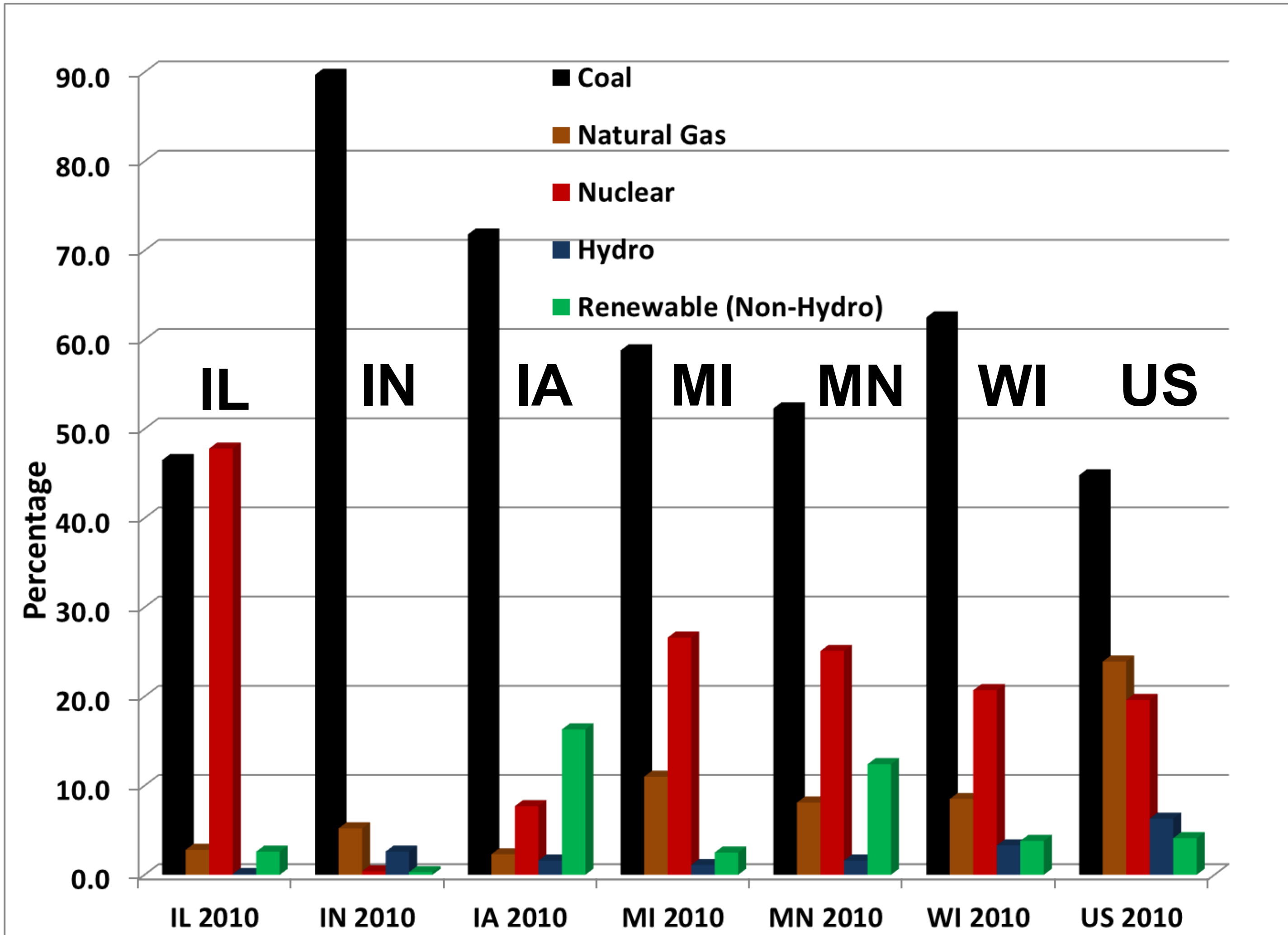
midwest renewable energy association

Building Workforce Capacity in the Midwest Solar Industry

Nick Hylla, 10/11/2012

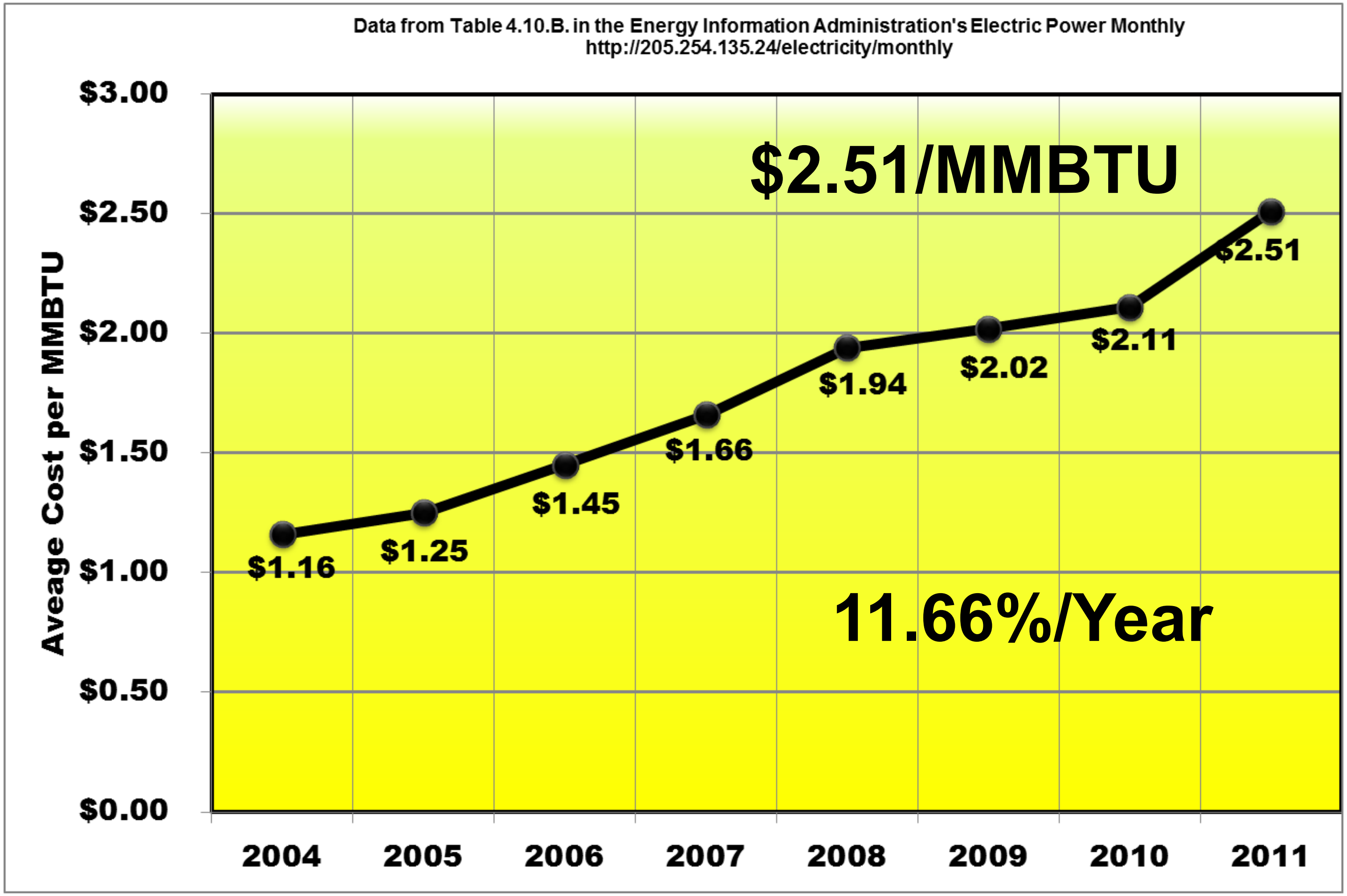
Presentation at the Solar Powering Your Community Conference in Madison, Wisconsin

