SunShot
U.S. Department of Energy

SunShot Initiative:
Lower cost via proven PV module reliability

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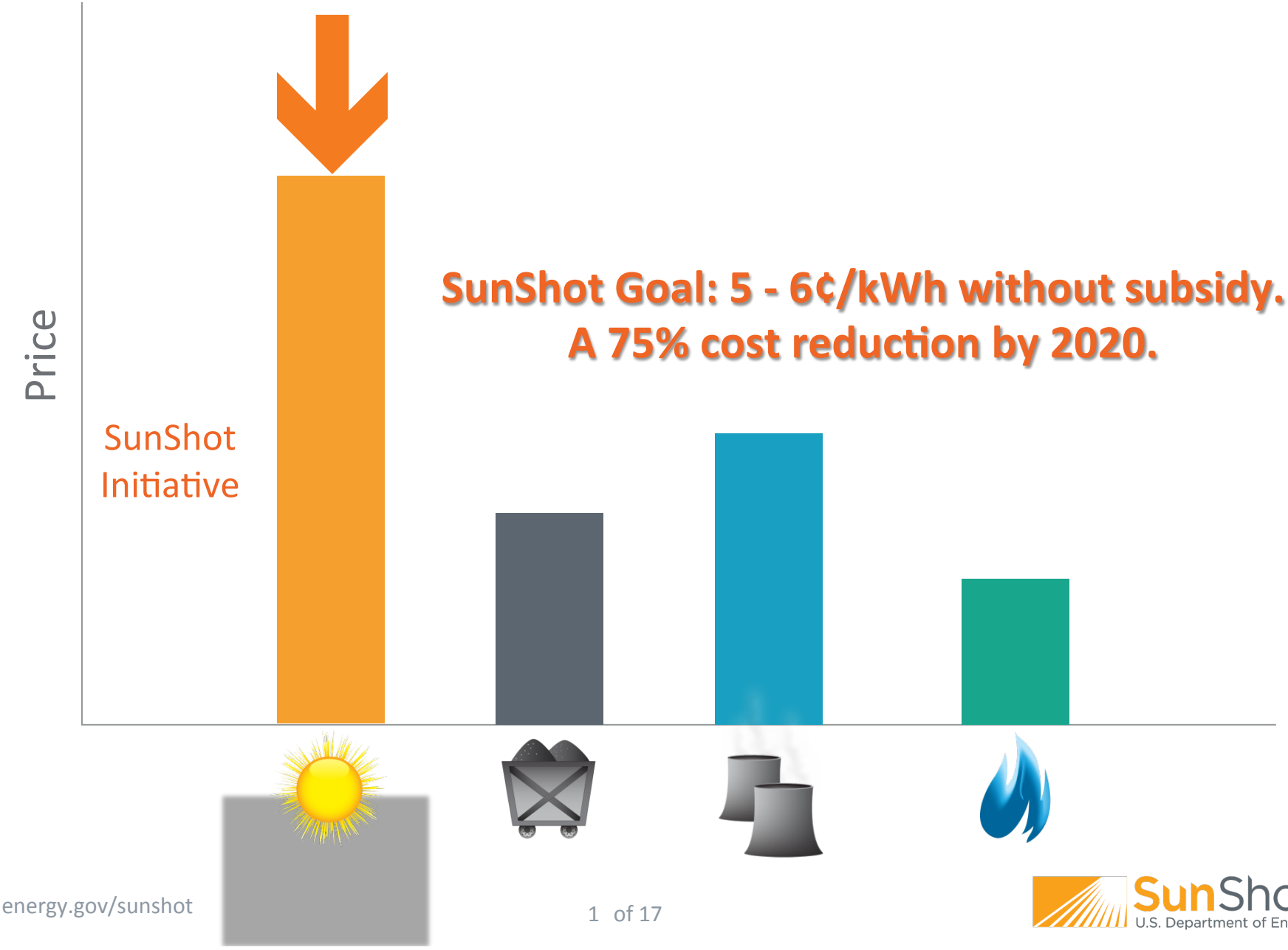
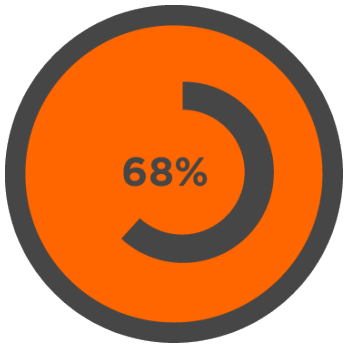


SunShot Goal: 5 - 6¢/kWh without subsidy.
A 75% cost reduction by 2020.

