



Solar Works in Texas

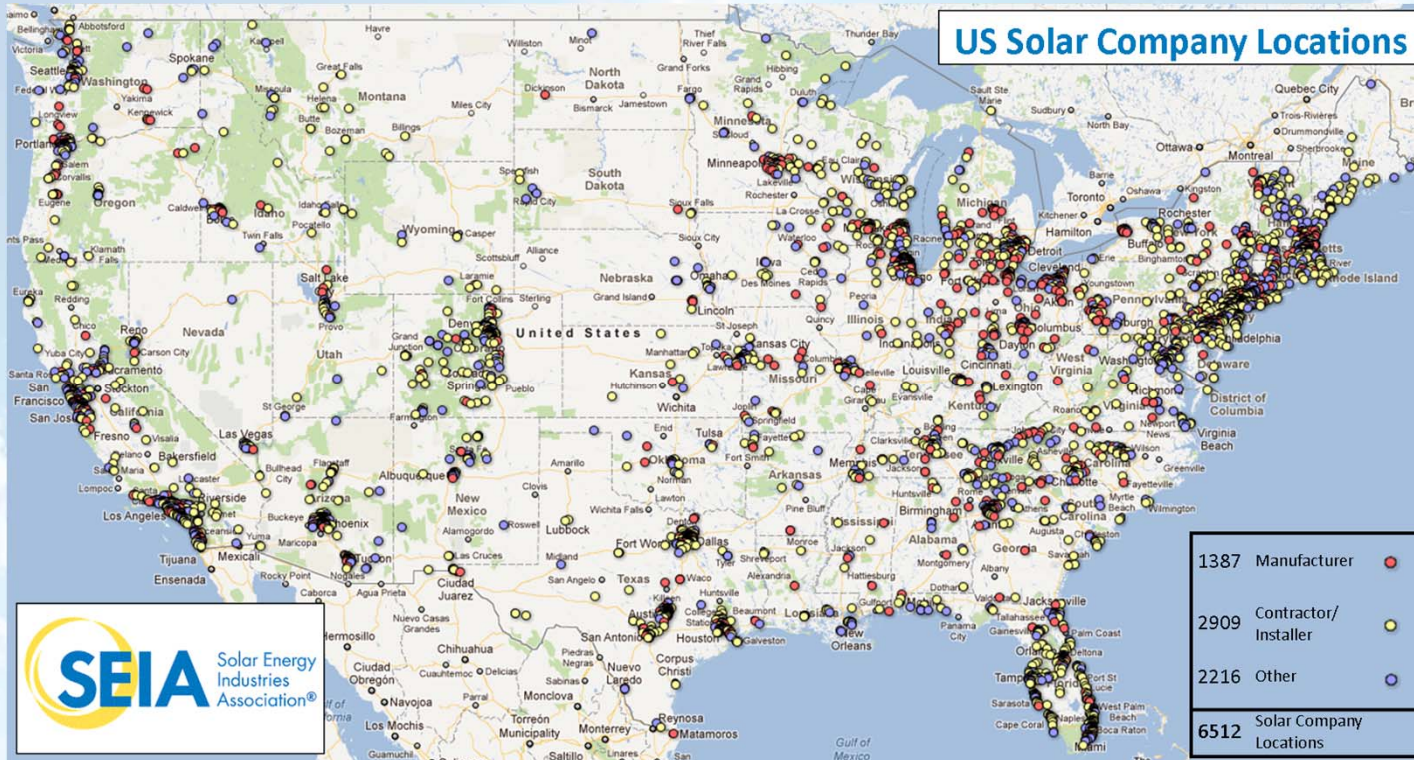
Emily J. Duncan
Manager of Government Affairs

Introduction to SEIA

- SEIA is the voice of the U.S. solar energy industry
 - Founded as a trade association in 1974
 - 1,000 member companies throughout solar supply chain
 - Represent largest solar companies in the world
 - Active at the federal, state and local level
- Mission: **Build a strong solar industry to power America**

