Market development and competitiveness of PV solar electricity

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WHO is EPIA?

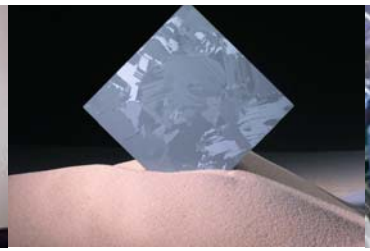
- Exists since **1985**
- 74 members: 58 full + 16 associate
- **58** full: manufacturers on the overall value chain
- Budget **2005**: **1.000.000 €** (EC 1/3 + 2/3 members and other incomes)
- Secretariat in Brussels - the heart of EUROPE :

  5 permanent employees speaking **13** languages
- **6** Board members elected for **3** years

EPIA and its members

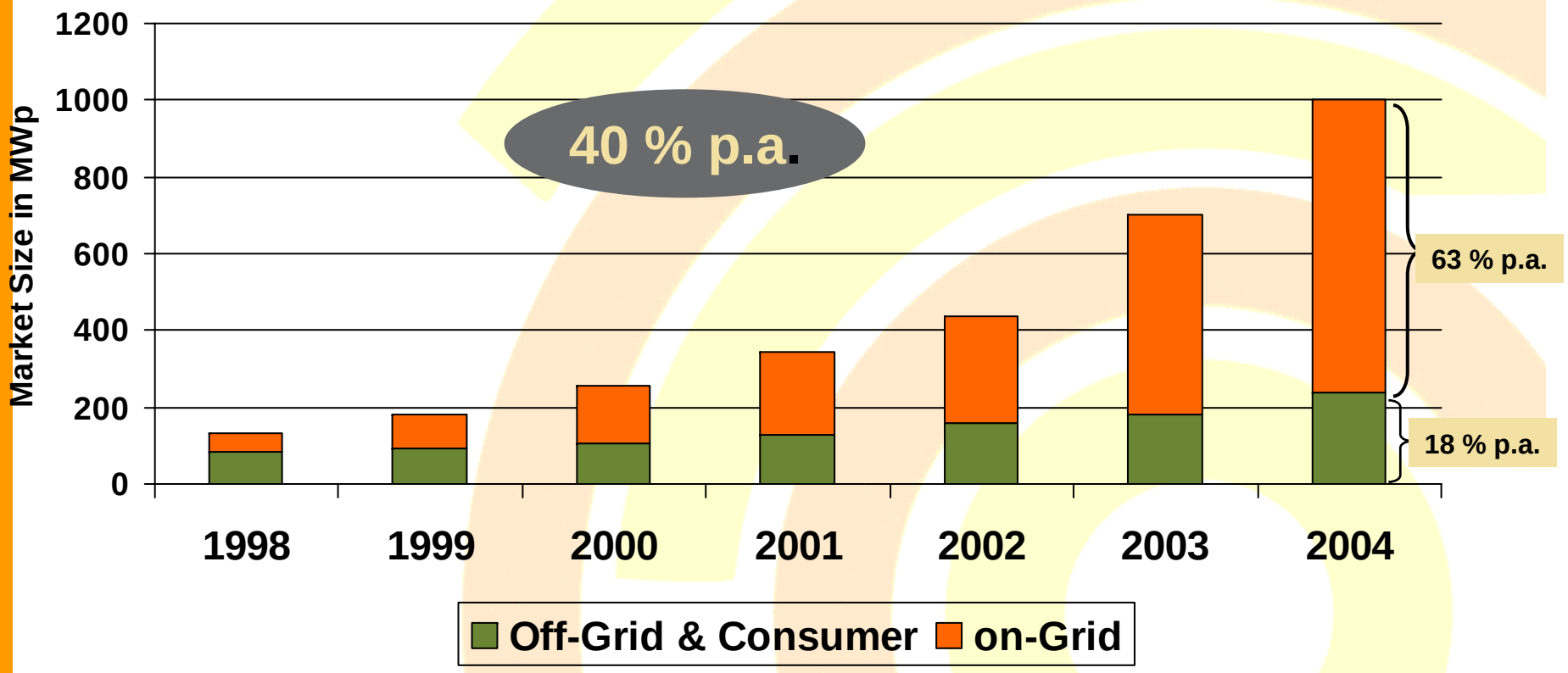
EPIA represents 95% of the photovoltaic European industry, covering the whole production chain.

- **Silicon feedstock:** Wacker …
- **Wafers and Ingots:** Crystallox, Scanwafer, PV Silicon, Pillar, Podolsky …
- **Cells:** Q-cells, BP Solar, Isofoton, Shell Solar, Deutsche Solar,…
- **Modules:** RWE Schott Solar, Photowatt, Photovoltech…
- **Systems:** Tenesol, Naps Systems, Conergy, Phoenix,…
- **Inverters:** SMA, Philips, Sunways, Fronius…


