INTERNATIONAL ENERGY AGENCY

CO-OPERATIVE PROGRAMME ON PHOTOVOLTAIC POWER SYSTEMS

Task 1

Exchange and dissemination of information on PV power systems

National Survey Report of PV Power Applications in Italy 2012

Prepared by

Salvatore Castello, Anna De Lillo, ENEA
Via Anguillarese, 301 00123 S.M. Galleria RM – www.enea.it

Salvatore Guastella, Fabrizio Paletta, RSE S.p.A.
Via Rubattino 54 – I 20134 Milano – www.rse-web.it

May 2013

TABLE OF CONTENTS

Definitions, Symbols and Abbreviations 3
Foreword 6
Introduction 7
1 Executive Summary 8
1.1 Installed PV power 8
1.2 Costs & prices 8
1.3 PV production 8
1.4 Budgets for PV 8
2 The implementation of PV systems 9
2.1 Applications for Photovoltaics 9
2.2 Total photovoltaic power installed 9
2.3 PV implementation highlights, major projects, demonstration and field test programmes 12
2.4 Highlights of R&D 12
2.5 Public budgets for market stimulation, demonstration / field test programmes and R&D 12
3 Industry and growth 13
3.1 Production of feedstocks, ingots and wafers 13
3.2 Production of photovoltaic cells and modules 13
3.3 Module prices 14
3.4 Manufacturers and suppliers of other components 15
3.5 System prices 15
3.6 Labour places 16
3.7 Business value 16
4 Framework for deployment (Non-technical factors) 18
4.1 Indirect policy issues 19
4.2 Standards and codes 19
5 Highlights and prospects 20
Annex A: Country information 21

Definitions, Symbols and Abbreviations

For the purposes of this and all IEA PVPS National Survey Reports, the following definitions apply:

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

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 W or more.

CPV: Concentrating PV

Hybrid system: A system combining PV generation with another generation source, such as diesel, hydro, wind.

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 industrial and agricultural 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 system 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, electricity utility businesses etc.

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.

Currency: The currency unit used throughout this report is €

PV support measures:

Feed-in tariff	an explicit monetary reward is provided for producing PV electricity; paid (usually by the electricity utility business) at a rate per kWh that may be higher or lower than the retail electricity rates being paid by the customer
Capital subsidies	direct financial subsidies aimed at tackling the up-front cost barrier, either for specific equipment or total installed PV system cost
Green electricity schemes	allows customers to purchase green electricity based on renewable energy from the electricity utility business, usually at a premium price
PV-specific green electricity schemes	allows customers to purchase green electricity based on PV electricity from the electricity utility business, usually at a premium price
Renewable portfolio standards (RPS)	a mandated requirement that the electricity utility business (often the electricity retailer) source a portion of their electricity supplies from renewable energies
PV requirement in RPS	a mandated requirement that a portion of the RPS be met by PV electricity supplies (often called a set-aside)

Investment funds for PV	share offerings in private PV investment funds plus other schemes that focus on wealth creation and business success using PV as a vehicle to achieve these ends
Income tax credits	allows some or all expenses associated with PV installation to be deducted from taxable income streams
Net metering	allows PV customers to incur a zero charge when their electricity consumption is exactly balanced by their PV generation, while being charged the applicable retail tariff when their consumption exceeds generation and receiving some remuneration for excess electricity exported to the grid
Net billing	the electricity taken from the grid and the electricity fed into the grid are tracked separately, and the electricity account is reconciled over a billing cycle
Commercial bank activities	includes activities such as preferential home mortgage terms for houses including PV systems and preferential green loans for the installation of PV systems
Activities of electricity utility businesses	includes 'green power' schemes allowing customers to purchase green electricity, operation of large-scale (utility-scale) PV plants, various PV ownership and financing options with select customers and PV electricity power purchase models
Sustainable building requirements	includes requirements on new building developments (residential and commercial) and also in some cases on properties for sale, where the PV may be included as one option for reducing the building's energy foot print or may be specifically mandated as an inclusion in the building development

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 27 participating members (Countries and Organization) are Australia (AUS), Austria (AUT), Belgium (BEL), Canada (CAN), China (CHN), Denmark (DNK),EPIA, European Union, France (FRA), Germany (DEU), Israel (ISR), Italy (ITA), Japan (JPN), Korea (KOR), Malaysia (MYS), Mexico (MEX), the Netherlands (NLD), Norway (NOR), Portugal (PRT), SEIA, SEPA, Spain (ESP), Sweden (SWE), Switzerland (CHE), Turkey (TUR), the United Kingdom (GBR) and the United States of America (USA). The European Commission, the European Photovoltaic Industry Association, the US Solar Electric Power Association and the US Solar Energy Industries Association are also members. Both Thailand and the International Copper Association are pending members.

