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New Legal Framework of Agrivoltaics in Germany

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Abstract. In Germany, numerous amendments have been made in the last year which are intended to take into account the special features of agrivoltaic systems. This is very welcome. Nevertheless, some legal challenges remain. In order to advance the technology and contribute to the energy transition and sustainable food production, the comprehensive embedding of this technology in the legal framework is crucial. Because ultimately, the way is only paved when all uncertainties have been removed. Agrivoltaics offers a solution to the conflict of interest between the sealing of land on the one hand and the need to increase the use of photovoltaic systems on the other. An analysis of the four sectors of public law, energy law, EU agricultural subsidies and tax law will present the current state of the legal framework for agrivoltaics in Germany, following-up the authors' contribution "Legal framework of agrivoltaics in Germany" in previous proceedings of the AgriVoltaics conference series [1]. Agrivoltaic systems are usually erected outside settlement areas without a development plan. In many cases it is difficult to obtain permission for these areas, as it is not always possible to classify them as privileged projects. In the area of a development plan, the designated use may collide with an installation of the photovoltaic system. Regarding the Renewable Energy Sources Act (EEG), it is to be noted that separate financial support schemes have now been introduced for certain agrivoltaic installations. A crucial question for farmers remains whether their land loses its eligibility for EU direct payments through the use of this technology. Here, too, the legislator has set an important course for agrivoltaics. This also applies in the area of inheritance-, gift-, land- and real estate transfer-tax law.

Keywords: Agrivoltaics, Legal Framework, Energy Transition, Renewable Energy Act (EEG)

1. Legal Framework

Along with wind power, photovoltaics (PV) is one of the most promising technologies allowing Germany to reduce non-renewable energy sources and achieve the transition towards sustainable energy. In the process of achieving the energy policy goals, the number of ground-mounted PV systems is constantly increasing. This increase is problematic regarding the goal of minimizing the sealing of surfaces to less than 30 ha per day until 2030. Agrivoltaics displays a solution to this conflict of interests. Today, most investments in agrivoltaics however can only be economically viable with appropriate policy support and reduced bureaucratic hurdles.

This report aims to present the three key legal sectors that are relevant for the implementation of agrivoltaics in Germany: Public law, energy, and agriculture. Based on the laws and jurisprudence of each of those key sectors, this paper assesses the current situation and concludes with a policy recommendation.

2. Construction Sector: Public Law

Currently, agrivoltaics generally belong to the category of ground-mounted PV systems. Usually, ground-mounted PV systems are considered as physical structures in terms of the building regulations law. Therefore, under normal conditions a building permit is required for their construction. Certain exceptions exist in some of the legal building codes of the federal states for systems that are to be erected on, affixed to or in a building or a noise barrier or for smaller ground-mounted PV systems.

Regardless of whether a permit is required or not, the requirements of the Federal building Code (BauGB) in particular must be complied with. The permissibility according to the BauGB depends on the location of the plot of land: If the land is located in an area covered by a development plan, its requirements have to be taken into account (see § 30, 31, 33 BauGB). In case that there is no such plan, permissibility depends on whether the project is located in urban area (see § 34 BauGB) or outside of an urban area (see § 35 BauGB). A building permit can only be granted if there is no conflict with other aspects of public law.

Typically, an agrivoltaic system will be erected on a plot of land located outside urban areas that is not covered by a development plan. In this case, the BauGB differentiates between privileged and other projects: Privileged projects according to § 35(1) BauGB are only prohibited when they conflict with public interests. In contrast, other projects outside urban areas are generally prohibited according to § 35(2) BauGB if they affect public interests. § 35(3) BauGB lists public interests that are to be considered in this regard. Depictions in zoning maps and requirements in land use plans are among them. It further contains a complete list of privileged projects.

Agrivoltaics are not explicitly designated as privileged projects within the meaning of Section 35(1) BauGB.

However, as of 1 January 2023, § 35(1) sentence 1 no. 8 lit. b BauGB includes projects that serve the use of solar radiation energy and are located on an area along motorways or railways of the superordinate network within the meaning of § 2b of the General Railway Act (AEG) with at least two main tracks and at a distance to these of up to 200 meters, measured from the outer edge of the carriageway. Since agrivoltaics are projects for the use of solar radiation energy, privileged treatment can be considered.

