

A large, light gray, stylized oak leaf graphic serves as a background for the lower half of the page. It has a central midrib and several pairs of lobes, with a small notch at the top center.

# LEED v4.1 CITIES AND COMMUNITIES: PLAN AND DESIGN

Getting started guide for beta participants

April 10, 2020

## Contents

WELCOME TO LEED V4.1 .....	5
PROGRAM OVERVIEW .....	9
WHAT YOU NEED TO KNOW.....	12
LEED FOR CITIES AND COMMUNITIES SCORECARD .....	14
INTEGRATIVE PROCESS (IP) .....	16
IP PREREQUISITE: INTEGRATIVE PLANNING AND DESIGN PROCESS .....	16
IP CREDIT: GREEN BUILDING POLICY AND INCENTIVES.....	18
NATURAL SYSTEMS AND ECOLOGY (NS) .....	20
NS PREREQUISITE: ECOSYSTEM ASSESSMENT .....	20
NS PREREQUISITE: CONSTRUCTION ACTIVITY POLLUTION PREVENTION .....	22
NS PREREQUISITE: GREEN SPACES .....	23
NS CREDIT: NATURAL RESOURCES CONSERVATION AND RESTORATION .....	25
NS CREDIT: LIGHT POLLUTION REDUCTION.....	29
NS CREDIT: RESILIENCE PLANNING.....	31
TRANSPORTATION AND LAND USE (TR) .....	34
TR CREDIT: COMPACT, MIXED USE AND TRANSIT ORIENTED DEVELOPMENT .....	34
TR CREDIT: WALKABILITY AND BIKEABILITY.....	38
TR CREDIT: ACCESS TO QUALITY TRANSIT .....	41
TR CREDIT: ALTERNATIVE FUEL VEHICLES.....	44
TR CREDIT: SMART MOBILITY AND TRANSPORTATION POLICY .....	46
TR CREDIT: HIGH-PRIORITY SITE .....	48
WATER EFFICIENCY (WE) .....	50
WE PREREQUISITE: INTEGRATED WATER MANAGEMENT .....	50
WE PREREQUISITE: WATER ACCESS AND QUALITY .....	53
WE CREDIT: STORMWATER MANAGEMENT.....	56

WE CREDIT: WASTEWATER MANAGEMENT .....	59
WE CREDIT: SMART WATER SYSTEMS .....	61
ENERGY AND GREENHOUSE GAS EMISSIONS (EN) .....	62
EN PREREQUISITE: POWER ACCESS, RELIABILITY AND RESILIENCY .....	62
EN PREREQUISITE: ENERGY AND GREENHOUSE GAS EMISSIONS MANAGEMENT .....	65
EN CREDIT: ENERGY EFFICIENCY .....	68
EN CREDIT: RENEWABLE ENERGY .....	70
EN CREDIT: LOW CARBON ECONOMY .....	73
EN CREDIT: GRID HARMONIZATION.....	74
MATERIALS AND RESOURCES (MR).....	76
MR PREREQUISITE: CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT .....	76
MR PREREQUISITE: SOLID WASTE MANAGEMENT .....	78
MR CREDIT: ORGANIC WASTE TREATMENT .....	82
MR CREDIT: RECYCLING INFRASTRUCTURE .....	85
MR CREDIT: RESPONSIBLE SOURCING FOR INFRASTRUCTURE .....	87
MR CREDIT: SMART WASTE MANAGEMENT SYSTEMS .....	89
QUALITY OF LIFE (QL).....	91
QL PREREQUISITE: DEMOGRAPHIC ASSESSMENT .....	91
QL PREREQUISITE: SOCIAL INFRASTRUCTURE .....	92
QL PREREQUISITE: ECONOMIC GROWTH .....	94
QL CREDIT: AFFORDABLE HOUSING .....	96
QL CREDIT: PUBLIC HEALTH .....	97
QL CREDIT: EMERGENCY MANAGEMENT AND RESPONSE.....	99
INNOVATION (IN) .....	101
IN CREDIT: INNOVATION .....	101
REGIONAL PRIORITY (RP) .....	103

RP CREDIT: REGIONAL PRIORITY .....103

APPENDICES.....105

# Welcome to LEED v4.1

Welcome to the next evolution of LEED for Cities and Communities! Whether you are a seasoned LEED practitioner, or new to LEED, we encourage you to test out this bigger, stronger, bolder rating system for your city or community and to be a leader in shaping the future of sustainability performance.

Six key goals have guided the technical development process for the LEED v4.1 Cities and Communities program:

- ▶ inspire leadership
- ▶ foster achievement of global goals
- ▶ ensure continuity of performance from design to development and operation
- ▶ leverage the large portfolio of complementing systems in GBCI portfolio, particularly STAR
- ▶ expand the market from buildings to cities and communities
- ▶ focus on quality of life of residents and enhance living standards

This version of LEED is the result of countless hours of effort from our volunteers and staff and we are confident that the rating system meets those goals.

LEED is a global rating system for the design, construction and operation of high-performance green buildings. For the last 18 years, various versions of LEED have pushed the global green building market forward progressively, with more than 93,000 registered and certified projects and more than 19 billion square feet of space worldwide.

Regions and markets move at different paces, and we want to be sure we can meet the needs of everyone in the green building and sustainability community. LEED v4.1 represents a series of upgrades that will improve our standards, encourage leadership, and make our platform more user friendly, more accessible—and most importantly—more collaborative than ever before.

LEED v4.1 will be our most inclusive and transparent platform to date. That is because our most important requirement for adoption will come from our most valuable resource of all—YOU!

