



# BOOSTING CIRCULARITY

RECYCLERS ROLE WHEN OVERCOMING THE SCARCITY  
AND QUALITY CHALLENGES IN STEEL VALUE CHAIN

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Family enterprise, founded **1914**



REVENUES **656.7 M€**

EMPLOYEES **1,012**

Avoided emissions globally: **1,360,000** tonnes CO<sub>2</sub>e = **500,000** passenger vehicle emissions

Unique research centre: **>600** SAMPLES, THOUSANDS OF ANALYSES EACH YEAR

**94.8%** utilisation rate of recycled materials

Recyclable materials collected **957,313** tonnes

Own operations carbon neutral by **2035** (Scope 1 and 2)

Entire value chain carbon neutral by **2045** (Scope 1, 2 and 3)

Statistics: Kuusakoski's global recycling operations in 2022

Scope 1 = direct emissions from operations • Scope 2 = indirect emissions from purchased energy  
Scope 3 = other indirect emissions from operations

# FOCUS ON SUSTAINABLE RECYCLING OF METALS

The biggest customers for our global deliveries include steel mills and foundries in Europe, Asia and North-America.



Aluminium



Precious metals



Iron & Steel scrap



Stainless steel



Non-ferrous metals

## DID YOU KNOW?

Using recycled metals as raw materials can reduce energy consumption by as much as 60–95 percent depending on the metal!

# RECYCLED STEEL

## - RAW MATERIAL FOR GREEN STEEL MAKING

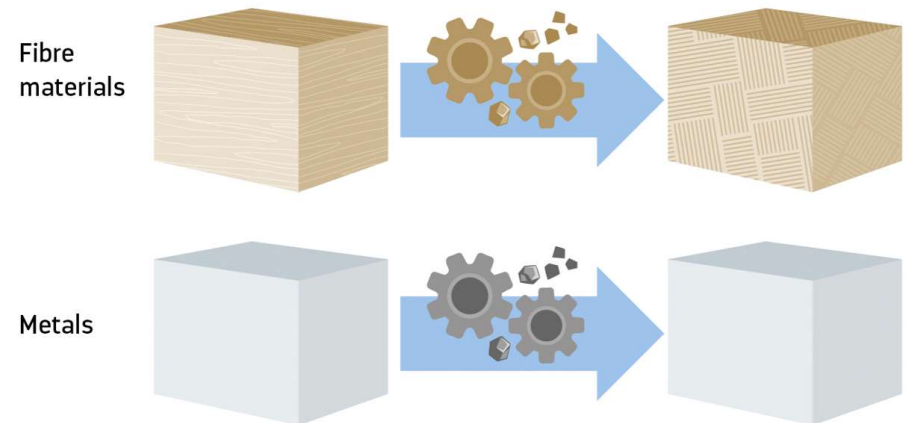
- Recycling is an enabler of sustainable growth. The **green transition and circular economy** are based on the efficient recycling of materials at the end of their life cycle.
- While Steel is **backbone of modern society**, present basically in all physical aspects of our lives, it is also key building block for green transition.
- Recycling is by far the best solutions for achieving **eco-efficient steel value chain**. In terms of climate impact together with energy and material inputs, efficient recycling creates a new life cycle with only **a fraction of the ecological burden** compared to virgin production.
- Steel is the **most recycled material** at our society
- Annually some **+600 million tonnes** of steel is being recycled
- This avoids app. **1 billion tonnes of CO<sub>2</sub>** emissions globally
- The ongoing steel industry decarbonization will significantly increase the demand for secondary raw materials as **the most preferred option** to meet future growth.

