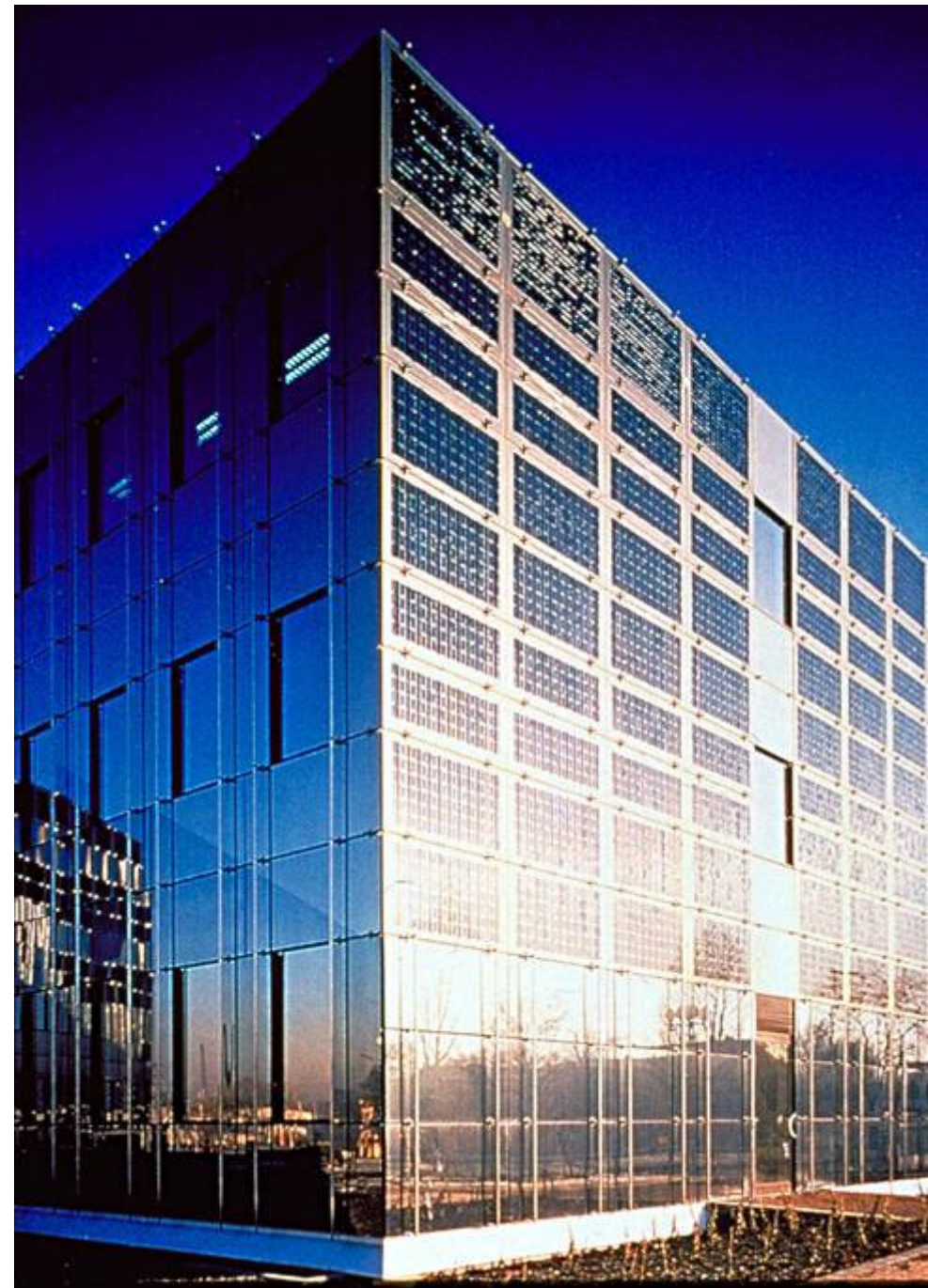




Evolution and Perspectives of the Global and European Markets and Potential Cost Reductions





EPIA and its Members (109 Members)

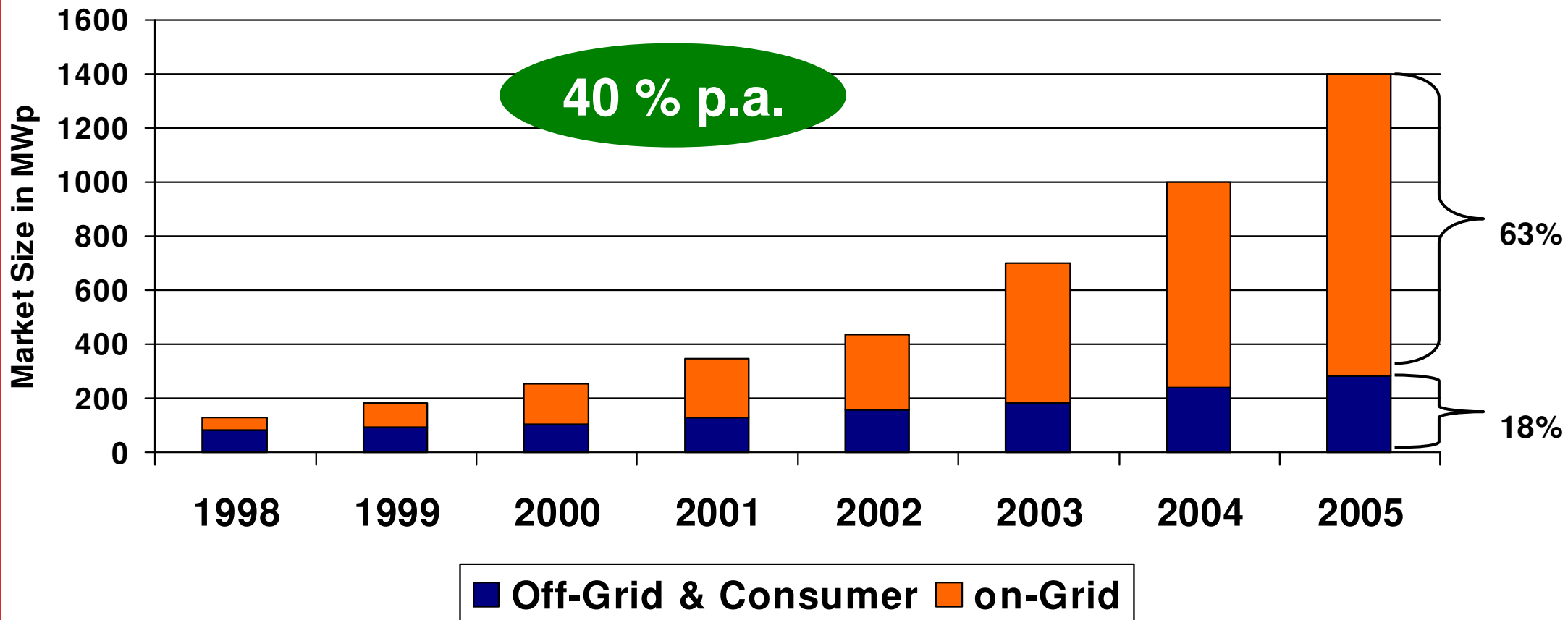
EPIA represents 95% of the photovoltaic European industry, and 80% of the Global photovoltaic industry

Silicon feedstock: **Wacker ...**

- Wafers and Ingots: **Crystalox, Scanwafer, Pillar, Podolsky, PV Silicon ...**
- Cells: **Q-Cells, BP Solar, Isofoton, Shell Solar, SolarWorld ,...**
- Modules: **Aleo, Schott Solar, Photowatt, Photovoltech...**
- Systems: **Tenesol, Naps Systems, Conergy, Phoenix,...**
- Inverters: **KACO, SMA, Sputnik, Sunways, Fronius...**



