



NORTH
CAROLINA
DEPARTMENT
OF REVENUE

Guidelines for Determining The Tax Credit for Investing in Renewable Energy Property

INTRODUCTION

This document describes the North Carolina tax credit for investing in renewable energy property (G.S. 105-129.16A) and explains tax credit provisions for taxpayers who donate to nonprofits and units of State and local government to enable the tax exempt-entity to acquire renewable energy property (G.S. 105-129.16H). It gives background, explains the various provisions of the tax credits, provides definitions for key terms, includes a chart of the ceiling limits for the different kinds of renewable energy property, and identifies the expenditures that are eligible and ineligible for the tax credit for each kind of technology. This document includes legislative changes enacted as of August 20, 2014, the adjournment date of the 2014 legislative session. If you have questions about this document, you may call the Corporate Tax Section of the Income Tax Division at (919) 814-1163 or the Personal Taxes Section at (919) 814-1066. You may also write either section at P.O. Box 871, Raleigh, N.C. 27602-0871.

Note: This document does not address the tax credit for biodiesel producers in G.S. 105-129.16F, the tax credit for constructing renewable fuel facilities in G.S. 105-129.16D, or the tax credit for a renewable energy facility in G.S. 105-129.16I.

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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; to produce biofuels; 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.

LEGISLATIVE HISTORY

1999

- 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.

2005

- Extended the renewable energy property tax credit, which was scheduled to expire January 1, 2006, for an additional five years and amended several provisions of the tax credit statute. These changes included increasing the maximum credit for renewable energy property placed in service for business purposes; expanding the definition of eligible renewable biomass resources; and clarifying that nonbusiness solar pool heating equipment is eligible for the credit.

2007

- Enacted G.S. 105-129.16H to allow a taxpayer who donates money to a tax-exempt nonprofit to help fund a renewable energy project to claim a tax credit for the taxpayer's proportionate share of the renewable energy property tax credit that the tax-exempt entity could have taken if the tax-exempt entity were subject to tax.

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2008

- Amended the credit for donating to a tax-exempt entity to include donations made to units of State and local government.

2009

- Expanded the definition of renewable energy property to include geothermal heat pumps that use the ground or ground water as a thermal energy source to heat or cool a structure and geothermal equipment that uses internal heat from the earth as a substitute for traditional energy for heating water or active space heating and cooling. A ceiling of \$8,400 per installation of a geothermal heat pump or geothermal equipment in nonbusiness property was established.
- The credit for renewable energy property was revised to allow the credit to be claimed against the franchise tax levied in Article 3, the income taxes levied in Article 4, or the gross premiums tax levied in Article 8B.
- Extended the sunset of the renewable energy property tax credit so that the credit is available for renewable energy property placed in service prior to January 1, 2016.

2010

- Amended the definition of “Cost” to include a new provision for leased property. If the taxpayer claims either a federal energy credit under section 48 of the Code or a federal grant in lieu of that credit and makes a lease pass-through election under the Code, the cost of the leased renewable energy property is the cost determined under the Code rather than eight times the net annual rental rate.
- Added a subsection in the statute to define an “installation of renewable energy property” as property that, standing alone or in combination with other machinery, equipment, or real property, is able to produce usable energy on its own.
- Expanded the definition of “renewable energy property” to include combined heat and power system property as defined in section 48 of the Code. Additionally, the definition of wind equipment was expanded to include equipment required to relay the electricity by cable from the turbine motor to the power grid.
- Clarified that the credit may be claimed for property for which a taxpayer has received federal renewable energy grants authorized under the American Recovery and Reinvestment Tax Act of 2009. Under the North Carolina statute, taxpayers are precluded from claiming the credit for property purchased with public funds. The modifications made by this legislation specified that the Recovery Act grants are not considered public funds for purposes of the credit.
- Added a provision to require a lessor of renewable energy property to provide to the lessee a statement that describes the property and states the cost of the property upon request of the lessee. It also replaced the terms “nonresidential” purpose and “residential” purpose with the terms “business” and “nonbusiness”, respectively. Renewable energy is placed in service for a business purpose if it generates useful energy that is offered for sale or is used on-site for a purpose other than providing energy to a residence.

- Added a provision to place a ceiling of \$5,000,000 on each installation of renewable energy property placed in service at an Eco-Industrial Park as defined in G.S. 143B-437.08.

2013

- Amended the tax credit for donating funds to a nonprofit organization to add a sunset provision. The sunset for this tax credit is the same as the sunset for the renewable energy tax credit.

