

# Telenor Group Climate Transition Plan

telenor group



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This document contains certain forward-looking statements that involve risks and uncertainties. In some cases, we use words and expressions to identify forward-looking statements (all statements other than statements of historical fact, including, among others, statements regarding Telenor's ambitions, plans, intentions, aims and expectations).

These forward-looking statements reflect current views about future events and are, by their nature, subject to significant risks and uncertainties because they relate to events and depend on circumstances that will occur in the future and are beyond Telenor's control and are difficult to predict. There are a number of factors that could cause actual results and developments to differ materially from those expressed or implied by these forward-looking statements, such as but not limited to, societal shifts in consumer demand and technological advancements, the political and economic policies of Norway and other jurisdictions where we have assets; general economic conditions; inability to meet strategic objectives or exploit growth or investment opportunities; adverse changes in tax regimes; currency exchange rate and interest rate fluctuations, the development and use of new technology; political and social stability and economic growth in relevant areas of the world; global political events and actions; including war, changes in, or non-compliance with, laws and governmental regulations; any of which could impair Telenor's ability to meet its climate ambitions and energy transition.

Although we believe that the expectations reflected in such forward-looking statements are reasonable, we cannot assure you that future results will meet these expectations. Additional information, including information on factors that may affect Telenor's business, is contained in our latest Annual Report which is available at Telenor's website <u>www.telenor.com</u>. You should not place undue reliance on these forward-looking statements since actual results could differ materially from those anticipated in these forwardlooking statements for many reasons. Telenor does not assume any responsibility for the accuracy and completeness of any forward-looking statements. Any forward-looking statement speaks only as of the date on which such statement is made. Unless required by law, we will not necessarily update any of these statements.



# Letter from the CEO

In a world where staying connected is everything, blending technological progress with taking care of our planet is key. At Telenor, we're all about linking people together while making sure we're doing our bit for the environment.

e all know going green is a must-do, so we're rolling up our sleeves. We're ramping up our use of renewable energy, teaming up with suppliers to cut emissions, working to enable emission reductions outside of our operations and progressing on our sciencebased targets.

What's next on our agenda? We're aiming for net-zero emissions by 2045. But it's not just talk; it's a full-on action plan. Our Climate Transition Plan maps out how we'll reach these goals, deal with climate risks, and make sure our efforts count. For us, dealing with climate change means more than one thing. It's about decreasing our own emissions, being ready for emergencies in all the countries we're in and getting everyone on board to reduce their carbon footprints.

Launching this plan isn't just a small step; it's a big responsibility. What we do in Telenor has ripple effects that reaches various industries, communities, and contributes to the shaping of a better future.

To all our partners, NGOs, government bodies, and everyone else in the mix; let's get collaborative! Together, we can use technology and innovation to build a world where progress and taking care of ur planet go hand in hand.

This plan is our way of making things happen and setting a new standard for a world that's sustainable, connected and for all.

Best regards, Sigve Brekke

## Introduction

The most recent assessment report from the Intergovernmental Panel on Climate Change (IPCC) has shown that to limit global warming to 1.5°C, the world must decarbonise all sectors of society and reduce global greenhouse gas (GHG) emissions to net-zero by 2050. According to the emission scenario most aligned with the 1.5°C target, the most rapid emission reductions must occur at the beginning of the period between now and 2050. As climate change is among the most impactful risks humanity currently faces, it is affecting how a telecommunicationscompany like Telenor conducts its business and operations as well as manages risks to both mitigate the effects of, and adapt to, climate change. This transition plan describes the targets and actions that Telenor will set and seek to accomplish to future-proof its operations worldwide.



# Executive summary

The Telenor Group Climate Transition Plan is structured around Mitigation, Adaptation and Enablement, and has been approved by Telenor's Board of Directors. There is a difference between Telenor's climate ambitions in Asia and the Nordics, primarily due to a lack of renewable electricity in Asia.

Our current climate targets are deemed science-based by the Science Based Targets initiative (SBTi), and are **1**) to reduce our own emissions by 64% within 2030, from a 2019 baseline, and for scope 3, **2**) to make sure that 66% of our spend comes from suppliers with sciencebased targets (SBTs) within 2025, and finally **3**) to make sure that 100% of Telenor's investments (True Corporation and CelcomDigi only) will set their own science-based targets by 2025. Telenor has further set a net-zero target according to the net-zero standard developed by SBTi. Telenor's target of reducing emissions by 90% across all scopes and to neutralize any residual emissions by 2045 is currently being validated by SBTi.



