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Responding to Emergencies, Protecting the Environment

Environment in Humanitarian Action: Global Training Manual Template

Greenhouse Gas Emissions and Sustainable Energy Management

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This module was developed as part of the UNEP/OCHA Joint Environment Unit's project titled Localisation of Environment in Humanitarian Action, and is part of a template of a training manual consisting of:
1 Introductory Module
11 Technical Modules
1 ToT Module

The template is an open source and available for any organisation or individual to use or refer to in the development and delivery of their Environment in Humanitarian Action training.
What distinguishes this training manual is its comprehensive and flexible framework. We encourage users to adjust the content to meet with the specific needs within their specific Contexts. We kindly ask that credit is given when using or adapting this resource.

MODULE OVERVIEW

This module covers the sources and impacts of greenhouse gas (GHG) emissions in humanitarian operations and focuses on strategies for reducing emissions through sustainable energy management. The module is designed for humanitarian organizations aiming to reduce their GHG emissions by promoting sustainable energy management within their operations. Participants will gain knowledge on key concepts such as energy efficiency, renewable energy options, and sustainable energy management within humanitarian contexts. The module is closely linked to other modules, including Module 6 on Sustainable Land Management, Module 5 on Climate Change Adaptation and Disaster Risk Reduction, and Module 8 on Supply Chain Management and logistics. The module includes case studies and practical exercises to help participants apply these concepts and strategies in real-world scenarios.

Learning outcomes

By the end of this module, participants will:

1. Identify and classify sources of GHG emissions in humanitarian operations.
2. Analyze the environmental and humanitarian impacts of GHG emissions within the context of humanitarian operations.
3. Develop and implement strategies for reducing emissions and promoting renewable energy.
4. Understand the importance of sustainable energy management and its role in reducing the environmental impact of humanitarian actions.

Estimated delivery time

Total time: 180 minutes

CONTENT OUTLINE

FACILITATOR'S GUIDE

Step	Activity	Method	Duration	Materials Needed	Expected Outcomes
1	**Introduce the module.** Provide an overview of GHG emissions and sustainable energy management in humanitarian contexts.	Presentation, plenary discussion	10 mins	Slides, handouts	Understand GHG emissions, and sustainable energy management principles
2	**Identify sources and impacts.** Discuss the sources of GHG emissions (Scopes 1, 2, and 3) and their environmental and humanitarian impacts.	Lecture, Q&A	40 mins	Slides, flipchart, markers	Identify sources and impacts of GHG emissions
3	**Explain reduction strategies.** Present methods and techniques for reducing GHG emissions in humanitarian operations, through energy efficiency and renewable energy options.	Presentation, Q&A	20 mins	Slides, handouts	Learn emission reduction techniques
4	**Present case study.** Discuss a selected case study (e.g., solar energy implementation in South Sudan), highlighting key lessons learned and best practices.	Case study presentation, Q&A	30 mins	Case study handouts, flipcharts	Learn from real-world examples
5	**Group activity.** Engage participants in developing emission reduction and renewable energy plans for a hypothetical community.	Group work, presentation	50 mins	Flipchart, markers	Develop emission reduction and renewable energy plans
6	**Discuss lessons learned.** Facilitate an in-session Q&A on the lessons learned and best practices from the case studies and group activity.	Q&A	20 mins	Flipchart, markers	Discuss lessons learned and best practices
7	**Summarize and conclude.** Review key points from the module and reinforce the main takeaways.	Presentation	10 mins	Slides	Reinforce key learnings

Facilitator notes

Section 1: Introduction to greenhouse gas emissions and sustainable energy management in humanitarian operations

Key points

- Highlight the significance of managing GHG emissions in humanitarian contexts.
- Introduce key terms and concepts essential for understanding GHG emissions and sustainable energy management.
- Emphasize the importance of sustainable energy management in reducing the environmental footprint of humanitarian operations, enhancing resilience, and supporting long-term sustainability.

