Rating System

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Acknowledgements

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Abbreviations

AMI   advanced metering infrastructure

ASCE   American Society of Civil Engineers

BAS   building automation system

BIS   Bureau of Indian Standards

CEA   Central Electricity Authority

DES   district energy system

EMS   energy management system

GIS   geographic information system

HVAC   heating, ventilation, and air-conditioning

IEEE   Institute of Electrical and Electronics Engineers

ISO   independent system operator

MAIFI   momentary average interruption frequency index

MED   major event day (defined in IEEE 1366)

NESC   National Electrical Safety Code

REC   renewable energy certificate

RTO   regional transmission operator

SAIDI   system average interruption duration index

SAIFI   system average interruption frequency index

SCADA   supervisory control and data acquisition

SEEC   system energy efficiency coefficient

VAR   volt-ampere reactive

RR Prerequisite: Reliability Performance Monitoring

Applicability:

- Cities and Utilities
- Campuses
- Transit

INTENT

To ensure data collection, monitoring, and reporting of power interruptions.

REQUIREMENTS

All Projects

Install infrastructure and/or develop formal processes to continuously monitor and record interruptions for the complete project distribution network at high, medium, and low voltage levels. Use the standard database structure specified in the PEER Reference Guide to document interruption data for all applicable system voltage levels for at least three months.

Cities and Utilities

Projects without existing monitoring capability must commit to a plan to monitor and record interruptions in the distribution network at the low voltage level within three years and incorporate the necessary infrastructure as part of the project's energy infrastructure improvement plan.

Campuses

The infrastructure and/or processes must address, at a minimum, interruptions at the building level for all buildings and loads that are centrally operated by the project. Commit to a plan to install automated interruption monitoring within three years.

Transit

The infrastructure and/or process must address, at minimum, interruptions at traction and non-traction loads operated by the project. In addition, commit to a plan to establish automated infrastructure for interruption monitoring within three years.

STANDARDS AND REFERENCES

Institute of Electrical and Electronics Engineers (IEEE) Guide for Collecting, Categorizing and Utilizing Information Related to Electric Power Distribution Interruption Events – IEEE Standard 1782 – 2014.

Reliability Monitoring and Data Collection – Guiding document.

RR Credit: Reliability Performance Assessment

Applicability:

- Cities and Utilities (1–6 points)
- Campuses (1–6 points)
- Transit (1–6 points)

INTENT

To give operators and customers greater transparency on interruption duration and frequency.

REQUIREMENTS

All Projects

Calculate SAIDI and SAIFI based on the interruption data recorded by the project, as specified in IEEE 1366. Report reliability indices for the three most recent years. If data for the full three years are not available, report indices for at least the most recent year, and provide justification for the missing data. At a minimum, projects should have a manual process at the low voltage level to monitor and report SAIDI and SAIFI interruption data.

Points are awarded according to Tables 1 and 2, where the values for duration and frequency of outages are maximums.

Table 1. Points for SAIDI

Average annual SAIDI performance value (In minutes)		Points
Cities and Utilities	**Campuses and Transit**	
≤ 164	≤ 49	1
129	18	2
94	1	3

Table 2. Points for SAIFI

Average annual SAIFI performance value (In numbers)		Points
Cities and Utilities	**Campuses and Transit**	
≤ 1.58	≤ 0.6	1
1.16	0.2	2
0.75	0.02	3

Cities and Utilities

Calculate reliability indices both with and without major event days (MEDs) as specified in IEEE 1366. Commit to disclosing the former in regulatory filings and annual performance reports; use the latter for the PEER submission.

Campuses

For each year, calculate reliability indices with major event days (MEDs) as specified in IEEE 1366. Calculate the average of these values for scoring purposes.

Transit

Use methodology described in IEEE 1366 to calculate reliability indices with number of trips scheduled and affected due to power interruption. For each year, calculate reliability indices including Major Event Days (MEDs) as specified in the methodology.

All Projects

Projects that estimate customer interruption cost, which assess and monetize the economic benefits customers receive from reliability improvement earn 1 additional point for exemplary performance under the Innovation credit category.

STANDARDS AND REFERENCES

Institute of Electrical and Electronics Engineers (IEEE) 1366-2012 Guide for Electric Power Distribution Reliability Indices

Interruption Cost Estimator (ICE) Calculator - https://www.icecalculator.com/

RR Credit: Momentary Interruption Tracking

Applicability:

- Cities and Utilities (1 point)
- Campuses (1 point)
- Transit (1 point)

INTENT

To support effective grid management and identify opportunities to improve reliability by tracking momentary interruptions.

REQUIREMENTS

All Projects

OPTION 1. Reporting of Momentary Interruptions (1 point)

Calculate the project's annual momentary average interruption frequency index (MAIFI) or momentary average interruption event frequency index (MAIFI$_E$) as specified in IEEE 1366.

OR

OPTION 2. Monitoring Capability for Momentary Interruptions (1 point)

Have in place infrastructure to monitor the operation of all interrupting devices used in the project's distribution network. Provide data for at least three months.

STANDARDS AND REFERENCES

Institute of Electrical and Electronics Engineers 1366-2012 Guide for Electric Power Distribution Reliability Indices

RR Credit: Damage and Exposure Prevention

Applicability:

- Cities and Utilities (1–6 points)
- Campuses (1–6 points)
- Transit (1–6 points)

INTENT

To improve project reliability and power quality by protecting infrastructure from common external threats that may damage equipment, cause malfunctions, or interrupt service.

REQUIREMENTS

All Projects

OPTION 1. External Damage Prevention (1 point)
Implement preventive measures to avoid infrastructure damage and/or service interruption from at least four of the following external risks:

- Tree contact
- Animal or bird contact
- Fire or hazardous area
- Weather effects
- Acts of terrorism and vandalism
- Vehicular interference

AND/OR

OPTION 2. Power System Hardening (1–3 points)
Have in place the following design considerations and/or infrastructure to harden power systems against flooding, storms, and other extreme events.

- **Flooding avoidance (1 point):** Implement one of the following strategies to prevent damage to electrical equipment and assets (e.g., substations, diesel generator sets, transformers, OH cables) and ancillary equipment (e.g., pumps, compressors), based on a 100-year flood mark or flood map. Protect stored fuel to meet or exceed the requirements set by the authority having jurisdiction.
    - **Strategy 1.** Build a permanent storm water drainage system to protect critical power assets from inundation.
      OR
    - **Strategy 2.** Install a standalone pump to pump water from low-lying areas around the electrical systems. The pump should be operable in the absence of power supply.
      OR
    - **Strategy 3.** Permanently relocate or increase the height of critical power assets in the flood-prone area as described in ASCE - Chapter 7, 24 or equivalent.
- **Storm protection (1 point):** Ensure that the outdoor equipment can withstand three-second wind gusts up to 140 mph or equivalent.
- **Seismic protection (1 point):** Have in place seismic restraint–certified equipment for critical electrical systems and/or install a seismic restraint structural support for critical electrical systems, based on the seismic zone.

AND/OR

OPTION 3. Undergrounding (1–2 points)
Bury electric cables underground or protect them in conduits or underground tunnels. Campus projects should use conduits or cable trays to protect electric cables inside buildings.

Points are awarded based on the percentage of the distribution network protected (calculated based on length), as shown in Table 1.

Table 1. Points for Undergrounding of Distribution Network

Network Protected (% of total length)		Points
Cities and Utilities	Campuses and Transit	
≥ 10	≥ 40	1
30	80	2

Projects that protect more than 50% (cities and utilities) or 90% (campuses and transit) of the distribution network earn 1 additional point for exemplary performance under the Innovation credit category.

STANDARDS AND REFERENCES

American Society of Civil Engineers (ASCE) Chapter 7, 24

Bureau of Indian Standards (BIS) National Electrical Code 2011, Seismic protection

Federal Emergency Management Agency (FEMA) 413, Installing Seismic Restraints for Electrical Equipment

International Electrical Safety Code (NESC), C2-2012

International Building Code (IBC) 2015, Chapters 16 and 17

Indian Standard (IS) 875, Practice for Design Loads for Buildings and Structures, Part 3, Wind Loads

Indian Standard (IS) 802- Use of structural steel in overhead transmission line towers-Part 1 Materials, Loads and permissible stresses.

RR Credit: Distribution Redundancy and Auto Restoration

Applicability:

- Cities and Utilities (1–2 points)
- Campuses (1–2 points)
- Transit (1–2 points)

INTENT

To improve reliability and resilience by ensuring that grid power can be supplied via multiple distribution pathways.

REQUIREMENTS

All Projects

Demonstrate the ability to sustain customer power with the use of redundant distribution and automated power restoration in case of an interruption within the project.

Calculate the percentage of circuits protected using the following formula:

$$\% \text{ protected} = \frac{1}{2}\left[\left(\%\text{DRe} - \frac{\%\text{DRe}}{1 + \text{ANS}}\right) + \left(\%\text{AR} - \frac{\%\text{AR}}{1 + \text{ANAS}}\right)\right]$$

Where:

%DRe = Percentage of circuits that have distribution redundancy or the percentage of customers connected to circuits with distribution redundancy.

ANS = Average number of redundant switches per circuit (i.e., the number of switches on circuits with distribution redundancy divided by the number of circuits with distribution redundancy).

