THE **AGILITY** EFFECT
MAGAZINE

Physical AI, the new revolution in industrial robotics

Does the future of cities lie beneath our feet?

Insurance: an essential factor in adjusting to climate change



A driver of economic and regional development

Heritage: a living asset

VINCI ENERGIES

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EDITORIAL

What if heritage were no longer something merely to be preserved but a force for progress? Having long been restricted to its symbolic value alone, heritage is now seen as a living asset, with benefits that extend well beyond the cultural sphere. And this edition of your magazine is devoted to just that subject.

The figures speak for themselves. With more than 100 million tourists recorded internationally in 2024, a country like France – one of the world's most popular destinations – owes much of its prominence to its museums and 46,000 protected monuments. The economic benefits are estimated at €28 to €31 for every euro invested, and the sector supports around 500,000 relocation-proof jobs including for artisans, engineers and guides.

However, these diffuse, indirect and long-term benefits can be tricky to reconcile with arbitration frameworks dominated by immediate profitability. And culture too often remains a low priority for spending, despite generating cohesion, community pride, knowledge transfer and regional resilience.

It is where these economic, social and technical challenges intersect that businesses must operate. With projects ranging from the Grand Palais in Paris to the Bayeux Tapestry Museum, the castle of the Dukes of Brabant near Amsterdam, the Episcopal Palace in Rodez, Antwerp City Hall in Belgium, Switzerland's Villa Morillon, and Domaine d'Harcourt in France's Eure department, VINCI Energies business units are renovating and showcasing heritage assets, helping to build more attractive, more inclusive and resolutely future-oriented regions.

It's all yours!

The Editorial Team

Automation that sparkles!

To design a disgorging line capable of processing between 2,000 and 3,000 bottles of champagne an hour: this was the mission the Baron-Fuenté Champagne House in Charly sur Marne assigned to VINCI Energies business unit Sedam Valentin in 2025. It was an ambitious project featuring a blend of reliability and technological innovation.

A key step in champagne making, disgorging is the process of eliminating the deposits from the second in-bottle fermentation while fully preserving the quality of the precious wine.

Sedam Valentin implemented a fully automated solution incorporating a freezer system with coolant fluid designed to be compliant with future environmental regulations. ■



HVAC must move with the – hybrid and low-tech – times

VINCI Energies Building Solutions has been seeking clarity on how the "HVAC of tomorrow" might look. With climate emergency, regulatory pressures and geopolitical uncertainty to the fore, strategies for efficient heating, ventilation and climate control in buildings increasingly require thoughtful decision-making. Fortunately, there is no shortage of hybrid approaches or low-tech solutions.

From facades fitted with insulation and air-handling systems to high-inertia construction materials (brick, low-carbon concrete); from reduced glass surfaces with shades and exterior blinds to high-volume interior fans; from hydraulic networks running under concrete-slab flooring to air-circulating climate ceilings...
As thermal resilience in buildings becomes a priority in the fight against greenhouse gas emissions and the pursuit of energy performance, the building sector is adopting multiple solutions to meet the need for energy-efficient infrastructure.
Building owners and operators have their sights set on polluting climate control systems that add to external heat with the hot air they discharge, intensifying the phenomenon of urban heat islands. In 2021, ADEME estimated that climate control systems were responsible for almost 5% of CO_2-equivalent emissions by the building sector in France.

Alternative cooling systems

In recent months, several top-tier tertiary sites in the Paris region – including grEEn-Campus Stellantis in Poissy (Yvelines) and the "Le Cologne" building in Rungis (Val-de-Marne) – have pivoted to more energy-efficient HVAC (heating, ventilation and climate control) techniques, enhancing their facades and interior spaces with "alternative" cooling systems.
While these initiatives undoubtedly signal the beginnings of a transformation in the sector, it still needs guidelines to take these energy-conservation efforts to the next level. That is why VINCI Energies Building Solutions, with consulting support from Impulse Partners, decided to explore what form the "HVAC of tomorrow" might take.
"This is a far-reaching qualitative study, explains Vincent Deyme, Performance Energy Manager at VINCI Energies Building Solutions, *"for which we took the time to interview a number of business leaders and subject specialists within VINCI Energies, as well as experts from recognised third-party institutions such as ADEME. The aims were to perform a diagnostic of internal expectations, to map out the different technologies and potential scenarios, and to identify key market transformation dynamics along with customer and user needs."*

> *"Regulations will change; the environmental emergency will intensify; geopolitical situations will remain unpredictable."*

Michel-André Tirat, Director at VINCI Energies and coordinator of the national Climate Engineering club, adds: *"In the face of changing technologies and regulations, customers need to feel supported end-to-end, from diagnostics through to systems management and maintenance, including installation and energy performance monitoring.*
In climate engineering, no two projects are ever the same.
As integrators, we absolutely must be creative and proactive.
That requires engineering competence and in-depth knowledge of the solutions and technologies."

Ice water or direct expansion?

The VINCI Energies Building Solutions study shows that the shapes of future solutions and business activities in the realm of HVAC are strongly linked to a range of parameters: changing building stocks (with a sharp rise in problems associated with renovation); intensification of environmental pressures; evolving energy trade-offs; skills transfer; and changing customer demand.
Will the technologies in use today have the same influence in the future?





Ice-water cooling systems offer a reliable, high-performance solution for larger buildings, especially those that are open to the public. Based on centralised cold production, this technology distributes chilled or heated water via hydraulic loops.

The other dominant technology, known as direct expansion, is present in 60% of tertiary building stock, particularly in small and medium-sized properties.

It uses a thermodynamic process in which refrigerant fluid circulating in occupied areas absorbs heat from interior air in passing from its liquid state to its gaseous state in a thermal exchanger.

But as Vincent Deyme explains, the problem is that *"the gases used in direct-expansion systems are under legislative scrutiny because of their global warming potential (GWP) and/or inflammability."*

A future for low-tech

In these circumstances, low-tech solutions are increasingly valued. From natural night-time cooling, free cooling, Canadian wells, Trombe walls and plant-covered buildings to optimised thermal-inertia solutions, high-performance glazing, infiltration and reflective paints, there are many tried-and-tested common-sense techniques available.

Some of the most promising passive techniques include phase-change materials incorporated into walls, floors or panels, which can store and later release heat to stabilise interior temperatures and reduce the need for active systems.

In addition to the trade-offs inherent in every building environment, the study carried out by VINCI Energies Building Solutions highlighted the importance of hybrid solutions – the more flexible the better.

"Regulations will change; the environmental emergency will intensify; geopolitical situations will remain unpredictable," says Vincent Deyme. *"In the face of all this uncertainty, one of the few things we are sure of is that we shouldn't put all our eggs in one basket."* ■

Net Zero Carbon contracts: where industrial performance meets environmental commitment

VINCI Facilities is introducing a Net Zero Carbon contract that combines industrial performance and local reforesting for a customer with five production sites in southwestern France. This initiative proves that environmental responsibility and competitiveness can go hand in hand.

In April 2025, VINCI Facilities (VINCI Energies Building Solutions) and a customer in the health, nutrition and beauty sector signed a Net Zero Carbon multiservice maintenance contract for five industrial sites in southwestern France.

This partnership, which follows the "avoid, reduce, offset" (ARO) principle, reflects a shared ambition to reconcile operational efficiency and environmental responsibility while meeting the target of carbon neutrality by 2045.

The Net Zero Carbon contract is based on rigorous methodology. As Emmanuel Nunes, Business Development Manager at VINCI Facilities, explains, *"We measure the contract's upstream impact, cut out any superfluous elements to limit this impact to the bare minimum, and reduce as much as possible what is not avoidable, and only then do we create a local project to offset the contract's residual impact."*

Virtuous local offsetting

This approach makes it possible to incorporate quantifiable and verifiable commitments to ensure a continuing reduction in emissions. *"We are committed to sustainably decarbonising our business and offsetting all residual emissions,"* says Emmanuel Nunes.

The Net Zero Carbon approach is also notable for its transparency and environmental ambition.

In the case mentioned above, VINCI Facilities launched a low-carbon-certified pine reforesting project in Les Landes to offset the residual impact. *"We launched a local forestry project to sequester CO_2 while also creating favourable conditions for biodiversity and for timber production,"* says Emmanuel Nunes.

This initiative aligns well with the customer's value chain, in which some processes use pine-resin derivatives.

Tangible results

Designing a local offsetting solution was the principal challenge to be overcome. *"We approached experts at VINCI Concessions to identify practical local low-carbon-certified offsetting solutions,"* explains Emmanuel Nunes.

And one year on, the benefits are clearly visible. *"This ARO approach is embedded into the contractual and operational model. Our reporting now includes progress reports on our Net Zero Carbon contact."*

The manufacturer can now consider its services carbon neutral thanks to the local forestry offsetting.

This Net Zero Carbon contract marks a major step forward in facility management. *"This is proof that industrial performance and environmental responsibility are compatible."* ■

Flexible solar panels: a targeted solution to the constraints of tertiary property

While a niche solution, flexible solar panels perfectly meet the needs of specific projects, especially in tertiary building stock. They are less efficient than rigid panels, but can address certain technical and economic constraints.

Flexible solar panels are emerging as an innovative alternative in the solar landscape, in particular for specific applications where conventional solutions are reaching their limits. Driven by companies like ELIOVE, a VINCI Energies Building Solutions business unit, this technology is attracting increasing interest.

Specialising in the installation of photovoltaic solutions for all types of buildings, ELIOVE offers a comprehensive solution incorporating project management, technical design, operation, maintenance and finance.
Its expertise draws on the experience of VINCI Energies, in particular in the development of systems on rooftops or car-park shade canopies. In this context, flexible solar panels may offer a solution when there are specific structural constraints.

An emerging market

"For the moment, this remains something of an emerging market," says Houda Matta, Business Unit General Manager at ELIOVE.
This can be attributed in part to performance levels inferior to those of conventional rigid panels. *"For the same surface area, we have almost 50% less power at a fairly high price,"* she explains.
And other barriers exist in addition to the performance and cost, notably *"the complexity of their maintenance"* and various technical constraints. All these factors *"are currently limiting their large-scale adoption".*

Avoiding costly heavy works

Despite these obstacles, says Houda Matta, flexible solar panels are proving their suitability in specific cases, *"especially in the tertiary sector. These solutions are particularly well suited to buildings where the roof cannot bear any additional load. Flexible panels then become a viable option."*
In some cases, the flexible solution can avoid costly heavy works.
Houda Matta emphasises this economic advantage: *"Sometimes, restoring the waterproofing can double the cost of a project. But with a small installation, which is common in tertiary, there is no need to redo everything."*
Real-world projects are already highlighting this trend.
"We currently have several projects in the study phase: tertiary projects, with non-technical type-B waterproofing (which cannot bear a load greater than 10 kg per sq. metre)."
These specific cases highlight the benefits of flexible solar panels in exploiting otherwise unused surfaces.

A complementary solution

However, the regulatory framework is still under construction. *"As yet, only a handful of flexible solar panels have gained certification,"* says Houda Matta. In addition, certain technical constraints can impact their operation, on flat roofs in particular. *"The lack of incline affects maintenance if the roof is flat and fills with water when it rains."*
Flexible panels have yet to emerge as a credible major alternative. Other new solutions do exist to address the same issues: lightweight rigid panels with integration systems, and lightweight waterproofing solutions. *"What we are offering is a more attractive solution,"* says Houda Matta. The development of lightweight rigid technologies could limit market growth in flexible panels.
Ultimately, flexible solar panels seem to be a complementary solution, applicable in highly targeted contexts, rather than a revolution in the solar market. Their future will depend on improvements in their performance, cost reductions, and their incorporation into building standards.
From there, they will continue to occupy a strategic position in projects with major constraints, where their flexibility makes all the difference. ■

"These solutions are particularly well suited to buildings where the roof cannot bear any additional load."



AI-optimised siting of charging stations

The E-ChargePredict solution cross-references traffic data, population profiles and the competitive landscape to find the best locations for future electric vehicle charging stations.