SunShot Initiative – Solar Grid Parity by 2020

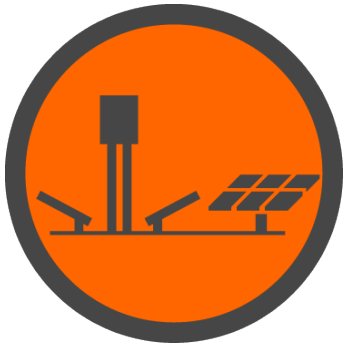


68% progress towards 2020 goals

SunShot Initiative – Solar Grid Parity by 2020

2010 2014 2020

MAJOR PROGRESS PRIORITY AREAS

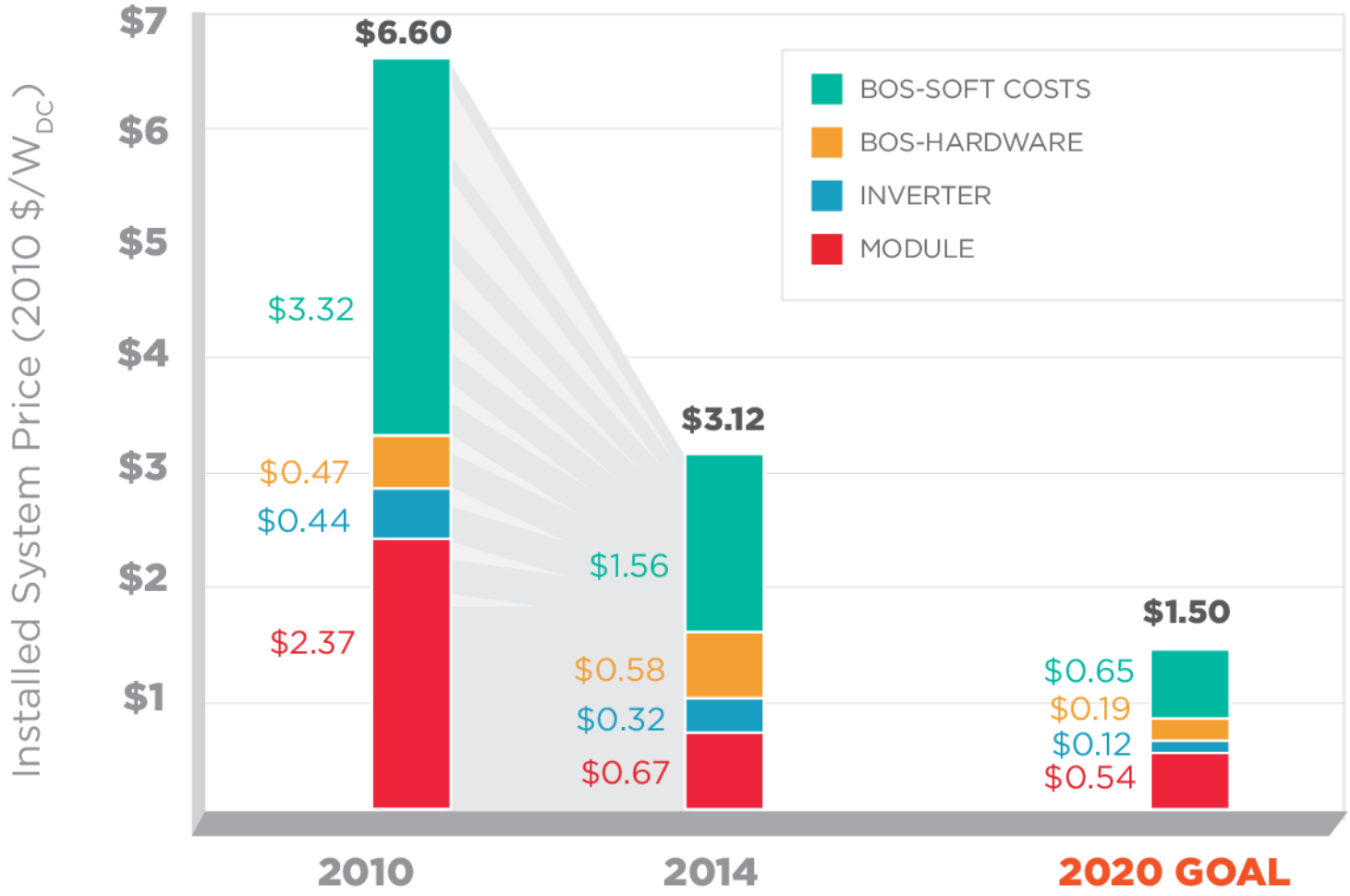


16GW of solar

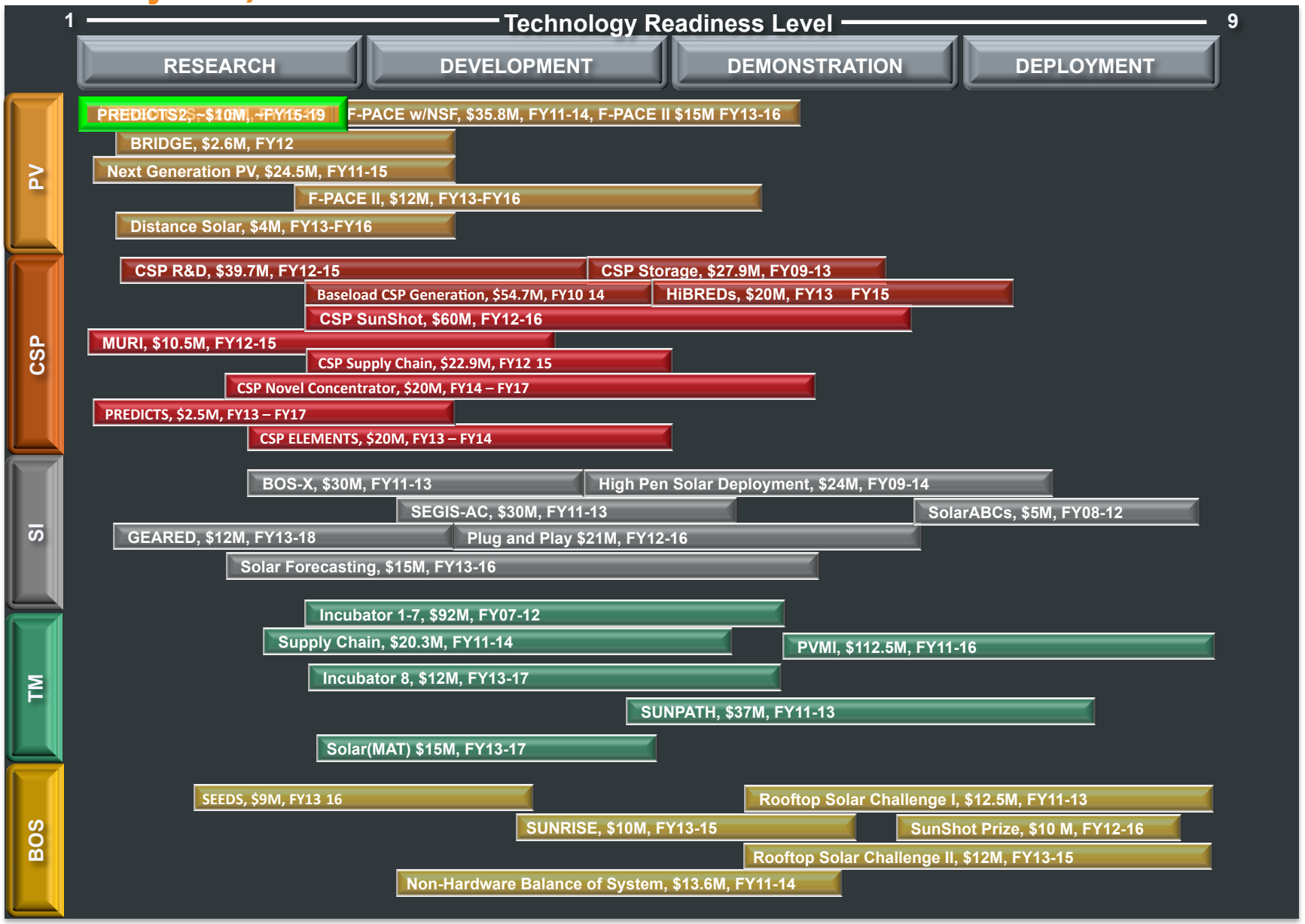
4.75GW of PV in 2013

13x growth rate from 2009

PV Residential-Scale System Pathway to SunShot

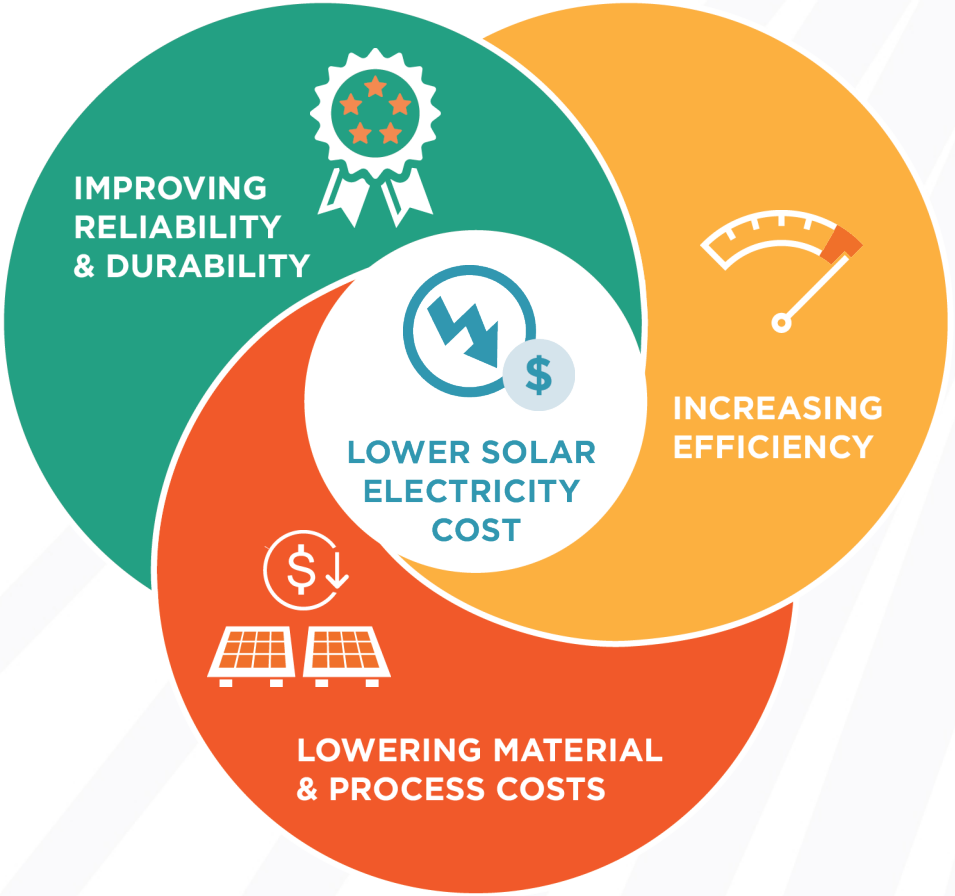


SETO Projects, FY08-16



Photovoltaics R&D

Dr. Rebecca Jones-Albertus, Program Manager



Reliability/durability/lifetime

Reliability/durability/lifetime at the National Labs

