

Environmental Solutions by VINCI

Optimizing resources thanks to the circular economy





Introduction

From line to circle: a model that must be changed

With almost 100 billion tonnes of material extracted every year, we are consuming more resources than the planet can regenerate, and at an increasing rate.

In 2024, the "Earth Overshoot Day"¹ was reached on 1 August worldwide. In 1986, we had to wait until 31 December to cross this limit. In 2025 in France, it was already reached on April 19. The depletion of mineral and metal reserves that are accessible at acceptable energy, environmental and social costs is one of the factors that should lead us to reconsider our models.

Indeed, we need to favour the use of recycled materials rather than virgin resources. But above all, we need to produce better with less, to move from a linear economy that depletes the planet's resources to an economy based on circular flows that are self-sufficient and regenerative.

Today, the building and infrastructure industries are major consumers of materials and are also among the leaders in terms of waste production: **around 50%**² **of resources extracted are used in construction** and, in the European Union, 30%³ of waste comes directly from construction activities. This is a serious situation that carries with it the potential risk of shortages. VINCI is a determined player in the essential transition that our industry must make to reduce its consumption of natural resources, especially by adopting eco-design, reusing and recycling materials and prioritizing a mix of materials. By fully assuming our responsibility as a Group with global involvement and by deploying our full potential for innovation, we are committed to moving towards a circular economy, which is the second pillar of our environmental commitment. This paradigm shift is not a constraint, but **a fantastic opportunity to innovate and build sustainably** while respecting the planet's limits.

Isabelle Spiegel, Director of Environment, VINCI

¹ Overshoot Day: date in the year when all the natural resources that the planet is capable of producing in one year are consumed in order to regenerate its reserves or absorb the waste produced.

² Source: European Green Deal: Commission proposes to boost renovation and decarbonisation of buildings, European Commission, 2021.

³ Source: What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050, World Bank, 2018.

The circular economy, for responsible resource management

The over-consumption of natural resources threatens the sustainability of certain activities. Tensions are particularly acute in the case of certain critical metals, but can also affect more common materials such as sand, depending on the region. Adopting a circular economy approach and preserving raw materials is a priority.

The dead end of the "take-make-waste" model

Urbanisation is progressing all over the world: over the next 40 years, 230 billion square metres of new buildings are expected to be erected, equivalent to the surface area of Paris every week.¹ Production and consumption are keeping pace with the growth of the middle classes, intensifying the pressure on resources. Global consumption of natural resources has tripled in 50 years.² If current production and consumption patterns continue, it could increase by 60% by 2060 compared with 2020.

This over-consumption has systemic effects: the depletion of resources, the destruction of ecosystems and massive pollution. Resource extraction and processing are responsible for more than 55% of greenhouse gas emissions³ and biomass extraction (agricultural crops, forestry, etc.) for more than 90% of terrestrial biodiversity losses.³

The construction sector is one of the world's biggest consumers of natural resources: **it uses around 50% of the materials extracted, including massive quantities of sand and aggregates,** the second most exploited resource after water (between 40 and 50 billion tonnes per year, a rate three times higher than 20 years ago).

This material is being exploited faster than it can regenerate, leading to sometimes irreversible ecological imbalances.

¹ Global Status Report, 2017.

² UN Global Resources Outlook 2024.

³ Ibid.

100 billion

tonnes of virgin natural resources consumed in the world Added to this is an economic model that is still predominantly linear: we extract, produce, consume and throw away, generating increasing volumes of waste. **Global waste production could reach 3.4 billion tonnes in the next 30 years,**¹ compared to 2.01 billion tonnes 10 years ago. The construction and public works sector plays a central role in this production: in Europe, it generates 30% of waste.

The linear model is not sustainable, and the capacity of ecosystems is not unlimited. **Responsible use of natural resources is no longer an option, but a necessity.** The circular economy offers a structuring path to extend the availability of materials, reduce waste and preserve ecosystems – without compromising development ambitions.

¹ World Bank Report, What A Waste2.0, 2018. ² European survey.

