

FOR ALL  
FUTURE  
ENERGY  
SOLUTIONS  
VINCI TECHNOLOGIES  
WILL BE THERE



VINCI  
TECHNOLOGIES



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**For all future energy solutions, Vinci Technologies will be there**

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# FOR ALL FUTURE ENERGY SOLUTIONS, VINCI TECHNOLOGIES WILL BE THERE

RENAUD  
PRESBERG

Chairman  
and CEO

Vinci Technologies originated in the 1960s as a subsidiary of France's foremost hydrocarbon research center. Its initial mandate was to engineer laboratory equipment for researchers in the oil & gas, primary energy source at that time.

In 2008, four members of the management team, including myself, took over this exciting company, which was dedicated to be at the pinnacle of technological and societal developments.

Weak signals hinted at this evolution. As an example a few years earlier, new European directives had led our customers, the researchers, to ask us to help them improve their refining processes to reduce lead levels and other pollutants as well as NOx emissions in fuels. At the same time, geologists were consulting us to improve the environmental impact of the operations they were working on, and chemists were appealing to us for pilot units intended for the development of biofuels and alternative fuels. As for us, we had very quickly developed a new business unit, Vacuum division, for researchers in the electronics industry – semiconductors, new materials, photovoltaic cells... We already had a foot in the energy transition.

In 2020, like everyone else, we were shaken up by the Covid. That year, our turnover fell by 35%. For the oil share of our business, the drop was 60%. We questioned ourselves about this discrepancy and became aware of our own shift, which is now reflected in the fact that two thirds of Vinci Technologies' turnover now comes from programmes directly linked to the energy transition.

This share is destined to increase. It is through science that the energy transition will happen. Our mission is to support chemists, physicists and geologists. Our know-how is to understand their problems in order to create the right tool for their research carried out in extreme conditions: under high pressure or in ultra-high vacuum, and in high or low temperatures. Our strength is our knowledge of the tools with which they will respond to new demands. Science needs our tools to move forward. We are at the forefront of the energy transition.

I am often asked to engage in a foresight exercise and imagine the energies that will exist tomorrow. My answer is disappointing: among all the existing projects I don't know which one will be predominant. Moreover, I don't even know all the subjects we will be working on tomorrow, just as ten years ago I didn't know all the projects and themes we are working on now. However, one thing is certain: for all future energy solutions, Vinci Technologies will be there!



**“It is through science that the energy transition will happen. Our mission is to support chemists, physicists and geologists. Our know-how is to understand their problems in order to create the right tool for their research carried out in extreme conditions.”**

# +1,5°C:

## A CHALLENGE, SOME ISSUES, A STRATEGY

In 1990, the IPCC, the Intergovernmental Panel on Climate Change, published its first report, warning of the risks of global warming.

In 2022, more than thirty years later, its sixth report is overwhelming: it predicts an average temperature increase of at least +1.5°C in the next twenty years (compared to the average during the pre-industrial era), with this threshold likely to be reached as early as 2030 if we do not act immediately.

Based on this, the report draws up five scenarios of our socio-economic future. The most pessimistic one predicts a doubling of greenhouse gas emissions by 2050 and a warming of +6°C in 2100 without massive changes in human activities, posing major risks for our societies. As we know, the climate is the century's challenge.

To keep climate change below 2°C in 2100, the effort will be significant, requiring us to reduce our greenhouse gas emissions by 8% per year to achieve carbon neutrality by 2050.

### But how do we do this?

73.2% of these emissions are linked to energy consumption – essential for transport, in the industrial sector and for all daily activities, including lighting and heating. And despite calls for sobriety, this consumption will not decrease, on the contrary: all projections show that it will continue to increase exponentially to meet the growing needs of our societies.

However, there is one essential lever we can use: the source of this energy. Today, 80% of the energy we consume is of fossil origin, derived from oil, gas or coal and emits a lot of greenhouse gases. We are beginning to know how to produce energy differently, and this is where we can act.

This is the conclusion reached by the International Energy Agency (IEA). It now advocates a new energy mix in which the share of renewable energies (solar, wind and modern biomass) would rise from 9% to 23%. A huge project is opening up before us.