World PV Market Size and Application Segmentation



Off-Grid Industrial



Consumer



Off-Grid Residential



On-Grid



96 MW / 8%

24 MW / 2%

108 MW / 9%

Economically viable

970 MW / 81%

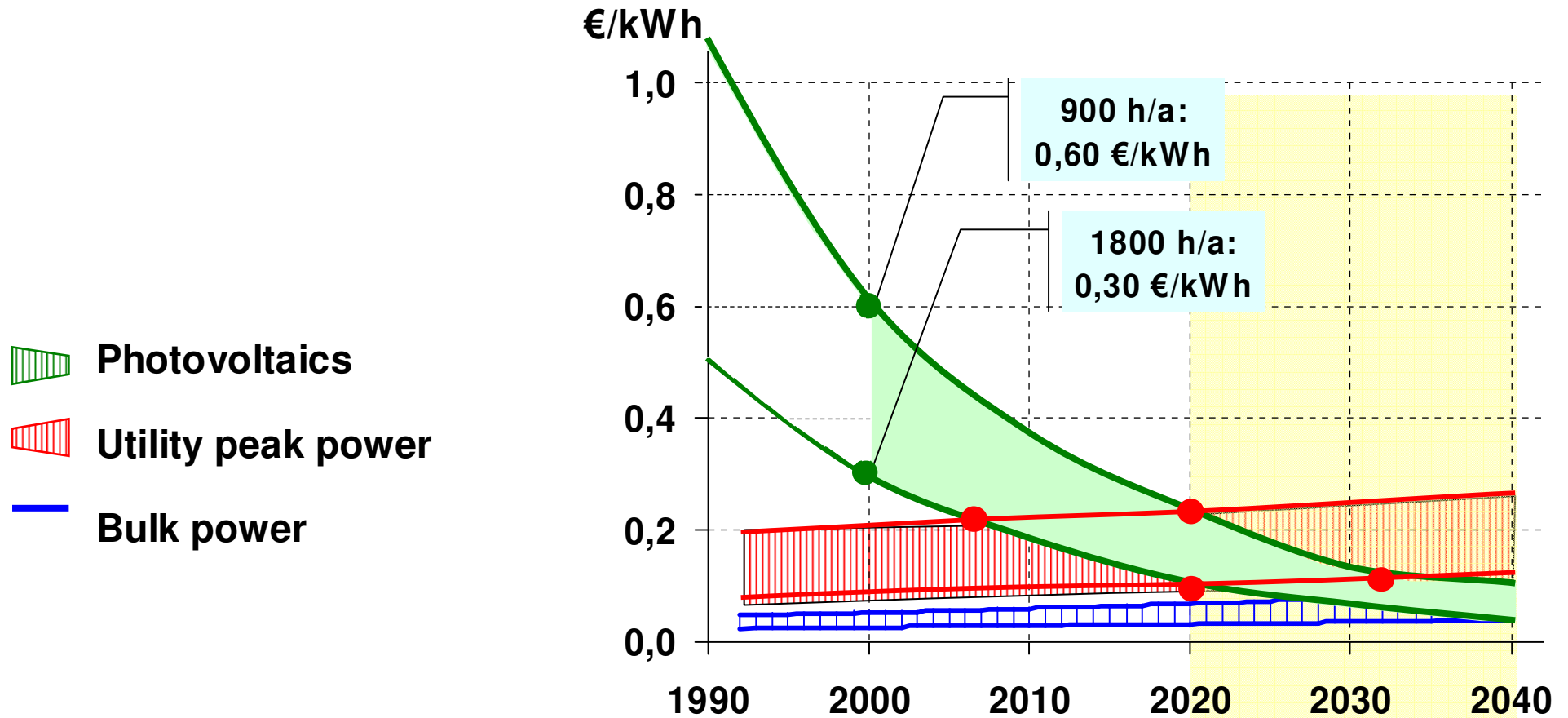
Dependant on market support programs

Market in 2005

Source: Strategies Unlimited

Market Segments

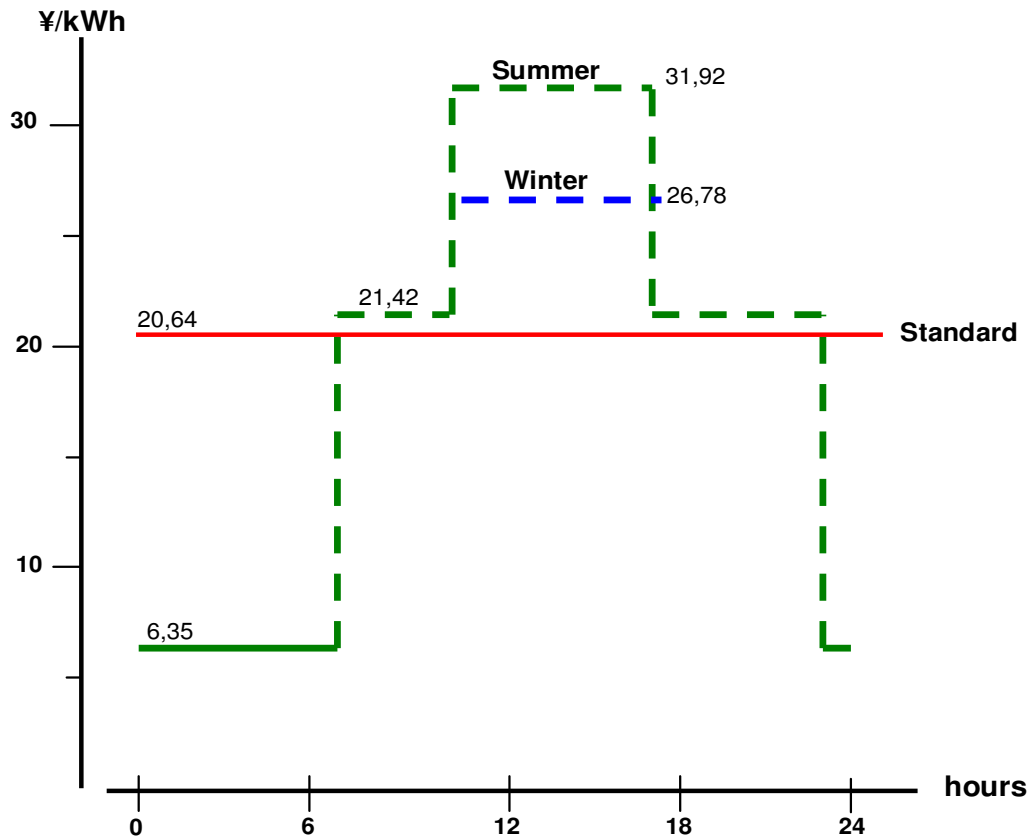
Competitiveness between Electricity Generating Cost for PV and Utility Prices



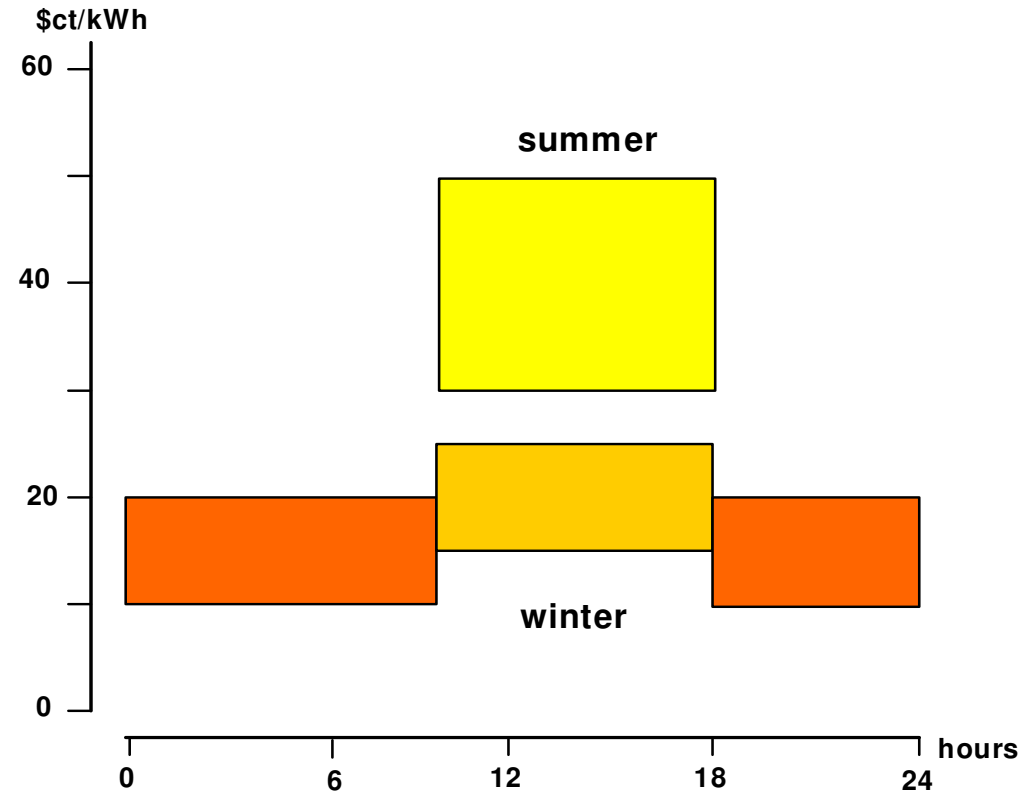
market support programs necessary:



