



Commonwealth of Kentucky

Finance and Administration Cabinet

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**Kentucky Technical Advice Memorandum  
KY-TAM-21-01**

**SUBJECT:** Application of Kentucky Ad Valorem Tax and Sales and Use Taxes on Equipment Generating Solar Power

**EFFECTIVE DATE:** Applies to all periods open under the statute.

**SUPERSEDES:** N/A

**REFERENCE:** [KRS 132.020](#)  
[KRS 132.200](#)  
[KRS 136.120](#)  
[KRS 136.160](#)  
[KRS 139.010](#)  
[KRS 139.480](#)  
[103 KAR 8:090](#)  
[103 KAR 30.120](#)  
[103 KAR 31.030](#)

**AUTHORITY:** [KRS 131.130\(8\)](#)

**SCOPE:** The purpose of a Technical Advice Memorandum (“TAM”) is to provide direction to the public and to Department personnel. A TAM is issued to apply principles of law to a set of facts or general category of taxpayers. The Kentucky Department of Revenue (“KDOR”), in its discretion, may retroactively withdraw, revoke, or modify any TAM including, but not limited to, if there was a change in the applicable statute(s), regulation(s), case law or other KDOR guidance; or if the TAM was issued in error. A TAM does not constitute a final ruling, order or determination of the KDOR and cannot be appealed.

**I. Issue/ Question(s)**

1. How does Kentucky ad valorem tax apply to solar power companies and common machinery and other equipment used in generating solar power?

2. How does Kentucky sales and use tax apply to common machinery and other equipment used in generating solar power?

## II. Law

1. Ad valorem taxes.

Kentucky Constitution Section [172](#) requires all property other than agricultural or horticultural land to be assessed for ad valorem taxation at its “fair cash value.”<sup>1</sup>

Kentucky Revised Statutes (KRS) [136.115](#), [136.120](#), [136.160](#), [132.020](#), and [132.200](#) establish the parameters for ad valorem taxation of property owned by public service companies in Kentucky. Kentucky Administrative Regulation [103 KAR 8:090](#) contains classification guidelines for use by public service companies when reporting their property for ad valorem tax purposes.

2. Sales and Use Taxes.

Kentucky Revised Statutes [KRS 139.010\(12\)](#), [139.010\(19\)\(a\)](#), [139.010\(20\)](#), [139.010\(28\)](#), and [139.480\(1\)](#) establish the parameters of the exemption from sales and use taxes for machinery purchased for new and expanded industry. Kentucky Administrative Regulation [103 KAR 30.120](#) sets forth the four (4) requirements for machinery to qualify for the new and expanded industry sales tax exemption. Kentucky Administrative Regulation [103 KAR 31.030](#) addresses the qualification requirements for a Direct Pay Authorization (DPA) permitting a taxpayer to report Kentucky sales and use taxes directly to the KDOR on all purchases of tangible personal property, digital property, or the services subject to tax enumerated in KRS [139.200\(q\)](#) through [\(q\)](#), according to the provisions of KRS [139.260\(3\)](#).

## III. Facts/Discussion

The following list provides descriptions of types of property commonly used in generating solar power:

- a. Solar panels are photovoltaic panels (modules) that convert sunlight into electrons to produce initial low voltage direct current (“DC”) electricity.
- b. Mounting systems are the racks, stands, and frames that are critical to the structure rigidity of the energy production process by keeping solar panels above grade to make them more efficient and out of hazards such as standing water. Mounting systems include racks, stands, frames, and hardware. The associated hardware is necessary for clamping the solar panels to the racking system to allow the system to function properly.

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<sup>1</sup> In pertinent part, Ky. Const. Section 172 provides: “All property, not exempted from taxation by this Constitution, shall be assessed for taxation at its fair cash value, estimated at the price it would bring at a fair voluntary sale[.]”