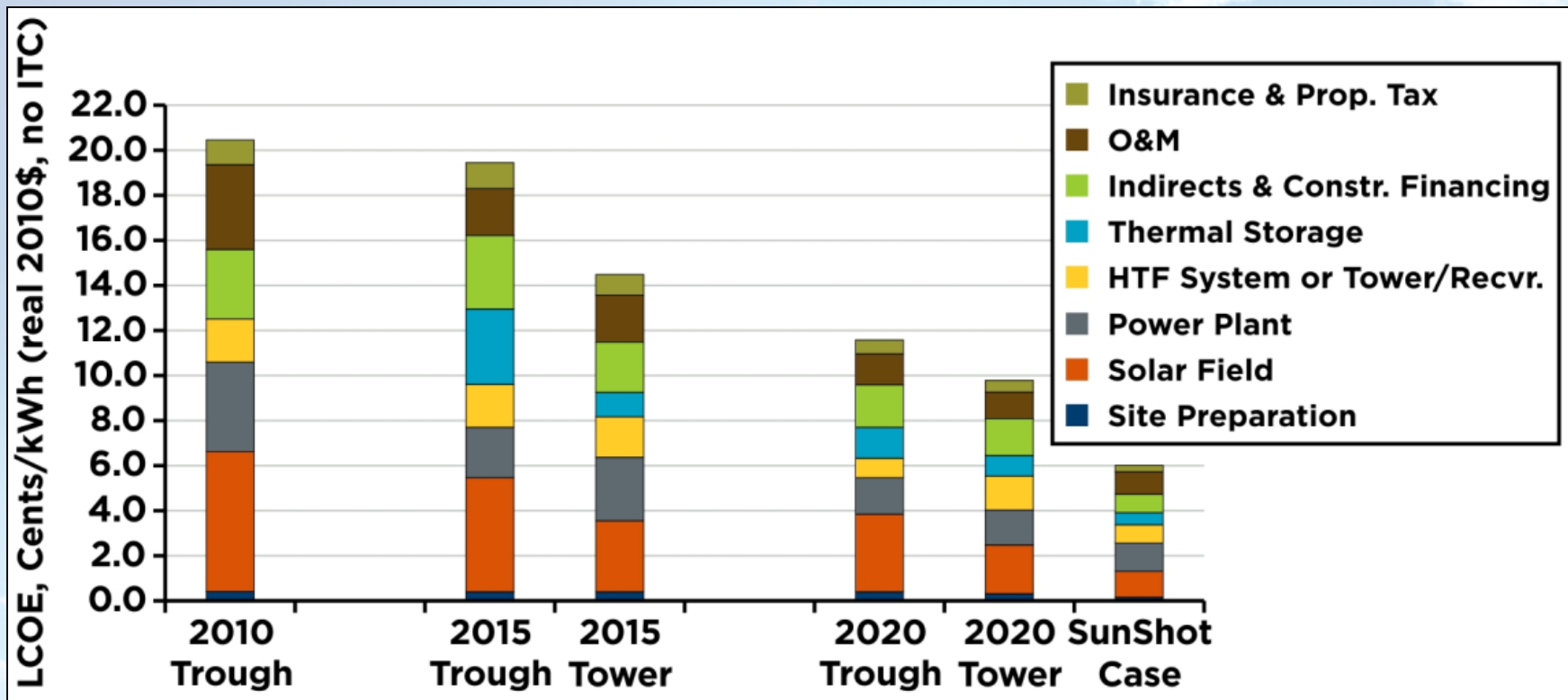
Solar Is in all 50 States

- **100,000** Americans employed in the solar industry
- 5,600 companies in all 50 states
- 4,623 MW of utility-scale solar under construction



