



National Survey Report of PV Power Applications in ITALY 2014



PHOTOVOLTAIC
POWER SYSTEMS
PROGRAMME

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PVPS

IEA PVPS TASK 1

National Survey Report of PV Power Applications in ITALY 2014

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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 member countries

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 participating countries and organisations can be found on the www.iea-pvps.org website.

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 promote and facilitate the exchange and dissemination of information on the technical, economic, environmental and social aspects of PV power systems. Task 1 activities support the broader PVPS objectives: to contribute to cost reduction of PV power applications, to increase awareness of the potential and value of PV power systems, to foster the removal of both technical and non-technical barriers and to enhance technology co-operation. An important deliverable of Task 1 is the annual "*Trends in photovoltaic applications*" report. In parallel, National Survey Reports are produced annually by each Task 1 participant. This document is the country National Survey Report for the year 2014. 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.

1 INSTALLATION DATA

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. Other applications such as small mobile devices are not considered in this report.

For the purposes of this report, **PV installations are included in the 2014 statistics if the PV modules were installed and connected to the grid between 1 January and 31 December 2014, although commissioning may have taken place at a later date.**

1.1 Applications for Photovoltaics

The year 2014 has been in Italy the first one after the conclusion of the incentive Programme “Conto Energia” and the year where a relevant revision of the “Conto Energia” tariffs took place.

Nevertheless, the regulatory framework for the installation of PV plants in Italy finally seems to have reached a stable condition. In fact:

- small plants (peak power less than 20 kW) continue to grow thanks to the confirmation of the tax deductions for residential application;
- companies and public institution could benefit of white certificates but only for small size PV plants;
- the rules of Efficient Systems of Users and self-consumption seem to be a good basis for medium size plant growth;
- rules and technical norms for the connection to the grid of systems with storage have been defined allowing their use in photovoltaic Plants connected to the electric grid;
- self-consumption, net-billing and energy sale are still in force

1.2 Total photovoltaic power installed

The total PV power installed during 2014 amounts to **424,3 MW** :

- almost 20% of plants realized still in the frame of “Conto Energia” Programme (due to an additional period of nine months granted to install and put in operation some particular PV plants already admitted to incentive)
- almost 80% MW installed benefitting of fiscal bonus for PV investments as well as measures concerning self-consumption and net-billing (or energy sale).

These results, even if lower than the expected value, however confirm a mature market and a positive public perception towards photovoltaic technology.

Then, a total cumulative capacity of **18,622 GW** results installed and operating in Italy at the end of 2014. In particular, the installations in the most significant sectors of PV power system applications connected to the grid are estimated cumulatively as follows:

- | | |
|-------------------------|-------------|
| - BIPV | 2 672 MW |
| - BAPV | 7 185 MW |
| - PV (other, on ground) | 8 722 MW |
| - CPV | 30 MW |
| - Total grid connected | 18 609 MW . |

As regards the BIPV plants, it must be noted that about **280 MW** plants are related to innovative BIPV plants (built under the third, fourth and fifth Conto Energia), while the remaining **2 392 MW** of integrated plants include systems on pergolas, greenhouses and shelters (under the second Conto Energia).

A marginal sector that continues to grow slowly is represented by PV Off-grid non-domestic applications that reached about 13 MW while domestic applications since they were built in the 80s, result almost completely decommissioned

At the cumulative installed PV capacity in Italy corresponds an overall photovoltaic electricity production of **22 306 GWh**, with a share to over **18,5%** or the electricity produced by Renewable Energies and to over **7,7 %** of the national electricity consumption (**291 084 GWh**). Specifically, in August 2014 in Italy, also because of the reduction of electricity consumption, grid connected PV plants met **12 %** of national demand, while for few midday hours in June the power delivered by PV plants has reached the value of the national electrical load.

Taking into account all renewables, the contribution of "new renewables" (solar, wind, geothermal) in the annual electric energy production reached **22.2% (43,1%** including hydroelectric), while still continue the decline of fossil fuel generation.

Table 1: PV power installed during calendar year 2014

			MW installed in 2014 (mandatory)	MW installed in 2014 (optional)	AC or DC
Grid-connected	BAPV (1)	Residential	368		
		Commercial			DC
		Industrial			
	BIPV (1) (if a specific legislation exists)	Residential	23		
		Commercial			DC
		Industrial			
	Ground-mounted	cSi and TF	33	30	DC
		CPV		3	DC
	Off-grid	Residential	0		DC
		Other			DC
Hybrid systems				DC	
Total			424		

- (1) BAPV (Building-Applied PhotoVoltaics) refers to PV installations that are a retrofit - integrated into the building after its construction.
- (2) BIPV (Building-Integrated PhotoVoltaics) refers to PV materials that are used to replace conventional building materials such as the roof, skylights, or facades.