The overall programme is headed by an Executive Committee composed of one representative from each participating Country or Organization, while the management of individual Tasks (research projects / activity areas) is the responsibility of Operating Agents. Information about the active and completed tasks can be found on the IEA-PVPS website www.iea-pvps.org

Introduction

The objective of Task 1 of the IEA Photovoltaic Power Systems Programme is to facilitate the exchange and dissemination of information on the technical, economic, environmental and social aspects of photovoltaic power systems. An important deliverable of Task 1 is the Annual Trends in photovoltaic applications report (International Survey Report), based on the National Survey Reports which are produced annually by each Task 1 participant. This document is the Italian National Survey Report for the year 2012. Information from this document will be used as input to the Annual Trends in photovoltaic applications report.

The PVPS website www.iea-pvps.org also plays an important role in disseminating information arising from the programme, including national information.

Figure 1 – 3,0 MW Orsomarso PV Plant on a greenhouse at Cosenza (Photo: Hfv spa).

1 EXECUTIVE SUMMARY

The year 2012 has been characterized by a series of institutional measures that introduced tariff reduction, budget limitations and above all uncertainty and discontinuity for the entire market. As a consequence the capacity installed during 2012 resulted lower with respect to the previous year figure

1.1 Installed PV power

At the end of the year 2012, 478 331 plants, corresponding to a total power of 16 420 MW, have been cumulatively installed in Italy, in the framework of the "Conto Energia" programme. Moreover, further 30 MW plants, installed with other initiatives, must be add to this power. Then the cumulative installed and operating power has reached **16 450,3 MWp**, with an increase around 28 % as respect to the previous year.

1.2 Costs & prices

The average module prices has reached the value of 0,6 €/W toward the end of 2012 while at the beginning of the year was around 0,8 €/W. For large volume orders the lowest value of 0,5 €/W has been reached. The average system price decreased reaching a lower value of 1,0 €/W for large free standing applications while, in the case of small rooftop, the prices have recorded a wide spread ranging from 2,0 €/W to 2,8 €/W.

1.3 PV production

During the year 2012 any production of ingots and wafer occurred in Italy, the production of photovoltaic cells has been drastically reduced while the production of photovoltaic modules remained stable (about 400 MW) compared to the previous year, but not adequate to the installed capacity. About 4 700 MW inverters have been produced with a production capacity of around 7 600 MW.

1.4 Budgets for PV

Public and private budget for research and demonstration initiatives remains flat with respect to the previous years and very small (+0,1%) with respect to the budget of about 6 036 M€ supplied for promoting tariffs during 2012.

Figure 2 – 3,5 MW Montenero PV Plant at Campobasso (Photo: Hfv spa).

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 W or more. A PV system consists of modules, inverters, batteries and all installation and control components for modules, inverters and batteries.

For the purposes of this report, **PV installations are included in these 2012 statistics if the PV modules were installed between 1 January and 31 December 2012, although commissioning may have taken place at a later date**.

2.1 Applications for Photovoltaics

In Italy can be identified the following sectors of PV power system applications:

- Off-grid domestic systems: almost all the plants belonging to this application have been dismounted, being commissioned in the early eighties. As a consequence the total power still operating is next to zero.;
- Off-grid non-domestic applications: slowly, but constantly increasing roughly reach **11 MWp**;
- On-grid distributed systems ([1]):at the end of 2012 an amount of **6 040 MWp** has been counted for this application;
- On-grid centralized systems: growing up to **10 399 MWp** as cumulative installed power; this sector continue dominating with a share of over 63% Italy's cumulative installed power

2.2 Total photovoltaic power installed

The PV power installed in the 4 sub-markets during 2012 is reported in Table 1.

In Table 1a published figures or estimates, concerning the role of PV in the broader national energy market, are provided.

Data of grid connected PV plants have been obtained by means of official publication of the Manager of Energy Services (GSE), which manages the "Conto Energia" Programme.