%AR = Percentage of circuits that have automated restoration or the percentage of customers connected to circuits with automated restoration.

ANAS = Average number of automatically restored switches per circuit (i.e., the number of switches on circuits with automated restoration divided by the number of circuits with automated restoration).

Points are awarded according to Table 1.

Table 1. Points for Distribution Redundancy and Auto Restoration

Circuits Protected (%)	Points
≥ 30	1
50	2

RR Credit: Alternative Source of Supply

Applicability:

- Cities and Utilities (1–5 points)
- Campuses (1–5 points)
- Transit (1–5 points)

INTENT

To improve reliability and resilience by providing an alternative source of electricity supply and transfer controls.

REQUIREMENTS

All Projects

OPTION 1. Alternative Supply (2 points)

Have in place provisions for alternative sources of power supply for:

- at least 40% of the project's total load and 80% of the project's critical load,

OR

- at least 80% of the project's total load and 100% of the project's critical load,

in case the primary power supply fails.

Choose one or more of the following backup power options:

- Alternative (or secondary) feeder from bulk grid

- Generation outside the project boundary (at the neighborhood level)

- Project-owned or project-operated backup power system

Calculate the fraction of the project load, including all critical loads that is protected by backup power supply options. Points are awarded according to Table 1.

Table 1. Points for Alternative Supply

Total project load with backup power supply (%)	Total project's critical load with backup power supply (%)	Points
≥ 40	≥ 80	1
≥ 80	100	2

AND/OR

OPTION 2. Transfer Controls (1–3 points)

Demonstrate advanced capability to transfer control from grid-connected mode to complete or partial island mode and back again. Points are awarded according to Table 2.

Table 2. Points for Transfer Controls

Transfer Capability	Points
Automatic and quick transfer	1
Seamless transfer	2
Ride-through	1

RR Credit: Power Surety and Resilience

Applicability:

- Cities and Utilities (1–5 points)
- Campuses (1–5 points)
- Transit (1-5 points)

INTENT

To ensure power for critical loads and essential services during emergencies and to support community recovery after catastrophic events and power grid outages.

REQUIREMENTS

Cities and Utilities

Identify critical facilities, customers, and feeders that require power supply during widespread outages or disasters (1 point).

Take at least one of the following sequential steps (1–4 points):

- **Step 1.** Identify interruption in critical facilities, loads, or feeders through advanced meters or an outage management system integrated through GIS and SCADA (1 point).

- **Step 2.** Achieve Step 1 and provide priority restoration for identified critical loads in blackouts or brownouts (1 point).

- **Step 3.** Achieve Step 2 and provide backup power for critical and essential loads and facilities (1 point).

- **Step 4.** Achieve Step 3 and provide power supply through a renewable energy system (e.g., solar, wind) that does not depend on external fuel (e.g., gas, diesel) to meet essential services.

Campuses and Transit

Identify the project's critical loads and essential services (listed in the PEER Reference Guide) that require backup power during widespread outages or disasters and determine their minimum daily runtime requirements (1 point).

Take at least one of the following sequential steps (1–4 points):

- **Step 1.** Equip all project loads with short-term backup power options to enable safe shutdown of the load, process, or other facility (1 point).

- **Step 2.** Achieve Step 1 and demonstrate that the project can supply power to all critical loads for the minimum daily runtime or longer (1 point).

- **Step 3.** Achieve Step 2 and demonstrate that the project has, within the project boundary and/or in the project neighborhood, a long-term power source that can support essential services for the minimum daily runtime for one week or longer (1 point).

- **Step 4.** Achieve Step 3 and have a renewable power generation system (e.g., solar, wind) that does not depend on external fuel (e.g., gas, diesel) to meet essential services (1 point).

The project must have in place a permanent fuel storage facility within the project boundary to support the backup power system or local generation.

STANDARDS AND REFERENCES

National Fire Protection Association (2013), NFPA 110: Standard for Emergency and Standby Power Systems

National Fire Protection Association (2013), NFPA 70: National Electrical Code

RR Credit: Power Quality Capabilities

Applicability:

- Cities and Utilities (1–5 points)
- Campuses (1–5 points)
- Transit (1-5 points)

INTENT

To assess and mitigate poor power quality events through detection, prevention, and corrective actions.

REQUIREMENTS

All Projects

OPTION 1. Power Quality Assessment (1 point)

Assess the project's existing level of power quality. Demonstrate compliance with the standard power quality audit process (defined in the PEER Reference Guide). The audit should satisfy, at a minimum, the following objectives:

- Assessing power quality

- Identifying locations for permanent power quality monitoring

- Identifying and troubleshooting the causes of poor power quality

- Verifying the performance of corrective measures

AND/OR

OPTION 2. Continuous Power Quality Monitoring (1–2 points)

Install permanent, integrated infrastructure to continuously monitor and record power quality at different network locations. The meters must be capable of measuring electric parameters that allow monitoring and detection of at least three power quality events relevant to the project:

- Voltage sag and swell

- Voltage unbalance

- Voltage harmonics

- Current harmonics

- Under voltage and overvoltage

Alternatively, use independent event loggers to detect and record power quality events. The infrastructure must also enable continuous monitoring and recording of true power factor.

Cities and Utilities

Implement permanent power quality monitoring at the substation level (1–2 points). Calculate the score as follows:

$$PQ\ Measurement\ Score = \frac{S_{PQ}}{S_t} \times \frac{EM}{8} \times 100$$

Where:

- S_{PQ} = Number of substations with permanent power quality monitoring capability

- S_t = Number of substations within the project boundary

- EM = Average number of event types monitored (**maximum 8**)

Points are awarded according to Table 1.

Table 1. Points for Power Quality Monitoring

Power Quality Monitoring Score	Points
≥ 15	1
50	2

Campuses and Transit

Have in place a power quality monitoring program at all points of city or utility connections (1 point).

Extend the program to cover network locations identified in the power quality audit (1 point).

AND/OR

OPTION 3. Power Quality Improvement (1–2 points)

Cities and Utilities

Have in place infrastructure for improving voltage profile and reactive power support at the substation or feeder level (1 point).

Implement a volt-VAR control program for the project's distribution network (1 point).

Campuses and Transit

Have in place infrastructure that improves the power factor at all points of common coupling and limits any power quality issues identified in the power quality audit (1 point).

Demonstrate that the project has automated infrastructure and controls to maintain unity power factor and zero harmonic injection at all points of common coupling (1 point).

STANDARDS AND REFERENCES

IEEE 519–2014, Recommended Practice and Requirements for Harmonic Control in Electric Power Systems

IEEE 1159, Recommended Practice for Monitoring Electric Power Quality

IEEE 1346, Recommended Practice for Evaluating Electric Power System Compatibility with Electronic Process Equipment

European Quality Standard EN 50160, Voltage Characteristics of Public Distribution Systems

EE Prerequisite: Environmental Performance Disclosure

Applicability:

- Cities and Utilities
- Campuses
- Transit

INTENT

To measure and make public the environmental consequences of power generation, transmission, and distribution.

REQUIREMENTS

All Projects

Evaluate the environmental impact of electricity consumption, using the PEER EE Index and the following formulae:

$$EE \text{ Index} = SEI_{score} + CO_2I_{score} + NOxI_{score} + SO_2I_{score} + WaterI_{score} + WasteI_{score}$$

Overall performance metrics are the sum of the SEI, CO_2, NO_x, SO_2, water intensity, and waste intensity for each generation source:

$$SEI_{overall} = \sum_i \varepsilon_i \times SEI_i \times (1 + TDL_i)$$

$$CO_2I_{overall} = \sum_i \varepsilon_i \times CO2I_i \times (1 + TDL_i)$$

$$NO_xI_{overall} = \sum_i \varepsilon_i \times NOxI_i \times (1 + TDL_i)$$

$$SO_2I_{overall} = \sum_i \varepsilon_i \times SO2_{Ii} \times (1 + TDL_i)$$

$$WaterI_{overall} = \sum_i \varepsilon_i \times WaterI_i \times (1 + TDL_i)$$

$$WasteI_{overall} = \sum_i \varepsilon_i \times Waste_i$$

Where:

TDL_i = Transmission and distribution losses (%) for generation source *i* (equals 0 for local generation)

$$\varepsilon_i = \frac{Generation\ delivered\ to\ site\ \ (MWh_i)}{Total\ generation\ delivered\ to\ site\ \ (MWh)}$$

$$SEI_i = \frac{(Nonrenewable\ energy\ consumed\ \ (MMBtu_i) - Recovered\ thermal\ energy\ \ (MMBTu_i)}{Generation\ delivered\ to\ site\ (MWh_i)}$$

$$CO_{2e}I_i = \frac{Carbon\ dioxide\ equivalent\ emissions\ (lb_i) \times Methane\ leakage\ multiplier_i}{Generation\ delivered\ to\ site\ (MWh_i)}$$

$$NO_xI_i = \frac{Nitrogen\ oxide\ emissions\ (lb_i)}{Generation\ delivered\ to\ site\ (MWh_i)}$$

$$SO_2I_i = \frac{Sulfur\ dioxide\ emissions\ (lb_i)}{Generation\ delivered\ to\ site\ (MWh_i)}$$

$$WaterI_i = \frac{Water\ consumption\ (gal_i)}{Generation\ delivered\ to\ site\ (MWh_i)}$$

$$WasteI_i = \frac{Solid\ waste\ recycled\ (tons_i)}{Solid\ waste\ generated_i}$$

$WasteI_i$ = 0 for nuclear and biomass, for rest of the fuel types please refer to the reference guide (or) EE Index calculator.

