



REFACTORY

FLINS - GROUPE RENAULT

INTRODUCTION

November 2020

Working to reduce emissions, to be more reasonable in the use of resources or energy, to eliminate the most polluting materials or processes, are already daily missions that must be pursued. Reduction is not enough, however. Tomorrow's economy will only be resilient if **a new paradigm is promoted, that of the circular economy, based on use rather than possession and on more efficient and sustainable management of resources.**

In addition to the ecological imperative, the impact of **digital technology, electrification, and new uses of mobility** are already transforming the value chain of our industry. Vehicles because they need to last longer and have several lives – as mobility objects, materials or uses - **have a strong potential for value creation linked to the new circular economy models.**

To convert this source of value into a growth lever, Groupe Renault has created the **REFACTORY** in Flins, **the first European circular economy site dedicated to mobility.** By 2030, it will employ more than 3,000 people in dedicated professions

The implementation of **this industrial and commercial ecosystem will take place gradually between 2021 and 2024**, replacing the production of new vehicles. It will be based on **a wide network of partners from all sectors** and will revolve around **4 poles of activity**, putting into practice the principles of the circular economy at each stage of the vehicle life cycle and mobility.

In line with the definition generally given (see [the Ellen MacArthur Foundation](#)), the circular economy model implemented in Flins will be based on a set of complementary and convergent loops, aimed at encouraging the use of a vehicle instead of its ownership, extending its life through maintenance, reusing it or reusing its components for other uses, when other solutions are no longer possible.

To support this approach, the **REFACTORY** will also include an **incubator**, open to start-ups, academic partners, large groups, local authorities and intrapreneurship, as well as a **training centre**, backed by a **university centre**, to promote know-how and accelerate research in the circular economy.

Thanks to this ecosystem of activities that can make a positive contribution to the decarbonisation of mobility, the **REFACTORY** aims to achieve **a negative carbon balance by 2030.** An objective in line with the Group's ambition to achieve carbon neutrality in Europe by 2050.

Through this transformation plan, Groupe Renault intends to carry out **a sustainable and responsible industrial reconversion, a source of new sources of growth and competitiveness.**

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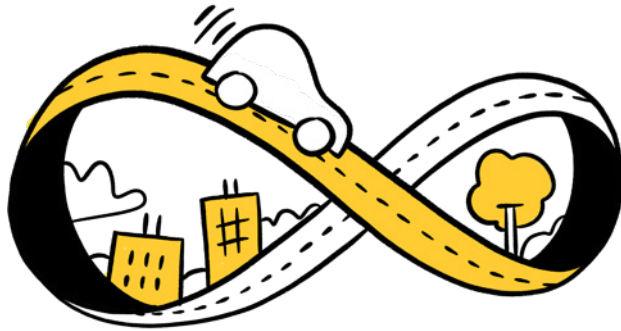
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GRUPE RENAULT, PIONEER OF THE CIRCULAR ECONOMY



A PIONEERING AND ONGOING COMMITMENT TO THE CIRCULAR ECONOMY

Although it predates the concept of the circular economy, the remanufacturing of mechanical components at the Choisy-le-Roi site (France) has been integrating sustainability and added value since 1949. **The know-how developed there has been contributing for more than 70 years to extending the service life of a vehicle, in the interests of saving energy and resources**, by making it possible to carry out a repair on a part, to offer a service life consistent with that of the repaired vehicle

A UNIQUE CAPITALISTIC AND INDUSTRIAL APPROACH

The creation in 2008 of the subsidiary **Renault Environnement** is fully in line with this pioneering dynamic. Groupe Renault is the only player in the automotive industry to have invested - through partnerships and shareholdings - in the development of recycling channels, stemming from the dismantling of end-of-life vehicles, maintenance and parts production, **to secure supplies of materials and reduce the impact on resources.**

Through **Indra**, a joint subsidiary with Suez, Groupe Renault processes end-of-life vehicles (ELVs) to **extract materials for recycling and reintegrate** them into the production of new vehicles and parts for subsequent reuse in the after-sales network. **Boone Comenor Metalimpex**, a joint venture with Suez, specialises in the recovery of scrap metal from the Group's plants. Finally, **Gaia, a 100% Renault subsidiary**, is at the interface of the various players in the circular economy who intervene during the life of the vehicle, for the collection and processing of parts and materials for a second life.

