The seal of the Texas Comptroller of Public Accounts is faintly visible in the background. It features a central five-pointed star surrounded by a wreath of olive and oak branches. The words "THE COMPTROLLER OF PUBLIC ACCOUNTS" and "TEXAS" are inscribed around the perimeter of the seal.

**Glenn Hegar**

Texas Comptroller of Public Accounts

# Solar and Wind- Powered Energy Device Exemption and Appraisal Guidelines

May 2022

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Tax Code Section 5.05(a) authorizes the Comptroller's office to prepare and issue publications relating to the appraisal of property and the administration of taxes as a public service. By publishing this manual, the Comptroller's office is making available an information resource of a general nature regarding the appraisal of property and the administration of taxes. This publication does not address and is not intended to address all aspects of property appraisal, tax administration or property tax law. The information contained in this publication neither constitutes nor serves as a substitute for legal advice. Pursuant to Tax Code Section 5.041(f), the Comptroller's office may not advise a property owner, a property owner's agent or the appraisal district on a protest matter. Questions regarding property appraisal, tax administration, the meaning or interpretation of statutes, legal requirements and other similar matters should, as appropriate or necessary, be directed to an attorney or other appropriate counsel.

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# Introduction

Renewable energy production and consumption are on the rise and Texas has vast amounts of renewable energy resources. According to an August 2020 Comptroller Fiscal Note’s article, Texas is the nation’s leader in wind-powered electricity generation and is ranked fifth among states in installed solar capacity. The Solar Energy Industries Association ranks Texas second nationally for projected growth during the next five years. As Texas continues to increase its use of renewable energy resources, it is likely that more property owners will apply to receive the exemptions allowed by Tax Code Section 11.27 for solar and wind-powered energy devices.

In 1978, Texas voters adopted a constitutional amendment that authorized the Texas Legislature to provide a property tax exemption for solar or wind-powered energy devices. Since that time, the Texas Legislature has enacted and subsequently amended Tax Code Section 11.27, which exempts from property tax the amount of appraised value associated with the installation or construction of a solar or wind-powered energy device that is primarily for the production and distribution of energy for on-site use, regardless of whether the person owns the real property on which the device is installed or constructed. The Texas Legislature also adopted Tax Code Section 23.26 to require chief appraisers to use the cost method of appraisal to determine the market value of solar energy property that is used for a commercial purpose.

The Comptroller’s office is statutorily required to develop guidelines to assist local officials in the administration of the exemption. The Comptroller’s office is not required to develop guidelines concerning the use of the cost method to appraise solar energy devices used for commercial purposes. The following information is offered as a general explanation of the types of devices that may qualify, as well as appraisal techniques and eligibility issues concerning the exemption. These matters are subject to legal interpretation and are not authorized for rule-making by the Comptroller’s office. Legal advice should be sought to answer questions concerning the eligibility of applicants for this property tax exemption.

Upon receipt of a completed application for this exemption, the chief appraiser determines whether or not the property qualifies. The following guidelines set procedures that the chief appraiser can use in administering this exemption. The guidelines contain a general policy, definitions of solar and wind-powered energy devices, examples of different device types, and a description of the manner in which the exemption applies when using the market, income and cost approaches for solar and wind-powered energy devices and the cost approach for solar energy devices used for commercial purposes.



# General Policy of Guidelines

Tax Code Section 11.27 defines solar and wind-powered energy devices for purposes of this exemption as follows:

A solar energy device is an apparatus designed or adapted to convert the radiant energy from the sun, including energy imparted to plants through photosynthesis employing the bioconversion processes of anaerobic digestion, gasification, pyrolysis, or fermentation, but not including direct combustion, into thermal, mechanical, or electrical energy; to store the converted energy, either in the form to which originally converted or another form; or to distribute radiant solar energy or the energy to which the radiant solar energy is converted.

A wind-powered energy device is an apparatus designed or adapted to convert the energy available in the wind into thermal, mechanical or electrical energy; to store the converted energy either in the form to which originally converted or another form; or to distribute the converted energy.

This definition does not include items used for energy conservation that do not actually provide thermal, mechanical or electrical energy and are not an integral part of a solar or wind-powered energy device. Examples include double-plated windows, building insulation, black or reflective roofs, reflective sheeting and solar shades for windows. The exemption from property tax will not apply to energy conservation or other devices that can be used regardless of the energy source used.

