

Domestic Applications in Greece: The present and future of PV

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Introduction

- Energy needs continuously increase, following quality of life improvement.
- The only way to cover the growing energy requirements without further environmental impact is increasing the share of renewable energy sources in the energy mix.
- Climate conditions (predominantly in SE Europe) are favourable for exploiting renewable energy sources, particularly wind and solar.
- Solar energy can be directly converted into heat (solar thermal collectors) or electricity (photovoltaic modules).

The PV Effect

The photovoltaic effect was observed in 1839, but the first applications were made possible after semiconductors were discovered in 1954.

Today there is large scale PV industry developed in Germany, Japan, China and the US. The technology is becoming mature.

However, production is still expensive and support is required for market development.

Potential for PV Development in Greece

- Law 3468/06 is the legislative and framework basis for the initiation of sustainable PV activities in the country.
- The Feed – in – Tariff (FiT) model that has been introduced includes favourable conditions for grid-connected PV application.

Price per KWh	Grid system	Off grid system
PV system installed capacity $\leq 100\text{kW}$	€45c	€50c
PV system installed capacity $> 100\text{kW}$	€40c	€45c

- The PV market in Greece is expected to explode in the next 3 – 5 years, especially medium (100 – 150 kWp) and larger size PV systems are expected to dominate the market.
- Smaller (domestic) systems will follow

Investment Opportunities



[1] **Centralised** PV power production (order of MWp)

[2] **Commercial** applications (tens of kWp)



[3] **Domestic** applications (few kWp)



