RPS Data Form 1: Renewable Generating Technologies

Company Name: Florida Solar Energy Center

Applicable Utility Service Area: Entire State

Renewable Technologies	
Solar	**Photovoltaic (PV) by 2020**
	Thermal Electric Plant
Wind	Inland
	Coastal
	Offshore
Hydroelectric	Dam (Incremental)
	Diversion (Run of the River)
	Pumped Storage
Geothermal	Dry Steam
	Flash
	Binary
Ocean Energy	Wave Action
	Tidal Change
	Thermal Gradients (OTEC)
	Ocean Currents
Biomass - Direct Combustion	Plant Matter
	Animal Waste
	Vegetable Oil
Biomass - Conversion to Liquid	Biodiesel / Renewable Diesel
	Ethanol - Cellulosic
	Ethanol - Non-Cellulosic
	Pyrolysis
Biomass - Conversion to Gas	Anaerobic Digester
	Gasification
	Renewable Natural Gas
Landfill Gas	Methane Combustion
Municipal Solid Waste	Biogenic
	Non-Biogenic
Hydrogen, renewable	Fuel Cells
	Combustion
Waste Heat	Sulfuric Acid Manufacturing
Other	

RPS Data Form 2: Conventional Generating Technologies

Company Name: Florida Solar Energy Center

Applicable Utility Service Area: Entire State

Conventional Technologies	
Natural Gas	Combustion Turbine
	Combined Cycle
Coal	Integrated Gasified Combined Cycle
	Supercritical Pulverized Coal
Nuclear	Steam Generation
Other	Other

RPS Data Form 3: Commercial Availability Data

Company Name: ______________________

Energy Resource: ______________________

Typical Unit Annual Capacity Rating (MW)	11396	total of all units
Earliest Commercial In-Service Date (Year)	2009	Compare to 61GW in 2015 per Navigant first units
Typical Construction & Permitting Time (Years)	0.5	per unit
Useful Life of Unit (Years)	30	
Fuel Type	Solar Energy	

RPS Data Form 4: Performance Characteristics Data

Company Name: **Florida Solar Energy Center**

Energy Resource: **Entire State**

Contribution to Summer Peak Demand (MW)	**10824**	**in 2020**
Contribution to Winter Peak Demand (MW)	**1140**	**in 2020**
Average Annual Heat Rate (BTU/kWh)	**N / A**	
Equivalent Availability Factor (%)	**N / A**	
Average Annual Generation (MWH)	**14518504**	**in 2020**
Resulting Capacity Factor (%)	**15.3**	

RPS Data Form 5: Environmental Characteristics Data

Company Name: Florida Solar Energy Center

Energy Resource: Entire State

Emission Rates	Carbon Dioxide (CO_2) (lb/kWh)	Zero
	Sulfur Dioxide (SO_2) (lb/kWh)	Zero
	Nitrogen Oxide (NO_X) (lb/kWh)	Zero
	Mercury (Hg) (lb/kWh)	Zero
	Water Usage (gal/kwh)	Zero

RPS Data Form 6: Estimated Cost Data

Company Name: **Florida Solar Energy Center**

Energy Resource: **Entire State**

	First Year of Commercial Operation (Year)	2009
Installed Capital	Cost[1] ($/kw)	5000
	Escalation Rate (%)	4
Fixed O & M	Cost[1] ($/kw-year)	25
	Escalation Rate (%)	0
Variable O & M	Cost[1] ($/kwh)	0
	Escalation Rate (%)	4.00%
Energy	Cost[1] ($/kwh)	0
	Escalation Rate (%)	4.00%
	Levelized Cost[2] - Life of Unit (cents/kwh)	13.7

(1) Expressed in year dollars associated with the first year of commercial operations

(2) Cumulative Present Value Total Revenue Requirements levelized over the life of the unit expressed in year dollars associated with the first year of commercial operation

RPS Data Form 1: Renewable Generating Technologies

Company Name: **Florida Solar Energy Center**

Applicable Utility Service Area: **Entire State**

Renewable Technologies	
Solar	Photovoltaic (PV)
	Solar Domestic Hot Water
	Thermal Electric Plant
Wind	Inland
	Coastal
	Offshore
Hydroelectric	Dam (Incremental)
	Diversion (Run of the River)
	Pumped Storage
Geothermal	Dry Steam
	Flash
	Binary
Ocean Energy	Wave Action
	Tidal Change
	Thermal Gradients (OTEC)
	Ocean Currents
Biomass - Direct Combustion	Plant Matter
	Animal Waste
	Vegetable Oil
Biomass - Conversion to Liquid	Biodiesel / Renewable Diesel
	Ethanol - Cellulosic
	Ethanol - Non-Cellulosic
	Pyrolysis
Biomass - Conversion to Gas	Anaerobic Digester
	Gasification
	Renewable Natural Gas
Landfill Gas	Methane Combustion
Municipal Solid Waste	Biogenic
	Non-Biogenic
Hydrogen, renewable	Fuel Cells
	Combustion
Waste Heat	Sulfuric Acid Manufacturing
Other	**Solar DHW (Res & Institutional**

by 2020

RPS Data Form 2: Conventional Generating Technologies

Company Name: ______________________

Applicable Utility Service Area: ______________________

Conventional Technologies	
Natural Gas	Combustion Turbine
	Combined Cycle
Coal	Integrated Gasified Combined Cy
	Supercritical Pulverized Coal
Nuclear	Steam Generation
Other	Other

RPS Data Form 3: Commercial Availability Data

Company Name: **Florida Solar Energy Center**

Energy Resource: **Entire State**

Typical Unit Annual Capacity Rating (MW)	**10549**	**total of all units**
Earliest Commercial In-Service Date (Year)	**2009**	**first units**
Typical Construction & Permitting Time (Years)	**0.1**	
Useful Life of Unit (Years)	**25**	
Fuel Type	**Solar Energy**	

RPS Data Form 4: Performance Characteristics Data

Company Name: **Florida Solar Energy Center**

Energy Resource: **Entire State**

Contribution to Summer Peak Demand (MW)	1991	in 2020
Contribution to Winter Peak Demand (MW)	2849	in 2020
Average Annual Heat Rate (BTU/kWh)	N / A	
Equivalent Availability Factor (%)	N / A	
Average Annual Generation (MWH)	12117600	in 2020
Resulting Capacity Factor (%)	69	summer equiv in 2020

RPS Data Form 5: Environmental Characteristics Data

Company Name: Florida Solar Energy Center

Energy Resource: Entire State

Emission Rates	Carbon Dioxide (CO_2) (lb/kWh)	Zero
	Sulfur Dioxide (SO_2) (lb/kWh)	Zero
	Nitrogen Oxide (NO_X) (lb/kWh)	Zero
	Mercury (Hg) (lb/kWh)	Zero
	Water Usage (gal/kwh)	Zero

RPS Data Form 6: Estimated Cost Data

Company Name: **Florida Solar Energy Center**

Energy Resource: **Entire State**

	First Year of Commercial Operation (Year)	2009
Installed Capital	Cost(1) ($/kw)	675 in large scale
Installed Capital	Escalation Rate (%)	4.00
Fixed O & M	Cost(1) ($/kw-year)	13.5
Fixed O & M	Escalation Rate (%)	4.00
Variable O & M	Cost(1) ($/kwh)	0
Variable O & M	Escalation Rate (%)	4.00
Energy	Cost(1) ($/kwh)	0
Energy	Escalation Rate (%)	0.00%
	Levelized Cost(2) - Life of Unit (cents/kwh)	3.85

(1) Expressed in year dollars associated with the first year of commercial operations
(2) Cumulative Present Value Total Revenue Requirements levelized over the life of the unit expressed in year dollars associated with the first year of commercial operation

Renewable Systems Interconnection: Rooftop PV Market Penetration Scenarios

Jay Paidipati, Project Manager
Lisa Franzis, Program Managing Director
Haley Sawyer
Ann Kurrasch

Navigant Consulting Inc.

October 30, 2007 – Draft

Please submit comments by
November 14, 2007 to
Dan Ton (dan.ton@ee.doe.gov)

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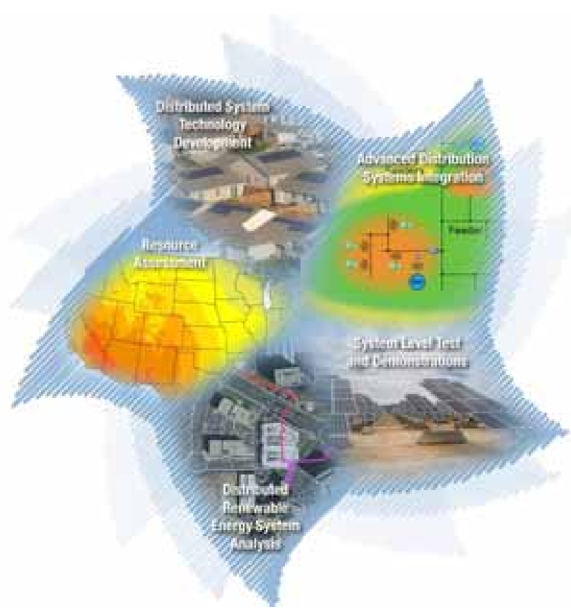

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NCI would like to first than NREL and DOE for sponsoring this work. NCI would also like to thank the McGraw-Hill company for providing floorspace data, a crucial component of this study. Further, NCI would like to thank all of the independent reviewers who took the time to review this report and provide valuable insights.

Preface

Now is the time to begin planning for the integration of significant quantities of distributed renewable energy onto the electricity grid. Factors such as growing concern about climate change, adoption of state-level renewable portfolio standards and incentives, and accelerated cost reductions are driving steep growth in U.S. renewable energy technologies. In particular, distributed solar photovoltaic (PV) installations are showing very rapid growth. As distributed PV and other renewable energy technologies mature they can provide a significant share of our nation's electricity demand. However, as their market share grows, concern about potential impacts on the stability and operation of the electricity grid may create barriers to their future expansion.

To facilitate more extensive adoption of renewable distributed electric generation, the U.S. DOE launched the *Renewable Systems Interconnection (RSI)* Study during the spring of 2007. This study addresses both the technical and analytical challenges that need to be tackled in order to enable high penetration levels of distributed renewable energy technologies. Given that integration-related issues at the distribution system are likely to emerge first for PV technology, the RSI study focuses on distributed PV technology. A key goal of the RSI Study is to identify R&D needed to build the foundation for realizing a high penetration renewable energy future while enhancing the operation of the electricity grid.

The RSI study consists of 14 individual reports that address a broad set of issues related to distributed systems technology development, advanced distribution systems integration, system level tests and demonstrations, technical and market analysis, resource assessment, and codes, standards and regulatory implementation. This report is one of the 14 RSI reports. The full set of reports from the RSI Study is listed below:

- *Advanced Grid Planning and Operations*
- *Utility Models, Analysis and Simulation Tools*
- *Advanced PV System Designs and Technology Requirements*
- *Development of Analysis Methodology for Evaluating the Impact of High Penetration PV*
- *Distribution System Performance Analysis for High Penetration PV*
- *Enhanced Reliability of PV Systems with Energy Storage and Control*
- *Transmission System Performance Analysis for High Penetration PV*
- *Renewable System Interconnection Security Analysis*
- *Solar Resource Assessment: Characterization and Forecasting to Support High PV Penetration*
- *Test and Demonstration Program Definition to Support High PV Penetration*
- *Value Analysis*
- *PV Business Models*
- *Production Cost Modeling for High Levels of PV Penetration*
- *Rooftop PV Market Penetration Scenarios*

Addressing grid-integration issues is a necessary prerequisite for the long-term viability of the distributed renewable energy industry in general, and the distributed PV industry in particular. The RSI study is one step on this path. In addition, the DOE is working with a broad group of stakeholders to develop an R&D plan aimed at making this vision into a reality.

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Abstract, including keywords

The goal of this study was to model the market penetration of rooftop photovoltaics (PV) in the United States under a variety of scenarios, on a state-by-state basis, from 2007 to 2015. The model looked at the retrofit and new construction segments of the residential and commercial rooftop markets. For each state, the model calculated percent market penetration, annual installations, and cumulative installations. Scenarios studied involved net metering rules, electric rate tariff levels and structures, availability of financial incentives, system pricing, and carbon legislation.

Key words: PV, photovoltaics, market penetration, rooftop, solar energy, net metering policy, interconnection policy, federal tax credits for solar

Executive Summary

The goal of this study was to model the market penetration of rooftop photovoltaics (PV) in the United States under a variety of scenarios, on a state-by-state basis, from 2007 to 2015. The model looked at the retrofit and new construction segments of the residential and commercial rooftop markets. For each state, the model calculated percent market penetration, annual installations, and cumulative installations. Scenarios studied involved net metering rules, electric rate tariff levels and structures, availability of financial incentives, system pricing, and carbon legislation.

We started by calculating the technical potential for each state by using floor space data, data on building characteristics, PV access factors, and data on PV system efficiency. Based on a selection of 98 representative utilities within the 50 states and Washington D.C., we calculated economic potential using current electric rate structures and tariffs, local and federal incentive levels, system costs, O&M and inverter replacement costs, building load profiles, PV output profiles, and net metering rules. We used all of this information to calculate a simple pay-back period, which was fed into a market penetration curve. The market penetration results were augmented by a technology adoption curve, screens related to interconnection standards and Renewable Portfolio Standard (RPS) solar set aside requirements to arrive at economic potential.

NCI ran a variety of scenarios to examine the effects of different variables, including: variations on system pricing, interconnection standards, net metering availability, net metering caps, carbon legislation, electricity price escalation, availability of Time-Of-Use rates, RPS enforcement and availability of federal and local incentives for PV. The variables with the largest impact were system pricing, the extension of the federal tax credits, and interconnection policy, as shown in Figure E-1.

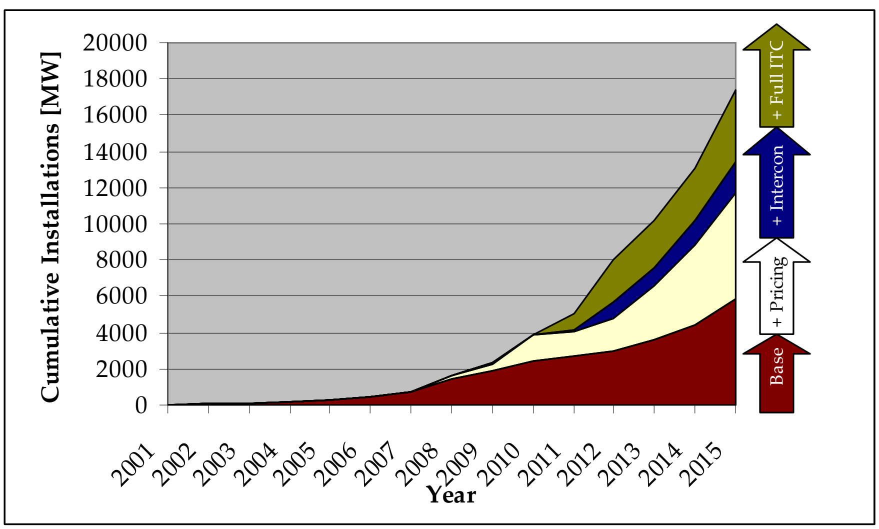

Figure E-1. Influence of System Pricing, Net Metering Policy, and Federal Tax Credits on Cumulative Installations in the U.S.

Figure E-1 shows significant potential in the U.S., but several variables not modeled in this study could impact the results. Constraints along the PV supply chain (such as the current silicon shortage) could result in higher prices or constrained supply, thus decreasing market penetration. Additionally, significant international demand could draw supply away from the US market, thus decreasing market penetration in the US. However, new state or federal policies, such as incentive programs or renewable portfolio standards, could drive US demand even higher. Also, electricity prices escalating higher than modeled in this study, which is likely in certain markets undergoing regulatory change, could drive demand higher.

1.0 Introduction

The economic viability of photovoltaics (PV) is a function of several variables including electricity prices, system costs, net metering laws, and incentives, among others. Given the fragmented nature of electricity markets, regulations, and incentives in the United States, PV economics needs to be assessed on a local basis.

The goal of this study was to model the market penetration of rooftop PV in the United States in as transparent a manner as possible, under a variety of scenarios, on a state-by-state basis, from 2007 to 2015. The model looked at the retrofit and new construction segments of the residential and commercial rooftop markets. The model does not include field-based systems (which is a potentially significant market segment for growth). The model does not capture price dynamics related to international competition for PV modules or changes in electricity prices due to a potential drop in demand because of PV. For each state, the model calculated percent market penetration, annual installations, and cumulative installations. Scenarios studied involved net metering rules, electric rate tariff levels and structures, availability of financial incentives, system pricing, and carbon legislations. We see this report and the current version of the model as a first step towards developing a better understanding of the market dynamics of the U.S. PV industry.

2.0 Current Status of Existing Research

Many market studies of the PV industry in the U.S. and globally have been done during the past couple of years. Examples include the PV Services Program reports, Solarbuzz's projections, DOE's PV road mapping exercises, and the Promethius Institute's report. However, a publicly available market penetration model for PV in the US is not currently available. NCI and others have completed in depth market penetration studies in constrained areas (Arizona, California, and Austin, TX), but each of these markets is unique and the results can not be extended to the entire US.

In addition, most previous studies have not used a market penetration approach that captures all facets of project economics. Prior projections have used a variety of approaches. The first is simple extrapolation of historical PV demand, with variations for aggressive or decreasing demand. Another method uses market surveys to get key players views on future projections. Finally, other projections look at the projected levelized cost of electricity for PV versus retail electricity rates to assess project attractiveness. However, none of these methods are in publicly available models. This goal of this research is to create a publicly available model that captures local variables such as retail electric rates, insolation levels, weather (and hence building load), incentives, net metering policy, and interconnection policy.

3.0 Project Approach

NCI created a Microsoft Excel© based spreadsheet tool for calculating market penetration. Figure 3-1 shows a flow diagram of the model. This chapter discusses each section of the model: technical potential, economic potential, and the scenarios studied potential.

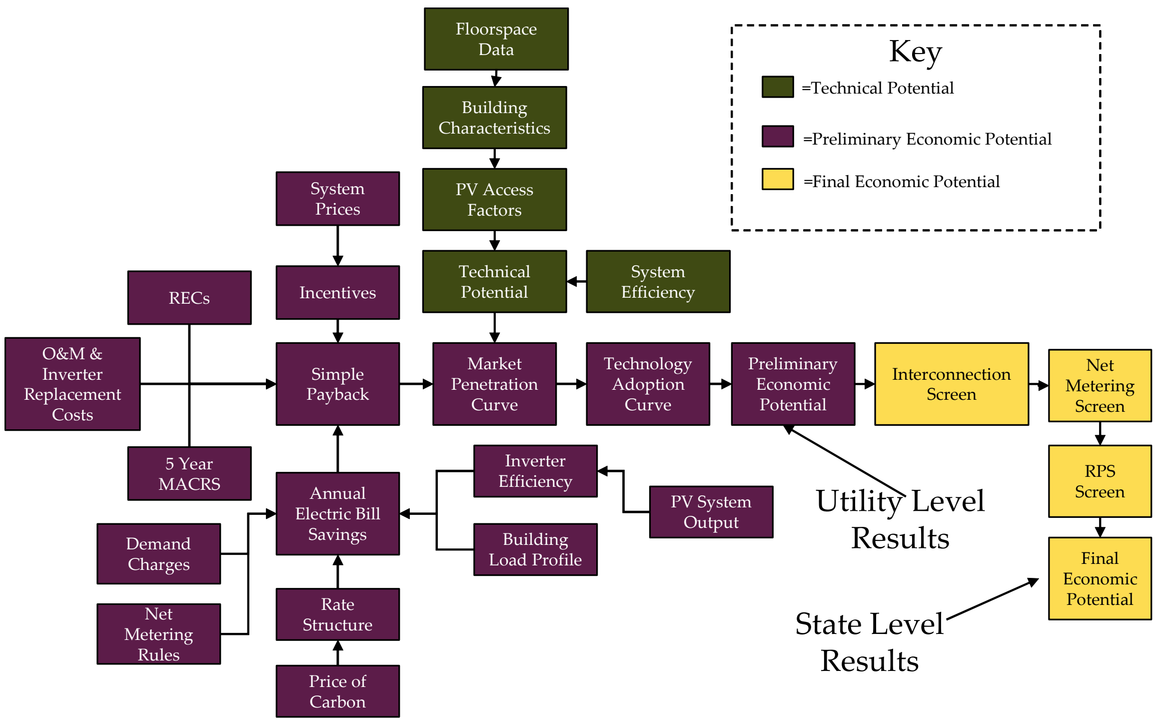

Figure 3-1. Market Penetration Flow Diagram

3.1 Technical Potential

To calculate the market penetration of PV, the available market size must first be known. Current and projected total US roof space was therefore estimated for 2007 through 2015, by state, for residential and commercial buildings. A PV access factor was applied to the roof space data to estimate how much roof space is actually available for PV. The PV access factor takes into account shading, building orientation, and roof structural soundness. PV power density data is then used to calculate potential installed capacity on a state-by-state basis.

To calculate total roof space, we started with the total amount of floor space in residential and commercial buildings, by state, from McGraw-Hill for 2007 through 2011. We used the growth (or decline) trends from 2007 to 2011 to project growth (or decline) from 2012 to 2015. To estimate how floor space translates into roof space, we used data on the average number of floors per building from the Energy Information Administration’s (EIA) RECS and CBECS databases. For pitched roofs, assumed to be 92% of the residential market, we assumed an 18 degree pitch to calculate roof space. Eighteen degrees is used as a typical number, though the angle can very from 0 to 45 degrees in a given region. We defined the new construction based upon the floor space added in any year.

To estimate how much of the total roof space is available for PV; we developed PV access factors that were based upon a NCI study for a major U.S. utility company. The study was adjusted for California conditions based upon interviews with Ed Kern of Irradiance, who possesses years of installation experience in the industry. Separate access factors were developed for cooler and warmer climates. State designations are shown in Figure 3-2. Figure 3-3 through Figure 3-6 show the different analyses with the flat commercial roof assumptions used for flat residential roofs. The PV access factors were then applied to the state level roof space data to estimate the available roof area for PV. The results should not be confused with share of homes that are not suitable for PV, as we are focusing on roof space. However, the factors arrived at (~25% for residential and ~60% for commercial) are similar to the space taken up by current PV systems.

