OP 5: Energy Use

Rationale

This credit recognizes institutions that are improving the energy efficiency of their buildings and supporting the use and development of energy from clean and renewable sources.

Applicability

Applicable to all institutions.

Points available

A maximum of 10 points are available for this credit.

Criteria

5.1 Energy consumption per square meter

An institution earns 3 points when its annual energy consumption per gross square meter of floor area is less than or equal to a benchmark for its peer group. Incremental points are available based on the institution's performance between a maximum threshold and the benchmark and earned as outlined in Tables I through IV.

Table I. Performance range by peer group

Peer group	A. Maximum threshold		B. Benchmark		C. Range
Associate's colleges, short-cycle institutions and pre-tertiary schools	698 kilowatt-hours (kWh) per square meter	-	149 kWh per square meter	=	549
Baccalaureate colleges and boarding schools	537 kWh per square meter	-	144 kWh per square meter	=	393
Master's colleges and universities	428 kWh per square meter	-	103 kWh per square meter	=	325
Doctoral universities and research institutions	688 kWh per square meter	-	123 kWh per square meter	=	565

Table II. Total annual energy consumption (MWh)

Total electricity consumption		Total stationary fuel consumption		Total heating and cooling from off-site sources		Total annual energy consumption
	+		+		=	

Table III. Annual energy consumption per square meter (kWh)

Total annual energy consumption (Table II)		Conversion factor		Gross floor area of building space		Annual energy consumption per square meter
	×	1,000	÷		=	

Table IV. Points earned for indicator 5.1

Maximum threshold (Table I, column A)		Annual energy consumption per square meter (Table III)		Range (Table I, column C)		Points available		Points earned
	-		÷		×	3	=	

Measurement

Report the most recent annual data available from within the previous three years. Use the most recent single year for which data are available or the annual average from throughout the period. An institution may choose the start and end dates that work best with the data available (e.g., fiscal or calendar year), as long as data are reported from a consecutive 12 month (or three year) period.

Report floor area for the same time period as that from which energy data are drawn, e.g., an average from throughout the performance period or a snapshot at a single representative point.

Documentation

Report the following information in the online Reporting Tool, converting **site energy** figures to megawatt-hours (MWh) using the STARS energy calculator or an equivalent resource.

- Performance year for energy use (required). The year the performance period ended.
- Peer group (required)
    - Associate's colleges, short-cycle institutions, and pre-tertiary schools
    - Baccalaureate colleges and boarding schools

    - Master's colleges and universities
    - Doctoral universities and research institutions

- **Gross floor area of building space** (required). Square meters. To convert square feet to square meters, multiply by 0.09290304. Parking structures are excluded.

Electricity

- Electricity generated by on-site renewable systems (required). Megawatt-hours. Include the total amount of electricity generated by renewable systems located on campus, including power exported to the grid.

  If the preceding figure is greater than zero, the following two fields are also required:

    - Description of the on-site renewable systems

    - On-site renewable electricity exported. Megawatt-hours. This figure is subtracted from the renewable generation figure to calculate annual energy consumption.

- Electricity from off-site sources (required). Megawatt-hours. Include all electricity procured from off-site suppliers.

Stationary fuels

Include all liquid, solid, and gaseous fuel products sourced during the performance year for the purpose of producing electricity and/or thermal energy, irrespective of whether they were used or not. Transportation fuels are excluded.

- Natural gas (required). Megawatt-hours.
- Propane/LPG (required). Megawatt-hours.
- Heating oil (required). Megawatt-hours.
- Coal/coke (required). Megawatt-hours.
- Bioenergy products (required). Megawatt-hours.
- Other stationary fuels (required). Megawatt-hours.

Heating and cooling from off-site sources

Include all district heating and cooling products sourced during the performance year from a utility or municipal facility.

- Steam from off-site sources (required). Megawatt-hours.
- Hot water from off-site sources (required). Megawatt-hours.
- Chilled water from off-site sources (required). Megawatt-hours.

The Reporting Tool will automatically calculate the following five figures:

- Total electricity consumption. Megawatt-hours.
- Total stationary fuel consumption. Megawatt-hours.
- Total heating and cooling from off-site sources. Megawatt-hours.
- Total annual energy consumption. Megawatt-hours.
- Annual energy consumption per unit of floor area. Kilowatt-hours per square meter.

5.2 Energy consumption per person

An institution earns 3 points when its annual energy consumption per **full-time equivalent** of students and employees is less than or equal to a benchmark for its peer group. Incremental points are available based on the institution's performance between a maximum threshold and the benchmark and earned as outlined in Tables V through VIII.