## Highlights of LEED v4.1 Cities and Communities

Integrative Process (IP)	<ul style="list-style-type: none"><li>• The rating system has an overarching prerequisite and a credit. The prerequisite intends to drive an inclusive process in city or community planning, while the credit ensures that a majority of buildings in the city or community are green and sustainable by design.</li><li>• The prerequisite on integrative planning and design facilitates teamwork for early analysis of city systems to derive cost effective, high performance outcomes.</li><li>• The credit is a facilitator for green buildings in the city or community. Buildings are primary constituents of any city or community that can contribute to higher energy and water consumption, higher waste generation and could lead to environmental degradation, if not designed and operated sustainably. The design and operation of green buildings support and contribute to better environmental, social and economic goals of a city and community. The rating system thus encourages cities to introduce policies, incentives and programs to encourage design construction and operation of green buildings certified to LEED or any other equivalent green building rating system, as an overarching credit.</li></ul>
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<p>Ecology and Natural Systems (EN)</p>	<ul style="list-style-type: none"> <li>• Cities depend on nature and ecosystem services to not only sustain life but also enhance the quality of life. Ecosystems protect and even regenerate natural systems, thereby increasing the ecosystem services they provide and creating ecologically resilient communities. These are better able to withstand and recover from episodic floods, droughts, wildfires, and other catastrophic events.</li> <li>• This category consists of prerequisites on <b>Ecosystem Assessment, Construction Activity Pollution Prevention and Green Spaces</b>, which outline the steps to analyze and respond to the local ecosystem; prevent or reduce pollution resulting from construction; cater to minimum green spaces essential for community health and well-being; and enhance environmental quality.</li> <li>• Credits on <b>Natural Resource Conservation and Restoration</b> and <b>Light Pollution Reduction</b> focus on maintaining the integrity of the natural ecosystems and the necessary steps to conserve and restore ecosystems and to reduce the adverse impacts of lighting.</li> <li>• <b>Resilience Planning</b> requires the city to generate awareness about climate risks and build strategies to effectively tolerate disturbances when faced with shocks and stresses. It also encourages cities and communities to carry out comprehensive climate risk assessments and prepare resilience plans.</li> </ul>
<p>Transportation and Land Use (TR)</p>	<ul style="list-style-type: none"> <li>• The transport sector is responsible for a quarter of energy-related greenhouse gas (GHG) emissions worldwide.<sup>1</sup> Land use is the key driver of mobility in a city and rapid urbanization has disrupted land use patterns, resulting in urban sprawl and increased dependency on personal, motorized vehicles. This credit category encourages cities to adopt an integrated approach towards urban planning through mixed use development, efficient transportation, better connectivity and engagement with stakeholders.</li> <li>• This category does not have any prerequisites. The credit on <b>Compact, Mixed Use and Transit Oriented Development</b> addresses land use and encourages compact development and access to diverse uses. This in turn discourages urban sprawl and encourages people to walk or bike thereby improving public health. The <b>Walkability and Bikeability</b> credit further lays out principles for designing safe walkable and bikeable cities and communities.</li> <li>• <b>Access to Quality Transit</b> encourages use of diverse transportation modes to reduce the reliance on personal vehicles within the city or community. It also addresses intermodal connectivity for easy access and transition from one mode of transport to another.</li> <li>• The credit on <b>Alternative Fuel Vehicles</b> encourages a shift to alternative fuel vehicles by providing infrastructure such as charging stations for electric vehicles and through policies and incentives.</li> <li>• <b>Smart Mobility and Transportation Policy</b> intends to promote efficiency in operation of transport systems, user facilitation, policies and behavior change to reduce environmental impacts.</li> <li>• The <b>High Priority Site</b> credit intends to preserve and revive the urban fabric of a city by promoting engagement, community development and social and mental</li> </ul>

<sup>1</sup> <https://unfccc.int/news/in-detail-role-of-transport-sector-in-fighting-climate-change>. Accessed on April 1, 2019.

	<p>wellbeing. It also encourages preservation of historic structures and sites and focuses on growth and redevelopment for infill and other priority locations.</p>
Water (WE)	<ul style="list-style-type: none"> <li>• Water is the lifeline of any city. However, equity and access have been a major challenge in many cities. Water demand has been constantly increasing in urban and peri-urban areas and is stressing freshwater reserves, creating a perennial shortage of water in these cities. This credit category addresses water at multiple levels – meeting demand, maintaining water quality, reducing water losses, capturing stormwater, and managing urban floods.</li> <li>• There are two prerequisites in this category. The prerequisite for <b>Integrated Water Management</b> requires reduced freshwater consumption and encourages the shift to a net zero water city.</li> <li>• <b>Water Access and Quality</b> requires the implementation of policies and infrastructure for the equitable supply of quality water to all members of society, along with the treatment of wastewater and stormwater before it is released into the environment.</li> <li>• The credit on <b>Stormwater Management</b> focuses on strategies to capture the maximum possible quantity of rainwater to reduce runoff volume, prevent erosion, and flooding, as well as recharge groundwater.</li> <li>• The credit on <b>Waste Water Management</b> is designed reduce pollution from wastewater, encourage water reuse and reduce stress on freshwater sources.</li> <li>• <b>Smart Water Systems</b> encourages cities to improve operational efficiency, reduction in water losses, and monitoring of water flow within the city through the use of smart technologies such as smart meters.</li> </ul>
Energy and Greenhouse Gas Emissions (EN)	<ul style="list-style-type: none"> <li>• Cities consume over two-thirds of the world's energy and account for more than 70% of global CO<sub>2</sub> emissions.<sup>2</sup> City energy systems can play a huge role in combating climate change. In addition, access to energy is critical in determining the quality of life of residents. This credit category encourages cities to provide equitable access to reliable power while simultaneously reducing the adverse impacts of energy use on environment.</li> <li>• There are two prerequisites in this category. <b>The second prerequisite is the only prerequisite in the rating system that carries a score.</b> The prerequisite on <b>Power Access, Reliability and Resiliency</b> addresses equitable access to a reliable power supply, along with system resiliency to withstand shocks and stresses.</li> <li>• The second prerequisite that also has incremental scoring necessitates that the city or community estimate and limit greenhouse gas (GHG) emissions from proposed development. The prerequisite on <b>Energy and Emissions Management</b> measures the GHG emissions per capita.</li> <li>• The credit on <b>Energy Efficiency</b> focuses on actions for efficient water and wastewater services to the city, public lighting and district energy systems within the city.</li> <li>• <b>The Renewable Energy</b> credit focuses on reducing the environmental impacts of conventional energy generation through installation of small scale and large-scale renewables, as well as renewable energy certificates and carbon offsets in energy procurement.</li> </ul>

<sup>2</sup> [https://www.c40.org/why\\_cities](https://www.c40.org/why_cities)

