Richmond Journal of Law & Technology Volume XXXI, Issue 2

A TAX FRIENDLY APPROACH TO AGRIVOLTAICS

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Cite as: Avery S. Younis, *A Tax Friendly Approach to Agrivoltaics*, 31 RICH. J.L. & TECH. 232 (2025).

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I. INTRODUCTION

[1] The first reported agrivoltaic farm experiment was performed on lettuce crops in 2013 in Montpellier, France.[1] Ground-mounted solar panels were co-located with either food crops or livestock to simultaneously engage in agricultural activities while producing energy.[2] This dual purposing of land is called agrivoltaics.[3] Agrivoltaic projects are promising because the co-location aids with food production, renewable energy production, and preservation of natural resources.[4]

[2] In America, the agricultural industry is supported by a myriad of policies protecting and benefitting farmers. One such benefit comes from current use programs. Many states offer current use programs in which agricultural land is assessed and taxed at its agricultural value, a "use value" based on production ability, rather than its market value.[5] Assessing and

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[1] Takashi Sekiyama & Akira Nagashima, *Solar Sharing for Both Food and Clean Energy Production: Performance of Agrivoltaic Systems for Corn, a Typical Shade-Intolerant Crop*, 6 ENV'TS 65, 66–67 (2019).

[2] *See* Sarah Brunswick & Danika Marzillier, *The New Solar Farms: Growing a Fertile Environment for Agrivoltaics*, 24 MINN. J. L. SCI. & TECH. 123, 138 (2023); Jessica Guarino & Tyler Swanson, *Emerging Agrivoltaic Regulatory Systems: A Review of Solar Grazing*, 12 CHI.-KENT J. ENV'T & ENERGY L. 1, 1 (2022).

[3] *Agrivoltaics: Coming Soon to a Farm Near You?*, USDA CLIMATE HUBS, https://www.climatehubs.usda.gov/hubs/northeast/topic/agrivoltaics-coming-soon-farm-near-you [perma.cc/3XWC-L92A] (last visited Feb. 23, 2025); *Current Use Programs*, KING CNTY., https://kingcounty.gov/en/dept/assessor/buildings-and-property/property-taxes/tax-relief/current-use-programs [perma.cc/9RR2-M2AP] (last visited Feb. 22, 2025).

[4] *See* discussion *infra* Section II.A.

[5] *See* GENEVIEVE BYRNE, FARMLAND SOLAR POLICY DESIGN TOOLKIT 68 (2020); *Agricultural, Timberland and Wildlife Management Use Special Appraisal*, COMPTROLLER.TEXAS.GOV [hereinafter COMPTROLLER], https://comptroller.texas.gov/taxes/property-tax/ag-timber/index.php [https://perma.cc/84LC-8LPP] (last visited Feb. 22, 2025).

taxing land at its use value lowers property taxes for the landowner.[6] However, current use programs come with eligibility requirements.[7] Once met, property owners must maintain an awareness of changes to the property use, as they can easily lose preferential treatment by a reclassification of land.[8] One such change that can cause problems is the implementation of solar panels on agricultural property.

[3] Although solar energy is one of the fastest growing and most affordable sources of new electricity in America,[9] it has not received the warmest welcome from current use programs. In some states, programs automatically disqualify a taxpayer if solar arrays are installed on the property, while others allow for limited conversion and installation without tax penalties.[10] Despite a 167% increase in the use of renewable energy producing systems on farms and ranches over the previous decade, as of 2022, only 153,101 farms and ranches in America—compared to the 1.9

[6] *E.g.*, *Current Use,* N.H. FISH & GAME DEP'T [hereinafter N.H. FISH & GAME], https://www.wildlife.nh.gov/hunting-nh/landowner-relations-program/current-use [perma.cc/6NB5-T9PV].

[7] *See, e.g.*, W. VA. ST. TAX. DEP'T, PTD – 3, PROP. TAX. DIV. PUBL'N, VALUATION OF FARMLAND 3 (2020) [hereinafter VALUATION OF FARMLAND]; V.L. Hendrickson, *Are There Tax Breaks on Agricultural Land in Pennsylvania?* , MANSION GLOB. (Mar. 24, 2022, 7:04 AM), https://www.mansionglobal.com/articles/are-there-tax-breaks-on-agricultural-land-in-pennsylvania-01648119848 [perma.cc/73QY-PRE6]; NEV. REV. STAT. § 361A.020–30 (2023).

[8] *See* COMPTROLLER, *supra* note 5.

[9] *See* U.S. DEP'T ENERGY, *Solar Energy*, https://www.energy.gov/solar [perma.cc/V2MY-ATXT]; Molly Lempriere, *Wind and Solar Are 'Fastest-Growing Electricity Sources in History'*, CARBONBRIEF (May 5, 2024, 1:01 AM), https://www.carbonbrief.org/wind-and-solar-are-fastest-growing-electricity-sources-in-history/ [perma.cc/TMW9-G63C.

[10] Guarino & Swanson, *supra* note 2, at 14.

million total—use these systems.[11] Agrivoltaics presents an opportunity to enhance the use of farmland through engaging both agricultural and energy production on the same property. However, given the novelty of this technological development, many state policymakers and administrators are struggling to determine how the addition of solar panels to farmland ought to affect taxation, as well as zoning.[12] States have inconsistent current use program regulations, many of which do not explicitly address dual-use property.[13]

[4] This Article argues that states should address agrivoltaics in their current use programs to prevent farmers from being penalized for enhancing the usage of their land without detracting from agricultural production. This Article further suggests that the treatment of minerals such as oil, natural gas, and coal, found on or under agricultural-use property, can serve as a baseline for future regulation of agrivoltaics. States should adopt statutes giving agrivoltaic projects on farmland treatment that is at least as generous as the treatment of minerals found on or under farmland because agrivoltaics synergize better with farmland than mining on farmland.

[5] Part II of this Article explores the benefits of agrivoltaics and the obstacles agrivoltaics face. The article discusses current research into the co-location of different types of crops with solar panels and livestock with solar panels and provides recommendations for future studies. Part III discusses the general policy goals and eligibility requirements of various state current use tax programs, as well as various state responses to the development of agrivoltaics. Part IV examines state statutory treatment of minerals found on or under agricultural use property for the purpose of

[11] *Fast Facts About Agriculture & Food*, AM. FARM BUREAU FED'N, https://www.fb.org/newsroom/fast-facts [perma.cc/AY6N-QXJY] (last visited Feb. 23, 2025).

[12] *See* Brunswick & Marzillier, *supra* note 2, at 155, 171–73.

[13] *See* Guarino & Swanson, *supra* note 2, at 14–16.

current use program eligibility and the negative externalities of excavating said minerals. Part V argues that states should adopt statutes so that the implementation of agrivoltaics on farmland does not defeat the agricultural-use determination of the property under current use programs. This Article will reason that the synergies between agrivoltaics and farmland, as opposed to the negative externalities of activities like mining on farmland, should encourage state treatment of agrivoltaics to be at least as generous as those of minerals found on farmland.

