

SUSTAIN E+ TRAINING SUSTAIN E+ PROJECT

MODULE N°3 WORKING PROCEDURES



Erasmus+

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1. Introduction to the topic

Sustainable (or Green) Project Management is an approach to project management that prioritizes environmental sustainability and social responsibility. It involves integrating sustainable practices throughout the entire project lifecycle, from project initiation to project closure.

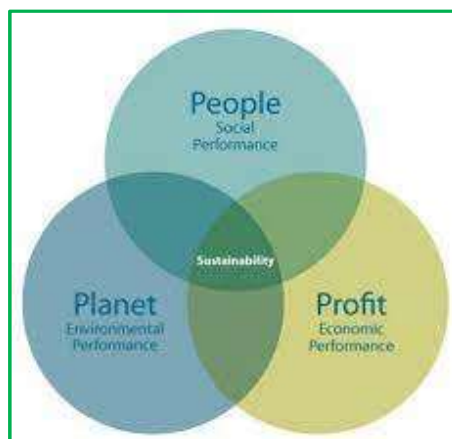


Fig. 1 – The 3P of a sustainable project

At the project initiation stage, design project management involves considering the environmental and social impacts of the project and identifying opportunities to reduce its impact on the environment. This includes conducting environmental impact assessments, engaging stakeholders to understand their concerns, and establishing sustainable project goals and objectives.

During the planning and design stage, design project management involves incorporating sustainable practices into the project design. This includes considering the use of renewable energy, sustainable materials, and efficient design principles to minimize the project's environmental impact.

In the implementation stage, design project management involves using sustainable practices to manage the project's environmental impact. This includes reducing waste, energy and water usage, and promoting sustainable transportation and logistics practices.

Finally, in the post-project evaluation stage, sustain project management involves assessing the project's environmental and social impact, measuring the project's success against sustainability goals and objectives, and identifying opportunities for continuous improvement.

This topic is important because it recognizes the impact of human activities on the environment and the need to reduce our environmental footprint. The adoption of sustainable practices in project management can help organizations to achieve their sustainability goals, reduce operating costs, and improve stakeholder engagement. By considering the environmental and social impact of projects, organizations can ensure that they are contributing to a more sustainable future while still meeting project objectives.

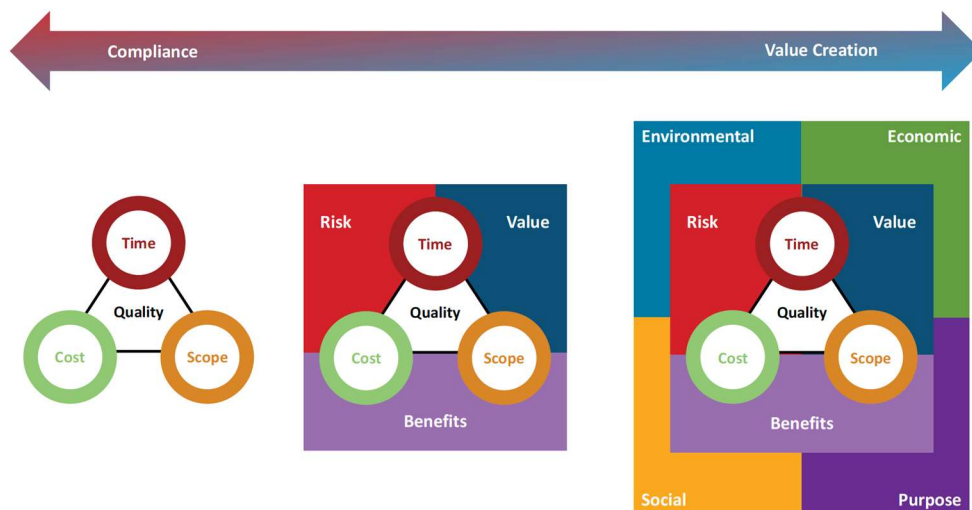


Fig. 2 – From traditional project management to sustainable project management.

Sustain project management can also improve stakeholder relationships by demonstrating a commitment to social responsibility and sustainability. This can help to build trust with stakeholders, increase brand reputation, and attract and retain talent. As the demand for sustainable practices continues to grow, adopting green project management practices is becoming increasingly important for organizations to remain competitive and meet stakeholder expectations.

2. Learning objectives

This module provides learners with the necessary knowledge and skills to adopt sustainable practices in project management processes. By the end of this module, learners will be able to integrate sustainable practices into project planning, design, and implementation, evaluate sustainability performance, and develop a sustainability strategy for future projects. This module will help learners to meet the growing need for organizations to adopt sustainable practices in project management and contribute to a more sustainable future.

Competence Profile

A competence profile for a Sustainable Project Management may include the following skills and knowledge areas:

1. Understanding of environmental and social impact assessment methods and tools.
2. Knowledge of sustainable project management practices, principles, and frameworks.
3. Skill to integrate sustainability considerations into project planning, design, and implementation.
4. Knowledge of sustainable sourcing and procurement practices.
5. Knowledge of sustainable construction and infrastructure design principles.
6. Skill to measure and report on sustainability performance metrics.
7. Skill to identify opportunities for continuous improvement and innovation.

Skills acquired

After this module will be completed, all the participants will have learned the :

1. Identify and assess environmental and social impacts of projects.
2. Develop and implement sustainable project management plans.
3. Integrate sustainable practices into project design and implementation.
4. Evaluate sustainability performance metrics and report on progress.
5. Identify and implement opportunities for continuous improvement and innovation.
6. Apply sustainable sourcing and procurement practices.

7. Apply sustainable construction and infrastructure design principles.

Training Need

There is a growing need for organizations to adopt sustainable practices in project management due to the increasing recognition of the impact of human activities on the environment and the need to reduce our environmental footprint. Green Project Management can help organizations to achieve their sustainability goals, reduce operating costs, and improve stakeholder engagement. Therefore, there is a need for training programs that equip learners with the necessary knowledge and skills to integrate sustainable practices into project management processes. The Green Project Management module addresses this training need by providing learners with the knowledge and skills required to adopt sustainable practices in project management and contribute to a more sustainable future.

3. Learning contents

Chapter 1 – Introduction to Sustainable Project Management

1.1 Understanding the need for Sustainable Project Management

Sustainable (or Green) Project Management is becoming increasingly essential in the modern world, given the growing environmental and social concerns that affect both organizations and society as a whole. The need for Green Project Management is primarily driven by the need to reduce the negative impacts that project activities can have on the environment and society. By adopting sustainable project management practices, organizations can promote resource efficiency, reduce waste, minimize greenhouse gas emissions, conserve natural resources, and enhance social and economic well-being. In this regard, Green Project Management is critical in ensuring that projects are designed, implemented, and managed in a way that fosters sustainable development.



Fig. 3 – Sustainability in project management.

The negative impacts of project activities on the environment and society can take various forms, such as pollution, deforestation, habitat destruction, biodiversity loss, health risks, and social exclusion. These impacts can lead to significant economic, environmental, and social costs in the short and long term, such as increased healthcare expenses, reduced productivity, decreased quality of life, and impaired natural systems. Therefore, by adopting Green Project Management practices, organizations can mitigate or avoid these negative impacts and promote more sustainable outcomes.

