

## AGRIVOLTAIC SYSTEMS: PRACTICAL APPLICATION AND CHALLENGES

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### OVERVIEW

"PNRR has allocated €2.6bn for agrivoltaic plants and parks, contributing to environmental sustainability and improving competitiveness of the agricultural sector."

The agrivoltaic sector represents a realistic solution to achieving Italy's energy transition goals whilst also offering benefits for both agriculture and energy production. Agrivoltaic facilities boost photovoltaic ("PV") energy and agricultural production through PV plants installed on farmland. They represent a more sustainable and advanced method compared to standard PV plants that merely occupy plots of land otherwise suitable for agriculture. In this respect, *"the hallmark characteristic of agrivoltaics is sharing of sunlight between two energy conversion systems: photovoltaics and photosynthesis"*.<sup>1</sup>

The ultimate goal is to combine decarbonisation with the promotion of agricultural production.

### LEGISLATIVE FRAMEWORK GOVERNING THE AGRIVOLTAIC SECTOR

The Italian legislative framework on agrivoltaics has been somewhat fragmented and incoherent to date but is now improving and stabilising. For example, as recently as 2021 legislators did distinguish between standard photovoltaic plants and those installed for agrivoltaic purposes. As a result, a significant degree of uncertainty has surrounded the sector since its inception as regards both authorisation and incentivisation.

#### The legal definition of "agrivoltaic installation"

On 31 May 2021, Law Decree No. 77/2021 (as converted, with amendments, by Law No. 108 of 29 July 2021 – the *"Simplification Decree Bis"*) was passed. Article 31 defined agrivoltaic installations as different to 'standard' PV installations, making them a separate category and, as such, unaffected by the prohibitions of Article 65 of Law Decree No. 1/2012 (converted, with amendments, by Law No. 27 of March 2012), which excludes ground-mounted PV plants in agricultural areas from accessing state incentives pursuant to Legislative Decree No. 28 of 28 March 2011 (concerning the implementation of the Directive (EU) 2009/28).

Article 31 has integrated Article 65, via introduction of new paragraphs 1-quater and 1-quinquies, as follows:

- (i) paragraph 1-quater: “[the exclusion of ground-mounted plants from state incentives] *does not apply to agrivoltaic plants adopting innovative and integrated solutions for the installation of fixtures situated above ground which do not jeopardise the continuity of agricultural and pastoral farming activity*”; and
- (ii) paragraph 1-quinquies: “*access to incentives [by agrivoltaic facilities] is further conditional upon the simultaneous implementation of monitoring systems designed to assess the impact on crops, water saving, agricultural productivity for different crops and livestock and continuity of the farms concerned*”.

Subsequently, Article 13 of Legislative Decree No. 199 of 8 November 2021, to implement Directive (EU) 2018/2001 of 11 December 2018, further defines agrivoltaic plants as energy facilities “*which, through the implementation of hybrid agriculture-energy production plants, do not adversely affect the use of land dedicated to agriculture*”.

## The specific incentives provided for in the PNRR

The National Recovery and Resilience Plan (“PNRR”) has allocated €2.6bn, divided as follows:

- (i) €1.1bn for agrivoltaic plants; and
- (ii) €1.5bn for “agrivoltaic parks” (the installation of PV systems on top of buildings specifically built for agricultural activities).

In this regard, investments made by agricultural enterprises dedicated to renewable energy production, if properly implemented, result in a decrease in their operating costs, which in turn can raise agricultural profitability and improve competitiveness. Self-consumption of the energy produced through the agrivoltaic system is therefore seen as a tool to increase farming efficiency.

The PNRR envisages that investing in the development of agrivoltaic plants will contribute not only to environmental sustainability but also improve the competitiveness of the agricultural sector by reducing energy supply costs (which are currently estimated to be 20% + of the variable costs of farms).

Agrivoltaic projects that meet MITE (“*Ministero della Transizione Ecologica*”) requirements are granted the following incentives:

- (a) a direct capital grant of a maximum of 40% of all eligible costs; and
- (b) an incentive tariff on the production of net electricity fed into the grid.

The maximum eligible investment amounts to €1,500/kWp to cover the following:

- (i) implementation of advanced agrivoltaic systems, supply and installation of storage systems equipment for the monitoring system;

(ii) national electricity grid connection, structural works, the purchase, transportation and installation of machinery, equipment and hardware and software facilities; and

(iii) feasibility studies, design, geological and geotechnical investigations, work management, safety and technical-administrative support.

## MITE guidelines

The requirements outlined in the MITE's June 2022 guidelines are considered pre-requirements to be fulfilled in order to access the state incentives provided by the PNRR.

