IEA International Energy Agency

CO-OPERATIVE PROGRAMME ON PHOTOVOLTAIC POWER SYSTEMS

TASK 1

Exchange and dissemination of information on PV power systems

NATIONAL SURVEY REPORT ON PV POWER APPLICATIONS IN ITALY

2006

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FOREWORD

The International Energy Agency (IEA), founded in November 1974, is an autonomous body within the framework of the organisation for Economic Co-operation and Development (OECD), which carries out a comprehensive programme of energy co-operation among its 23 member countries. The European Commission also participates in the work of the Agency.

The IEA Photovoltaic Power Systems Programme (IEA-PVPS) is one of the collaborative R & D agreements established within the IEA and, since 1993, its participants have been conducting a variety of joint projects in the applications of photovoltaic conversion of solar energy into electricity.

The nineteen participating countries are Australia (AUS), Austria (AUT), Canada (CAN), Denmark (DNK), Finland (FIN), France (FRA), Germany (DEU), Israel (ISR), Italy (ITA), Japan (JPN), Korea (KOR), Mexico (MEX), The Netherlands (NLD), Norway (NOR), Portugal (PRT), Spain (ESP), Sweden (SWE), Switzerland (CHE), The United Kingdom (GBR) and The United States of America (USA). The European Commission is also a member.

The overall programme is headed by an Executive Committee composed of one representative from each participating country, while the management of individual research projects (Tasks) is the responsibility of Operating Agents. Nine Tasks have been established, and currently seven are active. Information about the active and completed tasks can be found on the IEA-PVPS website www.iea-pvps.org .

This report is related to the status and trends of PV power applications in Italy in 2006 and is intended for the use of IEA Photovoltaic Power System Programme experts. It has been prepared by:

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The authors are greatly indebted with several experts from ENEA, CESI, ENEL and PV Industries, who have supplied information on PV systems and components installed in Italy.

INTRODUCTION

The objective of Task 1 of the IEA Photovoltaic Power Systems Programme is to promote and facilitate the exchange and dissemination of information on the technical, economic and environmental aspects of photovoltaic power systems for application by utilities and other users.

An important deliverable of Task 1 is the annual International Survey Report on PV power applications. This report gives information on trends in PV power applications in the twenty member countries, and is based on the information provided in the National Survey Reports which are produced annually by each Task 1 participant.

As the International Survey Report is based on the National Survey Reports, they have been prepared by national experts following guidelines adopted by Task 1 participants. The International Survey Report is an external publication of the IEA-PVPS Implementing Agreement so it must not contain confidential information. In contrast the National Survey Reports are classified as internal reports and are not published within the IEA-PVPS Implementing Agreement. When preparing National Survey Reports, experts have made their own arrangements with their sources on how to treat confidential information (e.g. by restricting circulation or ensuring anonymity of the data).

In Annex A an explanation is given about the method used in our country to gather the information and on the accuracy of data.

DEFINITIONS, SYMBOLS AND ABBREVIATIONS

For the purposes of the National Survey Reports, the following definitions have been applied:

PV power system market: The market for all nationally installed (terrestrial) PV applications with a PV power capacity of 40 Wp or more.

Installed PV power: Power delivered by a PV module or a PV array under standard test conditions (STC) – irradiance of 1 000 W/m^2, cell junction temperature of 25^{o}C, AM 1,5 solar spectrum – (also see 'Rated power').

Rated power: Amount of power produced by a PV module or array under STC, written as Wp.

PV system: Set of interconnected elements such as PV modules, inverters that convert d.c. current of the modules into a.c. current, storage batteries and all installation and control components with a PV power capacity of 40 Wp or more.

Module manufacturer: An organisation carrying out the encapsulation in the process of the production of PV modules.

Off-grid domestic PV power system: System installed to provide power mainly to a household or village not connected to the (main) utility grid(s). Often a means to store electricity is used (most commonly lead-acid batteries). Also referred to as 'stand-alone PV power system'. Can also provide power to domestic and community users (plus some other applications) via a 'mini-grid', often as a hybrid with another source of power.

