



The Global Photovoltaic Industry & Market Status & Prospects



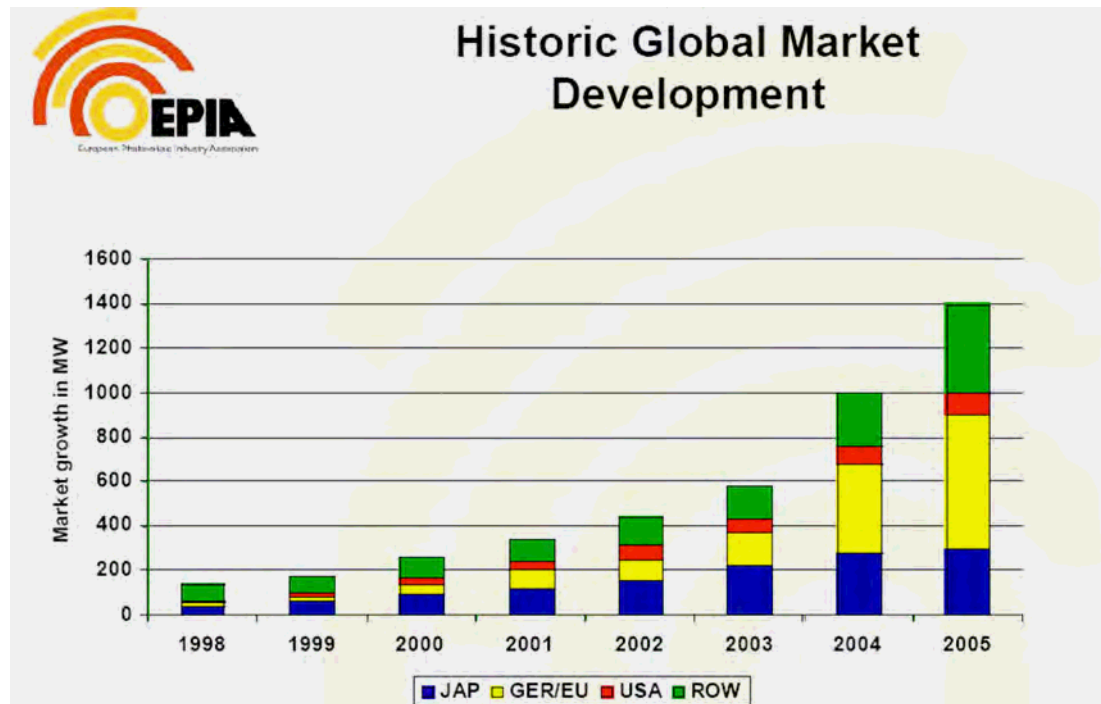
March 2007



Huge solar farms in the desert

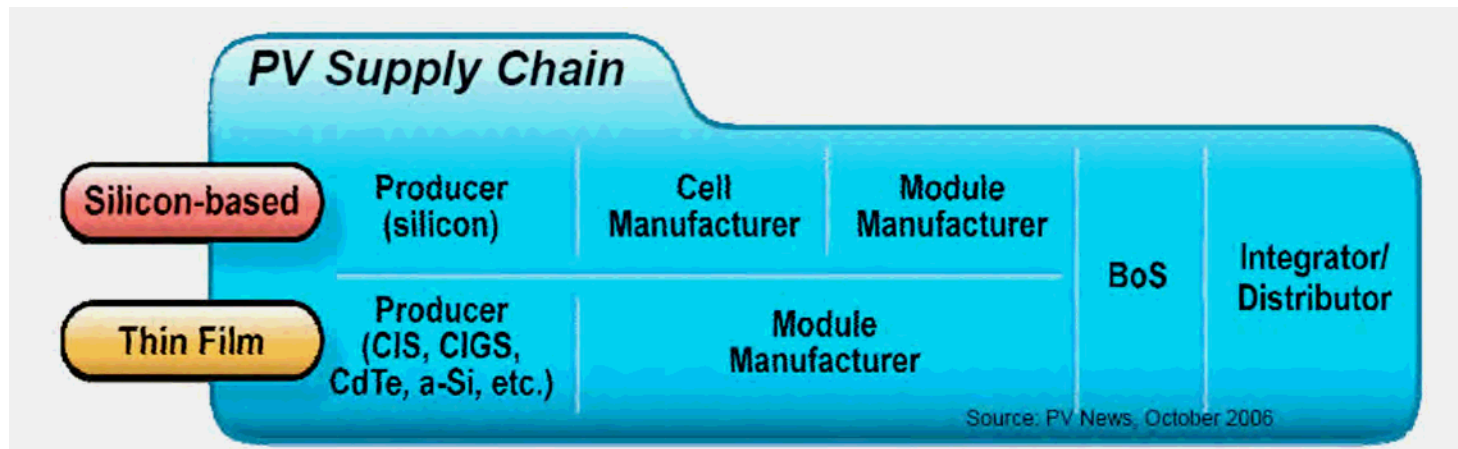
A thriving market

The solar power sector is sprinting ahead of any past estimates. Production growth, price increases and cost reductions are stronger than expected. In 2005, for example, the sector achieved 44% volume, 50% revenue and 149% profit growth.

