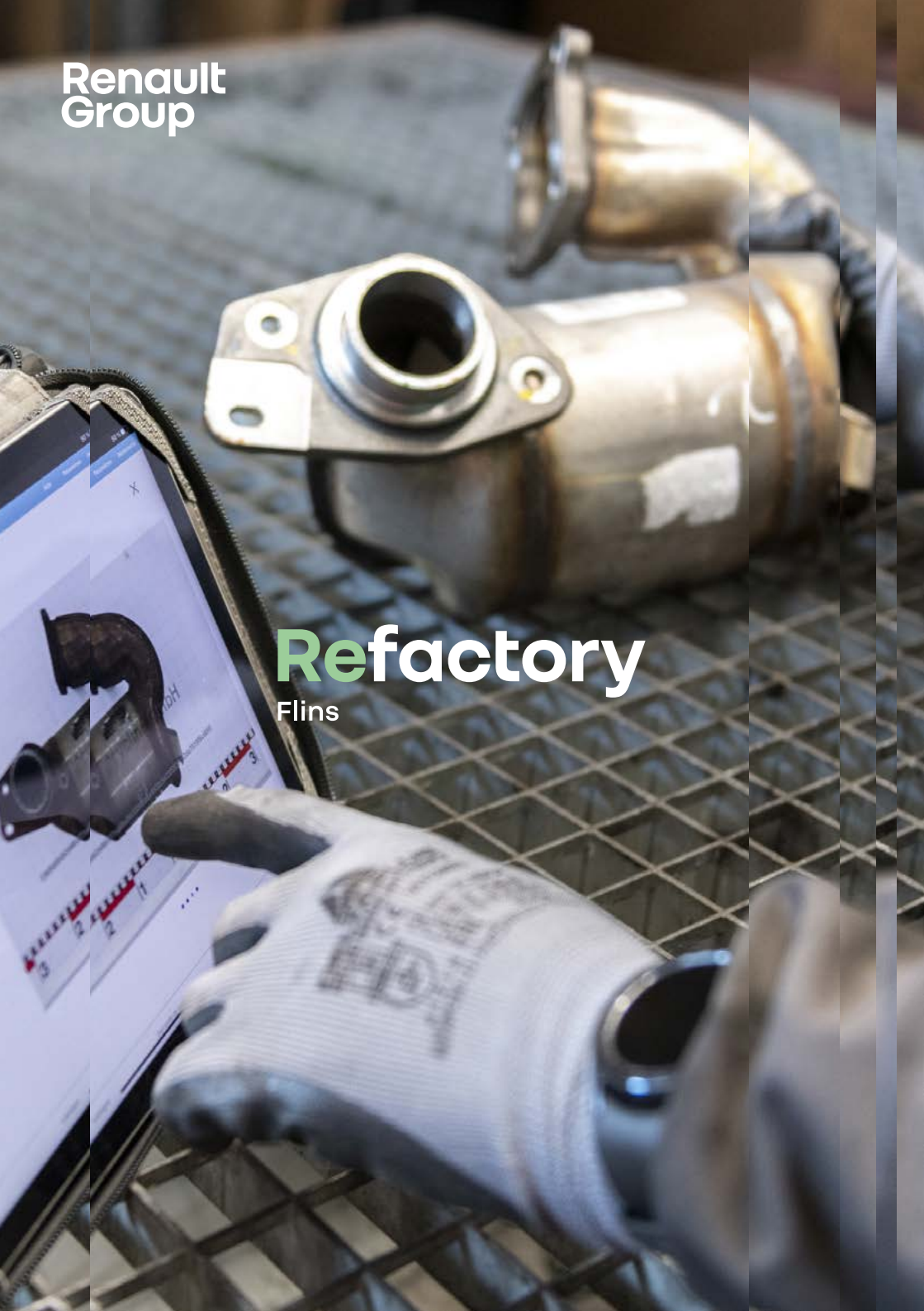
Renault Group



Refactory

Flins

The Refactory in Flins

Europe's first site focusing on the circular economy in mobility

The Refactory in Flins launched as part of the Renaulution strategic plan in 2021. By implementing a new industrial model based on the circular economy, the site is contributing to Renault Group's aim of achieving **net zero carbon emissions in Europe by 2040.** And reconverting the factory in Flins is the site's way of providing tangible answers to the challenges of the environmental transition and the transformation of businesses in the automobile sector.

A generator of value throughout the vehicle life cycle

The Refactory brings together the various industrial operations of new value chains within its ecosystem. It creates **economic, environmental and social value** throughout the entire vehicle life cycle by repairing vehicles to extend their lifespan, reusing components in closed-loop circuits after refurbishment, recycling raw materials, giving batteries a second life by using them in new ways, developing new energies, leading research into the circular economy and developing relevant skills, and more. **The Future Is NEUTRAL** entity is supporting the Refactory as it creates activities for the future of the circular economy, developing new growth drivers as a result.

The advantages of the Flins site and the strength of its ecosystem

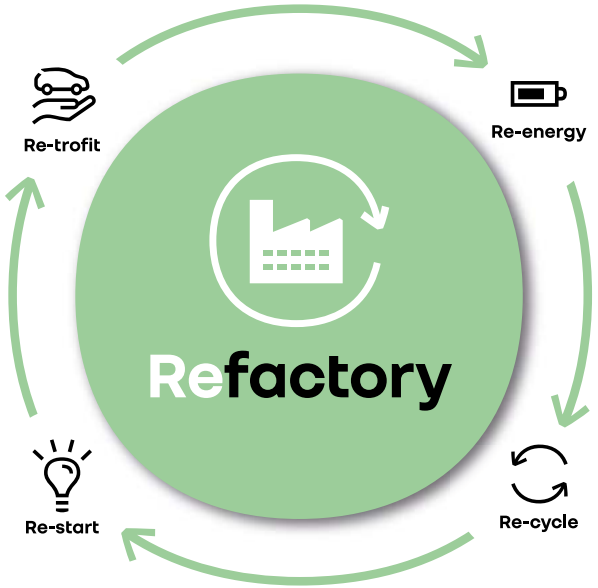
The bodywork and assembly plant in Flins was created in 1952 and went on to produce 20 different vehicles, including a number of iconic models such as the Dauphine, the Renault 4, the Renault 5 and the Clio. The site still presents a number of advantages, such as its **industrial expertise**, connections to roads and waterways, geographical proximity to Greater Paris and Normandy, and its network of suppliers.

