



| International Solar



Economic Impact of Extending the Section 1603 Treasury Program

EuPD Research – Exclusive Research Services

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Prepared for the Solar Energy Industries Association® (SEIA®)

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Introduction

This study analyzes the economic impact of extending the Section 1603 Treasury Program (TGP). It finds that extending the program would yield thousands of additional jobs and that longer extensions would result in even greater employment gains. EuPD examined the impact of extending the TGP for one, two and five years on additional employment and installed capacity for the years 2011-2016.

The 1603 Treasury Program was created to address the shortage of tax equity available to renewable energy projects due to the collapse of the financial markets. The TGP allows developers to receive a cash grant in lieu of the Section 48 Investment Tax Credit (ITC). The TGP has supported more than a thousand solar projects representing over \$3 billion in total investment, contributing to a nearly two-fold increase in solar electric capacity in 2010.

Executive Summary

Executive Summary

The U.S. solar market has experienced rapid growth in the last few years and is poised to continue growing over the next five years according to our baseline forecast. However, extending the TGP would significantly accelerate this growth, increasing investment, employment and deployment across the U.S. While an extension would benefit all sectors of the solar industry, utility-scale solar development would see some of the longest lasting impacts due to the long project development process.

Extension of the 1603 Treasury Program

A one-year extension of the 1603 Treasury Program through 2012 would have the greatest impact on economic activity in 2012 and 2013, as well as enable growth through 2016 as projects complete construction and come online.

- An additional 37,000 jobs would be supported by the solar energy industry in 2012, a 12% increase over baseline.
- The additional cumulative capacity installed through 2016 would be 2,000 megawatts over baseline, enough to power 400,000 homes.

Executive Summary (cont.)

Two-Year Extension

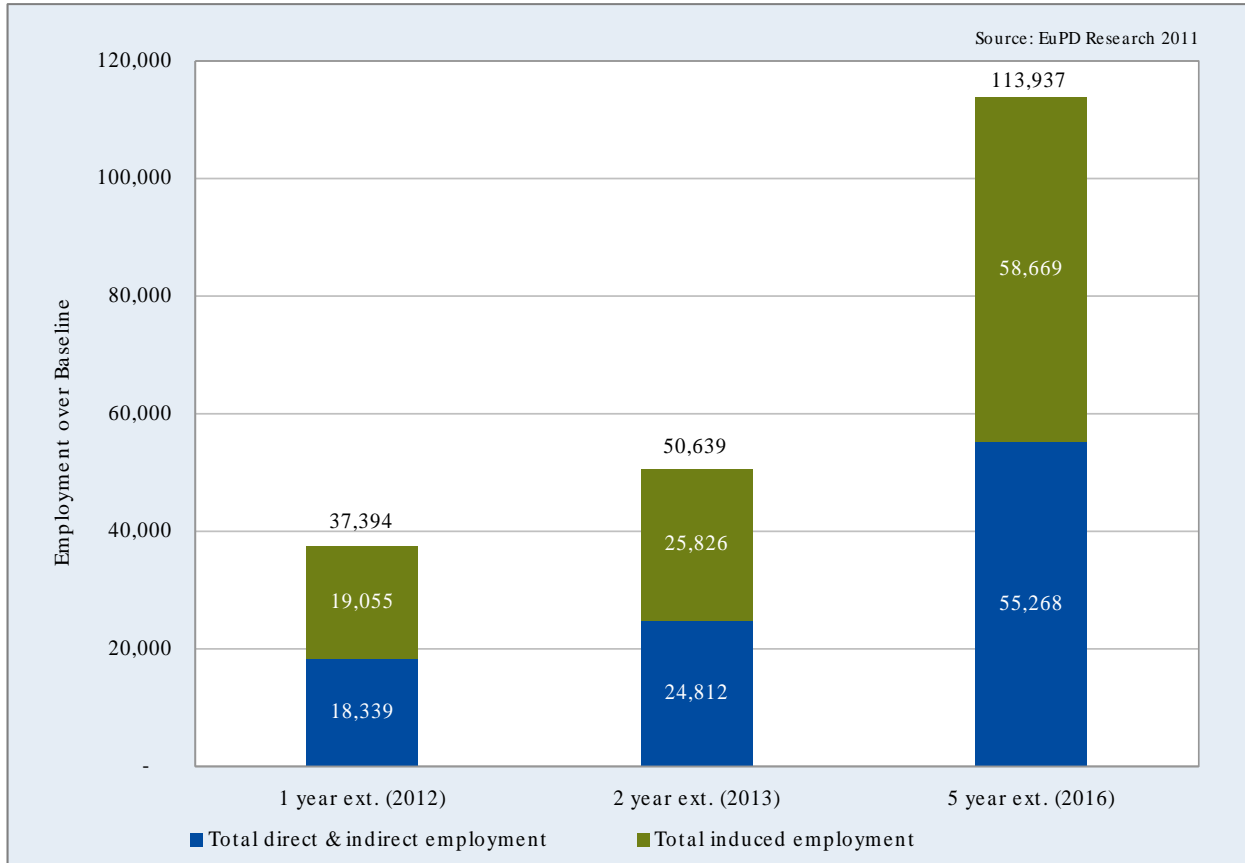
A two-year extension of the TGP commence construction deadline through 2013, would yield 51,000 additional jobs in the solar energy industry in 2013, a 16% increase over baseline, and would result in 3,650 megawatts of cumulative additional capacity installed through 2016.

Five-Year Extension

A five-year extension of the TGP to coincide with the term of the investment tax credit would support an additional 114,000 jobs in the solar energy industry in 2015, a 32% increase over baseline, and would result in 7,450 megawatts of cumulative additional capacity installed through 2016. A predictable five year policy framework will generate an environment that fosters industry growth larger than the potential year-to-year extensions and would create sustained momentum for the industry.

Additional Employment by Extension Scenario

Additional Employment Supported by the U.S. Solar Energy Industry in 2012, 2013 and 2016



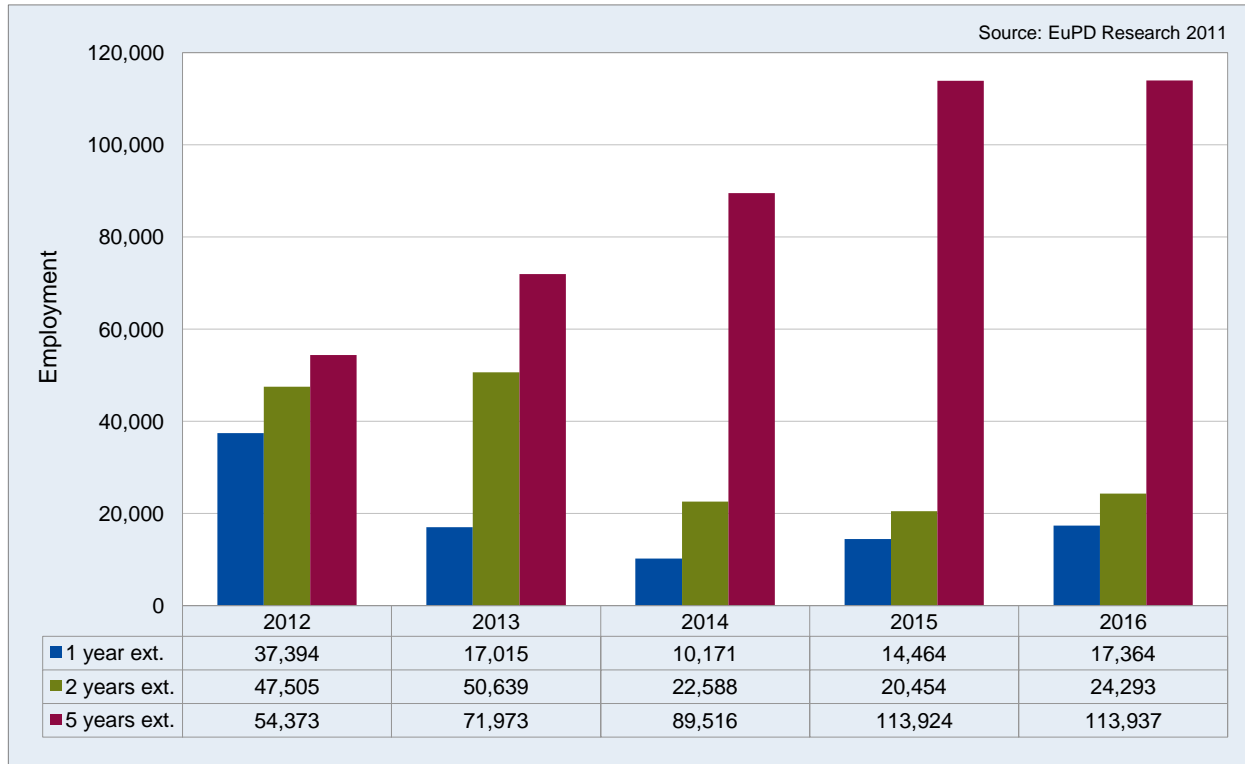
- The baseline U.S. solar employment forecast calls for significant growth.
- However, if the program is extended by 1 year, total employment will exceed the baseline forecast by over 37,000 in 2012. Of that, over 18,000 will be directly employed by solar companies or employed indirectly by firms that support the solar industry. An additional 19,000 jobs will be induced by the industry’s economic activity.
- If the program is extended by 2 years, total employment will grow an additional 51,000 in 2013.
- A 5-year extension will push the U.S. employment supported by the solar energy industry to almost 114,000 over baseline including 55,000 direct & indirect solar workers.