Sustainable Project Management is also crucial for organizations that seek to comply with environmental and social regulations, standards, and certifications. For instance, many countries have implemented laws and policies that require organizations to assess and manage the environmental and social risks and impacts of their projects. Similarly, international organizations such as the United Nations and the World Bank have established sustainability standards and guidelines that encourage organizations to adopt sustainable project management practices.

Another reason why Green Project Management is important is that it can create opportunities for innovation, collaboration, and competitive advantage. By integrating sustainability considerations into project planning and execution, organizations can identify new ways of delivering products and services that are more environmentally friendly, socially responsible, and economically viable. This can lead to improved customer satisfaction, brand reputation, employee morale, and stakeholder engagement, as well as cost savings and revenue growth.

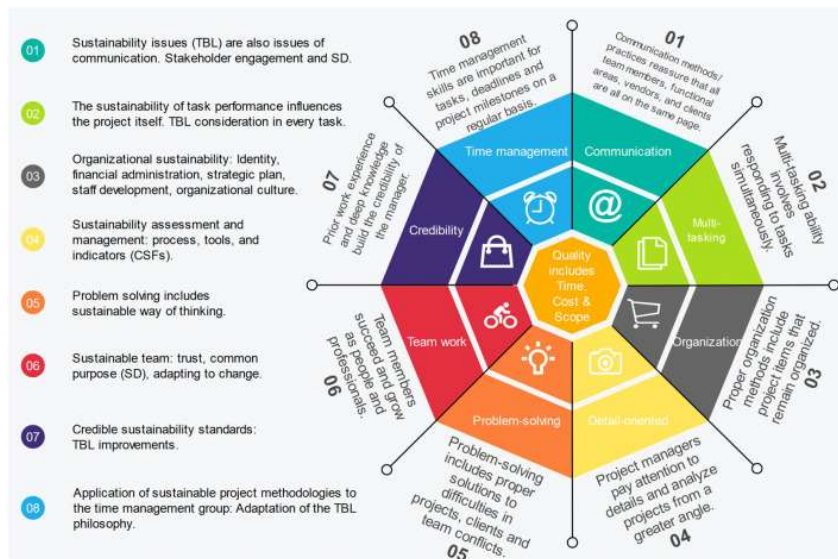


Fig. 4 – How integrate sustainability in project management methodologies.

Green Project Management can also contribute to broader sustainability goals at the organizational and societal levels. For example, by aligning project objectives with the United Nations Sustainable Development Goals (SDGs), organizations can support global efforts to eradicate poverty, promote health and well-being, ensure sustainable consumption and production patterns, and combat climate change. Similarly, by engaging with stakeholders and communities affected by their projects, organizations can build trust, transparency, and accountability, and contribute to social cohesion and resilience.

Overall, the need for Green Project Management is driven by a combination of ethical, legal, strategic, and societal factors that highlight the importance of integrating sustainability considerations into project management practices. By doing so, organizations can enhance their environmental and social performance, create value for their stakeholders, and contribute to a more sustainable future.

1.2 Introduction to environmental and impact assessment methods and tools

Environmental and social impact assessment methods and tools are critical components of Green Project Management. These methods and tools help organizations to identify and assess the potential environmental and social impacts of their projects.

They enable project managers to evaluate the project's potential effects on the environment and society, including the ecosystem, water resources, air quality, human health, and biodiversity. The assessment helps project managers to develop appropriate measures to mitigate any adverse impacts and ensure that the project aligns with sustainable development principles. The most common tools for environmental and social impact assessments include environmental impact assessment (EIA), social impact assessment (SIA), life cycle assessment (LCA), and carbon footprint assessment.

Environmental impact assessment (EIA) is a systematic process of identifying, predicting, and evaluating the potential environmental effects of a project or development proposal. The process involves a range of activities, such as scoping, baseline data collection, impact analysis, mitigation planning, and monitoring and evaluation. EIA is typically required by law or regulation in many countries and can be conducted at different stages of the project cycle, from planning to operation and decommissioning.

Social impact assessment (SIA) is a process of identifying, analyzing, and managing the potential social impacts of a project on communities, stakeholders, and vulnerable groups. SIA aims to ensure that the project's social effects are identified and addressed in a participatory and transparent manner, and that the affected groups are involved in the decision-making process. SIA can cover a wide range of issues, such as displacement, land use, labor rights, health and safety, cultural heritage, and social cohesion.

Life cycle assessment (LCA) is a tool for assessing the environmental impacts of a product, service, or process throughout its entire life cycle, from raw material extraction to disposal. LCA takes into account the use of resources, energy, and emissions associated with each stage of the life cycle and provides a comprehensive picture of the environmental impacts of the product or process. LCA can be used to compare different options and identify opportunities for improvement in terms of resource efficiency, waste reduction, and emissions reduction.



Fig. 5 – Project Life Cycle (LCA).

Carbon footprint assessment is a tool for measuring and quantifying the greenhouse gas emissions associated with a product, service, or activity. Carbon footprint assessments can cover different scopes, from direct emissions of an organization's operations to indirect emissions from its supply chain and customer use of its products. Carbon footprint assessments can help organizations to identify the main sources of emissions, set targets for emissions reduction, and communicate their environmental performance to stakeholders.

Environmental and social impact assessment methods and tools can be applied in different contexts and sectors, such as infrastructure development, energy production, agriculture, forestry, mining, and manufacturing. The selection of the appropriate methods and tools depends on the project's characteristics, scale, and complexity, as well as the regulatory and stakeholder requirements. Effective application of these methods and tools requires a multidisciplinary approach that involves various stakeholders, such as scientists, engineers, social scientists, community members, and decision-makers.

Overall, environmental and social impact assessment methods and tools are essential for ensuring that projects are designed and managed in a way that minimizes negative environmental and social impacts and promotes sustainable development. These methods and tools enable project managers to make informed decisions, involve stakeholders, and address the complex and interconnected environmental and social challenges of our times.

1.3 Overview of sustainable project management practices, principles, and frameworks

Sustainable project management practices involve incorporating environmental and social considerations into every stage of a project's lifecycle. These practices can include selecting sustainable materials and technologies, designing for energy efficiency, reducing waste and pollution, and engaging stakeholders throughout the project's lifecycle.

One framework for sustainable project management is the Project Management Institute's (PMI) Project Management Body of Knowledge (PMBOK). The PMBOK includes guidelines for project management that emphasize the importance of sustainability considerations. For example, the PMBOK emphasizes the need for stakeholder engagement and the incorporation of environmental and social factors in project planning and design.

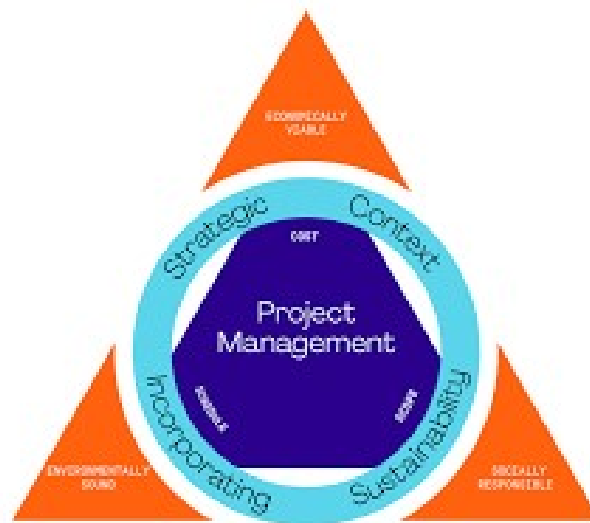


Fig. 5 – How PMI standards can be intergrated wit sustainability factors .

