Developing Brownfields as Electricity-Producing Solar Farms

Ohio Brownfields Conference
May 23–24, 2012

Jeff Wolfe, Non-Executive Chairman

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Nationwide EPC Services

Full-Line PV Procurement Services

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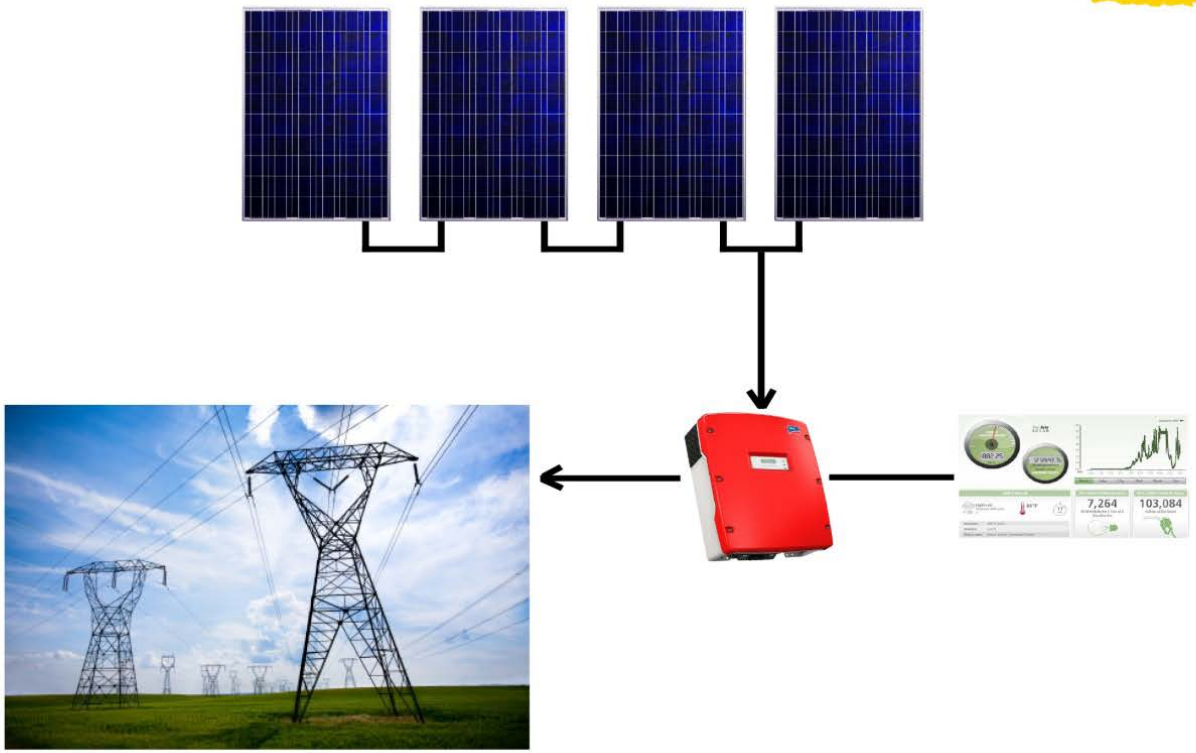
Solar Basics

How Solar Works



Solar Basics

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Solar Basics

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Brownfield Solar – Why?

- Inexpensive Land
- Not Available for Many Other Uses
- May Allow Reduction in Cap Costs
- Often not in Residential Neighborhoods
- IC Point May be Near
- May Have Existing IC Point from Landfill Gas Operation
- Provides Income to Offset Cap Maintenance Expenses

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Brownfield Solar – Why Not?