- c. Trackers, maximum power point (MPP) trackers, are required for the solar panels to follow the constant movement of the sun to more efficiently capture the daily sunlight and increase production energy.
- d. DC system items are tangible removable property required for the safe transmission of low voltage DC energy from solar panels to inverters to convert it to higher voltage alternating current (“AC”) energy. Examples of DC system items include over ground and underground DC cables and conduits, connectors, junction/combiner boxes, fuses, circuit breakers, and switches.
- e. Inverters convert the variable DC produced by the solar panels to AC to be used on the electrical grid.
- f. Converters convert the variable DC produced by the solar panels to AC to be used on the electrical grid.
- g. Transformers transform the current levels of electricity to match the required voltages to transport the energy to the grid. Transformers are located near the solar panels and are often placed along the transmission process to boost (or reduce) the AC voltage to proper level for ultimate distribution and sale.
- h. Substations are required to regulate the electric current flow, adjust the voltage of the electricity, and transport the electricity from the solar panel to the electric grid.
- i. Meters and regulators are necessary for assessing, measuring, and monitoring energy flow throughout the generation and transmission process of the operation until it reaches the substation and/or point of interconnection (“POI”).
- j. Other AC system items include AC cables, switchgears, and earthing/surge protection equipment. Switchgears are installed on the output side of the inverters and in substations and are required to maintain service and flow of AC current to unaffected circuits when there is an interruption in the AC system due to current overload and/or short-circuiting. Earthing/surge protectors are required for protection against electric shock, fire hazard, and lightening. Air/temperature control equipment is installed for safety purposes within the plant substations and various other stations to keep the electrical devices within a specified temperature range.
- k. Electric transmission property includes above ground electric wiring and lines, poles, and equipment. Electric transmission property is tangible property necessary to transport lower or medium voltage electricity from the solar plant to the grid.
- l. Monitoring system equipment includes computer systems and software that constantly runs and monitors the entire electric generation system and various subprocesses. Supervisory control and data acquisition systems are required to monitor and control the equipment within the substation and across the solar PV power plant. Other monitoring equipment constantly measures solar irradiance, environmental conditions, and plant power output. Monitoring equipment is also used to constantly measure voltage and current at the inverter, combiner box, or string level.

- m. Security system equipment includes security fences, security cameras, video analytics software, sensors, and warning devices. This equipment is also necessary for the safety of workers and bystanders.
- n. Communication equipment includes a communications medium with remote access for the solar plant monitoring system and the security system.
- o. Batteries used to store DC energy produced by solar panels.

#### IV. Conclusion

##### 1. How does Kentucky ad valorem tax apply to solar power companies and common machinery and other equipment used in generating solar power?

Solar power companies' facilities are generally large and utilize large amounts of acreage. The land upon which improvements are constructed to establish a solar power facility is valued at its "fair cash value" as required by Section 172 of the Kentucky Constitution.

Once land formerly devoted to agriculture or horticulture farming is devoted to the construction and operation of a solar power facility, it is no longer eligible for the special valuation procedures used for assessing agriculture or horticulture land as provided in KRS 132.450 and authorized under Ky. Constitution Section 172A.<sup>2</sup> The change in use invokes the requirement under Ky. Constitution Section 172 that the property be assessed at its fair cash value estimated at the price it would bring at a fair voluntary sale.

Prior to a solar power facility becoming operational, the Property Valuation Administrator (PVA) will assess the real estate separately. The solar power company shall file a Tangible Personal Property Tax Return (Form 62A500) to report tangible personal property relating to the construction work in process.

Once operational, solar power companies are considered to be public service corporations performing a public service. Therefore, a solar power company is governed for ad valorem taxation purposes under the statutory framework set forth in KRS 136.115 *et seq.* The Office of Property Valuation shall determine the fair cash value of an operating solar power facility's property under the rules for assessing the property of a public service corporation. Public service corporations are required to submit a Public Service Property Tax Return (Form 61A200).

A solar power company's operating property (real property, tangible personal property, and franchise) is valued as a unit as required by KRS 136.160. The nonoperating property (both tangible and intangible) is valued in the same manner and according to the same

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<sup>2</sup> Kentucky Constitution Section 172A provides: "The General Assembly shall provide by general law for the assessment for ad valorem tax purposes of agricultural and horticultural land according to the land's value for agricultural or horticultural use. The General Assembly may provide that any change in land use from agricultural or horticultural to another use shall require the levy of an additional tax not to exceed the additional amount that would have been owing had the land been assessed under Section 172 of this Constitution for the current year and the two next preceding years." (emphasis supplied). The General Assembly has provided that classification as agriculture land shall expire upon change of use by the owner or owners. See KRS 132.450(3).

standard as if valued by the property valuation administrator in the county where the property has its taxable situs.

The applicable tax rates derive from the state and local ad valorem tax rates set forth in KRS Chapter 132. KRS 136.120(2)(c) provides that “[o]perating property and nonoperating tangible property shall be subject to state and local taxes at the same rate as the tangible property of other taxpayers not performing public services.” The state and local tax rates for the various classes of property are provided in KRS 132.020.

