



R&D needs in solar photovoltaic energy conversion

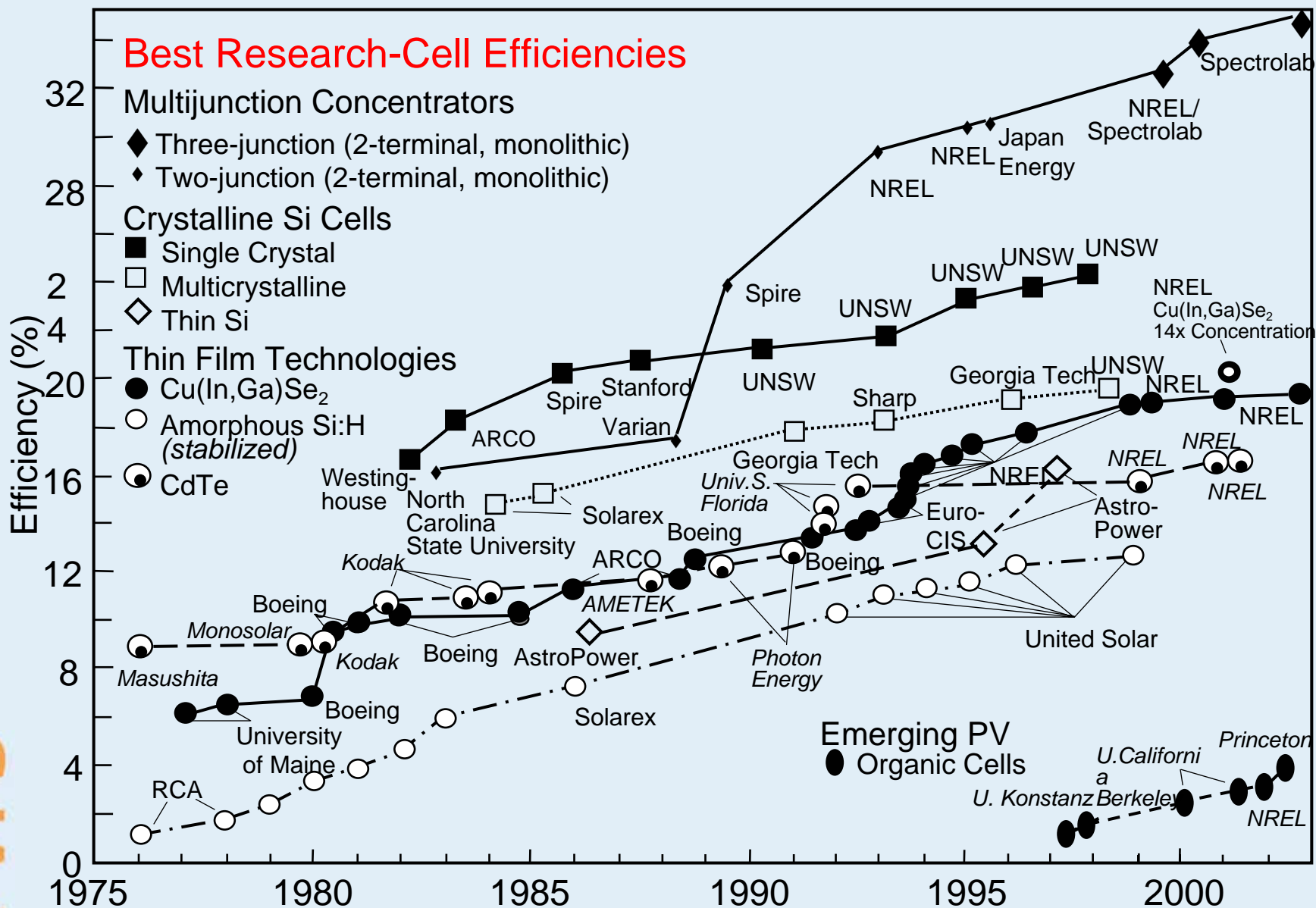
Stefan Nowak
Chairman IEA PVPS

PVPS





PVPS



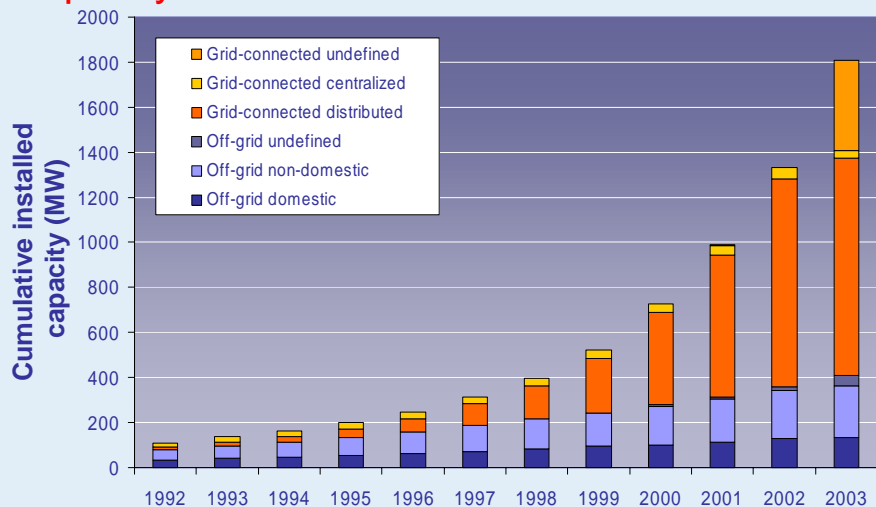