Electricity Sources - Midwest

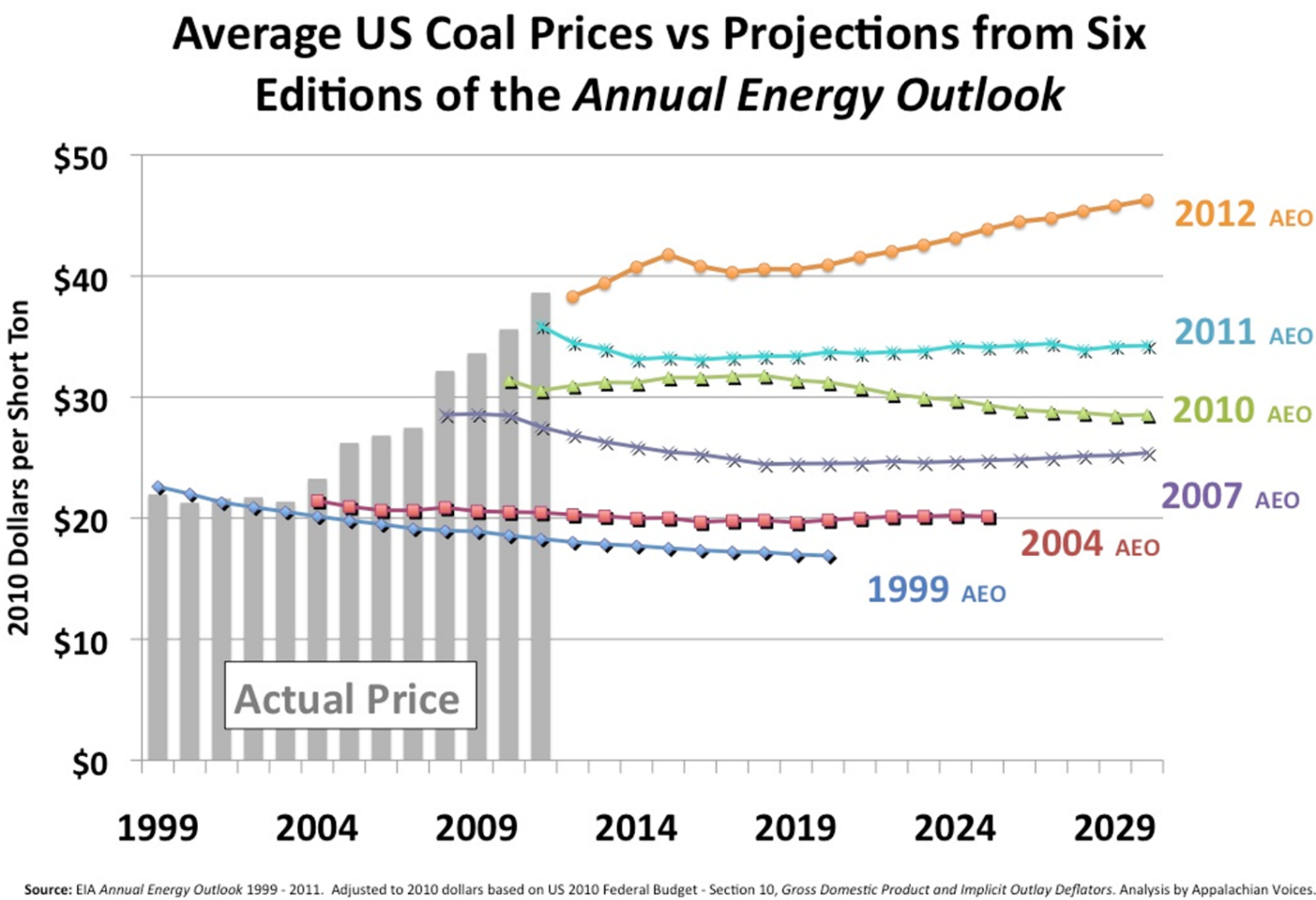


Data from Energy Information Administration State Electricity Data Table 5
http://www.eia.gov/electricity/state/unitedstates/index.cfm

