IEA INTERNATIONAL ENERGY AGENCY

National Survey Report of PV Power Applications in ITALY 2015

PHOTOVOLTAIC POWER SYSTEMS PROGRAMME

PVPS

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IEA PVPS TASK 1

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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 Technology Collaboration 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 2015. 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 2015 statistics if the PV modules were installed and connected to the grid between 1 January and 31 December 2015, although commissioning may have taken place at a later date**.

1.1 Applications for Photovoltaics

At the end of 2015 in Italy 688.398 photovoltaic plants were connected to the grid for a total capacity of 18.892 MW; moreover, a power of 14 MW of off grid systems is reported. Grid connected PV power plants produced 22.942 GWh during 2015.

Out of 298 MW grid-connected PV plants commissioned in 2015, almost all plants (slightly more than 40,000) are under a net-billing scheme, so-called Scambio Sul Posto (here below, SSP).

The number and capacity of plants commissioned in 2015 slightly decreased compared to 2014, due to the last commissioned systems under FiT law in 2014.

Small plants up to 20 kW represent 91% of installed systems in Italy and 18% of the cumulative national PV capacity. Most of the PV systems are domestic, with an average capacity of around 5 kW.

Around 97% of PV plants installed in Italy (669.709 out of 688.398) are connected to the low voltage distribution grid; however, the remaining share of 3%, consisting of less than 20.000 plants connected to medium voltage grid, is almost 60% of total existing capacity. Only a small number of installation is connected to the high voltage grid and with a capacity of around 1.176 MW, the 6,2% of the total.

Total cumulative and annual capacity in 2015 is installed mainly in the North of Italy (with a share of 44%) and in the South (37%), the remaining 19% is located in the Centre.

The capacity installed at the end of 2015 results in a national data of 63 kW per km^2; in 2015, the figure of national power per capita is equal to 311 W per inhabitant, a slight increase compared to 2014 (+ 1,6%).

1.2 Total photovoltaic power installed

Table 1: PV power installed during calendar year 2015 [1]

			MW installed in 2015	MW installed in 2015	AC or DC
Grid-connected	BAPV[2]	Residential	293	141	DC
		Commercial		125	DC
		Industrial		27[4]	DC
	BIPV[3] (if a specific legislation exists)	Residential			
		Commercial			
		Industrial			
	Ground-mounted	cSi and TF	5[4]		DC
		CPV			
Off-grid		Residential	2		
		Other			DC
		Hybrid systems			
		Total	300		DC

[1] *Blank box stands for not available data*

[2] *Building Applied PhotoVoltaic*

[3] *Building Integrated PhotoVoltaic*

[4] *Best estimate*

Table 2: Data collection process

If data are reported in AC, please mention a conversion coefficient to estimate DC installations	Data refer to the sum of PV nominal power
Is the collection process done by an official body or a private company/association?	Public bodies: GSE, RSE and ENEA
Link to official statistics	www.gse.it www.terna.it http://www.autorita.energia.it/

Table 3: PV power and the broader national energy market

MW-GW for capacities and GWh-TWh for energy	**2015 numbers**	**2014 numbers**
Total power generation capacities (all technologies)	120.031,9 MW	125.518,5 MW
Total power generation capacities (renewables including hydropower)	51.474,9 MW	50.579,6 MW
Total electricity demand (= consumption)	297.179,9 GWh	291.083,5 GWh
New power generation capacities installed during the year (all technologies)[1]	-5.486,6 MW	-2.884,5 MW[2]
New power generation capacities installed during the year (renewables including hydropower)	895,3 MW	661,0 MW[2]
Total PV electricity production in GWh-TWh	22.942,2 GWh	22.306,4 GWh
Total PV electricity production as a % of total electricity consumption	7,7%	7,7%

[1] *Net change in generation capacities*

[2] *Data updated with TERNA annual report 2015*

Table 4: Other information[1]

	2015 Numbers
Number of PV systems in operation	688.398
Capacity of decommissioned PV systems during the year in MW	0
Total capacity connected to the low voltage distribution grid in MW	6.612
Total capacity connected to the medium voltage distribution grid in MW	11.109
Total capacity connected to the high voltage transmission grid in MW	1.171

