

CIRCULAR ECONOMY STAKEHOLDER CONFERENCE

CIRCULAR SOLUTIONS FOR THE LOW-CARBON TRANSITION
WHAT TO DO WITH END-OF-LIFE PRODUCTS ? REUSE OR RECYCLING?

RENAULT CIRCULAR ECONOMY CASE

FEBRUARY 2018

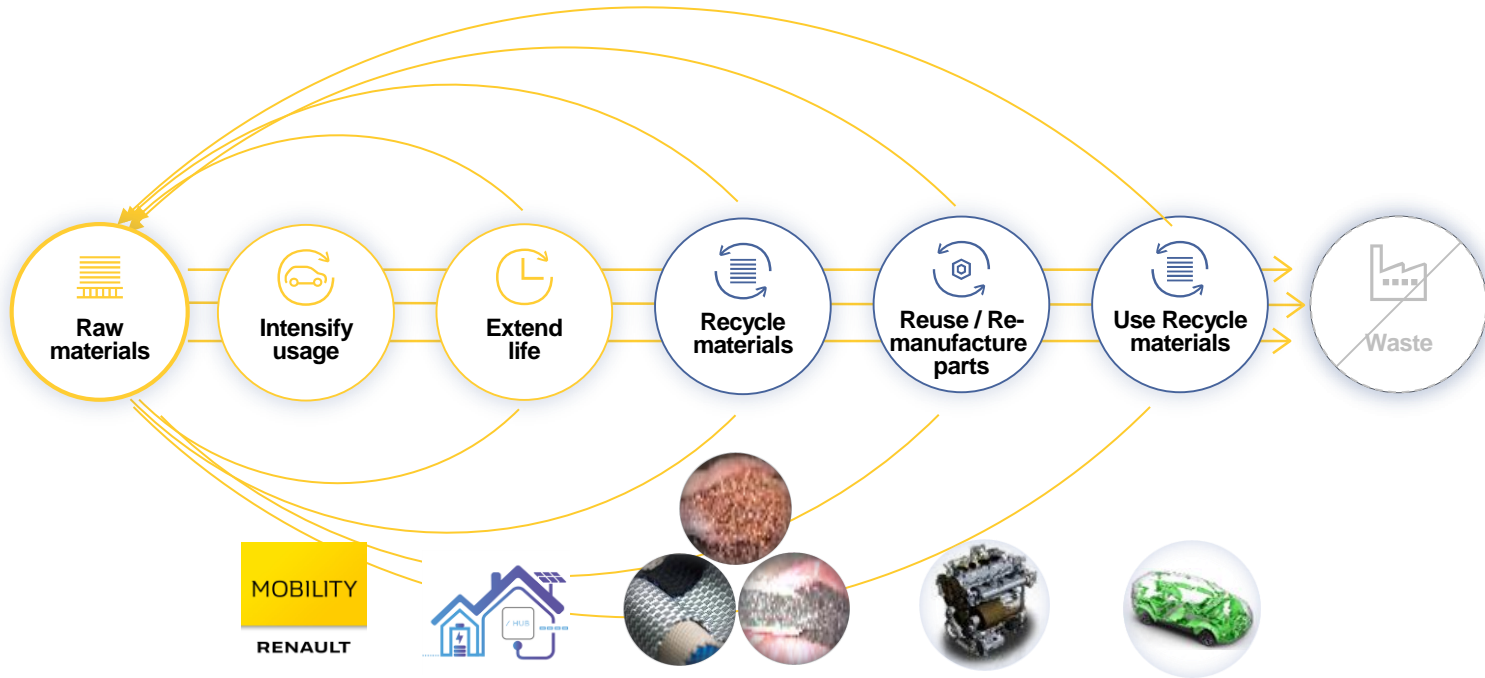
JEAN-PHILIPPE HERMINE
RENAULT VP STRATEGIC ENVIRONMENTAL PLANNING



CIRCULAR ECONOMY ACTS ALL ALONG THE PRODUCT LIFE CYCLE TO REDUCE RESOURCE CONSUMPTION AND PRESERVE VALUE THANKS TO CLOSED LOOPS