Background information

- Effective management of GHG emissions is crucial for minimizing the environmental footprint of humanitarian operations and mitigating climate change.
- Sustainable energy management, which includes the use of renewable energy sources and energy-efficient practices, is essential for reducing operational costs and ensuring the long-term resilience of humanitarian efforts.
- Aligning humanitarian operations with global environmental goals, such as those outlined in the Paris Agreement and the Sustainable Development Goals (SDGs), enhances the role of humanitarian organizations in promoting environmental sustainability.
- Implementing sustainable energy solutions not only reduces dependency on non-renewable resources but also supports the resilience of affected communities by providing reliable and environmentally friendly energy sources.

Content development: Introduction to greenhouse gas emissions and sustainable energy management in humanitarian operations

Table 1: Key concepts and terms

Concept	Description	Importance	Real-World Application
Greenhouse gas (GHG) emissions	Gases that trap heat in the atmosphere, contributing to global warming and climate change. Includes carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), and fluorinated gases.	Reducing GHG emissions in humanitarian operations mitigates climate change and its associated impacts on vulnerable populations.	Implementing energy-efficient technologies and practices in humanitarian shelters to reduce GHG emissions from diesel generators commonly used in refugee camps.

Carbon footprint	The total amount of greenhouse gases emitted directly and indirectly by an individual, organization, event, or product, expressed as a carbon dioxide equivalent (CO2e).	Understanding and reducing the carbon footprint of humanitarian operations helps in minimizing the environmental impacts and enhancing the sustainability of aid efforts.	Measuring the carbon footprint of a humanitarian logistics network to identify opportunities for reducing emissions through optimized transportation routes and the use of alternative fuels.
Direct emissions (Scope 1)	GHG emissions from sources that are directly owned or controlled by the organization, such as vehicles, generators, and on-site equipment.	Managing direct emissions is essential for reducing the immediate environmental impact of humanitarian field operations, especially in crisis settings.	Reducing Scope 1 emissions by transitioning from diesel to hybrid or electric vehicles in field logistics and transportation during disaster response.
Indirect emissions (Scope 2)	GHG emissions from the generation of purchased electricity, steam, heating, and cooling consumed by the organization.	Scope 2 emissions are significant in humanitarian contexts where electricity is often generated using fossil fuels, particularly in remote or off-grid locations.	Reducing Scope 2 emissions by installing solar panels at humanitarian field offices and shelters to replace grid electricity or diesel generators.
Other indirect emissions (Scope 3)	All other indirect GHG emissions that occur in the logistics and supply chain of the organization, including both upstream and downstream emissions.	Scope 3 emissions can be substantial in humanitarian operations, where supply chains, procurement, and travel are integral to projects success.	Addressing Scope 3 emissions by prioritizing local procurement to reduce transportation emissions and implementing sustainable waste management practices in refugee camps.
Sustainable energy management	The strategic use and conservation of energy resources to minimize environmental impact and operational costs.	Promotes sustainability and reduces operational costs in humanitarian settings.	Using renewable energy sources such as solar and wind power, or energy efficient material in disaster response operations.
Renewable energy	Energy generated from natural resources that are replenished constantly, such as solar, wind, and bioenergy.	Renewable energy reduces reliance on fossil fuels and ensures a stable and sustainable energy supply, especially in remote or crisis-affected areas.	Installing wind turbines or solar panels in refugee camps to provide sustainable energy for lighting, heating, and powering essential equipment, reducing dependency on external fuel supplies.
Greenhouse gas (GHG) emissions	Gases that trap heat in the atmosphere, contributing to global warming and climate change. Includes carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), and fluorinated gases.	Reducing GHG emissions in humanitarian operations mitigates climate change and its associated impacts on vulnerable populations.	Implementing energy-efficient technologies and practices in humanitarian shelters to reduce GHG emissions from diesel generators commonly used in refugee camps.

