

## Benefits and Limitations

Solar energy has great potential for the future. Radiant energy from the sun is free and its supplies are unlimited. It cannot be controlled by any one nation or industry. The electricity generated by photovoltaics does not pollute the environment; however, the manufacturing of the PV cell does have an environmental impact. As we improve the technology to harness the sun's enormous power, we can work toward a sustainable energy future.

### Benefits of Solar Energy

- Solar electric systems are safe, clean, and quiet to operate.
- Solar systems are highly reliable.
- Solar systems require very little maintenance.
- Solar systems are cost-effective in remote areas and for some residential and commercial applications.
- Solar systems are flexible and can be expanded to meet increasing electrical needs for homes and businesses.
- Solar systems can provide independence from the grid or backup during outages.
- The fuel is renewable and free and domestically produced.
- Harnessing solar energy spurs economic development.
- Using solar energy to generate electricity produces no greenhouse gases.

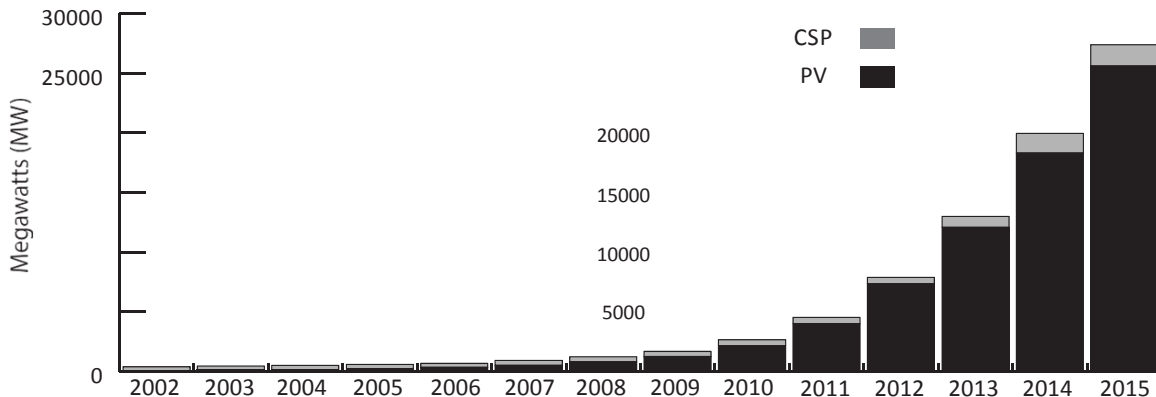
### Challenges of Solar Energy

- PV systems are not well suited for energy-intensive uses such as heating.
- Grid-connected systems are often expensive, except in areas with high electricity rates where local incentives are offered.
- We cannot harness solar energy at night.
- To be used around the clock, solar systems require battery or thermal storage.
- Utility scale systems require a large amount of land.
- The highest solar concentration is found in areas far from population centers.
- Systems are affected by shading, cloudy weather, and dirt accumulation.
- Large utility-scale concentrated solar systems require large amounts of water in areas where there is very little water.
- Due to the cost per kilowatt-hour to generate electricity from PV, power companies often opt for cheaper sources for generation.
- The process to make some solar electric technologies can have harmful effects on the environment.
- CSP facilities can affect wildlife in an area.

## Average Size of Photovoltaic Systems, Grid Connected, 2015



## A U.S. Total Installed Solar Electricity Capacity



Data: DOE EERE Renewable Energy Data Book, IREC