

**POINT DE VUE INDUSTRIEL SUR LA PERCEPTION ET LA GESTION DU
RISQUE D'APPROVISIONNEMENT EN CUIVRE
SEMINAIRE COMES DU 17 MAI 2021**

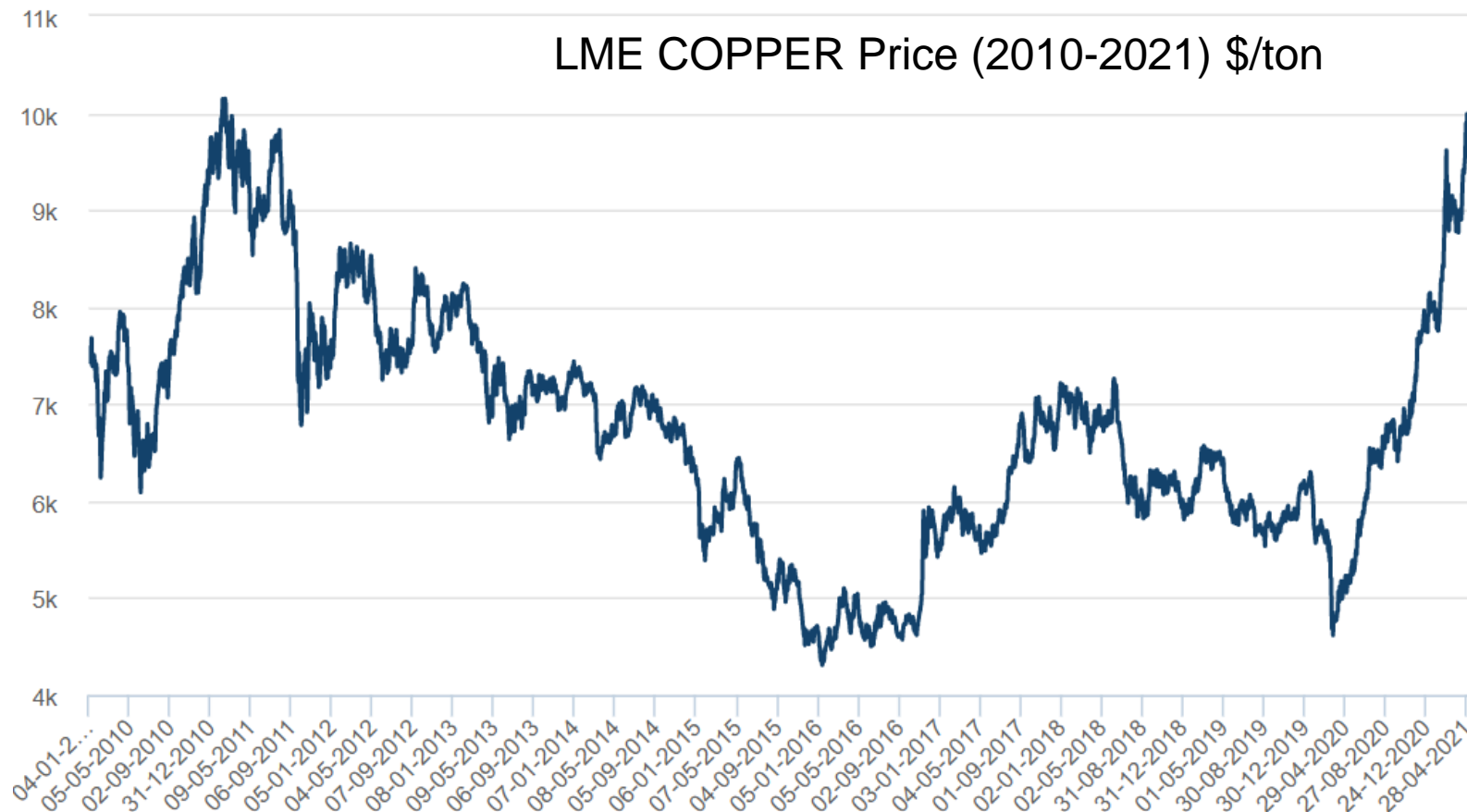
DEATC – RAW MATERIALS EXPERTISE / BARBARA FORRIERE / MAY2021

EXECUTIVE SUMMARY

- **Copper prices breaking records**
- **Key points**
 - A demand fuelled by the green transition
 - More copper used in Evs
 - New mining projects needed ; lower grades imply higher environmental impact
- **Mitigation**
 - Recycling and circular economy
 - A more global picture / Which levers on a FR / EU level ?