### A GROWING ENERGY DEMAND

1970	2000	2030
5 billion toe	9.2 billion toe	15.3 billion toe
1.35 toe/capita	1.5 toe/capita	1.9 toe/capita

### FUTURE CLIMATE SCENARIOS

NO CHANGE	+4°C
A SMALL CHANGE	+3.5°C
A MAJOR CHANGE	+2.5°C
A RADICAL CHANGE WITHIN 10 YEARS	+2°C
A RADICAL CHANGE IMMEDIATELY	+1.5°C

# THE 8 PILLARS OF DECARBONATION



In order to achieve carbon neutrality, and thus a reasonable limitation of global warming, the International Energy Agency (IEA) has established 8 decarbonisation pillars which are all levers to be activated to reduce our dependence on fossil fuels.

It has also calculated their possible contribution, by 2050, to reducing energy emissions. Through work, research and prototyping in its various divisions, the Vinci Technologies Group is today a player in the transition in each of its 8 pillars.

## STATES COMMIT THEMSELVES

Since 2015, within the framework of the COP 21 the signing of the Paris Agreement, a legally binding international treaty on climate change, climate action plans, known as Nationally Determined Contributions, have been submitted by the majority of signatory countries. For example:

— In September 2022, France announced an investment of €2.1 billion for the development of the national Hydrogen sector.

— At the European level, the Plastics Pact signed in 2020 commits the States to fight effectively against this growing source of waste, and industries to find new avenues (recycling, biosourced plastics, etc.).

— According to the IEA, 102 Gt of CO<sub>2</sub> will have to be captured and stored between 2015 and 2060, either naturally or artificially. In 2022, ahead of the States, the tech giants (Alphabet, Meta, Spotify and Stripe) launched the Frontier initiative, with massive investments to foster the acceleration of appropriate technologies, particularly the creation of carbon sinks.

PILLAR	CONTRIBUTION TO GHG REDUCTION	RESEARCH PROGRAMS USING VINCI TECHNOLOGIES INSTRUMENTS
1 CO <sub>2</sub> CAPTURE, STORAGE & USE (CCUS)	10%	SEQUESTRATION IN TANKS AND LEAKING PREVENTION, ABSORPTION, SYNTHETIC FUEL
2 HYDROGEN (PRODUCTION, TRANSPORT, STORAGE)	4%	CARBON-FREE H <sub>2</sub> PRODUCTION, CAPTURE, TRANSPORTATION METHODS STORAGE
3 BIOENERGIES & BIOMATERIALS	10%	BIOFUELS AND RENEWABLE MONOMERS
4 SOLAR ENERGY & WIND TURBINES	31%	ORGANIC PHOTOVOLTAICS, SOIL ANALYSIS
5 ELECTRIFICATION	17%	SEMICONDUCTORS, NATIVE HYDROGEN
6 ENERGY EFFICIENCY	16%	PROCESS OPTIMIZATION, ORGANIC DIODES (OLED)
7 OTHER RENEWABLE ENERGIES	7%	GEOHERMAL PROCESSES
8 OTHER DECARBONATION LEVERS	5%	PLASTIC WASTE RECYCLING, MICRO-ELECTRONICS, CO <sub>2</sub> STORAGE ON THE GROUND SURFACE

# VINCI TECHNOLOGIES SUPPORTS THE ENERGY TRANSITION



Compliance with the climate objectives set by the Paris Agreement is a challenge which, to be met, requires an increase in the performance of renewable energies, or even the search for new energy sources and the development of low-carbon production methods – many of which have yet to be discovered.

Indeed, research and development are at the heart of Vinci Technologies' strategy as a designer of pilot equipment and instruments used by its customers to explore unexpected

paths. In recent years, our activity has diversified and expanded into non-carbon sectors: CO<sub>2</sub> capture and storage, circular chemistry, hydrogen, photovoltaic cells, among others. Applications contributing to the energy transition have seen the strongest growth, now accounting for two-thirds of the Group's activity, all divisions combined.

Our objective is to continue to support our customers in this transition, for which research and development are the strategic pivot.