## **Mitigation:**

Telenor plans to reduce its GHG emission footprint in line with science-based targets aligned with the Paris Agreement's ambition to limit global warming to 1.5°C. **The plan consists of three steps:** 

- Until 2025: Mobilise suppliers and the merged companies Celcom Digi and True Corporation in Malaysia and Thailand to set science-based targets. This step is essential to reduce the significant amount of scope 3 emissions in the two subsequent steps. Reduce scope 1 and 2 emissions in line with Telenor's near-term science-based targets by 95% in Nordic operations and 50% in Asia operations. The preferred method for scope 2 emission reduction is to sign Power Purchase Agreements (PPAs) supporting the construction of new renewable electricity power plants. Since these are not currently available in Telenor's markets in Asia, advocacy efforts must be employed to ensure this mechanism becomes available.
- Until 2030: Continue to reduce scope 1 and 2 emissions. In addition, reduce scope 3 emissions so that the total scope 1, 2 and 3 emissions are on trajectory towards the net-zero target. Start phasing in carbon removal. Look into e.g. nature-based solutions, and ensuring this is aligned with our work on nature and biodiversity.
- Beyond 2030: Continue reducing scope 1, 2 and 3 emissions by 90% compared to the baseline year, in line with our netzero target – aiming to achieve this by 2045. Increasingly, Telenor must set stricter requirements for real emission reductions from suppliers, and proactively select suppliers with a low GHG footprint.

In addition to emission reductions, Telenor will continue to pursue energy efficiency improvements to minimise the need for renewable electricity, which is a limited global resource.

## **Adaptation:**

Telenor provides critical communication infrastructure to society and businesses. To ensure business continuity and service availability during more extreme, longlasting and/or frequent severe weather events, Telenor will need to balance proactive investments in hardening its transmission, fibre and mobile networks and data centres against operational costs related to restoration and repair during and after weather events. Such events are exacerbated by global warming and include storms, floods, landslides, fires and heatwaves.

Telenor's minimum short-term ambition is to maintain network availability at historical levels. However, as businesses and society adopt more mission-critical services dependant on the high availability of 5G slices or IoT, mobile network availability will need to further improve and be able to deliver according to strict Service Level Agreements (SLAs) and/or regulatory requirements.

## **Enablement:**

The digitalisation of society and business processes is expected to be a prerequisite to reduce emissions and adapt to climate change across most sectors and markets. This is known as the twin green and digital transition in Europe. This transition will depend on instrumentation, monitoring, data collection, remote operations, management and repair. Telenor will pursue an ambition to develop and invest in such enablement solutions together with partners, leveraging its fixed and mobile communication services in combination with IoT devices and services and datadriven automation.



#### The role of the Board of Directors

The Board of Directors (Board) is responsible for safeguarding the proper organisation of the business and supervising the day-to-day management and Telenor's business in general, including sustainability and climate-related topics. To do this, the Board annually approves Telenor's strategy as well as financial and nonfinancial targets. The strategy covers how Telenor will reach its ambitions, of which climate ambitions are part, and how it will mitigate its key risks to continue to be a long-term sustainable company. The Board also approves Telenor's Annual Report; this includes the Sustainability Statement, which contains Telenor's climate-related priorities, status and progress towards science-based targets. Sustainability reporting, including climate and environment, are addressed in the Risk and Audit Committee of the Board of Directors.

#### The role of Management

The overall responsibility for setting and working to achieve Telenor's climate targets resides with the Group Leadership Team (GLT), the Executive Vice Presidents (EVPs) of Telenor's Business Areas, and the CEOs of Telenor's Business Units. The responsibilities of Telenor's Executive Vice President – People, Sustainability & External Relations (EVP PSER) include recommending overall climate ambitions and maintaining relevant expertise in the areas of climate and environment.

Monitoring, supporting and following up Telenor's work to meet its plans for climate mitigation and adaptation falls under the responsibility of several functions and departments within Telenor Group, including PSER, Group Finance and Telenor Procurement Company. Business areas are also responsible for execution and reporting according to applicable reporting requirements and targets set by Telenor Group.