A LEVER FOR SUSTAINABLE COMPETITIVENESS

These three activities (Indra, Gaia and Bonne Comenor Metalimpex) that are grouped together within Renault Environnement, have generated **a turnover of 562 million in 2019**, and each of these three activities recorded positive net income in 2019. The standard exchange activities described above generated revenues of nearly €120 million in 2019.

The circular economy activities of Groupe Renault and its subsidiary Renault Environnement (the repair and second-life reuse of electric vehicle batteries, the recycling of materials, and the reuse of parts) created or preserved €219.8 million in technical and economic value during the 2019 financial year, an increase of €45.7 million compared to 2016.

A COLLABORATIVE AND PROACTIVE APPROACH

To widely deploy this integrated ecosystem of circular economy, Groupe Renault participates in collaborative research projects on the circular economy and contributes to organize a network of partners from the automotive industry, other economic sectors, as well as from the world of recycling, research and education.

In 2018, Groupe Renault took part in [the European Commission's Action Plan for the Circular Economy](#) by contributing its experience of the electric vehicle to identify regulatory obstacles

to the **deployment of second-life applications** of electric vehicle batteries (stationary storage, vehicle-to-grid, etc.).

A strategic partner since 2009, Groupe Renault has been working alongside the [Ellen MacArthur Foundation](#), working with companies, academics and decision-makers to **demonstrate the economic viability of the circular economy model**, in addition to its environmental relevance. As part of this collaboration, the Group contributes to the work and events coordinated by the Foundation (annual reports, case studies, business network).

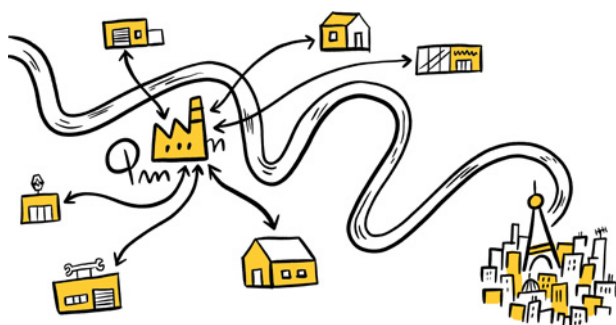




PRESENTATION OF THE REFACTORY & ITS 4 DIVISIONS

Between 2021 and 2024, the **REFACTORY** will be gradually rolled out around four divisions of activity - **RE-TROFIT, RE-ENERGY, RE-CYCLE AND RE-START** - whose expertise will make it possible to support the entire life of the vehicle by acting on the main components of the circular economy (supply, eco-design, economy of functionality, maintenance, reuse, remanufacturing and recycling).

To ensure its competitiveness, this integrated circular economy ecosystem will **rely on several assets at the Flins plant**, which was created in 1952. The stamping, injection and sheet metal activities, but also the available surface area (237 hectares, 67 of which are currently built), the network of suppliers, accessibility via road connections, and above all the excellence of the industrial operational system (standardisation, manufacturing 4.0, ISO 14 001 and ISO 9 001 certifications, logistics hub, etc.) are all strategic levers for the implementation of the reconversion project.



The performance of the **REFACTORY** will also relate to the **ability to generate closed-loop supply flows with controlled costs** (reuse, recycling for repair), and to **develop new value-added skills** (retrofitting, dismantling, fleet maintenance, preparation of batteries for the second life, etc.) based on **the integration of the company's areas of technical expertise** (reconditioning of second-hand vehicles, remanufacturing, recycling, batteries).

The strength of this ecosystem will therefore be based on the synergy of skills, the efficiency of industrial processes, as well as the sharing of innovation and research resources grouped together in the same place.

The **transformation plan will be deployed gradually in stages** between 2021 and 2024, starting in 2021 with the establishment of the Factory VO, (Used Car Factory) the transfer of Choisy-Le Roi's remanufacturing activities, and the integration of an incubator dedicated to start-ups, partners and intrapreneurship.



01. RE-TROFIT TO EXTEND SIGNIFICANTLY THE LIFE OF VEHICLES

In a growing second-hand market, driven by the emergence of new modes of consumption that favour use rather than possession, Groupe Renault wants to bring together the expertise needed to extend the lifespan of vehicles and their uses, while preserving resources through efficient management of the flow of used parts and materials within the same site.



