

# OP 6: Clean and Renewable Energy

4 points available

## Rationale

This credit recognizes institutions that support the development and use of energy from clean and renewable sources.

## Applicability

This credit applies to institutions.

## Criteria

Institution supports the development and use of *clean and renewable energy sources*, using any one or combination of the following options:

### Clean and renewable electricity

1. Purchasing or otherwise importing electricity from certified/verified clean and renewable sources. This includes utility-provided green power purchasing options, power purchase agreements (PPAs) for electricity generated off-site, and equivalent products that bundle physical electricity with the right to claim its renewable energy attributes.
2. Generating electricity from clean and renewable sources on-site and retaining or retiring the rights to its renewable energy attributes. In other words, if the institution has sold *Renewable Energy Certificates* (RECs) or the equivalent for the clean and renewable energy generated, it may not claim such energy here. The on-site renewable energy generating devices may be owned and/or maintained by another party as long as the institution has contractual rights to the associated environmental attributes.

### Clean and renewable thermal energy

3. Using clean and renewable stationary fuels on-site to generate thermal energy, e.g., using certain types of biomass for heating (see Standards and Terms).
4. Purchasing or otherwise importing steam, hot water, and/or chilled water from certified/verified clean and renewable sources (e.g., a municipal geothermal facility).

### Unbundled renewable energy products

5. Purchasing RECs, *Guarantees of Origin* (GOs), *International RECs* (I-RECs), or equivalent unbundled renewable energy products certified by a third party (e.g., *Green-e* or *EKOenergy*).

Energy on the grid is indistinguishable by source. Therefore, neither the electric grid mix for the region in which the institution is located, nor the grid mix reported by the electric utility that serves the institution (i.e., the utility's standard or default product) count for this credit in the absence of RECs, GOs, I-RECs, or

equivalent products that document the renewable electricity delivered or consumed and give the institution to right to claim it as renewable.

Technologies that reduce the amount of energy used but do not generate renewable energy do not count for this credit (e.g., daylighting, passive solar design, ground-source heat pumps). The benefits of such strategies, as well as the improved efficiencies achieved through using cogeneration technologies, are captured by the Greenhouse Gas Emissions and Building Energy Efficiency credits.

Transportation fuels, which are covered by the Greenhouse Gas Emissions and Campus Fleet credits, are not included.

## Scoring

An institution earns the maximum of 4 points for this credit by obtaining energy from clean and renewable sources (Options 1-4) and/or by purchasing unbundled renewable energy products (Option 5) equivalent to 100 percent of total campus energy consumption. Incremental points are awarded based on the amount of clean and renewable energy generated or purchased compared to total campus energy consumption. For example, an institution that obtained an amount of energy from clean and renewable sources equivalent to 50 percent of its total energy consumption would earn 2 points (half of the points available for this credit).

Points for this credit are calculated automatically in the STARS Reporting Tool as follows:

Clean and renewable energy option	Factor		Energy products that meet criteria			Total energy consumption		Points earned
1. Imported green power	4	x	_____	÷		_____	=	
2. On-site renewables			_____					
3. Clean and renewable fuels used to generate thermal energy			_____					
4. Imported thermal energy from clean and renewable sources			_____					
5. Purchased RECs/GOs/I-RECs			_____					
Total points earned →								Up to 4

## Reporting Fields

Required

- Total energy consumption, performance year (MMBtu) (electric and non-electric) (See the Building Energy Efficiency credit for details.)
- Clean and renewable electricity (in kilowatt-hours):
  - Imported electricity from certified/verified clean and renewable sources (i.e., bundled green power purchases) (kWh)
 

If greater than zero, provide:

    - A brief description of the certified/verified sources of clean and renewable electricity
  - Electricity from on-site, clean and renewable sources (rights retained/retired) (kWh)
 

If greater than zero, provide:

    - A brief description of the on-site renewable electricity generating facilities/devices
- Clean and renewable stationary fuels and thermal energy (in millions of British thermal units):
  - Clean and renewable stationary fuels used on-site to generate thermal energy (MMBtu)
 

If greater than zero, provide:

    - A brief description of the clean and renewable stationary fuels
  - Imported steam, hot water, and/or chilled water from certified/verified clean and renewable sources (MMBtu)
 

If greater than zero, provide:

    - A brief description of the certified/verified sources of clean and renewable thermal energy
- Unbundled renewable energy products (in kilowatt-hours):
  - Purchased RECs, GOs, I-RECs or equivalent unbundled renewable energy products certified by a third party (kWh)
 

If greater than zero, provide:

    - A brief description of the unbundled renewable energy products (Include contract timeframes.)