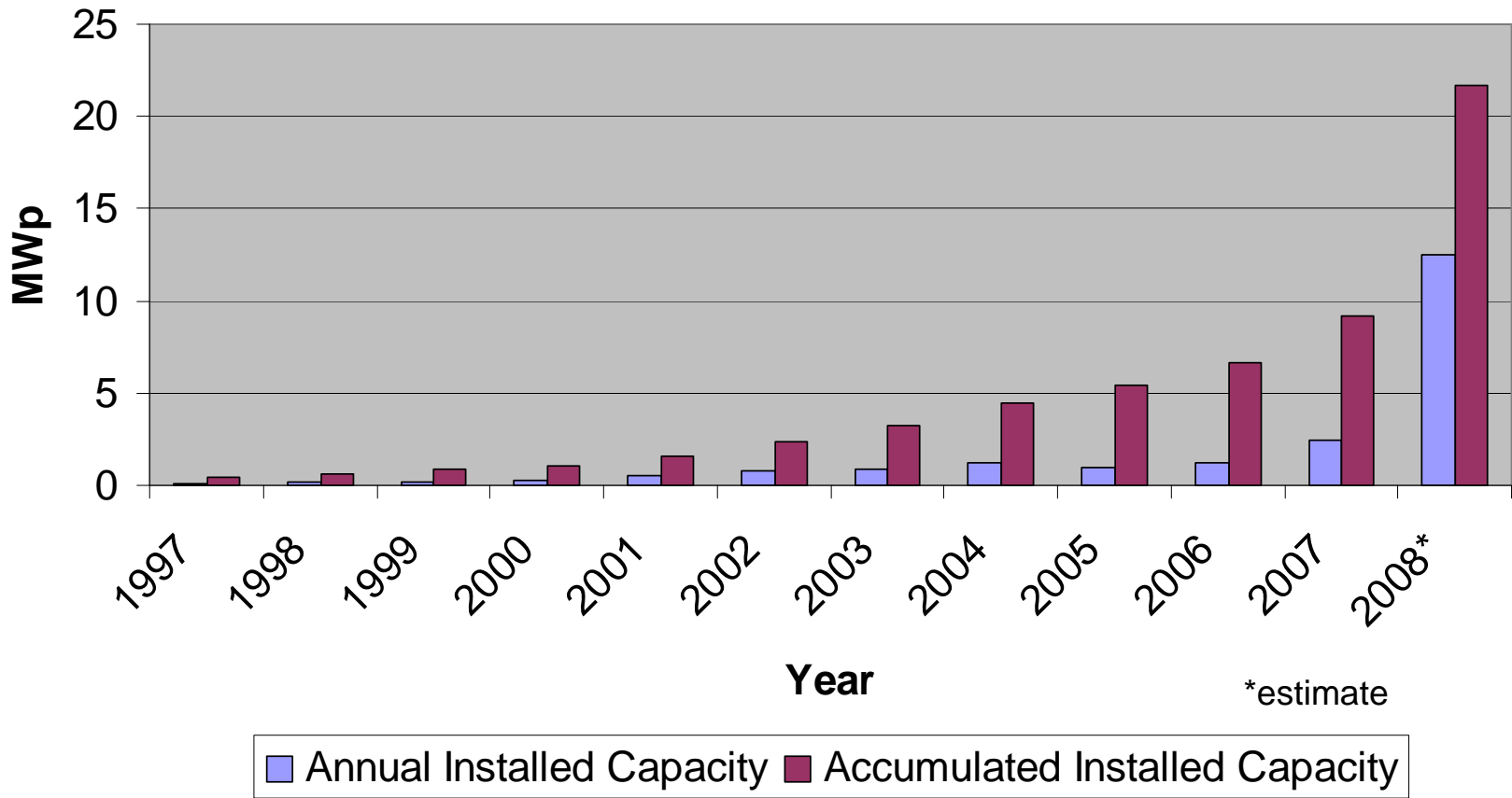
[4] Development of local **industry**



Market Prospects

- In Greece, more than 7000 applications (~3.2 GWp) have been submitted to the Regulatory Authority of Energy (RAE) for PV installation licenses. Minimum national target for ~800MWp by 2020
- Potential for very large projects (25-50MWp)
- Grid parity 2012-2015
- Sustainable market with large number of building integrated systems (BIPV)

Greek PV Market



Short (long) story

- 2kWp PV installation on private home roof (17sqm panel area)
- Installation completed in 2 days (4-5.12.05)
- Legal entity founded at tax authority: January 2006
- Connection contract with PPC in March 2006
- Electricity sales contract with HTSO in April 2006
- In July 2006 law 3468 comes into force. Procedures are simplified!
- September 2006: Planning authority document requirement!
- November 2006: First contact with planning authority
- June 2007: Planning authority document issued!
- September 2007: Revision of PPC contract
- November 07-January 08: 3 visits of PPC technicians
- 14.02.08: Connection with PPC

Do I want 2kWp on my roof?

- Equipment cost (2kWp): 12,000€ incl. VAT (19%)
 - Installation cost: A weekend of work with a friend
 - Maintenance: 0€
 - Accountant cost for legal entity initiation: 500€
 - PPC connection cost: 930€
 - Annual accounting fee: 700€/year
 - Mandatory Insurance (if no other employment): ~1,700€/year
 - Fixed annual connection fee for PPC: 16€/year
- => 13,430 € initial investment, 2,416 € annual cost**
- **Income from PV: ~1,350€/year incl. VAT (9%) (Taxable up to 40%)**
 - **Payback time: NEVER**

Answer: Please, NO!

Is there hope?

- Simplification of procedures, fast connection
- No planning authority documentation necessary
- No book keeping, hence no accounting cost or insurance
- Exemption from VAT and income tax

The above is considered by the Ministry of Development and will soon be formulated in a concrete proposal. (Also 1% monthly FiT reduction starting in 2010/11, 20year sales contract instead of 10+10)

The annual running cost will be reduced to zero and connection to the grid will be simpler and faster.

Tax incentives or initial capital investment subsidies may be considered. Bank loans will be available.

Answer: YES, definitely!

