

# Solar Power Generation Costs Discussion

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# Solar PV costs are dynamic and depend on system size, installation type, technology, and country

PV investment cost in 2010 EUR/kW according to draft paper

	2010	2020	2030	2040	2050
P. 5	1800	1474	1207	989	810
P. 18-19 *	2175- 7300	1000- 3862	700- 2984	500- 1471	400- 1700

\* For different PV system sizes, installation types, and technologies.

Source: DIW Berlin. Current and Prospective Production Costs of Electricity Generation. Draft version 19December 2012.

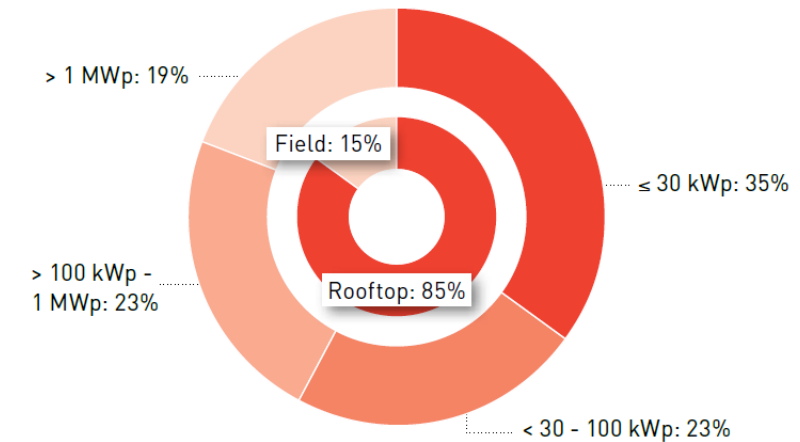
# PV prices across system sizes and market segmentation

Turnkey Prices of Typical PV Applications  
(VAT excluded (19%), net, prices rounded,  
prices at end of 2010, usually grid connected)

- 1 – 2 kWp: 3.200 €/kWp
  - 2 – 5 kWp: 2.800 €/kWp
  - 5 - 10 kWp: 2.650 €/kWp
  - 10 - 50 kWp: 2.450 €/kWp
  - 30 -100 kWp: 2.450 €/kWp
  - > 100 kWp: 2.300 €/kWp
- } 35%  
→ 23%  
→ 42%

Source: IEA co-operative programme on Photovoltaic power systems. National Survey Report of PV Power Applications in Germany 2010. May 2011.

## PV Market Segmentation in Germany 2010

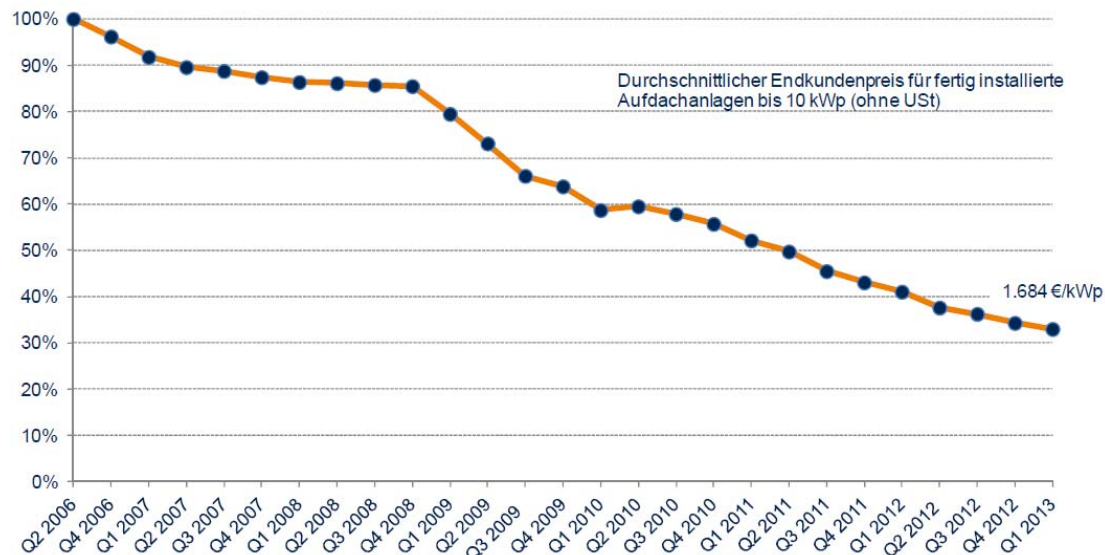


Source: Germany Trade & Invest. The Photovoltaic Industry in Germany. Issue 2011/2012. August 2011.

# PV system prices decreased by 67% since 2006

PV system price for roof-top installations up to 10 kWp:

- 2994-2842 €/kWp (Q1-Q4 2010)
- 1684 €/kWp (Q1 2013)





Source: BSW-Solar. Statistische Zahlen der deutschen Solarstrombranche (Photovoltaik). Februar 2013.

→ Draft paper so far assumes 55% price decrease between 2010 and 2050...