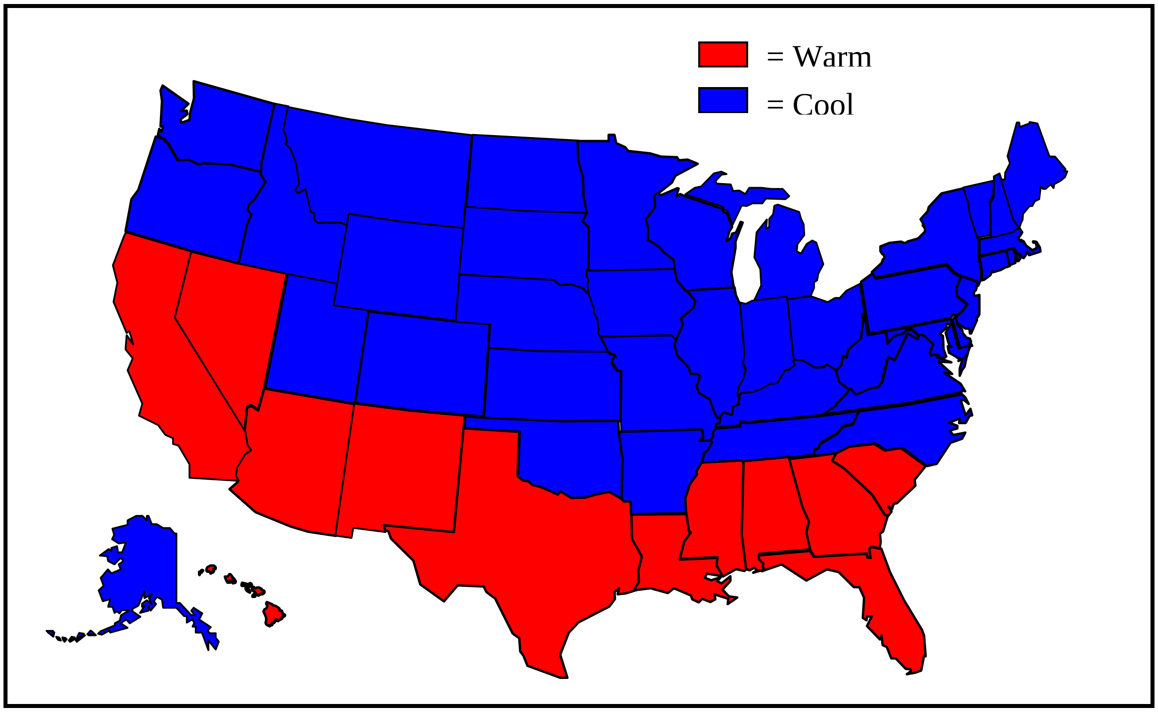

Figure 3-2. State level climate type designations

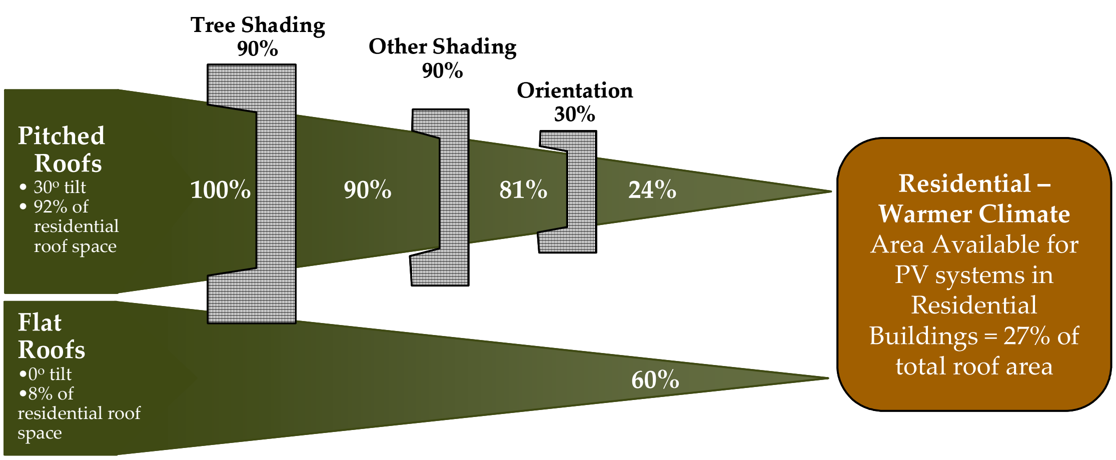

Figure 3-3. PV Access Factor Residential Buildings in Warmer Climates

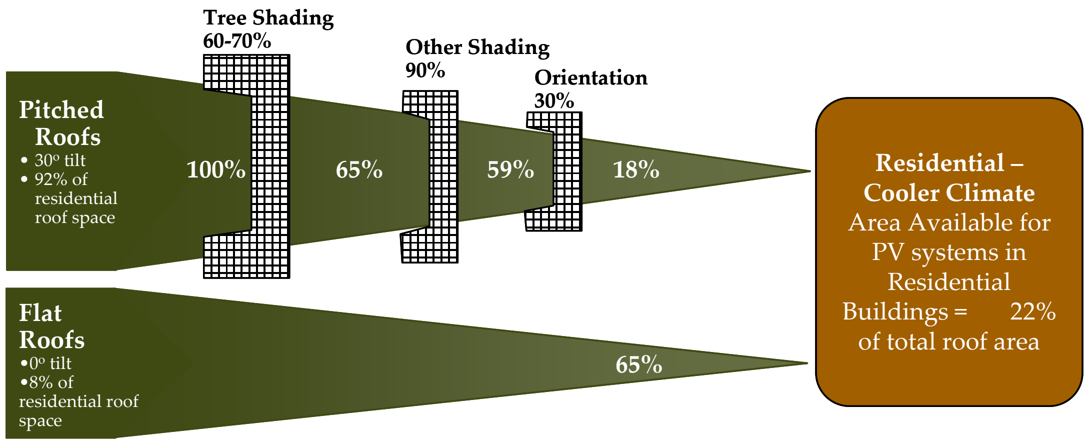

Figure 3-4. PV Access Factor for Residential Buildings in Cooler Climates

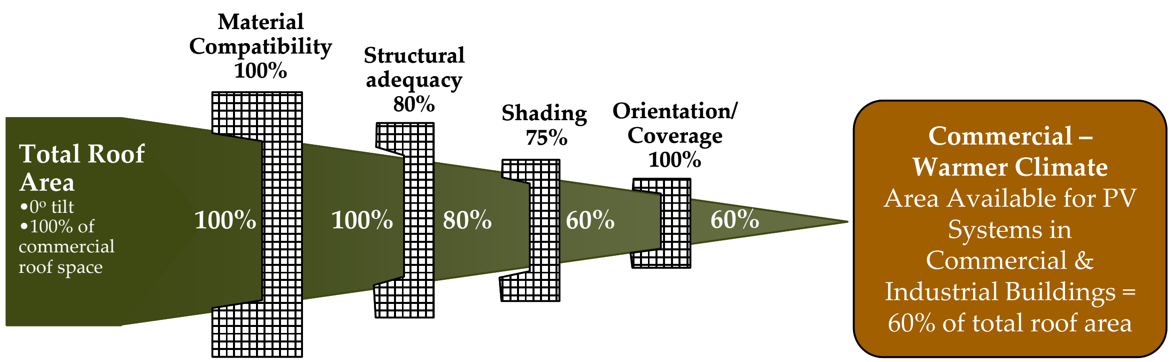

Figure 3-5. PV Access Factor for Commercial Buildings in Warmer Climates

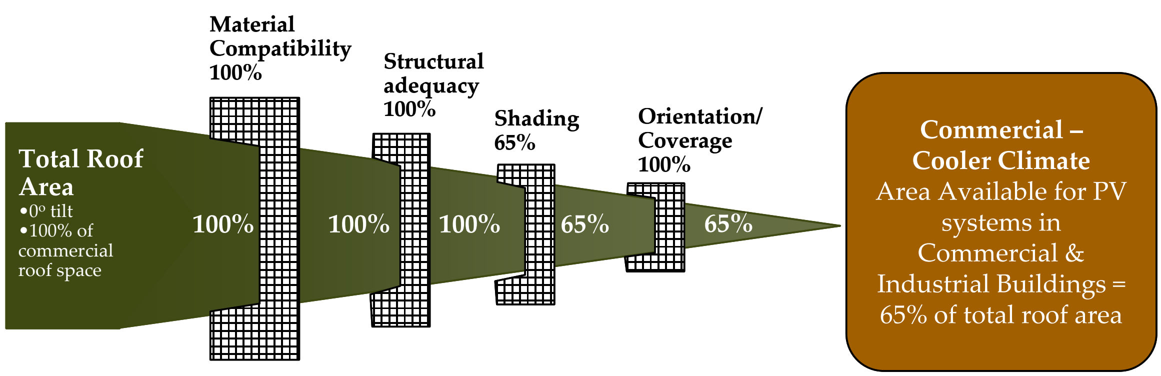

Figure 3-6. PV Access Factor for Commercial Buildings in Cooler Climates

We estimated the technical potential by using data on PV power density. To calculate the power density of a solar PV system in 2007, we developed a weighted-average module efficiency using market share for the three most prevalent technologies present in the market today. The power density of a module was then calculated on a square footage basis and the power density of a PV system was calculated by applying a packing factor of 1.25 for residential and commercial systems. The packing factor modifies the PV power density by taking into account space need for the system, such as space for access between modules, wiring and inverters.

The resulting system power density is 10 MW/million sq. ft. as derived from an average module efficiency of 13.5%. For 2015, we assumed an average module efficiency of 18.5% for all installations resulting in a power density of 13.7 MW/million sq. ft. in 2015. Figure 3-7 shows the technical potential in 2015. Technical potential increases over time for two reasons: rooftop area grows over time and system efficiency's increase over time. Refer to the appendix for a table of state-by-state results.

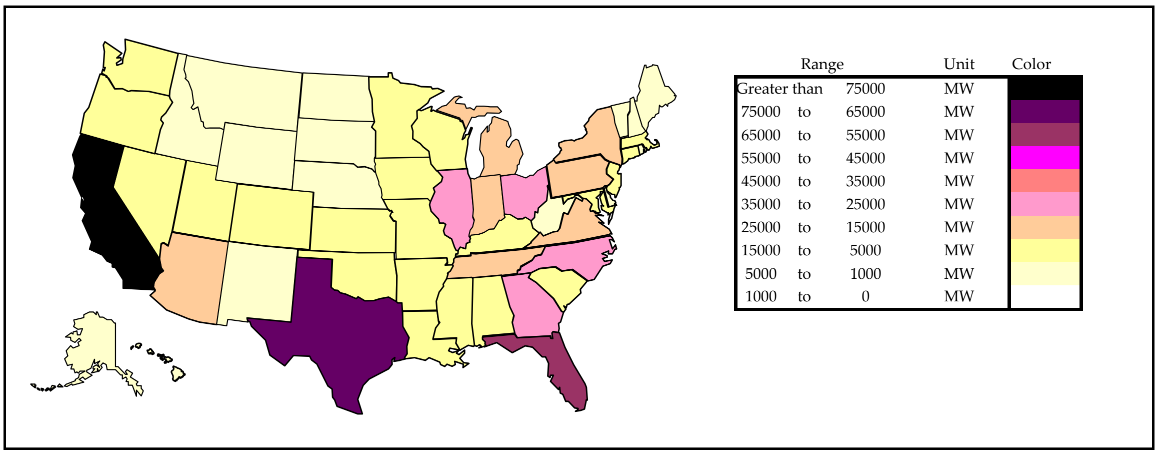

Figure 3-7. US Rooftop Technical Potential in 2015 (Independent of Economics)

3.2 Preliminary Economic Potential

After calculating the technical potential in each state, we looked at the economics of PV to assess economic potential. Referring back to Figure 3-1, economic potential is calculated by taking a market penetration (as a percentage of technical potential) and multiplying the results by a technology adoption curve.

The input to NCI's market penetration curves is simple pay-back, so we picked 1 to 5 utilities in each state to represent PV economics. For each utility (or state, for certain variables) analyzed, we collected rate structure and tariff data, net metering rules, incentives data, building load profiles, and PV output profiles. Refer to the appendix for more detail on the sources and values of each of these variables and the list of utilities analyzed, by state.

Equation 1 shows the simple pay-back calculation for the residential market and Equation 2 shows the commercial calculation. Note that according to EIA's CBECS database, approximately 25% of all commercial building floor space is contained in buildings that do not pay taxes (such as schools and government buildings), so this calculation is somewhat conservative for those segments.

$$\text{Simple Pay-Back} = \frac{[\text{Installed Cost} - \text{Federal Incentives} - \text{Capacity Based Incentives} + \text{tax rate*rebate amount}]}{[\text{Annual Electric Bill Savings} + \text{Performance Based Incentives} - \text{O\&M Costs}]}$$

Equation 1 Residential Simple Pay-Back

$$\text{Simple Pay-Back} = \frac{[\text{Installed Cost} - \text{Federal Incentives} - \text{Capacity Based Incentives} + \text{tax rate*rebate amount}]}{[(1-\text{tax rate})*(\text{Annual Electric Bill Savings}-\text{O\&M Costs}) + \text{Performance Based Incentives} + \text{Amortized MACRS savings}]}$$

Equation 2 Commercial Simple Pay-Back

NCI used two different market penetration curves (which both use simple pay-back as inputs): one for the retrofit market and one for the new construction market. Figure 3-8 shows the market penetration curves used. Based upon interviews with key stakeholders, we used a different curve for new construction because builders are (generally) reluctant to add PV as a standard feature and require shorter pay-backs before making it standard. We used two studies of market penetration to develop curves for this study. Kastovich et. al. calculated market penetration curves for retrofit and new construction markets of energy technologies. Kastovich surveyed customer behaviors based upon simple pay-back. Navigant Consulting Inc. produced a curve based on field interviews, consumer surveys, and market data on adoption of efficient energy technologies in the market, again based upon simple pay-back.

Several variables could influence the evolution of these market penetration curves over time. The first would be policies that support PV adoption. One example of this is a ruling in the California Solar Initiative that, after 2010, all new subdivisions over 50 homes must have PV as an option for potential homebuyers. Another variable could be consumer awareness campaigns that shift consumer behavior to adopt PV at higher pay-backs.

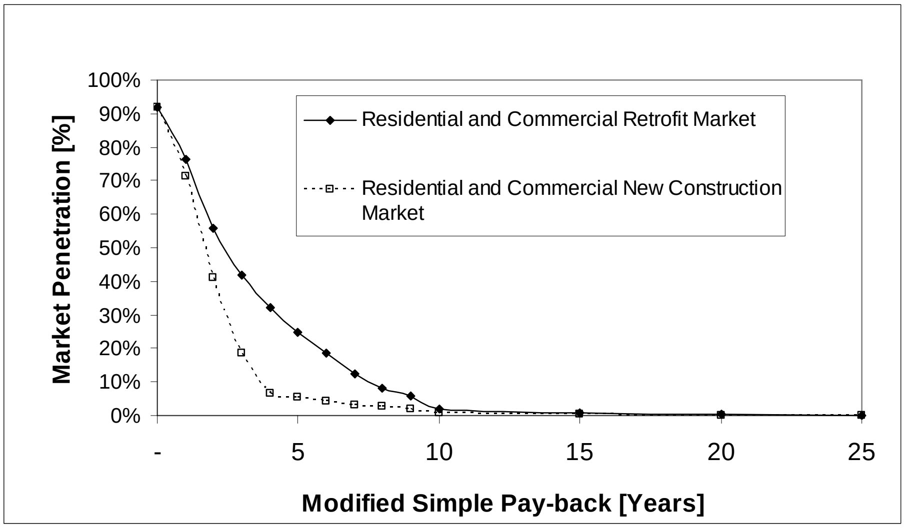

Figure 3-8. Market Penetration Curves Used

After calculating percent market penetration, we used an S-curve to model technology adoption. An S-Curve provides the rate of adoption of technologies, as a function of the technology's characteristics and market conditions. Figure 3-10 shows the shape of the S-Curve used. Fisher-Pry curves were used. The Fisher-Pry technology substitution model predicts market adoption rate for an existing market of known size. We used this model because consumers are replacing grid power with PV generated power. The market of known size comes from technical potential and market potential calculations.

The rate at which technologies are adopted depends on several market characteristics: technology characteristics (e.g., technology economics, new vs. retrofit), industry characteristics (e.g., industry growth, competition) and external factors (e.g., government regulation, trade restrictions). Historical data collected by Fisher-Pry and NCI reveals that major classes of technology/segment with common segment-penetration characteristics can be classified into five categories, each with its own time to segment saturation, as shown in Figure 3-9.

For PV, We picked the two classes that closely resembled the PV market in the US, class B and C. We then used the average of the two classes' curves, as shown in Figure 3-10.

Characteristics	A	B	C	D	E
Time to Saturation (t_s)	5 years	10 years	20 years	40 years	>40 years
Technology Factors					
Equipment Life	< 5 years	5–15 years	15–25 years	25–45 years	>40 years
Equipment Replacement	None	Minor	Unit operation	Plant section	Entire plant
Technology Experience	New to U.S. only	New to U.S. only	New to U.S. only	New	New
Industry Factors					
Growth (% per year)	>5%	>5%	2~5%	1–2%	<1%
Attitude to Risk	Open	Open	Cautious	Conservative	Adverse
External Factors					
Government Regulation	Forcing	Forcing	Driving	None	None

Figure 3-9. Five classes of technology adoption characteristics

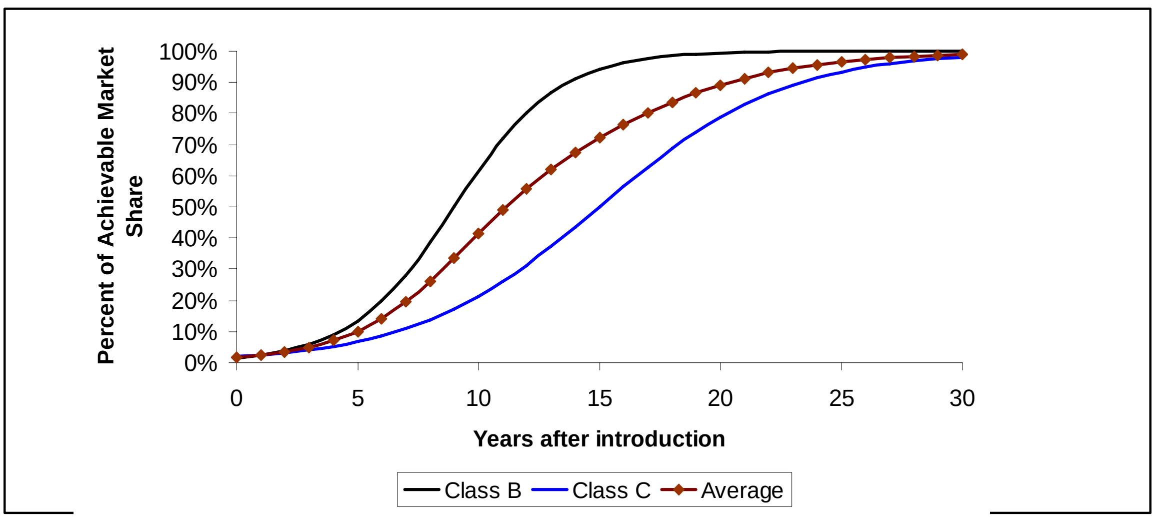

Figure 3-10. Technology Adoption Curve Used

Given that 2007 is more than half over at the time of the writing of this report, the model assumes 2007's annual installations and cumulative installations through 2007 and starts calculating results in 2008. As an example of this, 2007 installations for the Hawaii market are assumed to be 3.1 MW, and the installed base through 2007 is assumed to be 6 MW. The model starts calculating penetration in 2008.

Cumulative installations up to the year of analysis are arrived at after applying these screens. A final market penetration is calculated, after applying the RPS and interconnection screens discussed in the next section, where final market penetration is defined as cumulative installations (defined by peak DC rating) in a given area as a percentage of the technical potential in that area. Technical potential is defined as PV system power density (in MW_{pDC}/million square feet) times the roof space available for PV in a given area.

3.3 Scenarios Analyzed

We developed a set of scenarios dealing with interconnection policy, Renewable Portfolio Standard (RPS) solar set aside policy, system pricing, net metering policy, carbon legislation, rate structure policy, electric rate escalation, and federal incentives.

For the first scenario, we used data provided to DOE from the Interstate Renewable Energy Council's (IREC) assessment of each state's (or utility's in states without state-level interconnection laws) interconnection standards in regards to facilitation of distributed generation. IREC gave each location a rating on a five point scale, as shown in Table 3-1, that assess the likeliness of a system getting installed. Note that at the time of the writing of this report, IREC's results were not finalized. We then translated these assessments to an assumed percentage of achievable market, also shown in Table 3-1. We scaled preliminary economic potential by this amount. Refer to the appendix for a complete list of state rankings. Several states are considering revisions to their interconnection standards and many states' interconnection standards are a barrier to wider adoption of PV. Recognizing this, we created a scenario in which all states improve their interconnection standards to the point that the standards do not hinder PV interconnection (i.e. a "superior" ranking in IREC's scale in Table 3-1Table 3-2).

Table 3-1. IREC's Interconnection Assessment Rating System

IREC Rating	IREC's Assessment	NCI's Assumed Achievable Market
Superior	Interconnection policies encourage distributed generation	100%
Good	Interconnection policies contain some difficulties but less than 5% of solar projects will incur needless costs or delays because of interconnection problems	95%
Fair	Interconnection policies allow interconnection but with some difficulty. Up to 25% of proposed solar projects will incur needless delays, costs, or some will fail because of interconnection	75%
Poor	Interconnection policies are very poor. Costs of systems and time to complete interconnection will be significant. Up to 50% of projects will incur significant costs and delays to complete interconnection process. An undesirable number of projects will fail.	60%
Barrier	Interconnection policies represent a major barrier to the use of solar. 50% or greater will experience significant costs, delays or project cancellation because of interconnection policies	40%

Some states or utilities have net metering caps, typically expressed as a percentage of the utility's or state's peak load. We used EIA data on peak demand to translate net metering caps as percentages into net metering caps in MW. For each year of analysis, the market penetration compares cumulative installations to net metering caps. The model assumes that if net metering caps are reached in a given year, net metering is not allowed in the next year of analysis. We used EIA's Annual Energy Outlook projections for load growth to estimate how peak demand will change over time.

The next two scenarios concern net metering standards. Our first net metering-related scenario assumes all net metering caps are lifted in 2007. The second net metering scenario concerns net metering availability. Currently, many states and utilities do allow net metering, as shown in Figure 3-11. However, a number of key states such as Florida do not allow net metering, and a number of states that allow net metering have a variety of constraints limiting access to net metering. This scenario assumes net metering is available nationwide, starting in 2008.

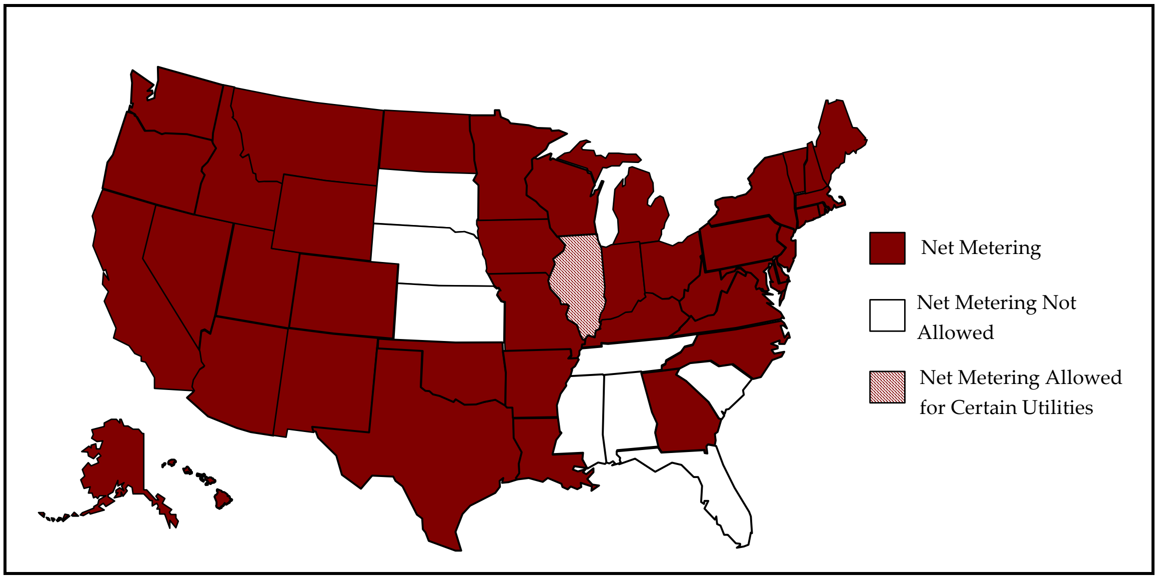

Figure 3-11. Net Metering Availability

The next scenario involved RPS solar set-asides. Several states have solar set-asides or distributed generation set-asides. For each year of analysis, the market penetration model will ensure that market penetration at least meets the level required by solar set-asides, independent of net metering caps, economics, or poor interconnection standards. The exact mechanisms for this are not specified, but examples could be extra utility rebates or utilities owning rooftop PV systems. For reference, Figure 3-12 shows solar set-aside requirements in 2015. As shown in the figure, RPS could account for a total of ~2200 MW of installed PV in 2015. Achieving these goals will depend on a number of factors, such as compliance mechanisms, and thus they may or may not be met. The model has a switch in which RPS solar set asides goals are met or not met.

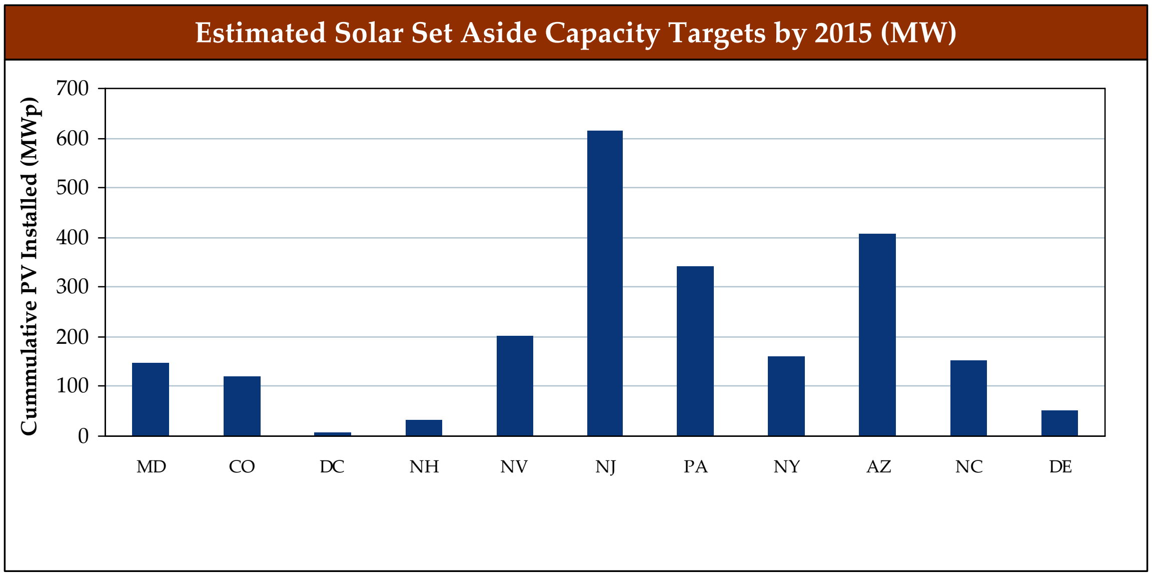

Figure 3-12. Solar Set-Aside Targets

NCI used two different system pricing cases. The first scenario assumed system prices decline at historical rates. The second scenario uses targets from the DOE's Solar America Initiative (SAI) program. DOE's targets are based on a combination of internal analysis of potential cost reductions in PV technologies and a review of information provided in applications submitted to the SAI Technology Pathway Partnership solicitation (during 2006). Table 3-2 lists the two pricing scenarios.

Table 3-2. System Pricing Assumptions

		Retrofit Installed System Price *($2007/Wpdc)*			New Construction Installed System Price *($2007/Wpdc)*		
System Price Scenario	Market Segment	2007	2010	2015	2007	2010	2015
Business-as-Usual (BAU)	Residential	$7.40	$6.20	$4.80	$7.40	$5.90	$4.50
	Commercial	$6.70	$5.80	$4.50	$6.70	$5.50	$4.20
Solar America Initiative(SAI)	Residential	$7.85	$5.11	$3.10	$7.10	$3.86	$2.44
	Commercial	$6.41	$3.75	$2.49	$6.23	$3.60	$2.32

At the time of this project, several bills are circulating through the U.S. House of Representatives and the U.S. Senate that would introduce some type of carbon legislation. During the course of this project, for illustration purposes we use the Senate's Low Carbon Economy Act bill sponsored by Senator Bingaman. The Act creates a national cap and trade system with a ceiling on the price of carbon, shown in Table 3-3. We assume carbon will trade at the ceiling price. To assess the effect of this on potential PV customers, we used carbon intensity data from EIA (in tones of CO_2 per kWh) and modeled the price of carbon as a surcharge on electric bills. Refer to the appendix for details on the calculations. The model includes a choice of whether or not carbon legislation is passed.

Table 3-3. Provisions of Low Carbon Economy Act

Year	Ceiling on Carbon Price [$/Tonne CO_2]
2007	$0.00
2008	$0.00
2009	$0.00
2010	$0.00
2011	$0.00
2012	$12.00
2013	$12.60
2014	$13.23
2015	$13.89

Time-of-Use (TOU) rates can significantly impact PV economics, yet they are not available in all areas. We created a scenario in which Time-of-Use rates are made available from every utility. To created TOU rates, we used a rate-multiplier approach. Within the 8 NERC regions, utilities from each state with established TOU rates were selected for analysis. For each utility, the ratio of peak to standard and non-peak to standard rates, for both the summer and winter seasons, were calculated. Overall averages of those ratios were then taken for each region to use as benchmarks when estimating TOU rates for those utilities that do not offer them. Another component of the rate-multiplier analysis involved the calculation of an average number of peak hours and start times of those peak periods within each region. Refer to the appendix for more detail.

The final two scenarios we analyzed involve incentives for PV. Federal incentives are set to expire at the end of 2008 (the commercial incentive will be reduced from 30% to 10%). However, the U.S. House of Representatives and the U.S. Senate are working on legislation to extend the tax credits. Each body has different provisions for extension and we worked with the Solar Industries Association to come up with a best guess as to what legislation will pass. The first scenario assumes the commercial incentive is extended to 2015 and the residential incentive is extended to 2010, with the $2,000/system cap lifted. The second scenario assumes the residential credit is fully extended to 2015 (with the $2,000/system cap lifted), along with the commercial credit.

We realize that many in the PV market have concerns surrounding the availability of installers to meet the demands of a growing PV market. In discussing this issue with stakeholders, we found that the time to train a qualified PV installer ranges from 6 weeks to 3 months, which fits within the 1 year temporal resolution of this model. To understand what the installer requirements will be, estimated installer requirements are calculated on a state-by-state basis for each year of analysis.