Moreover, the following data have been collected by authors and among Italian PV operators through direct interviews:

1. Module and cell production data (obtained from the industrial operators and national publications).
2. Prices of PV systems and components (declared by the installers of the plant after plant construction)
3. The quantity of imported modules and inverter installed in 2012 (obtained from the industrial operators).

Uncertainty of production, import and cost data is around 20%.

[1] In this sector, PV plants with power not greater than 200 kWp are taken into account.

Table 1: PV power installed during calendar year 2012 in 4 sub-markets.

Sub-market/ application	off-grid domestic	off-grid non-domestic	grid-connected distributed	grid-connected centralized	Total
PV power installed in 2012 (MW)	-	1	1 825,6	1 800,8	3 646,4
Amount of CPV in the above (MW)		-	6	14	
Amount of PV in hybrid systems (MW)	n.a.				

Table 2a: PV power and the broader national energy market.

Total national (or regional) PV capacity (from Table 2) as a % of total national (or regional) electricity generation capacity	New (2012) PV capacity (from Table 1) as a % of new electricity generation capacity	Total PV electricity production as a % of total electricity consumption
PV capacity: **16 450,3 MW** electricity generation capacity: **125 000 MW** PV percentage: **13,2 %**	New PV capacity: **3 646,4 MW** New electricity generation capacity: **4 500 MW** New PV percentage: **81 %**	PV production in 2012: **18,86 TWh** electricity production: **330 TWh** PV percentage: **5,7 %**

A summary of the cumulative installed PV Power, from 1992-2012, broken down into four sub-markets is shown in Table 3.

Table 3: The cumulative installed PV power (kWp) in 4 sub-markets. (as at 31 December)

Sub-market/ application	92	93	94	95	96	97	98	99	00	01	02	03
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
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
on-grid distributed	100	100	150	335	404	677	780	905	1 155	1 635	3 620	7 600
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
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

Sub-market/ application	04	05	06	07	08	09	10	11	12
off-grid domestic	5 300	5 300	5 300	5 400	5 400	5 000	4 000	---	---
off-grid non-domestic	6 700	7 000	7 500	7 700	7 900	8 000	9 000	10 000	11 000
on-grid distributed	12 000	18 500	30 500	83 900	295 000	656 800	1 532 600	4 208 700	6 040 300
on-grid centralised	6 700	6 700	6 700	23 200	150 000	511 500	1 956 710	8 584 210	10 399 000
TOTAL	30 700	37 500	50 000	120 200	458 300	1 181 300	3 502 310	12 802 91	16 450 300

2.3 PV implementation highlights, major projects, demonstration and field test programmes

The national market stimulation initiative in operation during the year 2012 is represented by the "Conto Energia" Programme.

In particular, during this year PV plants have been installed in the framework of the fourth and fifth phase of the "Conto Energia" Programme:

- IV phase: during the period of validity of this phase (from May 2011 to August 2012, when has been reached total spending limit of this phase amounting to 6 000 M€) have been installed 203 110 plants corresponding to a total power of about 7 586 MW; in 2012, and within this phase, however were installed 3 028 MW;
- V phase: The decree regulating the fifth Conto Energia has been issued the 5th of July 2012; in the framework of the fifth phase, until December 2012 about 618 MW have been installed and put in operation.

2.4 Highlights of R&D

Research, development and demonstration activities on photovoltaic devices and systems are mainly conducted by ENEA (the Italian Agency for New Technology, Energy and the Environment) and RSE (a research company owned by GSE - Gestore dei Servizi Elettrici - the Italian publicly-owned company managing the renewable energy source incentives and regulations). Additional contributions have been supplied by some Universities, CNR (the National Council for Scientific Research) and few private Laboratories.

ENEA is the main PV Research organization operating in Italy. Its most significant fields of interest regard: crystalline silicon, Cu2O solar cells, microcrystalline Si devices, micromorph tandem solar cell as well as concentrators technologies.

RSE is carrying out activities in research and development on high efficiency single and triple junction solar cells (InGaP/InGaAs/Ge) for terrestrial and concentrator applications, in the frame of Italian electric system research programme RdS (Ricerca di Sistema) and in the European projects "APOLLON", SOPHIA and SUN on CLEAN. Furthermore, RSE is involved in components' characterization and performance evaluation of PV innovative systems, as well as in research and demonstration activities for electrification of remote communities, again in the frame of the RdS programme.

