



Environmental Solutions by VINCI

Adapting to climate change: united in facing the challenge of the century



Introduction

Climate: adaptation is no longer an option

Extreme weather events are becoming more and more frequent, and their recurrence and severity will continue to increase in the years and decades to come.

Adapting to climate change has become a necessity. We now need to continue our efforts on mitigation, i.e. reducing greenhouse gas emissions, and adaptation, i.e. anticipating the physical risks associated with these climate events. Beyond the climate issue, adaptation brings co-benefits, including citizen well-being and health.

At VINCI, we position ourselves as a provider of concrete adaptation solutions in our business sectors. The road to adaptation is long, and new economic models are not yet mature – but the cost of taking action now is still lower than the cost of inaction and future damage. We're keeping up our efforts to support the adaptation of the regions in which we operate.

Together, with our partners and the regions we serve, it's time for action!

Isabelle Spiegel,
Vice-President Environment, VINCI



Adapting to climate change: what are we talking about?

With climate change,
investing in adaptation,
especially for infrastructure
and buildings, is essential.
It's also a relevant strategy
for businesses and regions.



Increase in extreme weather events
between 1970 and 2010³



3.3 to
3.6 billion

people live in environments that are
highly vulnerable to climate change¹

Accelerated and unstoppable climate change

Concentrations of CO₂ in the atmosphere have reached their highest level in two million years.

In fact, despite the efforts made, **global greenhouse gas emissions are continuing to increase**, and temperatures have risen by 1.1°C¹ between the pre-industrial era and the period 2011-2020. According to the IPCC (Intergovernmental Panel on Climate Change), the current commitments made by governments are taking us towards a global temperature rise of +3.2°C by 2100², which is equivalent to **+4°C for Europe**.

Faced with this situation, the IPCC recommends **two complementary strategies: mitigation and adaptation**. While mitigation is well underway, no structured adaptation policy has yet been implemented on a global scale. However, there is an urgent need to prepare our infrastructure and buildings for this new climate.

Climate change is accompanied by a cascade of environmental consequences.

Extreme weather events (floods, storms, forest fires, landslides, etc.) have quadrupled between the 1970s and 2010³. Added to this are chronic changes **such as rising sea levels and the accelerated melting of ice and permafrost**. These transformations have and will have major and irreversible effects on governments, businesses and communities.

¹ Source: Climate Change 2023, Synthesis Report - IPCC.

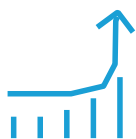
² Ibid.

³ Source: Climate Change 2022: Impacts, Adaptation and Vulnerability - IPCC.



\$800 billion

Estimated cost of
extreme weather events
each year



1-2 to 1-10+

Cost-benefit
ratio of adaptation
investments⁴



1,000 to 2,000

municipalities were
already uninsurable in France
on 1 January 2024

Adaptation, an essential investment

Every year, extreme weather events cause around **800 billion¹ dollars worth of damage to infrastructure and buildings**. By 2050, this figure could rise to between 1,700 and 3,100 billion dollars per year².

What's more, **the cost of adaptation is much lower than the cost of inaction**. While a deviation in global average temperature of 1°C could lead to a gradual decline in global GDP of up to 12%³, the cost of adaptation is estimated at only 1% of global GDP. The overall rate of return on investment in adaptation is very high, with a cost-benefit ratio

ranging from 1:2 to 1:10... or higher⁴! **Every euro invested in adaptation could prevent 10 in damage**. Furthermore, by limiting the destabilisation of our societies and economies, adaptation will help maximise the growth potential of mitigation efforts.

MITIGATION AND ADAPTATION : WHAT'S THE DIFFERENCE?

Mitigation aims to **curb climate change**, in particular by activating two levers: energy efficiency and the replacement of fossil fuels.

Adaptation involves **"making do" with the changes** underway and preparing to live in a warmer world. Adaptation is the path to resilience. Its aim is to ensure that people are protected, prepare territories (continuity of infrastructure and essential services), ensure the resilience of the economy and preserve the natural environment and cultural heritage.

In short, mitigation aims to **"avoid the unmanageable"**, adaptation to **"manage the inevitable"**.

¹ Source: Climate change damage to infrastructure poses 'huge' financial risks - Reuters, 2023.