THE QUICK RESTART OF THE CHINESE ECONOMY IN Q2 2020 AND SUPPLY DISRUPTIONS UNDERPIN RESURGENCE OF SPECULATIVE BUYING

- Copper prices hit a 10-year high of just over 10,000\$/t during the final week of trading in April (*still on-going!*). This compared to the all-time high of US\$10,190/t that was set back in February 2011.
- Prices have increased on the back of a combination of renewed speculative interest, declining LME stocks, a weaker dollar and lower production numbers that suggest some Covid-related supply problems continue

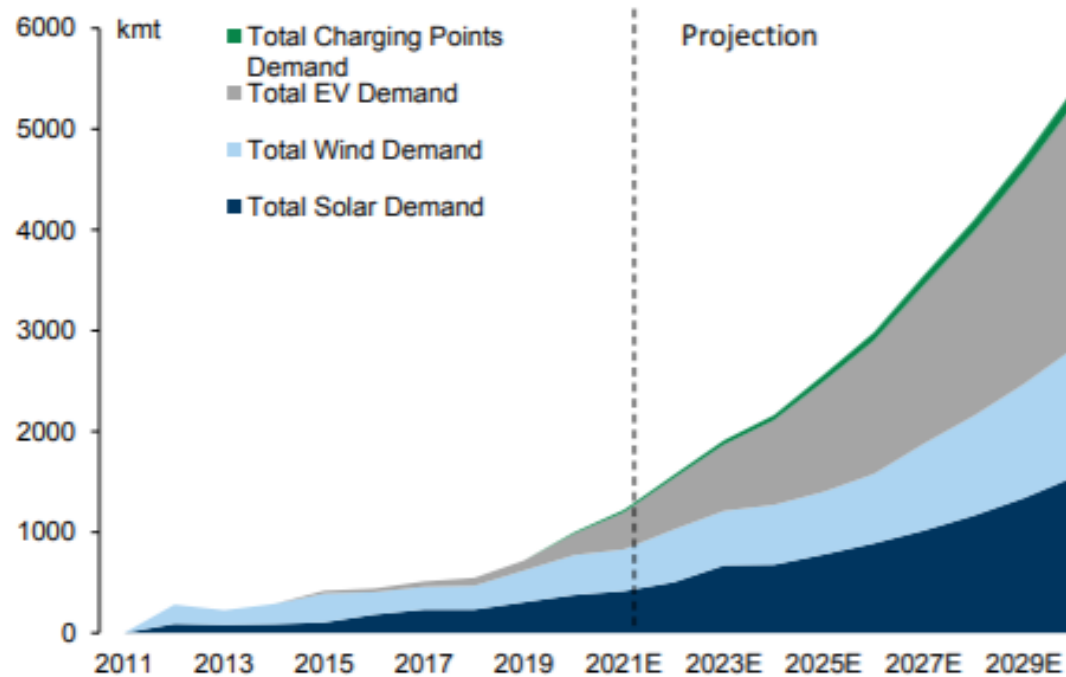


DEMAND INDICATORS ARE POSITIVE FOR COPPER, ESPECIALLY WITH GREEN TRANSITION

- The green-related copper demand could grow from 1Mt in 2020 to 5,5 Mt in 2030

(to be compared to 2020 mined production ~20Mt)

Copper demand, per year, by green sector



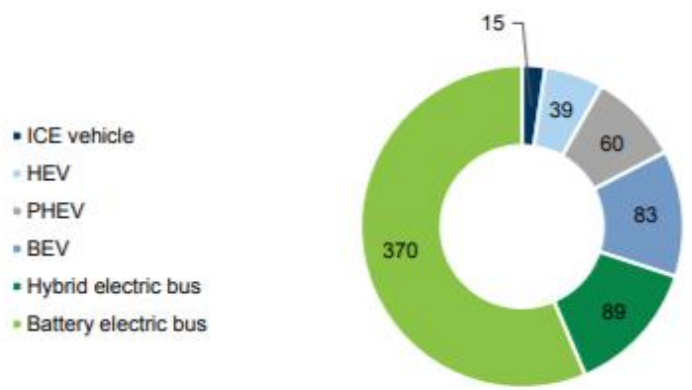
Source: IEA, IRENA, ICA, CDA, Goldman Sachs Global Investment Research

- President Biden's 2 trillion\$ plan, coupled with the ongoing focus on green infrastructure, have fuelled optimism in copper
- Indeed, sales of electric vehicles (EVs) are increasingly gaining popularity : Although the pandemic drove global car sales down by 16 % in 2020, **EV sales jumped by around 40% to around 3M vehicles**. This trend has continued into the first quarter of 2021, especially in the regions where governments have provided or extended fiscal incentives
- Upside risks for copper demand emerges as **China aims to become carbon neutral by 2060** : Achieving carbon neutrality means a much higher rate of electrification, more EVs on road, a higher share of renewable power