## Optional

- Website URL where information about the institution's support for clean and renewable energy is available
- Electricity use, by source (percentage of total, 0-100). Report the institution's best estimate of the source of all electricity used, including the institution's regional grid mix (e.g., US eGRID subregion).
 

<ul style="list-style-type: none"> <li>○ Biomass</li> <li>○ Coal</li> <li>○ Geothermal</li> <li>○ Hydro</li> <li>○ Natural gas</li> </ul>	<ul style="list-style-type: none"> <li>○ Nuclear</li> <li>○ Solar photovoltaic</li> <li>○ Wind</li> <li>○ Other (please specify and explain)</li> </ul>
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- Energy used for heating buildings, by source (percentage of total, 0-100):
 

<ul style="list-style-type: none"> <li>○ Biomass</li> <li>○ Coal</li> <li>○ Electricity</li> </ul>	<ul style="list-style-type: none"> <li>○ Fuel oil</li> <li>○ Geothermal</li> </ul>
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- Natural gas
- Other (please specify and explain)
- Additional documentation to support the submission (upload)
- Data source(s) and notes about the submission
- Contact information for a responsible party (an employee who can respond to questions regarding the data once it is submitted and available to the public)

## Measurement

### Timeframe

Report the most recent data available from within the three years prior to the anticipated date of submission. Institutions may choose the annual start and end dates that work best with the data they have (e.g., fiscal or calendar year), as long as data are reported from a consecutive 12-month period.

### Sampling and Data Standards

Report all electricity, raw fuels, and other energy products used on-site by the institution (as the institution is defined in the overall STARS institutional boundary). Transportation fuels are excluded. Reporting on a sample or subset of energy generation and consumption is not allowed for this credit.

All reported energy figures should be based on site energy (the amount of energy consumed on campus) rather than source energy (the amount of energy consumed on campus plus the energy used off-site to generate and transport the energy to the institution).

Institutions that convert fuel on-site (e.g., on-campus cogeneration facilities and boilers) should report only the amount of fuel purchased/converted toward the total energy consumption figure, not the resulting heat, steam, hot/chilled water, or electricity.

MMBtu (one million British thermal units - a standard measure of energy) is used to aggregate energy consumption data from multiple sources. An institution must report electricity data in kilowatt-hours, which are converted to MMBtu automatically in the Reporting Tool using a factor of 0.003412. All other figures (i.e., for stationary fuels and thermal energy) must be converted into MMBtu using the following equivalents prior to being entered into the Reporting Tool:

Energy unit	MMBtu equivalent
1 therm	0.1
1 kBtu	0.001
1 ton-hour	0.012
1 MJ	0.000948

AASHE publishes a [unit conversion tool](#) that includes more detailed conversion factors (e.g., for liquid fuels). See also the International Energy Agency's [unit converter](#).

## **Standards and Terms**

### **Clean and renewable energy sources**

Consistent with the Green-e Framework for Renewable Energy Certification, clean and renewable energy sources include the following systems:

- Solar photovoltaic and solar thermal electric
- Geothermal systems that generate electricity
- Low-impact hydroelectric power
- Ocean-based energy captured through tidal, wave, or ocean thermal energy conversion technologies
- Wind

And solid, liquid, and gaseous forms of biomass from the following fuels:

- Energy crops that have a rotation less than 10 years (e.g., poplar, willow, or eucalyptus) and do not displace food production
- Agricultural crop residue
- Animal waste
- Landfill gas and wastewater methane
- Untreated wood waste (e.g., residues such as tops and limbs and urban wood waste)
- Other organic waste

To qualify, a biofuel must fully meet Green-e criteria, for example by addressing potential social and environmental impacts. Biodiesel (B100), biomethane, biogas, bioethanol, green diesel, and syngas may qualify if produced from one or more of the feedstocks listed above. Some waste-to-energy (WTE) technologies that use biogenic resources rather than municipal solid waste may also qualify. Fuel cells may qualify if powered by fuels derived from one or more of the clean and renewable resources listed above. See the Center for Resource Solutions [Green-e Framework for Renewable Energy Certification](#) for more information.