	<ul style="list-style-type: none"> <li>• As GHG emissions are driven by a city's economic activity, the credit on <b>Low Carbon Economy</b> encourages the city to measure and lower the carbon intensity of its economy.</li> <li>• The credit for <b>Grid Harmonization</b> intends to improve operational efficiency of the energy system and encourage consumer participation in energy use optimization through the use of advanced technologies and the Internet of Things (IoT). This section leverages the Performance Excellence in Electricity Renewal (PEER) rating system that evaluates power generation, transmission and distribution systems.</li> </ul>
Materials and Resources (MR)	<ul style="list-style-type: none"> <li>• Cities are large aggregators of materials and nutrients, accounting for the highest natural resource consumption affecting the environment and human health. The intent behind this category is to eliminate waste from mainstream consumption and instead utilize waste as a resource. The development of cities provides opportunities to drive a global transition from a linear to a circular economy. With their high concentration of resources, capital, data and skills over a small geographic territory, cities could greatly benefit from the outcomes of such a transition.</li> <li>• There are two prerequisites that prepare a new city and community to strive towards net zero waste and a circular economy through recycling, reuse and reduction of waste generation. The prerequisite for <b>Construction and Demolition Waste Management</b> requires cities to reduce the disposal of C&amp;D waste in landfills and incineration facilities through recovery, reuse, and recycling.</li> <li>• The <b>Solid waste Management</b> prerequisite requires cities to put up adequate waste management infrastructure by properly estimating waste generation and diversion. Maximum diversion from landfills is the prime intent.</li> <li>• The credits for <b>Organic Waste Management</b> and <b>Recycling Infrastructure</b> prepare the city or community to manage and treat organic and inorganic waste, so that there is a minimal load on landfills.</li> <li>• <b>Responsible Sourcing for Infrastructure</b> encourages use of products and materials that have environmentally, economically, and socially preferable life cycle impacts.</li> <li>• As in other credit categories, the <b>Smart Waste Management</b> credit promotes strategies to improve operational efficiency of the waste management system.</li> </ul>
Quality of Life (QL)	<ul style="list-style-type: none"> <li>• Quality of Life is the general well-being of individuals and populations in the city or community. New cities are being developed as economic engines for their respective countries, thereby creating new jobs in the region. While the livability aspects of a city are mainly driven by the operations and management, this category addresses design and planning interventions to promote prosperity, health, and safety for all.</li> <li>• This credit category supports better quality of life for future residents. There are three prerequisites: <b>Demographic Assessment</b>, <b>Social Infrastructure</b>, and <b>Economic Growth</b>. These prerequisites require the city or community to assess its population, provision for adequate social infrastructure, and prepare economic growth pathways.</li> <li>• The <b>Affordable Housing</b> credit recognizes the importance of providing affordable housing for all.</li> <li>• The credit for <b>Public Health</b> assists cities and communities in planning for health-promoting services and opportunities for all citizens, while the <b>Emergency Management and Response</b> credit requires sufficient capacity to respond to emergency incidents and reduce their impacts on human health.</li> </ul>

# Program Overview

LEED for Cities and Communities is the leading global rating system and certification program for evaluating the sustainability and quality of life in a city or community. Our program serves as a catalyst and transformative tool toward more sustainable, equitable and resilient communities around the world. The rating system encompasses economic, environmental and social performance measures and provides a clear data-driven approach to benchmark and communicate progress.

Like the suite of LEED rating systems for buildings, LEED for Cities and Communities is designed to be applicable at all phases of a city's or community's lifecycle. New or developing cities, existing cities, neighborhoods or districts in redevelopment - all are examples of applicable projects. The flexible menu of standardized metrics and strategies in the rating system can be applied at various levels and stages of development and allow data to be rolled from the project level all the way up to a city or a larger regional level. Sustainability strategies can be incorporated more effectively and efficiently at an early stage of development. Cities can register as early as the conceptual phase and earn precertification. Cities with a Master Plan that is finalized can achieve full Plan and Design certification. Cities at the development phase can also apply the Plan and Design rating system. While the evaluation is based on the Master Plan, these cities are encouraged to undertake additional strategies to ensure that they can meet the prerequisite requirements. For example, if the city is under development and the master plan does not meet the prerequisite requirements for green spaces, the city can incorporate innovative strategies such as vertical gardens or urban rooftop gardens to meet the requirements.

New cities and communities are mostly developed in phases. Projects with phases at various stages of planning and construction must follow the guidance provided below:

- ▶ Precertification: A project must use Plan and Design precertification for the full project. Precertification is mandatory for these projects.
- ▶ Certification:
  - a. Plan and Design: A project must use the Plan and Design rating system for the phase that is at planning stage or is constructed less than 75% of its total building floor area.
  - b. Existing: If the phase is constructed over 75%, it must use the Existing rating system and must certify after being operational for a minimum period of one year.

LEED for Cities and Communities is performance-driven and includes a verified certification program. The resulting transparency and accountability of shared metrics and verified performance ensures a new generation of healthy, inclusive and prosperous places that offer people and businesses an environment in which to thrive.

This program aligns with our vision that buildings and communities will regenerate and sustain the health and vitality of all life within a generation. If you are designing a new city or community or if you are a city or community manager, we encourage you to test out this system. The rating system is intended to help cities and communities manage resources sustainably and provide a better quality of life for residents and visitors. Lastly, the rating system supports the United Nations Sustainable Development Goals for environmentally-sensitive, socially-responsible and economically-viable communities.

## WHAT IS A CITY OR A COMMUNITY AS DEFINED BY LEED v4.1?

The terms 'Cities' and 'Communities' are defined for purposes of the rating system as follows:

**Cities:** Cities are political jurisdictions or places defined by their municipal public-sector governance (e.g., mayors or town managers) except in those regions (especially Asia) where the term 'city' is culturally understood as encompassing some places with private sector governance.

**Communities:** Communities are defined as every urbanized location that is *not* a 'city' including sub-city locations such as districts and meta-city regions such as counties. In addition, privately developed or

owned urban areas (for example, Songdo District or Rockefeller Center) generally fit within the definition of ‘Community’ except where they are self-identified (per definition of ‘city’ above) as cities.

## **WHO CAN PARTICIPATE?**

LEED for Cities and Communities is flexible so that local governments (counties and municipalities), as well as the private sector, can use the rating system to achieve their goals. The primary applicant for LEED for Cities certification is the governing body of a city or municipality. LEED for Communities certification applies to non-city areas, such as counties, regions, districts, economic zones, neighborhoods, campuses and military installations.

