IEA PVPS

Global co-operation towards sustainable deployment of photovoltaic power systems

Issues of programme financing and development

- Hybrids and mini grids -

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PVPS

The IEA PVPS Mission

To enhance the international collaboration efforts through which photovoltaic solar energy becomes a significant renewable energy option in the near future

The PVPS Objectives

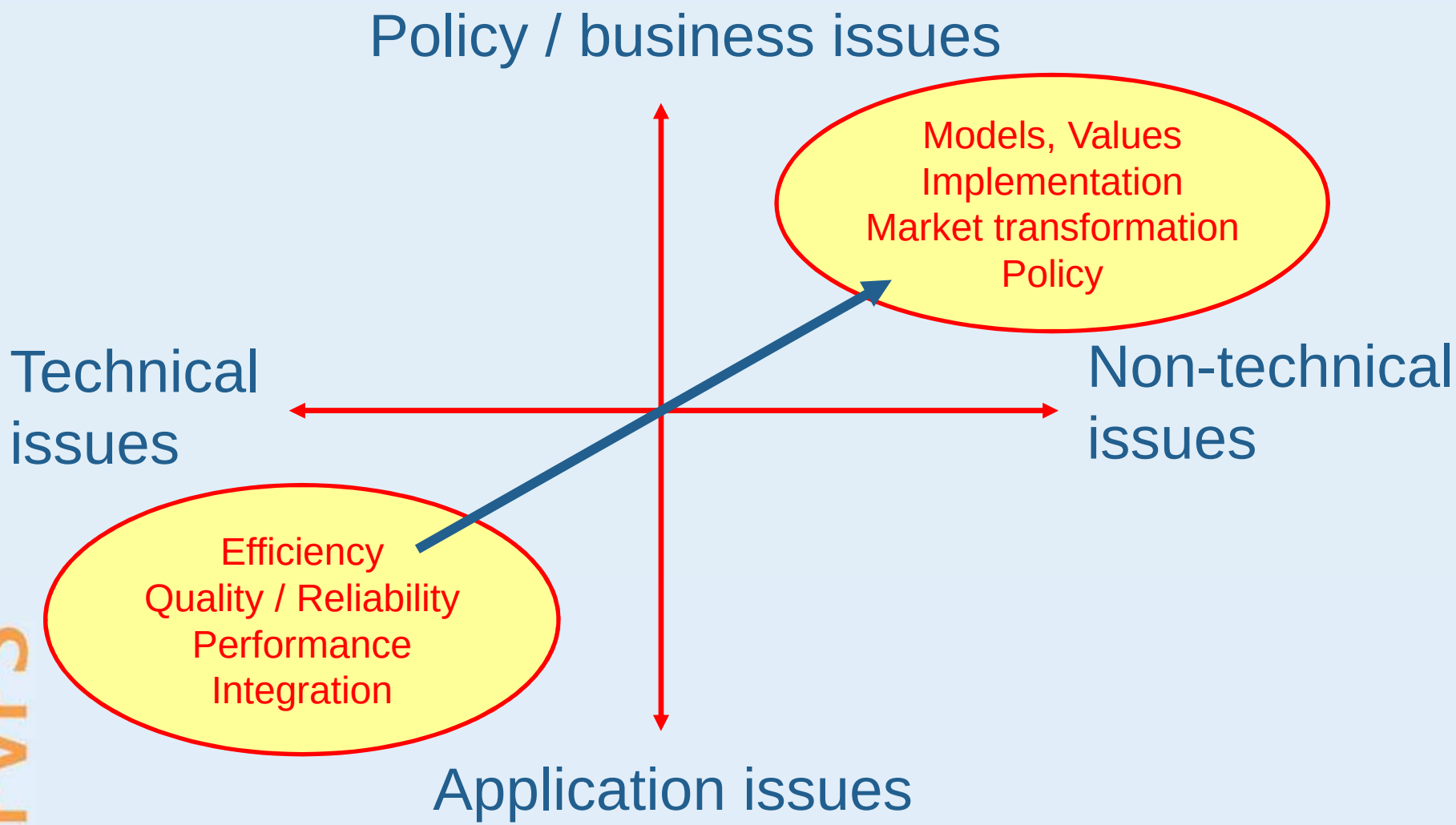
- To stimulate activities that will facilitate a cost reduction of PV power systems applications;
- To increase the awareness of PV's potential and value and thereby provide advice to decision makers from government, utilities and international organisations
- To foster the removal of technical and non-technical barriers of PV power systems for the emerging applications in OECD countries;
- To enhance co-operation with non-OECD countries and address both technical and non-technical issues of PV applications in those countries.