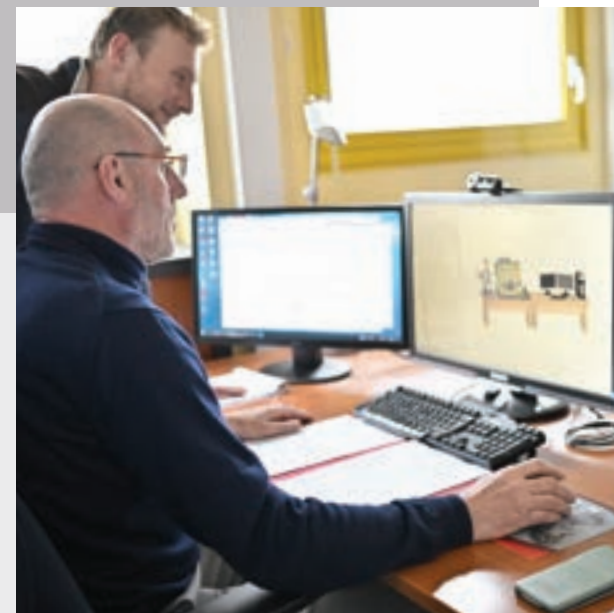
## FOUR DIVISIONS FOR FOUR BUSINESS SECTORS

The Group's four divisions have already seen their activities extend to different sectors that will be major players in the energy transition.

- 1 **Rocks & Fluids** designs instruments dedicated to the physical measurement of rocks and fluids, supports activities related to CO<sub>2</sub> sequestration and hydrogen storage issues, including their interactions with geological reservoir rocks, geothermal projects, analysis of abandoned wells...
- 2 **Pilot Plants** designs, creates and assembles prototypes simulating chemical processes intended, among other things, to test innovative methods of capturing and using CO<sub>2</sub>, to develop tomorrow's biofuels and biomaterials, and to solve the various problems posed by hydrogen or ammonia.
- 3 **High Vacuum** develops mainly thin film deposition systems required by nanotechnology research centers. These techniques are essential for the development of sectors such as organic photovoltaics, OLEDs, OFETs, semiconductors, quantum computers, and autonomous vehicles, among others. The company has also specialized in the design and manufacture of complete ultra high vacuum laboratories, either to connect all deposition machines or to create the environment required by high end technologies, such as aerospace or nuclear applications.
- 4 **Subsurface Imaging** covers the activities related to the potential of soils for carbon storage, reservoir monitoring and leak detection.

### THE GROUP'S CARBON FREE ACTIVITIES

2019	1/3 OF THE TURNOVER
2023	2/3 OF THE TURNOVER



# CARBON CAPTURE, USE AND STORAGE (CCUS): VINCI SOLUTIONS



CO<sub>2</sub> emissions are responsible for about 65% of the additional greenhouse effect due to human activities. Their main sources are industry and energy, with intensive agriculture and deforestation also contributing. The IEA is adamant that their reduction will have to be massive, and in its World Energy Outlook 2021 report, also emphasises the need for their capture.

There are natural sinks that absorb CO<sub>2</sub>: oceans, ecosystems such as forests, meadows and wetlands. In France, according to ADEME, they capture nearly 20% of emissions, but they are insufficient. Hence the option that is emerging: resorting to technological sinks, involving the voluntary capture of the carbon that would be stored there. But there are also possible uses for this collected carbon.

According to the IEA, by 2070, the development of these techniques will enable a 20% reduction in emissions from the industrial and energy sectors - compared with 0.06% at present. Vinci Technologies' solutions are part of this approach.

## Natural decarbonation

Carbon is a natural fertiliser for soils but its capture by the latter depends on several factors: the quality of the soil itself, its revegetation, moisture content among others. Vinci Technologies is contributing to the development of instruments for measuring soil capacities to capture CO<sub>2</sub> and to improve these capacities. So that one day farmers will also become paid players in this circuit...

## Technological decarbonation

It includes a series of steps and processes that entail first capturing CO<sub>2</sub>, then transporting it, and finally either storing it or using it.

— **Capture.** It is carried out where the concentrations of carbon are the highest, mainly in factory emissions (power plants, cement works etc.). Vinci Technologies supports its customers with the design of pilot units based on new technologies and on materials showing high absorbance performance, making it possible to capture carbon in a more energy-efficient and effective way.

— **Transportation.** It involves the concentration of CO<sub>2</sub> and can then be carried out by pipelines, by ship, or even by train or trucks.