DEVELOPING THE RECONDITIONING AND RETROFITTING OF USED VEHICLES AND FLEETS

Groupe Renault plans to set up an **8,500 m² Factory VO** (Used Car Factory) in Flins, with the capacity to refurbish **more than 45,000 second-hand vehicles per year**, from September 2021. This entity will offer a **simple, fast and cost-optimised logistics scheme** thanks to industrial management in the factory, **for the Ile-de-France commercial network** (RRG, dealerships, Renault Occasions/RVO). From 2022 onwards, an extension will be envisaged over a wider geographical area within the Group and externally.

The creation of this Factory VO also aims to **improve the quality** of services and significantly reduce the turnaround time for second-hand vehicles (from 21 days on average to 6 days), between entry into stock and resale. The objective: **to preserve the value of the product as much as possible and reduce the time the car is out of service.**

The entity will thus offer a turnkey service for the sales network: optimised **transport** of vehicles, supply of **spare parts (RE-CYCLE Centre)**, **renovation, storage**, production of photos and videos and their online availability. The service will include **real-time monitoring** of the renovation stages for the sales managers of the sales network.

Against a backdrop of tighter environmental regulations in cities (low emission zones, ban on diesel vehicles in 2024, then on petrol vehicles in 2030 in Paris, for example), the **RE-TROFIT** division wishes to **capitalise on Groupe Renault's industrial structure and expertise in electric and gas technologies to develop an attractive retrofit offer** (conversion of combustion engine vehicles to other less carbon-based energies). Through the sales network, these conversions will primarily target professional customers (commercial vehicles) dependent on access to the urban centre for the continuity of their activities. The parts and materials resulting from this activity will also enrich the activities of Factory VO, as well as **RE-ENERGY** and **RE-CYCLE**.

In the operation of mobility services, the ability to constantly maintain a fleet of vehicles in good condition is a determining factor in meeting customer expectations and avoiding an accelerated deterioration of the fleet. To meet this demand the division will work on developing **new services** (renewal, heavy repairs, etc.) **to vehicle fleets and shared mobility players**, such as the ZITY electric car-sharing service.

Following on from the manufacture of protective visors initiated as part of the health crisis, the division will also offer an **additive manufacturing service using 3D printers** already

present on the site, for example, for parts that have become unavailable, for garages, private individuals or collectors of vintage cars.

To support the development of new solutions aimed at increasing the useful life of vehicles and to draw useful lessons from them, the Group will set up a **test and prototyping centre for the durability and reparability of vehicles and materials**, to enrich the design of future products and facilitate the improvement of vehicles during their life cycle.





02. RE-ENERGY TO OFFER SOLUTIONS FOR THE PRODUCTION, STORAGE AND MANAGEMENT OF GREEN ENERGIES

Electric vehicles batteries are at the heart of the transformation of the automotive industry because of their potential applications. Optimising the battery's life cycle is a crucial issue for the development of the sector and limiting its impact on the environment.

Between 2021 and 2030 alone, the second-life batteries sold by Groupe Renault will represent a capacity of more than 200 MWh per year, the equivalent of 4,000 full charges of a Renault ZOE. The ambition of the RE-ENERGY division is to bring the ecosystem of applications resulting from the electric battery and new energies to an industrial scale, and to strengthen Groupe Renault's position as a key player in the energy transition.

EXTENDING FIRST BATTERY LIFE

As the fleet of electric vehicles continues to grow and hybrids and rechargeable hybrids make their way into the range, Groupe Renault has developed expertise in **the repair of first-life batteries** at a very early stage. At the heart of this expertise is the Flins plant, where a set of techniques and industrial processes for the repair of Renault electric vehicle batteries has been developed since 2011, before being distributed to some 20 battery repair centres in 17 countries.



While battery repairs will continue to be handled as close as possible to the customer, the Flins centre aims **to reach a capacity of 20,000 repairs by 2030, thanks to the development of an industrial structure**, keeping this expertise on the site for the long term.