[1] *Grid connected*

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	4,0	3,8	0,1	0,7	8,6
1993	4,4	4,2	0,1	3,5	12,2
1994	4,7	4,7	0,2	4,6	14,2
1995	4,8	4,8	0,3	5,9	15,8
1996	5,0	4,8	0,4	5,9	16,1
1997	5,1	4,8	0,7	6,2	16,8
1998	5,2	5,1	0,8	6,6	17,7
1999	5,2	5,6	0,9	6,7	18,4
2000	5,2	5,9	1,2	6,7	19,0
2001	5,3	6,4	1,6	6,7	20,0
2002	5,3	6,4	3,6	6,7	22,0
2003	5,3	6,4	7,6	6,7	26,0
2004	5,3	6,7	12,0	6,7	30,7
2005	5,3	7,0	18,5	6,7	37,5
2006	5,3	7,5	30,5	6,7	50,0
2007(1)	5,4	7,7	68,7	18,3	100,1
2008(2)	5,4	7,9	284,5	146,5	444,3
2009(2)	5,0	8,0	640,6	503,4	1.157,0
2010(2)	4,0	9,0	1.526,8	1.956,7	3.483,5
2011(2)	0,0	10,0	4.215,1	8.557,9	12.783,0
2012(2)	0,0	11,0	6.175,3	10.514,7	16.701,0
2013	0,0	12,0	7.010,0	11.175,5	18.197,5
2014(2)	0,0	12,0	7.236,4	11.358,0	18.606,4
2015(2)	0,0	14,0	7.500,0	11.392,0	18.906,0

[1] *Grid connected data updated with GSE statistics 2013*

[2] *Grid connected data updated with GSE statistics 2015*

2 COMPETITIVENESS OF PV ELECTRICITY

2.1 Module prices

Table 6: Typical module prices for a number of years – local currency per W[1]

Year	2009[2]	2010[2]	2011[2]	2012[2]	2013[2]	2014	2015
Standard module crystalline silicon price(s): Typical	2,50	1,70	1,50	0,80	0,60	0,55[3]	0,55[3]
Lowest prices	2,30	1,50	1,20	0,70	0,50	0,50[4]	0,50[4]
Highest prices						0,80	0,75

[1] *Blank box stands for not available data*

[2] *Statistics updated according to GSE analysis data related to database of plants accessing incentive scheme*

[3] *Crystalline silicon modules*

[4] *Imported crystalline silicon modules*

2.2 System prices

Table 7: Turnkey Prices of Typical Applications – local currency[1]

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)		1,39-1,83
Grid-connected Rooftop from 10 to 250 kW (commercial)		1,28-1,50
Grid-connected Rooftop above 250kW (industrial)		1,10-1,30
Grid-connected Ground-mounted above 1 MW		0,87-1,03
Other category (hybrid diesel-PV, hybrid with battery…)		

[1] *Blank box stands for not available data*

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

Price/Wp	2011[(1)]	2012[(1)]	2013[(1)]	2014	2015
Residential PV systems < 10 kW	3,60	2,60	2,20	1,67	1,60
Commercial and industrial	2,70	1,80	1,40	1,40	1,32
Ground-mounted	2,80	1,70	1,20	1,03	0,96

[1] *Statistics updated according to GSE analysis data related to database of plants accessing incentive scheme*

2.3 Cost breakdown of PV installations

2.3.1 Residential PV System < 10 kW

Table 9: Cost breakdown for a residential PV system – local currency[(1)]

Cost category	Average (local currency/W)	Low (local currency/W)	High (local currency/W)
Hardware			
Module	0,65	0,60	0,75
Inverter	0,15	0,14	0,16
Other (racking, wiring…)	0,27	0,22	0,32
Soft costs			
Installation	0,09	0,07	0,10
Customer Acquisition	0,03	0,02	0,03
Profit	0,30	0,25	0,35
Other (permitting, contracting, financing…)	0,11	0,09	0,12
Subtotal Hardware	1,07	0,96	1,23
Subtotal Soft costs	0,53	0,43	0,60
Total	1,60	1,39	1,83

[1] *GSE specific survey*

2.3.2 Utility-scale PV systems > 1 MW

Table 10: Cost breakdown for an utility-scale PV system – local currency(1)

Cost Category	Average (local currency/W)	Low (local currency/W)	High (local currency/W)
Hardware			
Module	0,52	0,50	0,54
Inverter	0,07	0,06	0,08
Other (racking, wiring, etc.)	0,12	0,11	0,13
Soft cost			
Installation	0,04	0,03	0,05
Customer acquisition	0,02	0,01	0,02
Profit	0,16	0,14	0,17
Other (contracting, permitting, financing etc.)	0,03	0,02	0,04
Subtotal Hardware	0,71	0,67	0,75
Subtotal - Soft cost	0,25	0,20	0,28
Total	0,96	0,87	1,03

[1] *GSE specific survey*

2.4 Financial Parameters and specific financing programs

Table 11: PV financing scheme

Average rate of loans – residential installations	4,5%
Average rate of loans – commercial installations	3,5%
Average cost of capital – industrial and ground-mounted installations	3,2%

2.5 Specific investments programs

Not Available.