Off-grid non-domestic PV power system: System used for a variety of applications such as water pumping, remote communications, telecommunication relays, safety and protection devices, etc. that are not connected to the utility grid. Usually a means to store electricity is used. Also referred to as 'stand-alone PV power system'.

Grid-connected distributed PV power system: System installed to provide power to a grid-connected customer or directly to the electricity grid (specifically where that part of the electricity grid is configured to supply power to a number of customers rather than to provide a bulk transport function). Such systems may be on or integrated into the customer's premises often on the demand side of the electricity meter, on public and commercial buildings, or simply in the built environment on motorway sound barriers etc. They may be specifically designed for support of the utility distribution grid. Size is not a determining feature – while a 1 MW PV system on a rooftop may be large by PV standards, this is not the case for other forms of distributed generation.

Grid-connected centralized PV power system: Power production system performing the function of a centralized power station. The power supplied by such a system is not associated with a particular electricity customer, and the system is not located to specifically perform functions on the electricity grid other than the supply of bulk power. Typically ground mounted and functioning independently of any nearby development.

Turnkey price: Price of an installed PV system excluding VAT/TVA/sales taxes, operation and maintenance costs but including installation costs. For an off-grid PV system, the prices associated with storage battery maintenance/replacement are excluded. If additional costs are incurred for reasons not directly related to the PV system, these should be excluded. (E.g. If extra costs are incurred fitting PV modules to a factory roof because special precautions are required to avoid disrupting production, these extra costs should not be included. Equally the additional transport costs of installing a telecommunication systems in a remote area are excluded).

Field Test Programme: A programme to test the performance of PV systems/components in real conditions.

Demonstration Programme: A programme to demonstrate the operation of PV systems and their application to potential users/owners.

Market deployment initiative: Initiatives to encourage the market deployment of PV through the use of market instruments such as green pricing, rate based incentives etc. These may be implemented by government, the finance industry, utilities etc.

NC: National Currency

Final annual yield: Total PV energy delivered to the load during the year per kW of power installed.

Performance ratio: Ratio of the final annual (monthly, daily) yield to the reference annual (monthly, daily) yield, where the reference annual (monthly, daily) yield is the theoretical annual (monthly, daily) available energy per kW of installed PV power.

1 EXECUTIVE SUMMARY

The amazing amount of subsidy demand recorded at the beginning of the year 2006 has been well beyond the availability of the feed-in tariffs foreseen by the Ministry of the Economic Development (MED) initial decree, amounting to 100 MWp. As a consequence, in order to provided the basis for an expansion of PV market in Italy, a new MED decree issued on February 2006 has increased the value of the admitted power up to 500 MWp and has introduced an annual limit of 85 MW in order to ensure a more stable situation.
However, in spite of the large interest of designers, architects, investors and common citizen as well as the real availability of prosperous feed-in tariffs, only a small fraction of the admitted projects by the Feed-in Programme has been effectively realised. In this contest:

- the **cumulative installed PV power** in 2006 increased only of about 12,5 MW reaching a total power of almost 50 MWp;
- at the same time, the enormous demand of PV plant has not yet been effectively followed by an adequate growth of the national **PV industry**, although recent initiatives seem prefigure valuable development plans: i.e., an initiative of the Ministry of Environment on CdTe module production, some shy signals coming from the MED as well as some initiatives aimed to crystalline module production
- the **prices** of modules have recorded a slight decrease with respect to the previous year;
- in the field of **research and demonstration**, the expenditure have been about 5 M€, remaining essentially flat with respect to the previous years and not adequate to the Feed-in Programme aims, even if a decree issued by MED has introduced soft loans for RD&D activities, privileging the ones carried out in cooperation between Industry and Research Institutions.