Table V. Performance range by peer group

Peer group	A. Maximum threshold		B. Benchmark		C. Range
Associate's colleges, short-cycle institutions, and pre-tertiary schools	11,731 kWh per person	-	1,123 kWh per person	=	10,608
Baccalaureate colleges and boarding schools	31,005 kWh per person	-	2,419 kWh per person	=	28,586
Master's colleges and universities	17,895 kWh per person	-	1,282 kWh per person	=	16,613
Doctoral universities and research institutions	28,585 kWh per person	-	2,830 kWh per person	=	25,755

Table VI. Full time equivalent students and employees

Full-time equivalent student enrollment		Full-time equivalent of employees		Full-time equivalent students and employees
	+		=	

Table VII. Annual energy consumption per person (kWh)

Total annual energy consumption (Table II)		Conversion factor		Full-time equivalent students and employees (Table VI)		Annual energy consumption per person

	×	1,000	÷		=	

Table VIII. Points earned for indicator 5.2

Maximum threshold (Table V, column A)		Annual energy consumption per person (Table VII)		Range (Table V, column C)		Points available		Points earned
	-		÷		×	3	=	

Measurement

Report population figures from the same time period as that from which energy data are drawn, e.g., an average from throughout the performance period or a snapshot at a single representative point.

Documentation

Report the following information in the online Reporting Tool.

- Full-time equivalent student enrollment (required)
- Full-time equivalent of employees (required)

The Reporting Tool will automatically calculate the following two figures:

- Full-time equivalent students and employees
- Annual energy consumption per person. Kilowatt-hours.

5.3 Percentage of energy from renewable sources

An institution earns 3 points when 100 percent of its annual energy consumption is from **renewable sources**. Incremental points are available and earned as outlined in Tables IX through XIV.

Table IX. Electricity from on-site renewable systems, rights retained/retired

Electricity generated by on-site renewable systems (reported for indicator 5.1)		**Energy attribute certificates (EACs)** sold or not owned by the institution		Electricity from on-site renewable systems, rights retained/retired
	-		=	

Table X. Electricity from renewable sources

Source/type	MWh
A. Electricity from on-site renewable systems, rights retained/retired (Table IX)	
B. Electricity from certified off-site renewable sources	
C. Electricity from uncertified off-site renewable sources	
D. Certified unbundled EACs	
Total* →	

* The sum of B, C, and D cannot exceed electricity from off-site sources reported for indicator 5.1.

Table XI. Renewable stationary fuels

Source/type	MWh
A. Certified bioenergy products	
B. Uncertified biomethane from organic waste or landfill gas	
Total →	

Table XII. Heating and cooling from off-site renewable sources

Source/type	MWh
A. Heating and cooling from certified off-site renewable sources	
B. Heating and cooling from uncertified off-site renewable sources	
Total →	

Table XIII. Annual renewable energy consumption

Electricity from renewable sources (Table X)		Renewable stationary fuels (Table XI)		Heating and cooling from off-site renewable sources (Table XII)		Total
	+		+		=	

Table XIV. Points earned for indicator 5.3

Annual renewable energy consumption (Table XIII)		Total annual energy consumption (Table II)		Points available		Points earned
	÷		×	3	=	

Measurement

Report on the same performance period used in indicator 5.1.

The percentage of a utility's standard or default product that is traceable to renewable sources may be included as electricity from uncertified off-site renewable sources to the extent that the renewable attributes of the energy are retained or retired on behalf of the institution (or a group including the institution) and that no other entities can lay claim to the renewable attributes of the same megawatt-hour of generation. An institution whose electricity supplier does not offer a bundled product or retain or retire the renewable attributes of its standard or default product on behalf of its customers may report the percentage of the utility's **residual supply** that is renewable and has not been claimed in compliance or voluntary markets.

For information about AASHE-approved equivalents, see the STARS Help Center.

Documentation

Report the following information in the online Reporting Tool, with energy figures provided in megawatt-hours (MWh). Each MWh may only be counted once, i.e., in no more than one of the documentation fields provided.

Contractual instruments for renewable electricity

- Energy attribute certificates (EACs) sold or not owned by the institution (required). Megawatt-hours. Report the amount of on-site renewable electricity used on-site, but for which the institution does not have the right to claim the renewable attributes. This may include energy attribute certificates (EACs) and equivalent contractual instruments that have been sold by the institution (directly or through arbitrage) and electricity for which the rights to the renewable attributes are otherwise owned by another entity.