² Source: Climate change is costing the world \$16 million per hour: study - World Economic Forum, 2023.

³ Source: Bilal & Känzig, The Macroeconomic Impact of Climate Change: Global vs. Local Temperature, 2024.

⁴ Source: Adapt Now: A Global Call for Leadership on Climate Resilience - Global Commission on Adaptation - 2019.

VINCI, mobilised to meet the challenge of adaptation

The VINCI Group is taking action by drawing on the expertise of its network of local companies, by supporting public authorities in their decision-making and by training its employees in the challenges of climate adaptation.

“For all the Group’s major projects, we are able to anticipate climate hazards over the long term. Thanks to the innovative diagnostic tools developed within our Group, we can be proactive in reducing our exposure to risks and thus propose adaptation solutions right from the project design phase. ”

Manuel Peltier,
Managing Director of Soletanche Freyssinet,
VINCI Construction

The VINCI Group is a private-sector public utility and, by virtue of its size and activities, is already a recognised player in the field of adapting to climate change. With more than 285,000 employees worldwide, **VINCI can intervene in every phase of a project:** consulting, diagnostics, studies, works, innovation, maintenance, management, etc. Through its local roots and presence in more than 120 countries, it is also a key partner for **States and local authorities** to support them in their efforts to adapt.

Internally, we train our teams in the challenges of adaptation. VINCI has created a climate pre-diagnosis platform called ResiLens, which enables all employees to become familiar with the subject of climate risks and to conduct an initial analysis of the criticality of the infrastructure on which they work.

The Group can also count on **Leonard, its innovation and foresight platform**, which has had a foresight group dedicated to adaptation since 2017. In addition to raising awareness among employees, this group is working on the business implications of adaptation, namely economic models, insurance issues and, more generally, the integration of climate adaptation into the strategies of the Group’s entities.



Restoring hydraulic continuity by building a fish pass on the river near La Jaille-Yvon (western France) enabling various fish species to swim upstream.

HOW VINCI IS CONTRIBUTING IN FRANCE TO THE NATIONAL PLAN FOR ADAPTATION TO CLIMATE CHANGE (PNACC-3)

This plan, presented by the government in March 2025, aims to prepare France for a warming of 4°C by the end of the century. VINCI contributed to an earlier national consultation, launched in September 2023, namely by proposing concrete responses. Some of the measures in the PNACC-3 for the building

and infrastructure sector echo proposals made by the Group, including:

- a measure based on the analysis of total costs and environmental, social and ecological benefits;
- a measure on mobilising public procurement;

- measures to raise awareness among all stakeholders and to share knowledge and practical solutions, and the long-term viability of the Mission Adaptation.



Adaptive solutions throughout the value chain



Parc de la Loubière in Toulon, where islands of freshness have been created using the Revilo® solution.

For several years now, VINCI has been experimenting with and implementing tried and tested, customised adaptation solutions for its customers, based on its capacity for innovation. These are integrated solutions - diagnostic, prevention and repair solutions - applicable to all our activities.

All of VINCI's areas of activity are concerned:

- **building and energy renovation**, to rebuild the city and promote climate resilience, decarbonisation and the protection of biodiversity;
- **energy infrastructure**, to protect production sites and energy networks (mechanical securing of the RTE network, burying networks, etc.);
- **transport and roads**, to ensure continuity of service after extreme events and create new protection systems against climate hazards;
- **water-related infrastructure**, to better manage water resources and restore their natural cycle, by holding water on-site or infiltrating it into the water table.

DIAGNOSTIC SOLUTIONS

BECAUSE GLOBAL WARMING IS TRANSFORMING THE WAY WE DESIGN INFRASTRUCTURE, VINCI OFFERS DIAGNOSTIC TOOLS THAT CAN TAKE INTO ACCOUNT LOCAL SPECIFICITIES AND CLIMATE HAZARDS. THE CHALLENGE: TO RAISE CUSTOMERS' AWARENESS OF THE NEED TO ADAPT AND TO PROPOSE PROJECTS THAT ARE COMPATIBLE WITH CLIMATE SCENARIOS.