THE COPPER CONTENT IN VEHICLES WILL INCREASE WITH THE ELECTRIFICATION

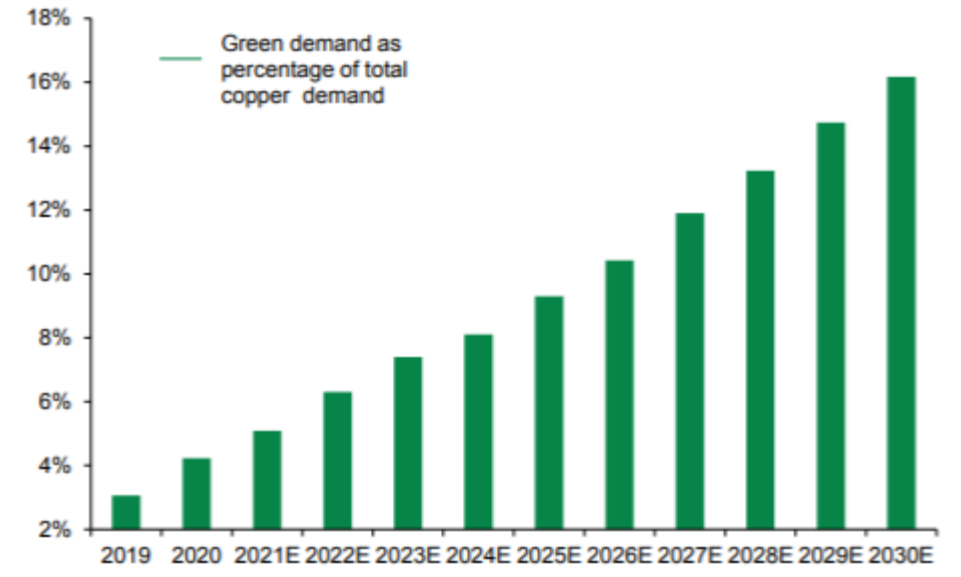
- We consider that there is four times more copper in an electric vehicle than in a combustion vehicle
- EV : ~80 kg copper

Copper content by type of vehicle (kg)