# Modules with large cost components share

Draft paper: “cost proposal is most suitable for model applications to Europe”

Capital cost components of PV systems

Components in 2010 EUR/kW	(Mac Donald 2011) 	(Black & Veatch 2012) 
Project development	360	
Modules	1740	1053
Inverters	540	180
Installation (electrical and civil) works	360	
Balance of Plant (BoP)	420	139
Structures		609
Engineering, procurement, construction management services		41
Owner's cost		105
<b>Total</b>	<b>3420</b>	<b>2128</b>

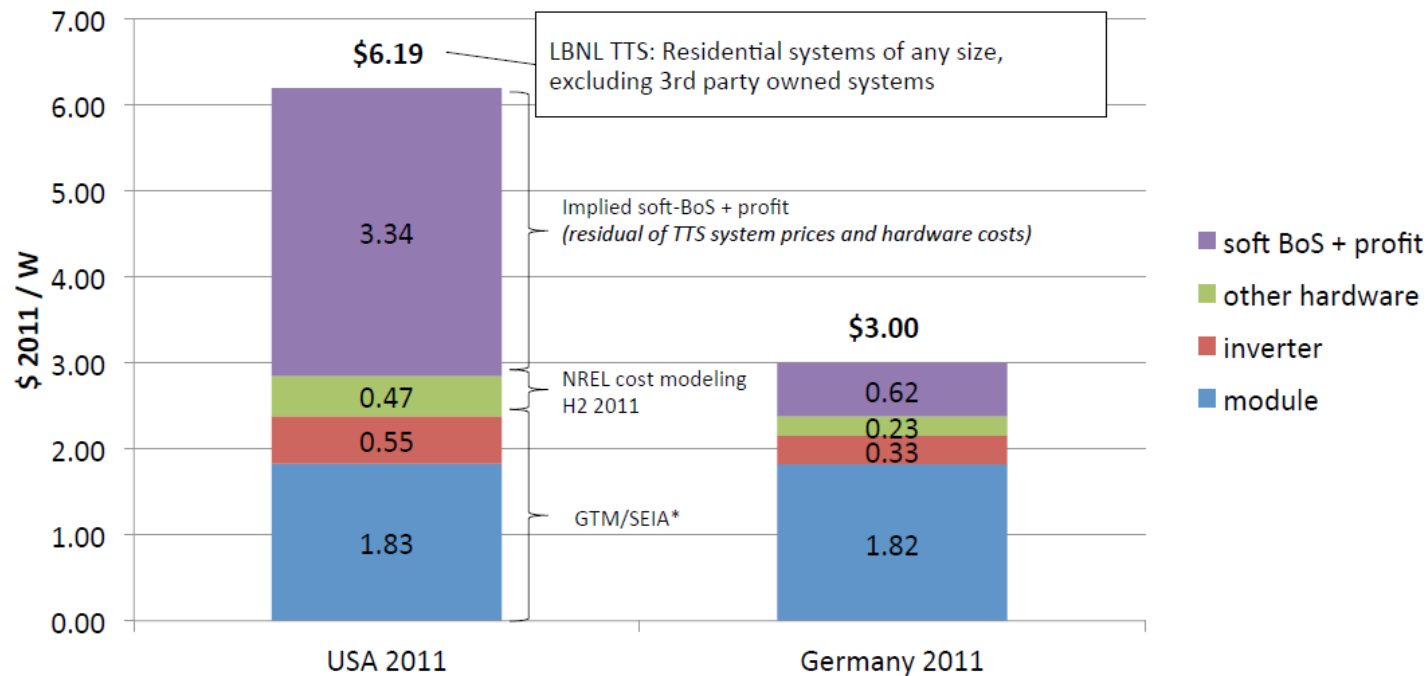
Source: DIW Berlin. Current and Prospective Production Costs of Electricity Generation. Draft version 20December 2012.

→ System size?

→ Germany is the largest PV market worldwide.

# Residential PV prices in Germany are much lower than in the United States

## Cost components in the US and Germany



Source: Seel, Joachim, Galen Barbose, and Ryan Wiser. Why Are Residential PV Prices in Germany So Much Lower Than in the United States? Lawrence Berkeley National Laboratory. February 2013.

# Construction period of PV power plants largely depends on system size and country

## Construction periods

	In years	(UK Government 2002) p. 202	(Strauss 2009) p.114 *	(IEA et al. 2010)	(Konstantin 2007) pp. 236-237
<b>WIND</b>	Wind Onshore	1	-	1	-
	Wind Offshore	1	-	1	-
<b>SOLAR</b>	Solar PV	1	-	1	-
	Solar CSP	1	-	1	-

Source: DIW Berlin. Current and Prospective Production Costs of Electricity Generation. Draft version 20December 2012.

## Project durations for different system sizes and countries

Residential Systems (3kWp)			
Country	Process Duration (Weeks)		
	Min	Avg	Max
Germany	5	7	10
Greece	7	10	15
France	21	24	30
Industrial Ground-mounted Systems (2500 kWp)			
Country	Process Duration (Weeks)		
	Min	Avg	Max
Germany	24	40	53
Greece	145	157	164
Spain	156	182	210

Source: [www.pvgrid.eu](http://www.pvgrid.eu) (retrieved 7 March 2013)

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