

The PV Industry: where it is and where it could go

Bernard McNelis, Jonathan Bates

Village Power 2000

Washington, December 2000

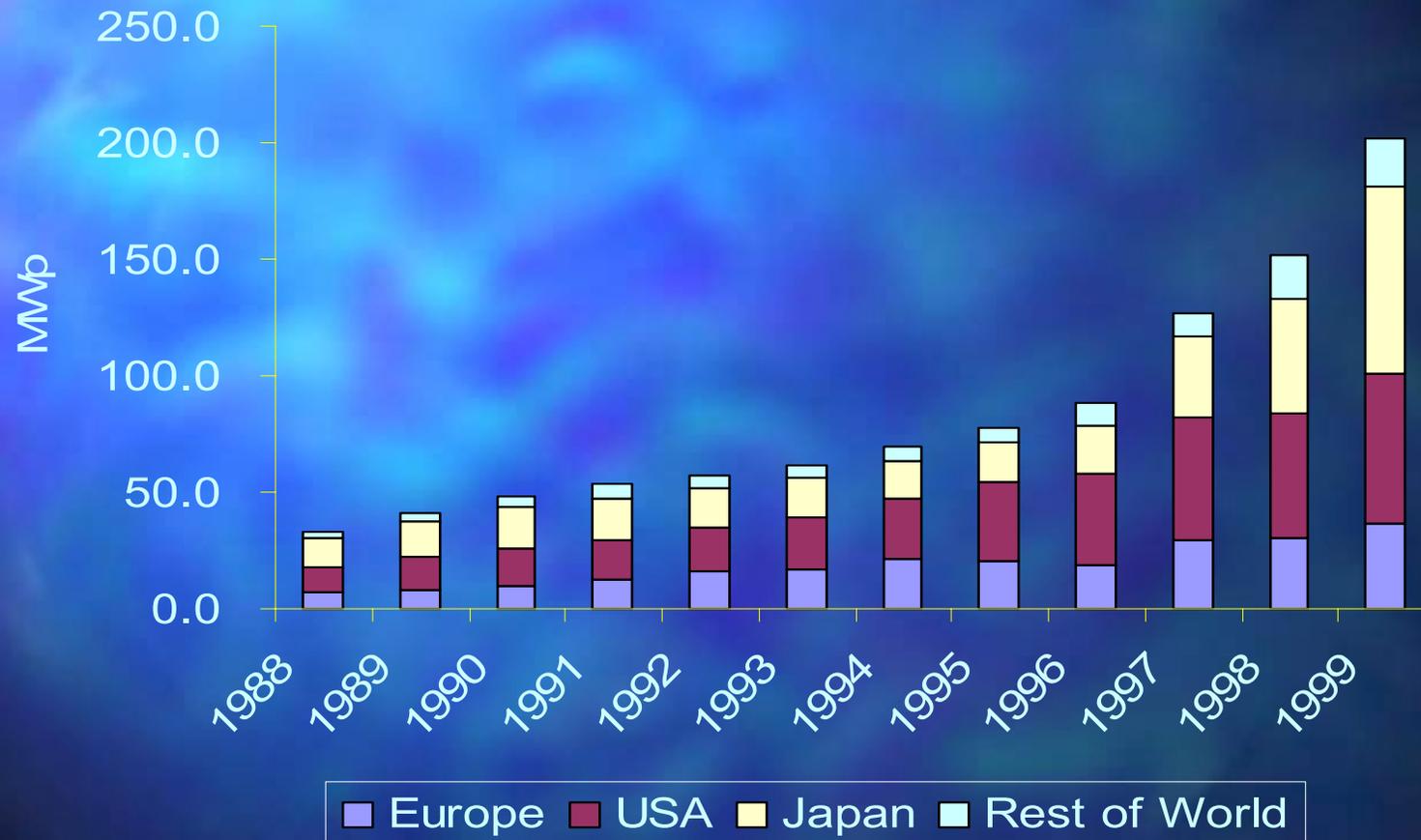


Village Power, World Bank, Washington December 2000

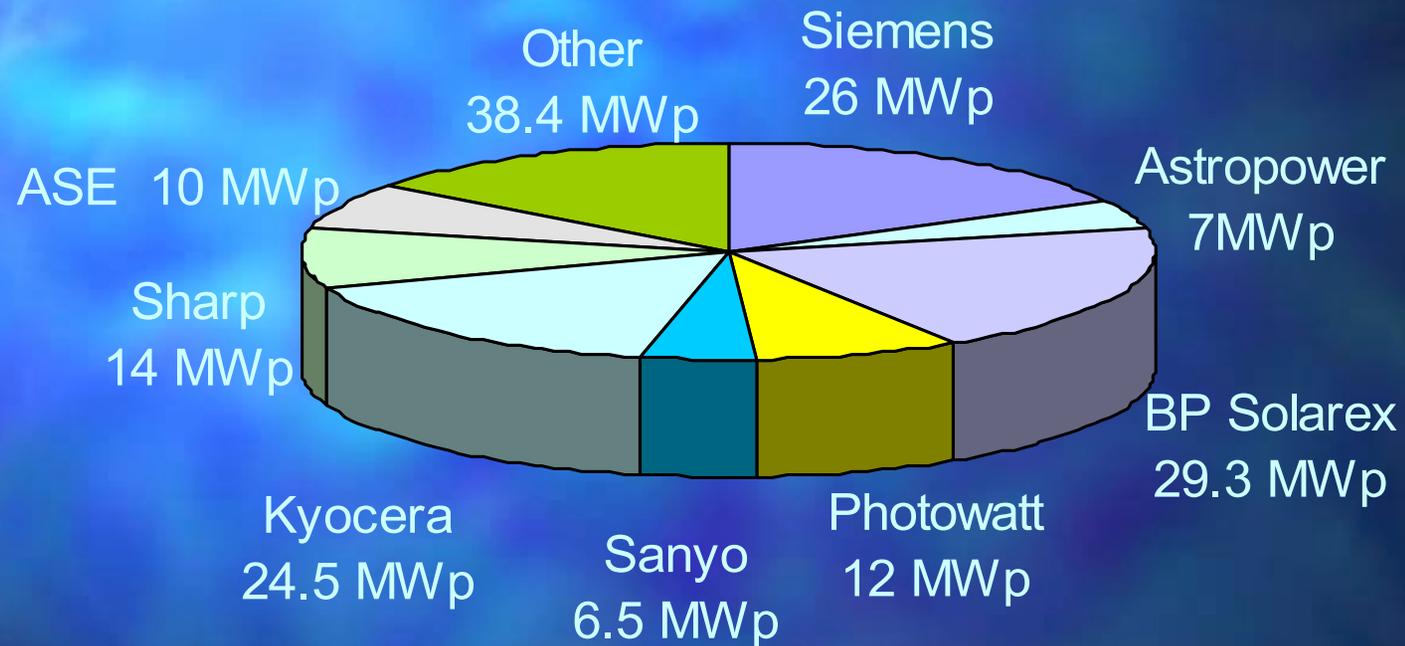
The PV Market

- Proven and sustainable markets for PV are in locations where PV is more convenient and cost effective than alternative power sources
- The professional systems market is the foundation of the global PV industry
- The same conditions of convenience and cost-effectiveness apply generally to the rural areas of developing countries, but market penetration is minimal

