CLIMATE ADAPTATION and RESILIENCE

The strategic approach of the Enel Group to managing the effects of climate change

<< Extreme events—such as wildfires, floods, and storms—are becoming increasingly frequent and intense, with impacts that challenge the resilience of communities and the stability of socio-economic systems. This is not an issue limited to the responsibility of individual actors, such as governments, scientists, or companies: it is a collective challenge that requires collaboration, innovation, and shared responsibility.

Our goal is to make a concrete contribution to the development of sustainable and resilient energy systems, also through the creation of a well-balanced electricity generation mix, together with our stakeholders and the communities in which we operate.>>

Flavio Cattaneo
CEO Enel Group

Introduction

Climate change is already a reality that produces tangible effects on people, economies, and infrastructure. Extreme events—such as wildfires, floods, and storms—are becoming increasingly frequent and intense, with impacts that challenge the resilience of communities and the stability of socio-economic systems.

This is not an issue limited to the responsibility of individual actors, such as governments, scientists, or companies: it is a collective challenge that requires collaboration, innovation, and shared responsibility. Even when certain extraordinary impacts cannot be completely avoided, preparation, planning, and collaboration are essential to address them effectively.

Alongside mitigation—which aims to reduce greenhouse gas emissions and limit temperature rise—adaptation plays a central role. Mitigation and adaptation are not alternatives but two sides of the same coin: without mitigation, future impacts would become unmanageable; without adaptation, we would not be able to live with the impacts already present and those we will inevitably have to face. For a global operator like Enel, with over 60,000 employees, 68 GW of renewable capacity, and 69.1 million customers served, building resilience for climate adaptation is not an option but a strategic priority.

Our goal is to make a concrete contribution to the development of sustainable and resilient energy systems, also through the creation of a well-balanced electricity generation mix, together with our stakeholders and the communities in which we operate. In addition to being a leading company in the energy transition, we have years of experience in adaptation and in dealing with climate phenomena, thanks to an ever-growing wealth of data, innovative tools, and specialized expertise.

This document is a contribution to the dialogue and collaboration between institutions, the scientific community, and the private sector, to promote and implement concrete, scalable, and sustainable solutions.

1 THE FUTURE IS SHAPED TODAY

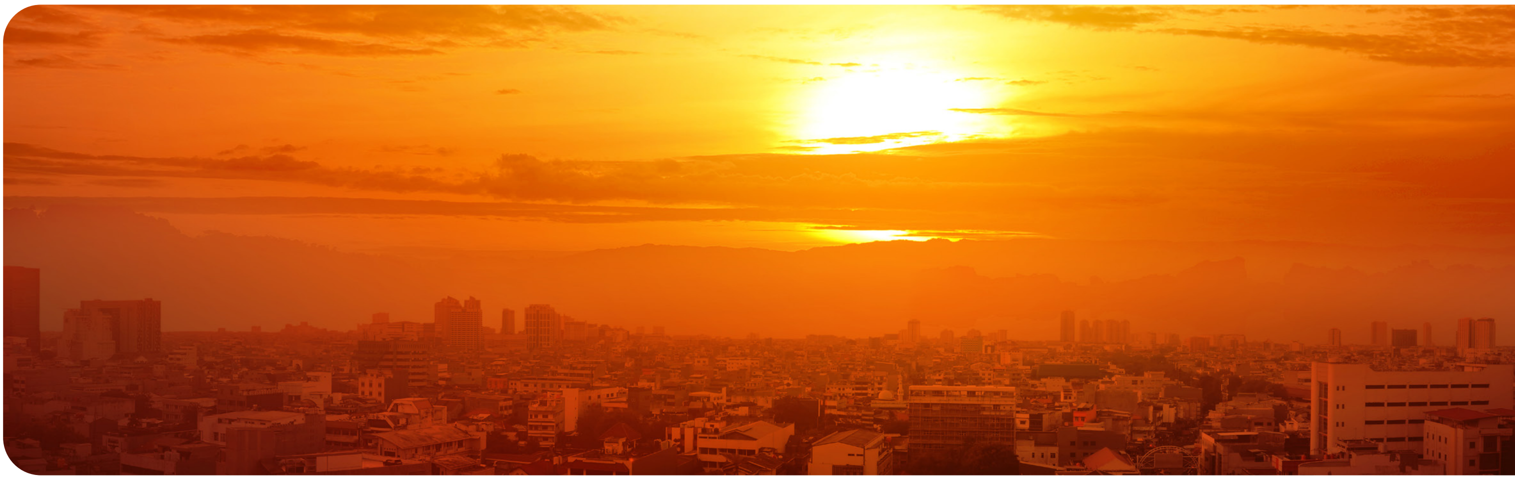
> “Adaptation is no longer a choice, nor does it compete with mitigation. Climate adaptation is the vehicle for care and repair towards collective transformation."
>
> Corrêa do Lago, COP30 President

Climate change is a global challenge in which mitigation and adaptation represent two complementary dimensions. Mitigation aims to reduce or eliminate greenhouse gas emissions to minimize climate change; adaptation concerns the process of strengthening the capacity of territories, communities, and socio-economic systems to face it. In short, the goal of mitigation is to avoid the unmanageable climate change effects, while the goal of adaptation is to manage the unavoidable climate change impacts.

In recent years, growing evidence and impacts have increased global attention on the need for adaptation – not merely as an emergency response, but as a structural solution to protect value, strengthen resilience, and support a sustainable transition. In 2015, the Paris Agreement set the global commitment to keep the rise in average temperature well below 2°C above pre-industrial levels and to pursue efforts to limit it to 1.5°C. However, even in a world where temperature increase over the century remains below 1.5 °C, the impacts will be significant, with more extreme events and greater effects on ecosystems: a slow and ineffective energy transition would require even greater adaptation efforts. Today, energy scenarios based on current policies project emissions consistent with global warming well above 2 °C[1]. At the current pace of greenhouse gas (GHG) emissions, in less than four years we will exhaust the “carbon budget”—that is, the maximum amount of GHG that can be emitted while still having a 50% chance of keeping global warming within 1.5°C[2].

Energy infrastructure is the vehicle for essential services and is therefore central to climate adaptation.

The widespread power outages in recent months—whether caused by climate change or not—have highlighted how crucial the resilience of energy infrastructure is, both for the delivery of essential services to millions of people and as an enabling platform for the energy transition.



1. IPCC Sixth Assesment Report (AR6) “Climate Change 2023”, section 2.1.1; Consistent with an increase in global temperature of approximately 2.7 °C by 2100 compared to pre-industrial levels. Based on climate scenarios SSP2-RCP 4.5 [IPCC: Intergovernmental Panel on Climate Change, SSP: Shared Socioeconomic Pathway, RCP: Representative Concentration Pathway]
2. Potsdam Institute for Climate Impact Research – Carbon clock

<< The ongoing changes in the climate system will persist in the coming decades, possibly in a more pronounced manner. This will require the development of adaptation policies to address the effects of these changes >>

Filippo Giorgi

Climatologist, Emeritus at the Abdus Salam International Centre for Theoretical Physics (ICTP)

The crucial role of the scientific community

"It is now an unequivocal fact that global warming is underway and that it is largely due to greenhouse gas emissions from human activities, primarily carbon dioxide emitted from the use of fossil fuels.

The effects of global warming on the Earth's climate system are now evident and increasingly impact various sectors of society. More intense and frequent heatwaves, an increase in extreme meteorological events, both flood- and drought-related, melting of continental and sea ice, and rising sea levels are just some of these effects. One of the most concerning aspects is the speed at which these changes in the climate system are occurring, unprecedented in at least the last 12,000 years. In fact, data show that these changes are accelerating, as are atmospheric concentrations of greenhouse gases.

Even if the necessary emission reduction policies can limit global warming below thresholds dangerous to sustainable societal development, the ongoing changes in the climate system will continue over the coming decades, potentially in even more pronounced forms. This will require the development of adaptation policies to manage the effects of these changes.

Adaptation has a regional and local character because the impacts of global warming vary from area to area. Consequently, planning and implementing adaptation plans requires highly accurate information, both climatic and regarding different types of impacts.

The contribution of the scientific community is also essential in transforming data into structured information and guiding its interpretation, making applied analyses increasingly effective and useful for planning climate change adaptation strategies."