Note:

Employment is calculated in job-years for calendar year 2016. Direct employment includes solar workers in installation of PV systems, construction of CSP and PV power plants, manufacturing of PV modules and components and key CSP components. Indirect employment includes employment at suppliers to the solar industry. Induced employment is the result of the broader economic activity created by the solar industry.

Additional Employment by Extension Scenario

Additional Employment Supported by Extending the 1603 Treasury Program



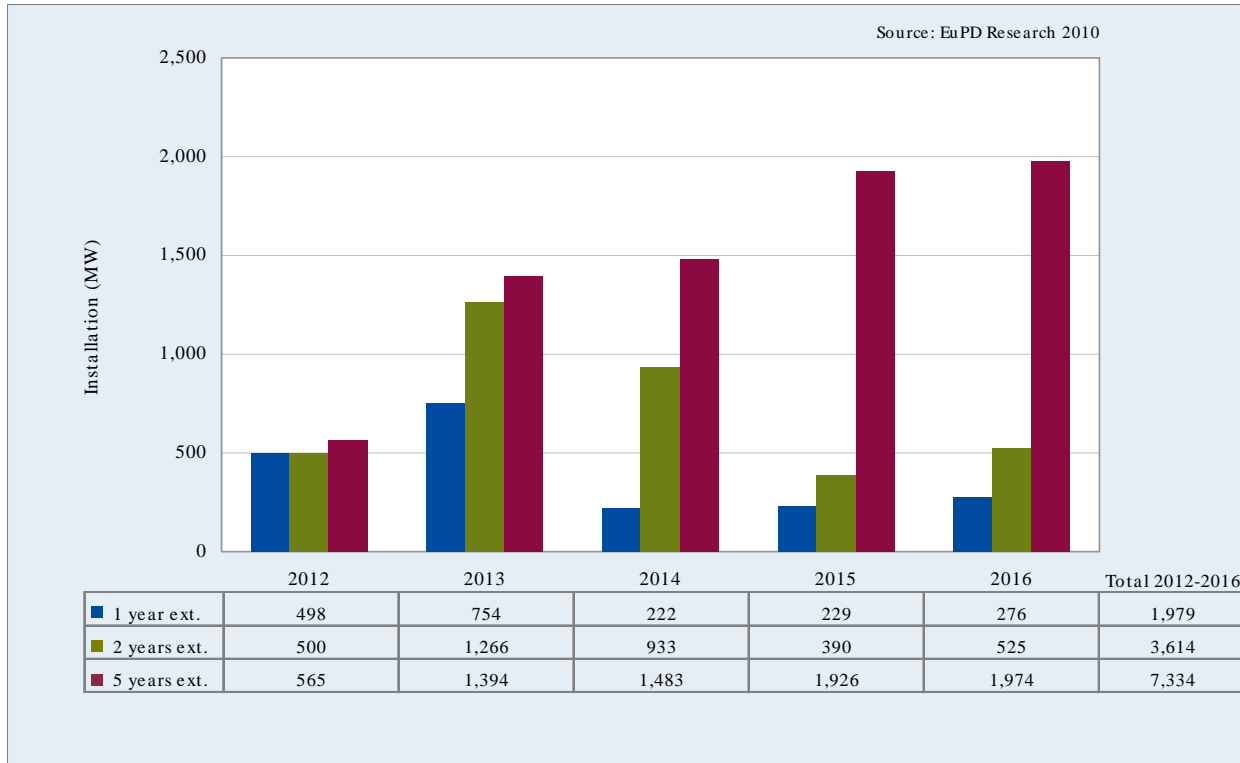
- Extending the program by 1 year will yield an additional 37,000 jobs in 2012 supported by the solar industry compared to the baseline.
- A 2-year extension would support an additional 51,000 jobs in 2013.
- Extending the program by 5 years will yield an additional 114,000 jobs supported by the solar industry in 2016. compared to baseline.
- Each scenario results in an employment peak in a different year.

Note:

The baseline scenario assumes that the 1603 Treasury Program will expire as currently scheduled. The one-, two- and five-year extension scenarios assume that the “commence construction” date will be extended one, two and five years, respectively. Estimates include direct, indirect and induced employment.

Additional Installations by Extension Scenario

Additional Installations of CSP and PV Systems in the U.S. above the Baseline Forecast



- Extending the program by 1 year would result in an additional 276 MW installed in 2016 and 1,979 MW of cumulative additional installations from 2012-2016.
- Extending the program by 2 years would drive additional installations of 525 MW in 2016 and 3,614 MW of cumulative additional installations from 2012-2016.
- Compared to the baseline scenario, extending the program by 5 years will support an additional 1,974 MW in installations in 2016 and 7,334 MW of cumulative additional installations from 2012-2016.

Note:

The baseline scenario assumes that the 1603 Treasury Program will expire as currently scheduled. The one-, two- and five-year extension scenarios assume that the program’s “commence construction” date will be extended one, two and five years, respectively.

A. U.S. Solar Electric

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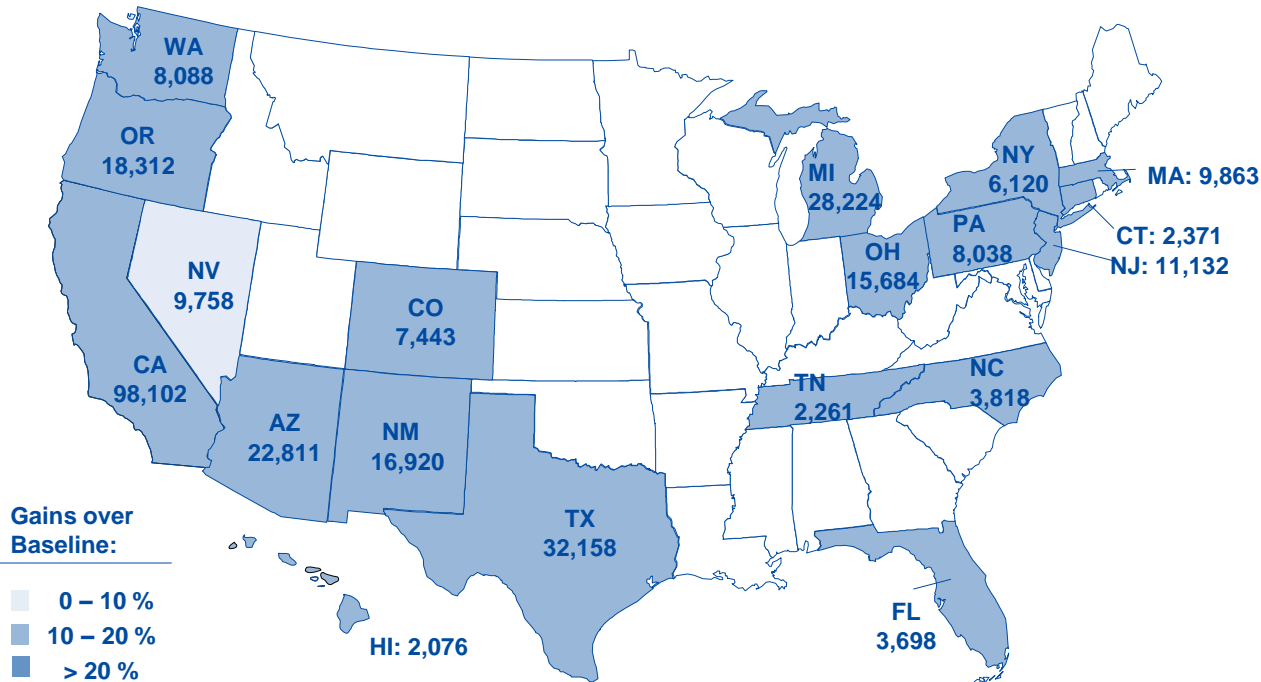
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Increased Employment Supported by the U.S. Solar Energy

A.1.2. Industry by State

Employment Supported in 2012 by a 1- Year Program Extension



- Extending the program for one year will spur additional employment growth in all states analyzed.
- States that deploy CSP plants or build CSP components, like Arizona and Texas, will benefit the most.
- Arizona, California, New Mexico and North Carolina show the greatest percentage gain over baseline.
- The major growth in Texas is driven by the state's manufacturing base.

