

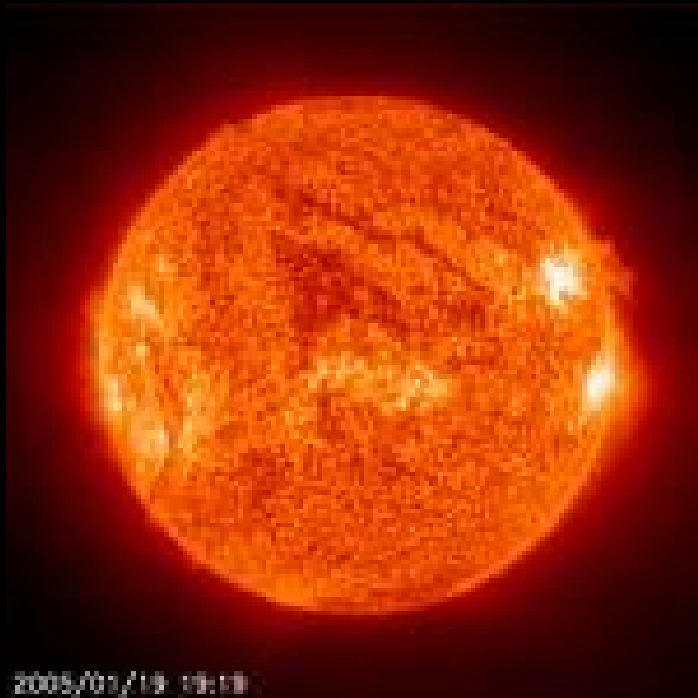


R&D needs in solar photovoltaic energy conversion

Hubert Fechner
IEA PVPS

PVPS



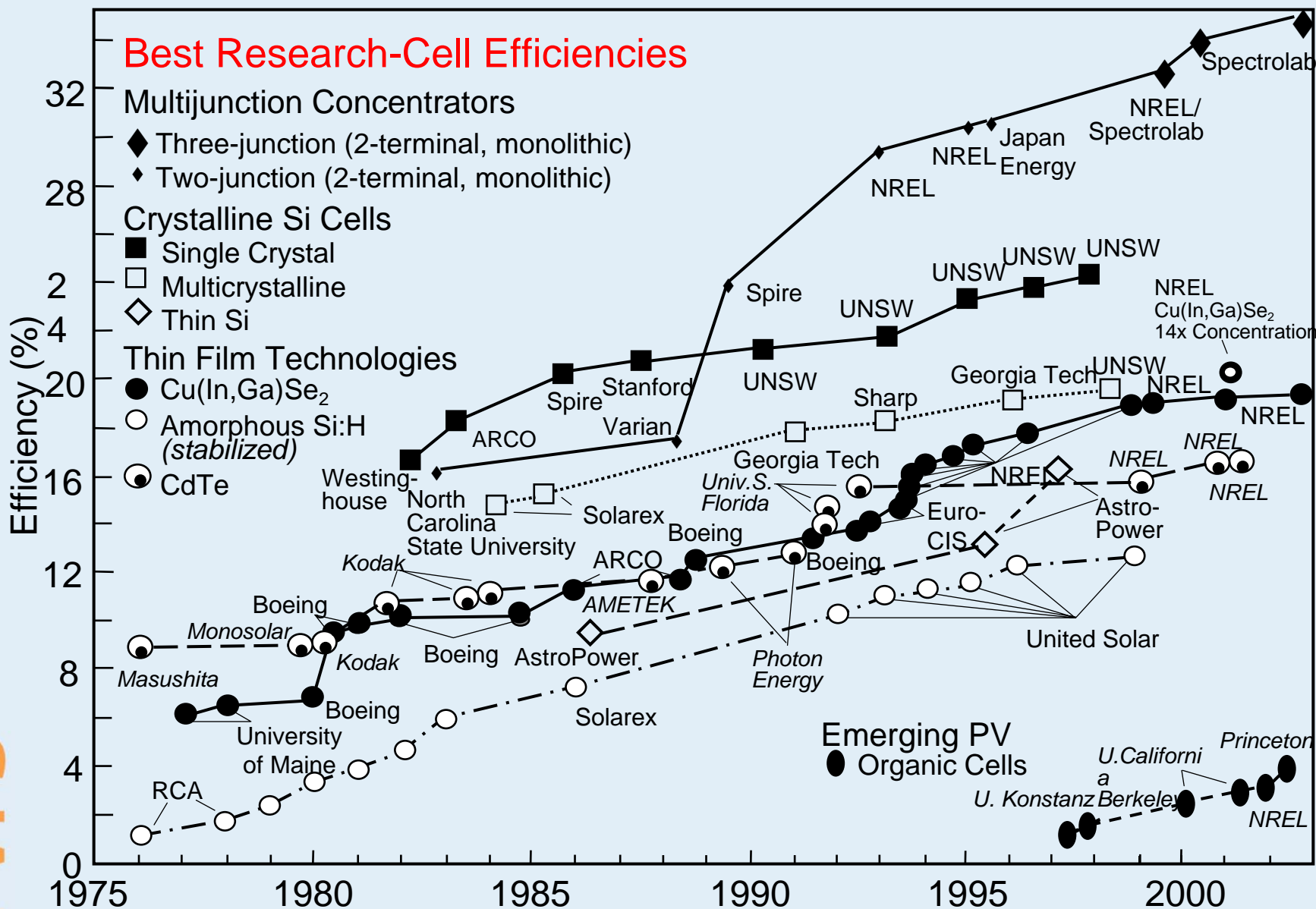


Solar energy radiated to the earth ~ 10.000 x world energy demand



Photovoltaic - direct conversion of solar radiation into electricity

How far is the technology today?



