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# LEED v4.1 CITIES AND COMMUNITIES EXISTING

Getting started guide for beta participants

April 2, 2019

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# 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 two credits for integrative process in the context of green buildings. The first one intends to drive an inclusive process in city or community planning, while the other ensures that a majority of buildings in the city or community are green and sustainable by design.</li><li>• The credit on integrative planning and design facilitates teamwork for early analysis of city systems to derive cost effective, high performance outcomes.</li><li>• The second 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 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 one prerequisite on <b>Ecosystem Assessment, which</b> outlines the steps to analyze and respond to the local ecosystem.</li> <li>• Credits on <b>Green Spaces and Natural Resource Conservation and Restoration</b> and <b>Light Pollution Reduction</b> focus on minimum green spaces essential for community and ecosystem health. These credits outline the necessary steps to conserve and restore ecosystems and 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>• The prerequisite for <b>Transportation Performance</b> requires cities to measure the total vehicle miles travelled by their occupants.</li> <li>• 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.</li> <li>• <b>Access to Quality Transit</b> focuses on use of different types of transportation modes available in a city and offers strategies for comfort and safety of commuters. The credit 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, and behavior change, thereby reducing environmental impacts</li> <li>• The <b>High Priority Site credit</b> intends to preserve and revive the urban fabric of a city by promoting engagement, community development and social and mental wellbeing. It also encourages preservation of historic structures and sites and focuses on growth and redevelopment for infill and other priority locations.</li> </ul>
<p>Water (WE)</p>	<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</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>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.</p> <ul style="list-style-type: none"> <li>• There are two prerequisites in this category. The prerequisite for <b>Water Access and Quality</b> requires the implementation of policies and infrastructure for the equitable supply of clean and safe water to all members of society, along with the treatment of wastewater and stormwater before it is released into the environment.</li> <li>• <b>The Water Performance</b> prerequisite encourages cities to track and monitor per-capita water consumption in the domestic sector.</li> <li>• <b>The Integrated Water Management</b> credit requires reduced freshwater consumption and encourages the shift to a net zero water city.</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>• <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>
<p>Energy and Greenhouse Gas Emissions (EN)</p>	<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<sup>2</sup> 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. 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 necessitates that the city or community estimate and limit greenhouse gas (GHG) emissions from proposed development. This 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 renewable energy sources, as well as renewable energy certificates and carbon offsets in energy procurement.</li> <li>• <b>As</b> 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 advanced technologies and the Internet of Things (IoT). This</li> </ul>

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

	<p>section leverages the Performance Excellence in Electricity Renewal (PEER) rating system, which evaluates power generation, transmission and distribution systems.</p>
<p>Materials and Resources (MR)</p>	<ul style="list-style-type: none"> <li>• Cities are large aggregators and consumers 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 operations and utilize it as a resource. The development of cities, with their high concentration of resources, capital, data and skills over a small geographic territory, provides opportunities to uniquely drive a global transition from a linear to a circular economy</li> <li>• There are two prerequisites that prepare cities and communities for net zero waste through recycling, reuse and reduction of waste generation. The prerequisite on <b>Solid Waste Management and Waste Performance</b> requires adequate waste management infrastructure by proper estimation of waste generation, waste diversion and provisioning for landfill needs, if required. Maximum diversion from landfills is the core intent.</li> <li>• The credits on <b>Special Waste Streams Management, Responsible Sourcing for Infrastructure and Material Recovery</b> prepare the city or community to transition from a linear to a circular economy.</li> <li>• As in other categories, the <b>Smart Waste Management</b> credit will cover strategies adopted to improve operational efficiency of the waste management system.</li> </ul>
<p>Quality of Life (QL)</p>	<ul style="list-style-type: none"> <li>• Quality of life and a higher living standard for residents is key to success and livability in a city or community. Cities must equitably address the needs of all people, irrespective of gender, ethnicity, socio-cultural and economic status.</li> <li>• The prerequisite <b>Demographic Assessment</b> requires the city or community to undertake an assessment of the needs of its diverse population.</li> <li>• The prerequisite on <b>Quality of Life Performance</b> and credit <b>Trend Improvements</b> evaluates the city’s performance on education, equitability, prosperity and health and safety of its citizens.</li> <li>• The credit <b>Distributional Equity</b> delves into equitable economic prosperity and encourages access to community services for all.</li> <li>• The credit <b>Environmental Justice</b> addresses neighborhoods and populations overburdened by environmental pollution, which leads to disproportionate environmental, economic, and health impacts.</li> <li>• The credit on <b>Housing and Transportation Affordability</b> requires cities or communities to provide an adequate and diverse supply of location-efficient and affordable housing options for all.</li> <li>• The credit on <b>Civic and Community Engagement</b> facilitates a cohesive and socially-connected community and participation in local decision-making.</li> <li>• The credit on <b>Civil and Human Rights</b> promotes respect, protection, and fulfillment of civil and human rights by and for all members of the community.</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.

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 Existing Cities and Communities 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
- Projects intending to register with LEED for Neighborhood Development

- 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 within 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 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: Existing 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 [lo.usgbc.org](https://lo.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: Existing Scorecard

LEED for Cities and Communities		Cities	Communities
<b>INTEGRATIVE PROCESS</b>		POSSIBLE: 5	POSSIBLE: 5
Credit	Integrative Planning and Leadership	1	1
Credit	Green Building Policy and Incentives	4	4
<b>NATURAL SYSTEMS AND ECOLOGY</b>		POSSIBLE: 9	POSSIBLE: 9
Prerequisite	Ecosystem Assessment	REQUIRED	REQUIRED
Credit	Green Spaces	2	2
Credit	Natural Resources Conservation and Restoration	2	2
Credit	Light Pollution Reduction	1	1
Credit	Resilience Planning	4	4
<b>TRANSPORTATION AND LAND USE</b>		POSSIBLE: 15	POSSIBLE: 15
Prerequisite	Transportation Performance	6	6
Credit	Compact, Mixed Use and Transit Oriented Development	2	2
Credit	Access to Quality Transit	1	1
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: 11	POSSIBLE: 11
Prerequisite	Water Access and Quality	REQUIRED	REQUIRED
Prerequisite	Water Performance	6	6
Credit	Integrated Water Management	1	1
Credit	Stormwater Management	2	2
Credit	Smart Water Systems	2	2
<b>ENERGY AND GREENHOUSE GAS EMISSIONS</b>		POSSIBLE: 30	POSSIBLE: 30
Prerequisite	Power Access, Reliability and Resiliency	REQUIRED	REQUIRED
Prerequisite	Energy and Greenhouse Gas Emissions Performance	14	18
Credit	Energy Efficiency	4	4
Credit	Renewable Energy	6	6
Credit	Low Carbon Economy	4	-

Credit	Grid Harmonization	2	2
<b>MATERIALS AND RESOURCES</b>		POSSIBLE: 10	POSSIBLE: 10
Prerequisite	Solid Waste Management	REQUIRED	REQUIRED
Prerequisite	Waste Performance	4	5
Credit	Special Waste Streams Management	1	1
Credit	Responsible Sourcing for Infrastructure	2	2
Credit	Material Recovery	1	-
Credit	Smart Waste Management Systems	2	2
<b>QUALITY OF LIFE</b>		POSSIBLE: 20	POSSIBLE: 20
Prerequisite	Demographic Assessment	REQUIRED	REQUIRED
Prerequisite	Quality of Life Performance	6	6
Credit	Trend Improvements	4	4
Credit	Distributional Equity	4	4
Credit	Environmental Justice	1	1
Credit	Housing and Transportation Affordability	2	2
Credit	Civic and Community Engagement	2	2
Credit	Civil and Human Rights	1	1
<b>INNOVATION</b>		POSSIBLE: 6	POSSIBLE: 6
Credit	Innovation	6	6
<b>REGIONAL PRIORITY</b>		POSSIBLE: 4	POSSIBLE: 4
Credit	Regional Priority	4	4
<b>TOTAL</b>		<b>110</b>	<b>110</b>

40-49 Points	50-59 Points	60-79 Points	80+ Points
CERTIFIED	SILVER	GOLD	PLATINUM



# INTEGRATIVE PROCESS (IP)

## IP Credit: Integrative Planning and Leadership

This credit applies to

- ▶ Cities (1 point)
- ▶ Communities (1 point)

### Intent

To support high-performance, cost-effective outcomes through an early analysis of the interrelationships among city or community systems

### Requirements

#### CITIES, COMMUNITIES

Use inter-disciplinary teams and at a minimum ensure the following processes are followed:

1. **Comprehensive Plan:** Develop a comprehensive plan for the city or have a plan which is adopted, reviewed, revised or updated within the last five years that establishes a clear vision and strategy for the future.

Reference:

STAR v2 IP-1: Best Practices & Processes

2. **LEED for Cities or Communities Team:** Assemble and convene an interdisciplinary and cross-departmental team. Include team members from at a minimum three of the following areas of expertise:

- ▶ Development Authority
- ▶ Urban / Master Planning and Design
- ▶ Engineering – Energy and Power; Hydrology; Transportation; Waste
- ▶ Economic Development
- ▶ Urban Ecologist, Biologist or Landscape Architect
- ▶ Construction Management
- ▶ Human Services
- ▶ Education / School Board
- ▶ Sustainability / Resilience Officer
- ▶ Data Officer / Information Technology

Include any other experts or stakeholders as relevant to the city or community. Conduct regular meetings with the integrative project team to review project status, introduce new team members to project goals, discuss problems, formulate solutions, review responsibilities, and identify next steps.

3. **LEED for Cities Roadmap Development:** Soon after formation of LEED team, conduct at least two workshops to assess and develop the following:
  - ▶ Gap Analysis: Assess the existing status of the city or community against the parameters mentioned in LEED prerequisite and credit requirements. Develop a gap analysis report.
  - ▶ LEED Goal Setting and Roadmap: Develop a strategic roadmap for the city to achieve the goals set out under LEED for Cities and Communities rating system. Create an action plan that identifies the targeted LEED rating, the credits that have been selected to meet the

targeted certification level and the entity accountable for meeting the requirements for each selected credit.

**Guidance**

**Behind the Intent**

All over the world, urban areas are experiencing rapid growth, and it is projected that 60% of the world’s population will be living in urban settings by 2030. Cities are closely connected to economic growth, producing over 75% of the world’s gross domestic product (GDP) and 75% of carbon dioxide emissions, while consuming 75% of global natural resources. It is clear that cities have a leadership opportunity to pioneer ways of living that strengthen ecosystems and promote high social and economic welfare. A comprehensive, integrative process accounts for the interaction of all buildings and systems, relying on an iterative cycle of analysis, stakeholder feedback, implementation, and performance tracking. This prerequisite facilitates teamwork for early analysis of city systems to derive cost-effective, high-performance outcomes.

**Further Explanation**

**Required Documentation**

Documentation	All cities and communities
Narrative describing comprehensive plan that will include vision, mission, key goals and objectives of the city or community	X
Narrative addressing prerequisite requirements for the LEED for Cities or Communities project team and Design Charrette.	X
Action plan from preliminary rating goals.	X

**Exemplary Performance**

This prerequisite is not eligible for exemplary performance.

# IP Credit: Green Building Policy and Incentives

This credit applies to

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

## Intent

To encourage the design, construction, and retrofit of buildings using green building practices.

## Requirements

### CITIES, COMMUNITIES

#### Option 1. Buildings owned and/or operated by the local government or development authority (1-2 points Cities, 1-3 points Communities)

- ▶ Existing Buildings: Register and certify existing buildings above 5000 square feet (465 square meter) that are owned and/or operated by the local government or development authority to LEED, EDGE or an equivalent green building rating system. The green building rating system must address energy, water, waste, transportation and ecological aspects of the city. Points are awarded as per table below.

**Table 1 Points for green buildings**

Percentage of buildings registered or certified to LEED or equivalent green building rating system	Cities	Communities
25 to 50%	1	1
50 to 75%	2	2
Above 75%		3

AND

- ▶ New Buildings: Adopt policy for all new construction undertaken by the city government or community local authority to achieve LEED or an equivalent green building certification.

AND/OR

#### Option 2. Green Building Policy and Incentives (2 points Cities)

Provide a minimum of two incentives for LEED or an equivalent green building rating system in the city.

- ▶ Structural Incentives: Provide expedited review or permitting processes to buildings achieving certification.
- ▶ Structural Incentives: Provide density or height bonus allowing for percentage increases in Floor Area Ratio or other measures of density contingent upon certification.
- ▶ Financial Incentives: Provide tax credits for buildings achieving certification.
- ▶ Financial Incentives: Provide permitting fee reduction or waivers for buildings achieving certification.

AND / OR

### Option 3. Building Performance Disclosure (1-2 points)

- ▶ Buildings owned and/or operated by the local government or development authority. (1 point)
  - Collect the annual energy data of jurisdictionally-owned or operated buildings. Track, benchmark, and report the data using tools such as ENERGY STAR Portfolio Manager, Arc Skoru, or a locally developed and recognized tool to help with data organization for on-going performance reporting.
  - Include a minimum of 50% of the buildings owned or operated by the jurisdiction or the community that are 5,000 square feet (465 square meters) or greater. The data year reported must be from within the most recent 3-year period.

AND/OR

- ▶ Privately owned buildings (1 point)
  - Adopt a program that requires disclosure of energy data from privately owned buildings in the jurisdiction. Disclosure may be to the public, the governing entity, and/or specific users of the building, such as tenants, prospective tenants, potential buyers, or potential lenders.
  - At a minimum, all privately owned nonresidential or multi-family buildings with a gross area of more than 20,000 square feet (1858 square meters), excluding parking, must be included. The data year reported for active programs must be from within the most recent 3-year period.
  - The program must include (i) a legally-enforceable policy or ordinance approved by the local governing body and (ii) a mechanism for reporting, a platform for disclosing individual or aggregated data, such as ENERGY STAR Portfolio Manager, Arc Skoru, or a locally developed and recognized tool, and an annual program report.
  - Provide the timeline for roll out and implementation within the next 3 years.

## Guidance

### Behind the Intent

Cities cover 2% of the world's land area but they account for 70% of greenhouse gas emissions. 30% of emissions are generated by buildings, the building blocks of cities<sup>3</sup>. Similarly, buildings impact resource consumption, ecological systems, and human health and well-being. Hence, green buildings are an essential component of a city's strategy towards sustainable development. The LEED for Cities rating system is targets macro-level strategies. Green buildings support the micro-level strategies to help cities be more sustainable. Green public buildings help the city lead by example, and green building policies and incentives ensure alignment of future development with the city's long-term strategy.

### Further Explanation

#### Required Documentation

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<sup>3</sup> <https://www.nationalgeographic.com/environment/urban-expeditions/green-buildings/benefits-of-green-buildings-human-health-economics-environment/>

Documentation	Option 1	Option 2	Option 3
Calculations demonstrating achievement of the point threshold	X		
Documentation supporting registration and /or certification of buildings to be owned by the local government or development authority	X		
Documentation supporting green building policy and incentives or programs		X	
Narrative describing the building performance disclosure for buildings owned and operated by the local government or development authority			X
Narrative describing the program that requires disclosure of energy data from privately owned buildings			X
Evidence supporting the implementation of the program for privately owned buildings			X

**Exemplary Performance**

This credit is not eligible for exemplary performance.

# NATURAL SYSTEMS AND ECOLOGY (NS)

## NS Prerequisite: Ecosystem Assessment

### Required

This prerequisite applies to

- Cities
- Communities

### Intent

To assess existing ecosystem conditions and services provided by ecosystems, built landscapes, and other open spaces to inform the city development along with conservation and restoration efforts.

### Requirements

#### CITIES, COMMUNITIES

Complete and document an ecosystem assessment of the areas that includes the following topics:

1. **Topography:** Contour mapping, unique topographic features, slope stability risks.
2. **Soils:** Natural Resources Conservation Service soils delineation, U.S. Department of Agriculture prime farmland, unique farmland or farmland of statewide or local importance, healthy soils, soils disturbed by previous development and degree of disturbance (local equivalent standards may be used for cities or communities outside the U.S.).
3. **Vegetation and Habitat:** Total existing vegetated area, primary vegetation types, native plants and plant communities, significant tree mapping, identification of top three threatened species as per The IUCN Red List of Threatened Species<sup>4</sup> or local or regional standards, habitat for threatened or endangered species, unique habitat. Identification of top three most damaging invasive plant species and mapping of degraded vegetation and habitats if applicable.
4. **Hydrology and Aquatic Ecosystems:** Special Flood Hazard Areas (SFHA) as determined by FEMA's Flood Insurance Rate Map (FIRM) (or local equivalent for cities or communities outside the U.S.), wetlands, lakes, streams, shorelines; precipitation, rainwater collection and reuse opportunities including overland water flow, water quality, storage capacity of the site and watershed conditions, potable and non-potable water sources; pollution sources and pollutants. Map areas with degraded aquatic ecosystems as applicable.

The survey or assessment should demonstrate the relationships between the features and topics listed above and how these features influenced the city or community strategy and development.

Note: Not all topics apply to every city or community, and each may contain additional important unique elements that are not explicitly addressed here.

#### References:

LEED v4 BD+C SS Credit: Site Assessment

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<sup>4</sup> <http://www.iucnredlist.org/>, Accessed on December 17, 2018.

