

Linking LCA and SDG 11

Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable

Date: 21 April 2023

Version: 2

Commissioned by: UNEP Life Cycle initiative and contributing companies

Prepared by: PRé Sustainability
Mark Goedkoop
Ellen Meijer
Rosan Harmens

About PRé

For thirty years PRé has been at the forefront of life cycle thinking and has built on its knowledge and experience in sustainability metrics and impact assessments to provide state of the art methods, consulting services and software tools. Internationally, leading organizations work with PRé to integrate sustainability into their product development procedures in order to create business growth and business value. PRé has an office in the Netherlands and a global partner network to support large international or multi-client projects.

Get in touch with us

Do you have a sustainability challenge for us? We would be happy to discuss it together.

PRé Sustainability B.V.

Stationsplein 121

3818 LE Amersfoort

The Netherlands

T +31 33 455 50 22

E consultancy@pre-sustainability.com

W pre-sustainability.com

PRé Sustainability is a trade mark, held by © PRé Sustainability B.V., Amersfoort, The Netherlands. All rights reserved. All trademarks acknowledged. PRé Sustainability B.V. is fully and privately owned by the management and registered with the Dutch Chamber of Commerce (Amersfoort) under number 32099599.

Table of contents

11	Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable	4
11.1	Introduction	4
11.2	Targets and indicators of SDG 11	4
11.3	Classifying the links between SDG targets and LCA impact categories	6
11.3.1	Overview of links	10
11.4	Characterizing the relation between LCA and SDG 11	10
11.4.1	Environmental LCA	11
11.4.2	Social LCA	12
11.5	Scoring matrix for SDG 11	12

11 Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable

11.1 Introduction

SDG 11 refers to Making cities and human settlements inclusive, safe, resilient and sustainable. The UN SDG website mentions the following facts and figures¹:

- Half of humanity – 3.5 billion people – lives in cities today and 5 billion people are projected to live in cities by 2030.
- 95 per cent of urban expansion in the next decades will take place in developing world
- 883 million people live in slums today and most of them are found in Eastern and South-Eastern Asia.
- The world's cities occupy just 3 per cent of the Earth's land, but account for 60-80 per cent of energy consumption and 75 per cent of carbon emissions.
- Rapid urbanization is exerting pressure on fresh water supplies, sewage, the living environment, and public health
- As of 2016, 90% of urban dwellers have been breathing unsafe air, resulting in 4.2 million deaths due to ambient air pollution. More than half of the global urban population were exposed to air pollution levels at least 2.5 times higher than the safety standard.

11.2 Targets and indicators of SDG 11

Within the targets and indicators of SDG 11, there is much focus on urban planning and development. The SDG seems especially relevant for organisations that provide services in this area, or deliver solutions for building transport and other services. The targets refer to quite a wide range of issues, like providing safe and affordable housing, green surfaces and transport, as well as reducing environmental impacts and disasters.

¹ <https://sustainabledevelopment.un.org/sdg11>

Table 1. The targets and indicators defined for SDG 11

Target	Indicator
11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums	11.1.1 Proportion of urban population living in slums, informal settlements or inadequate housing
11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons	11.2.1 Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities
11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries	11.3.1 Ratio of land consumption rate to population growth rate
	11.3.2 Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically
11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage	11.4.1 Total expenditure (public and private) per capita spent on the preservation, protection and conservation of all cultural and natural heritage, by type of heritage (cultural, natural, mixed and World Heritage Centre designation), level of government (national, regional and local/municipal), type of expenditure (operating expenditure/investment) and type of private funding (donations in kind, private non-profit sector and sponsorship)
11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations	11.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
	11.5.2 Direct economic loss in relation to global GDP, damage to critical infrastructure and number of disruptions to basic services, attributed to disasters
11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by	11.6.1 Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities

paying special attention to air quality and municipal and other waste management	11.6.2 Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)
11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities	11.7.1 Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities
	11.7.2 Proportion of persons victim of physical or sexual harassment, by sex, age, disability status and place of occurrence, in the previous 12 months
11.a Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning	11.a.1 Proportion of population living in cities that implement urban and regional development plans integrating population projections and resource needs, by size of city
11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels	11.b.1 Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015–2030
	11.b.2 Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies
11.c Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials	11.c.1 Proportion of financial support to the least developed countries that is allocated to the construction and retrofitting of sustainable, resilient and resource-efficient buildings utilizing local materials

11.3 Classifying the links between SDG targets and LCA impact categories

Target 11.1

“By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums.”