2 THE IMPLEMENTATION OF PV SYSTEMS

The PV power system market is defined as the market of all nationally installed (terrestrial) PV applications with a PV capacity of 40 Wp or more. A PV system consists of modules, inverters, batteries and all installation and control components for modules, inverters and batteries.

2.1 Applications for photovoltaics

In Italy can be identified four significant sectors of PV power system applications:

- Off-grid domestic systems: supported trough 80% capital incentive in order to provide electricity to about 5000 isolated households in rural remote areas in Southern Italy in the early eighties. Afterwards the growth has reached a saturation value of 5.3 MWp in the late eighties;
- Off-grid non-domestic applications: constantly increasing, but difficulty assessed in terms of total installed power, represent with 7 MW a share of about 20% of the cumulative installed capacity in Italy;
- On-grid centralized systems: boosted in the nineties by the financial support of the European Community, ENEA (the Italian Agency for New Technology, Energy and the Environment) and ENEL (the biggest Italian Electricity Utility) with the aim to validate satisfactory solutions for power generation by means of medium and large size grid-connected plants, for utility applications. This application is however expected to grow again, being allowed to benefit of feed-in tariffs;
- On-grid distributed systems, growing to 18.5 MWp over the last year and now dominating with a share of about 50% Italy's cumulative installed power. These systems firstly promoted by the Italian roof-top Programme are continued to be supported by feed-in tariffs.

2.2 Total photovoltaic power installed

During the year **2006** the total power of the photovoltaic system that have been installed in Italy sums to about **12.5 MWp**. Taking into account the cumulative power reached during the previous years, at the end of 2006 a total capacity of about 50 MWp, with an increase around 33%, results installed in Italy. Most of this increase has been due to the expansion of on-grid distributed systems market that now account for 60% of the total power installed.
In Table 1 is presented the total cumulative installed PV power for each submarket on the 31 December from the year 1992 onwards.

Table 1: The cumulative installed PV power in 4 sub-markets.

Sub-market/ application	31/12/ 92 kWp	31/12/ 93 kWp	31/12/ 94 kWp	31/12/ 95 kWp	31/12/ 96 kWp	31/12/ 97 kWp	31/12/ 98 kWp	31/12/ 99 kWp	31/12/ 00 kWp	31/12/ 01 kWp	31/12/ 02 kWp	31/12/ 03 kWp	31/12/ 04 kWp	31/12/ 05 kWp	31/12/ 06 kWp
off-grid domestic	3 950	4 350	4 700	4 830	4 962	5 052	5 210	5 220	5 240	5 300	5 300	5 300	5 300	5 300	5 300
off-grid non-domestic	3 750	4 150	4 650	4 780	4 792	4 814	5 100	5 640	5 890	6 350	6 365	6 400	6 700	7 000	7 500
on-grid distributed	100	100	150	335	404	677	780	905	1 155	1 635	3 620	7 600	12 000	18 500	30 000
on-grid centralised	680	3 480	4 590	5 850	5 850	6 166	6 590	6 715	6 715	6 715	6 715	6 700	6 700	6 700	6 700
TOTAL	8 480	12 080	14 090	15 795	16 008	16 709	17 680	18 480	19 000	20 000	22 000	26 000	30 700	37 500	50 000

It is worth mentioning that the accuracy of the assignment to this year is related to the actual date of the start of plant operation. Inadequate statistics of this information makes assessment accuracy around 10%.

2.3 Major projects, demonstration and field test programmes

In the following are described the major programmes and projects operating in Italy.

Feed-in Programme

The decrees issued by the MED in July 2005 and in February 2006 included a feed-in tariff for the whole electric energy produced by the PV plant at which must be added the value of the electricity that can be partially or totally sold to the local electric Utility. These incentives were addressed to individuals, registered companies, public bodies and condominiums. The overall power, which was expected to be supported, was 500 MWp, with an annual limit of 85 MW and a final target of 1.000 MWp by the year 2015.

