

Operational Resilience to Climate Change

[GRI 102-2]

The flash flood event in Sumatra at the end of 2025 is clear evidence of the increasing intensity of climate change, the impact of which is also felt by the telecommunications industry. In this regard, TelkomGroup itself has proactively identified climate-related risks and opportunities as well as analyzed the climate scenario based on the framework of the Task Force on Climate-related Financial Disclosures (TCFD) since 2023. This process will continue in 2025 to look at the financial impact of climate risks to provide insight into the company's resilience. The process, methods, results, limitations, and assumptions of climate risk assessment in full can be found in the

[2023 Climate Risk Report](#).

Climate-related Risks and Opportunities

TelkomGroup has identified climate-related risks and opportunities for two categories, namely physical and transitional, which have the potential to have an impact on the company in the short (next 5 years), medium (5-15 years), and long term (more than 15 years). Information related to the methodology in determining climate-related risks and opportunities identified by TelkomGroup can be accessed in [the Telkom Climate Risk Report 2023](#) and [Telkomsel Sustainability Report 2024](#).

Table 11. List of Risks and Opportunities related to TelkomGroup's Climate

Type		Risk [R] / Opportunity [O]
Physical	Acute Due to extreme weather events	• Extreme rain/flooding [R] • Cyclone [R] • Forest fires [R] • Heatwave [R]
	Chronic Due to long-term changes in climate patterns	• Temperature rise [R] • Increased rainfall [R] • Sea level rise [R] • Water stress [R]
Transition	Policy & legal Due to changes in emission reduction regulations	• Rising carbon prices [R/O] • Increased energy costs due to energy regulations [R]
	Technology As a result of the adoption of technology and innovation that supports emission reduction	• Renewable energy [O] • Low carbon/green ICT technology [O]
	Markets Due to changes in market prices and demand for high-emission commodities, services, and low-carbon products	• Increased material supply prices [R/O] • Changing consumer preferences [R/O]
	Reputation As a result of the distorted perceptions and expectations of stakeholders on climate action	Reputational impact in meeting stakeholder expectations [R/O]

To better understand how climate-related risks and opportunities may impact the company, TelkomGroup selects key risks and opportunities for further analysis. This process includes defining relevant time horizons, mapping the exposure of assets to identified risks and opportunities, determining appropriate response strategies, and assessing potential financial impacts. The selection process considers the relevance of policy developments and prevailing conditions that may affect TelkomGroup's business, as well as the availability and readiness of internal processes.

Table 12. TelkomGroup's Climate-related Risk and Opportunity Analysis

Physical	
[R] Increased intensity and frequency of extreme rainfall that can cause flooding	
Period	Short to long term (5 years to more than 15 years in the future)
Concentration of assets exposed to risk	Land and building assets mainly on the islands of Sumatra, Kalimantan, Java, Sulawesi, and Papua / Base Transceiver Station (BTS) on the islands of Sumatra and Sulawesi
Strategy	Land and building assets • Asset infrastructure upgrade • Routine flood risk assessments for critical assets • Provision of flood management equipment and facilities • Preparation of flood management guidelines and Business Continuity Management • Formation of Disaster Recovery Plan and Crisis Management Team • Acceptance of ISO 22301:2019 Business Continuity Management System (BCMS) certification • Backing up access networks and networks for vulnerable areas • Insurance of assets prone to disasters BTS • Installation of elevation platforms and waterproof fixtures to protect BTS units in flood-prone areas • Formation of Telkomsel Emergency Response and Recovery (TERRA) team and Crisis Management (CMT) team • Implementation of standalone and hybrid energy solutions at base sites to reduce dependence on grid electricity during extreme weather disruptions • Placement of critical network infrastructure in high-elevation locations to minimize flood risk • Conduct annual emergency exercises and simulations to ensure operational readiness • Insurance of assets prone to disasters
Potential financial impact	• Increased operational costs • Increased cost of capital on investment • Impairment of assets • Expected increase in credit losses
[R] Rising air temperatures can lead to damage to assets, infrastructure, and decreased productivity of field workers	
Period	Medium to long term (5-15 years or more than the next 15 years)
Concentration of assets exposed to risk	Land and building assets mainly in East Java, DKI Jakarta, and West Java Provinces / BTS on the islands of Sumatra and Sulawesi
Strategy	Land and building assets • Management of equipment and cooling systems through the Finance & Asset Operation unit • Implementation of IoT in towers and buildings for air temperature monitoring BTS • Use of heat-resistant materials and improved ventilation systems in critical equipment rooms • Use of infrastructure materials that are resistant to high temperatures
Potential financial impact	• Increased operational costs • Increased cost of capital on investment