Table 2: Importance of sustainable energy management in humanitarian operations

Aspect	Description	Importance	Real-World Application
Minimizing environmental impact	Sustainable energy management involves reducing GHG emissions and minimizing the use of fossil fuels through renewable energy sources and energy-efficient practices.	Critical for aligning humanitarian operations with global environmental goals and reducing the ecological footprint of aid activities.	Implementing solar power systems in refugee camps to decrease reliance on diesel generators, significantly lowering carbon emissions.
Cost efficiency	Utilizing renewable energy and improving energy efficiency can significantly reduce operational costs, particularly in remote or resource-scarce settings.	Cost savings can be redirected to other critical humanitarian needs, enhancing overall mission effectiveness and sustainability.	Installing energy-efficient lighting and solar panels in field offices, reducing long-term energy costs and dependence on fuel supplies.
Resilience and reliability	Sustainable energy sources, such as solar or wind, provide reliable and resilient energy solutions in areas where traditional energy supply may be disrupted.	Ensures the continuity of humanitarian operations in crisis situations, especially in remote or disaster-affected areas.	Using solar-powered water pumps in drought-prone regions to ensure a reliable water supply without relying on inconsistent fuel deliveries.
Supporting long-term sustainability	Sustainable energy management promotes long-term environmental and operational sustainability by reducing dependence on non-renewable energy sources.	Supports the longevity of humanitarian operations, ensuring they remain effective and environmentally responsible over time.	Deploying microgrid systems in disaster response areas to provide sustainable and scalable energy solutions.
Alignment with global environmental goals	Sustainable energy practices align humanitarian operations with international environmental agreements, such as the Paris Agreement and the SDGs.	Enhances the role of humanitarian organizations in contributing to broader environmental sustainability objectives.	Incorporating renewable energy projects in humanitarian missions that support the SDGs, particularly Goal 7 (Affordable and Clean Energy).
Enhancing community resilience	Integrating sustainable energy solutions into humanitarian efforts can help build local capacity and resilience, particularly in energy-insecure regions.	Empowers communities by providing them with sustainable energy resources that can be maintained locally, reducing long-term dependency on external aid.	Training local communities to maintain solar installations, fostering skills and ensuring the sustainability of energy access.
Reducing operational risks	Sustainable energy management reduces the risks associated with fuel supply chains, such as price volatility and supply disruptions, which can hinder humanitarian operations.	Lowers the operational risks related to fuel shortages and the logistics of fuel transportation, especially in conflict zones or during prolonged crises.	Transitioning from diesel generators to solar energy in conflict-affected regions to reduce the need for fuel convoys and associated security risks.

Section 2: Sources and impacts of greenhouse gas emissions

Key points

- Identify the sources of GHG emissions in humanitarian contexts, categorized by Scopes 1, 2, and 3.
- Discuss the environmental and humanitarian impacts of GHG emissions.
- Highlight strategies to mitigate these impacts within humanitarian operations

Background information

- Humanitarian operations can contribute to significant GHG emissions, impacting both the environment and human health.
- Understanding the sources and impacts of GHG emissions is essential for developing effective emission reduction strategies that are tailored to the specific challenges of humanitarian contexts.

Content development: Sources and impacts of greenhouse gas emissions

Table 1: Classification of GHG emission sources in humanitarian context

Scope	Source	Description	Examples in Humanitarian Contexts
Scope 1: Direct Emissions	Transportation	Emissions from vehicles and machinery owned or controlled by the organization.	Emissions from trucks delivering aid supplies, field ambulances, and vehicles used for reconnaissance in disaster areas. Helicopters used in search and rescue operations, boats for flood relief missions, and motorbikes for last-mile delivery of aid.
	On-site fuel combustion	Emissions from the burning of fossil fuels on-site, such as in generators or incinerators.	Diesel generators providing electricity in refugee camps, kerosene heaters in temporary shelters, incinerators for medical waste in field hospitals, and cooking stoves using biomass or kerosene in emergency shelters.
	Refrigeration and air conditioning	Emissions from the use of refrigerants in cooling systems, which can leak and have high global warming potential.	Refrigeration units in medical storage facilities, air conditioning systems in field hospitals and staff accommodations, portable coolers for vaccine storage during transportation, and cold chain logistics for food distribution.
Scope 2: Indirect Emissions from Energy Use	Purchased electricity	Emissions from the generation of electricity, heating, or cooling purchased by the organization.	Electricity used in humanitarian headquarters, field offices, and communication centers powered by local grids, often reliant on coal or natural gas. Energy used in warehouses for food storage, lighting in refugee camps, and air conditioning in medical tents.
	District heating/cooling systems	Emissions from central heating or cooling systems purchased by the organization and distributed across multiple buildings or sites.	District heating systems used in large refugee camps or field offices in cold climates, cooling systems used in large-scale medical or logistics hubs, and shared energy services provided in urban refugee settings.

