PVTRIN e-bulletin

May 2012

TRAINING OF PHOTOVOLTAIC INSTALLERS IN EUROPE

IN THIS ISSUE

The PVTRIN Scheme

Summary of the Initiative

PV installations fast growth has created a high demand for qualified installers.

In the EU, **465.000 PV jobs** will have been created until 2015; almost half of them in installation and maintenance. The shortage of competent workforce may result in a threat to the PV market. Certification schemes can provide reassurance that the installer has the capacity to complete a PV installation safely and effectively.

The PVTRIN (Training of Photovoltaic Installers) initiative addresses the market needs, by developing a training and certification scheme for technicians who are active in the installation and maintenance of small scale PV systems. This scheme incorporates the criteria set by the **2009/28/EC Directive** for qualification schemes and certified training courses in each Member State, taking into account the national framework and legislation, as well as the market's needs.

PVTRIN will, initially, be implemented in six (6) countries: **Greece, Bulgaria, Croatia, Cyprus, Romania** and **Spain**. In order to incorporate the genuine market needs and to assure the broadest possible support, the key stakeholder groups are involved in the project's activities.

The PVTRIN challenges are to:

- set the base for the adoption of a mutually acknowledged certification scheme
- establish a pool of local technicians who are competent at installing PV systems according multinational quality standards
- guarantee the best performance of PV installations, lowering risks or technical failures during the system's installation and life cycle
- reinforce PV technology's credibility and to boost the competitiveness of the PV industry

Long term, PVTRIN will contribute to the PV/BIPV market growth in the participating countries, provide a supporting instrument for EU MS to meet their obligations for acknowledged certifications for RES installers till **31/12/2012** and will enforce the MS efforts to achieve the mandatory target of a **20%** share of energy from RES in overall Community energy consumption by 2020.

More Information on the PVTRIN project:

www.pvtrin.eu | info@pvtrin.eu

Supported by INTELLIGENT ENERGY EUROPE

The need for Certification

What is Certification and why is it important?

In general terms, certification is:
'the confirmation that a product, process or person have met, and continue to meet, the appropriate quality standards'

While training schemes and certification can be seen by some as a barrier to market uptake in the short-term it has been proven time and time again that if appropriate standards are set and adhered to the whole supply chain benefits whether they be **product manufacturers, installers or investors**.

Independent certification is the process by which a third party gives –evidence based- written assurance that a product, process, service or person conforms to specified requirements. It is part of the risk reduction process. It does not diminish the need for skilled technicians and designers but provides assurance that the requirements of known and relevant standards have been met – it benefits everyone in the supply chain from the client to the manufacturer.

Certification programs accomplish the following goals:

- To provide a measure of reassurance by giving a credential for judging the competency of technicians
- To provide practitioners with a tool to distinguish themselves from their competition
- By underpinning quality, they improve the public perception of the occupation, helping maintain and improve the industry's reputation.

A certification scheme should be based on a well-defined standard derived from understanding of risks, problems or failures during design, manufacture, transport and use (including installation and life cycle) and prove independence of the certification body from vested interests.

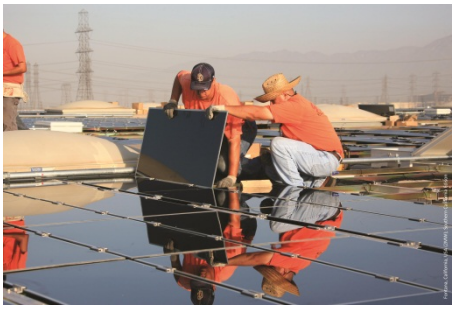
The PVTRIN Certification will offer:

To installers

- Proficiency
- Recognition
- Mobility
- Aspirations
- Employability

To PV investors

- Confidence
- Better system performance
- Reduced risks



To PV industry

- Efficient workforce
- Satisfied customers
- Lower operational costs
- Increased credibility

PVTRIN activities will result in:

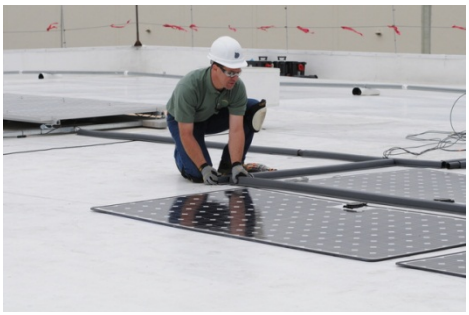
- Accredited training courses and operational certification scheme for PV installers in 6 countries
- Practical training material/tools for the installers and their trainers; web portal with access to technical information
- 8 pilot training courses implemented, a pool of skilled / certified PV installers in participating countries
- A roadmap for the adoption of the certification scheme across Europe.