THE FUTURE OF CLIMATE HAS ALREADY BEGUN

2024 set a global warming record: for the first time, average global temperatures exceeded the 1.5 °C threshold, a level of warming also confirmed in 2025 as well, 1.44 °C according to WMO, bringing the 2023–2025 three-year average to ~1.48 °C. Extreme events such as floods and storms occur with increasing intensity and frequency and the economic and social costs associated with these events continue to rise. Weather attribution studies show that approximately 80% of catastrophic weather events are already influenced by climate change[3].

The economic consequences are evident: in 2024, global losses from natural disasters reached $320 billion, well above the thirty-year average of $236 billion[4]. In Europe, according to the European Environment Agency (EEA), over the past ten years, the annual economic damage caused by weather and climate events has been twice that of the average of the previous two decades[5].

3. Carbon Brief, Mapped: How climate change affects extreme weather around the world, 2024
4. Munich Re - web site - Natural disasters worldwide: Losses are on the rise as climate change strikest
5. European Environment Agency

CLIMATE CHANGE IS OCCURRING AT AN UNPRECEDENTED SPEED

The most significant aspect of climate change is the speed at which it is occurring; we are moving in a world that is evolving faster than traditional risk assessment approaches. Current climate change is more than 100 times faster than natural cycles of the past: after the last Ice Age, the Earth warmed by approximately 0.001 °C per decade[6]. Since 1850, the planet has warmed by about 0.06 °C per decade, with a significantly higher average increase since 1982, ranging from 0.20 to 0.26 °C[7] per decade.

This rapidity amplifies uncertainty and dramatically reduces the effectiveness of predictive models based on historical data. The speed of change requires a transformation: moving from risk management based on historical series to approaches based on scenarios, climate projections, data, and continuous updates. Adaptation requires understanding trends and managing complexity and uncertainty.

"The rate of change since the mid-20th century is unprecedented over millennia"

NASA, IPCC Sixth Assessment Report

ADAPTATION IS AN INVESTMENT, NOT A COST

The challenge of adaptation allows infrastructures, systems, and business models to be transformed, making them resilient and profitable even in the new normal. The resilience of systems and infrastructure is fundamental in any economic and social context, both for emerging economies, which are often more vulnerable and exposed, and for advanced economies, which require interventions on complex and digitized infrastructures.

Evolving toward adaptation creates long-term value. Investments in adaptation generate benefits on multiple levels: first, they reduce the direct impacts of destructive events; they also create induced economic benefits by enhancing the capacity to generate value, as in the case of economic activities linked to natural resources; finally, they produce social and environmental advantages, in terms of health protection and ecosystem preservation.

Many studies aim to identify the value of adaptation, recognizing it as a useful and profitable investment at the systemic level. A BCG–University of Cambridge study[8] estimates that the cost of inaction could result in a global GDP loss between 11% and 27%, potentially reaching up to 34% if global temperatures rise to 3 °C by 2100. JP Morgan[9] reviewed multiple studies on the benefits of climate adaptation investments, identifying a range of returns from $2 to $43 per dollar spent. Another assessment by made by the OECD[10] estimates the return on adaptation interventions between $2 and $10 for every dollar invested[11].

The rising costs associated with extreme events are also putting pressure on insurance markets. This has led to significant increases in premiums and limitations on coverage provided by insurers, especially since 2021. Therefore, adaptation must also include the evolution of financial risk coverage instruments and their wider adoption, to ensure adequate coverage levels at reasonable costs in the future**.**

6. NASA Earth Observatory (https://earthobservatory.nasa.gov/features/GlobalWarming/page3.php) and https://climate.mit.edu/ask-mit/todays-climate-change-similar-natural-warming-between-ice-ages
7. NOAA 2023, Earth System Science Data 2024 and http://climate.gov/news-features/climate-qa/whats-hottest-earths-ever-been#:~:text=Since%201800%2C%20carbon%20dioxide%20has,0.20%C2%B0C)%20per%20decade.
8. BCG, University of Cambridge - Landing the Economic Case for Climate Action with Decision Makers, Mar 2025
9. JP Morgan - Building Resilience Through Climate Adaptation, 2025
10. Organization for Economic Co-operation and Development
11. Global Commission on Adaptation - Adapt Now: A Global Call for Leadership on Climate Resilience, 2019


2
THE ENEL GROUP ADAPTATION STRATEGY
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Over the years, Enel has faced a growing number of extreme climate events that have had significant impacts on company assets and customer service. Emergencies related to heatwaves, windstorms, and heavy rainfall have caused service interruptions in various regions, such as Italy, Chile, and Brazil.

The impacts of climate change make it necessary to develop strategies and actions capable of absorbing shocks and operating safely even when external conditions change. The goal of climate adaptation is to strengthen the resilience of assets by reducing risks and ensuring long-term profitability in an evolving climate context.

CLIMATE RISK ASSESSMENT

Climate risk is assessed by combining three factors:

- **Hazard**, which describes how each climate event is expected to evolve in terms of intensity and frequency in a given area.
- The **vulnerability** of assets to climate events, which quantifies how susceptible an asset is to damages due to climate hazards.
- **Exposure**, which represents the value of assets subject to hazards.

Risk increases when any one of *hazard*, vulnerability, or exposure rises: even a moderate *hazard* can cause damage if vulnerability and exposure are high.

HAZARD *	VULNERABILITY *	EXPOSURE
Assess the intensity and frequency of climate phenomena	Increase the capacity of assets to operate under adverse conditions (resilience) and improve the ability to manage emergencies and restore operations (response)	Define the technical and economic value of the assets and services involved

HOW ENEL IMPLEMENTS THE ADAPTATION STRATEGY

The definition of Enel's adaptation plans is based on the assessment of climate change impacts in line with the described framework: evaluation of climate hazards, analysis of vulnerability and impacts, with the aim of increasing asset resilience and the capacity to respond to adverse events, thereby reducing the potential exposure of the Group and the territories in which it operates.

At Enel, climate scenarios are developed through a defined process, applied to each business and geographic area of presence, to produce quantitative information that concretely supports decision-making:

- Identification of the most significant phenomena (e.g., floods, heatwaves, etc.).
- Development of scenarios and prioritization, drawing from the best climate data sources (research institutes, private companies, and public datasets).
- Definition of ad hoc indicators to track relevant events, considering business-specific characteristics (e.g., the effect of heatwaves on underground networks).

The analyses are based on global models from the *Intergovernmental Panel on Climate Change* (IPCC): multiple climate models - so-called model "ensembles" - are used to study the behavior of key physical variables (temperature, precipitation, wind, etc.) and are applied at the level of individual assets, using techniques and algorithms (downscaling and bias correction) developed in collaboration with scientific partners such as *The Abdus Salam International Centre for Theoretical Physics* (ICTP) and other sector experts.

The behavior of each variable is then analyzed under different climate scenarios. The following maps illustrate, by way of example, the projected increase in the number of days per year characterized by heatwaves[12] under the RCP 2.6 scenario—compatible with global warming below 2 °C by 2100—and the RCP 8.5 scenario—corresponding to warming above 4 °C—in the Mediterranean basin and the Americas.

