

Linking LCA and SDG

9

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation



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9 Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

9.1 Introduction

Economic growth, social development and climate action are heavily dependent on investments in infrastructure, sustainable industrial development and technological progress. With a rapidly changing economic landscape, sustained growth is vital to make opportunities accessible and support innovation and resilient infrastructure (UN, 2021a).

Basic infrastructure such as road, information and communications technologies, sanitation, electrical power and water are scarce in some developing countries. Approximately 1.2 billion people do not have access to reliable phone services. 2.3 billion people worldwide lack access to basic sanitation and almost 800 million lack access to water.

This goal is important because the growth of industry improves standards of living and should this be carried out sustainably, it can have a positive effect on the environment as well (UN, 2021a). The real GDP increased by 4.8% in 2019 and is estimated to be in decline due to the COVID-19 pandemic. Prior to the pandemic, the informal economy represented about 60.2% of global employment. This is characterized by a lack of basic protection and social protection coverage which leaves this workforce vulnerable to exploitation.

In 2019, more than one in five youth were not employed, being educated not in training.

Global tourism GDP increased at a higher rate than the rest of the economy before 2019, this represents 4.1% of the global GDP compared to the 3.7% in 2008. However this will be one the most difficult sector to recover during the pandemic years.

From 2018 to 2020, 25 countries in Africa, Asia, South America, Central Asia and the Middle East almost three fifths of rural dwellers lacked good access to roads.

Manufacturing in lower developed countries is expected to grow by a negligible 1.2% in 2020 compared to the 8.7% in 2019. This rate is too slow to reach the target of doubling the industry's share in GDP by 2030. This was one of the hardest hit sectors with regards to employment where an average decline of 5.6% in the second quarter of 2020 and 2.5 % in the third quarter of 2020 compared to the same periods of time in 2019 (UN, 2021b).

According to survey data before the pandemic, 29.3% of small-scale entrepreneurs benefited from loans or lines of credit, with regional difference. Only 15.7% of small-scale industries in sub-Saharan Africa received loans or lines of credit, compared with 44% in Latin America and the Caribbean.

GDP as a metric is of course unidimensional and provides a monetized view of progress. This therefore values economic aspects over underlying social and environmental aspects. The term 'sustainable growth' should encompass a broader set of metrics that are more representative of sustainable development.

9.2 Targets and indicators of SDG 9

This goal aims to industrially develop regions which result in sustained economic growth and therefore support of people's quality of life.

The main areas of focus are 1) sustainable infrastructure development 2) inclusive industrialization 3) accessible financial and communications technology infrastructure 4) upgrading infrastructure for better resource use and cleaner means of production and lastly 5) scientific research and development in support of innovation and technology development.

These areas are therefore focused on providing the resources needed to boost sustainable economic growth to lower developed areas that is accessible to all people. This includes access to financial services, ICT services and legal support as other forms of infrastructure. The goal aims to focus on industrializing as a value add to GDP and a stimulus for many positive downstream effects. In doing so, it should be noted that these activities should cause as little environmental impact as possible and should transition to "greener" processes through application of innovative design thinking¹. This design thinking should be stimulated through investment in R&D and suitable policy development.

The goal therefore links to environmental impact categories through resource efficiency and cleaner production methods. It also links largely to the social topics of employment, access to resources, services and inputs and other infrastructure related to social protection for people.

This goal interacts with goal 8: decent work and economic growth and goal 12: responsible consumption and production the most.

¹ "Design thinking is a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success." – Tim Brown, Executive Chair of IDEO

Table 1. The targets and indicators defined for SDG 9

Target	Indicator
9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all	9.1.1 Proportion of the rural population who live within 2 km of an all-season road 9.1.2 Passenger and freight volumes, by mode of transport
9.2 Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries	9.2.1 Manufacturing value added as a proportion of GDP and per capita 9.2.2 Manufacturing employment as a proportion of total employment
9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets	9.3.1 Proportion of small-scale industries in total industry value added 9.3.2 Proportion of small-scale industries with a loan or line of credit
9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities	9.4.1 CO2 emission per unit of value added
9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending	9.5.1 Research and development expenditure as a proportion of GDP 9.5.2 Researchers (in full-time equivalent) per million inhabitants
9.a Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States	9.a.1 Total official international support (official development assistance plus other official flows) to infrastructure

9.b Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities	9.b.1 Proportion of medium and high-tech industry value added in total value added
9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020	9.c.1 Proportion of population covered by a mobile network, by technology

9.3 Classifying the links between SDG targets and LCA impact categories

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.

9.3.1 Target 9.1 and 9.4 Develop and upgrade infrastructure and industries

Target 9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all

Target 9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities

Environmental LCA:

- **Total end point score for 'damage to ecosystems' and 'damage to resource availability':** when an industry lowers their total environmental footprint, they can contribute to target 9.4. This includes processes related to energy use, resource efficiency, waste treatment and any emissions.