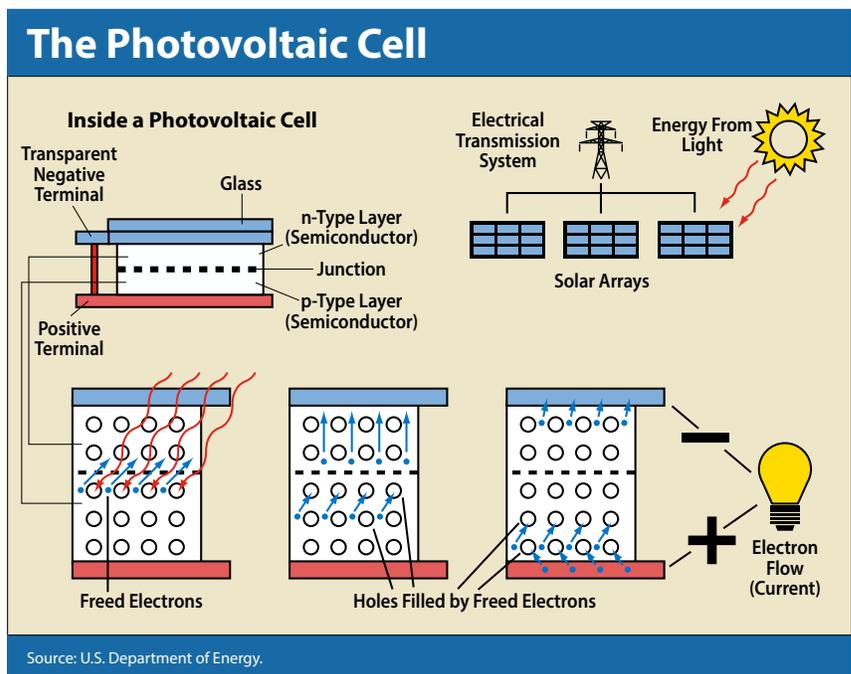
## Energy Devices

### Solar Photovoltaic Energy

Photovoltaic cells (PV) are used worldwide to convert sunlight into electricity. The PV cell contains two layers of semiconducting material, one with a positive charge and the other with a negative charge. When sunlight strikes the cell, some photons are absorbed by semiconductor atoms, freeing electrons that travel from the negative layer of the cell back to the positive layer, creating a voltage in the process. The flow of electrons through an external circuit produces electricity.

Simple and widely used applications of solar thermal energy include solar water heating, swimming pool heating and agricultural drying. In the U.S., solar pool, water and space heating are currently the major applications of thermal energy.

Solar thermal energy refers to technologies that use the sun's energy to heat water and other heat-transfer fluids for a variety of residential, industrial and utility applications.