II. AGRIVOLTAICS

A. Benefits of Agrivoltaics

[6] This section explores the benefits of locating solar panels with crops on farmland. It details current research supporting the conclusion that implementation of agrivoltaic projects on farmland does not diminish crop yields for most crops, although more studies would need to be done to determine how different crops, climates, and solar panel designs impact production. Agrivoltaics refers to the use of land for both agriculture production and solar photovoltaic energy generation.[14] Ground-mounted solar photovoltaics, commonly known solar panels, are co-located with food crops or livestock to simultaneously engage in agricultural activities while producing energy.[15] Generally, research has shown that ground-mounted solar panels shade crops, shelter them from the elements, and reduce their water demand.[16] In turn, the crops help cool the panels and thereby increase their productive efficiency.[17]

[14] *Agrivoltaics: Coming Soon to a Farm Near You?*, *supra* note 3.

[15] *See* Brunswick & Marzillier, *supra* note 2, at 138; *see also* Guarino & Swanson, *supra* note 2, at 1.

[16] *See* Brunswick & Marzillier, *supra* note 2, at 128, 141 (noting that panels protect crops from physical damage from rain, hail, or wind).

[17] *See* Brunswick & Marzillier, *supra* note 2, at 128.

[7] Beginning in 2013 in Montpellier, France, the first reported agrivoltaic farm experiment was performed on lettuce crops.[18] The results showed that shading created by solar panels had no significant effect on the lettuce yield.[19] Subsequently, research has expanded to a variety of other crops. Studies indicate that agrivoltaics are effective for plants that are shade tolerant, such as: arugula, Asian greens, chard, collard greens, kale, mustard greens, parsley, sorrel, spinach, scallions, broccoli, kohlrabi, cabbage, hog peanut, alfalfa, yam, taro, cassava, and sweet potato.[20] Field experiments performed with durum wheat even showed an increase in land productivity by 35–72%.[21]

[8] However, there are fewer studies on shade-intolerant, major commercial crops, such as: corn, watermelon, tomato, cucumber, turnip, pumpkin, cabbage, and rice.[22] A recent case study showed that corn could grow well even under the shade of agrivoltaic solar panels, but the conductor of the study acknowledged that a larger sample size should be used in future research.[23] A University of Arizona study reported that tomato fruit production doubled in its agrivoltaics study area.[24]

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[18] Sekiyama & Nagashima, *supra* note 1, at 66–67.

[19] Sekiyama & Nagashima, *supra* note 1, at 67.

[20] Sekiyama & Nagashima, *supra* note 1, at 67. Shade-tolerance is a plant trait that describes its ability to tolerate low light levels. Sekiyama & Nagashima, *supra* note 1, at 67.

[21] Sekiyama & Nagashima, *supra* note 1, at 67.

[22] Sekiyama & Nagashima, *supra* note 1, at 67.

[23] Sekiyama & Nagashima, *supra* note 1, at 73.

[24] Brunswick & Marzillier, *supra* note 2, at 140.

[9] Across the nation, there are variations in climate, weather, groundwater, and land conditions. All of these can affect the suitability of agrivoltaic implementation. One study posited that co-locating solar and high-value xerophytic plants, like agave and aloe vera, in arid and semi-arid regions could have several benefits.[25] While aloe is a non-food crop, its water requirements are low compared to other agricultural crops, and aloes are able to survive in nutrient-poor soils.[26] Furthermore, researchers have explored the viability of agrivoltaic implementations on existing grape farms in India.[27] Even with the weak shade tolerance of grapes, solar panel systems were able to be installed between trellises on the farm without compromising grape production.[28] This success represents a novel agrivoltaic approach in using space for shade intolerant crops.[29]

[10] Co-location not only aids crops but can be beneficial to solar panels. Solar panel performance can be significantly negatively impacted by dust.[30] In drier regions, airborne particulate matter accumulates on the panels sometimes resulting in 15%–25% declines in annual electricity production.[31] The co-location of crops can decrease dust emissions and aid in the conservation of water—water which is used to wash panels to maintain optimum power production.[32] Transpiration from the crops cools

[25] Sujith Ravi et al., *Colocation Opportunities for Large Solar Infrastructures and Agriculture in Drylands*, 165 APPLIED ENERGY 383, 384 (2016).

[26] *Id.* at 390.

[27] Prannay R. Malu et al., *Agrivoltaic Potential on Grape Farms in India*, 23 SUSTAINABLE ENERGY TECHS. & ASSESSMENTS 104, 105 (2017).

[28] *Id.*

[29] *Id.*

[30] *See* Ravi et al., *supra* note 25, at 384.

[31] Ravi et al., *supra* note 25, at 384.

[32] *See* Ravi et al., *supra* note 25, at 384, 390.

the panel above them, allowing for more efficient solar energy production.[33] Studies have found that solar panels become less efficient as their temperatures rise, and that agrivoltaic systems enable panels to stay cooler leading to an increase of productivity of up to 10%.[34]

[11] Many agrivoltaic projects are motivated by environmental and climate concerns.[35] The co-location helps with water preservation efforts as well as global food production.[36] Furthermore, with limited land availability, farmland provides a developed landscape that is relatively flat, unshaded, designed for drainage, with good capacity to add transmission line access.[37] Notably, farmland comprises 39% of all U.S. land.[38]

[12] It would be worthwhile to examine the financial feasibility of agrivoltaic systems with different crops and under different assumptions.[39] Microclimatic effects such as rain redistribution under panels, wind mitigation or acceleration, and crop and soil temperature changes should be explored further.[40] The future of agrivoltaics may lie in the continued study

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[33] *See* Brunswick & Marzillier, *supra* note 2, at 140.

[34] *See* Brunswick & Marzillier, *supra* note *2,* at 142.

[35] *See generally* Brunswick & Marzillier, *supra* note 2, at 129–38.

[36] *See* Brunswick & Marzillier, *supra* note 2, at 138.

[37] *See* Brunswick & Marzillier, *supra* note 2, at 132–33.

[38] U.S.D.A., NAT'L AGRIC. STAT. SERV., 2022 CENSUS OF AGRICULTURE HIGHLIGHTS: FARMS AND FARMLAND (2024), https://www.nass.usda.gov/Publications/Highlights/2024/Census22_HL_FarmsFarmland.pdf [perma.cc/WWS2-6JST].

[39] Sekiyama & Nagashima, *supra* note 1, at 73.