Increasing Prediction Accuracy and Confidence in PV System Performance

Characterizing Emerging Photovoltaic Technologies

PV Reliability: Prognostics and Health Management

Regional Test Centers

Quantifying Risk Through Bankability Reports/Standards

Emerging Technology Characterization

IEC PV Standards Activities

Advanced Measurement and Analysis of PV De-rate Factors

Predicting Service Life for PV Modules

Solar System Modeling Algorithms and Tools for Characterizing and Reducing Uncertainty

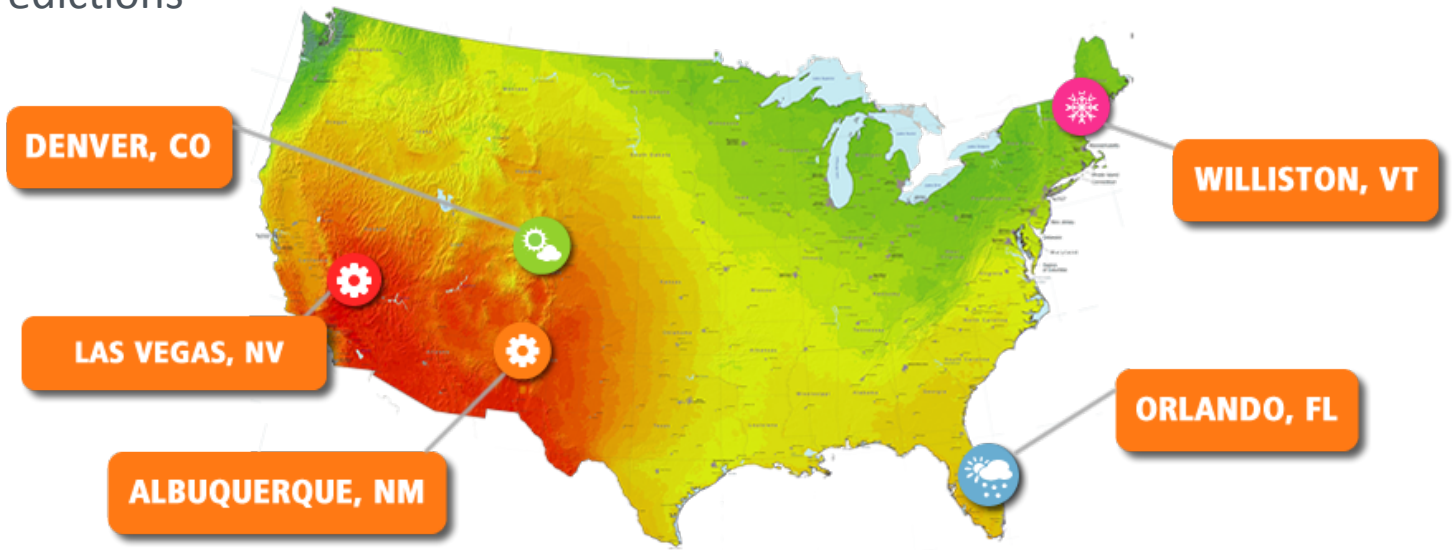
Mitigating Industry-Wide Risks through Data Collection and Assessment