Is artificial intelligence about to transform the electric vehicle charging market? Most AI use cases in this area currently involve predictive maintenance for installed charging stations. But what role might algorithms one day play in the configuration of future networks? In fact, we need not look into the future – solutions to identify strategic locations for EVCI (electric vehicle charging infrastructure) installations, estimate the long-term ROI of different charger types, and adjust pricing to maximise returns are all already a reality. EASYCHARGE, the joint venture between VINCI Energies and VINCI Concessions formed in 2017 to finance and manage EVCI networks, recently launched a solution that uses AI to estimate future energy consumption by charging infrastructure, based on data gathered from its three networks spanning the entire metropolitan area: Easy Charge Services, AVIA VOLT by EASYCHARGE, and the eborn network. This amounts to around 4,000 operational charging points. *"The profitability of a charging station installation project is very directly linked to predictions of consumption by its future users,"* explains Mohamed Belahrach, a developer at EASYCHARGE. *"It's therefore essential for us and our investment partners to be able to predict our market share in each geographical area in the short, medium and long terms, i.e. 15 to 20-year contract durations."*

"To offer the best possible value proposition and to maintain total ownership of the solution"

15 to 20-year consumption forecasts

The tool has been designed around a combination of three scientific approaches: estimating demand within a fine spatial grid, predicting changes in demand, and algorithmically identifying the most strategic locations within the communal network. But how does it actually work? Automatic learning (machine learning) models train themselves by cross-referencing data from a diverse set of sources (percentage of electric vehicles on the roads, commercial presence and coverage, median revenues, layout of the road network) for each geographical area with consumption data from EVCI networks. The consumption calculations are then extrapolated over 15 to 20 years of operation in order to identify locations for charger installations, ranked from most to least attractive. This solution also enables station operators to compare the most optimistic traffic predictions made two or three years ago with current electric vehicle adoption rates.

Eight months' incubation at Leonard

"When we launched this project, there were very few solutions on the market," says Eric Mendels, Business Unit Manager at EASYCHARGE. *"But the market is now becoming saturated, reflecting a real need. Our mission to develop a proprietary solution is driven by two objectives: to offer the best possible value proposition; and to maintain total ownership of the solution, from architecture to data."* EASYCHARGE took advantage of eight months' incubation at Leonard, the VINCI Group's future-oriented innovation platform, to fine-tune its modelling solution. The E-ChargePredict solution is now fully functional and ready for activation across the entire metropolitan EVCI network under VINCI management. Like many AI-based solutions, E-ChargePredict can continuously improve its performance thanks to its learning algorithm, making the solution increasingly fast, robust and easy to use. *"For now, this is a tool by and for the VINCI Group,"* says Eric Mendels, *"but we certainly intend to expand its commercial scope in future. For instance, it could soon be adapted to the needs of the heavy-goods market. Our intention is to continue developing the tool to work at pan-European scale."* ■

Securing infrastructure and protecting biodiversity – with tech

Thanks to drones and AI, it is now possible to inspect high-voltage lines more safely and more effectively while protecting birds and their natural habitats. We look at the example of Omexom in Germany.

As they face the dual imperatives of network reliability and biodiversity conservation, infrastructure operators are having to innovate. Surveillance using drones, combined with artificial intelligence, is proving a practical and effective response to these challenges.

In Germany, Omexom High Voltage offers a fine example in its work on the 380 kV Landsbergen–Borken overhead line, showing how technology and nature conservation can go hand in hand.

High-voltage electrical lines often span difficult-to-access natural areas. They are also the preferred nesting sites of many bird species.

German law dictates strict protection for many species during their breeding seasons, from 1 March to 30 September. Traditional inspection methods can be time-consuming and hazardous, making it difficult to reconcile regulatory constraints, team safety and the continuity of work.



Up to three flights a week

In response to this issue, since 2025, Omexom High Voltage has been rolling out a digital inspection solution using autonomous drones. Along a 60 km, 140-tower section of the Landsbergen–Borken line, five docking stations provide the platform for BVLOS (beyond visual line of sight) drone flights overseen from a digital control centre.

Drones complete up to three flights a week, capturing high-resolution images from different angles. This data is then analysed by artificial intelligence capable of detecting birds' nests at an early stage, with human verification in the initial phases. This approach offers a number of advantages. It allows the teams to anticipate constraints in connection with species protection, plan operations accordingly, and significantly reduce the risks to personnel.

> *"The main aim of drone monitoring is to identify obstacles to our work ahead of time"*

"The main aim of drone monitoring is to identify obstacles to our work ahead of time," says Thilo Gronholz, Sales Manager at Omexom High Voltage.

It also facilitates complete and reliable documentation for maintenance, along with an appreciable reduction in costs and the environmental footprint of these inspections.

Onward to new applications

The project presented some unexpected challenges, including in the acquisition of permits. *"The line is 60 km long, too far for line-of-sight flight with a single drone,"* explains Thilo Gronholz, speaking of the complexity of long-distance drone flights and the need to install docking stations.

This experience has allowed Omexom High Voltage to consolidate its expertise in drone technologies and their limits, while simultaneously opening the way to new applications.

In future, Omexom High Voltage hopes to create its own drone control centre and expand the potential uses to biodiversity monitoring, thermal inspections and worksite documentation.

These advances will benefit network operators and the environment alike, making drone surveillance a key lever for securing infrastructure while protecting biodiversity for the long term. ■

“Innovation begins when you allow yourself to fail”

For more than 20 years, Donnie Lygonis has been helping researchers, startups and major businesses transform their ideas into real-world projects. As an innovation strategist for KTH Innovation at the KTH Royal Institute of Technology in Stockholm, he promotes a vision of innovation rooted in experimentation, curiosity and the ability of organisations to reinvent themselves.



What do you think are the major barriers to innovation in large organisations?

Donnie Lygonis. The first barrier is often cultural – the fear of failure. Many companies talk encouragingly about innovation but in practice continue to reward efficiency, stability and short-term performance above all else. But experimentation implies uncertainty. Large organisations rarely lend themselves to testing, learning and starting over. Added to which, there is a structural problem. The better a business’s historical performance, the more it tends to identify with its product rather than its mission. And when the product becomes obsolete, the business disappears along with it. An organisation must therefore be capable of performing its current business activity while

> *“Creativity and performance are inseparable”*

also preparing its own reinvention over the next 10 or 20 years. Financial risk also plays a major role. When a product generates billions of euros, it becomes difficult to invest in more modest or uncertain projects. Businesses prioritise these “sure things” and leave little room for experimentation. But it is precisely this intermediate space between the idea and the massive investment that is missed the most.

What differentiates high-impact innovation from simply a promising idea?

D.L. Impactful innovation is not limited to technical achievements. The real question is: what problem does it solve and how far can uses be transformed? We can often determine from the outset whether a technology simply improves upon what already exists or whether it has the potential to transform an entire sector. History shows that with every major technological revolution, several competing solutions emerge. It’s not always the best technology that wins out, but the one that creates the most value for the user. The iPhone is a good example: technically, some competitors were more advanced in some areas, but Apple was offering a totally new experience. Major breakthroughs often arise from a change in perspective. Established businesses naturally seek to optimise what already works. But disruptors completely rethink the user experience, use cases and economic models.

How can we reconcile innovation, social and environmental impact, and economic value creation?

D.L. Setting profitability in opposition to impact is a mistake. A business can and must create economic value while also contributing positively to society and the environment. It should be a simple principle: everything we do should at least leave the world as we found it, and ideally improve it. Sustainability cannot be treated as an option or side project. It must become a central factor in value creation. Businesses that truly take these issues on board are building stronger relationships with their customers, employees and partners. But this naturally requires effort. As with diversity or quality, it requires changes in behaviour, habits and often the internal business culture. But in the long term, this commitment becomes a driver of growth.

What currently are the essential skills for becoming a driver of innovation?

D.L. The key quality is curiosity. In a world where technical knowledge is becoming more and more accessible, the ability to remain open, to learn, and to understand different realities becomes essential. Universities play an important role, not just in transferring knowledge, but above all in opening minds, encouraging interactions and developing a broader understanding of the world. What makes individuals innovators is often their ability to step outside their own context.

Businesses must encourage this curiosity, listen to ideas, and give their employees the freedom to experiment. Developing an entrepreneurial mindset – even without starting a company – makes people more adaptable, more creative, and better at resolving complex problems.

How can ideas be more effectively transformed into real-world projects?

D.L. Everything begins with experimentation. An idea shouldn't just be evaluated in a theoretical way; rather it should rapidly be confronted with the real world. You have to test quickly, learn quickly, and accept that failure is part of the process. Businesses must create spaces where employees can develop and test their ideas with real users. The best feedback often comes from the most curious customers, who are ready to try imperfect solutions and help to improve them. It is also essential to tear down silos and absorb the ideas coming up from grassroots level. Innovation contests can also be extremely useful, provided the focus is not solely on the proposed solutions, but also on the problems employees have identified.

How can we avoid innovation becoming just another buzzword?

D.L. The term "innovation" is now used for anything and everything. An idea is not an innovation; neither is an invention. Innovation begins when real value is created for the user. It is therefore essential to develop a common language within the business and to distinguish different types of innovation: incremental, disruptive, organisational, technological, etc. A continuous improvement of 2% a month can have considerable impact in the long term, but it's not the same as a radical breakthrough. Essentially, innovation shouldn't be considered an abstract concept, but a response to a clear mission: why do we exist and for whom? What problem are we trying to solve?

Do incremental innovation and disruptive innovation follow the same principles?

D.L. Not entirely. Incremental innovation consists in constantly improving what already exists – correcting problems, optimising processes, serving customers better. It relies on listening to voices on the ground and acting on that information. Disruptive innovation requires a much more fundamental change in perspective. It's not about improving what already exists but about asking ourselves what happens if we do things differently. In both cases, remaining close to customers is essential. The most innovative companies are often those that hear not only what users are saying but also what they really feel.

What role can startups play compared with big business?

D.L. Startups are naturally designed to experiment. They are still searching for their model and can evolve rapidly. Big companies are structured for efficiency and performance. When these two worlds work together in an intelligent way, they can form an extremely powerful combination. Large organisations can offer startups access to the market, resources and customers. Startups in return bring speed, creativity and new ideas. But this collaboration requires each side to understand their differences in rhythm, culture and working practices. For it to work, they need distinct pilot projects, dedicated teams, and time. Startups cannot work for free or wait a year for a decision.

What one piece of advice would you offer managers?

D.L. Give your people the right to fail. Innovation emerges when employees feel they have permission to try things, make mistakes, and learn. Without that confidence, no one will take the initiative.

How can a business remain innovative in the long term without losing its identity?

D.L. It needs to stop defining its identity by its products and identify with its mission instead. Products change; needs change; but a strong mission enables you to constantly reinvent yourself. Businesses also need to ensure there are spaces for reflection and creativity.



AT A GLANCE

Donnie Lygonis is a Swedish entrepreneur, innovation coach and innovation strategist known for his work with KTH Innovation, the innovation support organisation at Sweden's prestigious KTH Royal Institute of Technology.

Since 2009, he has been supporting researchers, students and entrepreneurs in the transformation of ideas, patents and technologies into viable businesses in areas such as ICT, Deep Tech and Food Tech.

He helped create and distribute the KTH Innovation Readiness Level methodological framework used by thousands of organisations and businesses to guide their innovation projects.

Before pivoting to supporting startups, Donnie Lygonis himself started several companies. He is also a renowned keynote speaker on themes of innovation, creativity and entrepreneurship, with many TEDx appearances to his name.

He promotes a highly pragmatic vision of innovation, emphasising the rapid validation of ideas and the importance of action over theoretical perfection. He is also known for his interest in impactful entrepreneurship, sustainability, and the rapid dissemination of innovations that work.

In organisations obsessed with efficiency, it becomes difficult to take a step back, explore, and simply think differently. And yet creativity and performance are inseparable. Today more than ever, curiosity and openness to the world have become strategic skills. ■

Physical AI: the new revolution in industrial robotics

Industry is set to undergo a major transformation with the emergence of Physical AI, which is redefining the possibilities of automation and opening the way to smarter, more flexible and more resilient factories. Integrators such as Actemium, capable of transforming technological innovations into real-world industrial solutions, have a leading role to play in this breakthrough.

In conventional robotics, robots execute predefined, repetitive tasks in stable, structured environments. Advanced robotics, stimulated by advances in computer vision in the 2010s, gave robots greater autonomy and enhanced perception of their environment with the integration of advanced sensors and artificial-intelligence algorithms. But their behaviours remained largely preprogrammed.

Adaptable robotics marks a new technological leap in allowing robots to modify their behaviour in real time when confronted with dynamic environments or unexpected situations. Thanks to learning algorithms that reduce their dependence on explicit programming, for example through reinforcement and imitation learning, these systems interpret their situation and modify their actions accordingly, offering real flexibility gains.

These advances are laying the groundwork for Physical AI, which combines cognition, adaptation and action. "*The concept of Physical AI describes embodied artificial intelligence capable of acting autonomously in the real world. We also refer to operational AI agents*," explains Frédéric Boulvert, Innovation, Automation and Advanced Robotics Business Engineer at Actemium, the VINCI Energies industry brand. "*These systems operate according to a perceive-decide-act cycle, with continuous learning.*" Sensors and computer vision provide the perception; reinforcement learning and human demonstrations guide the action; digital twins are used to simulate real environments, generate synthetic data and optimise behaviour prior to rollout. Robots in various forms equipped with adaptable actuators then precisely execute the actions.

Is Physical AI a reality?