Wisconsin Delivered Coal Cost

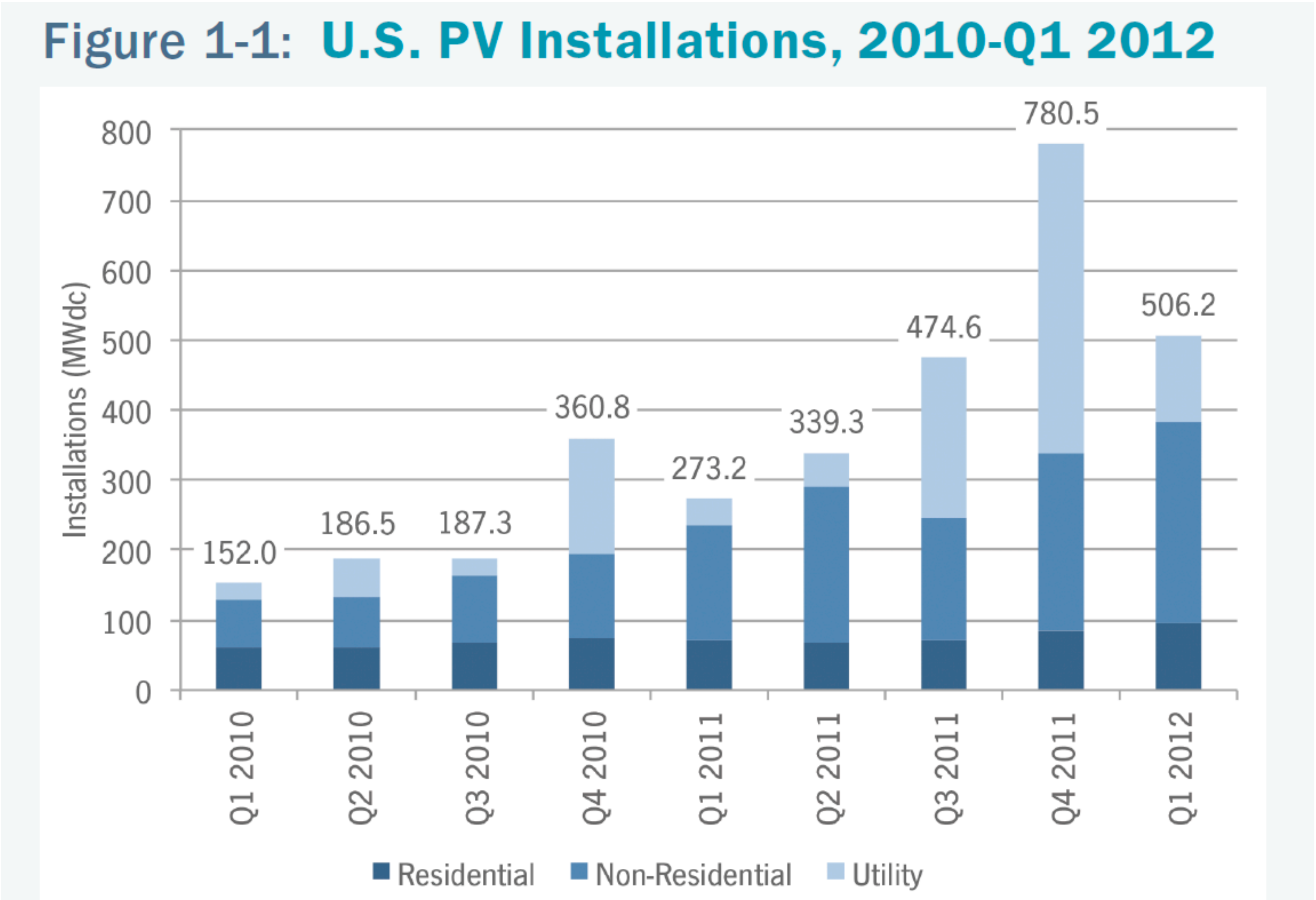


Data from EIA Electric Power Monthly, Table 4.10B



From Matt Wasson, Appalachian Voices

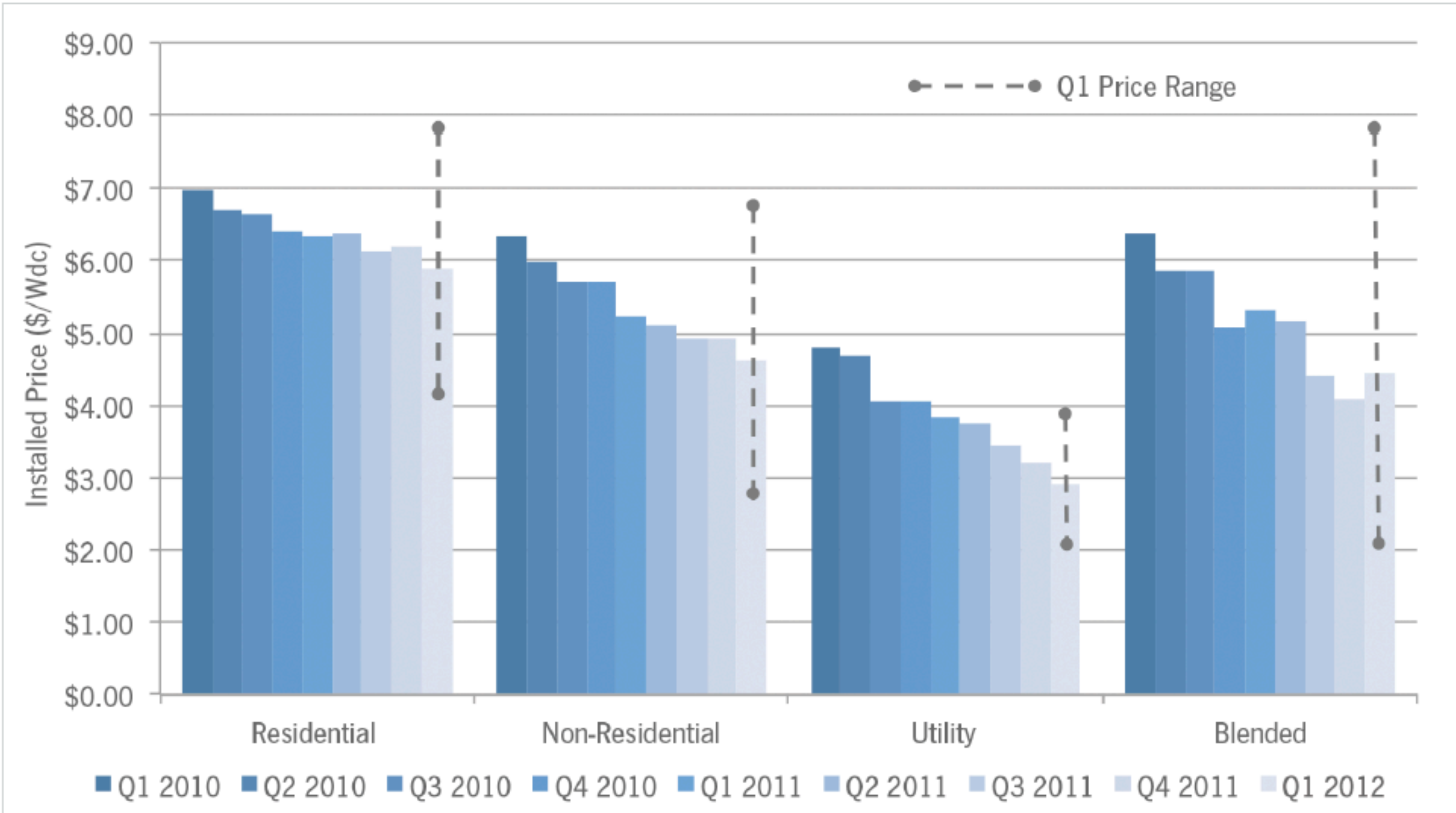
US PV Installation Trends



Sources: Solar Energy Industries Association. 2012. US Solar Market Insight: 1st Qtr. 2012

2012 Price Trends by Segment

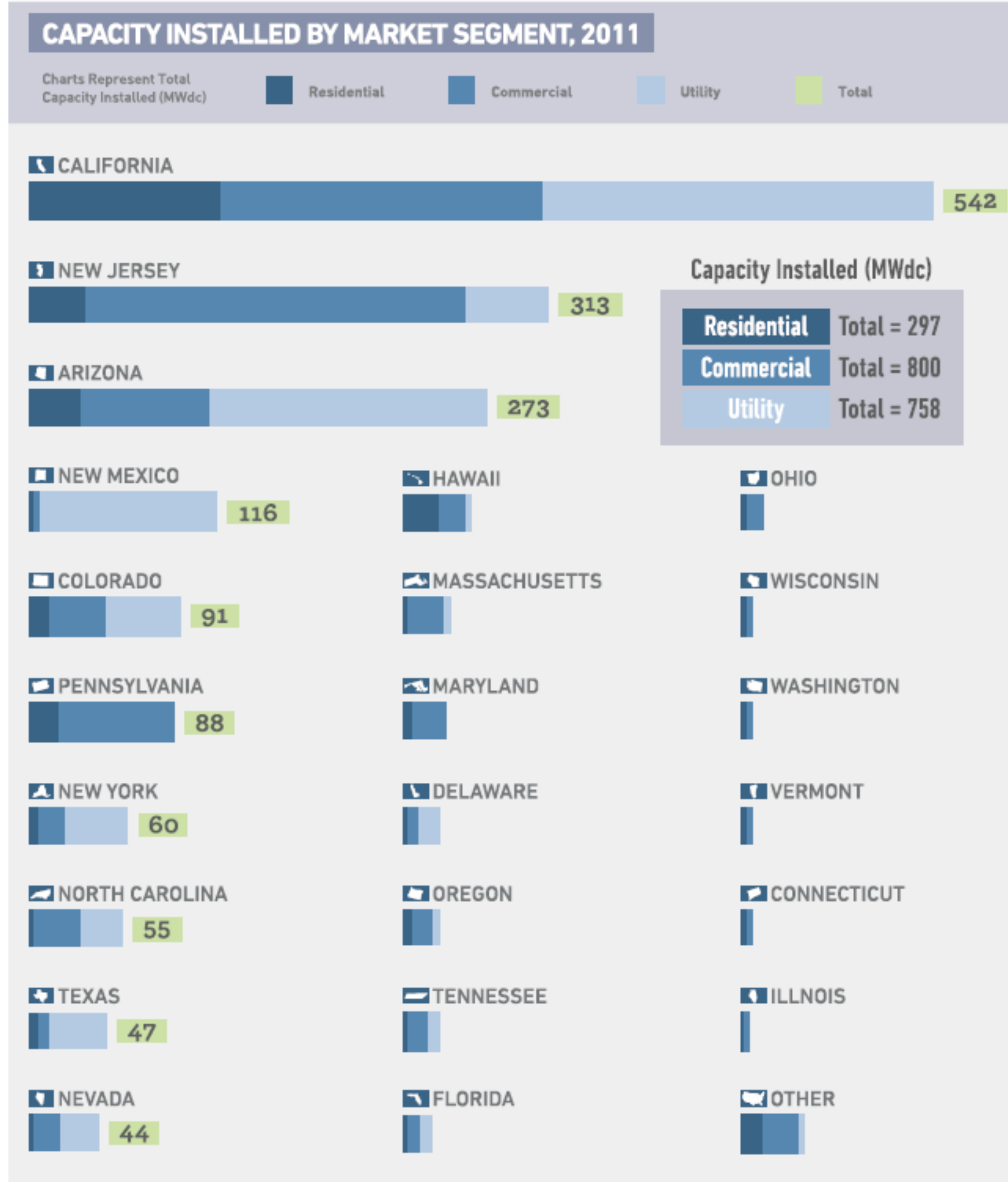
Figure 2-3: National Weighted Average System Prices, 2010-Q1 2012



Sources: Solar Energy Industries Association. 2012. US Solar Market Insight: 1st Qtr. 2012

Figure 2-1:
State-Level
Installations

By Market Segment and by State



Note: Additional state details are available in the full version of this report.