When determining the fair cash value of a solar power company’s operating property, the Kentucky “unit value” will be allocated in accordance with the classifications and ad valorem tax rates set out for various types of property as set forth in KRS 132.020. The unit value determination includes computation of the ad valorem taxes on real property, manufacturing machinery, tangible personal property, pollution control, business inventory, industrial revenue bonds (taxable or nontaxable), and any other property used in a solar power company’s operations.

“Franchise value” will be calculated as the difference between the KY allocated “unit value” and the sum of the KY assessed real estate value and the KY net book value of the tangible personal property.

$$\text{KY assessed franchise value} = (\text{KY allocated "unit value"}) - (\text{KY assessed real estate} + \text{KY tangible personal property net book value})$$

The KY assessed “franchise value” will be taxed at the state property tax rate set in KRS 132.020(1)(h), currently \$0.45/\$100 valuation and applicable local property tax rates.

A solar power company’s generation of electricity is considered to be manufacturing for Kentucky ad valorem property tax purposes. The manufacturing process of a solar power facility begins when the solar panels capture sunlight and ends when the product, the electricity, is in a form or condition for sale on the open market for the purpose for which it was intended to be used. Alternating electrical current is the product sold on the open market. Once the electricity converts from a DC to an AC, the AC is in saleable form.

Property commonly used in the generation of solar power is classified pursuant to the provisions of KRS 132.020 and KRS 132.200. The following types of property commonly used in the generation of solar power are classified as manufacturing machinery subject to KRS 132.020(1)(c) and 132.200(4):

- a. Solar panels;
- b. Mounting systems;
- c. Trackers;
- d. DC system items;
- e. Inverters;
- f. Converters;
- g. Transformers;
- h. Substations;
- i. DC meters and DC regulators; and
- j. Batteries

The following types of solar power property commonly used are classified as tangible personal property subject to KRS 132.020(1)(h):

- a. AC meters and AC regulators;
- b. Other AC system items;
- c. Electric transmission property;
- d. Monitoring system equipment;
- e. Security systems; and
- f. Communication equipment.

Conduits are classified as real property subject to KRS 132.020(1)(a).

Each “soft cost (e.g. a cost relating to engineering, transportation and installation of the machinery, site preparation, licenses/permits, professional fees or other development costs), shall be attributed to a particular asset and included as part of the asset cost to which it relates. An asset, including related soft costs, is classified and subject to taxation in accordance with KRS 132.020. An asset listing of each item of property shall be maintained by the taxpayer at all times and made available to KDOR upon request. The asset listing shall include original cost, acquisition date, make, model, serial number and/or other identification numbers, and physical location. Costs shall include inbound freight, millwrighting, overhead, investment tax credits, assembly and installation labor, material and expenses, and sales and use taxes. Premium pay and payroll taxes are included in labor costs. Costs are not reduced by trade-in allowances and costs of major overhauls must be capitalized in the year in which they occur.

**2. How do Kentucky sales and use taxes apply to machinery and other common equipment used in generating solar power?**

**a. The exemption for “machinery for new and expanded industry”.**

Components of the commercial operation for the generation of electricity through solar power meet the definition of “manufacturing” for purposes of Kentucky sales and use taxes. “Manufacturing” is defined in KRS 139.010(20) and means “any process through which material having little or no commercial value for its intended use before processing has appreciable commercial value for its intended use after processing by the machinery.”

An exemption is authorized for the sale or use of “machinery for new and expanded industry.” See KRS 139.480(10). “Machinery for new and expanded industry” is defined under KRS 139.010(19). Generally speaking, it is machinery:

- i) Directly used in the manufacturing or industrial processing process;
- ii) Which is incorporated for the first time into a plant facility established in this state; and
- iii) Which does not replace machinery in the plant facility unless that machinery purchased to replace existing machinery:

- (1) increases the consumption of recycled materials at the plant facility by not less than ten percent (10%);
- (2) performs different functions;
- (3) is used to manufacture a different product; or
- (4) has a greater productive capacity, as measured in units of production, than the machinery being replaced.

“Machinery for new and expanded industry” does not include repair, replacement, or spare parts of any kind, regardless of whether the purchase of repair, replacement, or spare parts is required by the manufacturer or seller as a condition of sale or as a condition of warranty.