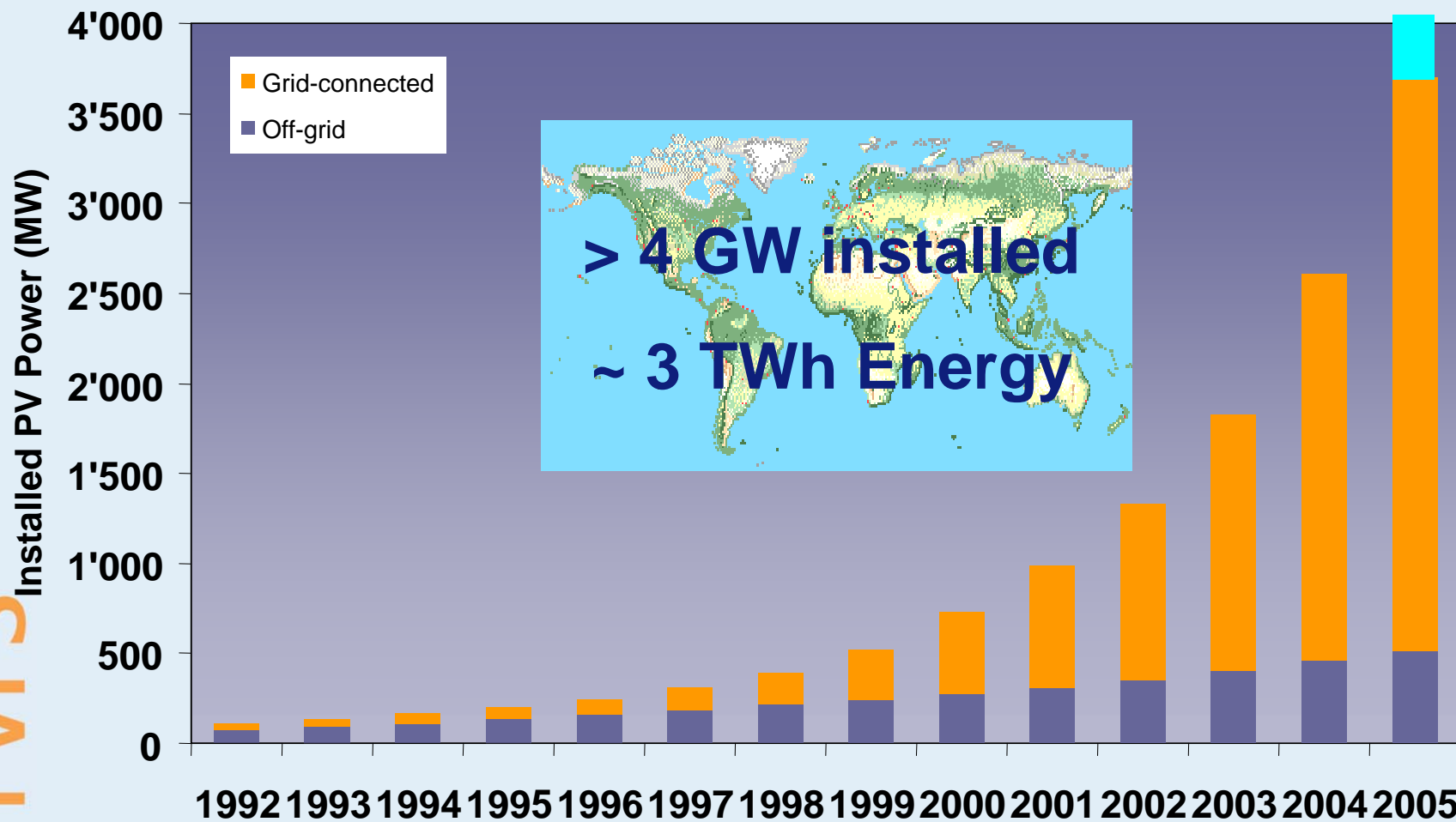
Ref. Tom Surek at NREL

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Photovoltaic Market (IEA)