Transition	
[R/O] The increase in carbon prices is driven by increasingly stringent carbon tax regulations to support decarbonization	
Period	Medium to long term (5-15 years or more than the next 15 years)
Concentration of assets exposed to risk	All entities in TelkomGroup
Strategy	• Preparation of a climate transition roadmap • Preparation of a response to the Carbon Disclosure Project (CDP) • Modernizing the system • Improving operational efficiency to reduce emissions
Potential financial impact	● Increased operational costs ● Reduced operational costs ● Increased revenue
[O] Use of renewable energy to reduce emissions and optimize operational costs	
Period	Medium to long term (5-15 years or more than the next 15 years)
Concentration of assets exposed to risk	Building Assets / BTS
Strategy	Building assets The use of new and renewable energy technologies in street lighting, data centers, and offices BTS Implementation of standalone and hybrid energy solutions at base sites to reduce dependence on grid electricity during extreme weather disruptions
Potential financial impact	● Increased operational costs ● Reduced operational costs ● Increased cost of capital on investment
[R] Increased energy and electricity costs from rising supply chain energy tariffs	
Period	Medium to long term (5-15 years or more than the next 15 years)
Concentration of assets exposed to risk	Building assets / BTS
Strategy	Building assets • Initiation of the Energy Efficiency Care Movement (GePEE) • Implementation of IoT and AN systems for energy saving BTS Adopt energy-saving technology
Potential financial impact	● Increased operational costs ● Reduced operational costs

Transition

[R/O] Reputational impact arising from the success of, or failure to meet, stakeholder expectations of a company's climate action

Period	Medium to long term (5-15 years or more than the next 15 years)
Concentration of assets exposed to risk	All entities in TelkomGroup
Strategy	• Collaboration with rating agencies to obtain ESG ratings • Regular reporting of ESG initiatives and performance to stakeholders
Potential financial impact	● Increased revenue ● Increased access to funding ● Decreased access to funding ● Increased operational costs ● Reduced operational costs

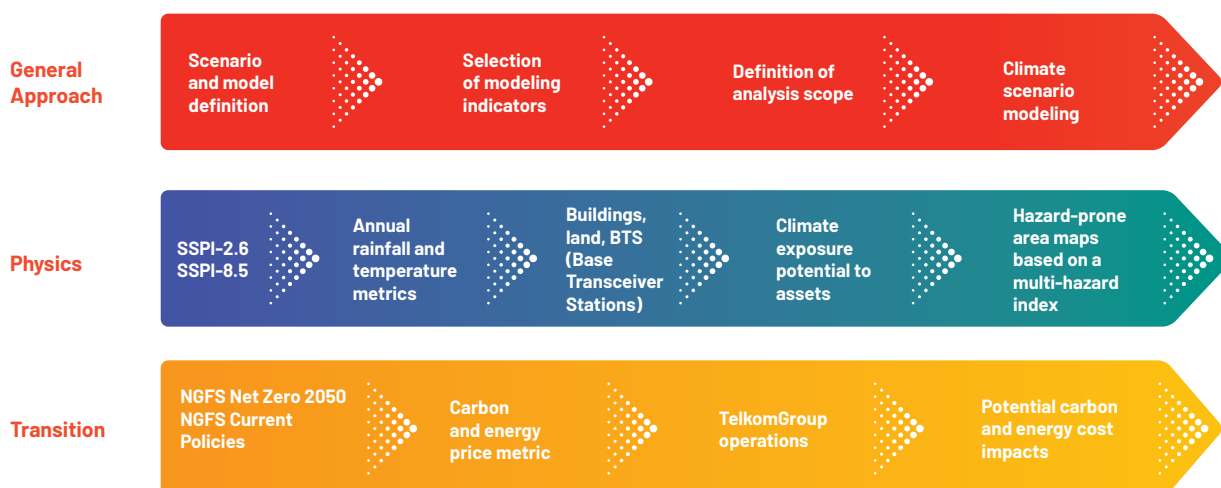
Legend:

● Positive financial impact ● Negative financial impact

Climate Scenario Analysis

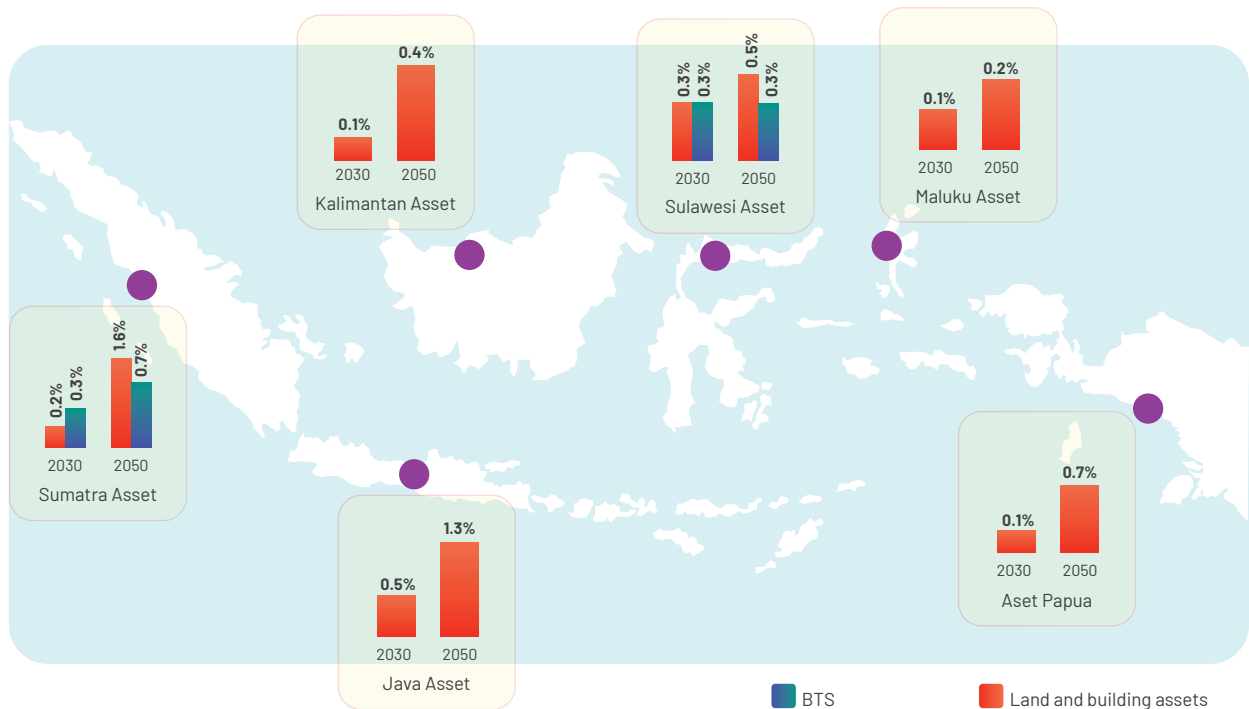
TelkomGroup has conducted a climate scenario analysis of two physical risks, namely extreme rain/flood and temperature rise, to determine the potential exposure to land and building assets in 2023, followed by an assessment of TelkomGroup's BTS assets in 2024 with the approach as shown in Figure 40. This analysis uses the Shared Socio-economic Pathways (SSP) – Sustainable Development (SSP1-2.6) and Fossil-fueled Development (SSP5-8.5) scenarios to see the conditions of climate change if the world achieves the Paris Agreement targets or limited climate action in 2030 and 2050. This process is further strengthened with follow-up analysis to map assets that are exposed to both physical climate hazards identified in high-emission scenarios and are in disaster-prone areas based on the multihazard index of the [2023 Indonesian Disaster Risk Index](#), according to the National Disaster Management Agency.

Figure 40. Climate Scenario Analysis Approach



The results of the climate scenario analysis in figure 41 show the number and distribution of land and building assets in disaster-prone locations based on BNPB that are exposed to extreme rain/flood in 2030 and 2050. The highest number of exposed assets is consistently represented by assets on the islands of Java and Sumatra, followed by Sulawesi.