PROVISIONS OF THE TAX CREDIT FOR INVESTING IN RENEWABLE ENERGY PROPERTY ([G.S. 105-129.16A](#))

Tax Credit Amount. If a taxpayer that has constructed, purchased, or leased renewable energy property places it into service in North Carolina during the taxable year, the taxpayer is allowed a tax credit equal to 35% of the cost of the property. The credit can be taken against franchise tax, income tax or, if the taxpayer is an insurance company, against the gross premiums tax. [G.S. 105-129.17(a)] If the property serves a nonbusiness purpose, the credit is taken for the taxable year in which the property is placed in service. For all other renewable energy property, the credit is taken in five equal installments beginning with the year the property is placed in service.

Placed in Service. The tax credit is allowable only to a person that places the renewable energy property in service. Renewable energy property is considered to be placed in service when it is installed and is producing usable energy. For renewable energy property used for a business purpose, the property must produce usable energy that is for sale or is used for another business purpose.

For renewable energy property that is leased, the lessor is entitled to claim the tax credit provided under N.C. Gen. Stat. § 105-129.16A if, under the leasing agreement, the lessee begins using the property to produce usable energy that is for sale or for another business purpose. The lessee is entitled to claim the credit if the lessor provides to the lessee a written certification that the lessor will not claim the credit.

Cost. For the purpose of computing the tax credit, cost is determined pursuant to regulations adopted under section 1012 of the Code, subject to the limitation on cost provided in section 179 of the Code, if the renewable energy property is owned by the taxpayer. In the case of property the taxpayer leases from another, cost is valued at eight times the net annual rental rate pursuant to G.S. 105-130.4(j)(2), unless the property is renewable energy property for which the taxpayer claims either a federal energy credit under section 48 of the Code or a federal grant in lieu of that credit and makes a lease pass-through election under the Code. In this circumstance, the cost of the leased renewable energy property is the cost determined under the Code. [G.S. 105-129.15(2)]

Maximum Credit and Other Limitations. The credit is subject to various ceilings depending on whether the renewable energy equipment is for a business purpose or nonbusiness purpose and, if for a nonbusiness purpose, the kind of renewable energy technology being used. The chart on page 12 provides an overview of the different kinds of renewable energy technologies and the ceilings that apply to each.

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 forward for the succeeding five 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 taxpayer may continue to carry forward the unused portion of previous years' installments. [G.S. 105-129.17(b)]

Taken Out of Service. Renewable energy property is considered taken out of service if the property is abandoned or destroyed. Renewable energy property is not considered destroyed if the property's renewable energy capacity is reduced, as long as the property still produces renewable energy. Renewable energy property placed in service for a business purpose is also considered taken out of service if the property is converted to use for a nonbusiness purpose.

Renewable energy property that is temporarily out of service for routine or emergency repairs, maintenance, inspection or other similar event is not considered taken out of service if, at the time the production ceases, the taxpayer intends to resume production of renewable energy upon completion of the repairs, maintenance, inspection or other similar event. If repairs, maintenance, inspection, or other similar event is not commenced within 60 days after the production ceases, the property will be presumed to be taken out of service. The taxpayer may overcome the presumption by providing, upon request by the Department, detailed records to support why the repairs, maintenance, inspection, or other similar event had not commenced within 60 days.

Eligibility to Claim a Credit. The tax credit is allowable only to a person that owns the system or to a person that leases a renewable energy system or 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 may claim a tax credit for investing in more than one type of renewable energy property. For example, a taxpayer who purchases and installs both a photovoltaic system and a solar water heating system for nonbusiness use may claim a credit for both the photovoltaic system (up to \$10,500) and a credit for the solar water heating system (up to \$1,400) in the same year.

Filing Tax Credit Forms. 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

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tax less other credits limitation and for corporations to elect whether the credit is to be claimed against franchise tax or income tax. These forms are available on the NC Department of Revenue website at: <http://www.dor.state.nc.us/downloads/corporate.html>.

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 renewable energy system or the building in which a renewable energy system is constructed or installed.

Eligible Costs. 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, costs provided by public funds, or other similar reductions paid to the owner of the system as an inducement to purchase the renewable energy system. Public funds include federal, State, and local government funds, but does not include grants made under section 1603 of the American Recovery and Reinvestment Tax Act of 2009.

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, and related labor costs, to increase capacity are 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.

Equipment and Installation Requirements. 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 placed into service. If a taxpayer has paid for the system, but it is not installed and placed in service during the year, no credit is allowed until the year in which the system is placed in service.