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4.0 Project Results

We conducted several model runs, varying each of the scenarios. The first run used worst-case (in terms of PV attractiveness) for each variable. The next run served as a base-case and used inputs that are more likely to occur. Using the base case as a starting point, we then looked at the impact of individual policy improvements for net metering, interconnection standards, and Time-of-Use rates, along with a full extension of the residential federal tax credit. Using the results of these four runs, we chose the two variables with the largest impact and looked at the results. Finally, we conducted a best-case run within the context of this model/set of assumptions. There is still the potential for more rapid market penetration, for example, if electricity prices rise faster then projected here, if states (or the federal government) institute more aggressive solar or climate related policies, etc. All runs were done with BAU and SAI system pricing.

Table 4-1. Inputs into each run

Scenario	Worst-Case	Base-Case	Focused Policies	Best-Case
Interconnection Policy Scenario	Current Rules	Current Rules	Improved	Improved
Net Metering Availability Scenario	Current Availability	Current Availability	Current Availability	Current Availability
Net Metering Cap Scenario	Current Caps	Current Caps	Current Caps	Caps Lifted
Cap and Trade Scenario	None	Low Carbon Economy Act	Low Carbon Economy Act	Low Carbon Economy Act
Electricity Price Escalation	EIA's Annual Energy Outlook	Accelerated	Accelerated	Accelerated
Federal Tax Credit	Baseline	Extended	Fully Extended	Fully Extended
Time-of-Use Rates	Current Availability	Current Availability	Current Availability	Nationwide Availability
RPS Solar Set Aside Enforcement	No	Yes	Yes	Yes

4.1 Worst Case

The first run used the worst-case of each input assumption, as shown in Table 4-2. The run assumes that federal tax credits are not extended (thus creating a labor supply issue as discussed in Section 3.3), carbon legislation is not passed, system price declines occur at historical levels, and electricity prices evolve per the EIA's projections. All of these factors combine to decrease the economic attractiveness of PV.

Table 4-2. Worst-Case Scenario Inputs

Scenario	Value
System Pricing Scenario	Business-As-Usual
Interconnection Policy Scenario	Current Rules
Net Metering Availability Scenario	Current Availability
Net Metering Cap Scenario	Current Caps
Cap and Trade Scenario	None
Electricity Price Escalation	EIA's Annual Energy Outlook
Federal Tax Credit	Baseline
Time-of-Use Rates	Current Availability
RPS Solar Set-Aside Enforcement	No

Figure 4-1 shows cumulative installations, by state, in 2015. A table of state-by-state results is in the appendix. Installations are strong in 2007 and 2008, but once the federal tax credits expire, the market shrinks by 90% in 2009. Significant installations only occur in California because of the California Solar Initiative. The assumption that RPS solar set-asides are not enforced has a large impact, as shown in Figure 4-2. Given that most RPS's have a ceiling on alternative compliance payments, market forces can only go so far in enforcing the solar set asides.

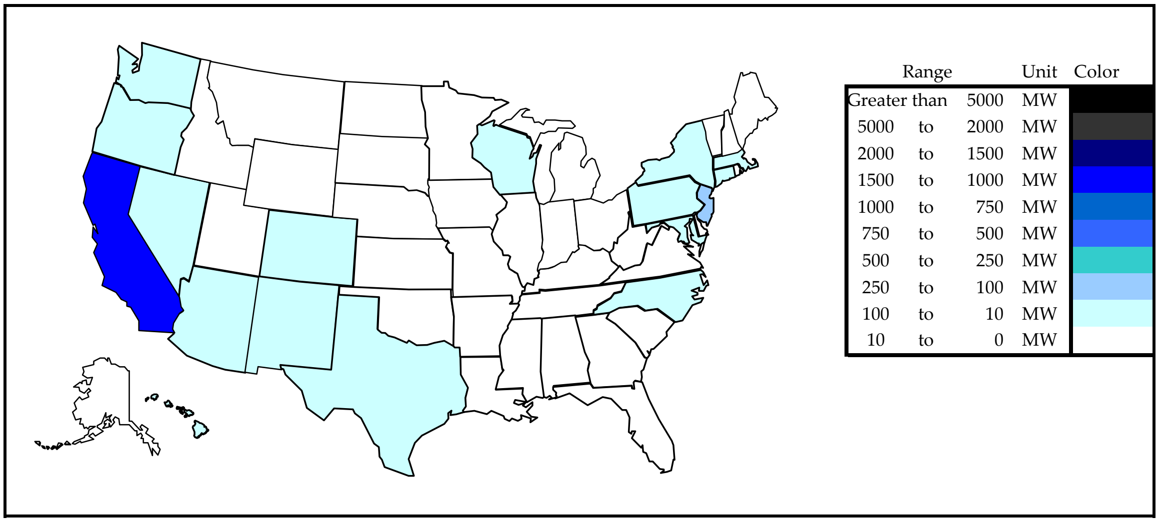

Figure 4-1. Cumulative Installations in 2015 Under the Worst-Case

Table 4-3. Nationwide Results for Worst-Case

Year	Annual Installations [MW]	Cumulative Installation [MW]	Installers Required [FTE]	Market Penetration [%]
2007	251	733	1,864	0.17%
2008	242	976	1,744	0.21%
2009	24	999	164	0.20%
2010	94	1,093	632	0.20%
2011	78	1,171	487	0.21%
2012	92	1,263	533	0.21%
2013	102	1,365	543	0.21%
2014	261	1,626	1,270	0.24%
2015	69	1,695	306	0.24%

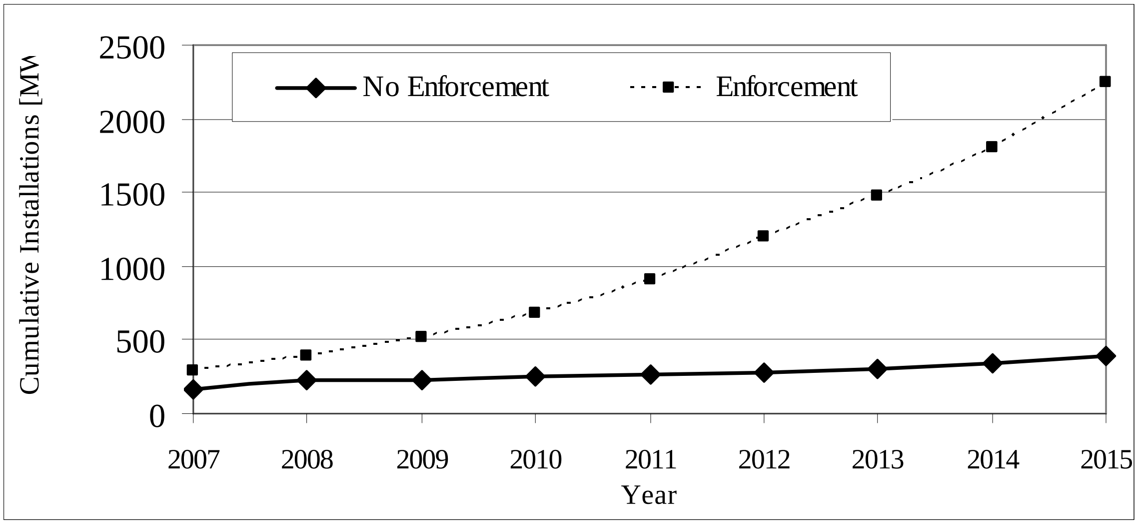

Figure 4-2. Impact of RPS solar set-asides, with all other scenarios at worst-case

4.2 Base Case

The next case studied used more probable scenario inputs. The federal tax credits are assumed to pass (but the residential tax credit is only extended to 2010), electricity prices are assumed to increase over time, carbon legislation is assumed to be enacted, and RPS solar set-asides are enforced, as detailed in Table 4-4. The resulting impact on market penetration is noticeable from the worst case, as shown in the figures below. State-by-state results are in the appendix. The extension of the tax credits and RPS enforcement have the largest impact. However, the market stalls temporarily in 2011 because the residential tax credit expires. BAU system pricing yields a 30% compound annual growth rate (CAGR) to 2015. SAI system pricing results in a ~44% increase in cumulative installations, with a 41%/Year CAGR.

Table 4-4. Base-Case Scenario Inputs

Scenario	Value
System Pricing Scenario	BAU/SAI
Interconnection Policy Scenario	Current Rules
Net Metering Availability Scenario	Current Availability
Net Metering Cap Scenario	Business-As-Usual
Cap and Trade Scenario	Low Carbon Economy Act
Electricity Price Escalation	Accelerated
Federal Tax Credit	Extended
Time-of-Use Rates	Current Availability
RPS Solar Set Aside Enforcement	Yes

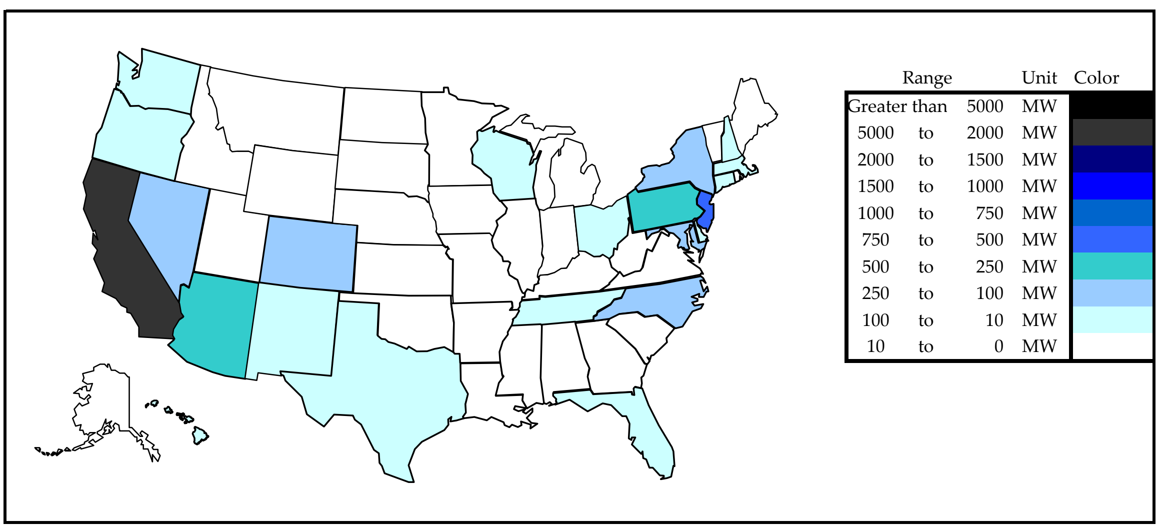

Figure 4-3. Cumulative Installations in 2015 Under the Base-case, with BAU System Pricing

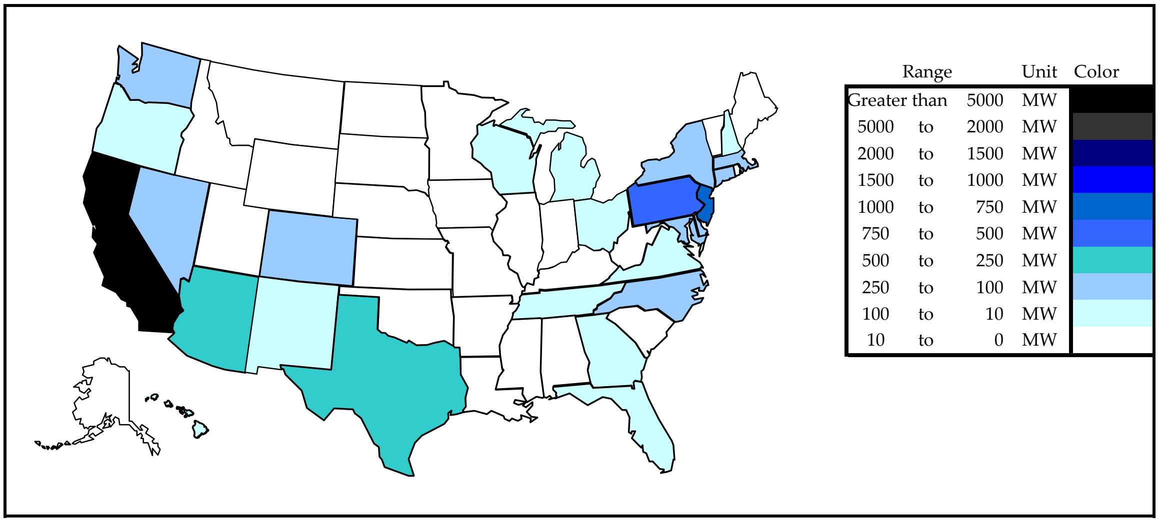

Figure 4-4. Cumulative Installations in 2015 Under the Base-Case, with SAI System Pricing

Table 4-5. Nationwide Results for the Base-Case, with BAU System Pricing

Year	Annual Installations [MW]	Cumulative Installation [MW]	Installers Required [FTE]	Market Penetration [%]
2007	251	733	1,864	0.17%
2008	727	1,461	4,124	0.31%
2009	413	1,874	2,874	0.37%
2010	576	2,449	3,865	0.46%
2011	235	2,685	1,472	0.47%
2012	291	2,976	1,686	0.49%
2013	661	3,636	3,524	0.57%
2014	734	4,370	3,576	0.64%
2015	1,455	5,825	6,425	0.81%

Table 4-6. Nationwide Results for the Base-Case, with SAI System Pricing

Year	Annual Installations [MW]	Cumulative Installation [MW]	Installers Required [FTE]	Market Penetration [%]
2007	251	733	1,864	0.17%
2008	862	1,596	5,096	0.34%
2009	677	2,272	4,706	0.45%
2010	1,562	3,834	10,488	0.71%
2011	233	4,067	1,456	0.71%
2012	730	4,797	4,233	0.79%
2013	1,736	6,533	9,260	1.02%
2014	2,306	8,840	11,243	1.30%
2015	2,910	11,750	12,849	1.64%

4.3 Focused Policy Cases

Realizing that large amounts of effort are required to change state level policies on a national scale, we took the two policies with the largest impact and ran them together with the base-case. Our analysis (shown in the appendix) found that improved interconnection policy and a full extension of the residential federal tax credit have the largest impact on cumulative installations in 2015 (14% and 25%, respectively). Table 4-7 shows the corresponding scenario inputs for the focused policy case. Figure 4-5 and Table 4-8 show the results. State-by-state results are in the appendix. With SAI system pricing, these two policies combine to increase (11,750 MW to 17,415 MW) cumulative installations ~50% by 2015 over the base-case.

Table 4-7. Focused Policy Case Inputs

Scenario	Value
System Pricing Scenario	BAU/SAI
Interconnection Policy Scenario	Current Rules
Net Metering Availability Scenario	Nationwide Availability
Net Metering Cap Scenario	Caps Lifted
Cap and Trade Scenario	Low Carbon Economy Act
Electricity Price Escalation	Accelerated
Federal Tax Credit	Fully Extended
Time-of-Use Rates	Current Availability
RPS Solar Set Aside Enforcement	Yes

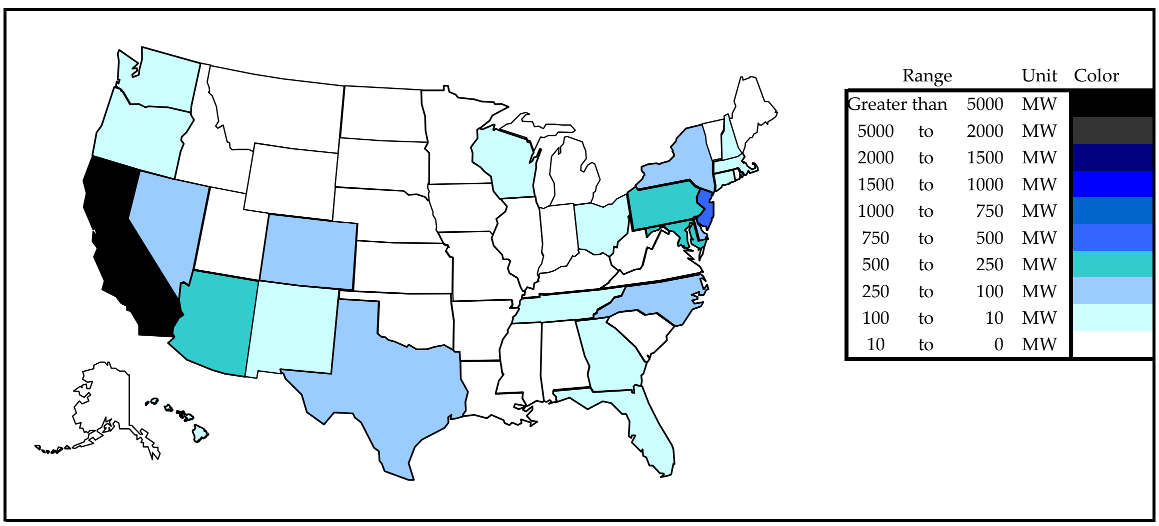

Figure 4-5. Cumulative Installations in 2015 in the Focused Policy Case, BAU System Pricing

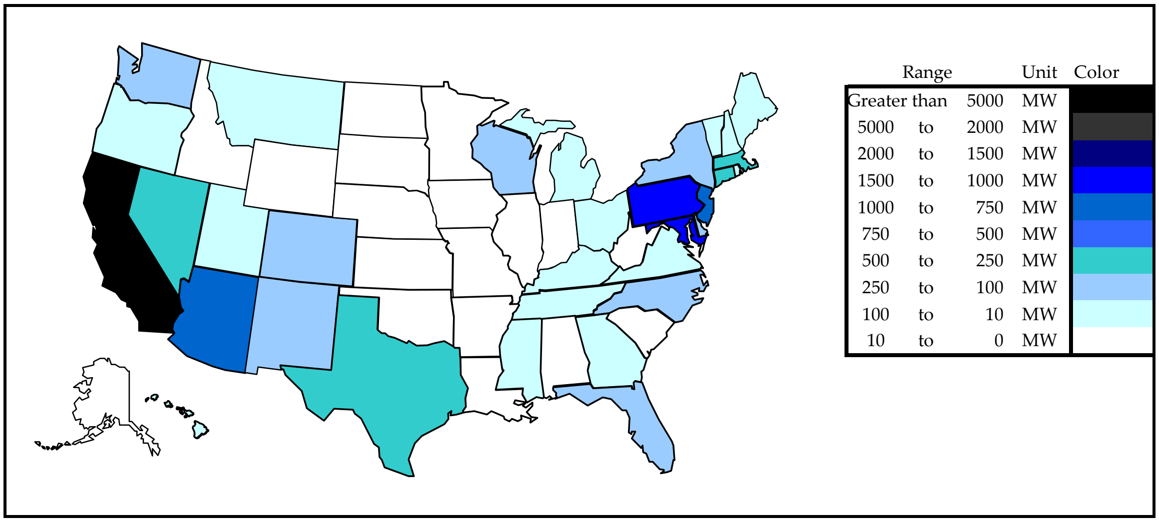

Figure 4-6. Cumulative Installations in 2015 in the Focused Policy Case, SAI System Pricing

Table 4-8. Nationwide Results for the Focused Policy Case, BAU System Pricing

Year	Annual Installations [MW]	Cumulative Installation [MW]	Installers Required [FTE]	Market Penetration [%]
2007	251	733	1,864	0.17%
2008	759	1,484	4,356	0.31%
2009	438	1,921	3,049	0.38%
2010	563	2,472	3,779	0.46%
2011	1,022	3,373	6,395	0.59%
2012	1,102	4,422	6,385	0.73%
2013	1,164	5,536	6,211	0.86%
2014	1,313	6,829	6,401	1.01%
2015	2,093	8,818	9,241	1.23%

Table 4-9. Nationwide Results for the Focused Policy Case, SAI System Pricing

Year	Annual Installations [MW]	Cumulative Installation [MW]	Installers Required [FTE]	Market Penetration [%]
2007	251	733	1,864	0.17%
2008	887	1,621	5,276	0.34%
2009	766	2,386	5,326	0.47%
2010	1,490	3,876	10,005	0.72%
2011	1,150	5,026	7,191	0.88%
2012	3,017	8,043	17,482	1.33%
2013	2,093	10,136	11,167	1.58%
2014	2,905	13,041	14,163	1.92%
2015	4,374	17,415	19,309	2.43%

4.4 Best Case

The final case analyzed used best-case inputs (in terms of PV attractiveness) as shown in Table 4-10. Figure 4-7 and Table 4-11 show the results, and state-by-state results are in the appendix. Achieving policy improvement in all of these areas would require a large effort and potentially lots of federal funding, but if successful, a very large, sustained demand (50%/Year CAGR to 2015 with SAI pricing) can be created.

Table 4-10. Best-Case Scenario Inputs

Scenario	Value
System Pricing Scenario	BAU/SAI
Interconnection Policy Scenario	Improved
Year of Policy Implementation	2008
Net Metering Availability Scenario	Nationwide Availability
Net Metering Cap Scenario	Caps Lifted
Cap and Trade Scenario	Low Carbon Economy Act
Electricity Price Escalation	Accelerated
Federal Tax Credit	Fully Extended
Time-of-Use Rates	Nationwide Availability
RPS Solar Set Aside Enforcement	Yes

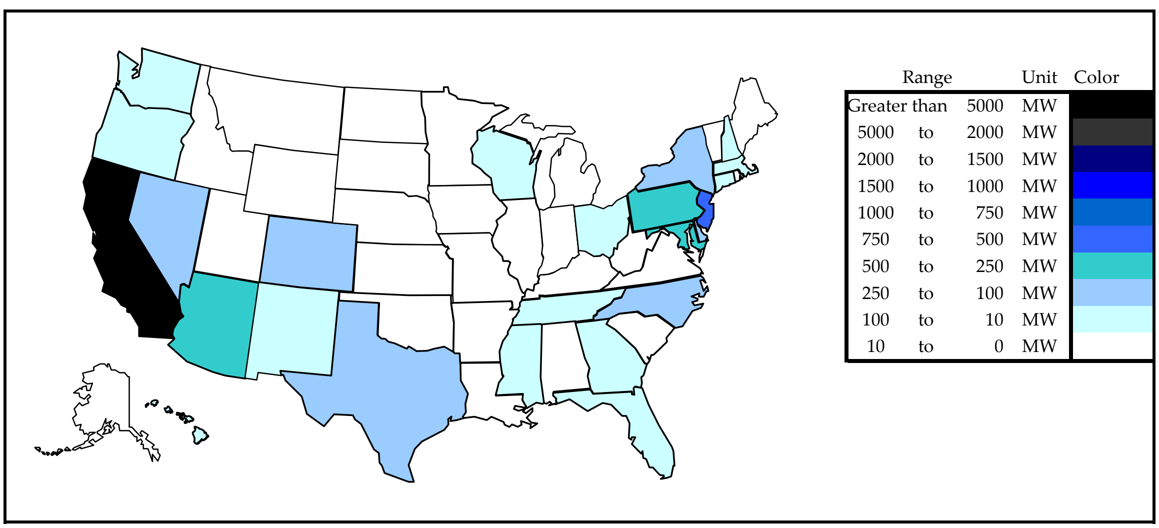

Figure 4-7. Cumulative Installations in 2015 in the Best-case, BAU System Pricing

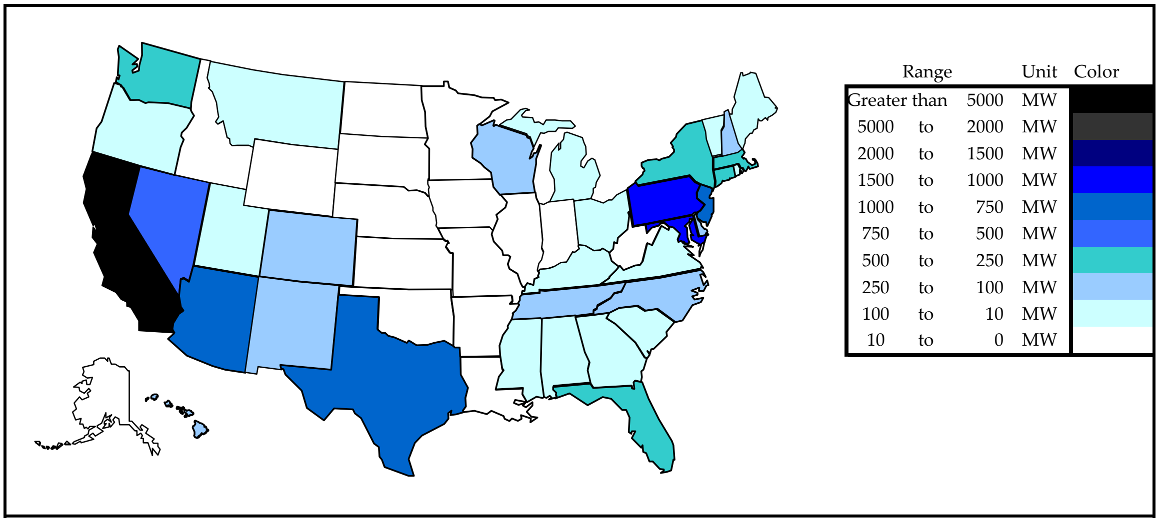

Figure 4-8. Cumulative Installations in 2015 in the Best-case, SAI System Pricing

Table 4-11. Nationwide Results for the Best-case, BAU System Pricing

Year	Annual Installations [MW]	Cumulative Installation [MW]	Installers Required [FTE]	Market Penetration [%]
2007	251	733	1,864	0.17%
2008	759	1,493	4,356	0.31%
2009	438	1,931	3,049	0.38%
2010	563	2,494	3,779	0.46%
2011	1,022	3,516	6,395	0.62%
2012	1,102	4,618	6,385	0.76%
2013	1,164	5,782	6,211	0.90%
2014	1,313	7,095	6,401	1.05%
2015	2,093	9,188	9,241	1.28%

Table 4-12. Nationwide Results for the Best-case, SAI System Pricing

Year	Annual Installations [MW]	Cumulative Installation [MW]	Installers Required [FTE]	Market Penetration [%]
2007	251	733	1,864	0.17%
2008	895	1,628	5,329	0.34%
2009	747	2,375	5,195	0.47%
2010	1,595	3,970	10,713	0.74%
2011	1,196	5,166	7,479	0.91%
2012	3,003	8,169	17,400	1.35%
2013	2,512	10,681	13,402	1.67%
2014	3,810	14,491	18,575	2.14%
2015	6,361	20,852	28,083	2.91%

5.0 Conclusions and Recommendations

The critical findings in this report are the influences of each of the scenarios discussed. The input with the largest impact is system pricing. In the base-case, focused policy case, and best-case, using SAI system pricing resulted in a ~ 200% increase in cumulative installations by 2015. Other scenarios with large impact are interconnection policy improvement and extension of the federal tax credit. Figure 5-1 below shows these variables, combined.

