

Legal Framework of Agrivoltaics in Germany

Jens Vollprecht¹, Max Trommsdorff² and Charis Hermann^{2 a)}

1 Becker Büttner Held Rechtsanwälte Wirtschaftsprüfer Steuerberater PartGmbH (BBH), Magazinstraße 15-16, 10179 Berlin, phone +49 30 6112840-133

*2 Fraunhofer Institut für Solare Energiesysteme ISE, Heidenhofstraße 2, 79110 Freiburg, phone +49 761 4588-0
www.ise.fraunhofer.de*

^{a)} Corresponding author: charis.hermann@ise.fraunhofer.de

Abstract. In Germany, agrivoltaic systems are not explicitly embedded in the legal framework. In order to advance the technology and thus make a contribution to the energy transition and sustainable food production, legal implementation is of great relevance. An analysis of the four sectors construction, energy, agriculture and environment presents the current state of affairs. Agrivoltaic systems are usually built in the so-called unplanned outdoor area. In many cases it is difficult to obtain a permit there, because the classification as a privileged project does not always succeed. In the planned area, the stipulation of use is associated with legal difficulties. With regard to the EEG, agrivoltaics often falls into the category of ground mounted systems and therefore is usually not eligible to receive a governmental feed-in tariff on agricultural land. The agricultural sector can recognize areas under agrivoltaic systems as eligible areas and, with the help of a detailed environmental analysis, it should be considered that at least no compensatory measures within the framework of the Eco Account Ordinance need to be created when building an agrivoltaic system. In the energy sector, an increased feed-in tariff can be achieved through certain adjustments.

LEGAL FRAMEWORK

Along with wind power, photovoltaic (PV) is one of the most promising technologies to push the energy transition in Germany. In order to achieve the energy policy goals, the number of ground mounted PV systems is constantly increasing. Since the sealing of surfaces in Germany shall be minimized to less than 30 ha per day until 2030¹, agrivoltaics seems to be one of the solutions for the energy transition. Agrivoltaic investments however will only be economically viable with policy support and reduced bureaucratic hurdles. It is crucial, that the experts in the EU are aware of the legal progress made in all EU member states, in order to create a similar legal situation across Europe. The current legal framework in Germany provides no dedicated funding for agrivoltaics.

The following report analyzes the four essential sectors that contribute to the implementation of agrivoltaics in the legal framework of Germany. Based on the laws and jurisprudence of the individual sectors, the current state of affairs will be assessed. The following sectors are considered: Construction, Agriculture, Energy and Environment. As a summary, the interpretation of the regulations results in a policy recommendation.

Construction Sector: Public Law

Agrivoltaic systems do not have the status of a standalone technology but fall under the category of ground mounted systems. Generally, these systems are considered as physical structures in terms of the building regulations law. Therefore, a building permit² is usually required for their construction.

¹ Deutsche Bundesregierung, (2018). Deutsche Nachhaltigkeitsstrategie, Presse- und Informationsamt der Bundesregierung, Berlin.

² The Federal Immission Control Act (BImSchG) does not apply because agrivoltaic systems are not listed in the annex to the fourth ordinance for the implementation of the Federal Immission Control Act (4th Federal Emission Protection Ordinance (BImSchV)).

Permissibility according to the Federal building Code (BauGB) depends on the location of the plot of land: If the land is located in an area covered by a development plan, the requirements of the development plan have to be taken into account (see § 30, 31, 33 BauGB). On a plot of land not covered by a development plan, permissibility depends on whether the project is part of an urban area (see § 34 BauGB) or outside an urban area (see § 35 BauGB). It is particularly to be emphasized that a building permit is only granted if there are no public law regulations to the contrary.

Typically, the area of interest is outside urban areas. In this case the BauGB differentiates between privileged projects and other projects: Privileged projects according to § 35(1) BauGB are only prohibited in exceptional cases when they conflict with public interests. In contrast, other projects outside urban areas are generally prohibited according to § 35(2) BauGB unless they do not conflict with public interests. Certain public interests are explicitly listed in § 35(3) BauGB. Depictions in zoning maps and requirements in land use plans are among them.