The EVP PSER and EVP Finance regularly reports to the Board on climate and environment-related progress and priorities. Material issues are raised and aligned with Telenor's top management and further reported to the Board when appropriate. Group Enterprise Risk Management aggregates risks from the business units/areas, analyses these risks across the Telenor Group in a Group Risk Forum and presents the risks, risk responses and process to top management, the Risk and Audit Committee of the Board (RAC) and ultimately to the Board. The Board and RAC reviews Telenor's top risk picture twice a year and have deep dives on relevant risks throughout the year as seen appropriate.



Telenor updates its strategy annually. The strategy is based on three strategic pillars, and includes Telenor's work on sustainability. Climaterelated ambitions, targets, plans, risks and opportunities are addressed and managed as part of the strategy process.

Telenor assesses climate risks within three time horizons: short (until 2025), medium (until 2030) and long (until 2050), in line with the scenario recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD). The years 2030 and 2050 are also key milestones in IPCC's reports as well as for the Science Based Target initiative (SBTi), where 2030 is the typical year used for near-term science-based targets, while 2050 is the final possible year related to net-zero or long-term targets. Climate risk assessment uses longer-term horizons than regular risk assessments since several climate risks have the most severe potential effects toward the end of the long-term horizon and worsen after that. This approach differs from other risks that are typically assessed within a three-year horizon aligned with Telenor's Group strategy period and strategic action plans.

# Scenario analysis

Telenor has developed **three** distinct scenarios for its climate risk assessment. The scenarios roughly correspond to public domain scenarios from the IPCC, and in particular its most recent 6th Assessment Report (AR6), as follows:

Telenor Scenario	IPCC 6th Assessment Report	IPCC - Warming by 2100 (best estimate)
Strong Mitigation Scenario (SMS)	SSP1-2.6 Low	1.3-2.4°C (1.8°C)
Delayed and Disorderly Scenario (DDS)	SSP2-4.5 Intermediate	2.1-3.5°C (2.7°C)
Business as Usual Scenario (BUS)	SSP3-7.0 High	2.6-4.6°C (3.6°C)

SSP stands for Shared Socioeconomic Pathways. These are climate change scenarios of projected socioeconomic global changes up to 2100 and are used to derive greenhouse gas emissions scenarios with different climate policies.



## **Telenor's Climate Scenarios**



### STRONG MITIGATION SCENARIO (SMS)

In this scenario, the world is able to regulate GHG emissions so that best-estimate global warming does not exceed 2 degrees, and net-zero  $CO_2$  emissions are achieved in the second half of the century. The primary risk to Telenor in this scenario is transitional and comes from policy change, as goods and services, including energy, will become more expensive due to increased pricing of GHG emissions.



### **DELAYED AND DISORDERLY SCENARIO (DDS)**

The physical damage from climate change is more severe in this scenario and the mitigation/transition is disorderly, as the global community adapts to a changing world. The transition risks to Telenor in this scenario are less severe than in the SMS, as the policy changes will happen later, and will allow Telenor to better prepare for the transition. However, the physical risks and adaptation impacts are more severe, especially toward the end of the long-term horizon.



#### **BUSINESS AS USUAL SCENARIO (BUS)**

In this scenario, there are significantly less stringent policies put into effect worldwide. GHG emissions continue to rise at approximately current levels, while the pace and severity of global warming increase significantly. The primary risk to Telenor in this scenario comes from the accelerating severity of acute and chronic physical risks related to climate change, as extreme weather, sea level and temperature increases all have increasingly severe effects in the long term.

For further details on our scenario analysis, please see Telenor's publicly available <u>TCFD report</u>.

# Mitigation, Adaptation and Enablement plans

### **Mitigation plan**

Telenor has set and published the following short-term science-based GHG emission reduction targets:

- Reduce absolute scope 1 and 2 GHG emissions by 64% within 2030, from a 2019 baseline year.
- 66% of Telenor's spend, covering purchased goods and services and capital goods, will come from suppliers having set their own science-based targets, til 2025.
- 100% of Telenor's investments will set their own science-based targets by 2025.<sup>1</sup>

Due primarily to differences in availability of renewable energy in Nordics and Asia, the ambition level in Asia is lower than in Nordics. For our near-term sciencebased target, we aim for 95% emissions reductions in Nordics and 50% in Asia. The aggregate and official near-term target is 64% reduction.