Source: ICA, Goldman Sachs Global Investment Research

Green copper demand as percentage of total copper demand

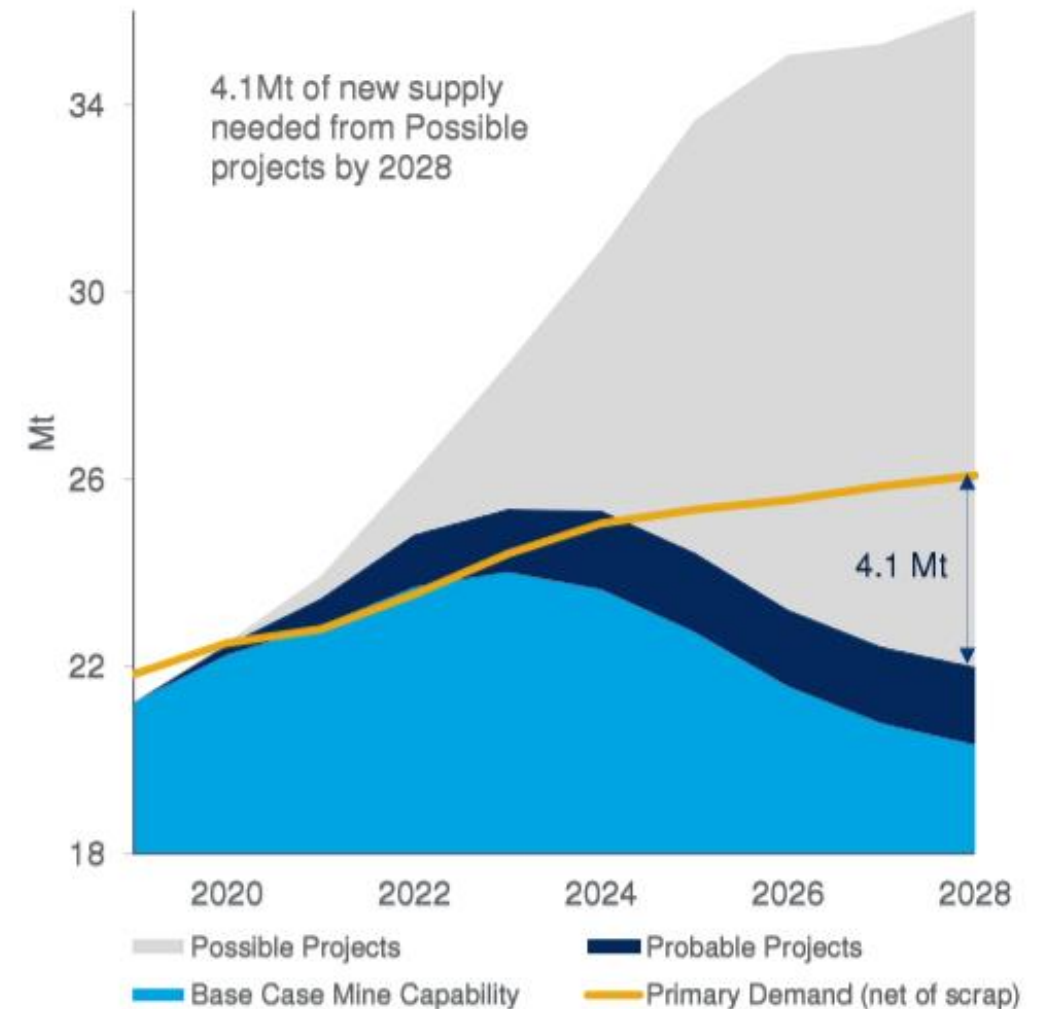


Source: Woodmac, Goldman Sachs Global Investment Research

SUPPLY DEMAND FOCUS AND FORECAST

- A deficit larger than expected in 2021 (some disruptions due to covid in Chile for example)
- ... before surpluses building through to 2023
- After 2024-25, new mining projects are still required to meet future demand for copper : further investment is required (implies incentive prices for copper !)
- Project quality is a hurdle, with lower grades, higher capital and operating costs => **higher environmental impacts for the new greenfield projects**

The copper mine gap opens from 2024 / 2025



Sources : WMK, HSBC, MS, internal studies

RAW MATERIALS STAKES FOR THE AUTOMOTIVE INDUSTRY

ACCESS SCARCITY

PLANET RENEWABLE RESERVE
OVERUSE IN LESS THAN 1/2 YEAR

COPPER RESERVES 37 years
1 EV = 4 x 1 ICE
(80kg engine + battery + cables)

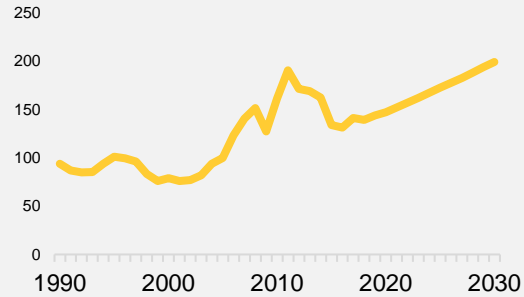


Source: Deutsche Bank, United States Geological Society

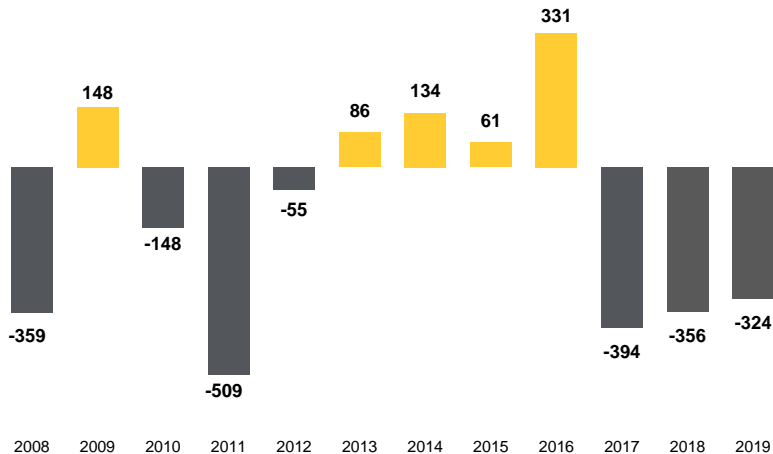
COST VOLATILITY

(CO+NI+LI) IN BAT COST

WORLD COMMODITY INDEX PRICE
(NON FUEL)

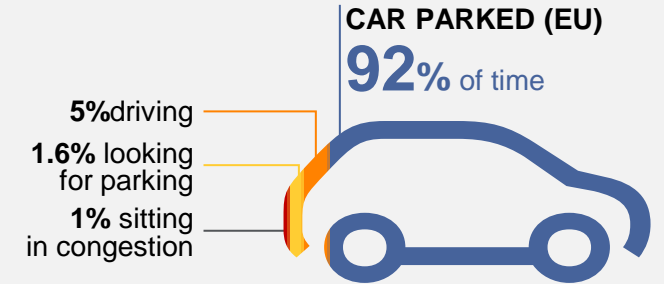


RAW MATERIALS COST IMPACT IN GROUP COP (M€)