Table 2: Data collection process:

If data are reported in AC, please mention a conversion coefficient to estimate DC installations.	The data refer to the sum of PV module nominal power
Is the collection process done by an official body or a private company/Association?	Public bodies: GSE and TERNA
Link to official statistics (if this exists)	www.gse.it www.terna.it
	<p>The following data collected by authors also through direct interviews of Italian PV operators:</p> <ol style="list-style-type: none"> 1. module and cell production data (obtained from the industrial operators and national publications): uncertainty around 15% 2. prices of PV systems and components (declared by the installers of the plant after plant construction): uncertainty of data is around 10% 3. quantity of imported modules and inverter installed in 2013 (obtained from the industrial operators): uncertainty is 15%; 4. PV plant numbers and power (data of "Conto energia" plants supplied by GSE, data of other plants collected among PV operators): uncertainty is 2%.

Table 3: PV power and the broader national energy market.

	2014 numbers	2013 numbers (1)
Total power generation capacities (all technologies)	125 533 MW	128.403 MW
Total power generation capacities (renewables including hydropower)	48 734 MW	48 100 MW
Total electricity demand (= consumption)	291 083 GWh	297 288 GWh
New power generation capacities installed during the year (all technologies)	- 2 870 MW	- 1 610 MW
New power generation capacities installed during the year (renewables including hydropower)	634 MW	2 200 MW
Total PV electricity production	22 306 GWh	21 600 GWh
Total PV electricity production as a % of total electricity consumption	7,7 %	7,3 %

(1) Some data have been modified as respect to the ones supplied in Italian NSR 2013. The adjustments of PV plants' data were made in 2014, following the work of integration and alignment among the system GAUDI of TERNA and the databases of GSE.

Table 4: Other informations

	2014 Numbers
Number of PV systems in operation in your country (a split per market segment is interesting)	648 418
Capacity of decommissioned PV systems during the year in MW	0
Total capacity connected to the low voltage distribution grid in MW	N/A
Total capacity connected to the medium voltage distribution grid in MW	N/A
Total capacity connected to the high voltage transmission grid in MW	N/A

Table 5: The cumulative installed PV power in 4 sub-markets [MW].

Sub-market	Stand-alone domestic	Stand-alone non-domestic	Grid-connected distributed	Grid-connected centralized	TOTAL
1992	3,95	3,75	0,10	0,68	8,5
1993	4,35	4,15	0,10	3,48	12,1
1994	4,70	4,65	0,15	4,59	14,1
1995	4,83	4,78	0,34	5,85	15,8
1996	4,96	4,79	0,40	5,85	16,0
1997	5,05	4,81	0,68	6,17	16,7
1998	5,21	5,10	0,78	6,59	17,7
1999	5,22	5,64	0,91	6,72	18,5
2000	5,24	5,89	1,16	6,72	19,0
2001	5,30	6,35	1,64	6,72	20,0
2002	5,30	6,37	3,62	6,72	22,0
2003	5,30	6,40	7,60	6,70	26,0
2004	5,30	6,70	12,00	6,70	30,7
2005	5,30	7,00	18,50	6,70	37,5
2006	5,30	7,50	30,50	6,70	50,0
2007	5,40	7,70	83,90	23,20	120,2
2008	5,40	7,90	295,00	150,00	458,3
2009	5,00	8,00	656,83	511,55	1.181,4
2010	4,00	9,00	1.532,60	1.956,71	3.502,3
2011	0 (*)	10,00	4.208,70	8.584,20	12.802,9
2012	0	11,00	6.040,30	10.399,00	16.450,3
2013	0	12,00	7.009,95	11.175,52	18.197,5
2014	0	12,40	7.368,55	11.240,81	18.621,8

(*) The value has been updated as the result of a survey carried out in 2011.

2 COMPETITIVENESS OF PV ELECTRICITY

2.1 Module prices

In Table 6 are shown the year 2014 module prices (excluding VAT/TVA/sales tax): for small (typical) and large (best price) orders. The numbers are reporting an average price of all known prices.

