Current and Future Cost of Solar Photovoltaics

Key Insights

FEBRUARY 2015
### Agora Energiewende - who we are

<table>
<thead>
<tr>
<th>• Independent and non-partisan Think Tank, 18 Experts</th>
<th>• Mission: How do we make the <em>Energiewende</em> in Germany a success story?</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Financed with 15 million Euro by the Mercator Foundation and the European Climate Foundation (Project duration: 2012-2017)</td>
<td>• Analyzing, assessing, understanding, discussing, putting forward proposals</td>
</tr>
</tbody>
</table>

www.agora-energiewende.com
Starting point: uncertainty about the future role of solar PV among experts and policy makers

Today: solar photovoltaics becomes mainstream

Future: very different perspectives on solar power

Cost for solar power will decrease

Cost for solar power will rise again soon

„The future will be based on solar power“

„Solar will remain a rich-people-technology“

„Solar is a game-changer for energy industry“

„The solar bubble is about to burst“

Source: ©iStock/trekandshoot
Objective: provide a range of future cost scenarios to support discussion on role of solar PV

<table>
<thead>
<tr>
<th>Cost of solar PV today</th>
<th>Cost of solar PV in 2050</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Conservative assumptions</td>
</tr>
<tr>
<td></td>
<td>Ambitious assumptions</td>
</tr>
</tbody>
</table>

Own illustration
Focus on large scale systems and crystalline silicon technologies – breakthroughs are far from impossible but not considered here.

Solar PV system size

<table>
<thead>
<tr>
<th>System Size</th>
<th>1 kW</th>
<th>10 kWp</th>
<th>100 kWp</th>
<th>1 MWp</th>
<th>10 MWp</th>
<th>&gt; 100 MWp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>Private house</td>
<td>Industry</td>
<td>Ground-mounted</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Solar PV technology

- Crystalline Silicon-Technologies
  - n-type c-Si
  - p-type c-Si
  - a-Si
  - a-Si:H

- Thin-film-Technologies
  - CdTe
  - CIGS/CIS

- Concentrating Photovoltaics
  - High concentration
  - Low concentration

- Other Technologies
  - Organic solar cells
  - dye-sensitized solar cells
  - Many other technologies

Own illustration

Sources: Fotolia/Smileus, Naturstrom AG, Fotolia/ls_design, Fraunhofer ISE

Einteilung nach: EPIA, Solar Generation 6, 2011
Future solar module prices in different scenarios are based on the historical “learning rate”

Example of methodology used

Expert discussion: Scenarios of market development

- Scenario 1, most pessimistic: 175 GW in 2050
- Scenario 4, PV-Breakthrough: 1780 GW in 2050

Resulting cost of solar modules based on “learning rate”

- Scenario 1, year 2050: 270-360 EUR/kWp
- Scenario 4, year 2050: 140-210 EUR/kWp

World market solar PV modules, in GW

2014: ~40 GW
2014: 175 GW in 2050

Own illustration

http://www.sunpower.de/haus/solarmodule/x-series/
Key Insight 1: Solar photovoltaics is already today a low-cost renewable energy technology

Feed-in tariff for new large-scale solar photovoltaic in Germany

*Nominal values, Feed-in tariff applicable at first of January each year, value 2015 excl. adjustment of 0,4 ct/kWh for direct marketing.
Source: German renewable energy law, Agora Energiewende
Key Insight 2: Solar power will soon be the cheapest form of electricity in many regions of the world.

### Cost of electricity from new solar power plants in Southern and Central Europe

<table>
<thead>
<tr>
<th>ct/kWh*</th>
<th>2015</th>
<th>2025</th>
<th>2035</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td></td>
<td>1/3</td>
<td></td>
<td>2/3</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*For Comparison: cost of electricity from fossil fuels:*

*Real values in EUR 2014; bandwidth represent different scenarios of market, technology and cost development, as well as power plant location between south of Germany (1190 kWh/kWp/y) and south of Spain (1680 kWh/kWp/y). Source: Own illustration*
Key Insight 3: Financial and regulatory environments will be key to reducing cost in the future.