IEA PVPS basics

- One of > 40 IEA Programmes on technology co-operation
- 24 members: 21 countries, EC, EPIA, SEPA
- Activities are carried out collaboratively on a country basis along a number of technical and non-technical subjects
- Currently, 7 Tasks are active

- Global network of expertise
- Broad variety of stakeholders
- Independent, objective, neutral
- Country based, task-shared
- Analysis
- Recommendations
- Communication & interaction

PVPS strategy dimensions



IEA PVPS Tasks

- Task 1 - Exchange and dissemination of information on PV power systems
- Task 2 - Operational performance, maintenance and sizing of PV power systems and subsystems (concluded 2008)
- Task 3 - Use of PV power systems in stand-alone and island applications (concluded 2004)
- Task 5 - Grid interconnection of building integrated and other dispersed PV systems (concluded 2001)
- Task 6 - Design and operation of modular PV plants for large scale power generation (concluded 1997)
- Task 7 - PV power systems in the built environment (concluded 2001)
- Task 8 - Very large scale PV power generation systems
- Task 9 - Deployment of PV technologies: co-operation for regional development
- Task 10 - Urban Scale PV Applications (concluded 2009)
- Task 11 - PV hybrid systems within mini-grids
- Task 12 - PV environmental, health & safety activities
- Task 13 - PV performance, quality and reliability (new 2010)
- Task 14 - High-penetration of PV systems in electricity grids (new 2010)

Thematic activities

- PV and water pumping
- Pico PV services
- Innovative Business models for sustainable PV deployment
- Roof top PV and integrating PV in the urban environment: perspectives and issues
- Hybrid systems for rural electrification services

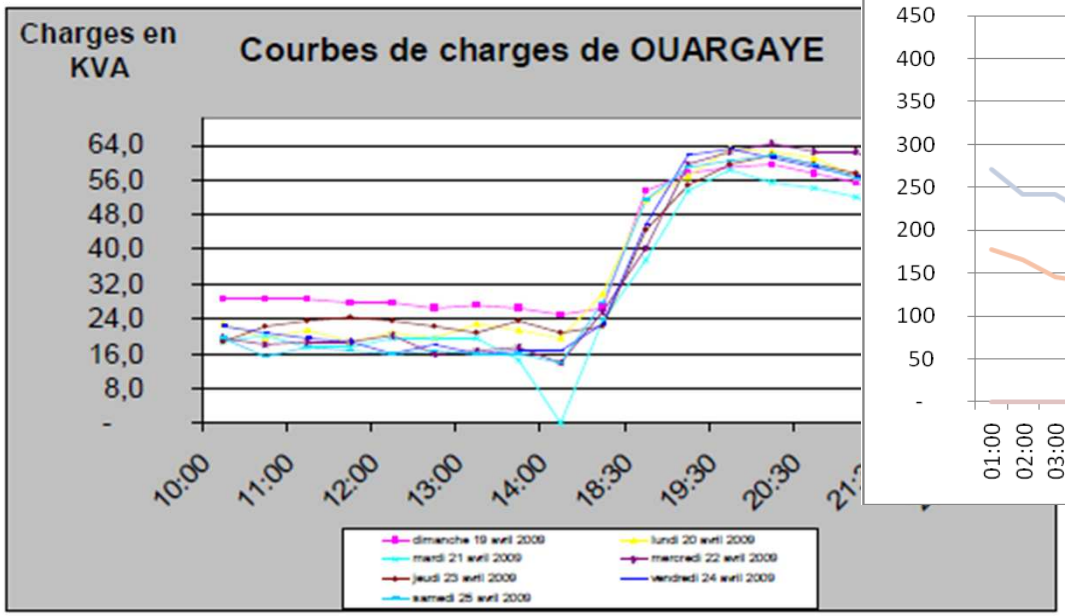
- *Developing partnerships with institutions and countries*