Figure 41. Percentage of Land and Building Assets (red) and BTS (blue) Exposed to Extreme Rain and Temperature Rise in the SSP5-8.5 Scenario in 2030



Telkom also conducts an analysis of climate transition risks and opportunities, which include: 1) increased carbon prices, 2) the use of renewable energy, 3) increased energy and electricity costs, and 4) reputational impacts to meet stakeholder expectations. This analysis uses two reference scenarios, namely the NGFS Net Zero and Current Policy. This process is intended to identify a company's exposure based on the potential imposition of a carbon price on GHG emissions, the cost of solar panel investment, and the energy cost incurred by the company.

Through an analysis of transition risks in 2023, it is noted that Telkom's potential exposure to carbon costs will reach IDR 2.7 trillion by 2050 for the Net Zero NGFS scenario. The results of the analysis also estimate that there is a potential reduction in investment costs for solar panels to around IDR 140 billion in 2050 for the NGFS Net Zero scenario compared to 2030 (IDR 229 billion), due to the increasingly massive global efforts in the transition to a low-carbon economy. Meanwhile, energy costs, including electricity and fuel, are estimated to increase by 4.4 – 4.5% CAGR until 2050 based on the NGFS Net Zero scenario.

The results of this climate scenario analysis serve as the basis for strengthening climate transition and adaptation strategies in order to achieve operational resilience and business sustainability that can adapt to the dynamics and uncertainties caused by climate change, as outlined in Table 12.

Financial Impact Assessment

As part of ongoing efforts to understand climate risks and opportunities and to strengthen management strategies, Telkom conducted a financial impact assessment of climate risks that have a significant impact on the company's operational continuity in 2025, namely major flooding in Sumatra. This event required the company to write off some of the affected fixed assets and to procure new assets to restore services and business operations. In connection with this event, the company also incurred cleaning and recovery costs. Nevertheless, Telkom has comprehensive insurance coverage as part of its climate adaptation strategy, including protection for equipment and building assets against physical risks due to flooding in Sumatra.

Recovery and Acceleration of TelkomGroup Operations in Flood-Affected Areas in the Sumatra Region

The Sumatra region has been identified as one of the areas vulnerable to extreme rainfall for TelkomGroup (see figure 42). In November-December 2025, extreme rainfall hit various regions of Sumatra and caused flooding disasters that impacted 18 Telkom STO buildings in Aceh, North Sumatra, and West Sumatra provinces.

The priority of network restoration in Sumatra is carried out through various technical schemes to gradually restore services. These measures include repairing and strengthening network assets, utilizing alternative infrastructure to maintain connectivity in areas with limited access, and optimizing network design in locations with high exposure to climate risks. By the end of the reporting period, the repair rate of network assets had reached 95% of the total affected assets.

Figure 42. TelkomGroup's Assistance in Flood Disaster Recovery in the Sumatra Region



In addition to accelerating operational recovery, TelkomGroup is distributing social and humanitarian assistance to support community recovery. TelkomGroup participates in the Danantara Housing (Huntara or Hunian Danantara) program by providing free telecommunication and WiFi access, including the provision of WiFi Access Points in residential areas and public facilities, strengthening the cellular network through BTS and Mobile BTS, and providing satellite network access in collaboration with Telkomsat. As of the end of the reporting period, TelkomGroup's total social and humanitarian assistance distribution reached IDR 122.6 billion.

In response to the increasing frequency and intensity of extreme weather, Telkom is evaluating the adequacy of coverage and insurance costs for the coming period and strengthening its operational adaptation strategy. The company also maintains flexibility in managing financial and operational resources to ensure service resilience.

Towards Climate-Resilient Telecommunications Services

The integration of climate factors into the company's strategy is a key prerequisite for realizing telecommunications services that are resilient to climate change. Departing from these principles, the company systematically identifies, assesses, and manages climate-related risks and opportunities to ensure service sustainability, protect strategic assets, and maintain operational reliability amid the increasing intensity of extreme climate events.

With the implementation of climate-wise adaptation and operational efficiency strategies supported by a solid financial position and targeted resource allocation planning, the company assesses that the measures that have been and will be implemented are adequate to support the resilience of its business model and service continuity in the face of physical risks related to climate change until the next reporting period.