Table 1. Methane Leakage Multipliers

Fuel	Multiplier
Coal	1.037
Natural gas	1.130
All other fuel types	1.000

Sum the EE index scores corresponding to the values shown in Table 2. The first five metrics in Table 2 are maximums: the project's value must not exceed the listed figure. The "waste recycled" metric, however, is a threshold: the project's value must equal or exceed the listed figure.

Table 2. PEER EE Index Values

SEI	CO$_2$	NO$_X$	SO$_2$	Water use	Waste recycled	EE index score
< 13.0	< 2300	< 5.00	< 10.0	< 700	≥ 30	1
12.6	2232	4.65	7.5	674	37	2
12.2	2165	4.30	5.0	647	43	3
11.7	2097	3.95	2.5	621	50	4
11.3	2030	3.60	0.0	595	57	5
10.9	1962	3.25		568	63	6
10.5	1894	2.90		542	70	7
10.1	1827	2.55		516	77	8
9.6	1759	2.20		489	83	9
9.2	1692	1.85		463	90	10
8.8	1624	1.50		437		11
8.4	1557	1.15		411		12
7.9	1489	0.80		384		13
7.5	1421	0.45		358		14
7.1	1354	0.1		332		15
6.7	1286			305		16
6.3	1219			279		17
5.8	1151			253		18
5.4	1083			226		19
5.0	1016			200		20

	948					21
	881					22
	813					23
	746					24
	678					25
	610					26
	543					27
	475					28
	408					29
	340					30

Additionally, establish a public disclosure policy to publish the results of environmental impact evaluations in the project's annual performance and/or sustainability reports.

Projects that own or operate local or backup generation sources must meet following requirements:

- Have in place a process to record fuel consumption, water consumption, and energy output data for all local and backup generation units.
- Have in place a policy to verify the emissions performance of local and backup generation units through third-party testing at least once every three years.
- Demonstrate compliance with regional environmental regulations applicable to the local and backup generation units, including emissions, waste handling and disposal, water consumption, and land use.

STANDARDS AND REFERENCES

U.S. Environmental Protection Agency, Emissions and Generation Resource Integrated Database (eGRID), 2014.

EE Prerequisite: System Energy Efficiency Coefficient Disclosure

Applicability:

- Cities and Utilities
- Campuses
- Transit

INTENT

To quantify and make public the energy system's conversion efficiency.

REQUIREMENTS

All Projects

Calculate the project's system energy efficiency coefficient (SEEC), benchmark SEEC, and percentage improvement above the benchmark based on the project's nonrenewable energy sources, using the following formula:

$$SEEC\ improvement\ \% = \frac{SEEC}{Benchmark\ SEEC} - 1$$

Where:

$$SEEC = \frac{Energy\ delivered\ to\ customers\ (MMBtu)}{Source\ energy\ consumed\ by\ project\ (MMBtu)}$$

Total energy delivered to customers (MMBtu) = CL + HL + EL

CL = Annual cooling load delivered to all customers (MMBtu)

Convert tons of cooling to MMBtu using a conversion factor of 0.012 (MMBtu/ton-hr)

HL = Annual heating load delivered to all customers (MMBtu)

EL = Annual electric load delivered to all customers (MMBtu)

Convert MWh of electricity to MMBtu using a conversion factor of 3.412 (MMBtu/MWh)

$$Benchmark\ SEEC = \frac{Energy\ delivered\ to\ customers\ (MMBtu)}{Benchmark\ energy\ delivered\ to\ project\ (MMBtu)}$$

Additionally, establish a public disclosure policy to publish the results of SEEC evaluations in the project's annual performance and/or sustainability reports.

Projects that own or operate local generation units (including backup generation) must have in place formal processes and/or infrastructure to enable periodic monitoring of the energy system conversion performance of electricity generation, cooling units, and heating units.

EE Credit: Environmental Performance Improvement

Applicability:

- Cities and Utilities (1–10 points)
- Campuses (1–10 points)
- Transit (1-10 points)

INTENT

To reduce the environmental consequences of energy generation, transmission, and distribution by improving source energy, air emissions, water use, and solid waste performance.

REQUIREMENTS

All Projects

Evaluate the project's energy efficiency performance based on the PEER EE index score achieved in the prerequisite. Points are awarded according to Table 1.

Table 1. Points for PEER EE Index Score

EE Index	Points
≥ 30	1
40	2
50	3
60	4
70	5

Projects with an EE index score greater than the benchmark may earn up to 5 points based on following formula:

$$Additional\ PEER\ points = 5\left[1 - \frac{(EE\ index - 100)^2}{(Benchmark - 100)^2}\right]$$

Benchmark EE values for the United States are given in Table 2. For projects in India, contact the PEER team.

Table 2. EE benchmarks for U.S. projects

State	Benchmark
Alabama	68
Alaska	55
Arizona	57
Arkansas	58
California	80
Colorado	61
Connecticut	73
District of Columbia	54
Delaware	62
Florida	74
Georgia	61
Hawaii	47
Idaho	62
Illinois	49

Indiana	42
Iowa	68
Kansas	63
Kentucky	49
Louisiana	68
Maine	62
Maryland	53
Massachusetts	70
Michigan	59
Minnesota	49
Mississippi	76
Missouri	49
Montana	53
Nebraska	57
Nevada	63
New Hampshire	60
New Jersey	68
New Mexico	62
New York	67
North Carolina	64
North Dakota	59
Ohio	47
Oklahoma	76
Oregon	59
Pennsylvania	63
Rhode Island	80
South Carolina	54
South Dakota	66
Tennessee	63
Texas	73
Utah	54
Vermont	54
Virginia	71
Washington	59
West Virginia	44
Wisconsin	53
Wyoming	45

STANDARDS AND REFERENCES

U.S. Environmental Protection Agency, Emissions and Generation Resource Integrated Database (eGRID), 2014.

EE Credit: System Energy Efficiency Coefficient Improvement

Applicability:

- Cities and Utilities (1–3 points)
- Campuses (1–3 points)
- Transit (1-3 points)

INTENT

To reduce fossil fuel consumption and encourage investments that capture waste energy, improve efficiency, and lower operating costs.

REQUIREMENTS

All Projects

Evaluate the project's SEEC performance based on the SEEC improvement percentage achieved in the prerequisite. Points are awarded according to the thresholds listed in Table 1.

Table 1. Points for SEEC Improvement

Cities and Utilities		Campuses and Transit	
SEEC Improvement (%)	Points	SEEC Improvement (%)	Points
≥ 10	1	≥ 5	1
15	2	10	2
20	3	15	3

Projects whose SEEC improvement exceeds 30% (cities and utilities) or 20% (campuses and transit) earn 1 additional point for exemplary performance under the Innovation credit category.

EE Credit: Renewable Energy and Carbon Offsets

Applicability:

- Cities and Utilities (1–4 points)
- Campuses (1–4 points)
- Transit (1-4 points)

INTENT

To reduce greenhouse gas emissions by encouraging development and adoption of renewable energy technologies at a large scale.

REQUIREMENTS

All Projects

Purchase renewable energy, bundled and/or unbundled renewable energy certificates (RECs), and/or carbon offsets to mitigate the environmental impacts of project energy consumption.

Contract for qualified resources that have come online since January 1, 2005, for a minimum of five years, to be delivered at least annually.

Renewable Energy, Bundled and/or Unbundled RECs must be Green-e Energy certified or the equivalent. Carbon offsets may be used to mitigate emissions on a metric ton of carbon dioxide–equivalent basis and must be Green-e Climate certified or the equivalent. Carbon offsets must be purchased from recognized greenhouse gas emission reduction projects within the country where the project is located.

Determine the percentage of energy consumption addressed by renewable energy, bundled and/or unbundled RECs, and/or carbon offsets. Calculate the percentage as follows:

$$\% \text{ energy addressed} = \left\{ \left[\frac{\substack{\text{Renewable Energy} \\ \text{purchased or contracted} \\ \text{through bundled RECs (MWh)}}}{\substack{\text{Total energy consumption} \\ \left(\substack{\text{excluding local} \\ \text{renewables}}\right) \text{MWh}}} \times 0.75 \right] + \left[\frac{\substack{\text{Equivalent Energy purchased} \\ \text{through carbon offsets} + \\ \text{Electricity purchased through} \\ \text{unbundled RECs (MWh)}}}{\substack{\text{Total energy consumption} \\ \left(\substack{\text{excluding local} \\ \text{renewables}}\right) \text{MWh}}} \times 0.25 \right] \right\} \times 100$$

Calculate the energy purchased through bundled and/or unbundled RECs as follows: $Energy\ purchased\ through\ bundled\ and/or\ unbundled\ RECs = RECs\ purchased * Energy\ equivalent\ to\ 1\ REC$

Points are awarded according to Table 1.

