OP 21: Water Use

4-6 points available

Rationale

This credit recognizes institutions that have reduced water use. By reducing campus water withdrawal, institutions can reduce pressures on local aquifers, streams, rivers, lakes, and aquatic wildlife.

Applicability

This credit applies to all institutions.

Criteria

Part 1. Reduction in potable water use per person

Institution has reduced its annual *potable water* use per *weighted campus user* compared to a baseline.

Part 2. Reduction in potable water use per unit of floor area

Institution has reduced its annual potable water use per gross square metre or foot of floor area compared to a baseline.

Part 3. Reduction in total water withdrawal per unit of vegetated grounds

Institution has reduced its total annual water use (potable + non-potable) per hectare or acre of *vegetated grounds* compared to a baseline.

Scoring

Each part is scored independently.

This credit is weighted more heavily for institutions located in areas of water stress and scarcity and less heavily for institutions in areas with relative water abundance. The points available for each part of this credit are determined by the level of ”Physical Risk Quantity” for the institution’s main campus, as indicated by the World Resources Institute Aqueduct Water Risk Atlas. The number of points available is automatically calculated in the online Reporting Tool as detailed in the following table:

Physical Risk QUANTITY	Points available for each part	Total available points for this credit
Low and Low to Medium Risk	1⅓	4
Medium to High Risk	1⅔	5
High and Extremely High Risk	2	6

Points earned are calculated according to the formulas below. Please note that users do not have to calculate the number of points available and the number of points earned themselves; points will be calculated automatically when the data listed under Reporting Fields is entered in the online Reporting Tool. STARS awards only positive points; points will not be deducted if normalized water use increased rather than decreased during the time period.

Part 1

An institution earns the maximum points available for Part 1 of this credit by achieving a 30 percent or larger reduction in potable water use per weighted campus user compared to a baseline. Incremental points are awarded for smaller reductions. For example, an institution that reduced its potable water use by 15 percent would earn half of the points available for Part 1.

$$\text{Points earned} = [E / 0.3] \times \{ [(A / B) - (C / D)] / (A / B) \}$$

A = Potable water use, baseline year (cubic metres or US gallons)
B = Weighted campus users, baseline year
C = Potable water use, performance year (cubic metres or US gallons)
D = Weighted campus users, performance year
E = Points available for Part 1

Part 2

An institution earns the maximum points available for Part 2 of this credit by achieving a 30 percent or larger reduction in potable water use per gross square metre or foot of floor area compared to a baseline. Incremental points are awarded for smaller reductions. For example, an institution that reduced its potable water use by 15 percent would earn half of the points available for Part 2.

$$\text{Points earned} = [E / 0.3] \times \{ [(A / B) - (C / D)] / (A / B) \}$$

A = Potable water use, baseline year (cubic metres or US gallons)
B = Gross floor area of building space, baseline year (square metres or feet)
C = Potable water use, performance year (cubic metres or US gallons)
D = Gross floor area of building space, performance year (square metres or feet)
E = Points available for Part 2

Part 3

An institution earns the maximum points available for Part 3 of this credit by achieving a 30 percent or larger reduction in total water use per hectare or acre of vegetated grounds compared to a baseline. Incremental points are awarded for smaller reductions. For example, an institution that reduced its total water use by 15 percent would earn half of the points available for Part 3.

$$\text{Points earned} = [E / 0.3] \times \{ [(A / B) - (C / D)] / (A / B) \}$$

A = Total water use, baseline year (cubic metres or US gallons)
B = Area of vegetated grounds, baseline year (hectares or acres)
C = Total water use, performance year (cubic metres or US gallons)
D = Area of vegetated grounds, performance year (hectares or acres)
E = Points available for Part 3

Reporting Fields

Required

Part 1

- □ Level of ”Physical Risk Quantity” for the institution’s main campus as indicated by the World Resources Institute Aqueduct Water Risk Atlas (Low, Low to Medium, Medium to High, High, or Extremely High)
- □ Total water withdrawal (potable and non-potable combined), performance year (cubic metres or US gallons)
- □ Potable water use, performance year (cubic metres or US gallons)
- □ Total water withdrawal (potable and non-potable combined), baseline year (cubic metres or US gallons)
- □ Potable water use, baseline year (cubic metres or US gallons)
- □ Start date, performance year or 3-year period
- □ End date, performance year or 3-year period
- □ Start date, baseline year or 3-year period
- □ End date, baseline year or 3-year period