EFFICIENCY IN RESOURCES AND VALUE ADDED USE INTENSITY

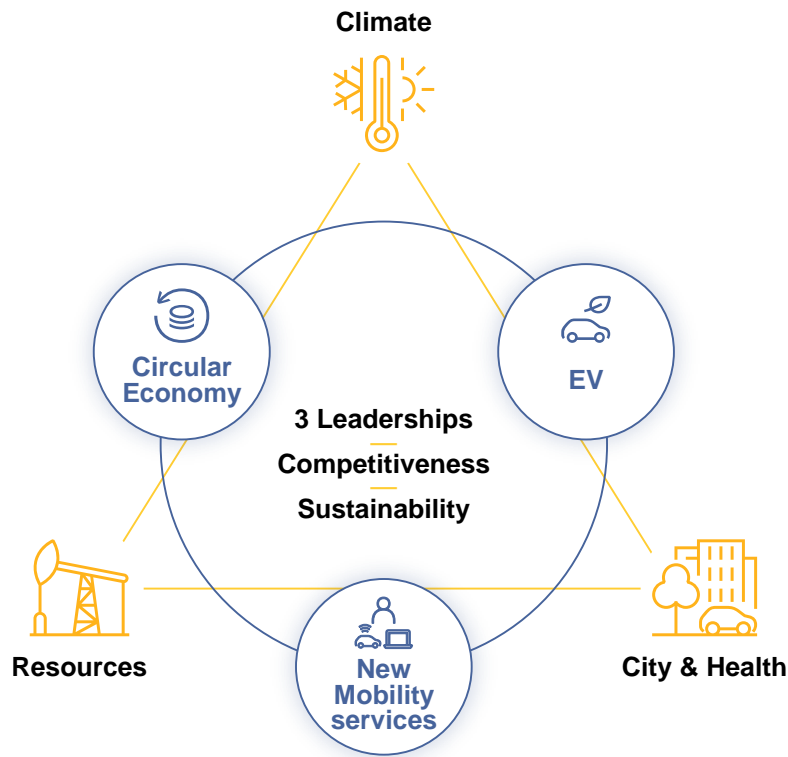


CIRCULAR ECONOMY IS A CORE LEVER, EMBEDDED IN RENAULT BUSINESS MID TERM PLAN, TO ADDRESS MAJOR ENVIRONMENTAL STAKES



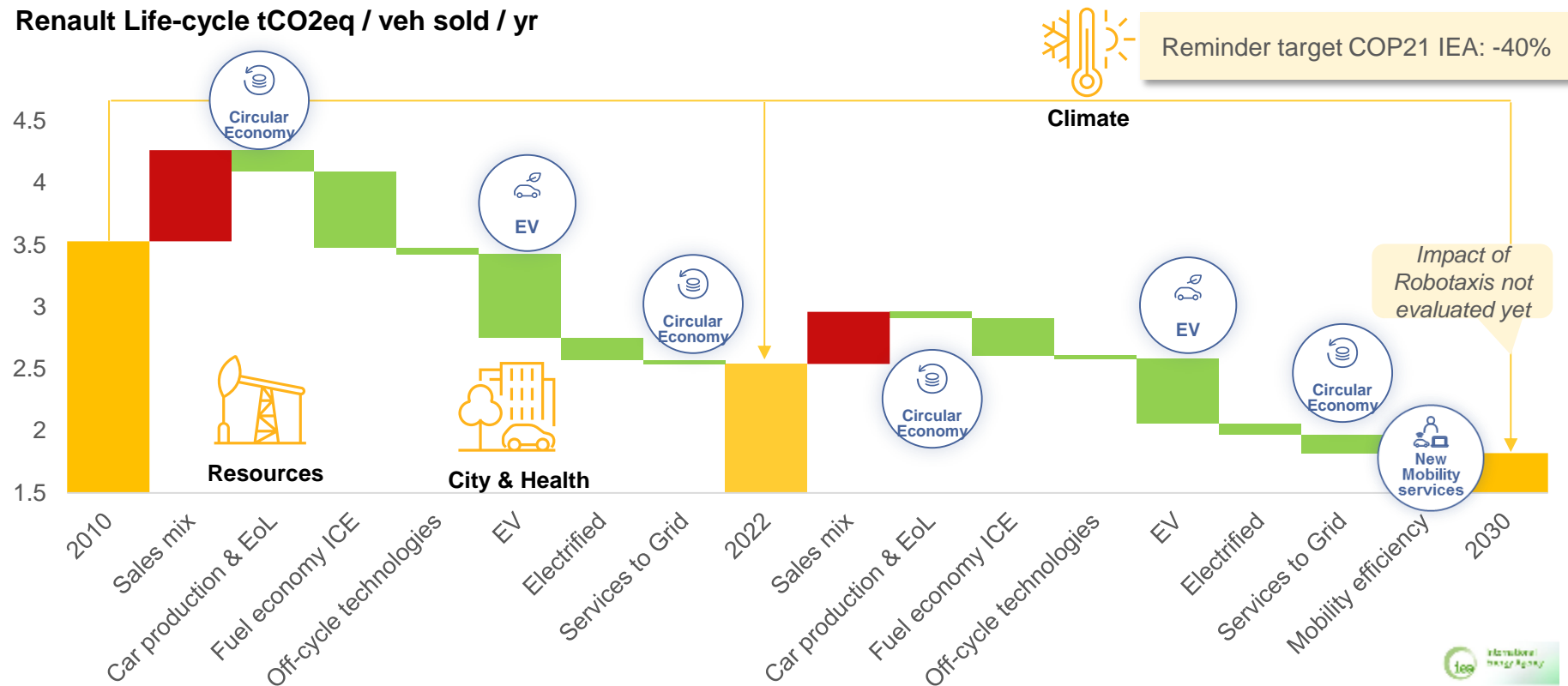
- △ **3 environmental stakes** challenge automobile industry & reshape the market
- Renault address those stakes through **3 transversal leadership claims** able to enhance innovation and transformation