Social LCA:

- **User's affordability*:** under the condition that a company is a basic infrastructure provider when a company contributes to this topic, they are ensuring that their product or service is cheap enough for people to be able to buy it. Should a company charge high above market prices for basic needs related products and services, they are negatively contributing to this topic. This links directly to target 9.1
- **User's accessibility*:** under the condition that a company is a basic infrastructure provider, when a company contributes to this topic, they are ensuring that their product

or service is accessible to different groups of people. For example, the transport system should account for people with disabilities and should be designed in this way. Should a company not make provision for this within the function of the specific piece of infrastructure, it will count towards a negative contribution. This links to target 9.1.

- **Local communities access material and immaterial resources*:** when a company contributes to this topic, they are addressing the needs of the community with regards to electricity, internet, mobile phones and transport. When they contribute to the local infrastructure, they can contribute to reaching target 9.1. Should they be damaging the possibility of provision of these types of infrastructure or having adverse effects then a negative contribution will be counted. This links to target 9.1.

9.3.2 Target 9.2 Inclusive industrialization in developing countries

Target 9.2 Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries.

Environmental LCA:

There are no links to environmental impact categories.

Social LCA:

- **Workers remuneration*:** providing remuneration and jobs to workers can contribute to the industry's share of employment and GDP. This link only applies in relation to manufacturing companies, since the target is specifically focussed on that.
- **Local communities' contribution to economic development:** when a company contributes to this topic, they are investing in the area, creating economic activities (including employment) and contributing to better infrastructure.

9.3.3 Target 9.3 Access to financial and ICT services

Target 9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets

Environmental LCA:

There is no link to environmental impact categories

Social LCA:

- **Small-scale entrepreneurs access to services and inputs:** when a company contributes to this topic, they are ensuring access to financial and ICT services for the running of their businesses. This links directly to target 9.3.

9.3.4 Target 9.5 Scientific research and development

Target 9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending

Environmental LCA:

There are no links to environmental impact categories.

Social LCA:

- Local communities skills development***: when a company contributes to this topic, they are ensuring that the company is investing in the skills gap that exists in the community. This only applies when a company is investing in upgrading technological or R&D capabilities of the local community.

9.3.5 Overview of links

In Figure 1 the overview of the links between LCA impact categories and SDG 9 is shown.

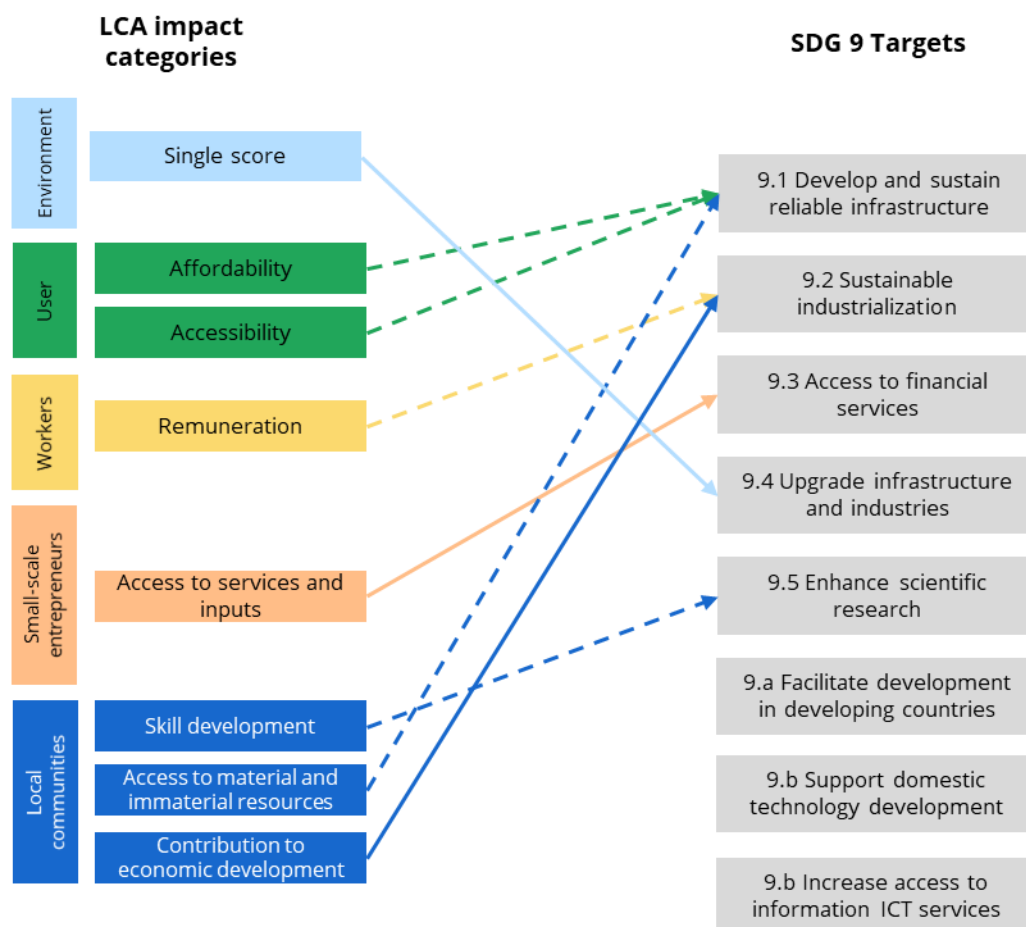


Figure 1 Overview of links between LCA impact categories and SDG targets for SDG 9

9.4 Characterizing the relation between LCA and SDG 9

In this paragraph, the nature of the relation between the impact categories and the targets of SDG 9 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.