Scope 3: Other Indirect Emissions	Supply chain activities	Emissions from the production, transport, and disposal of goods and services purchased by the organization.	Emissions from the manufacturing and shipping of relief items such as tents, medical supplies, and food rations. Packaging materials for aid deliveries, transportation of goods by third-party logistics providers, and disposal of used or expired goods.
	Travel and logistics	Emissions from business travel, including flights and ground transportation not owned by the organization.	Carbon emissions from flights taken by humanitarian workers for field assessments, coordination meetings, or emergency response. Ground transportation by rented vehicles, taxis, and buses for staff movement between sites.
	Waste management	Emissions resulting from waste disposal, including landfill, incineration, and recycling activities.	Methane emissions from organic waste in landfills, CO2 from the incineration of medical and hazardous waste, and emissions from the recycling process of plastics and metals in humanitarian camps.
	Procurement of services	Emissions associated with the services contracted by the organization, such as construction and catering.	Emissions from the construction of temporary shelters and medical facilities, catering services for staff in camps, and outsourced security services. Transportation of construction materials and emissions from on-site activities.
	Employee commuting	Emissions from the daily commute of humanitarian staff using various modes of transportation.	Emissions from staff commuting by car, bus, or train to field offices and coordination centers. Emissions from shuttle services provided to staff between housing and work sites in crisis zones.
	Water usage and treatment	Emissions related to the sourcing, distribution, and treatment of water used in humanitarian operations.	Emissions from the transportation and treatment of water for drinking and sanitation in refugee camps, desalination units powered by diesel generators, and wastewater treatment facilities.

Table 2: Environmental and humanitarian impacts of GHG emissions

Source	Environmental Impacts	Humanitarian Impacts
Transportation	Contributes to air pollution, increases CO2 levels, and accelerates climate change.	Worsen air quality, leading to respiratory issues among vulnerable populations; increases operational costs due to fuel consumption.
On-site fuel combustion	Increases the carbon footprint, releases CO2, particulate matter, and other pollutants.	Contributes to local air pollution, health problems for residents and aid workers, and dependency on unstable fuel supplies.
Refrigeration and air conditioning	Leaks of refrigerants can contribute significantly to global warming; energy use also increases emissions.	Essential cooling for vaccines and food, but can lead to high emissions if not managed properly.
Purchased electricity	Indirectly increases CO2 emissions if sourced from fossil-fuel-powered grids.	Dependence on non-renewable electricity can lead to higher operational costs and vulnerability to energy supply disruptions.

Supply chain activities	Emissions from production and transportation contribute to global GHG levels and environmental degradation.	Increases the carbon footprint of operations, leading to higher logistical costs and potential delays in aid delivery.
Travel and logistics	Air travel and extensive ground transportation significantly contribute to GHG emissions, particularly from long-haul flights.	High travel-related emissions can undermine the sustainability goals of humanitarian operations.
Waste management	Methane emissions from landfills, CO2 from incineration, and pollution from improper waste disposal contribute to climate change.	Poor waste management can lead to health hazards in camps, such as water contamination and increased disease risk.
Procurement of services	Construction and service procurement contribute to emissions by using heavy machinery, transportation, and material production.	Emissions from these activities can lead to increased environmental degradation and higher operational costs.
Employee commuting	Daily commuting by car or bus increases CO2 emissions, particularly in areas where public transport options are limited.	Can contribute to traffic congestion, air pollution, and health issues among staff and local communities.
Water usage and treatment	Energy-intensive water treatment processes contribute to GHG emissions, particularly in areas relying on diesel-powered systems.	Poor water management can exacerbate water scarcity, affect sanitation, and increase the risk of disease outbreaks.