The Refactory is gradually rolling out activities between now and 2030, and including its employees in this ambitious project through a unique **training plan** that guides them in their professional development.

The Refactory is also part of **a vast ecosystem** made up of many partners: industrial players, start ups, academic institutions, major groups, local authorities and more. The power of this ecosystem comes from the synergy of skills it offers and the effectiveness of its industrial processes, as well as the sharing of innovations and research methods, all brought together in one place.

By 2025, 2,000 people will contribute to new activities linked to the circular economy at the Flins site.

www.thefutureisneutral.com



The Refactory structures its operations around four interconnected divisions

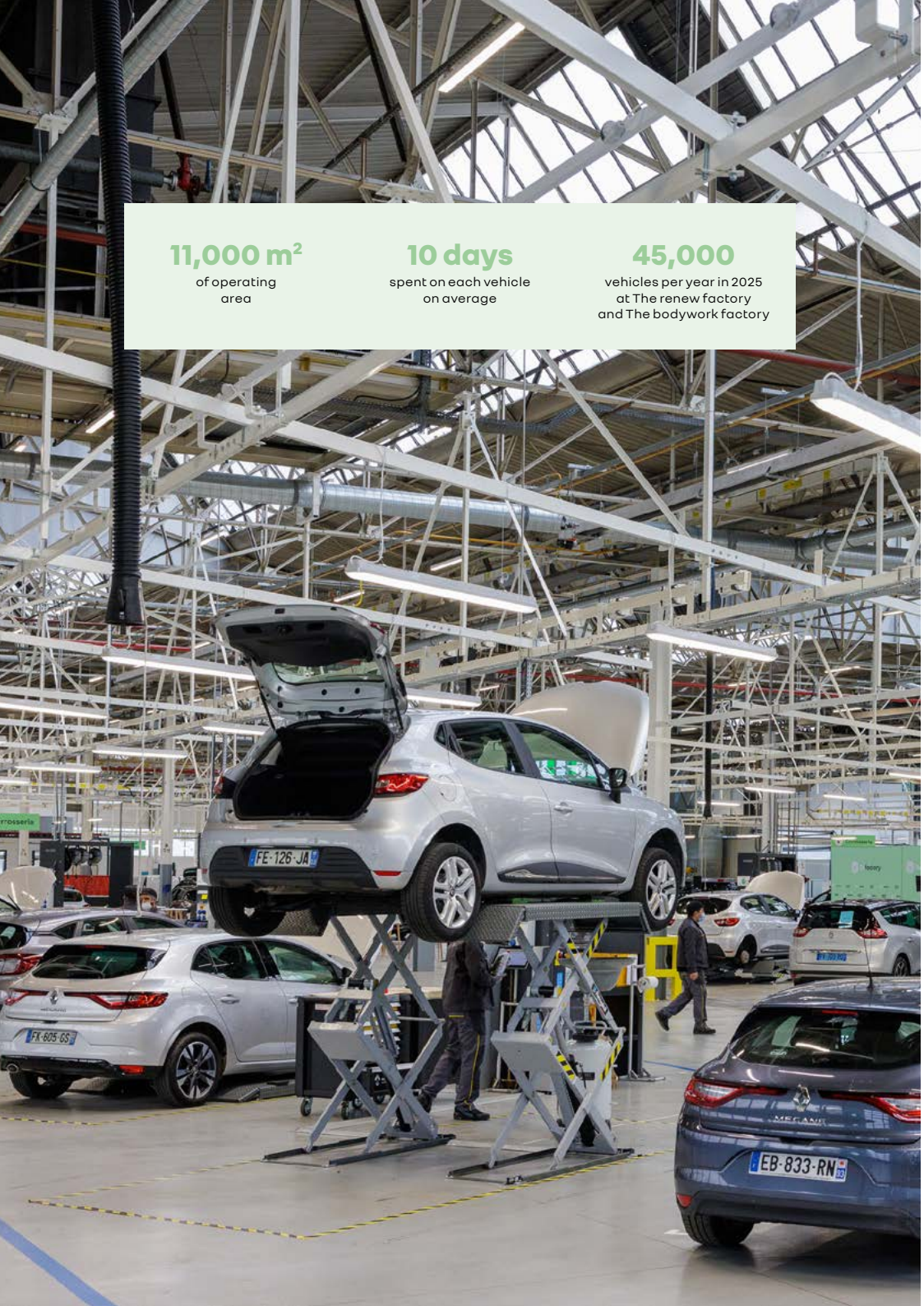
Re-trofit

Re-energy

Re-cycle

Re-start

Re-trofit



11,000 m²
of operating area

10 days
spent on each vehicle on average

45,000
vehicles per year in 2025 at The renew factory and The bodywork factory

The renew factory

To meet the growing demand for used vehicles and preserve their value over time, Renault Group has designed a unique vehicle refurbishment centre: The renew factory in Flins.

An industrial process that strives for the highest quality

Inaugurated in November 2021, **The renew factory** leverages the extreme precision of the industrial process to refurbish used vehicles of all types and all brands, mostly for the Greater Paris commercial network. It leads the way in terms of time and cost while providing the same **quality standards** found in the manufacture of new vehicles. At this **fully digital** site*, vehicles are monitored in real time at every stage, including vehicle inspection, before going on sale through the commercial network.