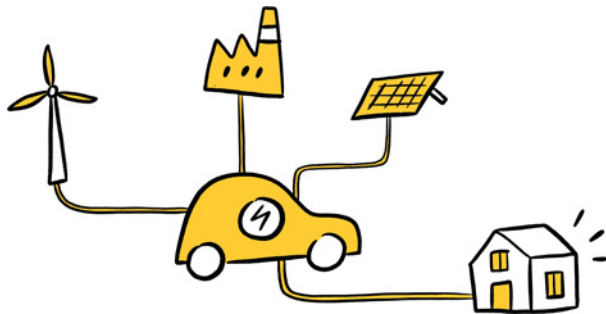
DEVELOPING APPLICATIONS IN SECOND LIFE

At the end of its first life in the vehicle and well before recycling, the battery provides an indispensable solution for the development of renewable and intermittent energies: **electricity storage**. New operating opportunities such as **stationary storage** make it possible to **perpetuate the service that the battery offers**. In this case, the battery makes it possible to integrate electricity from solar or wind power, on the scale of an individual house, a building, a recharging station or an industrial site, for example.

Groupe Renault has already set up several experiments that concretely illustrate the benefits of this approach:

- In [Porto Santo](#), thanks to **second-life Renault ZOE batteries stationary storage** reduces the island's dependence on fossil fuels, while encouraging the use of renewable energies;
- As part of the European ELSA (Energy Local Storage Advanced system) project, the Group offers storage solutions for **industrial and tertiary buildings** in collaboration with other players;

- [Two very large-scale energy storage projects](#) - Advanced Battery Storage in France and Germany and Smart Hubs in the United Kingdom - have also been initiated with the aim of reducing the gap between electricity consumption and production and increasing the share of renewable energies in the energy mix.



- The Group is also **developing mobile energy storage applications**. Reconditioned batteries have begun a second life on board cruise ships on the Seine in Paris (electrification of the [Paris Yacht Marina](#) fleet) and soon on board sailing cargo ships for transoceanic journeys ([Neoline](#) project). Second-life batteries are also used to operate refrigeration units on converted versions of Kangoo Z.E. and ZOE.

The second life market is booming today with the demand now greater than the supply as they are more affordable than new batteries. In this buoyant market, the **RE-ENERGY** division aims to:

- **strengthen the battery collection system within Groupe Renault and the sector;**
- **capitalize on skills to prepare batteries for a second life;**
- **develop and manufacture portable or mobile storage systems from second life batteries, in conjunction with partners.**

Finally, from 2021, Groupe Renault will install a stationary energy storage device in Flins from electric vehicle batteries with a capacity of 15.5 MWh.

TO MANAGE BATTERY END OF LIFE

When they are at the end of their life, the batteries are systematically recycled. With the support of its subsidiary **Indra** for the collection and disposal of the battery, the Group has been relying since 2013 on a historic **partnership with Veolia** for the recycling of batteries. After their dismantling, mechanical and hydrometallurgical processes are combined to extract and recover the metals contained in the battery. To accelerate the development of this sector, Groupe Renault has encouraged the **collaboration of Veolia with the chemicals group Solvay**. The two companies thus announced on September 9, the creation of a [circular economy consortium](#) aiming to mobilize the best technologies and mechanical and chemical skills, to transform metals into high purity raw materials directly usable in the production of new batteries. [[See here](#) to learn more about battery recycling.]

Putting the lithium-ion battery into a circular economy scheme also helps make the electric vehicle more competitive. The battery gains additional value, thereby lowering the cost passed on to the buyer of an electric car.

Within this division, Groupe Renault will also work on the **development of maintenance and recharging services, the development of technical and supply solutions, dedicated to new energies** (NGV, hydrogen), intended for individuals or local partners.



03. RE-CYCLE TO OPTIMIZE THE MANAGEMENT OF RESOURCES TO SUPPORT THE ECOSYSTEM

The **RE-CYCLE** pole will bring together activities allowing efficient management of the resource and its flows. Compared to other sectors, the automotive industry in Europe has high recycling and recovery rates for End-of-Life Vehicles (ELVs), as well as a high proportion of recycled materials in its new products.

Thanks to this new entity, the Group - which already incorporates an average of 30% recycled materials in its vehicles produced in Europe - wishes to go further, by continuing to increase the proportion of recycled materials incorporated in the production of new vehicles, while reducing procurement costs and the impact on resources.