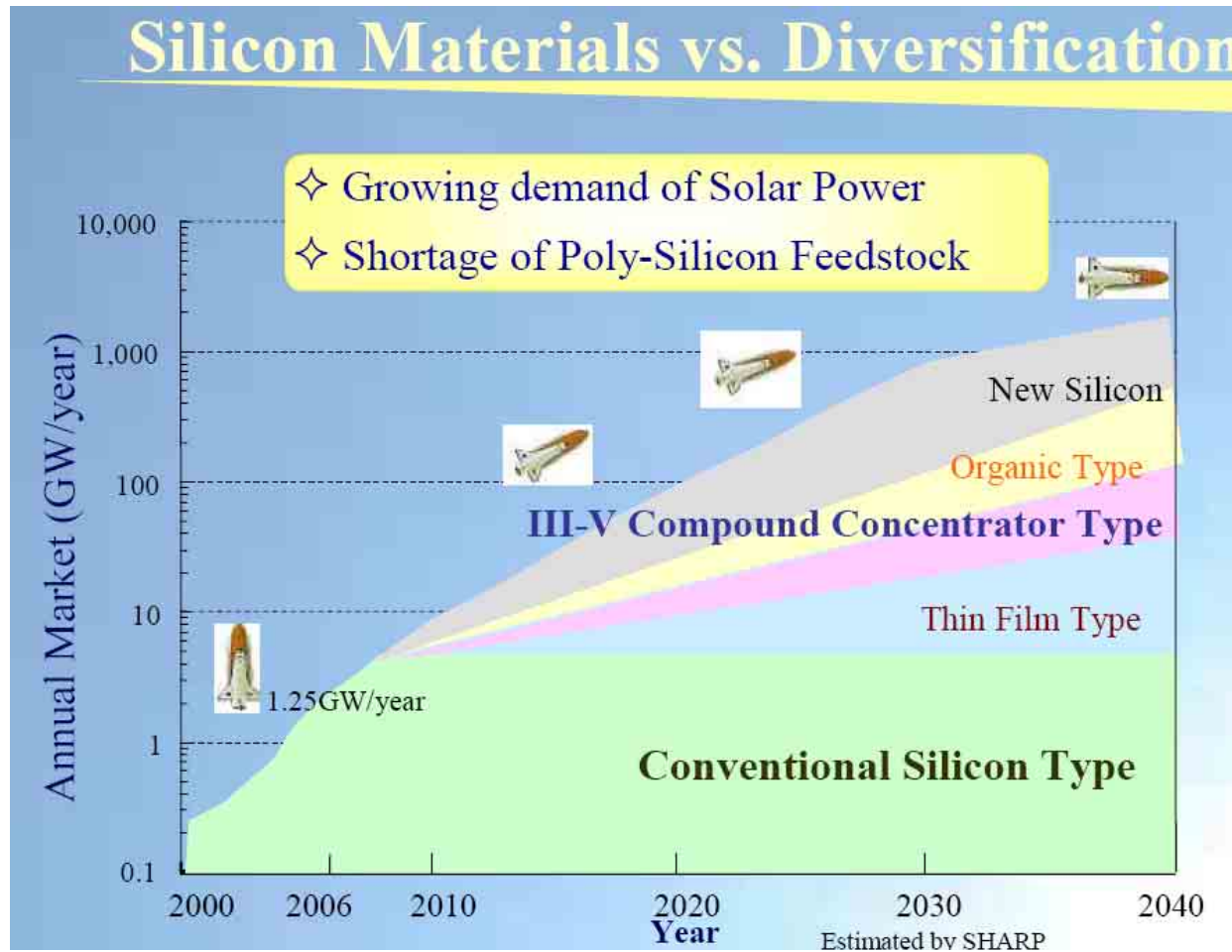


PV technology

The vast majority of PV systems sold in the market today are based on silicon (Si) and particularly crystalline silicon (poly or mono). However, the shortage of silicon stock during the last couple of years has brought other technologies on the surface (the so-called “thin-film” ones, such as CIS, CdTe, etc).