Examples of LEED for Cities and Communities: Plan and Design applicants include:

- A city manager representing a rapidly growing city
- A private sector planner developing a new city or community
- A local developer working on an eco-district or collection of buildings on an urban site/block within a mature city
- A housing authority or local group developing a neighborhood
- Townships or large area development projects
- Neighborhood developments
- Large educational, institutional or industrial campuses and communities

## **TECHNICAL DEVELOPMENT GOALS**

In past three years of working with 140+ cities globally to develop and refine LEED for Cities (through the LEED for Cities pilot program that precedes this beta and STAR Communities), USGBC and GBCI have gained immense experience on the system. This has helped us to move to the next level of technical development. We have now expanded the program to cover new and greenfield cities and communities in addition to existing cities. Now, with the Plan and Design version of the system, greenfield cities and communities can incorporate actions, strategies, policies and programs to perform sustainably.

The beta LEED for Cities and Communities rating system embeds the following inherent guiding principles in its development trajectory:

### **LEED Impact categories, UN Sustainable Development Goals and Triple Bottom Line:**

- The LEED for Cities and Communities rating system aligns with the seven Impact Categories of LEED.
- The rating system addresses all of the Sustainable Development Goals set by United Nations in 2015 to help cities achieve global goals.
- It upholds the triple bottom line and addresses social, environmental and financial aspects of a city.

### **Future-Ready Cities:**

- Requirements in the rating system encourage cities to adopt concepts of being carbon neutral, water positive, zero waste, human centric and equitable, transit oriented, connected through smart technologies, and integrated with a circular economy, to name a few.
- Social equity is a critical issue in contemporary cities. Cities and communities are encouraged to cater to social infrastructure at the design stage to support better quality of life and community well-being.

### **Integrated USGBC and GBCI Programs – LEED, STAR, SITES, PEER, LEED for Transit, TRUE:**

- LEED for Cities and Communities is aligned with the STAR Community Rating System, LEED for Neighborhood Development, and other GBCI rating systems such as PEER, TRUE and SITES.
  - Integration of a prerequisite or credit from a rating system entails that the intent of the credit is being met. This can be by (i) referencing the original credit as-is (ii) adapting the language to fit the city or community scale, (iii) adapting the requirements to fit within the LEED framework, or (iv) using the same thresholds as the original credit.

**Reviewable Requirements:**

- Selection of prerequisites and credits is based on their measurability and reviewability.
  - For example, Green Spaces has been included as a prerequisite in the Ecology and Natural Systems credit category, as vegetated area can be measured and reported at city level and thus can be reviewed.

**Building on the Foundations of Global Best Practices:**

- The rating system draws upon and references global best management practices wherever applicable.
  - For instance, the Recycling Infrastructure credit has been developed based on the review and analysis of programs, policies and regulations for extended producer responsibility, remanufacturing, sustainable consumption and production, and material recovery.

**Applicability at Global Level:**

- To ensure global applicability of LEED for Cities and Communities, due consideration has been given to credit and prerequisite applicability in various geographies.
  - National or regional equivalencies, compliance paths, regional priority designations, and guidance will be developed subsequently.

**Encouraging Cities to Adopt Green Buildings:**

- The LEED for Cities and Communities program aims to support USGBC's market transformation goal at two levels. First, it encourages green practices at city scale; and second, at the building level, it encourages the city to adopt policies and regulations to support sustainability.

# What You Need to Know

As a first step in launching LEED v4.1, USGBC released beta versions of each LEED rating system, allowing the market to work with the draft rating systems and provide feedback based on real-world application.

USGBC will present LEED v4.1 for public comment, followed by a member ballot. This beta rating system is not final; feedback from the beta will inform the public comment draft(s). We will update this document as needed and as more program features become available.

This document is a comprehensive guide to the LEED Cities and Communities: Plan and Design v4.1 beta program. The v4.1 Beta Guide contains guidance sections for basic usability and there shall be detailed reference guide available in due course of time. The rating systems such as PEER V2, Star Communities, Sites, LEED ND are referenced in several credits. Projects are encouraged to access these systems and respective reference guides to get further details and guidance.

## LEED CITIES AND COMMUNITIES V4.1 CERTIFICATION

- ▶ Registration
  - Your first step is to confirm eligibility and select the appropriate rating system.
  - Next, register your project under the selected LEED Cities and Communities v4.1 beta rating system in LEED Online at [leed.usgbc.org](https://leed.usgbc.org).
  - For registration fees, view our detailed fees table at [usgbc.org](https://usgbc.org).
- ▶ Certification
  - To complete your application for certification you will need to upload required documentation and/or provide requested information (*for each prerequisite / credit being pursued*).
  - In addition to documentation for specific prerequisites and credits, you need to submit the following documents to provide general information about the city or community:
    - Master Plan highlighting LEED boundary: Master plan of the city or community highlighting the LEED boundary that will receive a performance score and LEED for Cities and Communities certification.
    - Governance structure: Entities responsible for designing strategies that lead to the outcomes impacting the LEED score.
    - USGBC population calculator: Total population of the city or community. This should be inclusive of floating or transient population commuting daily for employment, education or other purposes.
  - GBCI, the certification body for the LEED rating system, will perform the beta certification reviews, in accordance with the Guide to Certification for Cities and Communities.

Total 110 points are available. A minimum of 40 points are required for certification. LEED has four levels of certification, depending on the point thresholds achieved:

- Certified: 40-49 points
- Silver: 50-59
- Gold: 60-79
- Platinum: 80+

## PRECERTIFICATION REVIEW

You may choose to pursue precertification ahead of full certification if you would like additional support and formal recognition up-front. This is an optional review pathway available for a fee for LEED for Cities and Communities: Plan and Design projects that focusses on intended design and construction strategies. We offer precertification prior to a full certification application to help you determine which credits and prerequisites your project is likely to achieve during the full review, as well as attract tenants, businesses, developers, financiers, and even permitting benefits in certain localities. If you are interested in pursuing precertification, select this option after registration in LEED Online within the *Timeline* tab. Achieve precertification by completing the LEED Precertification Worksheet that is

provided in LEED Online, marking prerequisites and credits as attempted, and submitting the project for review.

LEED for Cities and Communities v4.1 precertification expires after three years.

#### **RECERTIFICATION**

All certified projects are strongly encouraged to pursue recertification once it is available.