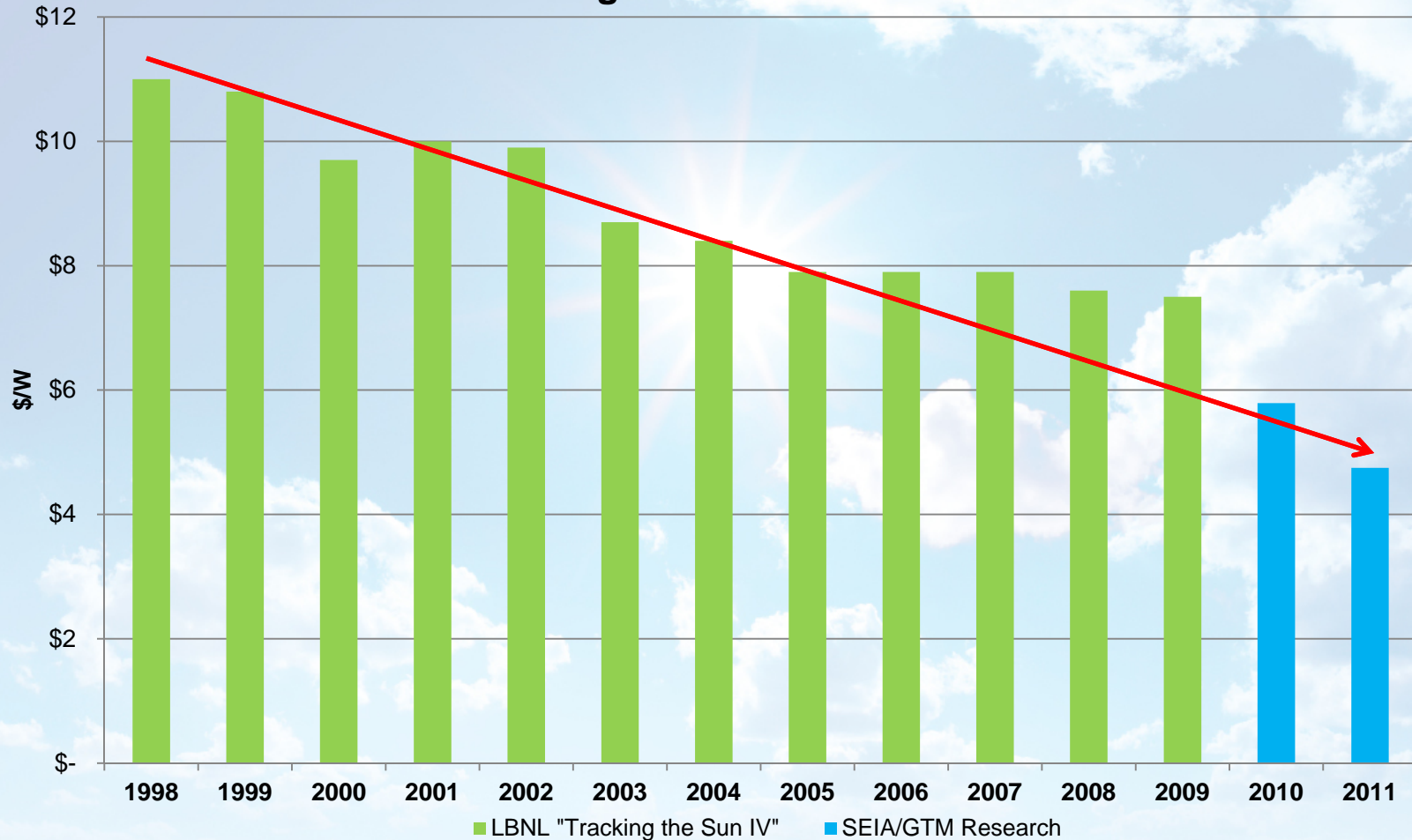
CSP Plant Prices Coming Down

- CSP generated electricity could decrease from 5%–30% in the near term to 45%–55% in the long term