Telenor has set a Group wide net-zero target to reduce emissions by 90% across all three scopes within 2045, and to neutralise remaining residual emissions by way of permanent removal. This target is currently being validated by SBTi. However, Telenor Nordic committed to net-zero GHG emissions by 2040 upon joining the European Green Digital Coalition (EGDC) as a founding member in 2021.

Telenor is also looking into increasing the circularity of its business models, by e.g. increasing the take-back rate of sold mobile phones. The company is also assessing impacts, dependencies, risks and opportunities within the field of nature and biodiversity.

<sup>1</sup> The 100% refers to the material unconsolidated ownership stakes in the merged companies in Malaysia and Thailand only. Investments in Amp and other minority ownership assets are not included in the target boundary.

#### Scope 1 and 2 emissions

To reduce scope 1 and 2 emissions in line with Telenor's science-based targets, the Business areas and operational companies will pursue a linear trajectory of GHG emission reductions between 2019 and 2030.



Furthermore, Telenor will continue to pursue energy efficiency improvements to minimise the need for additional renewable electricity generation due to the underlying traffic growth. This will e.g. be reached by way of the use of AI and machine learning. The greatest impacts are expected to come from sunsetting energy-inefficient legacy technologies (such as 2G, 3G and later 4G) and increased use of site and active network sharing (e.g. increasing the number of tenants in Telenor Infrastructure's towers).

These steps are in addition to constant incremental improvements through higher asset utilisation and more effective software-enabled optimisation from network equipment providers, including the use of predictive and prescriptive Al solutions. Telenor will continue to participate in TM Forum's projects aimed at energy efficiency improvements within the telecommunications sector.

Since 96% of Telenor's scope 1 and 2 emissions in 2019 (baseline year) came from electricity and 86% of that came from the use of grid electricity (99% in Nordic, 80% in Grameenphone and Telenor Pakistan), reaching the scope 1 and 2 target is primarily about sourcing renewable grid electricity. Telenor uses two mechanisms to source renewable electricity from the grid: Energy Attribute Certificates (EACs) and Power Purchase Agreements (PPA). Telenor has a clear preference for PPAs, as these agreements can be structured to support construction of new capacity for renewable energy generation, which is known as additionality. However, as long as PPAs are not available in our Asian markets, and because they will not cover the entire purchased electricity volume in any market, Telenor will also utilise EACs. EACs provide information about the quantity and origin of electricity from renewable energy sources and examples include Guarantees of Origin (GOs) in Europe and International Renewable Energy Certificates (I-RECs) in Asia. Furthermore, where corporate PPAs are not available, Telenor will actively engage in advocacy efforts to promote access to such PPAs.

# Using AI and machine learning for energy efficiency

The use of telecommunications services is not constant through 24-hour and annual cycles. For instance, areas that are tourism hotspots will see greater demand for Telenor's services during holidays and weekends. For Telenor, it's important to optimise our energy consumption by being able to better predict peaks and troughs in customer demand. Al and machine learning (AI/ML) technology can be used to achieve this, and to optimise the energy consumption of active equipment.

Telenor's Finnish operator, DNA, for example, expected energy consumption to grow 6-7% when deploying 5G equipment and increasing capacity four or five-fold. However, DNA managed to reduce energy consumption through a mix of Al/ML, planning, network technology choices and energy-saving features on radio access networks. Al/ML allows DNA to analyse customers' behaviour and predict their mobile data traffic requirements. DNA can then automatically and dynamically optimise its mobile sites' energy requirements, which has resulted in a 3% energy saving in the areas of the network concerned.

## Scope 1 and 2 reductions in the Nordics

In the Nordics, both PPAs and EACs are readily available. Our business units have taken steps to secure the supply of renewable electricity primarily by way of PPAs: one PPA for Norway that starts early 2024, another one for Denmark that starts late 2024 and one for Finland that starts early 2025. EACs, in the form of GOs, have been widely employed across all four markets since 2021.

Renewability costs for EACs in the Nordics are incorporated within Telenor's PPAs, meaning that this expense is integrated into the overall electricity costs rather than being an extra, separate cost. All Nordic business units are expected to secure the majority of their electricity consumption via PPAs covering renewable energy assets that are not yet constructed, thereby contributing to new renewable electricity capacity in the Nordics. Further to PPAs, all Nordic business units will source sufficient GOs to stay on trajectory for a 95% GHG emission reduction within 2030 (from a 2019 baseline).

