



# ACTING NOW TO DELIVER THE ECOLOGICAL TRANSITION

## Innovating for the environment

Using UHPFC (Ultra High Performance Fibre Concrete) to upgrade the Soulages holding tank in Saint-Chamond



**4%**

reduction in greenhouse gas emissions

**80%**

waste worksite materials recovered for reuse

**30%**

of the R&D budget devoted to environmental issues

➤ **Shrinking and controlling its environmental footprint is an integral part of NGE strategy alongside equally important issues, such as occupational safety, social cohesion and employee personal and professional fulfilment.**

NGE has been a signatory to the United Nations Global Compact for several years; the Group supports and applies the ten principles of the Global Compact according to four fundamental themes, which include environmental protection. Environmental performance is now integral to the roadmaps of all its entities, and the most important aspect of that performance today is to own and operate an increasingly fuel-efficient and clean machinery fleet. Other initiatives include recovering and recycling construction site waste for reuse, protecting biodiversity and using 'responsible' worksite facilities. 2021 saw practical implementation of

the three-year plan introduced by NGE to achieve the three goals of reducing greenhouse gas emissions, conserving natural resources and water, and protecting biodiversity.

### **MORE THAN ONE METRIC OF PERFORMANCE**

In today's world, environmental performance and financial performance are two sides of the same coin. This new reality is confirmed in the fact that the Group consolidated its investment capacity during the year with new bank lending and a green bond issue dependent on a series of criteria that include reductions in greenhouse gas emissions.



**26**

fixed materials recovery centres (exc. asphalt recycling)

**22**

new centres planned

**more than 450,000**

tonnes of materials recovered in 2021

**80%**

site spoil recovery rate in 2021

**FROM WASTE TO RESOURCE**

Committed to recovering materials and reusing worksite waste, NGE is investing in the development of a network of recycling centres across France. By 2021, 12 of our 13 Multi-expertise Regions had one. Some of these centres are open to other companies, making them profit centres in their own right. 2021 also saw the introduction of the REVAMA brand to raise the profile of the materials recovery business, which further expands NGE's regional presence, and strengthens its presence at every link in the value chain.

**10°C**

cooler in hot weather

**CLIMAT'ROAD: THE HEAT-REPELLENT PAINT**

→ LYON (69)

In the 7<sup>th</sup> *arrondissement* of Lyon, NGE is testing a paint coating that can lower road surface temperatures by at least 10°C in hot weather.

Baptised Climat'Road, this water-based paint contains partially hollow ceramic beads. These tiny voids mean that the beads cannot store calories, and therefore help to reduce surface temperatures. Developed as a solution for dissipating urban heat islands, Climat'Road creates an effective thermal barrier. A series of tests have already demonstrated that this paint can reduce heat transfer by 25%. The next step is full-scale commercial marketing in 2022.

**“Heat islands are usually mitigated using vegetation, and we'll never find a solution as effective as tree shade; nevertheless, paint is a potential solution for spaces where planting is impossible.”**

SONIA TURMEL,  
Head of Roadworks for the Greater Lyon metropolitan area



**PROMOTING GREEN MOBILITY WITH LOW-CARBON HYDROGENO**

→ TARN (81)

Low-carbon hydrogen is an integral part of the Group's diversification strategy. The HYDRO'TARN project, in which NGE is a stakeholder, was selected during the year as part of the 'H2 Corridor' call for projects in the Occitanie region of France. The project aims to develop a system that will facilitate the production, supply and consumption of hydrogen at departmental level. The project partners are investing a total of €19 million in two renewable hydrogen production units that will supply two distribution stations. NGE will contribute its expertise in project funding and build the green hydrogen production infrastructure. As well as being an investor in the entity that will sponsor the various project companies, the Group will also be responsible for producing green hydrogen using three electrolyzers with a total production capacity of 600 kg of H<sub>2</sub> per day.



**Thanks to its specialist water industry subsidiary and French leader in vacuum wastewater systems, NGE is developing processes that enable drinking water to be abstracted, treated, distributed and supplied, and wastewater to be collected, treated and returned to the natural environment with less impact on the environment.**

**USING WATER SYSTEMS TO GENERATE ENERGY**

**Hydroforce** transforms pumping stations into hydropower conversion plants, with the advantage that their operating range is greater than that of conventional turbines. For water system operators, this means lower electricity consumption and reduced CO<sub>2</sub> emissions. This innovative technology will be implemented in the Mexican city of San Miguel de Allende to generate green electricity from the water supply system.

**Thermowatt** applies the thermal recovery principle to use the residual heat in wastewater. The thermal energy recovered in this way is transferred via a water source heat pump. This patented solution reduces building energy bills, lowers GHG emissions and stabilises the cost of water treatment.

**“The department of Tarn has long provided fertile ground for research into green hydrogen and its future applications. At a time when European, national and regional politicians are showing increasing interest in this subject, we are positioning ourselves to bring together a group of local stakeholders to promote the development of a renewable hydrogen ecosystem integral to the European Corridor H2 project. What makes our Hydro'Tarn project particularly special is its status as an integral component of a circular economy built around local production for local application. The project is currently focused on producing fuel for Heavy Goods Vehicles (HGVs), but in the longer term, we could adapt it to fixed infrastructures.”**



CHRISTOPHE RAMOND,  
President of the Tarn Departmental Council.



► NGE will connect nearly 500 power and water distribution points in the Port Cogolin Marina

489

distribution points connected

20 - 30%

reduction in fluid consumption thanks to connected distribution points

**REDUCING CONSUMPTION FOR BOATS MOORED IN THE PORT COGOLIN MARINA**

→ COGOLIN (83)

NGE Connect designs and implements integrated telecoms networks, connected hardware and software solutions for use by operators and users. Particularly strong in the ports and marinas market, the Group provides connected solutions for the convenience of leisure sailors, port security and service management.