ONE INDICATOR FOR OVERALL GLOBAL PROGRESS:
CARBON FOOTPRINT -25%
(2022/2010 PER VEH SOLD) IN LINE WITH COP21 2DS OBJECTIVE



RENAULT SHOULD OVERPASS ITS COP21 OBJECTIVE BY 2030, THANKS TO ITS EV LEADERSHIP

Renault Life-cycle tCO₂eq / veh sold / yr



RENAULT MUST ANTICIPATE RESOURCES ISSUES (SOURCING AND COSTS) FOR STRATEGIC MATERIALS AND COMMODITIES TO SECURE SUSTAINABLE BUSINESS



SOURCING RISKS

COPPER RESERVES 37 Years

1 EV = 4 X 1 ICE

(80kg engine + battery + electric cables)



Source: Deutsche Bank, United States Geological Society

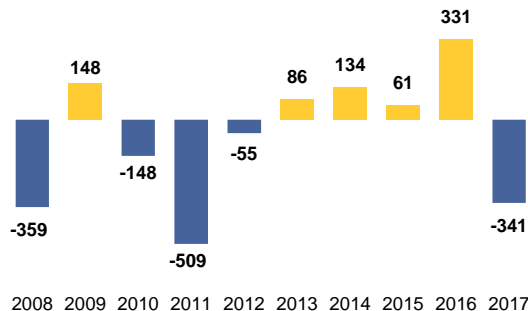
COBALT PRICE \$ by tonnes

RDC >60% production > 50% reserves
CHINA >50% Refining

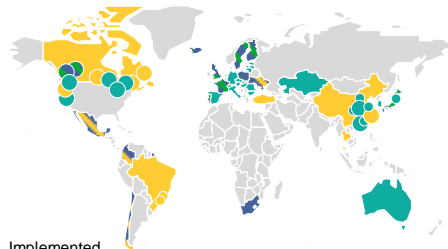


OVER COST RISKS

RM COST ON GROUP COP (M€)



CARBON TAX & ETS



Tax 20€/T → +150 M€ Purchase cost



3 ORGANIZATION

RENAULT HAS BEEN A CIRCULAR ECONOMY PIONEER BY SETTING UP A UNIQUE CIRCULAR ECONOMY ECO-SYSTEM ON FULL VALUE CHAIN



BRADING CONSUMER METALLURGIE

TO: 415 M€

Renault: 33%

Suez: 67%

Key points:

- Conditionning & Trading
- 2 M Tons/yr
- 400 people
- 28 worldwide site

GAIA

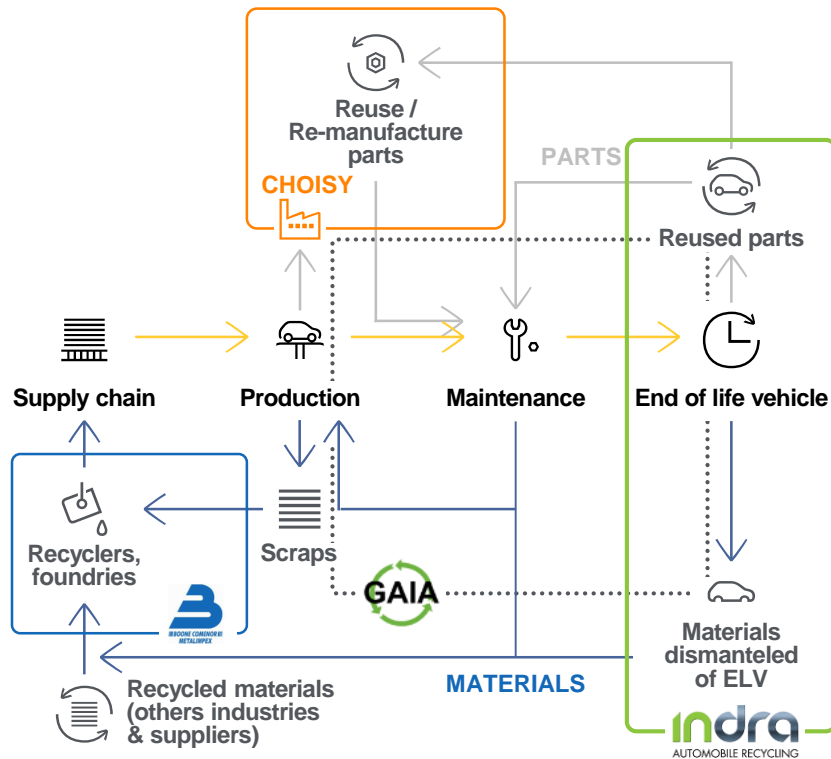
TO: 17 M€

Renault: 100%

Key points:

- Production waste valorisation
- Materials closed loops
- Second hand parts business
- Batteries life cycle

DATA 2017



CHOISY

TO: 61 M€

Renault: 100%

Key points:

- Remanufacturing 6 parts families
- 45% Reuse – 40% Recycled
- 15,000 engines,
- 18,000 gearboxes

indra
AUTOMOBILE RECYCLING

TO: 43 M€

Renault: 50%

Suez: 50%

Key points:

- E.L.V treatment (FR)
- 300 kveh/yr through French network
- 210 people

RENAULT ECOSYSTEM HAS DEVELOPED SEVERAL CLOSED LOOPS IN 2010-2016



EFFICIENCY IN RESOURCES AND VALUE ADDED USE INTENSITY




**USE RECYCLED
MATERIALS**

**RECYCLED MATERIAL
USE IN RENAULT CARS**




**RECYCLE MATERIALS
IN SHORT LOOPS**



**Wiring
(Copper)**



**Industrial
waste
metal loop**



**Catalytic
conv**



Bumper (PP)

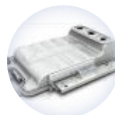

REUSE PARTS



**Resell
of 2nd life
parts**



**Parts
Remanu-
facturing**



**Battery
repair and
reconditioning**


EXTEND LIFE


INTENSIFY USE

BY 2022, RENAULT COMMITS TO CONSOLIDATE AND EXPAND ITS CE BUSINESS TO NEW ZONES AND ACTIVITIES (ESPECIALLY EV RELATED)

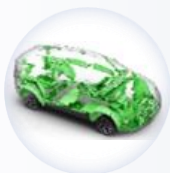


EFFICIENCY IN RESOURCES AND VALUE ADDED USE INTENSITY



USE RECYCLED MATERIALS

RECYCLED MATERIAL USE IN RENAULT CARS



+50% 2022/2013 (tones used)



Battery (Co, Ni...)