Cost of electricity of solar PV at different costs of capital, example southern Germany and southern Spain in 2025

<table>
<thead>
<tr>
<th>Cost of capital:**</th>
<th>Germany (south)</th>
<th>Spain (south)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>7.5%</td>
<td>7.5%</td>
<td>7.5%</td>
</tr>
<tr>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
</tbody>
</table>

* Real values in EUR 2014  ** Weighted average cost of capital (WACC)

Source: own illustration
Key Insight 4: Most scenarios fundamentally underestimate the role of solar power in future energy systems.

Cost of electricity and contribution to power system per technology, scenario for Germany 2035*

* Contribution of renewables based on scenario B2035 of grid development plan 2015, cost of electricity for other technologies based on Agora Energiewende 2014

Source: own illustration
Summary: Key Insights
Deep-dive regions and countries
Solar power will soon be the cheapest form of electricity in many regions of the world.

### Cost of electricity from new solar power plants in North America, Australia, India and Mena region

<table>
<thead>
<tr>
<th>Region</th>
<th>2015</th>
<th>2025</th>
<th>2035</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>(1.5 – 5.8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>(1.6 – 4.9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>(1.6 - 3.7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mena</td>
<td>(1.6 - 3.7)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Real values EUR 2014; full load hours based on [27], investment cost bandwidth based on different scenarios of market, technology and cost development; assuming 5% (real) weighted average cost of capital; Source: Own illustration
UK: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: United Kingdom

Currency: EUR

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.

Full load hours: 800 - 1150 kWh/kWp p.a., Cost of capital (WACC): between 5% and 10%
Spain: Current and future cost of solar energy

Currency: EUR

Levelized Cost of electricity from large scale solar PV: Spain

Full load hours: 1350 - 1900 kWh/kWp p.a.,
Cost of capital (WACC): between 5% and 10%

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.
France: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: France

Full load hours: 1000 - 1550 kWh/kWp p.a.,
Cost of capital (WACC): between 5% and 10%

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.
Poland: Current and future cost of solar energy

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.

Levelized Cost of electricity from large scale solar PV: Poland

Currency: EUR

Full load hours: 950 - 1050 kWh/kWp p.a.,
Cost of capital (WACC): between 5% and 10%

Comments and feedback welcome!

daniel.fuerstenwerth@agora-energiewende.de

Media contact:
christoph-podewils@agora-energiewende.de
Backup – Excel tool and further country-results
Online tool (Microsoft Excel) allows calculation of current and future cost of solar PV in different countries and currencies

Available (for free) at: www.agora-energiewende.org/pv-lcoe

To calculate cost of electricity in your country:
1. Go to tab „Cost of solar per country …in other currency“
2. Select a country
3. (Select cost of capital - optional)
4. Select currency to display
Greece: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: Greece

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.
Germany: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: Germany

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.
Italy: Current and future cost of solar energy

Currency: EUR

Levelized Cost of electricity from large scale solar PV: Italy

Full load hours: 1200 - 1650 kWh/kWp p.a., Cost of capital (WACC): between 5% and 10%

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.
Austria: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: Austria

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.
Denmark: Current and future cost of solar energy

**Levelized Cost of electricity from large scale solar PV: Denmark**

- Full load hours: 1050 - 1100 kWh/kWp p.a.,
- Cost of capital (WACC): between 5% and 10%

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.
Finland: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: Finland

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed; short-term effects of higher cost in new markets (e.g., first GW in a specific country) are not considered.

Currency: EUR

Full load hours: 850 – 1250 kWh/kWp p.a.,
Cost of capital (WACC): between 5% and 10%
Latvia: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: Latvia

- Full load hours: 1100 - 1250 kWh/kWp p.a.,
- Cost of capital (WACC): between 5% and 10%

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.
Romania: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: Romania

Full load hours: 1100 - 1250 kWh/kWp p.a.,
Cost of capital (WACC): between 5% and 10%

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.
Hungary: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: Hungary

- Full load hours: 1100 - 1200 kWh/kWp p.a.,
- Cost of capital (WACC): between 5% and 10%

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.
Czech Republic: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: Czech Republic

Full load hours: 950 - 1050 kWh/kWp p.a.,
Cost of capital (WACC): between 5% and 10%

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g., first GW in a specific country) are not considered.
Estonia: Current and future cost of solar energy

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.