PROVISIONS OF THE TAX CREDIT FOR DONATING FUNDS TO A NONPROFIT ORGANIZATION OR UNIT OF STATE OR LOCAL GOVERNMENT TO ENABLE THE TAX-EXEMPT ENTITY TO ACQUIRE RENEWABLE ENERGY PROPERTY ([G.S. 105-129.16H](#))

G.S. 105-129.16H allows a tax credit to a taxpayer who donates money to a tax-exempt nonprofit organization (as defined under section 501(c)(3) of the federal tax code) or a unit of State or local government to construct, purchase, or lease renewable energy property in North Carolina. This credit is available to any individual or business that is a North Carolina taxpayer.

The amount of the credit is the taxpayer's proportionate share of the credit the tax-exempt entity could have taken under the renewable energy tax credit in G.S. 105-129.16A if the tax-exempt entity were subject to tax. A single donor may qualify for the entire tax credit if the donor donates 100% of the cost of the renewable energy property. The calculation of the tax credit is as follows:

$$\text{Tax Credit} = \frac{\text{Taxpayer Donation}}{\text{Cost of Renewable Energy Property}} \times (\text{Allowable Credit Under G.S. 105-129.16A})$$

The maximum tax credit limit outlined on page 11 still applies in determining the allowable credit under G.S. 105-129.16A. In addition, if the donations made for the renewable energy property exceed the cost of the property, the tax-exempt entity must prorate each taxpayer's share of the credit. The sum of the credits allowed under this provision to taxpayers who make donations to a tax-exempt entity may not exceed the amount of the credit the tax-exempt entity could claim under G.S. 105-129.16A if it were subject to tax.

The credit must be taken in the year in which the property is placed in service even if the renewable energy property is used for a business purpose. Any unused portion of the credit may be carried forward for the succeeding five years.

Note that a taxpayer claiming a credit under this section may not also deduct this donation as a charitable contribution for State tax purposes. However, this provision does not restrict a taxpayer from claiming a deduction for the donation for federal tax purposes.

INFORMATION ABOUT ELIGIBLE RENEWABLE ENERGY PROPERTY

For information about eligible renewable energy property, contact the North Carolina Solar Center, North Carolina State University, Raleigh NC 27695, <http://www.ncsc.ncsu.edu> or Brian Lips (brian_lips@ncsu.edu, 919-515-3954).

The North Carolina Solar Center offers free fact sheets on various solar and renewable energy topics on its website at <http://www.ncsc.ncsu.edu/index.php/resource-center-2/fact->

sheets-publications/, as well a directory of professionals who provide products and services at <http://www.greenprofessionals.org/>.

DEFINITIONS

Authority Having Jurisdiction (AHJ).

The organization, office, or individual responsible for approving equipment, materials, and installation, or a procedure. Usually the local code official (building, electrical, plumbing, and/or mechanical).

Baffles

Louvers positioned in a light well to evenly distribute natural light and to prevent direct sunrays from reaching the floor or other surfaces in the space.

Collector

A device that collects solar radiation and converts it to heat.

Combined heat and power

Property comprising a system which uses the same energy source for the simultaneous or sequential generation of electrical power, mechanical shaft power, or both, in combination with the generation of steam or other forms of useful thermal energy (including heating and cooling applications).

Conditioned area

Any space within the shell of a building that is mechanically heated or cooled.

Double-glazing

Two pieces of glazing that are separated by at least 1/4 inch and enclose a sealed air space to create an insulating barrier.

Glazing

A transparent or translucent material used for separating space and admitting light.

Heat gain

An increase in the amount of heat contained in a space, resulting from direct solar radiation and heat given off by people, lights, equipment, machinery, and other sources.

Heat loss

A decrease in the amount of heat contained in a space, resulting from heat flow through walls, windows, the roof, and other building envelope components.

Heating season

The period during which additional heat is needed to

	keep a building warm in North Carolina, typically from October to April.
Hydroelectric generator	A machine that produces electricity by water power or by the friction of water or steam.
Installation of renewable energy property	Renewable energy property that, standing alone or in combination with other machinery, equipment, or real property, is able to produce usable energy on its own.
Light pipes	A device consisting of reflective pipes with a solar collection and distribution terminus at the ends.
Light well	A shaft or opening from the ceiling to windows or skylights at the roof, designed for the distribution of light.
Renewable biomass resources	Organic matter produced by terrestrial and aquatic plants and animals, such as standing vegetation, aquatic crops, forestry and agricultural residues, landfill wastes, and animal wastes.
Renewable fuel	Either biodiesel as defined by NC General Statutes, or ethanol either unmixed or in mixtures with gasoline that are 70% or more ethanol by volume.
Retrofit	The addition of a solar energy system or another device to an existing home.
R-value	A unit of thermal resistance used for comparing insulation values for different materials; the reciprocal of conductivity. The higher the R-value of a material, the greater its insulating properties.
Roof monitor	A weather-tight roof structure that includes a vertical glazed area and a roof surface.
Skylight	A clear or translucent glazing panel set into a roof to admit sunlight into a building.
Thermal storage	A device or medium specifically designed and constructed to absorb collected solar radiation, convert the energy to heat, and store the heat for later use.
Thermosiphoning	The convective circulation of fluid or air that occurs when warm fluid or air rises and is displaced by cooler fluid or air in the same system.