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.

9.4.1 Environmental LCA

Table 9.2 environmental topic linking to SDG 9

LCA impact category	Rationale	Requirements to be counted as a contribution to SDG 9	
Total end point score for 'damage to ecosystems' and 'damage to resource availability' indicators	If a company reduces its overall footprint, they contribute to SDG target 9.4 which is related to making industries sustainable.	+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%)

9.4.2 Social LCA

Table 9.3: Social topic linking to SDG 9

Stakeholder	Social topics	Rationale	Requirements to be counted as a contribution to SDG 9	
User	Affordability*	Linking to target 9.1, if a company is a basic infrastructure provider, their products or services should be affordable to people who will use it.	+2	The solution offered by the company is a disrupter, in the sense that it dramatically increases affordability for a underprivileged or vulnerable target group.
			+1	The product or service is designed to make products more affordable for underprivileged groups.

		-2	While a group of users would greatly benefit from accessing a product or service, the company offers these under conditions that are unaffordable to this groups and/or it hampers attempts of competitors to sell alternatives solutions that are more affordable to these vulnerable groups.
Accessibility*	Linking to target 9.1, if the company is a basic infrastructure provider, they are ensuring that their product or service is accessible to different groups of people.	+2	The product or service is regarded as a disrupter, in the sense it has introduced products and services that were not, or very limited available to people with disabilities.
		+1	The product or service is designed in such a way that it significantly improves the access by people with disabilities, and as far as applicable on the product category exceeds obligations of the UN Convention on the Rights of Persons with Disabilities and national regulations.
		-2	The product is poorly designed and not usable or dangerous to use by people with disabilities.
Workers	<u>Remuneration*</u> If a company provides jobs and payment to industry workers, they contribute to target 9.2	+2	All workers receive the (major share of) additional social benefits as defined for retirement, health insurance, disability coverage on top of the living wage levels for a standard family defined in the Wage-indicator project.
		+1	All workers are paid at least a living wage for a family as defined by the methodology of the Wage indicator.
		-2	Workers are paid below the poverty line in the country or region, or if this is not defined in the country or region, the payment is clearly insufficient, or workers are not paid the legal or industry minimum wage and/or social benefits are not according to applicable law. There is no commitment to address this issue.

Local communities	Access to material and immaterial resources *	Target 9.1 links to the contribution to local infrastructure, and is therefore linked to access to tangible resources for local communities, if this contribution is indeed related to infrastructure.	+2	The company has made the access to material and immaterial resources a top priority and is actively investing in this priority that have resulted in real improvements.
			-2	The actions of the company have resulted in incidents of actual damage, adverse impacts or risks to the community's access to material and immaterial resources, but a corrective action plan with a timeline for completion has not been developed.
	Skill development*	Target 9.5 links to encouraging innovation and research and development, a company could contribute to this when working on skill development of local communities.	+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.

Contribution to economic development		+2	The company actively invests in public private partnerships or invests in the local community in a way that creates new business opportunities and jobs in the region and is recognised as a constructive force in the region.
		-2	The company deliberately does not support, or damages the attempts of local authorities to create the conditions for economic growth, engaging in tax evasion, corruption and other detrimental policies or actions.
Small-scale entrepreneurs	<u>Access to services and inputs</u> Companies that contribute to this topic can contribute to achieving target 9.3, which related to the increased access to financial services for small-scale industries	+2	The company that sources from this supplier's community has provided stability and quality of the access to all four services inputs (financial services, information, inputs, infrastructure) a top priority.
		-2	No actions (screening, evaluation, monitoring) have been taken to assess the local conditions and evaluate improvement opportunities OR circumstantial evidence indicates that small-scale entrepreneurs' access to services or inputs is limited.

9.5 Scoring matrix for SDG 9

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 9.

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 9.4: Scoring matrix for determining whether the LCA results can indeed support SDG 9

SDG 9	Red flag (-2) or blocking (⊘)	Contributing	
Target 9.1			
Affordability*	-2	+1	+2
Accessibility*	-2	+1	+2

Access to material and immaterial resources*	-2		+2
Target 9.2			
Remuneration*	⊘	+1	+2
Target 9.3			
Access to services and inputs	⊘		+2
Target 9.4			
Total weighted score of all EF impact categories	-2		+2
Target 9.5			
Skill development*	-2		+2

9.6 References

UN, 2021a. "industry, innovation and infrastructure: why it matters". Via: https://www.un.org/sustainabledevelopment/wp-content/uploads/2019/07/9_Why-It-Matters-2020.pdf

UN, 2021b. Goal 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation. Via: <https://www.un.org/sustainabledevelopment/infrastructure-industrialization/>