Source: RWE Energie AG and RSS GmbH



**Tokyo Electric Power Cooperation
(Jp) Tariff 2005**

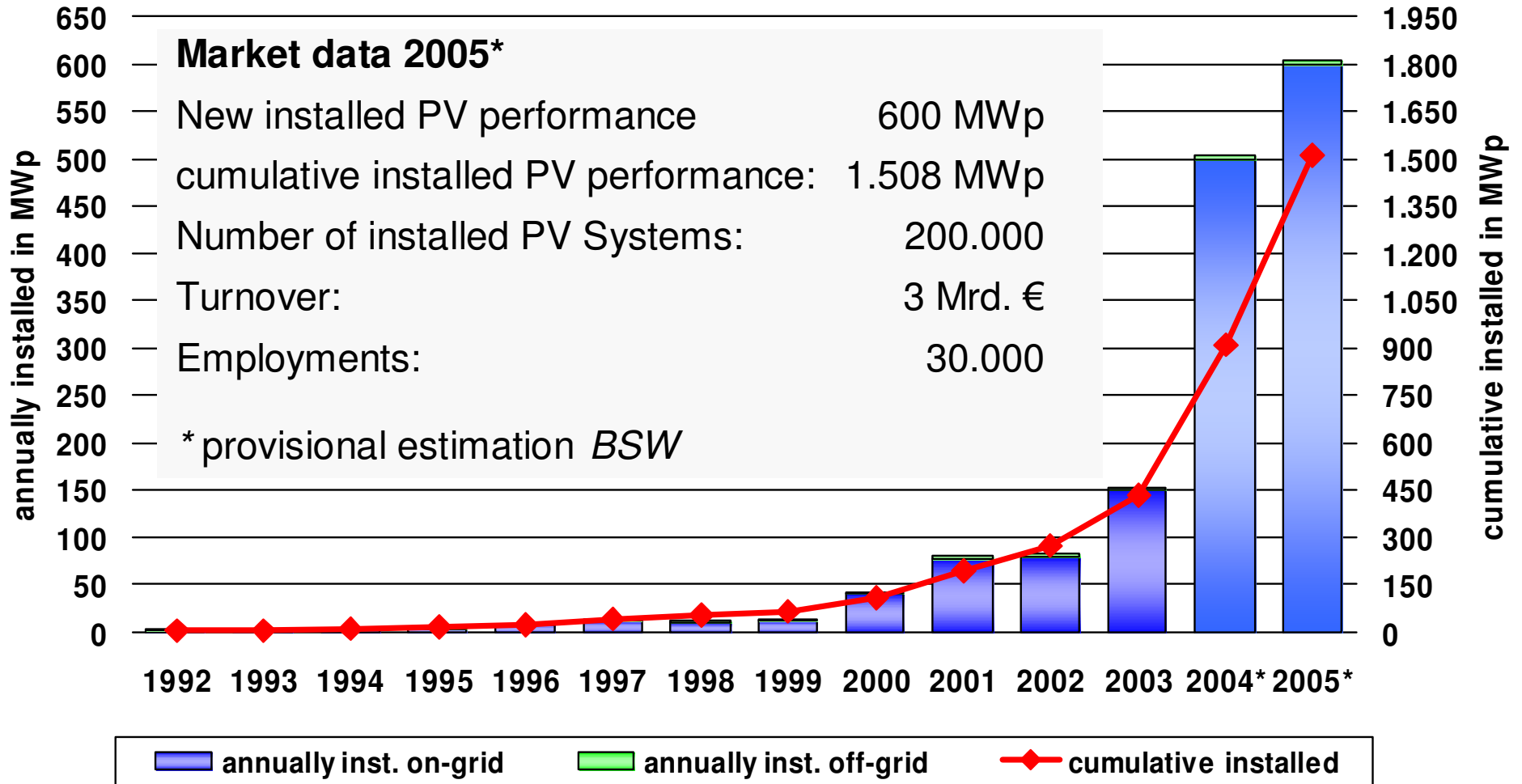


**Range of Electricity Prices in
California** (data from Alison Hyde, BSW)

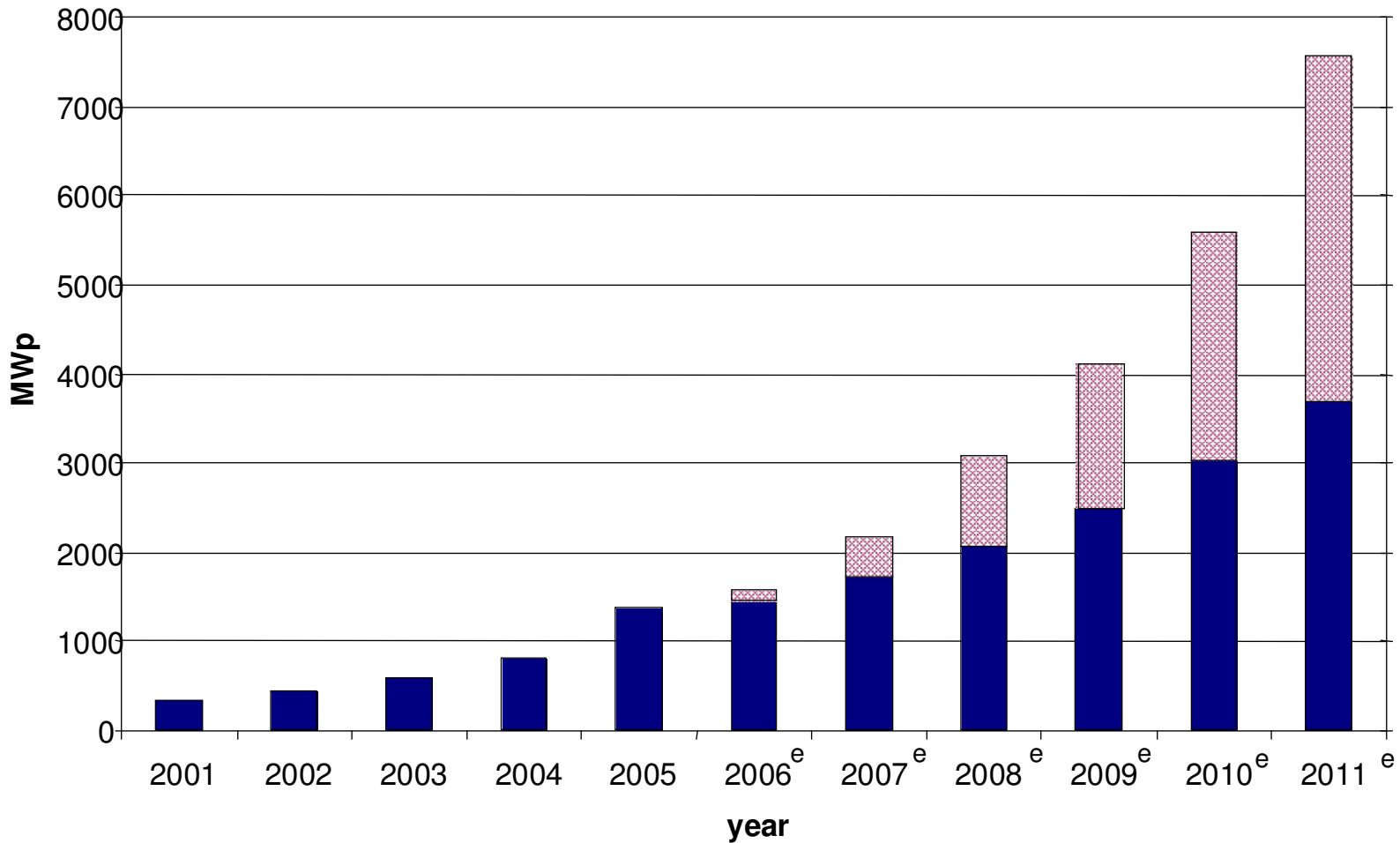


PV Market development in Germany

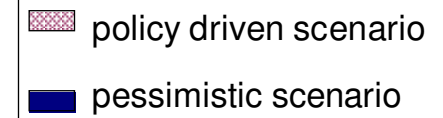
Annually and cumulative installed PV performance in Germany