Δ DAYS
RCP vs historical

0 - 5
5 - 10
10 - 15
15 - 20
20 - 25
25 - 30
30 - 35
35 - 40
40 - 43

RCP 2.6 | **RCP 8.5**

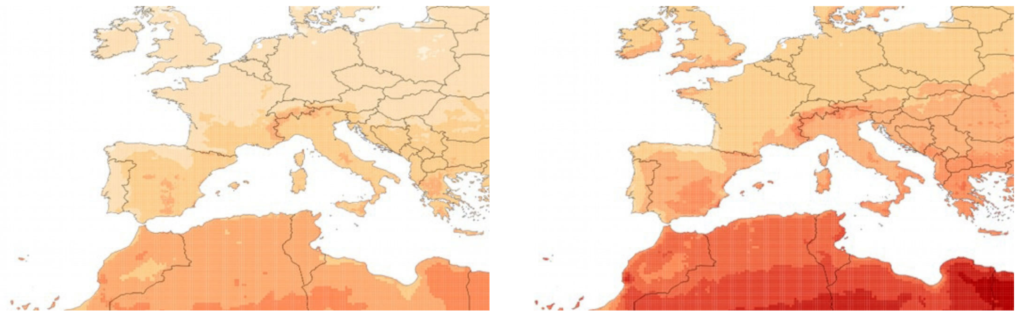


Image 2.1
Average variation in the number of days per year characterized by heatwaves (defined according to the WSDI – Warm Spell Duration Index) in RCP 2.6 and RCP 8.5 scenarios (2030–2050) compared to the historical period (1990–2020) in Central and Southern Europe

Δ DAYS
RCP vs historical

-2 - 0
0 - 10
10 - 20
20 - 30
30 - 40
40 - 50
50 - 60
60 - 70
70 - 80
> 80

RCP 2.6 | **RCP 8.5**

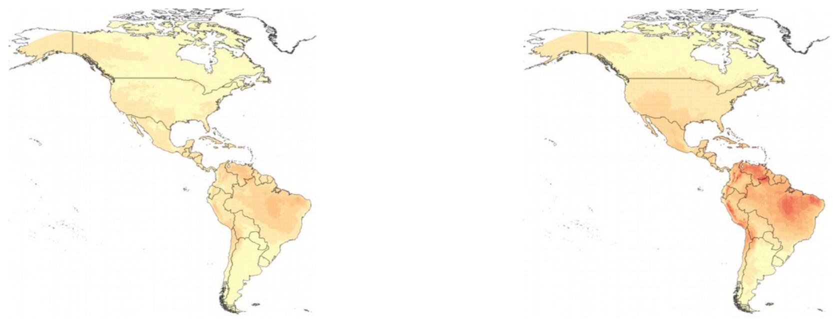


Image 2.2
Average variation in the number of days per year characterized by heatwaves (defined according to the WSDI) in RCP 2.6 and RCP 8.5 scenarios (2030–2050) compared to the historical period (1990–2020) in the Americas

12. In particular, SSP1-RCP2.6 (best case; <2 °C by 2100), SSP2-RCP4.5 (~2.7 °C by 2100), and SSP5-RCP8.5 (>4 °C by 2100) are used.

HIGH-RESOLUTION CLIMATE ANALYSES

To assess the effects of climate change at the level of individual assets (for example, a single wind farm), it is necessary to implement **high-resolution climate analyses**. These analyses are essential for supporting more robust and targeted adaptation decisions and for optimizing investments in resilience.

However, a significant gap exists between the information produced by research and the practical needs of infrastructure managers: more accessible, application-oriented tools are required, developed with the involvement of the companies and institutions that will use them.
To more precisely identify the areas and infrastructures most exposed to risks, it is important to have data and models capable of providing detailed point-scale projections and clear information on **limits and levels of uncertainty**.

Improving coordination between public authorities, private operators, and the scientific community represents one of the main challenges in turning analyses into concrete actions.

To translate scenario analyses into adaptation plans, it is necessary to model the specific vulnerabilities of the Group's assets. This allows for the identification of the most effective adaptation solutions. These solutions aim both to strengthen Resilience - the capacity to operate under increasingly challenging conditions – and to enhance the response to the impacts of adverse events (**Response**).

Specifically, the process involves the following steps:

- **Hazard**: Specific indicators are defined to describe the climate phenomena relevant to each type of asset, and projections are developed to assess their future evolution under different scenarios.
- **Vulnerability**: Methodologies are developed to quantify the vulnerability of each type of asset, then climate hazards and vulnerabilities are combined to evaluate the potential impacts for each climate scenario.
- **Adaptation priorities**: Climate impacts and adaptation priorities are analyzed, considering the characteristics of specific sites and assets. At this stage, cost-benefit evaluations are conducted to identify necessary and effective interventions.
- **Adaptation plan**: Adaptation needs are consolidated into an action plan to increase resilience and response capacity (Response) to adverse events, including resources, technical measures, processes, and procedures.

The information obtained through a patented approach[13], is then integrated into processes, informing Group decisions and business activities, such as operational asset interventions, investment assessments, business development initiatives, risk control, and access to funding. The insurance strategy ultimately manages residual risk and coverage for catastrophic events.
Each technology and asset type requires specific adaptation measures, described in the following sections, but bome practices are transversal, for example:

- *Weather alerting* systems that enable timely activation of pre-alert status, mobilizing resources and equipment to address emergencies;
- Tools and procedures to optimize fault identification and management and service restoration;
- Visual inspections, thermography, and sensors to map preventive maintenance needs and ensure optimal asset conditions.

Since 2021, Enel has established a Group policy to manage climate change risks and opportunities. The *"Climate Change Risks and Opportunities"* policy defines a common approach to integrating these issues into business processes, enhancing resilience and creating long-term sustainable value. Furthermore, to maximize the effectiveness of resilience and response measures, Enel engages with all stakeholders to catalyze any form of collaboration that improves service to its customers.

13. "Method to generating risk maps for localized or distributed infrastructures", patent granted by the Italian Ministry of Enterprises and Made in Italy

In addition to assessing physical *climate risks* for its own activities, Enel has conducted a climate risk analysis for its main supply chains, including photovoltaic modules, wind turbines, stationary batteries, cables, transformers, charging stations, and raw materials such as gas and coal, focusing on production sites and key commercial routes. Increasingly frequent and intense extreme climate events can indeed affect transportation, supply, and the operation of production facilities (for example, the drought conditions in the Panama Canal area in 2023–2024 demonstrated how climate change can influence global logistics).

TECHNOLOGICAL FRONTIERS FOR ADAPTATION

Technological innovation represents a key tool and an opportunity to accelerate and facilitate the adaptation of electrical grids and generation plants to climate change effects, strengthening their resilience and ability to respond to the impacts of extreme events.

The main initiatives that Enel is testing and implementing include:

1. Adoption of **innovative communication infrastructures**, such as Low Earth Orbit (LEO) satellites, to ensure connectivity and asset control even in remote areas or during emergencies, supporting operational teams and maintenance and operational activities.
2. **Digitalization and automation** of electrical grids, with the introduction of edge computing solutions, distributed automation, and artificial intelligence to:
   - Detect the health status of components and critical systems (e.g., remote control) and enable predictive maintenance models.
   - Identify potential risks in advance and plan appropriate actions (for example, vegetation management around grids or workforce management during emergencies).
   - Precisely locate faults in medium- and low-voltage networks, including underground lines, and improve network condition estimation to minimize service restoration time.
3. Implementation of **advanced diagnostic and control solutions** for generation plants.

For example, to cope with water scarcity, hydroelectric plants have adopted solutions capable of operating at variable speeds and expanding the operational range of turbines at reduced flows, thereby contributing to plant resilience, protecting river ecosystems, and increasing renewable energy production.

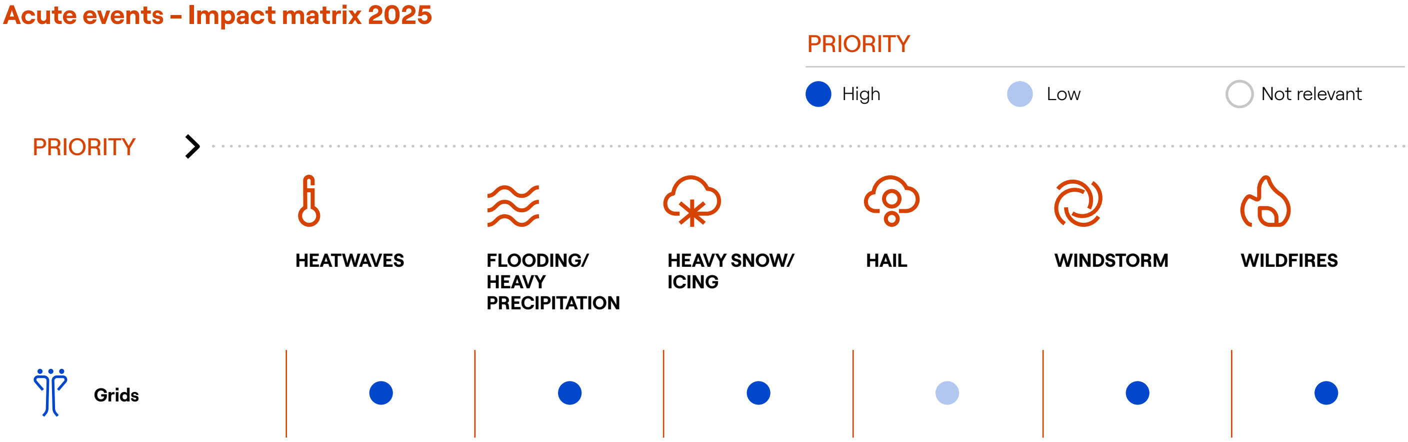
DISTRIBUTION NETWORKS

Climatic Hazards and Adaptation Challenges

The power infrastructure is exposed to adverse weather conditions and, consequently, to the effects of climate change, which can compromise the quality and continuity of energy supply. Extreme events—such as heat waves, windstorms, floods, and snow/ice—can damage electrical infrastructure, jeopardizing service continuity. Chronic changes, such as rising average temperatures, can also affect grid performance. In particular, the main sources of risk are:

- **Heatwaves** that can damage underground cables, causing interruptions, including multiple failures.
- **Windstorms** that can damage overhead lines (for example, through trees falling on the lines) and increase the risk of fires.
- **Floods** that can damage underground cable networks and/or affect primary substations.
- **Ice** that can accumulate on overhead conductors, causing them to break.
- **Fires**, with particularly significant risk where overhead lines and vegetation coexist.