Section 3: Strategies for reducing emissions focusing on sustainable energy management

Key points

- Discuss the various methods and techniques for reducing greenhouse gas (GHG) emissions in humanitarian operations, with a focus on prioritizing the most impactful measures, such as procurement, business air travel, and energy efficiency.
- Emphasize the role of renewable energy as a critical strategy for reducing emissions and enhancing sustainability in crisis settings.

Background information

- Reducing GHG emissions in humanitarian operations is essential for minimizing environmental impacts, enhancing sustainability, and ensuring the long-term effectiveness of aid efforts.
- Renewable energy offers significant opportunities for reducing reliance on fossil fuels, lowering operational costs, and providing reliable energy in remote or crisis-affected areas.
- Among the various strategies for reducing emissions in humanitarian operations, certain measures are particularly impactful and should be prioritized. These include the procurement of goods and services, which often constitute a significant portion of an organization's carbon footprint, as well as business air travel, which is typically one of the largest contributors to GHG emissions in the humanitarian sector. Energy efficiency measures, such as optimizing building insulation, are also crucial for reducing operational emissions and should be considered in all relevant projects

Content development: Strategies for reducing emissions and promoting renewable energy

Strategy	Description	Importance	Examples
Energy efficient techniques	Implementing energy-saving technologies and practices to reduce overall energy consumption in humanitarian operations, including building insulation to reduce heating and cooling demands.	Reduces the carbon footprint of humanitarian operations and supports environmental sustainability, crucial in resource-scarce and vulnerable environments.	Using LED lighting, optimizing generator use, and improving insulation in both temporary and permanent shelters to reduce energy consumption and improve energy efficiency.
Renewable energy options	Sustainable energy sources such as solar, wind, and bioenergy tailored for humanitarian settings.	Decreases reliance on fossil fuels and reduces GHG emissions, ensuring energy security in remote and off-grid locations.	Installing solar panels for electricity generation in refugee camps and field offices, using portable solar chargers for field operations.
Green building practices	Eco-friendly construction methods and materials suitable for temporary and permanent shelters in crisis areas.	Minimizes environmental impact and improves sustainability of shelters and infrastructure, enhancing resilience and reducing logistical burdens.	Using locally sourced, sustainable materials for building shelters; implementing passive cooling techniques in emergency housing.
Sustainable water management	Implementing energy-efficient systems for water collection, treatment, and distribution in humanitarian operations.	Reduces both water and energy consumption, mitigates environmental impact, and lowers emissions, especially in drought-prone and water-scarce crisis areas.	Using solar-powered water pumps for well extraction, gravity-fed water distribution systems to minimize energy use, and solar-powered chlorination stations for water treatment in camps.
Waste reduction and recycling	Programs to minimize waste and promote recycling in disaster-affected areas.	Reduces landfill use and lowers GHG emissions from waste decomposition, important for maintaining sanitation and health in camps.	Establishing comprehensive recycling programs and composting organic waste in refugee camps and disaster response sites.
Sustainable agriculture	Promoting eco-friendly farming practices in crisis-affected regions.	Supports food security while reducing environmental impact, vital for displaced populations relying on local agriculture.	Using organic fertilizers, crop rotation, and sustainable irrigation methods in agricultural programs for refugees and displaced persons.
Transportation optimization	Improving logistics to reduce emissions in humanitarian aid delivery and operations.	Lowers fuel consumption and reduces carbon footprint, essential for efficient and sustainable supply chains in crisis response.	Optimizing transportation routes and using electric or hybrid vehicles for aid delivery and logistics in disaster-affected areas.
Awareness and education on energy saving techniques	Educating staff and communities on the importance of energy efficiency and how to implement energy-saving practices.	Fosters a culture of sustainability within humanitarian operations, ensuring that energy efficiency and emission reduction are prioritized.	Training humanitarian staff on best practices for energy use in field offices, conducting workshops for local communities on how to reduce energy consumption, and integrating energy awareness into standard operating procedures.