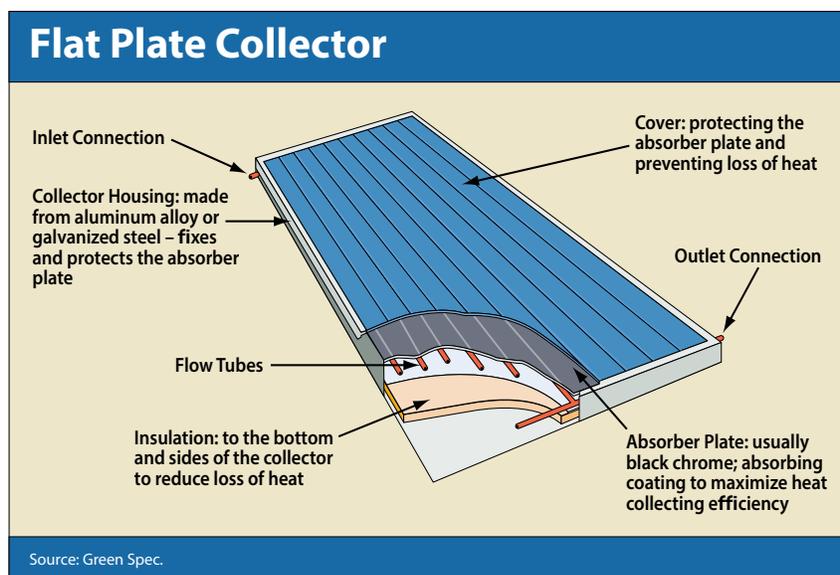
## Types of Photovoltaic Energy Systems

System	Energy Source	Connected to the Electricity Grid?	Energy Storage Device in the System?	Examples
Grid-tied* solar system	PV cells	Yes	No	Home system that draws on the electricity grid at night and exports excess power in the day
Stand-alone grid-tied* solar system	PV cells	Yes	Yes (batteries)	Home or business system uninterruptible power (e.g. for computers, servers); still operates when the grid is down
Stand-alone solar system without energy storage	PV cells	No	No	Water pumping
Stand-alone solar system with energy storage	PV cells	No	Yes (batteries)	Remote homes, lighting, TV, radio, telemetry
Stand-alone off-grid Hybrid solar system	PV cells in combination with another energy source**	Most often not	No	Remote large-scale communications, industrial uses

\* Also called grid-connected. / \*\*such as diesel or wind  
Source: Solarbuzz

Flat-plate collectors – large, insulated metal boxes with glass or plastic covers and dark heat-absorbing plates – are the most common collectors used for home solar water and space heating. Other common varieties are evacuated-tube collectors and integral collector-storage systems. All three types gather the sun’s energy, transform it to heat and then

transfer that heat to water, a heat-transfer fluid or air. Flat-plate collectors typically are mounted on the roof. Evacuated-tube collectors are sometimes used to heat water, but also have useful commercial and industrial applications where higher temperatures are required.



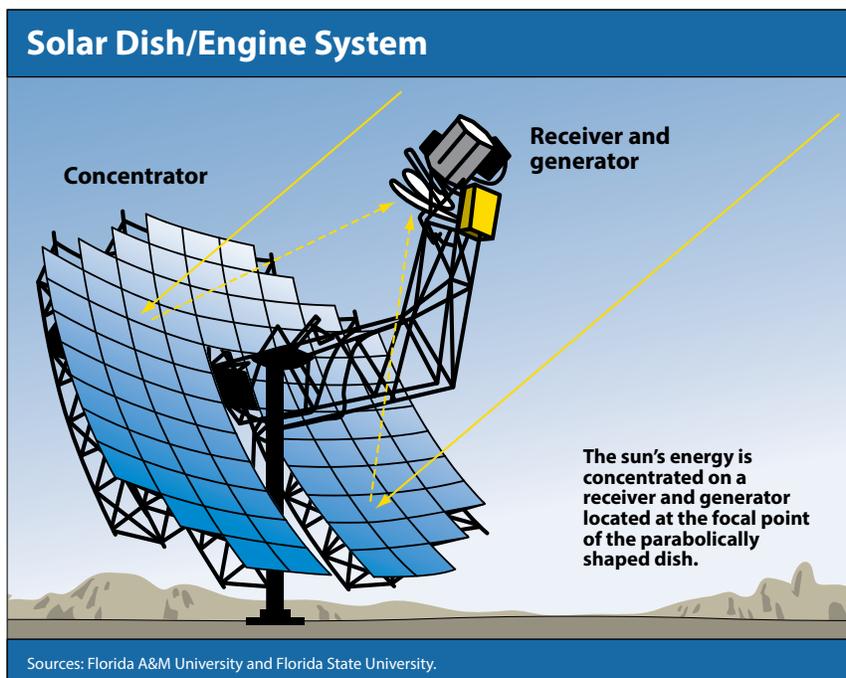
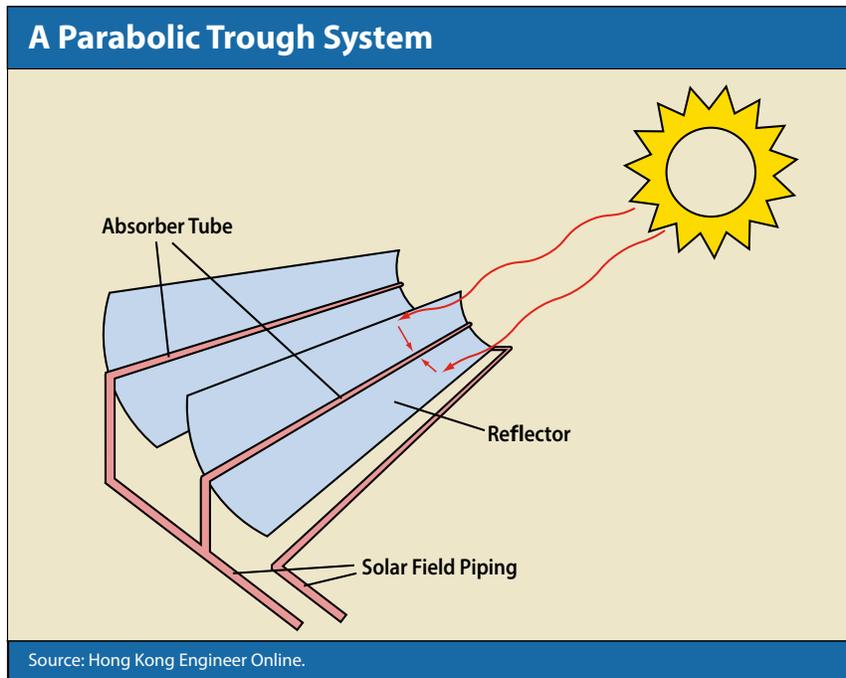
## Solar Thermal Energy