Table 1. Points for Renewable Energy

Renewable Energy (%)		
Cities and Utilities	Campuses and Transit	Points
> 10	> 20	1
20	40	2
30	60	3
50	80	4

ALTERNATIVE COMPLIANCE PATH

Projects in India may purchase RECs sold on power exchanges that operate REC trading with approval from the India Central Electricity Regulatory Commission. Both solar and non-solar energy are eligible renewable sources for this credit.

EE Credit: Distributed Energy Resources

Applicability:

- Cities and Utilities (1–6 points)
- Campuses (1–5 points)
- Transit (1-8 points)

INTENT

To reduce environmental impacts and minimize losses associated with energy transmission by promoting local renewable generation, distributed generation, energy storage, and district energy systems.

REQUIREMENTS

All Projects

OPTION 1. Local Renewables and Clean Generation (1–2 points)
Determine the percentage of the project's total electrical load served by local renewables and/or clean generation technologies, as follows:

$$Local\ generation\ \% = \frac{Local\ renewable\ (MWh) + Local\ clean\ generation\ (MWh)}{Project\ load\ (MWh)} \times 100$$

Points are awarded according to Table 1 and Table 2

Table 1. Points for local renewable and clean generation – campuses, cities and utilities

Local Renewable & Clean Generation %		Points
Campuses	Cities and Utilities	
≥ 10	≥ 3	1
30	5	2

Table 2. Points for local renewable and clean generation – transit

Local Renewable & Clean Generation % for Transit	Points for Non-traction load	Points for Traction load
≥ 10	1	1
30	2	2

AND/OR

OPTION 2. Local Energy Storage

Campuses, Cities and Utilities (1 point)
Have in place at least one of the following technologies that support the project's energy requirement:

- Mechanical

- Thermal

- Chemical energy storage

Only central storage systems are eligible to achieve points under this option.

Transit (up to 2 points)

Meet the below requirements (1 point each)

- Equip at least 10% of the active rolling stock with on-board energy storage systems

- Have in place way-side or stationary energy storage system integrated with project's electrical system

AND/OR

OPTION 3. Prosumers (Cities and Utilities only, 1 point)

Generate at least 2 MW from renewable energy within the project boundary that is owned and operated by customers.

AND/OR

OPTION 4. District Energy System (Cities and Utilities and Campuses only, 1–2 points)

Have in place a district energy system (DES) or be connected to a DES. For the purposes of this credit, a DES is a heating and/or cooling system that produces steam, hot water, and/or chilled water in a centralized plant using cogeneration or trigeneration and distributes this energy to multiple buildings. Determine the percentage of the project's electric, cooling, and/or heating loads serviced by the DES using the following formula:

$$\% \: district \: energy = \%H_{DES} + \%C_{DES} + \%E_{DES}$$

Where:

%H$_{DES}$ = Percentage of project heating load supplied by DES

%C$_{DES}$ = Percentage of project cooling load supplied by DES

%E$_{DES}$ = Percentage of project electric load supplied by DES

Calculate points based on the percentage of the project load supplied by a DES, as shown in Table 2.

Table 3. Points for District Energy Systems

DES energy (%)	Points
≥ 80	1
160	2

AND/OR

Option 5. Regenerative Braking System (Transit only, 2 points)

Equip at least 50% of the rolling stock with regenerative braking system with at least one of the following capabilities – (for 2 points)

- Ability to inject excess power generated during braking into the main distribution system
  OR
- Ability to transfer excess power generated during braking to an on-board energy storage device in isolation.

EE Credit: Environmental Impact Disclosure and Management

Applicability:

- Cities and Utilities (1–3 points)
- Campuses (1–3 points)
- Transit (1–3 points)

INTENT

To reduce the effects of project construction and operation on site biodiversity, land use, and noise levels.

REQUIREMENTS

All Projects

Implement policies and programs to reduce or prevent harm to the local environment, including trees, wildlife, and wildlife habitat. In addition, project shall track and record the following information and make a commitment to its disclosure:

- Trees cut or trimmed, and wildlife disturbed for project construction and operation (1 point).

- Area (m2) and type of land (e.g., agricultural, brownfield) used for project systems (1 point).

- Noise levels emitted by generation assets, overhead cables, substations, and switchyards (1 point).

To achieve the above 1 point on noise levels, project must additionally address the following:

- Determine the maximum acceptable noise level at the project's property line.

- Conduct screening measurements, then refine measurements to determine the loudest location on the property line using slow time response.

- Conduct measurements with IEC 60651 Type 1, IEC 61672 Class 1, ANSI S1.4-Type 1 sound level meter or equivalent.

- Identify strategies to reduce noise to acceptable levels.

ALTERNATIVE COMPLIANCE PATH

For projects in India, comply with CPCB Protocol for Ambient Level Noise Monitoring.

All Projects

Projects that support the growth of pollinator population by adopting at least one of the following strategies earn 1 additional point for exemplary performance under the Innovation credit category:

- Meet the requirements in LEED BD+C: New Construction – LEED v4.1, Sustainable Sites Protect or Restore Habitat.

- Obtain Pollinator Habitat Certification from a national or local organization.

- Follow USDA guidance to provide habitat to help pollinators rebound from the challenges they face.

STANDARDS AND REFERENCES

Bureau of Indian Standards (2004), BIS 14001—2004

International Organization for Standardization (2004), ISO 14001—2004

OP Prerequisite: Triple-Bottom-Line Analysis

Applicability:

- Cities and Utilities
- Campuses
- Transit

INTENT

To quantify the triple-bottom-line benefits associated with high performance and assess opportunities for future improvements.

REQUIREMENTS

All Projects

Quantify potential benefits from improving the project's performance and identify financially viable investment opportunities as follows:

- Identify systems that have contributed to improving performance as defined under PEER or as determined by the project owner or operator. Assess at least three of the following systems:

    o On-site generation and storage systems

    o Fault location, isolation, and service restoration systems

    o Power quality improvement systems

    o Monitoring and control systems

    o Asset maintenance systems

    o Energy metering systems

    o Demand-side management systems

- Identify all the relevant capabilities enabled by each system and determine expected or measured performance of the project under following scenarios:

    o *Baseline:* performance of the project with no additional systems

    o *Improved:* performance of the project with each system chosen for assessment

    o *Upper limit:* performance of the project with all chosen systems combined

- For each scenario, model project performance as a function of project and system characteristics, operational parameters, and external factors. Include the following outcomes in the analysis:

    o Economic impact

    o Environmental impact

    o Social impact

- Determine the incremental value achieved by the project in the Current scenario compared with the Baseline scenario.

- Estimate the benefits (opportunity cost) associated in the Upper Limit scenario compared with the Current scenario.

OP Credit: Risk Assessment and Mitigation

Applicability:

- Cities and Utilities (1–4 points)
- Campuses (1–4 points)
- Transit (1–4 points)

INTENT

To evaluate and reduce risks to the project and its functions.

REQUIREMENTS

All Projects

Conduct a comprehensive risk assessment for critical assets within the project boundary, using the risk matrix approach described in the PEER Reference Guide.

Develop a matrix for risk events with following dimensions, each with at least five classes:

- Probability or frequency of occurrence (rare, unlikely, possible, likely, almost certain)
- Severity (very low, low, medium, high, very high)

Conduct a risk assessment of at least four risk events for each of the following subsystems, including their individual assets. The selected four risk events should include at least two high or very high probability events and at least one high or very high impact events. [The project can select the 4th risk event at their discretion]:

- Main substations or switchyards
- Distribution substations or switchyards
- Distribution transformers
- Overhead distribution lines
- Underground power cables
- Local generation
- Energy storage systems
- Communication and control infrastructure
- Backup power supply
- Metering Infrastructure

Risk events identified may be categorized as:

- Natural Hazards
- Human-caused Events Facility Risks
- Technology-caused Events
- Departmental Risks

Evaluate each of the chosen risks across at least two of the following criteria:

- Financial
- Environmental

- Safety
- Quality of service

Points are awarded according to Table 1.

Table 1. Points for Risk Assessment

Assessment	Points
> 4 risk events, 2 criteria	1
> 6 risk events, 3 criteria	2

Prioritize the assessed risks for all subsystems and their assets (1 point).

Develop mitigation strategies for all identified and prioritized risks (1 point).

Projects that complete comprehensive risk assessments for eight risk events across four criteria earn 1 additional point for exemplary performance under the Innovation credit category.

STANDARDS AND REFERENCES

National Fire Protection Association (NFPA) 1600 - 2019: Standard on Continuity, Emergency, and Crisis Management

Central Electricity Authority (CEA) (Grid Standards) Regulations, 2010

OP Credit: Emergency Response Planning

Applicability:

- Cities and Utilities (1–3 points)
- Campuses (1–3 points)
- Transit (1–3 points)

INTENT

To ensure that the project can respond to emergency situations during power interruptions.

REQUIREMENTS

All Projects

Prepare an emergency response plan written specifically for the project or the project's customers, addressing both short-term and extended power interruptions. Incorporate at least the first five of the following strategies:

1. Create operating procedures, including instructions to start generators and placement of power switches for restoring power during a grid interruption and power restoration.

2. Develop a load priority list describing the order and priority in which power to loads or circuits should be restored after a power interruption.

