2.5 INTRODUCTION TO CLIMATE CHANGE

Climate mitigation and adaptation

Important notice
This unit is part of a package of learning materials designed to support understanding of foundational concepts relating to climate-related financial disclosures. These learning materials do not constitute application or regulatory guidance for the preparation of climate-related financial disclosures and are not intended to represent legal or professional advice. We encourage you to seek your own professional advice to find out how the Corporations Act 2001 (Corporations Act) and other relevant laws may apply to you and your circumstances, as it is your responsibility to determine your obligations and comply with them.

Key topics

- Climate mitigation
- Climate adaptation

Relevance for climate-related disclosures

Climate change mitigation and climate change adaptation are important concepts for understanding and identifying climate-related risks and opportunities. Entities can undertake mitigation and adaptation in their own capacity or can be impacted by the mitigation and adaptation activities of governments, businesses and societies.

In this unit, you will be introduced to the concepts of mitigation and adaptation, as understood through the United Nations Framework Convention on Climate Change (UNFCCC) and the Intergovernmental Panel on Climate Change (IPCC). Module 2, Unit 3 has more information on the UNFCCC and IPCC.

Overview

Mitigation and adaptation are two key pillars of global climate policy. Mitigation and adaptation activities by governments, businesses and societies, may impact on climate-related risks and opportunities at the entity level. Entities themselves may engage in activities to mitigate and adapt to climate change, and these activities can affect their climate-related risks and opportunities.

Mitigation (of climate change) at the global policy level is defined by the IPCC as measures such as those to reduce or avoid greenhouse gas emissions or enhance the sinks of greenhouse gases.

Adaptation at the global policy level is defined by the IPCC to mean changes by people and in nature to deal with current or future climate conditions, to reduce harm or take advantage of any benefits.

What is climate mitigation?

Mitigation (of climate change) is defined by the IPCC in its Sixth Assessment Report (AR6) as 'a human intervention to reduce emissions or enhance the sinks of greenhouse gases.'[1]
Mitigation measures can include climate policy, technologies, processes or practices that contribute to mitigation, for example, renewable energy, waste reduction or public transport.[1]

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Examples of climate mitigation measures

Table 1 shows illustrative examples of measures that could be implemented across different areas of activity to reduce emissions or enhance sinks and how a business could potentially apply these measures.

Table 1: Climate mitigation options by sector (adapted from IPCC AR6 WGIII Figure SPM.8)[2]

Sector and system	Mitigation options	Example of climate mitigation option
Energy	Renewable energy technologies like wind, solar and bioenergy.	A retail business could put solar panels on its buildings or buy green electricity.
Agriculture, forestry and other land use	Measures to enhance and conserve sinks like ecosystem restoration, reforestation and afforestation. Measures to reduce greenhouse gas emissions like reducing methane and nitrous oxide emissions from agriculture or reducing food loss and waste.	A business that uses timber could buy timber from sustainably managed forests and commit to no deforestation. A farming business could switch to organic fertilisers.
Buildings	Measures to improve energy efficiency for appliances, heating ventilation and air conditioning and change to on-site renewable energy where possible. Measures for new buildings to improve design and use less greenhouse gas emissions intensive materials and methods.	Offices can shift from gas to electric powered appliances and systems and install solar panels. A construction company could use recycled and green materials (e.g. green steel) and work with the architect to enhance building energy efficiency and use fewer materials.
Transport	Measures to shift to different modes of transport and switch to electric vehicles. Where electrification is not possible, measures to increase the fuel efficiency of vehicles, and/or switch to less greenhouse gas emissions intensive fuels.	A delivery business could encourage employees to take public transport or walk or bike into work and use electric vehicles for deliveries. A charter plane company could switch to sustainable aviation fuels.

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Urban systems	Measures to reduce emissions from energy systems, buildings, transport can also be applied in urban settings (outlined above). Measures to prevent, minimise and manage waste. Measures to increase green infrastructure and blue infrastructure in cities.	A restaurant chain could implement a composting system to ensure food waste does not go to landfill. A building company could incorporate more green infrastructure (e.g. green roofs or walls) and blue infrastructure (e.g. a pond) in urban buildings.
Industry	Measures to improve energy efficiency and electrify. Measures to use materials efficiently, minimise waste and maximise resource use.	A manufacturing company can switch from diesel- or gas-powered tools and machinery to electric options. A steel producer could shift to recycling and repurposing scrap metal rather than raw materials like iron ore.

What is climate adaptation?

Climate adaptation is about human and societal adjustment to actual or expected climate change and its impacts.