CERTIFICATION

For more details regarding the PVTRIN Certification please contact TUC, the Project Coordinator, at **info@pvtrin.eu**.

SEE ALSO THE NATIONAL CONTACT POINTS LIST IN PAGE 6.

Benefits for installers, the PV industry and society



- Creating **a qualified installers workforce,** PVTRIN supports the EU PV Industry to address the need for skilled technicians. The increased confidence of PV investors will lead to market growth.
- The trained installers gain **professional competitive advantage,** improving their technical skills and knowledge; the certification provides the "passport" to the EU job market. The training material, tools and web platform will provide them a "***24/7***" technical assistance.
- **Developers and engineers** will profit by the existence of skilled installers. Involving them in their PV projects means efficient installations, less technical failures and satisfied customers.
- **PV investors** win confidence that the appropriate level of quality and performance is met and maintained for their PV system
- **National authorities** will find a supporting instrument to meet their obligations for acknowledged certifications for RES installers.
- The **entire society** is to benefit; the higher PV penetration to the energy mix will reduce the greenhouse gas emissions improving citizens' quality of life.

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Case Study

PV System at Athens Metro Mall, Greece

Summary

Designed with the aim of saving resources and being environmental friendly, Athens Metro Mall combines various characteristics that make it a bioclimatic building with very low energy consumption. Solar panels cover **400 m²** on the south side of the building, achieving a reduction in energy consumption of up to **5%**.

FAST FACTS

Total installed power

51 kWp

Total cost of system

2,78 €/Wp

Background description

The BIPV consists of two façades and the south side of the Trade center "*Athens Metro Mall*".

The entire project was financed by the owner of the trade center, TALIMA VENTURE INC. and the project was completed in 20 days.

Technical description

- Total installed power: **51 kWp**
- Area needed per Kw: **7,72 m²**
- PV technology used: Crystalline silicon
- Type of modules: SCH660P from SOLAR CELLS HELLAS SA
- Type of Inverter: Sunergy ELV 230/5000W
- Maintenance services are delivered under contract by ACE POWER ELECTRONICS
- Warranties: **5 years** for Inverter and PV panels
- Lifetime of solution: approximately **25 years**.

Economic aspects

- Total cost of solution and cost of PV: **€142.000**, 2,78 €/Wp
- Feed-in tariffs, subsidies, local / regional or national grants: The system feeds energy into the public grid. The energy is paid according to the feed-in tariff – 0,394 €/KWh by the public power corporation (PPC).

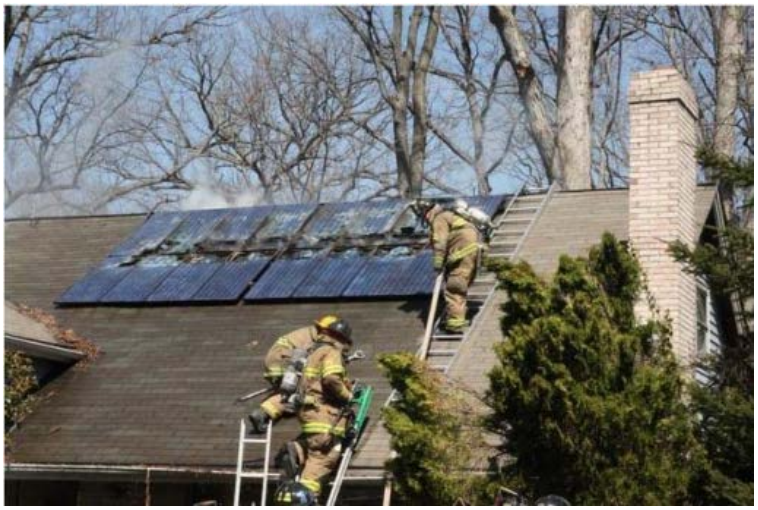
In theory the system will produce approximately **39,9MWh/year** which means that the total investment will paid in **9 years**.

Results/achievements

- Energy production: **39.900 kWp /year**
- CO_2 emissions savings: **23.940 kg/year.**

PV Installation and Maintenance

Common Failures



As a general comment, most common failures are not encountered because of bad practices in one specific step, but are a combination or accumulation of suboptimal actions in different stages or simply due to wrong or inadequate communication between the designers and the installers.

To avoid this kind of fault, the PV sector needs a diverse and qualified workforce. A skilled labor calls for an appropriate training and certification scheme.

Nowadays, most of the equipment has known incredible improvements in terms of quality and safety. Also testing requirements are better defined than before and the processes for testing are becoming more and more standardized.