PV System Prices Falling Dramatically

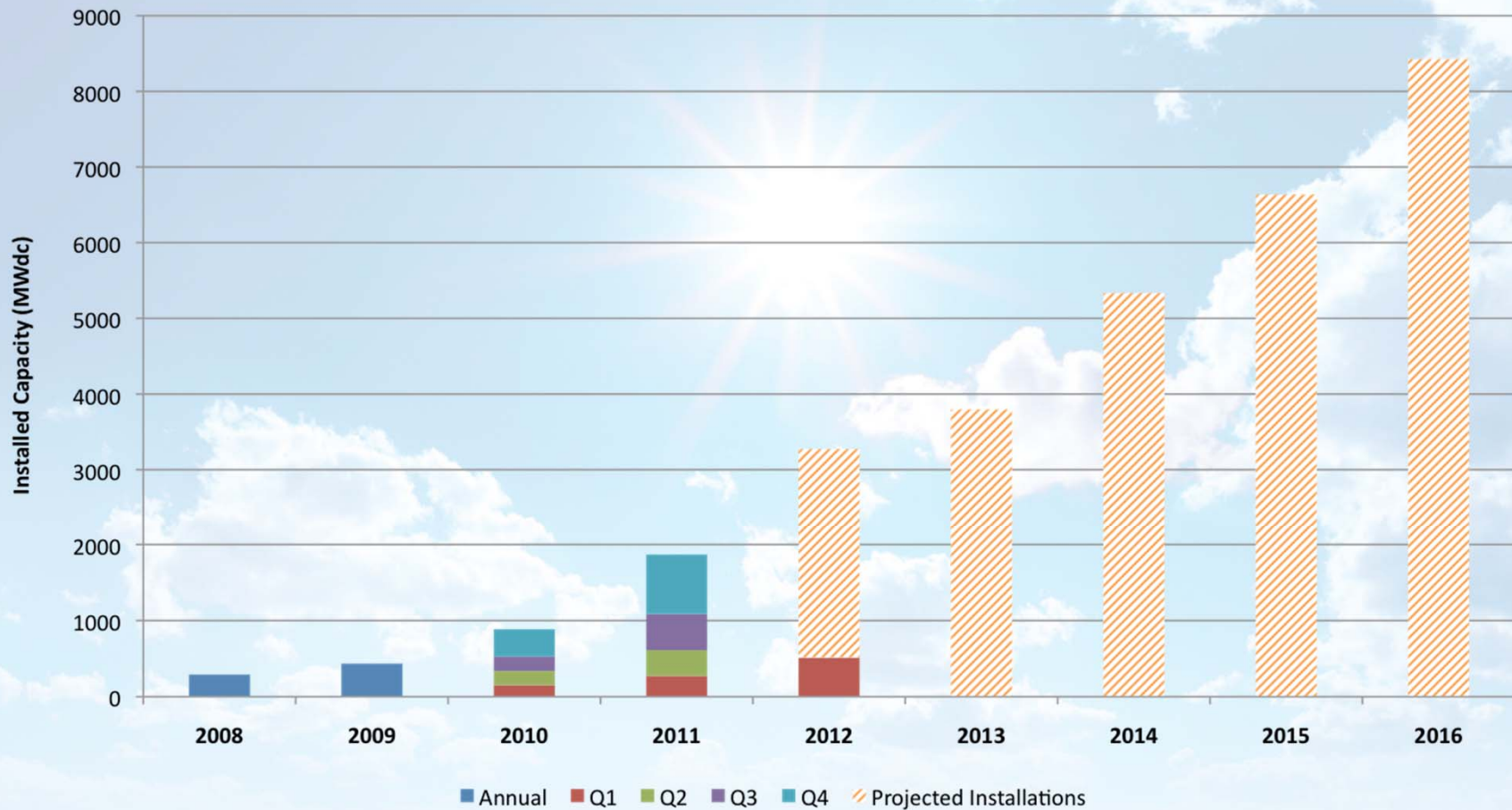
Average Installed Price of PV



Source: SEIA/GTM Research Solar Market Insight, "2011 Year In Review"

U.S. PV Demand Forecast to Grow 75% in 2012 to Nearly 3.3 GW

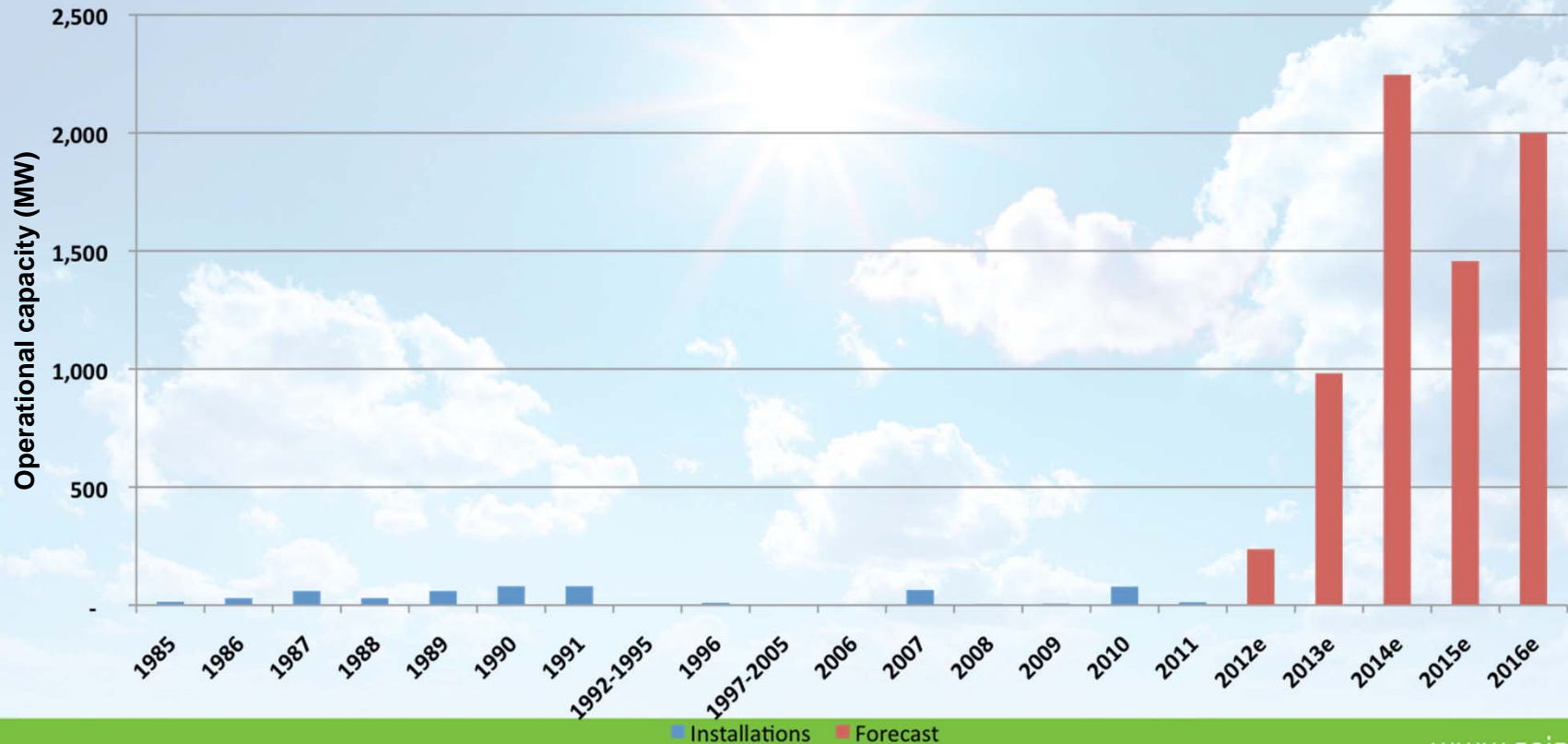
U.S. PV Installation Forecast



U.S. to Lead in CSP

- California, Arizona and Nevada are leading states, but Texas has great potential (22,786 TWh)
- The current CSP pipeline contains some 5,700 MW of projects with signed PPAs, none of which are in Texas