§ 35(1) BauGB contains a complete list of privileged projects. Unlike wind energy, biomass and greenhouses Agrivoltaics are not explicitly listed as privileged projects. These privileged projects include, for example, a project that

- serves an agricultural or forestry operation and only takes up a minor proportion of the operating premises (no. 1),
- serves a horticultural production operation (no. 2), or
- serves to use solar radiation energy on rooftops and exterior walls of permissibly used buildings, provided the system is structurally subordinated to the building (no. 8).

It is difficult to judge to what extent a project meets the criteria of the term “serve”. According to the Federal Administrative Court (BVerwG), a project fulfills this requirement when “a reasonable farmer, would implement this project with about the same intended purpose and about the same design and configuration and especially under consideration of the imperative to protect landscapes to the greatest possible extent. Furthermore this project has to belong to a concrete operation”³. Emphasizing, systems supplying energy for the belonging building and operation meet these requirements. In order to correspond to the significance of the term “serve”, however, the own consumption of the generated electricity must be noticeably higher than the proportion which is sold to the grid operator or another third person. As a benchmark the comparison with wind energy may be helpful: The Federal Administrative Court has considered the use of about two thirds of the electricity produced by a wind power plant in an agricultural operation to be sufficient for fulfilling the criteria of serving the agricultural operation⁴. Furthermore, a certain physical proximity of the agriphotovoltaic system to the operating premises underlines the affiliation to the operation.

The term agriculture used in no. 1 of § 35(1) BauGB is separately defined in § 201 BauGB. Horticultural production is also mentioned there. Thus, the privilege according to no. 2 of § 35(1) BauGB should also apply to operations that grow plants in pots, containers, and other receptacles, notably in greenhouses.

If the project is not permissible outside urban areas according to § 35 BauGB, preparing a development plan – possible with a partial amendment of the zoning map – should be considered. Although it is the responsibility of the local authorities to change a development plan, they are bound by the stipulations of § 9 BauGB and the Federal Land Utilization Ordinance (BauNVO). Therefore, the simplest solution may be to specify a “special area photovoltaic” for integrating agrivoltaics in the development plan. However, this poses the question whether agricultural use can be additionally stipulated at the same time. By passing what is known as a project-specific development plan, planning law leeway can be utilized since the municipality can then permit the project without considering § 9 BauGB and the BauNVO. However, the stipulations of the BauGB⁵ and BauNVO always have a guiding function. Orderly urban development therefore has to be observed, even within the scope of a project-specific development plan⁶.

The municipality and its citizens consequently play a central part during the entire process of applying for a building permit. For more acceptance, an early integration of all stakeholders is beneficial.

³ Federal Administrative Court, verdict of 3 November 1972, file no. 4 C 9.70.

⁴ Federal Administrative Court, decision of 4 November 2008, file no. 4 B 44.08.

⁵ Notably Section 9 BauGB.

⁶ Federal Administrative Court, NVwZ 2003, 98.

Energy Sector: Renewable Energies Act (EEG)

The Renewable Energy Act (EEG) is one of the most important milestones towards the German energy transition. The principle advantages that the EEG grants to renewable energies are privileged grid connection, privileged purchase of electricity and the regulation of feed-in tariffs. The latest version of 2017 does not list agrivoltaics separately. According to the current status (October 2020), the new version, which will come into force in January 2021, will not include agrivoltaics. Agrivoltaics will remain a general system for the generation of electricity from renewable energy according to § 3(1) EEG. Therefore, the operator of an agrivoltaic system is entitled to priority grid connection by the grid operator according to § 8(1) EEG. This involves determining the grid connection option with the lowest total economic costs. Once this option has been identified, it becomes clear who has to bear which costs. In principle, the grid expansion costs are borne by the grid operator and the grid connection costs by the system operator.