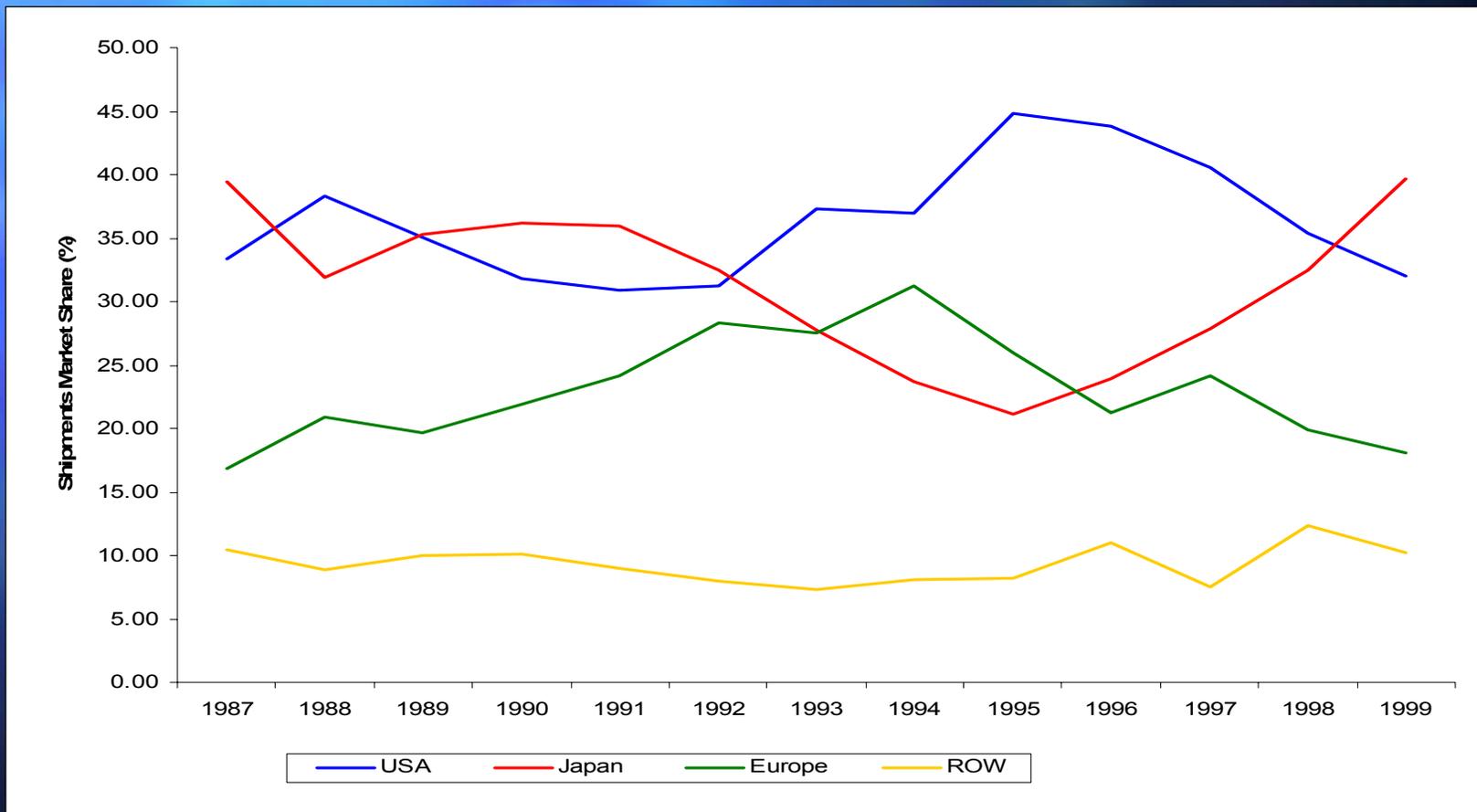
PV Shipments 1988 - 1999



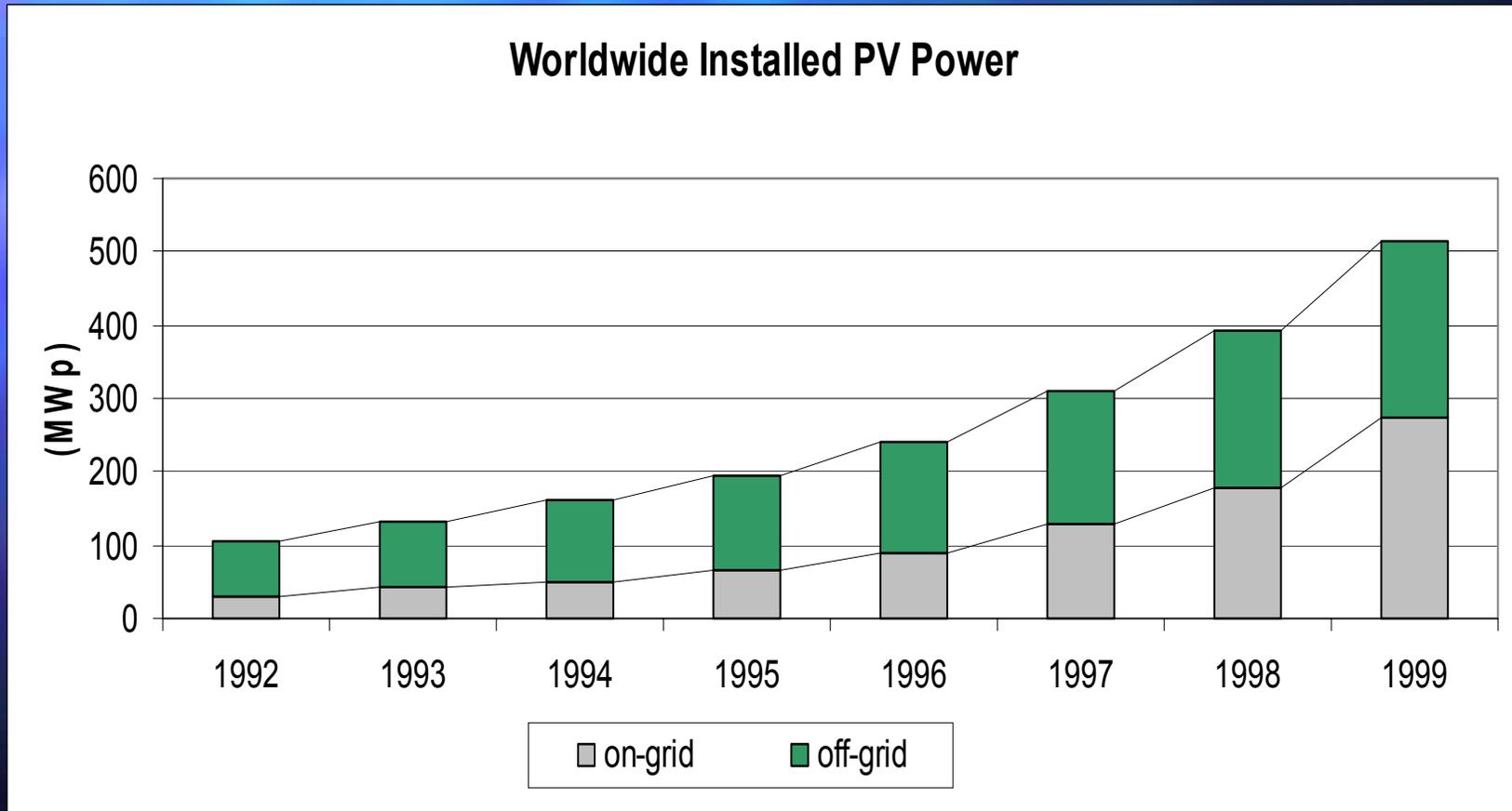