2.6 Additional Country information

Table 12: Country information 2015

Retail Electricity Prices for an household (range)	21-24 €cent/kWh[1]			
Retail Electricity Prices for a commercial company (range)	20-29 €cent/kWh[2]			
Retail Electricity Prices for an industrial company (range)	11-19 €cent/kWh			
Population at the end of 2014 (or latest known)	60.656.000			
Country size (km^2)	301.336			
Average PV yield (according to the current PV development in the country) in kWh/kWp	1.225 kWh/kWp			
Name and market share of major electric utilities[3]	**Year 2014**		**Year 2015**	
	Electric utilities	Share %	Electric utilities	Share %
	Enel	27,0	Enel	25,2
	Eni	8,2	Eni	8,6
	Edison	6,0	Edison	6,4
	Engie	2,7	Engie	3,2
	Czech Gas Holding	3,6	Czech Gas Holding	3,1
	A2A	3,0	A2A	3,0
	ERG	2,4	ERG	2,1
	Iren	2,4	Iren	2,9
	Edipower	2,1	Edipower	2,4
	Tirreno Power	1,6	Tirreno Power	1,4
	Others	41,0	Others	41,7

[1] *Consumption up to 5.000 kWh/y*

[2] *Nomisma Energia estimate*

[3] *Generation share*

3 POLICY FRAMEWORK

3.1 Direct support policies for PV installations

3.1.1 New, existing or phased out measures in 2015

3.1.1.1 Description of support measures excluding BIPV, and rural electrification

After the end of the FiT law in 2013, tax credit (available only for small size plants up to 20 kW), together with a net-billing scheme (SSP), are the remaining measures to support PV market. Self-consumption is allowed for all PV system sizes.

SSP is a net-billing scheme for systems up to 500 kW, in which electricity fed into the grid is remunerated through an "energy quota" based on electricity market prices and a "service quota" depending on grid services costs (transport, distribution, metering and other extra charges). Market prices are applied for the electricity injected into the grid as an alternative to SSP.

Moreover, the so-called "*Sistema Efficiente di Utenza*" (here below, SEU) mechanism is in force; SEU is a system in which one or more power production plants operated by a single producer are connected through a private transmission line to a single end user located on the same site. SEU bring cost reduction in transport and distribution, rewarding self-consumption.

3.1.1.2 BIPV development measures

None.

3.1.1.3 Rural electrification measures

None.

3.1.1.4 Support for electricity storage and demand response measures

Regarding storage, tax credit measures are foreseen.

Table 13: PV support measures (summary table)[(1)]

	On-going measures residential	Measures that commenced during 2015 - residential	On-going measures Commercial + industrial	Measures that commenced during 2015 commercial + industrial	On-going measures Ground-mounted	Measures that commenced during 2015 ground mounted
Feed-in tariffs	No					
Feed-in premium (above market price)	No					
Capital subsidies	Yes, at regional level				No	
Green certificates	No					
Renewable portfolio standards (RPS) with/without PV requirements	No obligations for utilities to obtain a minimum percentage of their power from renewable energy resources					
Income tax credits	Yes	No				
Self-consumption	Yes	No	Yes	No	Yes	No
Net-metering	No					
Net-billing [(2)]	Yes	No	Yes	No	Yes	No
Commercial bank activities e.g. green mortgages promoting PV	Yes	No	Yes			
Activities of electricity utility businesses	Yes	No	Yes	No	Yes	No
Sustainable building requirements	Yes	No	Yes	No		
BIPV incentives	No					

[1] *Blank box stands for not available data*

[2] *Up to 500 kW*

3.2 Self-consumption measures

PV self-consumption	1	Right to self-consume	Yes
	2	Revenues from self-consumed PV	Savings on the electricity bill
	3	Charges to finance Transmission & Distribution grids	No
Excess PV electricity	4	Revenues from excess PV electricity injected into the grid	SSP, net-billing based on energy and services; market price for selling
	5	Maximum timeframe for compensation of fluxes	Self-consumption, real time; SSP, advance payment twice per year
	6	Geographical compensation	On site (meter aggregation is allowed for some specific SSP cases)
Other characteristics	7	Regulatory scheme duration	Unlimited
	8	Third party ownership accepted	Yes, with condition for SSP
	9	Grid codes and/or additional taxes/fees impacting the revenues of the prosumer	On self-consumed electricity, a 5% of system tariffs applied to electricity withdrawn from the grid is charged above 20 kW
	10	Regulations on enablers of self-consumption (storage, DSM…)	Yes (tax credit for storage)
	11	PV system size limitations	Self-consumption, none; SSP, up to 500 kW
	12	Electricity system limitations	None
	13	Additional features	None

3.3 Tenders, auctions & similar schemes

None.