If agrivoltaic systems are to be erected on a different site, the effort required to justify the classification as a privileged project can increase significantly. However, depending on the design of the project, various other privileged statuses can be considered.

A project is considered to be a privileged project if, for example, a project that serves an agricultural or forestry operation and only takes up a minor proportion of the operating premises (no. 1) or a horticultural production operation (no. 2).

Of crucial importance is the question whether a system “serves” an agricultural operation in the sense of § 35(1) BauGB. According to the Federal Administrative Court (BVerwG), a project fulfils this requirement when a reasonable farmer would implement it with about the same intended purpose, about the same design and configuration and under consideration of the imperative to protect landscapes to the greatest possible extent. Furthermore, the project must belong to a concrete operation. Systems supplying energy for buildings that belong to the same agriculture operation are generally expected to meet these requirements. In order to meet these requirements, the own consumption of the generated electricity must be noticeably higher than the proportion of generated electricity that is sold to the grid operator or a third party. In regard to wind energy, the BVerwG stated that the use of about two thirds of the electricity produced by a wind power plant in an agricultural operation would fulfil these criteria.

It is currently being discussed whether a separate privileged status should be introduced for agrivoltaics. However, its concrete form is not clear at present.

The term “agriculture” used in no. 1 of § 35(1) BauGB is defined in § 201 BauGB. Horticultural production is mentioned there as well. 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 – possibly with a partial amendment of the zoning map – should be considered. When laying down a development plan, the responsible local authorities may only designate areas according to § 9 BauGB and the Federal Land Utilization Ordinance (BauNVO). Therefore, they can only stipulate the categories that are listed in § 9 BauGB. When designating a certain area for the use of agrivoltaics, the combined use of land for agricultural and energy purposes needs to be considered. Thus, the area should be designated as a “supply area, including areas for plants and facilities for the decentralized and centralized generation, distribution, use or storage of electricity, heating or cooling form renewable energies or combined heat and power” according to § 9(1) no. 12 BauGB and an “area for agriculture” according to § 9(1) no. 20 BauGB. An additional solution may be to extend the catalogue of categories in § 9 BauGB and therefore implement a “special area agrivoltaics” allowing its integration in a development plan. A third option is to pass a project-specific development plan, as the municipality can then permit the project without considering § 9 BauGB and the BauNVO. The guiding function of the § 9 BauGB and BauNVO must be taken into account and an orderly urban development needs to be ensured.

The municipality and its citizens play a central part during the entire process of applying for a building permit. In order to ensure the positive reception of the individual project, an early integration of all stakeholders appears beneficial.

3. Renewable Energy Act (EEG)

The Renewable Energy Act (EEG) represents the legal cornerstone of the German energy transition. The principle advantages that the EEG grants to renewable energy systems are privileged grid connection, privileged purchase of electricity, and the regulation of feed-in tariffs. Agrivoltaics remains 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 question of an entitlement for payment to the electricity supplied to the grid is complex.

System operators generally receive a payment for a duration of 20 years starting from the date of commissioning. For systems whose financial support is established by law, the payment is extended to December 31st of the 20th year.

Operators of systems with an installed capacity of more than 100 kW are obligated to market the electricity to a third party. As a rule, the "bracketing provisions" of § 24(1) and (2) EEG must always be observed when determining the size of the installation. Thus, the grid operator can only purchase the electricity in exceptional cases. However, in case of so-called subsidized direct marketing, the system operator is entitled to the “market premium” according to § 20 EEG; in addition, the system operator receives the agreed remuneration for the delivered electricity from the direct marketer. In the case of so-called other direct marketing, the system operator cannot claim any financial support from the grid operator. However, then it is possible to market the electricity as "green electricity" and, for example, to receive so-called guarantees of origin.

Operators of a system with an installed capacity of more than 1.000 kW have to successfully take part in a tender in order to gain an entitlement for payment. An exception to the obligation to invite tenders applies if the agrivoltaic system is operated by a so-called citizens' energy company within the meaning of § 3 no. 15 EEG: In this case, the limit is increased to 6.000 kW. The amount of the value to be invested is determined within the framework of this tender. They cannot claim feed-in tariff from the grid operator according to the EEG unless they have a surcharge and an entitlement for payment. § 27a was abolished with the EEG 2023. Electricity from systems subject to the tendering procedures can be used for own supply in the future. This opens up the possibility for more diverse marketing concepts.

