Technology Collaboration Programme
by IEA

International Energy Agency
Photovoltaic Power Systems Programme

Task 1 Analysis & Outreach

PVPS

National Survey Report of PV Power Applications in Italy

2024

GSE Gestore Servizi Energetici
RSE Ricerca Sistema Energetico
ENEA
GREEN HORSE

What is IEA PVPS TCP?

The International Energy Agency (IEA), founded in 1974, is an autonomous body within the framework of the Organization for Economic Cooperation and Development (OECD). The Technology Collaboration Programme (TCP) was created with a belief that the future of energy security and sustainability starts with global collaboration. The programme is made up of 6.000 experts across government, academia, and industry dedicated to advancing common research and the application of specific energy technologies.

The IEA Photovoltaic Power Systems Programme (IEA PVPS) is one of the TCP's within the IEA and was established in 1993. The mission of the programme is to "enhance the international collaborative efforts which facilitate the role of photovoltaic solar energy as a cornerstone in the transition to sustainable energy systems." In order to achieve this, the Programme's participants have undertaken a variety of joint research projects in PV power systems applications. The overall programme is headed by an Executive Committee, comprised of one delegate from each country or organisation member, which designates distinct 'Tasks,' that may be research projects or activity areas.

The 27 IEA PVPS participating countries are Australia, Austria, Belgium, Canada, China, Denmark, Finland, France, Germany, India, Israel, Italy, Japan, Korea, Malaysia, Morocco, the Netherlands, Norway, Portugal, South Africa, Spain, Sweden, Switzerland, Thailand, Turkiye, the United Kingdom and the United States of America. The European Commission, Solar Power Europe and the Solar Energy Research Institute of Singapore are also members.

Visit us at: www.iea-pvps.org

What is IEA PVPS Task 1?

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 2024. Information from this document will be used as input to the annual Trends in Photovoltaic Applications report.

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COVER PICTURE

Source: Catalogue of Photovoltaic Plants Integrated with Innovative Characteristics, Gestore dei Servizi Energetici, GSE

INTERNATIONAL ENERGY AGENCY
PHOTOVOLTAIC POWER SYSTEMS PROGRAMME

National Survey Report of PV Power Applications in Italy 2024

IEA PVPS
Task 1
Strategic PV Analysis & Outreach

October - 2025

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LIST OF ABBREVIATIONS

ARERA	Regulatory Authority for Energy, Networks and Environment
BAPV	Building Applied Photovoltaic(s)
BIPV	Building Integrated Photovoltaic(s)
EC	European Commission
EU	European Union
FiP	Feed-in Premium
FiT	Feed-in Tariff
GSE	Gestore dei Servizi Energetici
IEA	International Energy Agency
IEA PVPS	International Energy Agency, Photovoltaic Power Systems Programme
INECP	Integrated National Energy and Climate Plan
MASE	Ministry of Environment and Energy Security
MIMIT	Ministry of Enterprise and Made in Italy
NRPP	National Recovery and Resilience Plan
PPA	Power Purchase Agreement
PV	Photovoltaic(s)
RES	Renewable Energy Sources
SSP	Scambio sul Posto (net-billing scheme)
TERNA	Electricity Transmission System Operator

1 INSTALLATION DATA

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 2024 statistics if the PV plants were installed and connected to the grid between January 1st and December 31st, 2024, although commissioning may have taken place at a later date.

1.1 Applications for photovoltaics (PV)

PV market in Italy in 2024 continued the growth trend of the last years, with a new capacity installed of 6 683 MW for a number of 278 423 plants commissioned[1]. At the end of 2024 a number of 1 875 870 plants were installed in Italy, for a total capacity of 37 002 MW. The capacity of PV plants installed in 2024 is the highest value of the last ten years.

Small plants with a capacity below 10 kW represent 85% of the total systems installed at the end of 2024 and 21% in terms of power, while the data on plants with a capacity below 30 kW is 91% for number and 28% for capacity.

Almost all plants commissioned in 2024 have a capacity <30 kW, representing 26% of the capacity installed in 2024, while plants larger than 1 MW represent about 54% of the power installed during the year. Ground mounted capacity at the end of 2024 is equal to 11 244 MW[2].

The actual average capacity of PV plants commissioned in 2024 is 23.8 kW, while the average cumulative capacity in 2024 is equal to 19.7 kW. The actual national power per capita at the end of 2024 is equal to 627 W, an increase of 113 W compared to 2023.

Most of PV plants installed in Italy (1 842 369 out of a total of 1 875 870, a percentage of 98.2%) is connected to the low voltage distribution grid, while 33 263 plants are connected to the medium voltage grid, representing 47.7% of total existing capacity. Only a small number of plants are connected to the high voltage grid, with a capacity of 3 959 MW, equal to a percentage of 10.7% of total one.

At the end of 2024, a percentage of 55% of the plants installed in Italy is located in the North while 17% is installed in the Centre and 28% in the South.

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[1] ***The value results from the difference between the value at the end of 2024 and the value of 2023. It is important to point out that the actual number of installed PV plants in 2024 is equal to 280 425, and the actual installed capacity in 2024 is equal to 6 664 MW, due to decommissioning and statistic power update (see table 1 and 2, note 5)***

[2] ***Cumulative data. The actual capacity at the end of 2024 is equal to 11 574***

PV production in 2024 is equal to 36 TWh, of which a percentage around 23% is generated by domestic sector, 18% by the tertiary sector, 9% by the agricultural sector and 50% GWh by the industrial sector.