Acute events - Impact matrix 2025



Resilience

In line with the Group's strategy, Enel Grids defines guidelines and measures to enhance resilience and response capacity according to a framework called "4R": Risk Prevention, Readiness, Response, and Recovery. This framework encompasses all the key phases for managing and improving the resilience of infrastructure with an end-to-end perspective: from preventive reinforcement and redundancy measures, to the efficient and effective management of field operations following the occurrence of an extreme climatic event, including the prompt restoration of services.

Climate data are used to assess future trends of the most relevant climate phenomena and their potential effects in the distribution concession areas to define adaptation needs (**Risk Prevention**). Interventions to increase grids resilience can be of two types:

- **Reducing the vulnerability of network elements**, for example by using "jointless" underground cables—i.e., with as few joints as possible—thereby reducing weak points and the probability of failures.
- **Increasing redundancy and flexibility**, lowering the probability that a failure will cause widespread service interruptions and thus reducing its impact. For example, by increasing interconnections and the ability to section off portions of the network to limit the number of disconnected users.

Within this strategy, Enel Grids also adopts **Readiness** and **Response** tools to optimize fault identification, fault management, and service restoration in the shortest possible time following an extreme climatic event. When necessary, internal task forces are also established to support local teams.

An important aspect also involves the adoption of emergency management procedures and guidelines that define clear roles and responsibilities and **include training, emergency simulations, and partnerships** with specific entities to ensure that operational teams are able to intervene promptly.

Furhtermore, Enel plays an active role in building a security model that ensures intervention and collaboration at all stages of an emergency with all the parties involved (Civil Protection, Police Forces, and other companies providing essential services). Its main pillars are:

- Strengthening public–private partnerships and signing memoranda of understanding with local institutions and police forces;
- Carrying out crisis simulations in collaboration with civil police, military police, and civil protection forces;
- Using shared meteorological forecasting tools for adverse climatic events.

ADAPTATION IN PRACTICE: | Italy – Resilience to Heat Waves

High temperatures are a critical issue, particularly for underground cable networks. In Italy, this phenomenon is especially relevant during the summer period. A heat wave has negative effects such as:

- **Significant reduction of the maximum cable capacity** due to the persistence of very high temperatures for several consecutive days and specific soil conditions resulting from scarce or absent precipitation during the period;
- **Increased risk of infrastructure** failures caused by exceptional operating conditions that exceed standard design parameters (defined according to the standards of the Italian Electrotechnical Committee, CEI), due to a simultaneous sharp increase in load, in terms of peak power and consumption, and the persistence of high temperatures even during nighttime hours.
- **The phenomenon of "multiple failures" on cables**, meaning an increase in faults which, together with the prolonged peak in demand caused by high temperatures, push the system to its limits, further increasing the likelihood of service disruptions.

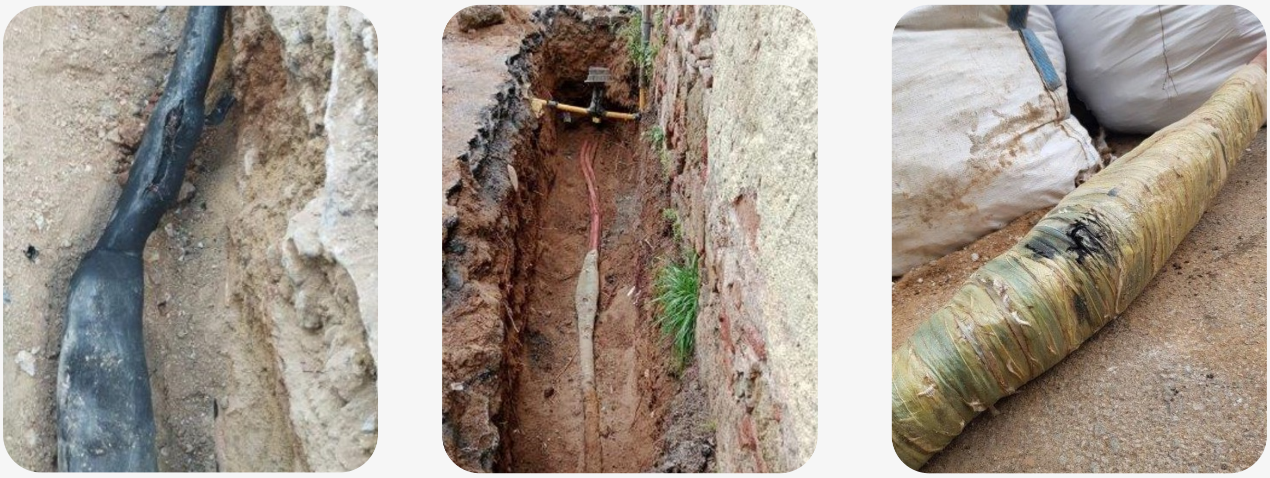


Image 2.3
Impact of soil overheating on underground power cables

The heat waves that affected the Catania area in Italy in July 2023 clearly highlighted the need to develop an evolved model for the resilience of distribution networks. As shown in image 2.4, heat waves (a phenomenon already having a major impact today) are expected to increase widely in both duration and frequency across all future scenarios and throughout the entire Italian territory.

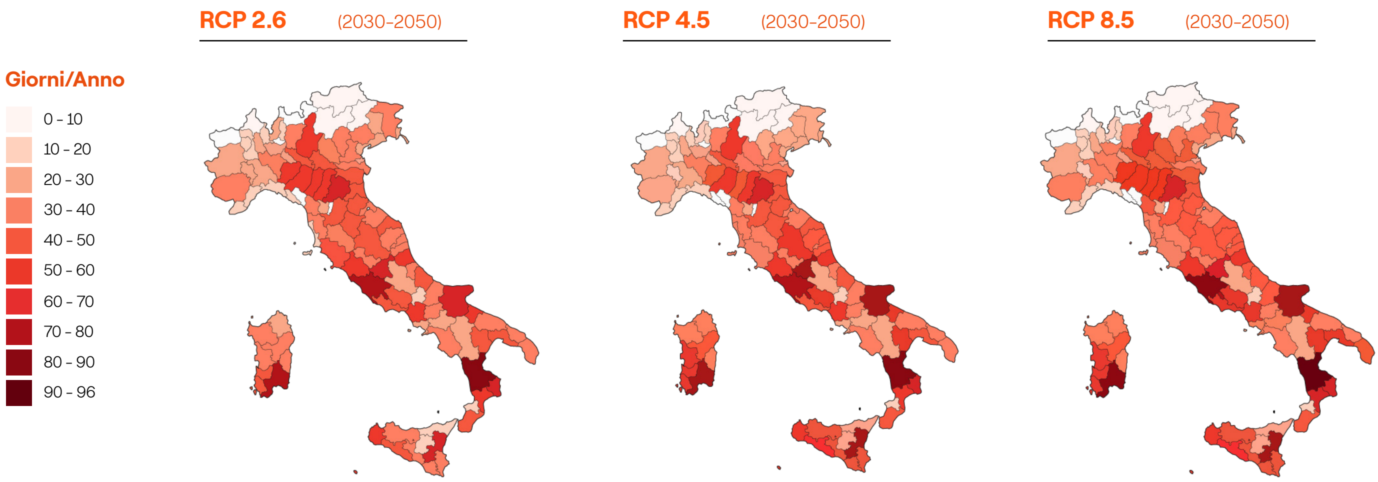


Image 2.4
Heatwave scenarios across Italian provinces

To increase the resilience of the Italian grids, an action plan has been developed aimed at reducing service interruptions and their impact on the network by enhancing robustness and redundancy through:

- Reconstruction and reinforcement of sections of the existing underground medium-voltage (MV) network using intrinsically resilient components;
- Increasing the network's capacity for re-supply through new MV lines departing from existing Primary Substations.