# LEED for Cities and Communities Scorecard

LEED for Cities and Communities		Cities	Communities
<b>INTEGRATIVE PROCESS</b>		POSSIBLE: 5	POSSIBLE: 5
Prerequisite	Integrative Planning and Design Process	REQUIRED	REQUIRED
Credit	Green Building Policy and Incentives	5	5
<b>NATURAL SYSTEMS &amp; ECOLOGY</b>		POSSIBLE: 13	POSSIBLE: 13
Prerequisite	Ecosystem Assessment	REQUIRED	REQUIRED
Prerequisite	Construction Activity Pollution Prevention	REQUIRED	REQUIRED
Prerequisite	Green Spaces	REQUIRED	REQUIRED
Credit	Natural Resources Conservation and Restoration	5	5
Credit	Light Pollution Reduction	2	2
Credit	Resilience Planning	6	6
<b>TRANSPORTATION &amp; LAND USE</b>		POSSIBLE: 18	POSSIBLE: 18
Credit	Compact, Mixed Use and Transit Oriented Development	6	6
Credit	Walkability and Bikeability	4	4
Credit	Access to Quality Transit	2	2
Credit	Alternative Fuel Vehicles	2	2
Credit	Smart Mobility and Transportation Policy	2	2
Credit	High Priority Site	2	2
<b>WATER EFFICIENCY</b>		POSSIBLE: 12	POSSIBLE: 12
Prerequisite	Integrated Water Management	REQUIRED	REQUIRED
Prerequisite	Water Access and Quality	REQUIRED	REQUIRED
Credit	Stormwater Management	5	5
Credit	Wastewater Management	5	5
Credit	Smart Water Systems	2	2
<b>ENERGY AND GREENHOUSE GAS EMISSIONS</b>		POSSIBLE: 31	POSSIBLE: 31
Prerequisite	Power Access, Reliability and Resiliency	REQUIRED	REQUIRED
Prerequisite	Energy and Greenhouse Gas Emissions Management	15	19
Credit	Energy Efficiency	4	4
Credit	Renewable Energy	6	6

Credit	Low Carbon Economy	4	
Credit	Grid Harmonization	2	2

#### MATERIALS AND RESOURCES

		POSSIBLE: 11	POSSIBLE: 11
Prerequisite	Construction and Demolition Waste Management	REQUIRED	REQUIRED
Prerequisite	Solid Waste Management	REQUIRED	REQUIRED
Credit	Organic Waste Treatment	2	2
Credit	Recycling Infrastructure	5	5
Credit	Responsible Sourcing for Infrastructure	2	2
Credit	Smart Waste Management Systems	2	2

#### QUALITY OF LIFE

		POSSIBLE: 10	POSSIBLE: 10
Prerequisite	Demographic Assessment	REQUIRED	REQUIRED
Prerequisite	Social Infrastructure	REQUIRED	REQUIRED
Prerequisite	Economic Growth	REQUIRED	REQUIRED
Credit	Affordable Housing	2	2
Credit	Public Health	6	6
Credit	Emergency Management and Response	2	2

#### INNOVATION

		POSSIBLE: 6	POSSIBLE: 6
Credit	Innovation	6	6

#### REGIONAL PRIORITY

		POSSIBLE: 4	POSSIBLE: 4
Credit	Regional Priority	4	4

#### TOTAL

		110	110
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40- 49 Points

50-59 Points

60-79 Points

80+ Points

CERTIFIED

SILVER

GOLD

PLATINUM

# ENERGY AND GREENHOUSE GAS EMISSIONS (EN)

## EN Prerequisite: Power Access, Reliability and Resiliency

### Required

This prerequisite applies to

- ▶ Cities
- ▶ Communities

### Intent

To provide safe, secured, reliable, resilient and equitable access to power.

### Requirements

#### CITIES, COMMUNITIES

Power system must meet the following requirements. Cities with multiple utilities or service providers must aggregate the data from the respective utility to demonstrate compliance.

#### Access

100% coverage of all buildings by power supply.

#### Reliability and Resiliency

Protect the power system from common external threats that may cause equipment damage, malfunctioning or service interruption by meeting all requirements as applicable to the project.

#### Option 1. External Damage Prevention

Identify risks and avoid infrastructure damage and / or service interruption from external risks such as tree contact, animal / bird contact, vehicle traffic or human interference, fire / hazardous area and weather.

AND / OR

#### Option 2. Power System Hardening

Have in place the following design considerations and/or infrastructure to harden power systems against flooding, storms, and other extreme events.

##### ▶ Flooding avoidance

- Prevent damage to electrical equipment and assets (e.g., substations, diesel generator sets, transformers, OH cables) and ancillary equipment (e.g., pumps, compressors), by having a permanent storm water drainage system to protect critical power assets from inundation 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.

- Existing infrastructure can meet this infrastructure requirement by installing a standalone pump (operable in the absence of power supply) to pump water from low-lying areas around the electrical systems or permanently relocate the assets or increase the height of critical power assets in the flood-prone area as described in American Society of Civil Engineers (ASCE) - Chapter 7, 24 or equivalent.
- ▶ **Storm protection** – Outdoor equipment should withstand three-second wind gusts up to 140 mph or equivalent.
- ▶ **Seismic protection** – 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

Bury a minimum of 10% of the total electric cable length underground or protect them in conduits or underground tunnels.

AND

### Power Surety and Resiliency

Identify cities' or communities' critical loads or emergency facilities and essential services that require backup power during widespread outages or disasters. Determine minimum daily runtime requirements for all the emergency facilities and essential services. Demonstrate that the city, utility or service provider can supply power to all emergency facilities and essential services for at least duration greater than the minimum daily runtime for one week or longer.

Off-grid developments or micro-grids are eligible if they independently meet the above requirements and are supported by the city development plans or policies.

#### References:

PEER v2 RR Credit: Damage and Exposure Prevention  
 PEER v2 RR Credit: Power Surety and Resiliency

### Guidance Behind the Intent

This credit aligns with one of the key targets under the United Nations Sustainable Development Goal 7, which calls for universal access to affordable, reliable, and modern energy services by 2030. Along with access, reliable delivery is a fundamental goal for energy system operators as it directly impacts livability of a city or community. The failure to supply power—whether to a specific community or to the entire distribution network—undermines the confidence of citizens and wastes money and resources. Moreover, careful design of the power system can reduce the likelihood of equipment failures. Power outages during severe weather events (such as floods, heavy winds, hurricanes, and cyclones) have increased over the past decade, and many utilities, cities, and campuses are “hardening” their systems by making the major electrical equipment less susceptible to damage. Designing with hardening strategies during the initial stages of a project can help reduce future operational and damage costs.