- Post-Closure Construction on Cap Requires Additional Permitting
- Construction on Cap Adds Costs
- O&M is More Specialized
- IC Point May be Remote
- Field May be Used as a Recreational Area (Legally or Illegally)
- Investor Hesitancy

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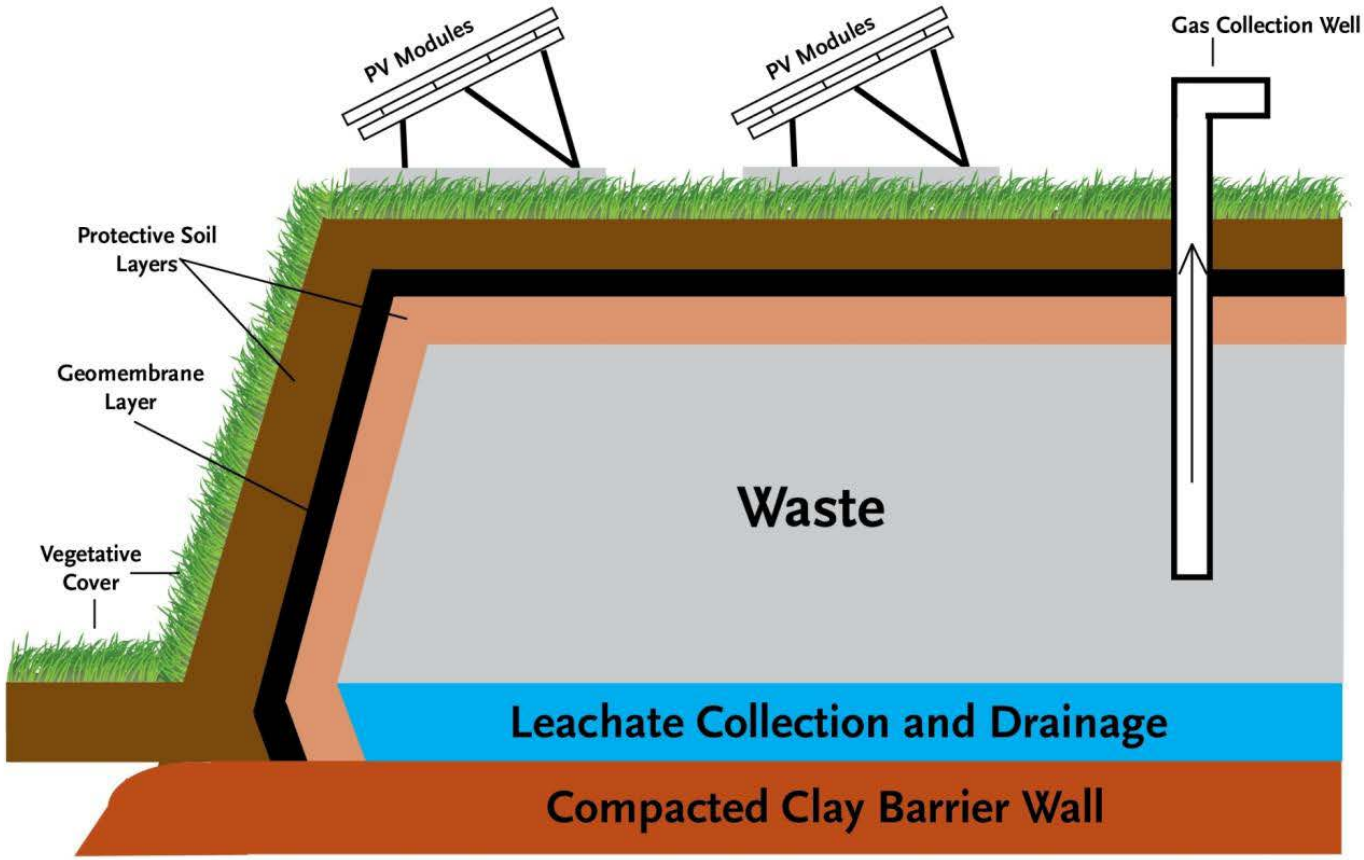
Brownfield Solar Basics

Utilizing Capped Landfills for Solar PV



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Brownfield Solar – Construction

- Existing Conditions
- Slopes
- Orientation vs. Drainage
- Loading
- Vehicles
- Maintenance Access

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Brownfield Solar – EPC Selection

- Brownfield Experience!
  - > Construction Experience
    - – Solar Experience
- Price / Quality / Schedule
- Longevity – Long-Term O&M

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Brownfield Solar – Developer Selection

- Brownfield Experience!
  - > Finance Methods
    - – Solar Experience
- Longevity – Long-Term O&M