## Guidance

### Behind the Intent

An ecosystem assessment evaluates environmental features that the cities and communities should take into consideration. It identifies assets, such as favorable wetlands, lakes, streams, shorelines, steep slopes and healthy plant populations, as well as liabilities, such as unhealthy soils, blighted structures, pollution sources, , and water quality. Performing an ecosystem assessment is part of an integrative planning process to account for a site’s ecological context. This assessment must address the city or community’s topography, soil, vegetation and habitat. Moreover, hydrology and aquatic ecosystems are important because they can significantly influence the city strategy and performance.

### Further Explanation

#### Required Documentation

Documentation	All cities and communities
Annotated ecosystem assessment report highlighting sections addressing all of the required topics	X
Overlay maps for each of the ecological systems	X
Narrative describing how the findings of the ecosystem assessment have informed the planning and design	X

### Exemplary Performance

This prerequisite is not eligible for exemplary performance.

# NS Credit: Green Spaces

This credit applies to

- Cities (1-2 points)
- Communities (1-2 points)

## Intent

To provide accessible green spaces to positively impact physical, mental and psychological health and well-being of the community while also enhancing the environmental quality of the city or community.

## Requirements

### CITIES, COMMUNITIES

Provide easily accessible green space. Points are awarded as per table below.

**Table 2. Points awarded for Green Spaces**

Green space (square feet per person)	Green space (square meters per person)	Points
121	11.25	1
145	13.5	2

AND

Minimum area of green space must be no less than 7212 square feet (670 square meters).

Reference:

LEED v4 ND NPD Credit: Access to Civic and Public Space

AND

A minimum of 70% of the dwelling units must have a green space within 1/2-mile (800 meters) walking distance<sup>5</sup>.

Reference:

STAR Communities V2 BE-6: Public Parkland, Outcome 2: Proximity

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<sup>5</sup> Communities can include city level green spaces which are not within the community boundary but are freely accessible to the residents and meet the prescribed requirements.



Green space is defined as land that is partly or completely covered with trees, shrubs, grass or other vegetation. This includes urban parks, trails and community gardens<sup>6</sup> including roof top or vertical gardens. This does not include schoolyards, playgrounds, public seating areas, public plazas or vacant lots.

## Guidance

### Behind the Intent

Green spaces provide important community-building space for people to gather, play, exercise, celebrate, learn, relax, reflect, and enjoy nature and city life. Recent estimates show that physical inactivity, linked to poor walkability and lack of access to recreational areas, accounts for 3.3% of global deaths.<sup>7</sup> Green spaces also are important to mental health. Having access to green spaces can reduce health inequalities, improve well-being, and support mental wellness. Some analysis suggests that physical activity in a natural environment can help remedy mild depression and reduce physiological stress indicators.<sup>8</sup>

### Further Explanation

#### Required Documentation

Documentation	All cities and communities
Master Plan with mapping of green spaces	X
Calculations demonstrating achievement of point threshold	X
Narrative describing equitable distribution of the green spaces explaining the achievement of the point threshold for green spaces within walking distance	X
Declaration from municipal official with authority for land use, natural resources, and/or recreational use that the requirement on 70% of the dwelling units having green space within walking distance is met	X

### Exemplary Performance

This prerequisite is not eligible for exemplary performance.

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<sup>6</sup> Adopted from United States Environmental Protection Agency's 'What is Open Space/Green Space?' retrieved from <https://www3.epa.gov/region1/eco/uep/openspace.html>. Accessed on December 17, 2018.

<sup>7</sup> <https://www.who.int/sustainable-development/cities/health-risks/urban-green-space/en/>. Accessed on March 23, 2019

<sup>8</sup> <https://www.who.int/sustainable-development/cities/health-risks/urban-green-space/en/>. Accessed on March 23, 2019

# NS Credit: Natural Resources Conservation and Restoration

This credit applies to

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

## Intent

To conserve and restore the natural resources within the city or community.

## Requirements

### CITIES, COMMUNITIES

#### Option 1. Natural Resource Acreage

- ▶ Maintain natural resource acreage at 861 square feet per person (80 square meters per person)<sup>9</sup>.

OR

- ▶ Maintain natural resource acreage at 11.5% or more of total jurisdictional land area.

Reference:

STAR Communities V2 NS-3: Natural Resource Protection Outcome 1: Natural Resource Areas

Natural resource areas include but are not limited to critical aquifer recharge areas; deserts and arid lands; fish or wildlife habitat, natural deltas or floodplains, steep slopes, natural parkland, forests, geologically hazardous areas, grasslands and prairies, habitats of endangered and threatened species, shorelines and their buffers, streams and their buffers and wetlands. Green spaces as defined under and / or provided under *NS Credit: Green Spaces* can be included within the Natural Resource Acreage.

OR

#### Option 2. Natural Resource Conservation and Restoration Plan<sup>10</sup>

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<sup>9</sup> Communities can include natural resource areas within a buffer of 1 km (1000 meters) from the community boundary to demonstrate compliance with the requirement.

<sup>10</sup> In lieu of a consolidated Natural Resources and Conservation Plan, cities and communities may provide individual plans, ordinances, regulations or policies to demonstrate compliance to credit requirements.

Have a Natural Resource Conservation and Restoration Plan adopted within the last five years or develop one based on the study carried out under *NS Prerequisite: Ecosystem Assessment* to meet requirements for ANY three of the following ecosystems:

**1. Steep Slopes:**

- ▶ Do not permit development on slopes greater than 40% and do not disturb portions of the land area within 50 feet (15 meters) horizontally of the top of the slope and 75 feet (23 meters) horizontally from the toe of the slope.
- ▶ For undeveloped slopes from 26% to 40%, development can be permitted on 40% of the area.
- ▶ For undeveloped slopes from 15% to 25%, development can be permitted on 60% of the area.
- ▶ For previously developed slopes (above 15%) restore a minimum of 50% of the slopes with native vegetation or noninvasive adaptive plants within a period of 5 years.

Reference:

LEED v4 ND SLL Credit: Steep Slope Protection

OR

If construction is permitted on steep slopes (greater than 15%), adopt a regulation to the effect that development permits and building permits will be issued after reviewing the following for each city or community:

- ▶ A general site survey, topographic and land feature survey along with geotechnical evaluation.
- ▶ A grading plan that indicates a clear feasibility for roads, driveways and building envelop without massive manipulation of the site.
- ▶ A tree and vegetation plan.
- ▶ A drainage management plan.
- ▶ An erosion control plan that avoids massive manipulation of the site.
- ▶ An Environmental Inventory and Assessment to identify environmentally sensitive areas and features to be protected, and to measures avoid, minimize or mitigate environmental impacts of the proposed development and development activities.

Reference:

LEED v4 ND SLL Credit: Steep Slope Protection

**2. Agricultural Land and Food Production:**

Do not disturb prime farmland, unique farmland, or farmland of statewide or local importance as defined by the U.S. Code of Federal Regulations, Title 7, Volume 6, Parts 400 to 699, Section 657.5 and identified in a state Natural Resources Conservation Service soil survey (or local equivalent for cities or communities outside the U.S.).

Reference:

LEED v4 ND SLL Prerequisite: Agricultural Land Conservation

OR

If the development footprint affects farmland of any category, mitigate the loss by providing alternative area for farming such as rooftop farming or vertical farming in the ratio of 2:1. In addition, plan for farmer's markets in residential areas which will be within 1/2-mile (800-meters) walking distance.

**3. Vegetation and Habitat:**

- ▶ If the site has any threatened or endangered species or ecological communities, as identified during the ecosystem assessment, comply with an approved habitat conservation plan under the U.S. Endangered Species Act (or local equivalent for cities or communities outside the U.S.) for each identified species or ecological community.

- ▶ Conserve any Significant Habitat<sup>11</sup> present within the area.
- ▶ Adopt or enforce an ordinance requiring control of listed top three invasive species or enact a preferred plant ordinance for private and public landscaping.
- ▶ Restore degraded vegetation and habitats within the area, identified during the Ecosystem Assessment. Restoration strategies must be developed based on Society for Ecological Restoration Science & Policy Working Group. 2002, The SER Primer on Ecological Restoration, Section 3, Attributes of Restored Ecosystems<sup>12</sup>.

References:

SLL Prerequisite: Imperiled Species and Ecological Communities Conservation  
 LEED v4 ND SLL Credit: Site Design for Habitat or Wetland and Water Body Conservation  
 SITES v2 Prerequisite 4.2: Control and manage invasive plants  
 SITES v2 Credit 4.4: Conserve healthy soils and appropriate vegetation  
 SITES v2 Credit 4.5: Conserve special status vegetation  
 SITES v2 Credit 4.8: Optimize biomass  
 STAR Communities V2 Action 2: Policy and Code Adjustment

**4. Aquatic Ecosystems:**

- ▶ Do not permit any development within limits specified below except for minor improvements or comply with the equivalent local or national regulations.
  - Shorelines and coastal areas: Within 200 feet (61 meters) from normal high tide line.
  - Floodplains, rivers and streams: A flood hazard area shown on a legally adopted flood hazard map or otherwise legally designated by the local jurisdiction or the state or entirely outside any floodplain subject to a 1% or greater chance of flooding in any given year.
  - Wetlands: Within 50 feet (15 meters) of a wetland, except for minor improvements.
  - Water bodies: Within 100 feet (30 meters) of a water body which is greater than 50 contiguous acres (20 hectares) and within 50 feet (15 meters) for waterbodies less than 50 contiguous acres (20 hectares).
- ▶ Restore degraded aquatic ecosystems identified during the Ecosystem Assessment. Restoration strategies must be developed based on Society for Ecological Restoration Science & Policy Working Group. 2002, The SER Primer on Ecological Restoration, Section 3, Attributes of Restored Ecosystems.

References:

LEED v4 ND SLL Prerequisite: Wetland and Water Body Conservation  
 SITES v2 Prerequisite 1.3: Conserve aquatic ecosystems  
 SITES v2 Credit 3.6: Restore aquatic ecosystems

OR

Demonstrate a local Watershed Health Index of greater than or equal to 70.

References:

STAR Communities V2 NS-5: Water in the Environment Outcome 1: Watershed Health Index

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<sup>11</sup> Significant Habitat for the purpose of this prerequisite is defined as Locally or regionally significant habitat of any size, or patches of predominantly native vegetation at least 150 acres (60 hectares) (even if part of the area lies outside the project boundary); Special status plants which include plants designated as special status in the region. These plants may include, but are not limited to, heritage or legacy trees, specimen trees (as designated by a local tree board), rare vegetation in a unique habitat, and unusual genetic variants of a particular species; and any habitat flagged for conservation under a regional or state conservation or green infrastructure plan.

<sup>12</sup> [https://www.ctahr.hawaii.edu/LittonC/PDFs/682\\_SERPrimer.pdf](https://www.ctahr.hawaii.edu/LittonC/PDFs/682_SERPrimer.pdf), Accessed on December 17, 2018.

## Guidance

### Behind the Intent

Ecosystems around the world have been impacted extensively by human influence, particularly over the past 50 years. In response, communities are taking action to protect and restore natural systems and maintain ecosystem services. Natural systems provide a wide range of services for human populations, such as clean water, food, forest products, and flood control. Cities and communities demonstrate leadership conservation and restoration by establishing robust natural resource protection goals and implementing strategies that improve the quality of natural resource areas.<sup>13</sup> At times, cities must weigh trade-offs between protecting ecological services in undeveloped areas while also managing land to prevent urban sprawl and overcrowding.

### Further Explanation

#### Required Documentation

Documentation	Natural Resource Acreage	Natural Resource Conservation and Restoration Plan
Master Plan with mapping of natural resources and schedule / table listing the natural resource type and area of each.	X	
Calculations demonstrating achievement of point threshold	X	
Natural Resource Conservation and Restoration Plan highlighting the sections demonstrating the achievement of the listed requirements		X
Supporting documentation for each of the ecological systems (as applicable)		X

### Exemplary Performance

This credit is not eligible for exemplary performance.

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<sup>13</sup> STAR Communities V2.0 Technical Guide, NS-3: Natural Resource Protection  
29

# NS Credit: Light Pollution Reduction

This credit applies to

- Cities (1 point)
- Communities (1 point)

## Intent

To minimize and manage ambient light levels to protect public health and the integrity of ecological systems and increase the night sky access, improve nighttime visibility, and reduce the consequences of development for wildlife and people.

## Requirements

### CITIES, COMMUNITIES

#### Option 1.

Achieve a sky glow at or below 4 in the Bortle Dark-Sky Scale where the Milky Way is still visible in residential areas, or a Sky Quality Meter reading of 21.2 or greater.

Reference:

STAR v2 BE-1: Ambient Noise & Light

OR

#### Option 2.

- ▶ A minimum of 70% of the street lighting in the city or community should meet the requirements of section on Glare and Sky-Glow requirements of 'ANSI/IESNA RP-8-14 Roadway Lighting'.

AND

- ▶ Adopt a lighting ordinance for the city or community conforming to the Section II to VI of the Model Lighting Ordinance (MLO), 2011<sup>14</sup> developed jointly by the International Dark Sky Association and Illuminating Engineering Society.

## Guidance

### Behind the Intent

Inappropriate or excessive use of artificial light, known as light pollution, can have serious environmental consequences for humans, wildlife, and the climate. Components of light pollution include glare, skyglow, light trespass, and clutter. Much of outdoor lighting used at night is inefficient, overly bright, poorly targeted, improperly shielded, and, in many cases, completely unnecessary. This light, and the electricity used to create it, is being wasted rather than being focused on targeted areas that need to be

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<sup>14</sup> [http://darksky.org/wp-content/uploads/bsk-pdf-manager/16\\_MLO\\_FINAL\\_JUNE2011.PDF](http://darksky.org/wp-content/uploads/bsk-pdf-manager/16_MLO_FINAL_JUNE2011.PDF), Accessed on December 17, 2018.

illuminated. Moreover, artificial lights disrupt the natural light patterns and the delicate balance of our environment. A growing body of evidence links the brightening night sky directly to measurable negative impacts including disrupting the ecosystem and wildlife and harming human health.<sup>15</sup> The credit requires compliance with standards to reduce light pollution and limit its negative effects.

**Further Explanation  
Required Documentation**

Documentation	Option 1	Option 2
Master Plan of the city highlighting key residential areas	X	
Measurements for select residential areas for at least 3 different seasons to establish the average rating or measurement	X	
Declaration from municipal official with authority for public works and/or infrastructure stating 70% of the street lighting meets the requirements from the listed standard		X
Narrative explaining the lighting design for various types of streets		X

**Exemplary Performance**

This credit is not eligible for exemplary performance.

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<sup>15</sup> <https://www.darksky.org/light-pollution/> accessed on March 24, 2019

# NS Credit: Resilience Planning

This prerequisite applies to

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

## Intent

To strengthen the resilience of communities to climate change risks, natural and man-made hazards and extreme events.

## Requirements

### Vulnerability and Capacity Assessment (2 points)

Identify the local environmental context and conduct a vulnerability and capacity assessment for climate change risks, natural and man-made hazards and extreme events as per the table below.

**Table 3. Classification of impacts for Vulnerability and Capacity Assessment**

Natural		Man-made	
Geo Physical	Earthquake	Social	Complex Emergencies/Conflicts
	Landslide		
	Tsunami		Displaced Populations
	Volcanic Activity	Technological	Cyber Attack
Hydrological	Avalanches	Industrial	Infrastructure failure
	Flood		Fire
Climatological	Extreme Temperatures	Transport	Explosion
	Drought		Accidents
	Wildfires		Accidents on Road, Air, Railway, Maritime
	Extreme heat/cold	Pollution	Air and Water
	Heat Island Effect		
Meteorological	Cyclones		
	Storms/Wave Surges		
Biological	Disease Epidemics		

Requirements for vulnerability and capacity assessment:

- ▶ **Risk Identification** - Identify the impacts from which an area is at risk. Use national/state level maps and historic data of occurrence to identify the potential threats.
- ▶ **Risk Assessment** - Estimate the probability of occurrence of the extreme events. Study their characteristics, frequency and potential severity. Conduct a socio-economic and environmental assessment of the impact.
- ▶ **Vulnerability and Capacity Assessment** - Assess the most exposed and affected sections of the city or community.
- ▶ **Adaptation and Mitigation Goal** - Set goals based on the vulnerability and capacity assessment. Highlight threats having maximum damage potential and most vulnerable areas that require mitigation strategies. The goal should address the top two natural and man-made hazards.



AND

### Resilience Plan (2 points)

Develop a Resilience Plan for the city or community. The plan should meet at least two of the following requirements:

- ▶ Climate Adaptation and Mitigation Strategies - Adaptation and mitigation strategies to meet the goals identified under Vulnerability and Capacity Assessment above.
- ▶ Fundamental Emergency Planning and Preparedness - Access to basic needs, first aid, emergency supplies, water, food communication, temporary shelter.
- Early Warning Systems - Strategies for early warning systems and operation of critical facilities during the extreme event and post-event rehabilitation. Demonstrate at least one early warning system in practice.
- ▶ Critical Infrastructure Location - Map and reduce over time any critical infrastructure that is located in designated high risk areas.
- ▶ Policy Intervention - Incorporate building structure resilience strategy to withstand the potential damage due to natural hazards in the building regulations.
- ▶ Capacity Building - Design awareness programs to educate different stakeholders (at least one at community level and one at internal administrative level) about hazard management. Plan for implementation the programs at regular intervals for at least one year. The programs should have the provision for revisions after stakeholders' feedback.