It is worth mentioning that public and private budget for research and demonstration initiatives, amounting to about 5 M€, remains flat with respect to the previous years and very small (0,1%) with respect to the budget allocated for promoting tariffs (about 6 036 M€).

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

The figures for the year 2012 on budgets from the public authorities for R&D, demonstration/field test programmes and market incentives (public subsidies, fiscal incentives) on the national/federal level, and on the state/regional level are given in Table 3

Table 4: Public budgets for R&D, demonstration/field test programmes and market incentives

	R & D	Demo/Field test	Market incentives
National/federal	5,8 M€	0,2 M€	6 036 M€
State/regional			
Total	6 042 M€		

3 INDUSTRY AND GROWTH

3.1 Production of feedstocks, ingots and wafers

During the year 2012 any production of ingots and wafer occurred in Italy: the branch of the American MEMC has held steady its factory in Merano; even LUX manufacturer has not produced during 2012.

3.2 Production of photovoltaic cells and modules

The production of photovoltaic cells has been drastically reduced in 2012 due to the stop to production of important national realities such as Solsonica, Helios Technology, Omniasolara and X-Group.

During 2012, the cells production in Italy sums to about 20 MW with a production capacity of 40 MW.

Even the production capacity of the modules has been reduced due to exit from the scene of the aforementioned X-Group, the subsidiary of Solon in Italy, the abroad transfer of MX Group and the market abandonment of other minor industrial operators.

As far as the module actual production, it has remained stable compared to 2012, thanks to the full operation of the 3Sun in Sicily, a joint venture between Enel Green Power and Sharp Solar.

The module production of all 7 companies sums to about 397 MW with a capacity around 610 MWp.

The total PV cell and module manufacture together with production capacity information is summarised in Table 5 below.

Table 5: Production and production capacity information for 2012

(source: Politecnico of Milano)

Cell/Module manufacturer (or total national production)	**Technology** (sc-Si, mc-Si, a-Si, CdTe)	**Total Production (MW)**		**Maximum production capacity (MW/yr)**	
		Cell	Module	Cell	Module
Wafer-based PV manufactures					
Solsonica	sc-Si, mc-Si	20	95	40	150
Moncada Solar	sc-Si, mc-Si		55		65
Brandoni	sc-Si, mc-Si		28		70
Eosolare	sc-Si, mc-Si		9		25
3Sun	sc-Si, mc-Si		160		160
Sunerg	sc-Si, mc-Si		25		45
Elital	sc-Si, mc-Si		40		45
Total		***20***	***397***	***40***	***610***

Additional information:

a) About 10% of the national production has been destined abroad. although there are cases such as Moncada and Solar Sunerg who have committed part of their own production to foreign orders.
b) The manufacturers, that produce modules, purchase cells on the international market. As a consequence a total of 377 MW of cells have been imported.
c) Taking into account that only 397 MW of modules have been produced in Italy during 2012, the other 3 250 MW have been imported.

3.3 Module prices

In Table 6 are shown the a module prices (excluding VAT/TVA/sales tax) and the best prices achieved. In particular, the typical prices derive from an average of price at the beginning (0.8 €/W) and at the end of the year (0.6 €/W). The best price are the lowest ones and regard import products at the end of 2011 (for Crystalline silicon modules from China).

Table 6: Typical module prices for a number of years

Year	**1993**	**2000**	**2003**	**2005**	**2007**	**2009**	**2010**	**2011**	**2012**
Standard module price(s): Typical	4,65	4,13	3,5	3,6	3,8	2,2	1,5	1,0	0,7 (*)
Best price			3,1	3,2	3,0	1,6	1,2	0,7	0,5 (**)
PV module price for concentration									

(*) Crystalline silicon modules
(**) Imported crystalline silicon modules

3.4 Manufacturers and suppliers of other components

In Italy, 8 companies manufacture inverters for on-grid and off-grid applications. The most important of them are Power One Italy, Elettronica Santerno, Aros, Siel, Fimer, Answer Drivers, Gefram and Astrid Energy. During 2011, these companies have produced about 4 700 MW of inverter while their production capacity is around 7 600 MW.