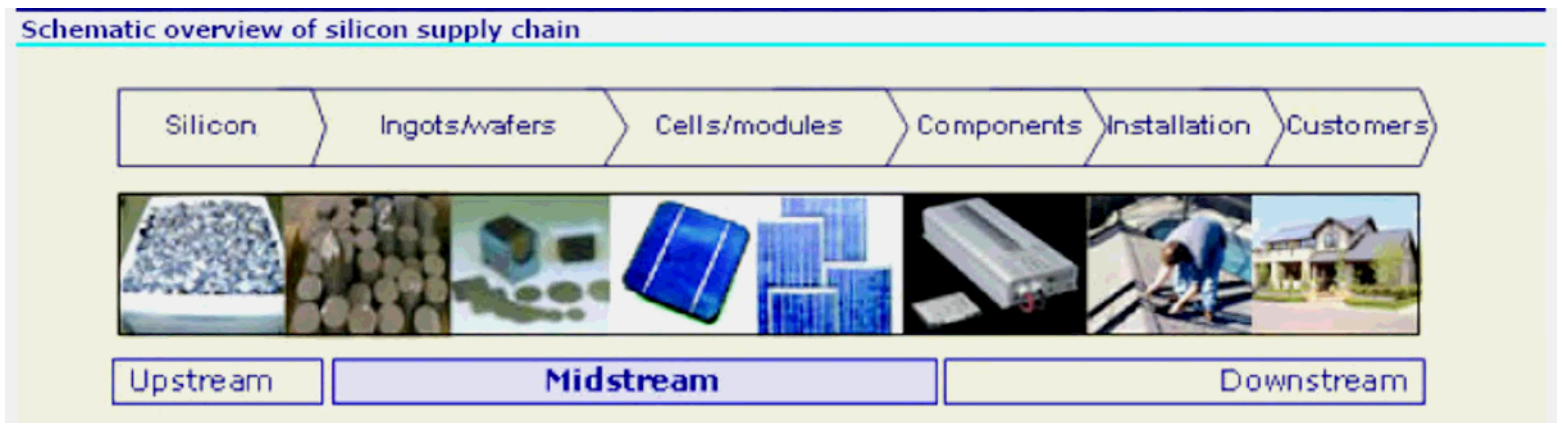
PV technology



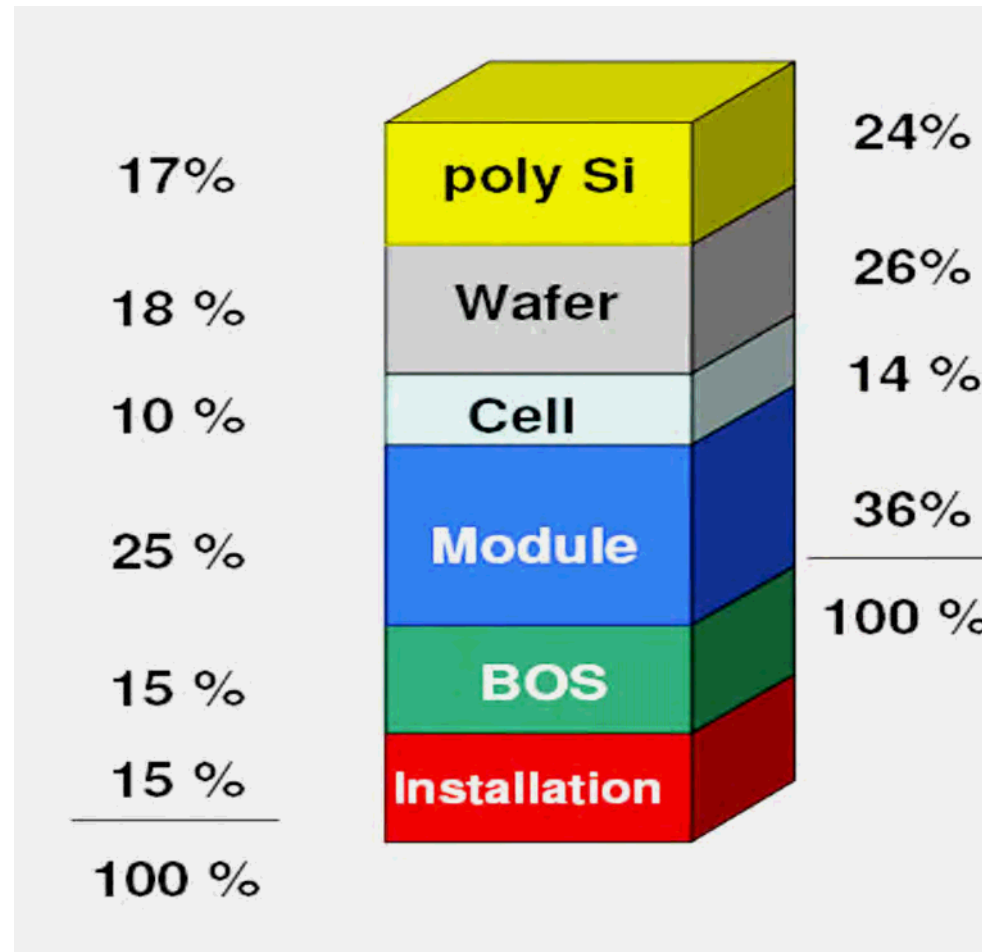
PV technology

The manufacturing of PV modules follows the following steps:

- Purification of metallurgical Si to high grade Si (similar to that of the semiconductors industry).
- Manufacture of PV wafers and cells.
- Assembling of cells to PV modules.