EPIA
European Photovoltaic Industry Association
Anniversary

World PV Market Size and Application Segmentation



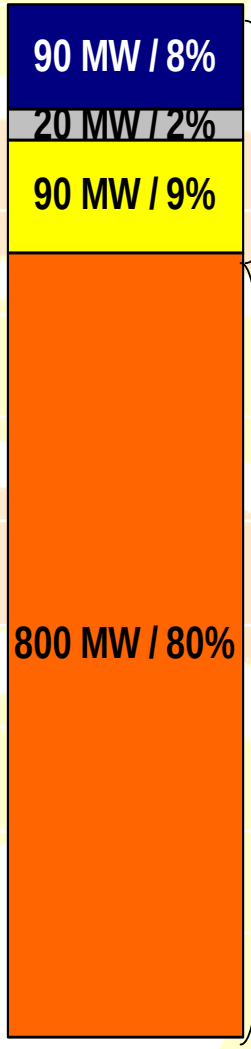
Market Segments

Off-Grid Industrial

Consumer

Off-Grid Residential

On-Grid

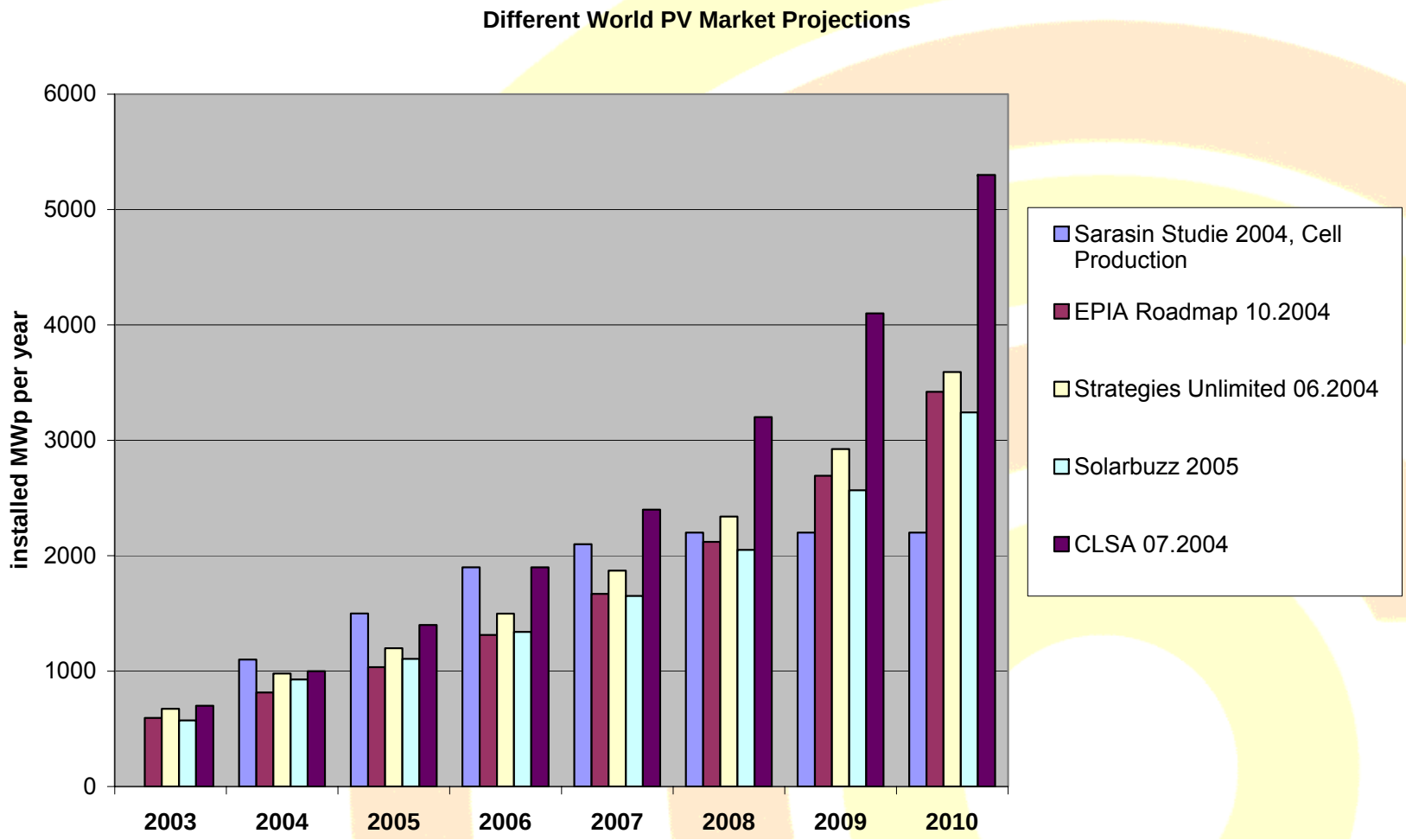


Competitiveness of PV Solar Electricity

- proven in the three segments:
  - industrial off-grid
  - consumer
  - rural electrification

- coming soon in grid-connected systems
  - First, in local replacement of peak tariff electricity kWh in liberalized southern OECD countries (… 2010 … 2015)
  - Second, the same in more northern OECD countries (… 2020 … 2025)

Different World PV Market Projections



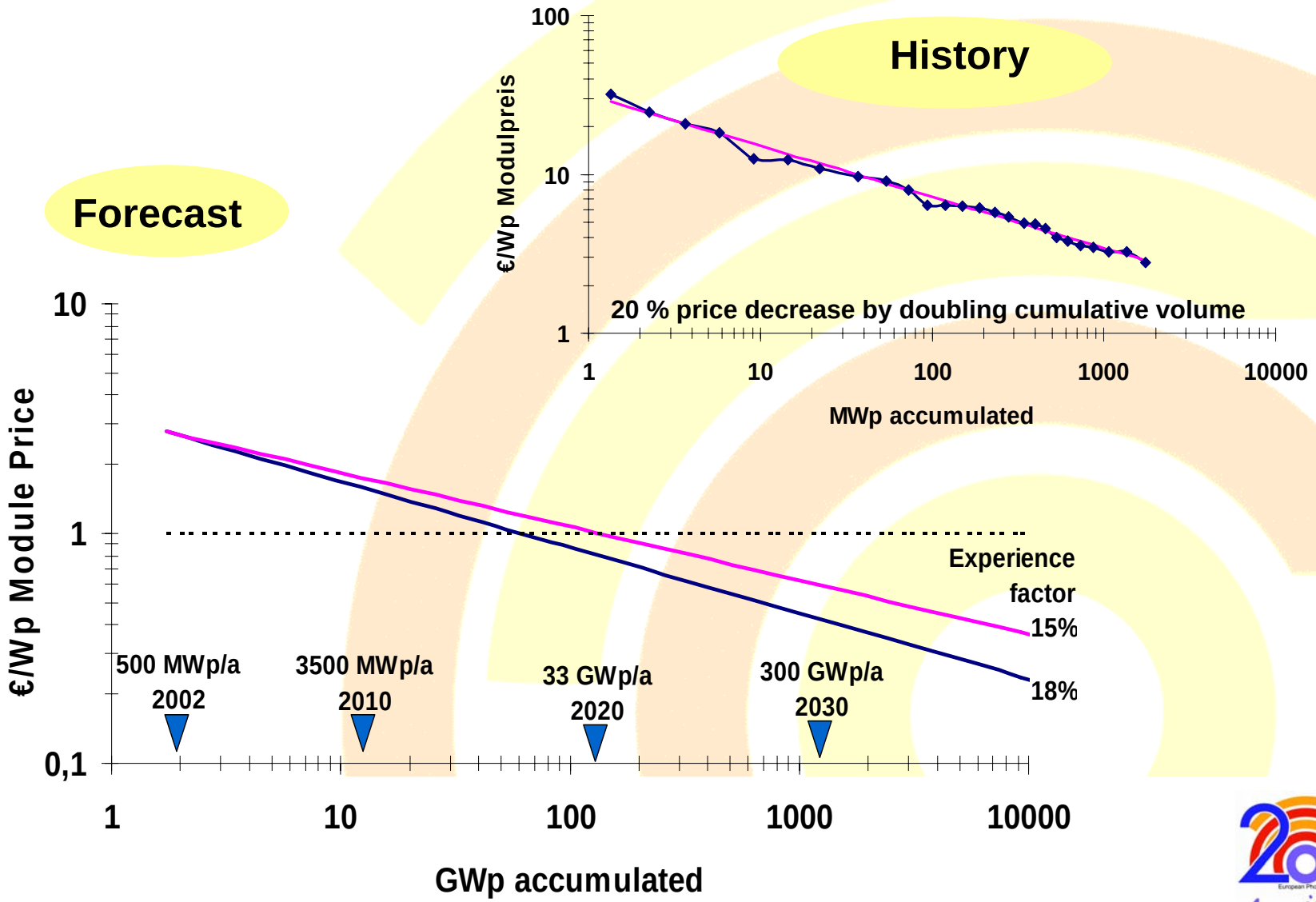
Point of time for competitiveness of grid connected PV Solar Electricity without support