Ref. Tom Surek at NREL



Photovoltaics today

Capacity

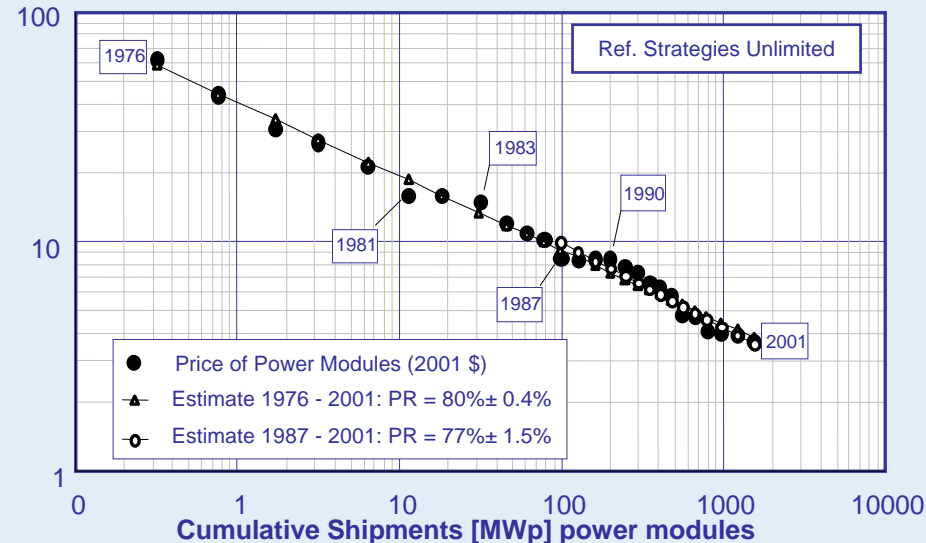
Installed PV power by application area in the IEA countries