ADAPTATION IN PRACTICE | Spain - Resilience to Cyclogenesis

Atypical cyclonic storms and explosive cyclogenesis are particularly significant climatic phenomena on the Iberian Peninsula. Both events are cyclonic in nature, characterized by heavy rainfall and extreme winds. Although their effects are similar, the two events originate from different meteorological conditions. The most critical one, explosive cyclogenesis, occurs due to a sudden drop in atmospheric pressure, which can lead to heavy rainfall, exceeding 100 mm per day, combined with winds that may surpass 150 km/h.

Image 2.5
Effects of explosive cyclogenesis

Overhead distribution networks are exposed to this type of stress, which can damage poles and cables both directly and through impact with trees and other objects. Although the Spanish regulator does not currently include recognition or incentives for improving the resilience of the electrical grid in the current remuneration framework, plans have been implemented to enhance service quality and undertake other initiatives aimed at managing emergency situations affecting electrical infrastructure:

- Undergrounding and reinforcement plans for overhead lines to increase the resilience of existing infrastructure;
- Interventions to increase network meshing and the possibility of re-supply in the event of failures;
- Installation of automation and remote-control systems to speed up service restoration times;
- Operational contingency plans shared with local institutions.

ADAPTATION IN PRACTICE | South America – Resilience to Storms

The electrical grids of South America are particularly vulnerable to severe wind and rainstorms due to the extensive presence of overhead power lines. For example, in August 2024, **Santiago de Chile** was affected by an exceptionally intense weather event, with wind gusts exceeding 120 km/h, which caused the outage of approximately 200 medium-voltage lines and damage to several hundred poles. In October of the same year, the city of **São Paulo** experienced a weather event of similar severity, with winds surpassing 100 km/h; in this case, more than 200 medium-voltage lines and 17 high-voltage lines were put out of service. As confirmed by attribution studies, both types of extreme events have been intensified and made more frequent by climate change.

In both circumstances, in order to ensure the prompt restoration of the grid, numerous generators were deployed—over 500 in Brazil—and support teams from other countries were mobilized.

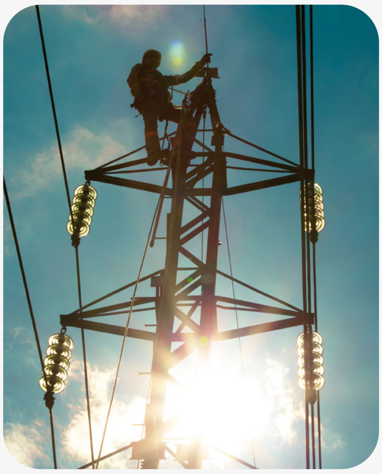




Image 2.6
Brazil - operations on the electricity grid

To mitigate the impact of similar events in the future, the Group's strategy includes several initiatives, among which:

- Interventions to **increase the resilience** of the networks;
- The establishment of a structured process for managing **international task forces**;
- Advanced predictive analysis methodologies for **vegetation management** to reduce interference with electrical infrastructure;
- Operational exercises and simulations aimed at testing the effectiveness of **emergency response** and coordination among all involved parties;
- Agreements and memoranda of understanding with **local authorities** and **law enforcement agencies**.

For example, starting in 2024, a structured program has been planned that includes several emergency simulations in the main Latin American countries where the Group operates: Brazil, Argentina, Chile, and Colombia.

Among the **specific adaptation measures for this area** are the installation of technological devices that make it possible to disconnect only the portion of the network directly affected, thereby minimizing the number of customers impacted, and the evolution of materials and/or undergrounding of networks in areas with high vegetation impact in order to **increase the resilience** of the infrastructure and, consequently, improve service to customers.

ADAPTATION FOR DISTRIBUTION NETWORKS IN BRAZIL

Enel operates distribution networks in three distinct areas of Brazil - Ceará, Rio de Janeiro, São Paulo - serving over 15 million customers. The main adaptation actions implemented are:

- Interventions to improve grid resilience and doubling of vegetation management activities;
- Increased staffing levels and faster response times;
- Enhanced customer support (e.g., an online platform that informs customers in real time about the areas affected by outages and the estimated restoration times);
- Targeted emergency simulations of contingency scenarios in São Paulo, conducted in an integrated manner with other involved stakeholders;
- Activation of an international Enel task force of qualified personnel in case of contingencies;
- "Hortas em Rede" – Gardens in the Network: a project by Enel São Paulo that enhances the use of land beneath power lines, reducing maintenance costs and improving safety.

The positive effects of these initiatives are already evident in operational performance, which has shown **significant improvements across all three concession areas**. Data from 2025 compared with the previous year, show a reduction in the duration of service interruptions — **16% in Rio de Janeiro**, **24% in the Ceará area**, and over **30% in the São Paulo area**— as well as a **decrease of more than 40%** in the number of customers affected in the **Ceará**, and over **60% in the other concession areas**.

The main critical issues are caused by extreme weather events, which lead to tree falls on power lines. In some cities, such as São Paulo , the network is almost entirely overhead and passess through areas with dens, tall vegetation. In many sections, the lines run through tree canopies, significantly increasing the damage caused by extreme weather events.

A solution to eliminate the impacts of such events is the **creation of safety corridors along power lines**, replacing existing vegetation with low-growing species so that any falling branches do not affect the lines. Another structural solution, already implemented in many urban contexts, is the **undergrounding of power lines**. However, both solutions **necessarily require the involvement of local authorities**, which is essential to allow operators to improve infrastructure resilience and service quality.

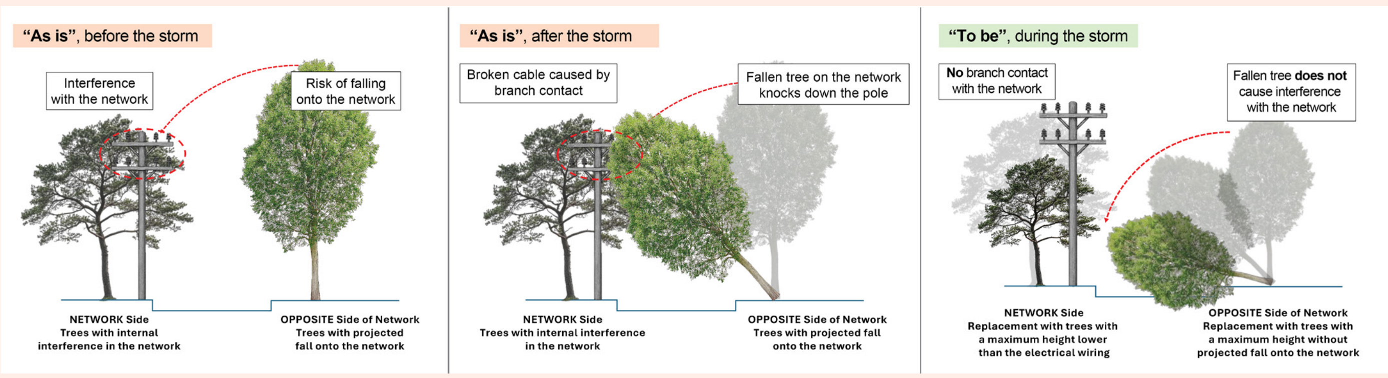


Image 2.7
Benefits of safey corridors along power lines

THE CHALLENGES OF CLIMATE MODELS IN LATIN AMERICA

Climate scenarios in South America are generally characterized by a high level of uncertainty, stemming from the complexity of regional climate dynamics influenced by phenomena such as El Niño and La Niña, which cyclically alter temperatures and precipitation patterns with effects that vary from one area to another.
Furthermore, global climate models often struggle to represent local conditions in South America with sufficient reliability. Applying these outputs is more complex both because few models are available for this geographic area and because the signals they produce exhibit a high degree of uncertainty.
Collaboration among the research sector, public institutions, and the private sector must accelerate to improve the quality, resolution, and accessibility of climate data. This is essential to develop more reliable, up-to-date, and targeted information tools capable of effectively supporting decision-makers in strategic planning and in managing risks related to climate change.