3. Perform and provide proof of risk assessment performed and its association with emergency response plan (see OP Credit Risk Assessment and Mitigation)

4. Establish plans and/or procedures for conducting emergency drills and training for the personnel responsible to restore power during power interruption and for the personnel responsible for operating the project's command and control centers during power interruptions.

5. Equip the project grid with at least two forms of pre-arranged backup communications for internal use and external communication.

6. Provide backup power for the project's command and control to be used during emergencies.

7. Perform a needs assessment to determine the capacity of backup power and stored energy or fuel required for each critical load and essential service.

8. Create plans for managing traffic during power interruptions.

Points are awarded according to Table 1.

Table 1. Points for Emergency Response Strategies

Strategies	Points
≥ 5	1
≥ 6	2
8	3

STANDARDS AND REFERENCES

National Fire Protection Association 1600: Standard on Disaster, Emergency Management and Business Continuity Programs, 2013 edition

CEA (Grid Standards) Regulation 2010 and State Disaster Management Plan (India)

OP Credit: Safety Review Process

Applicability:

- Cities and Utilities (1–2 points)
- Campuses (1–2 points)
- Transit (1–2 points)

INTENT

To ensure that the distribution and generation systems are built and operated safely.

REQUIREMENTS

All Projects

Comply with safety code requirements for any design or operational changes as described by the authority having jurisdiction or NESC C2-2012. Develop and implement at least two of the following strategies:

- Have in place a program equivalent to OSHA for investigating accidents involving project staff and members of the public. The reports must document the cause of any accident and identify solutions to prevent its recurrence.

- Establish a safety program following CFR 1910 or local equivalent where all procedures that apply to project are followed and documented i.e. LOTO, Confined Space, Electrical safety.

- A policy to hold safety review meetings for significant design or operational changes and new product rollouts.

- Procedures for incorporating safety review results into design standards and/or operating documents (e.g., procedures, manuals, diagrams) for safely installing and operating local generation and electric system assets.

Points are awarded according to Table 1.

Table 1. Points for Safety Review Process

Strategies	Points
≥ 2	1
4	2

ALTERNATIVE COMPLIANCE PATH

For projects in India, comply with National Electrical Code 2011.

STANDARDS AND REFERENCES

OSHA Laws and Regulations (Standards - 29 CFR) Part 1910 – Occupational Safety and Health Standards

Central Electricity Authority (CEA) (Grid Standards) Regulations, 2010

National Fire Protection Association (NFPA) 1600 - 2019: Standard on Continuity, Emergency, and Crisis Management

National Policy Safety, Health and Environment at Workplace – Ministry of Labor and Employment, Government of India

EU Strategic Framework on Health and Safety at Work 2014-2020

NESC–2012, National Electrical Safety Code CS–2012

NFPA 70, National Electrical Code

NFPA 70 E, Standard for Electrical Safety in the Workplace

OP Credit: Operational Processes

Applicability:

- Cities and Utilities (1–3 points)
- Campuses (1–3 points)
- Transit (1–3 points)

INTENT

To reduce operating costs by implementing continual improvement processes.

REQUIREMENTS

All Projects

Have in place preventive maintenance and condition-monitoring programs for critical project assets. Adopt processes to identify failure trends and causes to improve the effectiveness of corrective actions.

OPTION 1. Maintenance Optimization (1–2 points)

Implement at least two (1 point) or three (2 points) of the following:

- Preventive maintenance program for all critical assets

- Condition-monitoring program for all critical assets

- Life-cycle cost approach for selecting equipment and assets with regular maintenance requirements

AND/OR

OPTION 2. Failure Identification and Reduction (1 point)

Implement a formal process for identifying and reducing process failures that includes the following features (1 point):

- Failure tracking and trending

- Failure cause analysis

- Tracking of corrective actions for all failures

OP Credit: Advanced Metering Infrastructure

Applicability:

- Cities and Utilities (1–3 points)
- Campuses (1–3 points)
- Transit (1–3 points)

INTENT

To enhance grid performance and customers' ability to manage their energy use through smart grid infrastructure.

REQUIREMENTS

Cities and Utilities

OPTION 1. Advanced Metering Infrastructure (AMI) (1–2 points)

Have advanced meters in place for at least 5% of customers. Commit to achieving a higher percentage of AMI and incorporate the goal as part of the energy infrastructure improvement plan.

The AMI must be permanently installed and have the following capabilities and features:

- Ability to record data at intervals of one hour or less and transmit data to a remote location

- Ability to record both consumption and demand

- Ability to detect power interruptions and provide active notification

- Ability to store all meter data for at least 36 months

- Bidirectional communication between cities and customers or utilities and customers

- Compatibility with net metering arrangements

- Ability to measure power factor and monitor at least two types of power quality events

Points are awarded according to Table 1.

Table 1. Points for Advanced Metering Infrastructure

Customers with AMI (%)	Points
≥ 5	1
40	2

AND/OR

OPTION 2. Selection Process for Future Rollout (1 point)

Determine the project's metering needs and identify for future installation AMI with the following capabilities and features:

- Bidirectional communication and ability to receive signals from the operator

- Power interruption detection and alarm

- Data collection rate

- Safety, of both the meter and its installation

- Meter accuracy and accuracy limits

- Wireless versus hard-wired communications to the city or utility operator interface and to the customer

- Access to real-time consumption data and price data

- Interface usability

- Net metering

- Local versus centralized interval data storage options

- Sampling rates

Campuses and Transit

Equip all points of city or utility connection with permanently installed advanced meters and data collection systems that can store all metered data for at least 36 months. Additionally, individual buildings with more than 100 kVA load must have a metering system. The meters must have the following capabilities and features (1 point):

- Bidirectional communication

- Ability to measure at least two types of power quality events (e.g., voltage sag and swell, voltage and current harmonics)

- Ability to record data at intervals of one hour or less and transmit data to a remote location

- Ability to record both energy consumption and energy demand

- Ability to detect power interruptions and provide notification

- Compatibility with net metering arrangements

Additional points are awarded according to Table 2.

Table 2. Points for Advanced Energy Metering

Project loads or buildings with advanced metering (%)	Points
≥ 40	1
80	2

All Projects

Metering loads beyond electrical loads is important to understand and optimize building operations. Projects which have metering devices with the below listed capabilities to measure their volumetric and thermal loads such as chilled or hot water, steam and natural gas, earn 1 additional point for exemplary performance under the Innovation credit category:

- Ability to record data at intervals of one hour or less and transmit data to a remote location.

- Ability to record both consumption and demand.

- Ability to store all meter data.

OP Credit: Master Controller

Applicability:

- Cities and Utilities (1–3 points)
- Campuses (1–3 points)
- Transit (1–3 points)

INTENT

To promote adaptability through operational changes that optimize the electricity system in real time.

REQUIREMENTS

All Projects
Install a master controller or control system that automatically interfaces with local control systems within the project boundary.

Demonstrate the following capabilities (1 point):

- Ability to remotely start and stop local generation

- Ability to remotely control loads in more than one building, either directly or by communication with other controllers, such as the project's building controllers.

Additionally, adopt at least three (1 point) or all (2 points) of the following advanced capabilities:

- Ability to control loads and local generation to maintain specified levels of demand for demand response events, to respond to local demand reduction needs (such as by limiting the project's demand), and to respond to dynamic prices

- Ability to automatically detect threats to the project's electrical system and take action to mitigate such threats

- Ability to operate under loss of both primary power, and primary communication used by the master controller (or otherwise eliminate common-cause failure modes).

- Ability to use analytics to detect such problems as poor power quality, low voltage, and impending equipment failures, and to notify operators

- Ability to generate and/or use third-party forecasted data to improve operational decisions.

- Ability to operate in at least three of the following modes:

  o Grid connect optimization mode. The master controller optimizes the project's costs, efficiency, and/or emissions by controlling loads and local generation.

  o Safe mode. The master controller overrides the optimization functions under the grid connect mode and manages the project's electrical system to stabilize the project's grid. Generating assets are started, prepared to start, or operated to stabilize the grid in case grid conditions deteriorate. The project can be grid connected and does not need to be operated as an island.

  o Demand response mode. This mode is similar to the grid connect mode except that loads and generation are operated to meet the requirements of an ISO, city or utility demand response program.

- o Unplanned island mode. The master controller rapidly (within 1 minute) sheds load and starts generation to switch the project from grid connect to island mode.

- o Planned island mode. In response to threats to the power grid, the controller can either start generators and switch to island mode or prepare to start the generators and quickly enter island mode if the bulk power grid is interrupted.

OP Credit: Communications Network and Information Processing

Applicability:

- Cities and Utilities (1–2 points)
- Campuses (1–2 points)
- Transit (1–2 points)

INTENT

To promote power reliability and quality through advanced communication, data collection, monitoring, and control infrastructure.

REQUIREMENTS

All Projects

Install communications infrastructure connected to all major assets of the project using operational technology (OT) hardware and software that detects or causes a change through the direct monitoring and/or control of physical devices, processes and events in the enterprise, monitors and manages assets and equipment with a future implementation plan and schedule to address cybersecurity protection measures in accordance with the referenced standards (1 point).