Trombe wall

A passive heating system consisting of a vertical masonry wall with glazing in front. Solar radiation is absorbed by the wall, converted to heat, and transferred to the building interior by convection, radiation, or a combination of these. Vents may be used to circulate warm air from the space between the glass and wall to the building interior. Pronounced "trome."

TAX CREDIT LIMITS FOR RENEWABLE ENERGY TECHNOLOGIES

Renewable Energy Technology	Credit Limit	
	Nonbusiness Purpose	Business Purpose *
Solar Energy Equipment for Domestic Water Heating or Solar Pool Heating	\$1,400 Per Dwelling Unit	\$2,500,000 Per Installation
Solar Energy Equipment for Active Space Heating, Combined Active Space and Domestic Hot Water Systems, or Process Heating	\$3,500 Per Dwelling Unit	\$2,500,000 Per Installation
Solar Energy Systems for Passive Heating	\$3,500 Per Dwelling Unit	\$2,500,000 Per Installation
Geothermal	\$8,400 Per Installation	\$2,500,000 Per Installation
Solar Energy Systems for Daylighting	N/A	\$2,500,000 Per Installation
Solar Energy Equipment for Electricity Generation	\$10,500 Per Installation	\$2,500,000 Per Installation
Wind Equipment	\$10,500 Per Installation	\$2,500,000 Per Installation
Hydroelectric Generators	\$10,500 Per Installation	\$2,500,000 Per Installation
Biomass Equipment	\$10,500 Per Installation	\$2,500,000 Per Installation
Combined Heat and Power Property	\$10,500 Per Installation	\$2,500,000 Per Installation

*The credit limit is \$5,000,000 instead of \$2,500,000 for an installation of renewable energy property placed in service at an Eco-Industrial Park certified under G.S. 143B-437.08 for a business purpose.

For the purpose of determining the maximum allowable credit, an “installation of renewable energy property” is defined as “renewable energy property that, standing alone or in combination with other machinery, equipment, or real property, is able to produce usable energy on its own.” G.S. 105-129.15.

SOLAR ENERGY EQUIPMENT FOR DOMESTIC WATER HEATING, SOLAR POOL HEATING, ACTIVE SPACE HEATING, COMBINED ACTIVE SPACE AND DOMESTIC HOT WATER SYSTEMS OR PROCESS HEATING

Eligible Expenditures

- One hundred percent of the cost of the solar energy equipment for water heating, active space heating and cooling, distillation, desalination, detoxification, or the production of industrial or commercial process heat, including design, construction and installation costs.
- One hundred percent of the cost of related devices necessary for collecting, storing, exchanging, conditioning, or converting solar energy to other useful forms of energy, including design, construction, and installation costs.
- One hundred percent of the cost of energy monitoring or metering equipment, not to exceed 10% of the cost of the complete solar thermal system.
- 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.

Ineligible Expenditures

- 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.
- All maintenance expenditures at existing or previously credited projects, including replacement of eligible equipment.

System Requirements

- The system must be installed by a contractor appropriately licensed in North Carolina or, in the case of a nonbusiness installation by the homeowner, in accordance with the North Carolina State building code and be inspected by the authority having jurisdiction (AHJ).
- The tax credit may not be claimed for any tax year before the Certificate of Compliance (existing buildings)/Occupancy (new buildings), or similar inspector issued documentation is issued.
- The system must provide adequate freeze protection that does not rely on electrical power.
- Space heating systems must provide adequate overheating protection during the non-heating season.

- The system must have a permanent label adhered at an easily readable location that identifies the name, address, email or website, and phone number of the contractor for future service.
- The system must include an easy to understand way for the owner to determine if the system is operating properly. This may include thermometers and flow indicators.
- It is highly recommended that installed solar collectors be OG-100 certified by the Solar Rating and Certification Corporation (SRCC). It is also highly recommended that all stand-alone nonbusiness solar hot water systems installed be OG-300 certified by SRCC.

