Refactory of Flins

First European site dedicated to the circular economy of mobility

By creating the Refactory in Flins (near Paris, France) Renault Group is deploying a new industrial model based on the circular economy for more sustainable mobility. In this way, the Group anchors at the heart of its operations the commitment made as part of its sustainable development strategy, to preserve resources and achieve carbon neutrality by 2040 in Europe.

At its scale, the Flins plant conversion project provides concrete answers to the challenges of the ecological transition, the transformation of the automotive sector’s professions, and the new uses around electric mobility. The Refactory project is emblematic of the Renaultution, the Group’s transformation plan, which aims to conquer new growth relays on the automotive value chain and beyond.

Generating value throughout the life cycle

Repair to extend the life of vehicles, reuse parts in short loops or closed through their renovation, ensure the recycling of raw materials, use second-life batteries for new uses, develop new energies, animate research around the circular economy and develop related skills, etc. Throughout the life of the vehicle, as an object of mobility, materials or uses, the Refactory deploys new industrial activities, with strong potential for economic, but also environmental and social value creation.

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

Created in 1952, the body and assembly plant has produced over its history 20 models of vehicles including several become iconic such as Dauphine, Renault 4, Renault 5, Clio. Today, the site retains its many assets, in particular: its industrial skills, its large surface area, its road and river connections, its proximity to the Île-de-France and Normandy regions and its network of suppliers.

The Refactory, whose activities are gradually deployed by 2030, also relies on a large ecosystem, open to many partners (start-ups, academic partners, large groups, local authorities...) The strength of this ecosystem lies in the synergy of skills, the efficiency of industrial processes, as well as the sharing of innovation and research resources in one place. By 2030, 3,000 people will contribute to new circular economy activities at the Flins site.

First anniversary of the Flins Refactory
Refactory organizes its activity around four interconnected poles:

- **Re-trofit**: Factory VO
- **Re-energy**: 2nd life of the battery, betteries’ betterPack
- **Re-cyce**: 2nd life of the battery, stationary energy storage, Hydrogen mobility solutions
- **Re-start**: Remanufacturing of parts, Reuse, recycling and repair

**Re-trofit**
Factory VO

**Re-energy**
2nd life of the battery, betteries’ betterPack
2nd life of the battery, stationary energy storage
Hydrogen mobility solutions

**Re-cycle**
Remanufacturing of parts
Reuse, recycling and repair

**Re-start**
Industry Innovation Centre
Mobility Circular Industry Campus
Open Innovation Hub
Re-trofit
To meet the growing demand for used vehicles and preserve the value of the product over time, Renault Group has designed a unique vehicle refurbishment centre: the Factory VO* in Flins.

**An industrial process at the service of quality**

Inaugurated in November 2021, the Factory VO puts all the rigour of the industrial process at the service of the reconditioning of used vehicles of all types and all brands, for the commercial network of Île-de-France. It is at the best level in terms of time and cost and in the same quality standards as for the manufacture of new vehicles. On this 100% digitized site, vehicles are monitored in real time at all stages, including the vehicle inspection, before being put on sale by the commercial network.

**A player in the circular economy**

At the heart of the Refactory’s circular economy, the Factory VO strives to remain frugal in repair. In paint, the «smart repair» allows for example to work on body defects without retouching the paint, thus saving 12,000 liters of paint per year. Factory VO also benefits from short loops of renovated parts and materials, thanks to the activities deployed in the Re-cycle division.

In 2022, 200 employees will be working at the Factory VO. Recruited in-house at the Flins site, their skills development is ensured through a certified training program.

*VO: Véhicules d’Occasion = Used vehicles*
Re-energy
2nd life of the battery, betteries’ betterPack

Intelligent reuse of electric vehicle batteries
With the help of Mobilize, the betteries startup is developing the betterGen, a generator based entirely on the reuse of electric vehicle batteries. This innovation replaces the classic heat-engine generator with a 100% electric version. The betterGen provides green energy in places not covered by the electricity grid, or to remedy power outages. The uses are multiple, from the food truck to the yard, from the music festival to the pleasure boat.

A startup integrated into the Refactory
At the heart of the generator, the betterPack is assembled at the Refactory on a flexible manufacturing line located in the Expert Center for Battery Repair in Flins (GERBF). When a battery no longer has sufficient capacity for automotive use, it is dismantled and its modules are reused for the manufacture of betterPacks. By giving batteries a “second life” Mobilize and betteries support the circular economy and reduce the carbon footprint of batteries.

“I founded betteries in 2018 with the desire to truly ‘upcycle’ electric vehicle batteries – that is, to reuse them in a different situation – to combat climate change and contribute to the protection of natural resources”

Rainer Höning
betteries CEO

The end of polluting generators with Mobilize and betteries

www.betteries.com
2nd life of the battery, 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. Depending on the presence of the sun, wind or current, these energies are produced intermittently. In 2018, Renault Group launched Advanced Battery Storage (ABS), a large-scale stationary storage solution for electricity, to compensate for the intermittency of these energies. The Refactory in Flins hosts one of these three facilities in Europe.