The operator of an agrivoltaic system is also entitled to the priority purchase of the generated electricity according to § 11(1) EEG. However, the system operator does not have to feed the electricity into the grid but can, in principle, also use it directly or supply it to a third party “before” the grid.

The feed-in tariff for the electricity supplied to the grid is more complicated. First of all, operators of systems with an installed capacity of more than 100 kWp are obligated to market the electricity to a third party. Thus, the grid operator can only purchase the electricity in exceptional cases⁷. However, in case of subsidized direct marketing, the system operator is entitled to the “market premium” according to § 20 EEG; in addition, he or she receives the agreed remuneration for the delivered electricity from the direct marketer.

Operators of a system with an installed capacity of more than 750 kW have to successfully take part in a tender. They cannot claim feed-in tariff from the grid operator according to the EEG unless they have a surcharge and a “payment entitlement”⁸. Of importance is also § 27a EEG: In principle, electricity from systems subject to the tendering procedures cannot be used for own supply.

For systems smaller than 750 kWp, the stipulated values in § 48 EEG apply, whereby the degression must always be taken into account.

The feed-in tariff is paid for 20 years starting on the date the system is put into operation. For systems whose financial support is established by law, the payment is extended to December 31st of the 20th year. In addition to the general requirements for feed-in tariffs according to the EEG, further special requirements for solar energy must be taken into account:

As specified in § 48 EEG, there is an entitlement to financial support if the system is installed on or in a building or other physical structure that was built primarily for purposes other than the generation of solar power. Ultimately this is about installing the solar system on an area that is being used “anyway” (“dual use”).

In a court decision in 2010 the Federal Administrative Court decided to give the power plant operator an increased feed-in tariff⁹. In this case, the owner replaced the old wooden structure of his open-sided shade halls with a steel frame and PV modules. Decisive arguments of the judgement included the fact that the modules can form the roof and thus complement the construction to a building and that the new construction method has far-reaching advantages. In view of this verdict, it remains open how far agrivoltaics which in particular substitute protective structures such as hail- or sun protection nets, can be regarded as a building.

In case of PV systems on greenhouses, for example, it is necessary to ensure that the use of the greenhouse in its actual function remains the main focus. Among other things, this does not apply when plants are cultivated that do not require a greenhouse. This requires a detailed examination of each individual case. However, for “non-residential buildings” in unplanned rural areas according to § 35 BauGB – such as greenhouses – the restriction according to § 48(3) EEG has to be observed.

If these requirements are not met, funding eligibility is nevertheless possible, among others according to no. 3 of § 48(1) EEG: The prerequisite in such cases is always the availability of an approved development plan. If this development plan was prepared or amended after 1 September 2009 with the purpose of building a solar installation, the agrivoltaic systems have to be located on certain areas, such as along highways or railways, within a corridor of 110 meters measured from the outer edge of the road or in conversion areas.

⁷ See no. 2 of § 21(1) EEG.

⁸ See § 22(3) EEG; in determining the “750 kW limit”, the “system combination rules” contained in § 24(1) and (2) EEG also have to be observed.

⁹ Regarding the EEG, also see 2004 Federal Court of Justice (BGH), verdict of 17 November 2010, file no. VIII ZR 277/09.

An extension to these areas is only possible for systems that have to participate in tenders. Then a feed-in tariff is also applicable to areas whose parcels of land have been used as arable land or as grassland at the time of the resolution on the establishment or amendment of the development plan. To be brief, the area cannot be allocated to any other land category than the one mentioned in § 37 (1) EEG and they are located in a disadvantaged area¹⁰. However, this only applies if the Federal government has passed a regulation for tenders on the corresponding areas. To date this has only occurred in Bavaria, Baden-Württemberg, Hesse, Saarland, and Rhineland-Palatinate.

Agricultural Sector: EU Direct Payments

As part of its agricultural policy, the EU grants direct payments for land used primarily for agriculture. So, an important question is whether farmland loses its eligibility for financial support due to the use of agrivoltaics.