Table 6: Typical module prices for a number of years

Year		2009	2010	2011	2012	2013	2014
Standard module price(s): Typical		2,2	1,5	1,0	0,7	0,65	0,55*
Best price		1,6	1,2	0,7	0,5	0,50	0,50**
PV module price for concentration (if relevant)							

* Crystalline silicon modules

**Imported crystalline silicon modules

2.2 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 8.

Table 7: Turnkey Prices of Typical Applications – local currency

Category/Size	Typical applications and brief details	Current prices per W
OFF-GRID Up to 1 kW		
OFF-GRID >1 kW		
Grid-connected Rooftop up to 10 kW (residential)		1,45 – 1,89
Grid-connected Rooftop from 10 to 250 kW (commercial)		
Grid-connected Rooftop above 250kW (industrial)		
Grid-connected Ground-mounted above 1 MW		0,92 – 1,14
Other category existing in your country (hybrid diesel-PV, hybrid with battery...)		

Table 8: National trends in system prices (current) for different applications – local currency

Price/Wp			2011	2012	2013	2014
Residential PV systems < 10 KW			3,2	2,4	2,2	1,67
Commercial and industrial			2,75	2	1,6	1,4
Ground-mounted			2,25	1,3	1,2	1,03

2.3 Cost breakdown of PV installations (optional)

2.3.1 Residential PV System < 10 kW

Table 9: Cost breakdown for a residential PV system – local currency

Cost category	Average (local currency/W)	Low (local currency/W)	High (local currency/W)
Hardware			
Module	0,70	0,60	0,80
Inverter	0,15	0,14	0,17
Other (racking, wiring...)	0,30	0,25	0,35
Soft costs			
Installation	0,07	0,08	0,10
Customer Acquisition	0,02	0,02	0,03
Profit	0,30	0,27	0,32
Other (permitting, contracting, financing...)	0,10	0,09	0,12
Subtotal Hardware	1,15	0,99	1,32
Subtotal Soft costs	0,51	0,46	0,57
Total	1,67	1,45	1,89

2.3.2 Utility-scale PV systems > 1 MW

Table 10: Cost breakdown for an utility-scale PV system – local currency

Cost Category	Average (local currency/W)	Low (local currency/W)	High (local currency/W)
Hardware			
Module	0,55	0,52	0,58
Inverter	0,07	0,06	0,08
Other (racking, wiring, etc.)	0,12	0,11	0,13
Soft cost			
Installation Labor	0,05	0,04	0,06
Customer acquisition	0,01	0,01	0,02
Profit	0,15	0,14	0,17
Other (contracting, permitting, financing etc.)	0,05	0,04	0,10
Subtotal Hardware	0,74	0,69	0,79
Subtotal - Soft cost	0,29	0,23	0,35
Total Installed Cost	1,03	0,920	1,14

2.4 Financial Parameters and programs (leasing...)

A brief description of a PV financing scheme currently operating in Italy is given in in Table 9.

Table 11: PV financing scheme

Average Cost of capital	Nominal Interest Rate (NIR) = 6.75%
Specific PV financing scheme for Residential or commercial application up to 20 kW	<p>The amounts paid range from a low of 5,000 to a maximum of € 70,000, for the coverage of the total cost of purchase and installation, including VAT.</p> <p>The rate is fixed type (NIR= 6.75%) and the duration of the loan ranges from 36 months to 180 month.</p>

2.5 Additional Country information

Table 12: Country information

Retail Electricity Prices for an household (range)	16 ÷ 20 c€/kWh <i>Rel 2014 AEEG</i>			
Retail Electricity Prices for a commercial company (range)	16 ÷ 18 c€/kWh <i>Rel 2014 AEEG</i>			
Retail Electricity Prices for an industrial company (range)	13 ÷ 15 c€/kWh <i>Rel 2014 AEEG</i>			
Population at the end of 2014 (or latest known)	60 769 000			
Country size (km ²)	301 336			
Average PV yield (according to the current PV development in the country) in kWh/kWp	North 1 000 ÷ 1 200 kWh / kWp South 1 300 ÷ 1 500 kWh / kWp			
Name and market share of major electric utilities (Contribution of the major utilities in the gross domestic production)	Year 2013		Year 2014	
	Electric utilities	Share %	Electric utilities	Share %
	Enel	25,1	Enel	27,2
	Eni	8,5	Eni	8,3
	Edison	5,9	Edison	6,0
	E.On	4,5	E.On	3,6
	ERG	3,1	A2A	3,1
	A2A	3,1	GDF SUEZ	2,8
	Iren	3,1	ERG	2,5
	GDF SUEZ	2,9	Iren	2,4
	Tirreno Power	2,7	Edipower	2,1
	Edipower	2,2	Tirreno Power	1,8
	Others	39,0	Others	40,4

3 POLICY FRAMEWORK

This chapter describes the support policies aiming directly or indirectly to drive the development of PV. Direct support policies have a direct influence on PV development by incentivizing or simplifying or defining adequate policies. Indirect support policies change the regulatory environment in a way that can push PV development.