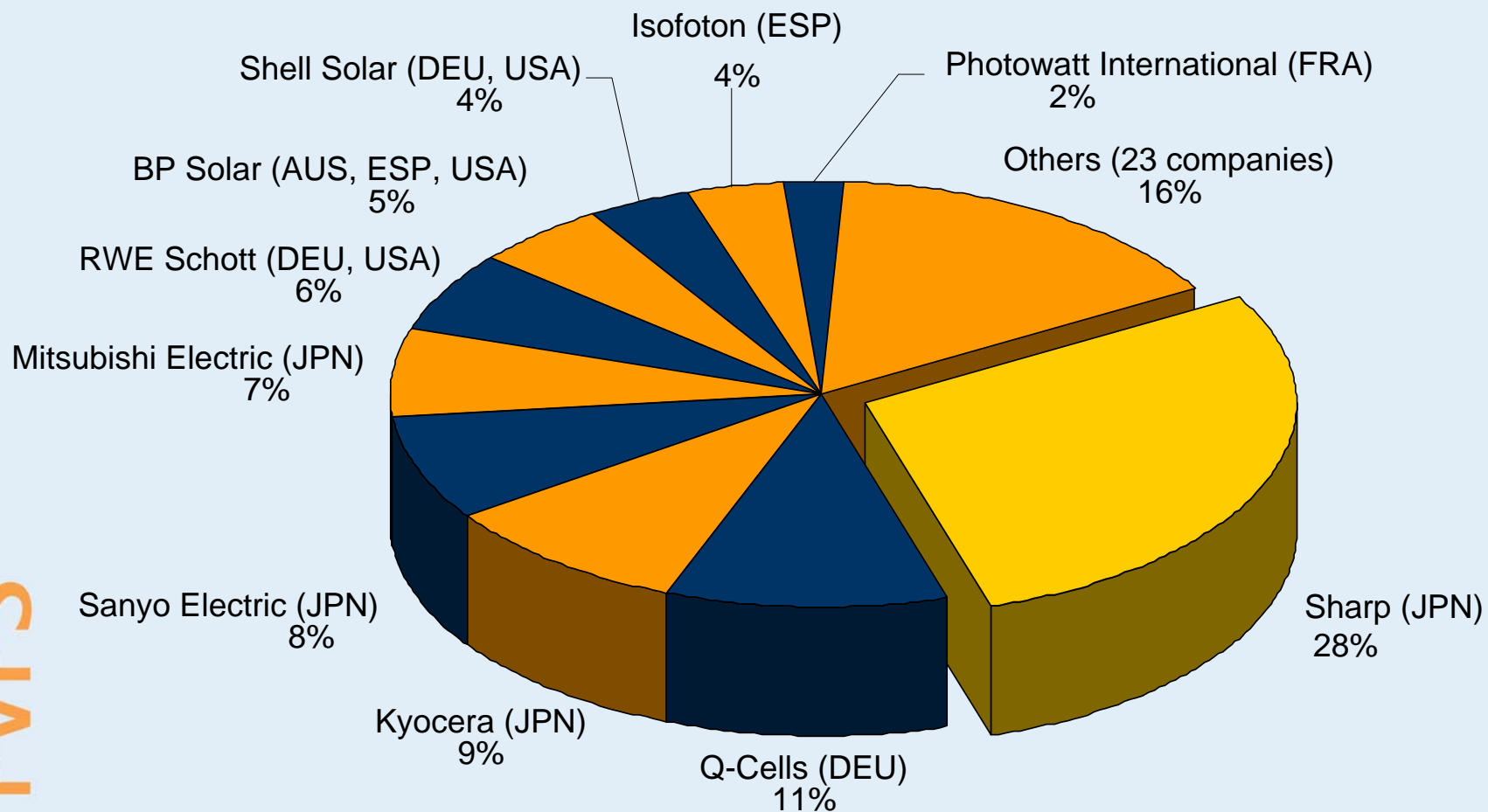
Cumulative installed grid-connected / off-grid PV power in the reporting countries