Extended use for batteries
Initialized with new batteries, the Advanced Battery Storage will integrate electric vehicle batteries after 10 to 15 years of use, when their load capacity will be too small to be used for automotive propulsion. This new use will extend the life of the battery from 5 to 10 years. While extending its life cycle, the battery becomes the best ally of green energies.

*source: International Energy Agency, 2021

3 sites in Europe
3 sites in Flins, Douai and Ervelingen

15 MWh of storage capacity
15 MWh of storage capacity planned in Flins

My Battery:
Trusted partner of the energy transition

Stationary storage:
batteries at the service of renewable energies

Re-trofit
Re-cycle
Re-energy
Re-start

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Hydrogen mobility solutions

To meet the challenge of the ecological and energy transition and provide a zero-emission mobility solution, the development of hydrogen mobility is complementary to that of electric mobility.

A hydrogen offer for professionals

Through their joint venture HYVIA, launched in June 2021, the Renault Group and Plug Power partners are pooling their knowledge of the automotive and hydrogen sectors to offer a complete mobility offer for professionals. From commercial vehicles running on hydrogen to charging stations and related services, HYVIA aims to provide the entire hydrogen ecosystem on a turnkey basis.

Three versions of Master H₂-Tech (Chassis Cabin, City Bus and Van) will be equipped with hydrogen propulsion. Vehicles that will be able to access urban centres even under traffic restrictions to limit emissions.

A complete ecosystem

This industrial adventure begins at the Refactory site in Flins. Inaugurated on March 15, 2022, the plant began assembling fuel cells. By the end of 2022, the plant will also assemble hydrogen charging stations and an on-site electrolyser will produce the hydrogen needed to test fuel cells and charging stations.

HYVIA will thus offer a complete ecosystem based on green hydrogen.

“Since its creation on June 3, 2021, HYVIA is moving fast. Our plant represents a major human, technological and industrial challenge. It is a fantastic illustration of our unique joint venture: we join the expertise of Renault Group, a major player in the automotive industry, and Plug Power, a world leader in turnkey hydrogen and fuel cell solutions.”

David Holderbach
CEO HYVIA

www.hyvia.eu
Re-cycle
Remanufacturing of parts

Renovated mechanical and mechatronic parts

Thermal engines and components of electric engines, mechanical gearboxes, turbos or R-Link embedded systems. No less than 9 families of parts, mechanical and mechatronics, are renovated in the workshops of the Re-cycle pole of the Refactory. This activity is at the heart of the circular economy, since it allows to collect in the commercial network the organs removed during repairs, to renovate them through an industrial process. All these organs once renovated are made available to the commercial network by the after-sales division. Unused materials are recycled through specific channels.

A cycle that wins for the environment, thanks to an extended lifetime of parts, and wins for the customer, who benefits from a quality level equal to new, for a reduced cost of 40% on average.

Historical expertise in the Group

Remanufacturing of parts benefits from the unique experience of the Choisy-le-Roi plant, which has specialized in standard exchange since 1949. A major player in the circular economy, its facilities joined the Refactory in Flins at the end of 2021. The teams from Choisy-le-Roi and Flins are now making their full contribution to the circular economy activities of the Refactory.
Reuse, recycling and repair

The reuse of parts
GAIA values automotive parts from dismantled vehicles in the approved End-of-Life Centres, as well as end-of-production 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 the parts, this activity makes possible a repair at a reduced cost, of guaranteed quality. All operations are recorded to ensure complete traceability of the circuit.

Recycling of materials
From these collected pieces, GAIA also organizes the recycling of materials. From the Refactory in Flins, parts are shipped to specialized recyclers. They extract the material which is then reused directly in the Group’s industrial sites. Three materials are now mainly recycled:
- polypropylene, particularly in shields
- copper, reused in foundry operations
- precious metals (platinum, palladium, rhodium) contained in catalysts

Repair of batteries
GAIA operates the Expert Battery Repair Center of the Refactory of Flins. Created in 2011, it relies on strong skills, to keep batteries in their automobile use as long as possible. The center hosts in repair the batteries of all of our hybrid and electric range. At the service of the customer (fleets and individuals), the teams work in close collaboration with engineering. When the battery capacity is no longer compatible with automobile use, GAIA teams then prepare it for other second-life uses, such as energy storage.