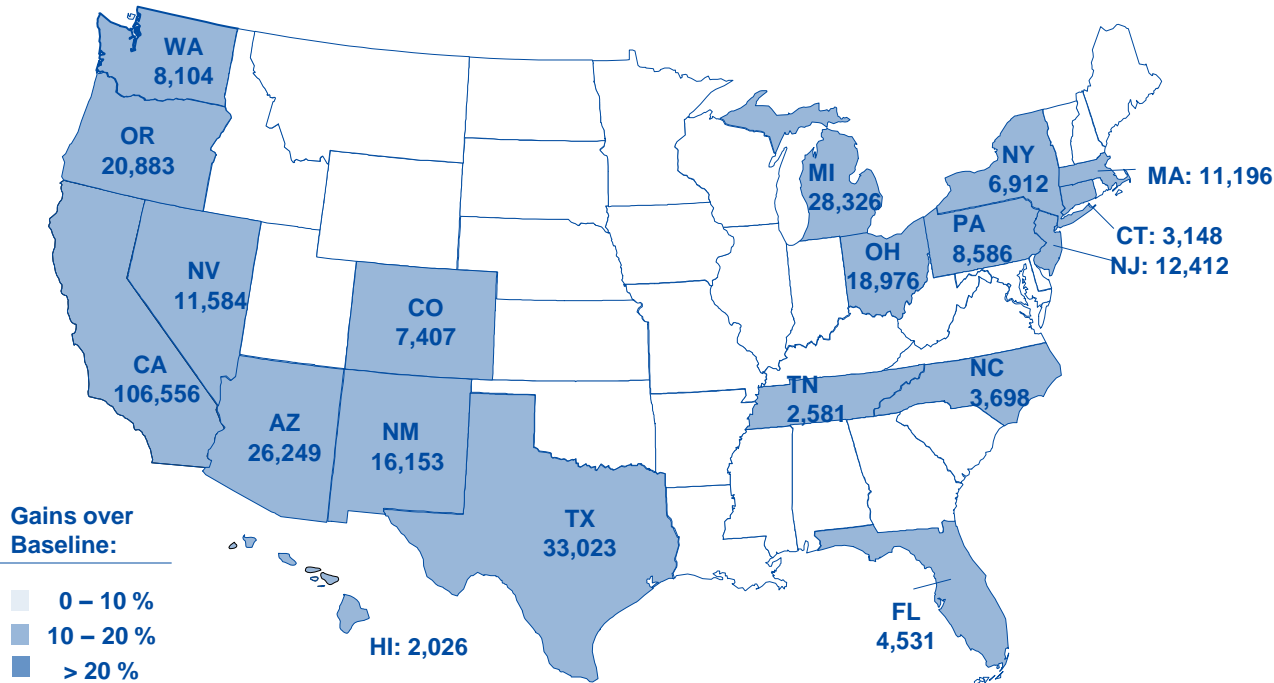
Note:

The map shows the 2012 U.S. employment level associated with the solar electric (Photovoltaic & Concentrating Solar Power) power industry, including direct, indirect and induced jobs. This scenario evaluates a 1-year extension of the 1603 Treasury Program.

Increased Employment Supported by the U.S. Solar Energy

A.1.3. Industry by State

Employment Supported in 2013 by a 2- Year Program Extension



- A two-year extension would spur further employment growth in all states.
- In this scenario California would support over 106,000 solar jobs in 2013.
- The solar industry in Texas would support over 33,000 jobs in 2013.

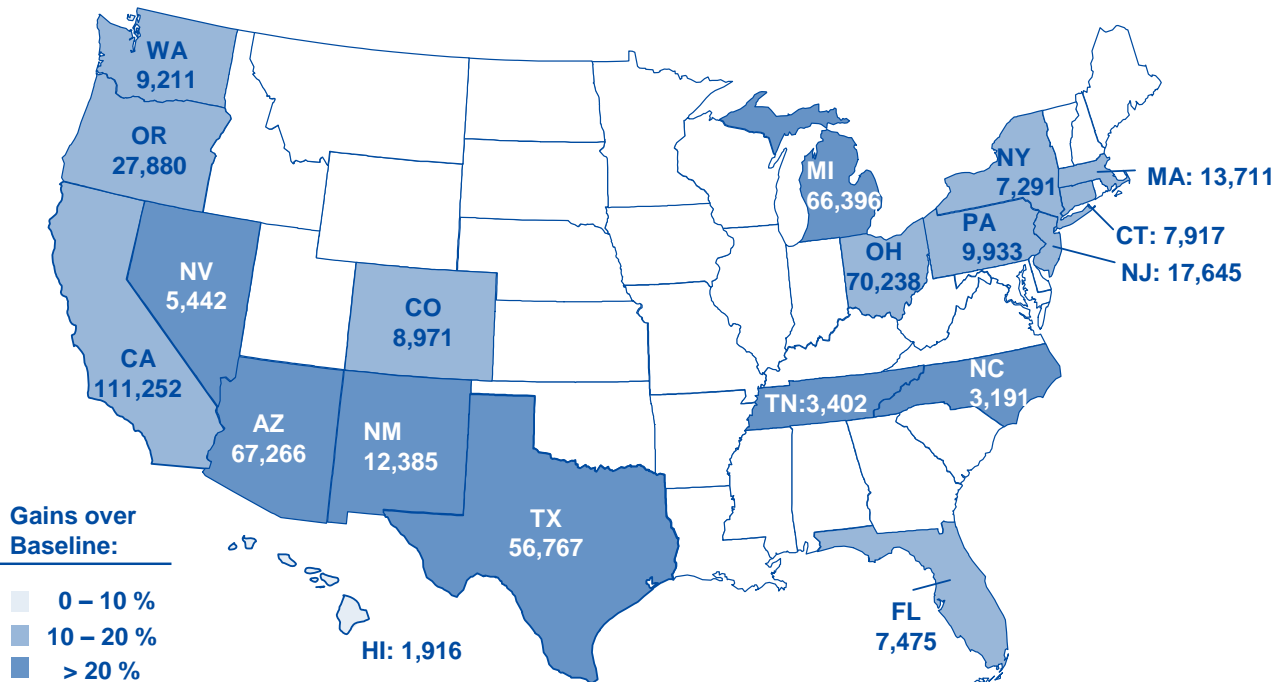
Note:

The map shows the 2013 U.S. employment level associated with the solar electric (Photovoltaic & Concentrating Solar Power) power industry, including direct, indirect and induced jobs. This scenario evaluates a 2-year extension of the 1603 Treasury Program.

Increased Employment Supported by the U.S. Solar Energy

A.1.4. Industry by State

Employment Supported in 2016 by a 5- Year Program Extension



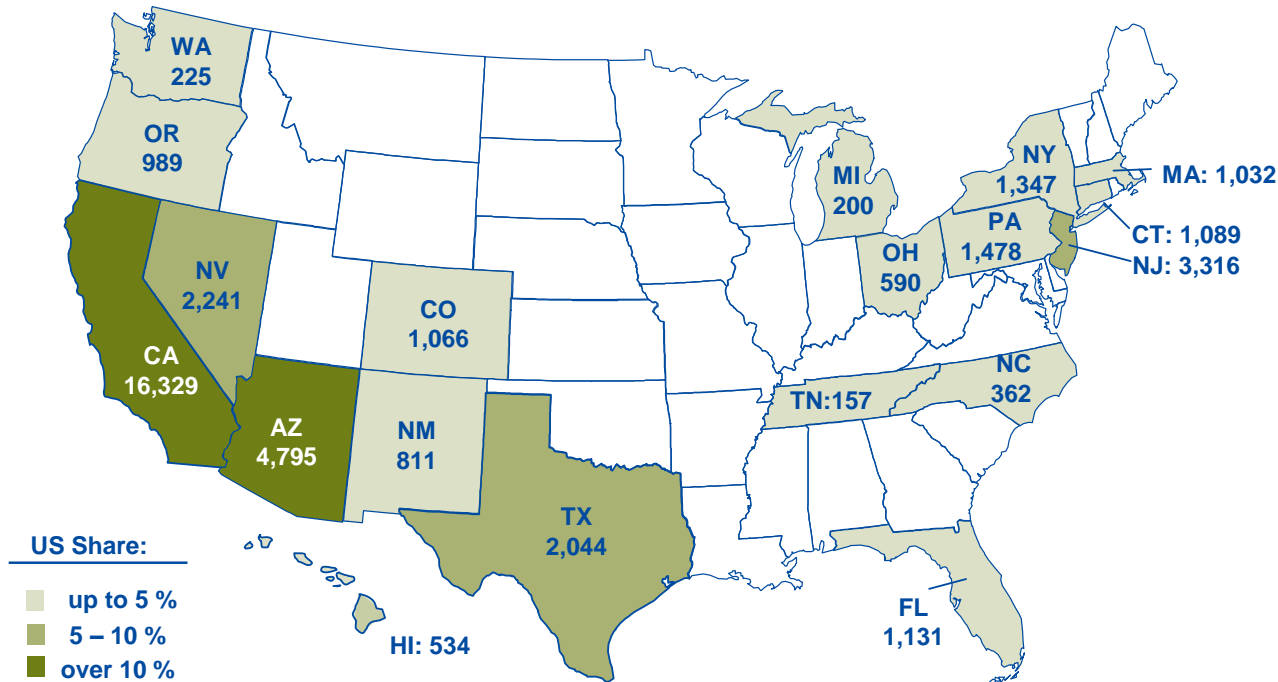
- All 19 states shown except for Hawaii show more than 10% solar job growth over the baseline scenario.
- Arizona shows a tremendous level of job creation in 2016 under this scenario – surpassing 67,000 jobs.
- Arizona, Texas and New Mexico show the greatest percentage gain over baseline.
- 9 out of 19 analyzed states will generate over 10,000 solar-related jobs in 2016, with three others close to that mark.

Note:

The map shows the 2016 U.S. employment level associated with the solar electric (Photovoltaic & Concentrating Solar Power) power industry, including direct, indirect and induced jobs. This scenario evaluates a 5-year extension of the 1603 Treasury Program.