- **Cost and price <u>decrease</u> for technology driven PV solar electricity systems**
  - experience curves
  - technology roadmap

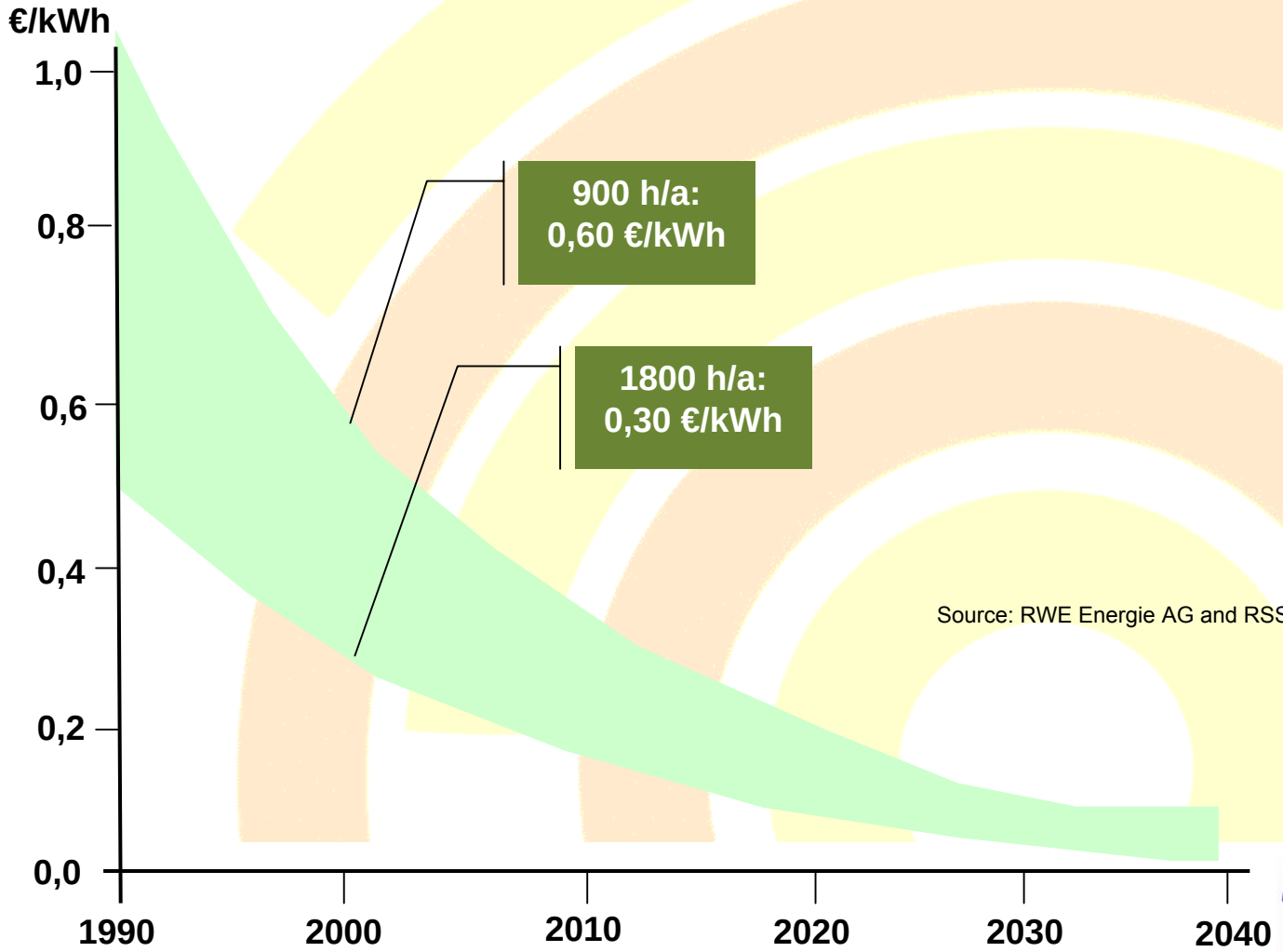
- **Cost and price <u>increase</u> for conventional electricity**
  - depletion of fuel
  - internalization of external cost (CO_2, …)
  - price differentiation of peak and bulk electricity in truly liberalized markets

- **Degree of correlation between times of peak power demand (high price) and delivery of PV produced electricity**