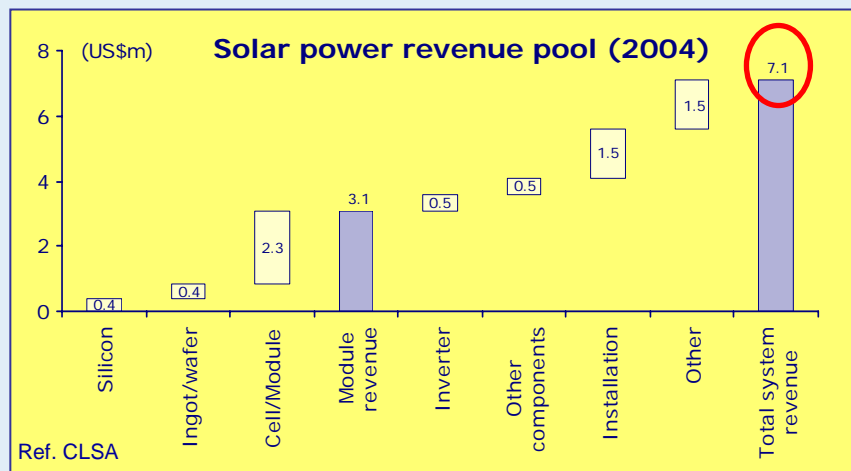
[2001 \$]

Power Modules (1976 - 2001)

Evolution



Revenue

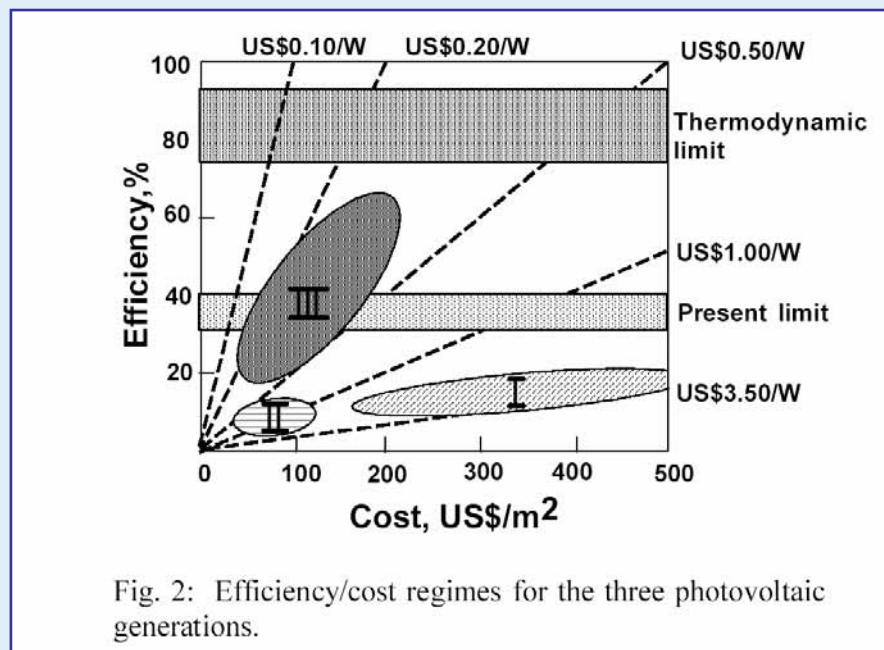


Typical prices

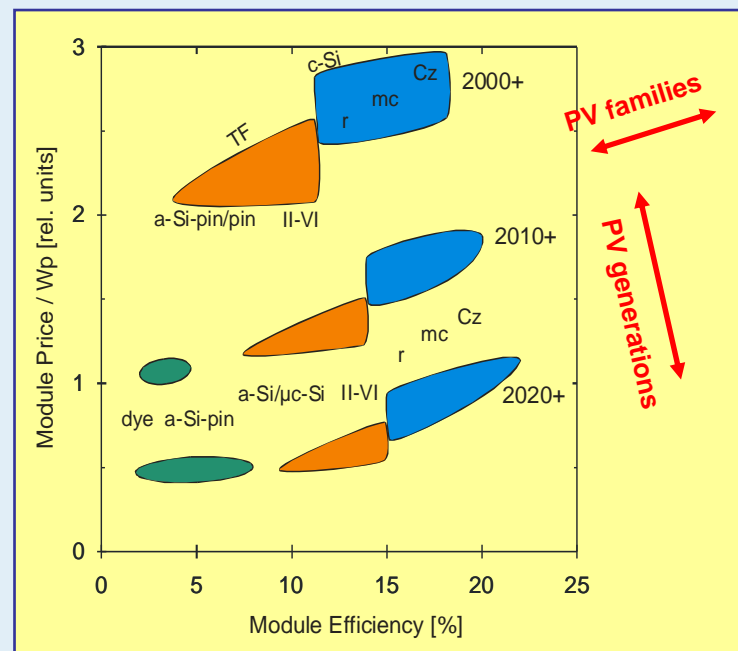
PV Modules	3 – 5 USD / Wp
PV Systems	5 – 8 USD / Wp
Energy (grid)	0.3 – 0.8 USD/kWh