So much for the theory. In practice, Physical AI is attracting growing interest, but actual rollout remains limited.

In the field, automation tends to be hybrid, with conventional robotics, advanced automation and the basic elements of Physical AI all coexisting.

"*Investment announcements are everywhere*," says Frédéric Boulvert. "*Hyundai, for example, is planning to gradually integrate humanoid robots into its production lines from 2028.*"

> *"Embodied artificial intelligence capable of acting autonomously in the real world"*

While the majority of projects are still in the pilot phase, some are already showing a high level of maturity: Fanuc's lights-out (dark factory) production facility in Japan is almost entirely self-operating, and in China, CATL is using humanoid robots to connect high-voltage batteries on its assembly lines.

Strategies vary between regions. In Asia, robotics is compensating for labour shortages. In Europe, the European Commission is promoting Industry 5.0, which builds processes to be human-centric, sustainable and resilient: in other words, robotics is an assistive tool, which automates repetitive and arduous tasks while keeping human beings at the centre of decision-making.

"*We are seeing a gradual shift from deterministic advanced robotics toward adaptable robotics, where systems can adjust their own behaviour without major reprogramming*,"



says Frédéric Boulvert. *"But the sense of touch remains a major technological hurdle. Handling differently shaped, soft or fragile objects with human levels of dexterity is a challenge."*

Actemium and its robots

In this radically changing landscape, Actemium is helping manufacturers design, implement and optimise robotics systems that are reliable, effective, sustainable, and can adapt to sectoral needs and real-world conditions.
As an integrator, Actemium has for many years been investing in advanced robotics for a variety of use cases: picking solutions for mixed parts, automated quality control, assembly, palletisation, packing, and self-navigating mobile robots. Its recent projects include: a collaborative robot for mixing pastry recipes; flexible, mobile end-of-line robots; and a humanoid robot designed to perform complex assembly of electronic components. AI-enabled robotic picking POCs or demonstrators are also in the pipeline, opening up new prospects in agrifood and logistics, where the sheer variability of items is still a barrier to automation.
Actemium is also preparing for the future with adaptable robotics and Physical AI.
The VINCI Energies industry brand is collaborating with AICA, using its AICA Studio solution to develop programming methods better suited to more flexible and scalable use cases. *"Will this make it possible to optimise existing systems or create new activities by robotising processes that hadn't been previously?"* wonders Frédéric Boulvert.
Today, Actemium's three main areas of expertise are industrial robotics, special-purpose machines and mobile robotics. Adaptable robotics may soon become a fourth strategic business line.
Guided by its in-house Robotics Club's advanced robotics working group, Actemium's vision is based on the three pillars of Robotics 5.0: a human-centric approach, sustainability and resilience.
Its strategic roadmap aims to identify market needs, to ensure technological accountability and share knowledge, to develop new use cases, and to stay abreast of evolving safety standards and concerns. ■





Universities and businesses hand-in-hand in the name of transition

Transformation in pursuit of environmental and energy transition is based in part on close collaboration between universities and businesses aiming to make the training available better match the professional demand. We examine an example in Metz, where the École nationale supérieure des Arts et Métiers has joined forces with VINCI Energies and ArcelorMittal Global R&D to create two new training pathways.





Under pressure to expedite their environmental and digital transition, industries are now facing significant recruitment difficulties. To attract, select and nurture talent requires a pool of candidates trained to meet employers' needs and challenges. Unfortunately, the skills required for large-scale energy-efficiency, decarbonisation and digitalisation projects are sorely lacking.
While maintaining the link between the supply of training and demand for professionals is a statutory role of higher education establishments, it is also becoming a critical imperative for the sectors most feeling the pinch. Universities and businesses are therefore increasingly thinking about ways to cooperate to fill these talent pools, add credibility to their expertise, and enhance their academic rankings.

Materials and energies: the metal industry green cycle

In Metz, the Ecole nationale supérieure des Arts et Métiers (ENSAM), in association with VINCI Energies and ArcelorMittal Global R&D, has codesigned two new courses: "Materials and Energies: the metal industry green cycle",[1] a pathway for expert engineers in the third year of the Programme Grande Ecole (PGE) ENSAM (Bac+5), which welcomed its first eight students in 2025;

"The aim of these courses is to foster an increase in vocational skills"

and the Bachelor of Materials and Energies (Bac+3 – higher technical), which opened in September 2026. *"The university's vocation has always been to support industrial revolutions,"* says Stéphane Fontaine, Director of the Arts et Métiers Campus in Metz. *"ENSAM was born of industrial mechanisation in the late 18th century. Over the years, it has supported every industrial revolution, including electrification, automation, smart factories, digitalisation and artificial intelligence. Today, we are entering the environmental transition on an equal footing, and this partnership with two industrial Titans sets the seal on our mission to offer businesses in the Grand Est region training that truly aligns with their needs."*
The course content has been created partly by ENSAM, to ensure rigorous academic standards are maintained, and partly by VINCI Energies and ArcelorMittal Global R&D, which contribute their business knowledge and skills.

Cobuilding

"This cobuilding is an essential element in the project," says Patrick Benard, Regional Director, VINCI Energies. *"VINCI Energies has been sponsoring ENSAM for eight years[2] at the national level. We also have a long history*

of business mentoring with the Metz Campus. But this is the first time we have been fully involved in a degree course. For us, this is about going beyond our involvement in student forums and being present at a much earlier stage, in order to identify the people who will help us transform our business activities."
The university and its two partners also share the aim of making careers in industry an increasingly attractive prospect by emphasising the role of new technologies and awareness of sustainability issues. VINCI Energies has developed content in four teaching areas: auditing and environmental standards; introduction to data science; carbon capture and storage; and reclamation systems and energy saving.

48 graduates a year

"The aim of these courses is to coordinate an increase in vocational skills directly applicable to the industrial environment," adds Thierry Delpech, Senior Business Unit Manager at Actemium Consulting 5.0, who works on this programme. *"That's why we wanted students to have intern, apprentice or professional trainee status. Through this association with ENSAM Metz, we are committing to take on 11 students in the first three years."*
The aim is to see 48 graduates from these two courses each year. A progress review will take place in three years. ■

(1) Source: Arts et Métiers
https://artsetmetiers.fr/en/actualites/expertise-materiaux-et-energies-decarbones-un-contenu-pedagogique-pour-une-industrie

(2) Source: INDUSTRIE Mag
https://www.industrie-mag.com/article18143.html



Living heritage, flourishing regions



Long perceived as something to be preserved purely for its own sake, heritage is now recognised as a powerful driver of growth and development. Experts and stakeholders concur: historical monuments, museums and religious buildings, but also converted industrial sites and even intangible know-how, are all part of a living capital whose impact reaches far beyond the cultural sphere. When properly maintained, renovated and marketed, heritage attracts millions of visitors, creates jobs and energises regions across France and Europe.

SUMMARY

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Heritage: a key driver of regional progress

Cultural heritage is more than a shared history – it is a powerful economic, social and regional driver of growth. In France and across Europe, it attracts millions of visitors, creates jobs and energises regions. Our article explains all.

Long seen as shared history to be preserved for its symbolic value alone, cultural heritage is now recognised as a powerful engine for economic, social and regional development. Experts and stakeholders concur: historical monuments, converted industrial sites and intangible know-how are all part of a living capital whose impact reaches far beyond the cultural sphere. *"Economic analysis based on objective indicators (cost-benefit studies, jobs created, local added value, multiplier effects) shows that investment in heritage generates long-term economic effects,"* explains Maria Gravari Barbas, Professor of Geography at Paris 1 Panthéon-Sorbonne University and Director of the UNESCO Chair in "Culture, Tourism, Development" and of EIREST (interdisciplinary research team on tourism studies). *"It stimulates activity, makes regions more attractive and generates tax revenues greater than the amounts invested, as several European studies[1] have shown."*

A powerful boost for tourism

In economic terms, heritage is intrinsically linked with attractiveness to tourists. In 2024, France welcomed more than 100 million international tourists, generating €71 billion in tax revenue. Tourism represents 8%

of national GDP and directly supports more than 1.3 million jobs.[2] One in two foreign tourists makes a cultural visit during their stay, attracted by an exceptional network of almost 46,000 protected monuments and close to a thousand recognised museums. And locals are also visiting these attractions: almost 67% of French people[3] visited a heritage site in 2024.

Cultural tourism also plays a central role at European level. Europe welcomed 631 million international tourists in 2024 – 43% of all international tourism.[4] Major cultural capitals, the Mediterranean and cross-border itineraries are the major attractions, with numbers up almost 6% compared with 2023. France, Spain, Italy and Greece are some of the most popular destinations, confirming the continuing attractiveness of European heritage.

A remarkable multiplier effect

Adding a site to the UNESCO World Heritage list generates a considerable economic boost, attracting visitors and stimulating local economies. As of 2025, there are 1,248 World Heritage sites, of which 972 are cultural sites, in 167 different countries. A significant number of these sites are concentrated in Europe, enhancing the continent's attractiveness and international reach.

"Unfortunately, however," says Maria Gravari Barbas, *"culture spending is often considered low-priority because the returns are diffuse, indirect and long-term. At European level, arbitration frameworks favour standardised financial indicators (deficit, immediate profitability, productivity, etc.), which only poorly reflect the social, symbolic and regional externalities intrinsic to the cultural sector."*

And yet heritage spending is subject to a remarkable multiplier effect. Every euro invested in heritage generates direct, indirect and induced economic benefits of between €28 and €31, according to a national study of more than 3,400 monuments. These figures indicate a far-reaching impact on local economies, largely through job creation. The sector generates approximately 500,000 non-relocatable jobs in France for artisans, architects, engineers, guides, curators and construction workers. Projects supported by the French Heritage Foundation alone create or sustain almost 16,000 jobs a year.

At European level, cultural heritage is a major source of employment: in 2024, 7.9 million people were working in the cultural sector across the European Union – equivalent to 3.8% of total employment. Activities related to cultural heritage (museums, monuments, archives, etc.) are showing sustained growth, confirming their role in regional economic resilience.[5]

Major social externalities

"Beyond tourism, heritage produces major social externalities," says Maria Gravari Barbas. *"These include cohesion and collective pride, knowledge and skills transfer, social inclusion, improved living conditions and strong regional attachment. It also increases resilience in the regions as a resource for economic conversion, consolidating social links in crisis periods and providing cultural reference points that promote collective adaptation."*

Heritage helps to revitalise regions and contributes to their attractiveness, as seen in France, for example, with flagship projects such as the Louvre Lens Museum and the Centre Pompidou Metz, which have sustainably transformed their surroundings.



Innovation and creation

Ultimately, far from being static, heritage assets foster innovation and contemporary creation. Ambitious restoration efforts, such as Notre-Dame de Paris with its new stained-glass windows after the fire in April 2019, show how the dialogue between heritage and modernity can bring about meaningful projects. The European Union, through its Horizon Europe programme, is encouraging the use of cultural heritage as a lever for sustainable innovation and strengthening the European sense of belonging.[6]

It is where these economic, social and technical challenges intersect that businesses like VINCI Energies operate. By showcasing heritage assets, we help to build more attractive, more inclusive regions resolutely focused on the future.

"Businesses and engineering experts play a key role in providing innovation, skills and finance: low-carbon restorations, materials reuse, digitalisation and new tools for adding value," says Maria Gravari Barbas. *"As well as their technical input, they also contribute to virtuous social dynamics by supporting local jobs, knowledge transfer and projects with local roots, making heritage assets a lever for ecological transition based on energy sobriety and social links."* ■

(1) Cultural Heritage Counts for Europe: Full Report (2015) – Report on the CHCFE project coordinated by Europa Nostra, European Commission
(2) 2024 Statement – French Ministry of Tourism
(3) Patrimostat Study 2025 – French Ministry of Culture
(4) Tourisme international. Chiffres Clés & Tendances 2024 – UNWTO (United Nations World Tourism Organization)
(5) Culture Statistics - Cultural Employment – Eurostat
(6) Patrimoine culturel européen et les industries culturelles et créatives – Horizon Europe

CULTURAL HERITAGE IN FIGURES

67% of French people visited a heritage site in 2024

100 million international tourists in France in 2024: €71 billion in tax revenue; 8% of national GDP; 1.3 jobs directly created, including 500,000 non-relocatable jobs

631 million international tourists in Europe in 2024 – 43% of all international tourism

1,248 UNESCO World Heritage sites in 2025, of which 972 are cultural sites

€1 invested in heritage in France generates €28 to €31 in economic returns

Sources: French Ministry of Tourism, French Ministry of Culture, UNWTO, Eurostat, Horizon Europe

INTERVIEW

“Heritage is no ordinary resource”

How can cultural heritage be protected in a time of ecological, technological and social transition? Patrizia Riganti, Professor in Tourism at the University of Glasgow, explains key principles for the responsible management of heritage assets seen as cultural capital to be transferred through time.