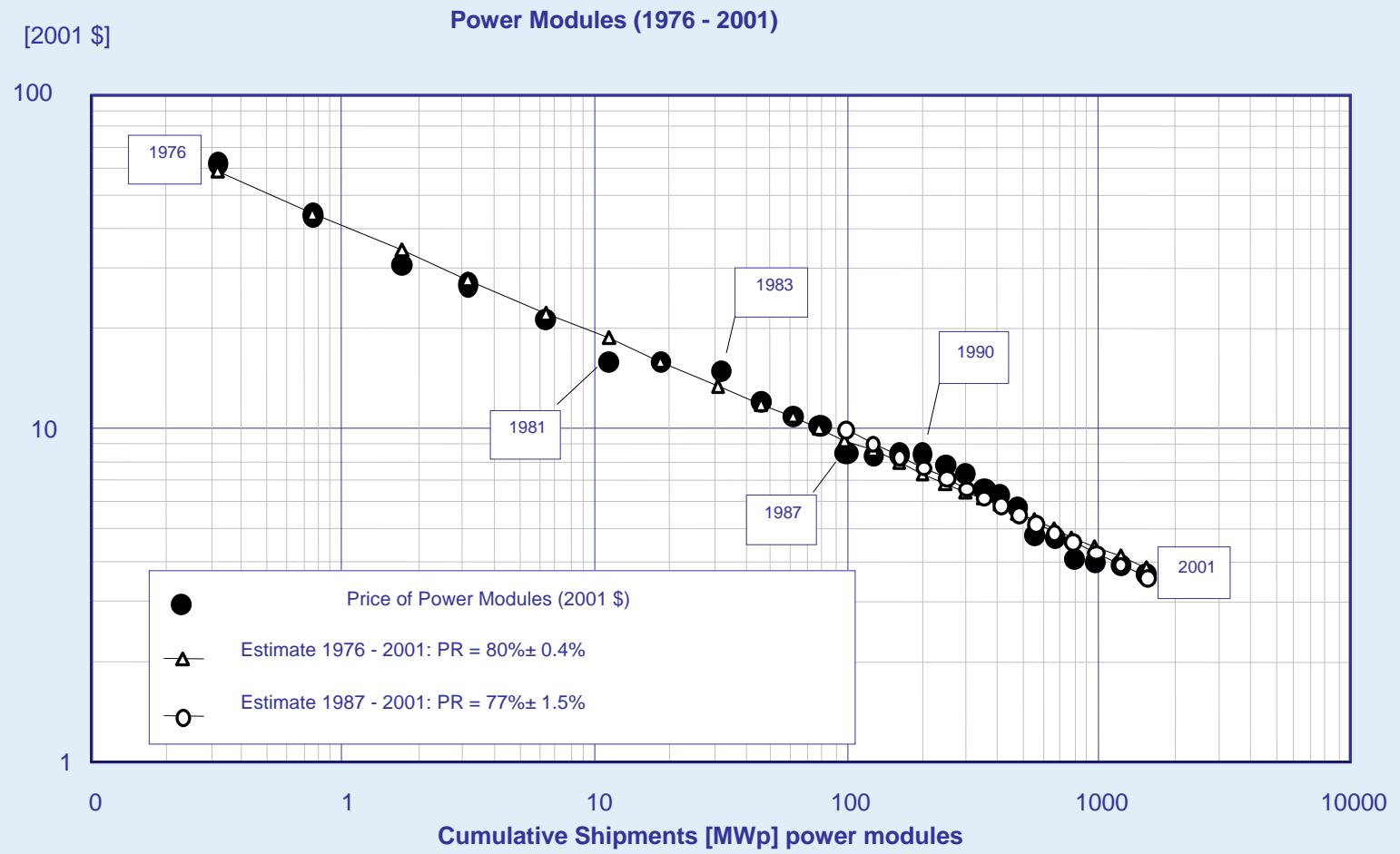
Key players

Share of PV cell production in the reporting countries by company in 2005 (%)