1.2 Total PV power installed

Table 1: Annual PV power installed during calendar year 2024 (1) (2)

	Installed PV capacity in 2024 [MW]	AC or DC
Decentralized (3)	4 314	DC
Centralized (4)	2 369	DC
Off-grid		
Total	**6 683** (5)	**DC**

[1] *Source: GSE*

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

[3] *Any PV installation which is embedded into a customer's premises (self-consumption), best estimate*

[4] *Any PV installation which only injects electricity and is not associated with a consumer (no self-consumption), best estimate*

[5] ***The value indicated in the table results from the difference between the value at the end of 2024 and the value of 2023. It is important to point out that actual installed capacity in 2024 is equal to 6 664 MW, due to decommissioning and statistic power update***

Table 2: PV power installed during calendar year 2024 (1) (2)

			Installed PV capacity [MW]	Installed PV capacity [MW]	AC or DC
Grid-connected	BAPV (3)	Residential	4 436	1 485	DC
		Commercial		803	DC
		Industrial		2 148	DC
	BIPV (4)				
	Utility-scale	Ground-mounted	2 247	2 062	DC
		Floating		0	DC
		Agricultural		185	DC
Off-grid					
Total			**6 683** (5)		**DC**

[1] *Source: GSE*

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

[3] *Building Applied Photovoltaics. BIPV is included since there are no specific data on BIPV applications*

[4] *Building Integrated Photovoltaics*

[5] ***The value indicated in the table results from the difference between the value at the end of 2024 and the value of 2023. It is important to point out that actual installed capacity in 2024 is equal to 6 664 MW, due to decommissioning and statistic power update***

Table 3: 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 body for statistical data: GSE, TERNA
Link to official statistics	www.gse.it; www.terna.it;

Table 4: The cumulative installed PV power in 4 sub-markets (1) (2)

Year	Off-grid [MW] (including large hybrids)	Grid-connected distributed [MW] (BAPV, BIPV)	Grid-connected centralized [MW] (Ground, floating)	Total [MW]
2019		13 021	7 844	20 865
2020		13 656	7 994	21 650
2021		14 546	8 048	22 594
2022		16 661	8 403	25 064
2023		20 992 (3)	9 328 (3)	30 319
2024		25 428	11 574	37 002

[1] *Source: GSE, TERNA*

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

[3] *Revised data*

Table 5: Other PV market information (1) (2)

	2024		
Number of PV systems in operation in your country	1 875 870 (3)	Residential Commercial Industrial Utility scale	1 598 847 126 203 133 203 17 617
Decommissioned PV systems during the year [MW]	28 (3)	Residential Commercial Industrial Utility scale	11 6 9 2
Repowered PV systems during the year [MW]			

[1] *GSE elaboration based on NSR classification*

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

[3] *GSE actual data*

Table 6: PV power and the broader national energy market

	Data	Year
Total power generation capacities [GW]	137.6	2024
Total renewable power generation capacities (including hydropower) [GW]	74.3	
Total electricity demand [TWh]	312.3 (1)	
New power generation capacities installed [GW]	7.6	
New renewable power generation capacities (including hydropower) [GW]	7.5 (1)	
Total PV electricity production (including self-consumed PV electricity) [TWh]	36.0	
Total PV electricity production as a % of total electricity consumption	11.5%	
Average yield of PV installations [kWh/kWp]	1 066	

[1] *TERNA estimate*

1.3 Key enablers of PV development

Table 7: Information on key enablers, 2024 (1)

	Annual Value (2)	Total Value	Source
Decentralized storage systems (number)	209 428	734 187	GSE (3)
Residential heat pumps (number)			
Battery Electric Vehicles BEV (number)	60 067	279 607	ACI (4)
Plug In Hybrid Electric Vehicles PHEV (number)	67 072	312 216	ACI (4)
Electric buses and trucks (number)	4 267	24 100	ACI (4)
- of which buses	1 116	2 406	ACI (4)
- of which trucks	3 151	21 694	ACI (4)

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

[2] *Data obtained as difference between the total fleet in 2024 and total fleet 2023*

[3] *Best estimate*

[4] *Automobile Club d'Italia, www.aci.it*

2 COMPETITIVENESS OF PV ELECTRICITY

2.1 Module prices

Table 8: Typical PV module prices [€/W] (1) (2)

Year	Lowest module price	Highest module price	Average module price
2009	2.30		2.50
2010	1.50		1.70
2011	1.20		1.50
2012	0.70		0.80
2013	0.50		0.60
2014	0.50	0.80	0.55
2015	0.50	0.75	0.55
2016	0.40	0.65	0.48
2017	0.32	0.56	0.40
2018	0.20	0.48	0.35
2019	0,18	0.45	0.29
2020	0.16	0.44	0.30
2021	0.20	0.52	0.38
2022	0.22	0.54	0.40
2023	0.15	0.48	0.32
2024	0.12	0.43	0.28

[1] *GSE specific survey*

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

2.2 System prices

Table 9: Turnkey system prices of different typical PV systems in 2024 (1) (2)