RESOURCE EFFICIENCY

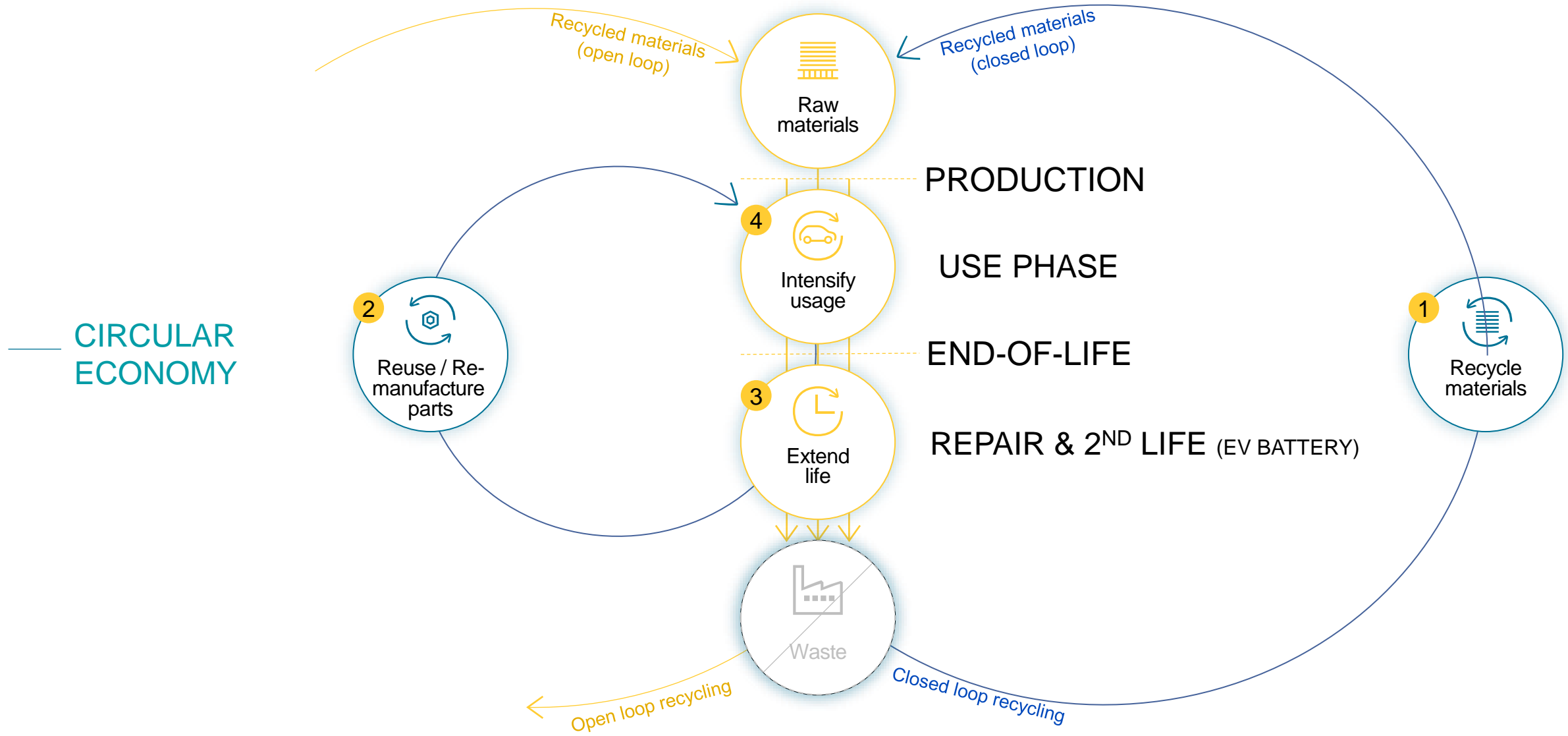
LOW USAGE RATE FOR CARS



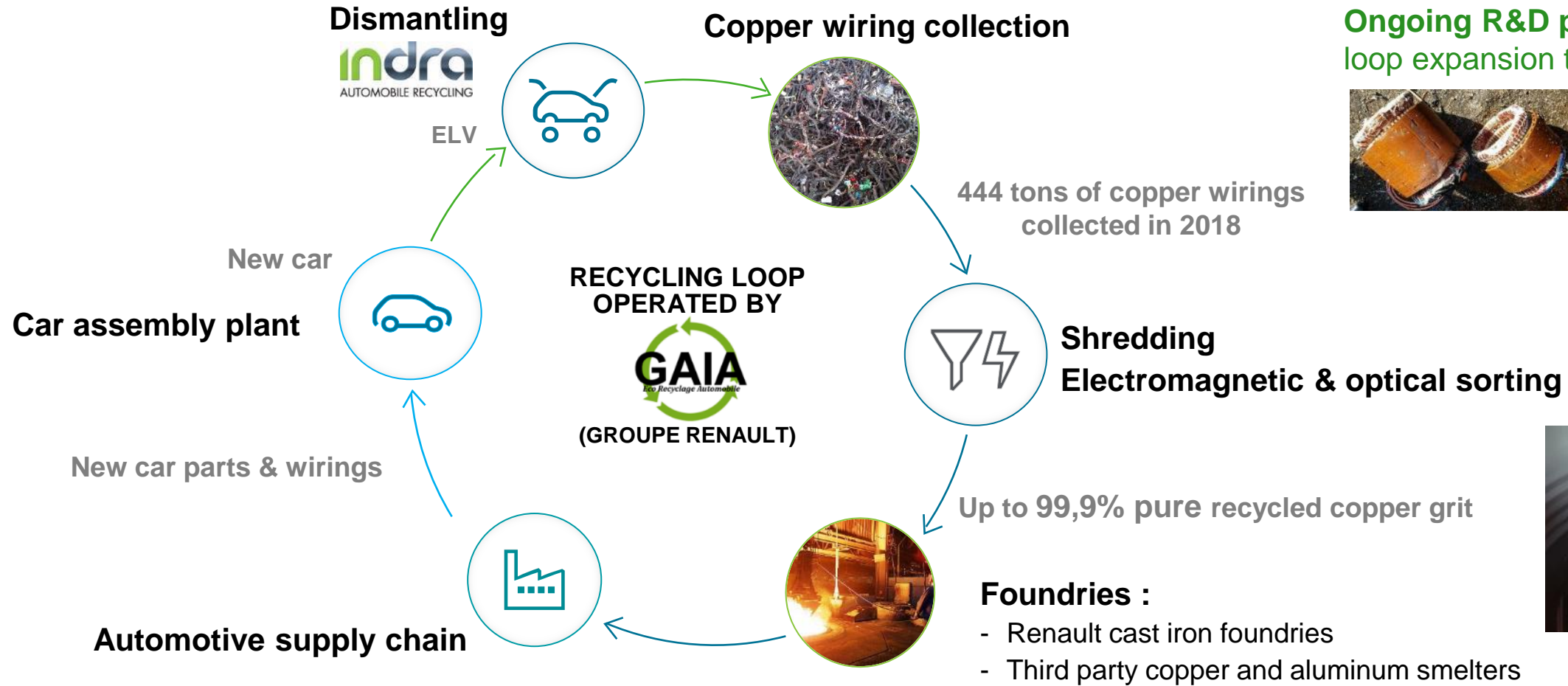
Average European car has 5 seats but carries 1.5 people/trip

50% PUBLIC SPACE DEDICATED TO CARS
IN MOST CITIES (today)