Another framework for sustainable project management is the International Organization for Standardization's (ISO) 14001 Environmental Management System. This standard provides guidelines for organizations to establish, implement, maintain, and continually improve an environmental management system.

The standard emphasizes the need for organizations to identify and manage their environmental impacts, comply with environmental regulations, and continually improve their environmental performance.

In addition to frameworks, sustainable project management also involves incorporating principles such as resource efficiency, waste reduction, stakeholder engagement, social responsibility, and environmental protection into project management practices. By adopting sustainable project management practices and principles, organizations can promote sustainable development, reduce their environmental footprint, and enhance their social and economic performance.

1.4 Practical activity

Worksheet:

1.1 Understanding the need for Sustainable (Green) Project Management

- a) What are some of the environmental and social concerns that have led to the need for Green Project Management?
- b) How can sustainable project management practices promote resource efficiency and reduce waste?
- c) Why is stakeholder engagement important in Green Project Management?

2.2 Introduction to environmental and impact assessment methods and tool

- a) What are some of the common tools for environmental and social impact assessments?
- b) How can environmental and social impact assessments help project managers to evaluate a project's potential effects on the environment and society?
- c) What are some of the measures that project managers can develop to mitigate any adverse impacts identified during an impact assessment?

3.3 Overview of sustainable project management practices, principles, and frameworks

- a) What are some of the principles of sustainable project management?
- b) How can organizations incorporate sustainability principles into project planning, implementation, monitoring, and evaluation processes?
- c) What are some of the benefits of using sustainable project management frameworks, such as PMBOK and ISO 14001?

Case Studies

1.1 Understanding the need for Sustainable (Green) Project Management

Case Study 1: XYZ Corporation is planning to construct a new manufacturing plant in a rural area. The project has raised concerns among local residents about its potential impact on the environment and the community. As the project manager, how would you address these concerns and ensure that the project aligns with sustainable development principles?

Case Study 2: ABC Organization is a large multinational corporation that is committed to reducing its environmental footprint. As part of this commitment, the organization has implemented a Green Project Management approach in all its operations. How has this approach helped the organization to achieve its sustainability goals?

2.2 Introduction to environmental and impact assessment methods and tool

Case Study 1: DEF Corporation is planning to construct a new highway through a sensitive ecosystem. The project has raised concerns among environmentalists about its potential impact on the ecosystem. As the project manager, how would you conduct an environmental impact assessment and develop appropriate measures to mitigate any adverse impacts?

Case Study 2: GHI Organization is planning to launch a new product line that involves the use of hazardous chemicals. As part of its sustainability commitment, the organization wants to ensure that the chemicals are handled and disposed of in an environmentally responsible manner. How would you conduct a life cycle assessment to identify the potential environmental impacts of the product and develop appropriate measures to mitigate any adverse impacts?

Exercise/Practical Activity:

3.3 Overview of sustainable project management practices, principles, and frameworks

Exercise 1: Develop a sustainability checklist for a construction project. The checklist should include items such as waste reduction, energy efficiency, and stakeholder engagement.

Exercise 2: Conduct a stakeholder analysis for a proposed project. Identify the project's stakeholders, their interests, and their potential impact on the project. Develop a stakeholder engagement plan that outlines how you will engage with each stakeholder group throughout the project's lifecycle.

Practical Activity: Conduct a carbon footprint assessment for a company. Identify the company's major sources of greenhouse gas emissions and develop a plan to reduce its carbon footprint. Present your findings and recommendations to the company's management team.

Chapter 2 – Integrating Sustainability into Project Planning and Design

2.1 Title Strategies for integrating sustainability into project planning and design and the “lean approach”

Integrating sustainability into project planning and design involves considering the environmental, social, and economic impact of a project throughout its lifecycle. One way to do this is by using a sustainability framework, such as the triple bottom line, which takes into account the project's impact on people, planet, and profit.

Another strategy is to establish sustainability goals and targets, such as reducing greenhouse gas emissions or increasing energy efficiency, and align project objectives with these goals. To achieve these goals, project managers may need to implement a range of sustainable practices, such as using sustainable materials, reducing waste, minimizing energy consumption, and promoting renewable energy sources. It is also important to involve stakeholders in the planning process, including employees, customers, and local communities, to ensure that their concerns and perspectives are taken into account. Finally, using a sustainability checklist can help ensure that all sustainability considerations are addressed throughout the project planning and design process. A big support to integrating sustainability practices into project planning and design can be got by using lean approach. Lean management is a methodology that aims to eliminate waste and increase efficiency in a project. This approach can be applied to sustainability by identifying and reducing activities that have a negative impact on the environment.

By minimizing waste and improving efficiency, projects can reduce their environmental footprint and create more sustainable outcomes. The concept of value is closely linked to lean management, as it focuses on delivering maximum value to customers while minimizing waste. In a sustainability context, the concept of value can be extended to include environmental and social benefits, such as reducing greenhouse gas emissions or improving community well-being. By prioritizing sustainability goals and integrating them into project planning and design, project managers can deliver more value to stakeholders while also contributing to a more sustainable future.

To achieve environmental sustainability in project management practices using lean management and the concept of value, project managers may consider strategies such as:

- Using sustainable materials and minimizing waste in production processes to reduce the environmental impact of the project
- Incorporating renewable energy sources to reduce carbon emissions and promote sustainable energy use
- Engaging with stakeholders to identify and address their concerns and perspectives on sustainability

- Aligning project objectives with sustainability goals and targets, such as reducing energy consumption or promoting biodiversity conservation
- Implementing continuous improvement practices to monitor and optimize sustainability performance throughout the project lifecycle.

Overall, incorporating lean management and the concept of value into project planning and design can help to create more sustainable outcomes by reducing waste, improving efficiency, and prioritizing sustainability goals and targets.

2.2 Sustainable sourcing and procurement practices

Sustainable sourcing and procurement practices involve choosing materials and products that are produced in an environmentally and socially responsible manner. This can include sourcing materials from suppliers who have a commitment to sustainability, using products made from recycled or biodegradable materials, and selecting materials that have been certified as sustainable, such as FSC-certified wood. Project managers may also consider the carbon footprint of the products they use and choose products with a lower carbon footprint, such as those that are produced locally or require less energy to produce. In addition to selecting sustainable materials, sustainable sourcing and procurement practices can also include using environmentally-friendly transportation and packaging methods. This can include using reusable packaging, reducing packaging waste, and selecting transportation methods that have a lower carbon footprint, such as using electric vehicles or public transportation.

In the same way, applying the principles of lean methodology to sustainable sourcing and procurement practices can help project managers to create more sustainable outcomes by reducing waste, optimizing transportation, collaborating with suppliers, and continuously improving sustainability performance. To integrate lean methodology into sustainable sourcing and procurement practices, project managers may consider the following strategies:

1. Reduce waste: by identifying and eliminating waste in the procurement process, project managers can reduce the environmental impact of their projects. This can include reducing the use of unnecessary packaging, choosing materials that require less energy to produce or transport, and avoiding over-ordering materials.