#### References:

RELI v1: Risk Adaptation + Mitigation for Acute Events  
STAR v2 CE-1: Climate Adaptation  
STAR v2 HS-6: Hazard Mitigation

### Guidance

#### Behind the Intent

Common signs of climate change include higher annual average temperatures, rising sea levels, and extreme weather. Serious impacts of climate change may involve flooding, drought, prolonged heat waves, and/or increased frequency of dangerous storm events. Such impacts can radically shift ecosystems, destabilize economies, and threaten quality of life. Climate change exacerbates the stress on already-strained infrastructure systems. Communities that make the choice to address future stresses and shocks from climate impacts today are likely to save money and experience a safer, healthier community now and in the future.

### Further Explanation

#### Required Documentation

Documentation	Vulnerability and capacity assessment	Resilience Plan
Narrative describing the risks identified, vulnerability and capacity assessment along with adaptation and mitigation goals for each of the top two natural and manmade hazards.	X	
Annotated resilience plan clearly highlighting the sections within the plan that demonstrate achievement of at least two of the listed requirements.		X

### Exemplary Performance

This credit is not eligible for exemplary performance.

# TRANSPORTATION AND LAND USE (TR)

## TR Prerequisite: Transportation Performance

This prerequisite applies to

- ▶ Cities (1-6 points)
- ▶ Communities (1-6 points)

### Intent

To promote non-motorized transportation, encourage use of public transit and reduce pollution from transportation sector.

### Requirements

**CITIES, COMMUNITIES**

Measure the daily per capita Vehicle Miles Travelled (VMT) for the city or community by capturing the commute patterns of the population. Total VMT must be calculated for a minimum period of the most recent calendar year using either of the following methodologies:

- ▶ Non-traffic count based
- ▶ Traffic count based
- ▶ Transportation modeling software derived

VMT per capita per day is calculated by dividing the total VMT for the city or community for a period of the most recent calendar year by total population of the city (Use USGBC population calculator based on residing and floating population). Divide this by 365 to get daily VMT per capita. Document the assumptions for differing day/night and seasonal populations if variations significantly alter travel patterns.

Obtain a minimum transportation performance score of 40. Additional points for this prerequisite are awarded for transportation performance scores above 40, according to the table given below.

**Table 4. LEED Points for Transportation Performance**

Transportation Performance Score in Arc	Points
40	Prerequisite
50	1
60	2
70	3
80	4
90	5
100	6

## Transportation Performance Score

VMT is a metric that measures the number of miles travelled by a vehicle or a fleet of vehicles. Traffic counts measure the number of vehicles passing a fixed point during a specified time. VMT includes trip distance with the traffic volume. For example, 10,000 vehicles each traveling an average of 15 miles per day (24 kilometers per day) would result in 150,000 vehicle miles travelled per day. VMT is useful as a descriptor of changes in travel demand in an urban area. As trip lengths increase, VMT goes up. Trip lengths are a function of the relative locations of residences, jobs, schools, and retail. As the number of vehicle trips increase, VMT again goes up. Factors affecting the number of vehicle trips made each day include age, income, population and household size, workers per household, auto ownership, and access to transit.

The score is a value from 1-100 based on city's or community's VMT per capita.

### Performance Score Calculation

To calculate transportation performance score, the following data are required:

1. Total VMT (in miles) for the city or community for a minimum period of one recent calendar year.
2. Total population of the city or community. Consider day time and night time population, permanent and floating population for calculations.

#### References:

LEED for Cities (Pilot) Transportation

STAR v2 BE-7: Transportation Choices, Outcome 4: Vehicle Miles Travelled

## Guidance Behind the Intent

Vehicle Miles Travelled (VMT) measures the total amount of travel for all vehicles in a geographic region over a given period of time. It is an indicator of the commute pattern of a region that typically depends on compactness, access to public transit facilities and diverse uses, and infrastructure for walking and bicycling. Cities and communities that are compact and offer safe, comfortable, and accessible walking, bicycling, and public transit infrastructure have lower vehicle miles travelled. This indicates reduced dependency on motorized vehicles, reducing GHG emissions as well as improving public health. This prerequisite requires cities to measure, monitor, and report the performance of their transportation system.

### Further Explanation

#### Required Documentation

Documentation	All cities and communities
Total VMT for the city or community	X
Supporting documentation from transport department or relevant authority confirming total VMT	X
Calculations for VMT per capita	X

### Exemplary Performance

This prerequisite is not eligible for exemplary performance.

# TR Credit: Compact, Mixed Use, Transit Oriented Development

This credit applies to

- ▶ Cities (1-2 points)
- ▶ Communities (1-2 points)

## Intent

To encourage compact and mixed use development, high level of connectivity within city or community and encourage walking, biking, and transit use.

## Requirements

### CITIES, COMMUNITIES

Identify Compact and Complete Centers (CCC) on the master plan or land use map of the city or community. CCCs are measured as areas within a ½ mile (800 meters) walking distance of a central point that represent the strong mix of uses, public transit availability, density, and walkability. CCCs may overlap.

Provide safe and comfortable sidewalks, bikeways and crosswalks that are unobstructed and barrier-free for people with disabilities, including wheelchair users and people with low vision. Comply with Americans with Disabilities Act (ADA) or relevant national or local guidelines for 100% of sidewalks, bikeways and crosswalks.

To qualify as a CCC meet the following requirements:

### Access to Transit Facilities

Demonstrate that at least 90% of residential and non-residential buildings within the CCC

- ▶ Are within ½ mile (800 meters) walking distance of an existing or planned mass transit station such as bus rapid transit stops, passenger rail stations (i.e. light, heavy, or commuter rail) or commuter ferry terminals.

AND/ OR

- ▶ Are within ¼ mile (400 meters) walking distance of an existing or planned bus, streetcar or informal transit stops that connects to a mass rapid transit station or a pulse point within 3 miles<sup>16</sup> (5 kilometers).

### Access to Diverse Uses

Demonstrate that at least 90% of all residential and non-residential buildings within the CCC have access to at least 10 diverse uses (see Appendix 1). Diverse uses should reflect the socioeconomic profile (income, demographics, race and ethnicity) of the CCC.

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<sup>16</sup> TOD guidelines, ITDP  
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The following restrictions apply:

- ▶ A use may be counted as only one use type (e.g., a retail store may be counted only once even if it sells products in several categories).
- ▶ No more than two uses in each use type may be counted (e.g., if five restaurants are within the required distance, only two may be counted).
- ▶ The uses accessible to each counted dwelling unit must represent at least two categories.

Points are awarded based on the percentage of population residing in CCCs as per table given below.

**Table 5. Percentage of population residing in CCC**

Percentage of population residing within CCCs		Points
Communities	Cities	
Up to 75%	40% to 69%	1
76% and above	70% and above	2

Based on the land use map or master plan, identify areas and total population that reside in mixed use zones and residential zones. Mixed use zone has a balanced mix of uses such as residential (high, medium and low), commercial and institution, open areas and others. Residential zones primarily consist of residential units. The definition of land use zoning should be as per local standard.

- ▶ Areas in mixed use zones will be considered to have qualified for a CCC and percentage of population residing in these areas will meet the requirements for this credit.
- ▶ For the residential zone, meet all requirements to qualify as a CCC.

References:

STAR v2 BE-3: Compact & Complete Communities  
 LEED v4 ND NPD Prerequisite: Connected and Open Community  
 LEED v4 ND NPD Credit: Mixed-Use Neighborhoods

**Guidance Behind the Intent**

This credit addresses high-level urban planning of the city or community. It encourages development in compact, human-scaled, walkable, and universally-accessible centers and neighborhoods that connect to public transit and offer diverse uses and services. The credit promotes street networks that are comfortable, safe, uninterrupted, and accessible for all people regardless of age, ability, and other factors. Cities and communities with dense, compact, and mixed-use development are able to contain urban sprawl, reduce dependency on motorized vehicles, encourage walking and bicycling, and reduce vehicular emissions.

**Further Explanation Required Documentation**

Documentation	All cities and communities	Access to transit facilities	Access to diverse uses	Density of CCC

Letter of Assurance by an authorized signatory confirming compliance with Americans with Disabilities Act (ADA) or an equivalent national or local standard for sidewalks, bikeways and crosswalks	X			
Master plan showing location of residential and non-residential buildings, planned or existing transit stations and/or stops and walking routes with distance from farthest buildings to these stops, for sample CCCs in each zone		X		
Master plan showing location of residential and non-residential buildings, location of use types and walking routes with distance from farthest buildings to these use types, for sample CCCs in each zone			X	
Description of socioeconomic profile of CCC that is reflected in selected use types for sample CCCs in each zone			X	
Documentation to demonstrate achievement of thresholds on percentage of total population residing in CCCs				X

**Exemplary Performance**

This credit is not eligible for exemplary performance.

# TR Credit: Access to Quality Transit

This credit applies to

- ▶ Cities (1 point)
- ▶ Communities (1 point)

## Intent

To encourage use of diverse transportation modes in order to reduce the reliance on personal vehicles within city community.

## Requirements

### CITIES, COMMUNITIES

All cities or communities must disclose data on modal split showing the percentage of population commuting to work and other places by using the following transportation modes, preferably calculated within past one year:

- ▶ Drive alone (or chauffeured)
- ▶ Carpool
- ▶ Motorcycle
- ▶ Taxicab
- ▶ Public transportation (excluding taxicab)
- ▶ Walk
- ▶ Bicycle
- ▶ Or, other means

Reference:

Variation on STAR v2 BE-7: Transportation Choices Outcome 1

AND

### Option 1. Quality of Transit Facilities (1 point)

Provide safe and comfortable transit stops to encourage use of public transport. Ensure the following for at least 80% of transit facilities:

- ▶ Covered and partially enclosed to buffer wind and rain, have seating and illumination, has signage that displays transit schedules and route information.
- ▶ Minimized interference with pedestrian flow.
- ▶ Main roads have right-of-way for public transportation, preferably with dedicated lanes<sup>17</sup>.

OR

### Option 2. Intermodal Connectivity (1 point)

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<sup>17</sup> TOD Guidelines, EMBARQ

Ensure that the station is connected to three or more modes of transportation by meeting the requirements of *Option 2, LT Credit: Intermodal Connectivity and Placemaking of LEED v4 BD+C Transit* (Appendix 2).

References:

STAR v2 BE-7: Transportation Choices, Outcome 1 and Outcome 3  
LEED v4 BD+C Transit, LT Credit: Intermodal Connectivity and Placemaking

OR

### Option 3. Frequency of Trips (1 point)

Ensure that transit stations identified in *TR Credit: Compact, Mixed Use and Transit Oriented Development, 1. Access to transit facilities*, including an existing or planned rapid mass transit station, bus rapid transit stops, passenger rail stations (i.e. light, heavy, or commuter rail), commuter ferry terminals, bus, streetcar or informal transit stops, meet the minimum requirement of 72 weekday trips and 30 weekend trips. The transit service at these stops and stations in aggregate must meet the given minimum requirement for each CCC as identified in *TR Credit: Compact, Mixed Use and Transit Oriented Development*. Planned stops and stations may count if they are sited, funded, and under construction during the time of certification.

Both weekday and weekend trip minimums must be met.

- ▶ For each qualifying transit route, only trips in one direction are counted towards the threshold.
- ▶ For weekend trips, only trips on the day with the higher number of trips are counted towards the threshold.
- ▶ If a qualifying transit route has multiple stops within the required walking distance, only trips from one stop are counted towards the threshold.
- ▶ Privately-run shuttles are only acceptable if the service is made available to the public.

If existing transit service is temporarily rerouted outside the required distances for less than two years, the project may meet the requirements, provided the local transit agency has committed to restoring the routes with service at or above the prior level.

Reference:

LEED v4.1 BD+C, LT Credit: Access to Quality Transit

### Guidance Behind the Intent

This credit requires cities and communities to provide multiple transit options as alternatives to personal motorized vehicles and encourage a shift to public transit that supports the environment as well as public health. Providing safe, comfortable, attractive, and convenient transit facilities tends to increase ridership of public transit. It is equally important to provide transit service that is frequent and regular.

### Further Explanation Required Documentation

Documentation	All cities and communities	Option 1	Option 2	Option 3
Documentation on modal split showing percentage of population using different modes of transportation such as drive alone, carpool, motorcycle, taxicab, public transportation, walk, bicycle, and others (as applicable)	X			



Letter of Assurance by an authorized signatory confirming the quality requirements for public transit shelters		X		
Documentation of a statistically-significant sample <sup>18</sup> of public transit shelters (e.g. drawings or photographs) demonstrating compliance with the quality requirements		X		
Documentation of selected options from the list for sample CCCs in each zone			X	
For bus routes, vicinity map showing mass transit stations and connectivity with three or more bus routes			X	
For bicycle storage, site plan showing location and number of short-term and/ or long-term bicycle storage spaces or valet at mass transit station			X	
For bicycle storage, policy allowing bicycles on mass transit systems			X	
For vehicle parking, site plan showing location of vehicle parking at the mass transit station			X	
For vehicle parking, description supporting provision of carpool services at vehicle parking at the mass transit station			X	
For connectivity to airport, map showing distance of airport from mass transit station			X	
For rail, map showing connectivity to regional or commuter rail			X	
For ferry, map showing connectivity of mass transit station with ferry			X	
For passenger drop-off area, site plan showing location of designated passenger drop-off area			X	
Timetables or other-service level documentation showing frequency of weekday and weekend trips				X

**Exemplary Performance**

This credit is not eligible for exemplary performance.

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<sup>18</sup> Statistical significance must be determined at a 95% confidence level and 5% margin of error based on the total number of public transit shelters.

# TR Credit: Alternative Fuel Vehicles

This credit applies to

- ▶ Cities (1-2 points)
- ▶ Communities (1-2 points)

## Intent

To reduce pollution by promoting alternatives to fossil fuel vehicles.

## Requirements

### CITIES, COMMUNITIES

#### Option 1. Electric Vehicle Charging Facilities (1 point)

Provide electrical vehicle supply equipment (EVSE) in 2% of all public parking spaces or at least two spaces, whichever is greater. Clearly identify and reserve these spaces for the sole use by plug-in electric vehicles.

The electrical vehicle supply equipment (EVSE) must meet the following requirements:

- ▶ Provide a Level 2 charging capacity (208 – 240 volts) or greater.
- ▶ Comply with the relevant regional or local standard for electrical connectors, such as SAE Surface Vehicle Recommended Practice J1772, SAE Electric Vehicle Conductive Charge Coupler or IEC 62196 of the International Electrotechnical Commission for cities or communities outside the U.S.
- ▶ Vehicle-to-grid (V2G) technology must be capable of responding to time-of-use market signals (e.g. price). Cities or communities pursuing *EN Credit: Smart Energy Systems* should incorporate EVSE into any demand response program or load flexibility and management strategies.

Demonstrate that the number of private and public electric vehicle charging stations exceed 1.07 per 10,000 residents.

OR

Demonstrate compliance with local or national policy for all types of vehicles within the city (privately and publicly owned vehicles or fleet) for electric vehicle charging facilities within the city or community.

AND/OR

#### Option 2. Alternative Fuel Stations (1 point)

Demonstrate that the total number of government and privately owned alternative fuel<sup>19</sup> stations meet or exceed 1.52 per 10,000 residents.

OR

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<sup>19</sup> Alternative fuel refers to low-polluting, non-gasoline fuels such as hydrogen, propane, compressed natural gas, liquid natural gas, methanol, and ethanol.

Demonstrate compliance with local or national policy for providing alternative fuel stations for all vehicles (privately owned vehicles and publicly owned vehicles or fleet) within the city or community.

References:

STAR v2 CE-3 Greening the Energy Supply, Outcome 1  
LEED v4 BD+C Transit LT Credit Green Vehicles

**Guidance  
Behind the Intent**

In 2016, transportation accounted for 28% of total U.S. GHG emissions, which is the largest portion of the total emissions.<sup>20</sup> GHG emissions not only impact the global climate, but also pose health risks from air pollution, especially for children, seniors, and other sensitive populations. This credit requires cities and communities to promote alternative fuels for vehicles that are lower-emitting and non-gasoline-based, such as electricity, hydrogen, propane, compressed natural gas, liquid natural gas, methanol, and ethanol. Initiatives such as preferred parking spaces, provision of charging and refueling stations, and incentives encourage a greener transportation system.

**Further Explanation  
Required Documentation**

Documentation	Option 1	Option 2
Master plan showing public parking spaces and electric vehicle charging spaces for sample CCCs in each zone; calculations based on total parking capacity	X	
Master plan showing electric vehicle charging stations for sample CCCs in each zone; calculations based on number of electric vehicle charging stations per 10,000 residents	X	
National or local policy providing regulation on provision of electric vehicle charging facilities such as stations, charging spaces, incentives or other features that encourage use of electric vehicles	X	
Master plan showing alternative fuel stations for sample CCCs in each zone; calculations based on number of alternative fuel stations per 10,000 residents		X
National or local policy providing regulation on provision of alternative fuel stations		X

**Exemplary Performance**

This credit is not eligible for exemplary performance.

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<sup>20</sup> <https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions> (accessed on March 22, 2019)

# TR Credit: Smart Mobility and Transportation Policy

This credit applies to

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

## Intent

To promote efficient operation of transport systems, user facilitation, behaviour change and reduced environmental impact through smart technologies and transportation policies.