§ 12 (1) direct payment implementing regulation (DirektZahlDurchfV) states that an agriculturally area is eligible even if further non-agricultural activity takes place. This activity shall not affect the agricultural activity in type, duration, intensity and timing. Both vertically and horizontally mounted agrivoltaic approaches permit the mixed use of solar electricity production and agriculture on the same area without severely limiting the agricultural use of land. While agricultural use takes place in the spaces between the rows with vertical agrivoltaic systems, the area underneath the modules is cultivated with horizontal systems. However, §12(3) is listing the generation of solar energy explicitly as a non-agricultural area and thus the right for funding becomes no longer valid. But this contradictory issue is to be interpreted under consideration of European law: Since 2015 the so-called “Demmer verdict” is influencing international decisions¹¹. 5 years ago, the European Court of Justice (EuGH) ruled in favor of a farmer who claimed financial support for his meadow bordering an airport runway. This decision is justified by the fact that the operations of the airport do not affect the agricultural activity. A similar case occurred in 2019 in Germany. In the opinion of the Federal Administrative Court, a corn maze does not affect the eligibility for financial support because, to put it briefly, it does not severely limit the agricultural use of the land¹². This perspective was also followed by the Regensburg Administrative Court in a case where sheep grazed under a PV system¹³.

A severe limitation of agricultural use would exist if there were real and significant difficulties or obstacles for the respective operations in carrying out farming activities because another activity is carried out in parallel.

Since with proper planning and installation of an agrivoltaic system the agricultural use is not impaired, or only to a very minor extent (due to the mounting structure, for example), there are good arguments supporting the view that farms meet the requirements for direct payments under EU law.

Environmental Sector: Eco - points

Regularly the question arises whether agrivoltaics is an intervention in the natural environment. The prevention of environmental damage takes priority; unavoidable significant impairments have to be compensated¹⁴. Agricultural activities respecting the guidelines of the good agricultural practice (GAP) are not considered a negative impact¹⁵. However, if an area is used for the generation of electricity, this currently constitutes an intervention in terms of § 14(1) of the German Federal Nature Conservation Act (BNatSchG). For example, the APV-RESOLA research project in Germany was also considered an intervention and eco-points had to be utilized according to the Eco-Account Ordinance (ÖKVO). This ordinance defines requirements for Baden-Württemberg for the recognition and assessment of nature conservation and landscape care measures (eco-account measures). According to the ÖKVO, projects can earn eco-points when generating positive effects on nature. These eco-points then can be used as compensation measure to an intervention project at a later date.

Since the benefits of agrivoltaics for the agricultural use of land can be significant, at least it should be considered whether the land allocation follows the rules of good agricultural practice and thus does not constitute an intervention according to the German Federal Nature Conservation Act. Taking this concept further, one could even

¹⁰ See points h.) and i.) of sentence 1, § 37(1) EEG.

¹¹ See verdict of 2 July 2015, file no. C-684/13.

¹² Federal Administrative Court, verdict of 4 July 2019, file no. 3 C 11.17.

¹³ See verdict of 15 November 2018, file no. RO 5 K 17.1331.

¹⁴ See § 13(1) BNatSchG.

¹⁵ See § 13(2) BNatSchG.

ask whether an agrivoltaic system can generate eco-points according to the ÖKVO. Projects accepted as eco-point compensation measures must comply with the requirements of §16(1) of the BNatSchG. It is explicitly listed that a measure that “only” complies with the guidelines of GAP and protects nature but does not enhance its condition, is not a compensation measure. In order to generate points, the project must, for example, verifiably promote specific species, restore or improve soil function or increase groundwater quality. A far-reaching environmental assessment for agrivoltaics must be carried out in order to gain a deeper insight of how the technology is affecting nature. It should be taken into account that the regulation of the compensative measures is regulated at federal state level.