A player in the circular economy

The renew factory is positioned within the Refactory's circular economy and strives to carry out repairs frugally. The "smart repair" technique, for example, enables teams to rectify bodywork defects without touching up the paintwork, saving 12,000 litres of paint per year. The renew factory also benefits from **short loops** of **refurbished parts** and materials, thanks to the activities deployed in the Re-cycle division.

In 2023, The renew factory had **150 employees**. Recruited in-house at the Flins site, their skills development is ensured through a **certified training programme**.

*paper-free

The bodywork factory

In 2023 the Refactory launched The bodywork factory, an end-to-end refurbishment service that gives heavily damaged vehicles from commercial fleets a second life. This service enables fleet managers to benefit from both industrial standard repairs and a range of all-in-one services.

A standardised industrial process

Each damaged vehicle going in for repairs undergoes **a standardised process that is inspired by manufacturing**. After an initial diagnosis, the vehicle undergoes part or all of the process, depending on its condition: mechanical repair, bodywork, paintwork, reassembly, finish, ADAS* adjustment, then wheel alignment, quality control, cosmetic repairs and photos before dispatch. At each stage, teams apply their **high level of specialised knowledge**, supported by **latest-generation facilities**. Quality is assessed at every operation and the vehicle's full journey is monitored in real time using a digital geolocation system.

A balance between economy and ecology

This standardised process enables the teams to **optimise the cost of repairs** and **use parts that have been refurbished** at the workshop (such as bodywork and, from 2024, rims) as well as Standard Exchange parts refurbished at the Remanufacturing workshop and used parts from the GAIA subsidiary. The workshop also strives to **reduce its environmental impact** by carefully controlling energy consumption and recycling the heat produced by its spray booths. What's more, CO2 emissions are measured and relayed to the client.

An all-in-one service

Insurers of damaged vehicles can directly request repairs from the Refactory. An **independent expert** is present on site, facilitating all of the steps where they intervene; they can recommend the use or reuse of Standard Exchange parts. Lastly, a **technical control unit** is also in operation locally to complete the process.

*Advanced Driver Assistance Systems

100 %
staffed by employees from the Flins site undergoing conversion

12,000 m²
of workshop

45,000
vehicles per year in 2025 at The renew factory and The bodywork factory

LCV Retrofit

Converting combustion-powered light commercial vehicles to electric helps to reduce greenhouse gas emissions and enables various professionals – company employees, tradespeople, delivery drivers, etc. – to continue to access low emission zones (LEZ), which are gradually imposing greater restrictions. According to the French Agency for Ecological Transition (ADEME), Europe already had 315 of these zones in 2022. Retrofits are cheaper and consume fewer resources and less energy than buying new low-emission vehicles.

A new partnership with the TOLV start-up

In 2022, Renault Group and TOLV formed a co innovation partnership with the aim of providing a **fully electric retrofit kit** for the Renault Master*. The aim of this new collaboration between **a start-up and a vehicle manufacturer** is to offer an innovative solution for clients. Sold by TOLV, this retrofit kit is made and assembled by Renault Group at the Refactory in Flins, which provides its industrial capacity and electric vehicle expertise.

An activity at industrial scale

This new activity is being rolled out at the Refactory at an industrial scale in early 2024 with a view to enabling the first transformations of the Master – all from the French market.