Global Annual Installations



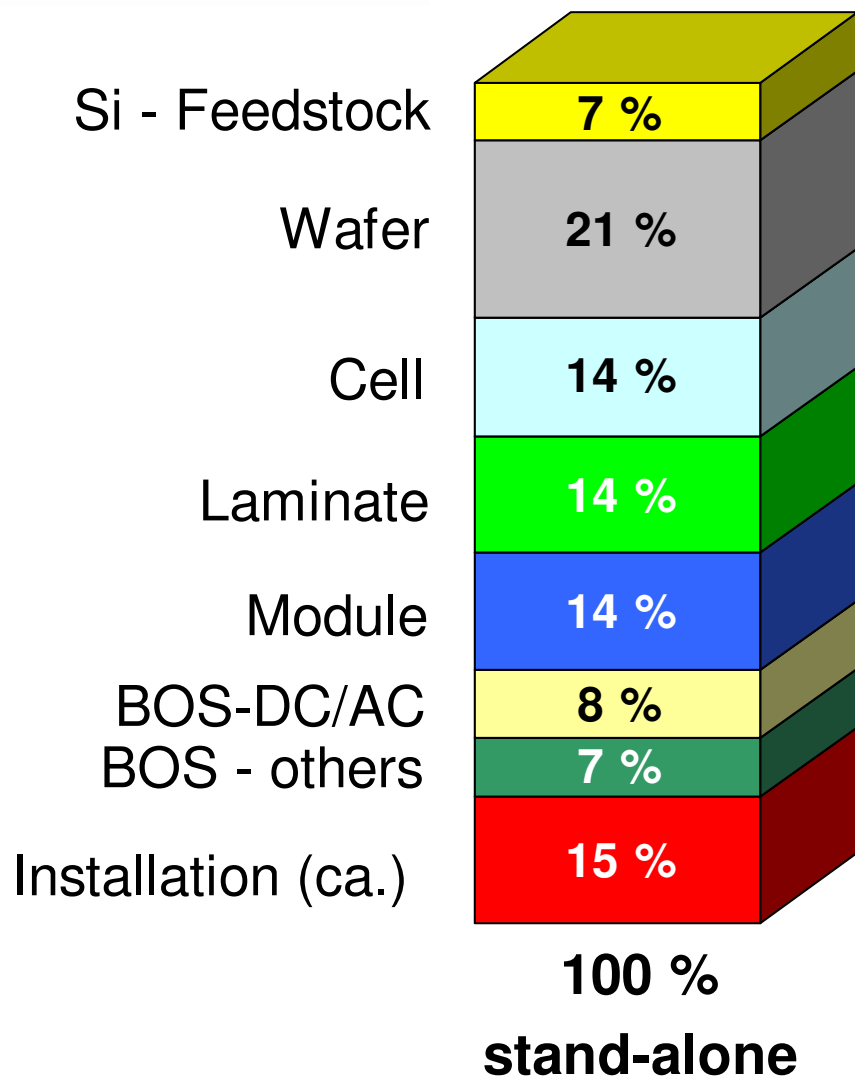
Global average annual growth rate > 35 %



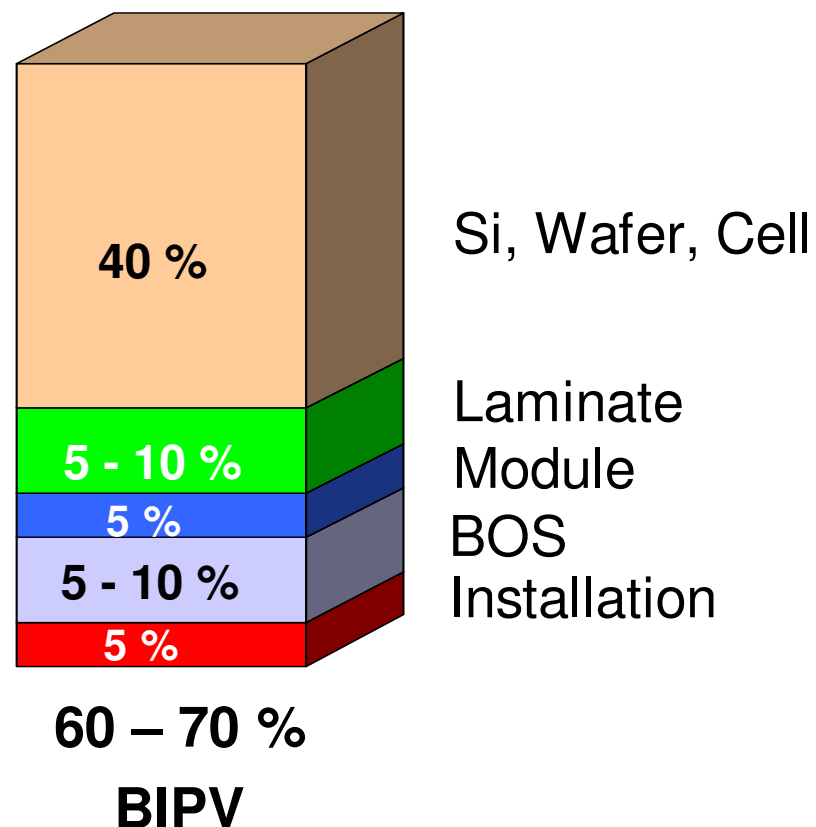
European Market Support Programms

Country	Feed-in law			2005	2006 (est.)
	Tariff [€ct/kWh]	Duration [a]	Cap [MW]		
Germany	41 – 52 BIPV + 5ct	20	-	650	600
Italy	44 – 49	20	1,000	10	25
Portugal	22 – 41	lifetime		5	5
Spain	22 – 44	25	400	25	40
France	30 - 40 BIPV + 15- 25	20	-	7	10
Greece	40 – 50	20		3	5
other countries	Feed in Laws: Switzerland (1991); Denmark (1993); Sweden (1997); Norway, Slovenia (1999); Latvia (2001); Austria, Czech Republic, Lithuania (2002); Cyprus, Estonia, Hungary, Slovak Republic (2003); Turkey, Ireland (2005)				

Value Added Chain for PV Systems (c-Si)

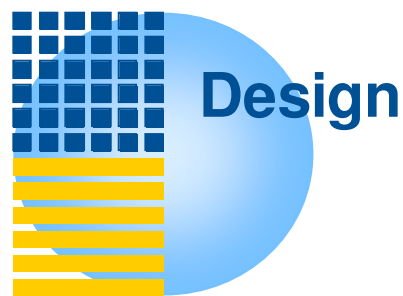
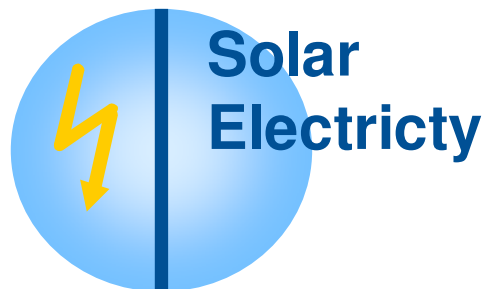