Solar thermal energy refers to technologies that use the sun's energy to heat water and other heat-transfer fluids for a variety of residential, industrial and utility applications.

Parabolic trough systems consist of a linear, parabolic-shaped reflector that focuses the sun's energy on a receiver pipe, heating a transfer fluid flowing through the pipe; the transfer fluid then generates superheated steam, which is fed to a turbine and electric generator to produce electricity. The

troughs track the sun from East to West during the day so that the sun is continuously focused on the receiver pipes.

A solar dish/engine system consists of a solar concentrator – glass mirrors in the shape of a dish that reflect sunlight onto a small area – and a power conversion unit that includes a thermal receiver and a generator. The thermal receiver includes tubes for the transfer fluid – usually hydrogen or helium – that transfers heat to a generator to produce electricity.



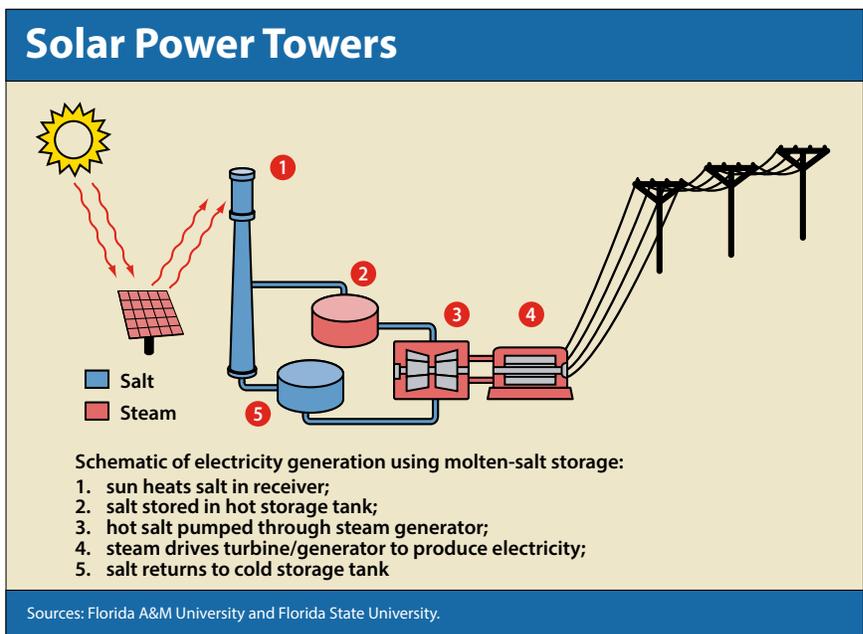
Solar power towers use a large field of sun-tracking mirrors called heliostats to concentrate sunlight on a receiver located on the top of a tower. The receiver heats a heat transfer fluid such as molten nitrate salt that is then used to generate steam to power a turbine-generator to produce electricity.