Power reliability means providing short-term power to support critical loads, such as traffic controls or communication systems, while power resiliency means providing long-term power for essential services such as medical centers to support a community through an extended outage. Essential services must be supplied with highly reliable power for at least one week, although power does not need to be continuous or offer full functionality.

**Further Explanation****Required Documentation**

Documentation	Option 1	Option 2	Option 3
Declaration from development authority or the electrical / energy engineer stating 100% coverage of buildings with power supply.	X	X	X
Power surety and resiliency: List the cities' or communities' critical loads or emergency facilities and essential services, with their minimum daily runtimes, identify the alternative power supply for each, including type, location, capacity, and minimum daily runtime.	X	X	X
Reliability, resiliency and power surety: Narrative describing the design considerations and strategies undertaken to protect the power system from common external threats. For critical loads and emergency facilities explain the energy storage or backup generators duty cycle, with their energy storage capacity (including fuel) and typical energy consumption.	X	X	X

**Exemplary Performance**

This prerequisite is not eligible for exemplary performance.

# EN Prerequisite: Energy and Greenhouse Gas Emissions Management

## Required, 1-19 points

This prerequisite applies to

- ▶ Cities (1-15)
- ▶ Communities (1-19)

## Intent

To move towards a zero emissions city and reduce environmental and economic harms associated with excessive energy use.

## Requirements

### CITIES, COMMUNITIES

Estimate the annual energy consumption and Greenhouse Gas (GHG) emissions for the city.

The projected energy performance must meet the following criteria:

Include Scope 1 and Scope 2 GHG emissions in the calculations. Address all of the following sectors present within the city:

- ▶ Buildings – All types of buildings such as residential, commercial, institutional and industrial buildings under public and private sector.
- ▶ Transportation – Public and private transportation.
- ▶ Street lighting and public area lighting.
- ▶ Water and wastewater.
- ▶ Waste management.
- ▶ Any other sector such as energy generation, mining or extraction if it falls within the city boundary.

For cities or communities in US and Canada:

- ▶ Use U.S. Environmental Protection Agency's (EPA) regional grid mix coefficients to calculate GHG emissions by energy source; or
- ▶ Use hourly emissions profiles from U.S. Environmental Protection Agency's (EPA) AVOIDed Emissions and geneRation Tool (AVERT)

For other International cities:

- ▶ Use national grid mix coefficients from the International Energy Agency CO<sub>2</sub> Emissions from Fuel Combustion 2017 report to calculate GHG emissions by energy source.
- ▶ ISO 52000-1:2017 – Greenhouse gas emission factors for each building energy source shall be determined consistently with ISO Standard 52000-1:2017 and published for the country or region where the project is located.

Calculate the projected energy performance for a sector based on (i) industry “standard practice” (ii) existing codes, standards or regulatory requirements (iii) published data or (iv) projects of similar scope and size operating within the same geographical area or within a geographical area with similar

operating condition. Additionally, baseline buildings must comply with ANSI/ASHRAE/IESNA Standard 90.1-2016<sup>34</sup>, with errata or a USGBC-approved equivalent standard.

Support energy and GHG reduction strategies which are not within the scope of the development authority's direct execution with appropriate regulations or policies.

Document the assumptions for differing daytime and night time population if varying numbers are used to arrive at GHG emissions per capita.

LEED points are based on projected energy and GHG performance based on Greenhouse gas emissions per capita (tons CO<sub>2</sub> per capita).

**Table 8. Points for projected energy performance of the city**

GHG emissions per capita	Energy and GHG Management Points	
	Cities	Communities
No greater than 9.5	Prerequisite	Prerequisite
9.0 - 9.4	1	1
8.5 - 8.9	2	2
8.0 - 8.4	3	3
7.5 - 7.9	4	4
7.0 - 7.4	5	5
6.5 - 6.9	6	6
6.0 - 6.4	7	7
5.5 - 5.9	8	8
5.0 - 5.4	9	9
4.5 - 4.9	10	10
4.0 - 4.4	11	11
3.5 - 3.9	12	12
3.0 - 3.4	13	13
2.5 - 2.9	14	14
2.0 - 2.4	15	15
1.5 - 1.9	-	16
1.0 - 1.4	-	17
0.5 - 0.9	-	18
0 - 0.4	-	19

<sup>34</sup> ASHRAE 90.1-2016 Compliance pathways in Section 4.2.1.1 include compliance with all mandatory provisions, and compliance with one of the following: (i) Prescriptive provisions of Sections 5 through 10 (ii) Section 11 Energy Cost Budget Method or (ii) Normative Appendix G Performance Rating Method. When using Appendix G, the Performance Cost Index (PCI) shall be less than or equal to the Performance Cost Index Target (PCIt) in accordance with the methodology provided in Section 4.2.1.1.

## Guidance

### Behind the Intent

Cities cover an estimated 0.5% to 2.7% of global land area, yet they could account for up to 70 percent of the world's anthropogenic (human-induced) GHG emissions. Cities consume significant fossil fuels across various sectors – transportation, industry, waste, and buildings. Any effort to mitigate and adapt to climate change requires an understanding and accounting of the various sources of, and sinks for, emissions in cities. As an example, parks and forestland can provide sinks to capture carbon dioxide. This credit requires cities and communities to develop an emissions inventory that can identify the most effective low-carbon growth strategies, reduce exposure to the risks of climate change, improve energy security, and attract climate finance.

### Further Explanation

#### Required Documentation

Documentation	All cities and communities
USGBC calculator for total annual greenhouse gas emissions from all sectors	X
Documentation (such as policies, ordinance or research) to support strategies for GHG emissions estimation.	X
Detailed Calculations for per capita emissions (including energy modeling for designed buildings as per requirements of ASHRAE 90.1-2016)	X

#### Exemplary Performance

- Cities: Demonstrate GHG emissions lower than 2.0 tCO<sub>2</sub>e per capita.
- Communities: .Net zero carbon emissions

# EN Credit: Energy Efficiency

This credit applies to

- ▶ Cities (1-4 points)
- ▶ Communities (1-4 points)

## Intent

To improve the energy efficiency of city services

## Requirements

### CITIES, COMMUNITIES

Attempt any of the following options for a maximum of 4 points:

#### **Option 1. Street Lighting and Public Area Lighting (2 points)**

Street lighting design should meet the efficiency related requirements of 'ANSI/IESNA RP-8-14 Roadway Lighting' or internal equivalent standard. In addition, lamps should have a minimum Luminous Efficacy of 100 lumens per watt.