  If end date of the baseline year/period is 2004 or earlier, provide:
  - A brief description of when and why the water use baseline was adopted (e.g., in sustainability plans and policies or in the context of other reporting obligations)
- □ Figures needed to determine weighted campus users during the performance year:
  - Number of students resident on-site, performance year
  - Number of employees resident on-site, performance year
  - Number of other individuals resident on-site, performance year
  - Total full-time equivalent student enrollment, performance year
  - Full-time equivalent of employees, performance year
  - Full-time equivalent of students enrolled exclusively in distance education, performance year
- □ Figures needed to determine weighted campus users during the baseline year:
  - Number of students resident on-site, baseline year
  - Number of employees resident on-site, baseline year
  - Number of other individuals resident on-site, baseline year
  - Total full-time equivalent student enrollment, baseline year
  - Full-time equivalent of employees, baseline year
  - Full-time equivalent of students enrolled exclusively in distance education, baseline year

Part 2

- □ *Gross floor area of building space*, performance year (square metres or feet)
- □ Gross floor area of building space, baseline year (square metres or feet)

Part 3

- □ Area of vegetated grounds, performance year (hectares or acres)
- □ Area of vegetated grounds, baseline year (hectares or acres)

Optional

- □ A brief description of any of the following water conservation and efficiency initiatives employed by the institution:
    - Behavior change, e.g. initiatives to shift individual attitudes and practices such as signage and competitions
    - Water recovery and reuse
    - Initiatives to replace plumbing fixtures, fittings, appliances, equipment, and systems with water-efficient alternatives (e.g., building retrofits)
- □ Website URL where information about the institution's water conservation and efficiency efforts is available
- □ 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

Performance Year

Report the most recent data available from within the three years prior to the anticipated date of submission. Institutions may use the most recent single year for which data is available or an average from throughout the period. 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 (or 3-year) period.

Report building space, campus area, and population figures from the same time period as that from which water use data are drawn (e.g., the consecutive 12-month or 3-year period that most closely overlaps with the water use performance period). Institutions may report building space and campus area using an average from throughout the period or a snapshot at a single representative point during the period.

Baseline Year

Report data from the baseline year, which may be:

- Any year from 2005 to the present
- A baseline year, 1990 to 2004, that the institution has adopted as part of its sustainability plans or policies or in the context of other reporting obligations

Recommended best practices for defining a baseline include:

- Using the average of three consecutive years to reduce the impact of outliers.

- Using the same baseline year for multiple credits to reduce reporting requirements. For example, institutions using 2005 for all STARS credits that are baseline-based would only have to calculate baseline weighted campus user data once.
- Ensuring that baseline and performance year data are valid and reliable (e.g., that the data were gathered in the same manner)

Institutions without valid and reliable historical data should use performance year data for both the baseline and performance year. Following this approach, an institution would not be able to claim points for reductions during its first STARS submission, but would be able to use its newly established baseline for subsequent submissions.

Institutions may choose the 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 (or 3-year) period.

Report building space, campus area, and population figures from the same period as that from which water use data are drawn (e.g., the consecutive 12-month or 3-year period that most closely overlaps with the water use baseline period). Institutions may report building space and campus area using an average from throughout the period or a snapshot at a single representative point during the period.

Sampling and Data Standards

Total water withdrawal is the total volume of water, potable and non-potable, withdrawn by the institution regardless of source, i.e.:

- surface water
- groundwater
- rainwater harvested directly and stored by the institution for use,
- reclaimed wastewater from off-campus sources, and
- water from municipal water supplies and water utilities.

To the extent possible, include all water that was withdrawn by the institution when reporting total water withdrawal for this credit; reporting on a sample or subset of water use is not allowed. If data on water use values are not available, institutions may work with their facilities department and water utility to estimate usage figures based on billing totals.

Water that is *recycled/reused* on campus should only be counted toward water use once (at initial withdrawal from its source) and excluded at subsequent uses.

Athletic fields and land dedicated to food production may be excluded from the area of vegetated grounds as long as they are excluded from both baseline year and performance year data. The footprint of buildings and other structures with green roofs may be included in the area of vegetated grounds.

Standards and Terms

Gross floor area of building space
Gross floor area of building space refers to the total amount of building space that is 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. Parking structures are included. For guidance on

calculating gross square footage of a building, you may also consult 3.2.1 Gross Area of the U.S. Department of Education's Postsecondary Education Facilities Inventory and Classification Manual.