Sources: Solar Energy Industries Association. 2012. US Solar Market Insight: 1st Qtr. 2012

PV Market Penetration Scenarios

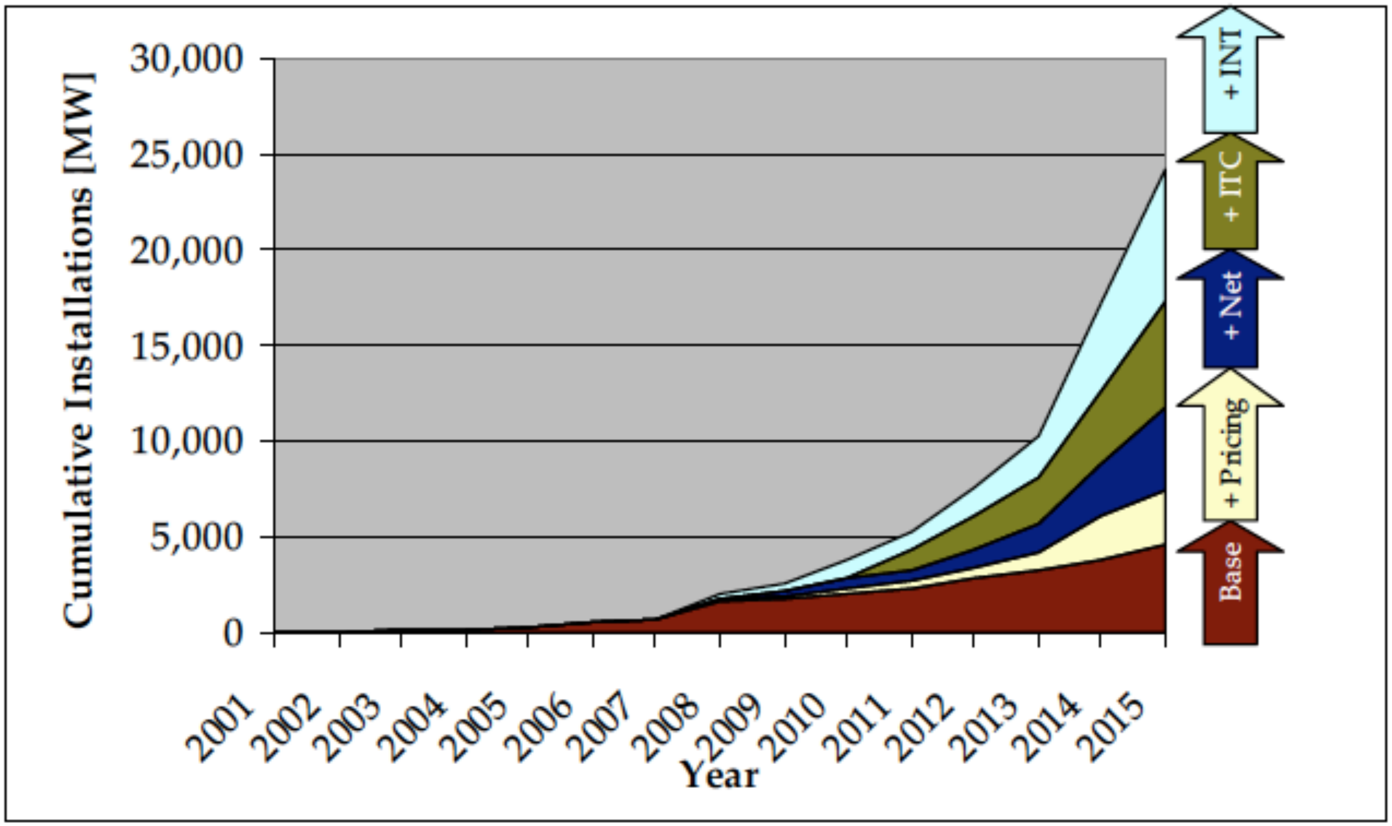


Figure E-1. Influence on cumulative U.S. PV installations of system pricing, net metering policy, federal tax credits, and interconnection standards

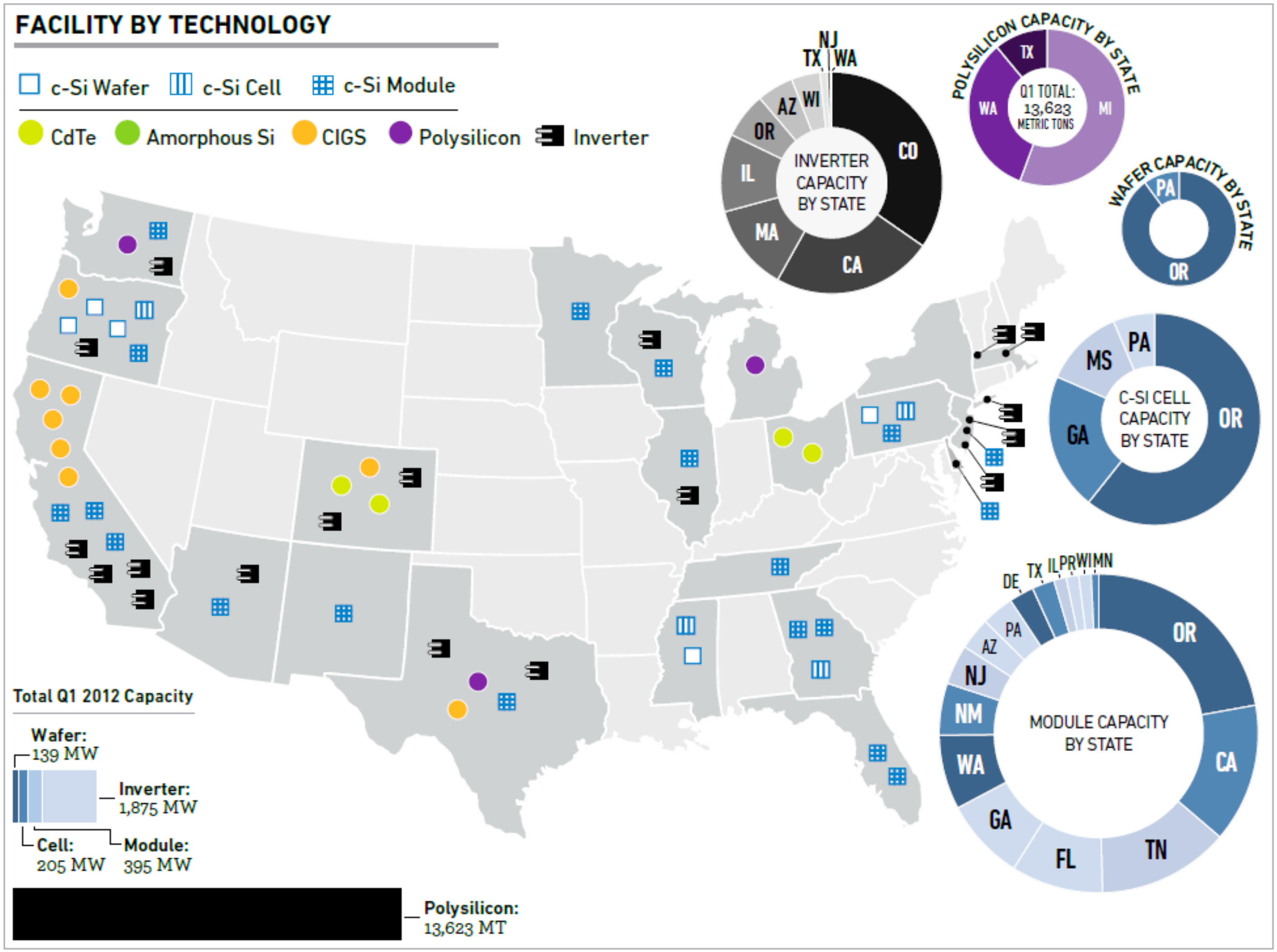
- Sources: Paidpati, J. et al. 2008. Rooftop Photovoltaics Market Penetration Scenarios National Renewable Energy Lab.

Finance Mechanisms

- Third-Party Financing
- Renewable Energy Credits
- Low Interest Consumer Loans
- Clean Energy Bonds
- Utility Solar Gardens
- Real Estate Investment Trusts
- Master Limited Partnerships
- And More!