FY 2014: $18.8 million

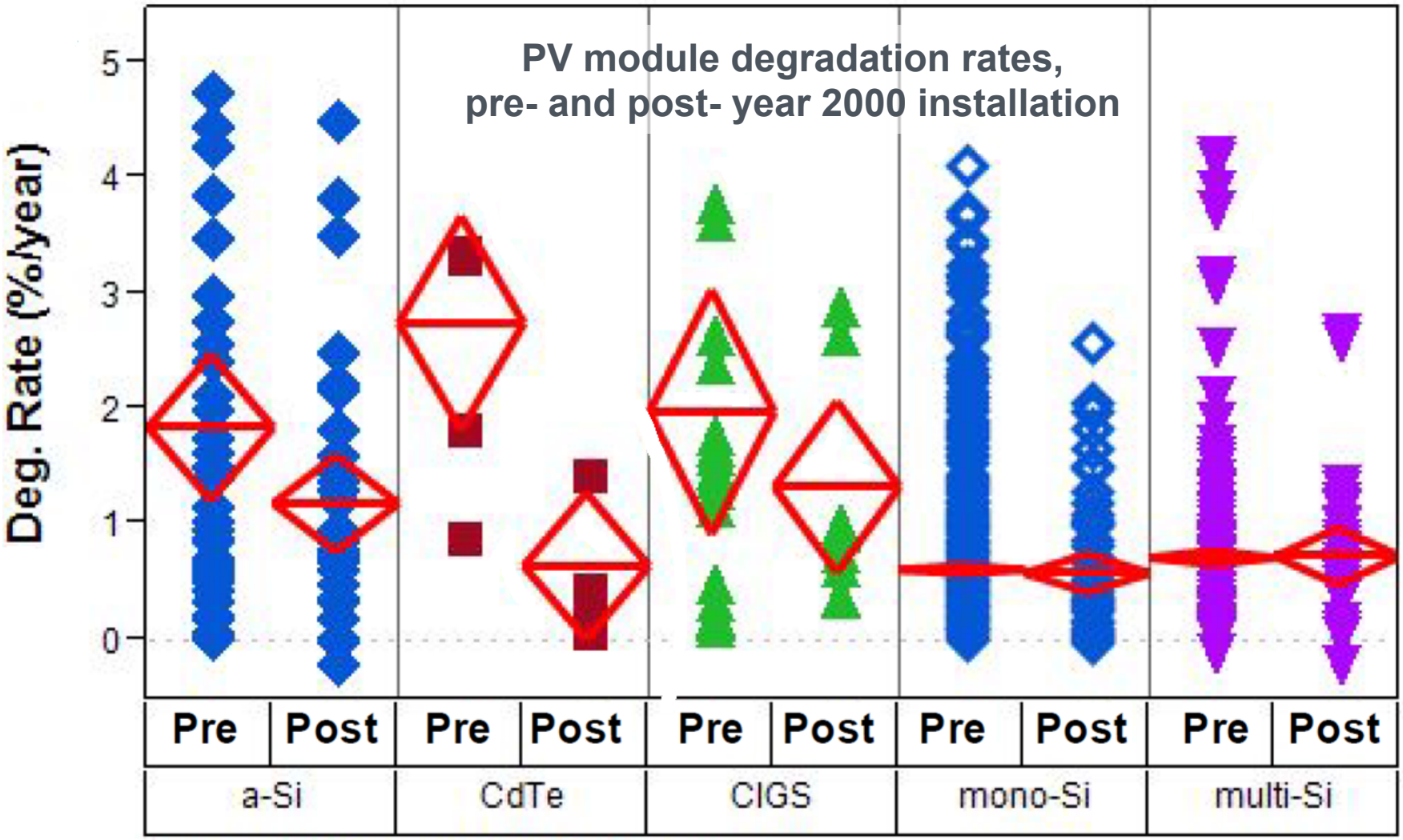
Regional Test Centers

Vision:

- Accelerate adoption of solar energy generation sources by helping U.S. PV manufacturers overcome the challenges on the path to commercialization
- Provide technical basis for bankability of PV systems
  - Installation size:
    - Module-level testing: 10-50kW per site
    - System-level testing: 50–300 kW per site
  - Validate in multiple climates, to compare performance and initial reliability against predictions