POLITICAL RECOMMENDATIONS AND OUTLOOK

Explicit privilege for agrivoltaic systems

An explicit privilege for agrivoltaic systems according to §35(1) BauGB appears fundamentally reasonable, since they are a natural part outside urban areas due to their agricultural use. Public interests are hardly affected by agrivoltaic systems: The systems serve climate protection purposes, improve climate resilience, and reduce water consumption. However, the landscape is impaired by the systems. Preference should therefore be given to sites outside of distinctive landscapes, such as areas along the edge of a forest.

Addition of “special area agrivoltaics” to BauNVO

Due to the uncertainties described above regarding the regulatory possibilities in building planning, a new “settlement component” should be added to the BauNVO in the form of a “special area agrivoltaics”.

Possible subsidization criteria and scenarios

Different frameworks for the propagation of agrivoltaics can be established respectively in the interplay of the EU, country, and federal state/municipality. A 30-field program/100-field program is a possible subsidization scenario: Corresponding to the 1000-roof program for PV systems in the 1990s, a field program could give agrivoltaics a boost. Research and development of the agrivoltaics technology could be significantly accelerated as a result. With the 1000-roof program, the country and federal states subsidized the system and installation costs.

Adding agrivoltaics to the EEG also constitutes a possible subsidization instrument: Thus, the conservation of farmland and the positive effects on agricultural products could be remunerated. The amendment of the EEG should be as “minimally intensive” as possible. Since agrivoltaics means dual use – for agriculture and energy – the circumstances are similar to the dual use of buildings and other physical structures. This speaks in favor of treating both constellations equally in the legal design of the provisions. A development plan could then be omitted in view of the EEG along with the existence of a certain area category. Continued agricultural use has to be possible, largely without restrictions. Only for reasons of acceptance this is important and avoids valuation contradictions within the EEG. To ensure this, the prerequisites for the EU direct payments should be applied. That increases legal certainty as well. The applicable jurisprudence could then be transferred to the “new” provision in the EEG. How could the implementation look like?

Among other things, a new no. 2 could be added after no. 1 in sentence 1 of § 48(1) EEG. The regulation would then be worded as follows:

“For electricity from solar installations, where the applicable value is determined by law, this is [...] cents per kilowatt hour if the system

[...]

No. 2 has been constructed on farmland and the agricultural activity on this area is carried out without being severely limited by the intensity, type, duration, or timing of the operation of the system,

[...]”

In view of proof of the prerequisites, the following sentence 2 could be added after sentence 1:

“Proof of the prerequisites of sentence 1, no. 2 can, in particular, take the form of submitting a notice for this area about the allocation of an operating premium in terms of Regulation (EU) No 1307/2013 of the European Parliament and of the Council of 17 December 2013 establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy and repealing Council Regulation (EC) No 637/2008 and Council Regulation (EC) No 73/2009 (official gazette L 347 of 20 December 2013, page 608) in the respective current version.”

Corresponding amendments would be required in § 37(1) EEG among others.

Currently the investment costs for agrivoltaics systems and other land use neutral PV generating plants are slightly higher compared to conventional ground mounted photovoltaic systems. A technology premium (cents per kilowatt hour) could be implemented in the EEG to provide the market boost required for these innovative systems: The legally established feed-in tariff (see § 48 EEG) would be increased accordingly to an adequate level. This premium would be reduced year by year and reach a value of zero as soon as the new PV generating plant technologies are competitive so that a market boost is no longer needed. In the current tenders (see § 37ff. EEG), land use neutral solar generating plant technologies hardly stand a chance today due to the described cost structure. The "technology bonus" could even out this financial disadvantage. Bidders could therefore take part in the tender and in return increase their chances against conventional ground mounted photovoltaic systems.

In order to ensure the benefits for the farmer, the requirements for an agrivoltaic system should also be defined exactly in the regulations. The performance figures and test procedures of the DIN specification currently being prepared for Germany by Fraunhofer ISE in cooperation with a broad consortium could serve as a starting point. A homogenized definition of agrivoltaics, further information on the economic benefits, concrete feedback from farming experience and an environmental impact assessment would promote the inclusion of agrivoltaics in the legal framework and thus would be beneficial in the distribution of this technology and the collaboration with neighboring countries.