There are multiple ways to source renewable energy beyond signing PPAs for each business unit. A joint PPA (for several business units) could be negotiated to balance electricity amounts on top of each business unit's PPA, a pool PPA (where a larger PPA has several offtakers, including offtakers from outside Telenor) could be targeted, or multi-year EAC agreements incorporating additionality – and thereby supporting new renewable energy capacity in the Nordics – could be arranged.



## Telenor's first Power Purchase Agreement - the Stor-Skälsjön wind park in Sweden

In 2022, Telenor signed its first PPA. This ten-year agreement is for longterm offtake of a significant percentage of the power produced by the Stor-Skälsjön wind park in Sweden and will supply more than 80% of the energy consumed by Telenor in Norway. The wind park, which will go into operation in early 2024, will consist of 42 turbines and is located close to Sundsvall on Sweden's east coast. The park is being built by Hydro Rein and partners and will be owned by Hydro Rein and MEAG.

## Legacy copper decommissioning in Telenor Norway

Telenor is aiming to be the first operator in Europe to completely decommission its legacy fixed copper network. The plan is to completely turn this network off in 2025. By November 2023, the decommissioning activities had already secured electricity savings of 21 GWh and avoided emissions of 8,500 tonnes of  $CO_2$  annually.





## **3G** shutdown across the Nordics

Shutdown of legacy mobile networks is complex and time consuming. In both Denmark and Norway, Telenor gradually decommissioned its legacy 3G networks over a period of five to seven years, releasing valuable spectrum resources to carry much more energy-efficient 4G or 5G traffic. By 2021, Telenor Norway had completed the decommissioning of its 3G network from a total of close to 5,900 sites. This represents an energy consumption of 18 GWh annually, or avoided emissions of 7,000 tonnes of  $CO_{\gamma}$ .

By the end of 2024, DNA in Finland will have completed the ongoing shutdown of its entire 3G legacy network from a total of 8,000 sites, enabling the frequencies to be reused for 4G. This will allow 300-400% the amount of data traffic to be delivered using the same energy consumption as the 3G networks required.

By the end of 2025, Telenor Sweden will have completed the decommissioning of its own and shared 3G legacy networks. The forecasted energy saving is 47.5 GWh annually (compared to a baseline of 2019), or avoided emissions of 1,900 tonnes of  $CO_2$ . Its shared 4G and 5G network will offer a much more energy-efficient alternative going forward.

#### Scope 1 and 2 reductions in Asia

In 2022, Telenor operating companies Dtac in Thailand and Digi in Malaysia were merged into True Corporation and CelcomDigi respectively. The scope 1&2 emissions of these former companies are transferred into Telenor's scope 3 emissions post mergers (in the Investments sub-category of scope 3), adjusted for ownership rate. The remaining operational companies in Asia, which are subject to the scope 1 and 2 GHG emission reduction plan, are therefore Grameenphone in Bangladesh and Telenor Pakistan.

In Pakistan and Bangladesh, corporate PPAs are currently not available. By contrast, EACs are – but they are currently in low supply. To deal with this, a two-pronged strategy is planned:

- 1. Active advocacy by Telenor Asia for the availability of corporate PPAs. This will be aligned with HQ activities, such as the advocacy efforts of the Group CEO and President with organisations such as the WEF and GSMA.
- 2. Continued purchases and active sourcing of EACs to ensure alignment with the 50% GHG emission reduction trajectory until PPAs become available and effective.

Since both Bangladesh and Pakistan joined the I-REC system in late 2022, supply of EACs in the two countries is currently low. A proactive sourcing strategy will be employed to secure enough EACs to stay on the planned decarbonisation trajectory. This requires developers of solar and wind facilities in the two countries to be identified, and EAC supply for consecutive years to be proactively secured in long-term sourcing agreements. This also has the benefit of providing additional revenue for new renewable energy projects and such commitments will help support investments in new generation of renewable electricity.

Obtaining the required amount of EACs for 2023 is likely to be a challenge, but Telenor has identified sufficient new renewable electricity projects that are coming online in 2024, 2025 and beyond. The plan is to secure EACs for 2024 and beyond during 2023.

# Clean energy advocacy from Telenor top management



Sigve Brekke has been a regular advocate for enhancing access to renewable electricity on national grids in both Bangladesh and Pakistan. His efforts have been particularly notable in international organisations such as the World Economic Forum (WEF) and GSMA. Mr. Brekke is an active member of the Alliance of CEO Climate Leaders, a WEF facilitated network of CEOs from companies that take climate action.