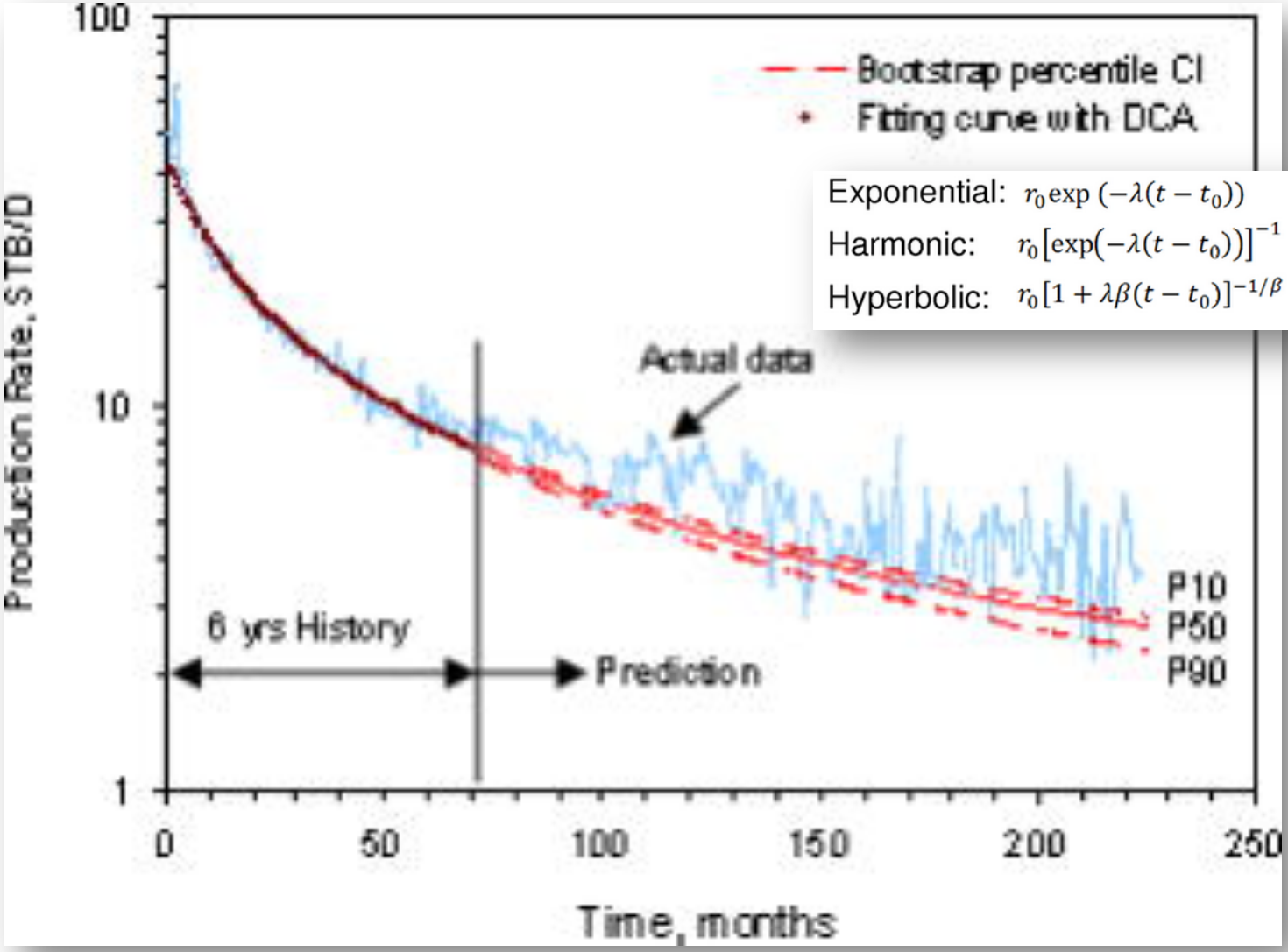


The challenge: degradation rates



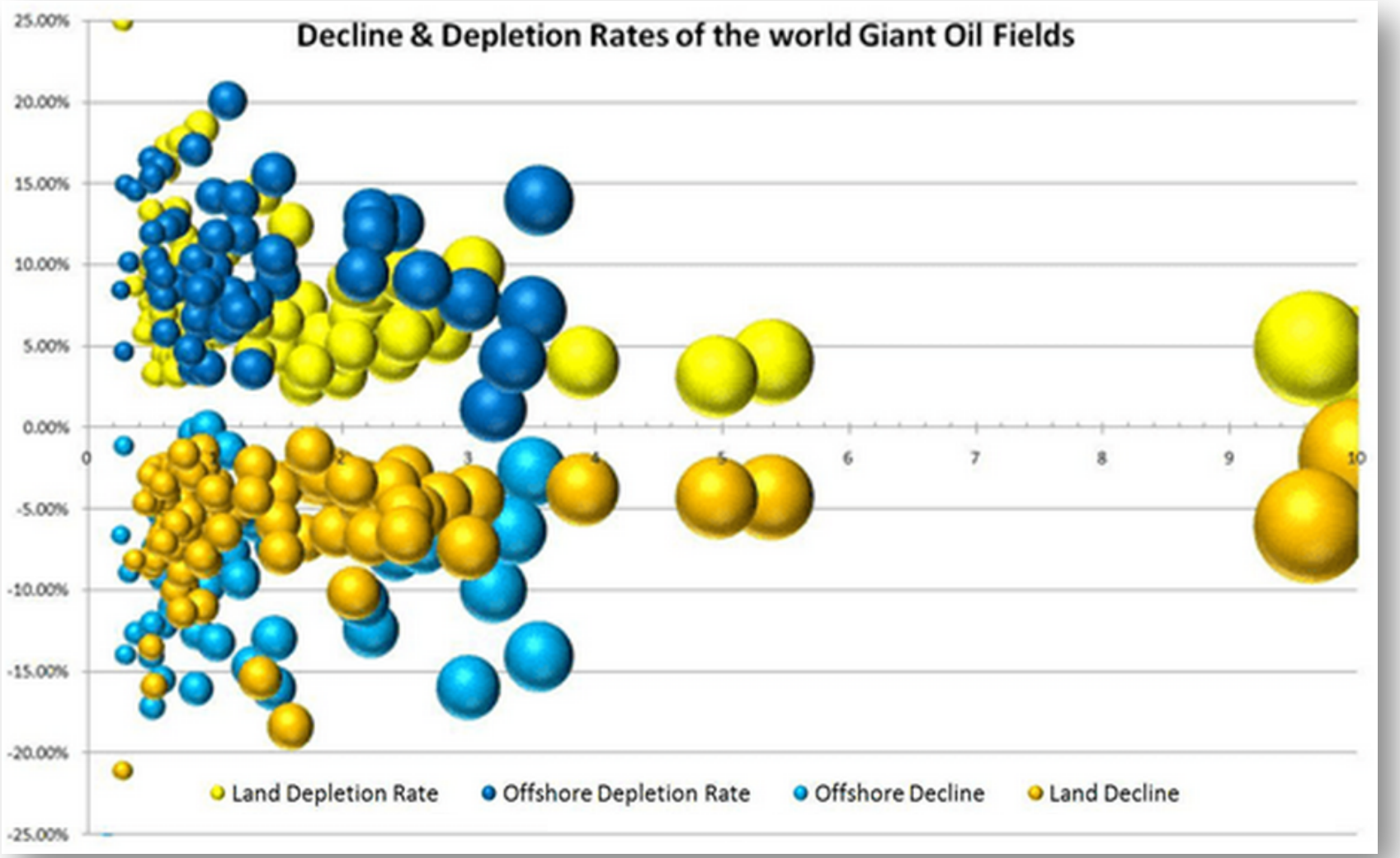
source: Jordan, D. C. and Kurtz, S. R. (2013), Photovoltaic Degradation Rates—an Analytical Review. Prog. Photovolt: Res. Appl., 21: 12–29. doi: 10.1002/pip.1182