Parts of PV add-on cost taken by standard building materials

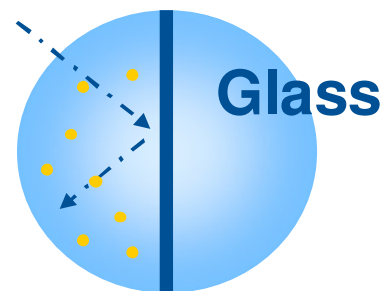
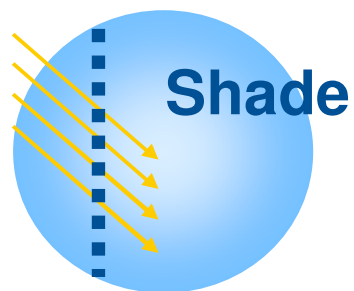
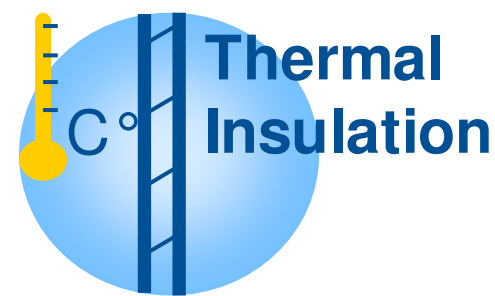


Solar Electricity Glass

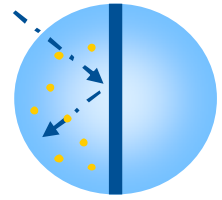
Serving the Needs of Today's Solar Architecture



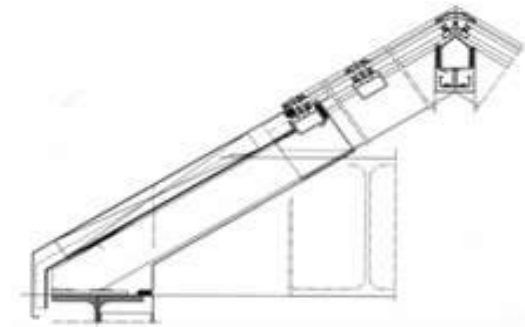
All the benefits of glass
plus
integrated solar power



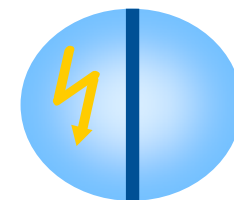
Building Material - Glass



- **Reliable**
- **Transparent**
- **Proven Construction Systems**

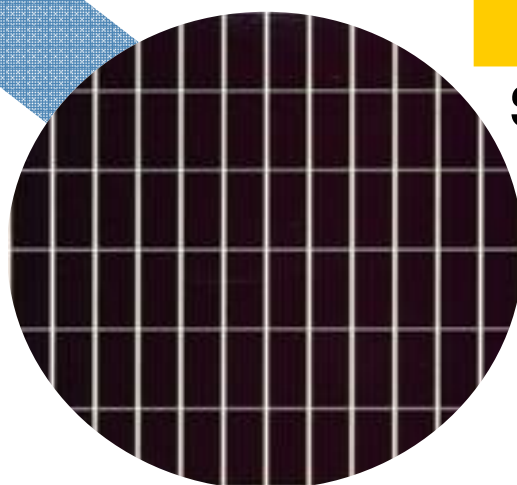
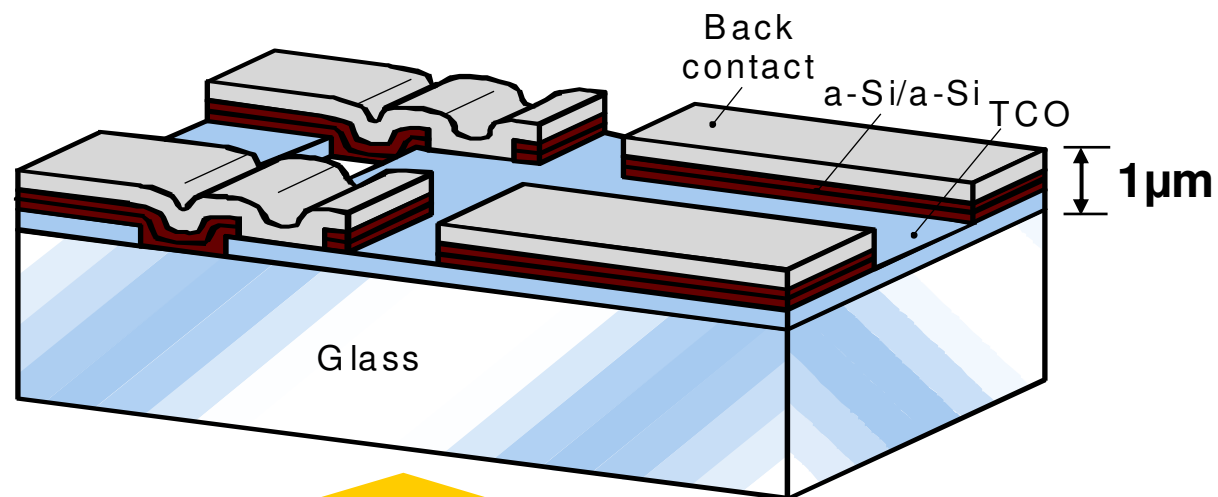
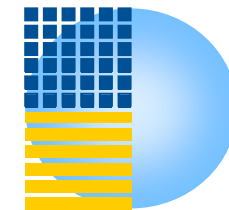


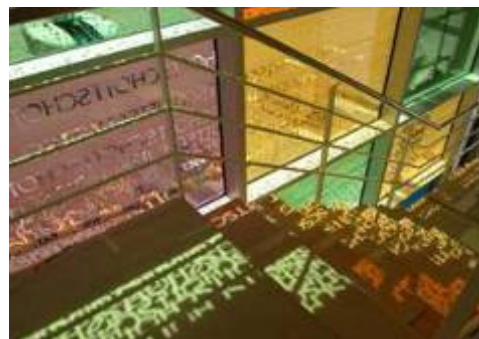
Electricity



- **Excellent low light performance and**
- **Low temperature coefficient**
thus higher energy yield for building integrated systems
- **attractive Price per Area**
- **Long Service Life**
- **Design Variations**

ASI THRU[®] Solar Cell Construction





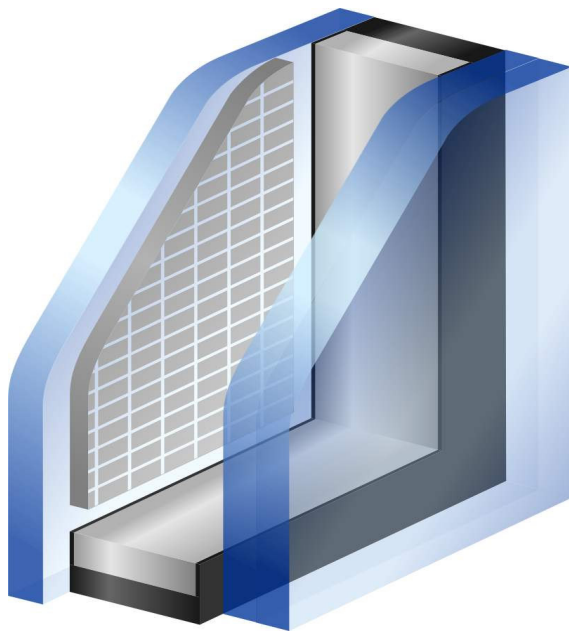
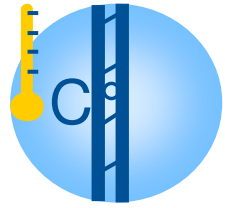
Project: SCHOTT
Iberica