CSP & CPV Forecast

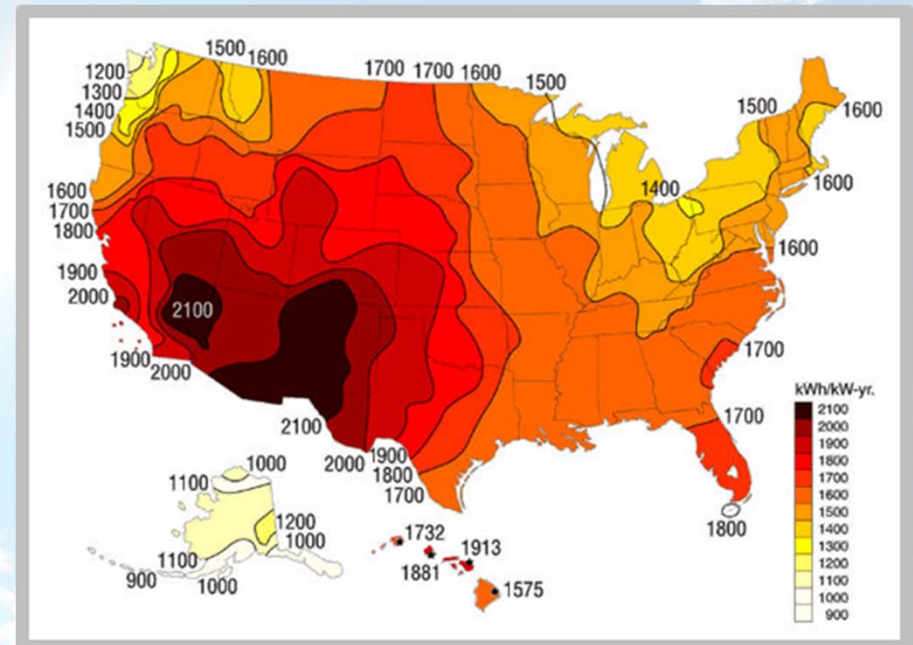


Solar Is Increasing in Texas...

- **Since the end of 2009, cumulative installed solar PV capacity in Texas has increased from 8 MW to over 76 MW. This is enough to power nearly 7,500 homes. This growth rate is the 6th fastest in the country over that time period.**
- **With 76 MW of solar energy, Texas is ranked 13th nationally.**
- **In 2011, 1,044 solar photovoltaic systems were installed in Texas, representing 44 megawatts of solar capacity. The state ranked 9th nationally in 2011 installed solar capacity.**
- **Solar is a job creator and can be an economic driver in Texas**
- **There are 255 solar companies operating in TX, including 21 manufacturing facilities.**

...But it can Expand even Further and Faster

- Texas has the highest potential for solar in the nation
- Texas accounts for roughly 14% (38,993 TWh) of the entire estimated U.S. technical potential for utility-scale PV and 20%(22,786 TWh) for utility-scale concentrating solar power



SEIA Brattle Group Study

- SEIA and the Energy Foundation asked *The Brattle Group* to evaluate the potential effects of adding PV generation in the Texas wholesale energy market
- Analysis focused on what would have happened in summer 2011 if there had been an additional 1-5 GW of solar PV capacity in ERCOT
- Also quantified the benefits associated with solar PV-related avoided generation from fossil-fuel plants, and reductions in CO₂ emissions