A.2.1. Solar Electric Installations by State

Baseline Installation Forecast 2011–2016 (MW)



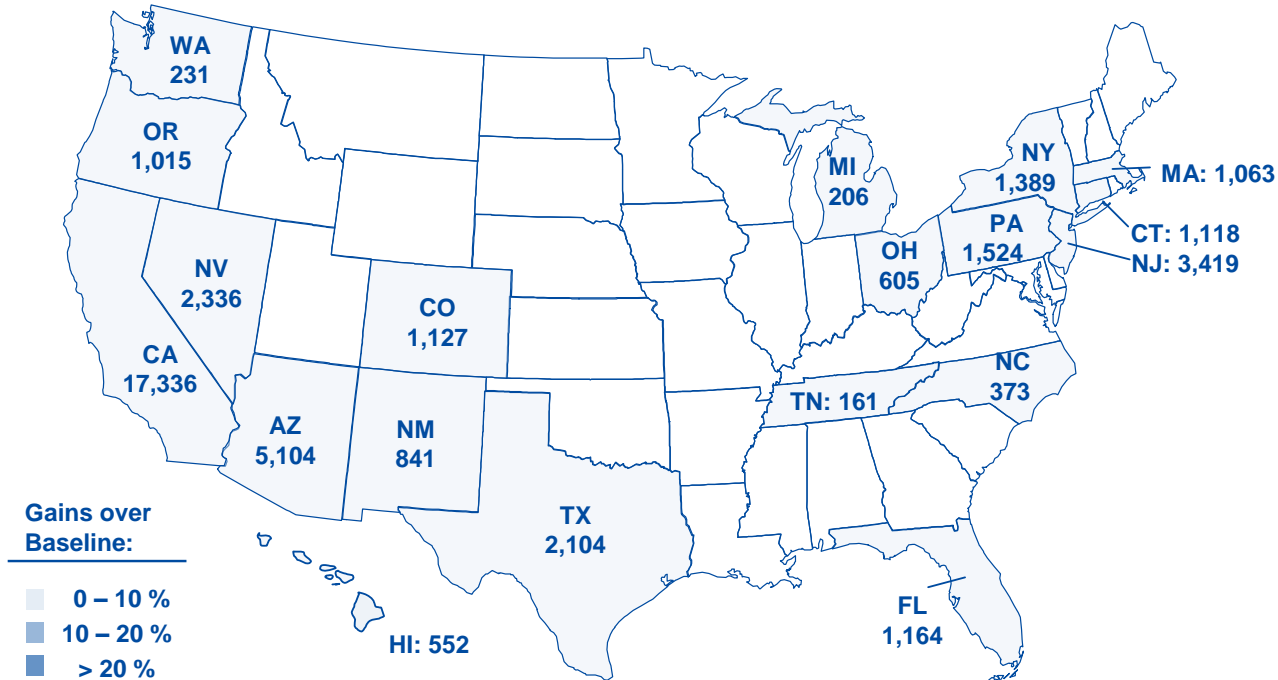
- California will remain the leading state in terms of solar installations – adding a cumulative 16,000 MW between 2011 and 2016, just over a third of the national total.
- Driven by its strong CSP sector, Arizona will approach 4,800 MW in new installations between 2011 and 2016.
- New Jersey, Nevada and Texas also show significant growth in solar deployment over the next five years.

Note:

The map shows the cumulative 2011-2016 installed solar electric (Photovoltaic & Concentrating Solar Power) power capacity in peak megawatts (MW). This assumes that the Section 1603 Treasury Program will expire as currently scheduled.

A.2.2. Increased Solar Electric Installations by State

Installation Forecast with a 1-Year Program Extension (Cumulative megawatts added 2011-2016)



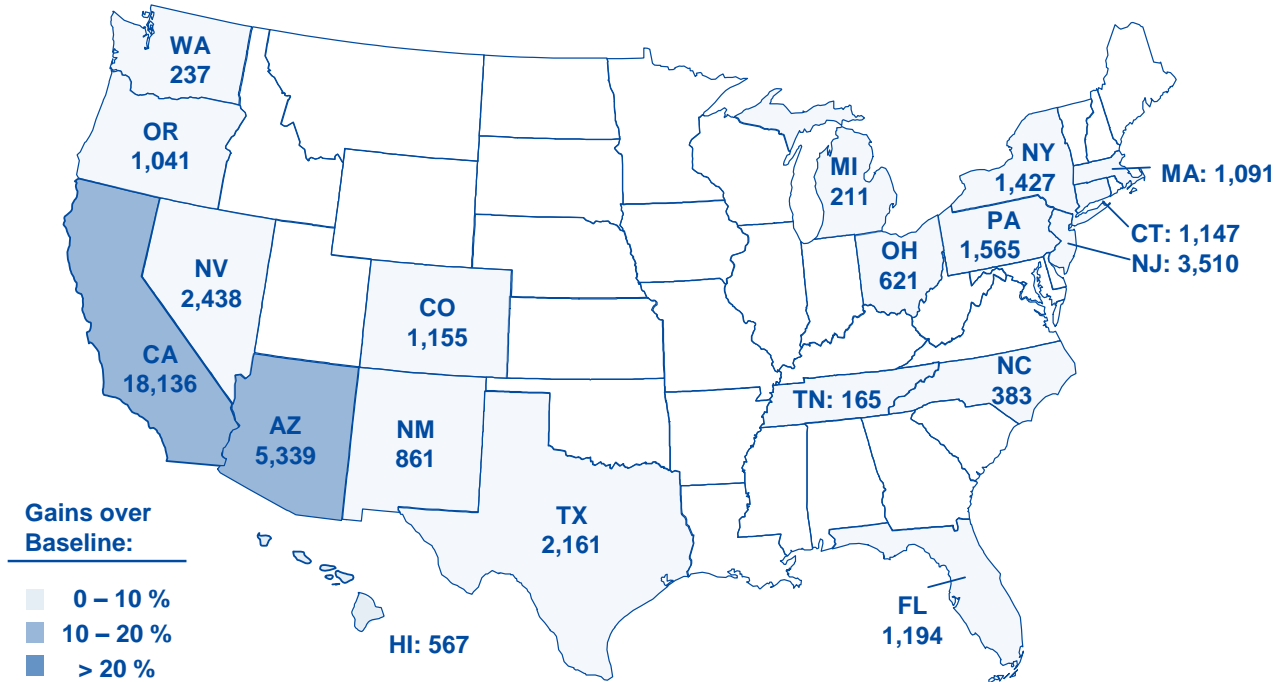
- All states analyzed show increased solar deployment under a 1-year extension.
- The increases are most significant for the southwestern states that have a strong CSP component in their installation mix, including Arizona and California.

Note:

The map shows the cumulative 2011-2016 installed solar electric (Photovoltaic & Concentrating Solar Power) power capacity in peak megawatts (MW). This scenario assumes that the 1603 Treasury Program will be extended for one year through 2012.

A.2.3. Increased Solar Electric Installations by State

Installation Forecast with a 2-Year Program Extension (Cumulative megawatts added 2011–2016)



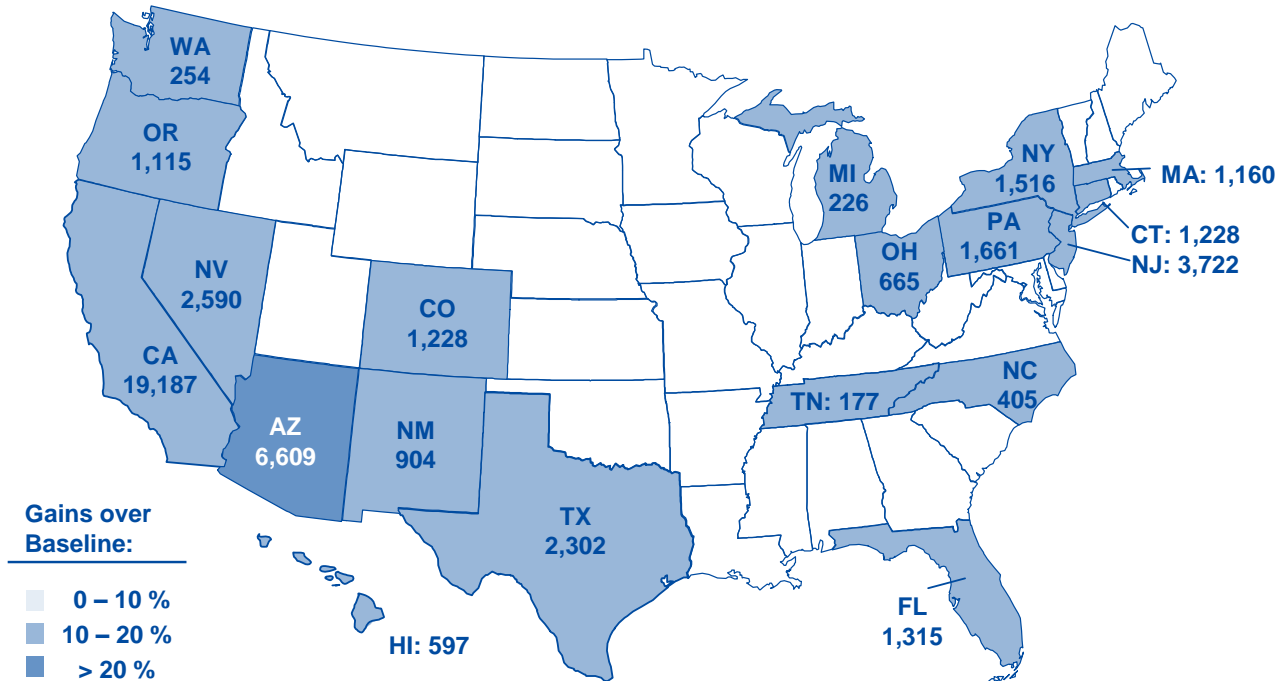
- Compared to the baseline scenario, all 19 states analyzed show 5-11% growth in cumulative solar electric power installed.
- Arizona and California show the strongest growth, in large part driven by newly installed CSP systems.
- Nevada and Colorado also show growth of 7-8% driven by the CSP sector.

Note:

The map shows the cumulative 2011-2016 installed solar electric (Photovoltaic & Concentrating Solar Power) power capacity in peak megawatts (MW). This scenario assumes that the 1603 Treasury Program will be extended for two years through 2013.