At the Port Cogolin Marina on the Mediterranean coast of the Var region, NGE is installing its 'R-marina' solution as part of a project that includes the connection of 489 power and water distribution points. Fluid consumption and distribution data are uploaded and managed by the R-Card telemetry unit which transmits these data in real time

via LoRa\* wireless networking technology to the R-Smart hypervisor used by the port or marina operator to monitor and manage the port remotely. This system is financially and environmentally exemplary, reduces electricity and water consumption, detects water leaks in the system, and improves understanding of leisure user consumption patterns.

**“We wanted to go down the road of remote consumption management so that every boat owner pays for the electricity and water they actually use. So we’re moving away from the ‘all-inclusive’ formula by making end users responsible for their own consumption”.**

JULIEN HARRAN, Technical Manager at Port Cogolin Marina

\* LoRA: abbreviation of 'Long Range', a technology that allows connected objects to exchange low data volumes at low bit rate.



**“Together with NGE, we took the decision to carry out tests using a specially formulated asphalt surfacing mix to provide better resistance to thermal and mechanical aggression, at the same time as extending the working life of the wearing course. This approach is fully consistent with our commitment to minimising the environmental footprint of our worksites and to making the roadbuilding industry cleaner and more sustainable”.**



JULIEN MASCIOTRA, Head of Maintenance Projects at Autoroutes et Tunnel du Mont Blanc

**RESEARCHING WAYS TO SAVE MATERIALS**

For half of its development of an HGV parking area in Bardonnex in the Savoie region on behalf of ATMB (Autoroutes et Tunnel du Mont Blanc), NGE used 600 tonnes of asphalt mix containing 40% asphalt aggregate reclaimed from old wearing courses, and an experimental binder containing regenerant additives.

The other half of the car park was surfaced using a more traditional formulation. Both areas will now be tested over the next 5 years to see how the formulation containing recycled materials performs relative to the standard solution.

For its Chambéry-Annecy-Lyon interchange project, NGE used UHPC (Ultra High Performance Fibre Concrete) to re-anchor cables, instead of using metal components. The decision in favour of UHPC was based on its fluidity and compression resistance properties. NGE also used UHPC produced on site for its project to upgrade the Soulages storage tank in Saint-Chamond.

**USING TREES FOR PROTECTION AND PRESERVING THEM BETTER**

NGE has developed an innovative rock retention system for use in forests to protect engineered structures, infrastructures and buildings against the risks of falling rocks. This new innovation received a 'low energy' award at the second Innov'DAY TP event in May 2021. The unique feature of this solution developed in conjunction with IRSTEA\* and IFSTTAR\*\* is the fact that it uses the forest trees themselves as structural elements, avoiding any need for drilled anchors and/or support posts. This new solution is also more respectful of the natural environment and biodiversity, since it limits the amount of felling required. ■

\* The French National Environmental & Agricultural Science & Technology Research Institute, which in 2020 became INRAE, the National Research Institute for Agriculture, Food and the Environment

\*\* The French Institute of Science and Technology for Transport, Development and Networks, which changed its name in 2021 to Gustave Eiffel University (UGE)



**Adapting the way we work**



**ECO-RESPONSIBLE SITE FACILITIES AND TRAILERS**

For the Cyber Place worksite in Cesson-Sévigné, where NGE is both developer and construction contractor, the Group's teams have developed a new standard for 'responsible' site facilities. The facilities at Cesson-Sévigné will be used as a pilot project which can later be duplicated on other worksites. The Savoie - Vercors - Vivarais Region has worked closely with the Plant & Machinery department and a French manufacturer of mobile site facilities to develop an eco-responsible trailer. Four of these trailers are now being tested in preparation to assess whether this concept could be extended to other worksites.

**EVERYTHING YOU NEED TO KNOW ABOUT WORKSITE PLANT, MACHINERY & VEHICLES**

14,500: that's the total number of units owned and operated by NGE in France and abroad. This fleet of cars, vans, HGVs and worksite plant and machinery is a major source of greenhouse gases, accounting for 92% of total Group Scope 1 and Scope 2 CO<sub>2</sub> emissions.

It therefore represents a very powerful lever for achieving our target to reduce our GHG emissions by 4% every year. Much of 2021 was devoted to developing an action plan designed to achieve this goal.

The programme includes accelerating the renewal of vehicles, plant and machinery, introducing a Mobility Guide to help reduce employee carbon footprints through training in eco-driving and investment in a fleet of electric vehicles, work on alternative fuels and the recruitment of an environmental engineer.

**USING DATA FOR MORE ECO-FRIENDLY MANAGEMENT OF PLANT & MACHINERY**

Initiatives implemented in 2021 included reducing machinery engine idling rates to reduce GHG emissions and fuel consumption, at the same time as extending the working life of plant and machinery.

Some NGE plant and machinery are now monitored using a system developed by startup company Hiboo. By connecting each item of plant and machinery to its network, Hiboo precisely geolocates each vehicle, and collects data that can then be used to manage the plant and machinery fleet more accurately in ways that benefit the environment. In 2021, Hiboo developed a standalone solution that can be used even for vehicles with no on-board power source. The next step is to extend conductivity to include all plant and machinery operated by the Group's rail contracting subsidiary TSO. ■

**CONNECTED PLANT, MACHINERY & VEHICLES IN 2021**

**2,460**

including 820 cars, vans and utility vehicles

**2%**

decrease in engine idling rates\* in 2021

\* periods when the engine is running even though the vehicle is stationary and non-operational



**EXTRACT FROM THE CONSOLIDATED FINANCIAL STATEMENTS AND NON-FINANCIAL INDICATORS**