ResiLens: to preview the climate risks on the Group's projects

VINCI

Concept:

ResiLens is an online platform for visualising climate risks, developed by Resalliance, VINCI's design office dedicated to adapting infrastructure and urban projects. ResiLens aggregates data produced by scientists (Giec, Cerema, Météo-France, etc.) and integrates, for each infrastructure project, the site's exposure to climate hazards and equipment specifications.

Value proposition:

Identify the main risks that need to be taken into account when designing new infrastructure or modifying existing equipment. ResiLens is the first platform developed and deployed worldwide by a major group to assess the criticality of its projects and activities to climate risks.

Biodi(V)strict®: improve the biodiversity potential of urban and suburban development projects

VINCI Construction

Concept:

Biodi(V)strict® is a predictive tool for assessing the biodiversity potential of an urban development project to propose greening solutions. Designed by VINCI's *lab research and environment*, Biodi(V)strict® is the first tool of its kind.

Value proposition:

Identify the main pressures on the site in terms of biodiversity, but also its assets. Propose a dynamic and rapid tool for simulating different scenarios.

Bi2O: to assess and compare the environmental performance of development projects

VINCI Construction

Concept:

This tool tracks and quantifies the improvements made by projects in favour of the environment, particularly in terms of rainwater management, reducing the urban heat island effect and biodiversity.

Value proposition:

Objective, recognised indicators and rapid assessment.

DPR (diagnosis of resilience performance): define the impact of climate hazards on buildings and regions

VINCI Construction

Concept:

This systemic modelling tool makes it possible to assess the losses and damage induced by climate hazards in a region, as well as the investment costs required to reduce these losses and damage.

Value proposition:

Understand the interconnections in a given region and highlight areas for improvement to facilitate decision-making.

PREVENTION SOLUTIONS

VINCI OFFERS A WIDE RANGE OF SOLUTIONS TO PROTECT INFRASTRUCTURE AND BUILDINGS FROM THE EFFECTS OF CLIMATE CHANGE.



Revalo®: combating urban overheating

VINCI Construction

Concept:

A range of urban cooling islands based on 4 levers: plants, to create shade; rainwater management, to direct rainfall towards plants; soil, able to store and infiltrate water; and pavement, playing on permeability and albedo.

Value proposition:

A comprehensive solution that addresses the issues faced by local elected representatives, the needs of municipal technical services and the expectations of residents.

Advanced analysis for forest fire risk prevention

VINCI Energies

Concept:

A system for detecting and preventing fires caused by contact between vegetation and medium-voltage lines, designed for operators of large-scale electricity transmission infrastructures. The solution was developed in close collaboration with the Portuguese distribution network operator.

Value proposition:

A solution that reduces operating losses and restoration costs and increases the acceptability of infrastructure. Preventing fires also has numerous environmental benefits, such as avoided CO₂ emissions and biodiversity loss.

Caledonia: simulating flooding in real time

VINCI Construction and VINCI Autoroutes

Concept:

This calculation software, based on artificial intelligence algorithms and terrain modeling, integrates rainfall data from Météo-France to simulate urban flooding in real time.

Value proposition:

Identify risks and anticipate impacts (on users, surrounding areas, infrastructure) to ensure appropriate crisis management and inform investment decisions.

Preventing disasters linked to the impact of typhoons and floods on airports

VINCI Airports

Concept:

A model for forecasting extreme weather events, analysing their impact on airports and planning for disasters.

Developed by Kansai Airports, in partnership with Kyoto University's Disaster Prevention Research Institute and Kumamoto University's Department of Civil Engineering and Architecture.

Value proposition:

Adapt infrastructure to climate hazards and anticipate extreme meteorological phenomena, in particular by enabling the development and revision of investment plans for infrastructure maintenance.

CONSTRUCTION SOLUTIONS

IN THE FACE OF EXTREME WEATHER EVENTS, VINCI'S SOLUTIONS MAKE IT POSSIBLE TO ANTICIPATE DAMAGE AND GUARANTEE A RAPID RETURN TO NORMALITY.



GREENFLOOR®: improving comfort and air quality in buildings

VINCI Energies

Concept:

The GREENFLOOR® solution involves passing air through ducts integrated into a very low-carbon concrete slab of conventional thickness. The air, used as a heat transfer fluid, transmits its heat or coolness to the concrete, which acts like a radiant ceiling. GREENFLOOR® seamlessly regulates temperature, combining ventilation, air conditioning and heating.