Location: Barcelona

Function: Office
building

Installation: 2005

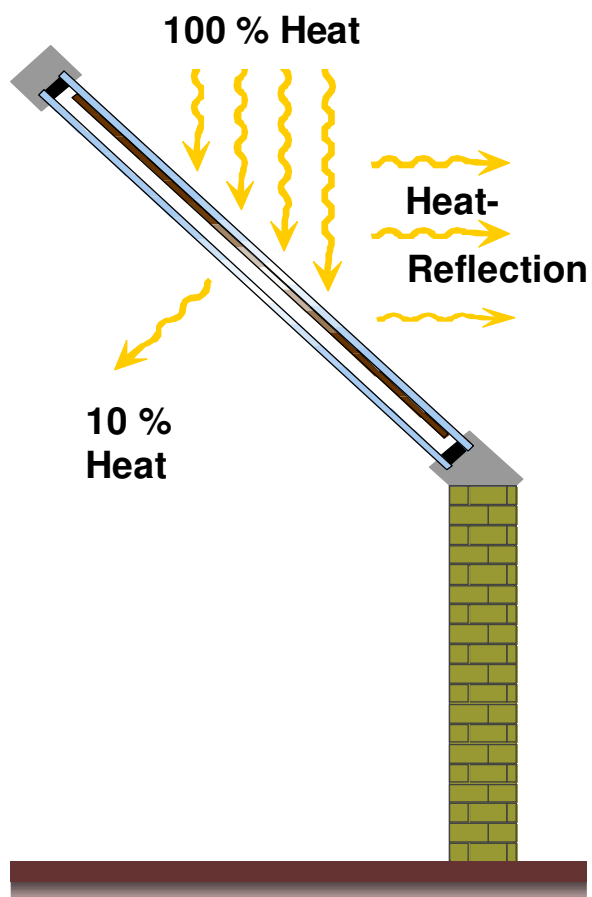
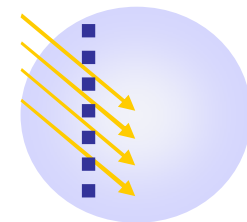
ASI[®] Glass double glazing



Front glass	6mm HSG
ASI Glass	3mm
Cavity	16mm
Back glass	8mm LSG

Solar Control and Shading

Minimizing heat gain in summer

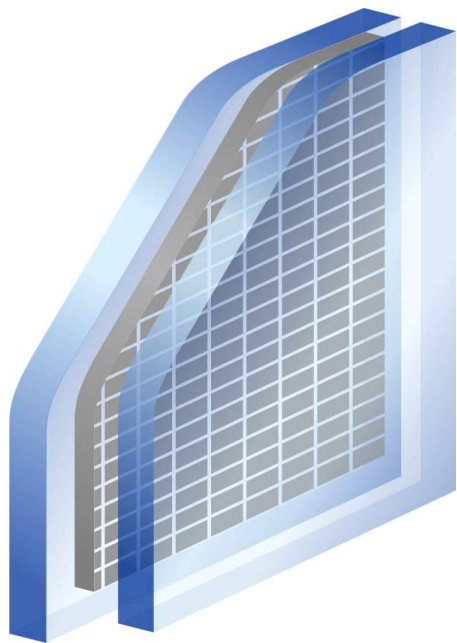
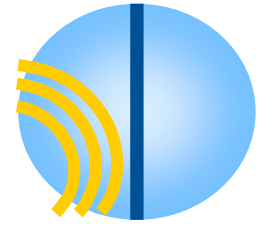


Comparison of different shading systems With ASI THRU® double glazed units

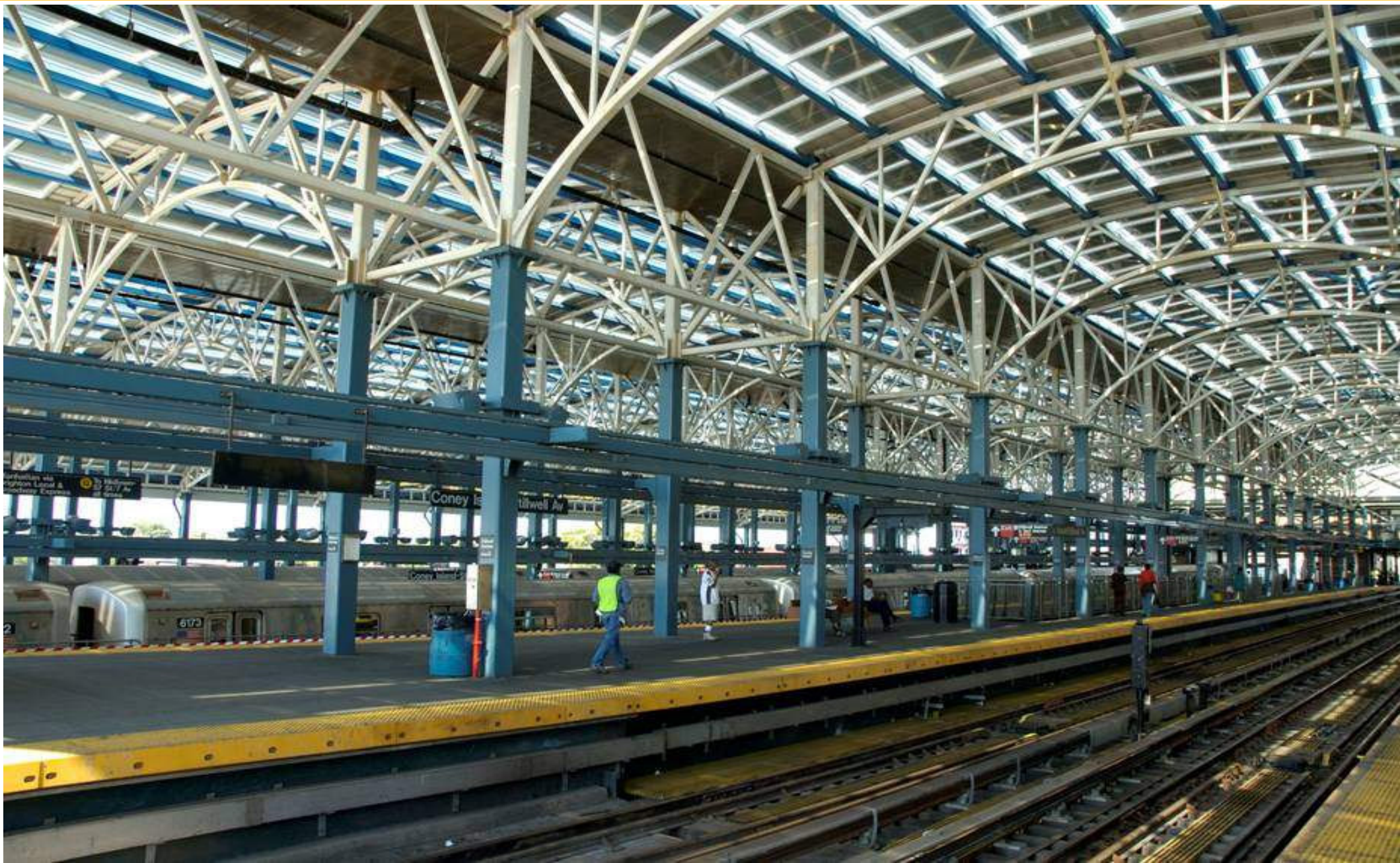
	G-Value
▪ Internal roller blind (white)	40%*
▪ External fabric canopy	9%*
▪ External Venetian Blind (white)	12%*
▪ ASI THRU® Double Glazing Unit	10%

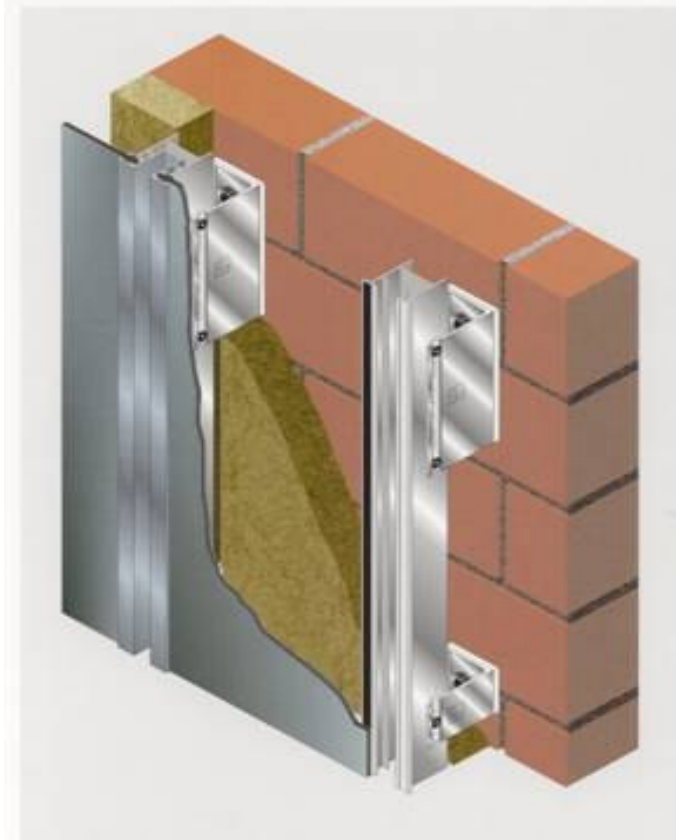
* Closed elements with double glazing windows with a G-Value = 61%; U-Value = 1.4W/m²K