Solar energy differs from most energy technologies in that it can be generated on site, reducing or eliminating fuel transportation and electricity transmission and distribution costs. Solar water heating and space heating devices are stand-alone systems that are not connected to the electric grid. A PV system provides electric power directly to a user and can be used either as a stand-alone power source or connected to the electricity grid.

### Wind

Wind turbines convert the wind's kinetic energy into mechanical power that a generator, in turn, converts into electricity. There are two main types of wind turbines, the horizontal-axis and vertical-axis models. Most modern wind turbines have a horizontal axis, with blades resembling airplane propellers. Vertical-axis units have blades that resemble an eggbeater's.

The kinetic energy of moving air provides the motive force that turns a wind turbine's generator. The wind turns the rotor blades; this motion spins a drive shaft that in turn spins the turbine of a generator to make electricity. A gear box located along the drive shaft increases speed to match generator requirements and optimize power generation. Some wind turbines have a large generator and no gearbox. Longer rotor blades mean a larger rotor swept area, the total area covered by spinning blades, increasing the energy that can be captured and generating more electricity.



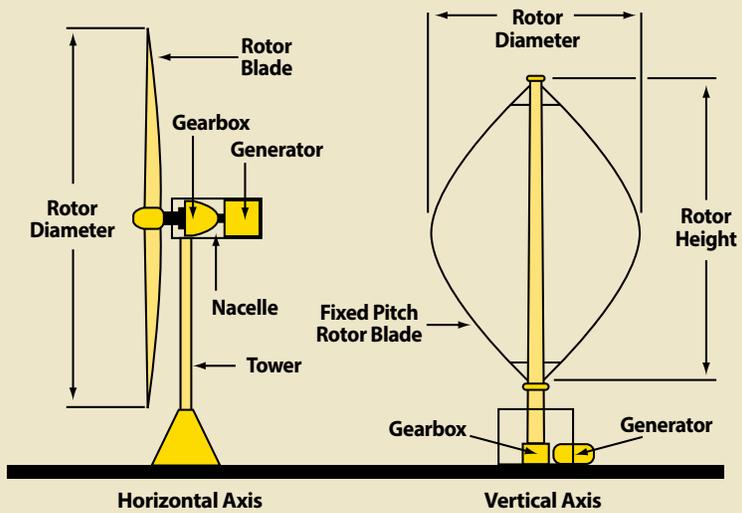
## Types of Devices

Solar and wind-powered energy devices include, but are not limited to:

- solar greenhouses or atriums;
- solar water heaters;
- water walls or drum walls;
- trombe wall;
- roof ponds with movable insulated covers; and
- rock bins, pebble beds or other similar storage units.

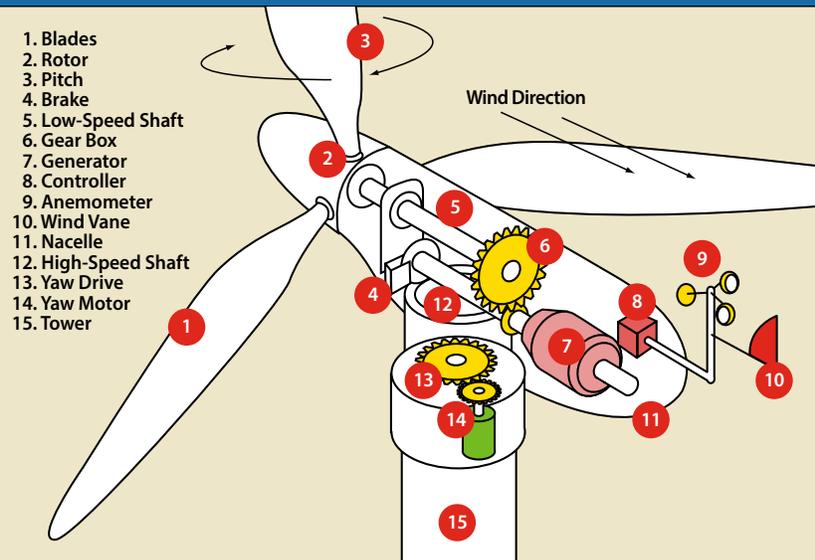
These guidelines are not intended to identify all types of devices, but offer some examples of items that could be submitted for exemption application.