Category/Size	Typical applications and brief details	[€/W]
Residential BAPV < 10 kW	Grid-connected, roof-mounted, distributed PV systems installed to produce electricity to grid-connected households. Typically roof-mounted systems on villas and single-family homes.	1.20 – 1.60
Small commercial BAPV 10-100 kW	Grid-connected, roof-mounted, distributed PV systems installed to produce electricity to grid-connected commercial buildings, such as public buildings, multi-family houses, agriculture barns, grocery stores etc.	1.10 – 1.45
Large commercial BAPV 100-250 kW	Grid-connected, roof-mounted, distributed PV systems installed to produce electricity to grid-connected large commercial buildings, such as public buildings, multi-family houses, agriculture barns, grocery stores etc.	1.00 – 1.30
Industrial BAPV >250 kW	Grid-connected, roof-mounted, distributed PV systems installed to produce electricity to grid-connected industrial buildings, warehouses, etc.	0.80 – 1.10
Small centralized PV 1-10 MW	Grid-connected, ground-mounted, centralized PV systems that work as central power station. The electricity generated in this type of facility is not tied to a specific customer and the purpose is to produce electricity for sale.	0.66 – 0.90

[1] *GSE specific survey*

[2] *Excluding VAT*

Table 10: National trends in system prices for different applications [€/W] (1) (2) (3)

Year	Residential BAPV Grid-connected, roof-mounted, distributed PV systems < 10 kW	Small commercial BAPV Grid-connected, roof-mounted, distributed PV systems 10-100 kW	Large commercial BAPV Grid-connected, roof-mounted, distributed PV systems 100-250 kW	Centralized PV Grid-connected, ground-mounted, centralized PV systems 10-50 MW
2011	3.60		2.70	2.80
2012	2.60		1.80	1.70
2013	2.20		1.40	1.20
2014	1.67		1.40	1.03
2015	1.60		1.32	0.96
2016	1.55		1.22	0.88
2017	1.44		1.10	0.80
2018	1.41	1.20	1.08	0.69
2019	1.34	1.15	1.00	0.63
2020	1.33	1.15	1.00	0.62
2021	1.44	1.36	1.10	0.71
2022	1.60	1.42	1.28	
2023	1.45	1.32	1.18	0.60
2024	1.39	1.28	1.15	

[1] *GSE specific survey*

[2] *Excluding VAT*

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

2.3 Cost breakdown of PV installations

Table 11: Cost breakdown for a grid-connected roof-mounted distributed residential PV system of <10 kW, 2024 [1]

Cost category	Average (€/W)	Low (€/W)	High (€/W)
Hardware			
Module	0.35	0.30	0.43
Inverter	0.17	0.16	0.18
Mounting material	0.34	0.27	0.37
Other electronics (cables, etc.)			
Subtotal Hardware	**0.86**	**0.73**	**0.98**
Soft costs			
Planning [2]			
Installation work	0.09	0.08	0.11
Shipping and travel expenses to customer	0.03	0.02	0.03
Permits and commissioning [3]	0.10	0.09	0.11
Project margin	0.31	0.26	0.37
Subtotal Soft costs	**0.53**	**0.45**	**0.62**
Total (excluding VAT)	**1.39**	**1.18**	**1.60**
VAT	10%	10%	10%
Total (including VAT)	**1.53**	**1.30**	**1.76**

[1] *GSE specific survey*

[2] *Planning cost are included in the other soft costs*

[3] *Including financing*

2.4 Merchant PV/PPA

The bulletin board of long-term energy contracts from renewable sources (PPA BULLETIN BOARD) is organised and managed by the Gestore dei Mercati Energetici, GME[3], pursuant to art. 28, paragraph 1, of 8 November 2021, no. 199, with the aim of:

a) promoting the meeting between parties potentially interested in the stipulation of long-term contracts for the sale of electricity from renewable source;

b) to allow the fulfilment of the obligation to register long-term contracts for the purchase and sale of electricity from renewable sources concluded between the participants;

c) carry out the allocation procedures related to electricity as shown in the decree of the Minister of Ecological Transition n. 341 of 16.09.2022.

2.5 Additional Country information

Table 12: Country information, 2024

Retail electricity prices for a household [€c/kWh]	35.70 (1)
Retail electricity prices for a commercial company [€c/kWh]	31.1 – 38.7 (2)
Retail electricity prices for an industrial company [€c/kWh]	26.52 (1)
Liberalization of the electricity sector	In Italy the electricity sector is almost totally liberalised. In mid-2024 the full transition to the free market for all domestic customers was completed while for the non-domestic sector the process was implemented more than ten years ago.

[1] ARERA (Energy Authority) provides a single price the entire sector for 2024, without distinctions for bands of consumption

[2] Nomisma Energia best estimate

[3] https://www.mercatoelettrico.org/en-us/Home/Markets/ElectricityMarket/Bulletin-Board-PPA

3 POLICY FRAMEWORK

Table 13: Summary of PV support measures

Category	Residential		Commercial + Industrial		Centralized	
Measures in 2024	**On-going**	**New**	**On-going**	**New**	**On-going**	**New**
Feed-in tariffs, FiT	Yes (2)	-	Yes (1)	-	Yes (1)	Yes (3)
Feed-in premium, FiP	Yes (2)	-	Yes (1)	-	Yes (1)	Yes (3)
Capital subsidies (4)	Yes	Yes	Yes	Yes	-	-
Green certificates (5)	Yes	-	Yes	-	Yes	-
Renewable portfolio standards with/without PV requirements (6)	-	-	-	-	-	-
Income tax credits	Yes	-	Yes	-	-	-
Self-consumption	Yes	-	Yes	-	Yes	-
Net-metering	-	-	-	-	-	-
Net-billing (7)	Yes	-	Yes	-	-	-
Collective self-consumption and virtual net-metering (8)	Yes	-	Yes	-	-	-
Sustainable building requirements	Yes	-	Yes	-	-	-
BIPV incentives (9)	-	-	Yes	-	-	-

