



SOLAR CENTER INFORMATION

NCSU • Box 7401 • Raleigh, NC 27695 • (919) 515-3480 • Toll Free 1-800-33-NC SUN

Renewable Energy Tax Credits for North Carolina

BACKGROUND

Renewable energy is energy derived from solar radiation, vegetation, organic wastes, moving water, or wind. Renewable energy does not include energy from nuclear reactions or fossil fuels. Renewable energy property is equipment that uses the renewable energy sources listed above to heat or cool buildings; to produce hot water, thermal, or process heat; or to generate electricity.

To promote and encourage the conservation of non-renewable energy through the increased use of renewable energy, the 1977 session of the North Carolina General Assembly enacted legislation that provided tax incentives in the form of a tax credit for the construction or installation of a solar energy system to heat, cool, or provide hot water to a building in North Carolina. Throughout the years, other tax credits encouraging investment in renewable energy sources were enacted. These included installation of a hydroelectric generator, installation of solar energy equipment for the production of heat or electricity in manufacturing or service processes of a person's business, installation of a wind energy device, and construction of a methanol gas facility. These credits were statutorily provided in both the corporation and individual income tax laws and had different calculation methods and maximum credit amounts.

The 1999 session of the General Assembly repealed the various tax credits in the corporation and individual income tax laws and recodified those provisions into one credit for investing in renewable energy property. The credit is codified in G. S. 105-129.16A, which is part of Article 3B of Chapter 105 of the North Carolina General Statutes. The different kinds of technologies that qualify for the renewable energy credit are subject to the same calculation percentage but the ceilings that apply to renewable energy property serving nonresidential property are different than those that apply to renewable energy property serving residential property. Also, because the credit is included in Article 3B, the allowable credit may not exceed fifty percent (50%) of the taxpayer's tax liability for the year reduced by the sum of all other credits. Corporations may elect to apply the

credit against either the income tax or the franchise tax. The election must be made in the first year in which an installment of the credit is claimed and is binding for all future installments or carryforwards of that credit.

WHAT ARE THE TAX CREDITS?

North Carolina's tax credit and property tax provisions to support renewable energy systems were originally created in 1977, and in 1999 the General Assembly revised and expanded the credits to cover other renewable energy properties. There are essentially four different tax incentives available:

- (1) 35% credit for renewable energy systems for residential buildings
- (2) 35% credit for commercial and industrial renewable energy systems
- (3) 25% credit for the construction of renewable energy equipment manufacturing facilities
- (4) Special valuation of solar energy equipment for property tax purposes

Each of these incentives is discussed in more detail in the table below.

PROVISIONS OF THE TAX CREDIT (G. S. 105-129.16A)

The tax credit for investing in renewable energy property is equal to thirty-five percent of the cost of renewable energy property constructed, purchased, or leased by a taxpayer and placed into service in North Carolina during the taxable year. If the property serves a single-family dwelling, the credit is taken for the taxable year in which the property is placed in service. For all other property, the credit is taken in five equal installments beginning with the year the property is placed in service.

The credit is subject to various ceilings depending on whether the renewable energy equipment serves nonresidential property or residential property and, for residential property, the kind of renewable energy technology being used. The chart below provides an overview of the different kinds of renewable energy technologies and the ceilings that apply to each. Detailed explanations of the different kinds of technologies are given following the chart.

The credit can be taken against franchise tax, income tax or, if the taxpayer is an insurance company, against the gross premiums tax. The allowable credit cannot exceed 50% of the taxpayer's tax liability for the year reduced by the sum of all other credits. The unused portion of the credit may be carried over for the next five succeeding years. The credit expires and any remaining installments of the credit cannot be claimed if the property is disposed of, taken out of service, or moved out of the State during the five-year installment period.

The allowable credit is calculated on Form NC-478G and the amount eligible to be claimed as a credit for the current year is carried to Form NC-478. Form NC-478 is used to determine if the credit is reduced because it exceeds the 50% of tax less other credits limitation and for corporations to elect whether the credit is to be claimed against franchise tax or income tax.

The tax credit is allowable only to a person that owns the system or to a person that first leases a building constructed or modified for sale in which a renewable energy system is constructed or installed. A taxpayer may not take a credit for property the taxpayer leases from another unless the taxpayer obtains the lessor's written certification that the lessor will not claim a credit with respect to the property. A taxpayer claiming a tax credit for investing in renewable energy equipment must designate the type of renewable energy system installed on Form NC-478G. Only one credit is allowed per system, regardless of the number of

subsequent owners or persons leasing the building.