2. Optimize transportation: to reduce the carbon footprint of transportation, project managers can use lean principles to optimize transportation routes, choose transportation methods with a lower carbon footprint, and consolidate shipments to reduce the number of trips required.
3. Collaborate with suppliers: project managers can work with suppliers to identify ways to reduce waste and improve sustainability in the supply chain. This can include selecting suppliers who have a commitment to sustainability, implementing sustainability criteria in the procurement process, and collaborating with suppliers to find ways to reduce waste and improve sustainability.
4. Continuously improve: using the principles of continuous improvement, project managers can monitor and optimize their sustainable sourcing and procurement practices over time. This can include tracking and analyzing sustainability metrics, identifying areas for improvement, and implementing changes to improve sustainability performance.

2.3 Tools and techniques for reducing the environmental impact of projects

There are many tools and techniques available to project managers to reduce the environmental impact of projects. Life cycle assessments (LCAs) are used to evaluate the environmental impact of a product or process over its entire lifecycle, from raw material extraction to disposal. LCAs can help identify areas where environmental impact can be reduced, such as through the use of alternative materials or production processes. Carbon footprint assessments are used to measure the amount of greenhouse gas emissions produced by a project, product, or process. By understanding the carbon footprint of a project, project managers can identify opportunities to reduce emissions, such as by improving energy efficiency or using renewable energy sources. Environmental impact assessments (EIAs) are used to identify and evaluate the potential environmental impact of a project on the natural and social environment. EIAs can help identify potential environmental risks and develop appropriate measures to mitigate any adverse effects.

Other tools and techniques may include sustainability reporting, green procurement policies, and energy audits. By using these tools and techniques, project managers can minimize the environmental impact of a project and contribute to sustainable development.

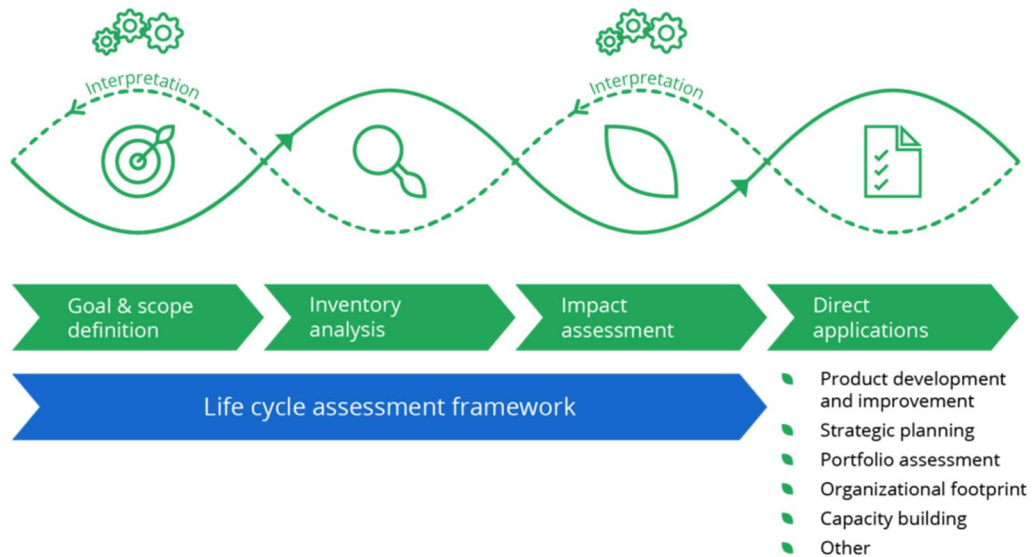


Fig. 6 – Life Cycle Assessment: a simple approach to LCA framework.

2.4 Practical activity

Worksheet:

Title: Sustainability Checklist

Objective: To help individuals identify and evaluate the sustainability considerations in a project planning and design process.

Instructions:

1. Use the following checklist to evaluate the sustainability considerations in your project planning and design process.

2. For each item on the list, indicate whether it has been addressed in the project planning and design process.
3. Identify any gaps or areas where sustainability considerations can be improved.
4. Develop a plan to address any gaps or areas for improvement.

Sustainability Checklist:

1. Has the project's impact on the environment been evaluated and addressed?
2. Have sustainable materials and products been used in the project?
3. Has waste reduction been incorporated into the project design?
4. Has energy efficiency been considered in the project design?
5. Has renewable energy been incorporated into the project design?
6. Have stakeholder perspectives been considered in the project design?
7. Have sustainable sourcing and procurement practices been implemented?
8. Have sustainability goals and targets been established and aligned with project objectives?
9. Have tools and techniques, such as LCAs and carbon footprint assessments, been used to reduce the environmental impact of the project?

Case study:

Title: Sustainable Building Design

Objective: To understand how sustainable principles can be applied in building design.

Instructions:

1. Read the case study on sustainable building design.
2. Identify the sustainable principles that were applied in the building design.
3. Identify any gaps or areas where sustainability considerations can be improved.

4. Develop a plan to address any gaps or areas for improvement.

Case study:

The Green Building is a new office building that was designed with sustainability in mind. The building was designed to minimize energy consumption and reduce its environmental impact. The building was designed with high-efficiency heating and cooling systems, energy-efficient lighting, and solar panels to generate electricity. The building also has a green roof that helps to reduce the urban heat island effect and improve air quality. The building uses sustainable materials, such as FSC-certified wood, and has a rainwater harvesting system that collects rainwater for irrigation and toilet flushing.

Practical activity:

Title: Carbon Footprint Reduction Plan

Objective: To develop a plan to reduce the carbon footprint of a project.

Instructions:

1. Select a project or process that you are involved in.
2. Conduct a carbon footprint assessment of the project or process.
3. Identify areas where greenhouse gas emissions can be reduced.
4. Develop a plan to address these areas and reduce the carbon footprint of the project or process.

Exercise:

Title: Sustainable Material Selection Exercise

Objective: To identify sustainable materials for a project.

Instructions:

1. Select a project that you are involved in.
2. Identify the materials that are required for the project.

3. Research sustainable alternatives for each material.
4. Evaluate the sustainability of each alternative using a sustainability framework, such as the triple bottom line.
5. Select the most sustainable materials for the project.

Chapter 3 – Implementing Sustainable Practices in Project Management

3.1 Sustainable transportation and logistics practices

Sustainable transportation and logistics practices are becoming increasingly important as transportation and logistics activities account for a significant portion of global greenhouse gas emissions. To reduce these emissions, organizations can adopt sustainable transportation and logistics practices that aim to minimize the environmental impact of these activities.

One strategy for sustainable transportation and logistics is to reduce the distance that goods and people travel. This can be achieved by adopting practices such as local sourcing and distribution, which can reduce transportation-related emissions and costs. For example, a company might prioritize sourcing materials from local suppliers or distributing products to nearby customers to reduce the distance traveled. Additionally, organizations can optimize the use of transportation assets, such as by using route planning software to minimize travel time and fuel consumption.