AND / OR

#### **Option 2. Water and Wastewater (2 points)**

All pumps used in the water and wastewater systems must meet the Pump Energy Index listed in Table I.1—Proposed Energy Conservation Standards for Pumps, 10 CFR Parts 429 and 431 of DOE standards Federal Register final rule Energy Conservation Program: Energy Conservation Standards for Pumps<sup>35</sup> or international equivalent standard.

AND / OR

#### **Option 3. District Energy Systems (1-2 points)**

Incorporate a District Energy System (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 tri-generation and distributes this energy to multiple buildings. Determine the percentage of city's electric, cooling and/or heating demand serviced by the DES using the following formula. Single-family residential buildings may be excluded from the calculation.

$$\% \text{ District Energy} = \% H_{DES} + \% C_{DES} + \% E_{DES}$$

Where:

%H<sub>DES</sub>: Percentage of city's heating demand supplied by DES

%C<sub>DES</sub>: Percentage of city's cooling demand supplied by DES

%E<sub>DES</sub>: Percentage of city's electric demand supplied by DES

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<sup>35</sup> <https://www.regulations.gov/document?D=EERE-2011-BT-STD-0031-0060> , accessed on December 17, 2018.

Points are awarded based on percentage of city load supplied by district energy resources as shown in table below.

**Table 6. Points for District Energy**

% District Energy	Points
80%	1
160%	2

District Energy Systems should be planned and designed to cater to the phase-wise development of the city to ensure that the requirements are met at each phase.

Reference:  
PEER v2 EE Credit: Distributed Energy Resources

## Guidance

### Behind the Intent

This credit focuses on demand-side energy efficiency in the city. It includes activities typically under the purview of the local government or development authority – street lighting, water and wastewater, and district energy systems. Energy efficiency in buildings is addressed through the Green Building Policy and Incentives credit. Transportation-related strategies such as use of alternative fuel vehicles are included under the Transportation and Land Use credit category.

## Further Explanation

### Required Documentation

Documentation	Street Lighting	Water and wastewater	District Energy Systems
Declaration from development authority or electrical / energy engineer stating street lighting will meet the requirements from the listed standard.	X		
Narrative explaining the lighting type and design for various types of streets	X		
Declaration from development authority or electrical / energy that all pumps will meet the requirements of the Pump Energy Index (PEI) of the listed standard.		X	
Narrative explaining the district energy system.			X
Calculation of the percentage of heating and cooling loads served by the system.			X

## Exemplary Performance

This credit is not eligible for exemplary performance.

# EN Credit: Renewable Energy

This credit applies to

- ▶ Cities (2-6 points)
- ▶ Communities (2-6 points)

## Intent

To reduce the environmental and economic harms associated with fossil fuel energy and reduce Greenhouse Gas emissions by increasing self-supply of renewable energy, use of grid-source renewable energy technologies and carbon mitigation projects.

## Requirements

### CITIES, COMMUNITIES

Cities or communities may choose one or more strategies for procuring renewable energy (such as solar PV, wind, geothermal, micro or small scale hydro, or biomass) from the categories below. Points are based on total city electricity consumption met by the specific strategy as per the table below. Points achieved through each individual strategy may be added for up to a total of 6 points.

- ▶ **On-site Renewables-** Includes on-site nonpolluting renewable energy generation, which will be owned, leased or subsidized by the city, utility, or energy provider.

Local renewables should be planned and designed to cater to the phase-wise development of the city to ensure that the requirements are met at each phase.

- ▶ **New Off-Site Renewables-** Includes large scale renewable energy plant with a minimum capacity of 1 MW, to meet the energy needs of the city. Plant maybe located within or outside the city boundary and should be owned or leased for a period of fifteen years by the city development authorities. Large scale renewables should be planned and designed to cater to the phase-wise development of the city to ensure that the requirements are met at each phase. The plant must be built within the last year or contracted prior to renewable energy project development. A new or on-going Power Purchase Agreement (PPA) or Virtual Power Purchase Agreement (VPPA) between the city/ community, utility and/or renewable energy provider is acceptable.
- ▶ **Existing Off-Site Renewables-** Includes renewable energy procured from an existing renewable energy provider or utility (Contract not required).
- ▶ **Green-e Certified RECs and Carbon Offsets-** Includes green-e certified Renewable Energy Certificates (RECs), and/or carbon offsets purchased by the city to mitigate the environmental impacts of city energy consumption; if purchased by the utility or energy provider, RECs and Carbon Offsets must be prorated as per the city's annual energy share in the utility's generation. RECs and carbon offsets must be Green-e certified. Carbon offsets must be purchased from recognized GHG reduction projects within the country where the city is located. For this purpose,

engage in a contract for qualified resources that have come online since January 1, 2005<sup>36</sup>, for a minimum of fifteen years to be delivered annually. Contract for qualified resources that have come online since January 1, 2005<sup>37</sup>, for a minimum of fifteen years to be delivered annually. If RECs or carbon offsets are purchased by the utility serving multiple cities, these must be prorated as per the city's annual energy share in the utility's generation.

- **RECs and Carbon Offsets-** Includes other Renewable Energy Credits and Carbon Offsets purchased by the city; if purchased by the utility, RECs and Carbon Offsets must be prorated as per the city's annual energy share in the utility's generation.

Prosumers, Community Choice Aggregation (CCA) or other aggregated consumers with a minimum on-grid capacity of 2 MW renewables which will be owned and operated by consumers may be included in the calculations based on whether these are on-site or off-site renewables.

Environmental benefits of the procurement must be retained by the city, utility or service provider. All off-site qualifying resources must be contracted, owned, or leased for at least 15 years.

**Table 10. Points for Renewables Procurement**

Points	On-Site Renewables	New Off-Site Renewables	Existing Off-Site Renewables	Green-e Certified: RECs and Carbon Offsets	RECs and Carbon Offsets
2	2 %	20 %	60 %	100%	150%
3	6 %	40 %	80 %	200%	
4	15 %	60 %	100 %	300%	
5	35 %	80 %			
6	60 %	100 %			

Note: Points are awarded for every single threshold that is met through each strategy, Points for each strategy and are added to determine the final point achievement.