*Master 3 produced before 2019

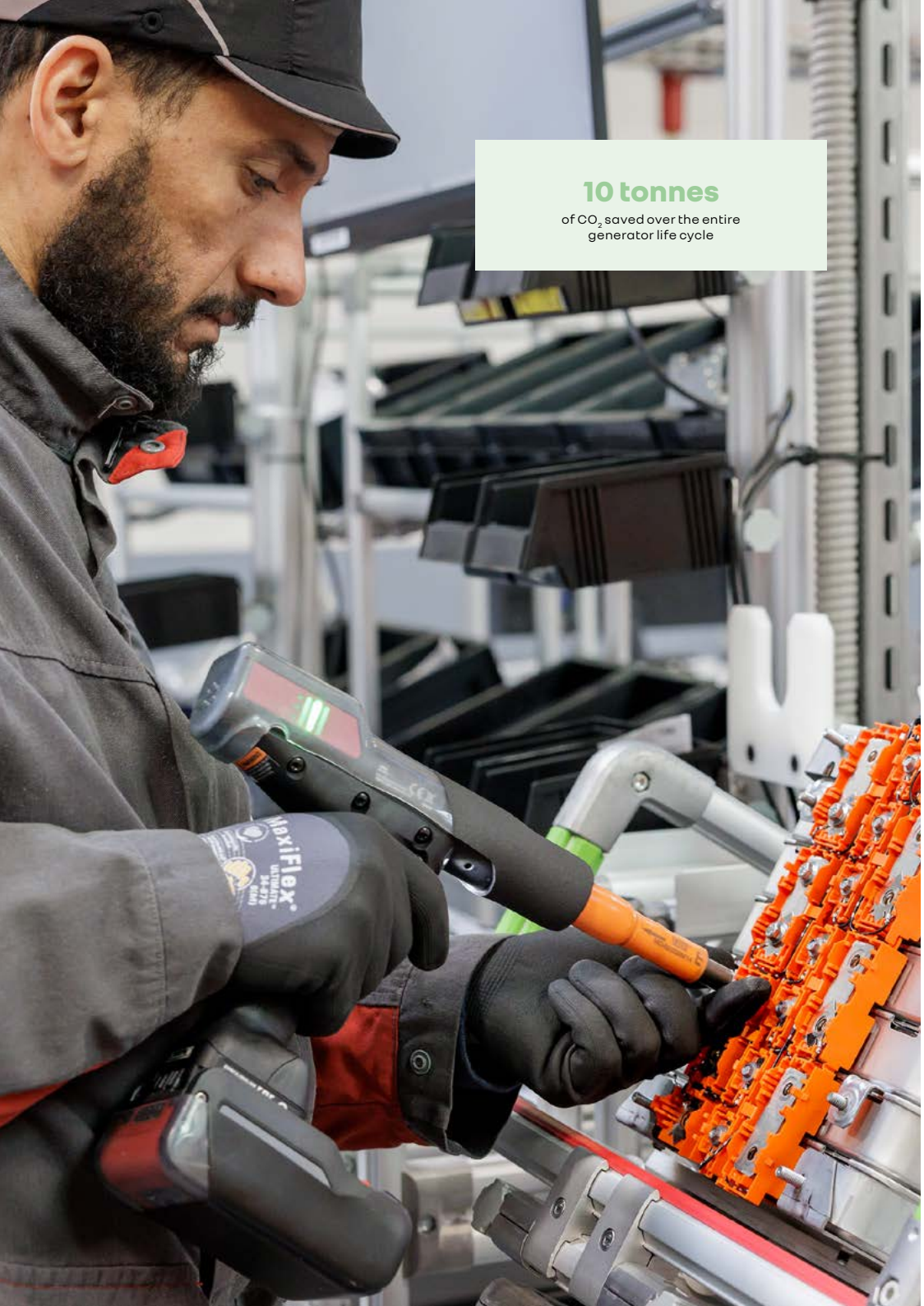
Renault Group TOLV partnership

315 LEZ
(low-emission zones)
in Europe in 2022

www.tolv-systems.com

TOLV

Re-energy



10 tonnes

of CO_2 saved over the entire generator life cycle

A second life for batteries: betteries' betterPack

Intelligent reuse of electric vehicle batteries

With the help of **Mobilize**, the **betteries** startup is developing the **z**, a generator entirely based on reusing electric vehicle batteries. This innovation replaces typical generators using an internal combustion engine with a fully electric version. The betterGen therefore provides green energy in areas that are not covered by the electricity grid, or in the event of power cuts. They can be used for various purposes – from providing an emergency energy supply to helping the film and photography industries to reduce their CO2 emissions.

A startup integrated into the Refactory

The betterPack used at the heart of these generators is assembled at the Refactory on a flexible manufacturing line located in the Expert Centre for Battery Repair in Flins (CERBF). When a battery no longer has sufficient capacity to be used in a vehicle, it is dismantled and its modules are reused to make betterPacks. By giving batteries a second life, Mobilize and betteries are supporting the circular economy and reducing the carbon footprint of batteries.

"I founded betteries in 2018 with the aim of truly 'upcycling' electric vehicle batteries – that is, reusing them in a different situation – to combat climate change and contribute to the protection of natural resources."

Rainer Hönig
CEO and founder of betteries

The end of polluting generators with Mobilize and betteries

www.betteries.com

betteries

3 sites
in Europe - Flins, Douai and Ervelingen

15 MWh
of storage capacity installed

A second life for batteries: stationary energy storage

A relay for green energy

At a time when fossil fuels still account for 80% of global energy production,* the fight against CO2 emissions requires the development of renewable energies. But solar, wind and marine energies are produced intermittently, depending on local conditions. That's why Renault Group launched the Advanced Battery Storage (ABS) system in 2018, a large-scale stationary electricity storage solution, to compensate for the intermittency of these energies. It is a battery bank that can store up to 15 MWh of energy, which the network operator can then inject into the electricity grid when demand is very high. One of the three facilities in Europe that make up this system is located at the Refactory in Flins.

Extended use for batteries

The Advanced Battery Storage system was initiated with new batteries, but will also integrate electric vehicle batteries after 10 to 15 years of use, when their load capacity will be too reduced for automotive propulsion. This new use will extend the lifespan of these batteries by another 5 to 10 years. With this extended life cycle, batteries are the **perfect partner for green energy**.

*Source: the International Energy Agency, 2021

My battery trusted partner of the energy transition

Stationary storage batteries at the service of renewable energies

Hydrogen mobility solutions

HYVIA has been a pioneer in hydrogen mobility since it was set up in 2021, harnessing Renault Group's expertise in automobiles and Plug's know-how in hydrogen to offer a unique and comprehensive ecosystem focused on hydrogen-powered mobility and the achievement of transport decarbonisation objectives.

A complete hydrogen ecosystem for professionals

HYVIA has deployed a comprehensive hydrogen ecosystem for light utility vehicles to meet the needs of professionals and their intense mobility usage. Focusing on the Renault Master Van H2-TECH, this ecosystem provides low-carbon hydrogen recharging solutions, along with maintenance and financing offers for professionals.

The Refactory at the heart of the process

This industrial adventure begins at the Refactory site. Inaugurated in 2022, the plant began with the assembly of fuel cells to equip its vehicles. An electrolyser was then installed in April 2023, producing enough green hydrogen for the site to test its fuel cells and charging stations.

"In March 2022, nine months after HYVIA was set up, it inaugurated its own plant within the Refactory – Renault Group's plant focusing on the circular economy. [...] One year later, HYVIA installed its first electrolyser for green hydrogen production. This industrial momentum once more demonstrates the power of the hydrogen ecosystem offered by HYVIA. It was a major challenge in industrial, technological and human terms, but we rose to it thanks to the strength of our collaboration with Plug and Renault Group."

Olivier Cormier
VP Manufacturing and Supply Chain at HYVIA

HYVIA - Fueling the future with hydrogen

Renault Master Van H_2-TECH Overview

www.hyvia.eu

HYVIA leading green H_2 mobility

3,000 m²
of operating area

1,000
fuel cells assembled per year (current industrial capacity)

30 kW
of power in fuel cells manufactured by HYVIA

450
components and flows into fuel cells

1 MW
of power in the electrolyser installed in April 2023


Re-cycle

Remanufacturing parts

Refurbished mechanical and mechatronic parts

From combustion engines and electric engine components to mechanical gearboxes, turbochargers, R-Link embedded systems and more, no less than nine families of parts, both mechanical and mechatronic, are refurbished in the workshops of the Re-cycle division at the Refactory. This activity is central to the circular economy, as it enables teams to recover components when vehicles from the commercial network are being repaired. These components are then refurbished through an industrial process and are all made available to the commercial network once more by way of the after-sales department.