Price Experience Curve for PV Modules



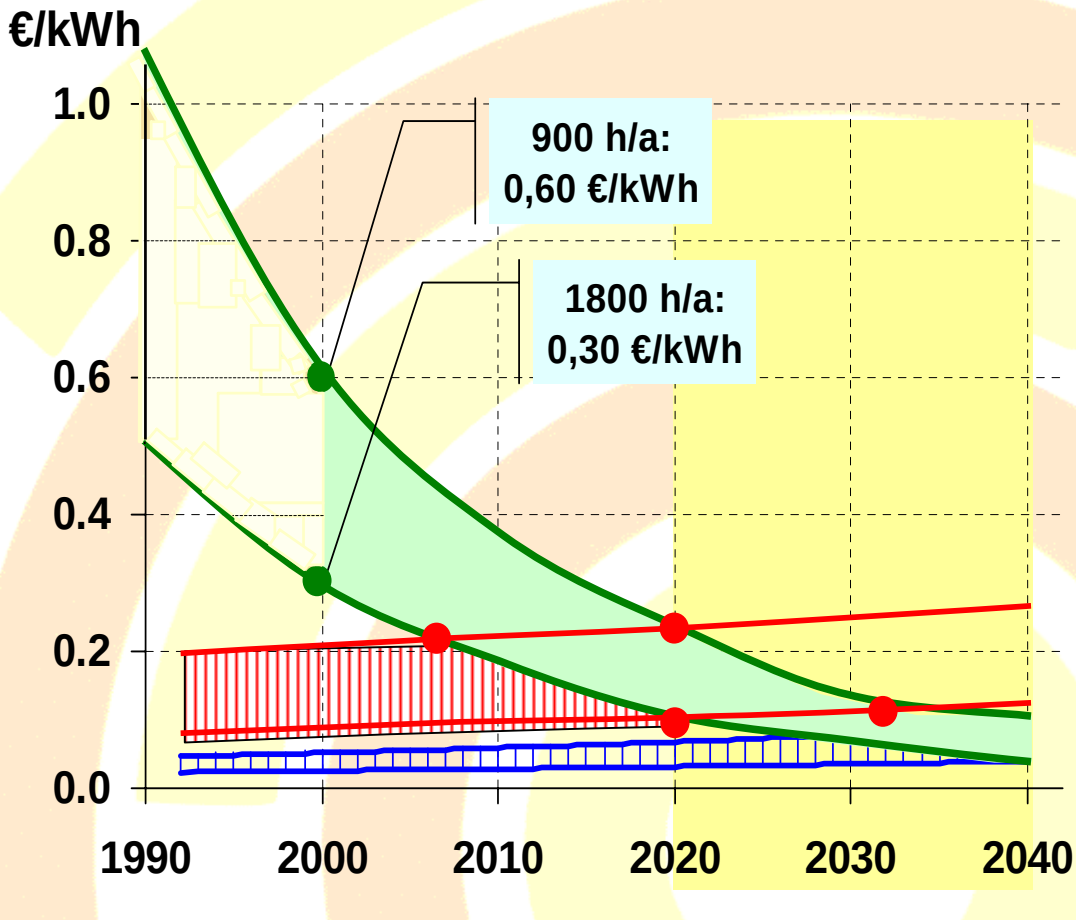
Price decrease for electricity from grid connected PV Solar electricity systems



Source: RWE Energie AG and RSS GmbH

Competitiveness

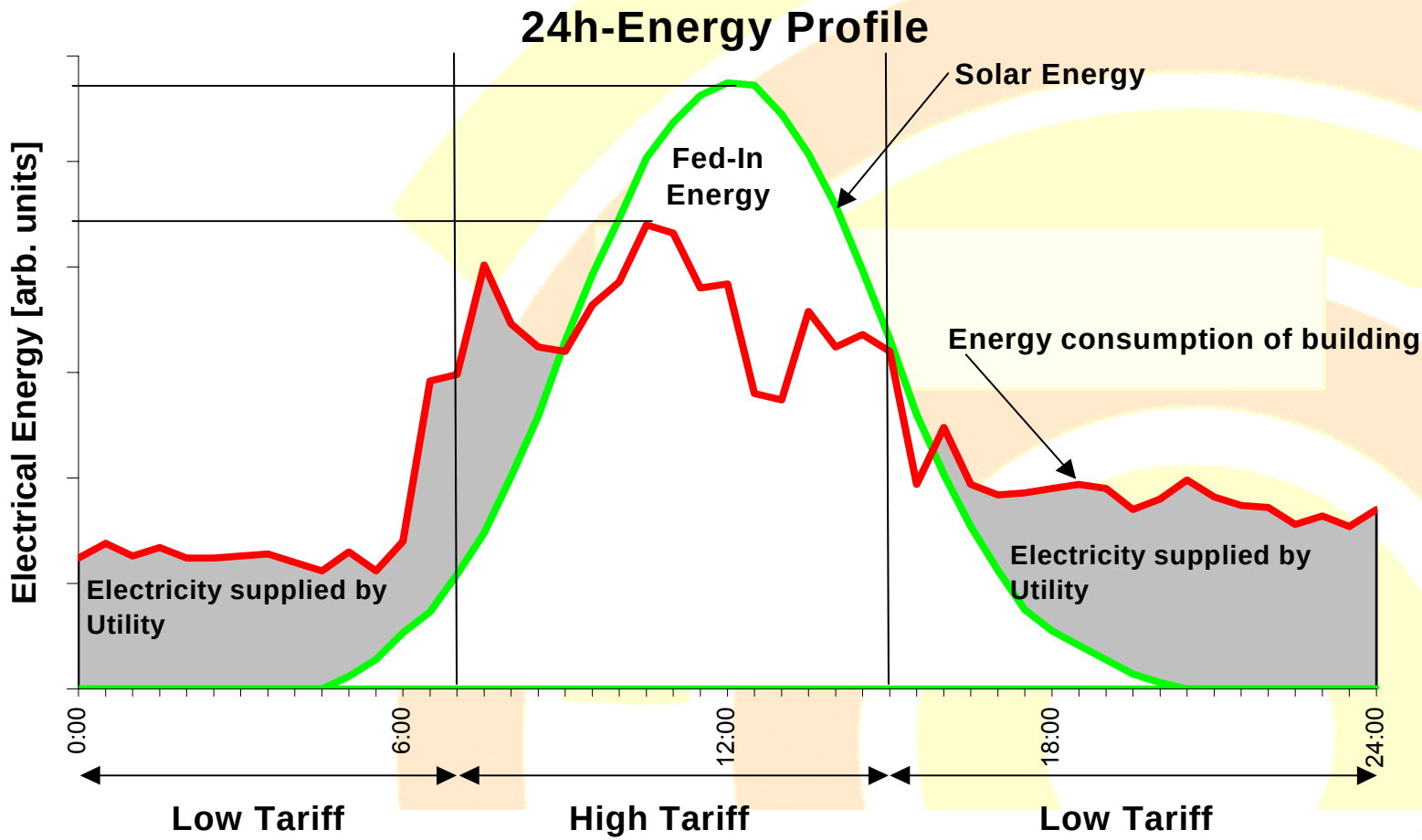
Electricity Generating Cost for PV and utility prices