Solar is a Proven, Reliable Technology

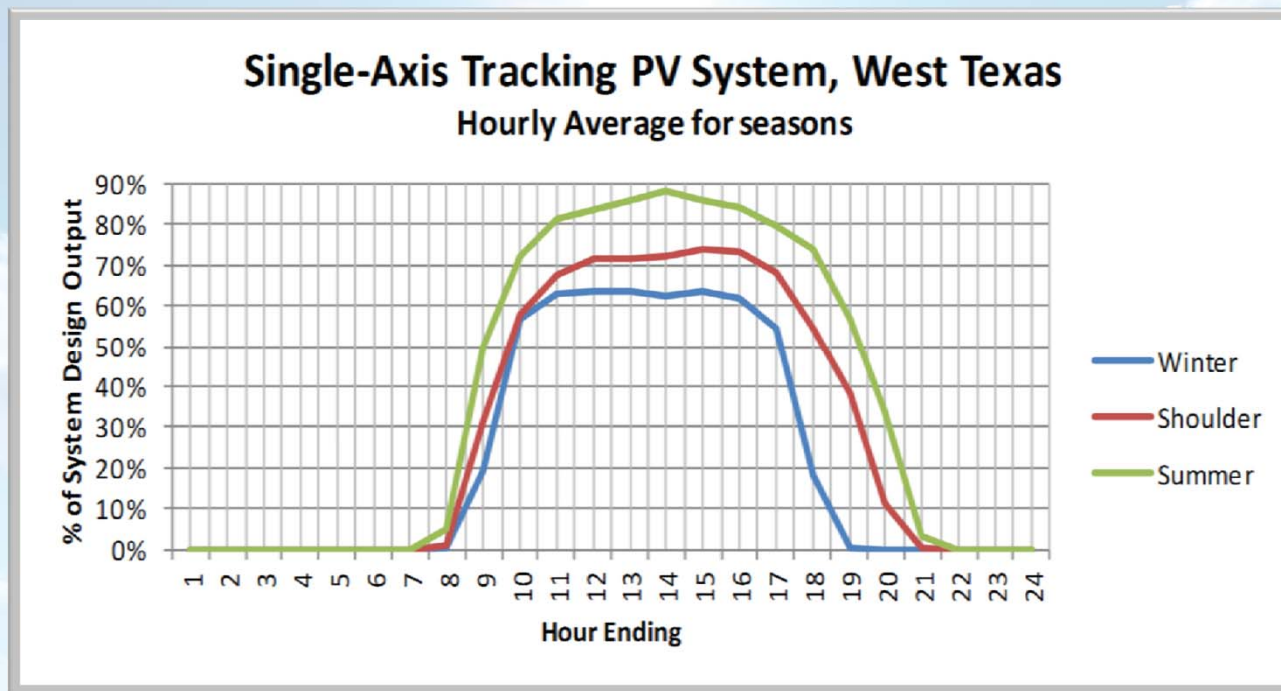
- **Solar variability is no different from load or wind variability**
 - Individual systems can have some production output variability, however aggregation of variability (load, solar, wind) across larger areas reduces integration costs considerably. At the distribution level, no issues due to variability have been found on high-penetration feeders to date.
- **The scale and timing of changes can be predicted in advance**
 - Development of robust forecasting techniques is in early stages, but can leverage the impressive work accomplished for forecasting wind energy.

Solar Helps Meet Resource Adequacy Needs

- **Coincides with peak demand**
- **Uses little to no water**
- **Highly scalable and quick to market**
- **Can be located in geographically targeted manner**
- **Can serve as a hedge against future commodity price increases**

Solar Energy Coincides with Peak Demand

- Solar meets Texas's peak demand (4-6 pm)
- This reduces the need to run older, expensive peaking units, reduces the risk of emergency events during high demand periods and reduces the need to drop industrial load.

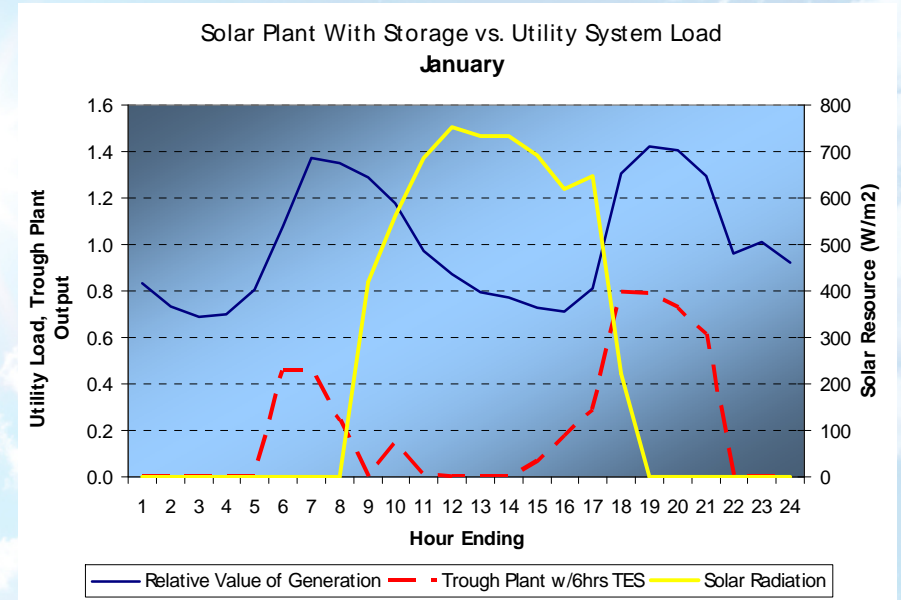
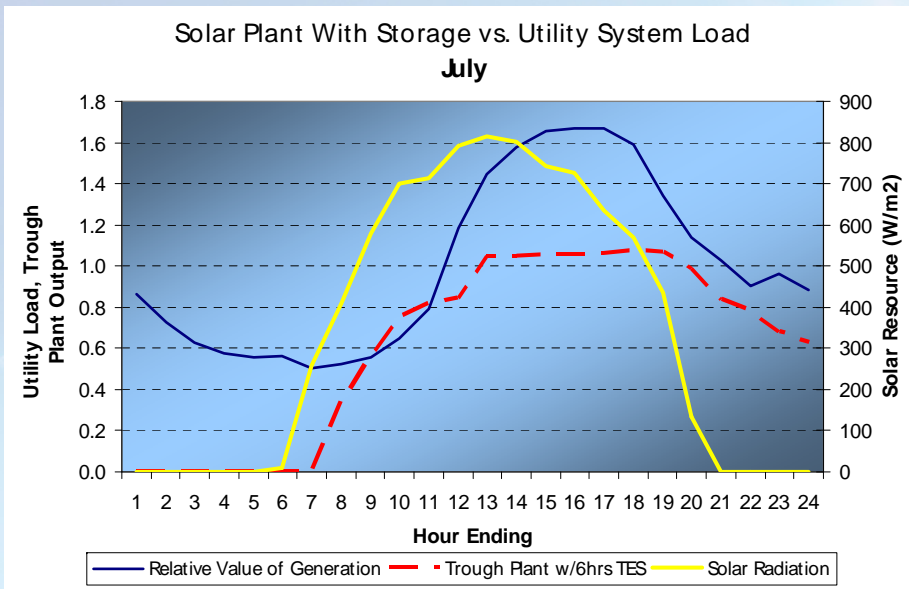