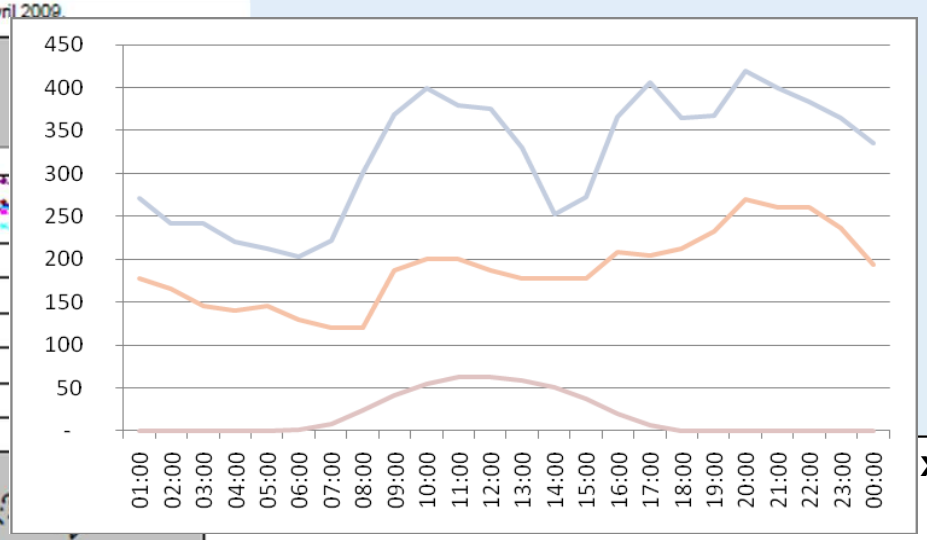
Issues

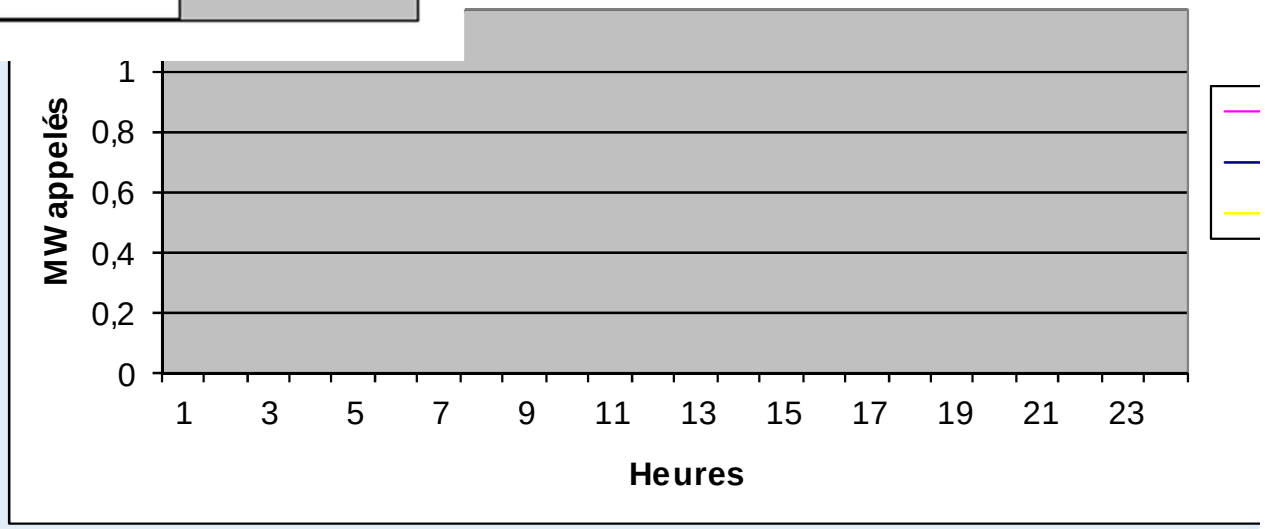
- Designing systems to meet demand characteristics and dynamics
- Using the opportunity of PV integration in (mini) grids for increasing system efficiency
- Chosing quality system components
- Crucial importance of local ownership – in remote areas
- Scaling up : Sensitivity of cost to volume and financing conditions