[1] *FER 1 Decree (see paragraph see 3.2). FiT, up to 250 kW, FiP over 250 kW*

[2] *Small Islands Decree (see paragraph 3.2), FiT for electricity fed into the grid, FiP for self-consumed quota*

[3] *FER 2 Decree, first tender in 2025 (see paragraph 3.2)*

[4] *At regional level, most of tenders are for PV on public administration buildings and for small/medium-sized enterprises (SMEs)*

[5] *Guarantees of Origin, GO (see paragraph 3.8)*

[6] *No obligations for utilities to obtain a minimum percentage of their power from renewable energy sources*

[7] *Up to 500 kW, a phase out is in place from 2025*

[8] *See paragraph 3.4*

[9] *Regional tenders, mostly for public administrations buildings and for small/medium-sized enterprises (SMEs), support RES and energy efficiency (BIPV is an option)*

3.1 National targets for PV

In July 2023 Italy submitted to the EC a draft of the INECP to meet the increased energy and climate targets and objectives under the European Green Deal, which foresees a strong increase of RES electricity share in consumption (40.5%). The main contribution is expected from PV technology, with a target of cumulative PV capacity of about 80 GW by 2030 and a corresponding electricity production of about 100 TWh/year.

Italy was amongst the few countries to have proposed a sufficient level of contributions for 2030. EC recommended Italy, *inter alia*, to elaborate more in depth how these targets would be reached.

On July1st, 2024, Italy has submitted to the EC the definitive updated INECP aligned with the EC recommendation. As to RES implementation, Italy set the goal to reach a capacity of 131 GW by 2030. Nearly eighty (79.2 GW) of these are expected to come from solar, 28.1 from wind, 19.4 GW from hydro, 3.2 GW from bioenergy, and 1 GW from geothermal. According to scenario assumptions developed in the INECP, nuclear power from fission, and in the long term from fusion, could provide about 11% of the total electricity demand by 2050, with a possible projection toward 22%.

On August 7th, 2023, Italy submitted its amended NRRP, which includes a Repower EU chapter focused on green transition, with 39% (37.5% in the original plan) of the available funds to support climate objectives.

The plan foresees funds for 194.4 billion €, of which 122.6 in loans and 71.8 in grants. In December 2023 the plan has been approved by the Council of the EU. In 2024 Italian authorities implemented significant amendments to the NRRP to accelerate the country's energy transition. By November 2024, the EC endorsed Italy's modified NRRP, which allocated 39% of available funds to climate objectives, including reforms to boost RES deployment and investments to enhance the electricity grid and hydrogen production.

3.2 Direct support policies for PV installations

A large number of PV plants commissioned between 2005 and 2014 still access to 20 years FIT tariff under the so-called Conto Energia scheme.

The Ministerial Decree of July 4th, 2019, (so-called FER 1 Decree) aims at supporting energy from new, refurbished and upgraded plants from the following RES: PV (with a capacity over 20 kW), onshore wind, hydro and sewage gas.
Competitive auctions (for capacities over 1 MW) for groups of technologies and registries for smaller plants (with a capacity up to 1 MW), with some competitive elements are foreseen. The support for the plants with a capacity up to 250 kW is a Feed-in Tariff (FiT), and over 250 kW a sliding Feed-in Premium (FiP), so-called “two-ways mechanism”: the producer receives from GSE an incentive equal to the difference between a reference tariff and the hourly zonal price of energy and *vice versa*.

Additional remunerations are foreseen for plants installed on buildings (with a capacity ≤100 kW), for self-consumed energy (if self-consumption exceeds 40% of yearly net production), and for BAPV/BIPV plants replacing asbestos.

At the end of September 2025, 16 procedures have been taking place for a commissioned RES capacity of 3 214 MW, of which 1 790 MW are referred to PV technology[4]. With the 16th procedure the FER 1 Decree ended operating, being replaced by other decrees such as the FER 2 Decree and the FER X transitory Decree highlighted below.

The Decree of June 19th, 2024 (so-called FER 2 Decree) supports non-mature technologies such as floating PV, offshore wind, biogas, biomasses, geothermal, thermodynamic solar, etc., granting a "two-ways mechanism" tariff for a 20-year period. The first tender for floating PV takes place in 2025.

On December 2024 the Italian government enacted the so-called FER X transitory Decree (in force from February 2025), supporting electricity production from RES with costs close to market competitiveness. The mechanism of the draft decree is based on competitive tenders and provides for the "two-ways mechanism" tariff for a 20-year period.

Italy in 2009 switched from a net-metering mechanism to a net-billing scheme (so called *Scambio sul Posto*, SSP) for systems with a capacity below 500 kW. 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. Market prices are applied for the electricity fed into the grid as an alternative to net-billing.
A phase out has been introduced by Legislative Decree 199/2021 from 2025. The end of the net-billing mechanism will move owners of small PV plants toward different forms of supports, such as energy communities or dedicated withdrawal managed by GSE.

An important contribution came from regional policies, such as, i.e., tenders for capital subsidies for PV plants, sometimes together with other RES, building energy efficiency interventions, heating pumps, and storage systems.

The Decree of February 14th, 2017 (so-called Small Islands Decree) grants subsidies to RES plants in small geographical islands not connected to the mainland electricity grid. The mechanism foresees a 20-year FiT for the electricity fed into the grid and a FiP is applied for the self-consumed quota.
Moreover, a bonus for PV replacing asbestos is foreseen.