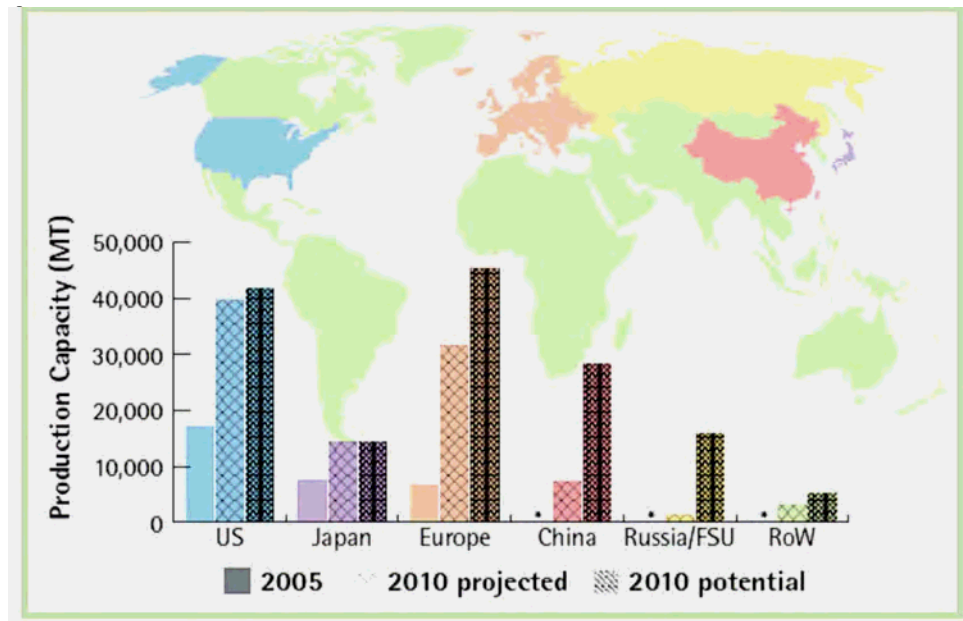


Typical PV system cost breakdown

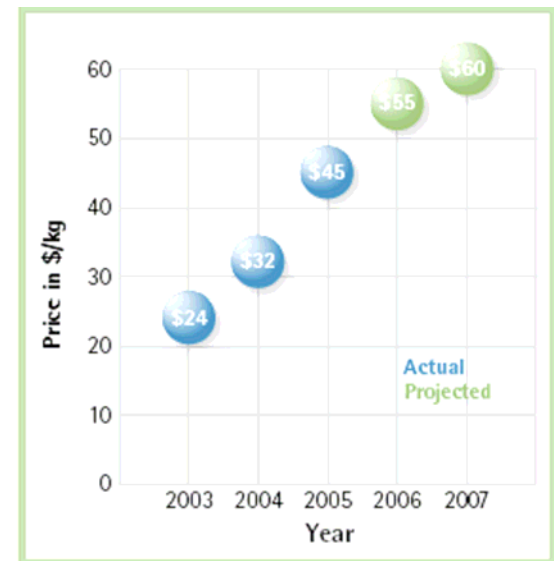


The silicon shortage

- Considering that demand is almost double the offer, the PV industry could pace more rapidly had there not been a silicon shortage during the last two-three years.
- Many new silicon, wafers-cells plants are now being built in order to satisfy demand. It is estimated that the silicon shortage bottleneck will be resolved by the end of 2008.