In order to be eligible for the incentive scheme, PV plants must be 1) connected to low or medium voltage grid; 2) ranging from 1 kW to 1 MW; 3) use components which accomplish with technical standards; 4) be put into operation within 1 year from the approval (or 2 years for plants larger than 50 kW).

The tariff of produced electric energy varies with the nominal power of the plant and ranges from 0,445 €/kWh to 0,490 €/kWh. The duration of the support is 20 years and the tariffs are updated on a yearly basis, taking into account the official inflation rate. A tariff reduction of 5 %/year is applied to PV plants for which the support request is delivered after 2006.

Moreover, the electricity produced by the PV plant can be used by owner for its own consumption or sold to the local Utility; this benefit is maintained also after 20 years. A tariff increase of 10% has been foreseen for Photovoltaic systems integrated in building structures

For plants larger than 50 kWp, the tariff is subject to a tender mechanism, which favours the tariff with a lower value. For these plants, a bank guarantee of 1.000 €/kWp is requested as a penalty, in the case the PV plant is not installed within the deadline fixed by the decree.
The decrees state that promotion tariffs are 1) reduced by 30% if combined with fiscal incentives; 2) not applicable to PV plants which have obtained incentives from public bodies exceeding 20% of investment cost and; 3) not compatible with green certificates.
In the first quarter of 2006 have been admitted to the feed-in tariffs about 3.190 projects, concerning plants up to 50 kWp (corresponding to about 91,2 MWp) and 36 over 50 kWp (28,3 MWp). Taking into account that in the year 2005 have been admitted about 9.000 project up to 50 kWp (197,3 MWp) and 116 over 50 kWp (70,7 MWp) on the whole, since the beginning of the Programme in September 2005, considering the annual limit of 85 MW introduced in February 2006, have been positively evaluated project for a total power of about 388 MWp. The total power of plants up to 50 kWp, corresponding to 288 MWp, should be installed within 12 months from approval (then, by July 2007 - March 2008 at latest) while the other 100 MWp of the plants larger than 50 kWp should be installed within 24 months from approval (then, by July 2008 - March 2009 at latest).
However, in spite of the large interest of designers, investors and citizen, only a small fraction of the admitted projects corresponding to 12 MWp has been effectively realised within 2006 while a total power of 130 MWp is expected to be installed within March 2009.

Demonstration Programme
The activities currently performed in the framework of the Demonstration Programme concern the analysis, tests, long term performance evaluations as well as operation and maintenance procedures carried out by *ENEA* (the Italian Agency for New Technology, Energy and Environment) on its own plants and on BIPV systems installed on public building of Municipalities and Universities in some important Italian cities. Furthermore, performance evaluation of photovoltaic components and plants are carried out by *CESI RICERCA* (the Institute for Research on electricity and energy sector), in order to assess long-term behaviour of PV technology in different climatic conditions and in different electric configurations.

Table 1a summarizes the major programmes in Italy.

Table 1a: Summary of main demonstration and field test programmes

Project Date plant start up	**Technical data Economic data**	**Objectives**	**Main accomplishments until the end of 2006 Problems and lessons learned**	**Funding**	**Project management**	**Remarks**
Fee-in Programme 2005	Tariffs from 0.445 to 0.49 €/kWh plus net metering or sale	- 1,000 MW by 2015	Admitted application for a total power of 388 MW but: - only 12 MW in operation at the end of 2006; - 376 MW expected by March 2009	About 0.44 Euro per kWh produced (corresponding to about 65 M€/year)	GSE (Manager of the National Electric Services)	Applications submitted well beyond the initial limit of 100 MW
Demonstration Programme 1991	10 grid connected plants, for utility applications, ranging from 100 kW to 3,3 MW and 25 BIPV systems	- to identify and to validate satisfactory solutions - to evaluate long term performance - to asses the architectural integration	Data collection, long term performance evaluation and maintenance experience in progress	ENEA – CESI 0.2 M€/year	ENEA - CESI	The plant have been installed in the framework of the Italian Demonstration Programme and the Roof-top Programme