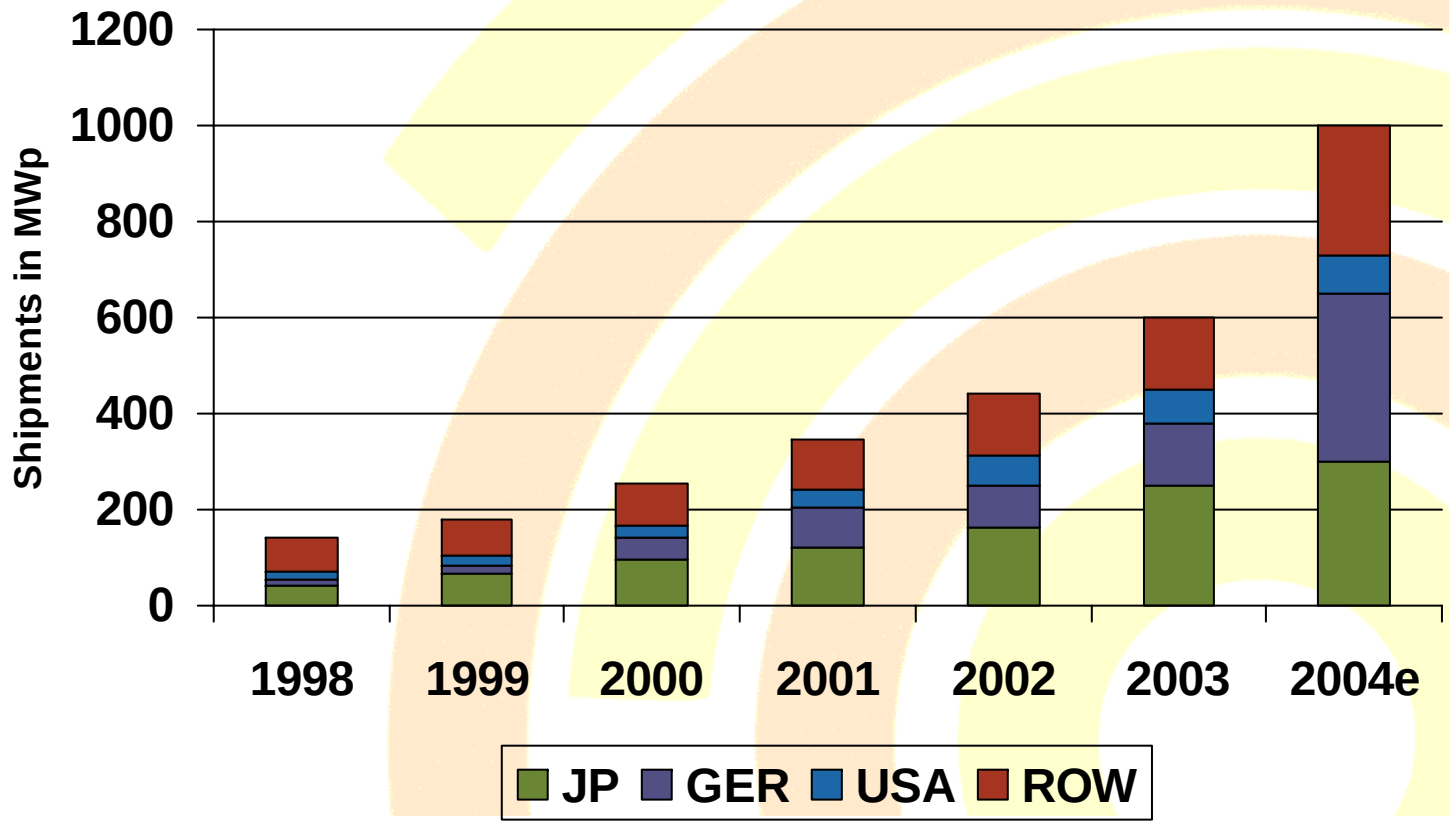
Source: RWE Energie AG and RSS GmbH

Competitiveness

Correlation between Daily PV Power Production and Energy Consumption of an Office Building in Spain