- Electricity from certified off-site renewable sources (required). Megawatt-hours. Include electricity products that 1) bundle delivered electricity with EACs or equivalent contractual instruments that document and give the institution the right to claim the renewable attributes of the electricity delivered and 2) are certified by the Green-e® Energy program, EKOenergy, the Low Impact Hydropower Institute (LIHI), UL ECOLOGO®, or AASHE-approved equivalent.

  If the amount of certified renewable electricity products is greater than zero, the following field is also required:

  - Description of the certified off-site renewable sources of electricity

- Electricity from uncertified off-site renewable sources (required). Megawatt-hours. Include any remaining electricity procured through green power purchasing programs, power purchase agreements (PPAs), and/or equivalent products that bundle delivered electricity with EACs or equivalent contractual instruments that document and give the institution the right to claim the renewable attributes of the electricity delivered.

  If the amount of uncertified off-site renewable electricity products is greater than zero, the following field is also required:

  - Description of the uncertified off-site renewable sources of electricity

- Certified unbundled EACs (required). Megawatt-hours. Include RECs, GOs, and I-RECs that are 1) procured independently of delivered electricity and 2) certified by EKOenergy, the Green-e® Energy program, or AASHE-approved equivalent. This may include EACs obtained through arbitrage.

  If the amount of certified unbundled EACs is greater than zero, the following field is also required:

  - Description of the certified unbundled EACs. Include information about each product for which points are being claimed, including the specific certification and contract timeframe.

Renewable stationary fuels

Convert all units to MWh using the STARS energy calculator or an equivalent resource. Include products sourced during the performance year for the purpose of producing electricity and/or thermal energy, irrespective of whether they were used or not.

- Certified bioenergy products (required). Megawatt-hours. Include solid biomass, liquid biofuels, and biogas products that are certified by EKOenergy, the Green-e® Renewable Fuels program, the Roundtable on Sustainable Biofuels (RSB), or AASHE-approved equivalent. Unless otherwise specified in an approved standard, qualifying products are limited to those originating from biogenic waste, production residues, and short rotation woody crops.

  If the amount of certified bioenergy products is greater than zero, the following field is also required:

  - Description of the certified bioenergy products

- Uncertified biomethane from organic waste or landfill gas (required). Megawatt-hours. Include biomethane, also known as renewable natural gas (RNG), from 1) projects that use anaerobic digestion to convert the energy in organic feedstocks (e.g., food waste, landscaping waste, and wastewater) into fuel and/or 2) landfill gas (LFG) methane projects that capture biogas produced in a landfill and process the gas into biomethane. To qualify, the renewable attributes of the fuel must be retained or retired on behalf of the institution (or a group including the institution) and no other entities can lay claim to the attributes from the same megawatt-hour of energy.

If the amount of uncertified biomethane is greater than zero, the following field is also required:

- Description of the uncertified biomethane products

Heating and cooling from off-site renewable sources

For example, district steam or hot water supplied by a municipal geothermal system. Convert all units to MWh using the STARS energy calculator or an equivalent resource.

- Heating and cooling from certified off-site renewable sources (required). Megawatt-hours. Include district heating and cooling products that are certified by EKOenergy or AASHE-approved equivalent.

  If the amount of certified heating and cooling from off-site renewable sources is greater than zero, the following field is also required:

  - Description of the certified off-site renewable sources of heating and cooling

- Heating and cooling from uncertified off-site renewable sources (required). Megawatt-hours. Include district heating and cooling products sourced during the performance year that meet EKOenergy baseline criteria for renewable heat or cold or AASHE-approved equivalent. To qualify, the renewable attributes of the thermal energy must be retained or retired on behalf of the institution (or a group including the institution) and no other entities can lay claim to the attributes from the same megawatt-hour of energy.

  If the amount of uncertified heating and cooling from off-site renewable sources is greater than zero, the following field is also required:

  - Description of the uncertified off-site renewable sources of heating and cooling

Demand reduction (optional)

- Description of any cogeneration, solar thermal, geothermal, or similar technologies used by the institution that reduce the demand for non-renewable energy (optional)

The Reporting Tool will automatically calculate the following six figures:

- Electricity from on-site renewable systems, rights retained/retired. Megawatt-hours.
- Electricity from renewable sources. Megawatt-hours.
- Renewable stationary fuels. Megawatt-hours.
- Heating and cooling from off-site renewable sources. Megawatt-hours.
- Annual renewable energy consumption. Megawatt-hours.
- Percentage of energy from renewable sources

5.4 Percentage of electricity from on-site or certified renewable sources

An institution earns 1 point when it supports the development of clean and renewable energy sources to the extent that the energy represented by the options listed below amounts to 100 percent of total electricity consumption. Incremental points are available and earned as outlined in Tables XV and XVI.