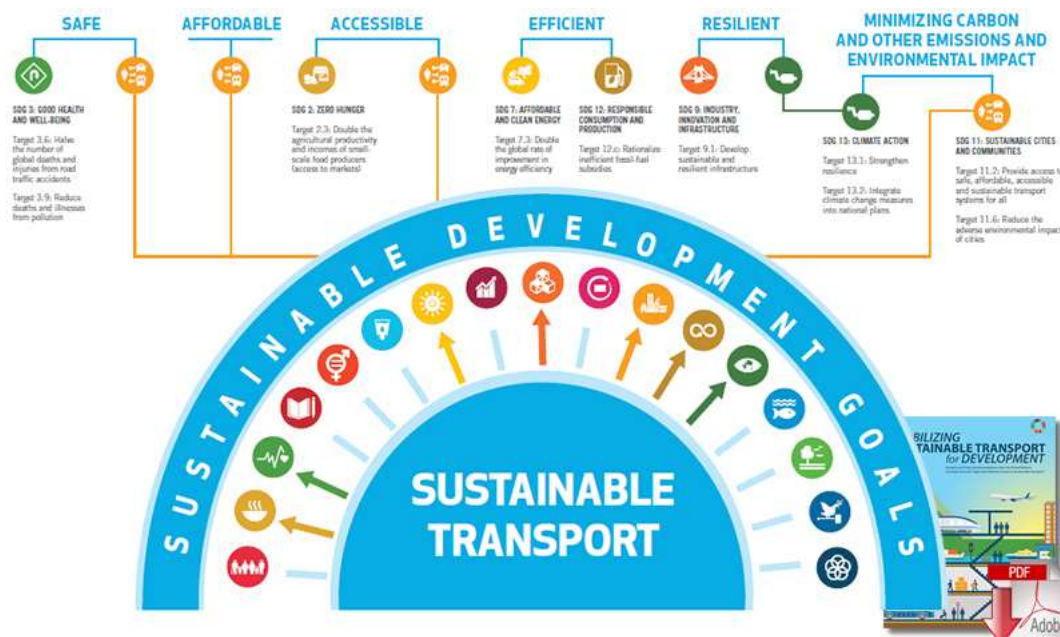


Fig. 7 – Sustainability in transports and logistic

Another key aspect of sustainable transportation and logistics is the use of low-emission modes of transportation. This can include electric vehicles, bikes, and public transit, which produce fewer greenhouse gas emissions than traditional gasoline or diesel-powered vehicles. Organizations can incentivize employees to use low-emission modes of transportation by offering bike parking, public transit passes, or electric vehicle charging stations. Companies may also prioritize the use of low-emission vehicles in their transportation fleets and set targets to increase the percentage of low-emission vehicles used over time.

Finally, sustainable transportation and logistics practices can also involve reducing packaging materials and optimizing the use of shipping materials. For example, organizations may use lighter packaging materials or optimize the use of pallets and containers to reduce the amount of packaging material required. Additionally, companies may adopt practices such as reverse logistics, which involves the reuse or recycling of materials and products to reduce waste and environmental impact.

By implementing sustainable transportation and logistics practices, organizations can reduce their environmental footprint, improve operational efficiency, and enhance their overall sustainability performance.

3.2 Reducing waste, energy, and water usage

Reducing waste, energy, and water usage is crucial for mitigating the environmental impact of human activities. A sustainable project management plan can help organizations identify areas where they can reduce resource usage and implement best practices. For example, a company may measure and monitor energy usage in their facilities, set targets to reduce energy consumption, and implement energy-efficient lighting and HVAC systems. In terms of waste reduction, companies may set targets for recycling and reusing materials, implement composting programs, and optimize their supply chain to reduce packaging waste. Water usage can be reduced through the implementation of water-efficient fixtures and landscaping, and by implementing rainwater harvesting systems. By reducing waste, energy, and water usage, organizations can save money on operating costs and reduce their environmental impact.

In addition to the measures mentioned above, sustainable project management plans can also involve the implementation of behavior change programs and employee engagement initiatives to encourage staff to adopt sustainable practices in their daily activities.

For instance, employees can be educated on best practices for energy and water conservation, waste reduction, and sustainable transportation options. Sustainability audits can also be conducted to assess the organization's current waste, energy, and water usage, identify areas for improvement, and develop an action plan to achieve sustainability targets. Organizations can also work with suppliers to source more sustainable materials and products, and promote the use of renewable energy sources such as solar and wind power. Finally, companies can track and report on their progress towards achieving sustainability goals to demonstrate their commitment to sustainable development and hold themselves accountable for their environmental impact.

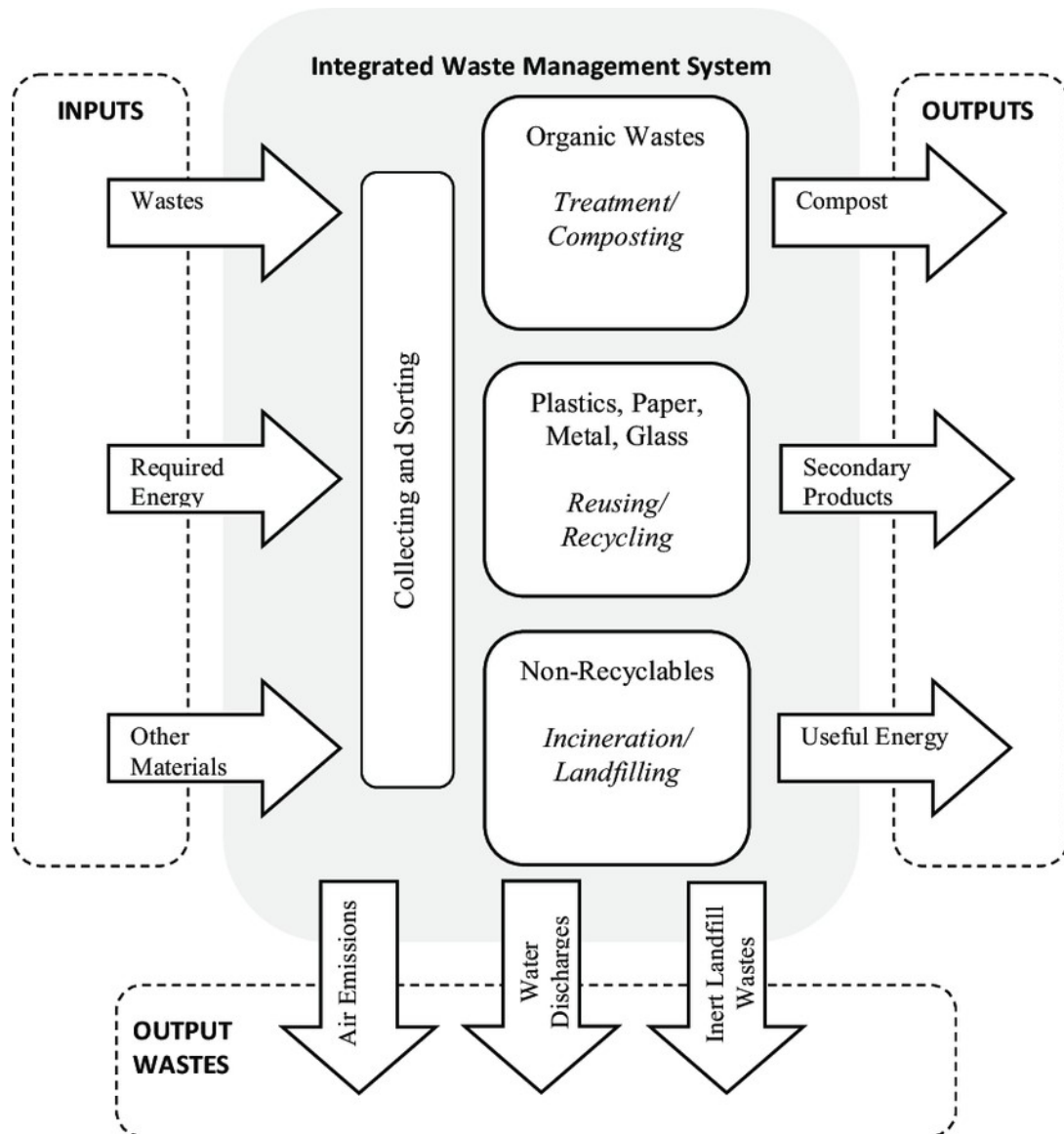


Fig. 8 – Reducing waste, energy, and water usage: a framework example

3.3. Implementing sustainable construction and infrastructure practices

Implementing sustainable construction and infrastructure practices is essential for reducing the environmental impact of buildings and infrastructure.