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[4] For updated data, please visit the following website https://www.pniecmonitoraggio.it/Dimensioni/Rinnovabili/FER%20Elettriche/Pagine/Incentivi-e-altre-misure.aspx#FER1

Tax credit measures for refurbishment of building energy efficiency, PV systems and infrastructures for charging electric vehicles, as well as storage systems, have been introduced in recent years (so-called Ecobonus and Superbonus).
Generally, PV plants and storage system have to be coupled with building energy efficiency interventions in order to access the support.

The so-called Transizione 5.0 Decree (Law Decree No.19 of 2024) provides tax credits to companies investing in energy efficiency and digital transformation projects completed by 2025. Companies can receive tax credits covering up to 45% of their investment, depending on the energy savings achieved.
To be eligible for the support, PV modules have to be listed in the ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development) PV Technology Register.

3.2.1 BIPV development measures

As in recent years, also in 2024 some regions introduced measures supporting PV plants mostly on and public administration buildings and for small/medium-sized enterprises (SMEs), sometimes coupled with heating pumps and/or storage systems. The above-mentioned measures are not focused specifically on BIPV, even if BIPV is allowed. The supports mainly consist of capital grant expenditure.

3.3 Self-consumption measures

Table 14: Summary of self-consumption regulations, 2024

PV self-consumption	**1**	*Right to self-consume (real time)*	Yes
	2	*Revenues from self-consumed PV*	Savings on the electricity bill
	3	*Charges to finance Transmission, Distribution grids & Renewable Levies*	No
Excess PV electricity	**4**	*Revenues from excess PV electricity injected into the grid*	Net-billing (SSP), a phase out is in place from 2025; indirect sale through a dedicated withdrawal and, in case of collective self-consumption and solar community, an incentive is granted on the shared energy (1)
	5	*Maximum timeframe for compensation of fluxes*	Net billing scheme, energy fluxes are calculated on a yearly basis. Collective self-consumption and energy communities, energy fluxes are calculated on an hourly basis
	6	*Geographical compensation (virtual self-consumption or metering)*	On site. In 2023 new incentive schemes to support RES communities, groups of self-consumers, and remote self-consumers
	7	*Regulatory scheme duration*	Real time self-consumption, unlimited. Net-billing is yearly renewed, even if a phase out is in place from 2025

Other characteristics	**8**	*Third party ownership accepted*	Yes, with condition
	9	*Grid codes and/or additional taxes/fees impacting the revenues of the prosumer*	None
	10	*Regulations on enablers of self-consumption (storage..)*	Tax credit for storage coupled with PV
	11	*PV system size limitations*	Self-consumption, none. Net-billing, up to 500 kW
	12	*Electricity system limitations*	None
	13	*Additional features*	None

[1] Managed by GSE. Concerning sale, the producer may choose between GSE dedicated withdrawal and market sale

3.4 Collective self-consumption, solar community and similar measures

After the Decree of 2020, on December 7th, 2023, the MASE enacted Decree No. 414 (so-called CACER Decree, Self-Consumption Configuration for Sharing Renewable Energy), which took effect on January 24th, 2024. The annex to the ARERA Resolution 727/2022/R/eel (Integrated Regulation Text for Distributed Energy Self-consumption), established the mechanism and the contributions for self-consumed energy. The decree supports energy communities and self-consumption both with a FiT scheme and with capital incentives in particular cases.

The FiT measure supports a widespread self-consumption scheme up to a capacity cap of 5 GW and, in any case, commissioned until December 2027. The main general requirements of the PV plants are the following:

- maximum eligible capacity of 1 MW;
- new plants (or new sections of existing plants);
- plants commissioned after December 15th, 2021;
- built with new components;
- in line with DNSH (Do Not Significant Harm) principles;
- not under net-billing scheme (SSP) or other incentives;
- PV capacity installed to meet new buildings requirements cannot access the measures.

Different options based on a virtual model are foreseen, as highlighted below:

1. Renewable Energy Communities (RECs). The REC is a legal entity, and members may be private persons, small and medium-size enterprises, local public administration authorities, research and training bodies, religious organizations, others. The scope of the Community is to provide environmental, economic or social benefits to the Community and to its members.
2. Renewable energy self-consumers groups. Plants and consumption must be in the same building.

3. Remote renewable energy self-consumer, which is the owner of the connection points (production and consumption). Third party producers may also be part of this configuration.

The FiT scheme is foreseen for twenty years (flat tariff), higher for small plants. FiT is granted on the shared electricity, which is the lowest value, calculated on an hourly basis, between the electricity fed into the grid and the electricity withdrawn from the points of connection. In addition to the flat tariff, there is a variable tariff depending on market price and on geographical compensation.

There are other configurations only accessing to the contribution for the value of self-consumed energy, like active customer groups, remote active customer, and Citizen Energy Communities (CECs).

The configurations for which it is possible to access capital support are RECs and groups of RES self-consumers located in small towns with a population of less than 5 000 people (50 000 from 2025). The support can cover up to 40% of the cost of energy projects, applications must be submitted by November 30th, 2025, and the cap foreseen is 2.2 billion €.

At the end of September 2025 GSE registered a number of 2 151 CER RES configurations under the so-called CACER scheme Decree for a total capacity commissioned equal to 194.6 MW [5]. PV technology cover almost all the capacity installed under the above-mentioned decree.

