State of the market & policy drivers
1. State of the market

2. Basic current policy regarding solar PV
State of the market
Nearly **260,000** American workers in solar – more than double the number in 2012 – at more than 9,000 companies.
Nearly 260,000 American workers in solar – more than double the number in 2012 – at more than 9,000 companies.
U.S. Solar Market Annual Installed Solar PV

[Graph showing the trend of annual installed solar PV capacity and blended average solar PV price from 2009 to 2016. The graph indicates a decrease in solar PV prices and an increase in installed capacity over the years.]
U.S. Solar PV Forecast

Yearly U.S. Solar Installations

Photo credit: SEIA
SunShot Initiative Progress and Goals

The solar industry is more than 90% of the way to achieving the SunShot Initiative’s 2020 utility-scale cost target. SunShot’s 2030 goal is to cut costs an additional 50% between 2020 and 2030.

*LCOE progress and targets are calculated based on average U.S. climate and without the ITC or state/local incentives. Utility-scale PV uses one-axis tracking.*
U.S. solar photovoltaic costs continued to fall in 2016

Credit: NREL

Installed **14.8 GW** of solar PV

Credit: SEIA
What is one Gigawatt?

Enough to power 750,000 homes
14.8 Gigawatts

About 30 Coal Fired Power Plants

Photo credit: NREL
14.8 Gigawatts

About 30 Coal Fired Power Plants

Photo credit: NREL
In Q1 2016

U.S. hit 1 million solar installations

Credit: SEIA
In 2017-2018

2 million MORE solar installations

Credit: SEIA
100 GW by 2020 with ITC Extension

U.S. PV Market Forecast Post-ITC Extension

From 2016-2020
72 GW, 220,000 jobs

ITC Extended 12/18/2015

Source: GTM Research Preliminary U.S. PV Forecast_Omnibus ITC Extension

Photo credit: SEIA
Growth in Solar led by Falling Prices

Photo credit: SEIA

Annual Installed solar PV Capacity (MW-DC)

Blended Average Solar PV Price ($/watt)

Solar PV Installations
Solar PV Prices


$- $1.00 $2.00 $3.00 $4.00 $5.00 $6.00 $7.00 $8.00


0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000
Solar PV Price Breakdown

Q4 2016 Quoted PV Prices

- Soft Costs (67% of residential installation cost)

Residential

Commercial

Utility-Scale

$0.50

$1.00

$1.50

$2.00

$2.50

$3.00

$/watt-dc

PV Module

Inverter

Electrical BOS

Structural BOS

Direct Labor

Engineering and PII

Supply Chain, Overhead, Margin

Photo credit: SEIA
Residential & Commercial Installations as of 2016

Yearly U.S. Solar Photovoltaic (PV) Installations

- Residential (PV)
- Non-residential (PV)

Megawatts

Year: 2006 to 2016

Photo credit: SEIA
Solar Maps

Solar maps provide monthly average daily total solar resource information on grid cells. The insolation values represent the resource available to a flat plate collector, such as a photovoltaic panel, oriented due south at an angle from horizontal to equal to the latitude of the collector location. This is typical practice for PV system installation, although other orientations are also used.

Several map variations are accessible below. For information on how these maps were developed, access the Solar Maps Development - How the Maps Were Made page.

Types of Maps

U.S. Solar Resource Maps

These maps show national solar photovoltaics (PV) resource potential and concentrating solar power (CSP) resource potential for the United States. They are available in JPEG format.

Photovoltaics

- Data - 1998 to 2009; Image - letter size (JPEG 1.234 KB)
- Data - 1998 to 2005; Image - letter size (JPEG 1.059 KB)
- Data - 1998 to 2005; Image - poster size (JPEG 5.63 MB)

Concentrating Solar Power

- Data - 1998 to 2009; Image - letter size (JPEG 1.261 KB)
PV accounted for 7.4% of Germany’s net-electricity generation in 2016
Top 5 States - % of Growth

Photo credit: NREL
Other Issues to Watch

• Access to capital

• Workforce Development
  – Industry will double number of employees over five years
  – Committed to hiring 50,000 veterans by 2020

• Technology Advances
  – Storage, Electric Vehicles, Continued Price Declines
Basic policy regarding solar PV
Net Energy Metering (NEM)

1. Solar PV Panels
2. Inverter
3. Service Panel
4. Smart Meter
5. Utility Grid

Photo credit: CSE

Powered by SunShot
U.S. Department of Energy
Value of Solar Tariff (VOST)

How the Value of Solar Tariff (VOST) works in Austin, TX

- You pay the utility company your regular residential rate for each kWh you use.
- Utility pays you 11.3¢ for every kWh you produce!
Consumption/Production Patterns by Month

Kilowatt hours (kWh)

- Consumption
- Production
Solar Renewable Energy Credits (SRECs)

SREC Markets and Solar RPS States in the U.S.

Eligible SREC markets listed in each state

- States with SREC markets: RPS, solar requirement and SACP
- States eligible to sell into other state SREC markets
- States with an RPS solar requirement but no SREC market yet

Photo credit: SREC Trade

Powered by SunShot
U.S. Department of Energy
Will allow renewable energy to replace insulation, but should it?
Will allow renewable energy to replace insulation, but should it?

- PV panels can be removed by future owners
Will allow renewable energy to replace insulation, but should it?

• PV panels can be removed by future owners

• Ceiling and wall insulation last more than 30 years and should not be compromised
2018 Model Building Code

Will allow renewable energy to replace insulation, but should it?

• PV panels can be removed by future owners
• Ceiling and wall insulation last more than 30 years and should not be compromised
• The greater the energy efficiency in building shells - the fewer PV panels are needed
  (Lowering the cost for adding solar!)
Summary: Opportunity Abounds

• Cost of solar PV has dropped by more than 70%

• Soft costs make up the largest portion of the cost breakdown and the SunShot Initiative is aiming to decrease them

• In 2017-2018, 2 million installations are expected

• Sunlight isn’t what determines solar growth rate – policies matter more
Quiz & Discussion
The number of solar PV installations is expected to increase by what percentage in 2017-2018?

a) 25%
b) 50%
c) 100%
d) 200%
The fastest growing PV markets are in the sunniest U.S. States.

a) True
b) False
Net energy metering offers what opportunity to consumers?

a) Lower conventional energy costs from the utility
b) Ability to balance electricity consumption and production patterns
c) Solar renewable energy credits (SRECS)
d) None of the above