A.2.4. Increased Solar Electric Installations by State

Installation Forecast with a 5-Year Program Extension (Cumulative megawatts added 2011–2016)



- California shows by far the most capacity installed – reaching 19,200 MW (38% of U.S. capacity).
- Arizona shows the highest percentage growth over baseline, with a total of 6,600 MW installed between 2011 and 2016, nearly 1,800 MW more than the baseline forecast.
- New Jersey will reach 3,700 MW.
- Other states that are expected to surpass the 2,000 MW mark are Nevada and Texas.

Note:

The map shows the cumulative 2011-2016 installed solar electric (Photovoltaic & Concentrating Solar Power) power capacity in peak megawatts (MW). This scenario assumes that the 1603 Treasury Program will be extended for five years through 2016.

B. Photovoltaics

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1. **Employment Supported by PV Sector vs. Baseline Forecast (through 2016)**
2. **Photovoltaic Installations vs. Baseline Forecast (through 2016)**

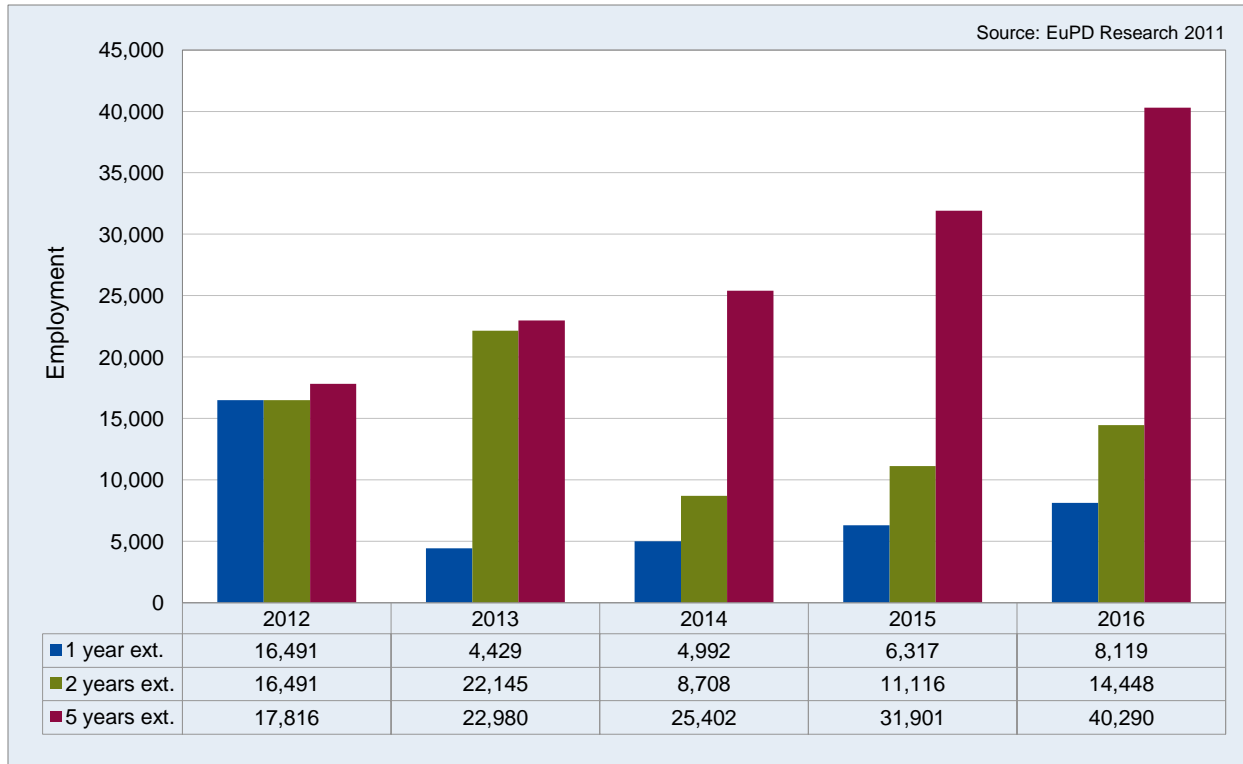
C. Concentrating Solar Power

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About EuPD Research

B.1. Employment Supported by the PV Sector vs. Baseline Forecast

Additional U.S. Employment Supported by the PV Sector vs. Baseline Forecast



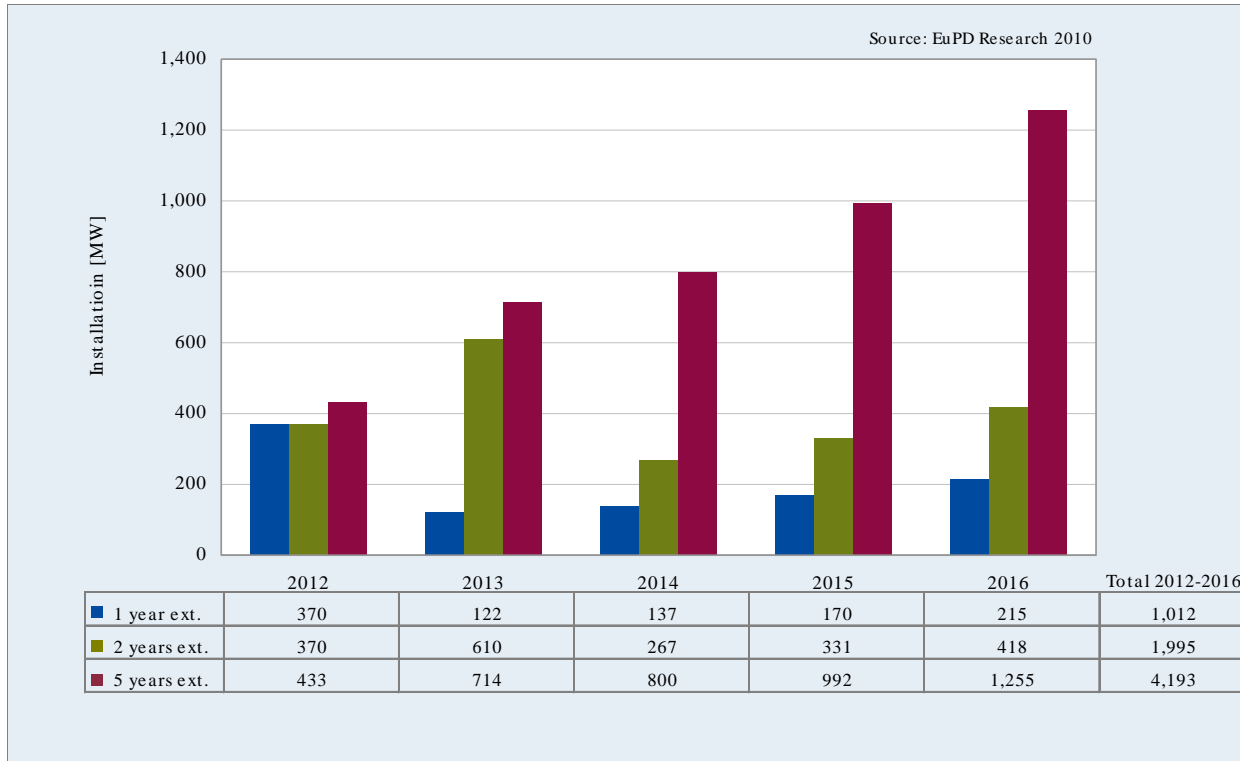
- This graph shows estimates for PV only.
- The 1-year extension has the greatest impact in 2012, yielding more than 16,000 additional jobs.
- A 2-year extension results in an additional 22,000 jobs in 2013.
- Extending the program by 5 years will have the strongest positive impact on employment in the U.S., with an additional 40,000 jobs supported in 2016.

Note:

The employment estimates for all scenarios includes all direct, indirect and induced jobs.

B.2. Photovoltaic Installations vs. Baseline Forecast

Additional U.S. PV Installations vs. Baseline Forecast



- This slide shows estimates for PV only.
- Cumulatively (2012-2016), a 1-year extension would result in 1,012 MW of additional installations, the 2-year extension would yield over 1,995 MW of additional installations, and the 5-year extension would deploy over 4,193 MW of additional PV capacity.