## Requirements

### CITIES

Adopt any four solutions or policies to support a city-wide smart and efficient transportation system. (2 points)

### COMMUNITIES

Adopt any two solutions or policies to support a community-wide smart and efficient transportation system. (2 points)

Indicative list of solutions<sup>21</sup>:

- ▶ Passenger Information System (PIS) - At least 80% of all transit stations identified in *TR Credit: Compact, Mixed Use and Transit Oriented Development, 1. Access to transit facilities* must be equipped with PIS system.
- ▶ Automated Speed Enforcement - At least 80% of roads to be equipped for automated speed enforcement.
- ▶ Traffic Surveillance: At least 80% of all transit stations identified in *TR Credit - Compact, Mixed Use and Transit Oriented Development, 1. Access to transit facilities* must be equipped with CCTVs for traffic surveillance.
- ▶ Global Positioning System (GPS)/ General Packet Radio Service (GPRS) - All public transit vehicles must be equipped with GPS/ GPRS system.
- ▶ Signal Synchronization and Transit Signal Priority - All signals on major roads must be synchronized or prioritized to address varying traffic flows.
- ▶ Integrated Ticketing System - At least 80% of all public transit systems and subsystems to have Automatic Ticketing System.
- ▶ Real-time Parking Management - At least 80% of all public and multi-level parking to have real-time parking management system.
- ▶ Electronic Toll Collection - All toll booths and plazas to have electronic toll collection system.
- ▶ Radio Frequency Identification (RFID) - Adopt RFID technology for logistics and/or for public transportation system.

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<sup>21</sup> <http://www.grantthornton.in/globalassets/1.-member-firms/india/assets/pdfs/smart-transportation-report.pdf>, Accessed on December 17, 2018.

**Guidance  
Behind the Intent**

Cities and communities face transportation-related issues such as traffic congestion, inadequate or inefficient mass transit infrastructure, issues hindering the safety, mobility, and productivity of commuters. This credit requires cities and communities to integrate information and communication technologies into the transportation system through the adoption of the given strategies or policies for smart technologies. Technologies such as passenger information systems, electronic toll collection, transit signal priority and synchronization, and real-time parking management help improve overall transportation system efficiency.

**Further Explanation  
Required Documentation**

Documentation	Cities	Communities
Documentation to show achievement of thresholds for selected solutions as applicable for a city or community, from the indicative list of solutions for smart and efficient transportation system. For solutions selected from outside of the given list, demonstrate servicing a minimum of 50% of city or community transportation network with these solutions	X	X
Policy to support smart transportation system showing solutions implemented and percentage of city or community transportation network that is serviced by the solutions	X	X

**Exemplary Performance**

This credit is not eligible for exemplary performance.

# TR Credit: High-Priority Site

This credit applies to

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

## Intent

To preserve historic structures and sites and focus growth and redevelopment to infill and other priority locations.

## Requirements

### CITIES, COMMUNITIES

#### Option 1. Historic Preservation (2 points)

This option is applicable to cities or communities with at least one historic building, contributing building in a historic district, or cultural landscape within the city or community boundary.

Develop an inventory of designated and eligible historic structure(s) and site(s). Consider historic buildings that are outside the city or community boundary but may be impacted by development.

Adopt a policy for alteration (rehabilitation, preservation or restoration) of any historic building or a contributing building in a historic district to ensure that following requirements are met:

- ▶ Approval in the form of a certificate of appropriateness from a local historic preservation commission or architectural review board for any exterior alterations or additions for building subject to local review.
- ▶ Approval in the form of a certificate of appropriateness for alteration from the office in case of buildings subject to state or federal or national review.

OR

#### Option 2. High-Priority Sites (2 points)

- ▶ Refer to an existing inventory or develop an inventory of infill, previously developed, greyfield, brownfield or sites of priority and potential for development or redevelopment.
- ▶ Adopt policies, regulations or provide incentives to focus development on infill and/or previously developed site or to cleanup and reuse brownfield and/or greyfield sites.

OR

#### Option 3. Designated High-Priority Locations (2 points)

Adopt policies, regulations or provide incentives to prioritize growth in high-priority redevelopment areas, as per the list below:

- ▶ a site in by the EPA National Priorities List;
- ▶ a Federal Promise Zone;
- ▶ a Qualified Opportunity Zone;
- ▶ a Department of the Treasury Community Development Financial Institutions Fund Qualified Low-Income Community (a subset of the New Markets Tax Credit Program);
- ▶ a site in a U.S. Department of Housing and Urban Development's Qualified Census Tract (QCT) or Difficult Development Area (DDA); or

- ▶ a local equivalent program administered at the national level for cities or communities outside the U.S.

References:

LEED v4.1 LT Credit: High-Priority Site  
 LEED v4 ND GIB Credit: Historic Resource Preservation and Adaptive Reuse  
 STAR v2 EAC-4: Historic Preservation (Action 1)  
 LEED v4 ND LT Credit: Preferred Locations

**Guidance Behind the Intent**

This credit requires cities and communities to identify high-priority redevelopment sites, such as historic structures and buildings, brownfields, previously developed sites, and infill sites. Redeveloping these sites have many environmental advantages over development in greenfields and environmentally-sensitive areas. Reusing historic structures helps in preserving community character, and underutilized properties can have a rich history. The redevelopment of sites in historic districts can also reduce urban sprawl through adaptive reuse. Building a project on a high-priority redevelopment site can revitalize the neighborhood and bring social and economic benefits to the surrounding community. Such projects also achieve savings because they are served by existing infrastructure.

**Further Explanation Required Documentation**

Documentation	Option 1	Option 2	Option 3	Option 4
Document from historic preservation entity confirming historic structures and sites	X			
Policy with terms and conditions for alterations or additions to historic structures and sites	X			
Vicinity map or other documentation showing infill, previously developed, greyfield, brownfield or sites of priority and potential for development or redevelopment for a minimum of 50% of such identified sites		X		
For brownfield sites, documentation from authority having jurisdiction declaring existence of specific contamination and confirming that remediation has been or will be completed to its satisfaction		X		
Policy, regulation document or incentive to focus development on infill and/or previously developed site or to cleanup and reuse brownfield and/or greyfield sites		X		
Vicinity map or other documentation confirming priority site designation				X

**Exemplary Performance**

This credit is not eligible for exemplary performance.

# WATER EFFICIENCY (WE)

## WE Prerequisite: Water Access and Quality

This prerequisite applies to

- ▶ Cities
- ▶ Communities

### Intent

To provide all sections of the society with equitable access to clean drinking water and sanitation services. .

### Requirements

#### CITIES, COMMUNITIES

Water and wastewater systems serving the city or community must meet the following requirements:

#### Water and Sanitation Access

**Case 1.** 100% coverage of all buildings within the boundary by public water supply and wastewater collection systems including centralized and decentralized systems.

**Case 2.** For cities which have not achieved a 100% coverage of all buildings within the boundary by public water supply and wastewater collection systems, provide a roadmap for achieving the same within 5 years of certification or at the time of LEED recertification.

Requirement can be met by including private water wells if it is permitted within the local or regional jurisdiction.

#### Drinking Water Quality

Demonstrate compliance with U.S. EPA's 2018 Edition of the Drinking Water Standards and Health Advisories Tables within the last year (or reporting year) for drinking water rules on chemical and microbial contaminants in drinking water pipes or comply with local, state, or national equivalent.

- ▶ Report on enforcement actions taken in case of non-compliance with the adopted drinking water quality standard, under the following categories:
  - Violation of testing frequency
  - Violation in water quality parameter threshold
- ▶ Provide the following data for each water supply facility:
  - Frequency of water quality testing (quarterly, monthly, bi-monthly, etc.)
  - Water quality testing parameters

Reference:

STAR v2 BE-2: Community Water Systems, Outcome 1

#### Treated Wastewater Quality

All centralized or publicly owned and decentralized (on-site, individual systems, septic systems, and others) wastewater treatment systems and wastewater discharged to surface water must comply with U.S. EPA's National Pollutant Discharge Elimination System (NPDES) permit program of Clean Water



Act (CWA) or local, state, or national equivalent for 100% of wastewater generated. Meet the water quality parameter thresholds in NPDES permit program manual section 5.1.1 - Secondary and Equivalent to Secondary Treatment Standards.

- ▶ Report on enforcement actions taken in case of non-compliance with the adopted wastewater treatment and quality standard, under the following categories:
  - Violation of testing frequency
  - Violation in water quality parameter threshold
  
- ▶ Provide the following data for each wastewater treatment facility:
  - Frequency of testing treated wastewater (quarterly, monthly, bi-monthly, etc.)
  - Water quality testing parameters

All wastewater treatment systems that are independently operated onsite or decentralized and are outside the jurisdiction of the city or development authority must disclose the applicable standards for wastewater treatment and discharge.

Reference:

STAR v2 BE-2: Community Water Systems, Outcome 3

## **Stormwater Quality**

### **CITIES**

Adopt a policy to comply with U.S. EPA's National Pollutant Discharge Elimination System (NPDES) permit program for stormwater pollution prevention from construction and industrial activities and municipal sources or local, state, or national equivalent.

Reference:

STAR v2 BE-2: Community Water Systems, Outcome 4

### **COMMUNITIES**

Monitor the quality of stormwater discharged from the community and ensure compliance with U.S. EPA's National Pollutant Discharge Elimination System (NPDES) permit program for stormwater pollution prevention from construction and industrial activities and municipal sources or local, state, or national equivalent.

## **Guidance Behind the Intent**

This prerequisite addresses three critical issues: access to clean drinking water, access to sanitation services, and pollution prevention from wastewater discharge and stormwater runoff.

Cities and communities are grappling with issues of equity and diversity among vulnerable populations, at times resulting in a total lack of basic amenities. Cities must ensure access to clean drinking water and sanitation services for all members of society. The drinking water must comply with water quality standards to ensure the safety of consumers.

Untreated or poorly-treated wastewater degrades surface water and makes it unsafe for many uses. This credit requires compliance with standards for maintaining quality of treated wastewater before it is reused or discharged into natural water bodies.

Rainwater in cities and communities picks up oil and other pollutants while flowing over impervious areas such as roof tops, paved surfaces, and parking lots before entering water bodies. Proper stormwater management by harvesting and treating runoff can help reduce flooding and pollution. In addition, reclaimed water can be reused to help meet a city's water demand.

**Further Explanation  
Required Documentation**

Documentation	Case 1	Case 2	Drinking water Quality	Treated Wastewater Quality	Stormwater Quality
Documentation from development authority demonstrating percentage of consumers that have public water supply and percentage of buildings that are connected to wastewater system	X	X			
Report or other documentation from public water supply and management utility confirming compliance to U.S. EPA standards for drinking water quality and treated wastewater quality or to local, state, or national equivalent; frequency of water and wastewater quality testing and parameters tested within past one year			X	X	
Description of enforcement actions to be taken in case of violation of testing frequency, violation in water quality parameter threshold, frequency of water quality testing			X	X	
For stormwater management in cities, policy on compliance with U.S. EPA's NPDES permit program and for communities, report or other documentation from authority demonstrating compliance with U.S. EPA's NPDES permit program for stormwater discharge					X

**Exemplary Performance**

This prerequisite is not eligible for exemplary performance.

# WE Prerequisite: Water Performance

This prerequisite applies to

- ▶ Cities (1-6 points)
- ▶ Communities (1-6 points)

## Intent

To support water management by minimizing water use and demand as a means to conserve water in the city or community.

## Requirements

### CITIES, COMMUNITIES

Measure the daily per capita domestic water consumption within the city. Domestic water consumption must be calculated for a minimum period of the most recent calendar year.

Domestic water is water used for indoor and outdoor household purposes including drinking, cooking, washing, landscaping and sanitation. Domestic water consumption is represented by the amount of water supplied by the public water supply utility or municipality. It may also include some industrial users that receive water from public water treatment facilities rather than well systems. It does not include water withdrawn for non-domestic uses such as agricultural irrigation, golf course irrigation, livestock, aquaculture, mining, or thermoelectric generation.

Applicants must include non-revenue water in the calculations.

Daily domestic water consumption per capita is calculated by dividing the total water consumed for a minimum period of the most recent calendar year by total population of the city (Use USGBC population calculator based on residing and floating population). Divide this by 365 to get Domestic Water Consumption per capita per day. Document the assumptions for differing day/night and seasonal populations if variations significantly alter water consumption patterns.

Obtain a minimum water performance score of 40. Additional points for this prerequisite are awarded for water performance scores above 40, according to table below.

**Table 6. LEED Points for Water Performance**

Water Performance Score in Arc	Points
40	Prerequisite
50	1
60	2
70	3
80	4
90	5

100	6
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### Water Performance Score

The Water Performance Score rates the city or community on per capita domestic water consumption in the city compared to the per capita domestic water consumption by comparable cities and communities. Lesser the amount of per capita domestic water consumption, the higher the score will be.

The score is a value from 1-100 based on per capita domestic water consumption.

### Performance Score Calculation

To calculate a water performance score, the following data is required:

1. Total domestic water consumption (in million liters or gallons), based on monthly or daily consumption for minimum period of the most recent calendar year.
2. Total population of the city or community. Consider day time and night time population, permanent and floating population for calculations.

#### References:

LEED v4.1 O+M Water Performance

STAR v2 BE-2: Community Water Systems, Outcome 2

STAR v2 CE-5: Water Efficiency, Outcome 1: Domestic Water Use Per Capita

### Guidance Behind the Intent

Water is an essential resource within the overall ecosystem of a city. Humans need water for agriculture, domestic use, and recreation, among other uses. Some researchers have calculated that in the year 2000, 150 million urban dwellers resided in cities with perennial water shortage, defined as having less than 100 liters per person per day of sustainable surface and groundwater flow within their urban extent.<sup>22</sup> This number is forecasted to grow to 993 million people by 2050. Therefore, protection, reuse, and efficient use of water resources to reduce the city's overall water footprint is critical to urban quality of life. This credit encourages cities to reduce their consumption of water while meeting basic needs and without compromising public health or economic needs.

### Further Explanation Required Documentation

Documentation	All cities and communities
Calculated water performance score. A minimum performance score of 40/100 is required	X
Utility bills for all water sources, with consumption values and dates highlighted showing total quantity of domestic water supplied	X

<sup>22</sup> <http://www.pnas.org/content/108/15/6312.full> (Accessed on March 23, 2019)

**Exemplary Performance**

Demonstrate achieving net zero water as a city or community.

# WE Credit: Integrated Water Management

This credit applies to

- ▶ Cities (1 point)
- ▶ Communities (1 point)

## Intent

To support water management, reduce freshwater consumption and encourage to move towards a net zero water city.

## Requirements

### CITIES, COMMUNITIES

Adopt an integrated water management process by developing a water balance statement to report on amount of water withdrawn to the amount entering the system through precipitation, river flow and other sources.

Demonstrate that the ratio of water withdrawals for human use to the total freshwater resources is less than 0.2.

Use Water balance calculator that consist of the following to demonstrate flow of water within the city:

#### 1. **Water Availability Assessment**

Assess the total quantity of water available for use to the city or community.

#### 2. **Water Demand**

Report on total water demand for all of the following sectors and use types present within the city or community, for past twelve consecutive months (one full year):

- ▶ Buildings – All use types such as residential, commercial, institutional and industrial buildings under the public and private sector.
- ▶ Landscaping for public spaces such as parks, alongside roadways and open spaces.
- ▶ Any other sector as applicable to the city.

#### 3. **Water Supply**

Measure the total amount of water supplied through various sources for past twelve consecutive months (one full year) sources of water supply may include, but not be limited to the following:

- ▶ Freshwater – Freshwater includes all naturally available water except for seawater and brackish water.
- ▶ Reclaimed water – Reclaimed water includes:
  - Treated wastewater – For each of the sectors identified in Water Demand, identify the wastewater generated. For reusing treated wastewater, provide centralized water treatment plant. Support treated wastewater reuse which is within the scope of the development authority's direct execution, such as at building or community level by adopting appropriate regulations, policies or ordinances. In addition, meet the requirements for wastewater quality as per *WE Prerequisite: Water Access and Quality*.
  - Harvested rainwater – For each of the sectors identified in Water Demand, identify the quantity of stormwater harvested. For harvesting stormwater at city or community level provide stormwater infrastructure. Support stormwater harvesting for areas within the scope of the development authority's direct execution, such as at building or community level by adopting appropriate regulations, policies or ordinances. In addition, meet the requirements for stormwater quality as per *WE Prerequisite: Water Access and Quality*.

- o Desalinated water – Measure the total amount of desalinated water supplied within the city.

Reference:

Variation on STAR v2 BE-2 Community Water Systems Outcome 2

**Guidance Behind the Intent**

Water is a vital resource needed to sustain life, human and ecosystem health, and the economy. Conventional water management systems consider water supply, wastewater, and stormwater as separate entities. However, sustainable urban water management has become critical with increases in water demand due to increased populations, urbanization, industrialization, and resulting low water availability. This credit requires cities and communities to take a comprehensive approach to urban water services, maintain the inflow and outflow of water in a city, and maintain water balance. To uphold the water balance, it is critical to assess the total amount of water available annually for use from surface water resources and plan the uses in a city or community based on that availability. This credit also encourages cities and communities to reduce dependency on non-renewable sources of water such as groundwater and to reuse treated wastewater and harvested rainwater to meet water demand. Ultimately, the credit encourages cities and communities to move towards a net zero water status. Achieving Net Zero Water means balancing the consumption of water resources and returning the same quantity back to the watershed so as not to deplete the resources of that region in quantity or quality over the course of the year.

**Further Explanation Required Documentation**

Documentation	All cities and communities	Water availability assessment	Water Demand	Water Supply
Calculations demonstrating water balance with total water demand based on various use types and water supplied by various sources calculated for a period of one year	X	X	X	X
Documentation showing ratio of total quantity of water available for use to total water withdrawn for potable use from natural resources	X	X	X	
Report or other documentation showing total quantity of water available for use from natural resources	X	X		

**Exemplary Performance**

This credit is not eligible for exemplary performance.