— **Storage.** This consists in fixing the CO<sub>2</sub> and then injecting it into underground geological reservoirs (coal seams, old depleted hydrocarbon reservoirs, saline aquifers, etc., onshore or offshore). The main issue is the safety of these reservoirs. It implies a study of the rocks (their permeability, porosity, possible interactions with carbon), a field in which Vinci Technologies has long-standing expertise.

— **Use.** New prospects are opening up, at more or less advanced stages of research and development, especially in the food industry, for the production of fuels (e-fuels), chemicals,... in which Vinci Technologies is a partner.

## 2050: THE EUROPEAN COMMISSION'S +1.5°C SCENARIO

IN MILLION TONS

TOTAL CO <sub>2</sub> CAPTURED	281 Mt TO 606 Mt
CO <sub>2</sub> STORED	80 Mt TO 298 Mt
CO <sub>2</sub> USED IN INDUSTRY	201 Mt TO 307 Mt

(Source: Ifri 2021)



The IEA expects a strong growth of CCSU installations, allowing to reach an absorption of more than 10 Gt of CO<sub>2</sub> per year in 2070, including capture from biomass.

## ADEME'S SCENARIOS FOR CARBON NEUTRALITY IN 2050

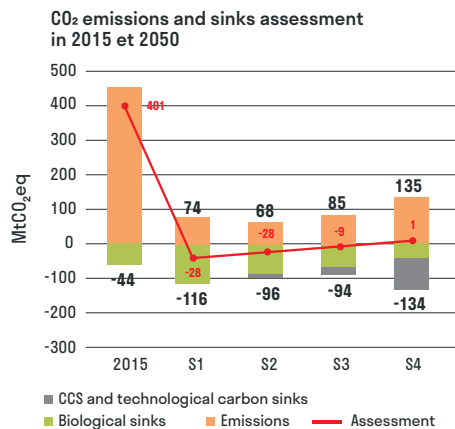
ADEME has developed four scenarios, or four societal choices, to lead France towards carbon neutrality in 2050:

**Scenario 1:** frugality in the means of eating, moving, consuming (70% of materials from recycling, meat consumption down by 70%...).

**Scenario 2:** territorial cooperation between NGOs, the public and private sectors and civil society to set up an economic system that combines sobriety and efficiency and an evolution of societal values. Scenarios 1 and 2 opt for natural carbon sinks.

**Scenario 3:** the development of green technologies to make them widely available, leading to 86% reduction in greenhouse gases in industry. This scenario introduces technological carbon sinks.

**Scenario 4:** the restorative bet, with the safeguarding of current lifestyles offset by a technological capacity to maintain a viable world. In this scenario, technological carbon sinks are a condition for the transition.



## THE POTENTIAL OF GEOLOGICAL STORAGE OF CO<sub>2</sub>

Since the first initiatives in the 1990s, about 260 million tons of CO<sub>2</sub> have been stored worldwide. The IEA estimates that the world's geological storage capacities are in the range of 6,000 to 42,000 Gt onshore, and 2,000 to 13,000 Gt offshore.

According to ADEME, in France, it would be possible to store up to 24 million tons of CO<sub>2</sub> per year, or 7% of emissions.



**STÉPHANE LEGRAND**

Director, Rocks & Fluids Division

## “Decarbonation, a growing market”

Established in 1998 to focus on the physical measurement of rocks and fluids, the Rocks & Fluids division of Vinci Technologies is mobilized around a growing market: the issues related to CO<sub>2</sub> and hydrogen. Explanations and perspectives with its director, Stéphane Legrand.

### What are the main activities of Rocks & Fluids?

This division designs, creates and manufactures laboratory equipment capable of analyzing the physical properties of a rock or a fluid. It brings together engineers and technicians, as well as PhD students who, through their research, participate in the implementation of innovative processes for our clients.

### Who are your customers and what are their main requests?

We work with energy companies as well as research institutes, universities and of course drilling and geological services companies. We receive a lot of requests for CO<sub>2</sub> sequestration simulation equipment but also, and this is new, for hydrogen storage. It is true that the devices for the measuring of rock permeability are similar for these two gases, but their interactions with the rocks are different.

