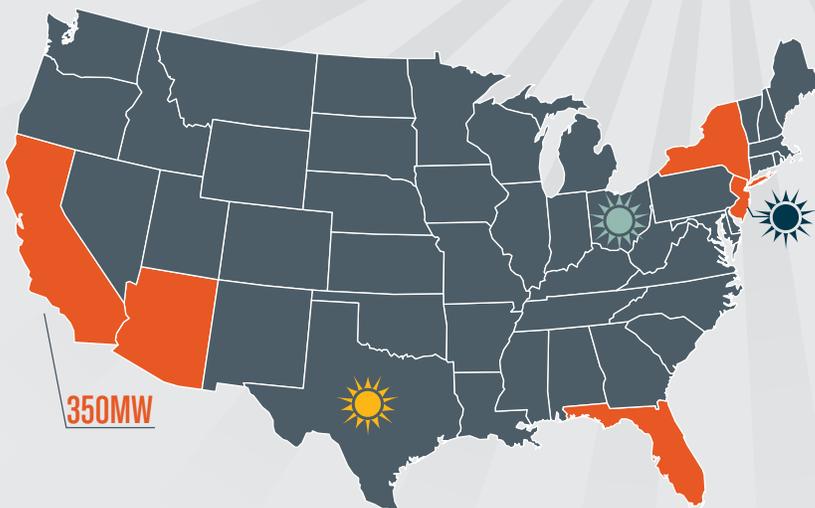
Utility Scale: **4X** number of installations since 2008

Estimated Copper Usage Megawatt: **5,400 – 15,400 lbs.**

The generation of electricity from renewable energy, including solar, has a copper usage intensity that is typically four to six times higher than it is for fossil fuels.



Plummeting equipment costs and federal and state incentives drove record-high new installations in the solar (**3.2GW**) sectors in **2012**.



In recent years, a category of PV projects in the **1–30MW** range, known as 'wholesale distributed generation,' has flourished across the country. These projects are utility-sided (rather than behind-the-meter) installations which are interconnected to the distribution grid.

Examples of these PV projects include:

-  Juwi Solar's **12MW** Wyandot plant in Ohio (with American Electric Power as the offtaker)
-  Lincoln Renewable Energy's **12.5MW** Oak Solar plant in New Jersey (with Macquarie Energy providing project finance as part of the Power Purchase Agreement)
-  SunEdison's **30MW** Webberville plant in Texas (with Austin Energy as the offtaker)

The top 5 states using PV are California, New Jersey, Florida, Arizona and New York. California has led the way of large-scale PV; approximately **350MW** of utility-scale PV projects were installed in that state in 2012.

Nationwide, **11 percent** of homes now have PV solar installations.