PV Shipments by manufacturer 1999



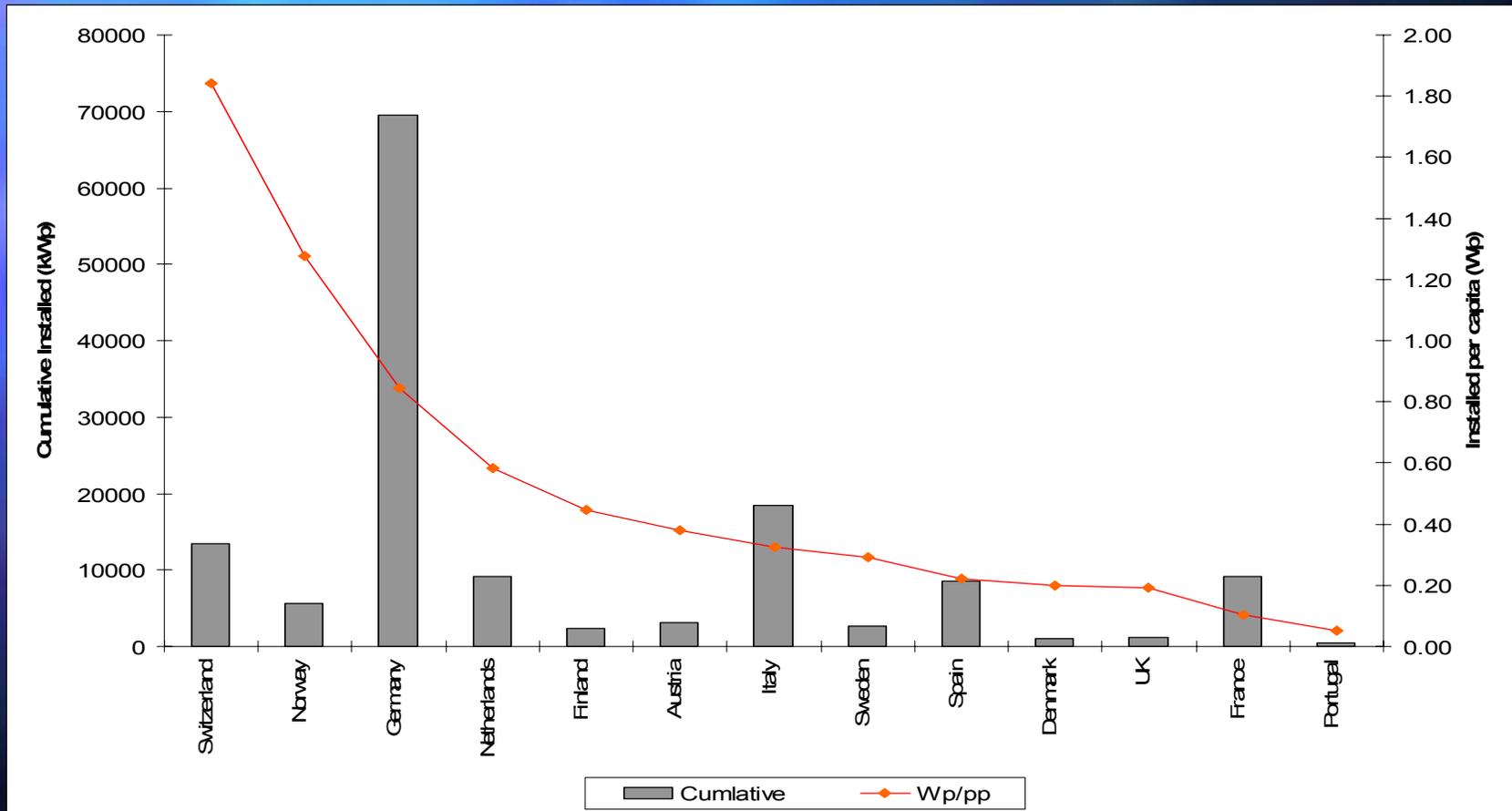
Market share



Installed...