A sustainable project management plan can help organizations identify opportunities to use sustainable building materials, design for energy efficiency, and reduce waste during construction. For example, companies may use sustainable building materials such as recycled steel or wood, or implement green roofs and walls to improve energy efficiency and reduce the urban heat island effect. To reduce waste during construction, organizations can implement lean construction practices, which aim to minimize waste and improve efficiency by optimizing the use of materials and labor. By considering the long-term environmental impact of buildings and infrastructure, organizations can also design for resilience and adaptability, such as by implementing natural disaster-resistant design features or designing for the ability to repurpose or adapt buildings over time. Overall, implementing sustainable construction and infrastructure practices can help organizations reduce their environmental impact, save money on operating costs, and enhance the value of their assets over time.

Sustainable construction and infrastructure practices also involve reducing the environmental impact of buildings and infrastructure throughout their entire lifecycle, not just during the construction phase. This includes considering the use of renewable energy sources, such as solar or wind power, to power buildings and infrastructure. Organizations can also implement building automation systems and energy management systems to optimize energy usage and reduce waste. Additionally, sustainable construction and infrastructure practices can also involve designing for accessibility and inclusivity, such as by incorporating features that enhance mobility and safety for all users.

To implement sustainable construction and infrastructure practices, organizations can use tools such as green building rating systems, including LEED (Leadership in Energy and Environmental Design) or BREEAM (Building Research Establishment Environmental Assessment Method), to guide their sustainability efforts. These rating systems provide guidelines and benchmarks for sustainable design and construction, including considerations such as energy efficiency, water efficiency, indoor air quality, and sustainable materials.



Fig. 9 - Leadership in Energy and Environmental Design Henry B. Gonzalez

Finally, sustainable construction and infrastructure practices also involve stakeholder engagement, including engaging with local communities and stakeholders to ensure that their needs and interests are considered in the design and construction process. This can involve consulting with local residents and community groups, providing public information sessions, and incorporating stakeholder feedback into the project design and implementation. By engaging with stakeholders, organizations can build trust, ensure social license to operate, and foster social and environmental sustainability.

3.4 Practical activity

Worksheet:

Title: Implementing Sustainable Practices in Transportation, Construction, and Infrastructure

Introduction: This worksheet is designed to help organizations implement sustainable practices in their transportation, construction, and infrastructure activities. By completing the following exercises, organizations can identify opportunities to reduce their environmental impact, conserve natural resources, and save money on operating costs.

Exercise 1: Sustainable Transportation and Logistics Practices

- Identify the transportation modes currently used by your organization for the movement of goods and people.
- Calculate the greenhouse gas emissions associated with your organization's transportation activities.
- Identify low-emission transportation options that can be used to reduce your organization's environmental impact.
- Develop a plan to implement sustainable transportation and logistics practices that reduce greenhouse gas emissions and conserve natural resources.

Exercise 2: Reducing Waste, Energy, and Water Usage

- Conduct an energy audit of your organization's facilities to identify areas of energy waste.
- Calculate the amount of waste generated by your organization and identify opportunities for waste reduction and recycling.
- Implement a water conservation plan that reduces water usage in your organization's facilities and operations.
- Develop a plan to reduce waste, energy, and water usage that includes setting reduction targets and implementing best practices.

Exercise 3: Implementing Sustainable Construction and Infrastructure Practices

- Identify sustainable building materials that can be used in your organization's construction and infrastructure projects.
- Implement lean construction practices to reduce waste and improve efficiency during construction.
- Design buildings and infrastructure that are energy-efficient, resilient, and adaptable.
- Develop a plan to implement sustainable construction and infrastructure practices that reduces your organization's environmental impact and enhances the value of your assets over time.

Case Studies:

Sustainable Transportation and Logistics Practices.

A company specializing in grocery delivery services decides to reduce their carbon footprint by implementing sustainable transportation practices. The company develops a project management plan that prioritizes low-emission vehicles, such as electric vans and bikes, for their delivery operations. They also set targets to reduce the distance that goods travel by optimizing their route planning and implementing last-mile delivery strategies, such as using cargo bikes for short-distance deliveries. As a result, the company reduces their greenhouse gas emissions by 20% and saves on fuel and maintenance costs.

Reducing Waste, Energy, and Water Usage.

A manufacturing company identifies opportunities to reduce waste, energy, and water usage in their facilities. They conduct an energy audit to identify areas of energy waste, such as inefficient lighting and HVAC systems. The company implements energy-efficient lighting and HVAC systems, and sets targets to reduce energy consumption by 10% over the next year. They also implement a recycling program for their waste materials and implement water-efficient fixtures and landscaping to reduce water usage. As a result, the company reduces their operating costs and enhances their reputation as a socially responsible business.

Implementing Sustainable Construction and Infrastructure Practices.

A real estate development company decides to implement sustainable construction practices in their new commercial building project. They use sustainable building materials such as recycled steel and concrete, and implement green roofs and walls to improve energy efficiency and reduce the urban heat island effect. The company also implements lean construction practices to minimize waste during construction, and designs the building for resilience and adaptability. As a result, the building is energy-efficient, resilient to natural disasters, and adaptable for future use.

Practical Exercise

Title: Developing a Sustainable Project Management Plan

Objective: To develop a project management plan that incorporates sustainable practices for transportation, construction, and infrastructure projects.

Steps:

Identify the stakeholders involved in the project, including clients, contractors, and community members.

Identify the environmental and social impacts of the project, such as greenhouse gas emissions, waste generation, and community disruption

Chapter 4 - Measuring and Reporting on Sustainability Performance

4.1 Sustainability performance metrics and indicators

To effectively manage sustainability, it's important to measure and evaluate an organization's environmental, social, and economic impacts. Sustainability performance metrics and indicators can provide valuable information on sustainability performance and help organizations identify areas for improvement. For example, greenhouse gas emissions can be used as a metric to measure an organization's environmental impact, while employee turnover rate can be used to measure social impacts.

Understanding sustainability performance metrics and indicators involves developing a deep understanding of these metrics and indicators. This includes learning about the different types of sustainability metrics and indicators, such as environmental, social, and economic, as well as understanding how to collect and analyze data to evaluate performance. It's important to select metrics and indicators that are relevant to the organization and align with its sustainability goals.