# WE Credit: Stormwater Management

This credit applies to

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

## Intent

To reduce runoff volume, prevent erosion, flooding and recharge groundwater.

## Requirements

### CITIES, COMMUNITIES

#### Option 1. Flooding Incidences (2 points)

##### Case 1. No reported flooding<sup>23</sup> incidences in past five years

Provide the following details:

- ▶ Precipitation volume for which the stormwater infrastructure has been designed.
- ▶ Strategies adopted to manage stormwater beyond its designed limits.
- ▶ Trend-line showing reduction in stormwater flooding events over past five years.
- ▶ Strategies adopted to inspect and ensure maintenance of existing stormwater facilities.

##### Case 2. Reported flooding incidences in past five years

Report on areas within the city that have faced flooding.

In a manner best replicating natural site hydrology processes, retain (i.e. infiltrate, evapotranspire, or collect and reuse) on site the runoff for, at minimum, the 60th percentile of regional or local rainfall for ten-year 24-hr rainfall event data using low-impact development (LID) and green-infrastructure (GI) practices. Refer the methodology given in Part I, Section E of U.S. EPA Section 438 Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects of the Energy Independence and Security Act to obtain 60th percentile rainfall event.

Cities or communities that have taken initiatives to manage stormwater, provide data trend-line showing reduction in stormwater flooding events over past five years. Additionally, provide details on strategies adopted to inspect and ensure maintenance of existing stormwater management facilities. Adopt techniques to infiltrate, evapotranspire, collect and reuse water for areas, such as pavements, walkways, parks, open spaces and others.

References:

LEED v4 ND GIB Credit: Rainwater Management

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<sup>23</sup> Flood is the overflowing of the normal confines of a stream or other body of water, or the accumulation of water over areas that are not normally submerged. Floods include river (fluvial) floods, flash floods, urban floods, pluvial floods, sewer floods, coastal floods, and glacial lake outburst floods. [https://www.ipcc.ch/pdf/special-reports/srex/SREX-Annex\\_Glossary.pdf](https://www.ipcc.ch/pdf/special-reports/srex/SREX-Annex_Glossary.pdf), Accessed on December 17, 2018.



OR

### **Option 2. Green Stormwater Infrastructure (2 points)**

Demonstrate that 35% of the jurisdiction's land area has designated green stormwater providing bioretention and infiltration services that are interconnected.

Provide details on strategies adopted to inspect and ensure maintenance of existing stormwater management facilities and techniques to infiltrate, evapotranspire, collect and reuse water for areas, such as pavements, walkways, parks, open spaces, and others.

Reference:

STAR NS-1 Green Infrastructure, Outcome 1

For cities or communities following Case 2 of Option 1 or Option 2, adopt techniques<sup>24</sup> to infiltrate, evapotranspire, collect and reuse water for areas such as pavements, walkways, parks, open spaces and others within the city.

### **Guidance Behind the Intent**

City and community development impacts land, impervious surfaces, soil compaction, vegetation, and natural drainage patterns, disrupting natural hydrological systems and watersheds. The cumulative effect of these changes is disruption to the natural water balance and water flow. Typically, a conventional city's rainwater management technique is to convey runoff as quickly as possible into centralized facilities at the base of drainage areas. However, such a strategy, although intended to prevent flooding and promote efficient drainage, can harm watersheds; it increases the volume, temperature, peak flow, and duration of runoff, eroding streams and causing other ecological damage.

Green infrastructure (GI) and low-impact development (LID) rainwater management strategies and techniques improve upon that conventional approach by mimicking an area's natural hydrology. These

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<sup>24</sup> Examples of acceptable techniques to achieve above requirements:

- Planting rain gardens with native or adapted plant material (e.g. trees shrubs);
- Installing a vegetated roof;
- Using permeable paving, consisting of porous above-ground materials (e.g., open pavers, engineered products), a base layer designed to drain water away from the building, and (often) a 6-inch-deep (150 millimeters) subbase; and
- Installing permanent infiltration or collection features (e.g., vegetated swale, rain garden, rainwater cistern) that can retain 100% of the runoff from at minimum, the 80<sup>th</sup> percentile of regional or local rainfall events.

Cities may also refer to Urban Best Management Practice Database and Codes by Maryland Department of Environment that provides a list of BMPs under the category of environmental site design, structural and other practices.

<https://mde.maryland.gov/programs/water/stormwatermanagementprogram/documents/Urban%20BMP%20Database%20for%20Phase%20I%20MS4s%202016.pdf>. Accessed on March 01, 2019.

techniques involve minimizing disturbed areas, preserving pre-development runoff conditions, limiting the amount of impervious cover, and infiltrating, storing, evaporating, or detaining rainwater runoff.

**Further Explanation  
Required Documentation**

Documentation	Option 1		Option 2
	Case 1	Case 2	
Report or other documentation confirming there have been no flooding events in past 5 years	X		
Typical plans, details, or cross sections depicting project conditions and GI or LID strategies, highlighting topography, direction of water flow, and area of site that each stormwater management facility addresses for sample CCCs	X	X	X
Trend line showing reduction in flooding events over years	X	X	
Report or other documentation on strategies adopted for inspection and maintenance of stormwater facilities	X	X	X
Report or other documentation confirming flooding events in past 5 years		X	
Rainfall data for past ten years		X	
Runoff volume calculations for sample CCCs in each zone and land use types		X	
Calculations for 60 <sup>th</sup> percentile storm from rainfall data for past ten years rainfall data		X	
Narrative confirming measures qualify as GI or LID		X	
Calculations for volume of rainwater managed by GI or LID strategies		X	
Master plan showing designated green stormwater infrastructure			X
Calculation showing percentage of total area with designated green stormwater infrastructure			X

**Exemplary Performance**

This credit is not eligible for exemplary performance.

# WE Credit: Smart Water Systems

This credit applies to

- ▶ Cities (1-2 points)
- ▶ Communities (1-2 points)

## Intent

To improve the operational efficiency of the water management systems through use of smart technology.

## Requirements

### CITIES, COMMUNITIES

#### Option 1. Water Audit (1 point)

Undertake water audit at least once a year to meet all of the following requirements:

- ▶ Address water use inventory, smart metering and water efficiency.
- ▶ Measure the amount of municipal water available and total water utilized from both municipal water supply and other sources.
- ▶ System efficiency and root-cause analysis for water losses, leaks and infiltration.
- ▶ Identify strategies for improving system efficiency.

OR

#### Option 2. Water Audit and Automation (2 points)

Adopt strategies for automation of water supply system for efficient operation and management by data collection, tracking and monitoring of water supply network and conduct regular water audits.

## Guidance

### Behind the Intent

This credit requires a city to apply information technology to enhance water efficiency. Smart water systems optimize water utility performance by improving efficiency, longevity, and reliability. These systems also help improve the overall performance of water supply networks by measuring, collecting, and analyzing data, then taking appropriate corrective actions. Smart water systems can link together multiple systems within a network to share data across platforms. Considering many of the common challenges faced by utilities, including leak management, regulation compliance, and customer service, utilities can improve performance by integrating systems in a manner that tracks and highlights specific problem areas.

## Further Explanation

### Required Documentation

Documentation	Option 1	Option 2
Report or documentation on water audit undertaken by water supply and management utility for system efficiency and strategies adopted to improve it	X	
Description of automation of water supply system for at least 50% of total water supply network to collect data, track and monitor water supply and conduct water audit		X

**Exemplary Performance**

This credit is not eligible for exemplary performance.

# ENERGY AND GREENHOUSE GAS EMISSIONS (EN)

## EN Prerequisite: Power Access, Reliability and Resiliency

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

**Case 1.** 100% coverage of households or population by electricity service.

**Case 2.** For cities which have not achieved a 100% coverage of all coverage of households or population by electricity supply, provide a roadmap for achieving the same within 5 years of certification or at the time of LEED recertification.

AND

#### Reliability Performance Monitoring

Continuous monitoring (automatic or manual) and recording of interruptions for the complete distribution network at high, medium and low voltage levels.

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 Prerequisite: Reliability Performance Monitoring  
 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	Case 1	Case 2
Declaration from municipal official with authority for public works and/or energy infrastructure confirming 100% coverage of buildings with power supply.	X	
Commitment and narrative of roadmap for achieving 100% coverage within 5 years of certification or at the time of LEED recertification.		X
Reliability performance monitoring: Three months of recorded interruption information. (Submit SAIDI, SAIFI reports if available)	X	X
Power surety and resiliency: List the cities’ or communities’ critical loads or emergency facilities and essential services, with their minimum daily runtimes, and the alternative power supply for each, including type, location, capacity, and minimum daily runtime.	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

### Exemplary Performance

This prerequisite is not eligible for exemplary performance.

# EN Prerequisite: Energy and Greenhouse Gas Emissions Management

This prerequisite applies to

- Cities (1-14 points)
- Communities (1-18 points)

## Intent

To support energy management and move towards a zero energy and emissions city.

## Requirements

### CITIES, COMMUNITIES

Measure the annual energy consumption and Greenhouse Gas (GHG) emissions for the city or community. The inventory<sup>25</sup> should cover Scope 1 and Scope 2 emissions for one whole calendar year or fiscal year. LEED points are based on Energy and GHG performance on Arc scored on Greenhouse gas emissions per capita (tons CO<sub>2e</sub> per capita).

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

Obtain a minimum Energy and GHG Performance Score of 40 on Arc. Additional points for this prerequisite are awarded for Energy and GHG Performance Scores above 40, according to table below.

**Table 7. Energy and GHG Performance score in Arc and corresponding LEED for Cities and Communities points**

Energy and GHG Performance Score on Arc Score		Points
Cities	Communities	
40	40	Prerequisite

<sup>25</sup> Protocols accepted for GHG inventory: 2006 IPCC Guidelines for National Greenhouse Gas Inventories (Intergovernmental Panel on Climate Change (IPCC)), Baseline Emissions Inventory/Monitoring Emissions Inventory methodology (BEI), (Covenant of Mayors). Bilan Carbone (Association Bilan Carbone (ABC)), Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC), Greenhouse Gas Inventory & Research Center of Korea (GIR), International Local Government Greenhouse Gas Emissions Analysis Protocol (IEAP) (ICLEI - Local Governments for Sustainability USA), International Standard for Determining Greenhouse Gas Emissions for Cities (UNEP and World Bank), PAS 2070: Specification for the assessment of greenhouse gas emissions of a city (British Standards Institute (BSI)), U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (ICLEI - Local Governments for Sustainability USA), GHG Protocol for Cities (Greenhouse Gas Protocol).

44	44	1
49	48	2
53	52	3
57	56	4
61	60	5
66	64	6
70	68	7
74	70	8
79	73	9
83	76	10
87	79	11
91	82	12
96	85	13
100	88	14
	91	15
	94	16
	97	17
	100	18

**Energy and GHG Performance Score**

The Energy Performance Score rates the city or community on GHG emissions of the city or community against the GHG emissions of comparable cities or communities as GHG is an indicator of energy use in the city. Lower the energy use, higher will be the score. The score is a value from 1-100 based on the Energy Performance.

**Performance Score Calculation**

To calculate Energy and GHG Performance Score, the following data is required:

1. Annual energy consumption from all sectors along with the source of energy.
2. Emissions co-efficient for electricity and all fuel types.
3. Total population of the city or community.



**Guidance  
Behind the Intent**

Cities cover 2% of the world's land area but they account for 70% of the world's anthropogenic (human-induced) GHG emissions.<sup>26</sup> 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
Total annual Scope 1 and Scope 2 greenhouse gas emissions from all sectors	X
Supporting documentation for GHG emissions such as GHG inventory.	X
Calculations for per capita emissions	X

**Exemplary Performance**

Zero Greenhouse gas emissions per capita per year (tons CO<sub>2</sub>e per capita).

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<sup>26</sup> <https://www.nationalgeographic.com/environment/urban-expeditions/green-buildings/benefits-of-green-buildings-human-health-economics-environment/>

# EN Credit: Energy Efficiency

This credit applies to

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

## Intent

To improve sectoral energy efficiency in the city.

## Requirements

### CITIES, COMMUNITIES

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

#### Street Lighting and Public Area Lighting (2 points)

A minimum of 70% of the street lighting in the city or community should meet the efficiency related requirements of 'ANSI/IESNA RP-8-14 Roadway Lighting. In addition, lamps should have a minimum Luminous Efficacy of 100 lumens per watt.

AND / OR

#### Water and Wastewater (2 points)

Meet the requirements of the standard listed below for a minimum of 50% of the pumps used in water supply, drainage and wastewater treatment:

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 or international equivalent standard.

AND / OR

#### District Energy System (2 points)

Incorporate a district energy system. For the purposes of this credit, a Distributed Energy Systems (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 load or 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:

$\%H_{DES}$ : Percentage of city's or community's heating load or demand supplied by DES

$\%C_{DES}$ : Percentage of city's or community's cooling load or demand supplied by DES

$\%E_{DES}$ : Percentage of city's or community's electric load or demand supplied by DES

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

**Table 8. Points for Distributed Energy Resources**

% District Energy	Points
80 %	1
160 %	2

Community scale DES systems do not qualify for this point under the LEED for Cities rating system. However, they can achieve points under the LEED for Communities rating system pertaining to the boundary.

**Guidance  
Behind the Intent**

This credit focusses 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 municipal official with authority for public works and/or energy infrastructure confirming 70% of the street lighting meets the requirements from the listed standard.	X		
Narrative explaining the lighting type and design for various types of streets.	X		
Declaration from municipal official with authority for public works and/or energy infrastructure that 50% of the pumps meets 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 and the 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<sup>27</sup>, or biomass) from the categories below. Points are based on total city energy consumption from *EN Prerequisite Energy and Greenhouse Gas Performance* met by the specific strategy as per the table given below. Points achieved in each category may be added for up to a total of 6 points.

- ▶ **On-Site Renewables:** Includes on-site nonpolluting renewable energy generation, owned, leased or subsidized by the city, utility (or energy provider).
- ▶ **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 or community. Plant maybe located within or outside the city boundary and should be owned or leased for a period of fifteen years by the city or utility. The plant 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 or been built within the last fifteen years. The contract must be 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.

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<sup>27</sup> Small hydroelectric is limited to capacity of 25 MW or as per national standard.

- **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 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 all procurement must be retained by the city or utility. All off-site qualifying resources must be contracted, owned, or leased for at least 15 years.

**Table 9. 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 %			

**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 renewable energy source and rated capacity	X		X		
Calculations or metered data 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 (2-4 points)

## Intent

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

## Requirements

### Greenhouse Gas Intensity (2 points)

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

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

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

AND/OR

### Reduction in Carbon Intensity (2 points)

Demonstrate a reduction in the Carbon Intensity of the economy over a period of three consecutive years.

Reference:

STAR Communities V2 EJ-2: Green Market Development Outcome 1: Greenhouse Gas Intensity

## 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	Greenhouse gas intensity	Reduction in carbon intensity
Total annual Greenhouse Gas emissions from all sectors as reported under EN Prerequisite Energy and Greenhouse Gas Emissions Performance	X	
GDP for the city and supporting documentation	X	
Calculations for carbon intensity	X	
Total annual Greenhouse Gas emissions for three consecutive years and supporting documentation		X
Year wise GDP data for three consecutive years and supporting documentation		X
Calculations for reduction in 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 and encourage consumer participation in energy use optimization.

## 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)

Adopt (or be committed to) an Interconnection and Net metering policy. The policy should meet the following requirements that 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.

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

References:

PEER v2 EE Credit: Distributed Energy Resources

PEER v2 GS Credit: Streamlined Interconnection and Net Metering

**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 predictable. Today, with advanced technology, consumers can make informed choices about energy usage or even become energy producers themselves.<sup>28</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 describe or explain 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>28</sup> PEER v2 EE Credit: Distributed Energy Resources

# MATERIALS AND RESOURCES (MR)

## MR Prerequisite: Solid Waste Management

This prerequisite applies to

- ▶ Cities
- ▶ Communities

### Intent

To effectively and efficiently manage waste in the city.

### Requirements

CITIES, COMMUNITIES<sup>29</sup>

The local government, development authority, or waste management service provider/s must meet the below requirements.

#### Access

**Case 1.** 100% coverage of all types of buildings or city population by waste management services for municipal solid waste.

**Case 2.** For cities which have not achieved a 100% coverage of all types of buildings or city population of all types and applicable buildings by waste management services, provide a roadmap for achieving the same within 3 years of certification or at the time of LEED recertification.

AND

#### Solid Waste Management Plan

Provide solid waste management plan, adopted or updated within the last five years, to meet the following requirements:

- ▶ **Segregation** - Waste must be sorted and segregated. Sorting must be done into minimum four categories - organic, recyclables, electronic waste (e-waste), and others. For areas where source segregation is not undertaken, central sorting facility must be provided.
- ▶ **Waste Storage and Collection** - Comply with the 'Requirement' sections of U.S. Code of Federal Regulations, Title 40, Volume 26, Part 243 on Storage, Safety and Collection (or local, state or national equivalent, whichever is more stringent).
- ▶ **Waste Handling and Processing Facility** - Total waste collected should be transported to the waste handling and processing facility situated within or outside the city boundary for further handling and processing of organic and inorganic waste. It must be either be centralized or decentralized. This facility must ensure that waste from registered project is only handled by them

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<sup>29</sup> Communities must meet all the requirements that are within the scope of the services provided or contracted by the community.

and not from any other source. In addition, all the organic waste should be stored in non-corrosive container with lid cover and recyclable and e-waste in a place with firm waterproof base at central waste handling and processing facility.