Adaptation as defined by the IPCC in AR6 has two components, for both human systems and natural systems:

- For people and communities: making changes to deal with current or future climate conditions and its effects, either to reduce harm or take advantage of any benefits
- For nature: making changes to deal with current or future climate conditions and its effects. People can also facilitate changes in nature to support this.[1]

Adaptation behaviour involves 'human actions that directly or indirectly affect the risks of climate change impacts.'[1]

Climate adaptation is closely related to climate resilience, which is our ability to prepare for and recover from the impacts of climate change.

Examples of climate adaptation options

Table 2 shows illustrative examples of measures that could be implemented across different systems to adapt to climate change and how an entity could potentially apply these measures.

Table 2: Climate adaptation options with high potential feasibility (adapted from IPCC AR6 WGII Figure SPM.4)[1,2,3]

System	Climate adaptation option	Description	Example of climate adaptation option
Land and ocean ecosystems	Forest-based adaptation	Sustainable forest management, forest conservation and restoration, reforestation and afforestation	A timber company might invest in reforestation and sustainable forest management to reduce erosion, improve biodiversity, and create carbon sinks that help offset emissions.

	Coastal defence and hardening	Infrastructure and engineering that protect, accommodate or relocate coastal assets using hard engineering (e.g. seawalls) and soft engineering (e.g. beach and shore nourishment)	A coastal resort could build sea walls or elevate buildings to protect against rising sea levels and storm surges.
	Integrated coastal zone management	Processes to promote sustainable management of coastal zones	A marine tourism operator might work with local councils and environmental groups to manage beach erosion, protect coral reefs, and balance tourism with ecosystem health.
Urban and infrastructure systems	Green infrastructure	Natural and constructed ecological systems that can deliver air and water purification, temperature and flood management and coastal protection.	An urban property developer could include green roofs, rain gardens, and tree-lined streets in new projects to reduce heat, manage stormwater, and improve air quality.
	Enhancing ecosystem services	Ecological processes or functions that promote value to society.	A tourism company ensures that people's damage to the environments visited is minimal and measures put in place to reduce impacts.
Energy systems	Resilient power infrastructure	Maintaining or increasing the reliability of power generation systems during extreme weather events	An energy company might upgrade its grid to withstand extreme weather—like burying power lines or installing smart grid technology to quickly reroute electricity during outages.
	Energy reliability	Including diversification, access and stability of energy	A data centre could install backup solar panels and battery storage to ensure continuous operation during heatwaves or grid failures.
	Improve water use efficiency	Improving water efficiency for existing and new energy generation systems	An energy company could implement water management strategies, including monitoring and forecasting systems to manage water storage and flow more efficiently.
Cross-sectoral	Disaster risk management	Making plans and taking action to understand and reduce the chances of disasters happening, and being ready to respond quickly and effectively when disasters do occur, to help keep people safe and support their wellbeing	A retail chain could develop emergency response plans, train staff, and stock essential supplies to stay operational during floods or bushfires.

	Climate services, including early warning systems	Providing scientifically credible, accessible information to help decision-makers. Early warning systems are the tools and processes to give timely, actionable information about dangers like floods or heatwaves so people can act promptly and reduce the possibility of harm or loss.	A logistics company might subscribe to climate forecasting services to adjust delivery routes and schedules based on extreme weather alerts.

Countries are required to both mitigate and adapt to climate change under the UNFCCC and the Paris Agreement, as explored in Units 3 and 4 of this module.

Key takeaways

- Mitigation and adaptation are the two key pillars of global climate policy.
- Climate mitigation refers to measures such as those to reduce or avoid greenhouse gas emissions.
- Climate adaptation refers to measures to adjust to climate impacts.
- Understanding current and future mitigation and adaptation efforts of governments, businesses and societies can help your entity consider its climate-related risks and opportunities.

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[1] Intergovernmental Panel on Climate Change *Glossary*

[2] Skea, J., Shukla, P. R., Reisinger, A., Slade, R., Pathak, M., Al Khourdajie, A., ... & Winkler, H. (2022). Summary for policymakers. In *Climate Change 2022: Mitigation of Climate Change: Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press

[3] Cooley, S., D. Schoeman, L. Bopp**,** P. Boyd, S. Donner, D.Y. Ghebrehiwet, S.-I. Ito, W. Kiessling, P. Martinetto, E. Ojea, M.-F. Racault, B. Rost, and M. Skern-Mauritzen (2022): *Oceans and Coastal Ecosystems and Their Services. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press