Solar cells: today and future



Ref. M. Green, UNSW

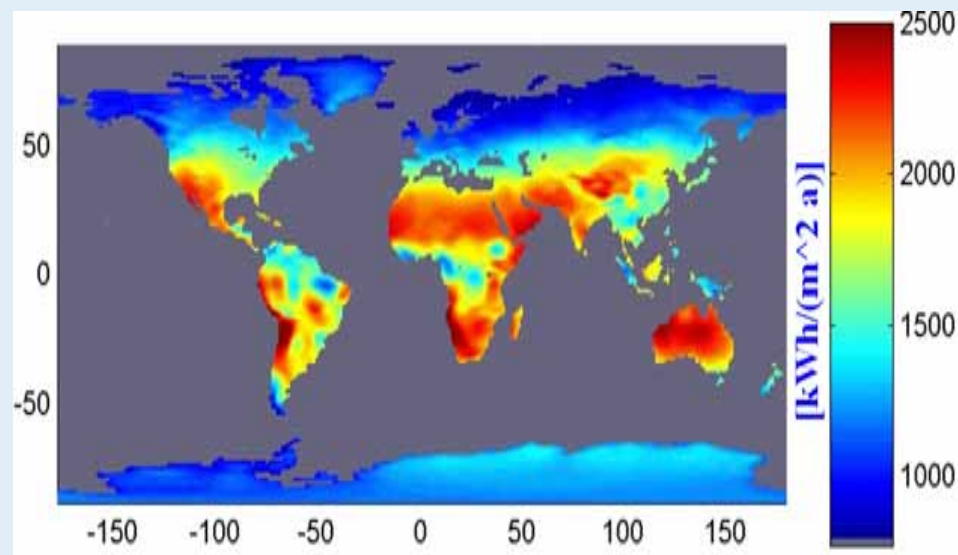


Ref. W. Hoffmann, RSS



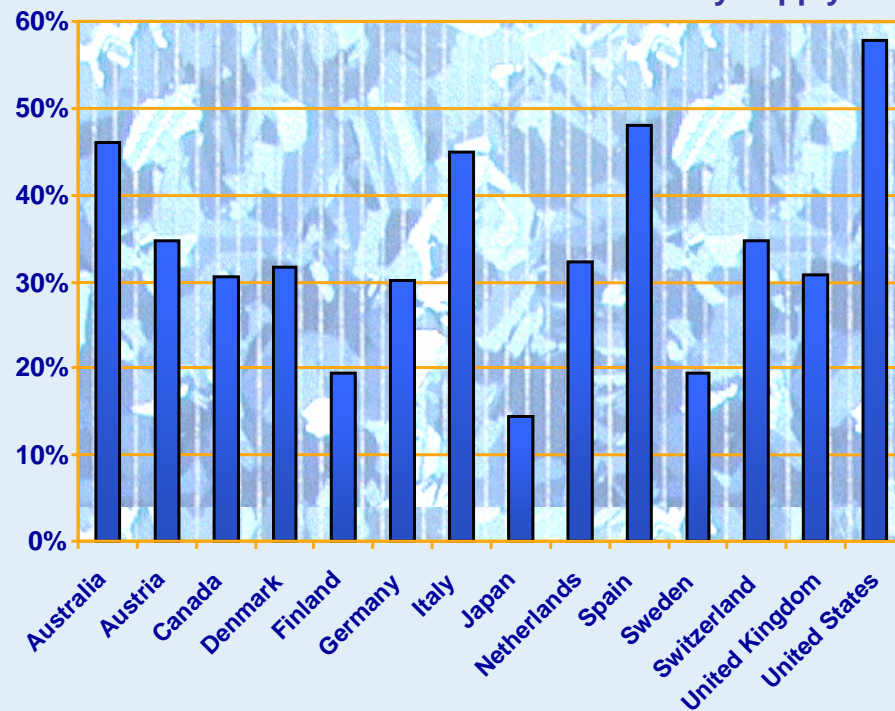
Resources and potential

The solar resource



Ref. ISET / Cziisch

BIPV: Potential contribution to electricity supply





PV R&D: subjects and issues

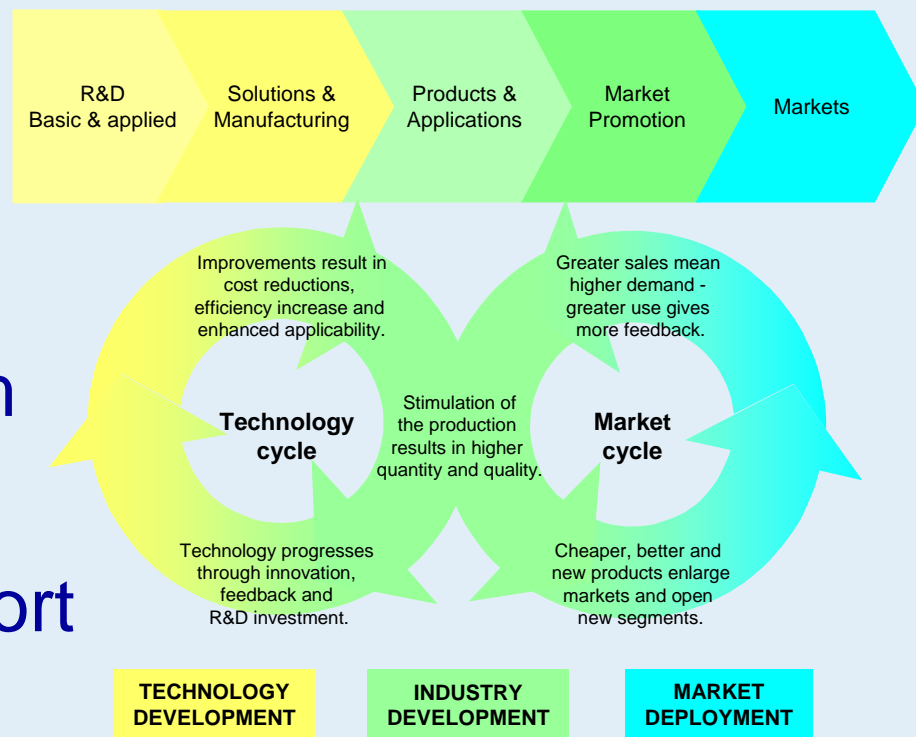
Main bottlenecks: cost, efficiency, products

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

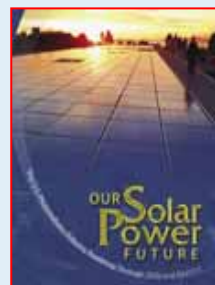
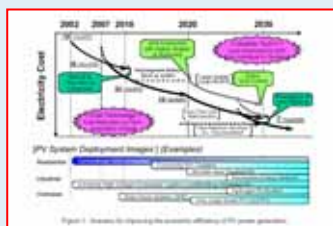


PV R&D: approaches

- System approach
- Technology and market
- 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.demosite.ch>
- <http://www.pvsyst.ch>

Dr. Stefan Nowak, Chairman IEA PVPS
NET Nowak Energy & Technology Ltd.
Waldweg 8, CH – 1717 St. Ursen, Switzerland
Tel. +41 26 494 00 30 / Fax +41 26 494 00 34
Email: stefan.nowak@netenergy.ch