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 and in which the institution is one of multiple tenants may be excluded. If the institution chooses to include such buildings, it must include all multi-tenant buildings that are included in the institution's overall STARS boundary and in which the institution is a tenant; institutions cannot choose to include some leased spaces and omit others. 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.

Potable water
Potable water (or "finished" water) is water that meets local and/or national standards governing drinking water. By contrast, non-potable water is water that does not, or may not, meet drinking water quality standards.

Recycled/reused water
Recycled/reused water includes water reused in closed loop systems, graywater that is recovered and reused, and blackwater that is reclaimed and reused. Reuse applications may include, but are not limited to, agricultural and landscape irrigation, industrial and cooling processes, and toilet flushing. Recycled/reused water includes water that is treated prior to reuse and water that is not treated prior to reuse.

Total campus area
The total amount of land within the institutional boundary, including the footprint of the institution's buildings.

Vegetated grounds
The area of vegetated grounds equals *total campus area* minus the footprint of buildings and non-vegetated surfaces (e.g., permeable or impermeable pavement). The footprint of buildings with green roofs may be included as vegetated grounds.

Weighted campus user
Weighted campus user is a measurement of an institution's population that is adjusted to accommodate how intensively certain community members use the campus. This figure is used to normalize resource consumption and environmental impact figures in order to accommodate the varied impacts of different population groups. For example, an institution where a high percentage of students live on campus would witness higher greenhouse gas emissions, waste generation, and water consumption figures than otherwise comparable non-residential institution since students' residential impacts and consumption would be included in the institution's totals.

STARS calculates the figure according to the following formula. Please note that users will not have to calculate this figure themselves; the result will be calculated automatically when the data are entered into the online Reporting Tool.

Weighted campus users = (A + B + C) + 0.75 [(D - A) + (E - B) – F]

A = Number of students resident on-site
B = Number of employees resident on-site
C = Number of other individuals resident on-site and/or in-patient hospital beds
D = Total full-time equivalent student enrollment
E = Full-time equivalent of employees
F = Full-time equivalent of students enrolled exclusively in distance education

Scoring Example: Water Use

Example College's "Physical Risk QUANTITY" for water is High according to the World Resources Institute's Aqueduct Water Risk Atlas, making 2 points available for each part of the credit.

Part 1

- Used 1,000,000 gallons of potable water in 2005 (A)
- Had 2,000 weighted campus users in 2005 (B)
- Used 900,000 gallons of potable water in 2018 (C)
- Had 2,000 weighted campus users in 2018 (D)

Points earned = (2 / 0.3) × { [(A / B) - (C / D)] / (A / B) }
= 6.67 × { [(1,000,000 / 2,000) - (900,000 / 2,000)] / (1,000,000 / 2,000) }
= 6.67 × { [500 - 450] / 500 }
= 6.67 × 50 / 500
= 6.67 × 0.10
= 0.67 points

Part 2

- Used 1,000,000 gallons of potable water in 2005 (A)
- Had 2,000,000 gross square feet of floor area in 2005 (B)
- Used 900,000 gallons of potable water in 2018 (C)
- Had 2,500,000 gross square feet of floor area in 2018 (D)

Points earned = (2 / 0.3) × { [(A / B) - (C / D)] / (A / B) }
= 6.67× { [(1,000,000 / 2,000,000) - (900,000 / 2,500,000)] / (1,000,000 / 2,000,000) }
= 6.67 × { [0.5 – 0.36] / 0.5 }
= 6.67 × 0.14 / 0.5
= 6.67 × 0.28
= 1.87 points

Part 3

- Used 1,000,000 gallons of potable and non-potable water in 2005 (A)
- Had 100 acres of vegetated grounds in 2005 (B)
- Used 900,000 gallons of potable and non-potable water in 2018 (C)

- Had 120 acres of vegetated grounds in 2018 (D)

Points earned = (2 / 0.3) × { [(A / B) - (C / D)] / (A / B) }
= 6.67 × { [(1,000,000 / 100) - (900,000 / 120)] / (1,000,000 / 100) }
= 6.67 × { [10,000 – 7,500] / 10,000 }
= 6.67 × 2,666.67 / 11,000
= 6.67 × 0.25
= 1.67 points