At the WEF Annual Meeting in Davos, the Telenor Group President and CEO has actively participated in renewable electricity-focused events, bringing together business leaders, policymakers and energy experts. Additionally, at the United Nations General Assembly, Sigve Brekke has continued to champion the cause of renewable electricity access, advocating for policies that promote the decarbonisation of the global power system. His engagement in such high-level discussions and dialogues amplifies the urgency of addressing clean electricity needs not just in challenging markets such as Bangladesh and Pakistan but also globally.

Sigve Brekke and John Kerry.

#### **Scope 3 emissions**

Telenor is currently working towards achieving its 2025 scope 3 sciencebased target. Since 90% of all scope 3 emissions are within its supply chain, Telenor's top priority is to systematically shift its purchasing approach, developing a low-carbon supply chain over time that consists of suppliers who are actively reducing their emissions in line with the Paris Agreement.

Up to 2025, Telenor will require suppliers to set science-based targets. Beyond 2025, Telenor will expect suppliers to deliver absolute emission reductions in line with these targets.

#### Telenor will influence and drive the adoption of science-based targets across Telenor's supplier base through actions mainly in the following areas:

- Influence current and potential new suppliers directly via formal procurement processes. Clauses covering expectations, selection criteria and formal requirements is used in supplier evaluations, tenders and contracts, with suppliers being potentially excluded from tender participation or short-listings.
- Influence, advocate towards and motivate existing on-contract suppliers to adopt science-based targets via our supplier relationship interactions. This will take place at all levels (executive, business unit top management and

senior leadership) to convey a uniform message about our ambitions and expectations towards our suppliers.

 Apply indirect influence and advocacy through industry organisations such as GSMA or the Joint Alliance for CSR, government agencies, collaboration with other global telecom groups and standardisation bodies that influence the industry and our supplier base.

# The long-term plan consists of three steps:

- Until end of 2025: Ensure that the majority of Telenor's spend is with suppliers who have set and are pursuing science-based targets.
- From 2026 through 2030: Follow up on whether suppliers are delivering scope 1 and 2 emission reductions in line with their science-based targets. Further decrease the share of spend with suppliers who either have not set targets or are not reducing their emissions in line with their targets. Telenor will likely set a new near-term science-based target for scope 3, and this target is likely to be an absolute emission reduction target.
- Beyond 2030 and until the net-zero target year: Continue the efforts in step 2 but manage supply chain emissions as an integral part of the total scope 1, 2 and 3 emission reductions required to reach net-zero.



### Progress towards 2025 scope 3 engagement target (status at end of year)

Actual / current year forecast \_\_\_\_\_ Linear Target from baseline year to target year

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# *Telenor requires main suppliers to set science-based emission reduction targets*

In June 2023, Telenor announced that about 250 existing suppliers, representing spend above a certain threshold, and all suppliers competing for new contracts above a given value are required to commit to setting science-based targets in line with the Paris Agreement, preferably through SBTi. By November 2023, an important milestone was reached, as 50% of Telenor's spend was with suppliers who had already set such targets. Telenor has also informed all its suppliers that in the next few years the company plans to systematically shift its spend to suppliers who have set such targets.

### Adaptation plan

Even under a 1.5°C warming scenario, physical damage from extreme weather events and chronic climate change will become more severe and frequent, depending on country. However, the world is currently en route to a 2.8°C warming scenario, in which case the physical weather-related risks will materialise earlier, and become more severe.

Telecom networks are a fundamental part of the digital infrastructure in any country. To maintain the availability of this infrastructure, resilience planning and construction of networks will need to be adjusted to withstand the physical consequences of the changing climate. Factors to be considered include the dimensions and location of towers, radio and core network equipment, duplication of backhaul networks, flood protection of data centres and longer-lasting backup power sources. Additional redundancy and failover designs will be required to further limit single points of failure.

## Telenor's Adaptation plan reflects two levels of ambition:

1. Continue to deliver its services with at least the same availability, despite the increased climate risk.

2. As businesses and society digitalise and adopt more mission-critical services dependent on the high availability of 5G slices or IoT, network availability will need to further improve and be able to deliver according to strict SLAs and/or regulations.