[40] C. Dupraz et al., *Combining Solar Photovoltaic Panels and Food Crops for Optimising Land Use: Towards New Agrivoltaic Schemes*, 36 RENEWABLE ENERGY 2725, 2732 (2011).

and creation of integrated designs that will optimize both food and energy production in a given economic context.[41] While early research on agrivoltaics was limited to case studies with fixed solar panels, models and studies have shown that modifications to solar panels and adjusting the tilting of panels across the cropping cycle can enhance production.[42]

B. Solar Grazing

[13] This section discusses the practice of co-locating solar panels with livestock on farmland, noting current successes and limitations. Agrivoltaic systems can also be used with livestock. Solar grazing is a subfield of agrivoltaics that focuses on grazing livestock on the same land used for solar energy generation.[43] Farmers have successfully reared sheep and poultry below traditional ground-mounted solar arrays.[44] Currently, solar grazing typically involves an agreement between a solar developer and a grazier—contracting to have livestock at a "determined season, duration, and intensity to accomplish defined vegetation of landscape goals." [45]

[14] There are various limitations of solar grazing. Because the livestock herds are not grazing on their owner's land, it can be difficult to protect the animals, transportation can be costly, and coming to contractual agreements may involve negotiations and third-party involvement.[46] Furthermore,

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[41] *See* H. Marrou et al., *Productivity and Radiation Use Efficiency of Lettuces Grown in the Partial Shade of Photovoltaic Panels*, 44 EUR. J. AGRONOMY 54, 63 (2013).

[42] *See* Stefano Amaducci et al., *Agrivoltaic Systems to Optimise Land Use for Electric Energy Production*, 220 APPLIED ENERGY 545, 546 (2018).

[43] Guarino & Swanson, *supra* note 2, at 16.

[44] Brunswick & Marzillier, *supra* note 2, at 143.

[45] Guarino & Swanson, *supra* note 2, at 17.

[46] *See* Guarino & Swanson, *supra* note 2, at 17–19, 21–22.

although other types of animals have been tested for solar vegetation management, sheep seem to be the best option;[47] "[h]orses can be picky about what they eat, cows are large and require a lot of space, and goats tend to chew on wires and climb on panels."[48]

C. Obstacles to Agrivoltaic Adoption

[15] This section presents obstacles to adoption of agrivoltaics including social acceptance, economic and cost concerns, and zoning and tax concerns. Although agrivoltaic projects are promising, there are several obstacles that come with the adoption of this new technological development. A study found that barriers to agrivoltaics development revolve around three dimensions of social acceptance: market, community, and socio-political factors.[49] Farmers care about economic profitability; the complexity, risk, safety, and liability; non-monetary benefits; and retaining agricultural interests.[50] Reluctance comes from the lack of familiarity with agrivoltaics and its potential advantages over the implementation of conventional solar. [51] Already faced with the volatility of food commodity markets and uncertainties in crop production, an introduction of new technology may be too big of a risk given the seeming loss of control and the fears of how it might impact existing farming methods.[52]

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[47] Benjamin Mow, *Solar Sheep and Voltaic Veggies: Uniting Solar Power and Agriculture*, NAT'L RENEWABLE ENERGY LAB'Y (June 6, 2018), https://www.nrel.gov/state-local-tribal/blog/posts/solar-sheep-and-voltaic-veggies-uniting-solar-power-and-agriculture.html [perma.cc/XD3Z-E6ST].

[48] *Id.*

[49] Alexis S. Pascaris et al., *Integrating Solar Energy with Agriculture: Industry Perspectives on the Market, Community, and Socio-Political Dimensions of Agrivoltaics*, 75 ENERGY RSCH. & SOC. SCI. *2 (2021).

[50] *See generally id.* at *4–6.

[51] Brunswick & Marzillier, *supra* note 2, at 154–55.

[52] *See* Brunswick & Marzillier, *supra* note 2, at 155.

[16] In addition, there are cost concerns. Designing and coordinating panel height, row and panel spacing, and the orientation to accommodate crop choices, crop needs, and associated operations involve development costs.[53] However, the benefits of implementing agrivoltaics likely would offset the initial cost demands, resulting in a positive net result. While there is ongoing research into crop suitability, much is still left to be studied. Farmers may find it more economically viable to limit crop types to lower-growing ones, or those that are more shade tolerant.[54] Farmers may be limited in their ability to later switch crops for crop rotation purposes or to adjust to market conditions.[55] These considerations may not be easy, nor uncostly, to implement.

[17] Lastly, there are zoning and tax concerns. Officials are unsure how new and existing zoning policies might apply to agrivoltaics, leading to increased time and costs spent with making determinations and permitting such projects.[56] Similarly to zoning, agrivoltaics presents difficulty with classifying land under state tax laws.[57] Many states classify land under different types, applying varying treatments to each class—whether it be for valuation or tax rate purposes.[58]

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[53] *See* MORGAN SMITH, CONG. RSCH. SERV., RL48197, DUAL-USE SOLAR PHOTOVOLTAICS: EMERGING APPLICATIONS AND ISSUES FOR CONGRESS 5 (2024).

[54] *See id.* at 22.

[55] *Id.*

[56] Brunswick & Marzillier, *supra* note 2, at 155.

[57] *See* Brunswick & Marzillier, *supra* note 2, at 172.

[58] *See e.g.*, *Property Tax Classifications*, W. VA. TAX DIV., https://tax.wv.gov/Business/PropertyTax/Pages/PropertyTaxClassifications.aspx [perma.cc/VSM7-6PLA] (last visited Feb. 22, 2025).

III. CURRENT USE TAXATION

A. General Structure and Policy Goals

[18] This section discusses the general policy goals of current use programs, centered around preserving undeveloped land, and provides examples of states' differing eligibility requirements for current use programs, such as those based on acreage versus production. Many states offer current use programs in which agricultural land is assessed and taxed at its agricultural value, rather than its market value.[59] "Agricultural value" means the property's productive value or "use value;" the land's ability to produce agricultural or timber products.[60] "Market value" is the price that a buyer would be willing to pay for the land if it was for sale on the market; the land's "highest and best use," including the real estate value of the land if it were to be a building site.[61] Assessing and taxing land at its use value lowers property taxes for the landowner.[62]

[19] Current use programs are aimed at providing private landowners some relief from market pressure to convert agricultural, open space, and forest land to economically "best uses" through development.[63]

[59] *See* BYRNE, *supra* note 5, at 68.

[60] *See* COMPTROLLER, *supra* note 5; *Land Use Program*, ROANOKE CNTY. VA., https://www.roanokecountyva.gov/769/Land-Use-Program [perma.cc/K3XA-JBAC] (last visited Feb. 22, 2025).

[61] *See* N.H. FISH & GAME, *supra* note 6; *Current Use Programs*, KING CNTY., https://kingcounty.gov/en/dept/assessor/buildings-and-property/property-taxes/tax-relief/current-use-programs [perma.cc/Q7NK-B42X]; James Chen, *What Is Market Value, and Why Does It Matter to Investors?*, INVESTOPEDIA, https://www.investopedia.com/terms/m/marketvalue.asp [perma.cc/8WG4-8T5W] (Feb. 11, 2025).

[62] *E.g.*, N.H. FISH & GAME, *supra* note 6.

[63] BYRNE, *supra* note 5, at 68.