3.1 Direct support policies

Table 13: PV support measures (summary table)

	On-going measures	Measures that commenced during 2014
Feed-in tariffs (gross / net?)	<i>None (see point 3.2.2)</i>	<i>None</i>
Capital subsidies for equipment or total cost	<i>Yes, at regional level</i>	<i>Some regions</i>
Green electricity schemes	<i>None</i>	<i>None</i>
PV-specific green electricity schemes	<i>None</i>	<i>None</i>
Renewable portfolio standards (RPS)	<i>None</i>	<i>None</i>
PV requirement in RPS	<i>None</i>	<i>None</i>
Investment funds for PV	<i>Yes</i>	<i>No</i>
Income tax credits	<i>Yes</i>	<i>No</i>
Prosumers' incentives (self-consumption, net-metering, net-billing...)	<i>Self-consumption plus net-billing</i>	<i>No</i>
Commercial bank activities e.g. green mortgages promoting PV	<i>Yes</i>	<i>N.A.</i>
Activities of electricity utility businesses	<i>Yes</i>	<i>No</i>
Sustainable building requirements	<i>Yes</i>	<i>No</i>

3.2 Direct Support measures

3.2.1 Support measures exiting in 2014

3.2.1.1 Description of support measures excluding prosumers, BIPV, and rural electrification

None.

3.2.1.2 Prosumers' development measures

Self-consumption is allowed in Italy. Clear rules have been developed for the sale, exchange and self-consumption of the produced electricity. In this context, the Italian Regulatory Authority for Electricity Gas and Water has updated the rules for exchanging energy with the grid for relatively plants up to 200 kW.

3.2.1.3 BIPV development measures

None.

3.2.1.4 Rural electrification measures

None.

3.2.1.5 Other measures including decentralized storage and demand response measures

None.

3.2.2 Support measures phased out in 2014

Although the "Conto Energia" Programme was closed in July 2013, once the financial cap set by

Italian authorities for the total yearly cost at 6,7 BEUR incentive was reached and definitively concluded in May 2014 (considered the PV plants enrolled in the GSE registers), during this year has been issued a decree regulating the reshaping of the incentives provided by the Programme.

By 30 November 2014, in fact, for PV plants with a nominal power greater than 200 kW was necessary to choose one of the following options, valid from January 2015:

- extend from 20 to 24 years the period of incentive reformulating the unit value of the incentive;
- continue to benefit from the incentives for a period of 20 years, but with a reduction in a first period and with a corresponding increase in a second time;
- continue with incentives paid for 20 years but reduced by a percentage depending on plant size.

3.2.3 New support measures implemented in 2014

The Italian regulatory Authority for Electricity, Gas and Water has introduced new rules that could facilitate the installation of PV plants:

- increase of the limit for exchanging energy with the grid from 200 kW to 500 kW of plant power;
- publication of specific rules for Electric Energy Storage System (EESS) installed in production plants (included PV plants) connected to the grid; unfortunately, this publication happened only in December 2014 and the long expectation resulted in a standstill of the market of storage systems combined with PV plants, which has a very high interest in Italy in spite of the storage is still expensive;
- definition of rules the Efficient Systems of Users, (SEU) concerning the management (connection services, measurement, transmission, distribution, dispatching and sale aspects) of private grid both of single user and with more consumption units and industrial production unit of electrical energy functional for the production process; the SEU are systems in which one or more production plants, with a total power of not more than 20 MWe and totally installed on the same site, powered by renewable sources or in high efficiency cogeneration, operated by the same manufacturer, are directly connected, by means of a private link, to the unit of the final customer.

Moreover, during the 2014, the barrier to the diffusion of PV plants represented by the electric grid, not adequate in some regions of Italy, has been partly solved by the new version of Italian standards (CEI 0-16 and 0-21) which require that production plants connected to the grid (included PV plants) have to provide services to the LV and MV grids in order to improve their management.