C. Concentrating Solar Power

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1. Employment Supported by the CSP Sector vs. Baseline Forecast (through 2016)
2. Increased CSP Installations vs. Baseline Forecast (through 2016)

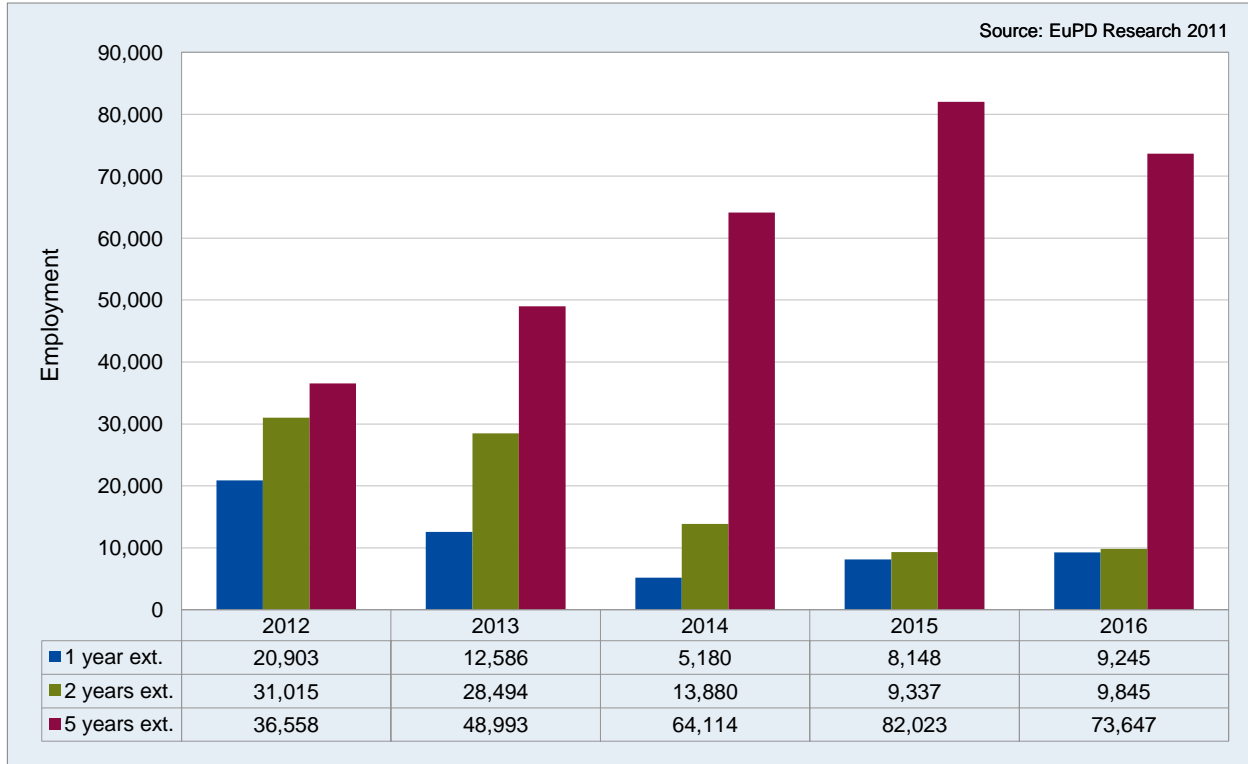
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About EuPD Research

Employment Supported by the CSP Sector vs. Baseline

c.1. Forecast

Additional U.S. Employment Supported by the CSP Sector vs. Baseline Forecast



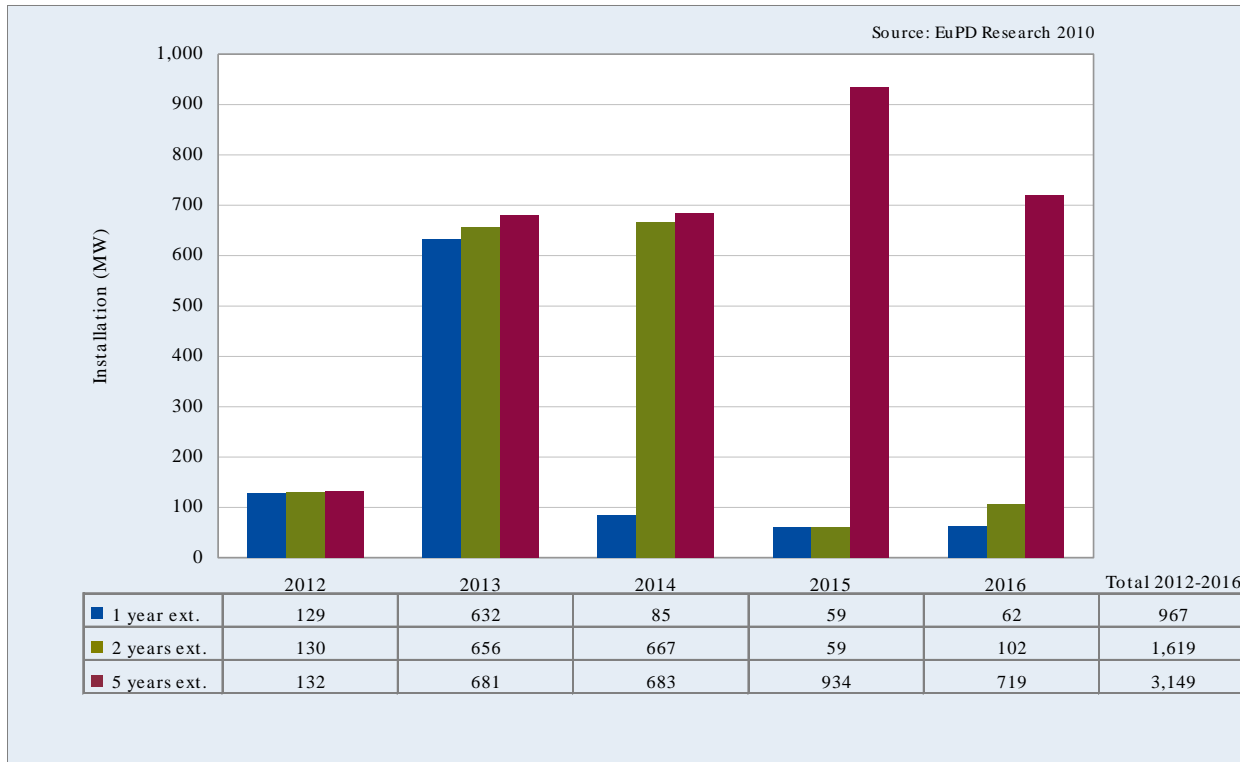
- This slide shows concentrating solar power (CSP) only.
- A 1-year extension yields an additional 21,000 jobs and a 2-year extension would add 31,000 jobs in 2012.
- The 5-year extension would have the strongest positive impact on CSP-related employment in the U.S. Under this scenario, an additional 82,000 CSP jobs will be supported in 2015.

Note:

The employment estimates for all scenarios includes all direct, indirect and induced jobs.

c.2. Increased CSP Installations vs. Baseline Forecast

Additional U.S. CSP Installations vs. Baseline Forecast



- This slide shows concentrating solar power (CSP) only.
- A 1-year extension would add 632 MW of additional CSP in 2013 and a cumulative 967 MW between 2012 and 2016.
- A 2-year extension would add 667 MW of additional CSP in 2014 and a cumulative 1,619 MW through 2016.
- CSP shows significant growth in installations under the 5-year extension, adding 934 MW of additional CSP in 2015 alone, as well as a cumulative 3,149 MW through 2016.

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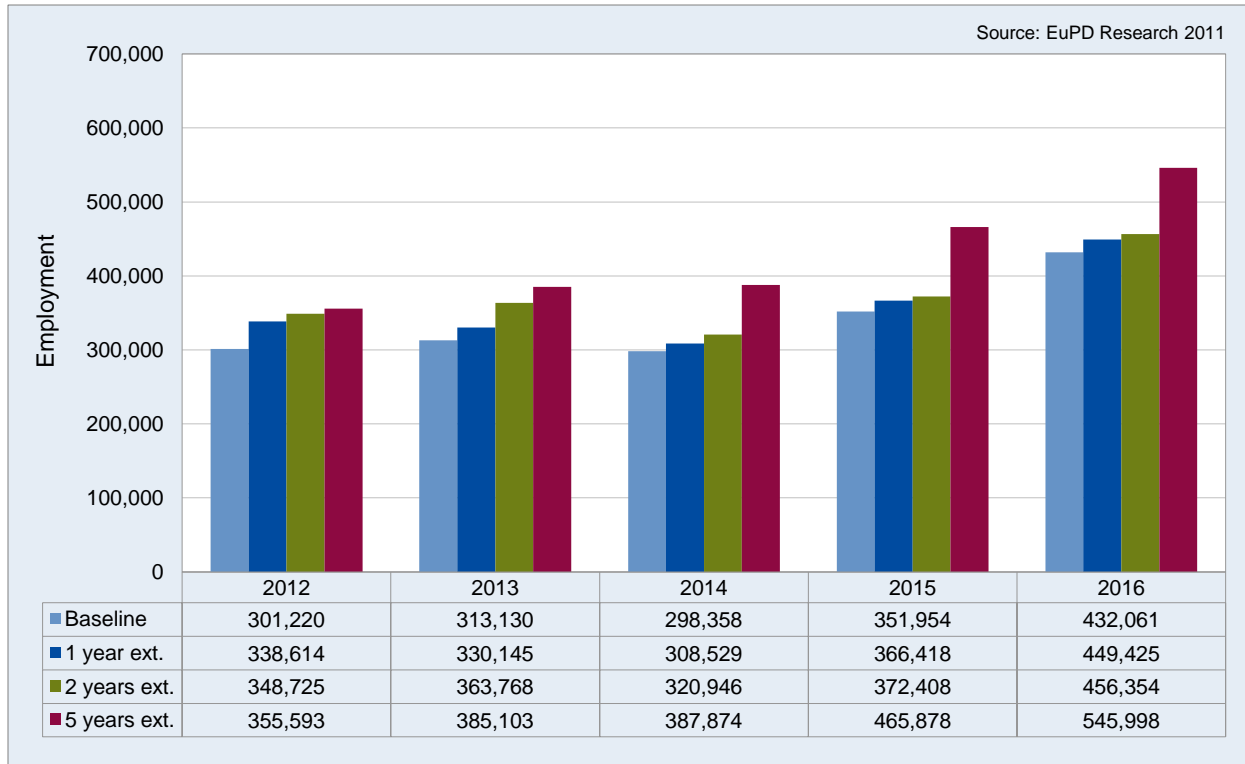
Appendix 1