40 to 50 billion

tonnes of these virgin natural resources are used by the construction sector

INCREASED PRESSURE ON CRITICAL MATERIALS

As part of a forward-looking study, and to gain a better understanding of the issues at stake, VINCI studied 9 critical resources that are under increasing pressure and closely linked to the Group's activities: copper, aluminium, lithium, cobalt, rare earth elements, steel, silicon, bitumen, sand and aggregates. Some of these resources are in great demand as part of the energy transition and global urbanisation. For example, "green" technologies, such as wind turbines, solar panels and batteries, require more cobalt, lithium, copper, nickel, manganese and rare earth elements. Demand for strategic metals could double by 2030, while copper demand could increase by 35%, creating supply tensions and the risk of shortages.



material circularity by 2024



Up to

of a product's impact is determined at the design stage²

UNLOCKING ECONOMIC AND SOCIAL BENEFITS

The circular economy also generates economic and social opportunities. It promotes local employment, stimulates innovation and strengthens local resilience. In France, it accounts for 3% of jobs.³

The global circularity rate for materials currently stands at just 6.9%, i.e. 6.9% of 100 billion tonnes consumed are re-injected into the economy at the end of their life. This figure is down 9.1% on 2018.¹ This inertia can be explained by ingrained habits, the complexity of value chains, low levels of digitalisation and the diversity of regulatory frameworks.

The circular economy, a virtuous model

Faced with the combined crises of over-consumption of natural resources and increasing pollution, the circular economy is emerging as a strategic response. It is transforming the way we produce, build, consume and manage resources. This economic model breaks with the linear pattern of "extract - manufacture - consume – dispose". It closes the loops in material and energy flows, limits extraction, extends the life of products and recycles waste as a new resource. **The aim: to do better with less – fewer raw materials extracted, less waste, fewer emissions.**

Circular systems define a self-sufficient and regenerative model based on three main principles:

• **eliminating** waste and pollution right from the design stage;

• **circulating** materials for as long as possible (reuse, repair, recycling);

• **regenerating ecosystems,** by drawing inspiration from natural cycles and promoting infrastructure that is sober and integrated into its environment.

 $^{\rm 2}$ Déchets du bâtiment – Qu'est-ce que l'éco-conception, Ministère de la Transition écologique, 2020.

³ L'économie circulaire, combien d'emplois, France Stratégie, 2016.

¹ Circularity Gap Report, 2024.



VINCI solutions to extend, replace, and regenerate

As a pioneer in recycling for almost 50 years, VINCI has adopted a circular approach, a source of innovation and sustainability for its activities.

Building sustainably

For the VINCI Group, adopting the circular economy in our business means making the choice to build sustainably, intelligently, sparingly and responsibly in the face of dwindling natural resources. **This critical change is the second pillar of the Group's environmental ambition.** To achieve this objective, we are taking action upstream and downstream of the production chain and projects, using levers such as: • **eco-design,** which plays a key role, since this stage is decisive for a product's circularity;

• **re-use of equipment and materials**, which extends the life of products;

• **materials recycling,** which preserves virgin resources; and

• **"urban recycling",** or the construction of a city on top of a city, which refers to all operations that involve rehabilitating, enhancing or transforming existing buildings while limiting urban sprawl and land artificialisation.



VINCI'S CIRCULARITY COMMITMENTS

Promote the use of construction techniques and materials that consume fewer natural resources.
Improve waste sorting to ensure that waste is systematically recovered.
Expand the offer of recycled materials to limit the extraction of virgin materials.



ECO-DESIGN: THINKING CIRCULAR

ECODESIGN INVOLVES INCORPORATING DESIGN AND PRODUCTION CHOICES AT THE DESIGN STAGE OF A PRODUCT OR STRUCTURE TO REDUCE ITS ENVIRONMENTAL IMPACT THROUGHOUT ITS LIFE CYCLE.



This principle is central to the circular economy, since 80% of a product's environmental impact is determined at the design stage¹. Applied to buildings, eco-design makes it possible to limit the consumption of natural resources, reduce waste, optimise material flows and anticipate future needs in terms of the adaptability and reversibility of structures.

Despite the obstacles sometimes encountered in certain projects, **this approach is a priority for VINCI given the long-term benefits** such as the preservation of resources and the long-term profitability of a project.

Eco-design in the field

City Rail Link (New Zealand) - VINCI Construction Construction of an underground metro line

The challenge: double the passenger rail capacity of Auckland, the country's largest city, while minimising environmental impact.

The solution: adopt an EiD approach for the entire project.

The figures: 18% reduction in concrete footprint (over 7,000 lorries avoided), 11% reduction in mined tunnels and associated materials.