For systems smaller than 1.000 respectively 6.000 kW, the values stipulated by law in § 48 EEG generally apply, whereby the degression must always be considered.

In addition to the general requirements for an entitlement to payment according to the EEG, further specific requirements for solar energy regarding the location must also be taken into account. The rules applicable to installations taking part in tenders in § 37 EEG differ slightly from the rules for installations for which the value is stipulated by law in § 48 EEG. The following aims to give an overview of some of the most important regulations in regard to the location that are relevant for agrivoltaics. Not all requirements in regard to the location can be discussed at this point.

As specified in § 48(1) no. 1 EEG, there is an entitlement to financial support that is stipulated by law 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. This means that the solar system must be installed on an object that is being used “anyway” (“dual use”). A “dual use” is also possible when the PV modules are integrated in such a way that they complement the structure in question. This question was subject to a decision in 2010 by the Federal Administrative Court. 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 of a building and that the new construction method has profound advantages. In the light of this verdict, it seems possible that agrivoltaics can be regarded as a building in cases where they substitute certain elements of protective structures such as hail or sun protection nets. In case of PV systems on greenhouses, it is necessary to ensure that the use of the building in its initial function remains the focus. In consequence, a cultivation of plants that do not require a greenhouse would not meet this requirement. The question as to whether the initial purpose remains the focus also after the installation of the PV modules requires a detailed examination of each individual case.

For non-residential buildings outside urban areas without a development plan, further requirements in regard to the building have to be met according to § 48(3) EEG.

If the above-mentioned requirements in regard to the location are not met, funding eligibility may still be 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 system has to be located on the listed locations, such as along highways or railways, within a corridor of 500 meters measured from the outer edge of the road, or in conversion areas.

Newly included in the EEG - and very welcome - are, among other things, the three different eligibility criteria in § 48(1) no. 5 lit. a to c EEG for certain agrivoltaic systems:

Among other things the following requirements must be met: Pursuant to letter a of the regulation, support is granted for installations on arable land with simultaneous crop cultivation on the same area (Arable-agrivoltaics). In order to be eligible for support under letter b, the installations must be built on land with simultaneous agricultural use in the form of cultivation of permanent or perennial crops on the same land (Horticulture-agrivoltaics). Letter c was only included at the last minute: This provides for the promotion of installations on grassland with simultaneous agricultural use as permanent grassland, if the area has not been designated as a national park within the meaning of § 24 BNatschG, is not located in a Natura 2000 site within the meaning of § 7(1) no. 8 BNatschG and is not a habitat type listed in Annex I of Directive 92/43/EEC (Grassland-agrivoltaics).

If the agrivoltaic system is horizontally elevated, the value to be applied is increased by a technology bonus, which amounts to 1.2 ct/kWh in the case of an award in 2023 and gradually decreases to 0.2 ct/kWh if the award is made in the years 2026 to 2028. This bonus is to be welcomed but should be significantly increased. This is because the additional costs for the elevations are so high that the resulting additional costs cannot usually be covered with this bonus level. It is therefore to be feared that these highly elevated systems will not be realized. Moreover, the technology bonus is only granted if the system operator has successfully participated in the tenders for solar systems in the first segment. This results from the reference to "special solar system according to § 37(1) no. 3 lit. a, b or c" in § 38b(1) EEG. Thus, this bonus cannot be claimed for systems for which the amount of financial support is determined by law. This is not comprehensible. For even in this size class, the additional costs for the elevation arise. An objective reason for such unequal treatment is not apparent, at least at first glance.

Another category of special solar installations is the so-called moorland soil PV in § 48(1) no. 5 lit. e EEG. A prerequisite for financial support here is that the installations are erected on moorland soils that have been drained and used for agriculture and that the areas are permanently rewetted with the erection of the solar installation. Here, too, the area does not have to be within the scope of a development plan. Section 38b(2) EEG provides for a "peatland bonus" of 0.5 ct/kWh. However, this bonus may also not be claimed for installations for which the amount of financial support is determined by law. There is no apparent objective reason for this.