3.5 Other measures including floating and agricultural PV

During 2024 Italy intensified its work on the support mechanism for agricultural PV (hereafter, Agri-PV). The Decree No.436 of December 2023 foresees a mechanism dedicated to advanced Agri-PV (with certain requirements in terms of height from ground and monitoring systems) developed by agricultural companies (or temporary associations between investor and agricultural companies) and is composed of an incentive tariff granted for 20 years and capital contributions up to 40% of the investment costs. In 2024 there was a competitive auction.

The so-called Agrisolar Park is foreseen in the NRRP, aiming to support PV plants on building roofs in the agricultural and agro-industrial sector. Moreover, the improvement of the building energy efficiency (i.e, thermal insulation of the roof, ventilation system, etc.) and the disposal of asbestos are also supported (coupled with PV). Storage systems and charging stations, if any, can be included in the admissible expenditure. A tender took place in 2024.

[5] *For updated data, please visit the following website https://www.pniecmonitoraggio.it/Dimensioni/Rinnovabili/FER%20Elettriche/Pagine/Incentivi-e-altre-misure.aspx#CACER*

3.6 Social policies

After the pilot project of the so-called *reddito energetico* (energy income) started in 2017 by the municipality of Porto Torres (Sardinia region) in cooperation with the GSE[6], many other municipalities and regions are carrying out similar support mechanisms.

Moreover, the MASE enacted Ministerial Decree No. 261 of 2023, which established a 200 million€ fund targeted at households in energy poverty conditions for the purpose of install PV systems for self-consumption during 2024 and 2025. The installations must be carried out on roofs and/or surfaces of buildings, real estate units and/or their appurtenances. The PV capacity foreseen is between 2 and 6 kW.

3.7 Retroactive measures applied to PV

Law 116/2014 defined procedures related to incentives granted to electricity produced by PV plants under the past Feed-in laws of 2005-2013. From 2015, tariffs for plants with a capacity over 200 kW accessing the above-mentioned tariffs were adjusted according to different options taking into account tariffs reduction or a longer period of incentive scheme.

3.8 Indirect policy issues

The Ministerial Decree of June 21st, 2024 (so-called Decree on the Eligible Areas) entered in force on July 3rd, 2024, with the scope of establish a common framework for the regions to identify eligible and non-eligible areas for the installation of RES plants to achieve the 2030 target. Within 180 days regions must identify the areas highlighted below:

- *eligible areas*, for which an accelerated authorization process is streamlined;
- *non-eligible areas*, where RES installations are deemed incompatible;
- *ordinary areas*, subject to standard permitting procedures;
- *restricted areas*, where ground PV plants are prohibited under recent agricultural legislation.

To ensure compliance, the MASE, with support from the GSE, will monitor regional implementation. The outcomes of the above-mentioned monitoring are published by GSE on a dedicated website. If regions fail to comply, the Italian government retains the authority to introduce corrective legislative measures. From January 1st, 2026, regions must justify any failure to meet their allocated RES targets; however, broad regional autonomy is granted by the decree.

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[6] *The municipality allocated public resources to purchase PV systems, sold on loan to families in energy poverty conditions, to benefit them from PV self-consumption, reducing their energy bills. The revenues of the net-billing feed a public fund, in order to support the purchase of PV plants for other families*

The regulation of the authorization procedures for RES has been entirely revised, with the Legislative Decree No. 190 of 2024, titled "Regulation of Administrative Regimes for Renewable Energy Production" (Testo Unico sulle Fonti Rinnovabili, so-called "TU FER Decree") came into force on December 30th, 2024, with regions and local authorities required to comply within 180 days. The decree streamlines and reorganizes regulations concerning the construction and operation of RES plants, simplifying administrative procedures by reducing the number of authorization regimes from four to three: free activity (no permit required), Simplified Authorization Procedure (PAS), and Single Authorization (AU).
It also introduces the Renewable Energy Acceleration Zones, with the GSE in charge to map priority areas. This legislative reform represents a crucial step in facilitating renewable energy expansion in Italy, ensuring faster permitting while maintaining regulatory oversight. However, its success will depend on regional implementation and coordination with national energy policies.

In the implementation of the provisions of Article 19 of Directive (EU) 2018/2001 on the promotion of the use of energy from RES, article 46 of legislative decree 199/2021 establishes specific provisions on Guarantees of Origin (GO). The GO is an electronic certification issued by GSE for every MWh of RES electricity fed into the grid by IGO-qualified plants. All GO titles are issued, transferred and cancelled electronically through the dedicated Web Portal.

3.8.1 Support for electricity storage and demand response measures

A number of 209 428 storage systems coupled with PV plants were installed in Italy in 2024, for a total number of 734 187. Storage systems are mainly concentrated in regions with a high number of installations. Tax deduction schemes for storage (mainly) coupled with PV plants are in force.

The Legislative Decree 210/2021, implementing EU Directive 2019/944, introduced the Electricity Storage Capacity Procurement Mechanism (in Italian, “Meccanismo di Approvvigionamento di Capacità di Stoccaggio Elettrico”, MACSE). On October 10th, 2024, the MASE approved the MACSE regulation for storage plants.
The incentive mechanism is aimed at fostering the growth of electricity storage capacity in Italy. This growth is crucial to accommodate the increasing presence of non-programmable renewable energy sources in the energy mix[7].

[7] *RSE, APE, Appunti di Energia, THE ELECTRICITY STORAGE CAPACITY PROCUREMENT MECHANISM (MACSE), https://www.rse-web.it/wp-content/uploads/2024/05/08_MACSE-inglese.pdf, May 2024*

3.8.2 Support for encouraging social acceptance of PV systems

After the booming market of the past FiT Law 2005-2013), which allowed the installations of around 18 GW of capacity, an increasing opposition from population and local authorities is reported, mostly for ground plants. The new legislation on energy communities constitutes a further element in favor of the social acceptability of plants (see paragraph 3.4).