- o Organic waste comprising of all food waste and yard waste i.e. yard trimmings, dry leaves and wasted manure must be transported to organic waste treatment facility for converting it into compost via composting or biogas via anaerobic digestion.
- o All the recyclable waste should be sorted into minimum six categories including paper, corrugated cardboard, glass, plastic, metal, and send to material recovery facility for treatment. For e-waste management refer *MR Credit Material Recovery*.
- o Landfill should meet the requirements of EPA Landfill Manual or local, state or national equivalent.

- ▶ **Material Recovery Facility** – This recycling facility must be designed and operated in accordance to the local / national regulations. All the sorted recyclable waste from waste handling facility must be send to MRF for recycling and further treatment to produce recycled products. These products must be send to suitable markets with vendors situated within the city or outside the city boundary.

Support waste management and diversion strategies which are not directly within the scope of the city or community services must be supported by the appropriate contract with the service provider.

AND

Divert a minimum of 35% of construction and demolition waste from all infrastructure works (new, renovation, repair or demolition) undertaken by the local government.

## **Guidance Behind the Intent**

With rapid urbanization, economic development and population growth, more and more resources are needed to meet consumer demand. As nations and cities expand, they must offer more services to citizens and in turn manage, treat, and dispose of corresponding amounts of waste.

Around the world, almost 40% of waste is disposed of in landfills.<sup>30</sup> About 19% is recovered through recycling and composting,<sup>31</sup> and 11% is treated through modern incineration. Although globally 33% of waste is still openly dumped,<sup>32</sup> governments are increasingly facing the risks and costs of pollution and pursuing sustainable waste disposal methods. To address these issues, this prerequisite encourages effective, efficient, and systematic waste management. It allows cities to pursue sustainable waste management methods through composting, recycling, and safe disposal.

## **Further Explanation**

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30 Chrisafis, Angelique. 2016. "French Law Forbids Food Waste by Supermarkets." The Guardian, February 4. <https://www.theguardian.com/world/2016/feb/04/french-law-forbids-food-waste-by-supermarkets>.

31 FAO (Food and Agriculture Organization). 2015. Global Initiative on Food Loss and Waste Reduction. Rome: Food and Agriculture Organization of the United Nations. <http://www.fao.org/3/a-i4068e.pdf>.

32 "SAVE FOOD: Global Initiative on Food Loss and Waste Reduction." Food and Agriculture Organization of the United Nations, Rome. <http://www.fao.org/save-food/news-and-multimedia/news/news-details/en/c/1105834/>.

### Required Documentation

Documentation	Case 1	Case 2
Declaration from municipal official with authority for sanitation and/or waste management stating 100% coverage of all buildings with waste management services	X	
Narrative describing the roadmap for achieving 100% coverage within 3 years of certification		X
Solid waste management plan addressing prerequisite requirements	X	X
Documentation supporting waste management and waste diversion by contractors or sub-contractors	X	X
Calculations for construction and demolition waste diverted from infrastructure works	X	X

### Exemplary Performance

This prerequisite is not eligible for exemplary performance.

# MR Prerequisite: Waste Performance

This prerequisite applies to

- ▶ Cities (1-4 points)
- ▶ Communities (1-5 points)

## Intent

To support waste management and move towards net zero waste city.

## Requirements

### CITIES, COMMUNITIES

Measure the total weight of waste (in lbs., kg, or tons) that is generated, and the total weight that is diverted from landfills or incineration for a minimum period of the most recent calendar year. LEED points are based on waste performance in Arc across two metrics:

- ▶ Municipal solid waste generated (in metric tons per year per capita)
- ▶ Municipal solid waste diverted (% of total generated)

Municipal solid waste generated must include waste generation from all sectors within the city or community including but not limited to residential, institutional, commercial, other sectors and open spaces.

Waste to energy may count as waste diversion method if the facility meets European Commission Waste Framework Directive 2008/98/EC and the European Commission Waste Incineration Directive 2000/76/EC.<sup>33</sup> In addition, cities or communities must demonstrate that reuse and recycling strategies were exhausted before sending material to waste to energy facility.

Construction and demolition waste is not included under this credit. Exclude land clearing debris, soil and landscaping materials.

Document the assumptions for differing diurnal and seasonal population if varying numbers are used to arrive at waste generation per capita.

Obtain a minimum waste performance score of 40. Additional points for this prerequisite are awarded for waste performance scores above 40, according to Table below.

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<sup>33</sup> These standards consist of performance metrics of both efficiency and emissions for different types of energy recovery systems. In addition, the facility must meet the applicable European standards based on the fuel type. See *Referenced Standards* for more information on these directives:

EN 303-1—1999/A1—2003, Heating boilers with forced draught burners

EN 303-2—1998/A1—2003, Heating boilers with forced draught burners

EN 303-3—1998/AC—2006, Gas-fired central heating boilers

EN 303-4—1999, Heating boilers with forced draught burners

EN 303-5—2012, Heating boilers for solid fuels

EN 303-6—2000, Heating boilers with forced draught burners

EN 303-7—2006, Gas-fired central heating boilers equipped with a forced draught burner

**Table 10. Waste Performance Score in Arc and corresponding LEED points**

Waste Performance Score in Arc		Points
Cities	Communities	
40	40	Prerequisite
55	52	1
70	64	2
85	76	3
100	88	4
	100	5

**Waste Performance Score**

The Waste Performance Score rates the resource consumption and resource use efficiency of the city (waste generated and diverted) against the consumption and efficiency of comparable cities or communities.

The score is a value from 1-100 based on the cities’ total weight of waste generated and the total weight of waste diverted from landfills and incineration facilities.

**Performance Score Calculation**

To calculate the Waste Performance Score, following data is required:

1. Municipal solid waste generated (lbs., kg, or tons)
2. Municipal solid waste diverted (lbs., kg, or tons)
3. Total population of the city or community

**Guidance Behind the Intent**

Around the world, waste generation rates are rising. In 2016, the world’s cities generated 2.01 billion tons of solid waste, amounting to a footprint of 0.74 kilograms per person per day.<sup>34</sup> With burgeoning population and rapid urbanization, annual waste generation is expected to increase by 70% from 2016 to 3.4 billion tons in 2050.<sup>35</sup>

Municipal solid waste is one the several waste streams that cities manage. Other common waste streams, including industrial waste, biomedical waste, and household hazardous waste, are often not

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<sup>34</sup> <http://www.worldbank.org/en/topic/urbandevelopment/brief/solid-waste-management>, Accessed on December 17, 2018.

<sup>35</sup> <http://www.worldbank.org/en/topic/urbandevelopment/brief/solid-waste-management>

managed by the municipality. Global trends show that industrial waste generation is almost 18 times greater than municipal solid waste. In 2016, the World Bank reported global industrial waste generation to be 12.73 kg per capita per day, biomedical as 0.25 kg, and electronic waste as 0.02 kg. <sup>36</sup>

To build sustainable and livable cities, it is essential to manage all waste streams including industrial, biomedical and household hazardous waste. As these waste streams are often overlooked by many cities, this prerequisite requires the city to calculate total waste generation and waste diversion for all waste streams.

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

Documentation	All cities and communities
Municipal solid waste report listing sector-wise waste generated and waste diverted	X
Calculations for per capita waste generated and waste diversion percentage	X
Narrative describing strategies adopted for municipal solid waste diversion	X

**Exemplary Performance**

This credit is not eligible for exemplary performance.

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<sup>36</sup> What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050  
<https://openknowledge.worldbank.org/handle/10986/30317>



# MR Credit: Special Waste Streams Management

This credit applies to

- ▶ Cities (1 point)
- ▶ Communities (1 point)

## Intent

To divert special waste streams from landfill and incinerators and recover and recycle reusable materials.

## Requirements

### CITIES, COMMUNITIES

Measure and report the total weight of waste generated under special waste streams and the total waste diverted from landfill or incineration. Report data for one full calendar or fiscal year.

Report data for each of following special waste streams:

- ▶ Waste generated through special waste streams (in metric tons per year)
- ▶ Waste diverted (percentage diverted)

Special wastes are defined as non-municipal solid waste generated within the city or community, including industrial waste, agricultural, bio-medical waste, hazardous waste or any other as specific to the city.<sup>37</sup>

## Guidance

### Behind the Intent

Special waste streams mainly comprising of industrial, agricultural, bio-medical and hazardous waste generated 18.35 kilograms of waste per capita per day on a global scale in 2016, they have a direct environmental impact.<sup>38</sup>

To reduce environmental implications associated with special waste streams, this credit encourages their diversion landfills and incinerators to instead carry out recovery and recycling. Diversion must be measured and reported for all special waste generated and diverted annually.

## Further Explanation

### Required Documentation

Documentation	All cities and communities
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<sup>37</sup> What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050 <http://www.worldbank.org/en/topic/urbandevelopment/brief/solid-waste-management> , Accessed on December 17, 2018.

<sup>38</sup> What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050 <https://openknowledge.worldbank.org/handle/10986/30317>

Documentation supporting the total waste generated and diverted for each of the special waste streams	X
Calculations for waste diversion percentage	X
Narrative describing strategies adopted for waste diversion for each of the special waste streams	X

**Exemplary Performance**

This credit is not eligible for exemplary performance.

# MR Credit: Responsible Sourcing for Infrastructure

This credit applies to

- ▶ Cities (1-2 points)
- ▶ Communities (1-2 points)

## Intent

To encourage use of products and materials for which life cycle information is available and that have been extracted and sourced in a responsible manner.

## Requirements

### CITIES, COMMUNITIES

Comply with one or more of the following criteria for minimum 20% by cost of the total value of permanently installed-top three materials used in infrastructure. (1 point)

Comply with at least one of the following criteria for minimum 40% by cost, of the total value of permanently installed top five materials used in infrastructure. (2 points)

Include new construction, major renovation, repair or demolition works undertaken or contracted by the local government for a full calendar year. Infrastructure includes but is not limited to roads and highways, transits, water supply and wastewater treatment plants, public spaces and parks.

Material should meet at least one of the following sourcing and extraction requirements:

- ▶ **Extended Producer Responsibility (EPR)** - Products purchased from a manufacturer (producer) that participates in an EPR program or is directly responsible for extended producer responsibility. Products meeting EPR criteria are valued at 50% of their cost for the purpose of credit achievement calculations.
- ▶ **Leadership Extraction Practices – Material Reuse** - Reuse includes salvaged, refurbished or reused materials/products. Materials meeting reuse criteria are valued 200% of their cost for the purpose of credit achievement calculations.
- ▶ **Leadership Extraction Practices – Recycled Content** - Materials meeting recycled content criteria are valued 100% of their cost for the purpose of credit achievement calculations.
  - Recycled content is the sum of postconsumer recycled content plus one half of pre-consumer recycled content, based on weight.
  - The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.
- ▶ **Leadership Extraction Practices – USGBC Approved Program** - Other USGBC approved program meeting responsible sourcing and extraction criteria.

Reference:

LEED BD+C v4 MR Credit: Building Product Disclosure and Optimization- Sourcing of raw materials.

## Guidance

**Behind the Intent**

Raw material extraction and sourcing has a direct environmental impact on ecosystems. This credit encourages the use of products and materials for which life-cycle information is available and that have been extracted and sourced in a responsible manner. Extended producer responsibility programs can close the material loop through a circular economy and promote take-back programs.

In addition to ensuring the responsible sourcing of virgin materials, teams are encouraged to reduce raw material usage by selecting reused and recycled materials. Teams may also adhere to leadership performance standards and certifications that encourage local sourcing. To recognize the rapidly changing marketplace conditions for product and material transparency, this credit has an additional “USGBC-approved program” criterion designed to recognize leadership certification programs that may be developed in the future.

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

Documentation	All cities and communities
Documentation of product claims for credit requirements for the point threshold achieved	X
Calculations demonstrating achievement of point threshold	X
Narrative describing sourcing and extraction strategies for the point threshold achieved	X

**Exemplary Performance**

This credit is not eligible for exemplary performance.

# MR Credit: Material Recovery

This credit applies to

- ▶ Cities (1 point)

## Intent

To recover materials from the waste stream which have a high value and provide mechanism for collection and channelization of these back to the producer thereby moving towards a circular economy.

## Requirements

### CITIES

#### Option 1: Extended Producer Responsibility

Collection centers must be provided within the boundary and must be equipped with facilities to collect and store the waste products pertaining to the Extended Producer Responsibility (EPR) Policy in order to transfer these to the manufacturers. Collection centers must be within or outside the city boundary and may be operated by the municipality or other organizations such as Producer Responsible Organizations (PRO).

AND

Mandate a Manufacturers or Producer's Extended Producer Responsibility (EPR) policy for companies within the city's jurisdiction to encourage refurbishment, remanufacturing and recycling. Policy should meet all of the following requirements:

- ▶ Address (i) Electronics and Electrical Equipment (EEE) and (ii) packaging or metal cans.
- ▶ Include specific guidelines regarding channelization, collection centers, storage, transportation, environmentally sound dismantling, recycling and refurbishment.
- ▶ Mandate companies to collect a minimum of 10% of the total annual waste generated. Waste generated by the producer is calculated using the formula:

*E-waste generation in the financial year 'x-y' = Sales in the financial year '(x-z) - (y-z)'*

*Where,*

*'x - y' = financial year in which generation is estimated (in weight or volume)*

*z = average life span of the products*

OR

#### Option 2: Non-recyclable Waste Generation Reporting

- ▶ Conduct a waste stream audit for all non-recyclable waste generated within the city, by either weight or volume.
- ▶ Based on the waste stream study, identify and list top five major contributing waste producers.
- ▶ Report major contribution based on source and total weight or volume of waste generated.
- ▶ Municipality must initiate a dialogue with identified producers to take appropriate measures for the safe collection, storage and recycling/reuse to take back product into the system.

Reference:

TRUE Leadership Credit 4: Take Responsibility for Company Products and Packaging

## Guidance

### Behind the Intent

Solid waste management is critical, yet often overlooked while planning sustainable, healthy, and inclusive cities and communities for all. In 2016, the world generated 242 million tons of plastic waste—12% of all municipal solid waste.<sup>39</sup> Cities and communities are rapidly developing without adequate systems in place to manage changing waste composition. An estimated 1.6 billion tons of carbon dioxide-equivalent (CO<sup>2</sup>-equivalent) greenhouse gas emissions were generated from solid waste management in 2016. This is about 5 percent of global emissions.<sup>40</sup>

This credit encourages material recovery from the waste stream and mechanisms for collection and return of these materials back to the producer. Through extended producer responsibility programs and non-recyclable waste reporting, this credit encourages cities to close the material loop and move towards a circular economy.

### Further Explanation

#### Required Documentation

Documentation	Option 1	Option 2
Extended producer responsibility policy	X	
Waste stream audit report, Calculations on quantity (by weight or volume) of non-recyclable waste generated within the city, Report top five major contributing waste producers in the city		X
Narrative describing the top five major contributing producers and the measures identified for safe collection, storage, recycling/ reuse to take back product into the system		X

### Exemplary Performance

This credit is not eligible for exemplary performance.

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<sup>39</sup> What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050 <http://www.worldbank.org/en/topic/urbandevelopment/brief/solid-waste-management> , Accessed on December 17, 2018.

<sup>40</sup> What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050 <http://www.worldbank.org/en/topic/urbandevelopment/brief/solid-waste-management> , Accessed on December 17, 2018.

# MR Credit: Smart Waste Management Systems

This credit applies to

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

## Intent

To improve operational efficiency of the waste management system.

## Requirements

### CITIES, COMMUNITIES

Provide smart waste management systems using any or both of the following to handle a minimum of 20% of the waste generated within the city.

#### Option 1. Pneumatic Transport Systems

- ▶ **Loading Stations** - Public areas and private property with pneumatic transport system will have hatches, called loading stations where the waste will enter the Automatic Waste Collection System (AWCS) pipe network. At this station, a minimum of two pipes one for compostable and another for recyclable waste will run underground.
- ▶ **Transport Network** - Underground transport network will have 19 inch (500 millimeters) diameter pipes coated by 3-layer PE coating. PVC conduits containing both the compressed air conduits and system communication control cables will run parallel to the waste pipes.
- ▶ **Central Waste Handling Facility** - At central waste handling facility all pipes will transfer waste for compacting and an automated software will direct the compacted waste to the proper container, from there to be trucked for recycling.

AND/OR

#### Option 2. Smart Bins and Route Optimization

- ▶ **Sensor Bins** - Ultrasonic sensors installed in municipal bins to guide fill level of waste and a communication system will transfer this information to the cloud for further processing and analysis.
  - Sensor Bins with Radio Frequency Identification (RFID) technology for e-waste: Electronic waste bins installed with ultrasonic sensors and RFID technology to automatically identify and track tags attached to products. The tags containing electrically stored information will exchange information between cloud and trucks for disposal or directly for the waste bins where the information from each bin is conveyed to the cloud and product recycling can be eased.
- ▶ **Route Optimization** - Information analyzed at the cloud will be processed further and sent to waste vehicle operators to optimize the fleet routing for waste collection.

## Guidance

### Behind the Intent

The world is on a trajectory where waste generation will drastically outpace population growth, by more than double, by 2050.<sup>41</sup> Although there are improvements and innovations in solid waste management globally, it is a complex issue requiring urgent action. This credit encourages cities to improve the overall efficiency of waste management systems through a comprehensive smart technologies, such as pneumatic transport systems, cloud-based software connected to Internet of Things (IoT) smart sensors, and smart bin technology.