Component Manufacturing

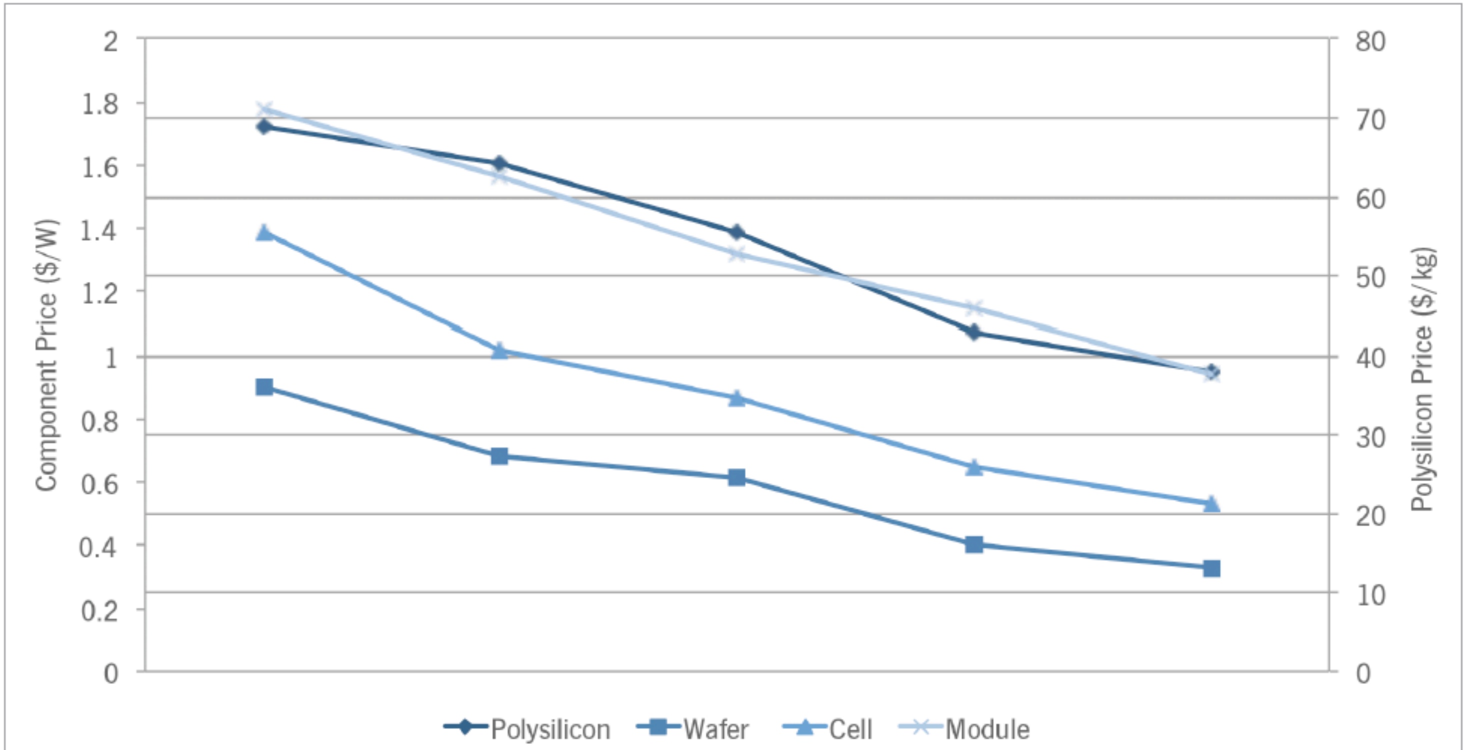
Figure 2-4: U.S. Manufacturing Map



Sources: Solar Energy Industries Association. 2012. US Solar Market Insight: 1st Qtr. 2012

Module Prices

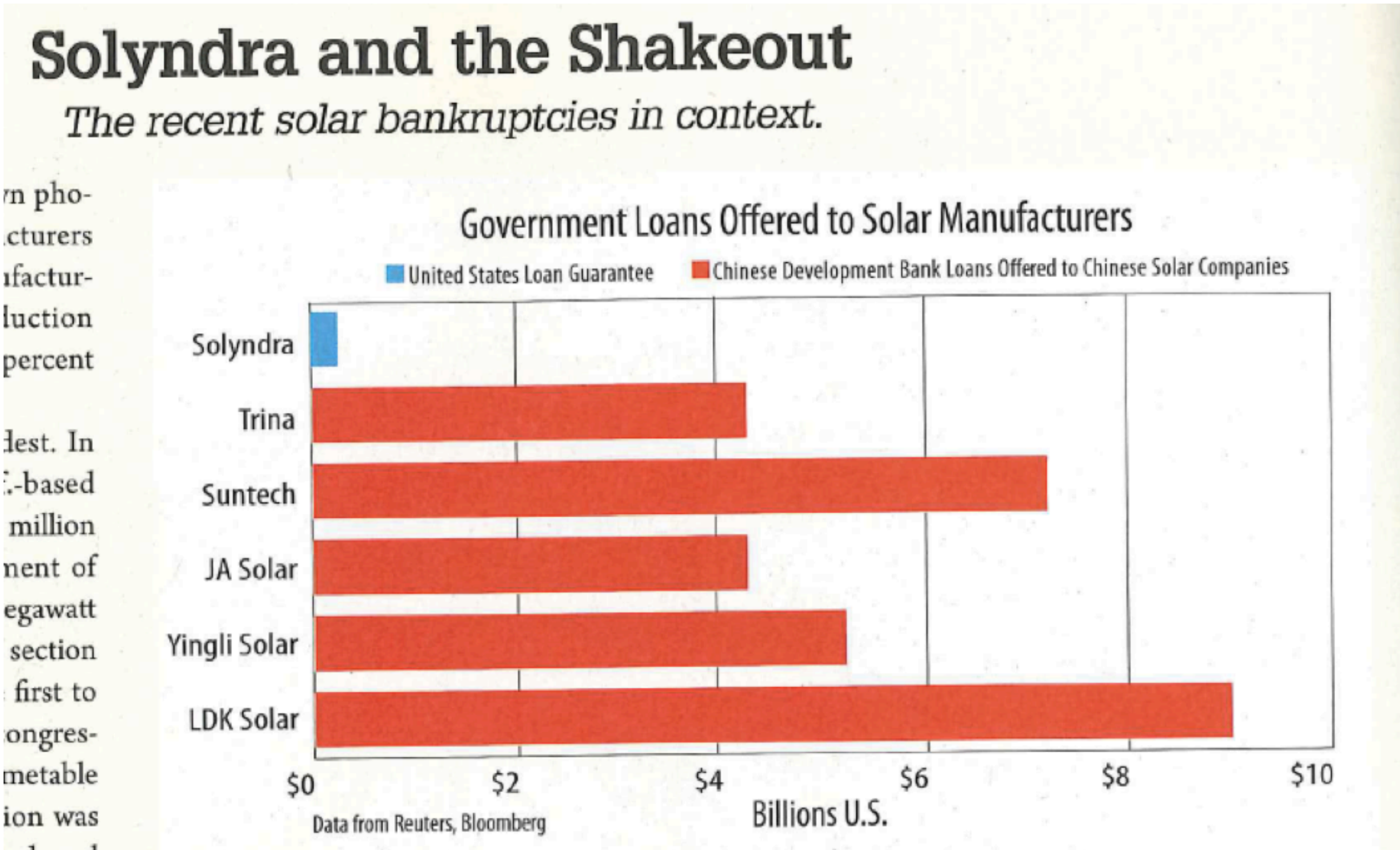
Figure 2-5: U.S. Polysilicon, Wafer, Cell and Module Prices, Q1 2011-Q1 2012



VALUE CHAIN COMPONENT	Q3 2010	Q4 2010	Q1 2011	Q2 2011	Q3 2011	Q4 2011	Q1 2012
Polysilicon	$65.00	$67.93	$69.00	$64.32	$55.54	$43.00	$38.00
Wafer	$1.07	$1.06	$0.90	$0.69	$0.61	$0.40	$0.33
Cell	$1.56	$1.61	$1.39	$1.02	$0.87	$0.65	$0.53
Module	$2.02	$1.92	$1.78	$1.56	$1.32	$1.15	$0.94