Given the numerous current challenges, what are the principles that should guide heritage preservation and enrichment projects?

Patrizia Riganti.
The first requirement is conceptual clarity. Heritage exists when a community recognises that an asset holds shared cultural values and chooses to pass it on. This recognition is fundamental to the idea of heritage as cultural capital in the sense defined by David Throsby[1]: a stock of cultural value that generates benefits, both commercial and non-commercial, over time. Heritage, like natural capital, is fundamentally a unique, non-renewable resource, difficult to replace and with risks of irreversible damage. This primarily affects physical heritage, which degrades over time.

And intangible heritage?

P.R. Some forms of intangible heritage, such as cultural practices and collective memory, can be renewed if they are consistently transmitted onward. Even where adaptations or innovations are possible, complete substitution is rarely acceptable for assets defined by their authenticity and contextual value. Three principles follow accordingly: 1) intergenerational and intragenerational equity, in order to ensure access to cultural benefits today without compromising their transmission; 2) rigorous assessment of management options, incorporating all the social benefits, including the value of non-use, using mechanisms based on collective preferences; 3) integration of the ecological transition, because climate risks directly affect the durability of heritage assets, while their conservation supports inclusive local development.

Are technological innovations transforming the preservation and enrichment of heritage?

P.R. Yes, but their effects depend on how they are used. Digital tools and energy innovations are improving preventive conservation, risk management and long-term planning. However, their effectiveness cannot be assessed solely using technical indicators. It must be considered in light of their capacity to enhance the sustainable management of cultural capital and to preserve the benefits linked to use and non-use, which are fundamentally what drive heritage preservation.

What should be the guiding principles for partnerships between public stakeholders, experts and businesses?

P.R. These partnerships are necessary for ecological and digital transition, but their legitimacy resides in their capacity to create sustainable public value, not short-term gains. Community involvement is essential, especially in a context where regulatory frameworks may be weakened. They should be structured around three principles: 1) the recognition of heritage as a non-renewable resource, meaning clear limits on the acceptable compromises; 2) a transparent assessment of management strategies, based on solid data and including economic, social and environmental factors; 3) an ethically responsible approach in the private sector, aligning innovation and investment with cultural values, authenticity and public confidence. Well-designed partnerships can thus reconcile contemporary uses, environmental performance and the preservation of cultural capital as a public good. ■

(1) Emeritus Professor of Economics at Macquarie University, Sydney, David Throsby is well known internationally for his research and numerous publications on the economics of the arts and culture.



Engineering with constraints: a new setting for the Bayeux Tapestry

The Normandy town of Bayeux has begun renovation of the museum dedicated to its eponymous 11th-century tapestry. The project will combine technical excellence, heritage constraints and CSR commitments. Cegelec Normandie Projets (VINCI Energies Building Solutions) has been selected for part of the technical batch.

Closed for two years for renovations: in autumn 2025, the Bayeux Tapestry Museum launched a major renovation and expansion project. This is a weighty decision by this town in Calvados, for which the famous medieval tapestry – a listed historic monument and UNESCO Memory of the World International Register document – is an powerful draw for tourism.

Visitor space extended by 3,000 sq. metres.

Having been housed for the past 40 years in the former Bayeux seminary, which dates from the 17th century, the museum will reopen in 2027 to mark 1,000 years since the birth of William the Conqueror, Duke of Normandy, whose conquest of England the tapestry depicts. Visitors will discover a new museum experience, designed by the British architects RSHP, appointed following a competitive bidding process.
Available visitor space will be increased with the construction of a new 3,000 sq. metre building. As project owner, the Town of Bayeux, in consultation with the Regional Cultural Affairs Directorate (DRAC), Calvados Departmental Council and Normandy Regional Council, awarded the project's technical batches to Cegelec Normandie Projets.
This VINCI Energies business unit, which had previously worked with the local authority on the renovation of the Baron Gérard Museum of Art and History, was assigned a broad area of responsibility: high-voltage power-supply works; architectural lighting; implementation of a building automation system (BAS); security and fire-protection systems; and solar panel installations.

Ticking all the CSR boxes

"For those of us specialising in major projects, here, the economic challenge is paired with a weighty heritage dimension that makes the project far more demanding than usual," says Mickaël Letscher, Business Unit General Manager at Cegelec Normandie Projets.

"Strategic dual economic and heritage dimensions"

The Bayeux authorities also wanted their museum renovated to the highest possible CSR (corporate social responsibility) standards. Cegelec Normandie Projets responded with a blend of technical expertise, environmental responsibility and social impact.
"In agreement with the customer, we prioritised reuse in our approach to the project," explains Mickaël Letscher. *"Existing cable trays were therefore stored directly on site for future reuse, and electrical cables were sourced through a reuse loop established by Circable."* This environmental approach is complemented by a social component: *"We are using selected disability-confident companies to prepare equipment ahead of its installation on the site."* ■



Le Grand Palais – star of Paris 2024

The renovation of this iconic French heritage site, unveiled at the Paris 2024 Olympic and Paralympic Games, was the result of a massive and complex project, with many technical batches entrusted to VINCI Energies business units. It was a real challenge of organisation and adaptation.

It was a titanic project that took shape between 2022 and 2025 in the heart of Paris: the renovation of the Grand Palais, one of the City of Light's most iconic heritage buildings. The project owner – Réunion des musées nationaux (RMN) – had a double objective: to host the Paris 2024 Olympic and Paralympic Games under Europe's largest glass roof, and to modernise the facilities to start a new page in the history of this monument more than a century old.

Two groups of VINCI Energies business units were assigned to technical batches worth more than €54 million. The plans included a complete overhaul of the electrical systems, installation of a Category-A fire safety system with thermal cameras, and renovation of the heating, ventilation and climate control (HVAC) equipment. All these installations are connected to a building automation system and hypervisor covering the site's three buildings, which occupy a total of 72,000 sq. metres.

Four business units were involved: Cegelec Tertiaire IDF and Saga Tertiaire for the HVAC and plumbing batch, and Phibor Entreprises and Citeos Grands Projets en IDF for the power supply and extra-low voltage batches and architectural lighting. The 400 or so people working for these business units installed 50 km of cable trays, 2,000 km of cables, 200 electrical cells and cabinets, 125 computing racks, and thousands of terminals, not to mention 35 km of mains power and sanitation networks.



112 sub-areas and 86 project batches

"This isn't the biggest project we've ever worked on, but it is the most complex," says Patrick Pulcrano, Project Director at VINCI Energies, who has worked on massive projects from the DUO Towers in Paris to Paris La Défense Arena in Nanterre (Hauts-de-Seine). The logistical challenges of the project – whose location beside the Seine in arguably the most prestigious district in Paris made plant supply particularly difficult – were only heightened by the complex phasing and organisation required. Concurrent working on each operational plot was extremely intense in a building divided into 112 works sub-areas. *"The project was divided into 86 batches, for the most part managed directly with the contractor. We had to work in fragmented spaces packed with dozens of different entities and trades,"* recalls Mathieu Juin, Business Unit General Manager at Citeos Grands Projets en IDF, which was responsible for the monument's architectural lighting. At peak times, up to 1,000 people were working on the Grand Palais site, including 400 from the VINCI Energies teams alone. The use of BIM (building information modelling) may have simplified the modelling of interactions between trades and resolved spatial conflicts between the different batches, but the teams constantly had to adapt to constraints that emerged as features were demolished or uncovered. *"We had almost 700 technical change requests. For every one, we had to find solutions with the least possible impact on the various activities in progress to make them compatible with our execution deadline,"* explains Patrick Pulcrano.

"This isn't the biggest project we've ever worked on, but it is the most complex."

The stock-management conundrum

In this hive of activity subject to so many modifications, stock management became a recurrent puzzle. *"Just for our lighting batch, we had to install over 70 different luminaire parts with different optics, sizes and trims. The slightest modification meant reviewing the parts list and amending our stocks of lighting terminals,"* says Mathieu Juin. Around 2.3 km of museum lighting rails were installed in the exhibition galleries to provide adaptable event lighting, and Citeos pulled more than 140 km of cables. *"We studded the whole site with 10,000 light points,"* he adds. *"At each stage, we had to consider the building's architecture as a whole while enhancing each individual space."*

Great ability to adapt

To renovate technical facilities in a listed monument like the Grand Palais requires a powerful ability to adapt. The teams from Phibor, who were responsible for routing major amenities, certainly experienced this. As works progressed, facing an accumulation of obstacles to the point where further progress would not be possible, they proposed burying most of the high-voltage loop, which was initially designed to use overhead lines throughout.

Over the course of the project, the Grand Palais revealed its share of technical quirks, but also previously undiscovered archaeological gems, requiring the teams to bring all their agility and ingenuity to bear to deliver the project on time. Their achievement earned the VINCI Energies teams a decoration from the Ministry of Culture – the title of Chevalier de l'Ordre des Arts et des Lettres. ■

KEY FIGURES

72,000 sq. metres
occupied by the three buildings on the Grand Palais site

4 VINCI Energies business units
mobilised, working amid 86 batches in 112 sub-areas

Up to 1,000 people
working under the PIC national citizenship scheme, including 400 from the VINCI Energies teams alone

2,000 km of cables,
50 km of cable trays, 200 electrical cells and cabinets, 125 computing racks

700 technical change requests
received during the project



Renovation and preservation: the unique challenges of fire protection in a historic building

To preserve the historic character of a monument nearly a thousand years old while meeting the most modern safety standards – this was the challenge facing VanderLinden with Heeswijk Castle. This VINCI Energies Building Solutions business unit in the Netherlands chose an approach based on a hybrid technical solution.

Built almost a millennium ago, Heeswijk Castle, linked with the Dukes of Brabant, is a historical gem located in the Dutch province of North Brabant, 150 km south of Amsterdam. A listed historic monument, this exceptional structure attracts a great many visitors each year, and its obsolete fire protection systems needed replacement in the interest of public safety.

To modernise an 11th-century castle without affecting its cachet is no easy task. *"One of the biggest challenges was to install a system compliant with current standards given the obvious architectural constraints,"* explains Ferry Mahieu, Client Manager Safety & Security at VanderLinden, a VINCI Energies Building Solutions business unit in the Netherlands.

There was no question here of drilling holes through walls for cables, for fear of damaging features steeped in history.

The solution? A hybrid system combining wireless components with wired solutions where it was possible to install them without causing aesthetic damage. *"This approach allowed us to create optimal coverage without damaging the castle's appearance,"* says Ferry Mahieu.

This technical choice required a detailed analysis of the monument and its sensitive areas. The VanderLinden teams worked hand-in-hand with the heritage preservation authorities to identify the best solutions. *"We had to adapt our methods to the site's unique features, which meant testing and making adjustments all the way through the project."*

Rigorous technical implementation

The installation had not only to meet preservation requirements, but also ensure maximum effectiveness in the event of fire. VanderLinden decided to install dual-sensing smoke alarms, which reduce the risk of false alarms while maximising responsiveness should an incident occur.

In addition, the system was integrated with the castle's existing safety infrastructure, including its intrusion protection systems. This interconnection allows effective, centralised alert management.

Working on this spectacular monument was an extraordinary experience for the VanderLinden teams, who also had to contend with significant accessibility constraints. In order to minimise the impact on visitors, works were scheduled around the castle's opening hours.

What was the key to success? *"Meticulous planning alongside the site's management team to schedule the work in time slots that allowed visits to carry on as usual."*

Following these upgrades, Heeswijk Castle's fire protection meets the highest standards without compromising its historical integrity. And VanderLinden has further consolidated its expertise in performing technical installations in sensitive environments. ■

The Episcopal Palace in Rodez: future tourism showcase for the Department of Aveyron

The Department of Aveyron (France) has undertaken an ambitious relaunch, renovation and transformation project on this architecturally complex site. Cegelec Rodez Electricité was its selection for the electrical engineering work.



Determined to preserve and develop its historical heritage, the Department of Aveyron has launched a project to restore and renovate the Episcopal Palace in the heart of Rodez, in a bid to make it one of the region's star attractions. Having been closed to the public for many years, this historical site has been vacant since the bishop departed in 2016 and a project to convert the palace into a luxury hotel was abandoned. The Department of Aveyron, which owns the site, was determined both to restore the site and to give it new purpose. This architecturally complex site encompasses 4,000 sq. metres of rooms, 6,000 sq. metres of gardens and a 1,000 sq. metre internal courtyard.