Install a data acquisition and control system that performs the following functions (1 point):

- Monitoring and recording of project load data

- Monitoring and recording of equipment fault data

- Display of information for project operators and notification of faults

- For district energy or central plant heating and cooling, monitoring and recording of heating and cooling data

- For central plant local generation, monitoring and recording of the generator output

- For a smart distribution system, monitoring and recording of switch and fault status

- Full implementation of cybersecurity protection measures in accordance with the referenced standards

STANDARDS AND REFERENCES

NIST SP 800-82 - 2015, Guide to Industrial Control Systems (ICS) Security

North American Electric Reliability Corporation (NERC) – Critical Infrastructure Protection (CIP) Program

National Institute of Standards and Technology (2012), NIST Framework and Roadmap for Smart Grid Interoperability Standards, Release 2.0

NISTIR 7628 (September 2014), Chapter 3, Guidelines for Smart Grid Cyber Security, vol. 1, Smart Grid Cyber Security Strategy, Architecture, and High-Level Requirements

Microgrid Cyber Security Reference Architecture, Version 1.0, SAND2013-5472 (July 2013)

OP Credit: Energy Management System

Applicability:

- Campuses (1–2 points)
- Transit (1–2 points)

INTENT

To encourage the use of energy management systems coordinated with the project's master controller or project operator.

REQUIREMENTS

Campuses and Transit

Install and use a building automation system (BAS) or energy management system (EMS) capable of interfacing with the project's communication network and with the project's master controller or user interface for the project's central generation, heating, and cooling plant.

Calculate the percentage of buildings with BAS or EMS using the following formula:

$$\%BldgBAS = \%TypeA + \%TypeB + \%TypeC + \%TypeD$$

Where:

%TypeA = Percentage of buildings with a BAS or EMS capable of controlling interior lighting scheduling and automatic shutoff.

%TypeB = Percentage of buildings with a BAS or EMS capable of optimizing heating and cooling system performance with the following minimum capabilities:

- o Direct digital control
- o Programmability for energy conservation and system optimization (setpoint reset, optimized start/stop, night setback)
- o Advanced scheduling (weekends, holidays)

%TypeC = Percentage of buildings with a BAS or EMS capable of reducing HVAC and lighting loads in response to remote signals from the project operator, with the following minimum capabilities:

- o Notification for alarms and system events
- o Remote real-time monitoring of critical set points related to asset operation

%TypeD = Percentage of buildings with a BAS or EMS capable of communicating with and providing data to the project's master controller or central plant operators (not just building operators)

Percentage of buildings calculation:

For calculating the percentage of buildings with Type A, Type B, Type C, and Type D - BAS/EMS capabilities, consider only the buildings where cooling loads and/or are supplied from a centralized cooling system or heating system (Chillers, AHU, etc.).

Sum the percentage of each type of building and refer to Table 1 to determine points earned.

Table 1. Points for Building Automation and Energy Management Systems

Buildings with BAS or EMS (%)	Points
≥ 120	1
240	2

GS Prerequisite: Customer and Load Survey

Applicability:

- Cities and Utilities
- Campuses
- Transit

INTENT

To assess customers' attitudes about service quality and performance and analyze demand characteristics of project loads.

REQUIREMENTS

Cities and Utilities

- Conduct a customer survey at least once every three years, following the guidelines and methodology in the Reference Guide.

- Have in place a process to document customer feedback regarding existing or new programs, policies, and specific services.

- Have in place, as part of a customer engagement plan, programs, and policies to improve service quality, customer awareness, and customers' use of services and participation in programs.

Campuses and Transit

Case 1. Customer Survey

- Conduct an annual customer survey of a representative sample or all customers served by the project.

- Have in place a program to assess qualitative and quantitative characteristics of individual customer or load demand across operational and design parameters.

- Have in place programs to improve customer service quality and overall energy performance of the project and incorporate this as part of future improvement plans.

OR

Case 2. Load Survey

- Conduct a survey of project loads with qualitative and quantitative characteristics across operational and design parameters.

- Identify interdependencies between multiple loads and/or processes in terms of operational schedules and input and output parameters.

- Have in place programs to improve project infrastructure and processes to optimize energy performance and incorporate this as part of future improvement plans.

GS Credit: Customer Engagement

Applicability:

- Cities and Utilities (1–3 points)
- Campuses (1–3 points)
- Transit (1–3 points)

INTENT

To encourage customers to leverage tools and services that improve system operation.

REQUIREMENTS

All Projects

Option 1. Communication and Outreach (1 point)

Identify customers' preferences for the following aspects of communication and outreach:

- Frequency of receiving information

- Different communication media

- Subjects covered by the communication

- Presentation of the information

AND/OR

Option 2. Planning and Implementation (1 point)

Prioritize approaches to communication and outreach in terms of awareness, satisfaction, and participation for all customer types and classes. Focus on awareness and increased participation through stakeholder workshops and outreach. Develop comprehensive improvement strategies for at least three existing or planned programs, with the following objectives:

- Improved customer satisfaction

- Customer participation

The strategies should be based on survey results of customer satisfaction and participation and may include strategies such as:

- Awareness and participation through dashboards or apps measuring participation by building or department (campuses).

AND/OR

Option 3. Customer Satisfaction (1 point)

Measure satisfaction with program objectives, ease of participation, etc., and advertise successes. Calculate a customer satisfaction index for individual programs, processes, and services using the methodology specified in the PEER Reference Guide and achieve an overall satisfaction score of 3.5 or greater.

GS Credit: Load Duration Curve Optimization

Applicability:

- Cities and Utilities (1–3 points)
- Campuses (1–4 points)
- Transit (1-4 points)

INTENT

To encourage investments that optimize hourly demand loads and reduce both project costs and environmental impacts.

REQUIREMENTS

All Projects

Calculate the project's annual hourly demand for one year, in kW, for all major loads served, including customer meters and central cooling and heating. Determine the annual load duration as a percentage of peak using the following formula:

$$Load\ duration\ \%\ of\ peak = \frac{E_{Consumed}\ (kWh)}{D_{peak}\ (kW) \times 8760}$$

Where:

- $E_{Consumed}$ = Total annual electricity consumption of project in kWh
- D_{peak} = Project peak annual electric demand in kW
- 8,760 = Hours per year

Points are awarded according to Table 1.

Table 1. Points for Load Duration Curve Optimization

Load Duration (% of peak)	Points	
	Cities and Utilities	Campuses and Transit
≥ 25	1	
40	2	1
55	3	2
70		3
85		4

Projects that achieve a load duration percentage of peak higher than 70% (cities and utilities) or 90% (campuses and transit) earn 1 additional point for exemplary performance under the Innovation credit category.

GS Credit: Data Privacy and Cybersecurity

Applicability:

- Cities and Utilities (1–2 points)
- Campuses (1 point)
- Transit (1 point)

INTENT

To build public confidence in grid modernization by protecting customers' private electricity usage data and protecting smart grid technologies from threats.

REQUIREMENTS

All Projects

Develop a comprehensive policy on data privacy and cybersecurity. The policy must identify steps to ensure secure network operation and data integrity under future grid modernization.

OPTION 1. Cybersecurity (1 point)

Have in place at least six of the following policies and practices to address cybersecurity threats:

- Inventory of secure configuration baselines or images of operating systems, software applications and firmware. Reviews include determining if vendor still supports product.

- Physical access control for all local and remote wired, wireless, and virtual access points, including physical protections and limited access to substations and networked equipment

- Boundary defenses that limit traffic only to allowed, utilize de-militarized zones (DMZs) and network segmentation, log and inspect traffic to detect (and prevent) intrusions and anomalous activity, and securely mange remote connections.

- Encryption of sensitive information both at rest and when in transit

- Host-based security through access control lists, network and application white listing, controlled use of elevated privileges, secure configuration (hardening) of devices, disable removable media (optical drives allowed).

- Network audit information and system logs are configured to capture events, detail successful/unsuccessful actions, are monitored and are aggregated to a centralized data collector

- Role-based access limiting access to least privilege and need to know; account management processes include strong passwords, disabling inactive accounts, individual identifiers, screen locks, account event logging, and strong authentication. Shared/group accounts are used sparingly.

- Secure versions of network protocols are used (e.g., TLS, SSL, HTTPS, SFTP, SSH, IPSEC) and remove or disable unused ports, protocols and services

- Continuous and automated vulnerability scanning where possible or scheduled, manual checks with mitigation or mitigation plans for all findings

- Automatic intrusion detection and operator notification

- Incident response plan including reporting/notification process, roles and responsibilities, and data and system recovery capabilities

- Firewall, adaptive security appliance, or router security
- Regular, up-to-date security awareness training for all personnel and cybersecurity plan/procedure training for system operators. Practical exercises that simulate actual cyber-attacks should be included in the security training.