Renewable energy equipment costs eligible for the tax credit include the cost of the equipment and associated design, construction costs, and installation costs less any discounts, rebates, advertising, installation assistance credits, name referral allowances, or other similar reductions paid to the owner of the system as an inducement to purchase the renewable energy system. The cost of repairs to an existing system will not qualify for any additional credit; however, increases in capacity to an existing system may qualify for a new credit. All of the cost of new equipment added to an existing system to increase capacity is eligible for the credit.

When replacing equipment in a system increases the capacity of that system, and a credit has previously been claimed for the system, a percentage of the cost of the replacement equipment is eligible for the tax credit. The allowable percentage is calculated by dividing the increase in project capacity by the project capacity after the replacement. If a credit has not previously been claimed for the system and the replacement of equipment results in an increased project capacity, 100% of the cost of the replacement equipment qualifies for the credit.

To qualify for the tax credit, a renewable energy system must conform to all applicable state and local codes and the requirements of all inspecting jurisdictions. The intent of the credit is to encourage the installation and use of equipment that takes advantage of a renewable energy resource such as solar energy. Systems that only incidentally incorporate renewable energy to sell other products do not qualify for the credit.

A system is not a renewable energy system for purposes of the tax credit until it is installed and fully functional. If an individual has paid for the system, but it is not yet installed and available for use during the year, no credit is allowed until the year in which the system is placed in service.

North Carolina Renewable Energy Technologies Overview

Renewable Energy Technology	Credit Limit	
	Residential Property	Non-residential Property
Solar Energy Equipment for Domestic Water Heating	\$1,400 Per Dwelling Unit	\$250,000 Per Installation
Solar Energy Equipment for Active Space Heating	\$3,500 Per Dwelling Unit	\$250,000 Per Installation
Solar Energy Equipment for Combined Active Space and Domestic Hot Water Systems	\$3,500 Per Dwelling Unit	\$250,000 Per Installation
Solar Energy Equipment for Passive Solar Energy	\$3,500 Per Dwelling Unit	\$250,000 Per Installation
Solar Energy Equipment for Solar Electric or Other Solar Thermal Applications	\$10,500 Per Installation	\$250,000 Per Installation
Solar Energy Equipment for Daylighting	N/A	\$250,000 Per Installation
Wind	\$10,500 Per Installation	\$250,000 Per Installation
Hydroelectric	\$10,500 Per Installation	\$250,000 Per Installation
Biomass	\$10,500 Per Installation	\$250,000 Per Installation

HOT WATER AND ACTIVE SPACE HEATING

Eligible Expenditures

A solar hot water or heating system is a system that is capable of collecting solar radiation, converting it into heat, and transferring the collected heat to storage or to the point of use. Any solar system that has a fan, pump, or another mechanical means of moving the heat collection medium is an active system. Solar systems without mechanical components are passive systems. While components, design, operation, and performance of systems will vary, to qualify for the tax credit the system must meet this description.

One hundred percent of the cost of the solar energy system design, installation, and equipment for water heating and active space heating is eligible for the tax credit. Components of the system that serve an additional purpose to what is necessary for the solar heating system, such as domestic hot water heaters, air conditioning systems, and conventional heating systems, are ineligible for the credit.

PASSIVE SOLAR ENERGY SYSTEMS

Eligible Expenditures

A passive solar energy system is a carefully designed assembly of non-mechanical building components that capture, store, and use solar energy to light building interiors (see Daylighting section) or to heat building interiors in the heating season without causing overheating in the non-heating season, thus providing a significant net energy savings. Great care must be taken when using passive solar energy systems in non-residential buildings because these buildings are often cooling-dominated and do not require significant heating.

To qualify for a passive solar energy tax credit, a building must include all of the following:

- A solar collection surface with required shading.
- Thermal storage elements.
- Control and distribution elements.
- A ratio of south facing glass area to room floor area (where glass is located) of at least 7% and a maximum of 12%, or
- If the building is sun-tempered, a ratio of at least 5% and a maximum of 7%.

There are 2 exceptions to the requirement for thermal storage:

- A sun-tempered building of limited solar collection area may qualify without thermal storage by using the contents of the house instead of building integrated thermal mass as the thermal storage element.
- A thermosiphoning collector can qualify without thermal storage.

It is recommended that all passive solar energy system designs be evaluated using the Sustainable Buildings Industry Council (SBIC) guidelines to ensure proper design practices have been followed. These guidelines may be purchased from the Council's website: <http://www.sbicouncil.org/soft/index.html>, or

by writing to the Council at 1331 H Street, N.W., Suite 1000, Washington, DC 20005 USA, Phone: (202)628-7400 / Fax: (202)393-5043, email: sbic@sbicouncil.org.