ONE WAY TO MITIGATE: FROM A LINEAR TOWARDS A CIRCULAR BUSINESS MODEL



CLOSED LOOP RECYCLING OF COPPER FROM AUTOMOTIVE WIRINGS



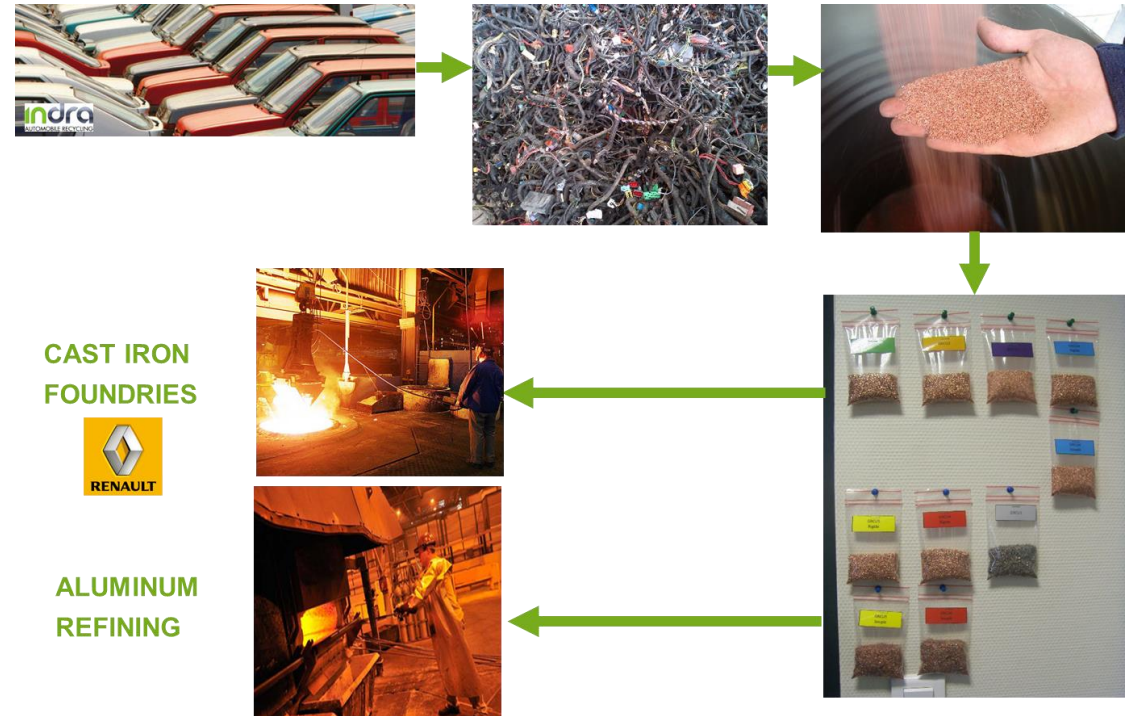
Ongoing R&D project with MTB: loop expansion to EV powertrains