ASI[®] Glass Laminates



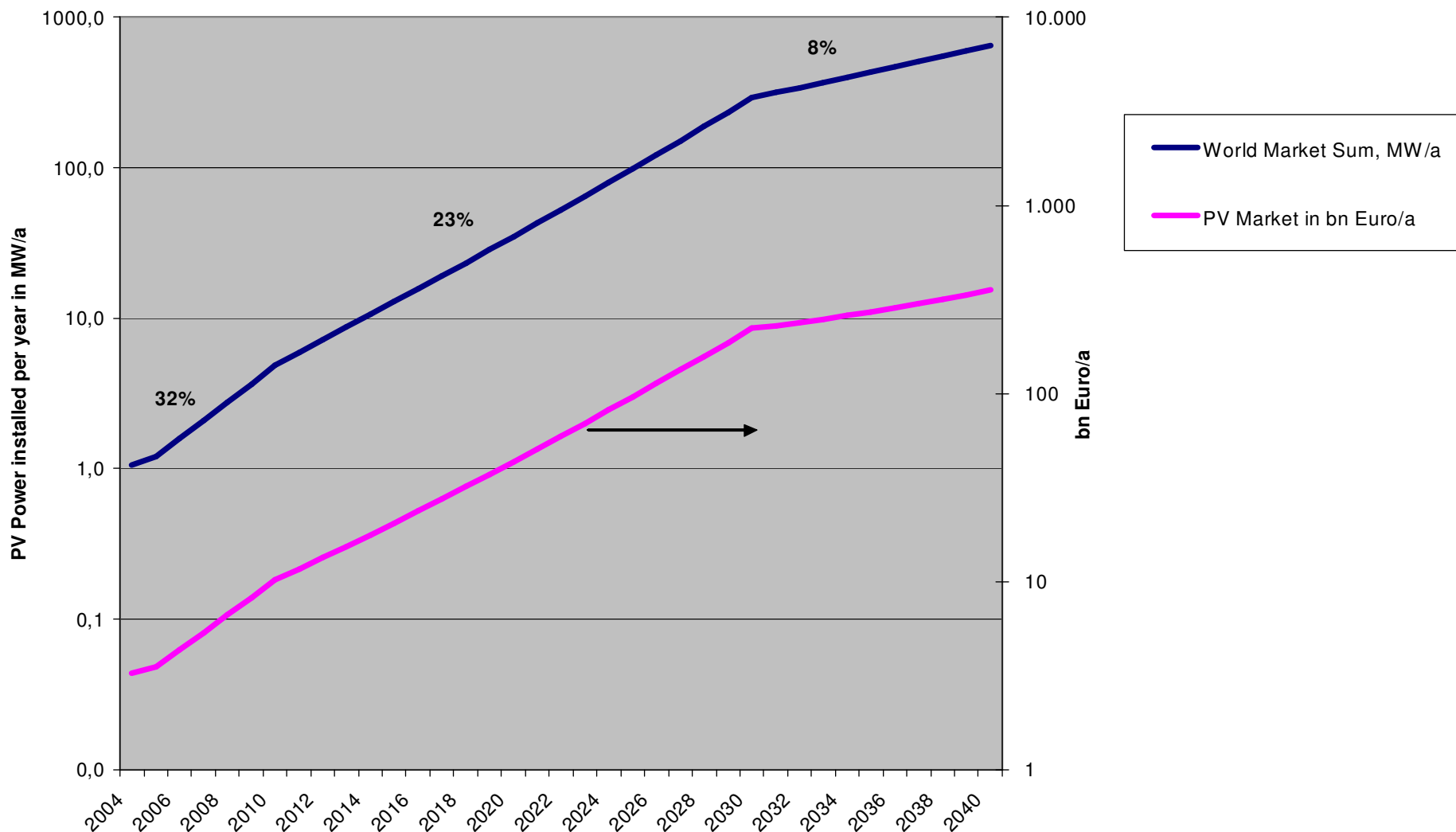
Front glass	6mm HSG
PVB foil	1,1mm
ASI Glass	3mm
PVB foil	1,1mm
Back glass	6mm HSG



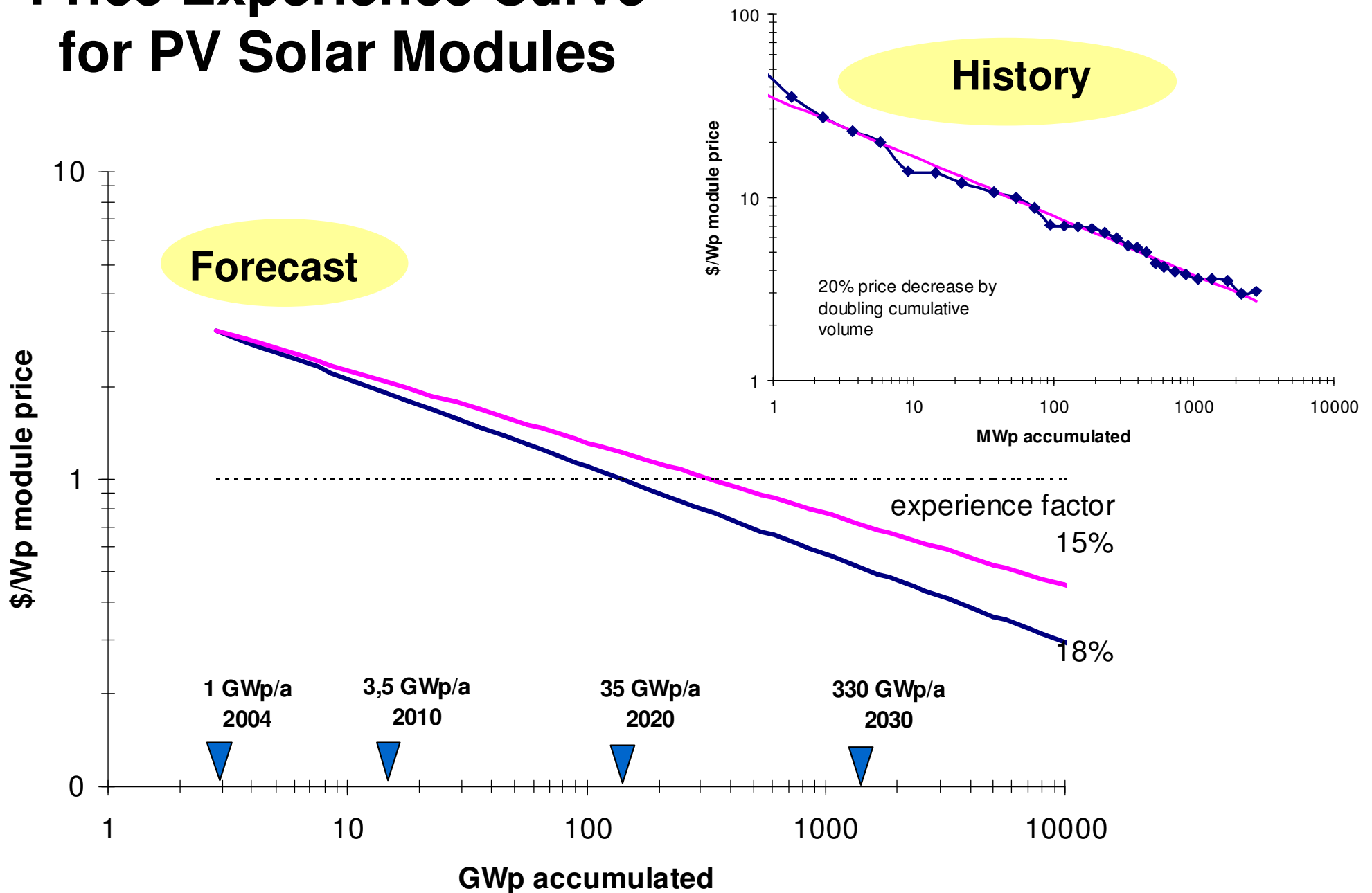


Project: Glaswerke Arnold
Location: Merkendorf
Function: Production building
Installation: 2004