### Could you give us an example?

For a university in Asia we are designing and manufacturing equipment that simulates CO<sub>2</sub> sequestration under different reservoir and temperature conditions. It will enable researchers to validate models to estimate the quantities of CO<sub>2</sub> that can be stored in specific geological reservoirs.

### Are there any risks associated with geological storage of CO<sub>2</sub>?

The main risk is that the reservoir lets the CO<sub>2</sub> rise to the surface, hence the importance of preliminary measures. On the other hand, when the reservoir is well sealed, the carbon injected under pressure of several hundred bars gets trapped in the reservoir. It also interacts with the crystals in the rock and, in time, mineralizes and becomes rock. It is never seen again, and that is what we are looking for.

### What prospects can we imagine for tomorrow?

The problems concerning the capacity of reservoirs to store carbon or hydrogen only emerged in the late 2010's. Other issues are emerging with the development of renewable energies, such as the study of soil resistance for the installation of wind turbines, the interactions of quartz with underground fluids in geothermal applications, among others. Laboratories need more and more new instruments to understand the phenomena, diagnose the problems and find solutions.



# HYDROGEN, TOMORROW'S ENERGY VECTOR



Dihydrogen (H<sub>2</sub>), commonly referred to as hydrogen, is the most present chemical element in the universe. Potentially endless resource, it is not easily accessible in its pure state as it is found in other molecules: water (H<sub>2</sub>O), biomass, hydrocarbons, etc. Consequently, its production typically requires energy input. However, it possesses a significant advantage: its combustion is non-emissive of greenhouse gases – it only produces water.

## Towards a decarbonized H<sub>2</sub> production

The most widespread process today is the steam reforming of natural gas, but it is highly CO<sub>2</sub>-emissive (11 tons for 1 ton of hydrogen). The IEA recommends the implementation of solutions to capture this CO<sub>2</sub>, solutions developed by Vinci Technologies for its customers, in parallel with the development of cleaner production technologies – those of a so-called green hydrogen.

A second process, again according to the IEA, with an almost neutral carbon footprint, is the gasification of biomass, in particular charcoal, at very high temperatures (1,200 to 1,500°C).

A third solution, which is increasingly supported internationally and is undoubtedly the solution of the future, is the production of hydrogen by electrolysis, but it depends heavily on the deployment of renewable energies (wind or photovoltaic) to obtain 100% green hydrogen. Vinci Technologies, which offers carbon capture solutions, is also being asked by its customers to think about the development of these last two sectors.

A fourth solution has recently appeared: native hydrogen, emitted by rocks via natural reactions. Vinci technologies, always on the lookout for the tomorrow's energies has developed specific instruments to evaluate the efficiency of this production method.



## The challenge of transport and storage

Hydrogen is the lightest gas. Transporting and storing it involves liquefying it at very low temperatures or compressing it at very high pressure, energy-consuming operations for which new technologies are being studied. It is also a dangerous gas because it is highly flammable. Its tiny molecules present significant risks of leakage, requiring particularly rigorous tests of the tightness and impermeability of materials and rocks, a field in which Vinci Technologies is an expert. The need for research to meet this technical and economic challenge is massive.

## ESTIMATED GLOBAL HYDROGEN DEMAND

IN METRIC TONS

2019	<b>71 MILLION</b>
2040	<b>137 MILLION</b>
2050	<b>287 MILLION</b>
2060	<b>415 MILLION</b>

(Source: IEA)

According to the IEA, **\$1,200 billion** are expected to be invested in the green hydrogen sector by 2030.

# “A massive need for research”

## VALENTIN GOUJARD

Director of the Pilot Plants Division. He has looked into the hydrogen value chain and the challenges posed by what could become the most promising energy.



## You say that the big challenge for hydrogen is not so much its production as its transportation. Why is that?

We know how to produce green, carbon-free hydrogen by electrolysis of water. This process is currently expensive, but advances in renewable energies, particularly photovoltaic and wind power, will help overcome this handicap. Vinci Technologies is called upon to create promising pilot plants in this field of applications. However, as a result, the sources of green hydrogen production, for example in deserts or remote locations where hectares of new generation solar panels can be installed, will be geographically distant from the populated areas where this hydrogen will be needed. But hydrogen is not easy to transport.

