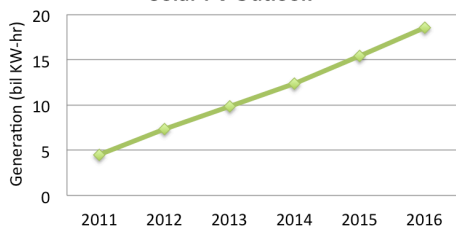


Fundamentals

- Types
 - Monocrystalline Silicon
 - Polycrystalline Silicon
 - Amorphous Silicon
- P-N Junction
- Glass Layer-Conductor-Silicon Wafer-Backing Layer
- Photons excite electrons to flow thru the N&P Silicon layers creating a current
- Quick Facts
 - More solar systems were installed in the last 18 months than in the previous 30 years
 - Cost in Utility market – 2.59/W
 - Avg system price was 15% lower in 2013 than in 2012

Solar PV Outlook



Policy

- Federal, State & Local
- Government incentives
 - Subsidies
 - Feed In Tariffs
 - Net Metering
 - Legislation
 - Renewable Portfolio Standards
 - Taxes
 - Exemptions & Credit
- ✧ **56%** of a businesses' equipment costs equals the worth of subsidies received & **30%** of a landowners

Industry Challenges

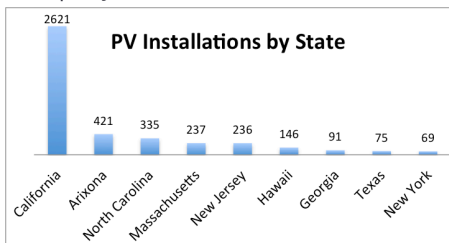
- Grid integration
- Political certainty
- Cost
- Education
- Recycling

Finance

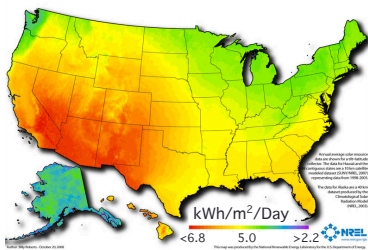
- Third-Party Financing
 - Solar Lease: Customer pays I/D to use their solar system (not for energy)
 - Power Purchasing Agreement: I/D finances & operates solar system and sells the energy to landowner (Typically cheaper than local utility price)
- Government Financing
 - MACRS Depreciation
 - Incentivizes investment solar technology
 - DOE Loan Guarantee Program
 - Provides certainty & competitiveness in long term financing
 - Increases investment

Policy In Action

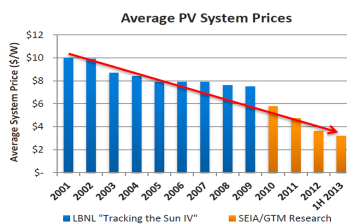
- Inconsistency in state and local policy yield disproportionate results
- Figures below demonstrate the power of policy
- There is no correlation between quantity of installations and efficiency
- **1/3** of the top 9 solar states are in the NE where efficiencies can be **2/3** the potential of states in the SW
- Example) New Jersey's net metering policy



Solar Photovoltaic Efficiencies

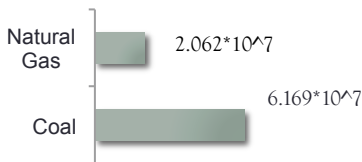


Costs

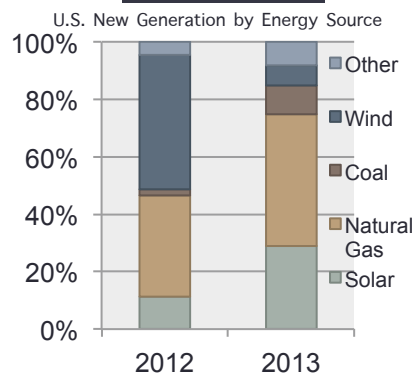


Benefits

- Virtually no environmental injustice
- No water consumption or contamination
- Applicable in rural and urban environment
- Produces during peak hour
- Environmental Implications
 - No GHG emission
 - Renewable resource
- CO₂ emissions avoided in 2013 by solar energy (metric tonnes)

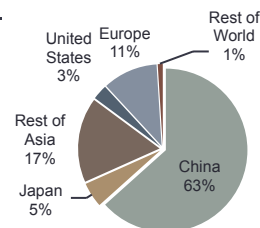


Hottest Industries

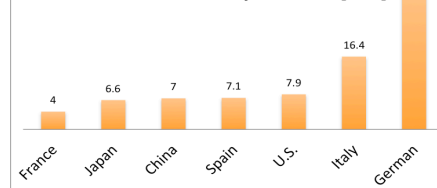


Global Perspective

- Manufacturing
- Political Tension
- Different Policy



Global Solar Electricity Installed [GW]



Fundamentals

- Nicodemus. Renewable Energy. Lafayette College, Easton. Lecture.
- Quick Facts all came from:
 - "Solar Market Insight Report 2013 Year in Review." *SEIA*. N.p. Web. 15 Apr. 2014.
- Solar PV Lookout Graph data collected from:
 - United States. U.S. Energy Information Administration. *Annual Energy Lookout 2014*. N.p.: n.p., n. Print.

Policy

- Subsidies
 - Burr, Christie. "Subsidies, Tariffs, and Investments in Solar Power Market." (2012): 1-37. Web. 12 Apr. 2014.
 - "Net Metering." *SEIA*. N.p., n.d. Web. 13 Apr. 2014.
 - "Feed In Tariffs." *SEIA*. N.p., n.d. Web. 13 Apr. 2014.
- Taxes
 - "Solar Tax Exemptions." *SEIA*. N.p., n.d. Web. 13 Apr. 2014.

Industry Challenges

Finance

- **Third-Party Financing:**
 - "Third-Party Solar Financing." *SEIA*. N.p., n.d. Web. 13 Apr. 2014.
- DOE Loan Guarantee Program: "Loan Guarantee Program." *SEIA*. N.p., n.d. Web. 12 Apr. 2014.

Policy In Action

- PV Installation by state data found:
 - "Solar Market Insight Report 2013 Year in Review." *SEIA*. N.p. Web. 15 Apr. 2014.
- U.S. Solar efficiency figure found:
 - *National Renewable Energy Laboratory (NREL) Home Page*. N.p., n.d. Web. 15 Apr. 2014.

Costs

- **Solar Cost figure from:**
 - "Solar Market Insight Report 2013 Year in Review." *SEIA*. N.p. Web. 15 Apr. 2014.

Benefits

- "Environment." *SEIA*. N.p. Web. 15 Apr. 2014.
- Nicodemus. Renewable Energy. Lafayette College, Easton. Lecture.

Hottest Industries

- Graph of New Electricity Generation:
 - "Solar Market Insight Report 2013 Year in Review." *SEIA*. N.p. Web. 15 Apr. 2014.

Global Perspective

- Manufacturing – data pulled from:
 - "2012 Renewable Energy Data Book." Department of Energy, Oct. 2013. Web. Apr. 2014.
- Different Policy – data pulled from:
 - "2012 Renewable Energy Data Book." Department of Energy, Oct. 2013. Web. Apr. 2014.