PV Installed

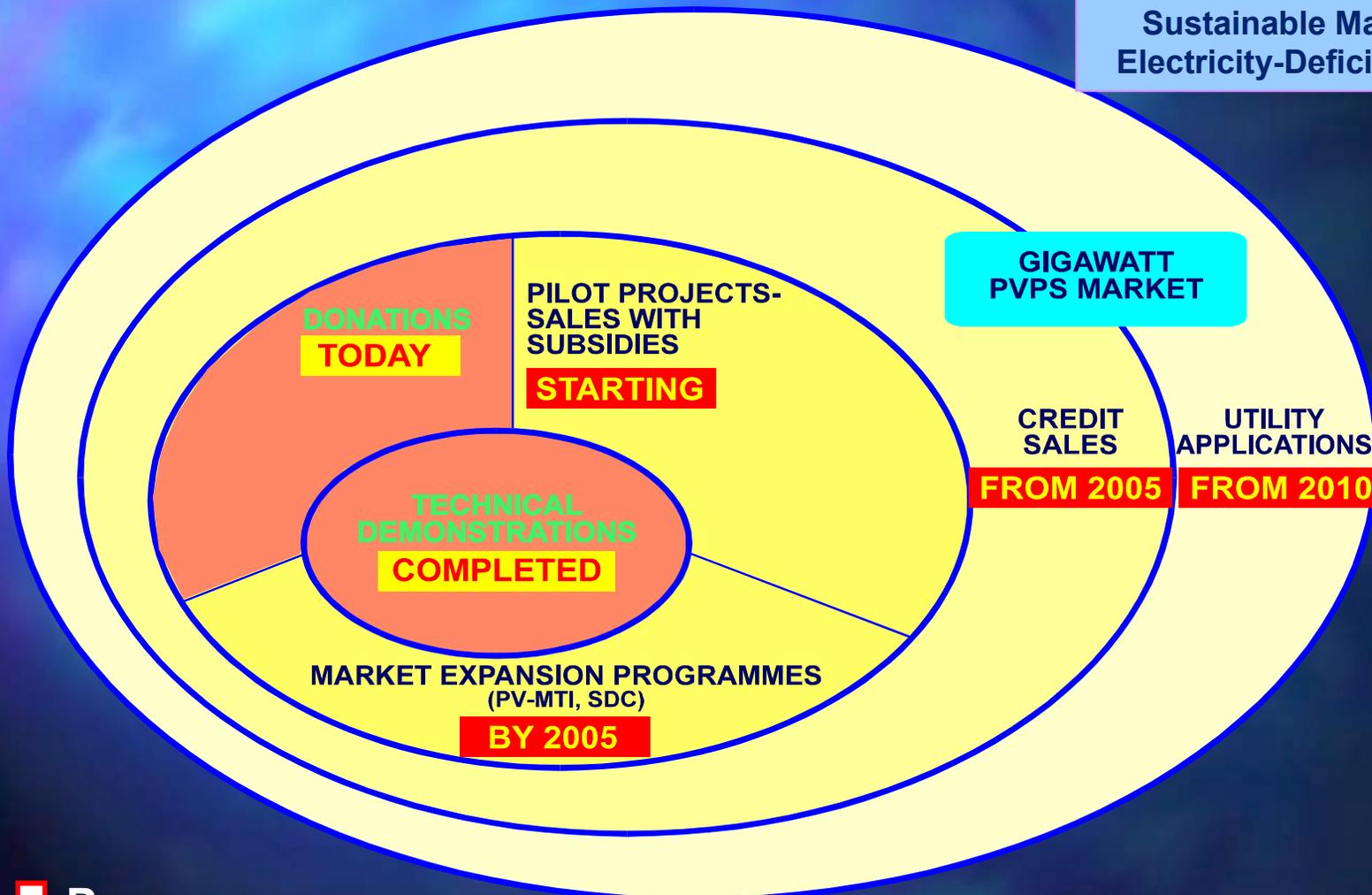


The Challenge

- 1.3 billion people in developing countries electrified over past 25 years
- BUT population increased by 2 billion over same period. There are now 700 million more people without electricity
- 2 billion people in 400 million villages to be electrified. This number is increasing
- The grid will never reach them - it is too expensive
- Renewable energy technologies are the only solution