POWER GENERATION PLANTS

Climatic Hazards and Adaptation Challenges

Power generation plants are exposed to weather events, and each technology (e.g., wind, solar, hydroelectric) is subject to different phenomena depending on its specific characteristics. While extreme events can cause damage and reduce or interrupt plant operations, chronic variations in weather conditions and renewable resources can either increase or decrease production.

Based on the mapping of globally relevant phenomena, annual analyses are carried out on both acute (see image 2.8) and chronic climate risks in order to estimate the medium- to long-term future impact on the Group's power generation plants

Acute events – Impact matrix 2025

PRIORITY: High / Low / Not relevant

PRIORITY	HEATWAVES	FLOODING/ HEAVY PRECIPITATION	HEAVY SNOW/ ICING	HAIL	WINDSTORM	WILDFIRES
Thermal	High	High	Not relevant	Not relevant	Low	Low
Solar	High	High	High	High	High	Low
Wind	High	Low	High	Low	High	Low
Hydro	Low	High	Low	Not relevant	Low	Not relevant

Image 2.8
Acute phenomena relevant to technology

The analysis of acute events affecting power generation plants is carried out in two phasesi:

- **Preliminary screening** of the hazards to which Enel's generation plants are exposed, considering their specific vulnerabilities and identifying the highest-risk plants.
- **Detailed analysis of the highest-risk plants** to identify possible adaptation measures, including cost–benefit analyses, aimed at preventing direct damage and production losses.

To assess risks across the generation fleet, the Group has developed the index AERI (Acute Events Risk Index). . AERI is a synthetic risk indicator for renewable plants related to acute climate events. It combines the vulnerability of each asset to a specific climatic phenomenon with the corresponding future climate scenarios. In particular, it shows the share of installed capacity at higher risk, based on the evolution of scenarios for the 2030–2050 period compared with the reference period. The most exposed plants are then subject to more detailed analyses to identify the necessary adaptation measures, assessing costs and benefits.

Finally, to evaluate the impact of the chronic effects of climate change on the production of the Group's assets, specific functions have been developed to associate each variation in climatic variables (e.g., temperature, radiation, wind speed, precipitation) with the likely variations in the power generation potential of the plants in the portfolio.

Solar power plants

The main climate phenomena relevant to photovoltaic technology are:

- **Floods, hailstorms, and wind gusts:** can damage infrastructure and cause interruptions in production;
- **Heatwaves:** reduce the output of photovoltaic modules, whose efficiency is inversely proportional to temperature; heatwaves also decrease the electrical conversion capacity of inverters (derating effect);
- **Variation in solar radiation:** affects the production of photovoltaic plants.

Enel has introduced a wide range of adaptation measures to mitigate these effects, including:

- **Structural protections,** such as the structural reinforcement of panels and fixed plant components;
- **Hydraulic risk management** through, for example, elevating electrical components, creating protective channels/levees, using forced drainage pumps, waterproofing substations and conversion units, and stabilizing the ground against erosion phenomena;
- **Plant temperature management and derating mitigation systems,** such as direct solar radiation protection systems, enhanced cooling systems, and reduction of the DC/AC ratio in order to maximize panel productivity;
- **Fire prevention** by strengthening vegetation clearing activities and "firebreak" strips, using fire-resistant paints/plasters, setting up water tanks for emergency response, and installing thermal cameras to promptly detect risk conditions.

ADAPTATION IN PRACTICE | Windstorm at "El Paso," Colombia

At the beginning of 2023, a windstorm occurred at the El Paso photovoltaic plant, with gusts exceeding 100 km/h, causing damage to more than 20 structures (including misalignment and breakage of photovoltaic panels).

To address this type of event, ultrasonic wind sensors were installed. These offer greater accuracy in detecting windstorms compared to analog sensors and are capable of promptly activating the "stow" positioning command, meaning placing the panel in a safe or "rest" position—usually flat or tilted—to reduce the risk of damage.

Image 2.9
Impact of extreme wind on the "El Paso" solar plant

Wind power plants

The main climate phenomena relevant to this technology are:

- **Variation in wind patterns** reduces the predictability of wind power generation, affecting energy planning. In areas subject to drought or desertification, increased exposure to dust and sand can accelerate the wear of moving components;
- **Wind gusts:** can damage turbines, blades, and towers, causing mechanical or electrical failures and production interruptions;
- **Heatwaves and cold spells:** can compromise the efficiency of production systems.

Enel implements the following adaptation measures, always applying a cost-benefit perspective to ensure plant operation and safety under extreme climate conditions:

- **Systems to detect ice formation** and ensure operability at low temperatures and in extreme wind conditions;
- Enhancement of **cooling system.**

ADAPTATION IN PRACTICE | Thermal Stress and Extreme Heat at "Valle de Los Vientos", Chile and "Chisholm View", United States

The "Valle de Los Vientos" plant in Chile is located in a desert area characterized by large temperature fluctuations, which subject electrical systems to stress and can potentially reduce their lifespan.
To adapt the plant to these conditions, a duct was directly installed to increase the airflow in the generator's cooling system, allowing for significant temperature regulation even at full capacity. In addition, the insulation system of the turbine generator components was reinforced.
This is an example of how solutions developed through experience in managing assets exposed to particularly extreme conditions can become best practices for adapting the electrical systems of wind turbines. In fact, this solution is now applied to all sites that will increasingly be exposed to extreme heat and low air density.

A heatwave with temperatures exceeding 40°C occurred in May 2024 in the United States at the "*Chisholm View*" plant, causing the failure of the gearbox (the mechanical component that allows the transmission ratio between the motor and the blades to vary, enabling the turbine to adapt to different speeds).
In this second case, it was decided to adapt the plant to the high heat conditions by using a new advanced synthetic oil in the replaced gearbox, featuring a more reliable viscosity index and enhanced protection capabilities.

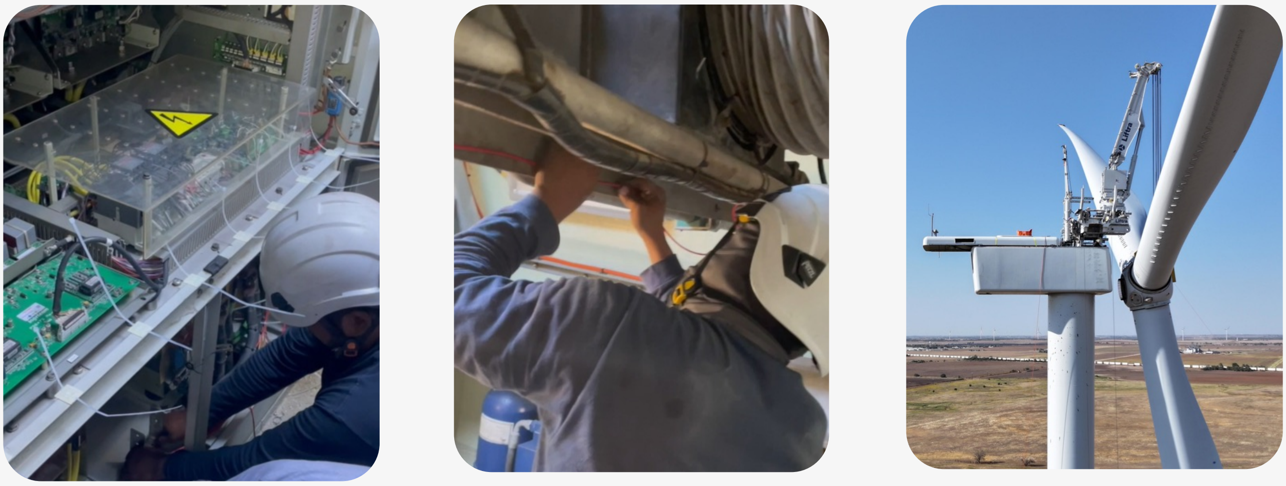


Image 2.10
Intervention on the "Valle de los Vientos" wind plant, Chile

Hydro power plants

The main climate phenomena relevant to hydropower technology are:

- **Changes in the availability and seasonality of water resources:** phenomena such as glacier retreat, altered precipitation patterns, and prolonged drought;
- **Reduced efficiency and reliability of plants:** extreme events such as floods can decrease energy production and increase the risk of infrastructure damage.