3.9 Financing and cost of support measures

The cost of the incentives for the FiT/FiP mechanisms is covered by a component of the electricity tariff paid by all final electricity consumers. Capex grants provided by incentive mechanisms launched in implementation of NRRP are funded by the EU.

3.10 Grid integration policies

3.10.1 Grid connection policies

A consultation has been launched by the ARERA in 2023 concerning the regulation (Integrated Text on Active Grid Connection) and in August 2023 a number of changes with immediate effects have been introduced, pending the definition of the new simplified procedures that will replace those currently in force. Connection costs are covered by the producers on the basis of tariffs defined by the ARERA. The approval of connections depends on several factors, such as high or medium/low voltage grid connection, TSO (longer timeframe) or DSO (shorter timeframe) decisions, construction permitting.

3.10.2 Grid access policies

The Italy's electric grid access policies, regulated by ARERA and managed by Terna for high-voltage transmission and local DSOs for MV and LV lines, ensure fair and efficient connections for electricity producers, including renewables. Producers must apply for a connection solution, which is assessed for feasibility before technical and economic conditions are set. Renewable energy sources receive priority access, benefiting from fast-track procedures under certain conditions. Connection costs vary depending on required network upgrades, with producers potentially sharing reinforcement costs.

4 INDUSTRY

4.1 Production of PV cells and modules (including TF and CPV)

Information on Italian manufacturers of PV cells and modules for the production year 2024 is summarised in the Table 15. The list includes the manufacturers who answered to Ricerca sul Sistema Energetico (here below, RSE) survey, and those for whom the information was available and updated on the company website. The data in the table refer only to production in Italy (some of the companies on the list currently have production plants in other countries as well).

Table 15: PV cell and module production, production capacity information for 2024 (1) (2)

Cell/Module manufacturer	Technology	Total Production [MW]		Maximum production capacity [MW/yr]	
		Cell	Module	Cell	Module
Wafer-based PV manufactures					
3SUN	Si-HJT		30	200	1 200 (3)
DAX Solar	sc-Si			0	600
Eclipse Italia	sc-Si, mc-Si	0	5	0	400
EXE	sc-Si	0	20	0	100
FuturaSun (4)	sc-Si, mc-Si	0	0	0	0
Gruppo STG	sc-Si, mc-Si	0	4	0	26
Midsummer	CIGS				50
Total			**59**	**200**	**2 376**

[1] *RSE specific survey*

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

[3] *3SUN's is nearing completion of its transformation project in Catania, evolving from a 200 MW/year solar module factory into a gigafactory with a 3 GW/year production capacity. The first assembly line was launched in September 2024, followed by the second in December*

[4] *FuturaSun, an Italy-based solar module manufacturer with production facilities in Asia, is currently in the process of establishing a gigafactory in Italy, which is still under construction*

The Italian PV industry is made up of companies specialised in various market segments, including building-integrated PV (BIPV), building-applied PV (BAPV) and electric mobility (VIPV). These companies are committed to developing innovative, high-efficiency PV module technologies. In 2024, their total reported annual production reached 59 MW, with an overall production capacity of approximately 2 376 MW per year. It’s important to note that the actual

production capacity may be higher, since some manufacturers did not participate in the survey and therefore, they are not included in these figures.

In 2024 Italy experienced a strong resurgence in domestic solar panel manufacturing, driven by the launch of major new factories and significant industry investments. This renewed momentum is largely thanks to the expansion of Enel Green Power's 3SUN plant in Catania. At the new 3SUN factory, two module assembly lines have already become operational, one in September 2024 and the second in December, bringing the total capacity to 1.2 GW. Plans are underway to introduce three additional production lines in 2025, which will raise annual output to an impressive 3 GW.

FuturaSun, an Italian solar module manufacturer that operates in over 70 countries, including Europe, South America, Africa, and Asia, is forging ahead with the FENICE project, aiming to establish a cutting-edge PV module manufacturing facility in Cittadella (Veneto). Supported by a *Memorandum of Understanding* signed in October 2024 with the MIMIT, this initiative seeks to create a robust domestic supply chain, reshoring activities previously conducted by FuturaSun in China and reducing Italy's reliance on imports.

The new factory will focus on advanced n-Type and xBC (Back Contact) solar technologies developed in-house, with an initial production capacity of approximately 2 GW per year that is designed for future expansion. Over its first decade of operation, the facility is expected to deliver up to 7.6 GW of high-efficiency PV modules, featuring cell efficiencies above 24%. By producing both cells and modules domestically, the FENICE project is poised to fill a strategic gap in European manufacturing, offering high-quality alternatives to imported modules and reinforcing Italy's position at the forefront of PV innovation. In 2024 groundwork for permits and financing was laid, with construction scheduled to commence in 2025.

In the recent past, FuturaSun acquired the start-up Solertix, which focuses on perfecting and optimizing the tandem composition and architecture of modules combining perovskite and silicon. Solertix originated from the academic excellence of the Centre for Hybrid and Organic Solar Energy (CHOSE) at the University of Rome Tor Vergata.

Beyond the headline cases above, other actors invested in production in 2024. For example, DAX Solar launched the production of PV modules at its new facility in Cittaducale (Lazio), with a full production capacity of 600 MW. The production is entirely Italian and based on advanced technologies such as PERC and TOPCon, offering high-efficiency modules.