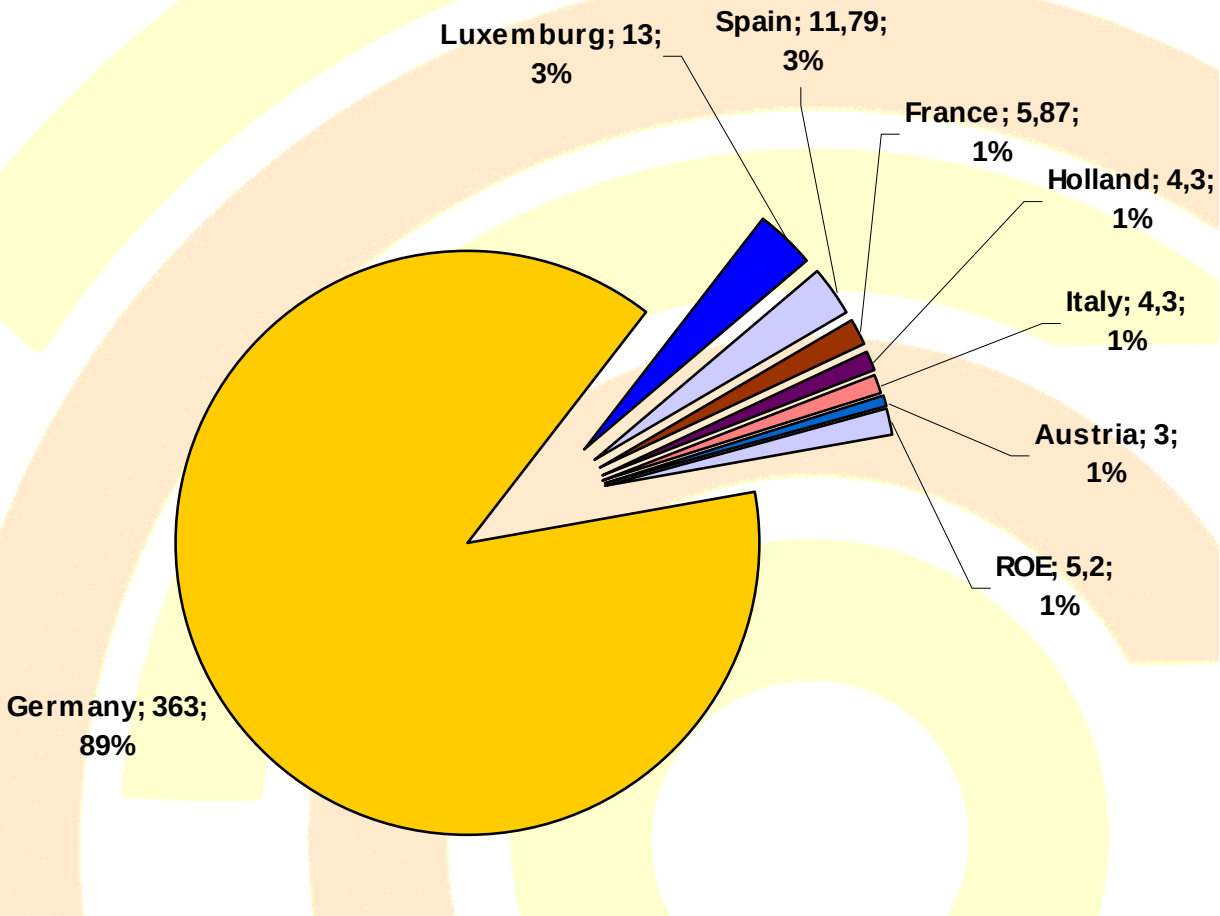
Historical Market Growth of the Solar Electricity Industry by Region



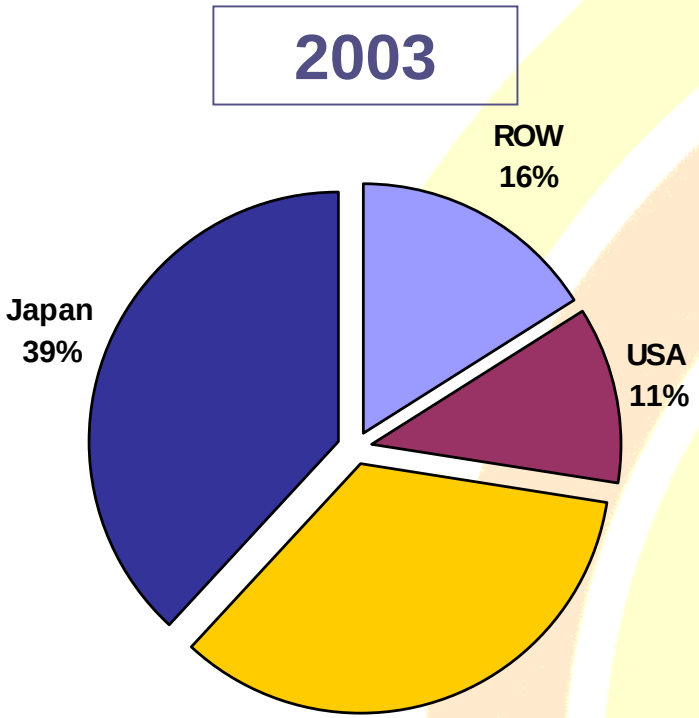
Source: PV News & Strategies Unlimited

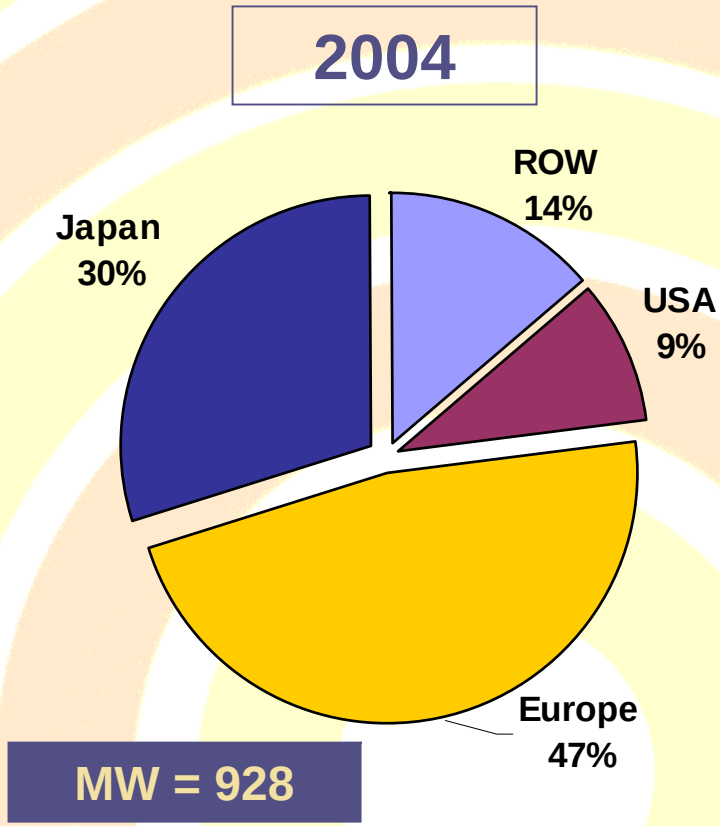
EU PV Market 2004

In 2004 363 MW were installed in Germany, which represented 89% of the European PV market



