The Solar Energy Technologies Office

Getting to Ubiquitous Solar

Minh Le, Director
Solar Energy Technologies Office
SunShot Initiative

5 - 6¢/kwh without subsidy

A 75% cost reduction by the end of the decade
The Right Stuff

• Half of the Federal Workforce
• 10 times the number of PhDs/MBAs (some with decades of industrial experience)
• FOAs awarded in half the time
• Working with community to achieve greater results
• 3X rate of world records in the past 2 years compared to prior decade
• 10-20% of awarded funds are redirected towards new projects
SunShot Initiative – Solar Grid Parity by 2020

2010
MAJOR PROGRESS

2013
PRIORITY AREAS

2020

60% PROGRESS TOWARDS 2020 OBJECTIVES
SunShot Initiative – Solar Grid Parity by 2020

- 2010: MAJOR PROGRESS
- 2013: PRIORITY AREAS
- 2020: TARGET

>13 GW OF SOLAR
4.75 GW PV IN 2013
10X GROWTH RATE FROM 2009

energy.gov/sunshot
SunShot Initiative – Solar Grid Parity by 2020

2010  2013  2020

MAJOR PROGRESS  PRIORITY AREAS

JOBS: 143,000
SunShot Initiative – Solar Grid Parity by 2020

2010

2013

MAJOR PROGRESS

PRIORITY AREAS

2020

SUNSHOT INCUBATOR $18 PRIVATE FOR EVERY $1 PUBLIC

energy.gov/sunshot
SunShot Initiative – Solar Grid Parity by 2020

2010

MAJOR PROGRESS

2013

PRIORITY AREAS

2020

SOFT COSTS
SunShot Initiative – Solar Grid Parity by 2020

2010  2013  2020

MAJOR PROGRESS  PRIORITY AREAS

GRID INTEGRATION
SunShot Initiative – Solar Grid Parity by 2020

2010
MAJOR PROGRESS

2013
PRIORITy AREAS

2020

CSP STORAGE
s-CO₂
SunShot Initiative – Solar Grid Parity by 2020

2010

MAJOR PROGRESS

2013

PRIORITY AREAS

2020

MANUFACTURING

COMPETITIVENESS
The SunShot Portfolio

- CSP R&D
- PV R&D
- Systems Integration
- Tech to Market
- Balance of Systems
FY14 Portfolio distribution

- NREL Site Wide: 5%
- PV R&D: 22%
- CSP: 19%
- Systems Integration: 20%
- BOS: 17%
- Soft Costs: 17%
- Tech to Market: 17%
FY13 funding distribution

- National Laboratories: 37%
- Universities: 23%
- Industry: 37%
- Other: 3%
Photovoltaics R&D
Dr. Rebecca Jones-Albertus
Long-Run U.S. Manufacturing Opportunities
Innovations in Manufacturing R&D (Tech to Market)  
Dr. Lidija Sekaric
Systems Integration R&D
Dr. Ranga Pitchumani

100 GW Solar Penetration

- Grid Performance and Reliability
  - PV gen capacity > 100% peak load
  - Interconnection approval at no additional cost
  - Voltage THD < 5%
  - IHD < 3%
- Power Electronics
  - Cost < $0.10/W
  - Service Life > 25 years
  - Efficiency > 98%
- Communications
  - Nodes connected > 5M
  - One-way time < 1 sec.
  - Two-way time < 1 sec.
- Reliability
  - Plant performance uncertainty < 2%
  - Failure detection > 95%
  - Lifetime ≥ 10,000 cyc
  - Labor costs < $0.10/W
- Dispatchability
  - 2 NERC standard at no additional cost
Balance of Systems (Soft BOS)
Dr. Elaine Ulrich

- Permit Fee: 2%
- Permitting, Installation, Interconnection Labor: 2%
- Sales Tax: 5%
- Transaction Costs: 6%
- Installer/Developer Profit: 9%
- Indirect Corporate Costs: 9%
- Customer Acquisition: 9%
- Installation Labor: 11%
- Supply Chain Costs: 12%

64% Hardware Cost
Minh Le
Director
Solar Energy Technologies Office
SunShot Initiative
minh.le@ee.doe.gov