Enel implements multiple adaptation measures to manage and reduce the potential impacts of climate change on hydropower resources:

- **Repowering and flexibilization** of plants to increase efficiency and adapt to changing flow regimes;
- **Floating photovoltaic plants** on both owned and third-party reservoirs, helping to reduce evaporation;
- **Selective sediment removal** to increase operational flexibility;
- **Stakeholder coordination** to manage drought emergencies and acute weather events (floods).

ADAPTATION IN PRACTICE | Floating Photovoltaic power plants – Italy

Enel is experimenting with the use of floating photovoltaic plants that enable the production of renewable energy without consuming land, while simultaneously reducing evaporation and improving panel performance thanks to the cooling effect provided by proximity to water.
The *Venaus, Montelupo*, and *Narzole* plants in Italy are the first developed by the Enel Group using this approach.

Additionally, in *Venaus*, a "continuous de-sedimentation" system powered by the plant itself is being installed. This system ensures constant and automatic cleaning of the channels feeding the water reservoirs, helping to maintain load capacity and reduce the risk of blockages during extreme events.

Image 2.11
Floating photovoltaic plants in Venaus and Narzole (canal coverage)

Thermoelectric Generation power plants

The main climate phenomena relevant to thermoelectric technologies are:

- **The chronic increase in air** and water temperature and the reduction of water resources, which are important for cooling, reduce the efficiency and operational capacity of thermoelectric power plants;
- **Acute climate events** which further put pressure on the plants, compromising their reliability and requiring technological and management adjustments to ensure efficiency and energy security.

Enel implements the following adaptation actions, always from a cost-benefit perspective, to ensure the operation and safety of gas thermoelectric plants under extreme climate conditions

- **Alternative/enhanced cooling systems** to improve heat exchange, thereby increasing the derating threshold, meaning the temperature level from which performance begins to deteriorate;
- **Upgrading gas turbines** to increase plant output and compensate for derating caused by air temperature.

In recent years, Enel has also carried out a series of investments aimed at increasing the performance of its combined cycle gas turbine (CCGT) plants to reduce derating due to heatwaves while simultaneously improving the efficiency of these plants, reducing the specific CO_2 emissions per unit of energy produced.

THE STRATEGIC ROLE OF HYDROELECTRIC RESOURCES

Hydropower represents an important resource for climate resilience thanks to its ability to:

- Mitigate drought, as hydroelectric reservoirs release water in a controlled way to ensure water supply, support agriculture, and preserve ecosystems;
- Manage floods, since they regulate river flows, reducing flood peaks and protecting communities and infrastructure;
- Support the energy transition, as they facilitate the integration of variable, non-dispatchable renewable sources such as wind and solar, contributing to grid stability.

This multifunctionality makes **hydropower a strategic asset for countries and a pillar for the sustainable management of water resources**. To reduce risks and ensure service continuity, scheduled maintenance, real-time data analysis, and the ability to intervene promptly during extreme events are essential.
Operating a hydroelectric plant requires advanced technical knowledge in engineering, hydrology, electromechanics, and environmental regulations: only qualified personnel can correctly monitor water flows, prevent plant failures, manage emergencies, and optimize energy production.

FLEXIBILITY AND DEMAND RESPONSE

The Group manages, in addition to its generation assets, resources that provide system flexibility, such as electrochemical storage capacity (BESS – battery energy storage systems) totaling over 3 GW, and leverages on a large demand response (DR) portfolio of industrial, commercial, and residential customers amounting to approximately 9 GW.

Batteries and energy storage systems are a relevant asset in the Group's strategy, as they support the development of renewables and provide the system with flexibility and resilience. They also play a crucial role in ensuring service continuity amid extreme events and the increasing variability of renewable generation and demand caused by climate change.

Demand response, or DR, is the ability of customers to temporarily reduce or shift their electricity consumption in response to market signals or grid needs. It represents an increasingly important tool for the flexible management of demand and for ensuring the security of the power system, especially in a context of strong growth in both non-dispatchable renewable energy sources and electricity demand. DR is considered a potentially useful measure both to strengthen the operational resilience of the power system and to support recovery activities in situations of stress caused by severe weather events.

In particular, DR can help mitigate the impacts of various extreme events:

- **Heatwaves,** which significantly increase electricity demand for cooling, overloading the grids: in this context, DR can help contain peak loads, reducing the risk of outages and easing pressure on infrastructure;
- **Windstorms, floods, ice, and wildfires,** which can physically damage lines and cause network interruptions: DR can reduce the load in risk areas, helping to limit the number of disconnected customers in case of network sectioning and facilitate a gradual restoration.

For example, in the case of ice, it can help by reducing the load in critical areas, preventing widespread blackouts and enabling controlled reactivation; in the case of wildfires, it can proactively help lower demand in zones identified as vulnerable.

ADAPTATION IN PRACTICE | Demand Response Events

DR has already proven to generate tangible benefits in power systems in several countries. Below are some examples in North America and Australia:

- **June 2025**: In North America, extreme heat required a record use of DR. From June 23 to 25, more than 2 GW were made available to the grid, successfully managing over 90 dispatch interventions.
- **July 2023**: During an exceptional heatwave in Texas and Arizona, DR helped to avoid emergencies. By incentivizing consumption reduction during peak hours, blackouts were prevented, and system stability was maintained.
- **December 2022**: During Winter Storm Elliott in North America, many plants went offline. DR was crucial in reducing consumption and restoring grid stability, avoiding widespread blackouts.
- **In 2018** in Australia, within the framework of the Frequency Control Ancillary Services (FCAS) program, the participation of DR capacity and batteries contributed to reducing service costs by approximately 70 million AUD compared to the previous year.

3

KEY FACTORS FOR ADAPTATION

Climate adaptation represents one of the most complex and multifaceted challenges of our time and therefore requires an integrated approach capable of combining interventions tailored to the local context with a strategic, system-wide vision at national and international scales. This challenge involves not only the transformation of infrastructures, economic systems, and urban environments, but also new modes of governance and public policies.

The success of adaptation strategies largely depends on the ability of public authorities to play a leadership role in directing public and private resources toward resilient and innovative solutions. It is also important to ensure coherence between national, supranational, and global sustainable development policies and to define incentive frameworks for investments in resilience.

Collaboration among all stakeholders, including through multi-level partnerships, together with a multidisciplinary approach, is necessary to address such a broad and complex issue with effective, sustainable, and socially legitimate solutions. In this sense, the institutional role includes promoting constant and constructive dialogue with a wide range of stakeholders, such as the scientific community, the industrial sector and its associations, the financial world, and civil society organizations.

In this challenge, finance is an essential enabling factor. To implement effective adaptation measures and ensure socio-economic resilience and security, it is crucial to strengthen financial mechanisms and direct new investments—also through international funds—to support especially the most vulnerable areas and strategic infrastructures. More specifically, public funds from international organizations (e.g., the World Bank, the European Investment Bank, etc.), regional sources (e.g., the European Recovery Fund), or national concessional funds can play a key role in accelerating investments in adaptation.

In summary, climate adaptation requires institutional coordination and targeted investments to strengthen the resilience of infrastructures and territories. Adaptation solutions must be built by involving all stakeholders and enabled by financial resources, regulatory tools, and appropriate policies, promoting adaptation as an opportunity for growth.

GOVERNANCE AND STRATEGIC ALLIANCES FOR CLIMATE ADAPTATION

The active and coordinated involvement of all actors in society is a key factor. Public-private partnerships play a strategic role in mobilizing resources and know-how and in contributing to the development of effective and lasting responses. These collaborations must be framed within multilevel governance that values local expertise, fosters co-design, and ensures consistency between climate objectives and development policies.

Integrating climate adaptation into urban, territorial, and infrastructure planning is a crucial step. Including resilience criteria in regulatory plans, public budgets, and sectoral strategies—from mobility to water resource management—makes it possible to anticipate climate impacts and reduce systemic vulnerabilities. Energy infrastructures are a cornerstone of this security and resilience strategy.