PV Market Deployment Model

Sustainable Markets in Electricity-Deficient Areas



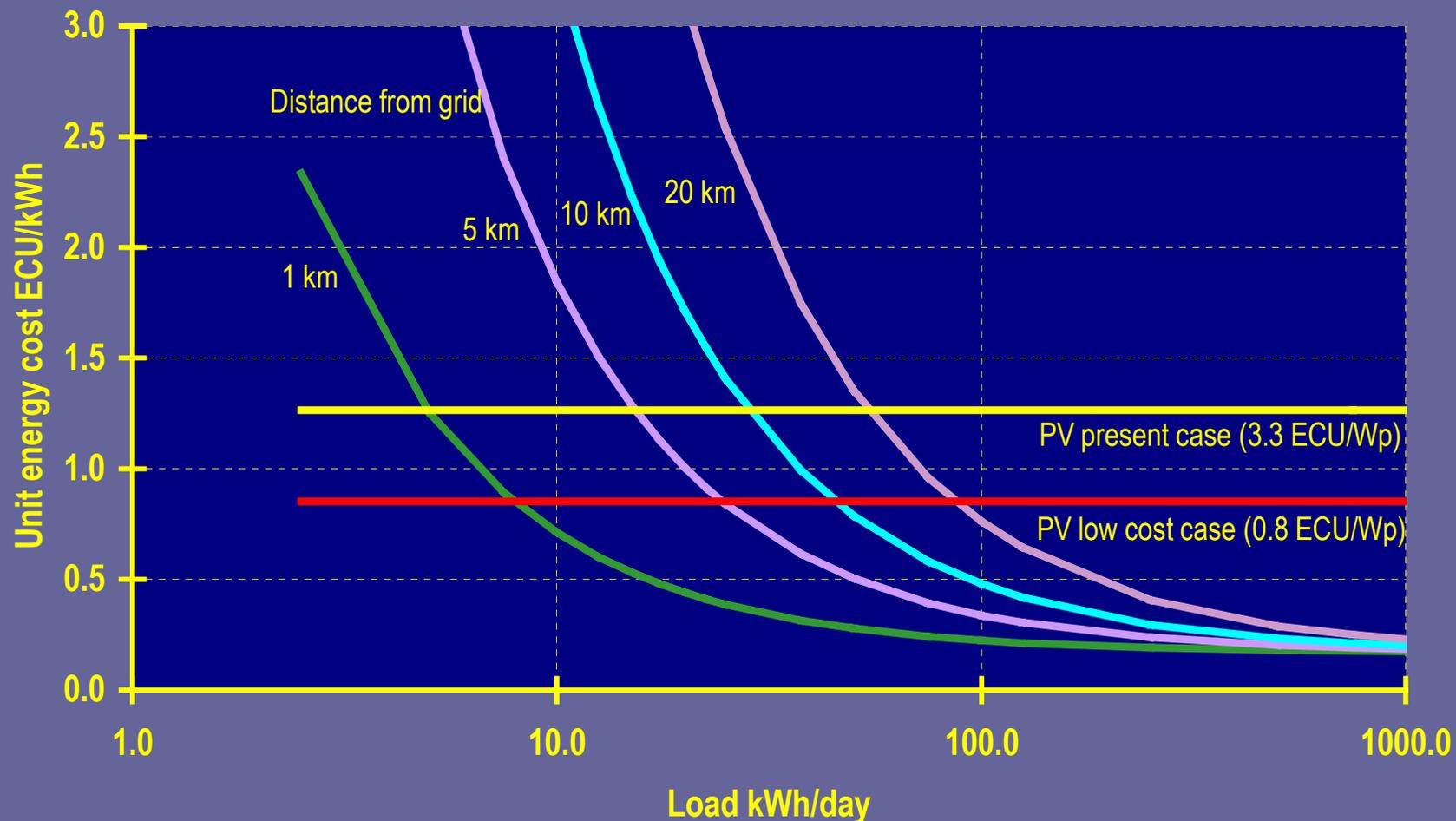
PV Rural Electrification

- 1 million SHS, 20,000 PV pumps
- =10m people served by PV
- Technical problems with quality of installations
- More work *in the field* is necessary