EXAMPLE OF COPPER FROM END-OF-LIFE VEHICLES (AND PLANTS)

Objectives of the ECC Competitive Circular Economy Project :

- Transforming automotive wiring into high purity copper shot (> 99%)
- Keeping the material's property
- Pay only the processing value
- Use this channel to recycle our internal wires
- **In the long term, make the European foundries of the Alliance independent from the Market (180T/year)**

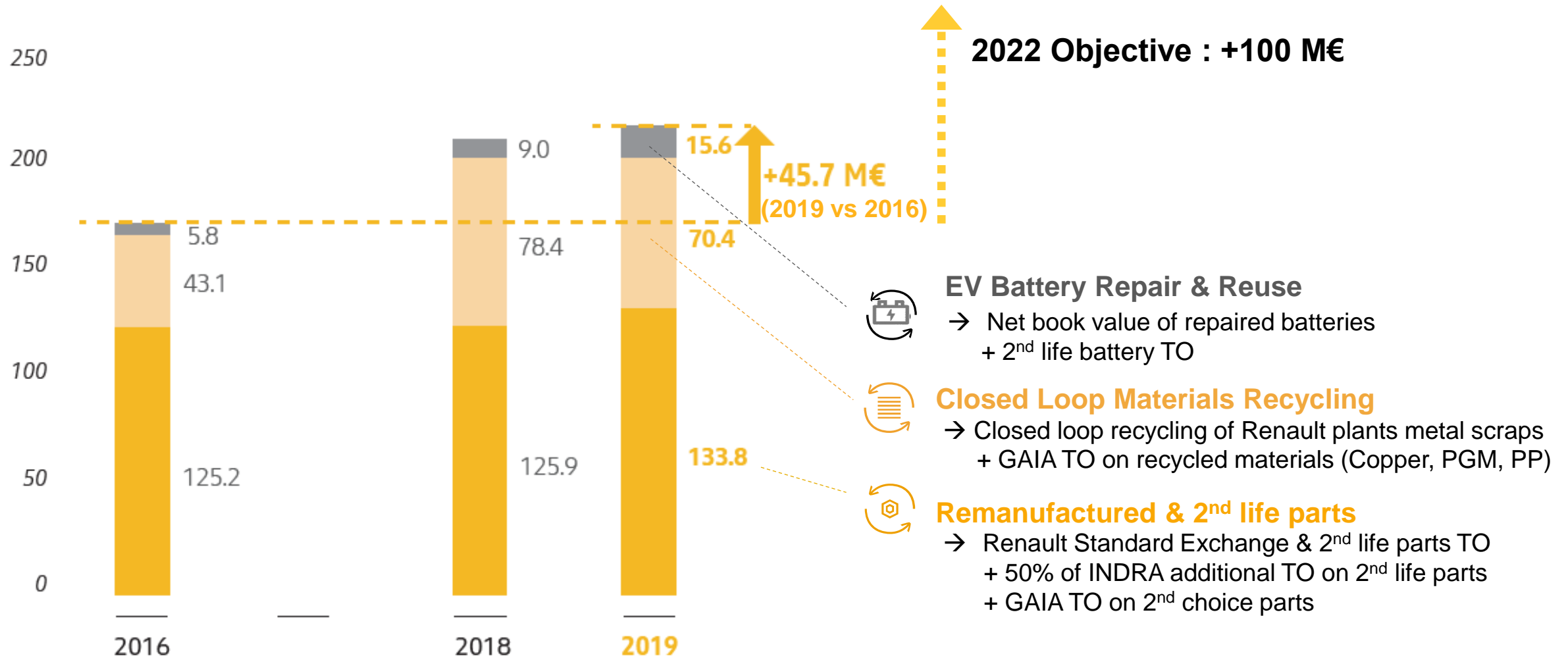


Process already operational, optimized with our partner MTB

- Identification of undesirable items (lugs, boxes, etc.)
- Elimination during the process (sieving) or by pre-treatment
- Quality control at the end of the process