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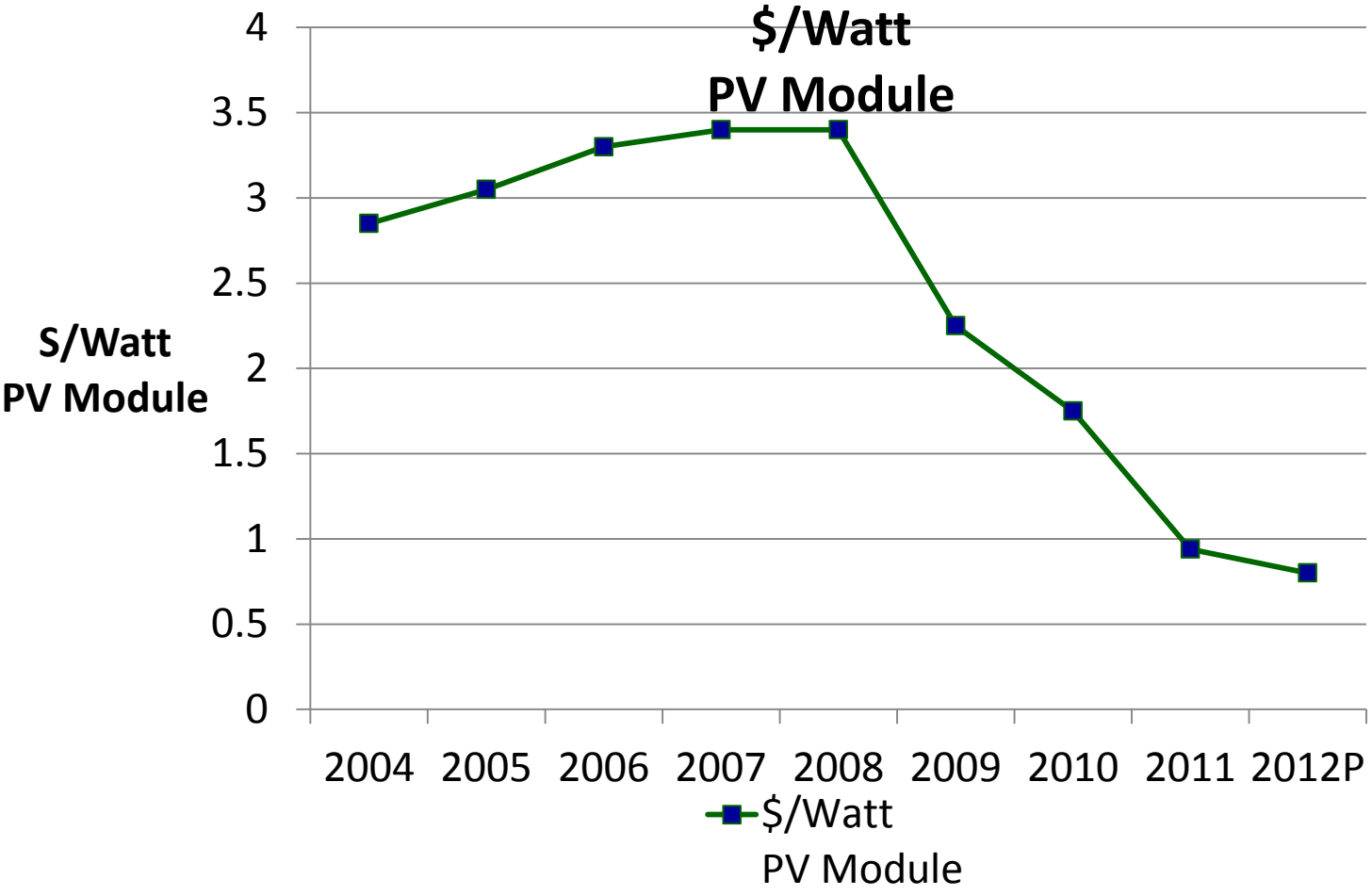
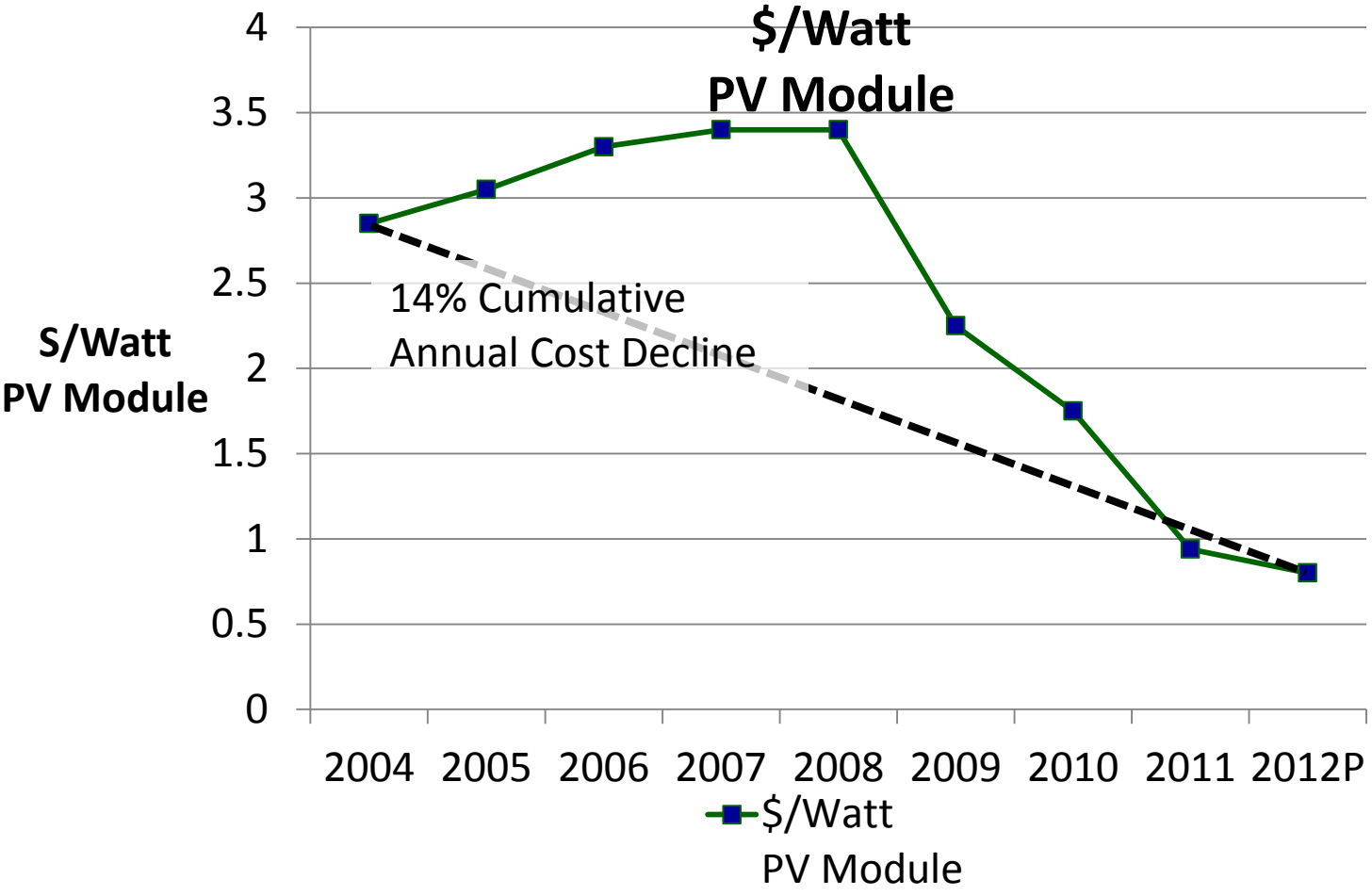