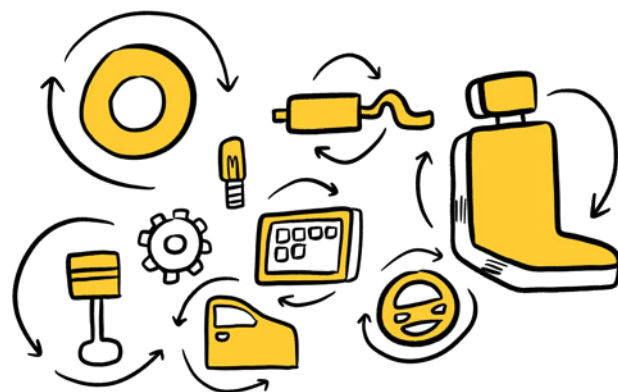
CREATION OF A DISMANTLING LINE

Suez and Groupe Renault co-own **Indra**, whose activity of **recycling end-of-life vehicles (ELV)** makes it possible to **extract materials from them for recycling and reintegrate** them into the production of new vehicles as well as **parts for reuse** by the continued in the after-sales network. A key player in the recycling of ELVs in France, Indra relies on a network of 400 demolition workers. In 2019, nearly 400,000 ELVs were treated in this way.

In addition to this activity, the conversion plan for the Flins site provides for the **installation of a dismantling line** from 2024, to capture additional volumes and increase the Group's capacity to source parts and materials in short loops. With **an objective of 10,000 vehicles per year on average**, this pole aims to be one of the main deconstruction sites in France and to develop expertise in **the deconstruction of electric vehicles**.

DEVELOPMENT OF SORTING, REUSE AND RECYCLING

95% of the mass of vehicles and their batteries can be recycled or recovered: this European regulatory requirement was anticipated in 2007 and is applied by Groupe Renault to all vehicles sold worldwide. To achieve this **Groupe**



Renault relies on an ecosystem of subsidiaries and partners in the field of recycling and recovery, which it intends to strengthen. Thus, the parts and materials that compose end-of-life vehicles once dismantled can go through the stage of **reuse, remanufacturing or recycling**, to be reintroduced into vehicle maintenance and production (closed loop) or in other industries (open loop).

A pioneer in **reuse**, since 2012 Groupe Renault has offered a range of used parts (bonnet, fenders, optics, etc.) in its sales network in France, collected and selected from the **Indra network**.

Developed for more than 70 years by the Choisy-le-Roi (France) plant, **remanufacturing** supplies the after-sales circuit with components and more recently with electronic elements

such as R-LINK tablets. This activity follows a strict industrial process: collection of used parts and components within the sales network, dismantling, cleaning, sorting, renovation and replacement of defective and wearing parts, reassembly and finally control.

Marketed under the name **'Renault Standard Exchange'**, these refurbished spare parts are offered at an average price 40% lower than that of a new part, while maintaining the same quality requirements. Far from being marginal, the standard exchange offer covers almost 70% of powertrain part numbers, up to 50% for ground link parts and is regularly extended to new families of parts. This is the only offer available on the market when serial production of the part has been discontinued.

Already established in Flins, Gaia, a Renault subsidiary, is responsible for qualifying and upgrading **vehicles, parts and materials through recycling, repair and reuse channels**. The material loops put in place by this subsidiary now allow the recycling of several closed-loop resources such as copper from electrical wiring, platinoid metals from catalytic converters or polypropylene from shields.

Groupe Renault has also more recently developed with partners, [the recycling of textile fibres](#) from automotive fabric and seat belt production scraps, in order to produce a textile intended for the interior trim of Renault ZOE. The short loop organization (manufacturing and supply) **reduces CO2 emissions by more than 60%** compared to the fabric of the old ZOE from a standard manufacturing process. Traditionally reserved for crankcases and other protective elements of the car, **recycled synthetic materials** were incorporated for the first time in the composition of interior components and exposed injection plastic parts. **Renault ZOE is thus made up of 22.5 kg of recycled synthetic materials**, an increase compared to the previous generation.

The strengthened coordination of these activities and their extension to other areas (ELVs, test or reformed vehicles, heavy goods vehicles, shared vehicle fleets, micro-mobility, etc.), will make it possible to capitalize on greater flows to supply the other divisions of the **REFACTORY** (Factory VO, battery repair, etc.), and **continue to increase the proportion of recycled or reused materials** in new or used vehicles. This development will be supported by a **logistics** (physical and virtual) and **commercial** ('digital marketplace') **platform** for efficient flow management.