## Guidance Behind the Intent

There are multiple ways a city or community can incorporate renewable energy in its energy portfolio. These include small-scale renewables such as rooftop photovoltaics (PV) or large-scale such as grid-connected wind farms. This credit provides a single pathway for cities to evaluate their effectiveness and advance towards renewable energy. Moreover, the credit is structured to reward cities based on

their level of effort and the impact of their solutions. A collaborative approach between the cities and utilities or service providers is critical to the success of implementing upstream and downstream renewable energy solutions.

### Further Explanation

#### Required Documentation

Documentation	On-Site	New Off-Site	Existing Off-Site	Green-e Certified: RECs and Carbon Offsets	RECs and Carbon Offsets
Documentation for planned renewable energy source and rated capacity	X		X		
Calculations for determining annual renewable energy generated	X		X		
Contract (or Power Purchase Agreement or Virtual Power Purchase Agreement) indicating percentage ownership, lease, or allocation of new off-site renewable system, specific location of new off-site system, the term and annual energy output		X			
Calculations demonstrating achievement of the point threshold	X	X	X	X	X
Confirmation of renewable attribute ownership	X	X	X	X	X
Purchase letter or contract of commitment showing renewable electricity or carbon offsets for targeted point threshold				X	X
Green-e certificate or documentation showing label development, transparent accounting processes and standards, if not Green-e certified				X	X

### Exemplary Performance

- ▶ On-Site Renewables: Meet 75% of the total estimated electricity consumption using on-site renewables.
- ▶ New Off-Site Renewables: Generate 120% of the total electricity consumption using off-site renewables to feed excess back into the grid.
- ▶ Green-e Certified RECs and Carbon Offsets: Purchase Green-e Certified RECs and Carbon Offsets equivalent to 400% of the total estimated electricity consumption.
- ▶ RECs and Carbon Offsets: Purchase RECs and Carbon Offsets equivalent to 300% of the total estimated electricity consumption.

# EN Credit: Low Carbon Economy

This credit applies to

- Cities (4 points)

## Intent

To progress towards a low carbon economy by decoupling economic growth of the city or community from greenhouse gas emissions.

## Requirements

### CITIES

#### Greenhouse Gas Emissions Intensity

Report the total estimated GHG emissions by the city or community per unit estimated economic output measured in Gross Domestic Product (GDP) by the city. Total GHG emissions must be per *EN Prerequisite Energy and Greenhouse Gas Emissions Performance*.

GDP of the city must include the projected increase in GDP of the region due to the economic activities planned in the city. Data at city level or apportioned metro or state level data must be used.

$$\text{GHG Intensity} = \text{Total GHG of the city} / \text{Total GDP}$$

## Guidance

### Behind the Intent

The post-industrial era is marked by an increase in GHG emissions attributable to economic growth. The strong coupling of economic growth and GHG emissions has been a major contributor to human-induced climate change. As cities are the engines of economic growth, they are required to estimate the GHG intensity of the economy and devise effective strategies to decouple GHG emissions and economic growth.

## Further Explanation

### Required Documentation

Documentation	All cities
Total estimated annual Greenhouse Gas emissions from all sectors as reported under <i>EN Prerequisite Energy and Greenhouse Gas Emissions Performance</i>	X
Projected GDP for the city and supporting documentation	X
Calculations for carbon intensity	X

## Exemplary Performance

This credit is not eligible for exemplary performance.

# EN Credit: Grid Harmonization

This credit applies to

- Cities (2 points)
- Communities (2 points)

## Intent

To improve operational efficiency of the energy system.

## Requirements

### CITIES, COMMUNITIES

#### Option 1. Load Management (2 points)

Have in place (or initiate dialogue with utility to be committed to) infrastructure and programs that provide access to dynamic pricing for metered users to motivate load shifting. Rate structures must be clearly defined, communicated to metered users in a standard format, and easily accessible. At minimum, have a tariff scheme that offers Time of Use pricing with at least one time block and two tiers for all consumers.

Reference: PEER v2 GS Credit: Demand Side Management

OR

#### Option 2. Demand Response (2 points)

Have in place (or initiate dialogue with utility to be committed to) tariff options that support short-term reduction in peak demand. Have in place following tariff structures for residential, commercial and industrial consumer categories at minimum:

- ▶ Critical Peak Pricing
- ▶ Critical Peak Rebate

Reference: PEER v2 GS Credit: Demand Response

OR

#### Option 3. Net Metering and Interconnection Policy (2 points)

The policy should meet the following requirements which are based on the Standard for Interconnecting Distributed Resources with Electric Power Systems, by Institute of Electrical and Electronics Engineers 1547-2003 or local equivalent.

- ▶ Applicability to all renewable generation and energy storage technologies (Distributed Power sources, Electric Vehicles).
- ▶ System capacity of 100 kW or more
- ▶ Incorporate the following best practices for interconnection policies:
  - Provisions for a fast-track, low-cost interconnection process for customers with generation capacity of 100 kW or less (Distributed Power sources, Electric Vehicles).
  - Defined timelines and an engineering fee structure for various stages of the process.
  - Identification of technical standards for interconnection of generation systems (Distributed Power sources, Electric Vehicles).
- ▶ Incorporate at least three of the following best practices for net metering policies:
  - Monthly rollover of excess energy to be 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.

- o Third-party ownership and meter aggregation are permitted.

Reference: PEER v2 GS Credit: Streamlined Interconnection and Net Metering Policies

## Guidance

### Behind the Intent

The energy industry's business model remained fundamentally unaltered for more than a century: the utility generated power and, in a one-way flow, sold it to customers, the energy consumers. Demand was fairly predictable. Today, with advanced technology, consumers can make informed choices about energy usage or even become energy producers themselves.<sup>38</sup> This credit requires the city to collaborate with the utility or service provider to deploy advanced technologies and provide a modernized grid with low environmental impact.

### Further Explanation

#### Required Documentation

Documentation	Option 1	Option 2	Option 3
Narrative describing dynamic pricing programs available to (or commitment made to) for customers, including the terms and applicable for each customer classes.	X		
Policies, programs, and tariff structures in place (or commitment made to) for different consumer categories the same		X	
Provide the percentage of customers/consumers eligible for the demand - response program and provide descriptions or narratives explaining how these values were determined		X	
Rules, policies, and program requirements covering fees, process timelines, and applicability for the interconnection standards.			X
Policies, practices, programs, and compensation rates for net metering.			X

### Exemplary Performance

This credit is not eligible for exemplary performance.

<sup>38</sup> PEER v2 EE Credit: Distributed Energy Resources