Administrative Regulation 103 KAR 30:120 summarizes the four (4) specific requirements that must be met for machinery to qualify for the new and expanded industry exemption as follows:

- i) It must be machinery.
- ii) It must be used directly in the manufacturing process.
- iii) It must be incorporated for the first time into plant facilities established in this state.
- iv) It must not replace other machinery.”

KRS 139.010(19)(a) defines “directly used in the manufacturing or industrial processing process” as:

the process within a plant facility that commences with the movement of raw materials from storage into a continuous, unbroken, integrated process and ends when the finished product is packaged and ready for sale.”

KRS 139.010(28) defines “plant facility” as:

a single location that is exclusively dedicated to manufacturing or industrial processing activities. A location shall be deemed to be exclusively dedicated to manufacturing or industrial processing activities even if retail sales are made there, provided that the retail sales are incidental to the manufacturing or industrial processing activities occurring at the location. The term “plant facility” shall not include any restaurant, grocery store, shopping center, or other retail establishment.

Based upon these definitions and as developed through judicial precedents, the manufacturing process of a solar power plant facility begins with photovoltaic solar panels capturing sunlight and ends when direct current electricity is generated for its intended end use and has commercial value. The electricity generated must be for sale and the manufacturing process generating the electricity cannot take place at a retail establishment.

Machinery purchased for use directly in a solar power plant facility may qualify for the exemption from sales and use taxes as machinery for new and expanded industry if it:

- (1) is installed in the plant facility;

- (2) is being incorporated for the first time into the plant facility;
- (3) is not replacing existing machinery (unless one of four exceptions<sup>3</sup> applies);
- and
- (4) is not a repair part.

Distribution lines used to transport or transmit the electricity are not part of the manufacturing process. Therefore, for example, equipment purchased and used for the delivery of the electricity processed by way of transmission lines to a switching station at a point of interconnection is not eligible for the exemption from sales and use taxes for new and expanded industry.

The following machinery commonly used in the generation of solar power may qualify as exempt from Kentucky sales and use taxes if the requirements for “machinery for new and expanded industry” stated above are met.

- i) Solar panels;
- ii) Mounting systems;
- iii) Trackers;
- iv) DC system items;
- v) Inverters;
- vi) Converters;
- vii) AC system items;
- viii) Meters and regulators directly used within the manufacturing process for the generation of electricity at the plant facility;
- ix) Transformers used directly within the manufacturing process for the generation of electricity at the plant facility; and
- x) Computer systems and equipment used to control and monitor “machinery used for new and expanded industry” exempt under KRS 139.480(10).

The following types of commonly used materials or equipment are not eligible as machinery for new and expanded industry and are subject to Kentucky sales and use taxes:

- i) The materials used for the construction of the actual substation facility (e.g., wood, drywall, flooring, etc.);
- ii) Meters and regulators used in the delivery or transmission of the electric current;
- iii) Electric transmission property used in the delivery or transmission of the electric current to the grid outside the integrated manufacturing process;
- iv) Security structures and systems designed and used to monitor the premises and not directly used in the manufacturing process;
- v) Communication equipment; and
- vi) Batteries.

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<sup>3</sup> Machinery purchased to replace existing machinery qualifies for the exemption if it: (a) increases the consumption of recycled materials at the plant facility by not less than ten percent (10%); (b) performs different functions; or (c) is used to manufacture a different product.

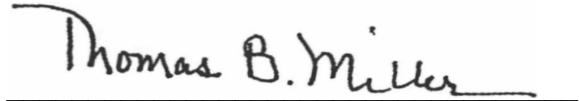


**b. The Direct Pay Authorization.**

Taxpayers that generate solar power may be eligible for a Direct Pay Authorization (DPA). A description of the qualifications, application process, requirements, and responsibilities for a Taxpayer to consider when applying for the DPA may be found in Administrative Regulations 103 KAR 31:030. A taxpayer must submit a fully completed "Application for Direct Pay Authorization" (Form 51A112) to KDOR. Once Form 51A112 and all other information required by 103 KAR 31:030 has been submitted, KDOR will review and issue a determination regarding the taxpayer's DPA application.

If you have questions concerning this TAM, please contact the Office of Tax Policy and Regulation at [DOR taxpolicy@ky.gov](mailto:DOR taxpolicy@ky.gov).

KENTUCKY DEPARTMENT OF REVENUE



Thomas B. Miller, Commissioner

Date: April 22, 2021