Environmental LCA:

- No links

Social LCA:

- **2.5 Inclusiveness (Users):** companies that deliver housing and components that are designed to be more affordable compared to current solutions, can claim a contribution.
- **3.2 Access to tangible resources (Local communities):** upgrading of slums may not directly mean providing new houses, but if companies deliver goods or services, such as: access to transport, sanitation, energy and water, this may be seen as a way to upgrade slums, even while the slums were not the prime focus of a development project. On the other side, companies that contribute to clearing slums for real estate development or for instance roads, are clearly creating a negative impact, if they do not provide an alternative and/or upgraded place to stay.

Target 11.2

"By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons."

Environmental LCA:

- No links

Social LCA:

- **2.5 Inclusiveness (Users):** companies that deliver transport systems and component that are designed to be more affordable compared to current solutions, can claim a contribution. In this case affordable does not only relate to the costs, but also to the accessibility by people in vulnerable situations.

In this case we cannot really refer to the local communities as most transport systems are to be used by entire communities, and they are not just designed to serve a specific group of people as in the case of housing development.

Target 11.3

"By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries."

This target can refer to service providers such as architects and urban planning specialist, who can contribute with new innovative ideas. It is however rather hard to link this to specific social or environmental LCA topics.

Environmental LCA:

- No links

Social LCA:

- No links

Target 11.4

"Strengthen efforts to protect and safeguard the world's cultural and natural heritage."

In the first place the responsibility for protecting cultural and natural heritage lies with national and local governments. Some technologies and product solutions can be essential in preserving old monuments against decay and help restoring the monuments. For this very specific solutions some companies could consider their product to be contributing. However, in most cases this will refer to technologies such as wood preservatives, paints etc., which will most likely not be especially be developed for preserving cultural heritage. Therefore we do not link this target to a specific topic for such solutions.

Environmental LCA:

- No links

Social LCA:

- No links

Target 11.5

“By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations.”

Product and services that significantly contribute to reducing the impacts from disasters, for instance by protecting against floodwater, can claim a contribution to this SDG, provided that there is evidence that such solutions are effective in reducing the impact (or death) of people, provided such solutions are inclusive to poor people in vulnerable situations.

Environmental LCA:

- No links

Social LCA:

- **2.5 Inclusiveness (Users).** If disaster protection solutions are clearly and explicitly designed to protect the most vulnerable people against the impacts of disasters, this can count as contribution.

Target 11.6

“By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.”

This target clearly refers to the environmental impact categories related to Particulate Matter, Ozone Formation and Terrestrial toxicity.

Environmental LCA:

- **Particulate Matter.** The presence of particulate matter in the air directly affects air quality.
- **Ozone formation.** The presence of ozone in the air directly affects air quality.
- **Eco toxicity, terrestrial.** In most inventory databases a distinction is made between emissions that occur in high population density area's and low population density areas.

For this target, only the high population emissions should be counted, but if this is not possible, all emissions can be used.

The target also refers to the minimising solid waste generation. Generating solid waste is not an impact category in environmental LCA, and not easy to link to the social LCA topics. Topic 2.6 on effectiveness and comfort comes closest, as creating much waste can be seen as a not so effective solution. However, we think this relationship is too indirect, and therefore it is not included in the links.

Social LCA:

- No links

Target 11.7

“By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities.”

This target is mostly relevant for national, regional and local governments, as the primary issue is to reserve space, product solutions play a relatively minor role, as it will often refer to services to prepare the soil, provide plants fences and some roads. Whether such spaces become accessible to vulnerable groups is most likely also not determined or influenced by companies delivering such solutions.

Environmental LCA:

- No links

Social LCA:

- No links

11.3.1 Overview of links

In Figure 1 the overview of the links between LCA impact categories and SDG 11 is shown.