Levelized Cost of electricity from large scale solar PV: Estonia

Full load hours: 1150 - 1250 kWh/kWp p.a.,
Cost of capital (WACC): between 5% and 10%
Lithuania: Current and future cost of solar energy

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.
Bulgaria: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: Bulgaria

Full load hours: 1150 - 1300 kWh/kWp p.a., Cost of capital (WACC): between 5% and 10%

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.
Slovakia: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: Slovakia

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.
Slovenia: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: Slovenia

- Full load hours: 1150 - 1300 kWh/kWp p.a.,
- Cost of capital (WACC): between 5% and 10%

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.
Montenegro: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: Montenegro

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.
Macedonia: Current and future cost of solar energy

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher costs in new markets (e.g. first GW in a specific country) are not considered.

Levelized Cost of electricity from large scale solar PV: Macedonia (FYROM)

Currency: EUR
Serbia: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: Serbia

<table>
<thead>
<tr>
<th>Year</th>
<th>Levelized Cost of electricity</th>
<th>Full load hours</th>
<th>Cost of capital (WACC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>5% WACC</td>
<td>1100 - 1200 kWh/kWp p.a.</td>
<td>between 5% and 10%</td>
</tr>
<tr>
<td>2025</td>
<td>7.5% WACC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2035</td>
<td>10% WACC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development. A global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g., first GW in a specific country) are not considered.
Backup – Non-EU countries
Australia: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: Australia

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g., first GW in a specific country) are not considered.
China: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: China

Full load hours: 1150 - 1750 kWh/kWp p.a.,
Cost of capital (WACC): between 5% and 10%

Exchange rates based on time of analysis (may 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered
India: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: India

Full load hours: 1400 - 1850 kWh/kWp p.a., Cost of capital (WACC): between 5% and 10%

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g., first GW in a specific country) are not considered.
Turkey: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: Turkey

Full load hours: 1350 - 1750 kWh/kWp p.a.,
Cost of capital (WACC): between 5% and 10%

Currency: EUR

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.
South Korea: Current and future cost of solar energy

Levelized Cost of electricity from large scale solar PV: Korea, South

Full load hours: 1300 - 1350 kWh/kWp p.a.,
Cost of capital (WACC): between 5% and 10%

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.
USA: Current and future cost of solar energy

Ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g. first GW in a specific country) are not considered.
Russia: Current and future cost of solar energy

Currency: EUR

Levelized Cost of electricity from large scale solar PV: Russia

- Full load hours: 850 - 1550 kWh/kWp p.a.,
- Cost of capital (WACC): between 5% and 10%

Exchange rates based on time of analysis (May 2014); ranges include differences in solar irradiation within the country as well as scenarios of technology and global market development; a global market for modules, inverters and other cost components is assumed, short-term effects of higher cost in new markets (e.g., first GW in a specific country) are not considered.
Backup – further details on analysis
Different approaches were applied to estimate future cost of components and were discussed in detail in expert workshops.

Overview of Methodology Applied to Estimate Total System Cost in 2050

<table>
<thead>
<tr>
<th>Component</th>
<th>Cost in 2014</th>
<th>Logic of calculation</th>
<th>Cost in 2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance of System</td>
<td></td>
<td>Component based</td>
<td></td>
</tr>
<tr>
<td>Inverter</td>
<td></td>
<td>Learning curve</td>
<td></td>
</tr>
<tr>
<td>Module</td>
<td></td>
<td>Learning curve</td>
<td></td>
</tr>
</tbody>
</table>
Short term market estimations for 2015 are used as starting point for scenario estimations*

PV market development, GW per year

*For 2015, the average of 4 available market forecast is used
Own illustration
Number of Duplications in Cumulated Production Does not Differ Strongly Across All Scenarios

Cumulated PV production in scenarios, in TW; duplications

Own illustration
Crosscheck with global electricity demand: PV break-through scenario only feasible with Electricifcation