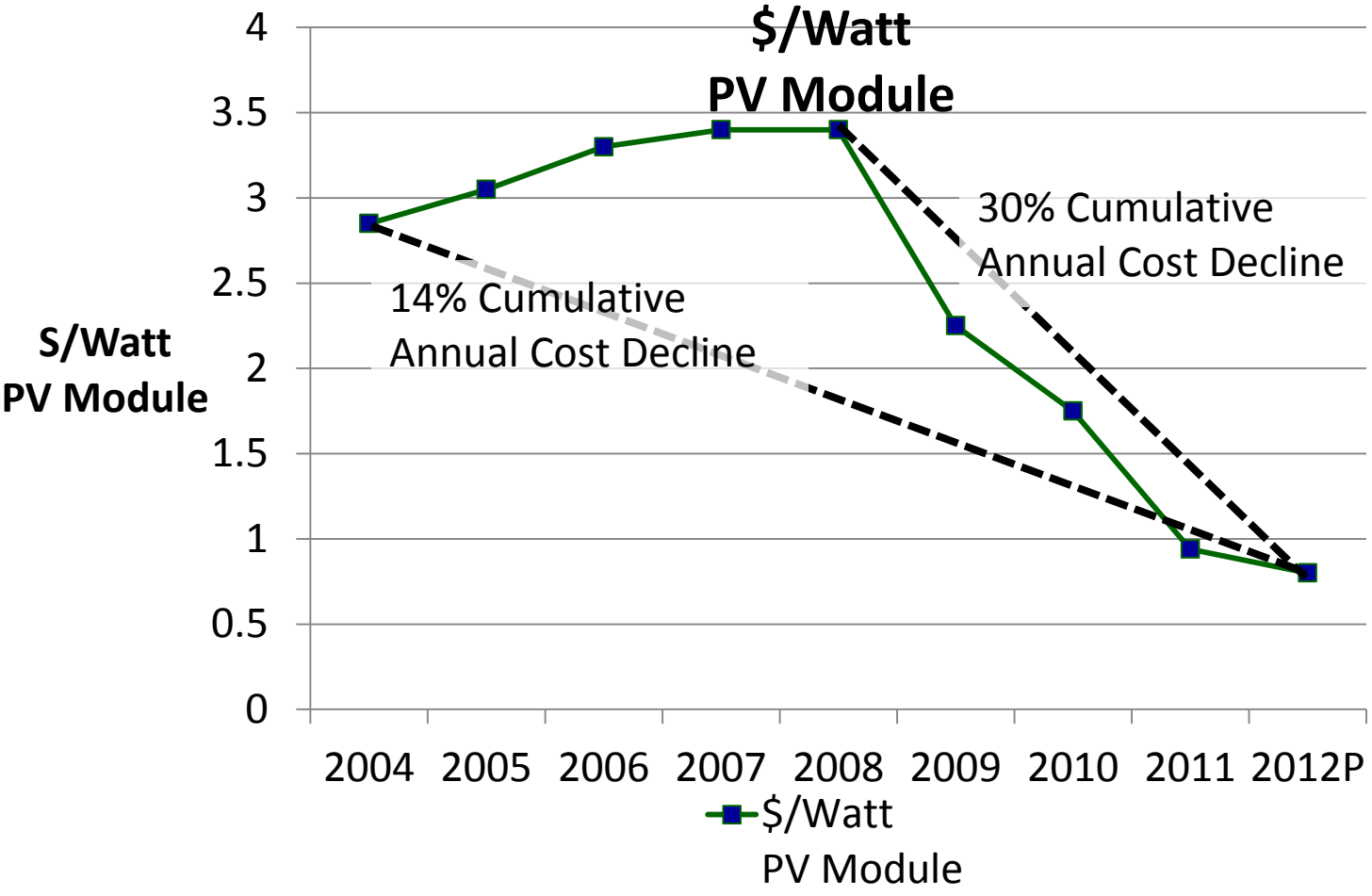
Solar Costs