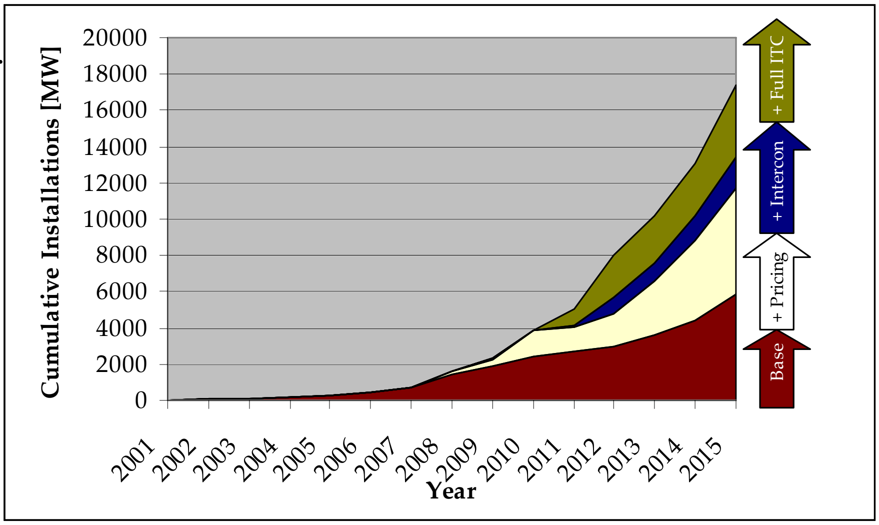

Figure 5-1. Influence of System Pricing, Interconnection Policy, and the Residential Federal Tax Credit on Cumulative Installations

During the course of this project, we identified several items that might enhance this analysis.

The first would be an easily accessible database of building load profiles, similar to PV Watts for PV output profiles. Fortunately, NREL had commercial building load profiles easily available for use, but the time required to generate profiles prevented us from using a unique residential profile for each utility analyzed. If a database of sample profiles was available, we could have used them for its residential analysis.

This analysis focused on rooftop applications, but other potential structures, such as parking garages or carports, are suited for PV installations. A useful activity might be to assess the feasibility of conducting a market potential analysis for PV on non-occupied structures. Additionally, this study did not assess the potential for ground mounted structures. A feasibility study should be conducted to identify or create methods and models for calculating the market potential for ground mounted systems.

As discussed in Section 3.3, many groups within the PV industry and those that monitor the PV industry (such as the investment community) have concerns surrounding the supply of installers to meet growing demand. In discussing this issue with stakeholders, we found that the time to train a qualified PV installer ranges from 6 weeks to 3 months, which fits within the 1 year temporal resolution of this model. To understand what the installer requirements will be, estimated installer requirements are calculated on a state-by-state basis for each year of analysis. However, actually modeling installer supply dynamics and feeding the results back into the model would provide valuable insight.

This model looks solely at the US market and uses two sets of pricing assumptions that do not take demand outside the US into account. If international markets (such as Spain or South Korea) have drastic surges in demand, module supply could be diverted to those markets. A supply constrained environment would develop in the US, and prices might not fall.

One key variable this model does not address is the impact of system financing. The market penetration curves used in this model use simple pay-back as inputs, and do not consider financing. In reality, interest payments for financed systems affect economic attractiveness. Also, this model can not assess the impact of innovative financing mechanisms or new business models (such as the PPA model) developing in the US market. These drawbacks point to the need for the development of a return on investment or demand-elasticity based market penetration model.

Finally, this model does not look at two key variables concerning retail electricity rates. The first is that the model does not take into account possible electricity price feedbacks if the demand for grid power drops because of significant deployment of PV. The second is that the two electricity price scenarios used do not look at markets where electric rates might jump significantly because of regulatory changes (such as Texas). Electric rate jumps would increase the demand for PV.

6.0 References

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7.0 Glossary

CBECS – Commercial Building Energy Consumption Survey
EIA – Energy Information Administration
IREC – Interstate Renewable Energy Council
MW – Megawatt
NCI - Navigant Consulting Inc.
O&M – Operation and Maintenance
RECS – Residential Energy Consumption Survey
RPS – Renewable Portfolio Standard
RSI – Renewable System Integration
TOU – Time-Of-Use

8.0 Appendices

8.1 Net Metering Improvements

After establishing a base-case, we looked at the impact of lifting net-metering caps and allowing net metering in all states, as shown in Table 8-1. Figure 8-1 and Table 8-2 show the cumulative installations in 2015 and nationwide results, respectively.

Table 8-1. Net Metering Improvements - Case Scenario Inputs

Scenario	Value
System Pricing Scenario	**SAI**
Interconnection Policy Scenario	Current Rules
Net Metering Availability Scenario	Nationwide Availability
Net Metering Cap Scenario	Caps Lifted
Cap and Trade Scenario	Low Carbon Economy Act
Electricity Price Escalation	Accelerated
Federal Tax Credit	Extended
Time-of-Use Rates	Current Availability
RPS Solar Set Aside Enforcement	Yes

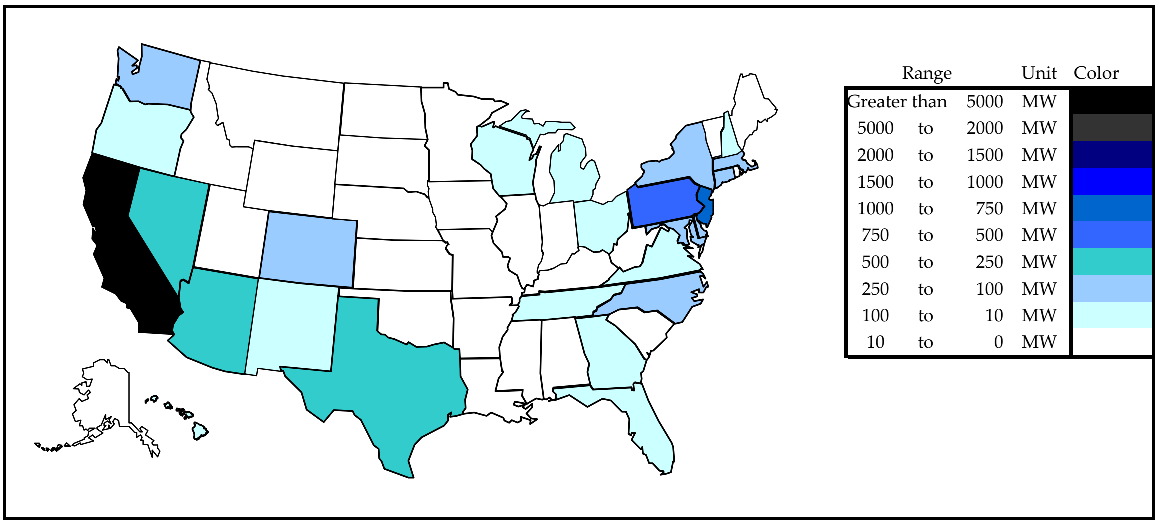

Figure 8-1. Cumulative Installations in 2015 in the Net Metering Improvement Case

Table 8-2. Nationwide Results for Net Metering Improvement Case

Year	Annual Installations [MW]	Cumulative Installation [MW]	Installers Required [FTE]	Market Penetration [%]
2007	251	733	1,864	0.17%
2008	864	1,597	5,106	0.34%
2009	677	2,274	4,706	0.45%
2010	1,698	3,972	11,405	0.74%
2011	231	4,203	1,443	0.74%
2012	717	4,919	4,152	0.81%
2013	1,823	6,743	9,727	1.05%
2014	2,348	9,090	11,445	1.34%
2015	3,098	12,189	13,678	1.70%

Lifting of net metering caps and establishment of net metering has noticeable impacts in a few states –Florida, Nevada, and New Hampshire. Florida currently does not allow net metering. Nevada has a net metering cap of 1% of a utilities peak load. Finally, New Hampshire has a net metering cap of 0.1% of a utilities peak load.

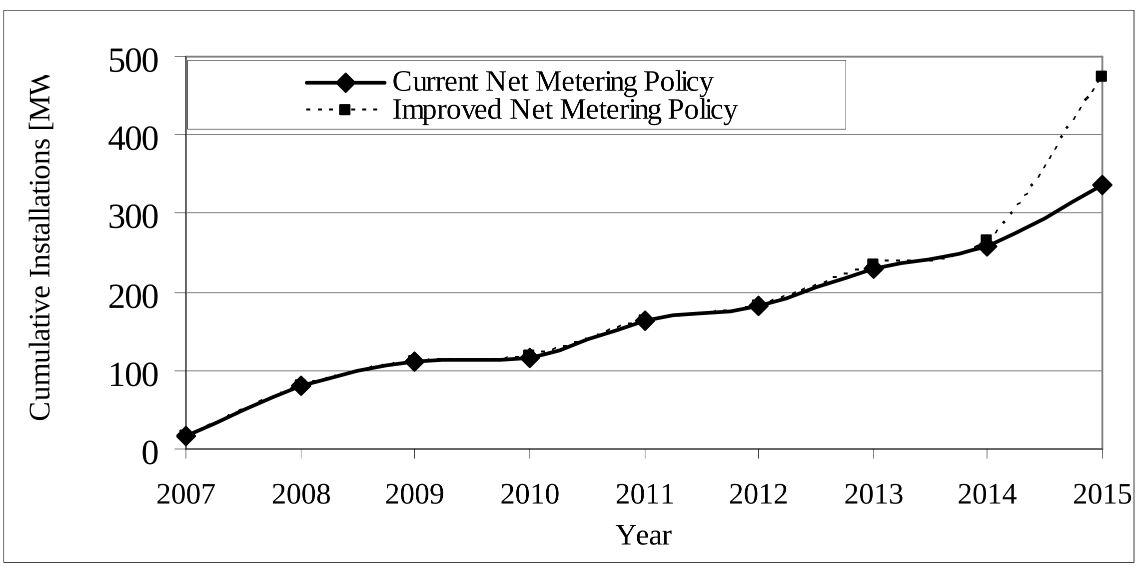

Figure 8-2. Impact of improved net metering policies in Florida, Nevada, and New Hampshire

8.2 Interconnection Standard Improvements

The next case started back at the base case and looked at improved interconnection standards, as shown in Table 8-3. Many states (or utilities) have interconnection standards that inhibit PV adoption. However, many states legislatures are in the process of revising their interconnection standards. This case examines the impact of all states improving their interconnection standards to "superior" per the IREC rating in Table 3-1 and the improved standards are in place by 2008. The results are shown in Figure 8-3 and Table 8-4.

Table 8-3. Interconnection Standard Improvements Case Scenario Inputs

Scenario	Value
System Pricing Scenario	SAI
Interconnection Policy Scenario	Improved
Year of Policy Implementation	2008
Net Metering Availability Scenario	Current Availability
Net Metering Cap Scenario	Business-As-Usual
Cap and Trade Scenario	Low Carbon Economy Act
Electricity Price Escalation	Accelerated
Federal Tax Credit	Extended
Time-of-Use Rates	Current Availability
RPS Solar Set-Aside Enforcement	Yes

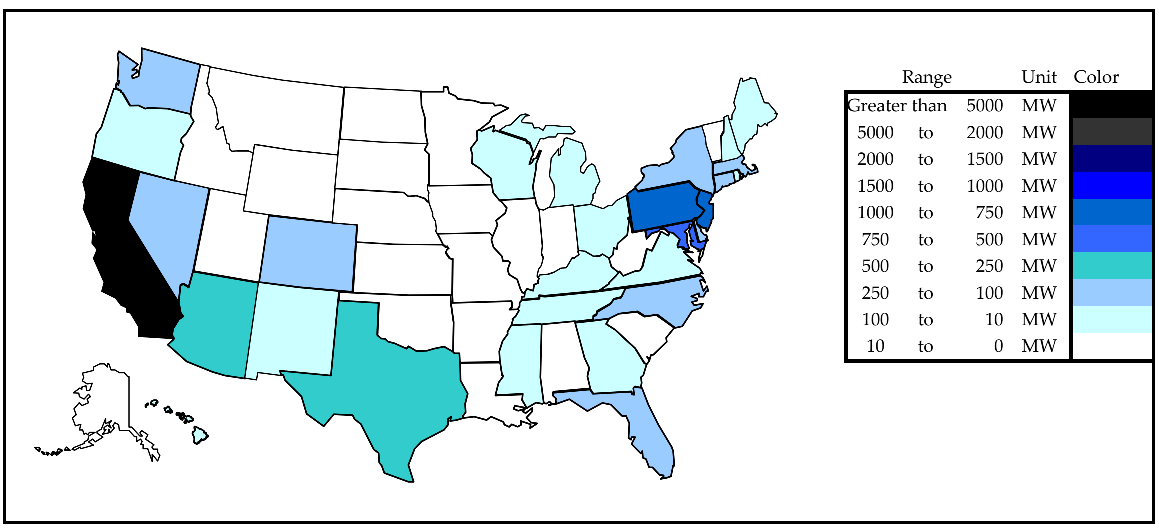

Figure 8-3. Cumulative Installations in 2015 in the Interconnection Standards Improvement Case

Table 8-4. Nationwide Results for Interconnection Standards Improvement Case

Year	Annual Installations [MW]	Cumulative Installation [MW]	Installers Required [FTE]	Market Penetration [%]
2007	251	733	1,864	0.17%
2008	887	1,621	5,276	0.34%
2009	766	2,386	5,326	0.47%
2010	1,490	3,876	10,005	0.72%
2011	253	4,130	1,584	0.72%
2012	1,530	5,660	8,867	0.94%
2013	1,890	7,549	10,081	1.18%
2014	2,592	10,142	12,637	1.50%
2015	3,255	13,397	14,371	1.87%

Improving interconnection standards has a large impact in the following states that have interconnection assessments of "poor" or below: Florida (Poor), Georgia (Poor), Maine (Barrier), Maryland (Barrier), New Mexico (Barrier), Tennessee (Barrier), and Washington (Poor). Figure 8-4 shows a ~140% increase in cumulative installations by 2015 in these states if interconnection standards are improved.

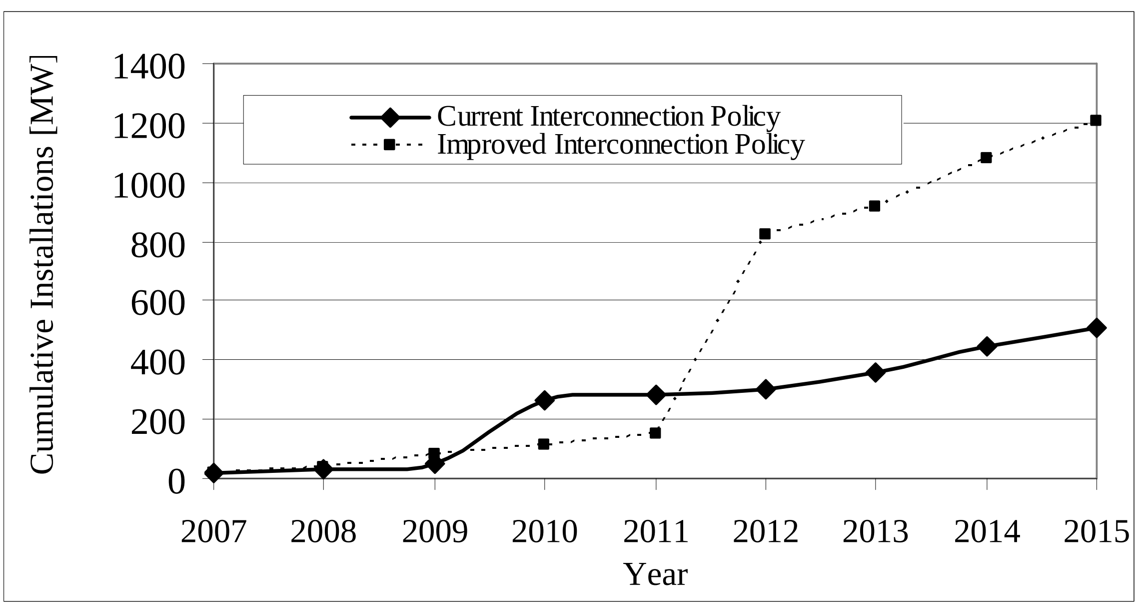

Figure 8-4. Result of Improved Interconnection Standards in FL, GA, ME, MD, NM, TN, and WA

8.3 Nationwide Availability of Time-of-Use Rates

The next case run assumed Time-of-Use rates were available from every utility, as shown in Table 8-5. We reviewed the economics in each utility region to determine if standard or Time-of-Use rates resulted in lower annual electric bills, and chose the cheaper option. Figure 8-5 and Table 8-6 show the results. Most markets already have Time-of-Use rates, but Florida (specifically Florida Power and Light) and New Hampshire (Unitil Energy) do not currently offer Time-of-Use rates. The statewide impacts on demand in those states is shown in Figure 8-6.

Table 8-5. Time-of-Use Availability Case Scenario Inputs

Scenario	Value
System Pricing Scenario	SAI
Interconnection Policy Scenario	Current Rules
Net Metering Availability Scenario	Current Availability
Net Metering Cap Scenario	Business-As-Usual
Cap and Trade Scenario	Low Carbon Economy Act
Electricity Price Escalation	Accelerated
Federal Tax Credit	Extended
Time-of-Use Rates	Nationwide Availability
RPS Solar Set Aside Enforcement	Yes

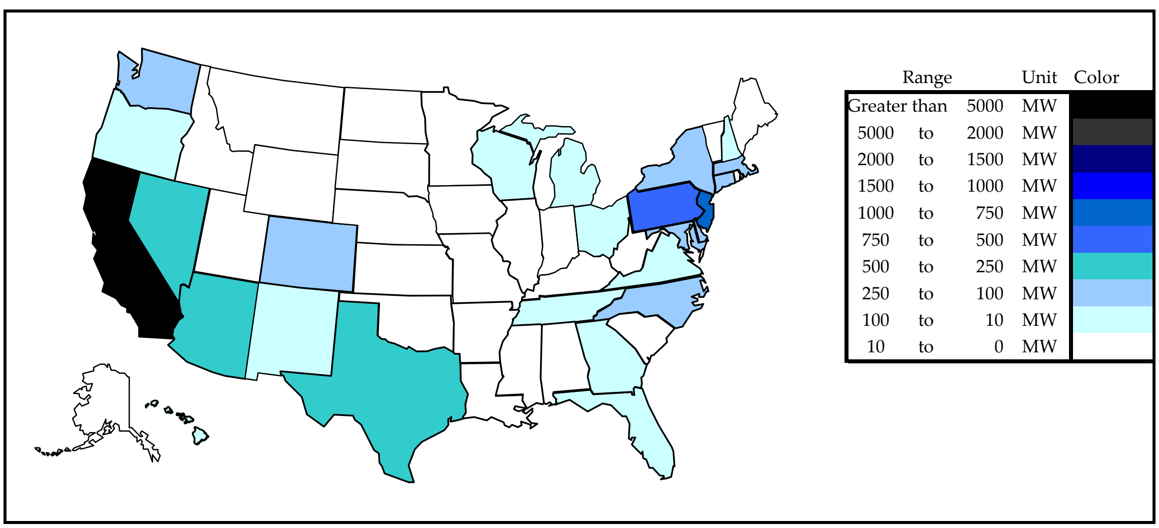

Figure 8-5. Cumulative Installations in 2015 in the Time-of-Use Availability Case

Table 8-6. Nationwide Results for the Time-of-Use Availability Case

Year	Annual Installations [MW]	Cumulative Installation [MW]	Installers Required [FTE]	Market Penetration [%]
2007	251	733	1,864	0.17%
2008	864	1,597	5,106	0.34%
2009	677	2,274	4,706	0.45%
2010	1,564	3,838	10,502	0.71%
2011	231	4,068	1,443	0.71%
2012	730	4,798	4,228	0.79%
2013	1,744	6,542	9,303	1.02%
2014	2,314	8,856	11,283	1.31%
2015	3,045	11,901	13,443	1.66%

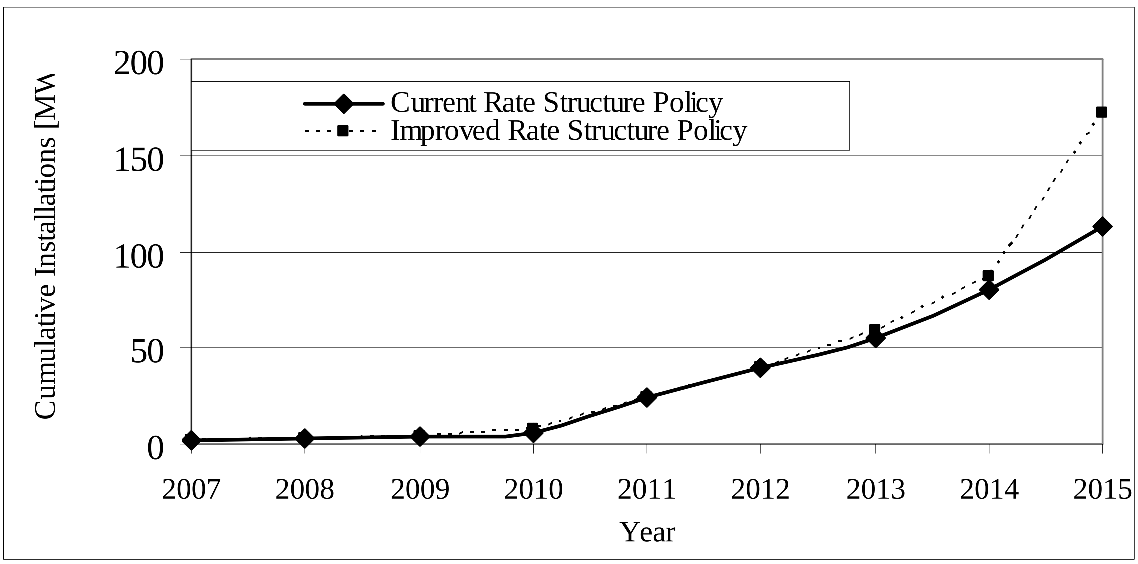

Figure 8-6. Impact of Time-of-Use rates in FL and NH

8.4 Fully Extended Residential Federal Tax Credit

To look at the impact of the Federal Tax Credit, we assumed the residential federal tax credit was extended until 2016. Table 8-7 shows the scenario inputs, while Figure 8 -7 and Table 8-8 show the resulting cumulative installations. The extension affects all markets, but the impacts are strongest in California, Connecticut, Delaware, Massachusetts, Pennsylvania, and Texas, as shown by Figure 8-8.

Table 8-7. Fully Extended Federal Tax Credit Scenario Inputs

Scenario	Value
System Pricing Scenario	SAI
Interconnection Policy Scenario	Current Rules
Net Metering Availability Scenario	Current Availability
Net Metering Cap Scenario	Business-As-Usual
Cap and Trade Scenario	Low Carbon Economy Act
Electricity Price Escalation	Accelerated
Federal Tax Credit	Fully Extended
Time-of-Use Rates	Current Availability

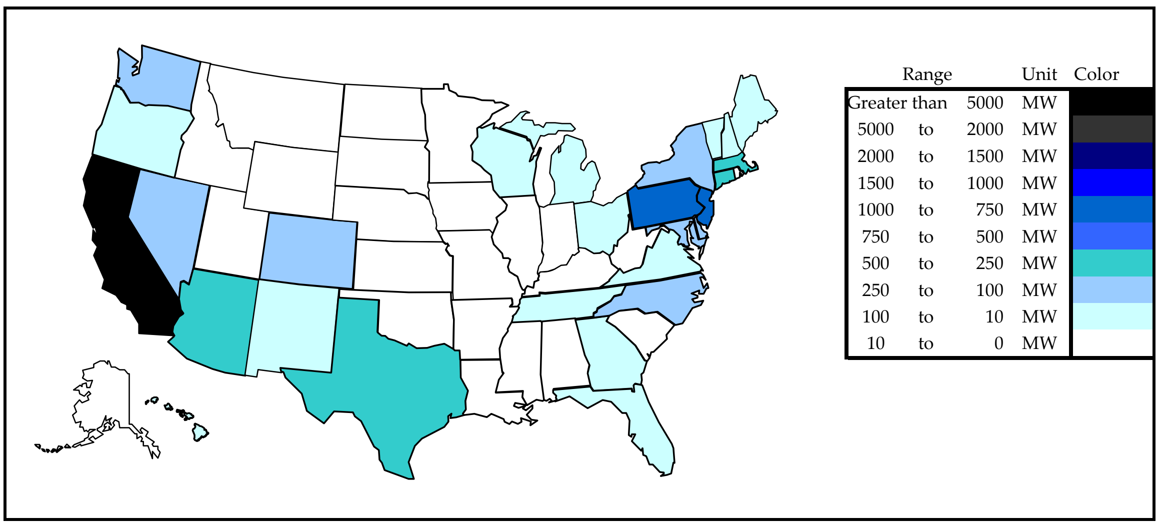

Figure 8 -7. Cumulative Installations in 2015: Fully Extended Tax Credit Case

Table 8-8. Nationwide Results for the Fully Extended Tax Credit Case

Year	Annual Installations [MW]	Cumulative Installation [MW]	Installers Required [FTE]	Market Penetration [%]
2007	251	733	1,864	0.17%
2008	862	1,596	5,096	0.34%
2009	677	2,272	4,706	0.45%
2010	1,562	3,834	10,488	0.71%
2011	1,008	4,842	6,306	0.85%
2012	1,845	6,687	10,692	1.11%
2013	1,865	8,553	9,951	1.34%
2014	2,558	11,110	12,469	1.64%
2015	3,564	14,674	15,733	2.05%

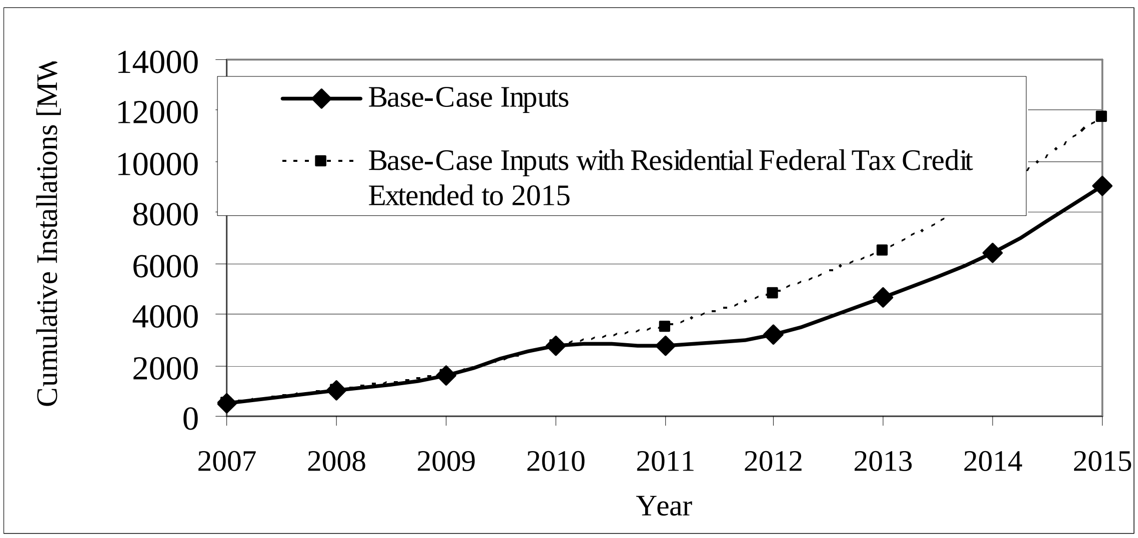

Figure 8-8. Impact of Extending the Residential Federal Tax Credit through 2015 in CA, CT, DE, MA, PA, and TX.