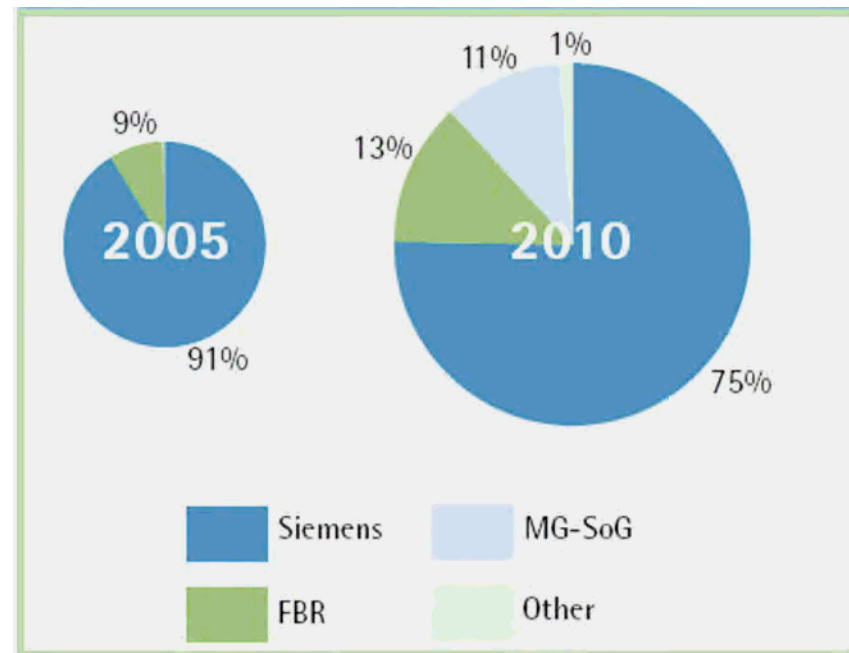


Silicon prices

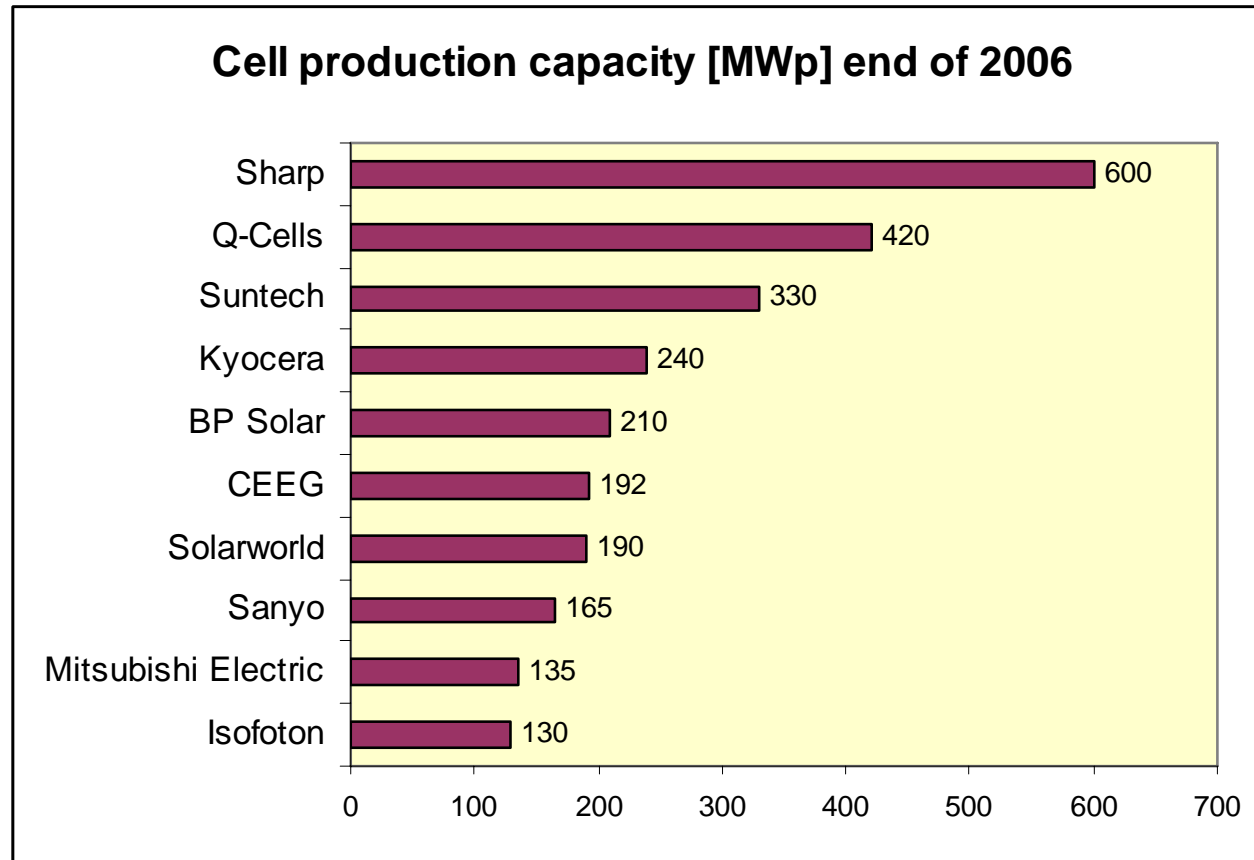


Silicon technology

- Polysilicon production is a capital-intensive and highly technical business that requires large amounts of electricity for melting and purification.
- Existing technology includes the Siemens process and the fluidized bed reactor (FBR) process. Siemens is the industry standard. The newer technologies being developed (such as MG-SoG) are more focused on a solar grade, or lower quality and thus cheaper, silicon product.