## Are there any solutions?

They consist in transforming this gas to obtain liquids. One way is to use ammonia or methanol. We are working on units that are evaluating catalysts to optimize the process (formation and cracking). We are also interested in e-fuels, synthetic fuels produced from hydrogen as well as a new process for transporting hydrogen by liquid carrier in which the hydrogen is housed in organic molecules, LOHCs (liquid organic hydrogen carriers), which have similar properties as oil, making it possible to use existing oil infrastructures for its transport.

## WHY PILOT PLANTS?

When scientists discover a new process in the laboratory, when they patent an idea, there is still a long way to go to achieve an industrial process. At this point, a pilot plant is an indispensable tool: it allows researchers to work on the operating parameters to optimize a reaction or obtain demonstrative quantity of a new product. In other cases, it makes it clear that further studies remain to be carried out to make the process operational.

In all cases, no process is created without one or more Pilot Plant stages.



# BIOENERGIES & BIOMATERIALS IN THE AGE OF VALORIZATION



They are the substitute for their fossil fuel equivalents, which are high emitters of greenhouse gases, and they represent an essential pillar of decarbonization. Biomaterials and bioenergy will be tomorrow's materials and energies, but for this to happen, a number of challenges on which Vinci Technologies is getting mobilized, must be overcome. Among them, the availability of soils (which should not compete with many other uses, especially food), their current cost which remains higher, and their production emitting CO<sub>2</sub>, for some. Explanations with **Olivier Clause**, president of Xytel.

## To begin with, what is Xytel?

Xytel is an American company specializing in the manufacturing of pilot plants, with a subsidiary in India, that was acquired by Vinci Technologies in 2006. We design, create and manufacture the pre-industrial instrument corresponding to the demand of our customers for their research, their process tests. At the time of its acquisition, Xytel had 4 employees. Today there are 50 of us, half of whom are structural, mechanical, process and electrical engineers and the other half are technicians, welders, pipe and tube fitters and instrument makers who manufacture the prototype designed by the engineers.

## You are based in the United States. Are the American and European approaches to biomaterials and bioenergy the same?

Europeans are more radical than Americans. For example, while the former want to set a deadline of 2035 to stop producing thermal vehicles, the latter are taking small steps and are starting by increasing the biofuel content in traditional fuels with the aim of reaching 100%. This is valid in other areas.

## What is meant by bioenergy and to what extent are Xytel and Vinci Technologies involved in this adventure?

It is almost exclusively about biofuels. Biofuels are not a recent option: when I started working in 1990, they already existed at 5% in diesel under the name of 'diester'. The goal today is to make them the only main fuel and, to do so, to overcome the pitfall of hundreds of thousands of hectares that would then be dedicated to them, not to mention the massive needs for fertilizers that would be used. But fortunately, there are solutions, such as the use of algae, or methane from landfills or farms – for which we have already created a prototype currently in operation in Florida. It conveys a huge field for the future research.

## What about biomaterials?

There are many projects to replace monomers of fossil origin (which, when assembled, give the different full gamut of plastics and fibers of daily use) by biomaterials meeting the same quality criteria. For example, Xytel has designed a prototype for one of the main European paper manufacturers who hit upon the idea of a new polymer, a bioplastic, produced from cardboard residues, which is sustainable and recyclable. I can also mention another pilot unit designed to produce acetylene, a component for the manufacture of fibers and polymers from biogas instead of natural gas.

## What type of customers do you target?

In equal measure, we have our usual customers, the major chemical companies that we support in their efforts to open up to new energies and new materials, and start-ups that are brimming with new and very ambitious ideas. This is an exciting time.

# QUANTUM DEVICES AND ENERGY EFFICIENCY



**CHRISTINE  
WALSH**

High Vacuum  
Business Unit  
Director

In 2008, to expand the portfolio of its other divisions, Vinci Technologies acquired Meca 2000, a French company that twenty years earlier had pioneered in the ultra-high vacuum industry. Renamed High Vacuum, this division designs and manufactures thin-film deposition systems dedicated to research or small-scale production using physical and chemical vapor deposition techniques (PVD and CVD). Here, our engineers and PhD students, supported by the Group's technicians, are seeking solutions that will accelerate the energy transition. Explanations with the unit's director, **Christine Walsh**.