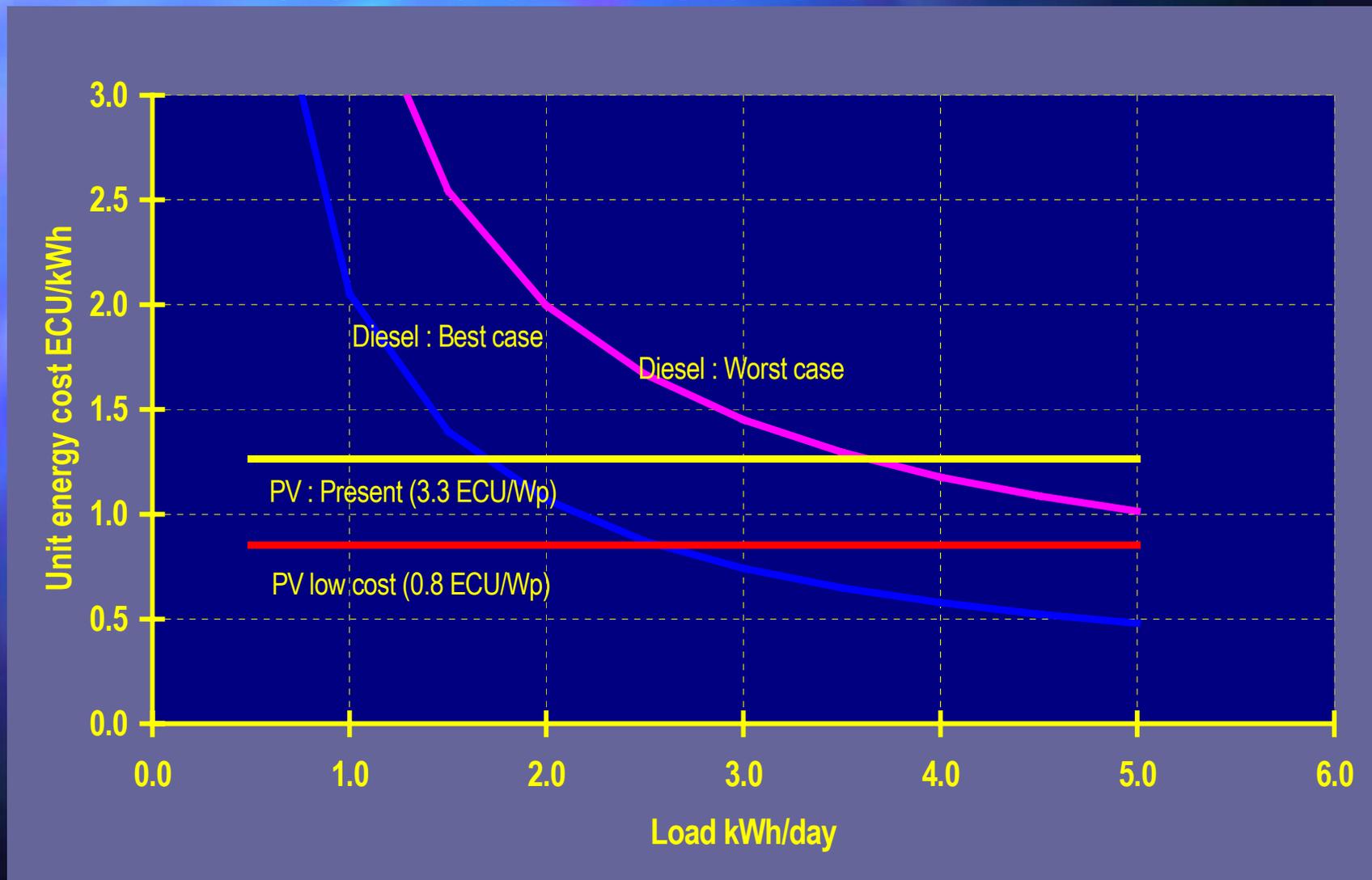
PV Rural Electrification

- Meets a real need and is economic
- Represents an enormous potential market
- Other developments - developed country PV subsidies, will also indirectly support this market
- There are major barriers: institutional, lack of awareness, financing, infrastructure.....
- New programmes are endeavouring to tackle these