Eligibility requirements and credit amounts are explained below according to element and component type. Items that only incidentally provide passive solar energy benefits are not eligible. For example, south-facing windows are only eligible when part of a complete system with thermal storage and control and distribution elements.

Solar Collection Surfaces

All solar collection surfaces must be oriented to within 15 degrees of true south for new construction and within 20 degrees of true south for retrofits. Solar collection surfaces must not be shaded at noon on December 21 and must be fully shaded at noon on June 21 (the dates of the lowest and highest sun angle each year). Solar collection surfaces include:

- a. South-facing windows with a minimum double-glazing in windows that have low conductive or thermally broken frames. It is recommended that coated glazings not be used on the south side of a passive solar building. If coated glazings are used, the solar heat gain coefficient must be greater than .70 or the shading coefficient must be greater than .75. Not all the cost of south-facing windows qualifies for the tax credit. The percentage of window cost eligible for the credit must be calculated using the worksheet at the end of this section. The calculation determines the percentage of a building's windows located on a building's south side to improve passive solar performance and only gives credit to buildings that have more windows on the south side than other sides.
- b. Trombe walls with double-glazing mounted no more than two feet in front of a thermal storage wall if that wall's sole function is for the collection of solar energy. The installation and equipment costs of the wall are eligible.
- c. Skylights with double-glazing located on a south-facing roof having a pitch of 8-12 (34° angle from horizontal) or greater, an area of less than 8%, and an area that, when combined with the area of south-facing windows, does not exceed 12% of the floor area of the room where they are located. The skylight must have integrated insulation having an insulating value of at least R-3 to provide winter night-



North Carolina Solar House

time insulation and summer shading. The installation and equipment costs of these skylights are eligible.

d. Thermosiphoning collectors that operate on thermosiphoning principles and whose sole purpose is solar energy collection. These include solar window box heaters, thermosiphoning water and air panels, and “integral solar collectors” for passive solar water heaters. The installation and equipment costs of these collectors are eligible for the credit.

Thermal Storage Elements

Building components or materials specifically designed for the storage of solar energy are eligible for the tax credit. These materials must be located in the same building spaces with the south-facing solar collectors and ideally have a maximum ratio of sq.ft. of mass to sq.ft. of glass of 6:1. Masonry products used as thermal storage in walls or floors must be a minimum of 2 inches thick and must not be more than 25% covered by carpet, linoleum, or other insulating materials. Materials that are not specifically designed for thermal storage, such as hot tubs or swimming pools, or do not have sufficient mass, such as single-layer gypsum board, wood paneling, and flooring, are not eligible. The percentage of thermal storage element costs eligible for the tax credit must be calculated using the worksheet at the end of this section. The calculation determines the percentage of the building’s thermal mass that is necessary to store the collected solar energy and control temperature swings.

Control and Distribution Elements

Devices that are specifically designed to control heat loss or heat gain or to distribute heat energy from a passive solar energy system are eligible for the passive solar energy tax credit. These include:

- a.* Movable insulation if the insulation is for solar collection surfaces, has an R-value of at least 3, and seals tightly against the window frame. Standard draperies and curtains do not qualify.
- b.* Shading devices for south-facing collection surfaces. These devices are required and must shade the collection surface at noon on June 21 and must not shade the collection surface at noon on December 21. Fixed, adjustable, or removable awnings, solar screens, and latticework used to support vines are examples of shading devices. Fixed roof overhangs, gutters, and trees, shrubbery, and other vegetation are not eligible, nor are interior shading devices such as shades or blinds.
- c.* Ducts, fans, vents, back-flow preventers, and other similar devices and their controls, if designed exclusively as part of the solar energy distribution (not collection) system. Although fans are not technically passive elements, some passive systems may use fans to assist the natural convective flows to improve system performance. Ceiling fans, attic fans, and freestanding fans are not eligible for the credit.

SOLAR THERMAL AND SOLAR THERMAL ELECTRIC APPLICATIONS

Eligible Expenditures

- 100% of the cost of equipment to generate electricity from solar energy and of the cost of related devices for collecting, storing, exchanging, or converting solar energy, including design, construction, and installation costs.
- 100% of the cost of equipment for distillation, detoxification, industrial or commercial process heat, or absorption cooling from solar energy including related devices to convert, condition or store thermal energy, including design, construction, and installation costs.
- A reduced amount of the cost of the above solar energy equipment when it serves two or more functions such as a roof or siding in addition to solar energy equipment. The expenditures eligible for the tax credit must be reduced by the cost of a comparable product for the non-solar energy equipment functions

SOLAR ELECTRIC APPLICATIONS

Eligible Expenditures

- 100% of the cost of equipment to generate electricity from solar energy, including related devices for collecting, storing, exchanging, or converting solar energy, including design, construction, and installation costs.
- A reduced amount of the cost is allowed when the solar energy equipment serves two or more functions such as a roof or siding in addition to solar energy equipment. The eligible expenditure for the tax credit is reduced by the cost of a comparable product for the non-solar functions.