Our approach: Environment in Design

The challenge: systematise eco-design in our design and construction processes.

The solution: VINCI Construction's Major Projects Division has developed the *Environment in Design* (EiD) approach. This involves avoiding superfluous materials, reducing the volumes needed and replacing them with low-impact alternatives. This approach is being deployed on emblematic projects such as line 15 of the Greater Paris Express project, City Rail Link in New Zealand and the Anne-de-Bretagne Bridge in Nantes (France).

The figure: reductions in concrete consumption of up to 40%.

¹Orée, Guide de l'éco-conception des produits et services.



The City Rail Link project has been awarded the highest sustainability rating for infrastructure in New Zealand. The total reduction in material emissions is around 15%.



The market halls at Nogent-sur-Marne (Val-de-Marne). In the background, optipoutres.

Optipoutre (Halles de marché de Nogent-sur-Marne, Greater Paris) -Civil Engineering Division France, VINCI Construction

The challenge: to limit concrete consumption in construction.

The solution: development by the ISC integrated design office of a hollow-core concrete beam without compromising structural performance.

The figures: 31 beams produced with 25% concrete savings; percentage of optimisation achievable in general: between 15 and 40%.

Moulded wall in unreinforced concrete (line 15 South, Greater Paris Express) - Soletanche Bachy

The challenge: save materials in engineering structures while ensuring that they meet requirements and safety standards. Construction of a shaft on metro line 15 at Vitry-sur-Seine.

The solution: innovative construction of a final wall without reinforcement, the cylindrical shape transmitting forces by means of a vaulting effect.

The figure: saving 115 tonnes of steel and 292 m³.

REUSE: THINKING SECOND LIFE

REUSE IS A CIRCULAR ECONOMY APPROACH THAT TAKES PLACE UPSTREAM OF RECYCLING. IT ALLOWS AN OBJECT TO BE GIVEN A SECOND LIFE WITH A VIEW TO EXTENDING ITS LIFESPAN.

The product retains its status as a product and never becomes waste. In the construction and public works sector, products, equipment and materials are recovered from structures at the end of their life cycle, before they are demolished or rehabilitated, so that they can be reused on another site. The entire sector is concerned.

Our approach: backin

The challenge: to deploy a global reuse strategy to scale up the Group's initiatives.

This strategy has two components:

- **to encourage the creation of re-use channels,** from the collection of materials from worksites through to their reconditioning and re-use by our subsidiaries;

- **facilitating the adoption of re-use in the BUs** by providing databases centralising relevant contacts and offers/requests for re-use materials from the Dossiers de Consultation des Entreprises (DCE).

The solutions: re-use channels are already operational: false floor slabs (via La Ressourcerie, an expert service on re-use provided by VINCI Construction's Bâtiment France division); heavy-current electrical cables (via <u>Circable</u>); industrial valves (Actemium Le Havre Raffinage Chimie).

The figures: 20,000 m² of false flooring reused on the PULSE site (Saint-Denis) carried out by Bateg (VINCI Construction) on behalf of ICADE in 2018. 10 types of materials reused on the DAREAU site (Paris) carried out by GTM Bâtiment (VINCI Construction) for GECINA and delivered at the end of 2024: cable trays, radiators, gravel slabs, suspended WCs, door units, etc.



CLIMATE BENEFIT

38% of CO₂ emissions linked to construction materials could be reduced worldwide by 2050 if circular economy strategies were deployed for steel, aluminium, cement and plastics¹.



¹ "Completing the Picture: How the Circular Economy Tackles Climate Change", Ellen MacArthur Foundation, 2021.

RECYCLING: IMAGINING THE RESOURCES OF THE FUTURE

SOME OF THE GROUP'S ACTIVITIES THAT PRODUCE MATERIALS AIM TO DEVELOP ALTERNATIVE SOLUTIONS TO PRIMARY MATERIALS BY OFFERING RECYCLED OR MIXED MATERIALS AND EXPANDING RECYCLING SITES.



VINCI Construction's recycling target is in line with its environmental ambitions. **The aim is to double the production of recycled materials in 10 years compared with 2019 and to reach 20 million tonnes by 2030. Some** recycling sectors are already well established in France (asphalt millings, aggregates, for example). Other sectors (plaster, PVC windows) are gradually catching up.