Decline curve analysis: oil and gas wells



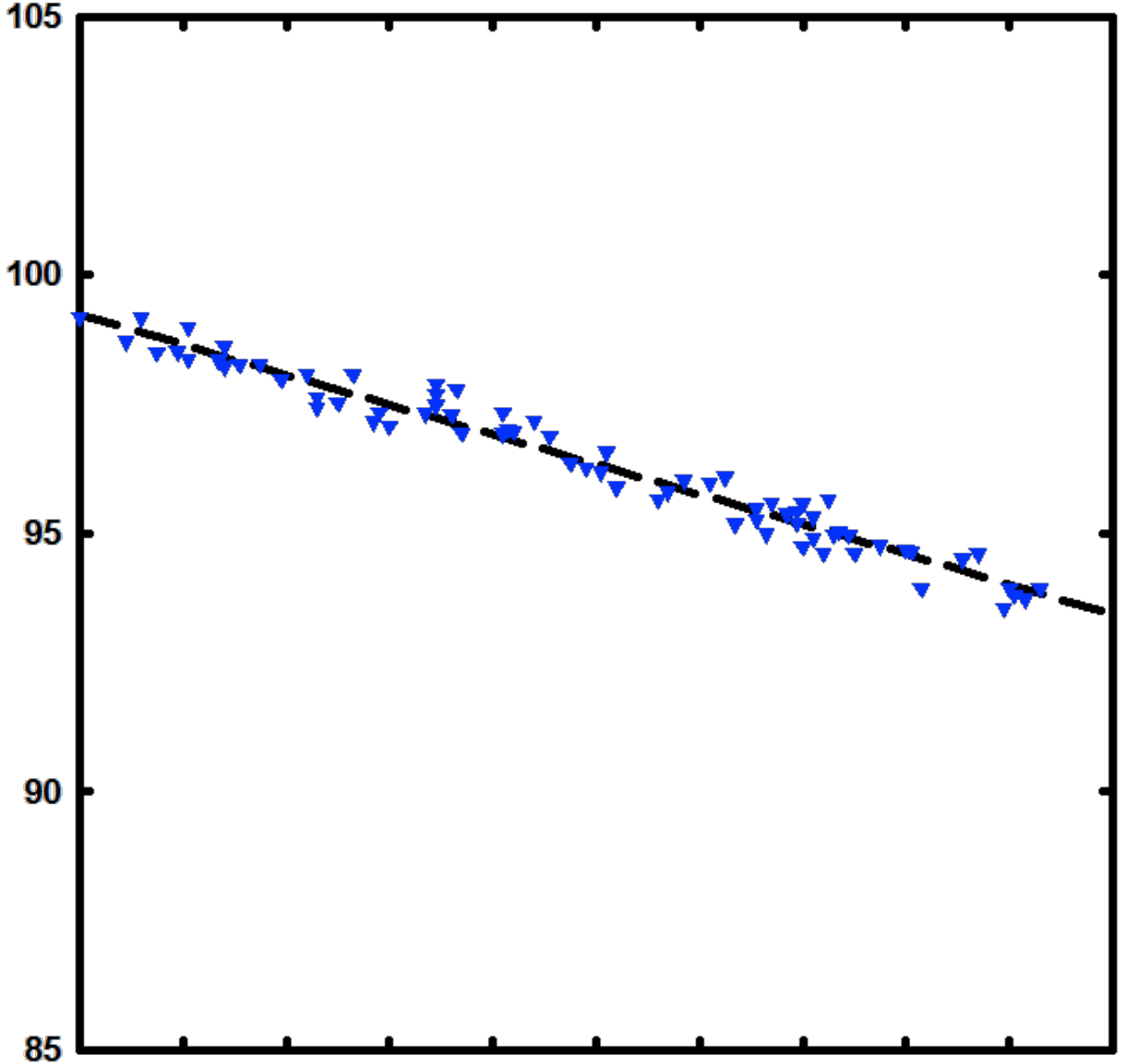
Source: Cheng Yueming, Lee W. John, McVay Duane A. Quantification of Uncertainty in Reserve Estimation From Decline Curve Analysis of Production Data for Unconventional Reservoirs J. Energy Resour. Technol. 130(4), 043201 (2008) (6 pages); doi:10.1115/1.3000096