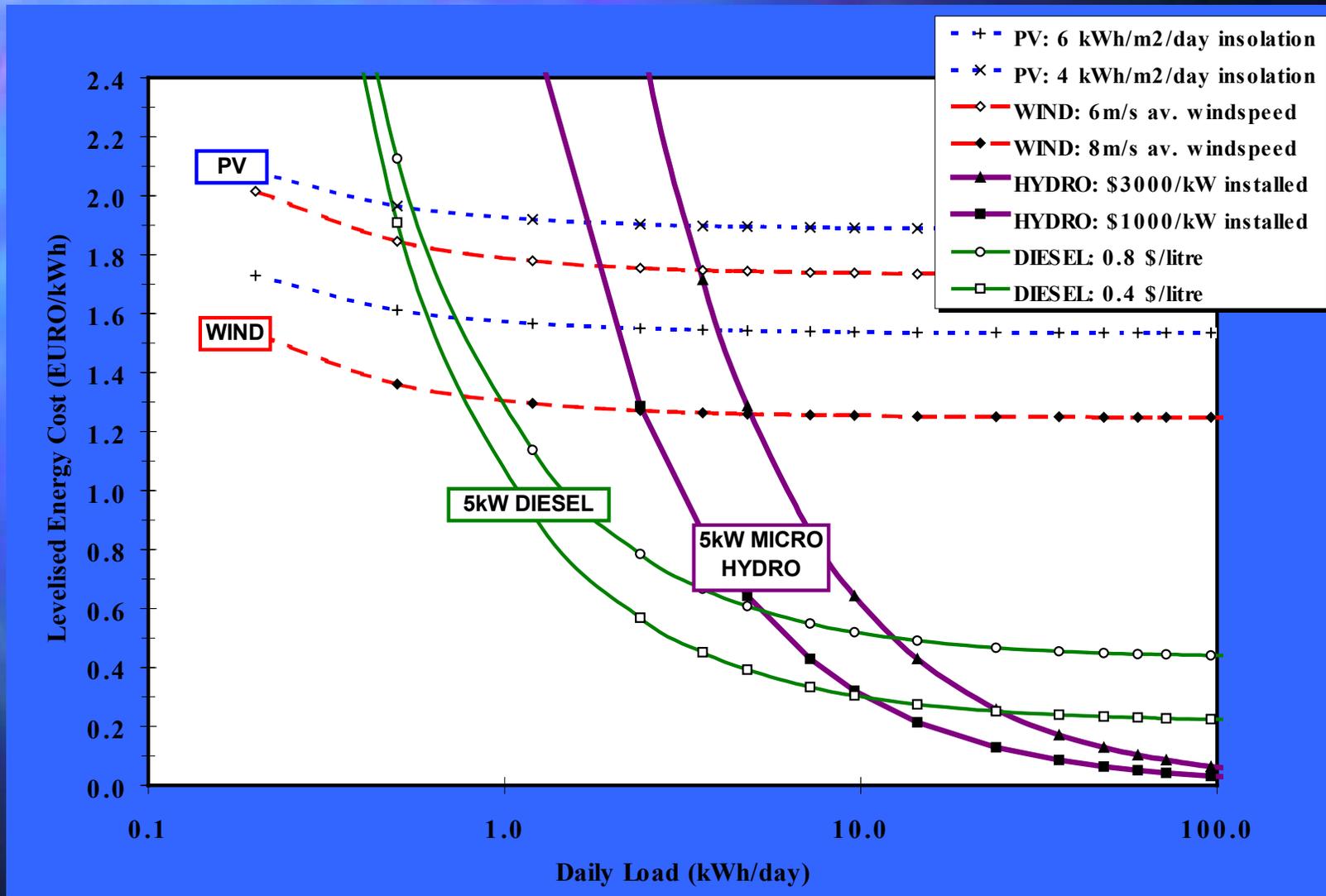
Unit Electricity Costs at Various daily loads: Photovoltaic Vs. Grid Extension



Unit Electricity Costs at Various Daily Loads: Photovoltaics Vs. Stand-alone Diesel



Levelised Electricity Cost vs Daily Load



Is PV affordable?

- The economic case for PV, compared to kerosene, diesel generators and grid extensions, is established
- The capital investment required is still high, especially for people not experienced in making long-term investments
- Ability and *willingness* to pay is often higher than suggested by average income or GDP/capita
- User-acceptable credit schemes and a distribution infrastructure are key to opening the market
- These involve industry, government, formal banking sector, utilities, credit co-operatives, NGOs, ESCOs.

Subsidies

- Are subsidies essential?
- Or can sustainable markets be developed with financing (ie loans)?
- Financing experiments are underway (PV-MTI), but results not yet available
- Endless subsidies are needed (it seems) to maintain European agriculture - so why not also in developing countries?

World Aid = € 50 billion/year

- Focus is poverty alleviation
- Market Expansion Initiatives - PVMTI, SDG and GEF/World Bank/UNDP are important experiments
- EU aid to Sahel, South Africa and Kiribati. Donations of PV hardware

A new initiative

- IEA PV Programme - a collaborative programme involving 22 OECD countries
- Task 9 - the first project to pool this expertise and focus on developing countries
- Awareness raising and Recommended Practices

Conclusions

- PV industry is growing at an annual rate of some 16%
- There is a huge potential for PV in rural electrification, but.....
- There are still significant barriers to be overcome.
- Go forth and install quality systems