Spaces to discover Aveyron's local heritage, enjoy fine food, or simply take a stroll…

In 2025, the local authority initiated a call for tenders for the redevelopment of spaces dedicated to Aveyron and its heritage, a tour of the site's historical treasures, a gastronomic experience, and walking trails, along with areas designed as regional innovation laboratories (e.g. for living, eating and ageing well). The palace will also be the administrative centre for the Departmental Attractions Agency. The palace boasts rooms with 17th, 18th and 19th-century decor, some of which are listed historical monuments, to be included in the visitor experience. They will also be made available for receptions and seminars. A new contemporary space will offer an unobstructed view of Rodez and its cathedral, the surrounding countryside, and the Aubrac Plateau. The extensive restoration works will include doors and windows, roofs, facades and exterior spaces. The total contract value is €21 million, and the site is expected to open its doors to the public in early 2028. *"The project, which kicked off in February 2026 and will be completed in late 2027, includes particularly complex operations relating to protection of the ancient structure and the incorporation of electrical installations into these listed buildings,"* explains Alexandre Carlut, Project Manager Tertiary and Industrial Business at Cegelec Rodez Electricité, the VINCI Energies business unit selected for the electrical engineering works.

40 km of cables and 944 lights

Power-supply work to be completed includes functional, scenographic and accent lighting. "We are working in close collaboration with museum lighting specialists from Paris," says Alexandre Carlut. On the low-voltage side, Cegelec is responsible for installing all the systems required to welcome the public in the utmost comfort and safety: IT distribution, fire protection, anti-intrusion systems, and a building automation system (BAS) with centralised monitoring. *"This is a significant project for us, which requires three technicians permanently on site and three supervisors,"* he adds. *"In total, after two years of work, we will have installed around 40 km of cables, 900 m of suspension rails and 944 lights."*

> *"Complex operations relating to protection of the ancient structure and the incorporation of electrical installations into the listed buildings"*

Constraints and surprises

From walls adorned with embroidered stretched canvas in one room to stone tiling in another, from heritage parquet flooring to vaulted cellars, every space and subspace reveals its share of constraints and sometimes surprises. *"Cable runs in particular require a lengthy preliminary study phase in collaboration with the architects,"* explains Alexandre Carlut. *"Everything has to be identified and precisely calibrated in advance to make sure we don't drill somewhere we shouldn't."* The call for tenders listed 25 different batches. One of the operational difficulties is the coordination of numerous trades working simultaneously in extremely diverse spaces, often with significant constraints. As Alexandre Carlut explains, *"The palace has several wings, each featuring different shapes, spaces and materials. The arrangement was to proceed wing by wing, which is undoubtedly drawing out the project, but does ensure maximum caution."* ■

Antwerp: a bespoke combination of heritage and digital

The Belgian city of Antwerp has completed a huge technological transformation of its city hall. Thanks to expert help from Axians, the council chamber now boasts advanced videoconferencing, integrated voting, live streaming and secure audiovisual infrastructure.

The UNESCO World Heritage-listed Antwerp City Hall in Belgium embodies the city's political and architectural history. Between 2021 and September 2022, this iconic monument underwent a major transformation by Axians, the VINCI Energies ICT brand, to bring it into the digital era without losing any of its soul. *"This was a complex integration project in a unique environment – just the type of project where Axians can make the difference,"* says Frederik Degryse, Business Unit Manager at Axians Audiovisual Belgium.

Full videoconferencing system

The challenge was to modernise the council chamber within strict architectural rules and in perfect harmony with the building's historical fabric. *"We developed a bespoke solution to integrate a third-party voting system with the conference system from our supplier Televic Conference,"* explains Frederick Degryse. This integration made it possible to eliminate redundant equipment.

"A bespoke solution to integrate a third-party voting system with the conference system from our supplier Televic Conference"

The solution is based around a comprehensive conferencing system with headphones, individual microphones, audio distributed throughout the building, and videoconferencing to support hybrid council meetings. Axians also implemented *"a fully automated camera system that follows the person speaking in real time".*

Sessions can now be captured with precision, live streamed and enhanced. *"We installed a broadcast and recording system connected to the conference system to automatically receive metadata such as the meeting name, agenda, and information on the person speaking."*

Reduced preparation time and more dynamic content

This innovative approach also extends to the infrastructure itself. An audiovisual network was installed in the building to distribute audio and video signals (AV over IP). *"This network is completely secure and integrated with the customer's IT system,"* explains Frederik Degryse. Intrusion testing confirmed the system's hardness, ensuring data protection and reliable communications.

The benefits were immediate and include *"reduced preparation time for the customer's admin team, thanks to the automatic integration of meeting agendas into our systems"*. Local citizens benefit from *"more dynamic content thanks to the system of automatic cameras"* and live streaming of public sessions.

Interactive design process

Part of the challenge was to implement these upgrades without disrupting monthly council meetings. The business unit manager explains that the Axians solution was *"an interactive design process alongside the customer, with multiple workshops, a well-defined scope and a clear approval process"*. In this respect, preparation was key: design validation, offsite configuration and testing of equipment, and close coordination in situ.

For Frederik Degryse, the takeaways from the project are clear: *"preparation for the project was a key factor in its success"*, as were detailed understanding of data and network security, and expertise in audio and video over IP.

City council meetings today are more fluid, more transparent and accessible to all. Journalists and visitors can follow debates from other parts of the building, while their elected officials enjoy a modern, intuitive experience. Frederik Degryse concludes that *"the city now has a future-proof solution that links its history with modern democracy."* ■





Villa Morillon and Domaine d'Harcourt: à la carte restoration

The modernisation of historical sites requires advanced expertise and an ability to adapt to unique environments. Two such projects involved Villa Morillon in Switzerland and Domaine d'Harcourt in France.

Renovation and modernisation projects at heritage sites have to meet highly specific requirements. The need to respect heritage locations leaves engineers and technicians no room for error. Even when the work at hand is particularly ambitious.
A masterpiece of Swiss neoclassicism built near Bern in 1832, Villa Morillon was renovated so it could accommodate cultural events and office spaces. The electrical works for this major project were entrusted to Etavis Bern-Mittelland AG (VINCI Energies) and included outlet and lighting circuits, chandelier connections, heating, ventilation, climate control, exterior lighting, control systems, mains-voltage installations, fire alarms, intrusion detection systems, and optical-fibre networks.

"Installing the cabling and connections required significant commitment from our teams, because the facade, woodwork and paintwork had to be left untouched," says Michael Zurbuchen, Administration and Operations Manager at Etavis.

Nocturnal trail and immersive experience

In France, an upgrade to Domaine d'Harcourt, the iconic site in the Eure department, demanded the same meticulous approach from the Lesens Électricité teams (VINCI Energies), who worked together to develop the infrastructure for Arbora Lumina, the chateau's night-time activity trail. Made up of nine sound and light set-pieces, this attraction was designed to enhance the medieval estate and its unique arboretum.

"We had three months to install the electrical networks for the stage lighting and audiovisual solutions to create an immersive experience," explains Pierre-Adrien Cosme, Business Unit General Manager at Lesens Électricité. *"We also installed the video protection systems and electric vehicle charging infrastructure to enhance site security and accessibility."*
Domaine d'Harcourt is the Eure department's third-largest pay-to-enter tourist destination.

The need to respect heritage locations leaves no room for error.

The departmental council, which owns the site, hopes that these enhancements will increase annual visitor numbers from 30,000 to 130,000 by 2027. ■

Does the future of cities lie beneath our feet?

With global warming, urban densification and land scarcity becoming increasingly pressing issues, underground spaces may hold considerable promise for our cities. Developers just need to seize the opportunity, as Marie-Claire Barré, Doctor of Urban Planning and Development, and founder of the project-support agency CAPACITé, explains.



How long has underground space been part of the conversation in urban planning?

Marie-Claire Barré. It's a topic that dates back to ancient times (with remarkable underground water cisterns for example, or Leonardo da VINCI's extensive cogitations on high-level and low-level roadways) and has for centuries consistently featured in philosophical and fictional representations of the urban space. In the modern era, it reappeared in the 1930s as a solution to urban squalor. The Underground Urbanism movement, which originated in the thinking of Eugène Hénard and is embodied in Edouard Utudjian[1], advocates the use of subterranean levels to underground a number of urban functions, including accommodation.
It's an approach diametrically opposed to that expounded in the Athens Charter, principally associated with Le Corbusier[2] and best known for its guiding principles of "green space, fresh air, and sunshine".
Since then, the idea of developing underground spaces has returned cyclically. And today with particular acuity, clearly underpinned by environmental concerns. To address the problem of underground spaces inevitably means raising questions of resource and land scarcity, the fight against and adaptation to global warming, how to manage urban densification, the potential of new logistical models, and so on.

Is the subject of underground spaces now framed in terms of "resources"?

M.-C.B. Yes, the subterranean space contains resources that are all too often ignored or overlooked, such as georesources, thermal inertia and usable spaces. But it's no longer so much about seizing a technological opportunity as about thinking in terms of necessity. Making use of underground spaces is viewed as part of an urban resilience approach in which the invisible land might be a solution to building the compact city, developing urban logistics, or innovating in low-carbon production of heating or cooling. The underground space offers significant prospects.

Are there some iconic architectural projects incorporating underground spaces we should mention?

M.-C.B. One of the best known is perhaps the Bibliothèque nationale de France François-Mitterrand in Paris, designed by Dominique Perrault, with its underground levels including an indoor forest. We also have the Ewha Womans University in Seoul and the Olympic Velodrome in Berlin, two more famous projects by Dominique Perrault, who is clearly something of a pioneer in this area.

Besides these iconic examples, are some cities further ahead than others?

M.-C.B. It's difficult to make comparisons given that the motivations for using underground spaces vary so much from one city to another, and what's more, the real function of these spaces may have diverged unexpectedly from the original or official intention.
In Helsinki, for example, the underground infrastructure was designed for civil protection, because Finland shared a border with the USSR at the time.
As they grew, these spaces ended up containing transport, waste and energy infrastructure, but also leisure facilities, places of worship, offices, and even homes. That said, Finland, along with Quebec, with its underground spaces dedicated to commerce and travel, are generally considered the most "advanced".
Switzerland, a nation of mountains and tunnels, but also of underground bunkers for civil protection, also has a special relationship with underground spaces. In 2023, the Swiss Federal Council adopted a strategy for the sustainable use of underground facilities and a law against urban sprawl to encourage use of the existing underground infrastructure.

And elsewhere? How does France compare, and Paris in particular?

M.-C.B. In 2021, the City of Paris selected some 20 projects from 200 proposed under a second call for projects entitled "Réinventer Paris" with the aim of transforming 31 underground sites in the capital. Most of these projects had a distinct "culture", "party" or "commerce" flavour to them. The winning project on the Grenier-Saint-Lazare site, created by Sogaris with Syvil Architectures, is particularly interesting in this respect, in that it involves changing from a parking function to an urban logistics function and presents innovative legal and economic models.

> *"Underground spaces are still too poorly understood"*

At national level, the Bureau of Geological Research and CNRS launched a priority research programme and utilities scheme (PEPR) entitled "Sous-sol, bien commun [lit. Underground space, a common good]" in early 2023. Under the third part of the programme, which relates to the sustainable underground city, a programme specific to Paris launched in 2023 with a budget of €3 million over seven years and involving partners such as the Ecole nationale des ponts et chaussées, RATP, Paris-Saclay University, CETU, and the Métropole du Grand Paris. The scope of the study matches the extent of the Grand Paris Express project and explores the possibilities from ground level to 100 metres down.

Are developers really on top of this subject?

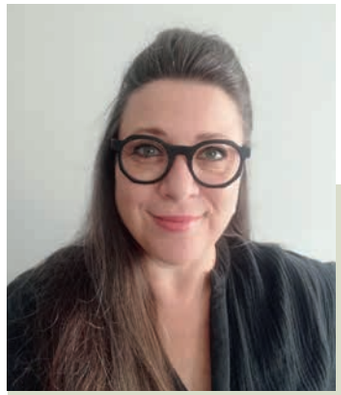
M.-C.B. Let's say that the conversation is ongoing and that here and there, we do see demonstrators emerge – some rather innovative – involving underground spaces. But beyond these expressions of inventive land use, the real challenge is reproducibility, which now has a number of obstacles to overcome.

What are they?