Functionally, the programs protect farmland and support long-term agricultural use.[64] In addition, the programs conserve natural resources to prevent erosion, protect water supplies, preserve natural beauty, and promote proper land-use planning.[65] By limiting the use of land to specific purposes such as agriculture or forestry, private landowner's land may be classified in a way that receives beneficial property tax treatment.[66]

[20] Every state that employs a current use program may designate its own requirements for eligibility. Many will designate that property consists of a set number of acres or more, and that the property be used to annually produce agricultural products with a value of a set dollar amount or more for use, consumption, or sale.[67] While eligibility may involve a variety of considerations, it is important to emphasize the ratio of farm or agricultural use of land to other uses of land.[68] Just as one can gain the current use benefit, one can lose it. Land that once was considered agricultural property may change and be appraised as non-agricultural use property.[69] Not only does the property lose its preferential treatment, but often property owners will also owe a rollback tax.[70] For the years required, the rollback tax typically will be the difference between taxes paid on the land's agricultural value and the taxes that would have been paid if the land had been taxed on

[64] *See* BYRNE, *supra* note 5, at 68.

[65] Gayle, *Land Use Tax Assessment in Virginia*, CENT. VA. FARMS, https://www.centralvafarms.com/blog/2016/07/land-use-tax-assessment-in-virginia/ [perma.cc/5GT3-T6R7] (last visited Feb. 22, 2025).

[66] BYRNE, *supra* note 5, at 68.

[67] *See e.g.*, VALUATION OF FARMLAND, *supra* note 7, at 3; Hendrickson, *supra* note 7; NEV. REV. STAT. § 361A.020–30 (2023).

[68] *See* VALUATION OF FARMLAND, *supra* note 7, at 5–6.

[69] *See* COMPTROLLER, *supra* note 5.

[70] COMPTROLLER, *supra* note 5.

its higher market value.[71] The table below outlines current use program eligibility requirements for a variety of states.

State	Eligibility Requirements
Michigan	Unoccupied property and related buildings classified as agricultural… devoted primarily to agricultural use.[72]
New Jersey	A property must be at least five contiguous acres devoted to agricultural/horticultural use; devoted to such activities for at least two consecutive years prior to the tax year; gross sales of crops or livestock must total at least $1,000 per year for the first five acres, plus $5 per acre for each additional acre; etc.[73]
New York	A property must be seven or more acres that were used in the preceding two years for production of crops, livestock, or livestock products.[74] Annual gross sales of agricultural products generally must average $10,000 or more for the preceding two years.[75]
Ohio	A property must be 10 or more acres devoted exclusively to commercial agricultural use; if less, then the owner must demonstrate an average income of at least $2,500 or more from agricultural activity during each of the previous years or have an anticipated gross income of

[71] COMPTROLLER, *supra* note 5.

[72] MICH. STATE TAX COMM'N, QUALIFIED AGRICULTURAL PROPERTY EXEMPTION GUIDELINES 2 (2018), https://www.michigan.gov/-/media/Project/Websites/taxes/MISC/2005/2005_Qualified_Agricultural_Prop.pdf?rev=8329d8490fd04f81b95c48b5561c8388.

[73] *Farmland Assessment*, N.J. DIV. TAXATION (June 14, 2022), https://www.nj.gov/treasury/taxation/lpt/lpt-farmland.shtml [perma.cc/7S9S-38Q9].

[74] *Agricultural Assessment Program: Overview*, N.Y. STATE DEP'T TAX'N & FIN. (Jan. 29, 2025), https://www.tax.ny.gov/research/property/assess/valuation/ag_overview.htm [perma.cc/9JSM-7RD4].

[75] *Id.*

	$2,5000 from agricultural activity during the year of application.[76]
Pennsylvania	A property must be ten acres in size, and in Agricultural Use, Agricultural Reserve, or Forest Reserve.[77]
Rhode Island	A director of environmental management shall examine the land and determine if it is farmland or dairy farmland.[78]
Texas	Land may qualify if it is currently devoted principally to agricultural use to the degree of intensity generally accepted in the area.[79]
Vermont	A property must be at least 25 contiguous acres in active agricultural use; or smaller parcels which generate at least $2,000 annually from the sale of farm crops, or actively used agricultural land owned by or leased to a farmer.[80]

[21] Some of these differences in state eligibility requirements are further explained as follows. In Pennsylvania, a property must be ten acres in size, and in Agricultural Use, Agricultural Reserve, or Forest Reserve.[81] "Agricultural Use" refers to land which is used for the purpose of producing an agricultural commodity, including any farmstead land on the tract, a

[76] *Current Agricultural Use Valuation*, CUYAHOGA CNTY., OHIO, https://cuyahogacounty.gov/fiscal-officer/departments/appraisal/current-agricultural-use-valuation [perma.cc/ZB84-CQFX] (last visited Feb. 22, 2025).

[77] *Clean and Green*, COMMONWEALTH PA. DEP'T AGRIC., https://www.pa.gov/en/agencies/pda/plants-land-water/farmland-preservation/clean-and-green.html [perma.cc/GK96-GZCQ] (last visited Feb. 23, 2025).

[78] R.I. GEN. LAWS § 44-27-3 (2021).

[79] COMPTROLLER, *supra* note 5.

[80] *Eligible Property*, VT. DEP'T TAXES, https://tax.vermont.gov/property/current-use/property-types [perma.cc/YU4C-BCYB] (last visited Feb. 23, 2025).

[81] *Clean and Green*, *supra* note 77.

woodlot, or land which is rented to another person for the purpose of producing an agricultural commodity.[82] The term also includes land devoted to the operation of an alternative energy system, *but only* if a majority of the energy annually generated is utilized on the tract.[83] To meet this requirement, the amount of electricity produced may have to be limited, and/or the electricity produced would have to be substantially directed towards powering the agriculture operations on the property.

[22] In Rhode Island, although the state defines "Farmland," much is left to the discretion of the director of environmental management.[84] For property to qualify, the director must examine the land and determine if it is farmland or dairy farmland.[85] He or she is then authorized to "promulgate and adopt rules and regulations defining particular categories and minimum acreages of land eligible for designation as farmland…."[86]

[23] In Texas, land may qualify if it is currently devoted principally to agricultural use "to the degree of intensity generally accepted in the area."[87] Given the variation in criteria and discretion of authority, property owners have good reason to be cautious any time they make changes to how they use their land—including what they add and what they remove.

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[82] 7 PA. CODE § 137b.2 (2015).

[83] *Id.*

[84] R.I. GEN. LAWS § 44-27-2 (2021).

[85] R.I. GEN. LAWS § 44-27-3 (2021).

[86] R.I. GEN. LAWS § 44-27-2 (2021).

[87] COMPTROLLER, *supra* note 5.