## What is your product portfolio and who do you reach out to?

Our customers are mainly research laboratories, and research-based industries, for whom we develop solutions that will be the corner stone of tomorrow's industries. In addition to the supply of individual thin film deposition machines, we have had the opportunity to design and supply complete laboratories with several machines linked together by an ultra-high vacuum environment, such as at the University of Lorraine (France), NYU (USA), Weizmann Institute (Israel). These multi-technique

platforms that combine several deposition & analysis technologies (PVD, MBE, PLD, etc.) are the culmination of our experience in vacuum equipment design, providing solutions for microchips, semiconductors, optical lenses, photovoltaic cells, medical devices and all kinds of peripherals.

## Is this what piqued your interest in quantum computers?

These are tomorrow's computers which will use much less energy for infinitely more computing power. They still need to be designed with materials that are faster, more compact and, above all, consume less energy than those we are using today.

## It is, in other words, the quest for clean energy efficiency...

Indeed, and the field of applications is vast. We are living in an exciting moment of accelerated research. Twenty years ago, we had the impression that industrialization had come to a standstill, that we were just repeating the same phones and computers, which were a little faster but nothing more. With the awareness of environmental and climate issues, industrialists are urged to imagine equipment that is both more efficient and more eco-responsible. Industry has had to return to the research laboratories, who are our customers, and reinject capital to support brand new innovations. We are only at the beginning of this adventure.



# RENEWABLE ENERGIES THE LEVERS OF EFFICIENCY



The know-how acquired by Vinci Technologies, in particular its expertise in soils, makes it a player in the development of renewable energy sources, so many bricks which will be part of the energy mix imposed by the States under the Paris Climate Agreement to accelerate the energy transition.

## **Geothermal energy: understanding the rock**

This technique consists in injecting water under pressure into the subsoil, along faults, until it reaches a heat source with which the water interacts to recover its heat and transform it into steam. Thanks to its long-standing know-how in soil and rock analysis, Vinci Technologies assists its customers in solving very concrete problems, such as measuring the efficiency of products added to water, testing permeability benches, and computing the speed of water circulation in the rock. With a client research institute, one problem concerned the dissolution of quartz that was clogging the water pipes. A prototype is being studied, simulating this process under conditions of pressure of 500 bars and temperature exceeding 500°C, to determine the means to slow down the dissolution mechanisms.

## **Solar energy: improving efficiency**

The potential of solar energy is for ever growing. First generation solar cells, silicon photovoltaic cells, led the market with high-efficiency output but their manufacturing process is not ideal. A first pivot was to make photovoltaic cells based on organic elements. However efficiency was lower, so researchers are constantly improving it. This provides an important opportunity for Vinci Technologies' deposition systems. In more recent times, we have collaborated with a major German research institute in designing and characterising a multi-technique deposition machine which enables the development of photovoltaic cells with perovskite layers, with improved efficiency. Such discoveries will lead to a large-scale increase of this type of energy.



## **Wind turbines & dams: soil resistance**

The study of the mechanical resistance of rocks is an essential prelude to the installation of wind turbine fields weighing several tons or to the creation of hydraulic dams. Press prototypes to measure the strength of rocks are designed by Vinci Technologies for its customers.



# OUR RESOURCE: OUR TEAMS

The Vinci Technologies Group has **150 employees** in France, the USA, and India, with projects in **110 countries**. Our employees travel frequently to accompany the in situ sites. It is therefore necessary to offer them optimal working conditions, based on social dialogue and empowerment, cornerstones of our corporate culture. In addition, in our various businesses, training time is long, and it is therefore important for us to retain our employees.

## FAIR PRACTICES

- 1 We advocate and apply ethical rules with our partners.
- 2 Quality controls are regularly carried out with all suppliers.