In terms of failures related to PV systems, the focus nowadays has shifted away from the components. Today, it is the planning, design and physical installation of the system, rather than the reliability and performance of the components it selves that need further improvement.

There are a number of stages in the development of a PV system in which mistakes can occur:

- Site selection
- Design and planning of the system
  - *Selection of components*
  - *Mechanical failures*
  - *Electrical failures*
- Physical installation of the components
  - *Mechanical failures*
  - *Electrical failures*
- Safety (personnel safety as well as safety of installation from e.g. external exposures)
- Service, including inspection & maintenance (insufficient)

Site selection

Common failures in the field of initial site selection for rooftop systems are very rare. Most installers (as well as end-customers) are aware of the importance of orientation and inclination of the PV installation. We will see almost no north-facing installations on residential roofs.

Unfortunately, shading is not always taken into account and more easily overlooked by the designer / installer. Therefore, it is important to perform detailed solar resource predictions, taking into account the orientation, inclination and all potential shading by surrounding trees and/or buildings.

Design and planning of the system

Common mistakes to be encountered in this stage are then:

- Incorrect energy yield prediction
- Different azimuths or inclinations in the same string
- Strings with modules of different power rating
- Stability: insufficient structural load calculations
- Sizing: e.g. undersized cables
- Shading problems not sufficiently taken into account
- Mismatch: e.g. inverter mismatch or generation meter not well fitted to inverter output
- Incorrect circuit protection
- No lightning protection, grounding and surge protection
- Building codes and electrical codes for grid connection not taken into account
- Missing documentation at late stages of design (not compliant with IEC standard).

Physical installation of the components

Common mistakes to be encountered in this stage are then:

- Installer does not follow the design of the system
- Insufficient inverter & module ventilation (the area around the inverter should be kept clear to allow good air flow for proper cooling
- Roof perforation without adequate sealing methods

- Poor wiring: tight or loose cables
- Labeling not present or incorrect
- No grounding or lightning protection
- No intervention in the case of rust
- Badly placed sensors.

Storm damaged modules

Safety

Safety issues include both the personnel level (worker safety) as well as the product level (safety of installation).

Worker safety:

Ideally, a team responsible for the installation of a PV system should consist of an electrician and a roofer. The electrician should manage the electrical DC connections as well as the connection to the grid, whereas the roofer should have sufficient experience to manage the installation of the panels mechanically on the roof and make the interconnections between the modules on the DC side. Ideally, electricians, roofers and other construction workers are to bring their knowledge together in a new kind of job description which could be called "**solar installer**".

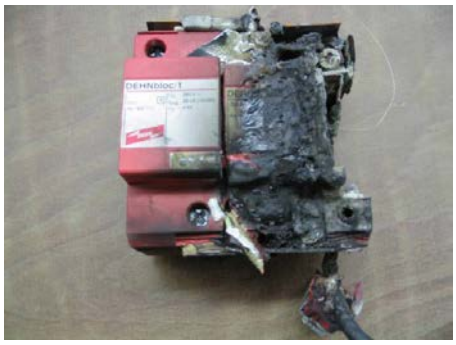
Safety of installation:

Multiple solutions are available in all stages of design and installation, such as selecting and designing the site in order not to block the access for fire departments, foresee sufficient labeling and applying it correctly, designing the electrical plan (for cables and other electrical equipment) in accordance with safety requirements etc.

Service, including inspection and maintenance

Common mistakes to in this area are:

- Manuals, warranties, test certificates, grid connection docs not supplied to owner/operator
- Not being able to deliver information on the latest innovations and specialised applications (BIPV)
- Not being able to deliver information on administrative requirements, grid connection procedures, support schemes and other related benefits
- Too aggressive sales attitude
- Failure to deliver quick and adequate inspection and maintenance services.



Overvoltage converter

FOR MORE INFORMATION

Detailed information on PV Installation and maintenance will be available for the PVTRIN trainees, during the training courses.

Please contact the National Coordinator for information on the Training Courses.

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PVTRIN Contact Points

The project consortium

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PROJECT PARTNERS

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- Building Research Establishment Limited (**BRE**), UK
- Energy Institute Hrvoje Požar (**EIHP**), Croatia
- European Photovoltaic Industry Association (**EPIA**), EU
- Scientific and Technical Chamber of Cyprus (**ETEK**), Cyprus
- Sofia Energy Centre (**SEC**), Bulgaria
- Technical Chamber of Greece –Western Crete (**TEE**), Greece
- Tecnalia Robotiker (**TECNALIA**), Spain

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