B. Response to Agrivoltaics

[24] This section discusses the different ways states have addressed the implementation of solar panels on farmland with current use program eligibility requirements. There is not a universal consensus on the treatment of solar panels on farmland, causing uncertainty for those considering agrivoltaic projects. Generally, current use program policies disincentivize activity that would change the land's previously designated use; in some states, the programs explicitly prohibit the installation of solar arrays, while others allow for limited conversion and installation without tax penalties.[88] The range of approaches includes:

- Solar arrays may never be sited on enrolled agricultural land;
- Solar arrays are not permitted on quality soils;
- Solar arrays may be sited on a case-by-case basis;
- Solar arrays of limited size may be sited on enrolled land;
- Solar arrays serving the farm may be sited on enrolled land; and
- Solar defers or cancels current use enrollment without penalty.[89]

The following table outlines various state policy approaches to implementation of solar panels on farmland for the purposes of current use program eligibility requirements.

[88] *See* Guarino & Swanson, *supra* note 2, at 4.

[89] *See* Guarino & Swanson, *supra* note 2, at 15–16; BYRNE, *supra* note 5, at 72.

State	Current Use Program Policy (Solar)	Type of Policy
Massachusetts	Farmland may retain its agricultural tax exemption if "the majority of the power from a solar energy system (or a wind turbine) is integral to farm production, construction and operation."[90]	Limited Conversion / Installation
Michigan	If a solar installation is placed on agricultural land, it loses its zoning classification and thus may face an increase in property taxes.[91]	Explicitly Prohibited
New Jersey	The installation of solar facilities, structures, and equipment on a farm are permitted so long as: the installation does not interfere significantly with the use of the land for agricultural production; the facilities are owned by the landowner or will be…; the energy is used to alleviate energy costs on the farm; and the energy generation is limited to the previous calendar year's energy demand plus 10% or it occupies no more than 1% of the area of the entire farm.[92]	Limited Conversion / Installation
New York	The Farm Bureau released guidance stating that even land used for dual purposes may still cause the property to lose its agricultural exemption.[93]	Undetermined

[90] Colleen Collins, *Solar Power to the People: A Call to Integrate Agrivoltaics into the Biden Administration's Plans for Supporting Minority Farmers and Reducing Carbon Emissions*, 45 ENVIRONS: ENV'T L. & POL'Y J. 149, 170 (2022).

[91] *Id.* at 171.

[92] *See* N.J. REV. STAT. § 4:1C-32.4 (2024).

[93] Collins, *supra* note 90, at 170–71.

Ohio	The construction or installation of an energy facility on a portion of a tract, lot, or parcel of land devoted exclusively to agricultural use shall not cause the remaining portion of the tract, lot, or parcel to be reclassified if the remaining portion of the tract, lot, or parcel continues to be devoted exclusively to agricultural use.[94]	Separate Tax Valuations
Oregon	The Land Conservation and Development Commission approved new laws that restrict commercial solar development on farmland across the state.[95]	Undetermined
Pennsylvania	Alternative energy systems, including solar energy, are permitted on enrolled land so long as "a majority of the energy generated annually is utilized on the tract."[96]	Limited Conversion / Installation
Rhode Island	Solar development is allowed on up to 20% of enrolled farmland acreage. Additional acreage may be converted without penalty if it is of a dual use design (if it is an agrivoltaics project).[97]	Limited Conversion / Installation
Vermont	A solar generating facility is permitted if it qualifies as a farm improvement—50% or more of the electricity generated is used by enrolled farm buildings.[98]	Limited Conversion / Installation

[25] Some of the different state approaches to solar implementation are further explained as follows. In Pennsylvania, alternative energy systems,

[94] OHIO REV. CODE § 5713.30(A)(4) (2021).

[95] Collins, *supra* note 90, at 171.

[96] 7 PA. CODE § 137b.2 (2015).

[97] BYRNE, *supra* note 5, at 71.

[98] *See* TB-69 VT. DEP'T TAXES TECH. BULL. 1 (Jul. 13, 2015).

including solar energy, are permitted on enrolled land so long as "a majority of the energy generated annually is utilized on the tract."[99] In New Jersey, the installation of solar facilities, structures, and equipment on a farm are permitted so long as: the installation does not interfere significantly with the use of the land for agricultural production; the energy is used to alleviate energy costs on the farm; and the energy generation is limited to the previous calendar year's energy demand plus 10% or it occupies no more than one percent of the area of the entire farm.[100] In Vermont, a solar generating facility is permitted if it qualifies as a farm improvement—50% or more of the electricity generated is used by enrolled farm buildings.[101]

[26] In Rhode Island, solar development is allowed on up to 20% of enrolled farmland acreage.[102] Additional acreage may be converted without penalty if it is of a dual use design (if it is an agrivoltaics project).[103] In Massachusetts, farmland may retain its agricultural tax exemption if "the majority of the power from a solar energy system (or a wind turbine) is integral to farm production, construction and operation."[104] In Oregon, the Land Conservation and Development Commission approved new laws that restrict commercial solar development on farmland across the state.[105] In Michigan, if a solar installation is placed on agricultural land, it loses its zoning classification and thus may face an increase in property taxes.[106] In

[99] 7 PA. CODE § 137b.2 (2015).

[100] *See* N.J. REV. STAT. § 4:1C-32.4 (2024).

[101] *See* TB-69 VT. DEP'T TAXES TECH. BULL. 1 (Jul. 13, 2015).

[102] BYRNE, *supra* note 5, at 71.

[103] BYRNE, *supra* note 5, at 71.

[104] Colleen Collins, *Solar Power to the People: A Call to Integrate Agrivoltaics into the Biden Administration's Plans for Supporting Minority Farmers and Reducing Carbon Emissions*, 45 ENVIRONS: ENV'T L. & POL'Y J. 149, 170 (2022).

[105] *Id.* at 171.

New York, the Farm Bureau released guidance stating that even land used for dual purposes may still cause the property to lose its agricultural exemption.[107]

[27] Inconsistencies in regulations "create uncertainty for the financial viability of agrivoltaics operations and possible legal consequences that might follow from the breach of these zoning and taxing legislation."[108] It is necessary for states to address the growing possibility of dual-purpose agricultural property, and reconsider how the goals of current use programs align with emerging agrivoltaic projects.

IV. MINERALS

A. Treatment of Minerals for Current Use Program Eligibility

[28] This section examines statutory language from West Virginia, Texas, Pennsylvania, and Nevada regarding the treatment of oil, gas, coal, and/or minerals found on farmland qualified under current use programs. Given the inconsistent state regulations and guidance toward solar energy system installation, it would be beneficial for states to review how state statutes treat minerals found on or under agricultural use property. The United States is one of few countries that allows private individuals to own the minerals under their land.[109] This ownership has led to many property and tax considerations of the minerals. However, there are two basic approaches to

[106] *Id.*

[107] *Id.* at 170–71.

[108] Guarino & Swanson, *supra* note 2, at 4.

[109] Marie Cusick & Amy Sisk, *Millions Own Gas and Oil Under Their Land. Here's Why Only Some Strike It Rich*, NAT'L PUB. RADIO (Mar. 15, 2018, 5:01 AM), https://www.npr.org/2018/03/15/592890524/millions-own-gas-and-oil-under-their-land-heres-why-only-some-strike-it-rich [perma.cc/PN3V-HL9D].

ad valorem taxation of mineral interests.[110] These approaches include the "severance approach" and the "reserves approach." The "severance approach" applies if the minerals have been severed from the ground; the "reserves approach" applies if the minerals remain in the ground.[111] With the complexity of tax considerations, it is unsurprising that states commonly dealing with these separate mineral interests have factored minerals into current use program requirements and exceptions.