RECYCLE MATERIALS IN SHORT LOOPS



Wiring (Copper)



Industrial waste metal loop



Catalytic conv



Bumper (PP)



REUSE PARTS



Resell of 2nd life parts



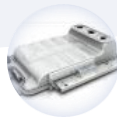
Textiles Seats



Parts Remanufacturing



E-Motor (Copper)



Battery repair and reconditioning



EXTEND LIFE



Electric Motor parts remanufacturing



Battery 2nd life reconditioning



INTENSIFY USE



New mobility



Mobility as a Service

EV BATTERIES ARE INTEGRATED IN A CIRCULAR ECONOMY LOOP OPTIMIZING THEIR ENVIRONMENTAL IMPACT



- Collecting 100% of batteries (battery lease)
- RM supply for new battery

BATTERY RECYCLING

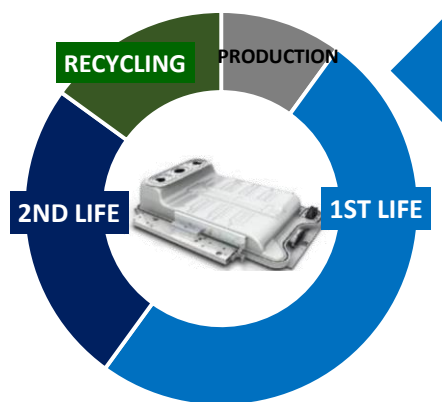
2ND LIFE BATTERY



Stationary usage for grid balancing, local storage

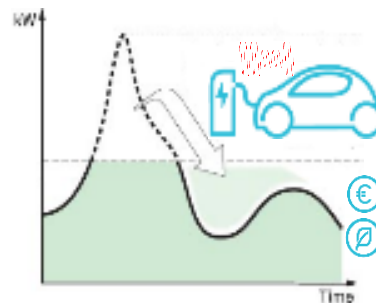
Ex: high power charging station with connected energy in Europe