Solar Energy Coincides with Peak Demand

Generation from a CSP plant with thermal energy storage can be shifted to match the utility system load profile

Summer

Winter



- Key:
- Solar
 - Demand
 - Generation

Source: Arizona Public Service

Solar Energy Uses Little to no Water

- Drought, growing population, and competing needs for water have stressed Texas's water system
- Adding solar capacity wouldn't further strain the system
- In general, all solar power technologies use little to no water. In fact, many solar plants use no water to generate power, and for some plants water use is limited to semi-annual panel cleaning.
- Today's concentrating solar power technologies are using dry-cooling methods as the technology has become more cost-effective.

Solar Energy Is Highly Scalable and Quick to Market

- **Solar energy has a quick construction timeline:**
 - Utility-scale PV = 1 – 1.5 years
 - Utility-scale CSP = 1.5 – 2 years
 - The average construction time for a smaller installation on a home or business is approximately two months.
- **Solar is scalable and can be effectively deployed at a residential, commercial and utility scale, which allows solar to provide ancillary services at both transmission and distribution service levels.**
- **Solar can offer both retail and wholesale generation**

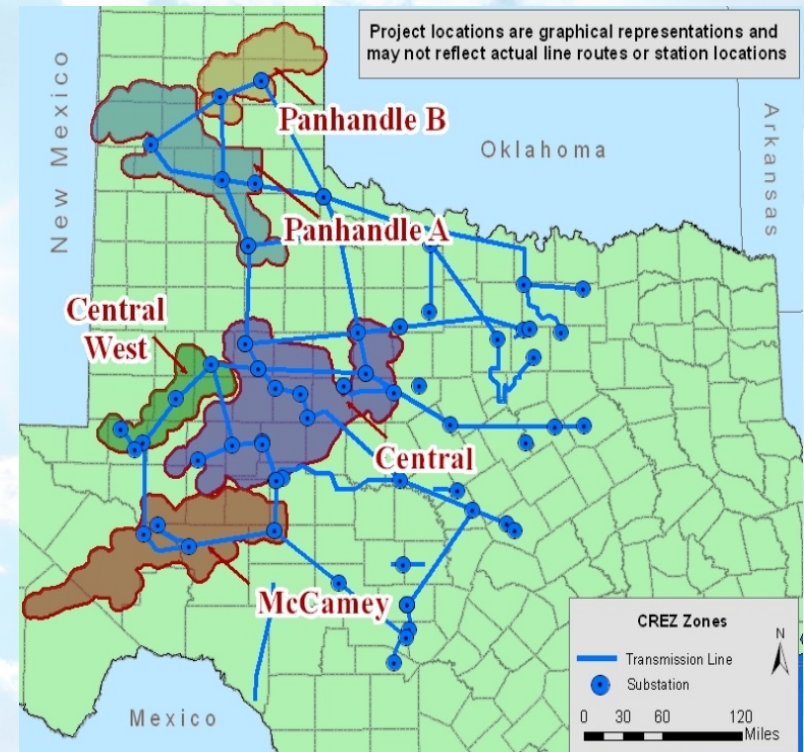
Solar Can Be Located in a Geographically Targeted Manner

- **Solar can be deployed in load constrained areas quickly (with little environmental or visual impact)**
 - Urban rooftops
 - Rural areas
- **Distributed solar plants are often sited near load, which results in reduced distribution and transmission line losses that can occur when moving power from central-station plants to load**

Texas Competitive Renewable Energy Zones

“Competitive Renewable Energy Zones”