DAYLIGHTING SOLAR ENERGY SYSTEMS

Eligible Expenditures

Daylighting systems are carefully designed solar applications that use sunlight to meet a building’s illumination needs. A system is only eligible if it accomplishes ALL of the following:

- Saves energy by reducing electrical lighting and, if mechanically cooled, by reducing mechanical operating costs.
- Brings sunlight into the interior spaces of buildings with no glare at workspace and less overheating than energy gain by reduced electric lighting.
- Integrates automatic lighting controls that reduce electrical lighting when solar daylighting satisfies the lighting requirements of the building.

The following daylighting systems and their system components are eligible for the tax credit:

1. Vertically glazed roof monitor daylight systems. These systems consist of roof-mounted or light well structures designed to allow solar radiation to enter a building while carefully minimizing and controlling glare and overheating. The system must include baffles or other measures designed

to eliminate glare and diffuse solar radiation, a minimum double-glazing or equivalent R-2/U-0.5 glazing, and automatic lighting controls that measure the daylighting levels within the space and proportionally reduce electrical lighting.

2. Sloped or horizontal glazing daylight systems (skylights). These systems consist of roof-mounted structures that have a glazed area to floor area (of the room where they are located) ratio of less than 15% and are designed to allow solar radiation to enter a building while carefully minimizing and controlling glare and overheating during the non-heating season. The system must include baffles or other methods designed to eliminate glare and diffuse solar radiation, a minimum double glazing or equivalent R-2/U-0.5 glazing, and automatic lighting controls that measure the daylighting levels within the space and proportionally reduce electrical lighting.
3. Light shelf daylight systems. These systems consist of highly reflective horizontal surfaces (over 75% reflectance) placed at least seven feet above the finished floor of a building and directly next to vertical glazing for the purpose of reflecting sunlight deep into interior building spaces. The light shelf must have a total horizontal dimension of at least one foot (inside, outside, or combined). The light shelf glazing must have a height of no more than two times the width of the light shelf and be a minimum double-glazing or equivalent R-2/U-0.5 glazing.
4. Advanced daylighting glazing that allows visible spectrum solar radiation to enter interior building spaces with minimal glare and heat gain. The glazing's thermal conductivity must not be greater than conventional double glazing R-2/U-0.5.
5. Daylight transport systems. These systems consist of highly reflective light wells, light pipes, shafts, fiber optic cables, or similar structures designed to transport visible solar radiation from its collection point to the interior of a building while excluding interior heat gain in the non-heating season. Included are tracking or fixed collectors that are designed to collect or concentrate the sunlight.

WIND RESOURCES

Eligible Expenditures

One hundred percent of the cost of equipment required to capture and convert wind energy into electricity or mechanical power and of related devices for converting, conditioning, and storing electricity, including design, construction, and installation costs, is eligible for the credit. Towers are considered eligible equipment.

HYDROELECTRIC RESOURCES

Eligible Expenditures

One hundred percent of the cost of equipment to generate electricity at existing dams or in free-flowing waterways and of related devices for water supply and control, and for converting, conditioning, and storing electricity, including design, construction and installation costs, is eligible for the credit.

BIOMASS RESOURCES

Eligible Expenditures

New Facilities — 100% of the cost of any of the following is eligible for the credit:

- Biomass processing plant equipment and structures that use renewable biomass resources for producing alcohol, ethanol, methanol, bio-oils, biodiesel, or other biofuels.
- Commercial thermal or electrical generation from renewable energy crops, wood waste materials or other biomass materials.

Eligible equipment and structures include devices at the processing plant site to receive, handle, collect, condition, store, process, or convert biomass materials into solid, liquid, or gaseous fuels, secondary co-products, process heat, or electrical generation and their associated design, construction, and installation costs. Biomass materials are non-fossil fuels and include landfill gas, vegetation such as forestry and agricultural crops and their harvesting residues, animal manure, and organic wastes such as sludges, waste waters, municipal solid wastes, textile wastes, and yard and urban wood wastes.