The guidelines outline in greater depth the specific features that agrivoltaic plants must comply with. Under the guidelines are:

(i) "agrivoltaic plant" is a PV facility built without jeopardising the continuity of agricultural or pastoral farming activity on the relevant plots of land; and an

(ii) "advanced agrivoltaic plant" is an agrivoltaic plant which, within the meaning of art. 65, paragraphs 1-quarter and 1-quinquies, of the Law Decree No. 1/2012 (as integrated by art. 31 of the Law Decree No. 77/2021):

(a) adopts innovative and integrated solutions for fixtures elevated from the ground so as to guarantee the continuity of agricultural or pastoral activity carried out beneath the plant; and

(b) provides for the installation of monitoring tools aimed at keeping track of, *inter alia*, the conditions of the ground, water savings, microclimate and the level of productivity of crops cultivated beneath the plant.<sup>2</sup>

Other notable specifications in the guidelines include the following<sup>3</sup>:

- *Requirement A* – the facility must be designed to enable integration between agricultural activity and electricity production and enhance the production capacity of both. Specifically, at least 70% of the land in question must be used for agricultural purposes in line with GAP ("Good Agricultural Practices – *Buone Pratiche Agricole*") adopted by the relevant Region.<sup>4</sup> The surface covered by the fixtures must not exceed 40% of the overall area affected by the agrivoltaic plant;

- *Requirement B* – the agrivoltaic project must ensure synergy between energy and agricultural production. Throughout its lifetime the plant must enhance both agricultural activity and electricity production. In particular, the following must be taken into account:

### **B.1 Continuity of agricultural activity:**

(a) it is important to ascertain the agricultural use of the land on which an agrivoltaic project is to be installed; and

(b) maintain said use going forward.

Thus, it is essential to establish a balance between the profitability of the PV installation and agricultural production.

This was further emphasised by Italy's Marche region which, at the end of a preliminary review on 10 October 2022, released a negative opinion on a proposal to install a 45-hectare 28+ MW agrivoltaic plant in the Municipality of Cartoceto. The arguments put forward by the regional body which carried out an Environmental Impact Assessment ("EIA") highlighted the risk the project entailed to agricultural activity at its specific location:

*"the plant would be installed in an area with a strong yield of high-quality agriculture and its implementation would in fact entail, despite a partial maintenance of agricultural activity, a distortion of the current yield with implications that cannot be ignored at this stage."*

**B.2 Minimum electrical productivity:** on the basis of data analysed by the MITE, it is estimated that the specific energy productivity of a properly designed agrivoltaic plant, compared to the electrical production level of a standard PV system, must be no less than 60% of the latter.<sup>5</sup>

- *Requirement C* – an agrivoltaic plant must implement innovative integrated solutions with fixtures elevated above ground aimed at optimising the performance of the project in both energy and agricultural terms;
- *Requirement D* – agrivoltaic plants must be equipped with monitoring systems to assess their impact on crops, water savings, agricultural productivity for different types of crops and the business continuity of the farms involved; and
- *Requirement E* – agrivoltaic plants must be equipped with monitoring systems that, in addition to satisfying requirement D above, enable the assessment of soil fertility, microclimate and climate change resilience.

In light of the above, the following conclusions can be drawn:

- the fulfilment of requirement A is necessary for a standard PV plant located in an agricultural area to qualify as an agrivoltaic plant (pursuant to the definition given by the MITE guidelines of a "simple" agrivoltaic plant);
- the fulfilment of requirements A, B, C and D are all mandatory in order to (i) satisfy the defined features of an "advanced agrivoltaic plant" and (ii) classify the plant as eligible to access state incentives, in compliance with article 65, paragraphs 1-quarter and 1-quinquies, of the Law Decree No. 1/2012 (as integrated by art. 31 of the Law Decree No. 77/2021); and
- the fulfilment of requirements A, B, C, D and E are considered pre-conditions for accessing the PNRR grants, with said grants subject to further evaluation on the basis of new criteria in terms of subjective and/or technical requirements or priority criteria.

In addition to the above, subjective criteria are also required to be eligible for the PNRR incentives. Indeed, according to the MITE Guidelines, agrivoltaic plants must be developed by one of the following entities:

## **(i) Agricultural enterprises (*società agricole*)**

Pursuant to article 2135 of the Italian civil code, “agricultural enterprises” are companies that carry out (a) the cultivation of land, (b) forestry and/or (c) animal breeding activities. To maintain the status of an agricultural enterprise additional requirements are provided under Italian law: (a) revenues produced by the aforementioned activities must be higher than those arising from any ancillary activity carried out by the company (including the sale of energy produced by an agrivoltaic plant); (b) if the company is a limited liability company (*società a responsabilità limitata*), at least one director must qualify as a “professional agricultural entrepreneur” (*Imprenditore Agricolo Professionale – IAP*).