2.4 Highlights of R&D

Research, development and demonstration activities on photovoltaics devices and systems are mainly conducted by ENEA and CESI RICERCA (a new research company owned by ENEA and CESI, the Institute for Research and Certification of Electric Components and Systems), with the support, in some cases, of Universities and CNR (the National Council for Scientific Research).
ENEA is the main PV Research organization operating in Italy. Its most significant crystalline silicon R&D activities concern the setup and optimization of fabrication processes of several kinds of innovative cells through laser assisted processes, buried contact and selective emitter technology, advanced screen-printing. Other important activities concern the optimisation of high efficiency crystalline silicon cells (EU Project), the development of thin film cells for BIPV as well as Cu_2O solar cells research.
As far as thin films, microcrystalline Si devices are still a main line of activity with the aim of improving the stabilized efficiency of integrated large area modules. A new cluster tool has been installed to begin a new investigation on micromorph tandem solar cell which first result consists in a cell efficiency of 11.3%.
Last, but not least, ENEA is working on the PhoCUS (Photovoltaic Concentrators to Utility Scale) Project, aimed at investigate concentrators technologies and to assess the technical and economical feasibility of this application in Italy for centralised generation of electricity. During the last year experimental activities are carried out on standard units of 5 kW and concentrating modules.
CESI RICERCA is carrying out activities in research and development on electricity and energy sector, by a Research Fund for the Italian Electrical System financed by the Ministry of Economic Development. An important research consists in the high efficiency solar cells for terrestrial applications, mainly based on three-five compounds. Besides, triple junction solar cells (InGaP/InGaAs/Ge) are under development and qualification. GaAs single junction and multi-junction concentrator solar cells are also manufactured for terrestrial application. In this field, CESI is involved in industrial manufacturing of high efficiency solar cells for space and terrestrial applications, mainly based on GaAs.
Furthermore CESI RICERCA is involved in components' characterization and performance evaluation of PV systems and in the analysis and testing of PV modules based on advanced solar cells (thin films, amorphous silicon, etc.) and innovative components (e.g. inverters).
Finally, in the field of PV systems, CESI RICERCA is involved on research and demonstration activities for electrification of remote communities, funded by MED.

2.5 Public budgets for market stimulation, demonstration/field test programmes and R&D

Public budget for R&D and market incentives totalled 11 M€ in the year 2006. In particular, expenditure on PV research and demonstration have been about 5 million of Euro, remaining essentially flat with respect to the previous years while the ones for market stimulation have been around 6 M€. Table 2 gives figures, for the year 2006, on budgets in National Currency from the authorities for R&D, demonstration and market incentives

(public subsidies, fiscal incentives, and amounts collected) on the national/federal level, and on the state/regional level.

Table 2 Budgets for R&D, demonstration programmes and market incentives in Italy for the year 2006.

	R & D	Demo	Market
National/federal	4,8 M€	0,2 M€	6 M€
State/regional			
Total	4,8 M€	0,2 M€	6 M€

3 INDUSTRY AND GROWTH

3.1 Production of feedstock and wafers

During the year 2006 have not been produced ingots nor wafers in Italy, as a consequence cells have been fabricated from imported wafers.

3.2 Production of photovoltaic cells and modules

In Italy can be identified two major manufacturers of PV modules and some assembling companies.
A major PV module manufacturer is Enipower (formerly Enitecnologie) owned by ENI Italian oil company. Its manufacturing facilities have a production capability of about 10 MWp/year. On the overall, in the last year the Enipower module production has been of 3 MWp. Both single-crystal and multi-crystalline silicon cells are currently produced from wafers imported from China. Moreover Enipower production includes also specially designed modules for roof-tops and facades.
Another important Italian module manufacturer is Helios Technology. Its manufacturing facilities have a production capability of 10 MWp/year. In the last year Helios Technology module production has been of 8 MWp. Helios Technology module manufacturing process comprehends the fabrication of cells and modules from mono-crystalline silicon wafers.
Further companies assembling and encapsulating standard or tailor-made modules can be found in Italy. During the year 2006 the modules produced by such companies sums to about 16 MW.
The average module prices has continued to increase in 2006, reaching lowest values of 3.4 €/W for reasonable volume orders. For small orders, prices range typically from 3.7 €/W to 4.2 €/W.