## Horizontal-Axis and Vertical-Axis Wind Turbines



Source: American Wind Energy Association.

## Components of an Energy-Generating Windmill



Source: Alliant Energy.



# Valuation Methods

In valuing property with on-site solar or wind-powered energy devices that have qualified for exemptions under Tax Code Section 11.27, the chief appraiser should not simply increase the real property's market value because solar or wind-powered energy devices exist on the property. Only when the market value has been increased because of those devices, as evidenced by appraisal data, should appraised value increase.

Chief appraisers often value these properties as if no solar or wind-powered devices exist. This is an efficient method, but one that does not capture the exempt value for these properties. If an application for a solar or wind-powered energy device is filed, the exempt value of the device should be identified and reported as determined through standard appraisal approaches.

The most appropriate approach for solar and wind-powered energy devices will depend on the quantity and quality of data available as well as the intended purpose of the device itself. Wind-powered energy devices and qualifying solar energy devices can be appraised using any valuation method. Tax Code Section 23.26 requires that solar energy devices used for commercial purposes be appraised using the cost approach. These general guidelines and examples present the methods for estimating the appraisal value of the exemption authorized by Tax Code Section 11.27 in the most basic form. The actual appraisal issue could be more complex, but the theory of each approach should lend itself to solving even the most complex appraisal problem. Nothing in these guidelines is intended to limit the appraiser's ability to employ appraisal techniques that would help determine the contributory value of a solar or wind-powered device to the market value of the real property on which it is located to determine the amount of the exemption.

These guidelines are provided to appraisal districts as required by Tax Code Section 11.27(b) to assist with the appraisal process. Other appraisal techniques and considerations may be required to estimate the value of an exemption permitted for solar or wind-powered energy devices that are

installed or constructed on real property primarily for the production and distribution of energy for on-site use. These exemptions are not automatic. Property owners must file applications for the appraised value of this type of property to be exempt.

The guidelines also mention the requirements of Tax Code Section 23.26 relating to appraisal of commercial solar energy devices. The Comptroller's office is not authorized to prepare guidelines for that purpose.

## Market Data (Sales) Comparison Approach

The market data (sales) comparison approach to value requires an analysis of an adequate number of sold properties, some of which contain solar or wind-powered energy devices and some that do not. This method follows traditional sales comparison techniques where the subject property will be one that has the device and the comparables do not.

Ideally, you would locate a sale of a property that had similar devices as the subject and using the adjustment process, bring them equal in all other respects, thus isolating the solar/wind variable, and quantifying the value of the device in the marketplace. After the comparables are adjusted for all other physical differences, they will provide an indication of the market value of the property without the solar or wind-powered device.

The difference between the sale price of the property with the device and the indicated value of the property without the device would be the market value of the device as recognized by participants in the marketplace. The market value of the device would be the exempt value.

Keep in mind that using this method could result in an exempt amount that does not resemble the actual cost. The exemption value could be an amount substantially less or more than the actual cost of the device, depending on the

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relative worth and the potential return, in the form of actual savings on utility bills, which market participants place on these items. With enough data, this method can yield a standard adjustment that could apply to all properties that have these devices.

Hypothetically, if you complete a study with 50 properties, 10 of which contained solar devices and find that the properties with solar devices typically sold for \$100,000, then the adjusted sale price for those without solar devices is \$80,000. This would indicate the exempt amount for the solar device is \$20,000 or 20 percent of the sales price. The solar device may have cost more or less than \$20,000.

With this information, you can arrive at an exempt amount by appraising the property, inclusive of the solar device, and applying the indicated percentage of adjustment. In this example, it is easy to see that a property with a sales price of \$100,000, inclusive of a solar device, would have 20 percent of its value exempt if an exemption application is filed.

Your appraisal problem, however, most likely will be to determine the exempt value for properties that do not sell. The information you have can be used to solve this problem. In this example, you can determine the premium the market recognizes for properties that have solar devices. To do so, divide the sale price of the solar powered property by the indicated sale price of a property that does not have a solar device. The resulting number, 1.25 in this case, is your multiplier.