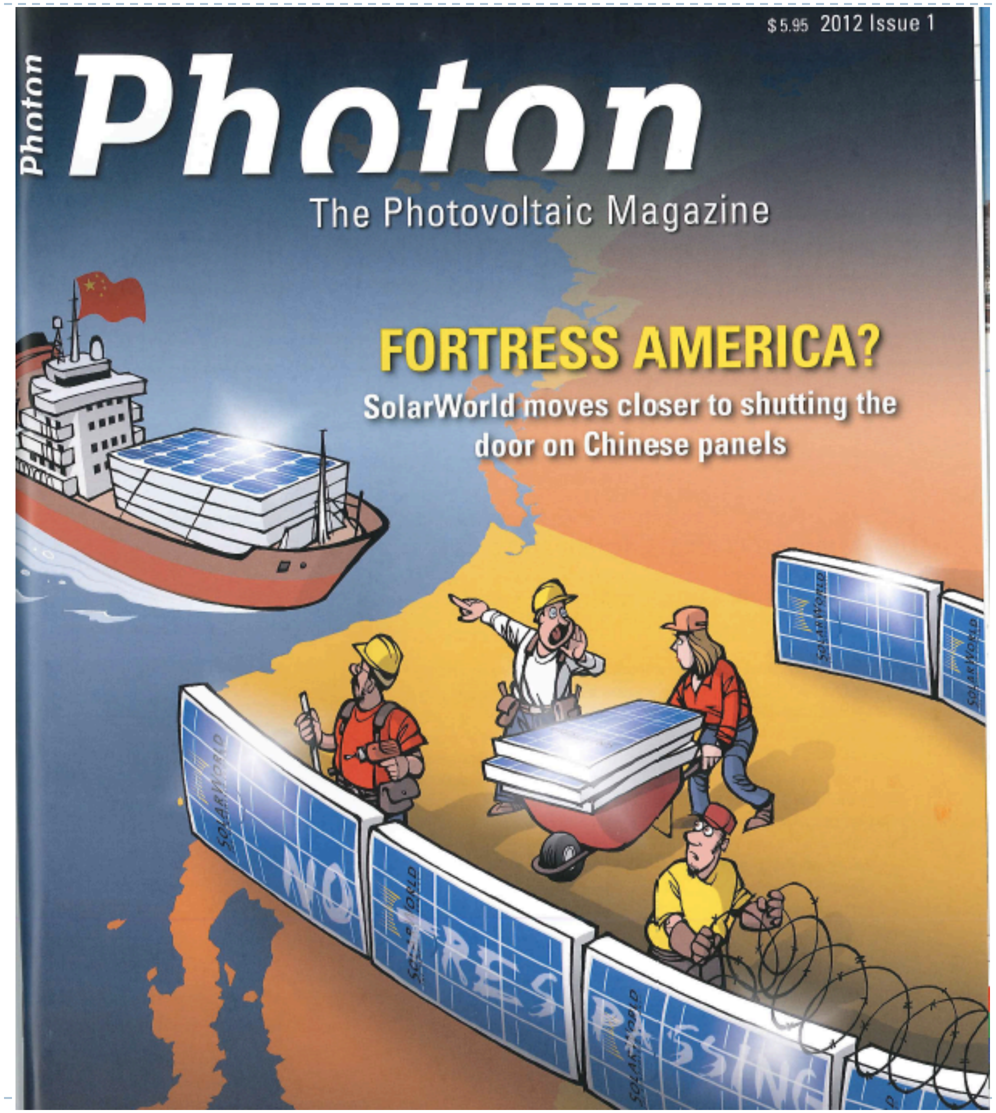
Sources: Solar Energy Industries Association. 2012. US Solar Market Insight: 1st Qtr. 2012

Opportunity



Source: Solar Today. Nov/Dec 2011

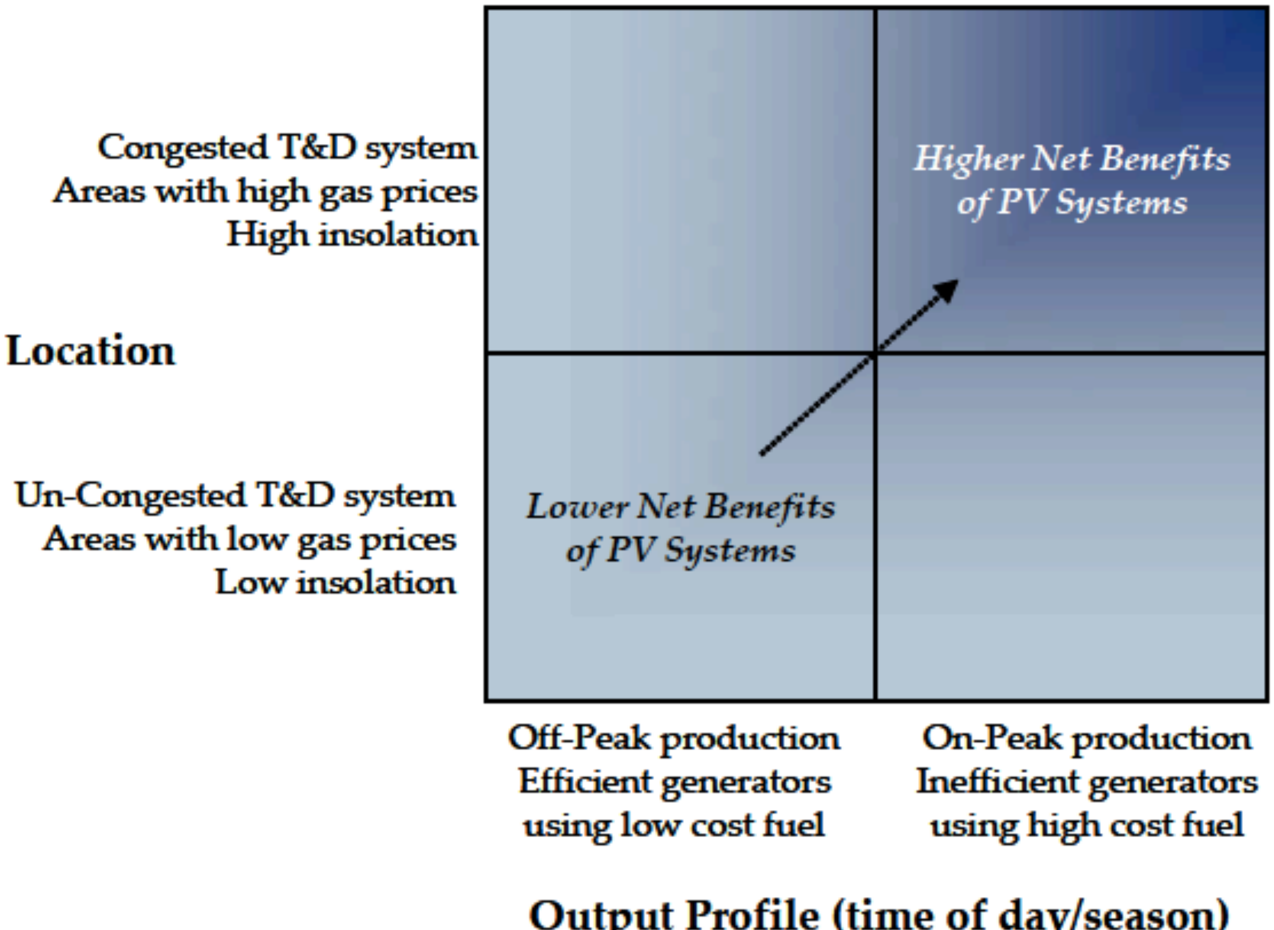
PV Module Import Tariffs



Source: Photon: The Photovoltaic Magazine. 2012 Issue 1.

Key Drivers of PV Values

Figure E-1. Key Drivers of PV Values



- Sources: Contreras J.L et al. 2008. Photovoltaic Value Analysis. National Renewable Energy Lab

Evolution of PV Business Models

0 Generation

PV System Supply

- Business models focus on manufacturing, supply and installation of PV systems
- End-user is the owner
- Utility is largely passive, providing net metering and standard/simplified interconnection, but otherwise, unaffected.

1st Generation

Third-Party Ownership & Operation

- Business models driven by third parties which develop projects and own PV systems, resulting in:
  - Reduction of hassle & complexity for end-user
  - Better access to financing
  - Leveraging of current incentives structure (especially for commercial building applications)
- Utility gradually takes on a facilitation role as PV market share grows