SOLAR ENERGY SYSTEMS FOR PASSIVE SPACE HEATING

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 business 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 two 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) passive solar guidelines to ensure proper design practices have been followed. These guidelines may be found at <http://passivesolar.sustainablesources.com/#guidelines>. Additional passive solar heating design information is available at <http://www.wbdg.org/resources/psheating.php>. The Council's website is www.nibs.org/?page=sbic.

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 nighttime 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 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 two 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.

Ineligible Expenditures

Equipment, components, and other items that do not qualify for the passive solar energy tax credit include:

- Insulation, except as otherwise noted above.
- Storm windows and storm doors.
- Wood burning stoves and furnaces.
- Oil and gas furnaces, including replacement burners and ignition systems.
- Automatic set back thermostats.
- Heat pumps, including air, ground, and water-source units.
- Evaporative cooling systems.

Worksheet for Calculating the Tax Credit for Investing in a Passive Solar Energy System

IMPORTANT: This worksheet must be retained with your tax records for examination by the North Carolina Department of Revenue. It will be a necessary supporting document, together with other supporting information, for the tax credit for renewable energy systems claimed on your tax return.

Solar Collection Surfaces

1. South-facing Windows

- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| a. Calculate the area of glass of the windows on the non-south walls | _____ sq.ft. |
| b. Calculate the interior area of the non-south walls | _____ sq.ft. |
| c. Divide line 1a by line 1b to get % of non-south walls in glass | _____ % |
| d. Calculate the area of glass of the windows on the south wall | _____ sq.ft. |
| e. Calculate the interior area of the south-facing wall | _____ sq.ft. |
| f. Divide line 1d by line 1e to get % of south wall in glass | _____ % |
| g. Subtract line 1c from line 1f | _____ % |
| h. Divide line 1g by line 1f to determine the percentage of extra glass on south wall as compared to the other walls. If line 1c % exceeds line 1f, enter zero here and on line 1i | _____ % |
| i. Multiply line 1h by the cost of south windows | \$ _____ |
| 2. Trombe Wall - cost of glazing and mass wall | \$ _____ |
| 3. Skylights - cost of qualifying south-facing skylights | \$ _____ |

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4. Thermosiphoning and Batch Water Heaters - cost of thermosiphoning collectors and batch water heaters \$ _____

Thermal Storage Elements

5. Storage

a. Calculate the floor area square footage of the building spaces where the solar collection windows are located _____ sq.ft.

b. Multiply line 5a times 5% (the minimum % of solar collection area to floor area for a passive solar building) _____ sq.ft.

c. Calculate the square footage of south facing windows _____ sq.ft.

d. Subtract line 5b from line 5c to determine the passive solar collecting area _____ sq.ft.

e. Multiply line 5d by 6 (the maximum ratio of sq. ft. mass to sq. ft. of south-facing glass allowable for the tax credit) _____ sq.ft.

f. Multiply line 5e by the cost per sq. ft. of thermal mass \$ _____

Control and Distribution Elements

6. Movable Insulation – the cost of movable insulation devices \$ _____

7. Shading Devices – cost of qualifying devices used to shade solar collection surfaces \$ _____

8. Distribution and Controls – cost of ducts, fans, vents and back-flow preventers designed exclusively as part of the solar energy system \$ _____

Total costs eligible for the tax credit – add lines 1i, 2, 3, 4, 5f, 6, 7 and 8 \$ _____

This is the total amount eligible for the passive solar energy systems tax credit. Add this amount to the total costs eligible for other renewable energy systems and enter the sum on Part 2, Line 1 of Form NC-478G (non business purposes) or Part 3, Line1 of Form NC-478G (business purposes).

SOLAR ENERGY SYSTEMS FOR DAYLIGHTING

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.

Ineligible Expenditures

- Skylights and all other roof-mounted structures that do not meet all the requirements of (2) above.
- Windows, glass or other glazing and window tinting films, and low E and other glass coatings that are not integrally part of daylighting systems listed above.
- Greenhouse structures, Florida rooms, atriums, and other structures that do not meet all the requirements of (2) above.

SOLAR ENERGY EQUIPMENT FOR GENERATING ELECTRICITY

Eligible Expenditures

- One hundred percent 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 and costs to provide the generated electricity to the local electric power system.
- One hundred percent of the cost of energy monitoring or metering equipment, not to exceed 5% of the cost of the complete solar electric system.
- 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 function(s).

Ineligible Expenditures

- All maintenance expenditures at existing or previously credited projects, including replacement of eligible equipment.

System Requirements

- The electrical system must be installed by a licensed electrical contractor or, in the case of a nonbusiness installation by the homeowner, with the permission of the electrical inspector in accordance with the National Electrical Code and local building codes.
- The system must be inspected and approved by the authority having jurisdiction (AHJ).
- A grid connected system must complete the appropriate interconnection procedure with the operator of the electric power system to which it is interconnected.