World PV Market

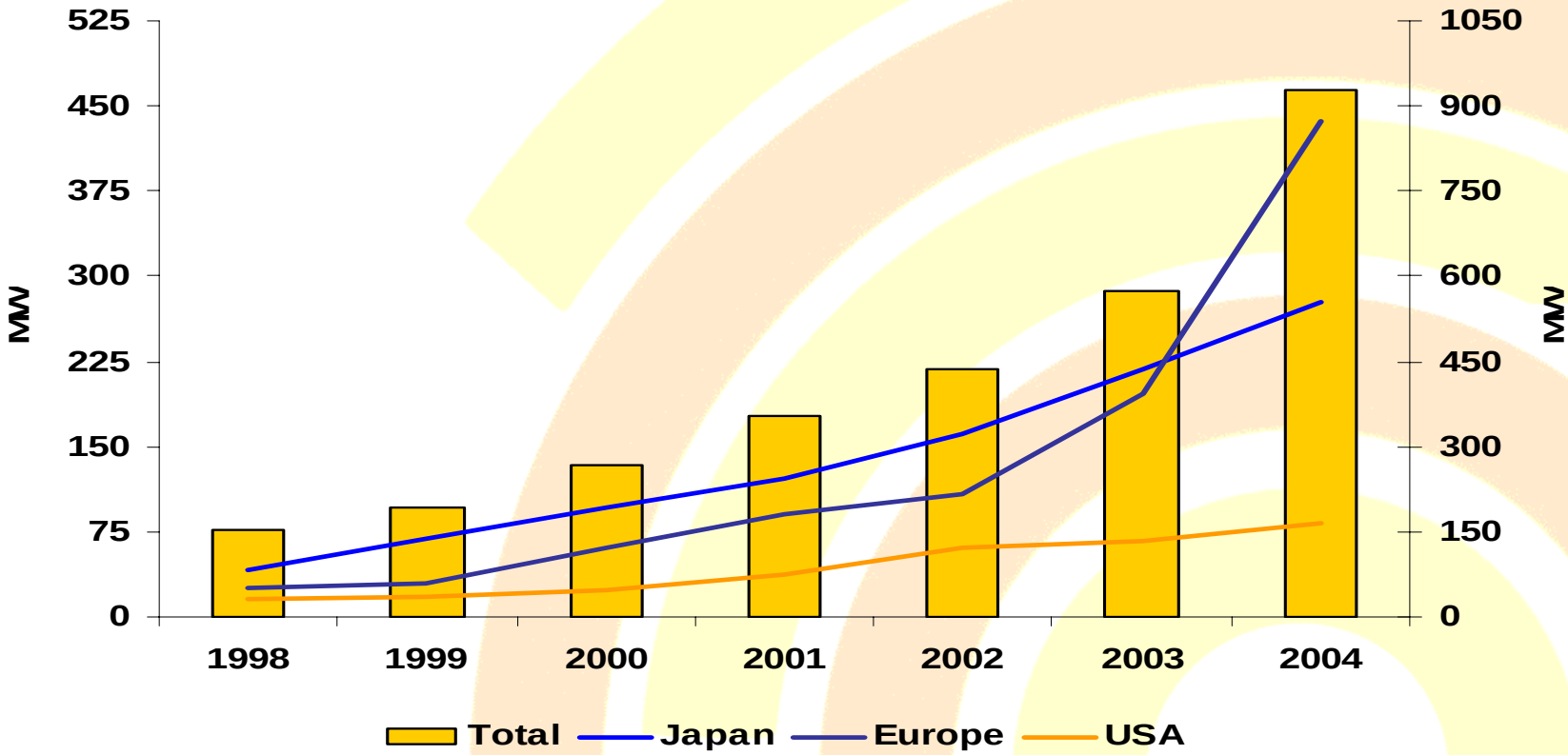




World PV Market

	2003		2004		▲03-04
	%	MW	%	MW	
Japan	39%	219	30%	278	27%
Europe	34%	197	47%	437	122%
USA	11%	66	9%	83	26%
ROW	16%	92	14%	130	41%
Total		574		928	62%