[29] The table below outlines how some states treat oil, gas, coal, and/or minerals for purposes of current use program eligibility requirements, noting if rollback taxes apply.

State	Current Use Program Policy (Oil, Gas, Coal, Minerals)	Rollback Taxes?
Nevada	"Agricultural real property" does not exclude land with respect to which the owner has granted and has an outstanding lease or option to buy geothermal resources, mineral resources, or other subsurface resources if the exploration of the resources does not interfere with the agricultural use of the land.[112]	None
Pennsylvania	Oil and gas development is allowed with a limited rollback tax penalty—limited to the areas of the property devoted to the activity. Commercial wind production is permitted with rollback taxes limited to those areas devoted to the activity. One small non-coal surface mining is permitted on enrolled	Limited

[110] Calvin A. Kent, *State and Local Ad Valorem Taxation of Mineral Interests* 1 (Lincoln Inst. of Land Pol'y, Working Paper WP15CK1, 2016), https://go.lincolninst.edu/Kent_WP15CK1.pdf?_gl=1*ukm832*_ga*MTk3NTQ5Mzc3NC4xNzM4NTMzMzM1*_ga_26NECLE3MM*MTczODUzMzMzNS4xLjAuMTczODUzMzMzNy4wLjAuMA [perma.cc/J7WJ-7Y3F].

[111] *Id.*

[112] NEV. REV. STAT. § 361A.020 (2023).

	land with rollback taxes due on the affected areas.[113]	
Texas	Minerals (oil, gas, or any hard mineral) must be appraised separately at market value; agricultural special use valuation applies to the land only and not to other property that may be connected to or on the land. Land must be devoted primarily to a qualifying agricultural use. However, if the land is used for more than one purpose, "the most important or primary use must be a qualifying agricultural use."[114]	Exempted
West Virginia	Farmland with minerals (coal, oil, and natural gas), where income is not derived from them, is subject to farm use valuation only. Where the minerals are severed, the whole property is subject to farm use valuation if 50% or more of the usual annual gross income is from the annual wholesale value of farm commodities or products.[115]	None

[30] Although the table provides information on each of the four states, it is important to discuss the statutory language further to discern the rationale behind the regulation and how it might be applied to agrivoltaics. In West Virginia, farmland with minerals (coal, oil, and natural gas), where income is not derived from the minerals, are subject to farm use valuation only.[116] Where the minerals are severed, the whole property is subject to farm use valuation if 50% or more of the usual annual gross income is from

[113] *See Clean & Green*, *supra* note 77.

[114] GUADALUPE APPRAISAL DIST., AN OVERVIEW OF QUALIFYING LAND FOR SPECIAL AGRICULTURAL USE VALUATION UNDER 1-D-1 AND INFORMATION ON THE ROLLBACK PROCESS at 4, 6 (2023), https://guadalupead.org/wp-content/uploads/2023/04/AG.-OVERVIEW-UPDATED.pdf [perma.cc/BLX8-ZL87].

[115] *See* VALUATION OF FARMLAND, *supra* note 7, at 10–11.

[116] *See* VALUATION OF FARMLAND, *supra* note 7, at 10.

the annual wholesale value of farm commodities or products.[117] When annual gross income from these commodities or products is less, West Virginia adds the applicable mineral value to the farm use value.[118] The presence of minerals and the extraction of them does not defeat the agricultural use of the entire property.[119]

[31] In Texas, minerals (oil, gas, or any hard mineral) must be appraised separately at market value; agricultural special use valuation applies to the land only and not to other property that may be connected to or on the land.[120] Texas sets a primary use requirement stating that land must be devoted primarily to a qualifying agricultural use. However, if the land is used for more than one purpose, the requirement becomes more subjective, "the most important or primary use must be a qualifying agricultural use."[121] Fitting with this subjective primary use requirement, the presence of minerals and the extraction of them does not defeat the agricultural use of the entire property.[122] Even when a change to non-agricultural use property does occur, if it is because of oil and gas operation, the change is exempted from rollback taxes.[123]

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[117] *See* VALUATION OF FARMLAND, *supra* note 7, at 10–11.

[118] *See* VALUATION OF FARMLAND, *supra* note 7, at 11.

[119] *See* VALUATION OF FARMLAND, *supra* note 7, at 10–12.

[120] GUADALUPE APPRAISAL DIST., AN OVERVIEW OF QUALIFYING LAND FOR SPECIAL AGRICULTURAL USE VALUATION UNDER 1-D-1 AND INFORMATION ON THE ROLLBACK PROCESS 6 (2023), https://guadalupead.org/wp-content/uploads/2023/04/AG.-OVERVIEW-UPDATED.pdf [perma.cc/9KBN-2ZNP].

[121] *Id.* at 4.

[122] *Id.*

[123] *See* COMPTROLLER, *supra* note 5.

[32] In Pennsylvania, the current use program allows for oil and gas development with a limited rollback tax penalty—limited to the areas of the property devoted to the activity.[124] Similarly, commercial wind production is permitted with rollback taxes limited to those areas devoted to the activity.[125] Furthermore, the program allows for one small non-coal surface mining permit on enrolled land with rollback taxes due on the affected areas.[126]

[33] In Nevada, "agricultural real property" does not exclude land with respect to which the owner has granted and has an outstanding lease or option to buy geothermal resources, mineral resources, or other subsurface resources if the exploration of the resources *does not interfere with the agricultural use of the land*.[127]

[34] Overall, the treatment of oil, gas, coal, and/or minerals found on farmland qualified under current use programs is very favorable. Retaining preferential treatment under the current use program is based upon primary use of the land, level of interference with agricultural use, or annual gross income from wholesale value of farm commodities or products. Excavation of minerals, even for commercial purposes, does not serve to automatically disqualify the farmland. At times, it may cause the portion of the land to be taxed at market value, but it does not impact the remaining agricultural-use property treatment. Lastly, there are no requirements that energy generated from oil, gas, coal, and/or minerals found on farmland be utilized for the agricultural operations on the tract of land.

[124] *Clean and Green*, *supra* note 77.

[125] *Clean and Green*, *supra* note 77.

[126] *Clean and Green*, *supra* note 77.

[127] NEV. REV. STAT. § 361A.020–30 (2023).