You now have a market indicator for what a property with a solar device would sell for in relation to the indicated sale price of comparable properties without the device. From this example, you know that the subject property would tend to sell for \$80,000 if it did not have a solar device. You know a 25 percent premium is attached to the property with the solar device, so you simply multiply the indicated market value by 1.25, yielding a market value of \$100,000. You can apply your market-derived factor to this number to estimate the value of the solar device. In this case, the factor is 20 percent and the amount of the exemption is \$20,000.

While the development and use of a multiplier may appear to be the simplest approach, you must exercise great care to be certain that the multiplier is used only on properties that

are completely comparable to the properties from which the modifier is developed; otherwise, the value could be overstated or understated.

## Income Approach

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Income-producing property that has incorporated solar or wind-powered energy devices may benefit from a direct or indirect increase in rental income because of a decrease in operational utility costs. Any increase in rents or decrease in expenses directly related to the solar or wind-powered device should result in a net operating income (NOI) that is greater than that for similar properties without these devices. You can determine the difference in NOI directly related to the devices by comparing your subject with similar properties that do not have the devices. After the comparable properties have been adjusted for all other differences, the resulting difference can be attributed to the energy device.

For example, three office buildings are very similar and compete in the same market. All have an annual rent of \$25 per square foot and a vacancy loss of 10 percent. All have 10,000 square feet of rentable area. One property has solar devices that offset the cost of electricity. Otherwise, there are no differences. The two buildings without solar devices have expense ratios of 45 percent and the building with the solar device has an expense ratio of 40 percent. The NOI for the property with solar power is \$135,000, while the NOI for the other properties is \$123,750; the difference is \$11,250 or 8.333 percent.

If you have enough information to establish typical percentage adjustments, you can appraise properties that have solar or wind-power devices and apply the adjustment factor to arrive at the exempt amount.

If you do not have a market adjustment factor, you could estimate the NOI using market rents and expenses, ignoring the energy device; capitalize that into an estimate of market value; and subtract it from the estimate of market value that includes the energy device. The difference between the two numbers is the exempt amount. The following example demonstrates the process. Keep in mind that the exempt value may not equal the cost for the item.

	Whole Property Capitalization	Comparison Method	
Potential gross income	\$250,000	\$250,000	
Vacancy and collection	\$25,000	\$25,000	
Effective gross income	\$225,000	\$225,000	
Expenses at 40%	\$90,000	\$101,250	Expenses at 45%
Net operating income	\$135,000	\$123,750	
Loaded cap rate @ 12%			
Indicated value	\$1,125,000	\$1,031,250	
Market adjustment 8.33%	\$1,125,000 x 0.083333	\$1,125,000-1,031,250	
Exempt amount	\$93,750	\$93,750	

## Cost Approach

If you do not have adequate market data or sales to determine the value of the energy component, you should consider the cost approach. In the traditional cost approach, you assume the value of the property is the replacement cost new, less depreciation from all sources, plus the value of the land. In the simplest form, it would appear that deducting the depreciated cost of the energy component would be an appropriate method to calculate the amount of the exemption, but the process may not be that simple.

First, you will need to obtain as much cost information as possible about the component, as well as information about life expectancies and maintenance schedules. At a minimum, you will need to determine if the cost to install an energy device on an existing structure exceeds the cost to install the same component during the construction process. If there is a difference, the excess cost for the installation, which is the difference between the two costs, would have to be added to the physical depreciation. Subtracting the depreciation from the cost of the component would yield the amount exempt from taxation.

Remember that if the cost to retrofit the device to an existing property exceeds the resultant gain in market value as a result of the device being added, the cost to cure is incurable. However, since the device would allow for utility savings over a period of time, it would have to be determined what the physical life of the device is and what the total cost savings would be over the life of the device.

## Appraisal of Solar Energy Devices Used for Commercial Purposes

Tax Code Section 23.26(c) requires chief appraisers to use the cost approach for appraisals to determine the market value of property with solar devices used for commercial purposes. This includes a commercial storage device, power conditioning equipment, transfer equipment, and necessary parts for the device and equipment.