The construction of the Midsummer Italia flexible panel factory in the Bari-Modugno industrial area also continued. This project, launched in 2021 with public support, is now nearing completion: by year's end the plant (10 deposition machines for a total of 50 MW capacity) will start producing the first CIGS thin-film cells and corresponding small flexible modules. This is a first-of-its-kind development in Italy, introducing a technology different from crystalline silicon. Midsummer's modules, extremely lightweight and glass-free, are designed for lightweight industrial roofs and vehicles. The commissioning of this plant represents the arrival of a new international player (Sweden's Midsummer) in the Italian market.

The developments seen in 2024 (including new factories, emerging players, and innovative products) highlight a dynamic and evolving supply chain. This promising trend suggests that

Italy is poised to play a leading role in the European PV value chain, increasingly producing domestically a greater share of the solar modules required for the energy transition.

Furthermore, it is also observed that some small module manufacturing companies have experienced a decrease in production compared to the previous year. This phenomenon is mainly due to the growing competition from Asian companies, which are able to offer PV modules at significantly lower prices thanks to economies of scale and intensive production strategies. This scenario has led many Italian companies to reduce their market share and, in some cases, to review their distribution and technological innovation strategies in order to remain competitive. Furthermore, price pressure has also affected the profitability and economic sustainability of national producers, highlighting the need for targeted investments in research and development, product quality, and after-sales services to stand out in the global market.

Finally, the recent initiative by the Italian Photovoltaic Network for Research, Development, and Innovation (ReteIFV) is enhancing collaboration between the research and academic communities and the PV industry. This collaboration aims to advance technological innovations and accelerate the energy transition in the PV sector.

There are no relevant industrial initiatives in the area of concentrating PV.

4.2 Manufacturers and suppliers of other components

National suppliers of various components for PV systems include Enertronica Santerno, Elpower, Friem, FIMER, Riello Solar Tech - RPS, Siel, and Zucchetti Centro Sistemi. Companies like Aton and Fiamm offer a range of energy storage solutions.

In the field of mounting structures for PV modules, Italian companies specializing in the development of single-axis trackers for PV utility-scale applications are Convert Italia (a Valmont Industries company), Comal, AcriGroup, REM Tec, RCM Italia, and Soltigua. Among these, Convert Italia, Comal, and REM Tec also provide tracker systems for agrivoltaic applications.

Ecoprogetti, a leading company in the design and assembly of production machines and quality control for PV modules, launched in 2024 a fully automated solar panel recycling line capable of recovering up to 100% of key materials without chemical treatments, offering a scalable and economically viable solution to the growing challenge of PV waste.

5 PV IN THE ECONOMY

5.1 Labour places

Table 16: Estimated PV-related full-time labour places in 2024 (1)

Market category	Number of full-time labour places
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 and installations	
Other	
Total	9 642 (2)

[1] Blank box stands for not available data

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

5.2 Business value

Table 17: Rough estimation of the value of the PV business in 2024 (VAT is excluded) (1)

Sub-market	Capacity installed [MW]	Average price [€/W]	Value of PV business [Billion €]
Off-grid			
Grid-connected	6 664 (2)	1.010	6.7

[1] Blank box stands for not available data

[2] 6 664 MW is the actual installed capacity in 2024 (see note 5 of Table 1 and Table 2)

6 INTEREST FROM ELECTRICITY STAKEHOLDERS

6.1 Structure of the electricity system

The Italian electricity sector went through a deep reform over the last 26 years that changed it from a vertically integrated monopolistic structure to a liberalized market. The process started in 1999, but the total liberalization was decided only in August 2017, and it was fully completed in mid-2024, with the tariff system eliminated in the domestic sector. It is still valid for a fraction of the market, the so-called vulnerable clients, consumers under conditions of potential energy poverty.

The former monopolist Enel still holds relevant market shares in all segments, especially in the domestic sector markets and in distribution. Enel is a private stock company where the state holds a 24% stake.

Generation, transmission and distribution are separated. Generation is liberalized, and the first six groups of industrial companies (Enel, Eni, Edison, A2A, EPH, Iren and ENGIE) hold around 50% of the national gross production in 2024, while the rest is scattered among several other players.

The Energy Authority (Italian Regulatory Authority for Energy, Networks and Environment, ARERA) was created in 1995 and regulates the electricity sector following directives from the Italian Government, the Parliament and the EU.

6.2 Interest from electricity utility businesses

Italian electricity utilities are committed in RES/PV sector and in innovative projects.

6.3 Interest from municipalities and local governments

At the end of 2024 Public Administration owns around 25 000 PV plants, for a total capacity close to 1 GW. They are strictly involved in the achievement of sustainability goals, given their key role in the deployment of RES energy sources and building energy efficiency projects.

7 HIGHLIGHTS AND PROSPECTS

As highlighted in paragraph 1.1, Italy experienced an important PV capacity growth in 2024, with 6.7 GW installed, primarily driven by an increase in utility-scale plants together with a slower growth in residential installations. This strong growth in capacity is the highest value of the last ten years, leading total installed capacity to 37 GW by the end of the year.

In the ambitious target of the updated Integrated National Energy Climate Plan, PV is expected to contribute the most with capacity of around 80 GW by 2030.

The regulations concerning energy communities, together with new support decrees and with administrative simplifications will contribute to the growth of the Italian market addressing permitting issues. Concerning permitting, an important challenge relies on the integration of PV technology in historical towns, considering the huge amount of heritage buildings that constitutes the Italian urban architecture and landscape.