It's a win-win – not only for the environment, as it **extends the lifespan of these parts**, but also for customers, who benefit from like-new quality for less, with costs coming in at 40% less on average.

Historic Group expertise

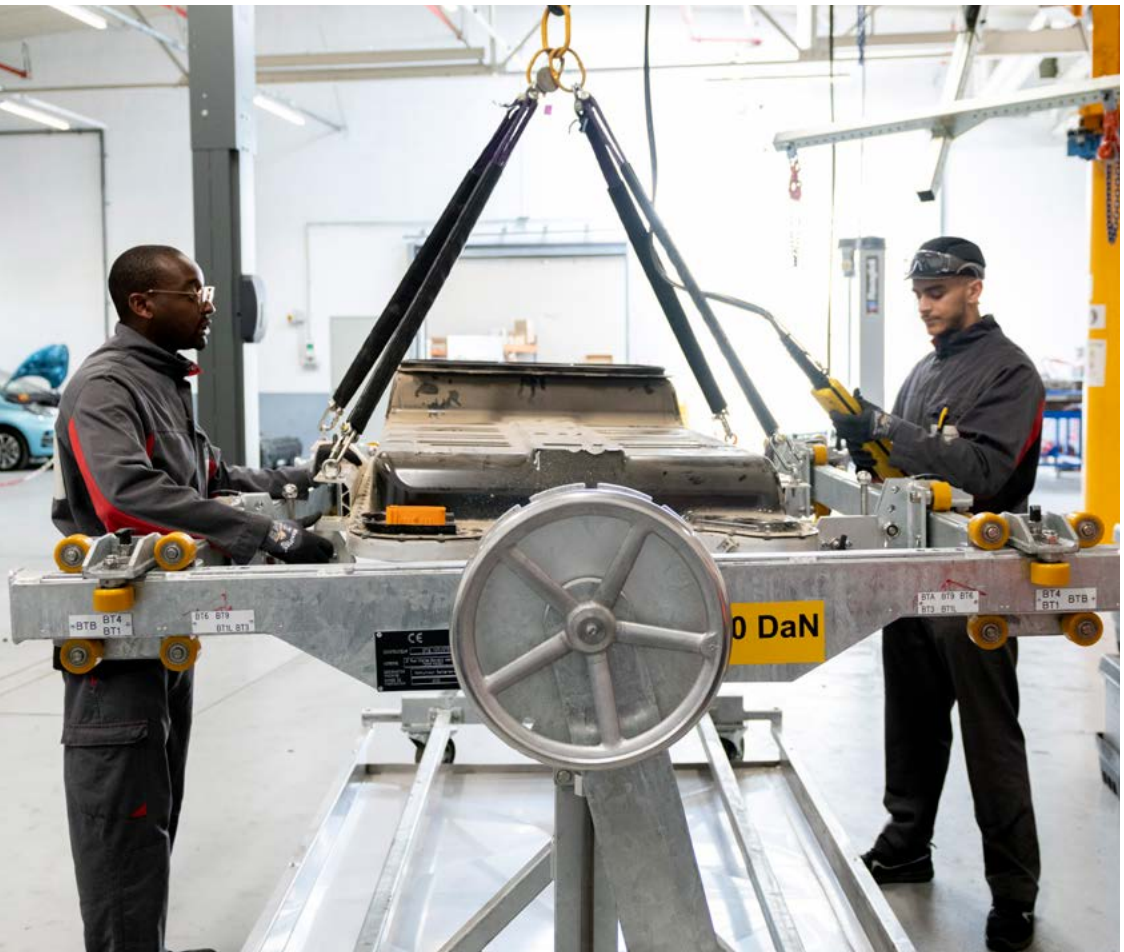
Remanufacturing parts is driven by the uniquely extensive expertise of the plant in Choisy-le-Roi, which had specialised in Standard Exchange since 1949. The plant's facilities joined the Refactory in Flins in late 2021. Teams from Choisy-le-Roi and Flins are therefore now making a full contribution to the Refactory's **circular economy activities**.

N°1
supplier in the Group's after-sales division in Europe

85 %
energy and 96% water saved compared to manufacture of new parts

92 %
of collected material is used to extend the lifespan of another mechanical part

20 %
of material is recycled at foundries, external to the Group



Reuse, recycling and repair

Reusing parts

GAIA, a wholly-owned Renault Group subsidiary, recovers automotive parts from dismantled vehicles at approved end-of-life Centres, as well as end-of-series parts from the Group's spare parts stores and factories. Once collected, sorted and repackaged at the Refactory in Flins, the parts are sold for export to wholesalers in the sector. **By extending the service life of these parts**, this business enables repairs at a reduced cost but while guaranteeing quality. All operations are recorded to ensure complete traceability throughout the process.

Recycling materials

GAIA also uses these recovered parts to **recycle materials**. Parts are shipped from the Refactory in Flins to specialised recyclers, who extract material that is then directly reused at the Group's industrial sites. There are three main materials that are recycled currently:

- Polypropylene, particularly in shields
- Copper, which is reused in foundry operations
- Precious metals (platinum, palladium and rhodium), which are found in catalytic converters

Repairing batteries

GAIA operates the **CERBF** at the Refactory in Flins. Set up in 2011, it leverages teams' substantial capabilities to ensure batteries can be used in vehicles for as long as possible. **The centre repairs batteries** for our entire hybrid and electric range. Teams work for both individual and fleet-manager customers, collaborating closely with engineers. When a battery's capacity is no longer compatible with automobile use, GAIA teams prepare it for other uses in its second life, such as energy storage.