Section 4: Case studies and best practices

Key points

- Present relevant case studies that illustrate successful emission reduction and renewable energy implementation.
- Highlight lessons learned and best practices from these case studies.
- Provide real-world examples to reinforce the concepts discussed in previous sections.

Background information

- Case studies offer concrete examples of the challenges and solutions related to emission reduction and renewable energy implementation in humanitarian contexts.
- By examining these real-world instances, participants can gain insights into effective strategies and practices that have been successfully implemented in various settings.

Content development: Case studies and best practices

Case Study	*Context*	*Environmental Challenge*	*Humanitarian Response*	*Lessons Learned*
Producing energy with a bio-digester system (IOM – South Sudan)	Malakal Protection of Civilians Site, South Sudan. Funded by DFID, USAID's Bureau for Humanitarian Assistance, DG ECHO.	Efficient faecal sludge management and energy provision in IDP camps, preventing soil and water contamination, and reducing deforestation	Implemented by IOM. An anaerobic bio-digester was installed to treat faecal sludge, producing biogas for cooking and lighting, reducing sludge volume, and associated GHG emissions	1. Bio-digesters reduce sludge volume by 67%, decreasing GHG emissions from waste stabilization ponds2. Saves 9.4-11.4 tonnes of firewood annually, reducing CO2 emissions by 11.07-13.32 tonnes/year3. Provides social benefits by saving time for beneficiaries, reducing gender-based violence risks, and offering training and employment opportunities4. Requires community sensitization and technical expertise for sustainability5. Demonstrates the importance of local capacity building and comprehensive maintenance plans for successful implementation

Solarizing a humanitarian hub (IOM – South Sudan)	Malakal Humanitarian Hub, South Sudan. Funded by DFID (now FCDO).	High energy costs and carbon footprint from diesel generators in a remote and insecure area.	Implemented by IOM. Transitioned the hub to solar energy covering 80% of its energy needs with a 700 kWp solar PV system and 1,368 kWh battery storage, reducing reliance on diesel generators.	1. Initial investment of €250,000 led to significant cost savings of €300,000 over 5 years and reduced CO2 emissions by 744 tonnes/year.2. Importance of comprehensive energy assessments and innovative contractual agreements with private sector.3. Key challenges included securing initial capital investment, technical expertise, and working with private companies in difficult contexts.4. Demonstrated the need for senior management support and multi-departmental collaboration for successful implementation.5. Highlighted unresolved issues related to battery recycling and maintenance, emphasizing the need for sector-wide solutions.
Nature-based solutions for climate resilience in humanitarian action (Sphere Guide)	Various humanitarian settings including protracted crises, post-acute shock situations, and refugee settlements. Supported by USAID, BMUV, BMZ, IUCN, and WWF.	Increasing disaster risk due to climate change and environmental degradation, which exacerbate humanitarian crises. Need for sustainable, resilient interventions that can be implemented in diverse humanitarian contexts.	Implemented by a coalition of experts and organizations under Sphere's guidance. Focuses on integrating Nature-based Solutions (NbS) such as ecosystem restoration, agroforestry, and sustainable land management into humanitarian action. These solutions address immediate humanitarian needs while building long-term resilience.	1. NbS reduce vulnerabilities to disasters by leveraging ecosystem services (e.g., flood control by wetlands) and improving immediate humanitarian outcomes.2. Effective when integrated with local knowledge and practices, promoting community-led solutions that are sustainable and culturally appropriate.3. Require cross-sectoral collaboration and long-term commitment for sustainability, ensuring that interventions are adaptable to changing humanitarian needs.4. Challenges include securing funding, technical expertise, and ensuring inclusive, gender-responsive approaches that engage all community members.5. Demonstrates the need for comprehensive assessments and continuous monitoring to adapt and scale NbS effectively, ensuring they meet both immediate and long-term humanitarian goals.