8.5 State-by-state results

Table 8-9. State-by-state Technical Potential, Over Time

	Alabama	Alaska	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	Florida	Georgia	Hawaii	Idaho	Illinois
2007	9,307	834	10,438	4,620	51,287	7,721	3,957	1,208	33,836	16,452	1,869	2,178	17,464
2008	9,936	884	11,394	4,922	54,685	8,306	4,175	1,305	36,867	17,820	1,992	2,367	18,506
2009	10,565	940	12,405	5,243	58,147	8,925	4,399	1,395	39,927	19,256	2,112	2,563	19,581
2010	11,208	995	13,477	5,543	61,734	9,581	4,629	1,486	43,000	20,738	2,238	2,765	20,672
2011	11,855	1,050	14,579	5,849	65,377	10,249	4,858	1,579	46,133	22,254	2,366	2,968	21,771
2012	12,514	1,105	15,725	6,162	69,125	10,940	5,094	1,676	49,469	23,838	2,497	3,177	22,882
2013	13,217	1,164	16,995	6,498	73,040	11,677	5,333	1,782	53,139	25,561	2,633	3,412	24,043
2014	13,940	1,225	18,345	6,843	77,076	12,449	5,575	1,893	57,009	27,372	2,774	3,660	25,231
2015	14,686	1,286	19,778	7,198	81,237	13,256	5,822	2,008	61,090	29,277	2,919	3,922	26,445

	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Mass.	Michigan	Minnesota	Mississippi	Missouri
2007	9,836	4,569	4,412	7,540	8,298	1,472	8,143	6,908	14,242	8,021	5,169	8,425
2008	10,466	4,841	4,676	8,022	8,840	1,561	8,684	7,291	15,057	8,526	5,505	8,967
2009	11,129	5,123	4,951	8,533	9,400	1,649	9,231	7,678	15,904	9,056	5,841	9,517
2010	11,803	5,409	5,234	9,053	9,938	1,739	9,788	8,078	16,765	9,593	6,188	10,075
2011	12,487	5,692	5,521	9,575	10,484	1,831	10,356	8,482	17,635	10,137	6,537	10,639
2012	13,187	5,979	5,814	10,105	11,039	1,926	10,937	8,895	18,528	10,699	6,887	11,218
2013	13,922	6,282	6,115	10,666	11,633	2,023	11,550	9,312	19,441	11,281	7,261	11,824
2014	14,679	6,591	6,424	11,245	12,243	2,122	12,181	9,736	20,374	11,879	7,647	12,447
2015	15,459	6,907	6,739	11,841	12,870	2,224	12,831	10,166	21,326	12,495	8,043	13,087

	Montana	Nebraska	Nevada	NH	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania
2007	1,225	2,692	5,003	1,402	7,744	2,831	14,414	16,787	1,032	18,026	6,352	5,192	11,278
2008	1,297	2,866	5,505	1,491	8,185	3,020	15,181	18,054	1,093	19,060	6,739	5,551	11,906
2009	1,371	3,041	6,040	1,583	8,655	3,219	15,957	19,401	1,155	20,139	7,144	5,942	12,562
2010	1,448	3,221	6,605	1,676	9,124	3,431	16,739	20,757	1,217	21,231	7,549	6,341	13,224
2011	1,525	3,402	7,177	1,771	9,596	3,645	17,520	22,141	1,279	22,331	7,963	6,747	13,886
2012	1,604	3,588	7,772	1,869	10,079	3,863	18,312	23,594	1,341	23,456	8,383	7,162	14,561
2013	1,685	3,783	8,453	1,970	10,575	4,092	19,122	25,143	1,407	24,611	8,820	7,604	15,253
2014	1,768	3,984	9,183	2,075	11,082	4,329	19,942	26,760	1,474	25,790	9,268	8,063	15,958
2015	1,853	4,190	9,965	2,182	11,599	4,573	20,771	28,447	1,543	26,993	9,727	8,539	16,675

	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	DC	West Virginia	Wisconsin	Wyoming
2007	1,029	7,563	1,098	11,688	42,458	3,664	703	13,465	8,959	1,227	2,449	8,098	762
2008	1,084	8,165	1,168	12,495	45,621	3,964	745	14,429	9,595	1,291	2,586	8,601	811
2009	1,141	8,787	1,241	13,325	48,923	4,265	786	15,392	10,275	1,364	2,719	9,108	862
2010	1,198	9,407	1,315	14,183	52,235	4,595	829	16,394	10,971	1,441	2,853	9,634	913
2011	1,255	10,039	1,388	15,049	55,632	4,927	872	17,417	11,681	1,516	2,985	10,165	964
2012	1,314	10,710	1,463	15,936	59,128	5,269	917	18,476	12,413	1,590	3,116	10,713	1,015
2013	1,373	11,431	1,543	16,878	62,891	5,641	962	19,594	13,190	1,668	3,256	11,279	1,070
2014	1,434	12,184	1,625	17,851	66,807	6,032	1,008	20,754	13,997	1,747	3,397	11,860	1,127
2015	1,495	12,972	1,709	18,859	70,882	6,442	1,056	21,955	14,835	1,828	3,541	12,457	1,186

Table 8-10. State-by-State Results for the Worst-case

		Alabama	Alaska	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	Florida	Georgia	Hawaii	Idaho	Illinois
Cumulative Installations	2007	1	1	14	1	499	20	3	1	1	1	6	1	1
	2008	1	1	21	1	614	20	3	8	2	1	10	1	1
	2009	1	1	21	1	633	20	4	8	2	1	10	1	1
	2010	1	1	21	1	695	20	4	8	2	1	10	1	1
	2011	1	1	21	1	758	20	5	8	2	1	10	1	1
	2012	1	1	21	1	819	20	7	8	2	1	10	1	1
	2013	1	1	21	1	882	20	10	8	2	1	10	1	1
	2014	1	1	21	1	1,086	20	13	8	2	1	10	1	1
	2015	1	1	21	1	1,086	20	16	8	4	1	10	1	1
Annual Installations	2007	0	0	5	0	166	6	1	1	1	0	3	0	0
	2008	0	0	7	0	116	0	0	7	1	0	4	0	0
	2009	0	0	0	0	19	0	1	0	0	0	0	0	0
	2010	0	0	0	0	62	0	1	0	0	0	0	0	0
	2011	0	0	0	0	63	0	1	0	0	0	0	0	0
	2012	0	0	0	0	61	0	2	0	0	0	0	0	0
	2013	0	0	0	0	63	0	3	0	0	0	0	0	0
	2014	0	0	0	0	203	0	3	0	0	0	0	0	0
	2015	0	0	0	0	0	0	3	0	2	0	0	0	0
Installers Required	2007	0	0	35	0	1,232	48	7	4	4	0	23	0	0
	2008	0	0	48	0	833	0	2	48	6	0	31	1	0
	2009	0	0	0	0	132	0	5	0	0	0	0	0	0
	2010	0	0	0	0	414	0	5	0	0	0	0	0	0
	2011	0	0	0	0	397	0	7	0	0	0	0	0	0
	2012	0	0	0	0	353	0	11	0	0	0	0	0	0
	2013	0	0	0	0	338	0	14	0	0	0	0	0	0
	2014	0	0	0	0	991	0	15	0	1	0	0	0	0
	2015	0	0	0	0	0	0	15	0	7	0	0	0	0
Market Penetration	2007	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	1%	0%	0%
	2009	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%
	2010	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%
	2011	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2012	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2013	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2014	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2015	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%

		Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Mass.	Michigan	Minnesota	Mississippi	Missouri
Cumulative Installations	2007	1	1	1	1	1	2	2	7	1	1	1	1
	2008	1	1	1	1	1	2	2	12	1	1	1	1
	2009	1	1	1	1	1	2	5	12	1	1	1	1
	2010	1	1	1	1	1	2	20	14	1	1	1	1
	2011	1	1	1	1	1	2	23	14	1	1	1	1
	2012	1	1	1	1	1	2	31	14	1	1	1	1
	2013	1	1	1	1	1	2	33	14	1	1	1	1
	2014	1	1	1	1	1	2	42	17	1	1	1	1
	2015	1	1	1	1	1	2	42	21	1	1	1	1
Annual Installations	2007	0	0	0	0	0	1	1	2	1	0	0	0
	2008	0	0	0	1	0	0	0	5	0	0	0	0
	2009	0	0	0	0	0	0	3	0	0	0	0	0
	2010	0	0	0	0	0	0	15	3	0	0	0	0
	2011	0	0	0	0	0	0	3	0	0	0	0	0
	2012	0	0	0	0	0	0	8	0	0	0	0	0
	2013	0	0	0	0	0	0	2	0	0	0	0	0
	2014	0	0	0	0	0	0	9	3	0	0	0	0
	2015	0	0	0	0	0	0	0	5	0	0	0	0
Installers Required	2007	0	0	0	0	0	7	7	16	4	0	0	0
	2008	0	0	0	6	0	0	0	34	0	0	0	0
	2009	0	0	0	0	0	0	24	0	0	0	0	0
	2010	0	0	0	0	0	1	98	17	0	0	0	0
	2011	0	0	0	0	0	0	21	0	0	0	0	0
	2012	0	0	0	0	0	0	44	0	0	0	0	0
	2013	0	0	0	0	0	0	10	0	0	0	0	0
	2014	0	0	0	0	0	0	45	13	0	0	0	0
	2015	0	0	0	0	0	1	0	21	0	0	0	0
Market Penetration	2007	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2009	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2010	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2011	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2012	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2013	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2014	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2015	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

		Montana	Nebraska	Nevada	NH	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania
Cumulative Installations	2007	1	1	15	1	69	9	32	3	1	2	1	2	9
	2008	1	1	17	1	103	10	35	7	1	4	1	35	11
	2009	1	1	17	1	103	10	35	7	1	4	1	35	11
	2010	1	1	17	2	103	10	35	11	1	4	1	35	15
	2011	1	1	18	3	103	10	35	11	1	4	1	35	18
	2012	1	1	19	4	109	10	36	11	1	4	1	35	22
	2013	1	1	22	5	122	10	39	11	1	4	1	35	27
	2014	1	1	25	6	139	10	42	11	1	4	1	35	34
	2015	1	1	29	7	161	10	47	11	1	4	1	35	43
Annual Installations	2007	0	0	7	1	29	3	10	1	0	1	0	1	3
	2008	1	0	2	0	34	1	2	4	0	2	0	33	2
	2009	0	0	0	0	0	0	0	0	0	0	0	0	0
	2010	0	0	0	1	0	0	0	4	0	0	0	0	4
	2011	0	0	1	1	0	0	0	0	0	0	0	0	3
	2012	0	0	1	1	6	0	2	0	0	0	0	0	4
	2013	0	0	2	1	13	0	3	0	0	0	0	0	5
	2014	0	0	3	1	17	0	3	0	0	0	0	0	7
	2015	0	0	4	1	22	0	5	0	0	0	0	0	9
Installers Required	2007	0	0	56	4	213	24	71	7	0	4	0	4	19
	2008	7	0	13	0	243	11	17	32	0	15	0	238	12
	2009	0	0	0	0	0	0	0	0	0	0	0	0	3
	2010	0	0	1	9	0	0	0	24	0	0	0	0	25
	2011	0	0	6	4	0	0	0	0	0	0	0	0	19
	2012	0	0	7	4	35	0	9	0	0	0	0	0	24
	2013	0	0	13	5	70	0	14	0	0	0	0	0	29
	2014	0	0	15	5	81	0	15	0	0	0	0	0	32
	2015	0	0	19	5	97	0	23	0	0	0	0	0	41
Market Penetration	2007	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	1%	0%
	2009	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	1%	0%
	2010	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	1%	0%
	2011	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	1%	0%
	2012	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2013	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2014	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2015	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%

		Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	DC	West Virginia	Wisconsin	Wyoming
Cumulative Installations	2007	1	2	1	1	6	1	2	1	6	1	1	6	1
	2008	1	2	1	6	9	1	2	6	9	1	1	10	1
	2009	1	2	1	6	9	1	2	6	9	1	1	10	1
	2010	1	2	1	6	14	1	2	6	9	1	1	10	1
	2011	1	2	1	6	18	1	2	6	11	1	1	10	1
	2012	1	2	1	6	24	1	2	6	12	2	1	10	1
	2013	1	2	1	6	31	1	2	6	14	2	1	10	1
	2014	1	2	1	6	40	1	2	6	17	2	1	10	1
	2015	1	2	1	6	55	1	3	6	17	3	1	11	1
Annual Installations	2007	1	1	0	0	1	1	1	1	3	1	0	2	0
	2008	0	0	0	5	3	0	0	5	3	0	0	4	0
	2009	0	0	0	0	0	0	0	0	0	0	0	0	0
	2010	0	0	0	0	5	0	0	0	1	0	0	0	0
	2011	0	0	0	0	4	0	0	0	1	0	0	0	0
	2012	0	0	0	0	6	0	0	0	2	0	0	0	0
	2013	0	0	0	0	7	0	0	0	2	0	0	0	0
	2014	0	0	0	0	9	0	0	0	2	0	0	0	0
	2015	0	0	0	0	15	0	0	0	0	1	0	2	0
Installers Required	2007	4	7	0	0	8	4	7	4	22	4	0	15	0
	2008	1	0	0	39	21	0	1	39	19	0	0	26	0
	2009	0	0	0	0	0	0	0	0	0	1	0	0	0
	2010	0	0	0	0	34	0	0	0	4	1	0	0	0
	2011	0	0	0	0	24	0	0	0	8	1	0	0	0
	2012	0	0	0	0	35	0	0	0	10	1	0	0	0
	2013	0	0	0	0	37	0	0	0	11	1	0	0	0
	2014	0	0	0	0	44	0	1	0	11	2	0	0	0
	2015	1	0	0	0	66	0	1	0	0	3	0	7	0
Market Penetration	2007	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2009	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2010	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2011	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2012	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2013	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2014	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2015	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 8-11. State-by-State Results for the Base-Case, with BAU System Pricing

		Alabama	Alaska	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	Florida	Georgia	Hawaii	Idaho	Illinois
Cumulative Installations	2007	1	1	14	1	499	20	3	1	1	1	6	1	1
	2008	1	1	41	1	896	34	3	14	2	1	11	1	1
	2009	1	1	72	1	1,162	35	7	14	2	1	11	1	1
	2010	1	1	122	1	1,474	36	10	14	2	1	11	1	1
	2011	1	1	187	1	1,474	73	10	14	6	1	11	1	1
	2012	1	1	268	1	1,474	75	13	14	9	2	11	1	1
	2013	1	1	313	1	1,850	77	17	19	14	3	11	1	1
	2014	1	1	360	1	2,228	78	23	33	21	5	11	1	1
	2015	1	1	408	1	3,176	120	29	53	30	9	11	1	1
Annual Installations	2007	0	0	5	0	166	6	1	1	1	0	3	0	0
	2008	0	0	27	0	397	14	0	13	1	0	5	0	0
	2009	0	0	31	0	267	1	4	0	0	0	0	0	0
	2010	0	0	50	0	312	1	3	0	0	0	0	0	0
	2011	0	0	65	0	0	37	0	0	4	1	0	0	0
	2012	0	0	81	0	0	2	3	0	4	1	0	0	0
	2013	0	0	45	0	375	2	5	5	5	1	0	0	0
	2014	0	0	47	0	379	2	6	14	6	2	0	0	0
	2015	0	0	49	0	948	42	6	20	9	4	0	0	0
Installers Required	2007	0	0	35	0	1,232	48	7	4	4	0	23	0	0
	2008	0	0	171	0	2,859	102	2	96	6	0	35	1	0
	2009	0	0	214	0	1,855	5	29	0	0	0	0	1	0
	2010	0	0	339	0	2,096	5	19	0	0	0	0	0	0
	2011	0	0	407	0	0	235	0	0	24	3	0	0	0
	2012	0	0	467	0	0	9	17	0	21	6	0	0	0
	2013	0	0	239	0	2,001	9	25	26	26	6	0	0	0
	2014	0	0	228	0	1,847	8	28	67	31	9	0	0	0
	2015	0	0	214	0	4,185	184	28	89	42	18	0	0	0
Market Penetration	2007	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	2%	0%	0%	1%	0%	0%	1%	0%	0%
	2009	0%	0%	1%	0%	2%	0%	0%	1%	0%	0%	1%	0%	0%
	2010	0%	0%	1%	0%	2%	0%	0%	1%	0%	0%	0%	0%	0%
	2011	0%	0%	1%	0%	2%	1%	0%	1%	0%	0%	0%	0%	0%
	2012	0%	0%	2%	0%	2%	1%	0%	1%	0%	0%	0%	0%	0%
	2013	0%	0%	2%	0%	3%	1%	0%	1%	0%	0%	0%	0%	0%
	2014	0%	0%	2%	0%	3%	1%	0%	2%	0%	0%	0%	0%	0%
	2015	0%	0%	2%	0%	4%	1%	1%	3%	0%	0%	0%	0%	0%

		Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Mass.	Michigan	Minnesota	Mississippi	Missouri
Cumulative Installations	2007	1	1	1	1	1	2	2	7	1	1	1	1
	2008	1	1	1	1	1	2	3	14	1	1	1	1
	2009	1	1	1	1	1	2	11	19	1	1	1	1
	2010	1	1	1	1	1	3	97	28	1	1	1	1
	2011	1	1	1	1	1	3	97	28	1	1	1	1
	2012	1	1	1	1	1	3	97	28	1	1	1	1
	2013	1	1	1	1	1	3	97	28	1	1	1	1
	2014	1	1	1	1	1	3	97	31	1	1	2	1
	2015	1	1	1	1	1	3	147	38	2	1	2	1
Annual Installations	2007	0	0	0	0	0	1	1	2	1	0	0	0
	2008	0	0	0	1	0	0	1	7	0	0	0	0
	2009	0	0	0	0	0	0	8	5	0	0	0	0
	2010	0	0	0	0	0	1	86	9	0	0	0	0
	2011	0	0	0	0	0	0	0	0	0	0	0	0
	2012	0	0	0	0	0	0	0	0	0	0	0	0
	2013	0	0	0	0	0	0	0	0	0	0	0	0
	2014	0	0	0	0	0	0	0	3	0	0	0	0
	2015	0	0	0	0	0	0	51	8	1	0	1	0
Installers Required	2007	0	0	0	0	0	7	7	16	4	0	0	0
	2008	0	0	0	7	0	2	4	50	0	0	0	0
	2009	0	0	0	0	0	2	56	38	0	0	0	0
	2010	0	0	0	0	0	5	577	57	0	0	0	0
	2011	0	0	0	0	0	0	0	0	0	0	0	0
	2012	0	0	0	0	0	0	0	0	0	0	1	0
	2013	0	0	0	0	0	0	0	0	0	0	2	0
	2014	0	0	0	0	0	0	0	14	0	0	2	0
	2015	0	0	0	0	0	0	223	34	6	0	3	0
Market Penetration	2007	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2009	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2010	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%
	2011	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%
	2012	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%
	2013	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%
	2014	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%
	2015	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%

		Montana	Nebraska	Nevada	NH	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania
Cumulative Installations	2007	1	1	15	1	69	9	32	3	1	2	1	2	9
	2008	2	1	79	1	103	10	128	7	1	4	1	37	11
	2009	2	1	107	2	140	10	134	14	1	4	1	37	23
	2010	2	1	109	4	194	10	140	31	1	4	1	37	37
	2011	2	1	140	8	253	10	146	31	1	4	1	37	58
	2012	2	1	143	16	321	10	153	76	1	5	1	37	96
	2013	2	1	175	22	405	11	159	76	1	7	1	37	166
	2014	2	1	179	33	502	12	160	76	1	8	1	37	290
	2015	2	1	203	33	614	14	161	154	1	11	1	37	343
Annual Installations	2007	0	0	7	1	29	3	10	1	0	1	0	1	3
	2008	1	0	64	0	34	2	95	4	0	2	0	35	2
	2009	0	0	28	1	37	0	6	7	0	0	0	0	12
	2010	0	0	2	2	55	0	6	18	0	0	0	0	14
	2011	0	0	30	4	59	0	6	0	0	0	0	0	21
	2012	0	0	3	8	68	0	6	44	0	1	0	0	38
	2013	0	0	32	6	83	1	6	0	0	2	0	0	70
	2014	0	0	4	11	98	1	1	0	0	2	0	0	124
	2015	0	0	24	0	111	2	1	77	0	3	1	0	53
Installers Required	2007	0	0	56	4	213	24	71	7	0	4	0	4	19
	2008	8	0	12	0	243	11	43	32	0	16	0	255	13
	2009	0	0	198	7	255	0	42	45	0	0	0	0	81
	2010	0	0	16	15	366	0	41	118	0	0	0	0	93
	2011	0	0	189	27	366	0	39	0	0	0	0	0	133
	2012	0	0	17	44	397	1	37	256	0	5	0	0	221
	2013	0	0	172	30	444	3	34	2	0	8	0	0	373
	2014	0	0	18	54	475	5	6	2	0	8	1	0	606
	2015	1	0	107	2	492	10	5	341	0	13	3	0	233
Market Penetration	2007	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	1%	0%	1%	0%	1%	0%	0%	0%	0%	1%	0%
	2009	0%	0%	2%	0%	2%	0%	1%	0%	0%	0%	0%	1%	0%
	2010	0%	0%	2%	0%	2%	0%	1%	0%	0%	0%	0%	1%	0%
	2011	0%	0%	2%	0%	3%	0%	1%	0%	0%	0%	0%	1%	0%
	2012	0%	0%	2%	1%	3%	0%	1%	0%	0%	0%	0%	1%	1%
	2013	0%	0%	2%	1%	4%	0%	1%	0%	0%	0%	0%	0%	1%
	2014	0%	0%	2%	2%	5%	0%	1%	0%	0%	0%	0%	0%	2%
	2015	0%	0%	2%	2%	5%	0%	1%	1%	0%	0%	0%	0%	2%

		Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	DC	West Virginia	Wisconsin	Wyoming
Cumulative Installations	2007	1	2	1	1	6	1	2	1	6	1	1	6	1
	2008	1	2	1	6	8	1	2	6	9	1	1	11	1
	2009	1	2	1	6	13	1	2	6	11	2	1	11	1
	2010	1	2	1	6	26	1	2	6	14	2	1	11	1
	2011	1	2	1	6	33	1	2	6	14	2	1	11	1
	2012	1	2	1	6	42	1	3	6	17	22	1	11	1
	2013	1	2	1	6	52	1	3	6	22	30	1	12	1
	2014	1	2	1	9	63	1	3	6	29	40	1	13	1
	2015	2	2	1	13	79	1	4	6	29	58	1	18	1
Annual Installations	2007	1	1	0	0	1	1	1	1	3	1	0	2	0
	2008	0	0	0	6	2	0	0	6	3	0	0	5	0
	2009	0	0	0	0	4	0	0	0	2	1	0	0	0
	2010	0	0	0	0	13	0	0	0	4	0	0	0	0
	2011	0	0	0	0	7	0	0	0	0	0	0	0	0
	2012	0	0	0	0	9	0	0	0	3	20	0	0	0
	2013	0	0	0	0	10	0	0	0	4	7	0	1	0
	2014	0	0	0	3	11	0	0	0	8	10	0	2	0
	2015	0	0	0	4	16	0	1	0	0	18	0	5	0
Installers Required	2007	4	7	0	0	8	4	7	4	22	4	0	15	0
	2008	1	0	0	40	17	0	1	40	22	0	0	34	0
	2009	1	0	0	0	31	0	0	0	11	4	0	0	0
	2010	1	0	0	0	87	0	1	0	26	2	0	0	0
	2011	1	0	0	0	45	0	1	0	0	3	0	0	0
	2012	1	0	0	0	52	0	1	0	15	116	0	0	0
	2013	1	0	0	2	52	0	1	0	24	39	0	5	0
	2014	1	0	0	13	55	0	1	0	38	50	0	8	1
	2015	1	0	0	16	70	0	3	0	0	81	0	20	1
Market Penetration	2007	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2009	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2010	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2011	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2012	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%
	2013	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%
	2014	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%
	2015	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%

Table 8-12. State-by-State Results for the Base-case, with SAI System Pricing

		Alabama	Alaska	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	Florida	Georgia	Hawaii	Idaho	Illinois
Cumulative Installations	2007	1	1	14	1	499	20	3	1	1	1	6	1	1
	2008	1	1	41	1	996	34	3	16	2	1	12	1	1
	2009	1	1	72	1	1,486	35	9	16	2	2	12	1	1
	2010	1	1	122	1	2,417	36	16	17	2	5	12	1	1
	2011	1	1	187	1	2,417	73	17	17	16	7	12	1	1
	2012	1	1	268	1	2,766	75	23	17	24	10	12	1	1
	2013	1	1	313	1	4,086	77	41	75	34	13	12	1	1
	2014	1	1	360	1	5,580	78	91	75	47	18	22	1	1
	2015	1	1	408	1	7,693	120	134	101	70	25	35	2	2
Annual Installations	2007	0	0	5	0	166	6	1	1	1	0	3	0	0
	2008	0	0	27	0	497	14	0	15	1	0	6	0	0
	2009	0	0	31	0	490	1	6	0	0	1	0	0	0
	2010	0	0	50	0	931	1	7	2	0	3	0	0	0
	2011	0	0	65	0	0	37	1	0	14	2	0	0	0
	2012	0	0	81	0	349	2	6	0	8	3	0	0	0
	2013	0	0	45	0	1,320	2	17	58	10	4	0	0	0
	2014	0	0	47	0	1,495	2	50	0	13	4	10	0	0
	2015	0	0	49	0	2,113	42	43	26	23	7	13	1	1
Installers Required	2007	0	0	35	0	1,232	48	7	4	4	0	23	0	0
	2008	0	0	171	0	3,580	102	2	106	6	0	43	1	0
	2009	0	0	214	0	3,407	5	40	0	0	9	0	2	0
	2010	0	0	339	0	6,255	5	48	11	0	19	0	0	0
	2011	0	0	407	0	0	235	8	0	86	14	0	0	0
	2012	0	0	467	0	2,020	9	38	0	47	17	0	0	0
	2013	0	0	239	0	7,042	9	93	310	55	19	2	0	2
	2014	0	0	228	0	7,287	8	245	0	65	21	48	2	2
	2015	0	0	214	0	9,327	184	191	113	100	31	59	3	4
Market Penetration	2007	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	2%	0%	0%	1%	0%	0%	1%	0%	0%
	2009	0%	0%	1%	0%	3%	0%	0%	1%	0%	0%	1%	0%	0%
	2010	0%	0%	1%	0%	4%	0%	0%	1%	0%	0%	1%	0%	0%
	2011	0%	0%	1%	0%	4%	1%	0%	1%	0%	0%	1%	0%	0%
	2012	0%	0%	2%	0%	4%	1%	0%	1%	0%	0%	0%	0%	0%
	2013	0%	0%	2%	0%	6%	1%	1%	4%	0%	0%	0%	0%	0%
	2014	0%	0%	2%	0%	7%	1%	2%	4%	0%	0%	1%	0%	0%
	2015	0%	0%	2%	0%	9%	1%	2%	5%	0%	0%	1%	0%	0%

		Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Mass.	Michigan	Minnesota	Mississippi	Missouri
Cumulative Installations	2007	1	1	1	1	1	2	2	7	1	1	1	1
	2008	1	1	1	2	1	2	3	16	1	1	1	1
	2009	1	1	1	2	1	3	14	43	1	1	1	1
	2010	1	1	1	2	1	7	208	175	1	1	1	1
	2011	1	1	1	2	1	7	208	175	2	1	1	1
	2012	1	1	1	2	1	7	208	175	3	1	2	1
	2013	1	1	1	2	1	7	208	175	6	1	2	1
	2014	1	1	1	3	2	7	208	175	9	1	3	1
	2015	1	1	1	5	3	7	208	175	15	1	5	2
Annual Installations	2007	0	0	0	0	0	1	1	2	1	0	0	0
	2008	0	0	0	1	0	0	1	9	0	0	0	0
	2009	0	0	0	0	0	1	11	27	0	0	0	0
	2010	0	0	0	0	0	4	194	132	1	0	0	0
	2011	0	0	0	0	0	0	0	0	1	0	0	0
	2012	0	0	0	0	0	0	0	0	1	0	0	0
	2013	0	0	0	0	0	0	0	0	2	0	1	0
	2014	0	0	0	1	1	0	0	0	3	0	1	0
	2015	0	0	0	3	2	0	0	0	6	0	2	1
Installers Required	2007	0	0	0	0	0	7	7	16	4	0	0	0
	2008	0	0	0	9	0	2	4	63	0	0	0	0
	2009	0	0	0	0	0	5	79	190	0	0	0	0
	2010	0	0	0	0	0	25	1,302	886	4	0	2	0
	2011	0	0	0	0	0	0	0	0	4	0	2	0
	2012	0	0	0	0	1	0	0	0	8	0	3	0
	2013	0	0	0	0	2	0	0	0	12	0	3	0
	2014	0	0	0	4	3	0	0	0	15	0	4	0
	2015	0	1	0	11	7	0	0	0	28	0	8	7
Market Penetration	2007	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2009	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
	2010	0%	0%	0%	0%	0%	0%	2%	2%	0%	0%	0%	0%
	2011	0%	0%	0%	0%	0%	0%	2%	2%	0%	0%	0%	0%
	2012	0%	0%	0%	0%	0%	0%	2%	2%	0%	0%	0%	0%
	2013	0%	0%	0%	0%	0%	0%	2%	2%	0%	0%	0%	0%
	2014	0%	0%	0%	0%	0%	0%	2%	2%	0%	0%	0%	0%
	2015	0%	0%	0%	0%	0%	0%	2%	2%	0%	0%	0%	0%

		Montana	Nebraska	Nevada	NH	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania
Cumulative Installations	2007	1	1	15	1	69	9	32	3	1	2	1	2	9
	2008	3	1	79	1	103	10	128	8	1	5	1	58	11
	2009	3	1	107	2	140	11	134	18	1	5	1	58	23
	2010	3	1	109	4	194	11	140	85	1	6	1	58	75
	2011	3	1	140	8	253	11	146	85	1	7	1	58	79
	2012	3	1	143	16	367	13	153	85	1	10	2	58	128
	2013	3	1	175	22	405	17	159	85	1	12	2	58	206
	2014	3	1	179	33	769	24	160	85	1	16	3	58	363
	2015	5	1	223	43	769	44	161	154	1	26	5	58	659
Annual Installations	2007	0	0	7	1	29	3	10	1	0	1	0	1	3
	2008	2	0	64	0	34	2	95	5	0	3	0	56	2
	2009	0	0	28	1	37	0	6	11	0	0	0	0	11
	2010	0	0	2	2	55	0	6	67	0	0	1	0	52
	2011	0	0	30	4	59	0	6	0	0	2	0	0	4
	2012	0	0	3	8	114	2	6	0	0	2	0	0	49
	2013	0	0	32	6	38	4	6	0	0	3	1	0	78
	2014	0	0	4	11	364	7	1	0	0	3	1	0	158
	2015	2	0	44	10	0	20	1	68	0	11	1	0	295
Installers Required	2007	0	0	56	4	213	24	71	7	0	4	0	4	19
	2008	16	0	12	0	243	12	43	33	0	24	0	406	16
	2009	0	0	198	10	255	3	42	73	0	0	0	0	79
	2010	0	0	16	12	366	0	41	452	0	1	4	0	348
	2011	0	0	189	27	366	2	39	0	0	12	2	0	28
	2012	0	0	17	44	660	11	37	0	0	13	3	0	285
	2013	0	0	172	30	202	21	34	0	0	14	3	0	414
	2014	0	0	18	54	1,775	33	6	0	0	15	3	0	769
	2015	11	2	194	45	0	89	5	302	0	48	6	0	1,304
Market Penetration	2007	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	1%	0%	1%	0%	1%	0%	0%	0%	0%	1%	0%
	2009	0%	0%	2%	0%	2%	0%	1%	0%	0%	0%	0%	1%	0%
	2010	0%	0%	2%	0%	2%	0%	1%	0%	0%	0%	0%	1%	1%
	2011	0%	0%	2%	0%	3%	0%	1%	0%	0%	0%	0%	1%	1%
	2012	0%	0%	2%	1%	4%	0%	1%	0%	0%	0%	0%	1%	1%
	2013	0%	0%	2%	1%	4%	0%	1%	0%	0%	0%	0%	1%	1%
	2014	0%	0%	2%	2%	7%	1%	1%	0%	0%	0%	0%	1%	2%
	2015	0%	0%	2%	2%	7%	1%	1%	1%	0%	0%	0%	1%	4%

		Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	DC	West Virginia	Wisconsin	Wyoming
Cumulative Installations	2007	1	2	1	1	6	1	2	1	6	1	1	6	1
	2008	1	2	1	7	10	1	2	8	10	1	1	12	1
	2009	1	2	1	7	19	1	2	8	14	2	1	12	1
	2010	1	2	1	7	55	1	3	8	24	3	1	16	1
	2011	1	2	1	7	59	1	3	8	24	4	1	16	1
	2012	2	2	1	9	81	1	4	8	34	61	1	20	1
	2013	2	3	1	13	115	1	5	8	64	91	1	28	1
	2014	3	4	1	20	165	1	6	8	124	91	1	38	1
	2015	5	7	1	29	251	1	8	14	124	91	3	54	2
Annual Installations	2007	1	1	0	0	1	1	1	1	3	1	0	2	0
	2008	0	0	0	6	4	0	0	7	4	0	0	6	0
	2009	0	0	0	0	9	0	0	0	4	1	0	0	0
	2010	0	0	0	0	36	0	1	0	10	1	0	4	0
	2011	0	0	0	0	4	0	0	0	1	1	0	0	0
	2012	0	0	0	2	21	0	1	0	10	57	0	4	0
	2013	1	1	0	4	34	0	1	0	30	31	0	8	0
	2014	1	1	0	7	50	0	1	0	60	0	1	10	0
	2015	1	3	0	10	86	0	2	6	0	0	1	16	0
Installers Required	2007	4	7	0	0	8	4	7	4	22	4	0	15	0
	2008	1	0	0	47	31	0	1	49	27	1	0	43	0
	2009	1	0	0	0	63	0	0	0	28	5	0	0	0
	2010	2	0	0	0	242	0	5	0	67	6	0	29	1
	2011	1	0	0	0	25	0	0	0	4	5	0	0	1
	2012	2	1	0	11	124	0	4	0	57	332	0	22	1
	2013	4	4	0	21	182	0	6	0	158	163	1	42	1
	2014	5	5	0	33	243	0	7	2	293	0	3	49	1
	2015	6	12	0	44	380	2	7	26	0	0	5	71	2
Market Penetration	2007	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2009	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2010	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2011	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2012	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	0%
	2013	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%
	2014	0%	0%	0%	0%	0%	0%	1%	0%	1%	5%	0%	0%	0%
	2015	0%	0%	0%	0%	0%	0%	1%	0%	1%	5%	0%	0%	0%

Table 8-13. State-by-State Results for the Focused Policy Case, BAU System Pricing

		Alabama	Alaska	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	Florida	Georgia	Hawaii	Idaho	Illinois
Cumulative Installations	2007	1	1	14	1	499	20	3	1	1	1	6	1	1
	2008	1	1	41	1	914	34	3	17	2	1	11	1	1
	2009	1	1	72	1	1,172	35	9	17	2	1	11	1	1
	2010	1	1	122	1	1,526	36	12	17	2	1	11	1	1
	2011	1	1	187	1	1,913	73	17	17	9	1	11	1	1
	2012	1	1	268	1	2,616	75	24	33	15	3	11	1	1
	2013	1	1	313	1	3,401	77	33	47	23	5	13	1	1
	2014	1	1	360	1	4,280	78	45	68	34	8	16	1	1
	2015	1	1	408	1	5,740	120	57	102	50	15	19	1	1
Annual Installations	2007	0	0	5	0	166	6	1	1	1	0	3	0	0
	2008	0	0	27	0	415	14	0	16	1	0	8	0	0
	2009	0	0	31	0	258	1	6	0	0	0	0	0	0
	2010	0	0	50	0	354	1	4	0	0	0	0	0	0
	2011	0	0	65	0	504	37	4	0	7	1	0	0	0
	2012	0	0	81	0	754	2	8	16	7	2	1	0	0
	2013	0	0	45	0	829	2	9	15	8	2	3	0	0
	2014	0	0	47	0	887	2	11	21	11	3	6	0	0
	2015	0	1	49	0	1,507	42	12	34	23	7	12	0	0
Installers Required	2007	0	0	35	0	1,232	48	7	4	4	0	23	0	0
	2008	0	0	171	0	2,990	102	2	113	6	0	57	1	0
	2009	0	0	214	0	1,795	5	39	0	0	0	0	2	0
	2010	0	0	339	0	2,377	5	25	0	0	0	0	0	0
	2011	0	0	407	0	3,150	235	28	0	44	5	0	0	0
	2012	0	0	467	0	4,372	9	44	91	39	11	8	0	0
	2013	0	0	239	0	4,422	9	49	78	43	10	17	0	0
	2014	0	1	228	0	4,323	8	55	104	51	15	28	0	0
	2015	2	3	214	0	6,651	184	53	150	100	29	53	0	0
Market Penetration	2007	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	2%	0%	0%	1%	0%	0%	1%	0%	0%
	2009	0%	0%	1%	0%	2%	0%	0%	1%	0%	0%	1%	0%	0%
	2010	0%	0%	1%	0%	2%	0%	0%	1%	0%	0%	0%	0%	0%
	2011	0%	0%	1%	0%	3%	1%	0%	1%	0%	0%	0%	0%	0%
	2012	0%	0%	2%	0%	4%	1%	0%	2%	0%	0%	0%	0%	0%
	2013	0%	0%	2%	0%	5%	1%	1%	3%	0%	0%	1%	0%	0%
	2014	0%	0%	2%	0%	6%	1%	1%	4%	0%	0%	1%	0%	0%
	2015	0%	0%	2%	0%	7%	1%	1%	5%	0%	0%	1%	0%	0%

		Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Mass.	Michigan	Minnesota	Mississippi	Missouri
Cumulative Installations	2007	1	1	1	1	1	2	2	7	1	1	1	1
	2008	1	1	1	2	1	2	3	15	1	1	1	1
	2009	1	1	1	2	1	3	24	23	1	1	1	1
	2010	1	1	1	2	1	5	24	35	1	1	1	1
	2011	1	1	1	2	1	5	282	35	1	1	1	1
	2012	1	1	1	2	1	5	282	35	1	1	1	1
	2013	1	1	1	2	1	5	282	39	1	1	2	1
	2014	1	1	1	2	1	6	282	51	1	1	3	1
	2015	1	1	1	2	1	8	282	66	3	1	5	1
Annual Installations	2007	0	0	0	0	0	1	1	2	1	0	0	0
	2008	0	0	0	2	0	0	1	7	0	0	0	0
	2009	0	0	0	0	0	1	21	8	0	0	0	0
	2010	0	0	0	0	0	2	0	11	0	0	0	0
	2011	0	0	0	0	0	0	258	0	0	0	0	0
	2012	0	0	0	0	0	0	0	0	0	0	0	0
	2013	0	0	0	0	0	0	0	3	0	0	2	0
	2014	0	0	0	0	0	1	0	11	0	0	4	0
	2015	0	0	0	2	0	2	0	12	2	0	5	0
Installers Required	2007	0	0	0	0	0	7	7	16	4	0	0	0
	2008	0	0	0	13	0	4	4	48	0	0	0	0
	2009	0	0	0	0	0	5	147	53	0	0	0	0
	2010	0	0	0	0	0	12	0	73	0	0	0	0
	2011	0	0	0	0	0	0	1,614	0	0	0	0	0
	2012	0	0	0	0	0	0	0	0	0	0	0	0
	2013	0	0	0	0	0	0	0	14	0	0	12	0
	2014	0	0	0	0	0	4	0	52	0	0	20	0
	2015	0	0	0	9	0	9	0	53	8	0	20	0
Market Penetration	2007	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2009	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2010	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2011	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%	0%	0%
	2012	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%	0%	0%
	2013	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%
	2014	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	0%	0%
	2015	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	0%	0%

		Montana	Nebraska	Nevada	NH	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania
Cumulative Installations	2007	1	1	15	1	69	9	32	3	1	2	1	2	9
	2008	2	1	79	1	103	11	128	7	1	4	1	37	11
	2009	2	1	107	3	140	13	134	21	1	4	1	37	23
	2010	2	1	109	4	194	13	140	50	1	4	1	37	37
	2011	2	1	140	8	253	13	146	50	1	5	1	37	58
	2012	2	1	143	16	321	16	153	76	1	6	1	37	96
	2013	2	1	175	22	405	19	159	76	1	8	1	37	166
	2014	2	1	179	33	502	24	160	76	1	10	1	37	290
	2015	4	1	203	33	615	30	161	154	1	14	2	37	343
Annual Installations	2007	0	0	7	1	29	3	10	1	0	1	0	1	3
	2008	1	0	64	0	34	3	95	4	0	2	0	35	2
	2009	0	0	28	2	37	1	6	14	0	0	0	0	12
	2010	0	0	2	4	55	0	6	29	0	0	0	0	14
	2011	0	0	30	3	59	0	6	0	0	0	0	0	21
	2012	0	0	3	7	68	4	6	25	0	2	0	0	38
	2013	0	0	32	6	83	4	6	0	0	2	0	0	70
	2014	1	0	4	11	98	5	1	0	0	2	0	0	124
	2015	2	0	24	24	111	7	1	77	0	4	1	0	53
Installers Required	2007	0	0	56	4	213	24	71	7	0	4	0	4	19
	2008	10	0	12	0	243	18	43	32	0	15	0	255	11
	2009	0	0	198	11	255	10	42	96	0	0	0	0	83
	2010	0	0	16	26	366	0	41	196	0	0	0	0	93
	2011	0	0	189	16	366	0	39	0	0	1	0	0	133
	2012	0	0	17	40	397	22	37	146	0	9	0	0	221
	2013	0	0	172	30	444	22	34	2	0	11	0	0	373
	2014	6	0	18	54	475	26	6	2	0	12	1	0	606
	2015	8	0	107	104	492	31	5	341	0	16	5	0	233
Market Penetration	2007	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	1%	0%	1%	0%	1%	0%	0%	0%	0%	1%	0%
	2009	0%	0%	2%	0%	2%	0%	1%	0%	0%	0%	0%	1%	0%
	2010	0%	0%	2%	0%	2%	0%	1%	0%	0%	0%	0%	1%	0%
	2011	0%	0%	2%	0%	3%	0%	1%	0%	0%	0%	0%	1%	0%
	2012	0%	0%	2%	1%	3%	0%	1%	0%	0%	0%	0%	1%	1%
	2013	0%	0%	2%	1%	4%	0%	1%	0%	0%	0%	0%	0%	1%
	2014	0%	0%	2%	2%	5%	1%	1%	0%	0%	0%	0%	0%	2%
	2015	0%	0%	2%	2%	5%	1%	1%	1%	0%	0%	0%	0%	2%

		Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	DC	West Virginia	Wisconsin	Wyoming
Cumulative Installations	2007	1	2	1	1	6	1	2	1	6	1	1	6	1
	2008	1	2	1	6	8	1	2	6	9	1	1	11	1
	2009	1	2	1	6	13	1	2	6	14	2	1	11	1
	2010	1	2	1	6	27	1	2	6	20	3	1	11	1
	2011	1	2	1	6	34	1	3	6	28	3	1	14	1
	2012	2	2	1	10	52	1	4	6	39	41	1	21	1
	2013	3	2	1	15	69	1	4	6	47	41	1	27	1
	2014	5	2	1	22	94	1	5	6	62	41	1	35	1
	2015	6	2	1	31	127	1	7	6	62	49	1	46	1
Annual Installations	2007	1	1	0	0	1	1	1	1	3	1	0	2	0
	2008	0	0	0	10	4	0	0	6	4	0	0	5	0
	2009	0	0	0	0	8	0	0	0	5	1	0	0	0
	2010	0	0	0	0	23	0	0	0	7	1	0	0	0
	2011	0	0	0	0	15	0	0	0	8	1	0	3	0
	2012	1	0	0	0	19	0	1	0	13	38	0	7	0
	2013	1	0	0	0	21	0	1	0	14	0	0	7	0
	2014	1	0	0	9	27	0	1	0	18	0	0	7	0
	2015	1	0	0	12	49	0	1	0	0	7	0	11	0
Installers Required	2007	4	7	0	0	8	4	7	4	22	4	0	15	0
	2008	0	0	0	74	27	0	1	40	26	0	0	37	0
	2009	0	0	0	0	55	0	0	0	32	6	0	0	0
	2010	1	0	0	0	156	0	2	0	46	4	0	0	0
	2011	1	0	0	0	91	0	3	0	51	4	0	16	0
	2012	5	0	0	0	111	0	5	0	75	220	0	39	0
	2013	5	0	0	0	113	0	4	0	73	0	0	36	0
	2014	6	0	0	43	131	0	5	0	85	0	0	36	0
	2015	7	0	0	51	216	0	5	0	0	32	0	48	0
Market Penetration	2007	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2009	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2010	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2011	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2012	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%
	2013	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%
	2014	0%	0%	0%	0%	0%	0%	1%	0%	0%	2%	0%	0%	0%
	2015	0%	0%	0%	0%	0%	0%	1%	0%	0%	3%	0%	0%	0%

Table 8-14. State-by-State Results for the Focused Policy Case, SAI System Pricing

		Alabama	Alaska	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	Florida	Georgia	Hawaii	Idaho	Illinois
Cumulative Installations	2007	1	1	14	1	499	20	3	1	1	1	6	1	1
	2008	1	1	41	1	1,015	34	3	18	2	1	12	1	1
	2009	1	1	72	1	1,538	35	11	18	2	3	12	2	1
	2010	1	1	122	1	2,453	36	20	23	2	7	12	2	1
	2011	1	1	187	1	3,254	73	30	38	25	11	13	2	1
	2012	1	1	268	1	4,463	75	43	73	39	16	17	2	1
	2013	1	1	313	1	5,936	77	107	119	56	22	21	2	1
	2014	1	1	360	1	7,692	78	239	180	78	29	40	3	2
	2015	1	1	753	1	10,176	120	392	245	116	41	65	4	5
Annual Installations	2007	0	0	5	0	166	6	1	1	1	0	3	0	0
	2008	0	0	27	0	517	14	0	17	1	0	6	0	0
	2009	0	0	31	0	522	1	8	0	0	2	0	1	0
	2010	0	0	50	0	915	1	9	5	0	5	0	0	0
	2011	0	0	65	0	801	37	10	16	23	4	1	0	0
	2012	0	0	81	0	1,209	2	12	34	14	5	3	0	0
	2013	0	0	45	0	1,472	2	65	46	17	6	5	0	1
	2014	0	0	47	0	1,757	2	131	61	22	7	18	1	1
	2015	0	0	394	0	2,483	42	153	66	38	12	25	2	2
Installers Required	2007	0	0	35	0	1,232	48	7	4	4	0	23	0	0
	2008	0	0	171	0	3,719	102	2	123	6	0	44	1	0
	2009	0	0	214	0	3,635	5	54	0	0	15	0	6	0
	2010	0	0	339	0	6,144	5	64	32	0	32	0	0	0
	2011	0	0	407	0	5,013	235	63	97	146	24	7	0	0
	2012	0	0	467	0	7,008	9	72	200	79	28	19	0	0
	2013	0	0	239	0	7,855	9	346	246	91	32	26	0	4
	2014	0	0	228	0	8,565	8	640	297	108	34	90	5	6
	2015	0	0	1,739	0	10,963	184	675	290	168	52	110	8	11
Market Penetration	2007	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	2%	0%	0%	1%	0%	0%	1%	0%	0%
	2009	0%	0%	1%	0%	3%	0%	0%	1%	0%	0%	1%	0%	0%
	2010	0%	0%	1%	0%	4%	0%	0%	2%	0%	0%	1%	0%	0%
	2011	0%	0%	1%	0%	5%	1%	1%	2%	0%	0%	1%	0%	0%
	2012	0%	0%	2%	0%	6%	1%	1%	4%	0%	0%	1%	0%	0%
	2013	0%	0%	2%	0%	8%	1%	2%	7%	0%	0%	1%	0%	0%
	2014	0%	0%	2%	0%	10%	1%	4%	10%	0%	0%	1%	0%	0%
	2015	0%	0%	4%	0%	13%	1%	7%	12%	0%	0%	2%	0%	0%

		Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Mass.	Michigan	Minnesota	Mississippi	Missouri
Cumulative Installations	2007	1	1	1	1	1	2	2	7	1	1	1	1
	2008	1	1	1	2	1	3	3	16	1	1	1	1
	2009	1	1	1	2	1	5	32	55	1	1	1	1
	2010	1	1	1	2	1	14	32	231	2	1	1	1
	2011	1	1	1	2	1	14	32	231	3	1	2	1
	2012	1	1	1	2	1	14	1,020	231	5	1	4	1
	2013	1	1	1	3	2	14	1,020	231	13	1	5	1
	2014	1	1	1	6	4	23	1,020	231	25	1	7	1
	2015	1	1	1	13	7	38	1,020	367	43	1	11	3
Annual Installations	2007	0	0	0	0	0	1	1	2	1	0	0	0
	2008	0	0	0	1	0	1	1	10	0	0	0	0
	2009	0	0	0	0	0	2	29	39	0	0	0	0
	2010	0	0	0	0	0	9	0	176	1	0	1	0
	2011	0	0	0	0	0	0	0	0	1	0	1	0
	2012	0	0	0	0	0	0	988	0	2	0	1	0
	2013	0	0	0	1	1	0	0	0	8	0	1	0
	2014	0	0	0	3	1	9	0	0	12	0	2	0
	2015	0	1	0	7	4	15	0	136	19	0	4	2
Installers Required	2007	0	0	0	0	0	7	7	16	4	0	0	0
	2008	0	0	0	10	0	4	4	69	0	0	0	0
	2009	0	0	0	0	0	14	203	268	0	0	0	0
	2010	0	0	0	0	0	62	0	1,181	6	0	6	0
	2011	0	0	0	0	0	0	0	0	6	0	6	0
	2012	0	0	0	0	3	0	5,725	0	13	0	7	0
	2013	0	0	0	7	6	0	0	0	42	0	8	0
	2014	0	0	0	13	7	45	0	0	58	0	9	0
	2015	0	3	0	30	17	64	0	601	83	0	19	11
Market Penetration	2007	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2009	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
	2010	0%	0%	0%	0%	0%	1%	0%	3%	0%	0%	0%	0%
	2011	0%	0%	0%	0%	0%	1%	0%	3%	0%	0%	0%	0%
	2012	0%	0%	0%	0%	0%	1%	9%	3%	0%	0%	0%	0%
	2013	0%	0%	0%	0%	0%	1%	9%	2%	0%	0%	0%	0%
	2014	0%	0%	0%	0%	0%	1%	8%	2%	0%	0%	0%	0%
	2015	0%	0%	0%	0%	0%	2%	8%	4%	0%	0%	0%	0%

		Montana	Nebraska	Nevada	NH	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania
Cumulative Installations	2007	1	1	15	1	69	9	32	3	1	2	1	2	9
	2008	3	1	79	1	103	11	128	8	1	5	1	59	11
	2009	3	1	107	3	140	14	134	28	1	5	1	59	26
	2010	3	1	109	6	194	14	140	140	1	7	1	59	96
	2011	3	1	140	9	253	18	146	140	1	9	2	59	120
	2012	3	1	143	18	578	24	153	140	1	12	3	59	207
	2013	5	1	175	36	578	35	159	140	1	16	4	59	398
	2014	8	1	179	50	792	56	160	140	1	20	5	59	722
	2015	12	2	256	79	819	109	161	154	1	35	7	59	1,199
Annual Installations	2007	0	0	7	1	29	3	10	1	0	1	0	1	3
	2008	2	0	64	0	34	3	95	5	0	3	0	57	2
	2009	0	0	28	2	37	3	6	21	0	0	0	0	14
	2010	0	0	2	3	55	0	6	111	0	1	1	0	71
	2011	0	0	30	3	59	4	6	0	0	2	1	0	24
	2012	0	0	3	10	325	6	6	0	0	3	1	0	86
	2013	2	0	32	18	0	12	6	0	0	4	1	0	192
	2014	3	0	4	15	214	20	1	0	0	4	1	0	324
	2015	4	1	77	28	27	53	1	14	0	14	2	0	477
Installers Required	2007	0	0	56	4	213	24	71	7	0	4	0	4	19
	2008	17	0	12	0	243	19	43	33	0	25	0	407	16
	2009	0	0	198	15	255	18	42	143	0	0	0	0	99
	2010	0	0	16	19	366	0	41	749	0	10	6	0	475
	2011	0	0	189	16	366	23	39	0	0	15	3	0	150
	2012	2	0	17	57	1,886	35	37	0	0	18	4	0	500
	2013	11	0	172	93	0	62	34	0	0	19	5	0	1,022
	2014	14	0	18	71	1,042	100	6	0	0	20	6	0	1,580
	2015	19	5	341	125	119	235	5	62	0	64	11	0	2,107
Market Penetration	2007	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	1%	0%	1%	0%	1%	0%	0%	0%	0%	1%	0%
	2009	0%	0%	2%	0%	2%	0%	1%	0%	0%	0%	0%	1%	0%
	2010	0%	0%	2%	0%	2%	0%	1%	1%	0%	0%	0%	1%	1%
	2011	0%	0%	2%	0%	3%	0%	1%	1%	0%	0%	0%	1%	1%
	2012	0%	0%	2%	1%	6%	1%	1%	1%	0%	0%	0%	1%	1%
	2013	0%	0%	2%	2%	5%	1%	1%	1%	0%	0%	0%	1%	3%
	2014	0%	0%	2%	2%	7%	1%	1%	1%	0%	0%	0%	1%	5%
	2015	1%	0%	3%	4%	7%	2%	1%	1%	0%	0%	0%	1%	7%

		Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	DC	West Virginia	Wisconsin	Wyoming
Cumulative Installations	2007	1	2	1	1	6	1	2	1	6	1	1	6	1
	2008	1	2	1	7	10	1	2	8	10	1	1	12	1
	2009	1	2	1	7	20	1	2	8	19	2	1	12	1
	2010	2	2	1	9	58	1	3	8	36	4	1	20	1
	2011	3	2	1	15	91	1	4	8	46	6	1	28	1
	2012	5	2	1	22	149	1	5	8	68	127	1	40	1
	2013	7	3	1	31	212	1	7	8	130	127	1	56	2
	2014	11	5	1	48	289	4	10	14	242	127	2	76	2
	2015	15	10	1	73	415	11	14	44	242	159	4	110	3
Annual Installations	2007	1	1	0	0	1	1	1	1	3	1	0	2	0
	2008	0	0	0	7	4	0	0	7	4	0	0	6	0
	2009	1	0	0	0	10	0	0	0	9	1	0	0	0
	2010	1	0	0	2	38	0	1	0	17	2	0	7	0
	2011	1	0	0	5	33	0	1	0	11	2	0	8	0
	2012	2	0	0	7	58	0	1	0	22	121	0	12	0
	2013	2	1	0	10	63	0	2	0	62	0	0	16	0
	2014	3	2	0	17	77	3	3	6	112	0	1	21	0
	2015	4	5	0	25	127	7	3	30	0	32	2	33	1
Installers Required	2007	4	7	0	0	8	4	7	4	22	4	0	15	0
	2008	1	0	0	47	31	0	1	49	29	1	0	46	0
	2009	4	0	0	0	68	0	0	0	62	9	0	0	0
	2010	6	0	0	14	255	0	7	0	112	11	0	49	1
	2011	7	0	0	34	208	0	6	0	66	13	0	49	1
	2012	11	1	0	41	335	0	8	0	128	700	0	69	2
	2013	12	6	0	53	334	0	10	2	330	0	2	86	2
	2014	17	9	0	82	375	15	14	27	546	0	5	101	2
	2015	20	20	0	109	560	31	15	134	0	143	9	146	3
Market Penetration	2007	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2009	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2010	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2011	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2012	0%	0%	0%	0%	0%	0%	1%	0%	1%	8%	0%	0%	0%
	2013	1%	0%	0%	0%	0%	0%	1%	0%	1%	8%	0%	0%	0%
	2014	1%	0%	0%	0%	0%	0%	1%	0%	2%	7%	0%	1%	0%
	2015	1%	0%	0%	0%	1%	0%	1%	0%	2%	9%	0%	1%	0%

Table 8-15. State-by-State Results for the Best Case, BAU System Pricing

		Alabama	Alaska	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	Florida	Georgia	Hawaii	Idaho	Illinois
Cumulative Installations	2007	1	1	14	1	499	20	3	1	1	1	6	1	1
	2008	1	1	41	1	914	34	3	17	2	1	14	1	1
	2009	1	1	72	1	1,172	35	9	17	2	1	14	1	1
	2010	1	1	122	1	1,526	36	12	17	2	1	14	1	1
	2011	1	1	187	1	2,030	73	17	17	9	1	14	1	1
	2012	1	1	268	1	2,784	75	24	33	16	3	15	1	1
	2013	1	1	313	1	3,613	77	33	47	24	5	18	1	1
	2014	1	1	360	1	4,499	78	45	68	34	8	24	1	1
	2015	1	1	408	1	6,006	120	57	102	57	15	36	1	1
Annual Installations	2007	0	0	5	0	166	6	1	1	1	0	3	0	0
	2008	0	0	27	0	415	14	0	16	1	0	8	0	0
	2009	0	0	31	0	258	1	6	0	0	0	0	0	0
	2010	0	0	50	0	354	1	4	0	0	0	0	0	0
	2011	0	0	65	0	504	37	4	0	7	1	0	0	0
	2012	0	0	81	0	754	2	8	16	7	2	1	0	0
	2013	0	0	45	0	829	2	9	15	8	2	3	0	0
	2014	0	0	47	0	887	2	11	21	11	3	6	0	0
	2015	0	1	49	0	1,507	42	12	34	23	7	12	0	0
Installers Required	2007	0	0	35	0	1,232	48	7	4	4	0	23	0	0
	2008	0	0	171	0	2,990	102	2	113	6	0	57	1	0
	2009	0	0	214	0	1,795	5	39	0	0	0	0	2	0
	2010	0	0	339	0	2,377	5	25	0	0	0	0	0	0
	2011	0	0	407	0	3,150	235	28	0	44	5	0	0	0
	2012	0	0	467	0	4,372	9	44	91	39	11	8	0	0
	2013	0	0	239	0	4,422	9	49	78	43	10	17	0	0
	2014	0	1	228	0	4,323	8	55	104	51	15	28	0	0
	2015	2	3	214	0	6,651	184	53	150	100	29	53	0	0
Market Penetration	2007	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	2%	0%	0%	1%	0%	0%	1%	0%	0%
	2009	0%	0%	1%	0%	2%	0%	0%	1%	0%	0%	1%	0%	0%
	2010	0%	0%	1%	0%	2%	0%	0%	1%	0%	0%	1%	0%	0%
	2011	0%	0%	1%	0%	3%	1%	0%	1%	0%	0%	1%	0%	0%
	2012	0%	0%	2%	0%	4%	1%	0%	2%	0%	0%	1%	0%	0%
	2013	0%	0%	2%	0%	5%	1%	1%	3%	0%	0%	1%	0%	0%
	2014	0%	0%	2%	0%	6%	1%	1%	4%	0%	0%	1%	0%	0%
	2015	0%	0%	2%	0%	7%	1%	1%	5%	0%	0%	1%	0%	0%

		Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Mass.	Michigan	Minnesota	Mississippi	Missouri
Cumulative Installations	2007	1	1	1	1	1	2	2	7	1	1	1	1
	2008	1	1	1	2	1	2	3	14	1	1	1	1
	2009	1	1	1	2	1	3	24	21	1	1	1	1
	2010	1	1	1	2	1	5	24	32	1	1	1	1
	2011	1	1	1	2	1	5	282	32	1	1	1	1
	2012	1	1	1	2	1	5	282	32	1	1	1	1
	2013	1	1	1	2	1	5	282	35	1	1	3	1
	2014	1	1	1	2	1	6	282	45	1	1	7	1
	2015	1	1	1	4	1	8	282	57	3	1	11	1
Annual Installations	2007	0	0	0	0	0	1	1	2	1	0	0	0
	2008	0	0	0	2	0	0	1	7	0	0	0	0
	2009	0	0	0	0	0	1	21	8	0	0	0	0
	2010	0	0	0	0	0	2	0	11	0	0	0	0
	2011	0	0	0	0	0	0	258	0	0	0	0	0
	2012	0	0	0	0	0	0	0	0	0	0	0	0
	2013	0	0	0	0	0	0	0	3	0	0	2	0
	2014	0	0	0	0	0	1	0	11	0	0	4	0
	2015	0	0	0	2	0	2	0	12	2	0	5	0
Installers Required	2007	0	0	0	0	0	7	7	16	4	0	0	0
	2008	0	0	0	13	0	4	4	48	0	0	0	0
	2009	0	0	0	0	0	5	147	53	0	0	0	0
	2010	0	0	0	0	0	12	0	73	0	0	0	0
	2011	0	0	0	0	0	0	1,614	0	0	0	0	0
	2012	0	0	0	0	0	0	0	0	0	0	0	0
	2013	0	0	0	0	0	0	0	14	0	0	12	0
	2014	0	0	0	0	0	4	0	52	0	0	20	0
	2015	0	0	0	9	0	9	0	53	8	0	20	0
Market Penetration	2007	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2009	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2010	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2011	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%	0%	0%
	2012	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%	0%	0%
	2013	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%
	2014	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%
	2015	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	0%	0%

		Montana	Nebraska	Nevada	NH	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania
ve Ins	2007	1	1	15	1	69	9	32	3	1	2	1	2	9

	2008	2	1	79	1	103	11	128	7	1	4	1	37	11
	2009	2	1	107	3	140	13	134	21	1	4	1	37	23
	2010	2	1	109	6	194	13	140	50	1	4	1	37	37
	2011	2	1	140	9	253	13	146	50	1	4	1	37	58
	2012	2	1	143	16	321	16	153	76	1	6	1	37	96
	2013	2	1	175	22	405	21	159	76	1	8	1	37	166
	2014	3	1	179	33	502	26	160	76	1	10	1	37	290
	2015	5	1	203	56	614	33	161	154	1	14	2	37	343
Annual Installations	2007	0	0	7	1	29	3	10	1	0	1	0	1	3
	2008	1	0	64	0	34	3	95	4	0	2	0	35	2
	2009	0	0	28	2	37	1	6	14	0	0	0	0	12
	2010	0	0	2	4	55	0	6	29	0	0	0	0	14
	2011	0	0	30	3	59	0	6	0	0	0	0	0	21
	2012	0	0	3	7	68	4	6	25	0	2	0	0	38
	2013	0	0	32	6	83	4	6	0	0	2	0	0	70
	2014	1	0	4	11	98	5	1	0	0	2	0	0	124
	2015	2	0	24	24	111	7	1	77	0	4	1	0	53
Installers Required	2007	0	0	56	4	213	24	71	7	0	4	0	4	19
	2008	10	0	12	0	243	18	43	32	0	15	0	255	11
	2009	0	0	198	11	255	10	42	96	0	0	0	0	83
	2010	0	0	16	26	366	0	41	196	0	0	0	0	93
	2011	0	0	189	16	366	0	39	0	0	1	0	0	133
	2012	0	0	17	40	397	22	37	146	0	9	0	0	221
	2013	0	0	172	30	444	22	34	2	0	11	0	0	373
	2014	6	0	18	54	475	26	6	2	0	12	1	0	606
	2015	8	0	107	104	492	31	5	341	0	16	5	0	233
Market Penetration	2007	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	1%	0%	1%	0%	1%	0%	0%	0%	0%	1%	0%
	2009	0%	0%	2%	0%	2%	0%	1%	0%	0%	0%	0%	1%	0%
	2010	0%	0%	2%	0%	2%	0%	1%	0%	0%	0%	0%	1%	0%
	2011	0%	0%	2%	1%	3%	0%	1%	0%	0%	0%	0%	1%	0%
	2012	0%	0%	2%	1%	3%	0%	1%	0%	0%	0%	0%	1%	1%
	2013	0%	0%	2%	1%	4%	1%	1%	0%	0%	0%	0%	0%	1%
	2014	0%	0%	2%	2%	5%	1%	1%	0%	0%	0%	0%	0%	2%
	2015	0%	0%	2%	3%	5%	1%	1%	1%	0%	0%	0%	0%	2%

		Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	DC	West Virginia	Wisconsin	Wyoming
Cumulative Installations	2007	1	2	1	1	6	1	2	1	6	1	1	6	1
	2008	1	2	1	11	10	1	2	6	10	1	1	11	1
	2009	1	2	1	11	17	1	2	6	14	2	1	11	1
	2010	1	2	1	11	41	1	2	6	21	3	1	11	1
	2011	1	2	1	11	55	1	3	6	29	3	1	14	1
	2012	2	2	1	11	74	1	4	6	42	41	1	21	1
	2013	3	2	1	11	96	1	4	6	56	41	1	27	1
	2014	4	2	1	20	122	1	5	6	73	41	1	35	1
	2015	5	2	1	31	171	1	7	6	73	49	1	46	1
Annual Installations	2007	1	1	0	0	1	1	1	1	3	1	0	2	0
	2008	0	0	0	10	4	0	0	6	4	0	0	5	0
	2009	0	0	0	0	8	0	0	0	5	1	0	0	0
	2010	0	0	0	0	23	0	0	0	7	1	0	0	0
	2011	0	0	0	0	15	0	0	0	8	1	0	3	0
	2012	1	0	0	0	19	0	1	0	13	38	0	7	0
	2013	1	0	0	0	21	0	1	0	14	0	0	7	0
	2014	1	0	0	9	27	0	1	0	18	0	0	7	0
	2015	1	0	0	12	49	0	1	0	0	7	0	11	0
Installers Required	2007	4	7	0	0	8	4	7	4	22	4	0	15	0
	2008	0	0	0	74	27	0	1	40	26	0	0	37	0
	2009	0	0	0	0	55	0	0	0	32	6	0	0	0
	2010	1	0	0	0	156	0	2	0	46	4	0	0	0
	2011	1	0	0	0	91	0	3	0	51	4	0	16	0
	2012	5	0	0	0	111	0	5	0	75	220	0	39	0
	2013	5	0	0	0	113	0	4	0	73	0	0	36	0
	2014	6	0	0	43	131	0	5	0	85	0	0	36	0
	2015	7	0	0	51	216	0	5	0	0	32	0	48	0
Market Penetration	2007	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2009	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2010	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2011	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2012	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%
	2013	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%
	2014	0%	0%	0%	0%	0%	0%	1%	0%	1%	2%	0%	0%	0%
	2015	0%	0%	0%	0%	0%	0%	1%	0%	0%	3%	0%	0%	0%

Table 8-16. State-by-State Results for the Best Case, SAI System Pricing

		Alabama	Alaska	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	Florida	Georgia	Hawaii	Idaho	Illinois
Cumulative Installations	2007	1	1	14	1	499	20	3	1	1	1	6	1	1
	2008	1	1	41	1	1,015	34	3	18	2	1	16	1	1
	2009	1	1	72	1	1,538	35	11	18	2	3	16	1	1
	2010	1	1	122	1	2,594	36	20	23	2	7	16	1	1
	2011	1	1	187	1	3,425	73	30	38	25	11	21	1	1
	2012	1	1	268	1	4,668	75	43	73	44	16	33	1	1
	2013	3	2	313	1	6,477	77	107	119	109	22	47	1	1
	2014	7	3	360	1	8,730	78	239	180	197	29	83	1	1
	2015	29	4	753	1	12,144	120	392	245	321	41	157	3	1
Annual Installations	2007	0	0	5	0	166	6	1	1	1	0	3	0	0
	2008	0	0	27	0	517	14	0	17	1	0	10	0	0
	2009	0	0	31	0	522	1	8	0	0	2	0	1	0
	2010	0	0	50	0	1,057	1	9	5	0	5	0	0	0
	2011	0	0	65	0	831	37	10	16	24	4	6	0	0
	2012	0	1	81	0	1,242	2	12	34	18	5	12	0	0
	2013	2	1	45	0	1,809	2	65	46	65	6	15	0	0
	2014	4	1	47	0	2,254	2	131	61	88	7	36	0	0
	2015	22	1	394	0	3,413	42	153	66	124	12	73	2	0
Installers Required	2007	0	0	35	0	1,232	48	7	4	4	0	23	0	0
	2008	0	0	171	0	3,719	102	2	123	6	0	69	1	0
	2009	0	0	214	0	3,635	5	54	0	0	15	0	5	0
	2010	0	0	339	0	7,095	5	64	32	0	32	0	0	0
	2011	0	1	407	0	5,198	235	63	97	147	24	36	0	0
	2012	0	4	467	0	7,199	9	72	200	105	28	67	0	0
	2013	12	4	239	0	9,652	9	346	246	347	32	78	0	0
	2014	21	5	228	0	10,987	8	640	297	429	34	175	0	0
	2015	99	6	1,739	0	15,070	184	675	290	549	52	324	8	0
Market Penetration	2007	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	2%	0%	0%	1%	0%	0%	1%	0%	0%
	2009	0%	0%	1%	0%	3%	0%	0%	1%	0%	0%	1%	0%	0%
	2010	0%	0%	1%	0%	4%	0%	0%	2%	0%	0%	1%	0%	0%
	2011	0%	0%	1%	0%	5%	1%	1%	2%	0%	0%	1%	0%	0%
	2012	0%	0%	2%	0%	7%	1%	1%	4%	0%	0%	1%	0%	0%
	2013	0%	0%	2%	0%	9%	1%	2%	7%	0%	0%	2%	0%	0%
	2014	0%	0%	2%	0%	11%	1%	4%	10%	0%	0%	3%	0%	0%
	2015	0%	0%	4%	0%	15%	1%	7%	12%	1%	0%	5%	0%	0%

		Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Mass.	Michigan	Minnesota	Mississippi	Missouri
Cumulative Installations	2007	1	1	1	1	1	2	2	7	1	1	1	1
	2008	1	1	1	3	1	3	3	15	1	1	1	1
	2009	1	1	1	3	1	5	31	30	1	1	1	1
	2010	1	1	1	3	1	14	31	178	1	1	1	1
	2011	1	1	1	3	1	14	31	178	2	1	1	1
	2012	1	1	1	3	1	14	1,020	178	5	1	6	1
	2013	1	1	1	7	1	14	1,020	178	12	1	11	1
	2014	1	1	1	19	1	23	1,020	178	24	1	20	1
	2015	1	1	1	37	1	38	1,020	264	43	1	37	3
Annual Installations	2007	0	0	0	0	0	1	1	2	1	0	0	0
	2008	0	0	0	2	0	1	1	8	0	0	0	0
	2009	0	0	0	0	0	2	29	15	0	0	0	0
	2010	0	0	0	0	0	9	0	148	1	0	0	0
	2011	0	0	0	0	0	0	0	0	1	0	0	0
	2012	0	0	0	0	0	0	988	0	2	0	5	0
	2013	0	0	0	4	0	0	0	0	8	0	6	0
	2014	0	0	0	12	0	9	0	0	12	0	9	0
	2015	0	1	0	19	0	15	0	85	19	0	16	2
Installers Required	2007	0	0	0	0	0	7	7	16	4	0	0	0
	2008	0	0	0	15	0	4	4	61	0	0	0	0
	2009	0	0	0	0	0	14	201	104	0	0	0	0
	2010	0	0	0	0	0	62	0	995	5	0	0	0
	2011	0	0	0	0	0	0	0	0	6	0	1	0
	2012	0	0	0	0	0	0	5,726	0	13	0	28	0
	2013	0	0	0	23	0	0	0	0	41	0	31	0
	2014	0	0	0	57	0	45	0	0	58	0	43	0
	2015	0	3	0	83	0	64	0	376	84	0	73	11
Market Penetration	2007	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2009	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2010	0%	0%	0%	0%	0%	1%	0%	2%	0%	0%	0%	0%
	2011	0%	0%	0%	0%	0%	1%	0%	2%	0%	0%	0%	0%
	2012	0%	0%	0%	0%	0%	1%	9%	2%	0%	0%	0%	0%
	2013	0%	0%	0%	0%	0%	1%	9%	2%	0%	0%	0%	0%
	2014	0%	0%	0%	0%	0%	1%	8%	2%	0%	0%	0%	0%
	2015	0%	0%	0%	0%	0%	2%	8%	3%	0%	0%	0%	0%

		Montana	Nebraska	Nevada	NH	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania
Cumulative Installations	2007	1	1	15	1	69	9	32	3	1	2	1	2	9
	2008	3	1	79	1	103	11	128	8	1	5	1	59	11
	2009	3	1	107	3	140	14	134	28	1	5	1	59	24
	2010	3	1	109	10	194	14	140	140	1	7	1	59	79
	2011	3	1	140	20	265	18	146	140	1	9	2	59	87
	2012	4	1	143	46	496	26	153	140	1	12	3	59	176
	2013	6	1	175	87	496	35	159	140	1	16	4	59	340
	2014	8	2	300	144	767	48	308	140	1	20	5	59	590
	2015	14	4	643	225	774	120	493	154	1	33	7	59	1,094
Annual Installations	2007	0	0	7	1	29	3	10	1	0	1	0	1	3
	2008	2	0	64	0	34	3	95	5	0	3	0	57	2
	2009	0	0	28	2	37	3	6	21	0	0	0	0	13
	2010	0	0	2	6	55	0	6	112	0	1	1	0	55
	2011	0	0	30	10	71	4	6	0	0	2	1	0	8
	2012	1	0	3	27	230	7	6	0	0	3	1	0	90
	2013	2	0	32	41	0	10	6	0	0	4	1	0	164
	2014	2	1	125	57	271	13	149	0	0	4	1	0	250
	2015	5	2	343	81	7	71	185	13	0	14	2	0	504
Installers Required	2007	0	0	56	4	213	24	71	7	0	4	0	4	19
	2008	15	0	12	0	243	20	43	33	0	24	0	407	13
	2009	0	0	198	16	255	19	42	143	0	0	0	0	89
	2010	0	0	16	43	366	0	41	753	0	9	6	0	367
	2011	0	0	189	63	444	26	39	0	0	15	3	0	51
	2012	8	0	17	154	1,336	43	37	0	0	17	4	0	519
	2013	11	2	172	217	0	52	34	0	0	19	5	0	873
	2014	12	3	608	277	1,319	64	728	0	0	20	6	0	1,219
	2015	24	9	1,514	358	32	315	815	59	0	61	10	0	2,225
Market Penetration	2007	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	1%	0%	1%	0%	1%	0%	0%	0%	0%	1%	0%
	2009	0%	0%	2%	0%	2%	0%	1%	0%	0%	0%	0%	1%	0%
	2010	0%	0%	2%	1%	2%	0%	1%	1%	0%	0%	0%	1%	1%
	2011	0%	0%	2%	1%	3%	0%	1%	1%	0%	0%	0%	1%	1%
	2012	0%	0%	2%	2%	5%	1%	1%	1%	0%	0%	0%	1%	1%
	2013	0%	0%	2%	4%	5%	1%	1%	1%	0%	0%	0%	1%	2%
	2014	0%	0%	3%	7%	7%	1%	2%	1%	0%	0%	0%	1%	4%
	2015	1%	0%	6%	10%	7%	3%	2%	1%	0%	0%	0%	1%	7%

		Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	DC	West Virginia	Wisconsin	Wyoming
Cumulative Installations	2007	1	2	1	1	6	1	2	1	6	1	1	6	1
	2008	1	2	1	12	10	1	2	8	10	1	1	12	1
	2009	1	2	1	12	26	1	2	8	19	2	1	12	1
	2010	2	2	1	12	71	1	3	8	36	4	1	20	1
	2011	3	2	1	12	111	1	4	8	52	6	1	28	1
	2012	4	3	1	17	177	1	5	8	78	127	1	40	1
	2013	6	8	1	30	252	1	7	8	144	127	1	56	1
	2014	8	15	1	53	339	4	10	14	255	127	2	76	1
	2015	13	26	1	102	828	11	14	50	255	159	7	110	1
Annual Installations	2007	1	1	0	0	1	1	1	1	3	1	0	2	0
	2008	0	0	0	12	4	0	0	7	4	0	0	6	0
	2009	0	0	0	0	16	0	0	0	9	1	0	0	0
	2010	1	0	0	0	45	0	1	0	17	2	0	7	0
	2011	1	0	0	0	41	0	1	0	16	2	0	8	0
	2012	2	1	0	5	65	0	1	0	26	121	0	12	0
	2013	2	5	0	12	76	0	2	0	66	0	0	16	0
	2014	3	7	0	24	87	3	3	6	111	0	1	21	0
	2015	5	12	0	49	489	7	3	37	0	32	5	33	1
Installers Required	2007	4	7	0	0	8	4	7	4	22	4	0	15	0
	2008	0	0	0	83	29	0	1	49	32	1	0	46	0
	2009	2	0	0	0	114	0	0	0	62	9	0	0	0
	2010	5	0	0	0	299	0	7	0	114	11	0	49	0
	2011	6	1	0	0	254	0	6	0	101	13	0	49	0
	2012	9	5	0	29	378	0	8	0	148	700	0	69	0
	2013	9	25	0	66	404	0	10	2	352	0	2	86	0
	2014	13	36	0	115	424	15	14	27	540	0	5	101	0
	2015	21	51	0	216	2,159	32	15	161	0	143	24	146	3
Market Penetration	2007	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2008	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2009	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2010	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2011	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2012	0%	0%	0%	0%	0%	0%	1%	0%	1%	8%	0%	0%	0%
	2013	0%	0%	0%	0%	0%	0%	1%	0%	1%	8%	0%	0%	0%
	2014	1%	0%	0%	0%	1%	0%	1%	0%	2%	7%	0%	1%	0%
	2015	1%	0%	0%	1%	1%	0%	1%	0%	2%	9%	0%	1%	0%

8.6 Input data

Table 8-17. Utilities Analyzed

State	Utility Name
AL	Alabama Power Co.
AK	Chugach
AZ	Arizona Public Service
AZ	Salt River Project
AZ	Tucson Electric Power
AK	Entergy Arkansas
CA	Southern California Edison
CA	Sacramento Municipal Utility District
CA	Pacific Gas and Electric Company
CA	San Diego Gas & Electric Company
CA	Los Angeles Department of Water and Power
CO	Public Service Company of Colorado
CO	Colorado Springs
CT	Connecticut Light and Power
DE	Conective (Delmarva Power)
FL	Florida Power & Light Co.
FL	Progress Energy Florida Inc
FL	Tampa Electric Company
GA	Georgia Power
HI	Hawaiian Electric Company (Oahu)
HI	Maui Electric Company
ID	Idaho Power
IL	Commonwealth Edison Co.
IL	Illinois Power Company
IN	PSI Energy Inc.
IA	IES Utilities (mid america)
IA	Interstate Power and Light
KS	Kansas Gas & Electric Co
KS	Westar Energy Inc
KY	Kentucky Utilities Co
KY	Louisville Gas & Electric Co
KY	Kenergy Corporation
LA	Entergy (Louisiana Power & Light)
ME	Central Maine Power

ME	Bangor Hydro Electric Company
MD	BGE (Baltimore Gas and Electric)
MD	Potomac Electric Power Company
MA	NSTAR (Boston Edison)
MA	Massachusetts Electric Company
MI	Detroit Edison
MI	Consumers Energy Company
MN	Xcel Energy (Northern States Power)
MS	Entergy Mississippi (Mississippi Power and Light)
MS	Mississippi Power Company
MO	AmerenUE - Missouri (Union Electric)
MT	Northwestern Energy (Montana Power Company)
NE	Omaha Public Power District
NV	Nevada Power
NV	Sierra Pacific Power Company
NH	Public Service of New Hampshire
NH	Unitil Energy Systems
NJ	PSE&G (Public Service Electric and Gas Co.)
NJ	Jersey Central Power and Light Co.
NJ	Atlantic City Electrical Company
NM	PNM (Public Service Company of New Mexico)
NM	Southwest Public Service Company
NY	Niagara Mohawk
NY	New York State Electric and Gas Corp
NY	Consolidated Edison
NY	Long Island Power Authority
NC	Duke Power
NC	Progress Energy Carolinas Inc
ND	Northern States Power Co
OH	Ohio Power Company
OH	Ohio Edison
OH	Cincinnati Gas & Electric Company
OK	AEP (Public Service Company of Oklahoma)
OK	Oklahoma Gas and Electric Company
OR	PacifiCorp (Pacific Power)
OR	Portland General Electric Company
PA	PPL Electric Utilities
PA	PECO Energy Co
PA	West Penn Power Co.
RI	Narragansett Electric
SC	South Carolina Electric and Gas