9,000
parts for reuse or recycling

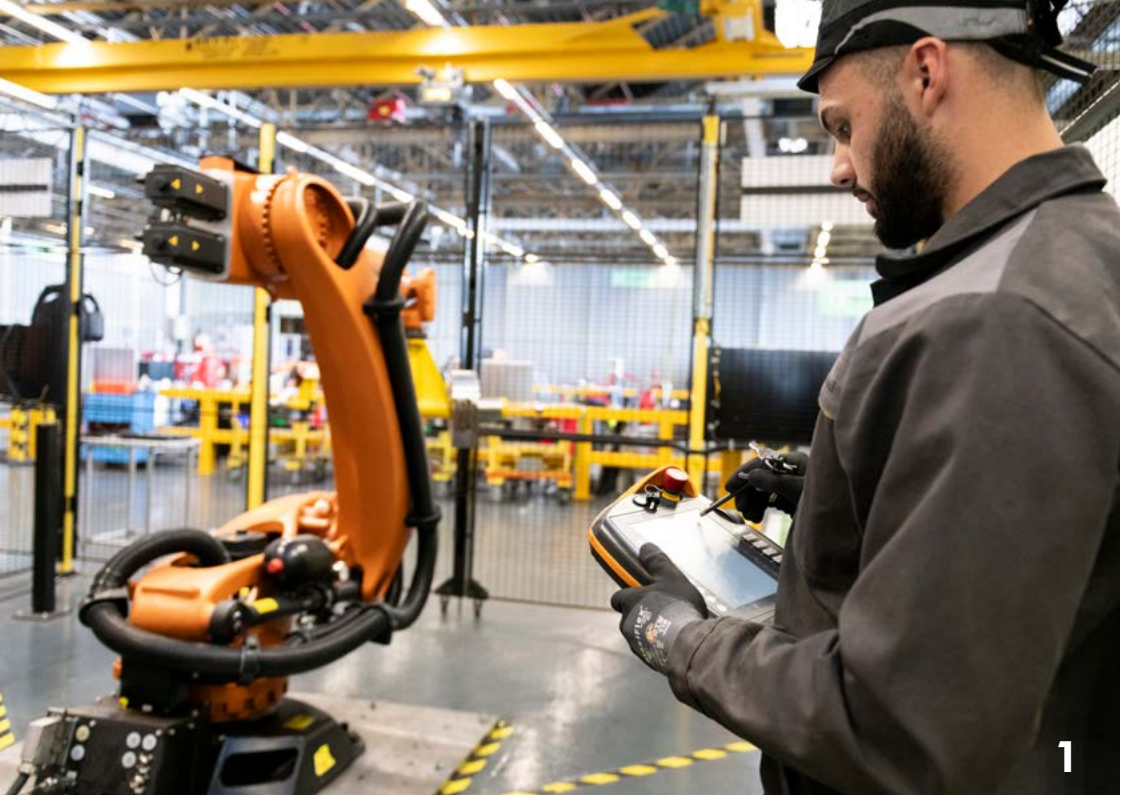
10-20 kg
of copper recovered from each end-of-life vehicle

20,000
batteries set to be repaired per year from 2030

www.gaiaautorecycling.com

GAIA
ÉCO RECYCLAGE AUTOMOBILE


Re-start



1

2

Industry Innovation Centre

1. The Retrofit Centre to retrofit production resources

This activity began in 2021, with the aim of making the Refactory the Group's benchmark for renovating production resources by harnessing teams' skills in robotics, mechanics and electromechanics. More than 250 robots have already been refurbished to work on new projects, with another 20 made ready every month. The activity is now expected to be rolled out to other industrial facilities to provide effective resources at a very competitive cost.

2. The Process innovation Centre

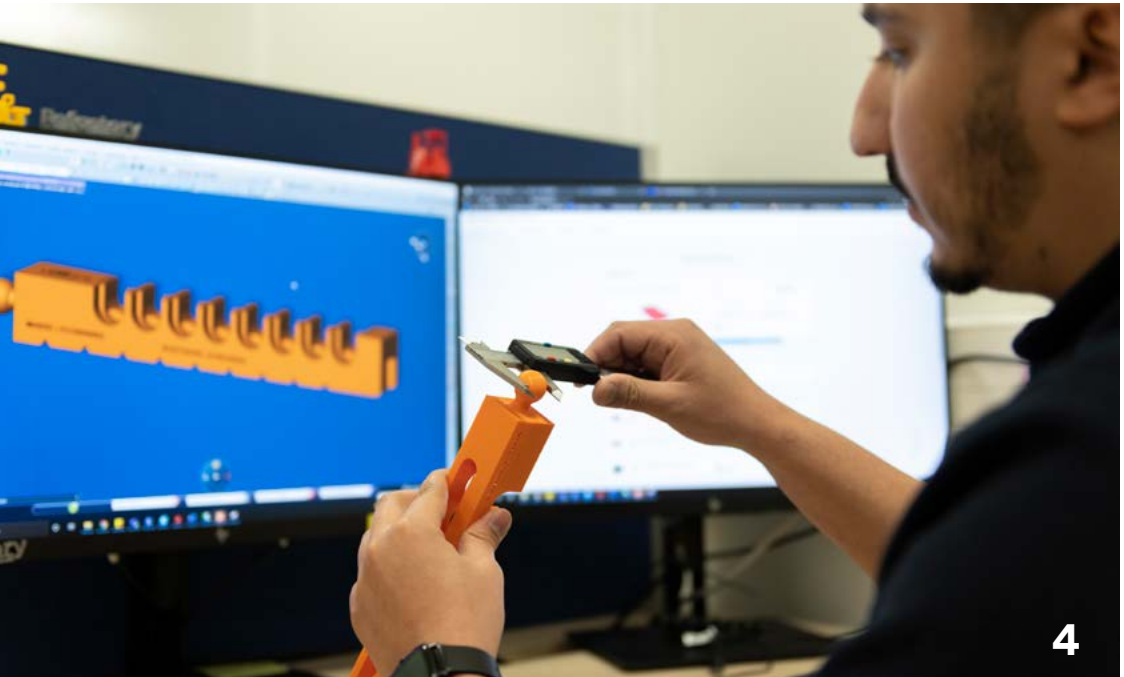
The centre enables production engineering to develop its future technological building blocks. These facilities reproduce real-life factory conditions to work on optimising production resources and developing new innovative solutions in close collaboration with the Industrial System, Industry 4.0 and Vehicle and Powertrain Processes businesses.