ACTIVITIES

1.Case study analysis:

- ***Activity:*** Participants analyze a provided case study (e.g., solar energy implementation in South Sudan) and discuss the lessons learned and best practices that can be applied to their own contexts.
- ***Discussion points:*** *What were the key environmental challenges? How did the humanitarian response address these challenges? What lessons can be learned from this case study?*

2. Interactive exercise: developing emission reduction and renewable energy plans:

- ***Activity:*** Participants work in small groups to develop a comprehensive emission reduction and renewable energy plan for a hypothetical humanitarian scenario.
- ***Scenario example:*** *Planning a new refugee camp with a focus on sustainability – participants will need to consider emission reduction, renewable energy solutions, and sustainable energy management.*

3. Group discussion: lessons learned and best practices:

- ***Activity:*** Facilitate a group discussion on the key lessons learned and best practices from the case studies.
- ***Discussion points:*** *What are the common themes across the case studies? How can these lessons be applied to other humanitarian contexts? What challenges might arise when implementing these best practices?*

4. Brainstorming session: identifying GHG emission sources:

- ***Activity:*** Participants brainstorm and identify potential sources of GHG emissions in a hypothetical humanitarian operation.
- ***Discussion points:*** *Which activities are likely to contribute to GHG emissions? How can these sources be minimized?*

5. Q&A session: exploring renewable energy options:

- ***Activity:*** A facilitated Q&A session to explore different renewable energy options suitable for humanitarian operations.
- ***Discussion points:*** *What are the benefits and challenges of using renewable energy in humanitarian settings? How can these challenges be addressed?*

RESOURCES

Materials

- Printed case studies and examples.
- Multimedia resources (videos, infographics) on successful emission reduction and renewable energy practices in humanitarian contexts.
- Tools and instructional materials for hands-on activities (e.g., solar panel setup).
- Flipcharts and markers for group activities and discussions.

References

- European Civil Protection and Humanitarian Aid Operations. (2021). Compendium of good practices for a greener humanitarian response. Retrieved from https://www.urd.org/wp-content/uploads/2021/06/DOC_EU_ENVIRONMENT_COMPENDIUM_EN_250621.pdf
- Hoffman, J., & Henly-Shepard, S. (2023). Nature-based solutions for climate resilience in humanitarian action: A Sphere unpacked guide. Sphere. Retrieved from https://spherestandards.org/resources/nbs-guide/
- IFRC. (2020). World Disasters Report 2020. Retrieved from https://www.ifrc.org/document/world-disasters-report-2020
- IFRC. (2021). Climate and Environment Charter for Humanitarian Organizations. IFRC. Retrieved from https://www.climate-charter.org/
- IFRC. (2021). Green Response: Introduction. IFRC. Retrieved from https://www.ifrc.org/sites/default/files/2021-11/Green-Response-Intro-Oct-2021.pdf

Delivery method

- **Lectures:** Use lectures to introduce the case studies and highlight key lessons learned and best practices.
- **Group work:** Engage participants in group activities to foster collaboration and deeper understanding.
- **Group discussions:** Facilitate interactive group discussions to ensure participant engagement and comprehension of key topics.
- **Q&A sessions:** Facilitate interactive Q&A sessions to ensure participant engagement and comprehension of key topics.