CIRCULARITY KPI : A SYNTHESIS INDICATOR FOR DIVERSIFIED CIRCULAR ACTIVITIES

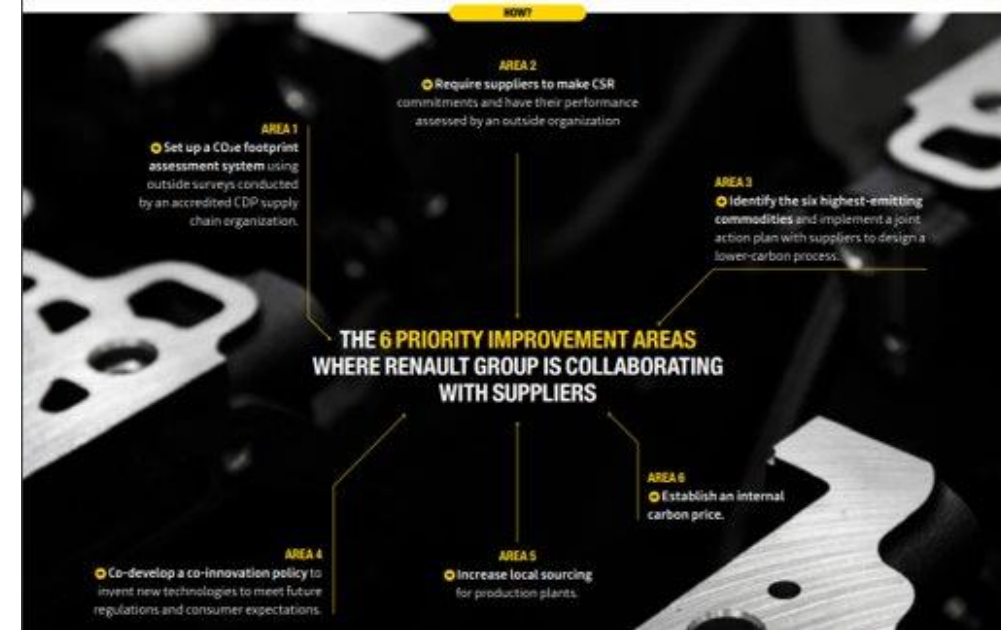
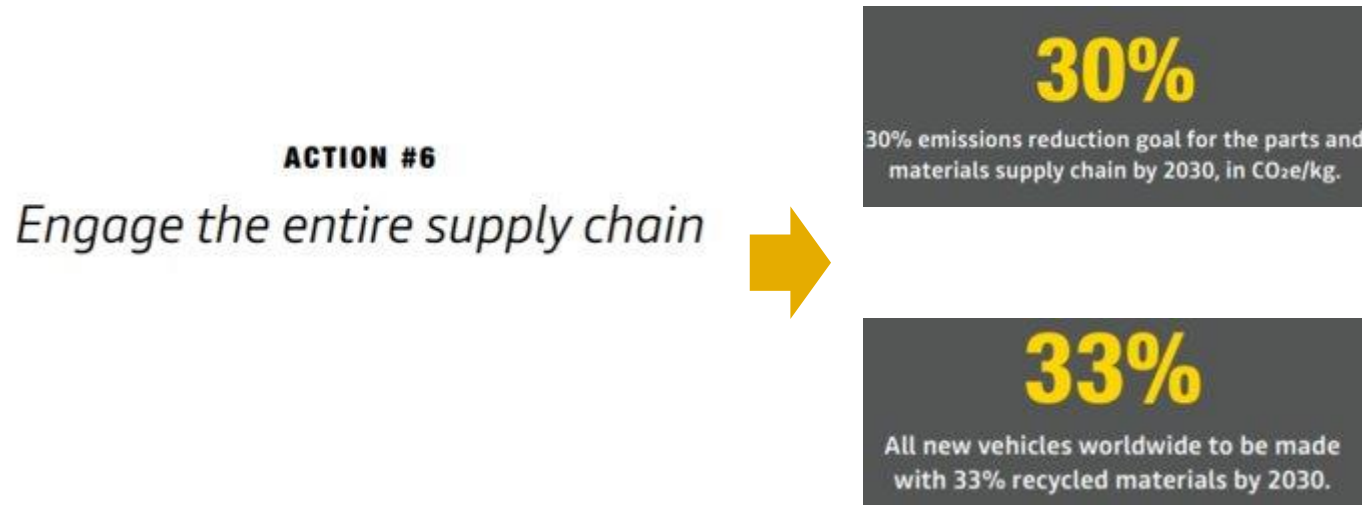
*Value (M€) preserved in the automotive sector through **Groupe Renault's circular economy activities***



A MORE GLOBAL PICTURE

■ Climate claim Renault – Luca de Meo April 23rd

- Renault to accelerate in its commitment to be aligned with Paris agreement 1,5°C. Carbon neutral EU 2040 and WW 2050



■ What can be done at national or European level to support the sector and our actions? Which levers or dedicated working groups?

- Supporting ERMA but not focused on copper at the moment ...

THANK YOU