Additional Research Results

About EuPD Research

Total Employment by Scenario

U.S. Jobs in the Solar and Supporting Industries

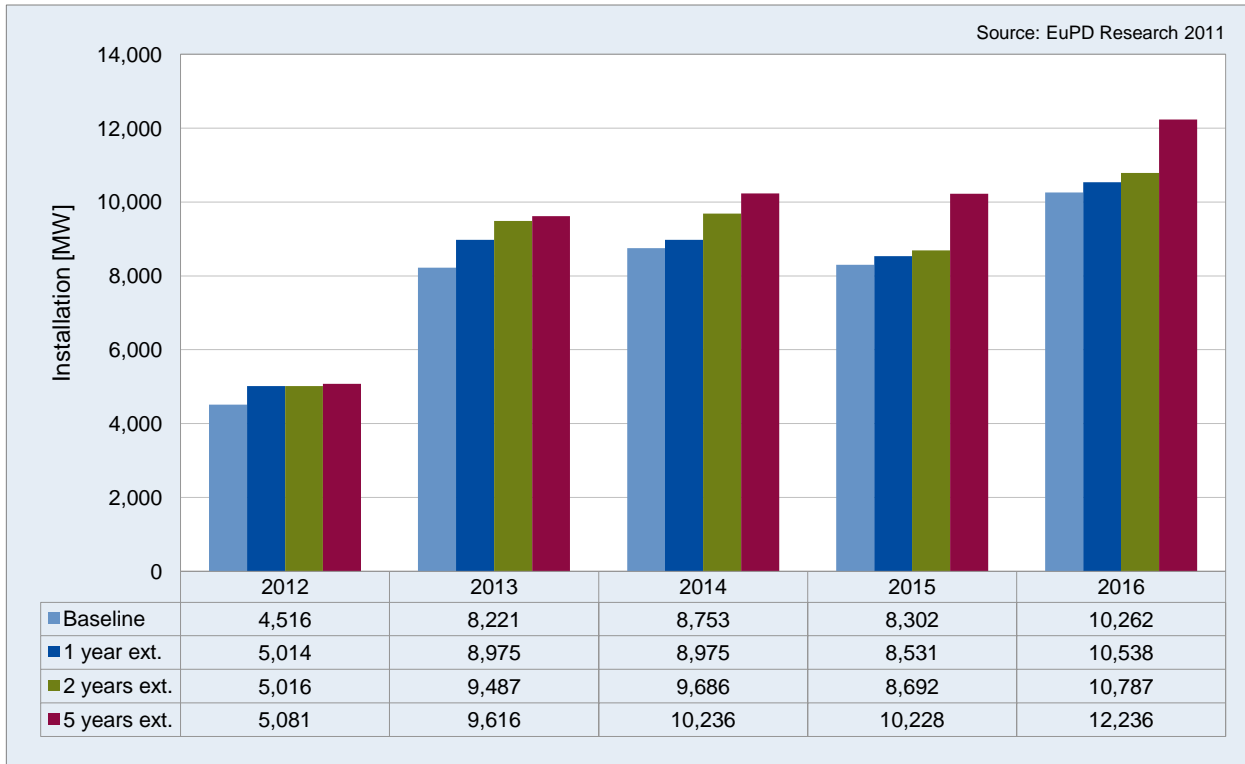


Note:

The baseline scenario assumes that the 1603 Treasury Program will expire as currently scheduled. The one-, two- and five-year extensions assume that the “commence construction” date will be extended one, two and five years, respectively.

Total Installations by Scenario

U.S. Installations for CSP and PV Systems by the Year of Operation

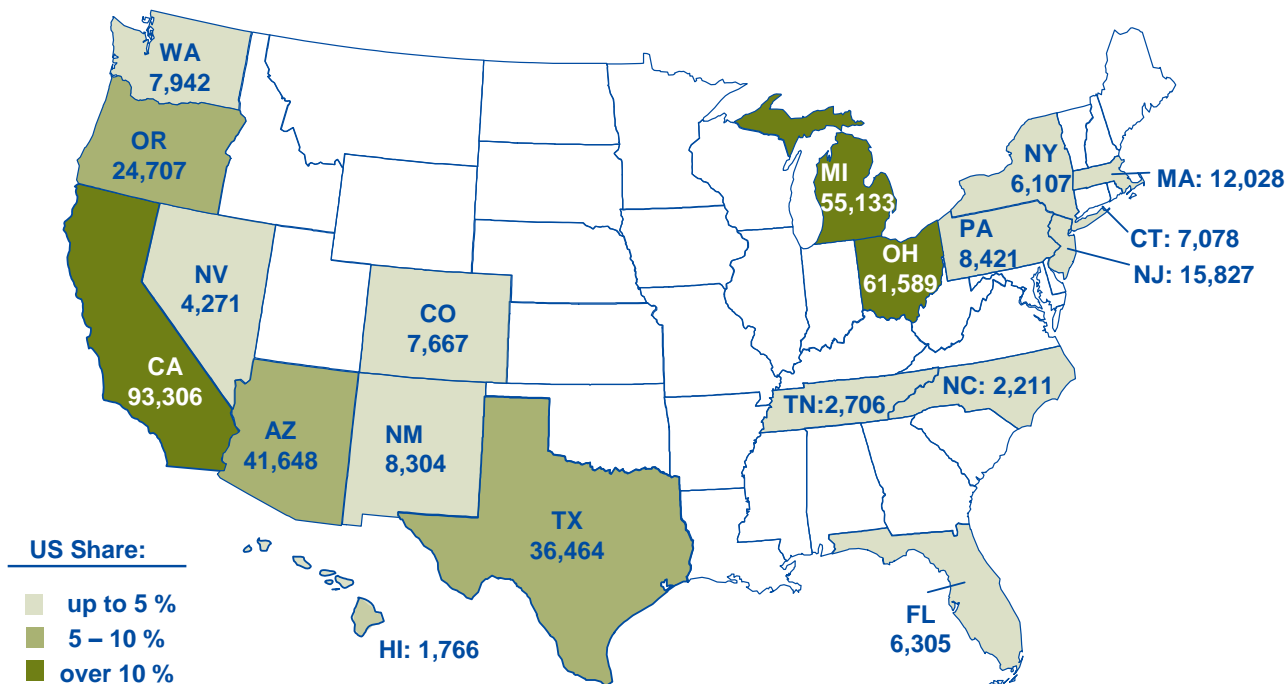


Note:

The baseline scenario assumes that the 1603 Treasury Program will expire as currently scheduled. The one-, two- and five-year extensions assume that the “commence construction” date will be extended one, two and five years, respectively.

Employment Supported by the U.S. Solar Energy Industry by State

Baseline Employment Forecast 2016



- While California is expected to host more solar jobs than any other state, it will account for less than one quarter of the national total with 93,000 jobs supported by the solar industry in the state in 2016.
- Other major solar employment hubs include Ohio, Michigan, Arizona and Texas —benefiting from more than 35,000 jobs each.
- Due to its strong manufacturing base, the solar industry in Ohio will support over 61,000 jobs in 2016.

Note:

The map shows the 2016 U.S. employment level associated with the solar electric (Photovoltaic & Concentrating Solar Power) power industry. Included are direct, indirect and induced jobs in 2016.

Increased Employment by State vs. Baseline Forecast in 2012

	Additional solar electric employment by state in 2012					
	1 year TGP Extension over baseline	1 year TGP Extension over baseline	2 year TGP Extension over baseline	2 year TGP Extension over baseline	5 year TGP Extension over baseline	5 year TGP Extension over baseline
	number Direct & Indirect	number Total	number Direct & Indirect	number Total	number Direct & Indirect	number Total
AZ	1,750	3,445	2,264	4,416	3,293	6,342
CA	5,174	10,425	7,133	14,194	7,445	14,797
CO	462	1,010	507	1,117	534	1,178
CT	114	248	143	303	154	322
FL	157	376	178	429	189	453
HI	84	201	85	203	85	201
MA	493	979	529	1,045	598	1,174
MI	1,556	2,924	2,039	3,829	2,320	4,355
NV	396	887	598	1,289	620	1,337
NJ	474	1,107	518	1,191	531	1,208
NM	998	1,934	1,373	2,638	1,541	2,952
NY	290	636	360	768	386	813
NC	207	418	287	567	320	629
OH	832	1,574	918	1,734	1,064	2,007
OR	941	1,796	972	1,854	1,125	2,139
PA	389	826	466	970	507	1,045
TN	128	244	169	322	193	367
TX	1,673	4,092	2,021	5,087	2,613	6,748
WA	425	805	458	866	531	1,003
Other	1,794	3,468	2,442	4,681	2,776	5,304
Total	18,339	37,394	23,460	47,505	26,826	54,373
Growth over Baseline	12%	12%	16%	16%	18%	18%

Note:

The total employment estimates for all scenarios includes all direct, indirect and induced jobs.