**45 YEARS OLD**  
AVERAGE AGE

**11 YEARS**  
AVERAGE SENIORITY

**5 TO 10%**  
TURNOVER

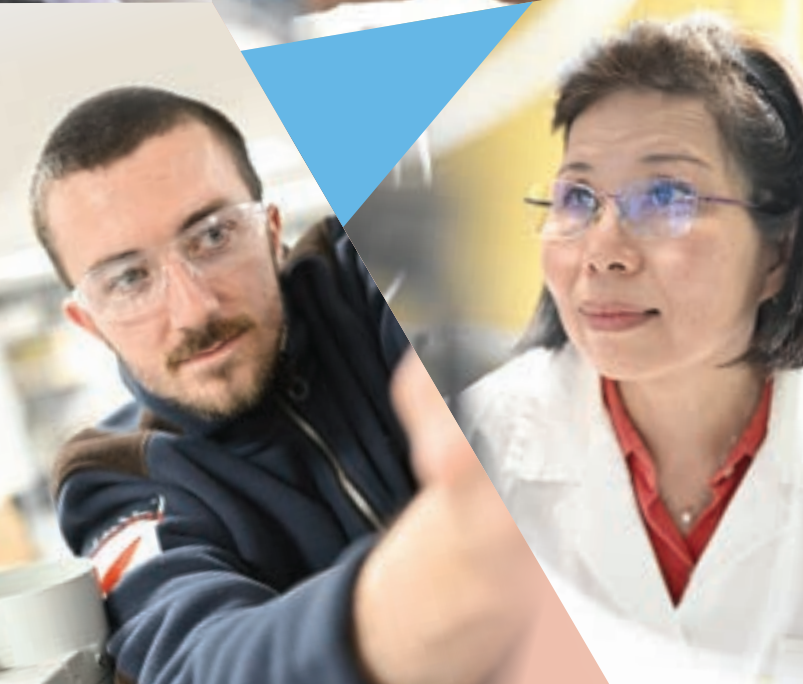
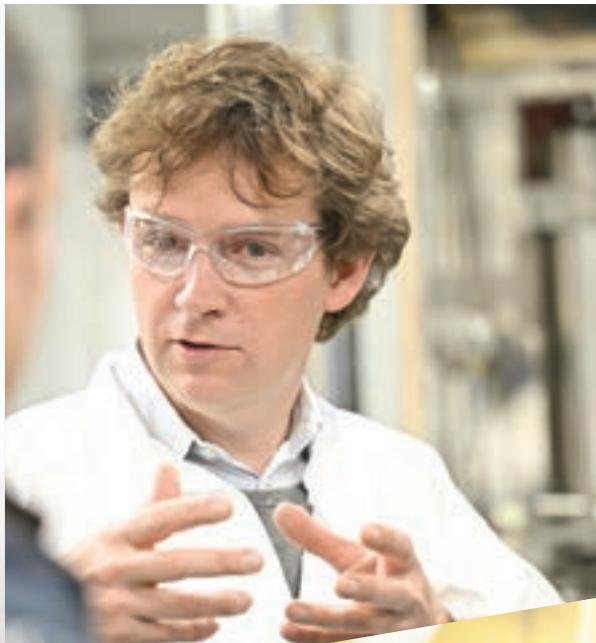
**16 PEOPLE**  
MIDDLE MANAGEMENT

**TRANSPARENT GOVERNANCE**

**BUYOUT OF THE COMPANY IN 2008 BY ITS EMPLOYEES, INCLUDING THE MANAGEMENT TEAM, HOLDING A MAJORITY STAKE SINCE THEN**

**EXTENSION OF EMPLOYEE SHAREHOLDING THANKS TO A FREE SHARE ALLOCATION PLAN FOR KEY PEOPLE**





## CSR IMPACT, CARBON, WASTE...

**Aware of the environmental impact of each of its activities, the Vinci Technologies Group is committed to reducing its overall impact on the planet. Different initiatives are implemented.**

- Our first carbon assessment is scheduled.
- We have introduced a waste management policy including rigorous selective sorting of all our materials, including chemicals.
- We keep optimizing our energy costs. We have opted for LED lighting and programmed heating in all our facilities. Vinci Technologies has also taken out green electricity contracts (ELMY).
- A supplier charter, intended to guarantee responsible purchasing, is currently being drawn up.
- Our car fleet has been renewed with hybrid vehicles.
- We have introduced a soft mobility package for our employees.

The energy transition is fully integrated into Vinci Technologies' corporate mission with the development of applications that aim to accelerate this transition.

Applications to support new issues in the energy field and positioning on the energy transition represented one third of our turnover in 2019, and two thirds in 2023. Our goal is to devote ourselves fully to this mission.



27 B, rue du Port  
92022 Nanterre (FRANCE)

[www.vinci-technologies.com](http://www.vinci-technologies.com)