3.2.4 Measures currently discussed but not implemented yet

The following measures are currently discussed but are not implemented yet:

- simplification of the authorization procedures for PV plant installation
- tax credit for PV plants greater than 20 kW Financing and cost of support measures
- economic support for the installation of storage systems in Renewable energy plants.

3.3 Indirect policy issues

3.3.1 International policies affecting the use of PV Power Systems

Not available

3.3.2 The introduction of any favourable environmental regulations

None

3.3.3 Policies relating to externalities of conventional energy

Not available

3.3.4 Taxes on pollution (e.g. carbon tax)

Not available

3.3.5 National policies and programmes to promote the use of PV in foreign non-IEA countries

Not available

4 HIGHLIGHTS OF R&D**4.1 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, 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 cell, amorphous-crystalline silicon hetero-junction cell, CZTS cell and CZTS/silicon Tandem cell, Perovskite single junction cell, Perovskite-silicon tandem cell, microcrystalline Si devices, micro-morph tandem solar cell as well as concentrators technologies. In the field of PV systems ENEA is developing devices, software, modelling, smart grid concepts and strategies for optimum plant integration in the electrical grid (for both existing and new plants) and added value services for producer/user and distributors.

RSE, in particular, is the main research organization carrying out activities on high efficiency solar cells in Italy, developing multi-junction solar cells based on III-V-IV elements and nano-structured coating for high concentration applications, in the frame of the Italian electric system research programme RdS (Ricerca di Sistema) and European projects. In this field, RSE is involved in the design of new optics, in outdoor and indoor concentrating module characterization and in the development of advanced solar tracking control. Furthermore, RSE is engaged in the performance evaluation of innovative flat modules and plants, as well as in research and demonstration activities for electrification of remote communities.

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

Not yet available.

Table 14: Public budgets for R&D, demonstration/field test programmes and market incentives.

	R & D	Demo/Field test
National/federal	5,8 M€	0,2 M€
State/regional		
Total	6,0 M€ (8,0 MUSD)	

5 INDUSTRY

5.1 Production of feedstocks, ingots and wafers (crystalline silicon industry)

During the year 2014 any production of ingots and wafer occurred in Italy.

Table 15: Production information for the year for silicon feedstock, ingot and wafer producers

Manufacturers (or total national production)	Process & technology	Total Production	Product destination (if known)	Price (if known)
Solland Silicon	Silicon feedstock	N/A tonnes		
	sc-Si ingots.	tonnes		
	mc-Si ingots	tonnes		
	sc-Si wafers	MW		
	mc-Si wafers	MW		

5.2 Production of photovoltaic cells and modules (including TF and CPV)

The production of photovoltaic cells in Italy has been drastically reduced in 2014 due also to the stop of production of some national operators.

The production capacity of the modules has remained stable compared to 2013, thanks to the full operation of the 3Sun company, a company of Enel Green Power, with a production capability of 190MW/year. Moreover recently a new Italian company, MegaCell, is on market with a production capability of 60MW/year of bifacial silicon solar cell.

Total PV cell and module manufactures together with production capacity information is summarised in Table 16 below.

Table 16: Production and production capacity information for 2014

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
<i>Wafer-based PV manufactures</i>					
Solsonica	sc-Si, mc-Si		N/A		N/A
Ferrania Solis	sc-Si, mc-Si	0	11,5	0	60
Sunerg Solar			27,4		100
Brandoni Solare		0	10	0	50
El.Ital.			N/A		N/A
AVProjec			N/A		N/A
Eclipse Italia			N/A		N/A
SPS ISTEM	mc-Si	0	5,8	0	60
Azimut		0	5,7	0	30
FERA – Fabbrica Energie Rinnovabili Alternative			N/A		N/A
Megacell	sc-Si	N/A		60	
Micron Cappello Group	sc-Si, mc-Si		3		40
Meridionale Impianti	mc-Si		0,1		20
TOTAL		N/A	63,5	60	360
<i>Thin film manufacturers</i>					
3SUN – Enel Green Power	a-Si	----	190	----	190
<i>Cells for concentration</i>					
TOTALS		NA	253,5	60	550

5.3 Manufacturers and suppliers of other components

In the field of BOS components, in Italy, 8 companies manufacture inverters for on-grid and off-grid applications. During 2014 their production capacity has been around 7.000 MW.