Table XV. On-site and third party certified renewable power

Option (all figures reported for indicator 5.2)	MWh
A. Electricity from on-site renewable systems, rights retained/retired	
B. Electricity from certified off-site renewable sources	
C. Certified unbundled EACs	
Total →	

Table XVI. Points earned for indicator 5.4

On-site and third party certified renewable power (Table XV)		Total electricity consumption (reported for indicator 5.1)		Points available		Points earned
	÷		×	1	=	Up to 1

Measurement

The figures required for this indicator are automatically drawn from indicators 5.1 and 5.3.

Documentation

The Reporting Tool will automatically calculate the following two figures:

- On-site and/or third party certified renewable power. Megawatt-hours.
- Percentage of electricity from on-site and/or third party certified renewable sources

Glossary

Energy attribute certificates (EACs) – Contractual instruments that represent and convey all attributes of renewable electricity generation, without requiring that the electricity itself be sold with the attributes. When a generator delivers electricity to the grid, it is able to sell these attributes in the

form of an EAC to another party who draws electricity from the grid, as a means of tracking who is buying and using the renewable electricity. Examples of EACs include:

- Renewable Energy Certificates (RECs): market-based instruments that represent the rights to the environmental, social, and other non-power attributes of renewable electricity generation.
- Guarantees of Origin (GOs): Certificates issued by European energy authorities to certify that electricity was produced from renewable energy sources.
- International RECs (I-RECs): a type of energy attribute certificate intended for regions without an existing or reliable energy attribute tracking framework.

Full-time equivalent (FTE) – A unit used to measure employed persons or students in a way that makes them comparable although they may work or study a different number of hours per week. An institution should report its best estimates for FTE figures, annualized as feasible and calculated according to relevant national, regional or international standards. IPEDS, for example, calculates the number of FTE staff by summing the total number of full-time staff and adding one-third of the total number of part-time staff. [Adapted from the definition used by Eurostat.]

Gross floor area of building space – The total amount of building space included within the institutional boundary. Any standard definition of building space may be used (e.g., ASHRAE, ANSI/BOMA, IECC) as long as it is used consistently. Unless otherwise specified, parking structures are excluded. Buildings within the overall STARS boundary that the institution leases entirely (i.e., the institution is the only tenant) should be included. Buildings that are not owned by the institution, but for which the institution is one of multiple tenants may be excluded. If the institution chooses to include such buildings, it should include all multi-tenant buildings that are within the institution's overall STARS boundary and for which the institution is a tenant. If an institution chooses to include leased spaces, the institution should count only the square footage of building space it occupies and not the entire building.

Renewable sources – Energy sources that are inexhaustible, i.e., that restore themselves over short periods of time and do not diminish. The following energy sources qualify as renewable:

- Solar
- Wind
- Geothermal
- Hydropower
- Ocean-based energy captured through tidal, wave, or ocean thermal energy conversion technologies
- Solid, liquid, and gaseous forms of biomass from biogenic waste, production residues, and/or short rotation woody crops
- Renewable hydrogen (hydrogen produced using electricity from renewable sources)

[Adapted from the definitions used by the Center for Resource Solutions (CRS) and the US Environmental Protection Agency (EPA).]

Residual supply – The mix of generation supplying the electrical grid that has not been exclusively claimed by consumers. For example, the mix of electricity supplied to an institution through the grid once all exclusive renewable energy purchasing claims (e.g., as documented in the form of EACs and other contractual instruments) have been removed is referred to as the residual supply.

Site energy – The amount of heat and electricity consumed by a building as reflected in utility bills. Site energy may be delivered to a facility in one of two forms. Primary energy is the raw fuel that is burned to create heat and electricity, such as natural gas or fuel oil. Secondary energy is the energy product created from a raw fuel, such as electricity purchased from the grid or heat received from a district steam system. When an institution purchases a raw fuel (e.g., natural gas) to produce thermal energy and/or electricity on site, only the fuel input should be included in the institution's total site energy use. To include both the raw fuel and the resulting energy would be duplicative. [Adapted from the definition used by ENERGY STAR Portfolio Manager.]