PROTECTING NETWORKS

HAZARD

RAINFALL AND FLOODS
COASTAL DYNAMICS
GEOTECHNICAL DROUGHTS
HEAT
WILDFIRES
STORMS AND STRONG WINDS

IMPLEMENTATION STEP

CONSTRUCTION
RENOVATION
TERRITORY

AREA OF ACTION

GROUND FLOOR
OUTDOORS

COST

€ € €
low medium high

LEVEL OF SKILL

high

Networks are essential to the smooth running of human activities, which is why it's vital to protect them against the damage that can be caused by extreme weather events. Strategic networks that need to be secured as a priority include road, electricity, water and telecommunications networks. The interdependence of these networks increases their vulnerability, as the cascade effect means that a failure in one network can impact the smooth operation of all of them, thereby exacerbating the effects of a crisis.

IMPACTS

Numerous climate hazards, such as floods, storms and heat waves, pose a risk of network failure, threatening the continuation of human, economic and industrial activities at building and regional levels.

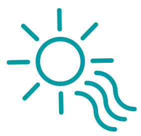
Protecting networks reduces the risk of partial or total network shutdown in the event of a major climate event, thereby limiting the impacts on humans (casualties, etc.), costs (loss of property, business stoppages, etc.) and the environment (pollution from leaks, disruption to essential infrastructure such as treatment plants, etc.).

INSTALLATION GUIDE

Before implementing a network protection strategy, you need to identify the critical networks and carry out a risk assessment based on the vulnerability of the area and the facilities.

There are various systems for protecting networks against climatic risks:

In the following table, the solutions in red constitute resilience factors regarding the hazard in question, but may be risk factors for other hazards.

HAZARDS	SOLUTIONS
	• Moving electrical and telecommunications installations out of water's reach in the building and surrounding area • Raising access roads to strategic buildings (emergency centres, hospitals, etc.) • Sealing networks • Improving the mechanical strength of structures • Keeping trees away from unburied networks
	• Paying particular attention to underground networks, which are very sensitive to temperature increases • Oversizing lines to compensate for the reduction in flow due to an increase in temperature
	• Selecting more flexible materials for pipes • Installing flexible joints at connection points • Sealing pipes

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	• Anchoring network installations • Burying networks • Keeping trees away from unburied networks
	• Adding fireproof sheaths around cables and pipes • Keeping trees away from unburied networks

WEAK POINTS AND STRONG POINTS

- Failing to protect your networks can turn out to be very expensive. In the event of flooding, damage suffered in flooded areas may be covered by compensation, but indirect damage resulting from network failures outside these areas will not be covered.
- Assessing the vulnerability of networks can be complex due to the **scattered information on the potential impact of network failures**. This is due to the involvement of numerous players and the difficulty of collecting this essential data.
- **Some recommendations may be contradictory**. For example, elevating networks may make them more resilient to flooding, but may also make them more vulnerable to high winds.
+ To ensure continuity of network service, it's advisable to combine network protection devices with effective meshing.

MALADAPTATION

Maladaptation can result from the following:

Water diversion

Raising access roads to ensure accessibility in the event of rising water levels can divert water from one place (strategic buildings) to another (other areas upstream or downstream), thereby increasing the risk of flooding. Transferring vulnerability can also affect local communities, ecosystems, infrastructure, surrounding farmland and amenities, etc., requiring integrated risk management involving coordination with local authorities and neighbouring landowners.

Disruption of biodiversity

Removing trees from unburied networks can disrupt local ecosystems, including underground habitats, by altering soil composition and natural habitats. This disturbance can reduce biodiversity, affecting the variety of species and interactions in these ecosystems. Similarly, other network protection measures, such as raising access roads, anchoring/burying network installations and other actions, can displace or destroy natural habitats during network construction and maintenance.

Disruption of co-benefits

Trees play a crucial role in providing shade and natural cooling in urban areas prone to urban heat islands (UHI). On the other hand, when trees are moved, these low-albedo surfaces (dark asphalt mix, etc.) can become more exposed to the sun, leading to a significant rise in ambient and local temperatures. This increase in heat can have negative implications for comfort and quality of life in urban environments.

MONITORING INDICATORS

ESSENTIAL RECOMMENDATIONS WORTH THINKING ABOUT

- IDENTIFY CRITICAL NETWORKS
- IMPLEMENT PROTECTIVE MEASURES FOR NETWORKS, IDENTIFIED ACCORDING TO THEIR EXPOSURE TO HAZARDS, WITHOUT AMPLIFYING THE RISK FACTOR OF OTHER HAZARDS

MONITOR MY ACTIONS FOR CLIMATE CHANGE ADAPTATION

+/- : Quantitative indicator ★ : Qualitative indicator

	INDICATORS OF MEANS	INTERPRETATION
+/-	Percentage of networks in poor condition in the sector covered (%)	To be minimised
+/-	Percentage of networks regularly checked and/or maintained (%)	To be maximised

	INDICATORS OF RESULTS	INTERPRETATION
+/-	Financial, material and/or human damage resulting from network failures during disasters linked to climate change	To be minimised
+/-	Total downtime of network supply capacity during disasters linked to climate change (hours)	To be minimised
+/-	Partial downtime of network supply capacity during disasters linked to climate change (hours)	To be minimised
+/-	Time taken to restore a building to working order after a disaster linked to climate change (hours)	To be minimised

REGULATION

- French Decree no. 2022-1077 of 28 July 2022 on the resilience of networks to natural hazards allows the prefect to require that operators of services or networks that are essential to the population (drinking water, sewerage, electricity, gas, telecommunications networks) **identify their vulnerabilities** to large-scale natural events (such as floods). The aim is to anticipate how to manage these networks in order to provide a minimum service to meet the population's essential needs for the duration of the crisis, and rapidly return to normal operations. The prefect's request also covers a **programme of priority investments** to be made to improve the **resilience of services** in the event of a hazard. The decree specifies the territories and potential natural hazards, the scenarios that must be studied by the operators of services and networks, how the prefect formulates the request and how the operators must comply with it.

FIND OUT MORE

CEPRI (2016), *Le territoire et ses réseaux techniques face au risque d'inondation*

Le monde de l'énergie (2019), *Réseaux électriques et changement climatique : une menace inévitable*

French Ministry of Ecology and Sustainable Development (2005), *Réduire la vulnérabilité des réseaux urbains aux inondations*

Techni.Cités (2018), *Pour des réseaux de plus en plus résilients*

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