Value proposition:

Optimised installation, improved environmental performance, better air quality, and enhanced well-being for occupants

Equo Vivo (expertise in ecological engineering): promoting ecosystem resilience

VINCI Construction

Concept:

This offer enables a mastery of techniques to enhance and restore biodiversity and ecological functions across both natural and human-made environments.

Value proposition:

Modulate the flow of a river to prevent flooding of sensitive areas, create new wetlands acting as carbon sinks and enable improved water management and enhanced ecosystem services.

Géotextile Enviro Mat: protecting against coastal and river erosion

VINCI Construction

Concept:

Form-fill mattresses and geotubes (made from geotextile with a high polyester yarn content and filled with concrete or sand) to protect coastlines and riverbanks against erosion caused by rising water levels and extreme events of increasing frequency.

Value proposition:

Reduce soil erosion and limit water velocity, promote biodiversity by encouraging plant growth. This solution is also cheaper, easier to install and has a reduced carbon footprint.

Reunion Island seawall: protecting the coastline with a new form of seawall

VINCI Construction

Concept:

A "seawall with shells", built with just a single layer of blocks to protect the airport's coastline against erosion and marine submersion. These 10,500 Xblocs®, patented by DMC, are always placed in the same orientation, making their laying easier. The block's special shape also makes it less fragile and more stable.

Value proposition:

A solution that performs better (greater efficiency and stability against swells), is more robust over time (less risk of breakage, less maintenance), is more attractive economically, and, above all, offers considerable environmental benefits (50% less concrete used compared with the initial design).

Examples of adaptation projects

VINCI has carried out numerous adaptation projects to prevent climate risks threatening infrastructure. Here is an overview.

Faro Airport - VINCI Airports - Portugal

Beneficiary: Aeroportos de Portugal

Co-constructing a global climate adaptation action plan for the airport

The challenge:

Using a participatory approach, build an action plan based on a diagnosis of the airport's vulnerabilities and climate risks. The plan should anticipate climate risks, improve resilience and optimise the resources allocated and the associated costs.

The solution:

The action plan addresses the risk of flooding, drought, high temperatures, risks to workers and passengers, and the prevention of new tropical diseases. Specific measures have been proposed for each aspect, such as rainfall monitoring, wastewater reuse, terminal shading and employee training and awareness campaigns. The plan also includes the monitoring and recording of extreme weather events to provide a useful historical database for future revisions.

The figures:

18 stakeholders involved in the participatory approach.
€105K in investments planned for 2025 to follow up on the proposed measures, and **€400K** for recycling treated wastewater.



Autoroute A8 – France

Beneficiary: VINCI Autoroutes

Maintaining a river crossing in nominal hydraulic conditions

The challenge:

In the Alpes-Maritimes, the A8 motorway crosses the Brague coastal river through a series of hydraulic nozzles. During its development in the 1950s, the motorway was designed to withstand a 30-year flood. Beyond this, the motorway is flooded. Poor maintenance of the banks of the Brague upstream of the motorway can lead, in the event of flooding, to the accumulation of debris on this structure. If the debris are larger than the diameter of the nozzles, the latter are blocked, which increases the probability and frequency of flooding of the traffic lanes and therefore of the motorway being cut off.

The solution:

Position a crane truck in the event of an intense rainfall event, to remove any obstructions that might block the nozzles.

The figure:

A budget of **€3K**

HS2 high-speed line - VINCI Construction - United Kingdom

Beneficiary: HS2

Maximising the HS2 line's climate resilience

The challenge:

The country's second high-speed rail line crosses numerous rivers and their associated floodplains. Without mitigation measures, the project is likely to increase the risk of flooding in riverside areas.

The solution:

Adopt an ecologically focused and nature-based alternative approach, using natural flood management techniques such as meander restoration, while incorporating ecological value at the design stage (Nature-Based Solutions: NBS).