As far as the prices of inverter an average value of 150-200 €/kW has been obtained on a sample of large size apparatus. In the case of small size inverter the typical prices range from 280 €/kW to 330 €/kW.

3.5 System prices

Table 7 gives turnkey prices per W (excluding VAT/TVA/sales tax) for the various categories of PV plant 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 have not been included. The prices reported indicate a range of all known prices.

Additional information regarding national trends in the turnkey prices of selected applications is reported in Table 7a.

Table 7: Turnkey Prices of Typical Applications

Category/Size	Typical applications and brief details	Current prices per W
OFF-GRID Up to 1 kW	Street light	3 - 5 €
OFF-GRID >1 kW		
GRID-CONNECTED Specific case	1-5 kW roof-mounted system	2,0 – 2,8 €
GRID-CONNECTED up to 10 kW		
GRID-CONNECTED >10 kW	100 kW on industrial building	1,5 - 2,6 €
GRID – CONNECTED (utility-scale plant, if relevant)	1 MW on ground	1 – 1,6 €

Table 7a: National trends in system prices (EUR) for small roof-mounted system (*2-3 kW*)

YEAR	1998	2000	2002	2004	2005	2007	2008	2009	2010	2011	2012
Price /W:	9,3	7,75	7,5	6,8	7,0	6,5	6,0	4,5	4,0	3,2	2,4

3.6 Labour places

Full time labour places in the following activities during the year 2012 are:

a) Public research and development (not including private companies): **250**

b) Manufacturing of products throughout the PV value chain from feedstock to systems, including company R&D: **4 000**

c) All other, including electricity companies, installation companies induced labour, etc.: **11 000**

d) Utilities and government: **750**

Table 8: Estimated PV-related labour places in 2012

Research and development (not including companies)	250
Manufacturing of products throughout the PV value chain from feedstock to systems, including company R&D	
Distributors of PV products	
System and installation companies	15 000
Electricity utility businesses and government	750
Other	
Total	16 000

3.7 Business value

An estimate of the value of PV business in Italy by the Gross Domestic Product approach is reported in table 9, taking into account

the imported volumes of:

- PV modules: 3 289 MW
- inverters: 446 MW
- cells: 377 MW

And the exported volumes of:

- PV modules: 28 MW
- inverters: 1 500 MW

Table 9: Value of PV business

Sub-market	**Capacity installed *in 2012* (MW)**	**Price per W** *(from table 7)*	**Value M€**	**Totals**
Off-grid domestic				
Off-grid non-domestic	**1**	**4**	*4*	
Grid-connected distributed	**1 826**	**2.4**	*4 382*	
Grid-connected centralized	**1 800**	**1.3**	*2 340*	
				6.726
Export of PV products *(including information from Tables 4 & 5)*				*380*
Change in stocks held *(including information from Tables 4 & 5)*				
Import of PV products *(including information from Tables 4 & 5)*				*2 500*
Value of PV business				***4 606***

4 FRAMEWORK FOR DEPLOYMENT (NON-TECHNICAL FACTORS)

Table 10 lists the main support measures (definitions at start of guidelines) for PV during 2012. Further details on these are to be provided on the following pages.

Table 10: PV support measures

	On-going measures	Measures that commenced during 2012
Feed-in tariffs (gross / net?)	---	**5° Conto Energia programme** **1-3 kW on building:** 0,208 €/kWh + 0,208€/kWh self-consumption **1-3 kW not on building:** 0,201 €/kWh + 0,119€/kWh self-consumption **3-20 kW on building:** 0,196 €/kWh + 0,114€/kWh self-consumption **3-20 kW not on building:** 0,189 €/kWh + 0,107€/kWh self-consumption **20-200 kW on building:** 0,175 €/kWh + 0,093€/kWh self-consumption **20-200 kW not on building:** 0,168 €/kWh + 0,086€/kWh self-consumption **200-1000 kW on building:** 0,142 €/kWh + 0,060€/kWh self-consumption **200-1000 kW not on building:** 0,135 €/kWh + 0,053€/kWh self-consumption **1000 – 5000 kW on building:** 0,126 €/kWh + 0,044€/kWh self-consumption **1000-5000 kW not on building:** 0,120 €/kWh + 0,038€/kWh self-consumption **> 5000 kW on building:** 0,119 €/kWh + 0,037€/kWh self-consumption **>-5000 kW not on building:** 0,113 €/kWh + 0,031€/kWh self-consumption **For all plant:** +5% for use of EU components