M.-C.B. There are many different kinds. Of course there are financial barriers. Legal provisions also sometimes make development rather complex. Most networks depend on highway laws, and legally speaking, ownership of the surface extends underground all the way to the centre of the Earth. This means that underground infrastructure that didn't match the surface infrastructure's footprint would soon run into administrative problems. Also, because legislation is constantly changing, developers have to remain highly vigilant, particularly where safety is concerned (room sizes, emergency exits, etc.). Another major obstacle exists in the fact that underground spaces are not properly covered in urban planning documents. Even at shallow depths, there are few maps or 3D models, and the layout of technical networks is not always known. Given the lack of joined-up cartographic resources, we would need to define a national framework for cataloguing underground spaces and their uses. That is actually one of the objectives of the "Sous-sol, bien commun" scheme. More generally, underground spaces are still too poorly understood to bring about a global vision and strategy, which are needed to consistently link the different possible uses. ■

(1) Underground urbanism has its roots in the thinking of Eugène Hénard, an early 20th-century Parisian architect who between 1903 and 1910 theorised a rational organisation of urban infrastructure in layers – technical networks, traffic, services, etc. – freeing up the surface for pedestrians and green spaces. But it was Edouard Utudjian who gave the movement its institutional form. In 1933, he founded GECUS – the Study and Coordination Group for Underground Urbanism – the first international organisation entirely dedicated to this discipline. An architect and urban planner, Edouard Utudjian proposed the idea that the urban underground is not a residual or purely technical space, but an entirely plannable resource that should be mapped, governed, and incorporated into wider urban planning approaches. He published Urbanisme souterrain in 1952 and championed this approach until it largely faded from view at the dawn of the 1970s.

(2) The Athens Charter takes its name from a 1943 Le Corbusier publication following an International Congress of Modern Architecture in 1933, which took place abord a ship bound for Athens from Marseille. It sets out the guiding principles of functionalism in architecture and urban planning.



AT A GLANCE

Marie-Claire Barré is an urban planner who obtained her doctorate from the École nationale des ponts et chaussées in 2001. Her career includes research (at LATTS), working at major urban services groups (such as Suez) and local authorities (Dunkirk in northern France), professional association, urban project management (with the architecture and urban planning agency Richez_Associés, now landForma), and training (with CNFPT).

In 2020, she founded the agency CAPACITé, which she now directs, an organisation based on cooperative processes between stakeholders, business incubation in complex fields, planning, and design.

On the theme of urban underground spaces, she led a feasibility study for the Underground Spaces and Transitions Committee at AFTES, the French association for tunnels and underground spaces, with a view to presenting its findings to the RGC&U (civil and urban engineering network) steering committee at the French Ministry of Ecology.

Her most recent contribution on the subject is a study commissioned by La Fabrique de la Cité (VINCI Group), published in October 2024 entitled Les promesses du sous-sol pour une ville durable [lit. The potential of underground spaces for a sustainable city]. This study assesses the potential of underground spaces in France and reviews the long history of underground urbanism.



“In Africa, support for electric mobility is still in its infancy”

Yao Tsoekeo Amedokpo, Doctor of Geography and a research fellow in the City Mobility and Transport Laboratory[1] at the École nationale des Ponts et Chaussées in Paris, explains mobility electrification policies in Africa.



Where does Africa stand in terms of transitioning its mobility?

Yao Tsoekeo Amedokpo. Africa has a long way to go, with fewer than 1% of new vehicle sales being electric cars, according to the International Energy Agency. But in many places across the continent, we are seeing real momentum, with the gradual integration of electric vehicles, initially with motorcycles. The urgency of the issues and the dynamism of new players – highly innovative startups in particular – will accelerate this transition. But change is not happening evenly across the whole continent. We can identify hotspots in southern and eastern Africa: I’m thinking of South Africa and the trio of Kenya, Uganda and Rwanda, which are leading the way. Western and Northern Africa are gradually embracing this momentum, with Central Africa still lagging behind.

How would you characterise public electrification policies in Africa?

Y.T.A. In Africa, support from public bodies for electric mobility is still in its infancy. Although the topic is not exactly new, the first forms of public policies in support of this transition only go back five years. According to a recent study, only 30 states of the 54 that make up Africa have adopted measures, to different degrees, ranging from true national electromobility strategies to isolated mechanisms in finance laws. Analysis of these efforts reveals two approaches: fleet-related policies and industrial policies. The first hinges on encouraging the increased electrification of vehicle fleets, acting primarily on fiscal levers (exemptions to import tax, VAT, excise duty, etc.). The second is more about encouraging local manufacture or assembly, through targeted grants or subsidies subject to performance criteria. Currently, only a handful of countries are on this path, including South Africa, Egypt, Kenya, Uganda, Nigeria and Rwanda.

“There are numerous barriers to the rollout of electromobility in Africa”

Are fleet-related policies and industrial policies mutually exclusive?

Y.T.A. In an ideal world, that shouldn’t be the case. But in reality, they still often are. Of 54 African countries, around 30 have the electrification of mobility on their agendas. And only around a dozen are taking a dual industrial and fleet-based approach.

What are the main obstacles to the mobility transition in Africa?

Y.T.A. There are numerous barriers to the rollout of electromobility: the prohibitive cost of electric vehicles, low per capita income, high dependency on the second-hand vehicle market, limited access to electricity, and unreliable power supply networks. Environmental concerns are being stifled under the weight of people’s economic worries. Also, transport systems in African cities have been neglected in research, with the possible exception of South Africa. To move forward, and in the right direction, public policies absolutely need data.

Where are the levers for accelerating electrification?

Y.T.A. They come from improving the content of policies to incentivise local industrialisation, developing charging infrastructure, and incorporating renewable energies into the electricity mix. Other levers involve targeting priority mobility segments across the continent (two and three-wheeled transport as well as minibuses and buses) and promoting inclusive economic models (such as pay-as-you-go and battery-as-a-service) that encourage an electromobility trajectory focused on use rather than ownership. ■

(1) Joint research unit between the École nationale des Ponts et Chaussées and Gustave Eiffel University

A modular micro data centre for intelligent water management

In northern Spain, the province of Burgos is taking a major step in digitalising the water cycle with the opening of a next-generation modular data-processing centre delivered by Axians.

The Provincial Council of Burgos is keen to equip its 37 municipalities with high-performance digital tools for managing the water cycle. From water quality and consumption tracking to reservoir volumes, wastewater discharges and flood risks: the data-processing centre (DPC) will centralise, secure and make use of all data obtained from the sensors due to be installed in the near future. It entrusted this project to Axians, the VINCI Energies ICT brand. *"This collaboration with Axians is setting out a unified management model, providing an overarching vision at provincial level and enabling each municipality to regulate the water cycle more effectively,"* explains Francisco José García López, Public Administration Business Manager at Axians in Spain.



The strategic choice of a micro data centre

Rather than a conventional data centre, Axians proposed a modular micro DPC, which is pre-assembled in the workshop before its final installation on site. This approach significantly reduced costs and rollout times, while also ensuring compliance with high-level NIS2, GDPR and ENS standards within the Spanish regulatory framework for cybersecurity. The infrastructure is notable for its robustness and safety: IP65 cabinets, IK10 anti-vandal protection, NOVEC fire suppression system, video surveillance, and biometric access control. *"The operational teams now have next-generation tools for managing access, physically and remotely,"* says Francisco José García López. Redundancy in the electrical, cooling and networking systems ensure maximum availability.

> *"A unified water cycle management model"*

Scalable and sustainable architecture

Designed to be modular and scalable, the DPC offers multiple configuration options and can be expanded at any time. It is currently operating at just 20% capacity, leaving a sizeable margin for meeting future needs, whether to further enhance the water cycle digitalisation project or to incorporate other public services such as waste management. *"Another standout feature of this data centre is its transportability,"* adds Francisco José García López. *"It can be dismantled and reassembled on another site in just a few days."* In addition, its carbon footprint is reduced thanks to less energy-intensive equipment and innovative solutions such as the fire-protection system using eco-friendly NOVEC gas. Financed under a European programme, the project is aligned with European Union climate targets. *"Sustainability and the capacity to absorb future workloads were essential criteria for the Provincial Council of Burgos. Our solution was designed from the outset to meet these two requirements."*

A global, end-to-end integrated approach

Ultimately, Axians has delivered a complete turnkey solution, including: civil engineering, power supply, cooling, physical security, IT infrastructure, training for local teams, and specialist support. The Provincial Council of Burgos now has robust, secure and sustainable infrastructure capable of supporting its digital overhaul of the water cycle across the region and evolving to meet future needs. ■

Cybersecurity: learning the lessons from a cyberattack

Cyberattacks are no longer just targeting large companies. They affect the entire economic fabric. In Belgium, East Flanders Building Materials learned this the hard way when its IT systems were paralysed. But thanks to a government aid package and support from Axians, it was able to transform this incident into a fully strategic cybersecurity project.

With cyberattacks proliferating, cybersecurity is becoming a clear strategic focus for businesses. In Belgium, the experience of East Flanders Building Materials (OVB Group), a small Ghent-based company active in the distribution of construction materials, perfectly illustrates this reality: digital security is more than technical tools and regular interventions – it requires a structured long-term approach.

A cyberattack like an electric shock

Founded in Ghent in 1936, East Flanders Building Materials is a typical firm in the economic fabric of Flemish Belgium. With a dozen employees and an operation heavily dependent on its IT systems, it could not afford the slightest interruption. However, like many SMEs, the company became aware of its vulnerability only in the aftermath of a cyberattack. In 2020, *"the business sustained an attack that exploited a vulnerability in its firewall, which was managed by the telecoms operator,"* says Marc Brouckaert, Account Manager at Axians Belgium, the ICT provider for East Flanders Building Materials. Fortunately, thanks to an off-network backup, the worst was avoided: *"We were able to reinstall the entire system, but one or two weeks of data were lost."* The company was thus able to resume operations after a weekend of restoration work without paying a ransom.

Government aid package

To prevent such an incident happening again, the company decided to adopt a more structured approach to cybersecurity. This was based on a cybersecurity enhancement programme from Vlaams Agentschap Innoveren en Ondernemen (VLAIO), a government scheme designed to help Flemish companies beef up their digital security. The programme combines subsidies and strategic support. *"That the VLAIO programme was able to finance 50% of the cost of a cybersecurity project was key, as was the selection of Axians as an approved ICT provider for this government programme for four years following a call for tenders in 2024,"* explains Marc Brouckaert. *"This financial support makes it easier for businesses like East Flanders Building Materials to invest in their digital security in a structured way."*

Analysis, technical measures and governance

The first stage of the support package is to perform a vulnerability analysis and establish a roadmap. *"With the Belgian Cybersecurity Centre (CCB), we conducted an initial analysis phase to assess the vulnerabilities that had accumulated over the years,"* says Marc Brouckaert. *"The second phase involved implementing technical measures, such as replacing the firewall and migrating the email system to the cloud."* The project also included an organisational dimension, which SMEs often tend to neglect. *"We are now working on cybersecurity governance procedures, for when employees join or leave, for instance."* This comprehensive approach is the response to a reality that is already familiar in the context of small organisations. *"In SMEs, IT systems often evolve organically,"* notes Marc Brouckaert. *"One year, they install a server; the following year, it's a new Wi Fi network, and so on. But it is rare to find an overarching IT policy."*

Protection and operational efficiency

For East Flanders Building Materials, the benefits are already clear. It now has a global overview of its cybersecurity and more robust management of its critical infrastructure. The aim is still to find the right balance between protection and operational efficiency. *"Security should not hinder the core business,"* says Marc Brouckaert. *"The secret is to find the right balance."* Beyond the experience of East Flanders Building Materials, this experience sends a clear message to the managers of SMEs. Cybersecurity can no longer be considered a cost or a constraint; it is an essential investment in the continuity of their business activities. *"The cost of prevention is always less than the cost of a cyberattack,"* says Marc Brouckaert. ■

"The cost of prevention is always less than the cost of a cyberattack"



Data central to industrial performance at Airbus

For the past 10 years, the world leader in aeronautics has been using data as a strategic lever for transformation, in order to optimise production, enhance its industrial resilience, and prepare for its move to a sovereign cloud.

Difficulties encountered with the engine manufacturer Pratt & Whitney did not prevent Airbus from recording record profits in 2025. Certainly, the European aircraft manufacturer – the world number one ahead of its American rival Boeing – had to revise downward its targets for increased production of the A320 family, but its capacity to ride out industrial unpredictability has been enhanced by the data-focused transformation it began almost 10 years ago.

"*Without these digital tools, Airbus could not have achieved the size it has in the current economic climate,*" says Jonas Murby, Partner at AeroDynamic Advisory, aeronautic-sector consultants based in Michigan, USA. The consultant believes that the digital transformation is more than just a lever for optimisation: it has become a key component in resilience to a particularly complex global supply chain.

From the A350 crisis to Skywise

The story begins in 2015. Facing production problems with the A350 programme, Airbus joined forces with US-based Palantir, a specialist in massive-scale data analysis, in order to make more effective use of its business data. "*Airbus really began thinking of data as a strategic asset in 2015, when it was able to solve the A350 production problems,*" says Jonas Murby.

This initial step rapidly expanded into a far more ambitious plan: Digital Design, Manufacturing and Services (DDMS). Its aim is to create a shared digital environment in which design, fabrication and maintenance data are available to every part of the business and to its partners.

In 2017, Airbus reached a new milestone with the launch of Skywise, a collaborative data management platform developed with Palantir. Today, more than 50,000 users have access to this digital environment, which covers the entire aircraft life cycle and includes tools for design, production, predictive maintenance, air operations, and fuel efficiency.