Some organizations use frameworks, such as the GRI or SASB, to guide their selection of sustainability metrics and indicators. These frameworks provide guidance on which metrics and indicators to use, how to collect and report data, and how to communicate performance to stakeholders. By understanding sustainability performance metrics and indicators, individuals can develop a baseline for measuring sustainability performance, set targets for improvement, and track progress over time.

4.2 Reporting on sustainability performance

Reporting on sustainability performance is a critical aspect of sustainability management.

Sustainability reporting involves communicating an organization's sustainability performance to stakeholders in a clear and concise manner. Effective sustainability reporting provides transparency and accountability, and can help build trust and credibility with stakeholders. Sustainability reporting can also help organizations identify areas for improvement and implement strategies to enhance sustainability performance over time.

Evaluating sustainability performance and reporting on progress involves learning about sustainability reporting frameworks and best practices.

This includes understanding the purpose of sustainability reporting, selecting relevant sustainability metrics and indicators, collecting accurate and reliable data, and communicating this information in a way that is accessible to stakeholders. Sustainability reports can take many forms, including written reports, online dashboards, and visual infographics.

Effective sustainability reporting requires a deep understanding of the organization's sustainability goals and stakeholder expectations. Organizations may choose to report on specific sustainability issues, such as energy efficiency or supply chain management, or provide a comprehensive overview of sustainability performance. By reporting on sustainability performance, organizations can demonstrate their commitment to sustainability, build trust with stakeholders, and identify areas for improvement.

4.3 Identifying opportunities for continuous improvement and innovation

Continuous improvement and innovation are essential for achieving sustainability goals and improving sustainability performance over time. Identifying opportunities for continuous improvement and innovation involves analyzing sustainability performance data, identifying areas for improvement, and developing new strategies and approaches to address sustainability challenges. Innovation involves developing new technologies, processes, and products that reduce environmental impact, enhance social well-being, and improve economic performance.

Identifying opportunities for continuous improvement and innovation involves learning about best practices in sustainability management and developing a deep understanding of the organization's sustainability challenges and opportunities. This may involve conducting a sustainability audit, engaging with stakeholders, and analyzing sustainability performance data. By identifying opportunities for sustainable innovation, organizations can develop new strategies and approaches that enhance sustainability performance, reduce costs, and create a competitive advantage in the market.

Examples of sustainable innovation include developing new products that use renewable materials, implementing circular economy approaches, and improving supply chain sustainability. Organizations may also identify opportunities for continuous improvement by implementing sustainability management systems, such as ISO 14001 or the UN Global Compact.

By continuously improving sustainability performance and innovating new solutions, organizations can enhance their sustainability performance and demonstrate their commitment to sustainable development.

4.4 Practical activity

Worksheet:

Title: Sustainability Performance Metrics and Indicators

Instructions: Review the following sustainability performance metrics and indicators and match them to the corresponding category (Environmental, Social, or Economic).

1. Energy consumption per unit of production
2. Employee satisfaction
3. Community engagement
4. Greenhouse gas emissions
5. Product recyclability rate
6. Employee turnover rate
7. Percentage of female managers
8. Total recordable injury rate
9. Customer satisfaction

10. Revenue growth

Categories:

- Environmental
- Social
- Economic

Answers:

1. Environmental
2. Social
3. Social
4. Environmental
5. Environmental
6. Social
7. Social
8. Social
9. Economic
10. Economic

Case Study:

XYZ Company is a manufacturing company that produces electronics. The company has set a sustainability goal to reduce its greenhouse gas emissions by 50% over the next five years. To achieve this goal, the company has implemented several sustainability initiatives, including:

- Replacing traditional lighting with LED lights
- Implementing an energy management system to optimize energy use
- Sensitizing employees to use public transport or optimize private transport to get to work
- Investing in renewable energy sources, such as solar panels

The company collects data on its sustainability performance using the following metrics and indicators:

- Greenhouse gas emissions
- Energy consumption per unit of production
- Employee commuting habits
- Investment in renewable energy sources

Exercise:

Instructions: Assume you are a sustainability manager at XYZ Company. Use the following sustainability performance data to evaluate the company's progress toward its greenhouse gas emissions reduction goal. Then, identify one area for improvement and develop a strategy to address it.

Data:

- Greenhouse gas emissions in 2020: 100,000 metric tons CO₂e
- Greenhouse gas emissions in 2021: 95,000 metric tons CO₂e
- Energy consumption per unit of production in 2020: 10 kWh
- Energy consumption per unit of production in 2021: 8 kWh
- Percentage of employees who use public transportation or carpool to work in 2020: 20%
- Percentage of employees who use public transportation or carpool to work in 2021: 22%
- Investment in renewable energy sources in 2020: \$500,000
- Investment in renewable energy sources in 2021: \$750,000

Evaluation:

- The company reduced its greenhouse gas emissions by 5,000 metric tons CO₂e, which represents a 5% reduction from 2020 to 2021.
- The company reduced its energy consumption per unit of production by 20% from 2020 to 2021.
- The percentage of employees who use public transportation or carpool to work increased by 2% from 2020 to 2021.
- The company increased its investment in renewable energy sources by \$250,000 from 2020 to 2021.

Area for Improvement:

- While the company made progress toward its greenhouse gas emissions reduction goal, the rate of reduction needs to increase to achieve the 50% reduction goal by the target date.

Strategy:

- Identify additional opportunities to reduce greenhouse gas emissions, such as improving supply chain sustainability or increasing the use of renewable energy sources.
- Develop a roadmap for achieving the 50% reduction goal, including specific actions, timelines, and responsible parties.

- Communicate the roadmap and progress toward the goal to stakeholders, including employees, customers, and investors.

Chapter 5 – References - tools

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Ellen MacArthur Foundation. (2021). Circular economy. This concept provides a framework for designing out waste and creating a closed-loop system for materials and resources. <https://www.ellenmacarthurfoundation.org/circular-economy/what-is-the-circular-economy>

Chapter 6 – Training instructions for trainers

6.1 Exploitation of the practical activities given in the module under the trainer perspective

Learning objectives:

- Understand the importance of sustainable practices in various sectors
- Identify opportunities for sustainability improvements
- Develop solutions for reducing environmental impact

Activity: Sustainable Design Challenge

Materials needed:

- Writing materials (paper, pen/pencil)
- Access to internet or library resources
- Optional: materials for prototyping (e.g., cardboard, glue, scissors)

Time needed:

- Introduction and instructions: 15-20 minutes
- Research and ideation: 30-45 minutes
- Design and prototyping (if applicable): 45-60 minutes
- Presentation and discussion: 30-45 minutes

Instructions:

1. Introduce the topic of sustainability and its importance in various sectors (transportation, construction, energy, etc.)
2. Divide participants into small groups (2-4 people per group)
3. Assign each group a specific sector or topic related to sustainability (e.g., transportation, waste reduction, green building design, etc.)
4. Instruct the groups to research current sustainability practices in their assigned sector/topic, and identify areas for improvement or opportunities for innovation.

5. Using their research and ideation, instruct the groups to develop a sustainable solution or design that addresses one or more of the identified opportunities for improvement.
6. If time and resources permit, allow groups to create a physical prototype of their design (e.g., using cardboard and other materials).
7. Instruct groups to prepare a brief presentation (3-5 minutes) that outlines their solution and how it addresses sustainability challenges in their assigned sector/topic.
8. Allow each group to present their solution and lead a brief discussion on the feasibility and potential impact of their design.
9. Assess participants based on their participation in the research, ideation, and design phases, as well as the quality and feasibility of their final design.