As with other devices, cost information about the commercial solar energy component must be obtained. Tax Code Sections 23.26(c), (d)(1) and (2) require that cost data be obtained from generally accepted sources and that appropriate adjustments for physical, functional or economic obsolescence and any other justifiable factor must be made. Tax Code Section 23.26(d)(3) requires that the depreciated value of the property be calculated using a useful life that does not exceed 10 years. Additionally, Tax Code Section 23.26(e) prohibits a chief appraiser from determining the depreciated value to be less than 20 percent of the total value adjusted for physical, functional, or economic obsolescence.

Remember that this appraisal requirement is not the same as the exemption authorized by Tax Code Section 11.27 for which these guidelines apply. The exemption is limited to the contributory value of solar and wind-powered energy devices used primarily for on-site energy production.



# Exemption Administration

Tax Code Section 11.43(a) requires a property owner applying for an exemption to file an exemption application form with the chief appraiser for the appraisal district in which the property is located.

To receive the solar or wind-powered energy devices exemption, a property owner must file an application with the chief appraiser of the appraisal district where the property is located. **Form 50-123, Exemption Application for Solar or Wind Powered Energy Devices**, is available on the Comptroller's website. The form requires information necessary for the chief appraiser to determine whether the property meets the exemption requirements. No application is required for requesting commercially used solar equipment to be appraised according to the cost approach.

Property owners must file the exemption application on or before April 30. For good cause, the chief appraiser may extend this deadline by written order for a period not to exceed 60 days. If a property owner fails to file a required application timely, he or she may not receive the exemption for that year. Once the exemption is allowed, the property owner does not have to file an annual application. The exemption applies to the property until it changes ownership or the property owner's qualification for the exemption changes.

## Notice of Exemption Qualifications

Generally, Tax Code Section 11.43(c) allows a chief appraiser to require an owner of property with an exemption to file a new application to confirm that the property owner still qualifies for the exemption. The chief appraiser must deliver an application form and written notice to the property owner that a new application is required.

Persons receiving a non-annual exemption who become no longer eligible for the exemption are required by Tax Code Section 11.43(g) to notify the appraisal office in writing before May 1 that the entitlement to the exemption has ended.

## Action on Applications

The chief appraiser will review the application and all supporting documentation or other relevant information and do a site visit to determine the applicant's right to the exemption. After the chief appraiser reviews the application and the requirements for the exemption, Tax Code Section 11.45 requires that one of four actions be taken.

1. The chief appraiser may approve the application and grant the exemption.
2. The chief appraiser may modify the exemption applied for and grant the exemption as modified. If modified, the chief appraiser notifies the property owner in writing within five days after the determination. The notice will include an explanation of the procedures for protesting the modification.
3. The chief appraiser may disapprove the application and request additional information to support the exemption claim. If additional information is requested, the applicant has 30 days in which to respond or the application is denied. The chief appraiser may, for good cause, extend the deadline for furnishing this information by written order for a single period not exceeding 15 days.
4. The chief appraiser may deny the exemption. The chief appraiser must send written notification of denial to applicant within five days of the determination. The notice will include an explanation of the procedures for protesting the modification.

## Review of Exemptions Granted, Denied or Modified

Tax Code Section 41.41 entitles a property owner to protest denial, in whole or in part, of an exemption to the appraisal review board (ARB). The property owner must file written notice of the protest with the ARB having authority to hear the matter protested. Provided the notice requirements in Tax Code Section 41.44 are met, the ARB will hold a hearing and make a determination on the protest.

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The ARB will schedule the hearing and notify the property owner of the date and time. The Comptroller’s website provides informational videos that contain tips on how to protest and a description of the process.

## **Need More Information?**

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For more information on property tax matters, please see the following resources:

- **Taxpayer Bill of Rights**
- **Property Tax Basics**
- *Property Taxpayer Remedies*
- **Valuing Property**
- **Paying Your Taxes**
- *Appraisal Review Board Manual*
- *Texas Property Tax Code*

These resources are located on the Comptroller’s website along with other property tax information at [comptroller.texas.gov/taxes/property-tax/](https://comptroller.texas.gov/taxes/property-tax/). You may contact the Comptroller’s Property Tax Assistance Division with questions or for further assistance at [ptad.cpa@cpa.texas.gov](mailto:ptad.cpa@cpa.texas.gov) or at 800-252-9121 (press 3).



For more information, visit our website:  
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