- The system must have a permanent label adhered at an easily readable location that identifies the name, address, email or website, and phone number of the contractor for future service.
- A maximum of 35 kWh (35,000 Watt hours) of battery storage capacity per kilowatt of photovoltaic capacity (standard test conditions DC rated) is eligible for the tax credit. Battery storage capacity is calculated at the c/20 discharge rate.

WIND EQUIPMENT

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 produced or relaying the electricity by cable from the turbine to the power grid, including design, construction, and installation costs, is eligible for the credit. Towers are considered eligible equipment.

Ineligible Expenditures

- All maintenance expenditures at existing or previously credited projects, including replacement of eligible equipment.

System Requirements

- The electrical system must be installed by a licensed electrical contractor or, in the case of a nonbusiness installation by the homeowner, with the permission of the electrical inspector in accordance with the National Electrical Code and local building codes.
- The system must be inspected and approved by the local authority having jurisdiction (AHJ) as required.
- The system must have a permanent label adhered at an easily readable location that identifies the name, address, email or website, and phone number of the contractor for future service.
- A maximum of 35 kWh (35,000 Watt hours) of battery storage capacity per kiloWatt of wind turbine capacity is eligible for the tax credit. Battery storage capacity is calculated at the c/20 discharge rate.

HYDROELECTRIC GENERATORS

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.

Ineligible Expenditures

- Construction of new dams, repairs or additions to existing dams, or dredging to increase original impoundment capacity.
- All maintenance expenditures at existing or previously credited projects, including replacement of eligible equipment.

System Requirements

- The electrical system must be installed by a licensed electrical contractor or, in the case of a nonbusiness installation by the homeowner, with the permission of the electrical inspector in accordance with the National Electrical Code and local building codes.
- The system must be inspected and approved by the local authority having jurisdiction (AHJ) as required.
- The system must have a permanent label adhered at an easily readable location that identifies the name, address, email or website, and phone number of the contractor for future service.
- A maximum of 50 kWh (50,000 Watt hours) of battery storage capacity per kiloWatt of hydro generator capacity (standard test conditions DC rated) is eligible for the tax credit. Battery storage capacity is calculated at the c/20 discharge rate.

BIOMASS EQUIPMENT

Eligible Expenditures

One hundred percent of the cost of biomass equipment, including design, equipment and installation costs, that uses renewable biomass resources for the following:

- Biofuel production of ethanol, methanol, and biodiesel;
- Anaerobic biogas production of methane utilizing agricultural and animal waste or garbage; or
- Commercial thermal or electrical generation.

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, spent pulping liquor, and yard and urban wood wastes.

Co-firing applications — When renewable biomass resources are co-fired with fossil fuels or other nonrenewable fuels (e.g. co-firing), project expenditures eligible for the credit shall be calculated by multiplying the total biomass energy system expenditures by the ratio of biomass energy input to the total energy input to the system for the year in which the credit is taken.

Ineligible Expenditures

- Wood burning stoves and furnaces used for space heating or water heating.
- All equipment and other costs for growing, collecting, handling, storing, and transporting biomass materials prior to their receipt at the processing plant gate or, in the case of on-site biomass resources such as those on a farm, prior to their placement in the on-site biomass processing equipment.
- Transportation and secondary storage of products and coproducts beyond their initial storage at the processing plant.
- All maintenance expenditures at existing or previously credited projects including replacement of eligible equipment unless capacity is increased.

GEOHERMAL HEAT PUMPS AND GEOHERMAL EQUIPMENT

Eligible Expenditures

- One hundred percent of the cost of geothermal heat pump systems, also known as ground source heat pumps, that use the ground or groundwater as a thermal energy source to heat a structure or as a thermal energy sink to cool a structure, or other geothermal equipment that uses the low seasonal variation in temperature of the earth as a mechanism to significantly reduce traditional energy use for water heating or space heating and cooling, including design, construction and installation costs.

Ineligible Expenditures

- All maintenance expenditures at existing or previously credited projects, including replacement of eligible equipment.