AND/OR

OPTION 2. Data Privacy (Cities and Utilities only, 1 point)

Have in place policies and practices that ensure the integrity and confidentiality of data and customer choice in sharing data. Ensure information security at all interfaces, devices, and data operations. Meet at least two of the following measures for data privacy:

- Opt-out data-sharing policy for aggregated data that explicitly protects customer privacy and personally identifiable information
- Opt-in customer data-sharing agreement for personally identifiable information
- Separate communication pathways policy for sending data

STANDARDS AND REFERENCES

National Institute of Standards and Technology (2012), NIST Framework and Roadmap for Smart Grid Interoperability Standards, Release 2.0

NISTIR 7628 (September 2014), Chapter 3, Guidelines for Smart Grid Cyber Security, vol. 1, Smart Grid Cyber Security Strategy, Architecture, and High-Level Requirements

Microgrid Cyber Security Reference Architecture, Version 1.0, SAND2013-5472 (July 2013)

Center for Internet Security (CIS) Controls® V6.1

GS Credit: Access to Energy Usage Data

Applicability:

- Cities and Utilities (1–4 points)
- Campuses (1–4 points)

INTENT

To encourage conservation and investments in home energy systems by giving customers energy usage feedback.

REQUIREMENTS

All Projects

Have in place equipment and programs that provide metered users with secure access to demand and usage interval data.

OPTION 1. Effective Data-Sharing Practices (1–2 points)

Design or subscribe to an online platform that gives users secure access to individual energy usage data that can be downloaded in standard file formats. The platform must have at least the following features and content (1 point):

- User authentication for secure access

- Annual energy usage data for at least three previous years

- Energy usage data by month or a shorter interval

- Energy usage data for the above interval for at least one previous year

- Energy usage data in standardized machine-readable format

- Infographics showing variations in energy consumption and electricity bills over one year

- Infographics showing historical trends in annual energy consumption and electricity bills

- Infographics comparing energy consumption and electricity bills for defined intervals from different years

Adopt at least one of the following advanced functionalities (1 point):

- The platform gives users options to estimate the financial and environmental benefits of energy conservation and high-efficiency electric appliances.

- The platform enables users to authorize third parties to access their energy consumption data directly from the cities or utility web portal. The third parties can access the online platform and also access energy usage data authorized by the user.

- The platform gives users the ability to benchmark their buildings energy performance to similar type buildings in their region (can use building energy use intensity or EUI data).

AND/OR

OPTION 2. Energy Usage Feedback Quality (1–2 points)

Improve the energy conservation behavior of customers by providing near-real-time data for micro-level applications. Information on customers' energy consumption is categorized in two levels.

Energy usage feedback, Level 1 (1 point):

- Provide account-level daily energy usage data for residential customers.

- Provide building-level daily energy usage data for commercial and industrial customers.

Energy usage feedback, Level 2 (2 points):

- Provide account-level near-real-time energy usage data to residential customers.

- Provide building-level hourly (or more frequent) energy usage data for commercial and industrial customers.

The strategies for both levels assume that customers have remotely readable meters. For this credit, at least 25% of residential customers and 50% of commercial and industrial customers must have remotely readable meters.

STANDARDS AND REFERENCES

EPRI, Guidelines for Designing Effective Energy Information Feedback Pilots: Research Protocols

American Council for an Energy-Efficiency Economy, Best Practices for Working with Utilities to Improve Access to Energy Usage Data

GS Credit: Supply Choice

Applicability:

- Cities and Utilities (1 point)
- Campuses (1–2 points)
- Transit (1–2 points)

INTENT

To enable and motivate users to choose and invest in preferred generation sources.

REQUIREMENTS

All Projects

Offer supply choice by providing more than one power supplier option to at least 50% of tenants or customers (campuses and transit) or all customer classes (cities and utilities) (1 point).

Campuses and Transit

Opt in to preferred electric supply offered by the local utility (1 point).

CASE 1. Supply Choice Available

Participate in a supply choice program and select an option that performs better than the state or regional average for at least one of the following measures:

- Renewables content

- Reliability performance

- Power quality performance

OR

CASE 2. Supply Choice Not Available

Discuss participation in future supply choice programs with grid operators. Provide self-generated (on-site) power which is a dispatchable (or firm) resource and shall supply at least 50% of project's energy need.

STANDARDS AND REFERENCES

California Energy Commission (2009), California's Power Content Label

Commonwealth Edison Company (2008), Rider LGC Local Government Compliance Adjustment

GS Credit: Demand-Side Management

Applicability:

- Cities and Utilities (1–3 points)
- Campuses (1–3 points)
- Transit (1–5 points)

INTENT

To achieve permanent reductions in energy demand and consumption through load management and conservation.

REQUIREMENTS

OPTION 1. Energy Conservation (Cities and Utilities and Transit, 2 points; Campuses, 1 point)

Cities and Utilities

Through surveys or otherwise, estimate end-use energy consumption for all customer categories. Estimate the potential for energy conservation through energy efficiency improvement of customers' appliances or processes. Have in place an energy conservation program, at least for residential and agricultural customers, with fixed targets for energy conservation, customer participation, and customer outreach (1 point).

Projects that have implemented at least two energy conservation programs in the past and achieved at least 60% of these programs' targets can earn 1 additional point.

Campuses

Based on project's end-use applications, determine the potential for reducing energy consumption by improving energy efficiency of operating loads, and develop a comprehensive program for implementing energy efficiency improvement measures (1 point).

Transit

Demonstrate that the project has implemented the following energy conservation strategies in non-traction processes and loads (1 point):

- Selection of energy efficient equipment
- Adoption of operational practices to optimize energy consumption

Demonstrate that the project has implemented the following operational practices for energy conservation in traction loads (1 point):

- Automatic controls for reducing energy consumption inside the rolling stock
- Use of low energy consuming driving techniques

AND/OR

OPTION 2. Load Management (Cities and Utilities, 1 point; Campuses, 2 points; Transit, 3 points)

Cities and Utilities

Have in place infrastructure and programs that provide access to dynamic pricing for metered users to motivate load shifting (1 point).

Rate structures must be clearly defined, communicated to metered users in a standard format, and easily accessible. The tariff scheme must offer real-time pricing or time-of-use pricing with at least two time blocks and two tiers for all customers.

Campuses

Have in place metering infrastructure that can support implementation of pricing schemes offered by the city or utility, and participate in a dynamic tariff scheme, in the following order of priority (1 point):

- Real-time pricing scheme
- Time-of-use pricing with two or more time blocks or as applicable to the project.

Implement load management programs to reduce peak demand on a permanent basis, using either of the following strategies (1 point):

- Energy storage systems
- Shifting of processes or loads from peak period to off-peak period

Transit

Have in place metering infrastructure that can support implementation of pricing schemes offered by the city or utility. Participate in one of the dynamic tariff schemes offered by the city or utility in following order of priority (1 point):

- Real-time pricing scheme
- Time of use pricing with two or more time blocks or as applicable to the project.

Using load survey, identify processes that can be shifted to off-peak periods. Implement a peak reduction program for project's non-traction load (1point).

Implement a scheduling program for transit operations based on hourly, daily and / or seasonal variations in commuter demand (1point).

GS Credit: Demand Response

Applicability:

- Cities and Utilities (1–2 points)
- Campuses (1–2 points)
- Transit (1–2 points)

INTENT

To promote demand-response (DR) strategies that improve performance and reliability.

REQUIREMENTS

Cities and Utilities

Have in place tariff options that support short-term reductions in peak demand, using the following tariff structures for customer categories, including residential, commercial, and industrial (1 point):

- Critical peak pricing
- Critical peak rebate

Have in place a DR program for at least 50% of customers across commercial, and industrial categories (1 point).

By having feed-in tariff options for at least one of the following innovative strategies, projects can earn 1 additional point for exemplary performance under the Innovation credit category:

- Grid-responsive or grid-interactive programs

- Vehicle to grid (V2G)

Campuses and Transit

CASE 1. Demand-Response Program Available (1–2 points)

Participate in an existing DR program and complete the following sequential steps:

- **Step 1.** Have in place a system with the capability for real-time, fully automated DR based on external initiation by a DR program provider. The program may be semi-automated.

- **Step 2.** Achieve Step 1 and make a minimum one-year DR contractual commitment with a qualified DR program provider, with the intention of multiyear renewal, for at least 10% of the annual peak electricity demand (1 point).

- **Step 3.** Achieve Steps 1 and 2 and develop a comprehensive plan for meeting the contractual commitment during a demand response event.

- **Step 4.** Achieve Steps 1–3 and include the DR processes in the current facilities requirements and operations and maintenance plan and initiate at least one full test of the DR plan (1 point).

OR

CASE 2. Demand-Response Program Not Available (1–2 points)

Have in place infrastructure to take advantage of a future DR program or dynamic, real-time pricing program.

- **Step 1.** Develop a comprehensive plan for shedding at least 10% of the annual peak electricity demand.

- **Step 2.** Achieve Step 1 and include the DR processes in the current facilities requirements and operations and maintenance plan (1 point).

- **Step 3.** Achieve Steps 1 and 2 *and* conduct at least one full test of the DR plan.

- **Step 4.** Achieve Steps 1–3 and discuss participation in future DR programs with local city or utility representatives (1 point).

Projects that adopt at least one of the following innovative strategies earn 1 additional point for exemplary performance under the Innovation credit category:

- Participate in grid-responsive or grid-interactive program with the local or adjacent power grid or microgrid

- Offer grid-responsive or grid-interactive services to customers on the power grid

- Install bi-directional electric vehicle (V2X) charging

- Participate in a "Buildings as Thermal Batteries" program

GS Credit: Streamlined Interconnection and Net Metering Policies

Applicability:

- Cities and Utilities (1–4 points)

INTENT

To encourage users' adoption of local electricity generation and storage that is interconnected and leveraged by the electricity system.