Assessment tools

- **Quizzes:** Short quizzes at the end of the module to assess understanding of key concepts such as sources and impacts of GHG emissions, emission reduction techniques, renewable energy options, and principles of sustainable energy management.
- **Reflection questions:** Open-ended questions for participants to reflect on what they have learned, such as:
  - *How can the strategies discussed be applied to your current or future humanitarian operations?*
  - *What are the potential challenges in implementing these strategies and how can they be overcome?*

- **Group presentations:** Evaluation of group presentations from the interactive exercise on developing emission reduction and renewable energy plans. This assesses participants' ability to apply the concepts learned in a practical scenario.
- **Participation in discussions and activities:** Informal assessment based on active participation in group discussions, and brainstorming sessions, ensuring engagement and comprehension of the material.

Reflection and review questions

- **Introduction to greenhouse gas emissions, and sustainable energy management**
  - What are the main sources of greenhouse gas emissions in humanitarian operations?
  - Why is energy management important in reducing the environmental impact of humanitarian actions?
- **Sources and impacts of greenhouse gas emissions**
  - Identify the primary sources of GHG emissions in humanitarian contexts.
  - Discuss the environmental and humanitarian impacts of these emissions.
- **Strategies for reducing emissions and promoting renewable energy**
  - What methods can be used to reduce GHG emissions in humanitarian operations?
  - How can renewable energy options be integrated into disaster response and recovery efforts?
- **Overall reflection**
  - How has this module changed your understanding of greenhouse gas emissions, energy management, and green response in humanitarian contexts?
  - What are three key takeaways that you will apply in your work?

KEY TAKEAWAYS

1. **Understanding Greenhouse Gas Emissions and energy management in humanitarian operations:**
   Managing GHG emissions is crucial for minimizing the environmental footprint of humanitarian operations. Sustainable energy management, which includes the use of renewable energy sources and energy-efficient practices, reduces operational costs and enhances the long-term resilience of humanitarian efforts.
2. **Identifying sources and impacts of GHG emissions:**
   GHG emissions in humanitarian contexts originate from direct sources such as fuel combustion and vehicle use (Scope 1), indirect energy use such as purchased electricity (Scope 2), and broader supply chain activities (Scope 3). These emissions contribute to climate change and have significant environmental and health impacts, particularly in vulnerable communities.
3. **Strategies for reducing emissions in humanitarian settings:**
   Implementing energy-efficient technologies, optimizing transportation, and promoting green building practices are effective methods for reducing emissions. Prioritizing impactful measures, such as procurement and business travel, helps humanitarian organizations achieve significant GHG reductions.
4. **Promoting renewable energy for sustainable operations:**
   Renewable energy sources, such as solar and wind power, provide reliable, sustainable alternatives to fossil fuels in crisis settings. Integrating renewable energy into humanitarian operations reduces GHG emissions, enhances energy security, and supports community resilience.
5. **Importance of sustainable energy management:**
   Sustainable energy management not only minimizes environmental impact but also aligns humanitarian operations with global environmental goals, such as the Paris Agreement and the Sustainable Development Goals (SDGs). This approach enhances the role of humanitarian organizations in promoting environmental sustainability.
6. **Case studies and best practices in emission reduction:**
   Real-world examples, such as the solarization of the Malakal Humanitarian Hub in South Sudan and the use of bio-digester systems for energy production, illustrate the effectiveness of emission reduction strategies. These case studies highlight the importance of innovation, community involvement, and multi-sectoral collaboration.
7. **Balancing operational needs and environmental sustainability:**
   Achieving a balance between operational needs and environmental sustainability is essential in humanitarian contexts. By adopting green response strategies and eco-friendly practices, humanitarian actors can reduce their carbon footprint while maintaining the efficiency and effectiveness of their operations.
8. **Engaging communities and building local capacity:**
   Involving local communities in energy management and renewable energy projects fosters ownership and enhances the sustainability of interventions. Training local populations in maintaining solar installations and energy-efficient technologies supports long-term energy access and resilience.
9. **Challenges and opportunities in implementing green response:**
   While implementing sustainable energy solutions presents challenges such as funding, technical expertise, and maintenance, these can be addressed through cross-sectoral collaboration, capacity building, and innovative approaches. Humanitarian actors must prioritize solutions that are adaptable, scalable, and context-specific.

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