ZOE

recycled polymer parts

22,5 kg

recycled synthetic materials



17,5 kg

injected plastic

3,3 kg

textiles

1,7 kg

non-woven fibres



04. RE-START PROMOTE INNOVATION AND KNOWLEDGE SHARING

The **RE-START** division aims to promote and develop industrial know-how, but also to accelerate research and innovation in the circular economy.

It will host an incubator, as well as a training centre and a university hub to strengthen the specialization of the **REFACTORY** teams.

The Flins **REFACTORY** will integrate an **incubator open to external partners** (start-ups, academic partners, large groups, local authorities, etc.) to develop or co-develop innovative projects around the circular economy. As a member of the Greentech National Incubator Network, this incubator has entered into discussions with the University Paris Sciences Lettres (PSL), which includes Mines Paris - PSL, Ecole Normale Supérieure - PSL, Chimie Paris - PSL, and Dauphine - PSL.

To that end, it will include an **'in vivo' experimentation area on industrial facilities** (sheet metal islands, plastic injection, etc.), in collaboration with experts from different fields (vehicle architecture, materials, electric vehicle, energy, recycling, lean manufacturing ...).

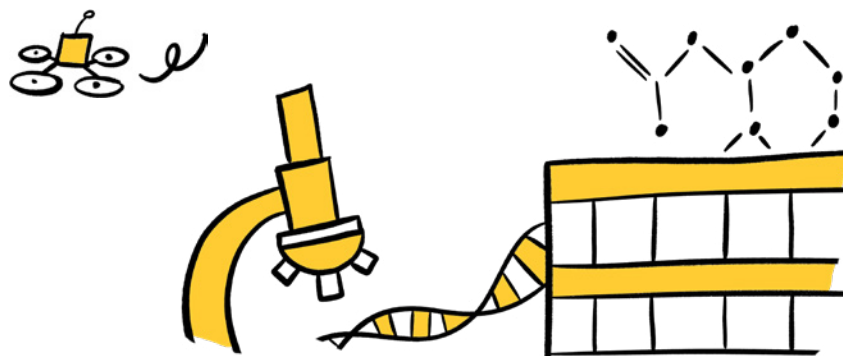
It will also host the **Centre of Excellence for Advanced Manufacturing**, for the prototyping of vehicles and the conduct of experiments around Industry 4.0 subjects such as 3D prin-

ting, predictive maintenance, retrofitting of production resources, or even automatic guided vehicles (AGV), and 5G.

DEDICATED TRAININGS

To support employees in this transformation plan, the project plans to develop a centre for the development of knowledge and skills, **around 3 axes**:

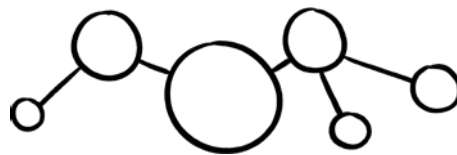
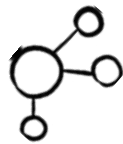
- The international vocational training centre (**Global Training Centre**) created in 2010 in Flins, which until now has been dedicated to industrial techniques (stamping, sheet metal, painting, assembly, etc.), will be entrusted with the development of **new training modules** applied to meet training needs within the **REFACTORY**, the Group, as well as outside the company.