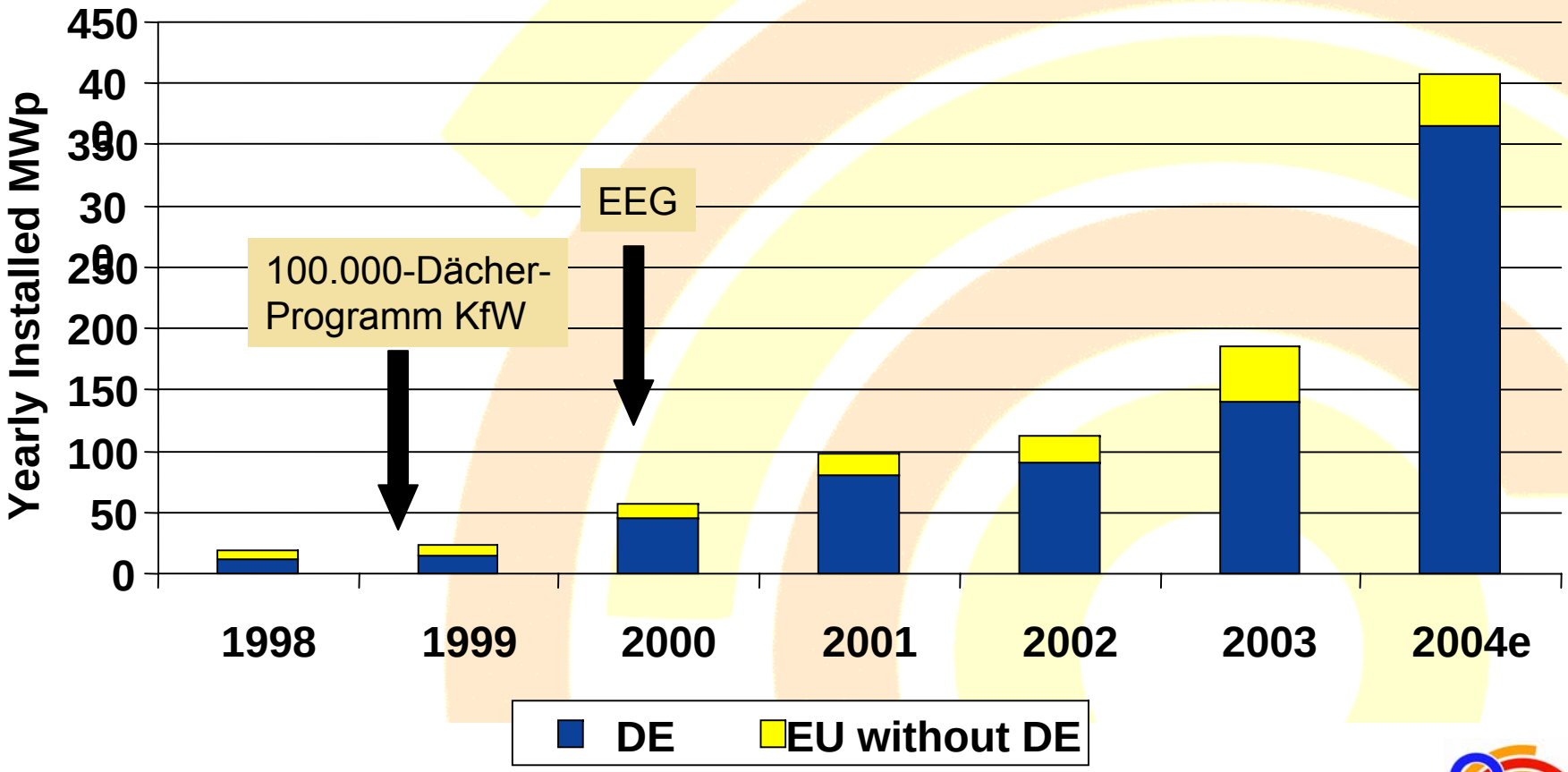
World PV Market



World PV Market 2004 = 928 MW

EPIA 20 Anniversary

Market Data Europe including the 100,000 Rooftop Program / Feed-in Tariff (EEG) in Germany



Source: IEA PVPS

Feed-in law as an industry political action to reach competitiveness for the European industry of new technologies

New Technology

- Global for production and application
- Two digit growth rates at least over two decades
- High-tech production at industrial location, later move of downstream value added steps
- Relevance for electricity market
- Prove of competitivenes within two decades

Industry political action

- No budgetary means but long-term secured financing
- No subsidy for industry but support for end-customer

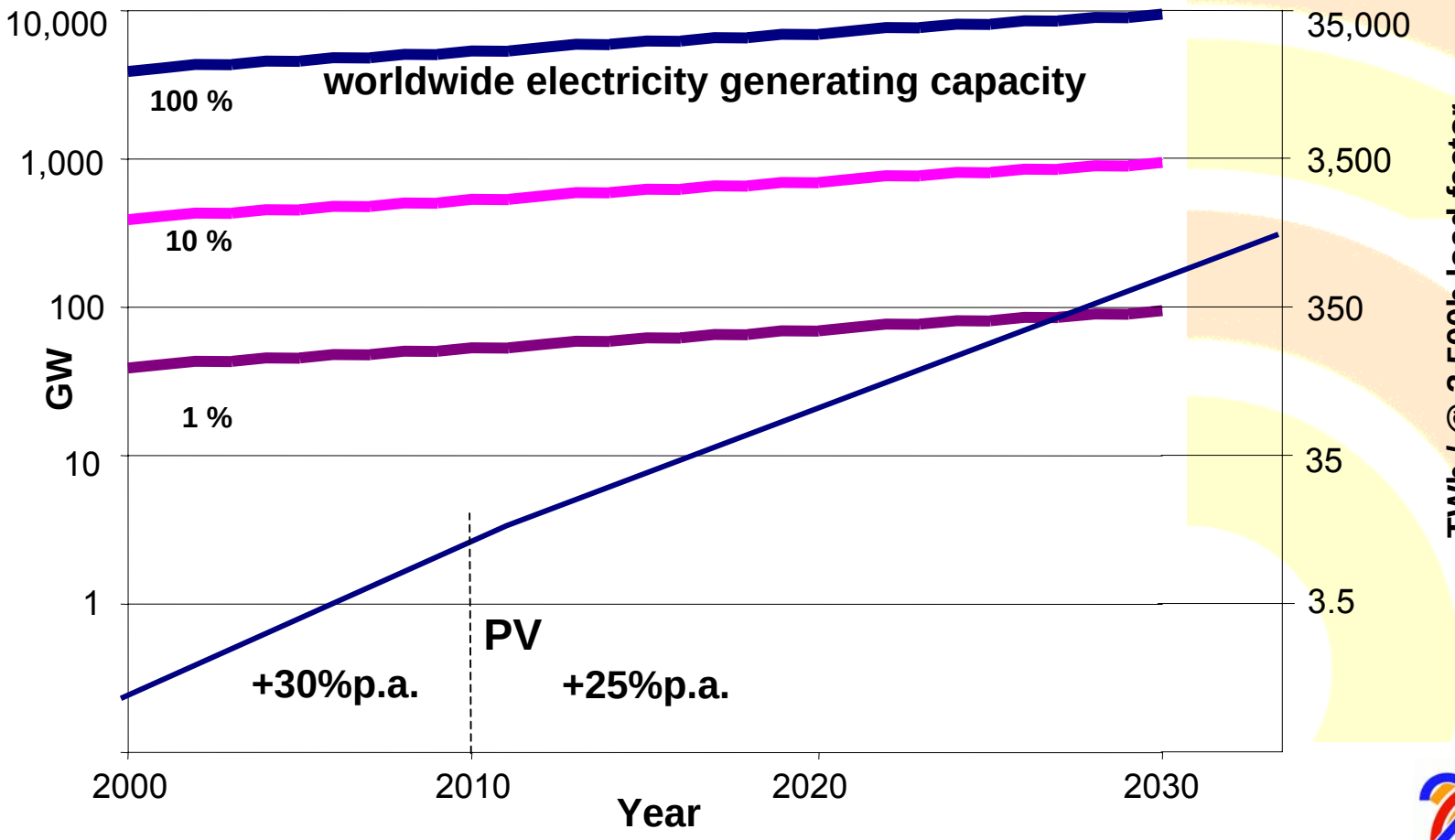
EU directive directed to the contribution of renewable energies to the electricity production in Europe in 2010

Target 2010 **22 %** from ca. 3500 TWh (≡ 770 TWh !)

Status 2003 ca. **12 %** (mainly "old" hydro,increasing wind)

Remaining gap has to be closed by "new" renewables (wind, "small" hydro, biomass, geothermal, PV solar electricity)

Development prediction of worldwide electricity capacity in relation to PV solar electricity contribution



Thank you for your attention !