Table 4: Production and production capacity information for the year 2004 for each module manufacturer

Cell/Module manufacturer	Technology (sc-Si, mc-Si, a-Si, CdTe)	Total Production (MWp) Cell	Module	Maximum production capacity (MWp)
Enipower	sc-Si / mc-Si	3	3	10
Helios technology	sc-Si	8	8	10
Other Companies	mc-Si		16	30
TOTALS (where applicable)		11	27	50

Table 4a: Module prices for a number of years

Year	1993	1997	2000	2001	2002	2003	2004	2005	2006
Module price(s) €/W	4.65	4.13	4.13	3.85 – 4.65	3.5 – 4.3	3.1 – 3.9	3 – 3.6	3.2 - 4	3.2 – 3.6

3.3 Manufacturers and suppliers of other components

About 10 companies manufacture inverters for on-grid and off-grid applications. Some of these have experience in inverters for large PV power plants, while others have produced 1.5-10 kVA inverters under Electric Utilities specifications. In Table 5 are given, further information on the prices of inverters.

Table 5: Price of inverters for grid-connected PV applications.

Size of Inverter	1 - 10 kVA	10 - 100 kVA
Average Price per kVA (€)	500 – 800	400 - 600

An estimation of the number of companies that install PV systems in Italy overtakes 120 units. These are specialist PV companies offering consultancy, installation services and component delivery, including the ENEL Group, CESI and some electric municipalities. The most important operators in this field are associated in the Italian PV firms Group (GIFI).

3.4 System prices

Table 6 gives the prices (excluding VAT/TVA/sales tax) in €/Wp for specific shipments of typical PV plants in the 4 categories of installation.
Prices do not include recurring charges after installation such as battery replacement or operation and maintenance. Additional costs, incurred due to the remoteness of the site or special installation requirements, are also not included.

Table 6: Prices of typical applications

Category/Size	Typical applications and brief details	Price per Wp in Euro
OFF-GRID Up to 1 kWp	Street lighting Rural electrification	11 - 14
OFF-GRID >1 kWp	Rural electrification Industrial application	11 - 13
GRID CONNECTED Up to 10 kWp	Distributed generation	6.0 – 6.8
GRID CONNECTED From 10 kWp to 100 kWp	Distributed generation	5.0 – 6.0

Table 6a: National trends in system prices for small grid connected systems (up to 10 kWp)

YEAR	1998	1999	2000	2001	2002	2003	2004	2005	2006
Price €/Wp	9.3	8.8	7.75	7.4	7.5	7.3	6.8	7	6.4

3.5 Labour places

Full time labour places in the following activities during the year 2006 are:
a) Research and development: 70
b) Manufacturing of PV system components: 100
c) All other, including electricity companies, installation companies etc.: 550.

3.6 Business value

In the year 2006 approximately 12 MW of on-grid applications and 500 kW of off-grid applications have been supplied into the Italian market. At average price of 6.4 €/Wp and 12 €/W respectively, the local market of these applications has been around 84 M€. Of this capacity about 75% of the installed modules (9.4 MW) have been imported, as a consequence a rough estimation of the exported modules during the year 2004 lead to a figure of about 24 MW, being produced by the Italian PV industry about 27 MW. At an

average price of 3,4 €/Wp the total value of the exported modules has been approximately 81 M€. Therefore, in Italy the overall net value of PV manufacture and sale has been in 2004 around 165 M€.
On the other hand, in the year 2006 have been imported:

- about 2000 inverters (average power 6 kW), corresponding to 8 M€
- 9 MW of modules (30 M€);
- 27 MW of wafers (24 M€):

As a consequence, in Italy the net value of the products has been about 103 M€.