B. Negative Externalities of Mining

[35] This section explores the disadvantages of mining on farmland. In general, mining generates significant "externalities" that can negatively impact agricultural production.[128] Mining can impact water quality and quantity; cause air pollution; and cause soil pollution and erosion.[129] The contamination of surface and ground water resources can be caused by chemical pollution from explosive or regular mining operations, as well as by heavy metals that find their way into streams and rivers, thus making their way into ground water.[130] High levels of contamination may cause destruction of farm crops.[131] Studies, mostly done in controlled environments, have found that exposure to air pollutants associated with the burning of fossil fuels results in significant crop yield reductions.[132] Observing gold mining operations in Ghana, a study found that the average agricultural productivity of farmers in the vicinity of mines declined by

[128] Keith Slack, *The Growing Battle Between Mining and Agriculture*, OXFAM (Apr. 17, 2013), https://politicsofpoverty.oxfamamerica.org/the-growing-battle-between-mining-and-agriculture/ [perma.cc/794T-FF5H].

[129] *See e.g.*, *id.*; *The Impact of Mining on Agricultural Land*, AGRIORBIT (Jan. 16, 2023) [hereinafter AGRIORBIT], https://agriorbit.com/the-impact-of-mining-on-agricultural-land-2/ [perma.cc/3RTJ-SA5S]; Vivian Schueler et al., *Impacts of Surface Gold Mining on Land Use Systems in Western Ghana*, 40 AMBIO 528, 528, 532 (2011), https://pmc.ncbi.nlm.nih.gov/articles/PMC3357810/ [perma.cc/MFF6-GCV7]; Fernando M. Aragón & Juan Pablo Rud, *Mining, Pollution and Agricultural Productivity: Evidence from Ghana* 9–10 (Dartmouth Coll., 2011), https://www.dartmouth.edu/neudc2012/docs/paper_7.pdf [perma.cc/V9VW-7AQ5].

[130] Ignitious Tetteh Ocansey, Mining Impacts on Agricultural Lands and Food Security – Case Study of Towns in and Around Kyebi in the Eastern Region of Ghana (2013) (B.A. thesis, Turku University of Applied Sciences), https://www.theseus.fi/bitstream/handle/10024/53720/Ocansey_Ignitious.pdf?sequence [perma.cc/X3W4-7AXK].

[131] *Id.* at 15–16.

[132] Aragón & Rud, *supra* note 129, at 11.

around 40%, relative to farmers located farther away.[133] Although this decline in production could be due to pollution, the study acknowledged that other factors could be impacting production, such as the displacement of farmers due to competition for inputs. Regardless, the study still found that the water and soil in mining areas had higher than normal levels of pollutants.[134]

[36] Furthermore, mining requires large amounts of land that could otherwise be used for agricultural production.[135] To drill and hydraulically fracture an oil or gas well requires several acres around the well for the drilling rig, drill pipe storage, trailers for equipment and staff, pump trucks, data vans, and pits or tanks for water and waste storage. Once drilling is finished and the well is producing oil or gas, much of the drill site can be reclaimed. The size of a well site, or "pad," will depend on many factors, including location, land use restrictions, and the type and number of wells being drilled from the site. In Pennsylvania's portion of the Marcellus Shale, a typical well site is five to eight acres, including land used for water, impoundments for hydraulic fracturing, access roads, and other equipment. While modern drilling technology aims to reduce the acreage used by guiding a drill horizontally underground for up to several miles, this technique does not completely erase the other negative externalities from the operations.[136]

[37] Mining still has some benefits. From an economic perspective, mining is a profitable industry. It can help economic growth in developing countries and it can provide job opportunities. The minerals, metals, and

[133] *See* Aragón & Rud, *supra* note 129, at 24.

[134] Aragón & Rud, *supra* note 129, at 27.

[135] *See* Slack, *supra* note 128.

[136] *See* E. Allison & B. Mandler, *Land Use in the Oil and Gas Industry*, AM. GEOSCIENCES INST., https://profession.americangeosciences.org/reports/petroleum-environment-2018/land-use-oil-gas-industry [perma.cc/TQ6A-HVRR] (Jan. 6, 2018).

rare earth materials extracted are often essential for manufacturing products like steel, electrical wiring, and gadgets—including solar panels.[137] In addition, the materials are used for infrastructure development, as well as for energy production. Although mining has these benefits, when it comes to farmland, it can cause severe negative impacts to the land that can be permanent, rendering previously fertile agricultural land unusable. [138]

V. RECOMMENDED TAX STRUCTURE: THE INTERSECTION OF AGRIVOLTAICS AND CURRENT USE PROGRAMS

[38] This section argues that the synergies between agrivoltaics and farmland, as opposed to the negative externalities of activities like mining on farmland, should encourage state treatment of agrivoltaics to be at least as generous as those of minerals found on farmland. Agrivoltaics synergizes with farming. Ground-mounted solar panels aid in crop production and water preservation.[139] The panels shade crops, shelter them from the elements, and reduce their water demand.[140] Weather protection lowers the volatility inherent in food production, leading to increases in net

[137] *See* Ana Almerini, *How Are Solar Panels Made?*, SOLARREVIEWS, https://www.solarreviews.com/blog/how-are-solar-panels-made [perma.cc/P8SV-MVNA]; *see also* Clarissa Escamilla, *The Importance of Mining in Modern Society*, UNIV. ARIZ. SCH. MINING & MIN. RES. (June 24, 2024), https://mining.arizona.edu/news/importance-mining-modern-society [perma.cc/AV6Z-LY45].

[138] *See* Adator Stephanie Worlanyo & Li Jiangfeng, *Evaluating the Environmental and Economic Impact of Mining for Post-Mined Land Restoration and Land-Use: A Review*, 279 J. ENV'T MGMT *7 (2021); Slack, *supra* note 128.

[139] *See* Sarah Brunswick & Danika Marzillier, *The New Solar Farms: Growing a Fertile Environment for Agrivoltaics*, 24 MINN. J. L. SCI. & TECH. 123, 128 (2023).

[140] *Id.*

revenues.[141] Shaded areas created under solar panels can provide cooler conditions for livestock and for farm workers.[142]

[39] Furthermore, agrivoltaics is preferential to typical solar installations, as it does not require the development of land—farmland is often already flatter, unshaded, with a drainage system and easy implementation of transmission access.[143] Agrivoltaics can help reduce the conversion of farmland and undeveloped land.[144] In California, the Nature Conservancy estimates that 35–50% of ideal locations for solar installation are located on current cropland.[145] Developing agrivoltaic projects on such land could enhance productivity without removing the land from crop rotation.[146] Also, farmland is often already adjacent to infrastructure like roads and transmission lines, allowing for the generation of electricity where there is already access to the transmission system.[147]

[40] In contrast, mining on farmland generates significant externalities that can negatively impact agricultural production. Mining can impact water quality and quantity; cause air pollution; and cause soil pollution and erosion.[148] Studies have linked the contaminations of mining to decreases

[141] *Id.* at 141.

[142] *Id.*

[143] *Id.* at 132–33.

[144] Sarah Brunswick & Danika Marzillier, *The New Solar Farms: Growing a Fertile Environment for Agrivoltaics*, 24 MINN. J. L. SCI. & TECH. 123, 146 (2023).