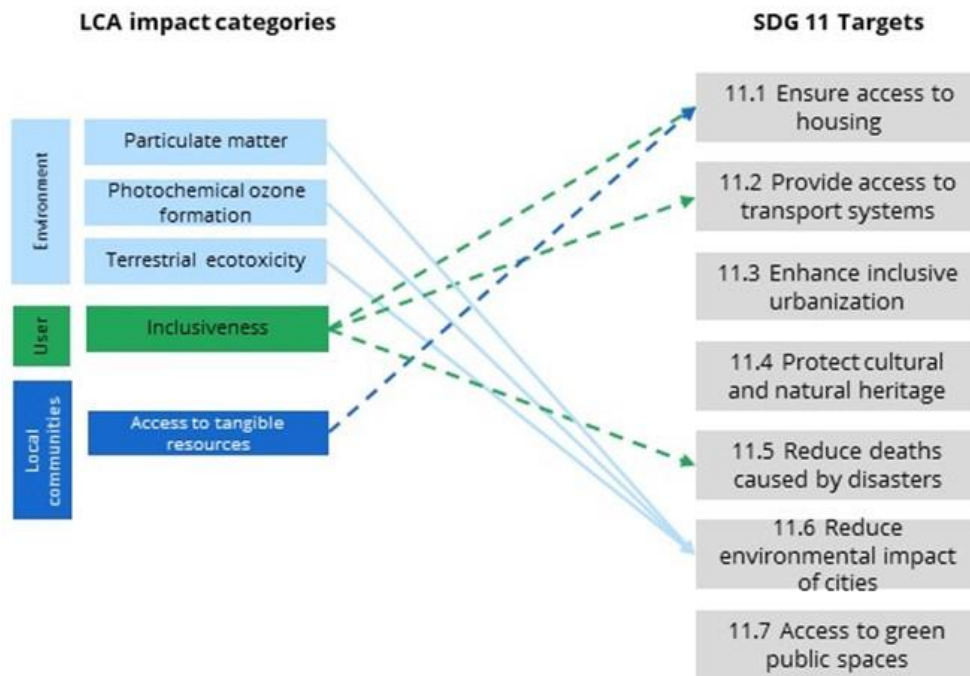


Figure 1 Overview of links between LCA impact categories and SDG targets for SDG 11

11.4 Characterizing the relation between LCA and SDG 11

In this paragraph, the nature of the relation between the impact categories and the targets of SDG 11 are defined. This step determines the score needed to qualify as a contribution to a target, per target and impact category. The first section describes how environmental impact category indicator results can be linked; the second section does the same for social metrics.

11.4.1 Environmental LCA

Table 11.2 environmental topic linking to SDG 11

LCA impact category	Rationale	Requirements to be counted as a contribution to SDG 11	
Particulate Matter	SDG target 11.6	+2	The environmental impact is a lot lower than the reference product (>10%)
		-2	The environmental impact is a lot higher than the reference product (> 10%)
Photochemical ozone formation	SDG target 11.6	+2	The environmental impact is a lot lower than the reference product (>10%)
		-2	The environmental impact is a lot higher than the reference product (> 10%)
Eco toxicity, terrestrial	Target 11.6. As far as feasible, only the impact from emissions from high population density area's should be included	+2	The environmental impact is a lot lower than the reference product (>10%)
		-2	The environmental impact is a lot higher than the reference product (> 10%)

11.4.2 Social LCA

Table 11.3: Social topic linking to SDG 11

	Social topics	Rationale	Requirements to be counted as a contribution to SDG 11
User	2.5 Inclusiveness (user)	Target 11.1 and 11.2 focus on equitable access to transport and housing, including upgrading slums. Access does not only refer to costs, but in the case of transport also other barriers for vulnerable groups, that prohibit them from using the services.	+2 The solution offered by the company is designed and marketed with the clear objective to give the most vulnerable groups in a society access to essential products and services at considerably lower costs than traditional solutions.
		Target 11.5 focusses on disaster protection. Solutions that are clearly and explicitly designed to protect the most vulnerable people against the impacts of disasters, can count as contribution.	+1 The solution offered by the company is designed and marketed to give all users access to essential products and services, including some of the vulnerable groups in a society.
Local communities	3.2 access to tangible resources	Target 11.1 is connected to upgrading the situation of people who benefit or incur detrimental consequences of housing and other urban development projects;	+2 The company or facility has a PDCA programme in place to address the local community's access to tangible resources (beyond the requirements set in the local laws). Commitments, performance, improvements and effectiveness of programmes are disclosed publicly.
			-2 Incidents of actual damage, adverse impacts or risks to the community's access to tangible resources have been discovered, but a corrective action plan with a timeline for completion has not been developed.

11.5 Scoring matrix for SDG 11

Based on the tables above, the following summary can be made as a checklist for determining if the LCA results can support a contribution to SDG 11.

Asterisk (*) represents a link that is established under specific condition outlined under the target.

Underlined topics represent those that are deemed critical by the SDG Assessment methodology.

Table 11.4: Scoring matrix for determining whether the LCA results can indeed support SDG 11

SDG 11	Blocking	Contributing	
Target 11.1			
2.5 Inclusiveness*		+1	+2
3.2 Access to tangible resources*	-2		+2
Target 11.2			
2.5 Inclusiveness*		+1	+2
Target 11.3			
n/a			
Target 11.4			
n/a			
Target 11.5			
2.5 Inclusiveness*		+1	+2
Target 11.6			
Eco toxicity, terrestrial*	-2		+2
Particulate matter	-2		+2
Photochemical ozone formation	-2		+2
Target 11.7			
n/a			