$/Watt
PV Module
S/Watt
PV Module
4
3.5
3
2.5
2
1.5
1
0.5
0
2004
2005
2006
2007
2008
2009
2010
2011
2012P
$/Watt
PV Module

Solar Costs


$/Watt
PV Module
S/Watt
PV Module
4
3.5
3
2.5
2
1.5
1
0.5
0
14% Cumulative
Annual Cost Decline
2004
2005
2006
2007
2008
2009
2010
2011
2012P
$/Watt
PV Module

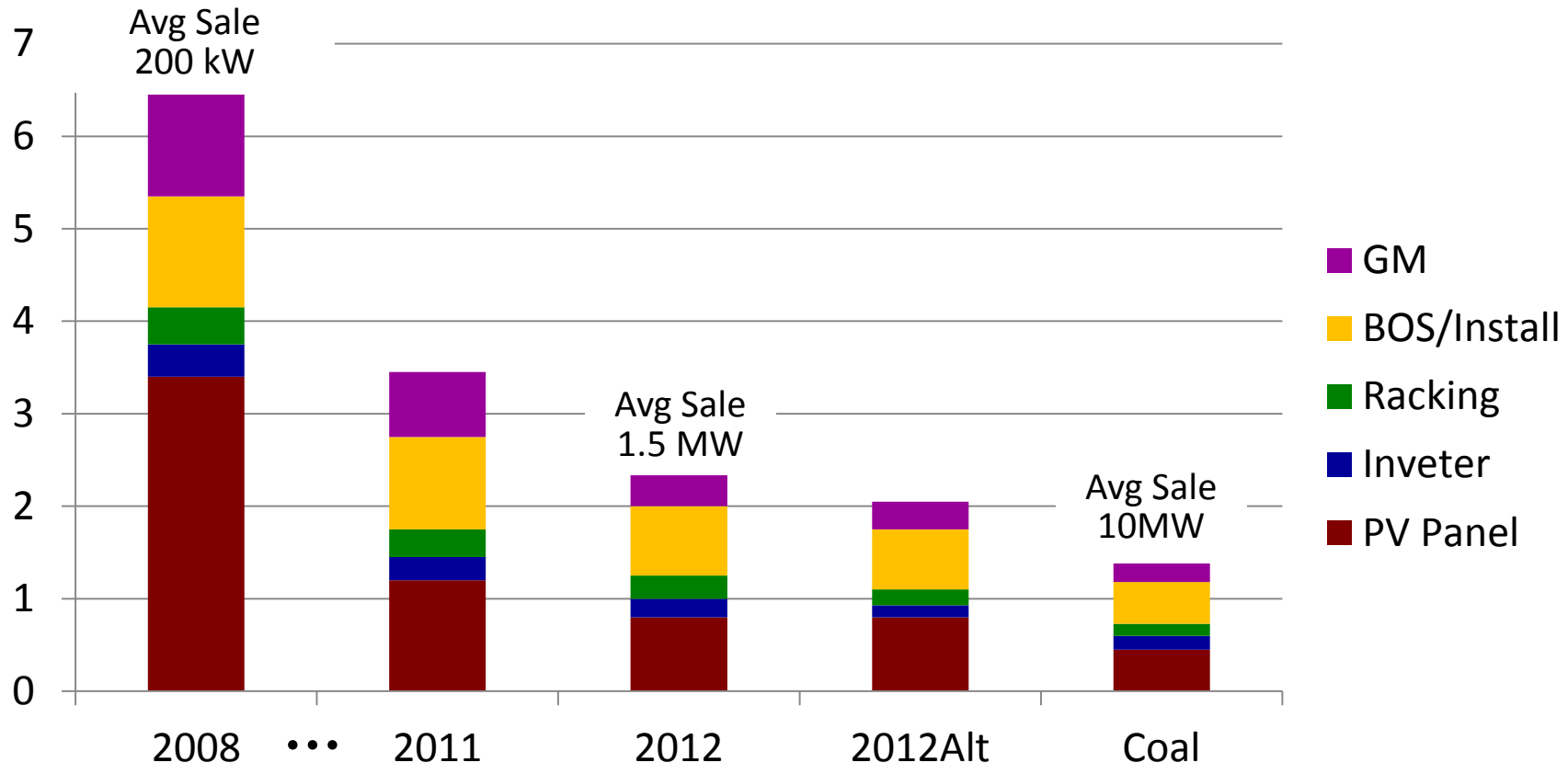
Solar Costs


$/Watt
PV Module
S/Watt
PV Module
4
3.5
3
2.5
2
1.5
1
0.5
0
30% Cumulative
Annual Cost Decline
14% Cumulative
Annual Cost Decline
2004
2005
2006
2007
2008
2009
2010
2011
2012P
$/Watt
PV Module