A pioneering approach with Granulat+ and Ogêo

Challenge: limit the extraction of virgin raw materials, recycle waste and guarantee the supply of critical materials.

Solution: Granulat+ is the VINCI Construction approach dedicated to the circular economy of construction materials.

At the largest network of mineral waste reception sites for construction and industry in France, recycled materials become certified quality aggregates. A site with the Granulat+ label sorts all the waste it receives, optimising its recycling and recovery. Eventually, advances in recycling techniques will pave the way for veritable "perpetual quarries" that operate without natural deposits.

In 2023, VINCI Construction launched Ogêo, a new aggregates offering combining primary resources (aggregates from quarries) and secondary resources (local materials from deconstruction and recycling). Ogêo offers highly technical materials with a mix that can be adapted to all types of project. The mix of primary and secondary resources is tailored to the technical needs of each customer, each project and each region (in particular, the availability of resources).

Key figures: in 2024, 211 recycling platforms, i.e. more than a third of the Group's materials sites, 16 million tonnes of aggregates produced will be recycled, i.e. 21% of total production.

URBAN RECYCLING: DESIGNING THE CITY FROM WITHIN THE CITY

IN THE FACE OF LAND DEPLETION AND THE NEED FOR ZERO NET ARTIFICIAL DEVELOPMENT, URBAN RECYCLING IS BECOMING A PRIORITY.



VINCI has all the technical skills needed to meet the specific demands of urban recycling across the entire chain, particularly in terms of pollution removal, decontamination and asbestos removal.

By mobilising all of its specialities, the Group is able to work on extremely complex projects involving the rehabilitation, enhancement or transformation of existing buildings. This involves transforming obsolete assets, rehabilitating brownfield sites and achieving a measured reduction in the net artificialisation of land.

In 2024, urban recycling accounted for 41% of VINCI Immobilier's sales. Target for 2030: 50%.

Intergenerational residence in Fécamp - VINCI Immobilier

From clean-up to reconstruction

The challenge: to deal with the necessary decontamination of an industrial wasteland (a former gasworks) and the need for suitable social housing for the town of Fécamp. **The solution:** VINCI Immobilier carried out a complete clean-up of the site and, with its partner Brownfields, built an intergenerational residence turning highly polluted land into sustainable, socially useful housing.

The figure: VINCI Immobilier aims to halve the amount of land it builds up between 2020 and 2022.



Intergenerational residence in Fécamp.

Facing the challenges of criticality and independence thanks to circularity

Building sustainably today means building differently – by optimizing every resource, at every stage of the building's life cycle.

By aiming to preserve natural resources and eliminate the notion of waste, the circular economy enables **the development of responsible activities and the creation of new local jobs that cannot be relocated.** In its most advanced form, the circular economy even helps to regenerate natural ecosystems and ensure a balance between economic challenges and respect for planetary limits.

At VINCI, we are convinced that **adopting this model is an opportunity for our business.** This transition is a lever for positive transformation, and we are mobilising all our expertise to rethink the way we build. And our commitments are not new. The Group has been a pioneer in recycling, setting up its first concrete recycling platform back in 1980. Today, this approach is at the heart of our environmental priorities, and shapes all our working approaches. From eco-design, which determines the impact of a product or project, to urban recycling, via the reuse and mass recycling of materials, every action we take aims to limit our footprint and extend the life of materials. **This is how we innovate and develop our know-how and our understanding of the issues. With this in mind, VINCI relies on the environmental research lab and its scientific partners, notably École des Ponts ParisTech, which is working on circularity indices and the potential for reuse in construction.**

Our ongoing work to understand the issue of resource criticality will enable us to anticipate any risks (shortages, price volatility) likely to impact our activities, and to meet the challenges of sovereignty for greater economic, social and environmental added value for the regions.



This shore protection breakwater at La Réunion airport is an example of eco-designed infrastructure. Its construction halved the amount of concrete, avoiding the equivalent of 21,000 m^3 of concrete.

The series *Environmental Solutions by VINCI* deciphers the challenges of the environmental transition and highlights the vision and the solutions that the Group is implementing 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.

Photo credits: Guillaume Mussau (page 11); Grégoire Crétinon (page 13), VINCI photo library and subsidiaries.

Cover photo: "Carrière perpétuelle", in Tourville-la-Rivière (76), a site with a unique facility for producing sand and gravel exclusively from construction site rubble.

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