Oil and gas industry falls back on linearity, too…

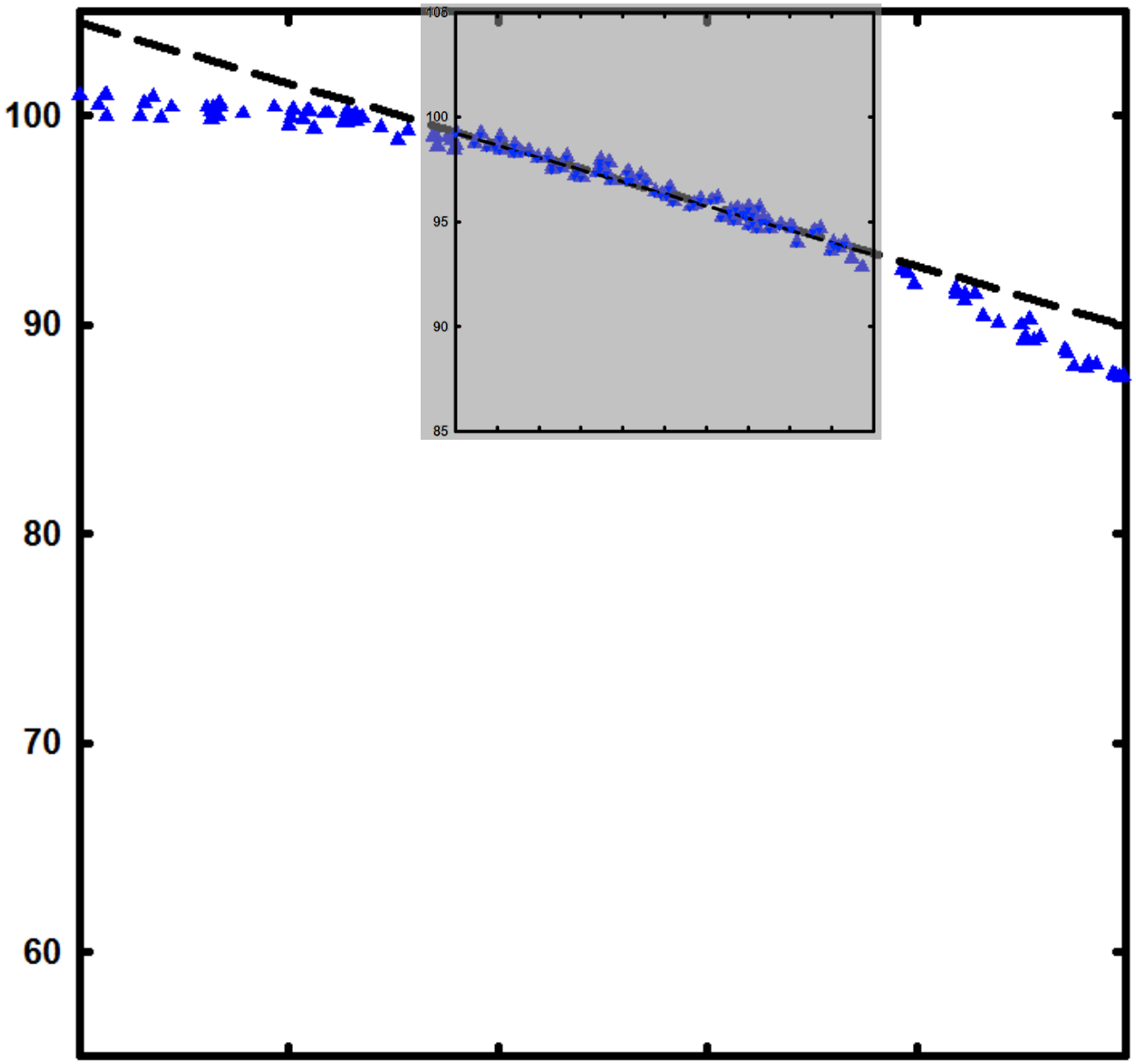


Source: M. Hook, Depletion and Decline Curve Analysis in Crude Oil Production, Licentiate Thesis, Uppsala University, 2009.