Solar Costs

Declining Costs & Increasing Scale

Commercial Cost Reduction Roadmap For the Years 2006-2012 *($/watt)*



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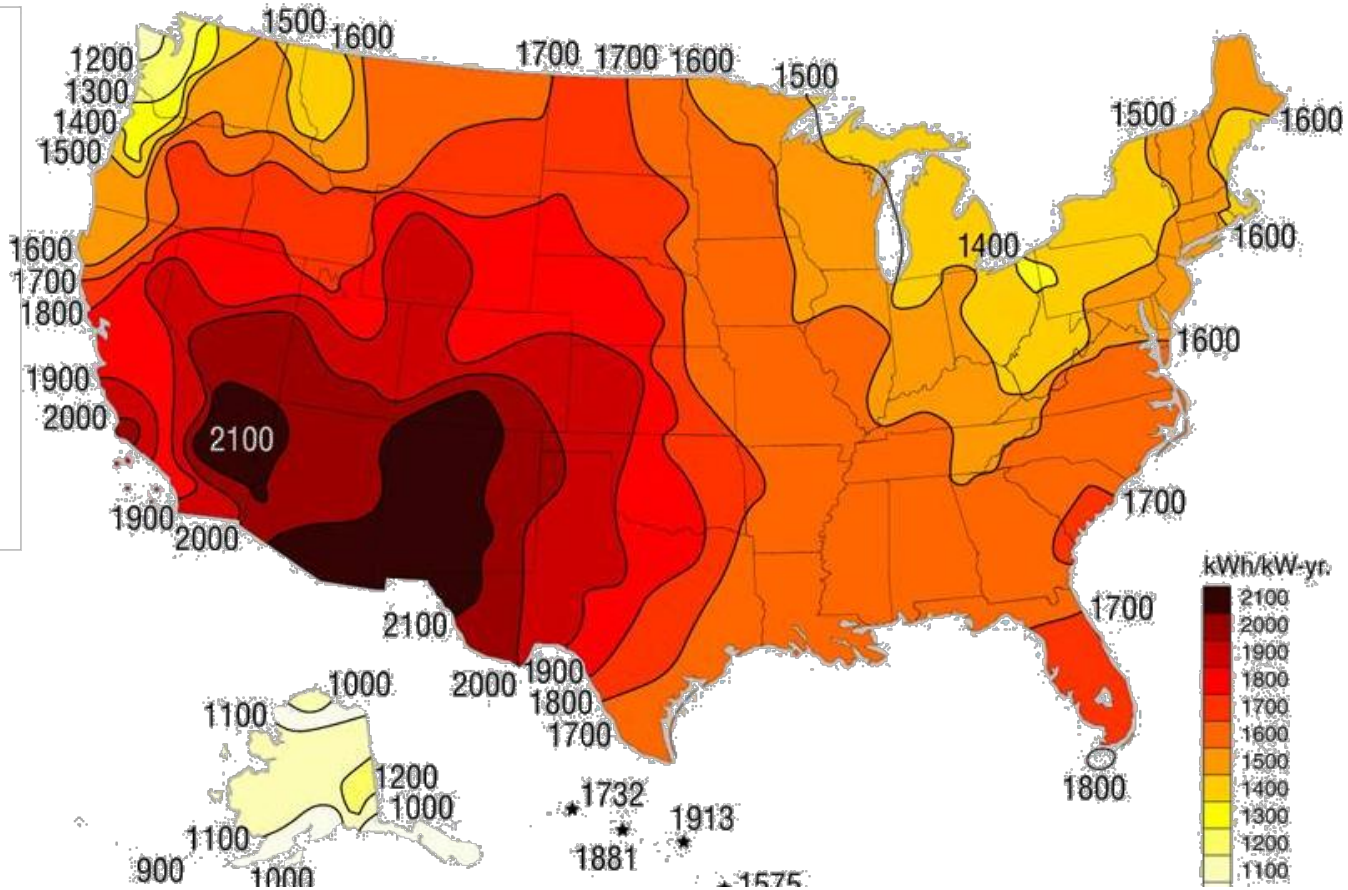
U.S. Solar Markets