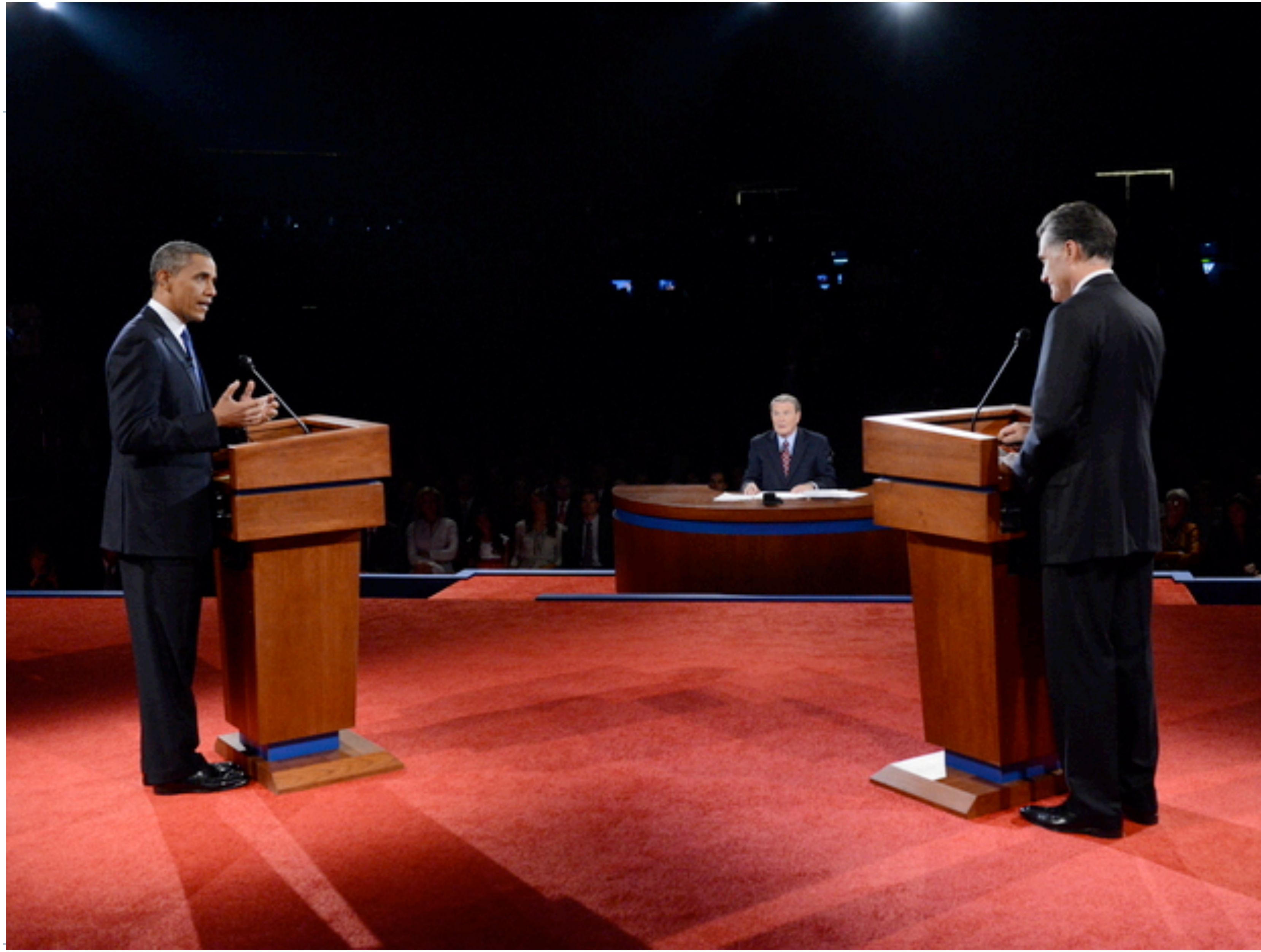
2nd Generation

Full Integration

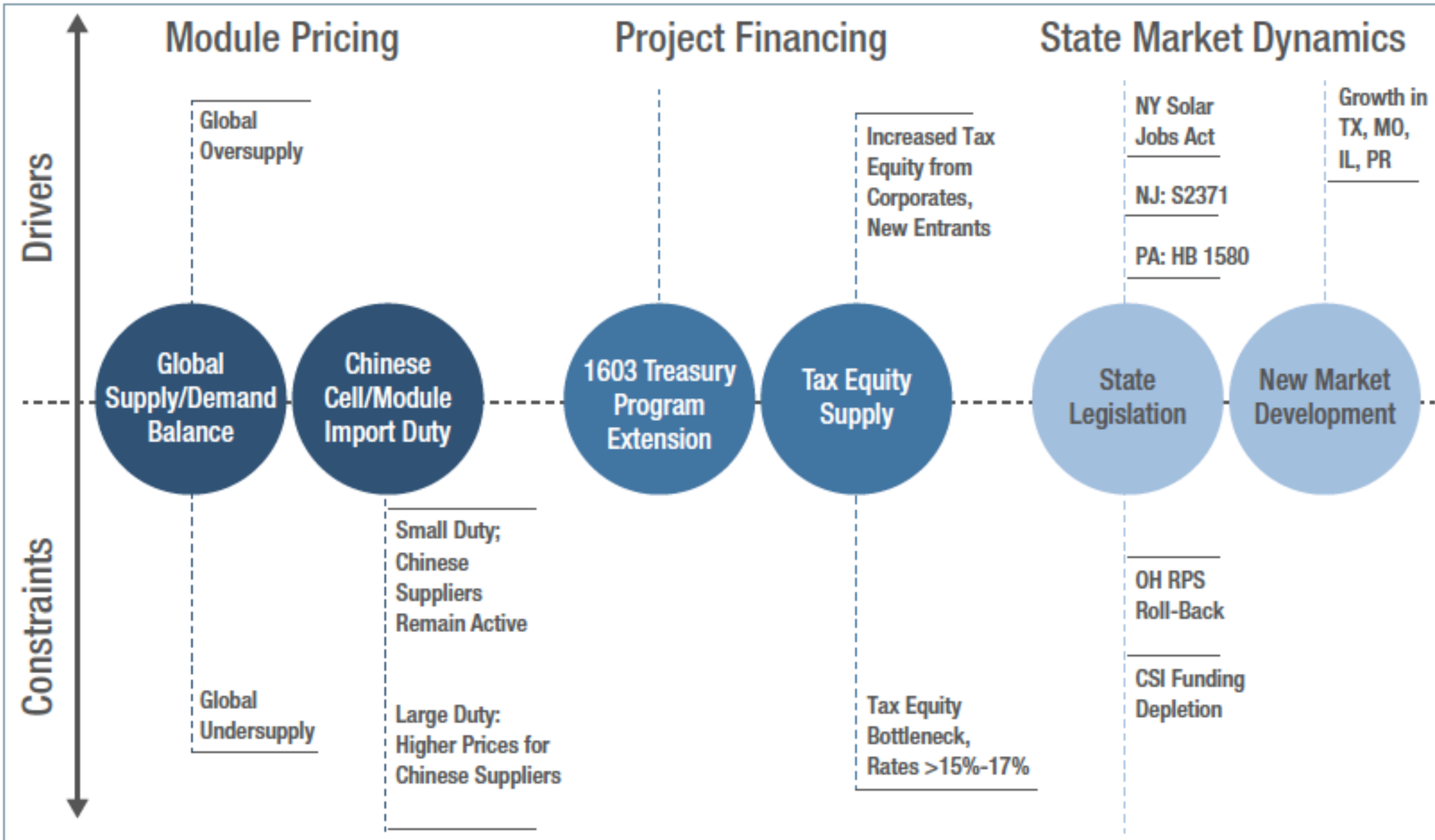
- Business models allow PV to become an integral part of the electricity supply and distribution infrastructure
- Business models emerge with variation of system:
  - Ownership
  - Operation
  - Control
- Utility becomes more deeply involved, as PV becomes major consideration
- PV product supply chain becomes "commoditized"