Price of PV modules

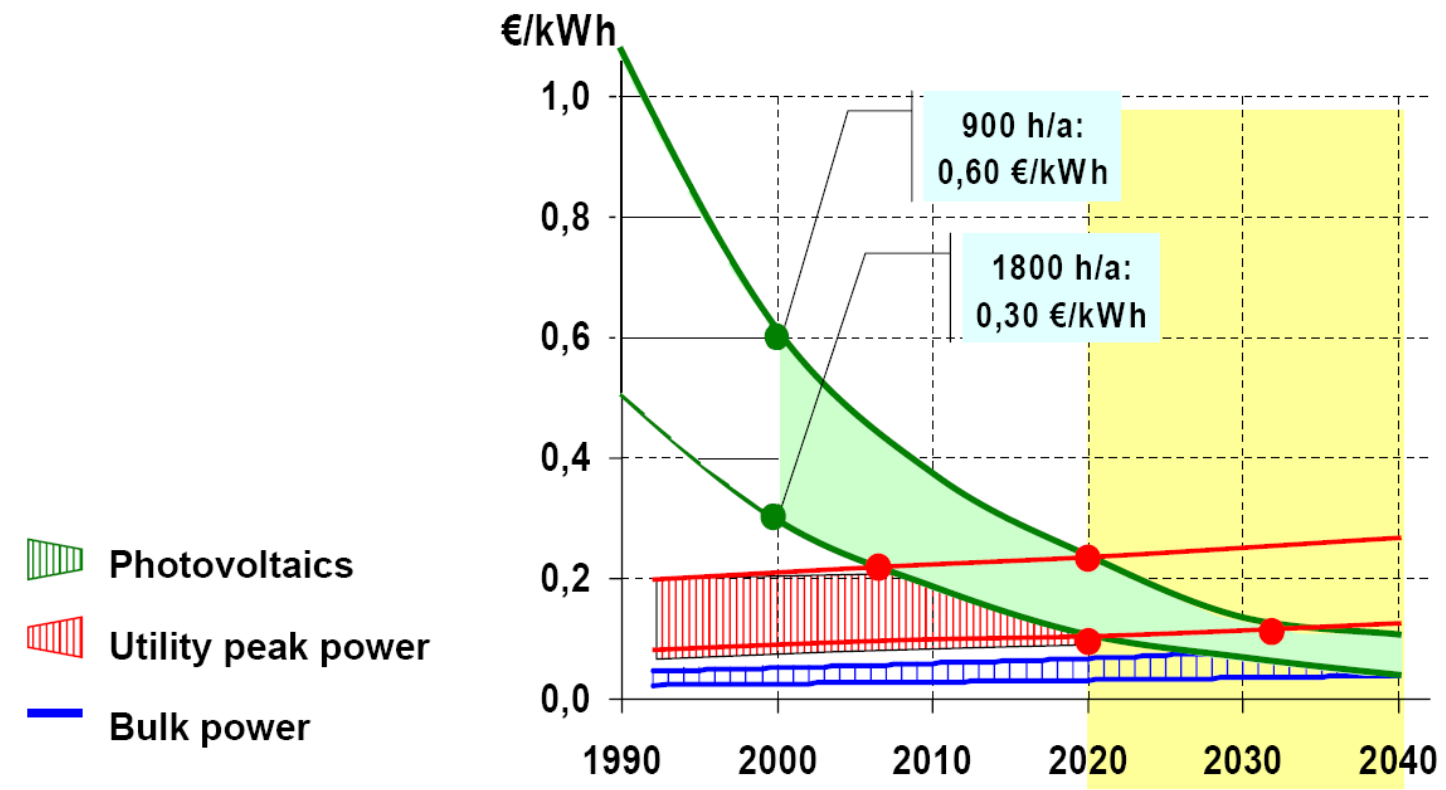


Source: Strategies Unlimited



Competitiveness

Electricity Generating Cost for PV and utility prices



Source: RWE Energie AG and RSS GmbH

PV cost compared to bulk power

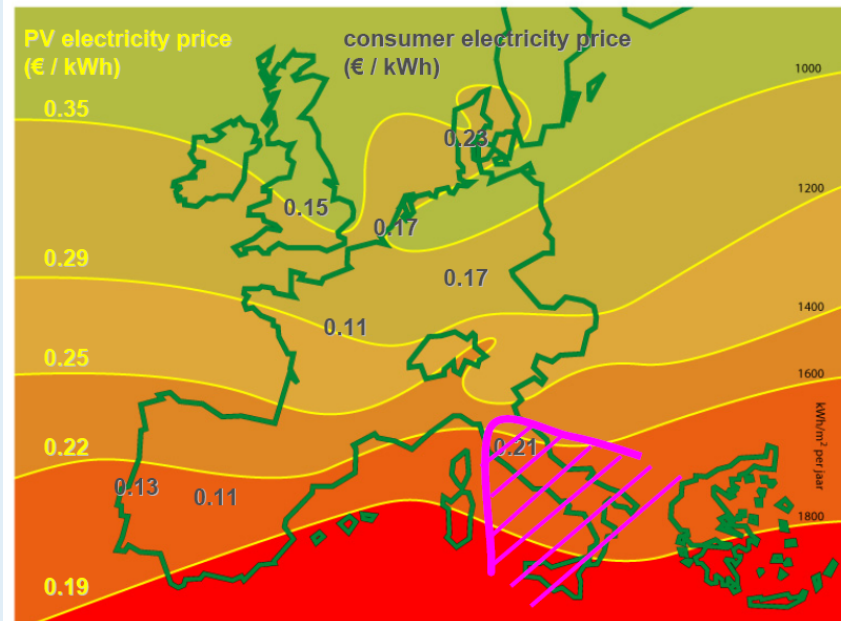
Assumptions:

1% annual increase in Electricity Tariffs

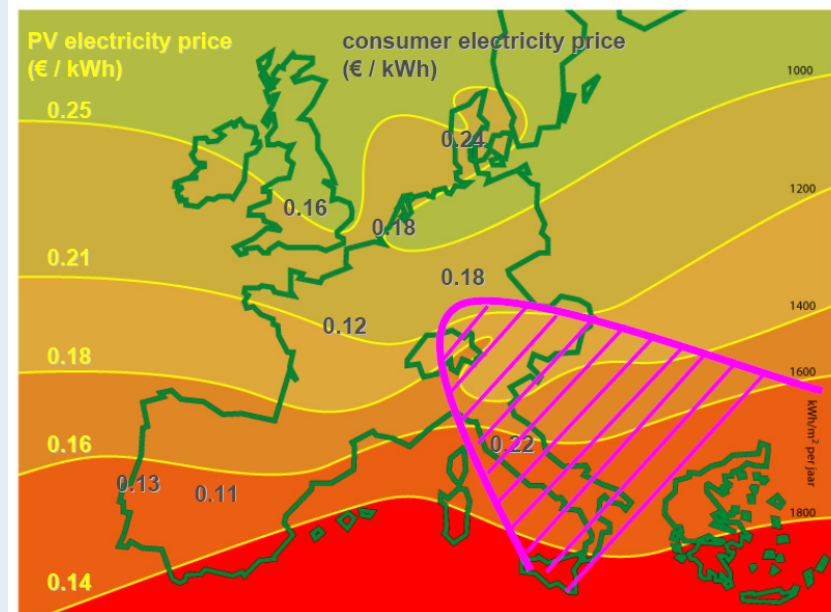
5% annual reduction in PV costs

Source: EU Technology Platform

2010

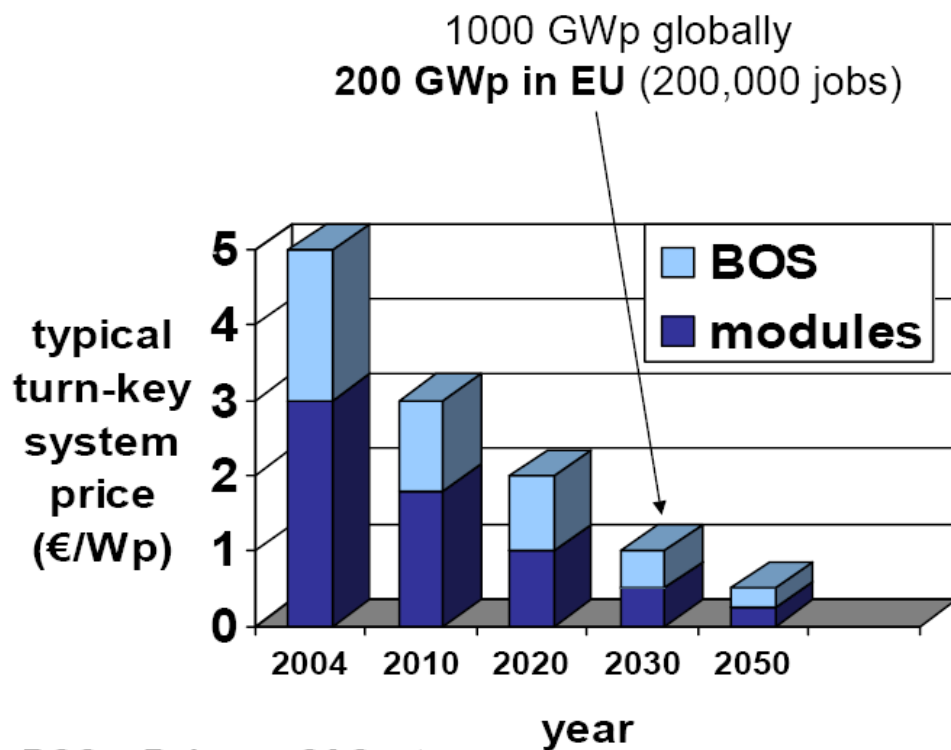


2015

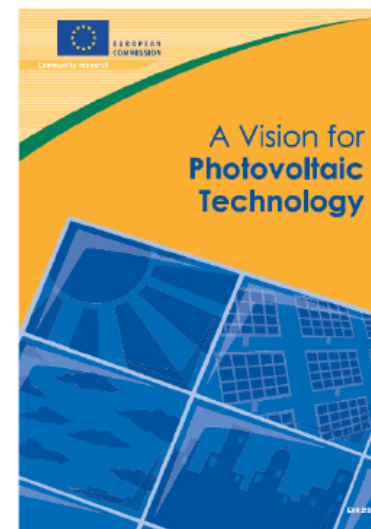




Evolution of turn-key system prices



BOS = Balance-Of-System



<http://europa.eu.int/comm/research/energy/pdf/vision-report-final.pdf>



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Solar cells: today and future

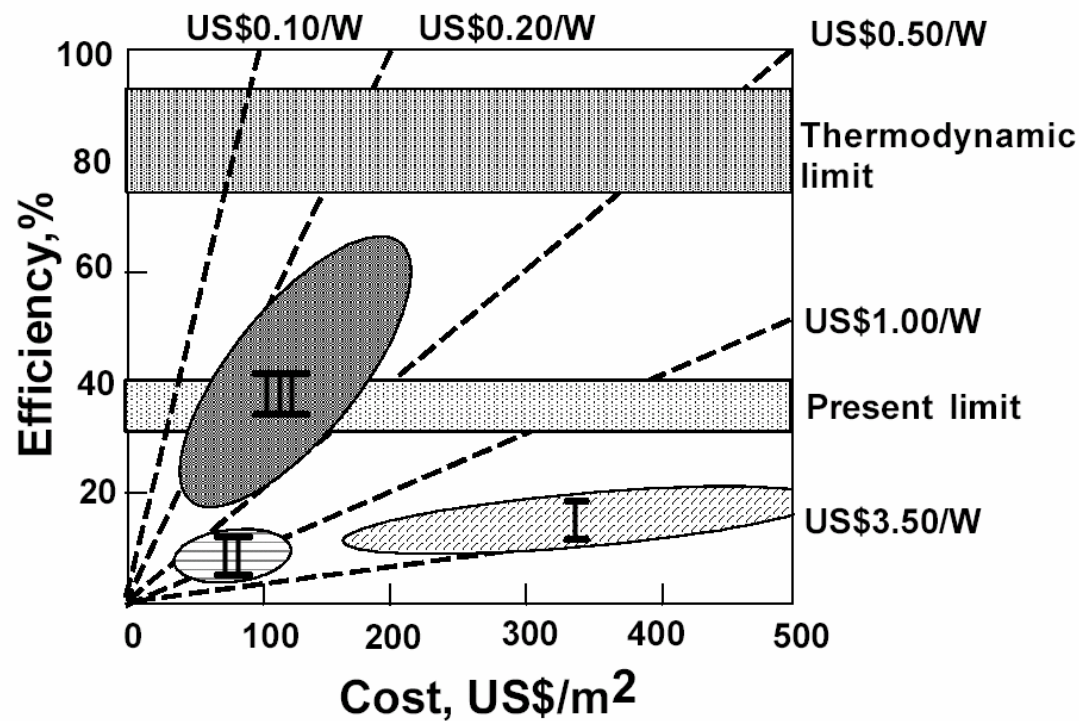


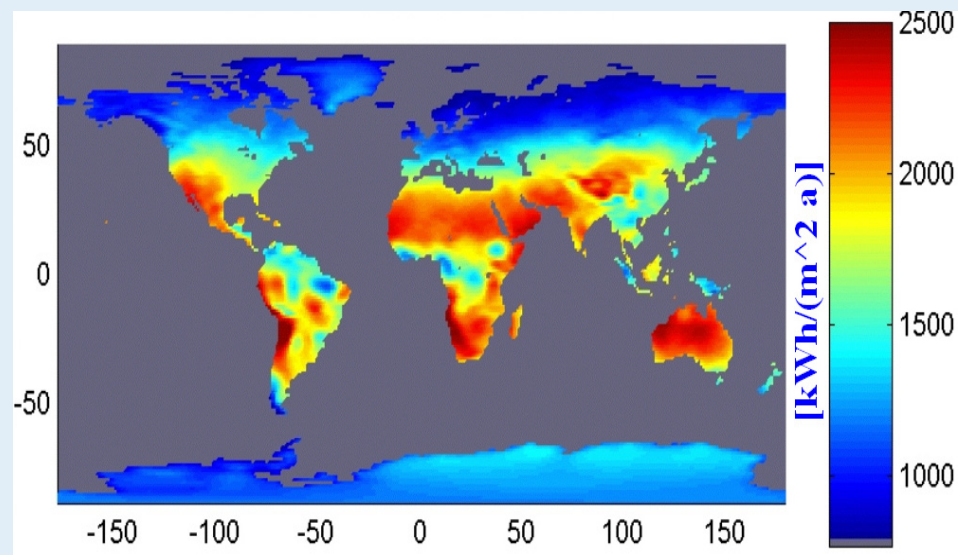
Fig. 2: Efficiency/cost regimes for the three photovoltaic generations.