NATIONAL ADAPTATION PLANS

The definition and implementation of National Adaptation Plans (NAP) encourage effective collaboration between the public and private sectors in several ways:

- **Strategic framework**: A clear vision and long-term objectives, identifying national and local priorities, are essential to guide private investments;
- **Investment needs**: Outlining requirements, the role of the public sector, and opportunities for the private sector;
- **Multi-stakeholder coordination**: Facilitating collaboration and the sharing of knowledge and best practices by involving private actors, academia, and communities;
- **Capacity building and transparency**: Strengthening capabilities and technology transfer, ensuring transparency and monitoring progress to attract further investments.

To strengthen the effectiveness of climate change adaptation policies, it is essential to ensure full coherence between planning instruments at regional and national levels.

For example, in Europe, it is crucial to ensure that the EU Adaptation Plan and the National Energy and Climate Plans (NECP) operate on complementary levels, with consistent and synergistic objectives and measures. The **new European framework** (Climate Resilience and Risk Management Integrated Framework and European Climate Adaptation Plan), expected in 2026, will be an important opportunity to define governance and tools to deliver concrete actions and foster collaboration among all stakeholders.

PUBLIC POLICY AND REGULATION

The adaptation challenge is not only technological but also institutional, financial, and regulatory. Authoritative international sources—such as the Intergovernmental Panel on Climate Change Sixth Assessment Report (AR6), the OECD guidelines[14], and the recommendations of the Global Commission on Adaptation—highlight the need to integrate long-term climate adaptation decision-making processes, supporting them with appropriate guidelines and incentive mechanisms.

In this context, regulation is a key tool to embed climate adaptation as a structural and lasting component of sustainable economic development, sparticularly for critical infrastructures such as energy distribution networks. It is essential to define clear, stable, and coherent regulatory frameworks that make adaptation measures effective, practical, and replicable on a large scale..

Specifically, energy security requires a collective approach based on sharing best practices among operators, regulatory authorities, and stakeholders, as well as adopting appropriate techno-economic regulations and tariff mechanisms to direct and support the necessary investments. The regulatory framework must evolve from a reactive, emergency-driven logic to a systemic, enabling logic, capable of fostering resilience, technological innovation, and the removal of bureaucratic and financial barriers to infrastructure development. Such regulatory and policy evolution is essential to build an energy system capable of dynamically adapting to climate impacts, ensuring continuity and quality of service for citizens and businesses.

14. Some examples: European Commission, 2021 – "Climate Resilience Proofing Guidelines"; Canada Standard Council , 2016 – "Climate Resilient Built Environment (CRBE)"

To this end, with regard to power grids, the design of remuneration schemes must be structured to guide and reward efforts and investments aimed at enhancing the resilience of infrastructures, ensuring that operators have the necessary resources to plan, implement, and maintain resilient infrastructures. Furthermore, it is important to promote a culture of collaboration and continuous innovation.

REGULATORY BEST PRACTICES FOR RESILIENCE

For distribution networks, it is crucial to have a stable and clear regulatory framework that incentivizes resilience investments through specific mechanisms. The regulator should recognize the strategic value of interventions aimed at strengthening the electricity infrastructure against extreme events, encouraging distributors to act proactively in this area.

The Italian regulation on network resilience represents one of the most advanced and innovative models worldwide. Over recent years, the sector regulatory Authority has worked to identify system priorities, establishing regulatory mechanisms and tools to incentivize operators' investments in resilience and quality. Starting in 2024, the regulator introduced a new incentive model for development projects on distribution networks[15], including resilience measures, which provides, among other things:

- **Positive cost-benefit analysis**: Interventions can access the incentive model only if the Cost-Benefit Analysis (CBA) is positive (i.e., benefits exceed costs). The assessment of benefits also considers the reduction in the probability of failure, the number of customers benefiting from the intervention, and the concept of Value of Lost Load (VoLL), i.e. the economic value attributed to "unserved" energy.
- **Future climate scenarios**: To design interventions that are truly effective in the long term, operators can base their planning on projections of extreme events (e.g., heatwaves), rather than historical data, thereby accounting for expected impacts of climate change.

In conclusion, the incentive model is based on a systemic benefit valorization logic: operators implementing interventions that meet the established criteria are awarded a premium that reflects part of the value generated for the system, encouraging targeted investments and virtuous behavior.

15.
- Resolution of 18 December 2018 – 668/2018/R/eel: Economic incentives for measures aimed at increasing the resilience of electricity distribution networks. https://www.arera.it/atti-e-provvedimenti/dettaglio/18/668-18
- Annex A to Resolution 566/2019/R/eel – Integrated text of output-based regulation for electricity distribution and metering services for the period 2016–2023, Title 10 Resilience of the electricity system, available at the link.
- Resolution of 27 December 2023 – 614/2023/R/eel: Update of the provisions on incentive regulation for increasing the resilience of electricity distribution networks, for the period 2019–2024, available at https://www.arera.it/atti-e-provvedimenti/dettaglio/23/614-23
- L. Lo Schiavo, C. Turconi, F. Villa, Regulatory incentives for improving the resilience of electricity distribution grids in Italy, 25th CIRED, Madrid, 3-6 June 2019, paper 2192]
- Annex A to Resolution 617/2023/R/eel – Integrated text of output-based regulation for electricity distribution and metering services for the period 2024–2027, Title 10 – Incentive provisions related to the benefits of interventions on distribution networks, available at the link: https://www.arera.it/fileadmin/allegati/docs/23/617-23alla_ti.pdf

FINANCE FOR ADAPTATION

Finance is essential to scale up adaptation globally - not only to bridge the growing gap between needs and available resources, the so-called "adaptation finance gap", which in 2023 reached over USD 360 billion annually according to the Adaptation Gap Report (UNEP[16], 2024), but also to create conditions that make the most effective solutions accessible and replicable.

Estimates indicate that adaptation finance accounts for around 5% of total climate finance data 2021–2022), and by 2030 current flows could be four times lower than required[17]. To increase flows toward adaptation, several aspects are important:

- Improving **tracking** and **measurement** methodologies for investments and their impacts;
- **Clear** and **targeted** financing **programs,** from national, regional, and international public institutions, using direct subsidy instruments (grants) or concessional loans (from Development Banks and/or Export Credit Agencies, ECAs);
- **Better perception of risks and returns** for the private sector and public-private collaboration, including through diversification of financial instruments (e.g., guarantees, blended finance, result-based finance) and incentives for public-private cooperation.

For example, in 2021, BEI Global provided the Enel Group with a financing framework that resulted in a total equivalent of approximately €900 million to support targeted investment plans in Latin America (particularly Brazil and Chile) for both networks and renewable power plants.

The contribution of finance operates on multiple levels, including instruments to attract private capital. According to Climate Policy Initiative, out of 60 public financial institutions examined, only 13 had made specific public commitments to adaptation finance. In this regard, multilateral development banks play an important role. Initiatives such as the Global Shield against Climate Risks[18], the Green Climate Fund or the Climate Adaptation Windows of the African Development Bank demonstrate how financial instruments can unlock private capital in high climate-risk contexts or in countries with limited fiscal capacity.

The financial system can contribute to scaling adaptation by integrating physical and transition risks related to climate change into decision-making and capital allocation frameworks. For example, initiatives such as the Climate Risk Investment Framework by IIGCC[19] , and actions undertaken by central banks to assess risks and inform supervisory activities[20] (e.g., ECB, BoE)[21], are driving more informed and resilient allocation, generating market signals for companies and territories.

Finally, finance is also important for strengthening scientific and technological capacities: developing climate data and scenarios, supporting technological innovation, promoting territorial cooperation, and ensuring equitable access to funding, especially for vulnerable communities and low-income countries.

Therefore, pursuing climate adaptation financing goals is essential to ensure long-term resilience. To achieve this, it is important to engage both the public and private sectors in targeted investment plans and to strengthen strategic infrastructures, with particular attention to energy security.

16. United Nations Environment Programme
17. State and Trends in Climate Adaptation Finance 2024 - Climate Policy Initiative, Global Center on Adaptation
18. Initiative launched at COP27 to increase financial protection for vulnerable populations
19. Institutional Investors Group on Climate Change
20. ECB Annual Report on supervisory activities 2024 – Supervisory priorities for 2024-2026; ECB Press release July 2025 - ECB to adapt collateral framework to address climate-related transition risks
21. European Central Bank (ECB); Bank of England (BOE)

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