"*The primary objective was to make data available in a 'data lake'*[1] *in order to break down organisational silos,*" explains Jonas Murby. He believes that the main difference between Airbus and Boeing is the open nature of the platform. "*Skywise is a shared platform where airlines actually contribute data rather than simply analysing what they find.*"

Data-driven performance

This strategy is now producing tangible results. According to Jonas Murby, the first benefit was a 33% reduction in lead times for the A350. Other indicators demonstrate the operational impact of this approach: 20% fewer readjustments to production lines; an 80% reduction in wiring harness assembly times; over 90% automation in purchasing; and predictive maintenance meant hundreds fewer flights disrupted.

These benefits stem from the cross-functional application of data. Airbus now uses real-time analysis to manage its assembly lines, logistics, supplier network, and airline maintenance operations.

For Nicolas Sekkaki, Senior Vice President Global Cloud Practice at computing infrastructure service provider Kyndryl and the former chairman of IBM France, the effects of these advances extend far beyond the technology sphere. "*The mastery of data and its governance have become crucial, all the more so with the rise of artificial intelligence, which requires massive volumes of high-quality data to train it.*"

But the value of data is not derived solely from amassing it. "*It is essential that the value found in data nourishes the ecosystem in which each partner contributes and derives a benefit. The Skywise project is absolutely aligned with this approach.*"

For Nicolas Sekkaki, this approach implies that all stakeholders share the same governance rules and ethics on data use, whether for advanced analytics or artificial intelligence.

> *"Skywise is a shared platform where airlines actually contribute data rather than simply analysing what they find"*
>
> Jonas Murby, Partner at AeroDynamic Advisory





A risk management tool

In addition to the productivity gains, massive-scale data processing has produced a risk management tool. In a sector where many thousands of suppliers are delivering millions of parts across assembly lines worldwide, access to a consolidated overview is a decisive advantage.

"Skywise has given Airbus broader and deeper coverage of its supply chain, with a more comprehensive overview of its suppliers, their circumstances, their capacities, and any actions required," notes Jonas Murby. But he adds that *"this is no miracle solution,"* as the persistent problems with some equipment suppliers, notably Pratt & Whitney, would certainly indicate. Nevertheless, he believes that these data management tools have considerably limited the consequences of successive crises.

"Without these tools, having to manage thousands of suppliers and millions of parts a week using traditional methods would have made the post-Covid period far more damaging."

This capacity for anticipation is part of a broader industrial strategy. Airbus has simultaneously been rolling out its DDMS (Digital Design, Manufacturing & Services) programme, which aims to connect all digital design, production and service platforms together to facilitate data exchange between different areas of the business and its industrial partners. It is also exploring the potential of AI, advanced analysis, quantum technology and enhanced connectivity to improve its entire industrial cycle.

> *"The most pressing issue remains how infrastructure is controlled and the ability of companies to select their partners according to their business needs and applications"*
>
> Nicolas Sekkaki, Senior Vice President Global Cloud Practice at Kyndryl

The digital sovereignty challenge

Having built its strategy around Skywise and Palantir, early in 2026, Airbus launched a new project to tackle digital sovereignty. The European group has initiated a call for tenders for the migration of some of its most critical applications (ERP, manufacturing operation systems, product life cycle management tools, CRM, etc.) to a so-called "sovereign" European cloud. The contract, expected to be worth more than €50 million over up to 10 years, suggests a change in priorities for the manufacturer.

For Nicolas Sekkaki, this development reflects a problem that exists well beyond Airbus. *"Currently, almost 80% of these technologies are American in origin. Under these conditions, digital sovereignty remains a purely relative concept."* He believes that the real question is not simply the supplier's nationality but the control they exert over infrastructure. *"The most pressing issue remains the mechanisms controlling infrastructure and data, and the ability of companies to select their partners according to their business needs and applications."*

All of which is leading manufacturers to review their selection criteria. *"The central question is a simple one: who controls what, and how?"* Nicolas Sekkaki advocates an approach based on "business and digital resiliency," which identifies weak points liable to affect business activity and prepares contingency measures. *"Reversibility becomes a key requirement: if a stakeholder in the ecosystem fails, the business must have an alternative solution to hand."*

This approach also applies to artificial intelligence projects. *"It's now possible to train models in the cloud using artificial data, then deploy them to locally controlled 'on-premises' infrastructure[2] with real data."* This approach strengthens data protection and minimises the energy costs relating to AI infrastructure.

Transformation is far from complete

But the choice of a sovereign cloud will not erase 10 years of investment in Skywise. In February 2026, Airbus also renewed and extended its multi-year partnership with Palantir, whose platform remains the foundation of its data strategy. *"Airbus now probably has no practical alternative to Palantir,"* says Jonas Murby. *"To rebuild an equivalent platform would require considerable investment."*

The European aircraft manufacturer is therefore prioritising a pragmatic trajectory based on multi-cloud architecture that combines sovereign solutions with more conventional infrastructure depending on the applications concerned. This gradual approach gives European suppliers time to improve their cloud service offerings. Fundamentally, the data strategy adopted by Airbus illustrates the direction of travel for some major manufacturing groups: data is not just a lever for operational performance; it has become a strategic asset affecting competitiveness, resilience and technological sovereignty. In a period of generalised reindustrialisation, acknowledging this change could well inspire the entire European manufacturing industry. ■

(1) A data lake is a centralised data repository associated with big-data infrastructure. It enables a company or institution to import and store large quantities of data of multiple types and from multiple sources in one place.

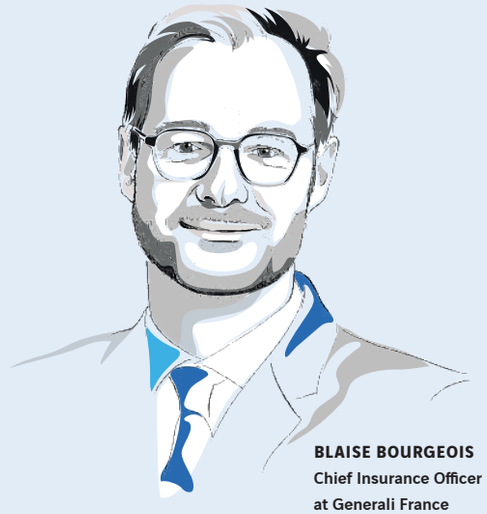
(2) Computing or software infrastructure is known as "on-premises" when it is hosted and maintained by a company's in-house IT department.

Insurance: an essential factor in adjusting to climate change

As extreme climate events accelerate and intensify, historical risk-transfer models must change.



LOUIS MEUNIER
Insurance Director
at VINCI Energies



BLAISE BOURGEOIS
Chief Insurance Officer
at Generali France

Insurers and businesses – their customers – alike must be more objective, and must anticipate and prevent more effectively. This means working together, as **Blaise Bourgeois**, Chief Insurance Officer at Generali France, and **Louis Meunier**, Insurance Director at VINCI Energies, explain.

According to the World Economic Forum's most recent annual Global Risks Report, published in January 2026, the three risks business leaders consider most severe for the coming decade are all climate-related. Do you agree with their assessment?

Blaise Bourgeois. In July 2026, Generali published its 2025 report on emerging risks. Cybersecurity retains its place among the major risks, and geopolitical instability continues to be a major cause for concern, but climate risk, which was still considered an emerging risk just a few years ago, is rocketing up the list of concerns. For the third consecutive year, risk experts have identified climate change as one of the biggest issues. Our Generali Climate Lab, the aim of which is to anticipate changes in climate risks, has this year identified three trends: significant exposure to risks in France; recurring meteorological phenomena on an unprecedented scale; and a climate shift accelerating toward major financial consequences in the absence of adjustments.

Louis Meunier. There is no doubt that climate risk is a major issue, in that it will forever transform regions, supply chains, infrastructure and the very way we do business.
The World Economic Forum report correctly identifies the challenge of linking long-term risks, climate being one of the most significant, with shorter-term risks such as geo-economic clashes, misinformation and disinformation, and the increasing polarisation of society. In other words, the difficulty lies not only in identifying major risks, but also in understanding how they interact. It's the cumulative impact – both immediate and delayed – that will be the most complex to anticipate and manage.

Given the increasing risk, what other mechanisms should general insurance bring into play?

L.M. General insurance is currently the number-one insurance product onto which climate risks can be transferred. But VINCI Energies aims to build a resilient model before even thinking about transferring risks.
We have already made significant progress in this regard. At VINCI Energies, resilience is based on risk-management strategies shared by all our employees. At the operational level, because that's where risks are identified: at grassroots level, in the reality of our business activities and those of our customers. And at organisational level, in every function that has to manage risk: insurance of course, but also finance, legal, human resources, communications, etc.

Is prevention becoming an essential element in risk management?

B.B. It is becoming a new link in our value chain. That's evident in our proactive approach in terms of analysis and a minutely detailed understanding of the risks, including through our Generali Climate Lab, launched in 2015 and involving actuaries, climatologists and data scientists, to refine our knowledge of climate risks, disseminate our understanding of those risks to the widest possible audience, and roll out suitable prevention solutions.

L.M. Prevention is driven by forward analysis. The VINCI Group, through its innovation platform, Leonard, is using forecasting to tackle the theme of adjusting to climate change. A working group was formed of 27 VINCI members who represent the issues facing different entities, including some insurance department directors. This initiative helped to enhance the Group's proficiency in identifying challenges specific to each business activity. This led to concrete actions, such as the response to the business-unit consultation process under the third French national plan for adjusting to climate change (known as PNACC) and the publication of Adapting to climate change: united in facing the challenge of the century.

Is spreading information and raising awareness going to be enough?

B.B. The crucial thing now is to move on from informing and raising awareness to diagnosing vulnerabilities and then rolling out preventive measures to assess their effectiveness. We have two instruments available for this. The first, "Facing the risks together", offers individuals a free diagnostic of their home's exposure to criminal, technological or climate risks, and ways to guard against them. The second, "Geoya", launched in January 2026, is a pay-to-use platform with advanced diagnostics and remediation plans for individuals, businesses and local authorities. It's a unique project with a totally innovative model, supported by three insurers – Generali France, MAIF and Société Générale Assurances – and two risk-management specialists – Saratec

and the Soletanche Freyssinet (VINCI Construction) subsidiary Sixense.
With Geoya, we address the causes of climate risk with a view to then moving on to action. It's a question of encouraging measures, from the very simplest to those requiring finance, in order to increase resilience in a building, production platform or piece of infrastructure. We can't do anything about the frequency or intensity of weather events, but we can encourage action by showing the benefits of investing in resilience compared with the costs of non-prevention.

How can a group such as VINCI Energies take material action on the causes?

L.M. By knowing and better understanding our exposure, by mapping our risks, by stress-testing the projects we take on for our customers, by analysing the potential impacts in the design phase, and by documenting the action taken or to be taken. In another action area, we incorporate adjusting to climate change into the technical choices our customers make. This involves trade-offs in the design and installation phases, including in the choice of materials and business-continuity processes. Treating the causes means making investments without knowing which risks will actually become reality.

So, it all comes down to an organisation's strategy. There has to be an anticipatory approach.

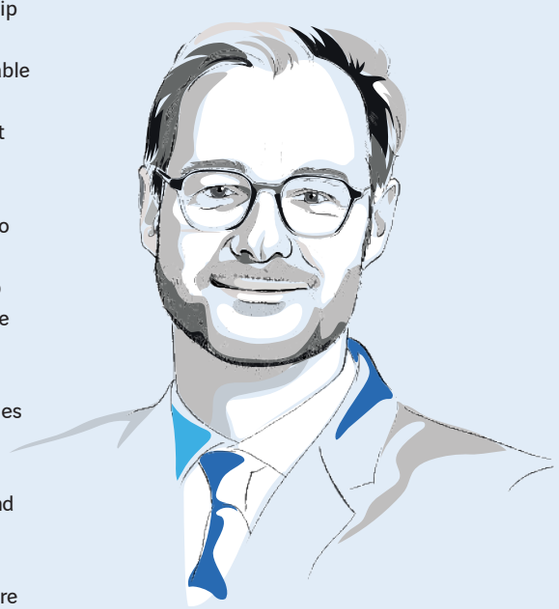
How are two economic entities like Generali and VINCI Energies working together to manage climate risk?

L.M. Generali has been the insurance provider to VINCI Energies since 2018. We are in a long-term partnership based on trust that is renewed each year. Despite the unfavourable background of global economic tension and an insurance market under considerable pressure between 2018 and 2024, the relationship between our two companies has strengthened. The longevity of this partnership is the product of regular dialogue and a trust-based relationship.