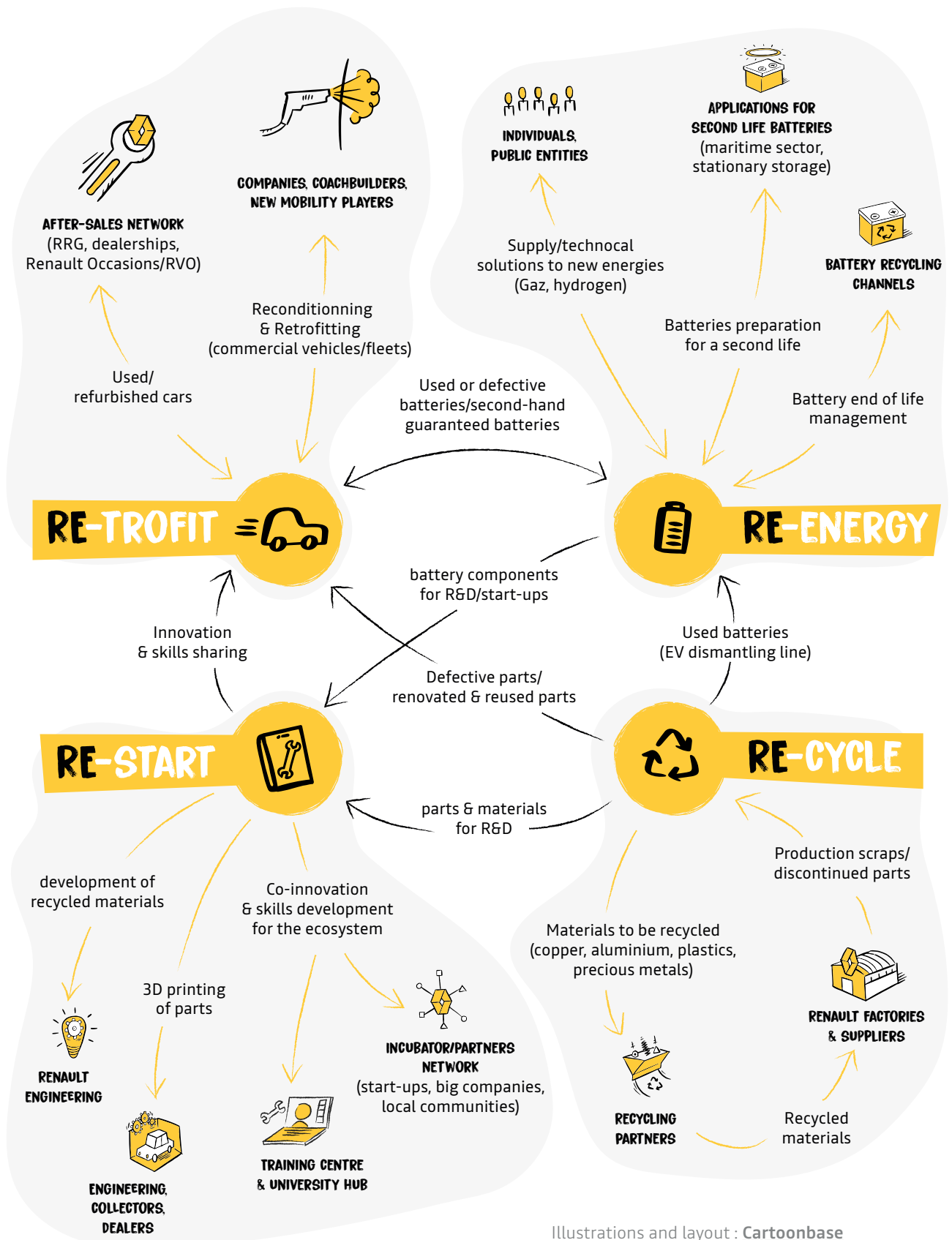
- At the level of the automotive sector and industry, the **REFACTORY** also intends to contribute to the creation of **academic training**, such as a Certificate of Trades and Qualifications (CMQ), in order to share more widely know-how and design training courses that meet the needs of the industry of the future.
- Finally, in the field of **applied research**, the entity will set up partnerships with groups of schools and universities to boost innovation in the field of the circular economy. By promo-

ting **concrete experimentation and direct immersion** in an industrial field, the Group wishes to encourage research on a **scientific** (technology, chemistry, engineering, etc.) and **sociological** level (study of mobility and new uses, the transformation of work organization, etc.).

The project will also study how to integrate inclusion within this development pole, pursuing the objective of promoting access to employment.



4 INTERCONNECTED DIVISIONS WITHIN AN ECOSYSTEM OF MATERIAL, SERVICES AND SKILLS FLOWS



Illustrations and layout : [Cartoonbase](#)

ABOUT GROUPE RENAULT

Groupe Renault has manufactured cars since 1898. Today it is an international multi-brand group, selling close to 3.8 million vehicles in 134 countries in 2019, with 40 manufacturing sites, 12,700 points of sales and employing more than 180,000 people.

To address the major technological challenges of the future, while continuing to pursue its profitable growth strategy, Groupe Renault is focu-

sing on international expansion. To this end, it is drawing on the synergies of its five brands (Renault, Dacia, Renault Samsung Motors, Alpine and LADA), electric vehicles, and its unique alliance with Nissan and Mitsubishi Motors. With a 100% Renault owned team committed to the Formula 1 World Championship since 2016, the brand is involved in motorsports, a real vector for innovation and awareness.