Such adaptation is already ongoing. For example, towers are being strengthened to withstand strong winds, fundaments for mobile towers are being raised and equipment is being installed in the towers themselves in flood-prone areas. In addition, more sites are being equipped with battery backup power or more battery capacity and/or are being supplied with double fibre or microwave backhaul connections.

Mobile network investments will likely gradually shift from expanding geographic coverage and capacity to resilience and availability subject to SLA commitments like those for data centres, cloud infrastructure services and enterprise fixed line services.

Financially such adaptation is expected to require both proactive investments and reactive costs for restore –and repair that should be planned for.

# Examples of proactive investments are:

- Future towers/rooftops may need to be redesigned, using more/stronger materials, for example stronger/bigger concrete foundation, thicker steel etc. to withstand storms.
- Future towers, equipment cabinets and data centres may need to be placed at or moved to less flood-exposed locations to withstand higher flood levels.
- Network and IT equipment may need additional cooling solutions to with-stand hotter heatwaves.
- Sites may need duplicated/backup backhaul (e.g. microwave in addition to fibre) to handle landslides that sever fibre connections.
- Bigger backup battery capacity may be required to reflect more long-lasting power outages at important mobile sites.

# Examples of reactive restore and repair costs are:

- Mobilisation of more operations personnel before, during and after extreme weather events.
- More field force personnel required to restore and repair services during and after such events.
- More costly material damage to assets affected (towers, fibre, power) – and more materials required to repair such damage.

### Proactive protection against weather events may also mitigate the following indirect costs:

- Increasing cost of insurance premiums, bearing in mind that in a worst-case scenario, assets may become noninsurable in particularly risk-prone areas.
- Short-term lost revenues during downtime, particularly in prepaid markets in Asia.
- Potential long-term lost revenues if Telenor's services are perceived to be less resilient to weather events than competitors' services.

## Dual homing of mobile sites in Norway

As part of the rollout of its 5G network, Telenor Norway is increasing network resilience by introducing dual homing to approximately 6,100 (or 70%) of its mobile sites. This means that even if one of the transmission fibres to the base station is severed due to landslides, floods or other weather-related events, the network services will remain available. This is expected to increase the availability for these sites from approximately 99.9% (9 hours of downtime/year on average) to 99.99% (1 hour of downtime/year on average) compared to sites without dual homing. The main advantage, however, is that it will reduce the number of situations where several base stations are unavailable at the same time, i.e. an area/region is without mobile coverage, due to one error situation such as a fibre breach.

### **Enablement plan**

Both the Mitigation plan and the Adaptation plan are prerequisites for Telenor to be able to credibly deliver on the Enablement plan. For instance, Telenor's scope 1 and 2 emissions need to become net-zero in order to reduce our customers' scope 3 emissions (increasingly, corporate customers will have their own science-based or netzero targets). And Telenor's services need to deliver the required uptime for low-emission highly automated digital services that are mission critical or play a socially critical role.

Beyond this, the Enablement plan reflects that Telenor will drive GHG emissions reductions across various sectors via the power of digitalisation. A prime example of this is the adoption of IoT (Internet of Things) technology, which employs sensor systems to optimise external value chains, such as those in agriculture and transportation. IoT-driven solutions like building management systems and smart meters have demonstrated their ability to enhance energy efficiency in buildings, resulting in substantial emissions savings. Similarly, the application of telematics in the transport sector holds the potential to improve route optimisation and vehicle fuel efficiency. Furthermore, remote surveillance, operation and just-in-time maintenance reduce the need for transportation and resource use and thereby emissions.

With a portfolio spanning transportation, utilities, smart metering, water conservation and more, Telenor Connexion, Telenor's standalone IoT subsidiary, is at the forefront of providing enablement solutions across diverse industrial sectors. Furthermore, Telenor Connexion's consistent recognition by Gartner and Berg Insight underscores Telenor's dominance in the IoT domain.

As of 2022, Telenor Group has successfully connected 20 million devices through its IoT platforms across the Nordics and internationally. Looking further ahead, Telenor seeks to maintain its IoT leadership within the Nordics, while aiming to be a pioneer in IoT markets across Asia and to strategically position itself in vertical industries where innovative business models, driven by sensor data and analytics, are poised to emerge.



# Waste management enhanced through digitalisation

Waste Vision offers advanced waste management solutions, and currently operates an extensive network of 35,000 access control systems and 42,000 fill level sensors, all integrated into a software platform via Telenor Connexion's managed connectivity. This platform provides invaluable insights into various aspects, including system status and performance.