4 FRAMEWORK FOR DEPLOYMENT (NON-TECHNICAL FACTORS)

4.1 New initiatives

A new edition of the feed-in decree has been issued in February 2007. The overall power, which is supported, is 1200 MWp while a final target of 3000 MWp is expected by the year 2016. The mechanism introduced in this new decree should eliminate the "licence trade" phenomenon that has characterized the July 2005 and in February 2006 feed-in decrees, being incentivating tariffs addressed only to plants already installed and not at plant preliminary design phase. Besides, the tariffs will privilege building integrate applications and will be related to improvements adopted for energy saving in building sector. Moreover in this decree, the issue of acts aimed at promoting the development of innovative photovoltaic technologies is foreseen.

Utility perception of PV
Several Utilities continue to support the implementation of photovoltaic distributed generation, co-operating with ENEA, CESI RICERCA, installers as well as inverter producers, to overcame some technical barriers related to grid interface aspects which cause increase of costs. On the side of bureaucratic delays barrier, the Italian Authority for Electric Energy and Gas has recently issued (April 2007):

- the technical and economic conditions for the connection of production plants to the low voltage grid;
- the instructions concerning the measure of the electric energy produced by photovoltaic plants.

Changes in public perceptions of PV
The popular acceptance for photovoltaics continue to be constantly increasing especially after the introduction of feed-in tariffs related to improvements adopted for energy saving in building sector. In particular, the interest in photovoltaic is confirmed by massive participation of citizens and public institutions to incentivating initiatives as well as the involvement of students, teachers, designer and architects in lectures, training courses or seminars. In this contest, ENEA, ISES, CESI RICERCA, CEI (the Italian Committee for electric system standardization) as well as IEA-PVPS are providing a valuable source of information on PV technology, through Conference, Exhibitions, Handbooks, training courses, workshops and web sites.

4.2 Indirect policy issues

The Italian Ministry of the Economic Development together with the Ministry of Environment and Land and Sea Protection (MELSP) are fully convinced that the development and the diffusion of renewable technologies combined with energy saving measures constitute a significant opportunity perfectly in agreement with the European directives. In this contest, an Inter-ministerial decree in concert with the Ministry of the Economy and Finances has introduced fiscal detractions for energy saving improvements as well as solar thermal utilization, up to 55% of capital cost.

4.3 Standards and codes

During this year, the Technical Committee 82 of CEI has issued the guide for the design, installation and test of PV plants connected to low and medium voltage grid. As a result of this effort, the realization of PV plants and the connection to the grid is going to reach to be nearly routinely performed.
At international level, Italy has actively participated to the works on new and revised standards carried out within both IEC and CENELEC working groups. In this contest, the Technical Secretariat of CENELEC TC 82, is managed by the Italian Electrotechnical Committee (CEI).

5 HIGHLIGHTS AND PROSPECTS

The new edition of the feed-in decree should ensure a stable situation providing the basis for the expansion of PV market in Italy, through higher values of the incentivated power which should be effectively followed by an adequate growth of the national PV industry.

Moreover, in this contest the issue of acts aimed at promoting the development of innovative photovoltaic technologies is foreseen, following MELSP initiative on CdTe module production. Some shy signals are coming also from MED that has introduced soft loans for developing activities between Industry and Research Institution and has approved the three year plan for the research in the framework of the national electric system.

ANNEX A - METHOD AND ACCURACY OF DATA

The value of the PV power installed in 2006 has been obtained collecting data from module producer, installers, Regions and the Manager of Electric Services (GSE) that manages the feed-in Programme. The accuracy of these data is related to the actual date of the start of plant operation. Inadequate statistics of this information makes assessment accuracy around 5%. Major uncertainty (20%) is associated to the real quantity of installed *off-grid domestic* PV plants, whose installation often is arranged directly by the user.

Prices of PV systems and components are strongly dependent on the number of units per shipments and on their technical characteristics. Values are supplied only for specific shipments.