B.B. We share with VINCI Energies the same risk culture, the same spirit of innovation, and the same ambition to move beyond a compensation-based approach to an anticipatory approach. Many in the insurance world were surprised to see our two companies so closely connected in this initiative. I sincerely hope we will be able to win over other insurers. The more of us there are, the more obvious the benefits will be, and the better they will be shared.

How can data and AI find their place in risk modelling?

B.B. The reliability, depth and granularity of the data used are the prerequisites for increasingly sophisticated risk modelling. But working on historical series of external data is no longer sufficient. Our interpretations must be less static, more dynamic and more future-oriented, with internal analysis of event combinations (such as storm and hail phenomena, or the immediate and more long-term effects of drought, such as clay swelling and shrinking) to find signs of breaking or changing trends.
AI makes it possible to massively aggregate all the data we're using and thus to detect weak signals that evade conventional statistical analysis.



"With Geoya, we address the causes of climate risk with a view to then moving on to action."

BLAISE BOURGEOIS
Chief Insurance Officer
at Generali France

As phenomena continue to intensify, individuals and local authorities are struggling or even not bothering to get insurance. What's happening with businesses?

L.M. Risks that appeared around the dawn of the 21st century (terrorism, cyber risk, environmental risk) forced businesses to control their exposure and implement prevention mechanisms, which has given them a real head start over local authorities and individuals. The non-insurability hypothesis is not unreasonable in the long term, if the economic model for insurance were no longer sufficiently robust to bear a risk that had become too systemic.

B.B. The first report from the Insurability Observatory, designed at the French government's request by the state national insurer, the results of which were published in June 2026, shows that uninsurability is now extremely unusual. If you want insurance in France, you will find an insurer.

L.M. If we deprived businesses of a risk-transfer mechanism such as insurance, there would be major economic consequences. That's why it's incumbent upon businesses to challenge insurers and help them strengthen their model so they can be more efficient in the long term.
But to me it seems fundamental that in a sphere where we are still trying to make our analyses objective, that there must be room for everyone, and that no one is asking insurers to do anything that is beyond them. Building dialogue with trust, transparently and in the long term, is what will give everyone a place and allow then to play their full role. ■

"At VINCI Energies, resilience is based on risk-management strategies shared by all our employees."

LOUIS MEUNIER
Insurance Director
at VINCI Energies





Bertrand Leclerc on high alert

A pure "home-grown" product of VINCI Energies, where he began as a student intern, its cybersecurity director is a seasoned ultra-trail runner who combines endurance and vigilance to protect an international group constantly exposed to cyber threats.

A seasoned ultra-trail runner, Bertrand Leclerc, aged 43, took part on 28 August 2026 in the Ultra-Trail du Mont Blanc, an extreme test that echoes his professional life. Now the cybersecurity director at VINCI Energies, since 2018 he has managed a department he created from scratch, which has grown from four to fifty experts working from numerous sites and organised in line with the Follow the Sun strategy to ensure continuous protection for some 2,200 VINCI Energies business units in 61 countries. In the face of thousands of security events daily, his priorities include process automation, controlled use of artificial intelligence, the Security by Design strategy, regulatory compliance (NIS 2, AI Act) and reducing the environmental footprint of IT infrastructure.

This "pure VINCI Energies product" embodies a vision of cybersecurity based on endurance, vigilance and continuous adaptation.

Having joined the Group as a student intern in 2001, he describes himself as *"a pure VINCI Energies product"* and embodies a vision of cybersecurity based on endurance, vigilance and continuous adaptation: qualities as essential in ultra-trail races as in cyberspace. ■

A career path outside the lines

Since May 2026, Alexis Martel, aged 38, has been a purchasing manager at Omexom Nîmes. He previously worked for Omexom OHL International, where he managed the construction of a strategic power line in northern Finland. Behind these exacting experiences where the technical and the human meet, we find an extraordinary professional career full of twists, reconsiderations and assumed choices.

At the age of 38, Alexis Martel, Project Manager at Omexom OHL International (EEE), oversaw construction of the strategic Järvilinja 1 electrical line for Fingrid in northern Finland. In a first for Omexom OHL International in that country, in partnership with Omexom Finland, this strategic project is part of the Nordic Grid Development Perspective (NGDP) plan to modernise and strengthen the Nordic power supply network. The project involved the construction of 216 towers, the installation of 66 km of 400 kV and 110 kV overhead line, and the dismantling of 51 km of old infrastructure. The work took place on isolated marshlands near Vuolijoki, with teams working on frozen ground and in extreme weather conditions.

"If my career journey can spark ideas in young – or not so young – people who may feel it's too late to change direction, I will have achieved something vital: proving that every career can be reinvented."

Day-to-day, Alexis Martel managed international teams of 40 to 60 people of 11 nationalities. The human dimension was central to this project: listening, adaptation and cohesion are crucial, as is technical expertise. His career path is unusual. After several years with Club Med and temporary assignments working on electrical lines, he joined EEE in England as an assistant fitter. Aged 31, he went back to school and earned his advanced technical certificate, his degree, and then a master's in business engineering on a work-study placement with EEE at Omexom OHL International. In May 2026, he returned as a purchasing manager. His message: *"If my career journey can spark ideas in young – or not so young – people who may feel it's too late to change direction, I will have achieved something vital: proving that every career can be reinvented."* ■



A practical guide to transforming production facilities with AI

Under pressure to adopt AI, manufacturers are struggling to transform ambition into results. Quick, targeted diagnostics firmly entrenched in real-world data and processes offer a pragmatic way to rapidly generate measurable value.



Manufacturers are feeling increased pressure to incorporate artificial intelligence into their production facilities, but many are struggling to translate this ambition into tangible results. They are often asked to “use AI” without any clear roadmap.

Some are only just beginning to explore their data’s potential; others have already invested in MES (manufacturing execution systems), analysis solutions or data platforms, but are having difficulty demonstrating their real added value.
This gap is often attributed to the fact that AI initiatives are developed too quickly, before the fundamentals are properly understood.
A more effective approach is to begin with targeted diagnostics of short duration in order to minimise uncertainty before launching into large-scale transformation programmes. Rather than foregrounding the technology, this approach is focused on understanding processes, validating hypotheses and analysing data to identify the areas where AI can really add value.

Begin by understanding: diagnosis before transformation

The process generally begins with a brief discovery phase. Operational teams are questioned, workflows analysed, and existing data sources evaluated in terms of availability, quality and context.

A modest beginning quickly leads to results

From there, an exploratory analysis of the data and targeted automated learning are used to test hypotheses about how the processes behave, performance variations and inefficiencies.
These early diagnostics often flag up information that would remain invisible using dashboards or simple empirical testing.
A modest beginning quickly leads to results. In many cases, pertinent information appears within a few weeks, providing the teams with concrete proof to work with, rather than relying on projections or intuition alone. This approach also avoids oversizing initiatives before their value has been proved.

Rapid evidence to create sustainable industrial value

Take the example of a manufacturer that began its DataOps initiative with the focus on contextualising and standardising industrial data in order to improve quality and collaboration. The business wanted to optimise its startup process.
By reconstructing hundreds of historical startup events and applying automated machine learning, the analysis revealed clear patterns. Some operators systematically achieved a stable condition more quickly than others. These “key signatures” were used to develop an algorithm to automatically detect stability and ensure control is handed over at the optimal moment.
The result was reduced waste, improved consistency and a clearer roadmap for future improvements, all in less than three weeks.
In another case, a manufacturer with a more mature database was trying to understand the variability in a filling operation.
By standardising the data from all equipment and applying predictive models, their analysis was able to identify the filler heads contributing most strongly to the performance variations and to detect the first signs of mechanical degradation.
In a few weeks, the teams established usable performance indicators and a prioritised maintenance and optimisation plan.

Rooting AI in operational reality

Whether a business is just beginning its AI journey or seeking to expand its existing platforms, the same principle applies: AI adds more value when it is rooted in operational reality, applied selectively and validated by data before being rolled out at scale.
By using targeted diagnostics to guide decision making, manufacturers can move beyond the experimental phase to a sustainable and measurable improvement in their production processes. ■



MATTHEW HOLMAN
Senior Director of Operations - Industrial Intelligence & Reliability at Actemium Avanceon

Reuse in building: from anecdote to social and environmental revolution

Still considered a marginal concept just a few years ago, the reuse of building materials and equipment is now a major lever for ecological and social transition. It is creating jobs, creating new business sectors and redefining construction practices.



OLIVIER GENELOT
General Manager
at VINCI Energies
France Tertiaire IDF



In 2020, the reuse of technical equipment from building was still largely seen as marginal, even anecdotal. But since then, an inescapable reality has become clear: the potential for reducing Scope 3 [indirect greenhouse gas] emissions far exceeded that of direct emissions and energy consumption in Scopes 1 and 2, by a factor of almost 100. With this fact established, inaction was not an option.

Involving the entire value chain

VINCI Energies Building Solutions in Ile-de-France made this commitment gladly, without waiting for the implementation of the RE2020 regulation, the EU Taxonomy, customer demand or supplier offerings. There was a clear will to act, to involve the entire value chain, and to move more quickly.
Initial actions were focused on low-carbon design and identifying low-impact equipment-purchasing chains. With each exploration, new solutions emerged. They were no more costly and no less effective, but did show more collective intelligence and engineering.
At the VINCI Environment Awards in 2021, a site supervisor suggested reusing cable trays. The idea was duly fine-tuned, structured and implemented.
The reclamation of equipment via RESO Services, followed by its reintroduction into the supply chain for business units, showed that the model was feasible.
That success has spread, and many other materials can now be reused, reconditioned or retrofitted.

A business framework that empowers audacity and anticipation

A dozen different streams are now in operation in a VINCI-level framework with Backin, the VINCI solution for large-scale reuse of materials on sites.
A reuse chain is more than a technical process: it requires a mechanism for identifying potential resources, removal procedures, reconditioning, traceability, insurance, storage, and a system for making materials available for new projects.
This organisation required tangible investments, such as doubling the size of the warehouse and recruiting dedicated project managers. Economic balance is yet to be achieved, but this medium-term vision is made possible by a business framework that empowers audacity and anticipation.
Project owners are now engaging with this approach. A renovation no longer begins by blindly stripping the site, but with an initial review of what to keep, what to reuse, what to transform.
So, is reuse still merely anecdotal? Perhaps in the short term.
But in 2025, it will have enabled Building Solutions contracting businesses in Ile de France to eliminate around 1% of their upstream Scope 3 emissions.
However, it would be a mistake to reduce this dynamic to a simple percentage.
Because everything required for exponential scaling-up has come together: customers are convinced; chains are tried and tested; business units are ready.
But also because reuse adds major social value.

One of the pillars of a fair, value-creating and deeply human environmental transition.

Useful for the planet and for society

In economic terms, €10,000 of new materials costs the same as €10,000 of reused materials.
The difference lies in their contents: choosing new primarily mobilises materials and energy; choosing reused material creates jobs.
That one percent mentioned above has generated 100,000 additional hours of work, equivalent to 60 full-time jobs. The result?
Collective pride in work that is useful for the planet and for society
This social value is not yet included in the criteria for comparing contract bids. But there are grounds for optimism: this recognition will come. Reuse is no mere anecdote.
It is one of the pillars of a fair, value-creating and deeply human environmental transition. ■



Modernising the Rhône's locks with no interruption to river traffic

In a huge project expected to take five years, the aim of modernising the locks on the Rhône in Bollène and Châteauneuf du Rhône is to accommodate increasing river traffic and ensure their availability 24 hours a day. There is one major constraint: the Compagnie nationale du Rhône's project, in which VINCI Energies is playing a key role, must not adversely affect traffic. Since a straightforward replacement of the gates would have required a two or three-month interruption to traffic, a decision was made to build two additional metal gates, each 20 metres high and weighing 200 tonnes.
An exercise in organisational and operational agility, the project also includes the modernisation of mechanical equipment, electrical integration, and the creation of a new control room. ■

VINCI ENERGIES ACCELERATOR OF ENVIRONMENTAL TRANSITION

In a world undergoing constant change, VINCI Energies contributes to the environmental transition by helping bring about major trends in the digital landscape and energy sector. VINCI Energies' teams roll out technologies and integrate customised multi-technical solutions, from design to implementation, operation and maintenance.
With their strong local roots and agile and innovative structure, VINCI Energies' 2,200 business units have positioned themselves at the heart of the energy choices of their customers, boosting the reliability, efficiency and sustainability of their infrastructure and processes. VINCI Energies strives for global performance, caring for the planet, useful to people and committed to local communities.

The Agility Effect explores everything that drives acceleration and transformation, with a focus on the energy transition and digital transformation.
Through analyses, testimonials, and reports, it highlights the expertise of VINCI Energies and its brands, as well as exemplary and/or significant topics and initiatives.
The Agility Effect is both a www.theagilityeffect.com web content platform and a magazine published twice a year.

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