SC	Duke Energy Corporation
SD	Xcel Energy (Northern States Power)
TN	Nashville Electric Service
TN	Knoxville Electric Board
TN	City of Memphis
TX	TXU Electric
TX	Reliant Energy Services
TX	Entergy Gulf States Inc
TX	Constellation New Energy Inc
TX	City of San Antonio
UT	PacifiCorp (Utah Power & Light)
VT	Green Mountain Power
VT	Central Vermont Public Service Corporation
VA	Dominion (Virginia Electric and Power)
VA	Appalachian Power Co
WA	Puget Sound Energy
WA	Snohomish County PUD No 1
WA	City of Seattle
DC	PEPCO
WV	American Electric (Appalachian Power)
WI	We Energies (Wisconsin Electric)
WI	Wisconsin Public Service Corporation
WY	PacifiCorp (Pacific Power)

Table 8-18. IREC's Interconnection Assessments

State	Utility	Interconnection Policy Assessment
Alabama	Alabama Power Co.	Barrier
Alaska	Chugach	Good
Arizona	Arizona Public Service	Barrier
Arizona	Salt River Project	Barrier
Arizona	Tucson Electric Power	Barrier
Arkansas	Entergy Arkansas	Poor
California	Southern California Edison	Good
California	Sacramento Municipal Utility District	Good
California	Pacific Gas and Electric Company	Good
California	San Diego Gas & Electric Company	Good
California	Los Angeles Department of Water and Power	Good
Colorado	Public Service Company of Colorado	Good
Colorado	Colorado Springs	Barrier
Connecticut	Connecticut Light and Power	Fair
Delaware	Conective (Delmarva Power)	Fair
Florida	Florida Power & Light Co.	Poor
Florida	Progress Energy Florida Inc	Poor
Florida	Tampa Electric Company	Poor
Georgia	Georgia Power	Poor
Hawaii	Hawaiian Electric Company (Oahu)	Poor
Hawaii	Maui Electric Company	Poor
Idaho	Idaho Power	Barrier
Illinois	Commonwealth Edison Co.	Barrier
Illinois	Illinois Power Company	Barrier
Indiana	PSI Energy Inc.	Good
Iowa	IES Utilities (Mid American)	Barrier
Iowa	Interstate Power and Light	Barrier
Kansas	Kansas Gas & Electric Co	Barrier
Kansas	Westar Energy Inc	Barrier
Kentucky	Kentucky Utilities Co	Barrier
Kentucky	Louisville Gas & Electric Co	Barrier
Kentucky	Kenergy Corporation	Barrier
Louisiana	Entergy (Louisiana Power & Light)	Barrier
Maine	Central Maine Power	Barrier
Maine	Bangor Hydro Electric Company	Barrier

Maryland	BGE (Baltimore Gas and Electric)	Barrier
Maryland	Potomac Electric Power Company	Barrier
Massachusetts	NSTAR (Boston Edison)	Fair
Massachusetts	Massachusetts Electric Company	Fair
Michigan	Detroit Edison	Poor
Michigan	Consumers Energy Company	Poor
Minnesota	Xcel Energy (Northern States Power)	Fair
Mississippi	Entergy Mississippi (Mississippi Power and Light)	Barrier
Mississippi	Mississippi Power Company	Barrier
Missouri	AmerenUE - Missouri (Union Electric)	Poor
Montana	Northwestern Energy (Montana Power Company)	Poor
Nebraska	Omaha Public Power District	Barrier
Nevada	Nevada Power	Good
Nevada	Sierra Pacific Power Company	Good
New Hampshire	Public Service of New Hampshire	Poor
New Hampshire	Unitil Energy Systems	Poor
New Jersey	PSE&G (Public Service Electric and Gas Co.)	Superior
New Jersey	Jersey Central Power and Light Co.	Superior
New Jersey	Atlantic City Electrical Company	Superior
New Mexico	PNM (Public Service Company of New Mexico)	Barrier
New Mexico	Southwest Public Service Company	Barrier
New York	Niagara Mohawk	Fair
New York	New York State Electric and Gas Corp	Fair
New York	Consolidated Edison	Fair
New York	Long Island Power Authority	Fair
North Carolina	Duke Power	Poor
North Carolina	Progress Energy Carolinas Inc	Poor
North Dakota	Northern States Power Co	Poor
Ohio	Ohio Power Company	Fair
Ohio	Ohio Edison	Fair
Ohio	Cincinnati Gas & Electric Company	Fair
Oklahoma	AEP (Public Service Company of Oklahoma)	Poor
Oklahoma	Oklahoma Gas and Electric Company	Poor
Oregon	PacifiCorp (Pacific Power)	Good
Oregon	Portland General Electric Company	Good
Pennsylvania	PPL Electric Utilities	Fair
Pennsylvania	PECO Energy Co	Fair
Pennsylvania	West Penn Power Co.	Fair
Rhode Island	Narragansett Electric	Barrier
South Carolina	South Carolina Electric and Gas	Poor

South Carolina	Duke Energy Corporation	Poor
South Dakota	Xcel Energy (Northern States Power)	Barrier
Tennessee	Nashville Electric Service	Barrier
Tennessee	Knoxville Electric Board	Barrier
Tennessee	City of Memphis	Barrier
Texas	TXU Electric	Good
Texas	Reliant Energy Services	Good
Texas	Entergy Gulf States Inc	Good
Texas	Constellation New Energy Inc	Good
Texas	City of San Antonio	Good
Utah	PacifiCorp (Utah Power & Light)	Poor
Vermont	Green Mountain Power	Fair
Vermont	Central Vermont Public Service Corporation	Fair
Virginia	Dominion (Virginia Electric and Power)	Poor
Virginia	Appalachian Power Co	Poor
Washington	Puget Sound Energy	Poor
Washington	Snohomish County PUD No 1	Poor
Washington	City of Seattle	Poor
Washington, DC	PEPCO	Poor
West Virginia	American Electric (Appalachian Power)	Poor
Wisconsin	We Energies (Wisconsin Electric)	Fair
Wisconsin	Wisconsin Public Service Corporation	Fair
Wyoming	PacifiCorp (Pacific Power)	Poor

Rate Structures

NCI researched each utility's website to locate Residential and Commercial Electric Rates. We then confirmed with the FERC Form 1 Database which Standard and TOU Rates are most representative for that utility. Record three rate structures for each utility's residential and commercial electric services: 1.Standard 2.Time-of-Use, Weekday (if time-of-use is available) 3. Time-of-Use, Weekend (if time-of-use is available). For each representative utility and assumed system size, We looked TOU and standard rates to see which rate would yield the lower annual electric utility bill (with PV). We then used that rate structure for the analysis. Refer to the model for actual rate structures.

Demand charges

NCI cataloged utility peak demand charges from utility websites and tariff sheets. We assumed PV only offsets peak demand charges.

State and Local Incentives

NCI's PV Services group provided a comprehensive list of local incentives for PV, broken down by state or utility. We divided incentives into three types: capacity based (in $/kW), performance based, and capacity based (as a % of system cost). We researched when the programs funding was going to run out and implemented that into the model. In cases where data could not be found, we implemented a switch to allow incentives to expire in 2009, 2012, or 2016. All of the analysis done in the report assumed 2009, to be conservative. In reality, if the tax credits are extended, most state level subsidies will be reduced or eliminated. Given that all cases analyzed, except the worst-case, assume the federal tax credits are extended, we believe this is a good assumption.

For the California Solar Initiative (CSI), We implemented a feed back mechanism in the model that mimics the actual feed back mechanism being used in CSI in that when cumulative installations within a utility service area reach a certain level, the rebate amount is reduced. However, this model only reduces the incentives on an annual basis, as opposed to continuously.

5 Year MACRS depreciation

To account for the benefits of accelerated depreciation within the context of a modified simple pay-back in the commercial sector, We amortized MACRS benefits over system life.

Net metering rules

NCI cataloged net metering rules for each state (or utility, where applicable) and accounted for the following: (1) Is net metering allowed? (2) If so, at what rate is electricity sold back to the grid? (3) Can a customer get credit for electricity sold back in excess of their annual bill? (4) If so, at what rate is excess credit bought at? Options for sell back include retail, wholesale, and annual average rate. We collected data on these rates where necessary from EIA and internal NCI sources.

Table 8-19. Net metering availability and sell back rules for the representative utilities analyzed

State	Utility	Net Metering Allowed?	Net Metering Sell Back Rates
Alabama	Alabama Power Co.	N	
Alaska	Chugach	N	
Arizona	Arizona Public Service	Y	Retail
Arizona	Salt River Project	Y	Retail
Arizona	Tucson Electric Power	Y	Retail
Arkansas	Entergy Arkansas	Y	Retail
California	Southern California Edison	Y	Retail
California	Sacramento Municipal Utility District	Y	Retail
California	Pacific Gas and Electric Company	Y	Retail
California	San Diego Gas & Electric Company	Y	Retail
California	Los Angeles Department of Water and Power	Y	Retail
Colorado	Public Service Company of Colorado	Y	Retail
Colorado	Colorado Springs	Y	Retail
Connecticut	Connecticut Light and Power	Y	Retail
Delaware	Conective (Delmarva Power)	Y	Retail
Florida	Florida Power & Light Co.	N	
Florida	Progress Energy Florida Inc	N	
Florida	Tampa Electric Company	N	
Georgia	Georgia Power	Y	Retail
Hawaii	Hawaiian Electric Company (Oahu)	Y	Retail
Hawaii	Maui Electric Company	Y	Retail
Idaho	Idaho Power	Y	Retail
Illinois	Commonwealth Edison Co.	Y	Retail
Illinois	Illinois Power Company	N	
Indiana	PSI Energy Inc.	Y	Retail
Iowa	IES Utilities (mid america)	Y	Retail
Iowa	Interstate Power and Light	Y	Retail
Kansas	Kansas Gas & Electric Co	N	
Kansas	Westar Energy Inc	N	
Kentucky	Kentucky Utilities Co	Y	Retail
Kentucky	Louisville Gas & Electric Co	Y	Retail
Kentucky	Kenergy Corporation	Y	Retail
Louisiana	Entergy (Louisiana Power & Light)	Y	Retail
Maine	Central Maine Power	Y	Retail
Maine	Bangor Hydro Electric Company	Y	Retail
Maryland	BGE (Baltimore Gas and Electric)	Y	Retail

Maryland	Potomac Electric Power Company	Y	Retail
Massachusetts	NSTAR (Boston Edison)	Y	Retail
Massachusetts	Massachusetts Electric Company	Y	Retail
Michigan	Detroit Edison	Y	Retail
Michigan	Consumers Energy Company	Y	Retail
Minnesota	Xcel Energy (Northern States Power)	Y	Retail
Mississippi	Entergy Mississippi (Mississippi Power and Light)	N	
Mississippi	Mississippi Power Company	N	
Missouri	AmerenUE - Missouri (Union Electric)	Y	Wholesale
Montana	Northwestern Energy (Montana Power Company)	Y	Retail
Nebraska	Omaha Public Power District	N	
Nevada	Nevada Power	Y	Retail
Nevada	Sierra Pacific Power Company	Y	Retail
New Hampshire	Public Service of New Hampshire	Y	Retail
New Hampshire	Unitil Energy Systems	Y	Retail
New Jersey	PSE&G (Public Service Electric and Gas Co.)	Y	Retail
New Jersey	Jersey Central Power and Light Co.	Y	Retail
New Jersey	Atlantic City Electrical Company	Y	Retail
New Mexico	PNM (Public Service Company of New Mexico)	Y	Retail
New Mexico	Southwest Public Service Company	Y	Retail
New York	Niagara Mohawk	Y	Retail
New York	New York State Electric and Gas Corp	Y	Retail
New York	Consolidated Edison	Y	Retail
New York	Long Island Power Authority	Y	Retail
North Carolina	Duke Power	Y	Retail
North Carolina	Progress Energy Carolinas Inc	Y	Retail
North Dakota	Northern States Power Co	Y	Wholesale
Ohio	Ohio Power Company	Y	Wholesale
Ohio	Ohio Edison	Y	Wholesale
Ohio	Cincinatti Gas & Electric Company	Y	Wholesale
Oklahoma	AEP (Public Service Company of Oklahoma)	Y	Retail
Oklahoma	Oklahoma Gas and Electric Company	Y	Retail
Oregon	PacifiCorp (Pacific Power)	Y	Retail
Oregon	Portland General Electric Company	Y	Retail

Pennsylvania	PPL Electric Utilities	Y	Retail
Pennsylvania	PECO Energy Co	Y	Retail
Pennsylvania	West Penn Power Co.	Y	Retail
Rhode Island	Narragansett Electric	Y	Retail
South Carolina	South Carolina Electric and Gas	N	
South Carolina	Duke Energy Corporation	N	
South Dakota	Xcel Energy (Northern States Power)	N	
Tennessee	Nashville Electric Service	N	
Tennessee	Knoxville Electric Board	N	
Tennessee	City of Memphis	N	
Texas	TXU Electric	Y	Retail
Texas	Reliant Energy Services	Y	Retail
Texas	Entergy Gulf States Inc	Y	Retail
Texas	Constellation New Energy Inc	Y	Retail
Texas	City of San Antonio	Y	Retail
Utah	PacifiCorp (Utah Power & Light)	Y	Retail
Vermont	Green Mountain Power	Y	Retail
Vermont	Central Vermont Public Service Corporation	Y	Retail
Virginia	Dominion (Virginia Electric and Power)	Y	Retail
Virginia	Appalachian Power Co	Y	Retail
Washington	Puget Sound Energy	Y	Retail
Washington	Snohomish County PUD No 1	Y	Retail
Washington	City of Seattle	Y	Retail
Washington, DC	PEPCO	Y	Retail
West Virginia	American Electric (Appalachian Power)	Y	Retail
Wisconsin	We Energies (Wisconsin Electric)	Y	Retail
Wisconsin	Wisconsin Public Service Corporation	Y	Retail
Wyoming	PacifiCorp (Pacific Power)	Y	Retail

Table 8-20. Net metering caps for the representative utilities analyzed

Utility	Do Net Metering Caps exist?	Cap Amount (% of utilities peak demand unless otherwise noted)
Alabama Power Co.	N	
Chugach	N	
Arizona Public Service	N	
Salt River Project	N	
Tucson Electric Power	N	
Entergy Arkansas	N	
Southern California Edison	Y	2.50%
Sacramento Municipal Utility District	Y	2.50%
Pacific Gas and Electric Company	Y	2.50%
San Diego Gas & Electric Company	Y	2.50%
Los Angeles Department of Water and Power	Y	2.50%
Public Service Company of Colorado	N	
Colorado Springs	N	
Connecticut Light and Power	N	
Conective (Delmarva Power)	N	
Florida Power & Light Co.	N	
Progress Energy Florida Inc	N	
Tampa Electric Company	N	
Georgia Power	Y	0.2%
Hawaiian Electric Company (Oahu)	Y	0.5%
Maui Electric Company	Y	0.5%
Idaho Power	Y	0.1% Of 2000 peak demand
Commonwealth Edison Co.	N	
Illinois Power Company	N	
PSI Energy Inc.	Y	0.10%
IES Utilities (mid america)	N	
Interstate Power and Light	N	
Kansas Gas & Electric Co	N	
Westar Energy Inc	N	
Kentucky Utilities Co	Y	0.10%
Louisville Gas & Electric Co	Y	0.10%
Kenergy Corporation	Y	0.10%
Entergy (Louisiana Power & Light)	N	
Central Maine Power	N	

Bangor Hydro Electric Company	N	
BGE (Baltimore Gas and Electric)	Y	Fixed # of MW's
Potomac Electric Power Company	Y	Fixed # of MW's
NSTAR (Boston Edison)	N	
Massachusetts Electric Company	N	
Detroit Edison	Y	0.1%
Consumers Energy Company	Y	0.1%
Xcel Energy (Northern States Power)	N	
Entergy Mississippi (Mississippi Power and Light)	N	
Mississippi Power Company	N	
AmerenUE - Missouri (Union Electric)	Y	5.0%
Northwestern Energy (Montana Power Company)	N	
Omaha Public Power District	N	
Nevada Power	Y	1.0%
Sierra Pacific Power Company	Y	1.0%
Public Service of New Hampshire	Y	0.1%
Unitil Energy Systems	Y	0.1%
PSE&G (Public Service Electric and Gas Co.)	N	
Jersey Central Power and Light Co.	N	
Atlantic City Electrical Company	N	
PNM (Public Service Company of New Mexico)	N	
Southwest Public Service Company	N	
Niagara Mohawk	Y	0.1%
New York State Electric and Gas Corp	Y	0.1%
Consolidated Edison	Y	0.1%
Long Island Power Authority	Y	0.1%
Duke Power	Y	0.2%
Progress Energy Carolinas Inc	Y	0.2%
Northern States Power Co	N	
Ohio Power Company	Y	1.0%
Ohio Edison	Y	1.0%
Cincinatti Gas & Electric Company	Y	1.0%
AEP (Public Service Company of Oklahoma)	N	
Oklahoma Gas and Electric Company	N	
PacifiCorp (Pacific Power)	Y	0.5%
Portland General Electric Company	Y	0.5%
PPL Electric Utilities	N	
PECO Energy Co	N	
West Penn Power Co.	N	

Narragansett Electric	Y	Fixed # of MW's
South Carolina Electric and Gas	N	
Duke Energy Corporation	N	
Xcel Energy (Northern States Power)	N	
Nashville Electric Service	N	
Knoxville Electric Board	N	
City of Memphis	N	
TXU Electric	N	
Reliant Energy Services	N	
Entergy Gulf States Inc	N	
Constellation New Energy Inc	N	
City of San Antonio	N	
PacifiCorp (Utah Power & Light)	Y	0.1% of 2001 peak demand
Green Mountain Power	Y	1.0%
Central Vermont Public Service Corporation	Y	1.0%
Dominion (Virginia Electric and Power)	Y	0.1%
Appalachian Power Co	Y	0.1%
Puget Sound Energy	N	0.25% of 1996 peak
Snohomish County PUD No 1	N	0.25% of 1996 peak
City of Seattle	N	0.25% of 1996 peak
PEPCO	N	
American Electric (Appalachian Power)	Y	0.1%
We Energies (Wisconsin Electric)	N	
Wisconsin Public Service Corporation	N	
PacifiCorp (Pacific Power)	N	

REC assumptions

NCI cataloged current REC prices in existing REC markets and for states with an RPS that have not established a REC market, we used a REC value of 15% below the alternative compliance payment. For these states, we assumed a REC market is partially developed in 2009 and fully developed in 2010. For states with separate solar alternative compliance payments, we assume that if in the previous year of analysis, the RPS solar set aside target is met for the current year, the market value of a REC drops to 15% below the normal alternative compliance payment level for the current year (this is only necessary in DC, DE, MD, NJ, and PA). More refined methods can not be used because the model only has a temporal resolution of one year.

Building load profiles

Residential - NREL provided 8760 building load profiles on a regional basis using 2003 weather as an input. NCI and NREL worked to identify 10 representative cities. We then assigned each utility a representative load profile based upon the utilities climate zone as specified by Building America. The 10 cities were Phoenix, Sacramento, Los Angeles, Boulder, Tampa, Atlanta, Chicago, NYC, Houston, and Seattle.

Commercial - NREL provided 8760 building load profiles for all 98 utilities being analyzed, using 2003 weather data. Typical building load profiles were office buildings, warehouses, or hospitals.

PV output profiles

Residential - NREL provided 8760 PV output profiles on a regional basis using 2003 weather as an input into PV Watts with a 30 degree tilt. NCI and NREL worked to identify 10 representative cities. We then assigned each utility a representative PV system output profile.

Commercial - NREL provided 8760 PV output profiles for all 98 utilities being analyzed, using 2003 weather data as an input to PV Watts with a 0 degree tilt.

O&M and inverter costs

DOE provided NCI with aggregated, combined O&M and inverter replacement costs from applicants and awardees of the Solar America Initiative.

Table 8-21. O&M and Inverter Replacement Costs

	O&M Costs and Inverter Replacement Costs ($/kW-Yr)		
Market Segment	2007	2010	2015
Residential	$57.98	$39.45	$35.00
Commercial	$51.28	$38.07	$27.33

System size

NCI started with default system sizing of 5 kW in the residential sector and 250 kW in the commercial sector. We then reduced system size based on net metering rules, interconnection standards and local incentive amounts so as to maximize the value of the incentive (i.e. if a utility only offer rebates for the first 100 kW, a 100 kW system size was used).

Calculation of annual electric bill savings:

Using 8760 building load profiles provided by NREL and actual utility rate structures (accounting for seasonal variation, TOU rates, etc), We first calculated a customer's annual electric bill. Next, We calculated annual electric bill savings by combining 8760 PV output profiles, actual utility rate structures, and local net metering law (i.e. is net metering allowed, at what rate is power sold back to the grid, and can a customer sell back in excess of their annual electric bill).

Information on calculated TOU rates

Not all state utility rates used in the analysis conform nicely to the average TOU structures. Where applicable, extreme outliers were ignored in the calculation. For example, PSI Energy Inc. was ignored in the analysis of the RFC region because its existing TOU rate is available only to those customers with its Low-Load Factor service, a very specific rate. Within the NPCC region, Central Maine Power is the only utility with a shoulder period and rate, thus a weighted average of the peak and shoulder rates and times was taken to create a new, representative peak rate and length of time.

As expected, the TOU structures tended to vary within each region. For example, the Florida utilities all establish a morning peak and an evening peak-period with non-peak rates throughout the middle of the day. The average changes in peak-hour rates and non-peak-hour rates between the Winter and Summer seasons vary the most between the Northeast and Pacific States, with the NE showing almost no change between seasons and the SW & W showing as much as 147% increase in Commercial peak rates between the two seasons. The utility structures within the RFC region vary the most, potentially due to the recent merger of the ECAR, MAAC and MAIN RRCs.

Impact of Carbon Pricing

To examine the impacts of potential national carbon legislation, We modeled the price of carbon as a surcharge on retail electric rates. To assess the impact on electric rates, We used carbon intensity data from EIA's Annual Energy Outlook, by EMMR, and developed $/kWh impacts for $/tonne pricing. See below for values calculated.

Table 8-22. Impact of Carbon Cap

Utility IDs	Utility Names	Impact of Carbon Cap [$/kWh per $/ton]
1	Alabama Power Co.	0.00058
2	Chugach	0.00016
3	Arizona Public Service	0.00064
4	Salt River Project	0.00064

5	Tucson Electric Power	0.00064
6	Entergy Arkansas	0.00058
7	Southern California Edison	0.00031
8	Sacramento Municipal Utility District	0.00031
9	Pacific Gas and Electric Company	0.00031
10	San Diego Gas & Electric Company	0.00031
11	Los Angeles Department of Water and Power	0.00031
12	Public Service Company of Colorado	0.00064
13	Colorado Springs	0.00064
14	Connecticut Light and Power	0.00039
15	Conective (Delmarva Power)	0.00051
16	Florida Power & Light Co.	0.00057
17	Progress Energy Florida Inc	0.00057
18	Tampa Electric Company	0.00057
19	Georgia Power	0.00058
20	Hawaiian Electric Company (Oahu)	0.00016
21	Maui Electric Company	0.00016
22	Idaho Power	0.00037
23	Commonwealth Edison Co.	0.00060
24	Illinois Power Company	0.00060
25	PSI Energy Inc.	0.00083
26	IES Utilities (mid america)	0.00060
27	Interstate Power and Light	0.00060
28	Kansas Gas & Electric Co	0.00084
29	Westar Energy Inc	0.00084
30	Kentucky Utilities Co	0.00083
31	Louisville Gas & Electric Co	0.00083
32	Kenergy Corporation	0.00083
33	Entergy (Louisiana Power & Light)	0.00058
34	Central Maine Power	0.00039
35	Bangor Hydro Electric Company	0.00039
36	BGE (Baltimore Gas and Electric)	0.00051
37	Potomac Electric Power Company	0.00051
38	NSTAR (Boston Edison)	0.00039
39	Massachusetts Electric Company	0.00039
40	Detroit Edison	0.00083
41	Consumers Energy Company	0.00083
42	Xcel Energy (Northern States Power)	0.00077
43	Entergy Mississippi (Mississippi Power and Light)	0.00058
44	Mississippi Power Company	0.00058

45	AmerenUE - Missouri (Union Electric)	0.00060
46	Northwestern Energy (Montana Power Company)	0.00037
47	Omaha Public Power District	0.00077
48	Nevada Power	0.00037
49	Sierra Pacific Power Company	0.00037
50	Public Service of New Hampshire	0.00039
51	Unitil Energy Systems	0.00039
52	PSE&G (Public Service Electric and Gas Co.)	0.00051
53	Jersey Central Power and Light Co.	0.00051
54	Atlantic City Electrical Company	0.00051
55	PNM (Public Service Company of New Mexico)	0.00064
56	Southwest Public Service Company	0.00064
57	Niagara Mohawk	0.00033
58	New York State Electric and Gas Corp	0.00033
59	Consolidated Edison	0.00033
60	Long Island Power Authority	0.00033
61	Duke Power	0.00058
62	Progress Energy Carolinas Inc	0.00058
63	Northern States Power Co	0.00077
64	Ohio Power Company	0.00083
65	Ohio Edison	0.00083
66	Cincinnati Gas & Electric Company	0.00083
67	AEP (Public Service Company of Oklahoma)	0.00084
68	Oklahoma Gas and Electric Company	0.00084
69	PacifiCorp (Pacific Power)	0.00037
70	Portland General Electric Company	0.00037
71	PPL Electric Utilities	0.00051
72	PECO Energy Co	0.00051
73	West Penn Power Co.	0.00051
74	Narragansett Electric	0.00039
75	South Carolina Electric and Gas	0.00058
76	Duke Energy Corporation	0.00058
77	Xcel Energy (Northern States Power)	0.00077
78	Nashville Electric Service	0.00058
79	Knoxville Electric Board	0.00058
80	City of Memphis	0.00058
81	TXU Electric	0.00057
82	Reliant Energy Services	0.00057
83	Entergy Gulf States Inc	0.00057

84	Constellation New Energy Inc	0.00057
85	City of San Antonio	0.00057
86	PacifiCorp (Utah Power & Light)	0.00037
87	Green Mountain Power	0.00039
88	Central Vermont Public Service Corporation	0.00039
89	Dominion (Virginia Electric and Power)	0.00058
90	Appalachian Power Co	0.00058
91	Puget Sound Energy	0.00037
92	Snohomish County PUD No 1	0.00037
93	City of Seattle	0.00037
94	PEPCO	0.00051
95	American Electric (Appalachian Power)	0.00083
96	We Energies (Wisconsin Electric)	0.00060
97	Wisconsin Public Service Corporation	0.00060
98	PacifiCorp (Pacific Power)	0.00037