64,000
3D-printed parts
in 2023

120
robots refurbished
in 2023

652
machines monitored
by the Control Tower in 2023

3



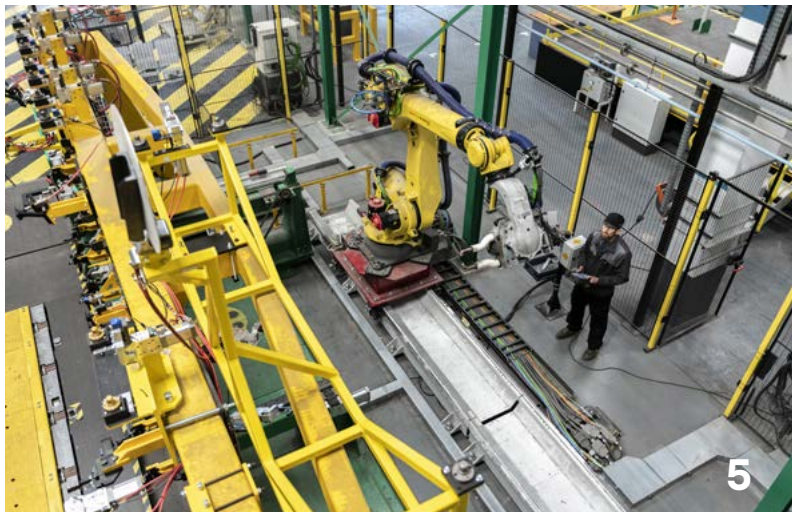
4

3. The Industrial Control Tower

Installed in Flins in 2021, the Industrial Control Tower monitors the health of more than 600 machines in operation in the group's plants around the world. With the support of the Automation and Maintenance department, it now monitors data from stamping presses and machining centres, and in the future will be extended to other types of machines such as robots and filling processes. Sensors collect the data, which is then analysed for any discrepancies. If an anomaly is detected, the site is alerted and action is taken in order to avoid any failures that would have an impact on operations at our sites. It also monitors data collection, as part of 4.0 Industry Data Management Program.

4. The 3D printing Centre

This centre produces prototype parts for new vehicle models and spare parts for machinery, as well as consumer parts and accessories for new vehicles. To do so, the team use **design and printing** facilities with a fleet of 16 machines that implement fused filament fabrication and powder bed fusion technologies. In 2022, 78,000 parts were produced in this workshop – i.e., a total 1.1 million cm^3 of 3D-printed material.



5

5 The Utility vehicle Prototype production Centre

This is where the body in white of all the first utility vehicles under construction is assembled, using robotised processes. Once assembled, these car body frames are used for rolling tests and verifying checkpoints upstream in projects. The Engineering team manages the product and process development, while the Quality team ensures the compliance of assembly, Logistics supplies parts and delivers frames, and Manufacturing carries out assembly and metalwork.

6,000 m²
dedicated to training and research

4,000
people trained by 2025

20
academic and industrial partners

Campus partners

- Ministère de l'économie, des finances et de la relance,
- Ministère de l'éducation nationale, de la jeunesse et des sports,
- Ministère de l'enseignement supérieur, de la recherche et de l'innovation,
- Ministère du travail, de l'emploi et de l'insertion,
- Région Ile-de-France,
- Académie de Créteil,
- Académie de Versailles,
- Académie de Paris,
- Université Paris-Saclay,
- Université de Versailles, Saint-Quentin-en-Yvelines,
- HEC,
- Grand Paris Seine & Oise,
- Seinergy Lab,
- Next Move,
- Plateforme automobile (PFA),
- Dassault Systèmes,
- EDF,
- Enedis,
- SGS,
- Valeo

The Mobility Circular Industry Campus (CIM)

In response to the challenges of climate change, Renault Group is reinventing a more sustainable mobility – and **developing new skills across the entire value chain is key** to rising to those challenges. The Mobility Circular Industry Campus (CIM) at the Refactory in Flins strives to do so.