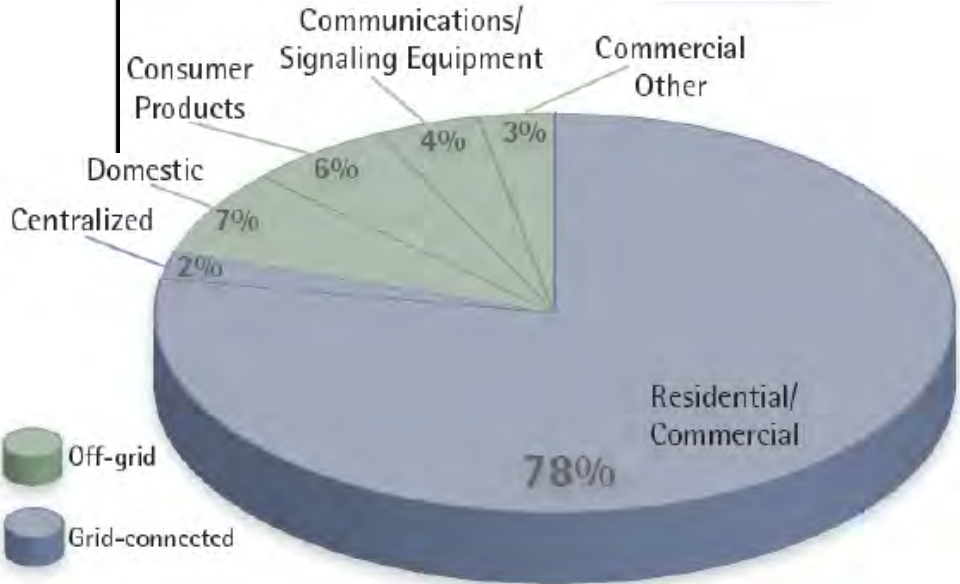
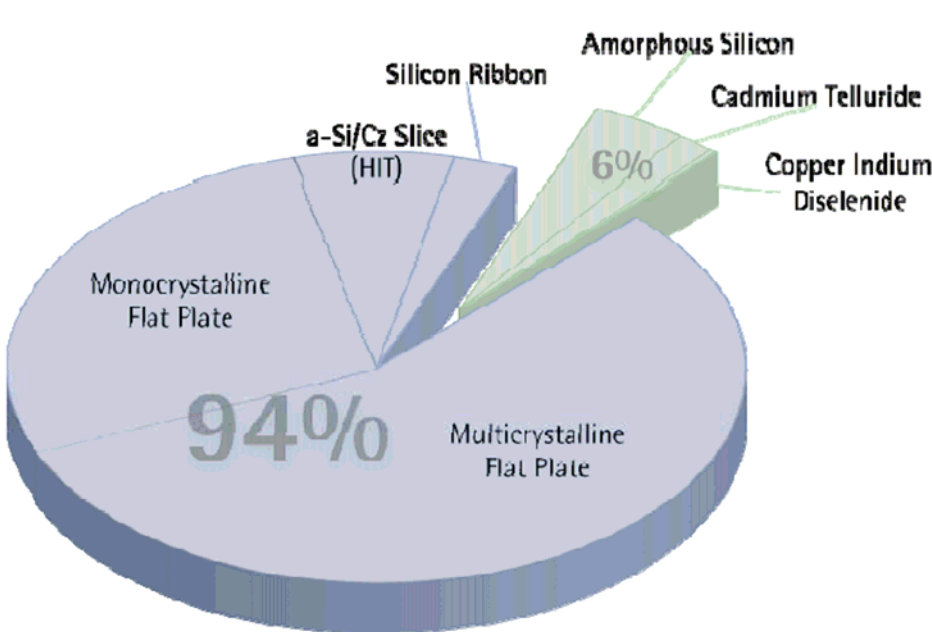