Assessment criteria:

- Understanding of sustainability concepts and challenges
- Quality and feasibility of the proposed solution
- Creativity and innovation in the design process
- Ability to communicate and present ideas effectively
- Collaboration and teamwork skills.

6.2 Other practical activities

Activity 1: Waste Audit

Learning objectives:

- Understand the types and sources of waste
- Identify opportunities for waste reduction
- Develop solutions for reducing waste

Materials needed:

- Garbage bags or bins
- Gloves (if necessary)
- Weighing scale
- Spreadsheet or paper for recording data

Time needed:

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- Introduction and instructions: 15-20 minutes
- Waste audit: 30-60 minutes
- Analysis and discussion: 30-45 minutes

Instructions:

1. Introduce the topic of waste reduction and its importance in sustainability.
2. Instruct participants to conduct a waste audit in their home, workplace or community space.
3. Provide participants with garbage bags or bins and gloves (if necessary) to collect and sort the waste into categories (e.g. recyclables, compostables, non-recyclables).
4. Weigh each category of waste using a weighing scale and record the data on a spreadsheet or paper.
5. Analyze the data and identify the sources and types of waste, as well as opportunities for waste reduction.
6. Discuss the findings and potential solutions for reducing waste in the home, workplace or community space.

Assessment criteria:

- Understanding of waste reduction and its importance in sustainability
- Ability to categorize and weigh waste correctly
- Analysis of data and identification of opportunities for waste reduction
- Development of solutions for reducing waste

Activity 2: Sustainable Food Choices

Learning objectives:

- Understand the impact of food choices on the environment
- Identify sustainable food choices
- Develop solutions for reducing environmental impact of food choices

Materials needed:

- Access to internet or library resources
- Paper and pen

Time needed:

- Introduction and instructions: 15-20 minutes
- Research and ideation: 30-45 minutes
- Discussion and reflection: 30-45 minutes

Instructions:

1. Introduce the topic of sustainable food choices and their impact on the environment.
2. Instruct participants to research and identify sustainable food choices that can reduce the environmental impact of their diet.
3. Provide a list of criteria that participants should consider when evaluating the sustainability of their food choices (e.g. local, organic, plant-based, low carbon footprint).
4. Instruct participants to develop a plan for incorporating sustainable food choices into their daily diet.
5. Lead a discussion on the challenges and benefits of sustainable food choices, and facilitate reflection on how participants can continue to make sustainable choices in the future.

Assessment criteria:

- Having a greater awareness of the impact of one's food choices on the environment around us
- Identification of sustainable food choices
- Development of a plan for incorporating sustainable food choices into the daily diet
- Reflection on the challenges and benefits of sustainable food choices

Activity 3: Sustainability Scavenger Hunt

Learning objectives:

- Identify sustainable practices in the community
- Develop solutions for improving sustainability in the community

Materials needed:

- Paper and pen
- Access to internet or library resources

Time needed:

- Introduction and instructions: 15-20 minutes
- Scavenger hunt: 45-60 minutes
- Analysis and discussion: 30-45 minutes

Instructions:

1. Introduce the topic of sustainability and its importance in the community.
2. Instruct participants to conduct a sustainability scavenger hunt in their community, using a list of sustainability practices (e.g. bike lanes, public transit, community gardens, solar panels, etc.).
3. Provide participants with a list of criteria for evaluating the sustainability of each practice (e.g. energy efficiency, resource conservation, environmental impact).
4. Instruct participants to document their findings and identify opportunities for improving sustainability in the community.

6.3 Tips and examples of best practices to apply this module to your own training activity

Best Practice 1: Engage Participants in the Learning Process

Do:

- Encourage participants to share their own experiences and knowledge related to sustainability.
- Use interactive and participatory activities to promote engagement and active learning.
- Incorporate opportunities for reflection and discussion to encourage critical thinking and application of knowledge.

Don't:

- Lecture or present information without engaging participants in the learning process.
- Assume that all participants have the same level of knowledge and understanding of sustainability.
- Neglect to provide opportunities for reflection and discussion.

Best Practice 2: Set Clear and Measurable Sustainability Goals

Do:

- Develop clear and measurable sustainability goals that align with the organization's mission and values.
- Use data and metrics to track progress towards sustainability goals.
- Develop strategies and action plans to achieve sustainability goals.

Don't:

- Set vague or unclear sustainability goals that are difficult to measure.
- Neglect to track progress towards sustainability goals or use data to inform decision-making.
- Develop sustainability goals without a clear strategy or action plan.

Best Practice 3: Foster Collaboration and Partnerships

Do:

- Foster collaboration and partnerships with other organizations, stakeholders, and the community to achieve sustainability goals.
- Engage with a variety of perspectives and stakeholders to ensure that sustainability efforts are inclusive and effective.
- Share knowledge and best practices with other organizations and stakeholders to promote broader sustainability efforts.

Don't:

- Work in isolation without engaging with other organizations or stakeholders.
- Ignore the perspectives and needs of different stakeholders when developing sustainability initiatives.
- Hoard knowledge and best practices without sharing with other organizations and stakeholders.

Bad Practice 1: Greenwashing

Don't:

- Misrepresent the environmental impact of products, services, or initiatives as more sustainable than they actually are.
- Use vague or ambiguous language to describe sustainability efforts without providing concrete evidence or data to support claims.
- Focus on superficial or cosmetic changes that do not address underlying environmental issues or sustainability challenges.

Module assessment

Competence.

Understanding of environmental and social impact assessment methods and tools.

What is the purpose of an environmental impact assessment (EIA)?

- To evaluate the economic viability of a project (1 point)
- To identify potential environmental effects of a project (4 points)
- To assess the social impacts of a project (2 points)
- To determine the political feasibility of a project (1 point)

Competence.

Knowledge of sustainable project management practices, principles, and frameworks and Ability to integrate sustainability considerations into project planning, design, and implementation

What is the main objective of sustainable project management?

- To complete projects on time and within budget (1 point)
- To maximize profits for the organization (1 point)
- To minimize negative impacts on the environment and society while achieving project objectives (4 points)
- To meet the needs of the project team members (1 point)

Competence.

Knowledge of sustainable sourcing and procurement practices.

What is the definition of sustainable sourcing? a) The practice of buying goods and services without consideration for environmental impact (1 point) b) The practice of purchasing goods and services with the aim of reducing environmental impact and promoting social responsibility (4 points) c) The practice of purchasing goods and services without any consideration for social responsibility (1 point) d) The practice of purchasing goods and services with the aim of increasing the price of the products (2 points)

Competence.

Sustainable Construction and Infrastructure Design Principles

What is the purpose of using low-emitting materials in sustainable building design? a) To reduce the amount of material waste generated b) To improve the energy efficiency of the building c) To improve indoor air quality d) To minimize the use of fossil fuels in construction

Competence.

Ability to measure and report on sustainability performance metrics

Which of the following is an example of a sustainability performance indicator for a supply chain? a) Employee turnover rate (1 point) b) Percentage of recycled materials used (3 points) c) Average time to market (2 points) d) Number of suppliers audited for sustainability (4 points)