## **(ii) Temporary Enterprise Associations (*Associazioni Temporanee di Imprese – ATI*)**

In Italian corporate law, temporary association of enterprises (“ATI”) have a corporate structure in which several enterprises come together to develop a specific project.

In order to classify as an ATI, corporate associations must have the following characteristics: (a) they must be temporary, meaning that the duration of the association must be proportionate to the lifetime of the relevant project; (b) each enterprise involved is responsible for the maintenance of its own administrative, operational and fiscal autonomy.

Said temporary association of enterprises must be legally recognised (“*personalità giuridica*”) and are considered autonomous entities with respect to their constituents. Regarding incorporation, the constituent businesses are subject to the normative standards provided for by Italian corporate law, therefore the ATI must be constituted through a public deed; and be duly recorded in the companies register.

Traditionally, ATIs were formed in the context of public bidding procedures, with businesses pooling their individual assets (equipment, facilities, specialist personnel, know-how, patents etc.) to meet the technical and professional qualifications required to participate in said competitive bidding process. To date, therefore, they have not been seen as the best vehicle for businesses looking to develop agrivoltaic projects.

## **Authorisation procedure**

From a permitting perspective, Article 9 of Law Decree No. 17 passed on 1 March 2022, converted into Law No. 34/2022 (known as “*Decreto Energia*”), established that agrivoltaic plants which are no farther than 3km from industrial, artisanal or commercial areas, are subject to the simplified authorising procedure or PAS (*Procedura Abilitativa Semplificata*).

## **CONTRACT STRUCTURE FOR AGRIVOLTAIC TRANSACTIONS**

Whilst there is an ‘all purpose’ contract structure for agrivoltaic projects, the following provisions are generally included to regulate their development in Italy:

### **(i) Acquisition/Incorporation – Devex funding**

In some cases, by executing a quota sale and purchase agreement, an investor acquires a majority stake in an Italian company that qualifies as an agricultural enterprise and already holds rights over land suitable for the development of an agrivoltaic project.

More often, an investor identifies the land required to develop their project and secures it via a newly incorporated special purpose vehicle (“SPV”), whose managing body includes at least one professional agricultural entrepreneur.

In both cases, the investor generally provides the agricultural enterprise/SPV with the financial resources needed to develop the agrivoltaic project until ready-to-build status is achieved by granting shareholder’s loans and/or making equity contributions.

## **(ii) Land agreements**

If not already owned by an agricultural enterprise, land used in the development, construction and operation of an agrivoltaic project must be secured by an SPV through land agreements with the relevant landowners.

Generally, Italian transactions assume that the execution of preliminary surface right agreements (including easement rights which may be needed to cover the interconnection works) or preliminary sale and purchase agreements, both subject to the condition precedent of the achievement of the ready-to-build status within a long-stop date (normally within a 24-48 months period), are required.

In any case, it is crucial that land agreements are in line with standard international bankability requirements including, *inter alia*, the possibility of assigning receivables by way of security, the possibility of creating a mortgage right over the land and the landowner’s commitment to renegotiate the agreement in good faith to address any financing entities’ requests.

## **(iii) Agricultural services agreement**

As highlighted above, a legal requirement to be eligible for the PNRR incentives is that the SPV actually carries out, as its core business in terms of revenues, agricultural activity. Said activity is normally provided by an experienced local farmer, who may be either the professional agricultural entrepreneur in charge as director of the SPV or a third-party provider.

A direct agreement between the SPV and the farmer is generally agreed to provide for the latter’s obligation to carry out agricultural services for a pre-established period of time, always in compliance with agronomic plans and any other technical standards that may be required to ensure full compliance with any laws and regulations applicable *ratione temporis*.

Finally, it is important to ensure that all services agreements comply with international bankability standards, to ensure that construction costs are covered via project financing.

[1] Jordan Macknick, lead energy-water-land analyst at the US National Renewable Energy Laboratory

[2] Ref. Ministry of Ecological Transition, guidelines on agrivoltaic plants,  
[https://www.mite.gov.it/sites/default/files/archivio/allegati/PNRR/linee\\_guida\\_impianti\\_agrivoltaici.pdf](https://www.mite.gov.it/sites/default/files/archivio/allegati/PNRR/linee_guida_impianti_agrivoltaici.pdf)

[3] *Ivi*, pp. 20-28.

[4] *Ibid*. The Good Agricultural Practices (GAP) is a set of standards for the safe and sustainable production of crops and livestock. The compliance with such standards reinforces responsible farming methods from site selection and land preparation to harvesting and handling.

[5] *Ivi*, p. 23.

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