**Further Explanation**

**Required Documentation**

Documentation	Option 1	Option 2
Total percentage of waste handled by smart waste management systems	X	X
Narrative describing pneumatic transport system, waste handling report	X	
Narrative describing smart bin and route optimization plan, waste handling report	-	X

**Exemplary Performance**

This credit is not eligible for exemplary performance.

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<sup>41</sup> What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050  
<http://www.worldbank.org/en/topic/urbandevelopment/brief/solid-waste-management> , Accessed on December 17, 2018.



# QUALITY OF LIFE (QL)

## QL Prerequisite: Demographic Assessment

### Required

This prerequisite applies to

- ▶ Cities
- ▶ Communities

### Intent

To describe the population demographics and housing characteristics of the area.

### Requirements

#### CITIES, COMMUNITIES

Provide a comprehensive demographic narrative that includes the following population and housing characteristics:

- ▶ Brief history of development, noting critical points of change for the overall area or specific neighborhoods.
- ▶ Age cohorts, including the following categories: Under 18 years, 18 years and over, and 65 years and over.
- ▶ Racial/Ethnic composition. [In the U.S., this must include Black or African American, American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, White alone (not Hispanic or Latino), two or more races, and Hispanic or Latino (of any race).]
- ▶ Other prominent sociocultural groups present, such as migrants, religious groups, and linguistically isolated.
- ▶ Housing market analysis, including total housing units, dwelling units per acre, homeowner vacancy rate, rental vacancy rate, units in structure (including single-unit, duplex, 3 or 4 units, 5 to 9 units, 10 to 19 units, 20 or more units, mobile home, and boat, RV, van, etc.), age of housing (including 2014 or later, 2000 to 2013, 1980 to 1999, 1960 to 1979, 1940 to 1959, and prior to 1939), median value of owner-occupied units, median monthly owner costs, and median rent.

AND

Develop a series of maps (or interactive layers) that provide demographic breakdowns of selected characteristics at the neighborhood or block group scale:

- ▶ Demographic Indicators:
  - Minority population,
  - Low income population,
  - Linguistically isolated,
  - Less than HS Education,
  - Under Age 5, and
  - Over Age 64.
- ▶ Residential density
- ▶ Public Accommodations and Services: Parks, Libraries, Recreation Centers, Schools, Fire Stations, Police Stations, and Healthful retail food outlets

**Guidance  
Behind the Intent**

Every community has different prioritized needs and spatial areas of concern. As a result, a comprehensive assessment of demographics is needed to understand localized needs. This requirement includes the composition of sociocultural groups and distribution of key foundational assets. Disparities in proximity and access to foundational assets are a function of interests represented in past decision-making processes. Inclusion in decision-making (process equity) contributes to more evenness in the spatial distribution of foundational assets (distributional equity), which in turn reduces incidents where future generations inherit negative health, education, and economic outcomes (intergenerational equity). A fundamental attribute of urban sustainability is the ongoing reduction in unevenness in the distribution of foundational assets.

**Further Explanation  
Required Documentation**

Documentation	All cities and communities
Comprehensive demographic narrative describing all of the population and housing characteristics listed in the requirements.	X
Overlay maps or interactive layers highlighting all of the demographic indicators listed in the requirement, residential densities within the city or community, highlighting the public accommodations and services.	X

**Exemplary Performance**

This prerequisite is not eligible for exemplary performance.

# QL Prerequisite: Quality of Life Performance

This prerequisite applies to

- Cities (1-6 points)
- Communities (1-6 points)

## Intent

To track and measure metrics related to elevating the living standards of all people.

## Requirements

### CITIES, COMMUNITIES

Measure all of the Quality of Life parameters below for a minimum period of the most recent calendar year or fiscal year. LEED points are based on city performance in Arc (under Human Experience)<sup>42</sup> combined across four categories – Education, Equitability, Prosperity, and Health and Safety.

#### 1. Education

- ▶ **Population with (at least) a High School Degree** – Percentage of adult population
- ▶ **Population with (at least) a Bachelor’s Degree** – Percentage of adult population

#### 2. Equitability

- ▶ **Median Gross Rent as a % of Household Income**
- ▶ **Gini Coefficient** – A number between 0 and 1

#### 3. Prosperity

- ▶ **Median Household Income** – Median household income in equivalent US dollars
- ▶ **Unemployment Rate** – Percent of population 16 years and over

#### 4. Health and Safety

- ▶ **Median Air Quality Index (AQI)** – A number between 0 and 500<sup>43</sup>
- ▶ **Air Quality Days Unhealthy for Sensitive Groups** – Number of days
- ▶ **Violent Crime** – Per capita<sup>44</sup>

Obtain a minimum Quality of Life Performance score of 40 on Arc. Additional points for this prerequisite are awarded for Quality of Life Performance Scores above 40, according to table below.

**Table 11. Points for Quality of Life Performance**

Quality of Life (or Human Experience) Performance score in Arc	Points
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<sup>42</sup> Refer to Human Experience category on Arc for Quality of Life.

<sup>43</sup> Daily AQI must be based on hourly monitoring of all five major air pollutants - ground-level ozone, PM 2.5, PM 10, carbon monoxide, sulfur dioxide, and nitrogen dioxide.

<sup>44</sup> The Violent Crime Rate is an aggregate per capita measure of the number of homicides (murder and non-negligent manslaughter), forcible rape, robberies, and aggravated assault crimes. Violent Crime is defined differently based on national standards. Therefore, consider the data requested and disaggregate local values as needed to reflect the LEED for Cities’ definition.

40	Prerequisite
50	1
60	2
70	3
80	4
90	5
100	6

## Guidance

### Behind the Intent

Quality of Life covers an array of critical topics, including human health, education, housing, economic conditions, civil rights, and safety. The education metrics focus on literacy and workforce readiness. The equitability metrics consider the affordability of housing and distribution of wealth. The prosperity metrics reflect economic performance and opportunities for upward mobility. Finally, the health and safety metrics look at susceptibility to outdoor air pollution and the impact of violence. Taken together, these metrics reflect the socioeconomic condition of the population living within the jurisdiction.

### Further Explanation

#### Required Documentation

Documentation	All cities and communities
Data for each of the metric in the prerequisite	X
Supporting documentation clearly highlighting the data points in the respective documents	X

### Exemplary Performance

- ▶ Population with (at least) a High School Degree: Greater than or equal to 70%
- ▶ Population with (at least) a Bachelor’s Degree: Greater than or equal to 40%
- ▶ Median Gross Rent as a % of Household Income: Less than or equal to 20%
- ▶ Gini Coefficient: Less than or equal to 0.3
- ▶ Median Household Income: Greater than or equal to 150% of national household income
- ▶ Unemployment rate: Between 3% and 4%
- ▶ Median Air Quality Index (AQI): Zero
- ▶ Air quality Days Unhealthy for Sensitive Groups: Zero
- ▶ Violent Crime per 100,000 population: Equal to or less than 5.5 homicides, 70 incidents of forcible rape, and 462.7 aggravated assaults

# QL Credit: Trend Improvements

This credit applies to

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

## Intent

To demonstrate an improvement over time in key metrics pertaining to a person's quality of life.

## Requirements

### CITIES, COMMUNITIES

Select up to four (4) of the following metrics and demonstrate either an annual improving trend from a baseline year no more than five years prior to the most recent reporting year or achievement of the stated thresholds. One point is available for each metric demonstrating improvement.

- ▶ **Population with a High School Degree** – Portion of population aged 25 years and over who have obtained a high school diploma<sup>45</sup>; Threshold: Equal to or greater than 70%
- ▶ **Graduation Rate** – Portion of school district's initial cohort class graduating from high school (or ISCED level 3)<sup>46</sup>; Threshold: Equal to or greater than 90%
- ▶ **Small Businesses** – Number of businesses having fewer than 500 employees per 1,000 residents<sup>47</sup>; Threshold: Equal to or greater than 20
- ▶ **Unemployment Rate** – Portion of population in the labor market who are not employed<sup>48</sup>; Threshold: Between 3 to 4 percent
- ▶ **Poverty Rate** – Portion of population living below the national poverty line<sup>49</sup>; Threshold: Declining at a rate of zero poverty by 2025
- ▶ **Percentage of household incomes meeting the living wage standard** – Portion of households meeting the living wage for the area<sup>50</sup>; Threshold: Equal to or greater than 80%
- ▶ **Violent Crime** – Incidents of violent crime, weighted by type, per 100,000 people<sup>51</sup>; Thresholds: Equal to or less than 5.5 homicides, 70 incidents of forcible rape, and 462.7 aggravated assaults.

<sup>45</sup> High school degree may include equivalency, such as GED or other certificate of completion

<sup>46</sup> Graduation Rate is the percentage of a school's first-time cohort who completes their program within the published time for the program. The International Standard Classification of Education (ISCED) provides a standard for international comparison of education statistics. A high school degree is equivalent to ISCED level 3. Reference: STAR v2 EAC-3 Educational

<sup>47</sup> Reference: STAR v2 EJ-3 Local Economy Outcome 3

<sup>48</sup> Reference: variation on STAR v2 EJ-1 Business Retention & Development Outcome 2

<sup>49</sup> Reference: STAR v2 EE-6 Poverty Prevention & Alleviation Outcome 1

<sup>50</sup> Consider costs for food, childcare, health, housing, transportation, other necessities and taxes to calculate the living wages. Minimum living wage must be calculated individually for the main family compositions found within the city. Take a weighted average of the living wages to calculate the average minimum living wage for the city. Based on income data, identify the percentage of population meeting the minimum living wage requirement.

<http://livingwage.mit.edu/resources/Living-Wage-User-Guide-and-Technical-Notes-2017.pdf> Reference: STAR v2 EJ-4 Quality Jobs & Living Wages Outcome 2

<sup>51</sup> Violent Crime Rate includes the number of homicides (murder and non-negligent manslaughter), forcible rape, robberies, and aggravated assault crimes. Violent Crime is defined differently based on national standards. Therefore, disaggregate local values as needed to reflect this definition. Incidents should include all reportable offenses in the given area, even if not under the local authority's jurisdiction. Reference: variation on STAR v2 HS-7 Safe Communities Outcome 1

- ▶ **Asthma rate** – Portion of the population aged 18 years and over who have current asthma prevalence; Threshold: None, trend decreasing only
- ▶ **Hypertension** – Portion of the population aged 18 years and over with high blood pressure<sup>52</sup>; Threshold: Non, trend decreasing only
- ▶ **Obesity rate** – Portion of the population aged 18 years and over who have a body mass index (BMI) greater than or equal to 30.0 kg/m<sup>2</sup> <sup>53</sup>; Threshold: Equal to or less than 26%

## Guidance

### Behind the Intent

Given the scale of cities and communities and the variation in their history, culture, and economic condition, understanding how improvement is being made in key indicators is valuable for reflecting on the effectiveness of actions. In this credit, applicants may select up to four key indicators to show demonstrated improvement in the most recent reporting year from a baseline year no more than five years prior. Exemplary performance can be achieved by demonstrating certain thresholds have been met.

In addition to three metrics from the Quality of Life Performance Prerequisite (Population with a High School Degree, Unemployment, and Violent Crime), this credit considers the quality of the school district’s education system, number of small businesses, poverty (United Nation Sustainable Development Goal #1), living wages, asthma, hypertension, and obesity rate.

## Further Explanation

### Required Documentation

Documentation	All cities and communities
Data point or trend line analysis for each of the selected metric	X
Supporting documentation clearly highlighting the data point in the respective documents	X

### Exemplary Performance

- ▶ Population with a High School Degree – Threshold: ≥ 70%
- ▶ Graduation Rate – Threshold: ≥ 90%
- ▶ Small Businesses – Threshold: ≥ 20 per 1,000 residents
- ▶ Unemployment Rate – Threshold: Between 3% to 4%
- ▶ Poverty Rate – Threshold: Declining at a rate of zero poverty by 2025
- ▶ Percentage of household incomes meeting the living wage standard – Threshold: ≥ 80%
- ▶ Violent Crime per 100,000 population – Thresholds: ≤ 5.5 homicides, 70 incidents of forcible rape, and 462.7 aggravated assaults
- ▶ Asthma rate: Not eligible for exemplary credit.
- ▶ Hypertension: Not eligible for exemplary credit.
- ▶ Obesity rate – Threshold: ≤ 26%

<sup>52</sup> This metric may also be reported as “Poor or fair health”. Reference: variation on HS-2 Community Health Outcome 1

<sup>53</sup> Reference: variation on HS-2 Community Health Outcome 2

# QL Credit: Distributional Equity

This credit applies to

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

## Intent

To foster equitable economic prosperity and expand access to community services to all.

## Requirements

### CITIES, COMMUNITIES

#### **Option 1. Equitable Per Capita Income (1 point)**

Demonstrate the median earnings of males and females is not less than 5 percentage points of the total median earnings and that the disparity of income per capita amongst identified sociocultural groups is not greater than 5 percentage points.

Reference:

Variation on STAR v2 EE-6 Poverty Prevention & Alleviation Outcome 2

AND/OR

#### **Option 2.**

##### **Equitable Workforce Mobility (1 point)**

Demonstrate that the post-secondary educational attainment of the population aged 25 and older in the subcategories of male, female, and identified sociocultural groups is not less than 5 percentage points of the overall post-secondary educational attainment. Post-secondary educational attainment includes high-quality credentials and associate, bachelor, and graduate/professional degrees.

Reference:

STAR v2 EJ-6 Workforce Readiness Outcome 3

OR

##### **Graduation Rate Equity (1 point)**

Demonstrate that the high school graduation rate (or ISCED level 3) for the subcategories of male, female, and identified sociocultural groups is not less than 5 percentage points of the overall graduation rate for the district.

Reference:

STAR v2 EAC-3 Educational Opportunity & Attainment Outcome 4

AND/OR

#### **Option 3. Equitable Employment (1 point)**

Demonstrate that the unemployment rate for the subcategories of male, female, and identified sociocultural groups is not less than 5 percentage points of the overall unemployment rate.

Reference:  
STAR v2 EJ-1: Business Retention & Development Outcome 3

AND/OR

**Option 4. Access & Proximity (1 point)**

Demonstrate that community facilities, such as parks, libraries, recreation centers, and schools, and healthful retail food outlets are as accessible to low-income residents as they are to the broader community. Density is based on the number of dwelling units per acre. Use Network Analyst to identify walkability routes and the density category to select the appropriate walk distance requirement for the buffered area.

Table 12. Points for Access and Proximity

Dwelling Units per Acre	Density Category	Walk Distance Requirement
12+	High	¼ mile (400 meters)
7-11	Intermediate	¾ mile (1200 meters)
<7	Intermediate-low or Low	1 mile (1600 meters)

Reference:  
STAR v2 EE-4 Equitable Services & Access Outcome 1

**Guidance Behind the Intent**

This credit considers both access and proximity to foundational assets as well as intergenerational equity that has resulted from past decision-making. The reported data considers the relative achievement of different sociocultural groups to the population as a whole and highlights significant gaps that need to be addressed. Addressing these issues now will strengthen quality of life for future generations and their ability to thrive.

Where applicable, use the same sociocultural groups as identified in the Demographic Assessment Prerequisite.

**Further Explanation Required Documentation**

Documentation	Equitable Per Capita Income	Equitable Workforce Mobility	Graduation Rate Equity	Equitable Employment	Access & Proximity
Calculations demonstrating achievement of the point threshold	X	X	X	X	
Supporting documentation clearly highlighting the data	X	X	X	X	



points in the respective documents					
Narrative describing equitable access and proximity to the listed social infrastructure					
Master plan highlighting walk distances from dwelling units the listed social infrastructure for an overall zone and one low-income zone.					X

**Exemplary Performance**

- ▶ This prerequisite is not eligible for exemplary performance.

# QL Credit: Environmental Justice

This credit applies to

- ▶ Cities (1 point)
- ▶ Communities (1 point)

## Intent

To address conditions that may lead to neighborhoods or populations being overburdened by environmental pollutants.

## Requirements

Demonstrate progress in reducing the risks and exposure to priority environmental justice conditions for priority areas in the last 5 years.

- ▶ Identify the priority environmental justice conditions.  
Priority environmental justice conditions are considered when a specific section of the community such as women and/or children, low-income groups, specific neighborhoods or sociocultural groups experience a disproportionate amount of human health or environmental effect, such as:
  - Bodily impairment, infirmity, illness or death
  - Air, noise, and water pollution and soil contamination
  - Destruction or disruption of man-made or natural resources
  - Destruction or disruption of community cohesion or a community's economic vitality
  - Destruction or disruption of the availability of public and private facilities and services
  - Displacement of persons, businesses, farms, or nonprofit organizations
  - Isolation, exclusion, or separation from the broader community

The scope of environmental justice includes not only the disparate impacts from degradation to the natural environment, but impacts to the general environment that people live and work in as well.

- ▶ Identify the priority areas.  
Priority areas must be identified based on evaluating the following:
  - Sections with the highest percentage of historically overburdened populations
  - Areas known to have the highest concentration of environmental pollutants or polluters
  - Areas identified through substantial community engagement or complaints surrounding environmental justice conditions
  - Areas currently in violation of state environmental regulations or where violations have been resolved within the last 3 years

Reference:

STAR v2 EE-3: Environmental Justice

## Guidance

### Behind the Intent

Environmental justice (EJ) is rooted in the belief that all people, regardless of race, ethnicity, gender, or income, have the right to a clean and healthy environment in which to live, work, study, play, and pray. While the definition of environmental justice varies, most definitions include three elements: distribution, procedure, and process. This credit focuses on distributional EJ. Distributional EJ refers to the unequal spatial allocation of environmental burdens across a community, resulting in lasting negative social, environmental, economic, and public health impacts in certain neighborhoods or communities and not others. Examples include the unequal siting of industrial emitters, unequal proximity to high-volume roadways, or unequal exposure to toxics at worksites.