The figure:

Zero net loss of biodiversity



Universeine - VINCI Immobilier - France

Beneficiaries: Ministry of the Interior, PCH, CDCH, Coopimmo, private individuals

Designing a mixed, resilient neighbourhood

The challenge:

The athletes' village for the Paris 2024 Olympic and Paralympic Games was to be built in Saint-Denis, on a 6.4-hectare former industrial wasteland on polluted and artificial ground. After the Games, it was to be transformed into a district of housing and offices (3,000 inhabitants and 4,300 employees) in anticipation of the heat waves expected over the next thirty years.

The solution:

Design structures for conversion that are optimised in terms of cost and timeline, with construction techniques that facilitate change of use and reuse of materials; build resilient structures, designed for summer comfort in 2050; create urban cooling islands thanks to the creation of the biodiversity corridor to combat heat.

The figures:

20% soil renaturation throughout the district. By 2025, **65,333 m²** of housing, **57,029 m²** of offices and **3,060 m²** of shops.



Kansai International Airport - VINCI Airports - Japan

Beneficiary: Kansai International Airport (KIX)

Preventing flooding caused by heavy rainfall

The challenge:

Located on an artificial island almost 5 kilometres from the coast, Kansai airport is built 5 metres above sea level.

The solution:

To compensate for potential flooding, various measures have been adopted:

- **measures against coastal flooding:** raising the six-kilometre-long seawall on the first island by 2.7 metres. Installing approximately 40,000 tetrapods, each weighing between 12 and 20 tonnes, along 4.5 km of seawalls on the eastern and southern sides, where wave overtopping was significant. In parallel with the

seawall elevation, Runway A of the airport was raised to ensure the safety of aviation operations;

- **flood damage prevention measures:** to prevent flooding, emergency power supply facilities, which were previously underground, have been relocated above ground. Additionally, flood barriers and watertight doors have been installed to prevent water from entering the facilities.

Furthermore, a new crisis management system has been developed, and passenger information dissemination has been improved.

The figure:

A project cost of **€350m**.

Towards an economic model based on collaboration between public authorities and private players

Adapting to climate change is a major challenge that requires technical solutions and a strong political will, as well as economic models that have yet to be (re)invented.

Above all, adaptation requires a collaborative and innovative approach. Although many solutions already exist, their implementation comes up against numerous obstacles, both political and economic. This is why there is an urgent need to **take a comprehensive approach to adaptation, addressing these issues on a regional scale.**

While the definition and programming of projects and investments linked to adaptation are most often in the public interest (e.g. combating heat islands to reduce damage to health), **it is necessary to mobilise all the economic players in an area.**

Mobilising the private sector

Private sector players, including VINCI, have an essential role to play in designing and implementing hybrid economic models for adaptation. This can take the form of private co-financing, or new contractual arrangements enabling a new form of profitability to be achieved. Calculating the overall value proposition requires thinking in terms of total costs, integrating issues of health, air quality, biodiversity and public well-being into the returns on investment.

Innovative financing models

Numerous options are being studied or tested, such as public-private partnerships and Sustainability-Linked Bonds. In terms of mitigation, VINCI is actively participating in these discussions and experiments. In Brazil, for example, the Group is developing renewable energies and building thousands of kilometres of high-voltage lines as part of public-private partnerships (PPP). PPPs of this type dedicated to adaptation projects would make it possible **to attract private capital to pre-finance a project without having to resort to the public budget.** They also make it possible to allocate the risks borne throughout the contract, particularly in terms of performance and continuity of service.

Adapting to climate change represents a huge challenge, but also an opportunity to create resilient infrastructure and jobs in the field of adaptation.

Whether it's a question of financing, studying, constructing, transforming, maintaining or operating, infrastructure and buildings are on the front line in meeting this demanding and exciting challenge, one mobilising actors from around the world in the conviction that these sectors are more meaningful, valuable and future-oriented than ever.



The series *Environmental Solutions by VINCI* deciphers the challenges of environmental transition and highlights VINCI's point of view and the solutions implemented within the Group to help improve living spaces, infrastructure and mobility.


These documents embody the Group's determination to put action at the heart of the rollout of its environmental ambition based on three priorities: acting for the climate, optimising resources through the circular economy and preserving natural environments.


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Cover photo: Development of the La Bassée site in Châtenay-sur-Seine (France), to protect the area from flooding by the Seine using Equo Vivo, a VINCI Construction solution for ecological development projects.




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