Compared to conventional waste management systems, Telenor's Connexion solutions drive significant cost reduction, minimise vehicle wear and lower fuel consumption. Real-time data and analytics empower smarter decision-making and route planning, ultimately enhancing operational efficiency. This leads to fewer collections, reduced emissions and decreased fuel usage and cleaner public spaces.

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# Water pumps' environmental footprint decreased through IoT

Xylem Avensor, powered by Telenor's IoT-enabled data, is a digital solution for waterrelated assets. It provides operators with data, alarms and insights, streamlining maintenance and investment decisions to mitigate risks and lower costs.

Customers have achieved significant improvements such as an 11% increase in firsttime fixes, a 9% boost in asset uptime and a 9% reduction in mean time to repair. On average, users of the Avensor service have realised annual savings of EUR 110,000 and reduced travel-related emissions by 8,500 metric tons of  $CO_2$ .

## **Risks and opportunities**

### The most material climate risks to Telenor are:

- · Increased pricing of GHG emissions and consequent cost increases
- · Cost increase and lack of availability of renewable electricity
- · Physical risks from extreme weather events and chronic global warming effects

#### The most material climate opportunities for Telenor are:

- · Increased demand for development of new services
- · Evaluation as a climate resilient and prepared company
- Use of more efficient production and distribution processes

More details on these risks and opportunities can be found in the publicly available Telenor TCFD report.



Telenor is currently operationally tracking metrics related to climate mitigation and transition costs. Scope 1 and 2 related metrics include energy consumption and cost, GHG emissions, share of renewable electricity, fuel consumption for generators at base stations and GHG emissions intensity for network data traffic. Scope 3 related metrics primarily address the most material upstream emissions from suppliers, but also downstream emissions related to sold products.

Formal scope 1, 2 and 3 emissions are disclosed annually in both Telenor's Annual Report and its CDP report – both on Group and business unit levels, as well as per energy source.

For further details, please refer to the sustainability section in Telenor Group's latest Annual Report.

## Appendix - Explanation of Key Terms and Abbreviations

Greenhouse gases (GHG)	Gases that drive climate change, such as Water vapor, Carbon dioxide, Methane, Ozone, Nitrous oxide and Chlorofluorocarbons.
Energy Attribute Certificate (EAC)	Certificates that act as proof of purchase of renewable electricity (or in some cases other energy). Relevant examples to Telenor are Guarantees of Origin (GOs, the official system in the EU and the EEA) and International Renewable Energy Certificates (I-RECs), which can be used worldwide.
Power Purchase Agreement (PPA)	An agreement to purchase electricity (in most cases renewable electricity such as wind, solar, hydropower and others). Differs from EACs in that a PPA involves the direct purchase of electricity, and not just the renew- ability of electricity.
Science-based Targets (SBTs)	Climate targets, for example emission reduction targets, that are aligned with climate science, and with the goal of keeping global warming below 2°C, and preferably below 1.5°C.
Science Based Targets initiative	The Science Based Targets Initiative (SBTi) is an organi- sation that promotes the setting and communication of science-based targets. The organisation also validates targets from companies that join the initiative.
Scope 1 emissions	GHG emissions from a company (or other organisation) that are direct from that organisation (from assets owned or controlled by the organisation). This includes emissions from vehicles, and in Telenor's example, emissions from diesel generators.
Scope 2 emissions	Indirect emissions from an organisation's use of electricity, steam and heat.
Scope 3 emissions	All other indirect emissions, such as emissions from the production and distribution of purchased goods and services.
Net-zero	To be net-zero means that an organisation will first reduce its own emissions, typically by 90%, across all three scopes, and then permanently remove any residual emissions by way of funding projects with a verifiable emission reduction elsewhere in the world.
Climate Mitigation	Climate mitigation refers to efforts and actions aimed at reducing or preventing the emission of greenhouse gases and minimizing their impact on climate change.
Climate Adaptation	Climate adaptation involves implementing strategies and measures to cope with and respond to the impacts of climate change, such as enhancing infrastructure to become more resilient to changing climatic conditions.
Circular Economy	A circular economy is an economic model focused on minimising waste and maximising resource efficiency by promoting the continual reuse, repair, and recycling of products and materials within closed-loop systems.