RENAULT EV BATTERY LEASING MODEL



1ST LIFE OPTIMIZING SERVICES

RENAULT ENERGY SERVICES



Pilot charging to avoid peak charging and balance RE production

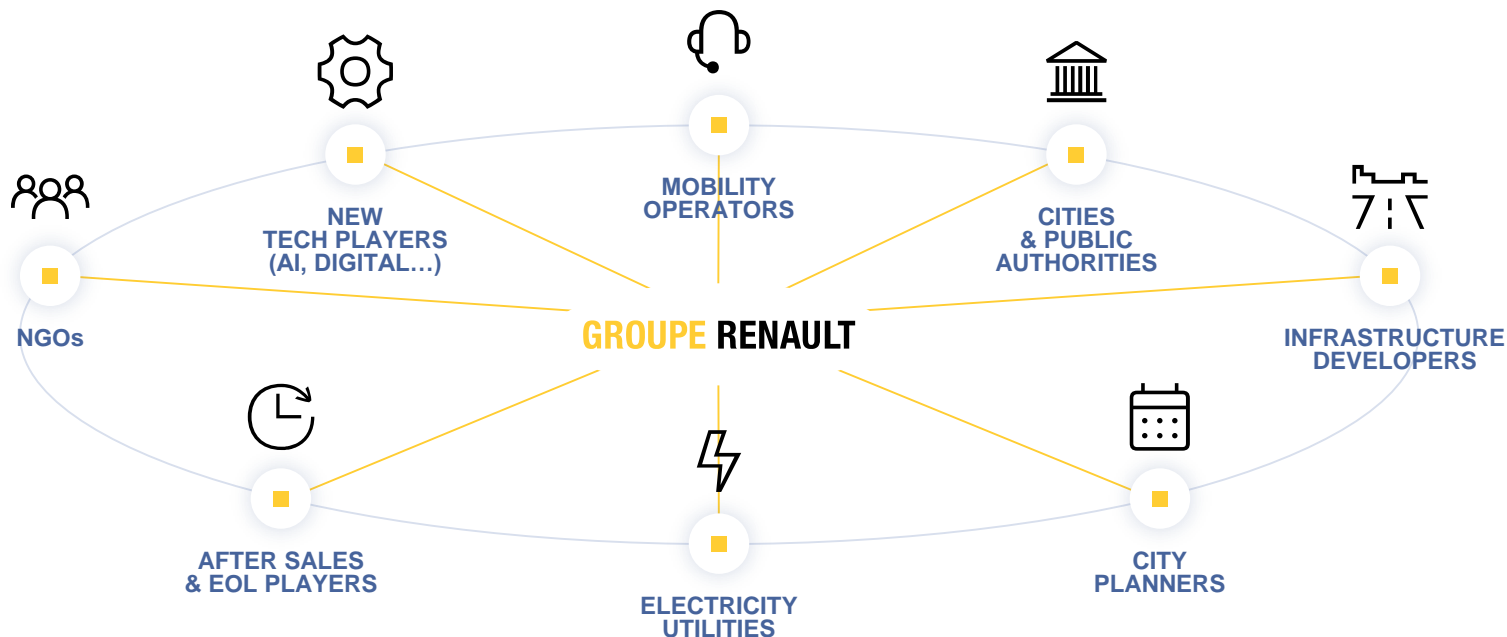
Ex: Smart city / Island

Pilot charging to replace costly & emitting electricity production

Ex: We drive Solar in NL

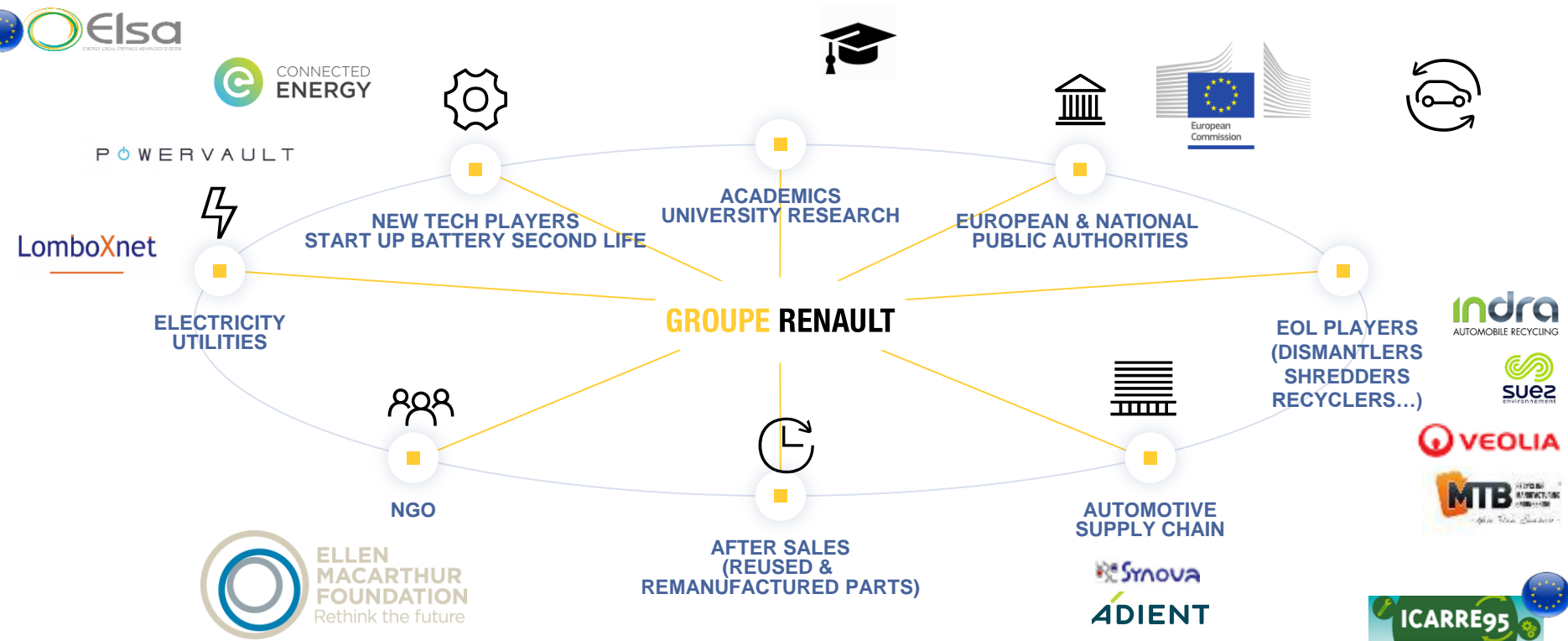
RENAULT'S ACTIONS INCREASINGLY NEED TO INTEGRATE INTO ECO-SYSTEMIC SOLUTIONS TO DELIVER EFFICIENT RESULTS

MOBILITY ECO-SYSTEM MUTATION



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CIRCULAR ECONOMY ECO-SYSTEM MUTATION



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