Grid Connected Applications on Buildings

- Replacement of expensive building materials
- Auxiliary role, architectural and aesthetic integration
- Use of existing infrastructure/surface, proximity to grid
- Decentralised production at location on consumption, saving transport losses
- Grid reinforcement – peak shaving
- Selling electricity to the grid at preferential price

Flat roof





Inclined roof – building material replacement



Building Façades



Shading



Sheds



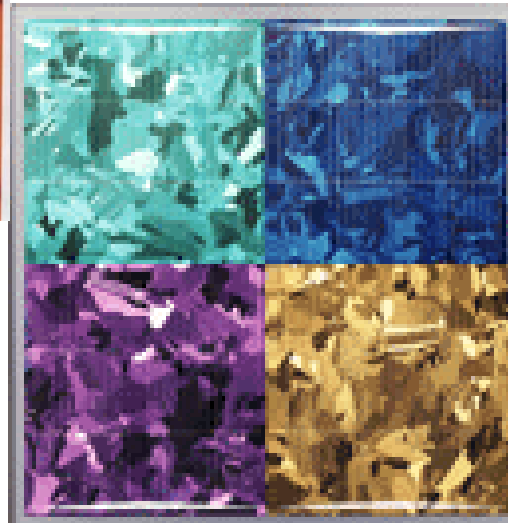
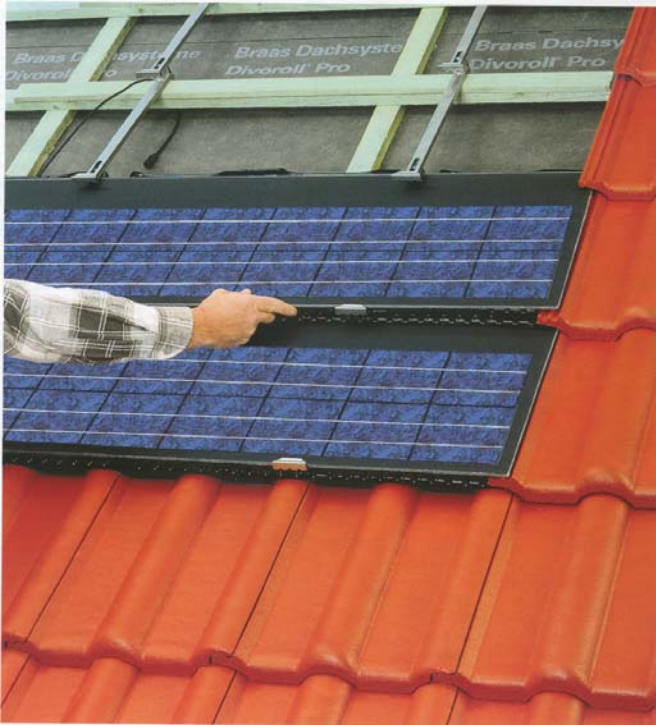
Glazing



Sound Barriers



Integration Solutions



HELAPCO

HELAPCO is a non-profit organization established by representatives of Greek photovoltaic companies in 2002.

The aim of HELAPCO is the promotion of Renewable Energy Sources, Energy Saving, Rational Use of Energy Resources, with emphasis on solar energy and particularly PV.

HELAPCO has currently 32 members and 13 new ones will be added by the end of the year.



HELAPCO

Solar Cells Hellas Group

Vertically Integrated PV Company



Wafer/Cell/Module Manufacturing:

Solar Cells Hellas S.A.

Soltech S.A.

System Design, Installation, Energy Saving, O&M

Reni S.A.



PV Plant Development

Solar Datum, 4E Energiaki, Solar Concept, Spes Solaris...

Solar Cells Hellas SA / Soltech S.A. General Info

- Founded in 2005
- Building and equipment installation completed in industrial area of Patras
- Cell production to start in October. Module and wafer production in early 2009.
- Initial capacity 30MWp/yr
- Full capacity: 60MWp/yr to be reached by Q1 2009.



- Building: 14.000m²
- Available land (privately owned): 37.000m².
- Working places: 230 (currently 60)
- www.schellas.gr



RENI – General Info

- Founded in 2007, aiming to promote RES system installation.
- High quality, professional turn-key solutions (concept, feasibility study, permit procedure, design, project, installation, commissioning, operation and maintenance)
- Central systems, domestic systems, grid connected or autonomous, energy saving solutions



R E N I
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- Simulation software Development
- Collaboration with largest manufacturers world-wide for equipment supply
- www.reni.gr

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