PV market status



Year	2000	2005
No. of manufacturers	~ 30	~ 50
Manuf. preparing	~ 15	> 40

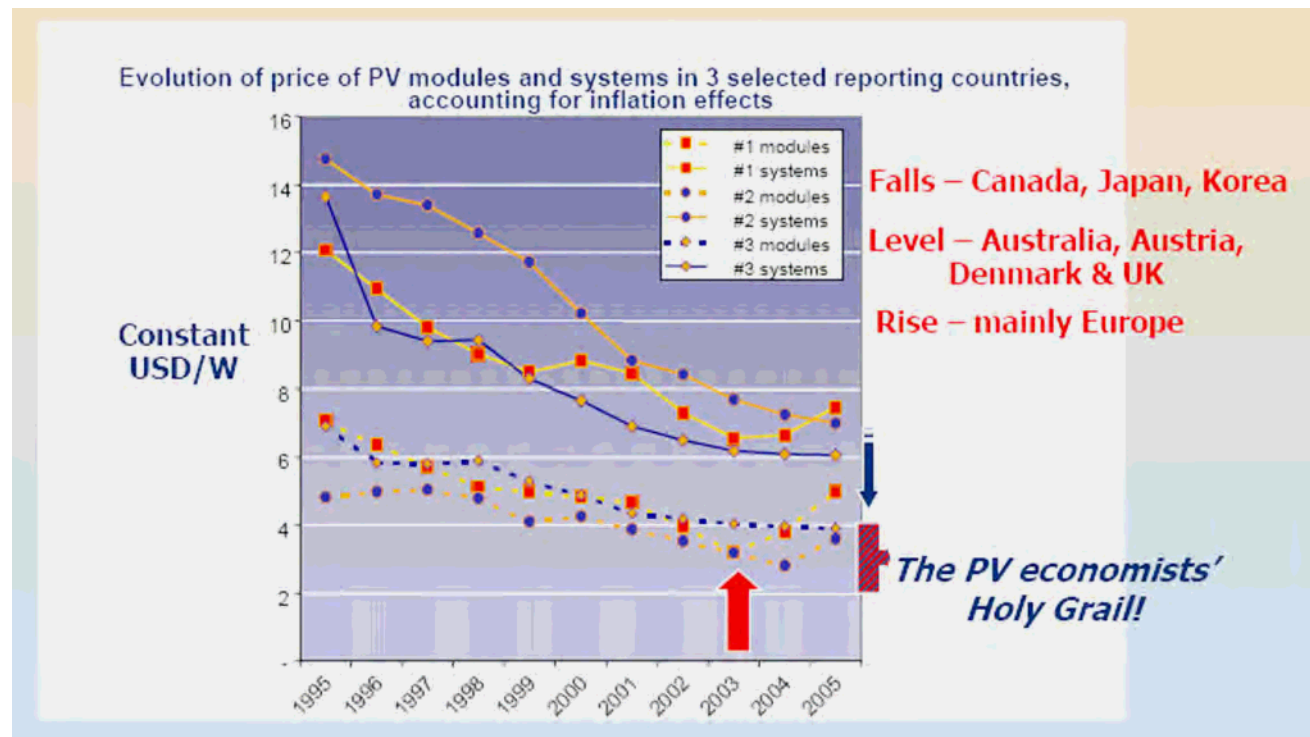
PV market status



■ Off-grid
■ Grid-connected

PV cost trends

Capacity	2000	2005
<10kW	7 - 10 €/W	5 - 8 €/W
>10kW	5 - 12 €/W	5 -7 €/W



PV cost trends

Target cost of PV electricity

(Unit: Eurocent/kWh)

		2005	2010	2015	2020	2030	2050
		30.0		15.0		6.0	3.0
		45	30		10		
	Residential	18.0 - 25.1	10.2 - 14.1	6.3 - 7.8			
	Commercial	12.5 - 17.3	7.1 - 9.4	4.7 - 6.3			
	Utility	10.2 - 17.3	7.8 - 11.8	3.9 - 5.5			
		27.47	15.41		9.38	4.69	

Source:

EU: Strategic Research Agenda (SRA) for Photovoltaic Solar Energy Technology, PV-TRAC (July 2006)

Germany: PV R&D Roadmap, developed during the 9th BMU strategy meeting of representatives from German industry and research institutes (November 2005) (in Southern Europe)

USA: The Solar America Initiative, NREL (February 2006)

Japan: PV Roadmap Toward 2030 (PV2030), NEDO (June 2004)

Conversion Rate: 1 USD = 78.4191 EUR, 1 JPY = 0.67 EUR (as of November 1, 2006)