System Requirements for Geothermal Heat Pumps and Geothermal Equipment

- The system must be installed by a contractor appropriately licensed in North Carolina.
- The system must be inspected and approved by the authority having jurisdiction (AHJ) as required.
- The tax credit may not be claimed for any tax year before the Certificate of Compliance (existing buildings)/Occupancy (new buildings), or similar inspector issued documentation, is issued.
- Systems in residential buildings covered by North Carolina Energy Conservation Code are required by code to be sized according to ACCA Manual S and ACCA Manual J (Section 403.6 of 2009 IECC).
- Multi-speed ground source heat pumps may be sized over the Manual J loads by no more than 15%, Single speed systems may be oversized by no more than 15% in climate zone 3 and no more than 25% in climate zones 4 and above. Once the appropriate equipment size is determined, if that specific size does not exist, the next larger size of manufactured equipment shall be acceptable, regardless of the percentage listed.
- Non-residential systems must be designed to meet the requirements of the appropriate section(s) of the version of ASHRAE 90.1 enforced by the NC State Building Code: Energy Conservation Code at the time of installation.

COMBINED HEAT AND POWER SYSTEM PROPERTY

Eligible Expenditures

- One hundred percent of the cost of combined heat and power system property, as defined in section 48 of the Internal Revenue Code, including design, construction and installation costs.
- Typical combined heat and power systems include, but are not limited to, those generating power based on combustion turbines, fuel cells, microturbines or reciprocating engines with heat recovery equipment, or boilers with steam turbine generators.

Ineligible Expenditures

- Property used to transport the energy source to the combined heat and power facility or distribute energy produced by the combined heat and power facility.

System Requirements

- System must meet the following criteria per the definition in section 48 of the Internal Revenue Code:
 - produce at least 20% of its total useful energy in the form of thermal energy which is not used to produce electrical or mechanical power (or combination thereof), and
 - at least 20% of its total useful energy in the form of electrical or mechanical power (or combination thereof), and
 - the energy efficiency percentage must exceed 60% on a Btu basis for normal expected annual operation, calculated by dividing the total useful thermal, electrical and mechanical power output by the total energy input based on lower heating value of the fuel sources.

FREQUENTLY ASKED QUESTIONS

1) Does the installation of one large solar PV facility owned by one or more entities, on a building or land, where that facility is divided into more than one individual system or array by separate disconnection devices, whereby each system or array can operate independently of the other and can generate usable power when the other system(s) or array(s) is(are) disconnected and not generating power qualify as a separate "installation" for purposes of determining the \$2.5 million NCREC cap for solar equipment used for a business purpose pursuant to G.S. 105-129.16A(c)(1)?

Each installation of renewable energy property that meets the definition of "installation of renewable energy property" in G.S. 105-129.15(4b) qualifies as a separate "installation" for purposes of determining the \$2.5 million NCREC cap. That definition states that the renewable energy property standing alone or in combination with other machinery, equipment, or real property, is able to produce usable energy on its own. This definition is met by the system described because each individual system can operate in combination with other equipment (equipment required to connect each inverter to the local power system) to produce usable energy on its own. Each individual solar energy system should include at least a PV array and an inverter.

2) Do the costs incurred to purchase and install fuel cells qualify for the Credit under G.S. 105-129.16A(a)?

A fuel cell [consuming renewable biomass resources] qualifies as "renewable energy property" under the Statute, either as "biomass equipment" or as "combined heat and power property," so long as it meets the definition and requirements for the type of equipment that is being claimed. When a fuel cell uses a renewable biomass resource, it is eligible for all or some of the credit as "biomass equipment", depending on the percentage

of the annual fuel energy that is renewable. 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. In instances where the fuel cell is used to supply both electricity and heat, the expenditures will qualify for the credit if the installation meets the criteria for minimum useful energy output percentages and minimum energy efficiency under section 48 of the Code.

3) Does a combined heat and power biomass cogeneration facility consuming renewable biomass resources qualify as "renewable energy property" under NC G.S. 105-129.16A and 105-129.15(7)?

A combined heat and power biomass cogeneration facility consuming renewable biomass resources qualifies as "renewable energy property" under the Statutes, either as "biomass equipment" or as "combined heat and power property." If it is considered combined heat and power property the facility must meet the criteria for minimum useful energy output percentages and minimum energy efficiency under section 48 of the referenced Internal Revenue Code.

4) Do the costs to construct and install a wind energy facility in North Carolina qualify for the State's Renewable Energy Tax Credit under NC G.S. 105-129.16A(a)?

The costs to construct and install a wind energy facility that meets the definition of wind equipment under the Statute are eligible for a tax credit. Eligible equipment includes that which "is required to capture and convert wind energy into electricity or mechanical power, and related devices for converting, conditioning, and storing the electricity produced or relaying the electricity by cable from the turbine motor to the power grid."

5) Does each wind turbine in a wind energy facility constitute an "installation of renewable energy property" under NC G.S. 105-129.16A(c)(l)?