Figure ES-1-1. Evolution of PV business models

Sources: L. Frantzis et al. 2008. Photovoltaic Business Models. NREL



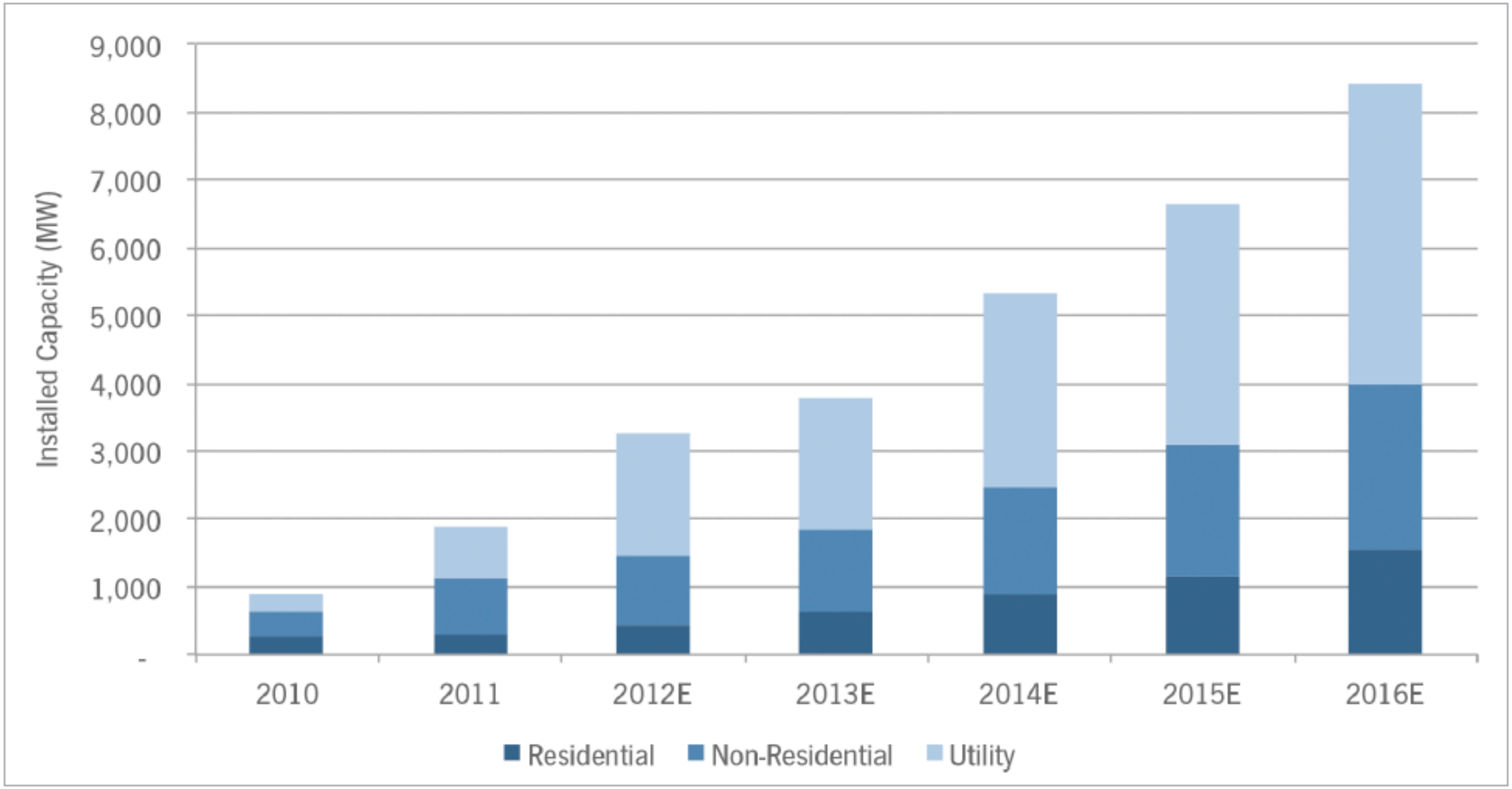
Predicting the Future



Sources: Solar Energy Industries Association. 2012. US Solar Market Insight.

US PV Installation Forecast

Figure 2-6: U.S. PV Installation Forecast by Market Segment, 2010-2016



Note: Full report contains market forecast through 2016 by state and market segment.

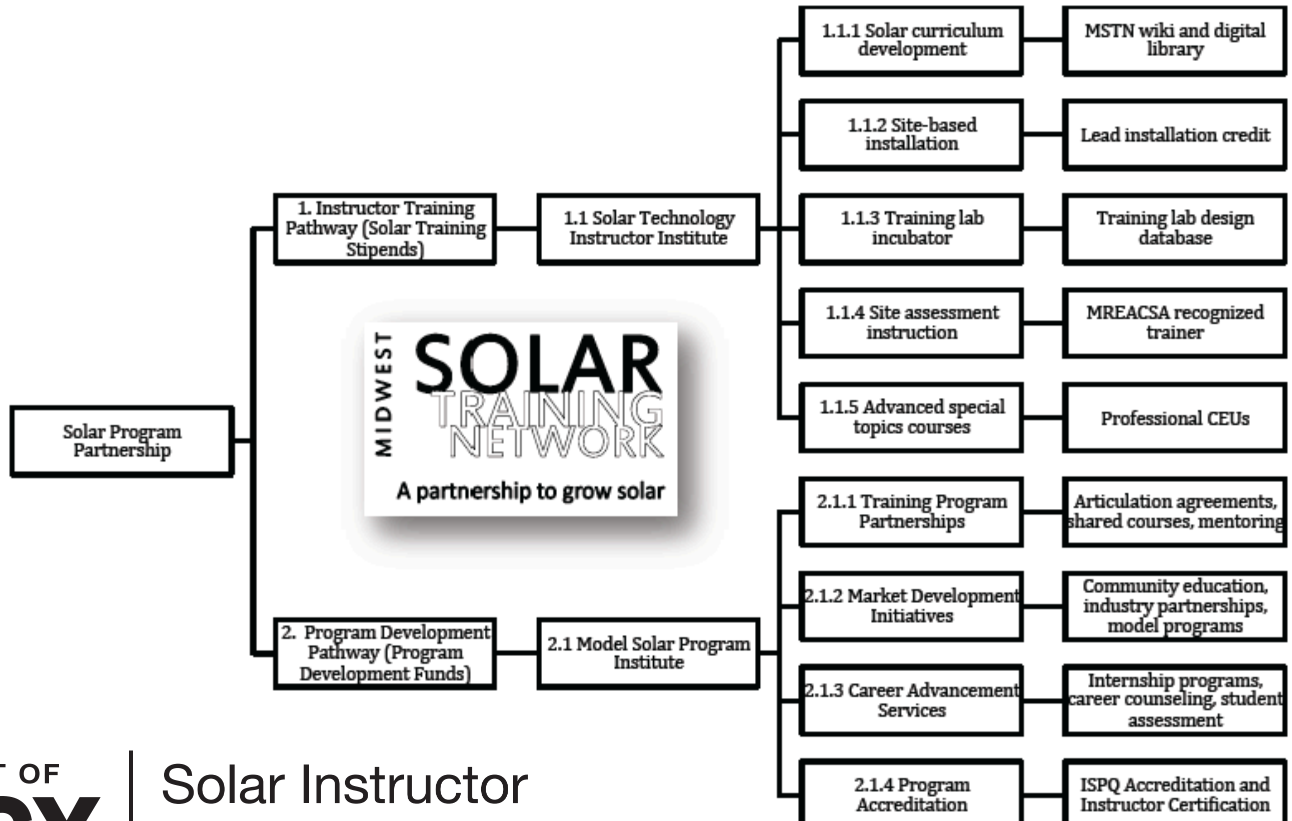
Sources: Solar Energy Industries Association. 2012. US Solar Market Insight: 1st Qtr. 2012

7 Fundamentals of Program Development

1. Build **leadership density** at your school
2. Be familiar with local, regional, and national **market expectations**
3. Define **career pathways** for graduates
4. Prioritize the **integration** of training with relevant, established curriculum
5. Seek **accreditation** and "market-valued" certificates/certifications
6. Build partnerships that lead to **work experience**
7. Share successes to grow **community support**

MREA Approach

Phase 1: Instructor Development Program



U.S. DEPARTMENT OF ENERGY | Solar Instructor Training Network

Midwest Region

MREA Approach

Phase 2: Training Partnerships

mrea
midwest renewable energy association
PV Site Assessor
CERTIFICATE

mrea
midwest renewable energy association
Solar Thermal Site Assessor
CERTIFICATE

MIDWEST SOLAR TRAINING NETWORK
MSTN Recognized
TRAINING PROVIDER

ANSI
IREC
Interstate Renewable Energy Council
ACCREDITED PROGRAM
American National Standards Institute
and Interstate Renewable Energy Council

MREA Approach

Phase 3: Market Development

Power Pack and the Solar Supply Chain

- Provider Network
- Manufacturer Network
- Financing Network
- Community Network
- Training Network

MREA Overview

- 22 years
- RE Education and Demonstration
- Accredited Training Programs
- Midwest Solar Training Network
- Site Assessment Certificate
- Grow Solar Wisconsin
- Energy Fair (3rd Weekend in June)
- Solar Thermal Conference (Dec 6-7)
- Offices in Custer and Milwaukee

mrea
midwest renewable energy association

Source: www.midwestrenew.org, www.midwestsolartraining.org www.growsolar.org

Nick Hylla
Executive Director, MREA
715-592-6595, nickh@midwestrenew.org