Load curves and system design

Le graphique ci-dessous présente la courbe de charge moyenne observée dans la semaine du 19 au 25 avril 2009







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Some design Issues

- Need to understand details of the load curve and grid quality
  - amount of PV (intermittent) penetration
  - Combined with costs: battery storage, diesel generation

System efficiency in mini grids

- PV often is an opportunity to:
  - Upgrade the distribution grids
  - Change the diesel generator
  - In rural Cambodia, leads to 30% efficiency improvement

- Technically difficult to integrate PV in weak and unstable grids – as the inverters will trip

Chosing quality and appropriate system components

- A few examples
  - The battery: Cycling issue
  - Genset: « Reaction time »
  - Inverter and transformer losses

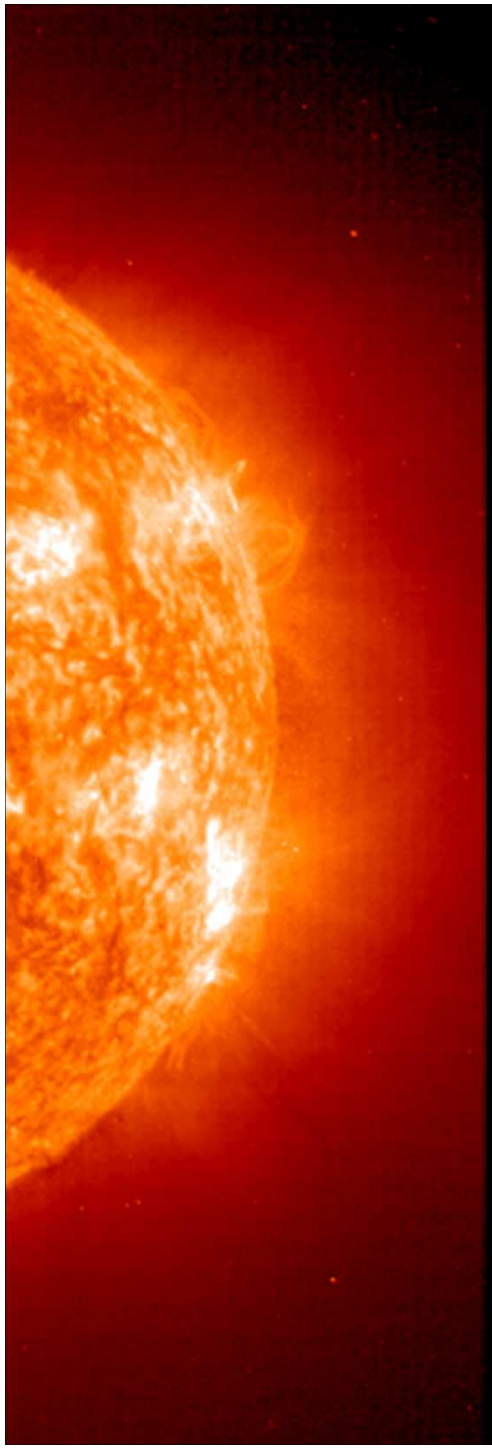
- Ensuring local ownership for sustainability
  - These are not « zero maintenance »
  - Need trained local technicians
  - Adequate higher level back up technicians

Scaling up

- Sensitivity of cost to volume:
  - Isolated pilot hybrid unit can cost up to 15 000€ / kW
  - With « programme » approach: reduce by more than 50%
  - Scaling up : Sensitivity of cost to volume
- Ensuring that « networks » are simultaneously built
  - Service technicians
  - Spares (electronics and batteries)

Example:
40kWp integrated in a rural LV grid
100% battery storage
Renewed every 5 years

Item	Cost in €/Wp	Total cost (€)
Panel	1,85	74 000
Inverter and Monitoring	0,45	18 000
Cabling	0,10	4 000
Fencing and civil works	0,35	14 000
Engineering, inspections, supervision	0,22	8 800
Contingencies	0,14	5 500
International fret	0,05	2 000
Connection to LV network		1 300
Present value of batteries		69 761
Local transport and installation		32 000
Estimation € / Wp		5,73



Thank you for your attention !

- http://www.iea-pvps.org
- http://www.iea.org
- http://www.ruralelec.org

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