Taking into account the Italian manufacturing assets and the size of the national market (expected around 0,5-1 GW/year), the road of internationalization is a necessary way for the Italian photovoltaic industry.

However, while the business area of the inverter has recorded a higher degree of internationalization, more difficult has been the path for module manufacturers.

Regarding EPC contractors and System Integrators, the reduction of the domestic market pushes them to address towards international markets relying on their own know-how.

Moreover, during 2014, the achievement of considerable stock of installed capacity has contributed to a significant change in the dynamics of business which are now related to the activities of Operation and Maintenance. In fact, the main Italian players previously acting as EPC and System Integrators appear now more and more focussed on large size plant management and maintenance services.

Finally, in the Italian PV market has been recorded a growing interest in the acquisition of large size existing plants (secondary market), mainly due to risk increase to the development of new large plants, accentuated by the effect of the tariff reshaping and the extremely limited installation permitting.

6 PV IN THE ECONOMY

This chapter aims to provide information on the benefits of PV for the economy.

6.1 Labour places

Provide an estimate of labour places in the following (where these are mainly involved with PV):

- a) Public research and development (not including private companies);
- b) Manufacturing of products throughout the PV value chain from feedstock to systems, including company R&D;
- c) All other, including within electricity companies, installation companies etc.

Table 17: Estimated PV-related labour places in 2014

Research and development (not including companies)	250
Manufacturing of products throughout the PV value chain from feedstock to systems, including company R&D	5 000
Distributors of PV products	
System and installation companies	
Electricity utility businesses and government	750
Other	6 000
Total	12 000

6.2 Business value

NYA

Table 18: Value of PV business

Sub-market	Capacity installed in 2014 (MW)	Price per W (from table 7)	Value	Totals
Off-grid domestic	0			
Off-grid non-domestic	0,4	5	2 000 000	
Grid-connected distributed	358,6	1,67	598 862 000	
Grid-connected centralized	65,29	1,03	67 248 700	
				668 110 700
O&M activities				401 080 000
Export of PV products				1 446 656 000
Import of PV products				-176 359 700
<i>Value of PV business</i>				2 339 487 000

7 INTEREST FROM ELECTRICITY STAKEHOLDERS

7.1 Structure of the electricity system

<p>Short description of the electricity industry landscape</p> <ul style="list-style-type: none"> - structure – vertically integrated or separate generation, transmission, distribution; - retailers and network businesses – integrated or separate; - ownership – private – public (state owned or municipal) - Electricity industry regulator? 	NOT YET AVAILABLE
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7.2 Interest from electricity utility businesses

Not Available

7.3 Interest from municipalities and local governments

Not Available

8 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).

The standards, published during 2014 by CEI (Italian Electrotechnical Committee), which can affect the development of PV plants in Italy are the following:

- CEI 0-16 Reference technical rules for the connection of active and passive users to the MV and HV electrical grids
- CEI 0-21 Reference technical rules for the connection of active and passive users to the LV electrical grids

In particular, these standards foresee the use of electrical storage in PV plants connected to the grid, as regulated by the Italian Regulatory Authority for Electricity, Gas and Water (AEEGSI) and by GSE, as regards the "Conto Energia" PV plants.

9 HIGHLIGHTS AND PROSPECTS

Even if the national market stimulation initiative (Conto Energia Programme) has been extinguished in July 2013 restraining the entire PV market, it is expected that in Italy the PV installations will not be stopped, although considerably reduced.

Whereas Photovoltaics in Italy has reached competitiveness due to good radiation values in southern regions and high cost of electricity bill, some important factors currently hampers the further development of this technology.

At the contrary, as highlighted by several PV operators, the development of PV in Italy could continue to grow by initiatives at no cost for the public finances, like as:

- stable rules for the sale or the exchange of the produced electricity with the grid;
- simplified permitting process for PV installations (specially ground based);
- major focus on self-consumption of produced energy through electric storage;
- easier access to credit.

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/m², 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 Euro

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
Compensation schemes (self-consumption, net-metering, net-billing...)	These schemes allow consumers to reduce their electricity bill thanks to PV production valuation. The schemes must be detailed in order to better understand if we are facing self-consumption schemes (electricity consumed in real-time is not accounted and not invoiced) or net-billing schemes (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). The compensation for both the electricity self-consumed and injected into the grid should be detailed. Net-metering schemes are specific since they 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
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