[145] *Id.*

[146] *Id.*

[147] *See* MORGAN SMITH, CONG. RSCH. SERV., RL48197, DUAL-USE SOLAR PHOTOVOLTAICS: EMERGING APPLICATIONS AND ISSUES FOR CONGRESS 13 (2024).

[148] *See, e.g.*, Slack, *supra* note 128; AGRIORBIT, *supra* note 129; Schueler et al., *supra* note 129, at 40; Aragón & Rud, *supra* note 129, at 9–10.

in crop yields.[149] Additionally, mining requires large amounts of land that could otherwise be used for agricultural production.[150] Although land can be reclaimed, the negative impacts from mining can be permanent, rendering previously fertile agricultural land unusable.[151]

[41] Current use programs emerged as a response to pressures to convert land for economic purposes.[152] Eligibility frequently turns on the amount and value of production of agricultural products.[153] States want to incentivize crop production and food production. Farmers are one of the biggest, most ubiquitous recipients of tax breaks in the United States.[154] From sales tax to ownership property tax breaks to research and development tax credits, the country acknowledges that the agricultural industry is essential to state economies.[155] Agrivoltaics allows for dual operations, providing farmers with an alternative form of income.[156] With careful spacing of the density of solar panels and planting shade-tolerant crops, yield loss from the presence of solar panels can be minimized while increasing annual income of farmers through the generation of energy.[157]

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[149] Aragón & Rud, *supra* note 129, at 11.

[150] *See* Slack, *supra* note 128.

[151] *See* Slack, *supra* note 128.

[152] *See* BYRNE, *supra* note 5, at 68.

[153] *See e.g.*, VALUATION OF FARMLAND, *supra* note 7; Hendrickson, *supra* note 7; NEV. REV. STAT. § 361A.020–30 (2023).

[154] *8 Really Nice Tax Breaks for Farmers That Might Save You Money*, CRS CPAS (Mar. 15, 2023), https://crscpa.com/blog/8-really-nice-tax-breaks-for-farmers-that-might-save-you-money/ [perma.cc/3QZX-PNJ7].

[155] *Id.*

[156] *See* Guarino & Swanson, *supra* note 2, at 12.

[157] *See* Guarino & Swanson, *supra* note 2, at 12.

Farmers can benefit from the onsite electricity savings and additional revenue from excess energy sales (if permitted).[158]

[42] In addition, current use programs aid in conserving natural resources and promote better land planning.[159] Agrivoltaic projects leave ecosystems intact and preserve topsoil.[160]Agrivoltaic projects do not require land to be converted. Forests and open spaces can remain undisturbed; agricultural use land can have additional purpose. "The agrivoltaic approach is a modern-day attempt at land use preservation…."[161] Accordingly, states should adopt statutes giving treatment to agrivoltaics that is at least as generous as the treatment of minerals on agricultural-use property.

[43] The treatment of oil, gas, coal, and/or minerals found on farmland qualified under current use programs is very favorable. Retaining preferential treatment under the current use program is based upon primary use of the land, level of interference with agricultural use, or annual gross income from wholesale value of farm commodities or products. Excavation of minerals, even for commercial purposes, does not serve to automatically disqualify the farmland. Nevada's statutory language best presents the reason why agrivoltaics should not impact current use tax: "does not interfere with the agricultural use of the land."[162] Agrivoltaic projects are unique because they maintain the agricultural function of the land.[163]

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[158] Brunswick & Marzillier, *supra* note 2, at 140.

[159] *See* Gayle, *supra* note 65.

[160] *See* Brunswick & Marzillier, *supra* note 2, at 144.

[161] Debaleena Majumdar & Martin J. Pasqualetti, *Dual Use of Agricultural Land: Introducing 'Agrivoltaics' in Phoenix Metropolitan Statistical Area, USA*, 170 LANDSCAPE & URB. PLAN. 150, 151 (2018).

[162] NEV. REV. STAT. § 361A.020 (2023).

[163] *See* Guarino & Swanson, *supra* note 2, at 16.

[44] When states outline requirements related to primary purpose and percentage of production, or implement rollback taxes on solely the property devoted to the activity, are these not indicative of a correlation between a loss of eligibility and the reduction of agricultural use? West Virginia sets a 50% gross income standard.[164] The state does not want the efforts of the land to be converted substantially to something else. Pennsylvania applies limited rollback taxes for minerals and wind production, limiting the penalty to the areas of the property devoted to the activity.[165] Unlike an agrivoltaics system, the implementation of something like an oil well on agricultural property requires several acres of surface disturbance for road construction, well pad construction, and turnaround/production facility areas to service the wells.[166] Systems for oil, gas, and even wind, cannot exist as seamlessly as agrivoltaics. These systems are not dual-purpose; they do not provide for the plants and the plants do not provide for them in the way that ground-mounted solar panels do—there is a "symbiotic 'cooling' relationship" between plants and solar panels.[167]

[45] In devising additional statutes for current use programs, states should consider that agrivoltaic projects deserve treatment that is at least as generous as the treatment of minerals. Ideally, states should permit agrivoltaics on farmland without defeating the agricultural-use determination of the property under current use programs. The present treatment of solar arrays installed on property in many states is poor. Installation of any solar panels can result in the loss of agricultural-use

[164] *See* VALUATION OF FARMLAND, *supra* note 7, at 10–11.

[165] *See Clean & Green*, *supra* note 77.

[166] *See* USDA, SUPPLEMENTAL INFO. REP.: HORIZONTAL DRILLING USING HIGH VOLUME HYDRAULIC FRACTURING: APPENDIX B at 11–12 (2004).

[167] *Agrivoltaics: Coming Soon to a Farm Near You?*, *supra* note 3.

determination under some current use programs. Additionally, many states require that energy generated from the solar panels be used for the agricultural operations on the tract of land and/or be limited to the amount used on the tract—a requirement not applied to energy generated from oil, gas, coal, and/or minerals found on farmland. Given the myriad of benefits agrivoltaic projects could provide, states should create legal environments that do not punish farmers for implementing them onto their land.

VI. Conclusion

[46] Overall, states should adopt statutes providing favorable treatment for the implementation of agrivoltaic projects on agricultural-use property. Although the concept of agrivoltaics is still fairly new and thus there has been reluctance towards adoption, dual-usage of property could greatly benefit the agricultural industry as well as the energy industry. Through strategically co-locating solar installations with crops or livestock, efficiency for both agricultural and energy production can be increased. By contrast, mining operations on farmland have shown to decrease production, due to contamination of water, soil, and air, as well as the acreage taken for operations. The treatment of oil, gas, coal, and/or minerals found on farmland qualified under current use programs is very friendly, generally allowing property to maintain its status as agricultural-use property. Considering the negative externalities of mining on farmland versus the benefits of agrivoltaics, the treatment of minerals should serve as the baseline for states in determining the treatment of agrivoltaic projects on farmland. States should devise statutes that give agrivoltaic projects treatment that is at least as generous as the treatment of minerals. Ideally, states should permit agrivoltaics on farmland without defeating the agricultural-use determination of the property under current use programs.