Ref. M. Green, UNSW



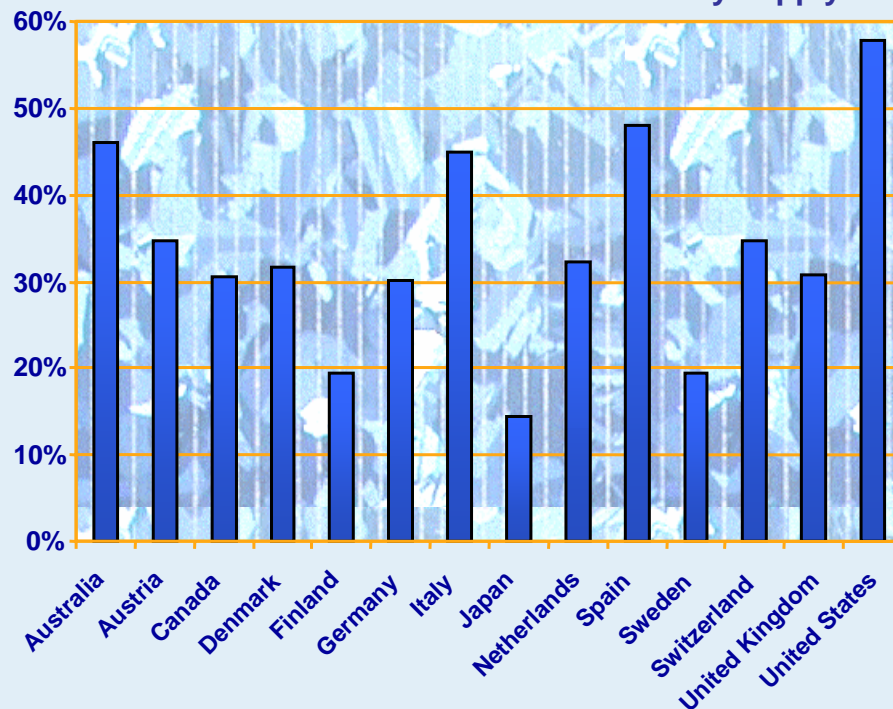
Resources and potential

The solar resource



Ref. ISET / Cziisch

BIPV: Potential contribution to electricity supply





PV R&D: subjects and issues

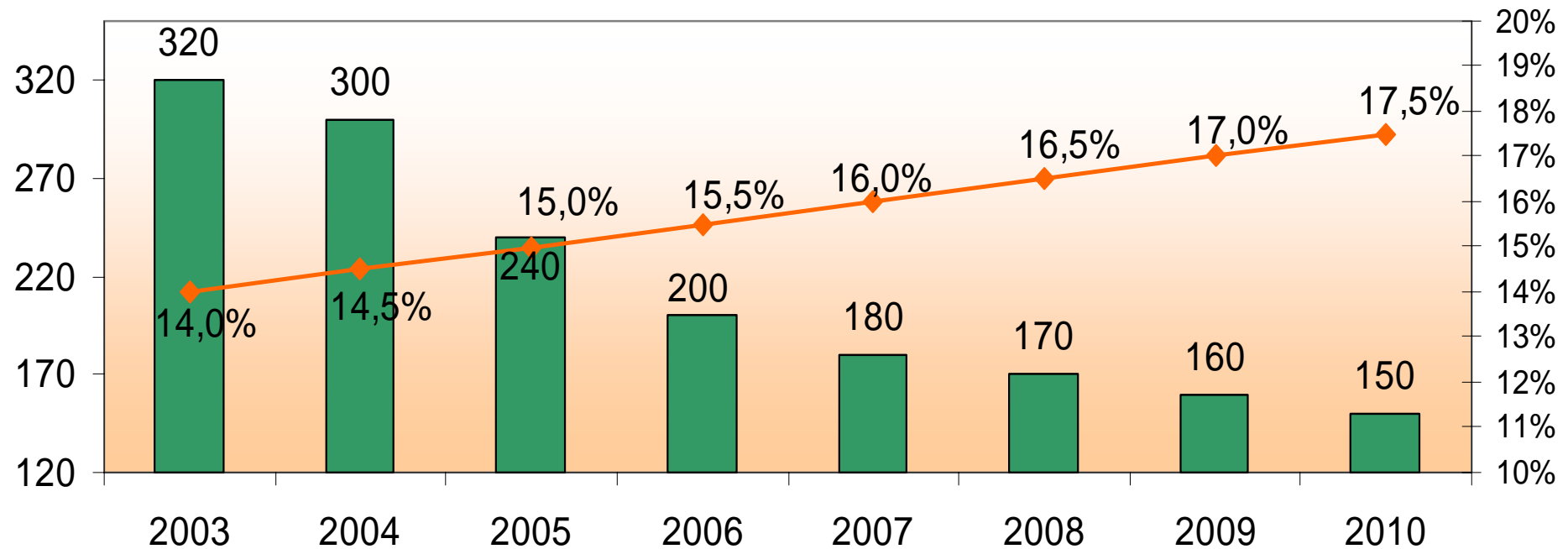
Main bottlenecks: cost, efficiency, products

- Materials
- Cells and Modules
- System components & BIPV
- **Processes and manufacturing**
- Environmental aspects
- Quality assurance and standards
- **Cross-cutting issues**

Ingots/Wafer thickness and Cell Efficiency

[μm]