Training for everyone

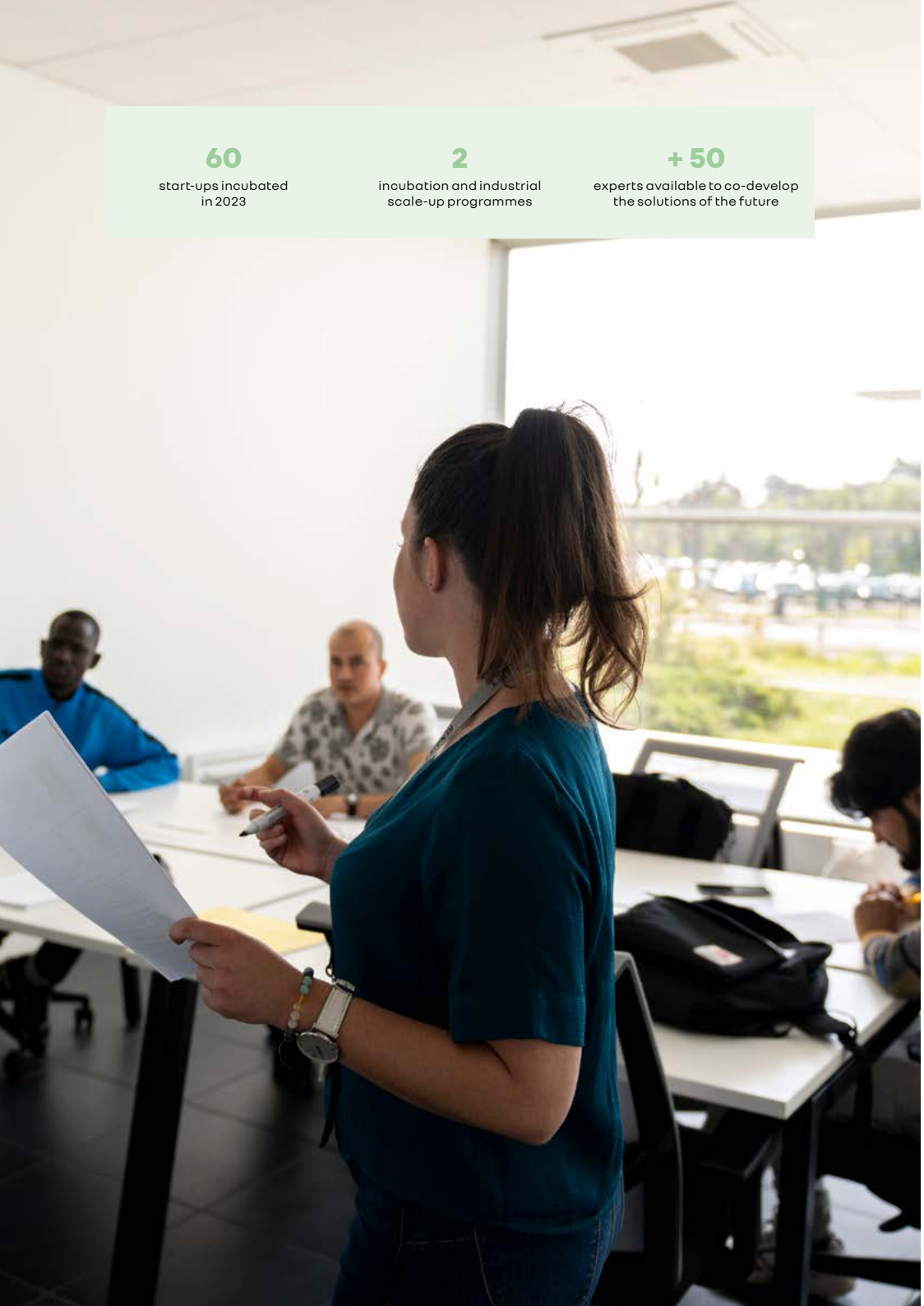
As an integral part of **ReKnow University**, the CIM offers **circular economy training modules** that are open to everyone, with the aim of:

- bringing young people on board right from their initial training, from secondary level through to higher degrees;
- preparing employees undergoing retraining for new careers through continuous professional development; and
- expanding the training network by preparing new trainers and teachers.

A campus that's open to everyone involved in the circular economy

By bringing together academic, institutional and industrial partners, the CIM has created shared and transformative momentum. It offers circular economy-related training for professionals, students and researchers alike that is highly focused on and relevant to industrial operations.

The CIM takes an inclusive approach to education that is based on new tools, of which the **Global Training Centre** is a core part. It provides classrooms and industrial resources in a building spanning almost 6,000 m².



60
start-ups incubated in 2023

2
incubation and industrial scale-up programmes

+ 50
experts available to co-develop the solutions of the future

The Open Innovation Hub

Exploring avenues for innovation and bringing forward new solutions to limit mobility's environmental impact, encouraging the creation of new businesses that implement fresh ideas, and supporting industrial development to help companies grow; the Refactory's Open Innovation Hub fully contributes to these objectives by welcoming start-ups with projects to its incubator. Fledgling companies in recycling, retrofit, energy, mobility and the industry of the future are given guidance as part of a structured process.

Welcoming start-ups and growing companies at the heart of our industrial facility

Two activities have been launched: an incubation programme to develop projects linked to the circular economy, and a project to scale up products for new companies that have already developed solutions. Thanks to its location at the Refactory site, the Hub enables start-ups to benefit from Renault Group's business-specific expertise in relation to the circular economy, as well as its industrial savoir-faire, with bespoke guidance. This twofold expertise makes the Hub a unique centre for innovation, with a specific space for scaling up startups located at the heart of the site.

Certain start-ups have already brought their projects to life at the Refactory, such as Betteries, which reuses batteries from electric vehicles in power generators. Another example is Virvolt, which offers electric bike conversion kits, with other projects set to follow.

The Hub is an open ecosystem that enjoys the support of the Greater Paris Region and is part of a network of local incubators and accelerators, as well as the national network of incubators Greentech, which was launched by the French Ministry of Ecological Transition. These networks aim to foster connections between the incubators, stimulate synergies, and step up the environmental transition.

www.greentechinnovation.fr

Région îledeFrance

RÉSEAU NATIONAL DES INCUBATEURS GREENTECH

Printed on uncoated, naturally white paper produced from 100% recycled fibres.

Does not contain optical brighteners, chlorine or chlorine compounds.

FSC-certified paper, an independent certification system that guarantees that forests are managed in a responsible and sustainable manner.

Photo credits:

The Renew factory, Advanced Battery Storage, Open Innovation Hub (insert) : Olivier Martin-Gambier

Hydrogen mobility solutions: MC Productions, Pagécran

3D printing: Elephant at work

All other photos: Marianne Lavarde

Graphic design: chump.fr

December 2023

renaultgroup.com