3.4 Direct Support measures

Regional subsidies for RES, covering a percentage of the plant costs, are foreseen.

3.5 Financing and cost of support measures

In 2015 GSE spent around 15 BEUR for supporting RES, mainly for power production and purchasing RES electricity, of which around 6,8 for PV plants (6,3 for incentives granted for PV plants built between 2005-2014 when FiT was in force and the rest for net-billing and simplified purchase).

Part of the cost is recovered by revenues arising from electricity sale (2 BEUR) on the power exchange, thus determining a RES burden on electricity bills of 12,9 BEUR. This resulted at the end of 2015 in around 4 EURcts/kWh paid by the electricity consumers in the residential sector (of which around 1,8 EURcts/kWh for PV). The amount paid by the other consumers is slightly lower.

3.6 Indirect policy issues

None.

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 heterojunction cell, CZTS cell and CZTS/silicon Tandem cell, Perovskite single junction cell, Perovskite-silicion tandem cell, microcrystalline Si devices, micromorph tandem solar cell as well as concentrators technologies. In the field of PV systems ENEA is developing devices, software, modeling, 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 available.

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

Not available.

5 INDUSTRY

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

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

Not available.

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

Table 16: Production and production capacity information for 2015[(1)]

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					
AV Project					
Azimut		0	5,7	0	30
Eclipse Italia					
El.Ital.					
Ferrania Solis	mc-Si, pc-Si	0	11,5	0	60
Futura Sun	mc-Si, pc-Si	3	50	10	150
HF Energy					
Megacell	mc-Si			60	
Meridionale Impianti	pc-Si		0,1		20
Micron - Cappello Group	mc-Si, pc-Si		3		40
Solsonica	mc-Si, pc-Si				
SPS ISTEM	pc-Si	0	5,8	0	60
Sunerg Solar					
V-Energy	mc-Si, pc-Si		5,8		23
Waris					
Thin film manufacturers					
3SUN - Enel Green Power	a-Si		190		190
Cells for concentration					
TOTAL		**3**	**272**	**70**	**573**

[1] *Blank box stands for not available data*

Source: RSE, Fotovoltaico: power to the people?, 2016

5.3 Manufacturers and suppliers of other components

Business trend changed since 2014, after the end of FiT scheme; few big companies manufacturing inverters started to reach new markets. The main activities in 2015 are focused on operation and maintenance of existing plants and a secondary market related to large size plants acquisition.

6 PV IN THE ECONOMY

6.1 Labour places

Table 17: Estimated PV-related labour places in 2015 [(1)]

Research and development (not including companies)	
Manufacturing of products throughout the PV value chain from feedstock to systems, including company R&D	
Distributors of PV products	
System and installation companies	
Electricity utility businesses and government	
Other	12.739[(2)]
Total	

[1] *Blank box stands for not available data*

[2] *2015 GSE data, concerning permanent jobs, in terms of FTE (Full Time Equivalent), directly and indirectly related to O&M activities on existing PV facilities.*

6.2 Business value

Table 18: Value of PV business

Not available.

7 INTEREST FROM ELECTRICITY STAKEHOLDERS

7.1 Structure of the electricity system

Short description of the electricity industry landscape	Italian electricity sector went through a deep reform over the last 20 years that changed it from a monopolistic structure to a liberalised market. The process started in 1999 but is not yet completed since the full liberalization will be achieved in mid 2018 when the regulated market is expected to be replaced by the free market in retail sector. The former monopolist ENEL still holds relevant market shares in all segments. Structure: generation, transmission and distribution are separated. Generation is a free activity where ENEL has a 27% market share while the rest is scattered among several players. Transmission is a regulated activity held by the transmission system operator (TSO) Terna; distribution is a regulated activity where ENEL still holds a 89% market share. Retail activity is free where ENEL holds 70% of the market with a formal separation from the other activities. Enel is a stock company where the state holds a 26% stake. Terna is a stock company with the state holding a 30% stake. Some companies with activities in production, distribution and retail are former municipalities hold by local authorities. Energy authority was created in 1995 and is regulating the electricity sector following directives from the Italian Government and Parliament.

7.2 Interest from electricity utility businesses

Not available.

7.3 Interest from municipalities and local governments

Not available.

8 HIGHLIGHTS AND PROSPECTS

Market evolved from large ground plant investments to small residential systems based on SSP mechanism and self-consumption.

Despite small additional installed capacity, the number of installations is increasing, thanks also to the plant cost reduction.

Basically, two main segment emerged from the market, first one that of residential small plants, the other that of large systems that created a secondary market of managing and acquisition.

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^oC, 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