The details of these special solar installations will be determined by the BNetzA in accordance with § 85c EEG. With regard to the Arable agrivoltaics and the Horticulture-agrivoltaics, the BNetzA's determination of 1.10.2021 is to be applied. With regard to the Grassland agrivoltaics and the Moorland PV, the BNetzA is obliged to issue a determination by 1.7.2023. In the determination for the Moorland PV, the additional agricultural use of the areas (paludiculture) can be regulated. A corresponding consultation procedure has been initiated by the BNetzA.

An extension of this area range is only possible for plants that participate in tenders: Financial support can then also be considered for areas whose parcels were used as arable land or grassland at the time of the decision to draw up or amend the development plan, in short, cannot be assigned to any other land category than the one specified in § 37(1) no. 2 EEG and are also located in a disadvantaged area. It should be noted that the definition of the disadvantaged area in § 3 no. 7 EEG has been supplemented by the areas referred to in letter

b. However, this extension only applies if and to the extent that the Land government has issued a statutory order for bids on the corresponding areas. On the basis of the EEG 2021 - i.e. still with the current definition of the less-favored area - this has so far only been done in Bavaria, Baden-Württemberg, Hessen, Lower Saxony, North Rhine-Westphalia, Saxony, Saxony-Anhalt, Saarland and Rhineland-Palatinate.

There is no exclusion or superior/subordinate relationship between the regulations on rooftop installations, installations on structures, the "classic" ground-mounted installations and the special solar installations. Such a relationship does not result from the wording of the provision, nor is it required by the purpose of the subsidy. Rather, the respective payment entitlement is merely linked to different area-related prerequisites and the bidder or system operator can decide which subsidy category he would like to claim if the prerequisites for several subsidy categories are met.

Apart from the regular tender processes for solar installations, agrivoltaic installations can also participate in innovation auctions. The participation in the innovation auctions is only possible with a combined installation according to § 4 InnAusV. This means that the PV system needs to be combined with other renewable energy systems or a storage system in order to participate.

4. EU Direct Payments

Within the framework of its agricultural policy, the European Union grants direct payments to farmers for land that is primarily used for agricultural purposes, provided that the regulated conditions are observed. An important question is therefore whether an agricultural area loses this eligibility due to the use of agrivoltaics.

For the implementation of the numerous specifications on the Common European Agricultural Policy there is, among other things, the Direct Payments Implementation Ordinance (DirektZahlDurchfV). There is currently uncertainty as to whether payments can be claimed if an agrivoltaic system is built on an area used for agriculture, even if, if the system is designed appropriately, very good arguments can be made that the area is eligible for EU subsidies.

At the beginning of 2022, the CAP Direct Payments Regulation (GAPDZV) was issued, which now removes these uncertainties. According to this regulation, the exclusion described does not apply if the installation is an agrivoltaic installation. What constitutes such an agrivoltaic installation is defined in § 12(5) GAPDZV. According to this, it is a system erected on an agricultural area for the use of solar radiation energy, which does not exclude the cultivation of the area using usual agricultural methods, machines and equipment and which reduces the agriculturally usable area by a maximum of 15 percent based on DIN SPEC 91434:2021-051. If those conditions are fulfilled, 85 percent of the area is considered eligible.

5. Tax Law

If a solar plant is erected on an agricultural area, there is a risk that the area will no longer be assigned to the agricultural and forestry business, but to the real estate. This means that the preferential treatment of agricultural and forestry assets for inheritance and gift tax will cease to apply - even retroactively if the so-called retention periods have not yet expired after the transfer of the farm. There is also a threat of disadvantages with regard to land and land transfer tax with the allocation to land tax B.

These disadvantages are eliminated with a decree in the Federal Tax Gazette for certain agrivoltaic systems: For their attribution and for the purposes of land tax, inheritance and gift tax and land transfer tax, it is stipulated, among other things: Areas on which photovoltaic

systems are located that are category I or II agrivoltaic systems according to DIN SPEC 91434 are to be attributed to agricultural and forestry assets. Areas on which photovoltaic systems are located that are not category I or II agrivoltaic systems according to DIN SPEC 91434 (in particular ground-mounted photovoltaic systems) are to be attributed to real property.

Author contributions

Jens Vollprecht: Conceptualization, methodology, investigation, writing – original draft, writing – review & editing. Max Trommsdorff: Conceptualization, writing – review & editing, funding acquisition.

Competing interests

The authors declare that they have no competing interests.

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