Increased Employment by State vs. Baseline Forecast in 2013

	Additional solar electric employment by state in 2013					
	1 year TGP Extension over baseline	1 year TGP Extension over baseline	2 year TGP Extension over baseline	2 year TGP Extension over baseline	5 year TGP Extension over baseline	5 year TGP Extension over baseline
	number	number	number	number	number	number
	Direct & Indirect	Total	Direct & Indirect	Total	Direct & Indirect	Total
AZ	879	1,703	2,085	4,161	5,374	10,316
CA	2,877	5,395	7,850	15,892	9,148	18,384
CO	258	484	466	1,042	597	1,319
CT	62	116	179	395	217	461
FL	76	143	226	540	255	607
HI	24	45	89	218	83	202
MA	159	297	634	1,264	749	1,473
MI	733	1,374	2,077	3,905	2,943	5,528
NV	236	443	704	1,535	899	1,929
NJ	180	338	608	1,413	642	1,448
NM	517	970	1,322	2,534	1,896	3,605
NY	141	264	401	878	496	1,043
NC	112	210	278	554	404	787
OH	291	546	1,156	2,194	1,442	2,728
OR	264	496	1,191	2,287	1,405	2,684
PA	165	310	505	1,070	626	1,285
TN	66	123	187	358	263	502
TX	955	1,791	1,962	4,816	3,661	9,801
WA	121	227	489	929	605	1,146
Other	928	1,741	2,406	4,653	3,520	6,726
Total	9,075	17,015	24,812	50,639	35,226	71,973
Growth over Baseline	6%	5%	16%	16%	23%	23%

Note:

The total employment estimates for all scenarios includes all direct, indirect and induced jobs.

Increased Employment by State vs. Baseline Forecast in 2016

	Additional solar electric employment by state in 2016					
	1 year TGP Extension over baseline	1 year TGP Extension over baseline	2 year TGP Extension over baseline	2 year TGP Extension over baseline	5 year TGP Extension over baseline	5 year TGP Extension over baseline
	number	number	number	number	number	number
	Direct & Indirect	Total	Direct & Indirect	Total	Direct & Indirect	Total
AZ	1,465	2,812	1,754	3,382	13,531	25,618
CA	1,911	3,860	2,652	5,353	8,925	17,946
CO	104	233	163	353	588	1,304
CT	83	193	113	267	379	839
FL	70	169	102	242	533	1,169
HI	16	40	25	61	63	150
MA	153	310	257	515	856	1,682
MI	934	1,757	1,507	2,837	5,994	11,263
NV	106	239	124	282	512	1,171
NJ	180	405	268	604	845	1,818
NM	305	581	358	686	2,158	4,081
NY	102	221	128	283	578	1,184
NC	74	145	83	165	510	980
OH	775	1,470	1,438	2,722	4,582	8,650
OR	294	585	527	1,038	1,630	3,173
PA	132	280	179	384	746	1,512
TN	56	110	76	150	361	696
TX	843	2,324	1,073	2,845	7,095	20,304
WA	111	216	188	363	662	1,269
Other	712	1,417	874	1,761	4,718	9,127
Total	8,424	17,364	11,889	24,293	55,268	113,937
Growth over Baseline	4%	4%	6%	6%	26%	26%

Note:

The total employment estimates for all scenarios includes all direct, indirect and induced jobs.

Increased Installations vs. Baseline Forecast

Additional solar electric installation by state 2011-2016			
	1 year TGP Extension over baseline	2 year TGP Extension over baseline	5 year TGP Extension over baseline
	MW	MW	MW
AZ	309	544	1,814
CA	1,007	1,807	2,857
CO	61	89	162
CT	29	58	139
FL	33	64	184
HI	18	33	63
MA	30	59	128
MI	5	11	26
NV	95	197	349
NJ	103	195	406
NM	31	51	93
NY	42	80	169
NC	11	21	43
OH	16	31	75
OR	26	52	127
PA	46	86	183
TN	4	8	20
TX	60	117	259
WA	6	12	29
Other	72	138	323
Total	2,003	3,651	7,449
Growth over Baseline	5%	8%	17%

- Under each scenario of the program extension, all 19 analyzed states show a significant increase in solar electric capacity.
- State markets that grow the most with the extension are the southwestern states of Arizona, California, Colorado and Nevada.

Note:

The table shows the additional solar electric capacity installed between 2011 and 2016 in megawatts (MW) compared to the baseline forecast.

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Appendix 2

Methodology, assumptions & sources

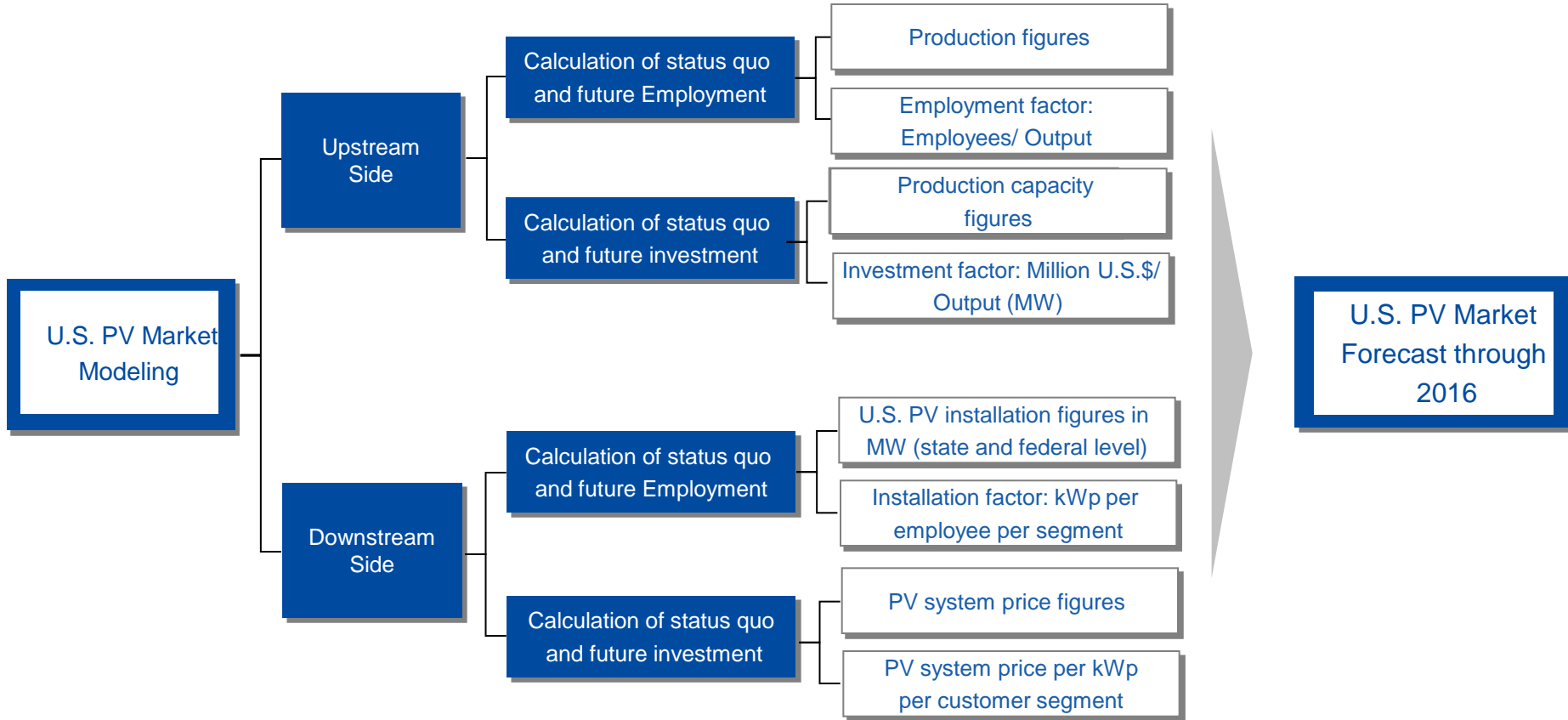
About EuPD Research

Appendix 2

Methodology






-  Most of the forecast data, especially for PV, is based on research data in EuPD Research's extensive solar database and its continuous global market research. The other data points were modeled leveraging existing market data and industry knowledge of the PV and CSP markets. EuPD Research uses a combined upstream and downstream research methodology to forecast the baseline PV, which is illustrated graphically on the next page.
-  The three policy extension scenarios are modeled based on the substantial experience EuPD Research has in analyzing incentive policies in the U.S., Europe and Asia. The key modeling factors that were adjusted in EuPD Research's PV and CSP models to reflect the policy change impact were primarily: demand factor, U.S. competitive factor, accelerated learning curve effects, labor rates and the likelihood that questionable CSP projects get completed as scheduled.
-  The CSP market is analyzed on a project by project basis. NREL's JEDI models were used to calculate the employment and key component cost for solar trough plants.
-  CSP Projects sources included SEIA, NREL and CSP Today lists.
-  Model output data was crosschecked with other industry sources and expert interviews to validate key data points.

Economic Model



Appendix 2

Assumptions PV

-  The baseline PV growth is driven by continued state and federal incentives that will not change significantly in the next five years beyond the changes known as of May 2011.
-  The 1603 Treasury Program will impact most of the open field PV installations and a minority of the commercial rooftop market. For these installations, the program provides a higher perceived value in the cost of capital compared to the ITC.
-  The learning curve cost reduction will be accelerated if the policy changes that stimulate the solar market come into effect.
-  The state PV incentives will be adjusted slowly and predictably over the next five years in a way that allows end-users and the industry to adjust accordingly.
-  The data for this study was gathered in May 2011. Impacts for 2011 from the 1603 extension scenarios are based on the assumption that the U.S. solar industry knew at that time, with a high degree of certainty, that the program would be extended.

Appendix 2

Assumptions CSP

- ➔ The investment environment for CSP will remain favorable in the southwestern U.S. The CSP industry will continue to receive support at the state and local level.
- ➔ The Treasury program will impact most projects. It will be strongest for projects that would otherwise have difficulty obtaining financing.
- ➔ Implementing CSP for base load reasons, is considered to be a major strategic issue for the US.
- ➔ The learning curve cost reduction will be accelerated if the policy changes that stimulate the solar market come into effect.

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