### **EKOenergy**

EKOenergy is an international ecolabel for electricity. In addition to being 100 percent renewable, the energy sold with the EKOenergy label fulfills additional environmental criteria and raises funds for new renewable energy projects.

### **Green-e**

Green-e, a program of the Center for Resource Solutions, is an independent certification and verification program for renewable energy and greenhouse gas emission reductions in the retail market. Green-e Climate is a voluntary certification program launched in 2008 that sets consumer-protection and environmental-integrity standards for greenhouse gas (GHG) emission reductions sold in the voluntary market. Green-e Energy is an independent certification and verification program for renewable energy.

### **Guarantees of origin**

A Guarantee of Origin (GO) is a certificate issued by European energy authorities to certify that electricity was produced from renewable energy sources.

### **Imported electricity**

Imported electricity includes all electricity purchased or otherwise obtained from off-campus sources.

**Imported thermal energy**

Imported thermal energy includes all steam, hot water, and chilled water purchased or otherwise obtained from off-campus sources.

**International RECs**

An International REC (I-REC) is a type of energy attribute certificate intended for regions without an existing or reliable energy attribute tracking framework.

**Renewable energy certificates**

The Center for Resource Solutions (CRS) Green-e provides the following definition of Renewable Energy Certificates (RECs) (also known as green tags, renewable energy credits, renewable electricity certificates, and tradable renewable certificates):

When a renewable energy facility operates, it creates electricity that is delivered into a vast network of transmission wires, often referred to as “the grid.” The grid is segmented into regional power networks called pools. To help facilitate the sale of renewable electricity nationally, a system was established that separates renewable electricity generation into two parts: the electricity or electrical energy produced by a renewable generator and the renewable “attributes” of that generation. (These attributes include the tons of greenhouse gas that were avoided by generating electricity from renewable resources instead of conventional fuels, such as coal, nuclear, oil, or gas.) These renewable (“green”) attributes are sold separately as renewable energy certificates (RECs). One REC is issued for each megawatt-hour (MWh) unit of renewable electricity produced. The electricity that was split from the REC is no longer considered “renewable” and cannot be counted as renewable or zero-emissions by whoever buys it.

RECs contain specific information about the renewable energy generated, including where, when, at what facility, and with what type of generation. Purchasers of RECs are buying the renewable attributes of those specific units of renewable energy, which helps offset conventional electricity generation in the region where the renewable generator is located.

## Credit Example: Clean and Renewable Energy

### Step 1. Gather required data

Example College used electricity and natural gas and purchased Renewable Energy Certificates (RECs) during the past year.

- Purchased electricity: 1,000,000 kWh
- Purchased natural gas: 10,000 therms
- Generated electricity from an on-site solar photovoltaic installation: 250 MWh (250,000 kWh)
- Purchased RECs: 300,000 kWh

Step 2. Copy the total energy consumption figure from the Building Energy Efficiency credit or else calculate total consumption by converting all energy use units to MMBtu

- Purchased electricity:  $1,000,000 \text{ kWh} \times 0.003412 \text{ MMBtu/kWh} = 3,412 \text{ MMBtu}$
- Purchased natural gas:  $10,000 \text{ Therms} \times 0.1 \text{ MMBtu/Therm} = 1,000 \text{ MMBtu}$
- On-site renewables:  $250,000 \text{ kWh} \times 0.003412 \text{ MMBtu/kWh} = 853 \text{ MMBtu}$

Step 3. Report clean and renewable energy in kWh (for electricity and RECs) or MMBtu (for stationary fuel and thermal energy)

- On-site renewables: 250,000 kWh
- Purchased RECs: 300,000 kWh

Points earned are automatically calculated based on MMBtu:

Points earned are automatically calculated based on MMBtu.							
Clean and renewable energy option	Factor		Energy generated or purchased that meets criteria (MMBtu)		Total energy consumption (MMBtu)		Points earned
1. Imported green power	4	×	0	÷	5,265	=	0
2. On-site renewables			853				0.77
3. Clean and renewable fuels used to generate thermal energy			0				0
4. Imported thermal energy from clean and renewable sources			0				0
5. Purchased RECs/GOs/I-RECs			1,023				0.93
Total points earned →							1.7