Germany

United States



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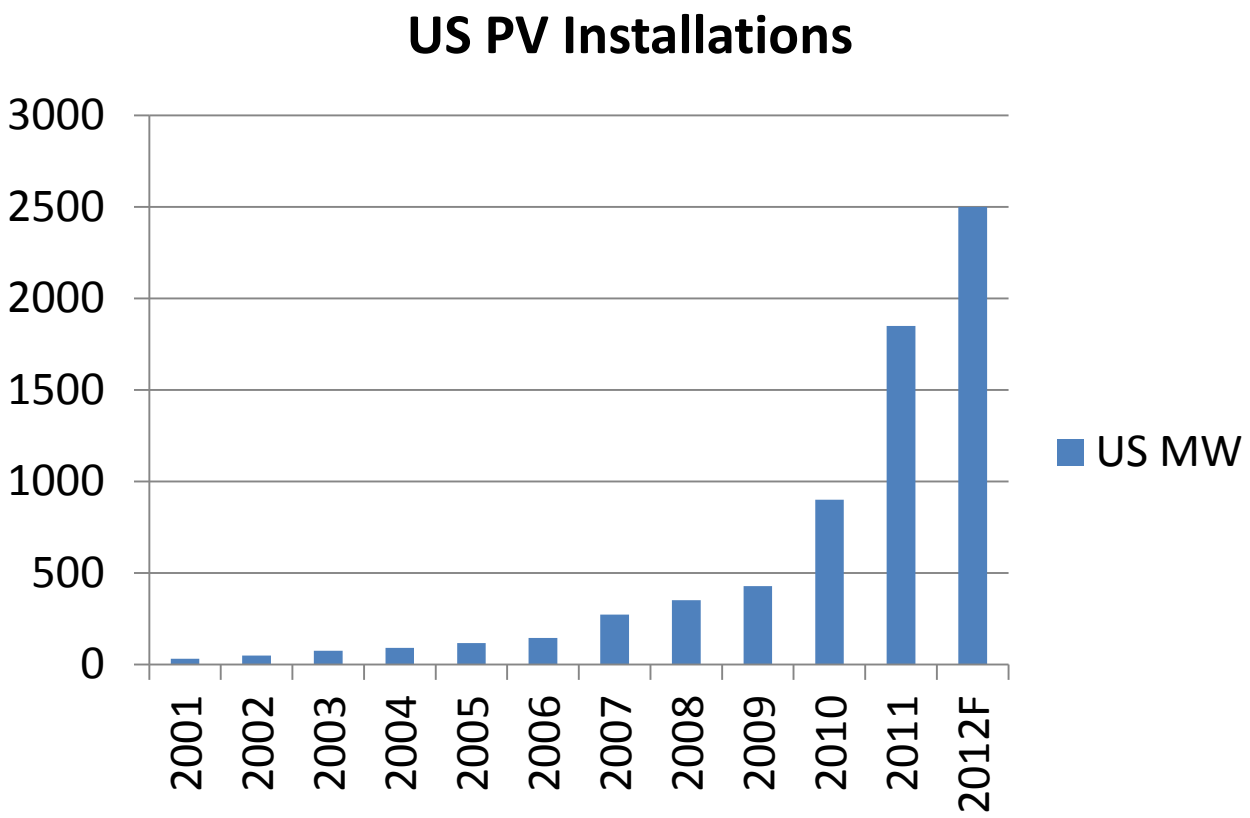
US Markets



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Financing

Commercial / Utility Scale:

- Federal Investment Tax Credit
  - 30%, Need Tax Liability
- State Solar Renewable Energy Credit (SREC)
  - 5 to 10 Year Contract – Financed (But Difficult "Market")
- State Incentive (If Any, Changes Often, Each State Different)
- Equity Requires ~10+% Unlevered Return
- 40% Debt Possible
  - If Available, Adds Other Costs

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Brownfields

- Great Opportunity
- Respect the Site
- Choose Partners with the Right Experience
- Solar is Feasible and Cost Effective Today

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