Procedural EJ and process EJ are addressed in the credits for Civic and Community Engagement and Civil and Human Rights.

**Further Explanation**

**Required Documentation**

Documentation	All cities and communities
Narrative describing the identification of the priority environmental justice conditions, priority areas and values of risk reduction to environmental justice conditions in priority areas in the last five years.	X

**Exemplary Performance**

This credit is not eligible for exemplary performance.

# QL Credit: Housing and Transportation Affordability

This credit applies to

- ▶ Cities (1-2 points)
- ▶ Communities (1-2 points)

## Intent

To provide an adequate and diverse supply of location-efficient and affordable housing options for all.

## Requirements

### CITIES, COMMUNITIES

Demonstrate the delivery of high quality homelessness services related to short-term emergency shelter options and permanent housing solutions in coordination with non-governmental service providers.

Reference:

Adaptation on STAR v2 EE-5 Human Services Outcome 1 and Action 8

AND

Option 1. Adopt a comprehensive housing policy that addresses the following elements (1 point)

- Higher density (12 DU per acre) within ¼ mile (400 meters) of walking distance to public transit stations;
- A housing needs assessment addressing housing supply affordability, diversity of housing stock by unit and ownership type, and community demographics;
- Programs or code enforcement ensuring healthy housing standards for both rental and owner-occupied units; and
- Evaluation of existing area conditions to identify whether a family of four with an income at 200% national poverty level could afford to live with less than 45% housing plus transportation costs or zoning ordinances requiring at least 10% of units are affordable in transit-served areas and areas identified for compact, mixed-use development.

References:

Adaptation on STAR v2 BE-3 Compact & Complete Communities Action 4

BE-4 Housing Affordability Actions 1 & 2

HS-2 Community Health Action 5

AND/OR

Option 2. Demonstrate that at least 60% of households, compared to the National Typical, would spend less than 45% on housing and transportation combined. (1 point)

Reference:

Adaptation on STAR v2 BE-4 Housing Affordability Outcome 1

**Guidance  
Behind the Intent**

The purpose of this credit is to construct, preserve, and maintain an adequate and diverse supply of location-efficient and affordable housing options for all residents, including addressing the needs of people who are lower-income or experiencing homeless. Rising housing prices are a challenge facing many areas, especially those that have had success in building vibrant, economically-thriving neighborhoods and downtowns. Without targeted strategies, affordable areas become too expensive for low- and moderate-income households, potentially forcing them to seek less expensive housing on the urban fringe. This leads to a “drive-till-you-qualify” phenomenon resulting in much higher transportation costs for individuals and families, as well as worsening traffic, air pollution, climate change, and negative impacts to public health and quality of life.

Cities are required to measure affordability in both housing and transportation costs at the neighborhood level. Affordable housing professionals have traditionally used a standard of 30% of household income for housing costs, plus 15% of household income for transportation costs.

**Further Explanation  
Required Documentation**

Documentation	Option 1	Option 2
Narrative describing delivery of high-quality homelessness services for short-term emergency and permanent housing solutions in coordination with non-governmental service providers.	X	X
Comprehensive housing policy including specified elements	X	
Percentage of households spending less than 45% on housing and transportation combined.		X

**Exemplary Performance**

This credit is not eligible for exemplary performance.

# QL Credit: Civic and Community Engagement

This credit applies to

- ▶ Cities (1-2 points)
- ▶ Communities (1-2 points)

## Intent

To promote a cohesive, and socially connected community and facilitate their participation in local decision-making.

## Requirements

### CITIES, COMMUNITIES

Demonstrate both high-tech and high-touch on-going engagement techniques that empower the public in shaping the future of the community.

AND

Demonstrate that public engagement techniques include practices that intentionally and directly engage all residents, including traditionally unrepresented or underrepresented groups, through inclusive, context-sensitive, and transparent decision-making processes.

Reference:  
STAR v2 IP-1 Best Practices & Processes (2)

AND

Attempt any of the following options for a maximum of 2 points:

Option 1. Demonstrate that appointments to local advisory boards and commissions reflect the gender, racial, and ethnic diversity of the area. (1 point)

Reference:  
STAR v2 EE-1 Civic Engagement Outcome 3

AND/OR

Option 2. Demonstrate that 51% or more of residents believe they are able to have a positive impact on their community based on a local survey. (1 point)

Reference:  
STAR v2 EE-1 Civic Engagement Outcome 2

AND/OR

Option 3. Demonstrate that at least 80% of residents report positive levels of neighborhood cohesion based on a local survey. (1 point)

Reference:  
STAR v2 EAC-2 Community Cohesion Outcome 3

AND/OR

Option 4. Demonstrate that at least 30% of residents in large jurisdictions or 35% of residents in small or mid-sized jurisdictions volunteered in the past year. (1 point)

Reference:  
STAR v2 EAC-2 Community Cohesion Outcome 2

**Guidance  
Behind the Intent**

Local governments and development authorities continually make decisions, expenditures, and investments that affect community sustainability. The strength of local decision-making is informed by community input, public planning efforts, regulations, and internal coordination across departments and agencies.

For this credit, applicants must demonstrate a combination of high-tech (digital) and high-touch (direct engagement) techniques utilized to engage all residents. Points are credited based on achievement of up to two of four additional options: diverse community representation, sense of empowerment, cohesion and connectedness, and volunteerism rate.

**Further Explanation  
Required Documentation**

Documentation	All cities and communities	Option 1	Option 2	Option 3	Option 4
Narrative describing high-tech and high-touch on-going public engagement techniques and explaining actions undertaken to intentionally and directly engage with diverse groups of residents.	X				
Overall percentage of male, female, and sociocultural groups in the city or community.		X	X	X	X
Percentage of male, female, and sociocultural groups appointed to local advisory boards and commissions.		X			
Supporting documentation clearly highlighting the data points		X			X
Narrative describing the local survey and the response rates.			X	X	
Calculations demonstrating achievement of the point threshold.			X	X	X

**Exemplary Performance**

This credit is not eligible for exemplary performance.

# QL Credit: Civil and Human Rights

This credit applies to

- ▶ Cities (1 point)
- ▶ Communities (1 point)

## Intent

To uphold a process that ensures the civil and human rights of all people is fundamental.

## Requirements

### CITIES, COMMUNITIES<sup>54</sup>

- ▶ Adopt a policy-based mission statement to promote a discrimination free quality of life for all relating to employment, housing, and public accommodations on the basis of race, sex, color, religion, national origin, disability, age, sexual orientation, marital status or familial status and gender identity or expression.

Reference:

STAR v2 EE-2 Civil & Human Rights Action 2

- ▶ Describe initiatives and policies that ensure the voting rights of all eligible voters are protected.
- ▶ Integrate community policing and procedural justice into police department operations to support and build trust with residents.

Reference:

STAR v2 HS-7 Safe Communities Action 7

- ▶ Have in place a local officer or Commission on Human Rights who is responsible for:
  - formulating and carrying out educational programs designed to minimize or eliminate discriminatory practices;
  - receiving and investigating complaints alleging any discriminatory practices by police or non-police;
  - providing mediation services to resolve incidences of alleged discriminatory practices; and
  - publishing an annual report detailing any issues, complaints, and other activities;
  - advising leadership on human rights issues.

Reference:

Adaptation of STAR v2 EE-2 Civil & Human Rights Actions 3 and 5

## Guidance

### Behind the Intent

A report by the United Nations Human Rights Council concluded that local governments can enable the enjoyment of human rights by all through the fulfillment of three duties: respecting human rights by not

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<sup>54</sup> Communities may include city level officers accessible to the community residents to demonstrate achievement of this credit.



violating those rights through government actions; protecting human rights by ensuring no third parties violate individual rights and freedoms; and fulfilling human rights by taking positive action to facilitate the enjoyment of those rights.

This credit requires implementation of all four actions: adoption of a local comprehensive equal opportunity policy applicable to employment, housing, and public accommodations; activities to ensure voting rights; community policing<sup>55</sup> and procedural justice initiatives; and an entity responsible for accountability for human rights. These actions must reflect a deep understanding of civil and human rights at the local level and the practices that best meet the needs of the population.

**Further Explanation  
Required Documentation**

Documentation	All cities and communities
Policy-based mission statement that promotes a discrimination free quality of life for all.	X
Narrative describing initiatives and policies that ensure the voting rights of all eligible voters are protected.	X
Narrative describing how community policing and procedural justice are integrated into police department operations.	X
Declaration from the owner or agent confirming the capacity and responsibility of either a local officer on Human Rights or Commission on Human Rights	X

**Exemplary Performance**

This credit is not eligible for exemplary performance.

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<sup>55</sup> Community policing is defined as policing strategy that focuses on the ties between police and members of the community ( p.457, Technical Guide to the STAR Community Rating System Version 2.0)

# INNOVATION (IN)

## IN Credit: Innovation

This credit applies to

- ▶ Cities (1-6 points)
- ▶ Communities (1-6 points)

### Intent

To encourage cities to achieve exceptional or innovative performance.

### Requirements

#### CITIES, COMMUNITIES

One point is awarded for each Innovation credit achieved, up to a maximum of six. A city or community may use any combination of the options below. Each option is equivalent to one point.

**Option 1.** Achieve significant, measurable environmental performance using a strategy not addressed in the LEED for Cities and Communities rating system.

Identify all of the following:

- ▶ Intent of the proposed innovation credit
- ▶ Proposed requirements for compliance
- ▶ Proposed submittals to demonstrate compliance
- ▶ Design approach or strategies used to meet the requirements.

AND / OR

**Option 2.** Achieve exemplary performance in any of the LEED for Cities and Communities prerequisite or credit. An exemplary performance point is typically earned for achieving double the credit requirements or the next incremental percentage threshold.

AND / OR

**Option 3.** Meet all of the requirements of a prerequisite or credit from any of the below rating systems at the city or utility level:

- STAR Community Rating System v2, October 2016
- PEER Rating System v2, February 2018
- LEED v4 Transit, November 2018

### Guidance

**Behind the intent**

Sustainable design is spurred forward by innovative strategies, as well as exceptional efforts that go beyond minimum thresholds. When cities innovate and go beyond LEED requirements, they not only achieve measurable environmental benefits beyond those specified by the LEED rating system, but also have the opportunity to explore cutting-edge pilot credits and contribute to the development of future LEED credits. When cities or communities can demonstrate that they exceeds the standard level of performance associated with one or more LEED credits, their innovation can inspire and motivate other teams in the future.

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

Documentation	Option 1	Option 2	Option 3
Credit write up including intent of the proposed innovation credit, proposed requirements for compliance and proposed submittals to demonstrate compliance	X		
Documentation to support the design approach or strategies used to meet the requirements	X		
Identify the LEED for Cities and Communities prerequisite or credit for exemplary performance		X	
Identify the credit and provide all supporting documentation as per the specific rating system prerequisite or credit requirement			X

# REGIONAL PRIORITY (RP)

## RP Credit: Regional Priority

This credit applies to

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

### Intent

To provide an incentive for the achievement of credits that address geographically specific socio-economic and environmental priorities.

### Requirements

#### CITIES, COMMUNITIES

**Option 1.** One point is awarded for each Regional Priority credit achieved, up to a maximum of four.

- ▶ Identify the credit which is a regional priority.
- ▶ Provide Background and context outlining the regional priority.
- ▶ Achieve the full points for respective LEED for Cities and Communities credit.

AND/OR

**Option 2.** Achieve significant, measurable environmental performance for a regional priority using a strategy not addressed in the LEED for Cities and Communities rating system.

Identify all of the following:

- ▶ Intent of the proposed regional priority credit
- ▶ Provide Background and context outlining the regional priority.
- ▶ Proposed requirements for compliance
- ▶ Proposed submittals to demonstrate compliance
- ▶ Design approach or strategies used to meet the requirements.

### Guidance

#### Behind the Intent

LEED projects are designed, built, and operated in many different contexts. Climate, population density, and local regulations can differ significantly from one location to another, making certain environmental issues more critical than others. Examples include water conservation in arid climates versus rainwater management in wet climates. LEED projects can be more transformative if teams recognize their location's priority environmental issues and address them through design, construction, and operation choices. LEED encourages a focus on regional issues through Regional Priority credits—existing LEED credits that USGBC volunteers around the world have determined to be especially important in a given area and result in a bonus point if achieved.

### Further Explanation

#### Required Documentation

Documentation	Option 1	Option 2
Narrative providing background and context outlining the regional priority for the identified credit.	X	

Credit write up including intent of the proposed innovation credit, proposed requirements for compliance and proposed submittals to demonstrate compliance		X
Narrative providing background and context outlining the regional priority for the identified credit.		X
Documentation to support the design approach or strategies used to meet the requirements		X

# Appendices

## APPENDIX 1. DIVERSE USES

### List of Diverse Uses

Category	Use type
Food retail	Supermarket
	Grocery with produce section
Community-serving retail	Convenience store
	Farmers market
	Hardware store
	Pharmacy
	Other retail
Services	Bank
	Family entertainment venue (e.g., theater, sports)
	Gym, health club, exercise studio
	Hair care
	Laundry, dry cleaner
	Restaurant, café, diner (excluding those with only drive-thru service)
Civic and community facilities	Adult or senior care (licensed)
	Child care (licensed)
	Community or recreation center
	Cultural arts facility (museum, performing arts)
	Education facility (e.g., K–12 school, university, adult education center, vocational school, community college)
	Government office that serves public on-site
	Medical clinic or office that treats patients
	Place of worship
	Police or fire station
	Post office
	Public library
	Public park
	Social services center
Open community spaces such as squares and plazas	

## APPENDIX 2. LT CREDIT: INTERMODAL CONNECTIVITY AND PLACEMAKING

(LEED v4 BD+C TRANSIT)

1-4 points

### Intent

To encourage development in locations shown to have multimodal transportation choices or otherwise reduced motor vehicle use, thereby reducing greenhouse gas emissions, air pollution, and other environmental and public health harms associated with motor vehicle use.

### Requirements

#### Option 1. Transit for Placemaking

Ensure that the station displays characteristics that will integrate a mixture of uses to connect people and places and maximize utilization (1-3 points)

- ▶ Walkable Streets
- ▶ Compact Development
- ▶ Public Spaces and Cultural Opportunities
- ▶ Mixed Use

Table 1. Points for Placemaking Characteristics

Number of placemaking characteristics displayed by station	Points
1 characteristics	1
2 characteristics	2
3-characteristics	3
4-characteristics	4

### AND/OR

#### Option 2. Transit for People-moving: Intermodal Connections (1-4 points)

Ensure that the station is connected to three or more other modes of transportation and includes at least 3 of 8 of the following intermodal connectivity features:

- ▶ Three or more bus routes at station
- ▶ Minimum of four short-term bicycle storage spaces at station
- ▶ Minimum two long-term bicycle storage spaces or valet at station or policies to allow bicycles on transit systems
- ▶ Vehicle parking at station with carpool services provided
- ▶ Airport within one connection and total transit travel time of less than . . . 1.5 hours

- ▶ Regional or commuter rail within one connection and total transit travel time of less than . . . 1 hour
- ▶ Ferry within one connection
- ▶ Designated passenger drop off area

Table 2. Points for intermodal connections

Number of modal connections offered at station	Points
3 connections	1
4 connections	2
5 connections	3
6+ connections	4



## APPENDIX 3. SLL CREDIT: BROWNFIELD REMEDIATION

(LEED v4 ND)

### 1-2 points

This credit applies to

- ▶ Neighborhood Development Plan
- ▶ Neighborhood Development

### Intent

To encourage the cleanup of contaminated lands and developing sites that have been identified as contaminated.

### Requirements

#### ND PLAN, ND (SLL)

#### Option 1. Brownfield Site (1 point)

At a project site identified as a brownfield or where soil or groundwater contamination has been identified, and the local, state, or national authority (whichever has jurisdiction) requires its remediation, perform remediation to the satisfaction of that authority.

OR

#### Option 2. High-Priority Redevelopment Area (2 points)

Achieve the requirements in Option 1.

AND

Locate the project in one of the following high-priority redevelopment areas:

- ▶ EPA National Priorities List
- ▶ Federal Empowerment Zone
- ▶ Federal Enterprise Community
- ▶ Federal Renewal Community <sup>56</sup>

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<sup>56</sup> The equivalent programs previously in the criteria (Empowerment Zones, Enterprise Community sites, and Renewal Community sites) have been superseded by Opportunity Zones and Promise Zones due to updated U.S. tax legislation. Reference existing standards, with the following modification:

- ▶ **U.S. Department of Housing and Urban Development, Federal Promise Zones:**  
<https://www.hudexchange.info/programs/promise-zones/>
- ▶ **U.S. Department of the Treasury, Qualified Opportunity Zones:**  
<https://www.cdfifund.gov/Pages/Opportunity-Zones.aspx>

- ▶ Department of the Treasury Community Development Financial Institutions Fund Qualified Low-Income Community (a subset of the New Markets Tax Credit Program)
- ▶ U.S. Department of Housing and Urban Development's Qualified Census Tract (QCT) or Difficult Development Area (DDA)
- ▶ Or a local equivalent program administered at the national level for projects outside the U.S.