Global Electricity Demand and PV Generation, in 1000*TWh

Crosscheck of scenarios: PV share of electricity demand in 2050

Demand based on…
IEA                  Prof. Breyer
91%                  40%
42%                  18%
22%                  10%
12%                  5%

Own illustration
Increasing module efficiency will lead to cost reductions in all other parts of the power plant

Total land area needed for PV power plant with 1 MWp

<table>
<thead>
<tr>
<th>Today: (Module Efficiency ~15%)</th>
<th>2050: (Module Efficiency ~30%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>~2 soccer fields</td>
<td>~1 soccer field</td>
</tr>
<tr>
<td>~2x Efficiency</td>
<td>~50% Surface</td>
</tr>
</tbody>
</table>

Effect of higher module efficiency:
- Less modules to install
- Less weight to transport
- Less structures to build
- Less surface to use

Own illustration
Future Balance-of-System cost are based on scenarios of module efficiency and further analysis

Example of methodology used

<table>
<thead>
<tr>
<th>Scenarios of module efficiency</th>
<th>Resulting balance-of-system (BOS) cost*</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Today</em></td>
<td>~340 EUR/kWp</td>
</tr>
<tr>
<td>Scenario 2050</td>
<td>~210 EUR/kWp</td>
</tr>
<tr>
<td>„Conservative“</td>
<td>~120 EUR/kWp</td>
</tr>
<tr>
<td>„Average“</td>
<td>-39%</td>
</tr>
<tr>
<td>„Optimistic“</td>
<td>-65%</td>
</tr>
</tbody>
</table>

*Detailed analysis of cost drivers and impacts, including those beyond module efficiency, as well as results of expert discussions included in study

Own illustration
Inverter for large scale solar PV power plants have developed tremendously over the last decade.

Example of technology development: Inverter

<table>
<thead>
<tr>
<th>30 kW PV-inverter</th>
<th>30 kW PV-inverter</th>
<th>20 kW PV-inverter</th>
</tr>
</thead>
<tbody>
<tr>
<td>manufactured 2004</td>
<td>manufactured 2008</td>
<td>manufactured 2014</td>
</tr>
<tr>
<td>370 kg -&gt; 12 kg/kW</td>
<td>155 kg -&gt; 5 kg/kW</td>
<td>40 kg -&gt; 2 kg/kW</td>
</tr>
</tbody>
</table>

Possible technical progress:
- SiC power modules
- higher switching frequency → higher power density
- higher voltage levels in utility scale inverters

Own illustration, Fraunhofer ISE
Future Cost of Inverters are estimated based on the „Price Experience Curve“

Inverter Price, Cumulated Produced Capacity

Historic learning curve only for inverters <20 kW. Adaption for inverters >500 kW by shift of -25% according to 2013 prices.

Scenario 1: 40 EUR/kWp
Scenario 3: 30 EUR/kWp
Scenario 4: 20 EUR/kWp

Inverter > 500 kW
10 - 12 ct/kW in 2013

Inverter > 500 kW
10 - 12 ct/kW in 2013

Source of historic data: SMA

Own illustration, Fraunhofer ISE
Resulting total cost of ground mounted PV systems in 2050 ranges between 280 and 610 EUR/kWp – assuming no technology breakthroughs (conservative estimate)

<table>
<thead>
<tr>
<th>Cost of PV System, in EUR/kWp</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
</tr>
<tr>
<td>~1000 €/kWp</td>
</tr>
<tr>
<td>BOS</td>
</tr>
<tr>
<td>335</td>
</tr>
<tr>
<td>Inverter</td>
</tr>
<tr>
<td>110</td>
</tr>
<tr>
<td>Module</td>
</tr>
<tr>
<td>550</td>
</tr>
</tbody>
</table>

| 2050 Max                     |
| ~610 €/kWp                  |
| BOS                          |
| 206                          |
| Inverter                     |
| 43                           |
| Module                       |
| 357                          |

| 2050 Min                     |
| ~280 €/kWp                  |
| BOS                          |
| 117                          |
| Inverter                     |
| 20                           |
| Module                       |
| 135                          |

Own illustration