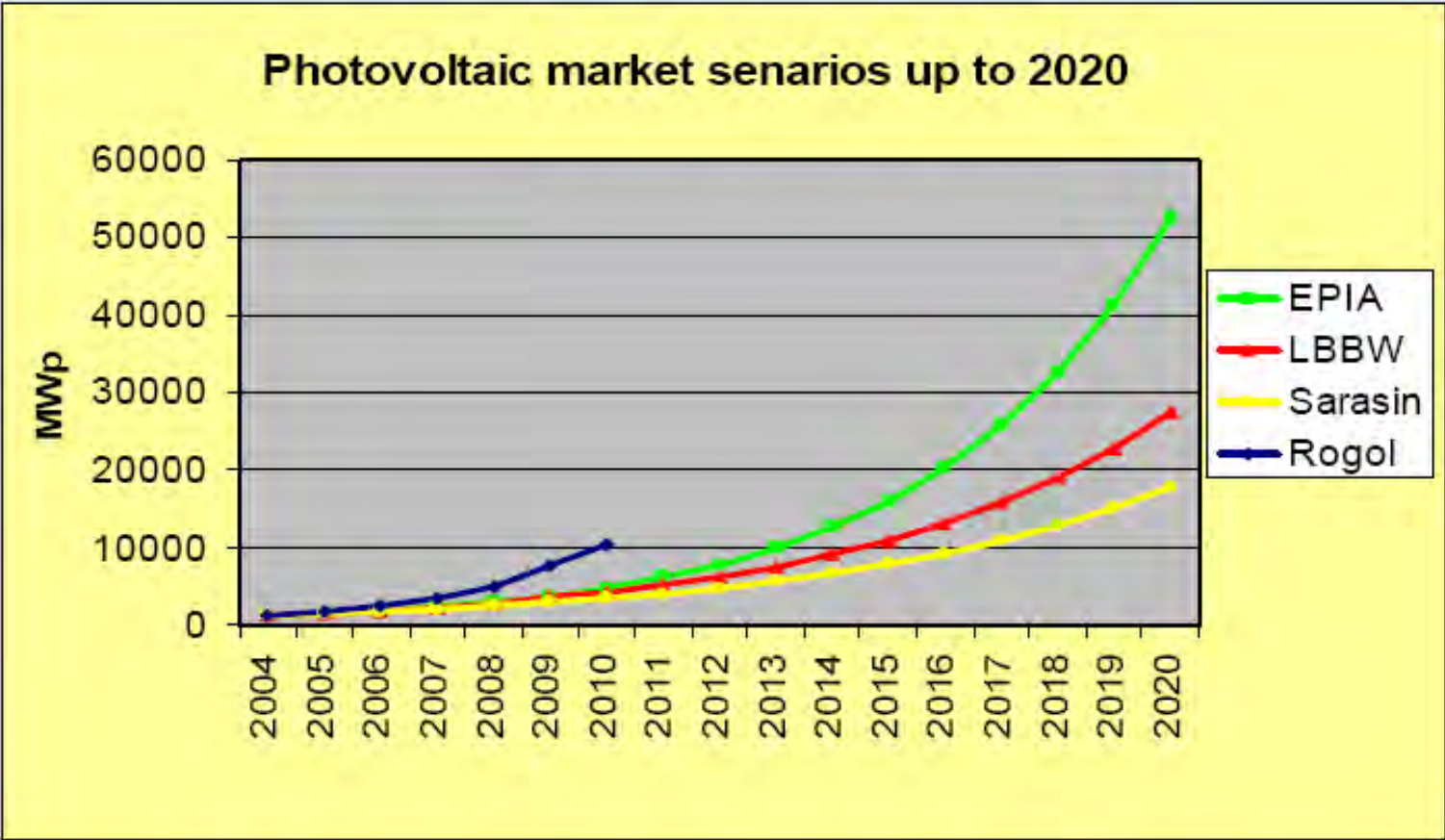


PV market prospects

Outlook for the solar power sector

OVERALL SECTOR DATA	2004	2005	2006	2007	2008	2009	2010
Production (GW)	1.2	1.7	2.4	3.4	5.0	7.6	10.4
Production growth (%YoY)		44%	44%	43%	48%	51%	37%
Global ave. module price (\$/watt)	\$3.25	\$3.70	\$4.30	\$4.50	\$4.50	\$4.25	\$4.00
Module price growth (%YoY)		14%	16%	5%	0%	-6%	-6%
Global ave. installation price (\$/watt)	\$7.25	\$7.50	\$7.91	\$7.93	\$7.76	\$7.35	\$6.94
Installation price growth (%YoY)		3%	5%	0%	-2%	-5%	-6%
Revenue pool (\$bn)	\$8	\$12	\$19	\$27	\$39	\$56	\$72
Revenue pool growth (%YoY)		49%	51%	43%	45%	43%	30%
Industry ave. pre-tax profit margin (%)	15%	22%	30%	33%	36%	37%	38%
Pre-tax profit pool (\$bn)	\$1.2	\$2.7	\$5.7	\$8.9	\$14.1	\$20.5	\$27.2
Pre-tax profit pool growth (%YoY)		118%	111%	56%	58%	46%	32%

PV market prospects



The key market driver

	Feed-in Tariff	Net-metering/ Net-billing	Direct Subsidy	Tax credit	RPS
Europe	*** (Germany, Spain, Italy, France, Greece ...)	.	** (Belgium, Greece, Cyprus, Portugal...)	* (France, ...)	* (UK, Ireland, etc.)
USA	* (State)	*** (State)	*** (State)	** (Federal/ State)	** (State)
Japan	.	*** (Utilities)	***	.	**
Note	Incentive for power generation (kWh)		Incentive for installed capacity (kW)	Incentive based on kW or price	Obligation of share of renewables

Key markets

Market Size/Year	Country
300 - 1,000 MW	Japan, Germany
100 - 300 MW	USA
50 - 100 MW	Spain
10 - 50 MW	Italy, Australia, France, Korea, China
5 - 10 MW	Switzerland, Greece, India
1 - 5 MW	Austria, Netherlands, UK, Canada, Mexico, Portugal
Below 1 MW	Sweden, Finland, Denmark, Norway