[Efficiency in %]



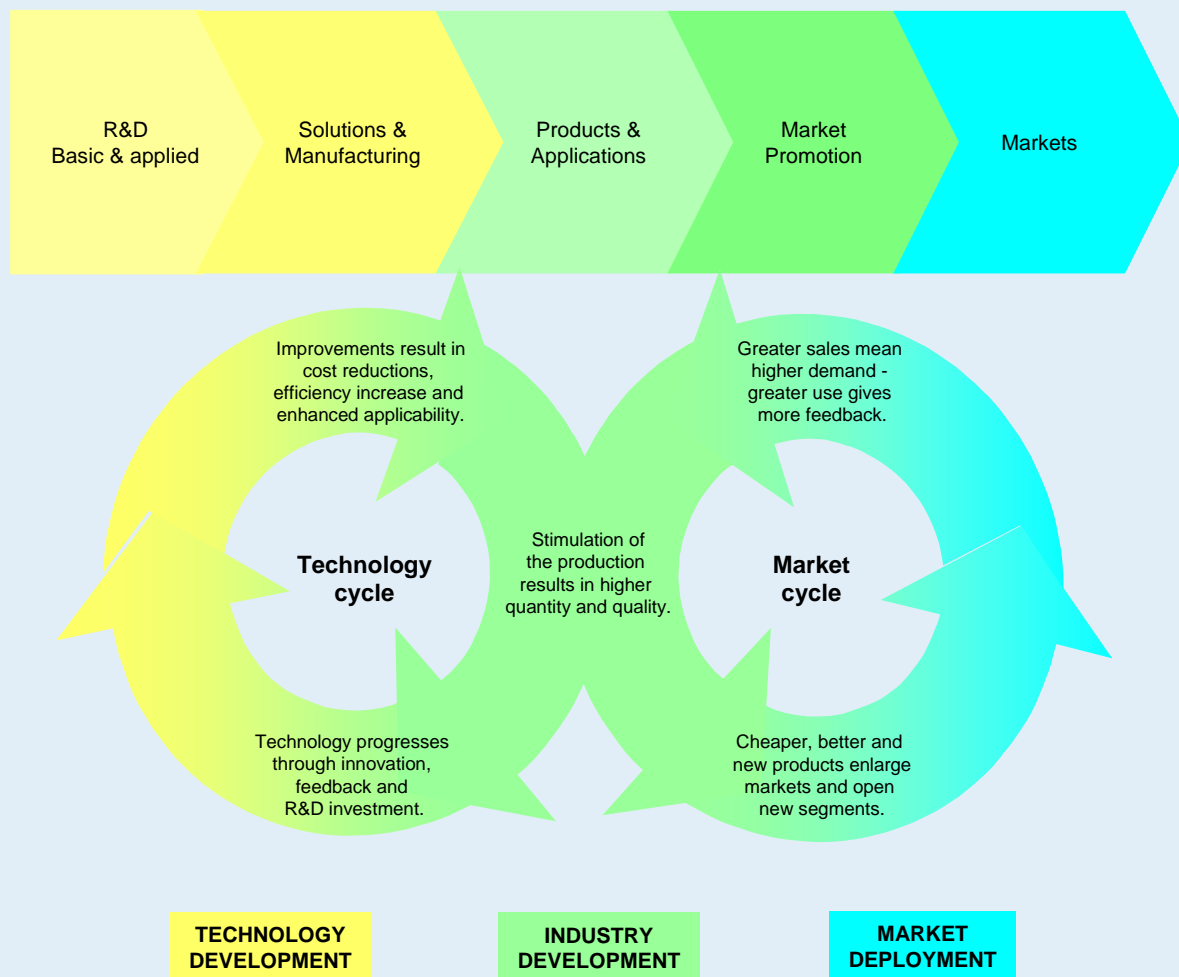
■ Ingots/Wafer thickness (μm) ◆ Cell efficiency (in percent)



Technology and market

- Evolution not Revolution

(Jeff Portmans)

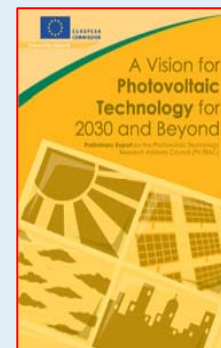
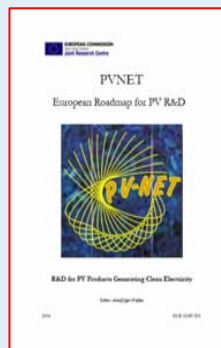
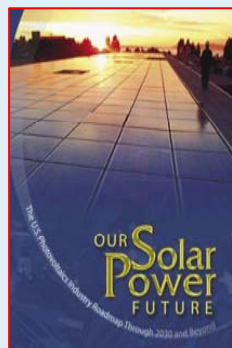
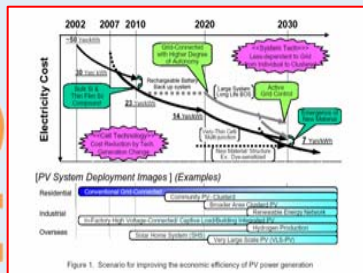




PV R&D: approaches

- Industry involvement
- Short, medium, long-term
- Continuity
- Strong and dedicated effort
- Roadmaps

PVPS





Useful links & contact

- <http://www.iea-pvps.org>
- <http://www.pvdatabase.com>
- <http://www.epia.org>
- <http://www.demosite.ch>

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