	On-going measures	Measures that commenced during 2012
Capital subsidies for equipment or total cost	---	**Allowed but non supplied by 5° Conto Energia programme** **1-3 kW on building:** 30% **PV plant on public building** 60% **PV plants in areas subject to remediation** 30% **Innovative PV plants** 30% **CPV plants** 30%
Green electricity schemes	9 c€/kWh	
PV-specific green electricity schemes		
Renewable portfolio standards (RPS)		
PV requirement in RPS		
Investment funds for PV		
Income tax credits	50% of investment cost (as alternative to Conto Energia)	
Net metering		
Net billing		Up to 200 kW
Commercial bank activities e.g. green mortgages promoting PV		
Activities of electricity utility businesses		
Sustainable building requirements		

4.1 Indirect policy issues

Policy initiatives that influence the implementation of PV power systems in Italy are:

a) the governmental decree 5 July 2012 for PV plants (the fifth "conto energia"), that redefines the maximum expense to support the tariffs of the PV plants.

b) the governmental decree 6 July 2012 on energy production by renewable energies

4.2 Standards and codes

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).

At national level, the following standards, which can affect the development of PV plants in Italy, have been published during 2012 by CEI (Italian Electrotechnical Committee

- CEI 82-25 (Guide for the design, installation and test of PV plants connected to low and medium voltage grid);
- CEI 0-16 (Reference technical rules for the connection of active and passive consumers to the HV and MV electric al networks of distribution Company)
- CEI 0-21 (Reference technical rules for the connection of active and passive users to the LV electrical Utilities)

In particular, the last two stands require that PV plants have to provide services to the LV and MV grids in order to improve its management.

5 HIGHLIGHTS AND PROSPECTS

The most significant driver for the deployment of PV in Italy during 2012 has been represented by the Conto Energia Programme (IV phase up to august 2012 and V phase to now).

During 2012 are still evident two main barriers that are restraining the growth of the photovoltaic plant installations in Italy.

1. The electric grid is practically not adequate in some regions of south Italy, where the installed power of wind turbines and photovoltaic power stations is almost the same order of magnitude of peak load.

   It is expected that this barrier to the diffusion of PV plants should be partly removed by the electric grid managers and partially solved by the recent Italian regulations which require that PV plants have to provide services to the LV and MV grids in order to improve its management

2. At the end of 2012, the annual cost for the incentive tariffs has reached 6 450 M€ and is quickly reaching the limit of 6 700 M€ fixed by the fifth phase of the "Conto Energia" Programme; when that limit will be reached (perhaps in June 2013), the photovoltaic won't be incentivated any more in Italy.

   In order to overcome this obstacle, the representatives of the Italian PV firms have presented a series of proposals for the development of PV in Italy even without incentives. The most significant ones regard:

   - clear rules for the sale of the produced electricity;
   - the simplification of the authorization process for PV installation;
   - a major focus on self-consumption of produced energy though electric storage;
   - fiscal bonus for PV investment costs as well as for the creation of job opportunities in PV activities.

   In particular, the representatives of the Italian PV operators have asked to the Government to insert the above proposals in the new National Energetic Strategy, presently under definition.

ANNEX A: COUNTRY INFORMATION

This information is simply to give the reader some background about the national environment in which PV is being deployed. It is not guaranteed to be 100 % accurate nor intended for analysis, and the reader should do their own research if they require more detailed data.

Source of the information: author's estimates.

1) retail electricity prices - household, commercial, public institution
   a. household (17,5 c€/kWh)
   b. commercial, public institution (18 c€/kWh)
2) typical household electricity consumption (kWh): 2 700 kWh/year
3) typical metering arrangements and tariff structures for electricity customers: typical metering arrangements and tariff structures for electricity customer's tariffs include a fixed charge, a demand charge (€/kW) and an energy charge (cent €/kWh) with several tiers
4) typical household income: 35 000 €
5) typical mortgage interest rate: 7%
6) voltage (household, typical electricity distribution network): 230 Vac
7) electricity industry structure and ownership: private owned or municipal companies
8) price of diesel fuel: 170 c€/l
9) typical values of kWh / kW for PV systems in parts of Italy:
   a. North 1000 -1200 kWh / kWp
   b. South 1300 -1500 kWh / kWp