- CREZ lines are now under construction
- Should support about 18 GW of renewable generation capacity
- Solar capacity nicely complements wind resources in the West
- Solar radiance is high in the West



Solar Energy Can Serve as a Hedge Against Rising Fuel Costs

- **Solar energy has minimal operations and maintenance costs, and no fuel costs, which eliminates the risks inherent in commodity prices.**
- **Long-term contracts mitigate risk and increase financial security**

Suggested Solutions

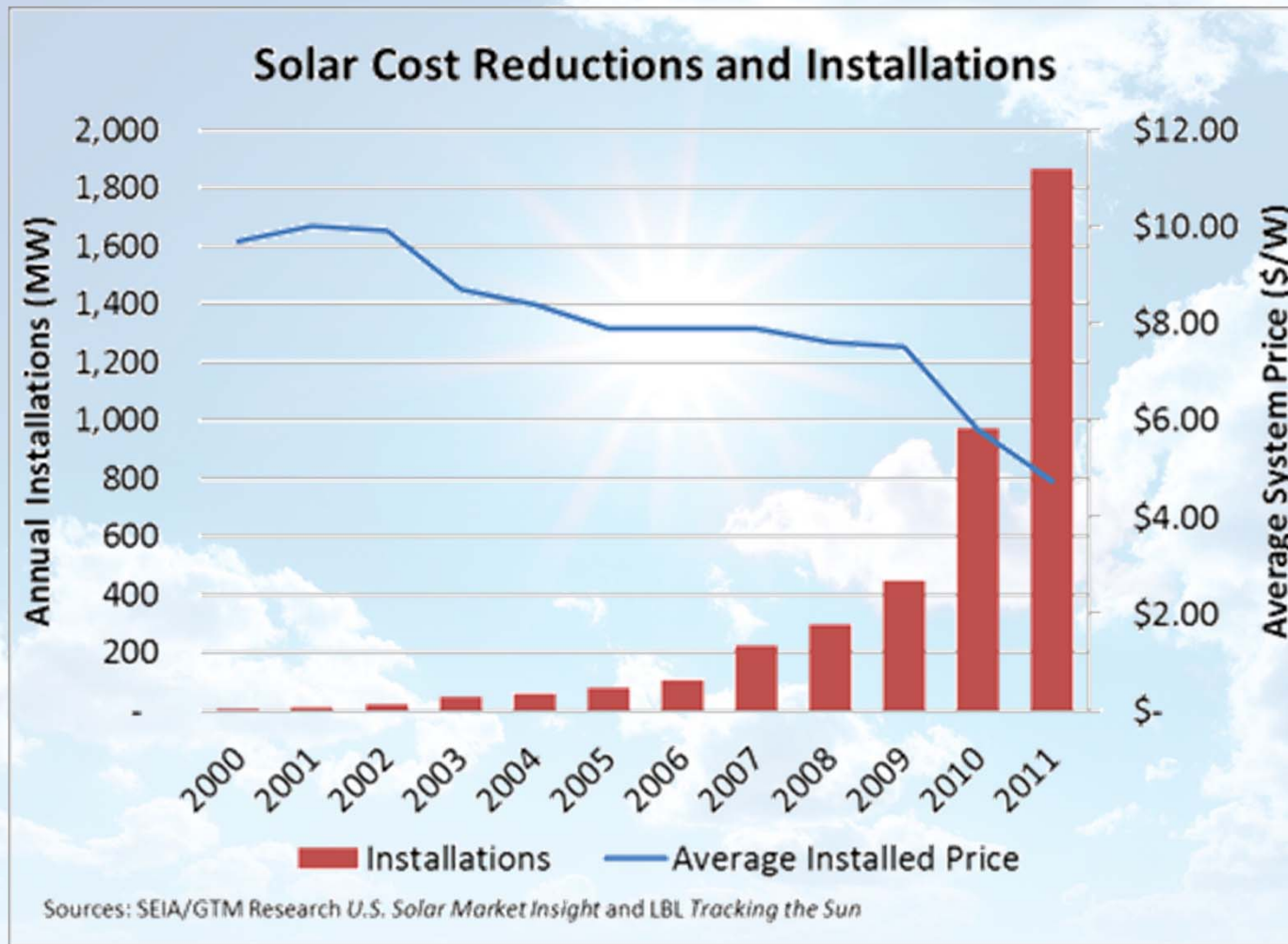
- Increase solar capacity in Texas
- Increase the system-wide offer cap and peaker net margin threshold to catalyze investment in new capacity
- Ensure that new rules do not exclude solar electric generation because of its many benefits
- Develop additional pricing mechanisms to monetize the unique attributes solar generation provides
 - Little to no water use
 - Coincides with peak demand



APPENDIX OF SLIDES

Cost Reductions Driving Growth

- PV demand grew 85% in Q1 2012 over Q1 2011



Source: SEIA/GTM Research "U.S. Solar Market Insight: Q1 2012"