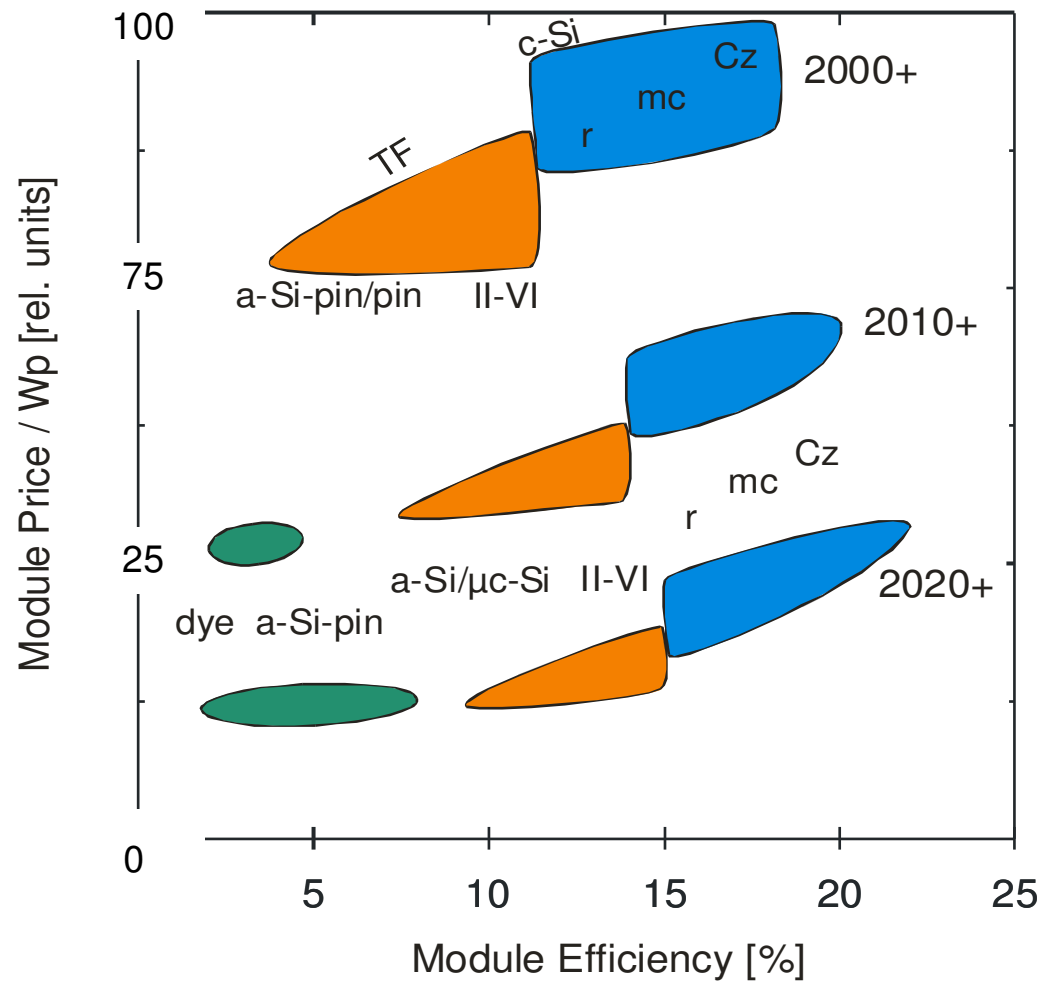
Future Growth of the Global PV Solar Electricity Market in GW and bn€ turnover



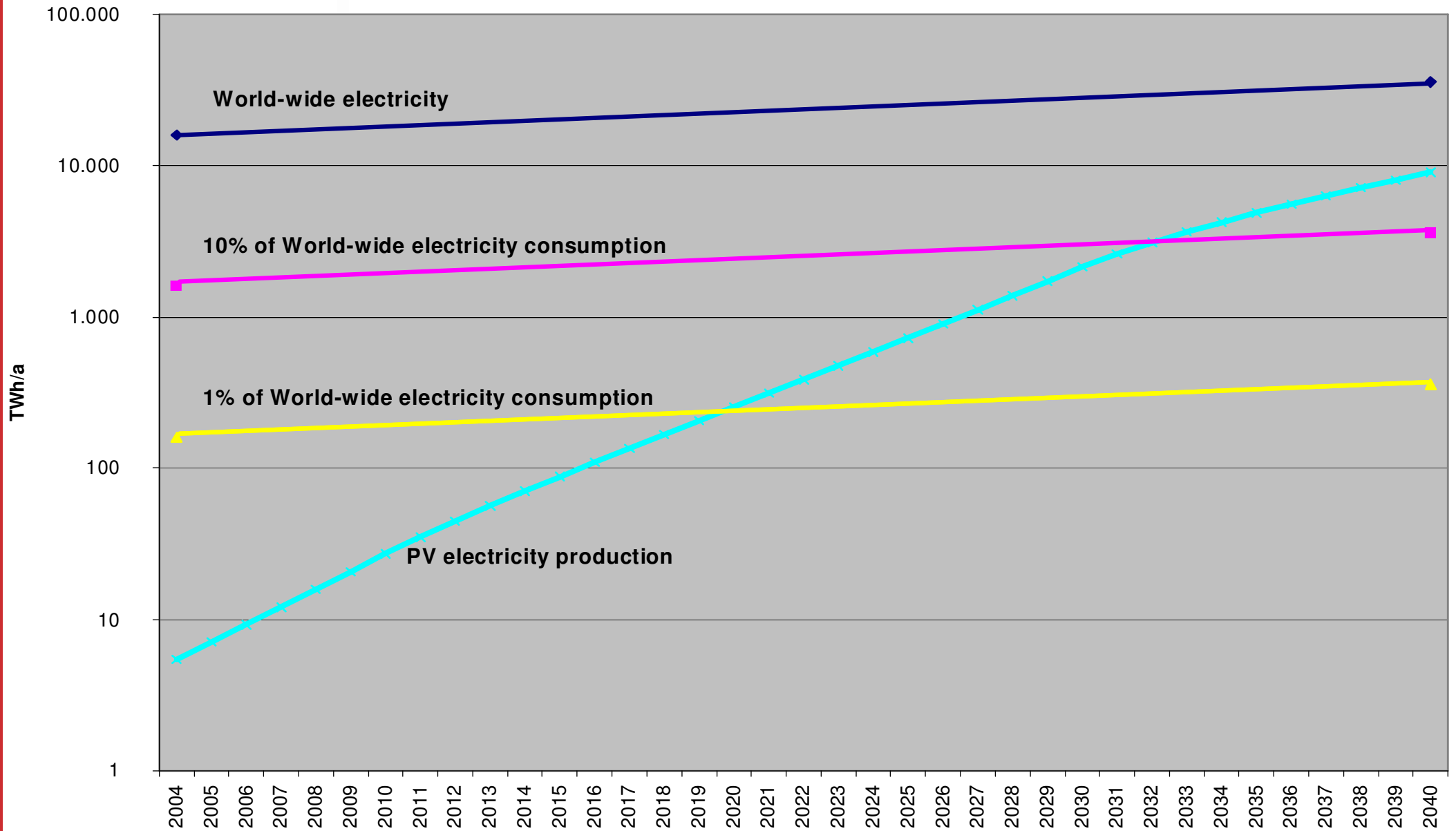
Price Experience Curve for PV Solar Modules



Technology Evolution



Electricity produced by PV compared with Global Electricity Consumption



Solar Potential for Tomorrow