Each wind turbine can constitute an installation of renewable energy property if when "standing alone or in combination with other machinery, equipment, or real property, is able to produce usable energy on its own."

6) For the purpose of determining which dollar cap applies, if a system is installed at a residence and the resident is selling all of the generated energy to a utility company, for example, as an NC GreenPower generator, is that system placed in service for a business purpose or a nonbusiness purpose?

G.S. 105-129.16A states “[r]enewable energy property is placed in service for a business purpose if the useful energy generated by the property is offered for sale or is used on-site for a purpose other than providing energy to a residence.” System owners who are in a “sell-all” arrangement with a utility company do not use the energy generated on-site. Since the power is offered for sale, the system is placed in service for a business purpose.

7) Do solar-powered attic fans or solar-powered street lights qualify for the tax credit?

The costs associated with the solar panel on the solar attic fan or the attic fan and battery in street lights qualify for the tax credit, but all other costs do not. Purchasers should ask the manufacturer and/or retailer to separate the costs so they can accurately calculate their tax credit. If that is not possible, the purchaser can subtract the cost of a comparable non-solar attic fan or street light from the cost of the solar-supported equipment. That difference in cost can be presumed to be the cost of the solar panel and allowable battery storage and is eligible for the tax credit.

8) How does the federal tax credit for renewable energy equipment impact the state tax credit?

Both tax credits are calculated against the same installed cost. You do not have to subtract one before calculating the other. For instance, a \$10,000 photovoltaic system would be eligible for a \$3,500 State tax credit and a \$3,000 federal tax credit.

9) Does the tax credit require installers of renewable energy equipment to hold a specific license?

G.S. 105-129.16A makes no reference to specific licensing requirements. However, G.S. 87-43 states that any person “engaging or offering to engage in the business of installing, maintaining, altering or repairing any electric work, wiring, devices, appliances or equipment” must hold a license as an electrical contractor. Therefore, renewable energy equipment that produces electricity must be installed by a licensed electrical contractor. Renewable energy equipment that does not produce electricity must be installed by a contractor appropriately licensed in North Carolina. All systems must be installed in accordance with the North Carolina State building code and be inspected by the authority having jurisdiction (AHJ).

In the case of a nonbusiness installation, the system may be installed by the homeowner if the homeowner has received the permission of the electrical inspector or other relevant inspectors and the system is installed in accordance with the National Electrical Code and local building codes.

If you are looking for an installer, see:

- <http://www.greenprofessionals.org/> for a directory of renewable energy professionals maintained by the North Carolina Solar Center at N.C. State University;
- <http://www.nabcep.org/installer-locator?state=NC> for a list of photovoltaic and wind energy generator installers in North Carolina certified by the North American Board of Certified Energy Practitioners; and
- <http://www.igshpa.okstate.edu/directory/directory.asp> for a list of geothermal heat pump installers certified by the International Ground Source Heat Pump Association.

A taxpayer does not need to use installers found on these websites to qualify for the credit. They are listed here only for informational purposes.

10) If batteries are added to an existing system, do the batteries qualify for a tax credit?

A battery does not increase capacity to an existing system and is considered a repair or maintenance.

11) If part of a solar array is damaged and not replaced, thus reducing array capacity to less than 100% of the original capacity, does the whole installment expire or only a percentage?

A reduction in the capacity to produce renewable energy does not cause an installment of the tax credit to be reduced or to expire, as long as the system still produces renewable energy.

12) In a capital lease transaction where the lessee begins using the renewable energy property under a leasing agreement, is the lessor entitled to claim the renewable energy tax credit?

The lessor is entitled to claim the tax credit provided under N.C. Gen. Stat. § 105-129.16A if, under the leasing agreement, the lessee begins using the property to produce usable energy that is for sale or for another business purpose. The lessee is entitled to claim the credit if the lessor provides to the lessee a written certification that the lessor will not claim the credit.

13) A partnership qualifies for the renewable energy property tax credit and, in the year the qualifying property is placed in service, distributes the first installment of the credit to its two partners (Partner A and Partner B). In the second year, Partner B sells his interest in the partnership to a new partner (Partner C). Which partner (Partner B or Partner C) is entitled to the distributive share of the second installment of the tax credit?

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Unless the partnership agreement states otherwise, the distributive share of the second installment belongs to Partner C. If the change of ownership is not considered to be a termination of the partnership and/or a disposition of the renewable energy property for federal income tax purposes, then the partner that acquires a partnership interest from a former partner after the close of the first taxable year of the five-year tax credit period is allowed to claim the prior partner's allocable share of future installments of the North Carolina credit. Any unused portion of an installment that accrued during a prior year remains with the former partner.