900 parts references in reuse or recycling
10 to 20 kg of copper per end-of-life vehicle
20,000 batteries repaired per year planned for 2030

www.gaiaautorecycling.com

Re-trofit Re-cycle Re-energy Re-start
Re-start
Industry Innovation Centre

The Industry Innovation Centre has 5 activities:

1. Retrofit Center of the means of production
It started its activity in 2021, with the ambition of making the Refactory the reference place of the Group for the renovation of the means of production, relying on the skills in robotics, mechanics and electromechanics of our teams. Initially focused on the supply of robots for new projects, the activity now extends to other industrial equipment to provide efficient means at a very competitive cost.

2. Process Innovation Centre
It enables production engineering to develop its future technological components. These facilities reproduce the real conditions of a factory in order to work on optimising the means of production and developing new innovative solutions, in close collaboration with the Industrial System, Industry 4.0 and Vehicle and Powertrain Processes businesses.

<table>
<thead>
<tr>
<th>Employees</th>
<th>Parts 3D printed</th>
<th>Robots renovated</th>
<th>Machines monitored</th>
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</thead>
<tbody>
<tr>
<td>73</td>
<td>11,000</td>
<td>70</td>
<td>400</td>
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</table>
3. Industrial Control Tower
It is used to monitor the health of machines operating in the Group’s factories around the world. With the support of the engineering of the industrial systems, it now monitors the data from the stamping presses and the machining centers and will extend tomorrow to other types of machines: robots, filling means, etc. The data are collected thanks to sensors, then analyzed for any deviations. In the event of an anomaly, the site is alerted and intervene in order to avoid the most impactful failures for the activity of our sites.

4. 3D Printing Centre
It produces prototype parts for new vehicle models, spare parts for machines and consumer parts and accessories for new vehicles. For this production, the team has design and printing facilities, with a fleet of 18 machines using melted wire and powder melting technologies. In 2022, 11,000 pieces will be produced in this workshop, or 1.4 million cm³ of printed material.

5. Commercial Vehicle Prototype Production Centre
It assembles the body in white of the very first rolling vehicles of the projects, on which are carried out the first rolling tests and validated the first project milestones. Eighteen people work there, in two teams, one dedicated to logistics, the other to the assembly of the prototype crate.
Mobility Circular Industry Campus

Faced with the challenges of climate change, the world of mobility is changing. In Europe, the automotive industry is actively engaged in decarbonization by designing products and services oriented towards sustainable mobility and by integrating the fundamentals of the circular economy into its design and production models. To meet these challenges, developing new skills and preparing employees for new jobs is essential. These are the objectives of the Mobility Circular Industry Campus (CIM), within the Refactory project in Flins, by offering training modules on the circular economy open to all audiences.

5 audiences/5 axes:
- Initial training
  - Training modules for students
- Continuing training
  - Levels: CAP to master
  - Training modules for adults/professionals (Operators, technicians and engineers)
- Applied research
  - Research projects with universities
- Inclusive training
  - Training modules for a population excluded from the school system
- Support teams and projects
  - Team seminars (learning expeditions)

An integral part of ReKnow University, the new enterprise university whose mission is to train learners (internal and external) in the trades and skills of tomorrow’s automotive industry, the Mobility Circular Industry Campus brings together academic, institutional and industrial partners. It proposes a training offer dedicated to the circular economy, closer to industrial activity. Locally based and aimed at professionals, students and researchers, its pedagogy is based on innovative tools. The Global Training Center is at the heart of this device, housed in a building of nearly 6,000 m², equipped with industrial means to provide technical training, and training rooms.

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<tr>
<th>6,000 m²</th>
<th>4,000 people</th>
<th>7 academic &amp; industrial partners</th>
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<tr>
<td>dedicated to training and research</td>
<td>trained by 2025</td>
<td>partners</td>
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Re-trofit
Re-cycle
Re-energy
Re-start
Open Innovation Hub

Explore fields of innovation and develop new solutions to limit the environmental impact of mobility... The Refactory Open Innovation Hub fully contributes to this objective by welcoming projects-leading startups into an incubator. Positioned in the fields of recycling, retrofit, energy, mobility and the future of the industry, these start-ups are supported in a structured way in their approach and benefit from favourable conditions for the development of their ideas.

Welcoming startups at the heart of our industrial site

In 2022, two programs are launched, one dedicated to the development of projects related to the circular economy, the second to the preparation of the industrialization of products, for young companies that already have a solution. Thanks to its location on the Refactory site, the hub allows them to benefit from the site’s industrial resources, including the Industry Innovation Centre and its business expertise, as well as a space where they can test life-size solutions. The Hub also offers a co-innovation approach to more mature players. Some projects carried out with startups have already been implemented within the Refactory. This is the case with the re-employment of electric vehicle batteries by the betteries startup, which manufactures electric generators. Other projects are to follow!

An open ecosystem

Supported by the Ile-de-France region, the Open Innovation Hub is a member of the national network of Greentech incubators, launched by the French Ministry of Ecological Transition. A network that aims to activate the relationships between incubators involved in the ecological transition and to generate synergies.

www.greentechinnovation.fr