Co-energy Applications — When renewable biomass resources are combined with fossil or other nonrenewable fuels (e.g. co-firing), project expenditures eligible for the credit are the same percentage as the percentage of contribution to the project's output of the renewable, biomass resources based on the BTU inputs of the various fuels in the year the biomass resources are placed into service.

Renewable Energy Equipment Manufacturers Credit

In addition to the 35% corporate tax credit for renewable energy equipment installations, North Carolina offers a corporate income tax credit to manufacturers of renewable energy equipment. The credit is equal to 25% of the construction and equipment costs of a renewable energy equipment manufacturing facility. There is no maximum limit to the credit except that it cannot exceed a taxpayer's tax liability in one year. If the credit does exceed the manufacturer's tax liability, the credit may be carried forward for up to five years.

Special Valuation for Property Taxes

This property tax exclusion allows for active solar heating and cooling systems to be assessed at not more than the value of a conventional heating or cooling system for the purposes of property taxation. This applies only to active solar systems and does not include any land or structural elements of buildings such as walls and roofs. Residential, commercial, and industrial property is eligible for this exclusion.

Federal Tax Credit for Commercial and Industrial Solar Systems

A tax credit against federal corporate income tax for the installation of solar energy equipment that is used to generate electricity, to heat or cool (or provide hot water for use in) a structure, or to provide solar process heat is provided for in Federal Statute Title 26, Subtitle A, Chapter 1, Subchapter A, Part IV, Subpart E, Section 48. It is a 10% credit with no maximum limit on the amount of the credit. For more information about the Federal Solar Tax Credit, contact the NC Solar Center.

Federal Tax Credit for Wind and Biomass Renewable Electricity Production Credit (REPC) or Wind Energy Production Tax Credit (PTC)

The Renewable Electricity Production Credit (REPC), also called the wind energy Production Tax Credit (PTC), is a per kilowatt-hour tax credit for electricity generated by qualified energy resources- defined as wind, closed-loop biomass, or poultry waste. Available during the first 10 years of operation, the REPC provides a 1.5 cents per kWh credit adjusted annually for inflation. The adjusted credit amount for 2002 is 1.8 cents per kWh. Enacted as part of the Energy Policy Act of 1992, the credit, which had expired at the end of 2001, was extended in March 2002 as part of H.R. 3090, Job Creation and Worker Assistance Act of 2002. The credit is set to expire on 12/31/03.

For more information on the renewable energy tax credits please review the “ Guidelines for NC Tax Credits for Renewable Energy Resources” located on the NC Solar Center web site: www.ncsc.ncsu.edu under publications. The Passive Solar Energy Worksheet is also in the “Guidelines”

This publication is available for download and printing from the list of information factsheets on the NC Solar Center's web-site at www.ncsc.ncsu.edu. To reduce paper waste, this publication was not mass reproduced in hardcopy. Printed copies can be mailed to those who do not have access to the Internet.



North Carolina Solar Center
Box 7401, NCSU, Raleigh, N.C. 27695-7401
(919) 515-3480, Toll free in N.C.: 1-800-33-NC SUN
Fax: (919) 515-5778
E-mail: ncsun@ncsu.edu
Web: www.ncsc.ncsu.edu

Federal Modified Accelerated Cost Recovery System (Accelerated Depreciation)

In addition to the above tax credit provisions, Section 168 of the Internal Revenue Code contains a Modified Accelerated Cost Recovery System (MACRS) by which businesses can recover investments in solar, wind, and geothermal property through depreciation deductions. The MACRS establishes a set of class lives for most property, ranging from three to 31.5 years, over which the property may be depreciated. For property placed in service after 1986, the current MACRS class life for applicable renewable energy technologies is five years. The types of systems covered by MACRS are:

- * Solar property that meets the same standards for eligibility required by the Federal 10% tax credit;
- * Wind property, including wind turbines, wind electric generators, storage devices, power conditioning equipment, transfer equipment, and related parts, up to the electrical transmission stage, subject to the same 25% limit on dual-fueled equipment required for solar property; and
- * Geothermal property including equipment used to produce, distribute, or use energy derived from a geothermal deposit, but only in the case of electricity generated by geothermal power, up to the electrical transmission stage.



State Energy Office, N.C. Department of Administration
1340 Mail Service Center, Raleigh, NC 27699-1340
Phone: (919) 733-2230, Fax: (919) 733-2953
Toll free in N.C.: 1-800-662-7131
E-mail: Doa.Energy@ncmail.net
Web: www.energync.net

The NC Solar Center is sponsored by the State Energy Office, NC Department of Administration, and the US Department of Energy, with state Energy Program funds, in cooperation with North Carolina State University.