REQUIREMENTS

Cities and Utilities

Have in place an interconnection and net metering policy that meets following minimum conditions for the generation system's type and size (1 point):

- Applicability to all renewable generation and energy storage technologies
- System capacity of 100 kW or more

Incorporate the following best practices for interconnection policies (1 point):

- Provisions for a fast-track, low-cost interconnection process for customers with generation capacity of 100 kW or less
- Defined timelines and an engineering fee structure for various stages of the process
- Identification of technical standards for interconnection of generation systems

Incorporate at least three of the following best practices for net metering policies (1 point):

- Monthly rollover of excess energy is permitted up to one year.
- Compensation is provided for excess energy at predefined, nonzero rates.
- Ownership of renewable energy certificates is offered to the customer.
- Third-party ownership and meter aggregation are permitted.

Publish the following (1 point):

- Average time for process completion
- Average cost of application
- Prior case studies

STANDARDS AND REFERENCES

Institute of Electrical and Electronics Engineers 1547-2003, Standard for Interconnecting Distributed Resources with Electric Power Systems

EPA Energy and Environment Guide to Action: State Policies and Best Practices for Advancing Energy Efficiency, Renewable Energy, and Combined Heat and Power

California Public Utilities Commission Electric Rule No. 21 for Generating Facility Interconnections

GS Credit: Other Tools and Financial Incentives

Applicability:

- Cities and Utilities (1 point)
- Campuses (1 point)

INTENT

To encourage users to invest in energy use reduction and electricity system improvements and to promote third-party tools and services.

REQUIREMENTS

Cities and Utilities

OPTION 1. Third-Party Tools and Services (1 point)

Have in place equipment and programs that provide a wide array of third-party tools and service choices for all types of users. Customers must be allowed to choose among at least three providers, manufacturers, or suppliers for two or more of the following technologies:

- Advanced thermostats that can communicate directly with advanced meters

- Building energy management systems

- Electricity or chilled water storage

- Grid integrated controllable water heater and appliances

OR

OPTION 2. Market and Financial Incentives (1 point)

Have in place financial incentives for demand-side investments for any one of the applicable customer classes, including residential, commercial, small industrial, and large industrial, by providing financing that meets the following criteria:

- Interest rate less than the market prime rate or base points

- Term greater than five years

- Application process that can be completed in four weeks or less

- Applicability to more than one generation technology

Campuses

Offer tenants an energy clause, green lease, or other contractual language addressing energy-efficient build-outs, payment structures for energy efficiency upgrades, cost recovery or pass through for energy related capital costs, and/or utility data sharing (1 point).

GS Credit: Aggregation

Applicability:

- Cities and Utilities (1 point)
- Campuses (1 point)
- Transit (1 point)

INTENT

To enable customers to aggregate their loads, lower costs, improve efficiency, promote local clean energy, and generate jobs.

REQUIREMENTS

Cities and Utilities

Have in place policies and/or programs for meter aggregation, physical or virtual, that allow groups of customers or buildings to collectively procure electricity or provide ancillary services back to the grid as a single entity (1 point).

Campuses and Transit

Participate in meter aggregation with at least one other building or aggregate at least two buildings (1 point).

GS Credit: Advanced External Interface

Applicability:

- Campuses (1–2 points)
- Transit (1–2 points)

INTENT

To encourage use of automated technologies that coordinate loads and generation services to meet the needs of the larger grid.

REQUIREMENTS

Campuses and Transit

OPTION 1. Information Exchange System (1–2 points)
Install and use a remote signal or information exchange that allows the project's master controller (or other supervisory software program) to automatically receive service request signals from the project's supplying city or utility, ISO, regional transmission operator, or regional electricity aggregator.

Design the interface for information exchange with the following basic functions (1 point):

- It can receive a remote dispatch signal or demand response signal.
- Signals are transmitted securely either via a dedicated phone line or using established cyber security protocols.

Design the interface for information exchange to have the following advanced functions in addition to the basic functions (1 point):

- It can determine and report the project's remaining generation capacity or load shedding capability or stored energy charge state.
- It supports two-way communication between the project and the coordinating authority.
- The controller can opt out of events.
- It can bid or propose load reduction or generation to the coordinating authority.
- It can receive load control or generator dispatch signals.
- It supports information exchange regarding both supply pricing and demand charges.

OR

OPTION 2. Open ADR Compliance (1–2 points)
Install and use a remote signal or information exchange that allows the project's master controller (or other supervisory software program) to automatically receive service request signals from the project's supplying city or utility, ISO, regional transmission operator, or regional electricity aggregator.

Demonstrate compliance with either of the following:

- OpenADR 2.0 Profile A (1 point)
- OpenADR 2.0 Profile B or Profile C (2 points)

STANDARDS AND REFERENCES

OASIS Energy Interoperation Version 1.0

Regional Priority

Applicability:

- Cities and Utilities (1–4 points)
- Campuses (1–4 points)
- Transit (1–4 points)

INTENT

To address geographically specific environmental, energy security, safety, social equity, and public health priorities.

REQUIREMENTS

Select up to four of the six Regional Priority credits (listed below) and meet or exceed the threshold (1 point each).

Projects cannot double-count points under both Regional Priority and Innovation for the same credit. For example, for U.S. projects, Damage and Exposure Prevention is both a Regional Priority credit and an Innovation credit, but meeting the threshold earns the project only 1 point, not 2.

Regional Priorities for India

The following six credits have been identified by GBCI India's PEER Advisory Committee and stakeholders as having regional energy and environmental importance. Projects may select up to four, for a maximum of 4 RP points.

- RR Credit: Reliability Performance Assessment. Achieve 4 or more points (1 point).

- RR Credit: Power Quality Capabilities. Achieve 3 or more points (1 point).

- EE Credit: Environmental Performance Improvement. Achieve 5 or more points (1 point)

- EE Credit: Renewable energy and Carbon Offset. Achieve 2 or more points (1 point).

- EE Credit: Distributed Energy Resource. Achieve 3 or more points (1 point). For transit projects, achieve 5 or more points (1 point).

- OP Credit: Advanced Metering Infrastructure. Achieve 2 or 3 points (1 point).

Regional Priorities for the United States

The following six credits have been identified by USGBC and GBCI, in consultation with PEER stakeholders in the United States, as regional priorities for addressing challenges in energy, the environment, and climate change. Projects may select up to four, for a maximum of 4 RP points.

- RR Credit: Damage and Exposure Prevention. Achieve 4 or more points (1 point).

- RR Credit: Distribution Redundancy and Auto Restoration. Achieve 2 points (1 point).

- EE Credit: Environmental Performance Improvement. Achieve 6 or more points (1 point).

- OP Credit: Risk Assessment and Mitigation. Achieve 3 or 4 points (1 point).

- OP Credit: Emergency Response Planning. Achieve 2 or 3 points (1 point).

- GS Credit: Demand Response. Achieve 2 points (1 point).

IN Credit - Innovation

Applicability:

- Cities and Utilities (1–5 points)
- Campuses (1–5 points)
- Transit (1–5 points)

INTENT

To encourage projects to achieve exceptional or innovative performance.

REQUIREMENTS

Project teams can use any combination of innovation and exemplary performance strategies.

OPTION 1. Innovation (1-2 points)

Achieve significant, measurable energy and environmental performance using a strategy not addressed in the PEER rating system.

Identify the following:

- Intent of the proposed innovation credit
- Proposed requirements for compliance
- Proposed submittals to demonstrate compliance
- Approaches or strategies to meet the requirements

OR

PEER Pilot Credits (1-2 points)

Achieve any one of the PEER Pilot Credits listed below:

- PEER Pilot Credit 1 – Safety First: Electrical System Operations, Management and Safety (Cities and Utilities and Campuses Only)
- PEER Pilot Credit 2 – Safety First: Transit – Electrical System Operations, Management and Safety (Transits Only)
- PEER Pilot Credit 3 – Safety First: Accelerate Digital Transformation (Cities and Utilities and Campuses Only)

AND/OR

OPTION 2. Exemplary Performance (1–3 points)

Achieve exemplary performance—typically, achieving double the credit requirements (1 point) or the next incremental percentage threshold (1 point per threshold, up to a maximum of 3).

Projects may attempt Innovation points for the following credits:

RR Credit: Reliability Performance Assessment

RR Credit: Damage and Exposure Prevention

EE Credit: System Energy Efficiency Coefficient Improvement

EE Credit: Environmental Impact Disclosure and Management

OP Credit: Risk Assessment and Mitigation

OP Credit: Advanced Metering Infrastructure

GS Credit: Load Duration Curve Optimization

GS Credit: Demand Response

IN Credit - PEER Education

Applicability:

- Cities and Utilities (1 point)
- Campuses (1 point)
- Transit (1 point)

INTENT

To give project team members and consultants a fundamental understanding of the PEER rating system and smart grid concepts.

REQUIREMENTS

At least one member of the project team or a project consultant must achieve the PEER Pro Badge or must participate in a PEER workshop given by GBCI and/or complete a certification program or course in smart grid technology accredited by an international organization (1 point).

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