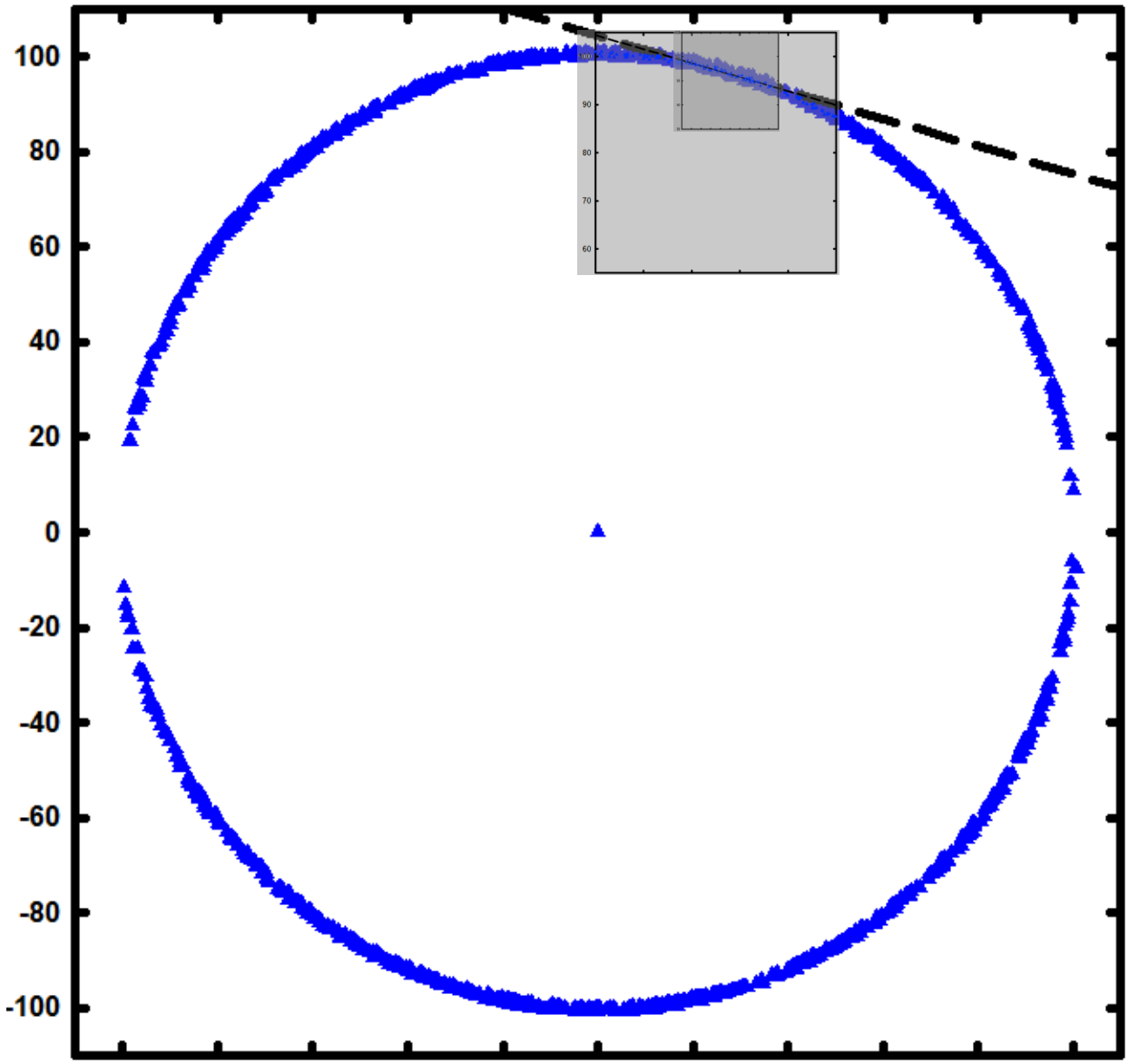
Linear degradation



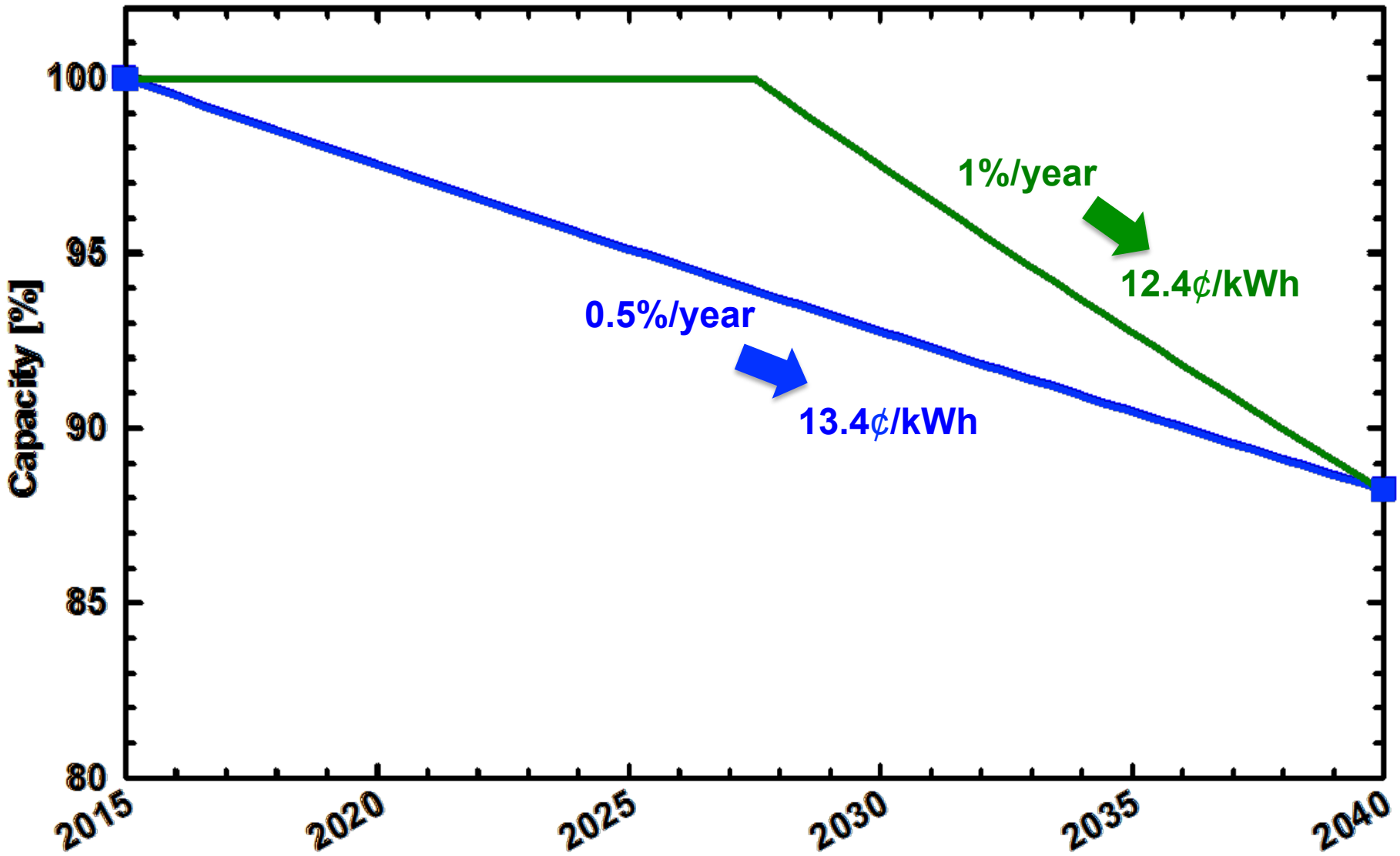
Linear degradation?



Linear degradation?



Impact on LCOE



Join our team!

Take on the SunShot challenge to make solar energy cost-competitive with traditional energy sources by 2020.

- Photovoltaics
- CSP
- Systems Integration
- Soft Costs
- Tech to Market

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