# METALS ARE INFINITELY RECYCLABLE

## – EFFICIENCY OF RECYCLING IS DECISIVE FACTOR

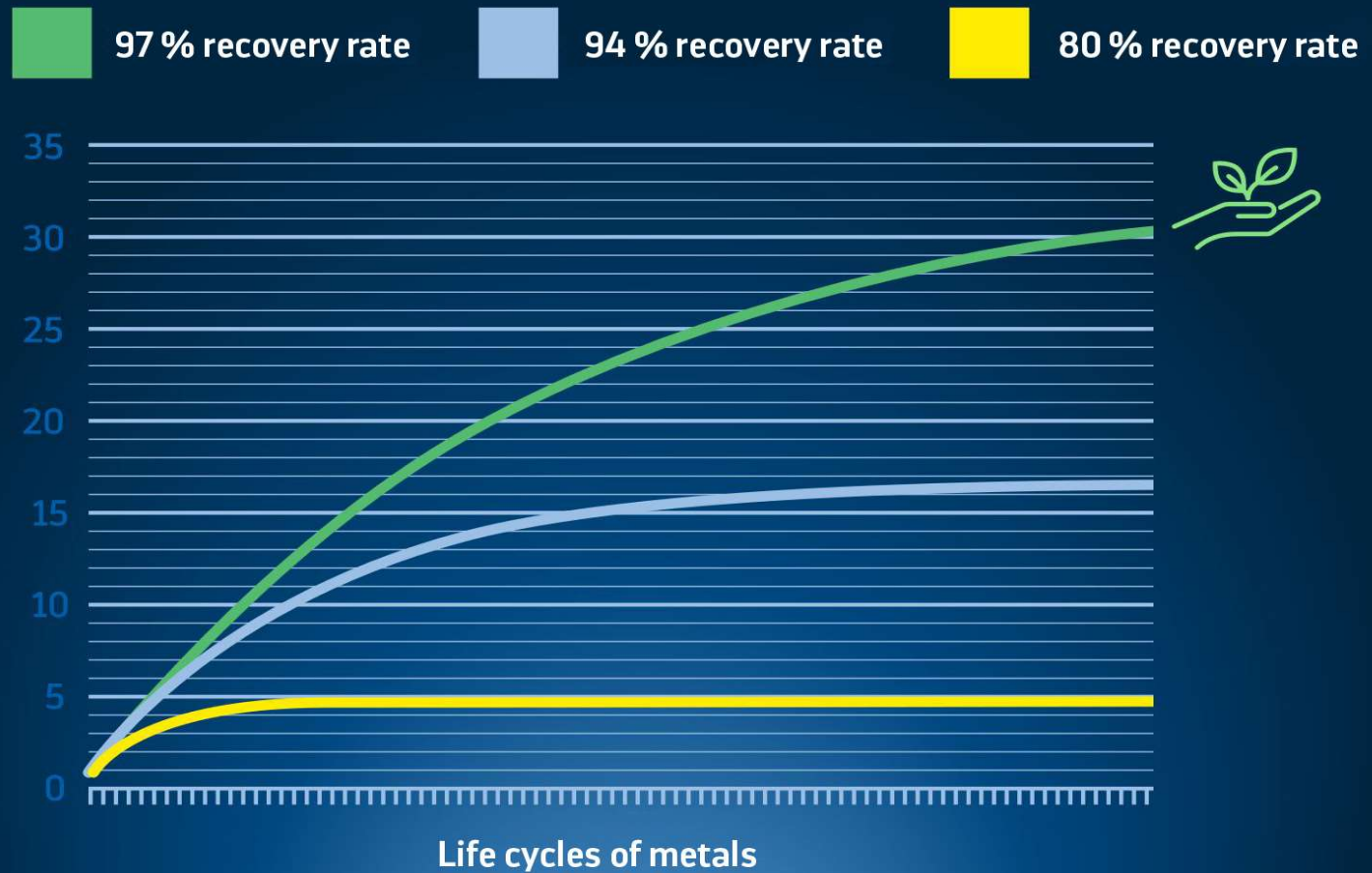
- Metals are elements or alloys and can be recycled multiple times - in theory forever
- The quality and purity achieved in the recycling process are essential to achieve high rate of recycling.
- The recycling rate determines the overall life cycle efficiency of the end material and product.
- This is especially important for metals that can be recycled several times at the end of their service life without deterioration in quality

**UNLIKE FIBRE MATERIALS, THE PROPERTIES OF METALS ARE NOT WEAKENED BY RECYCLING**





# The overall life cycle efficiency of metals is dictated by recycling rate



# CRITICAL PHASES IN RECYCLING LOOP

Recycling based production represents 30 % of global demand 1,9 billion tonnes

1. New Steel entering the cycle
  - Steel products life cycle begins
  - Annual steel demand 1,9 billion tonnes

KPI: Recycling Input rate 30%

4. Steel recycling for new steel products
  - Secondary steel production based on recycled raw materials

KPI: Recycled content 97%

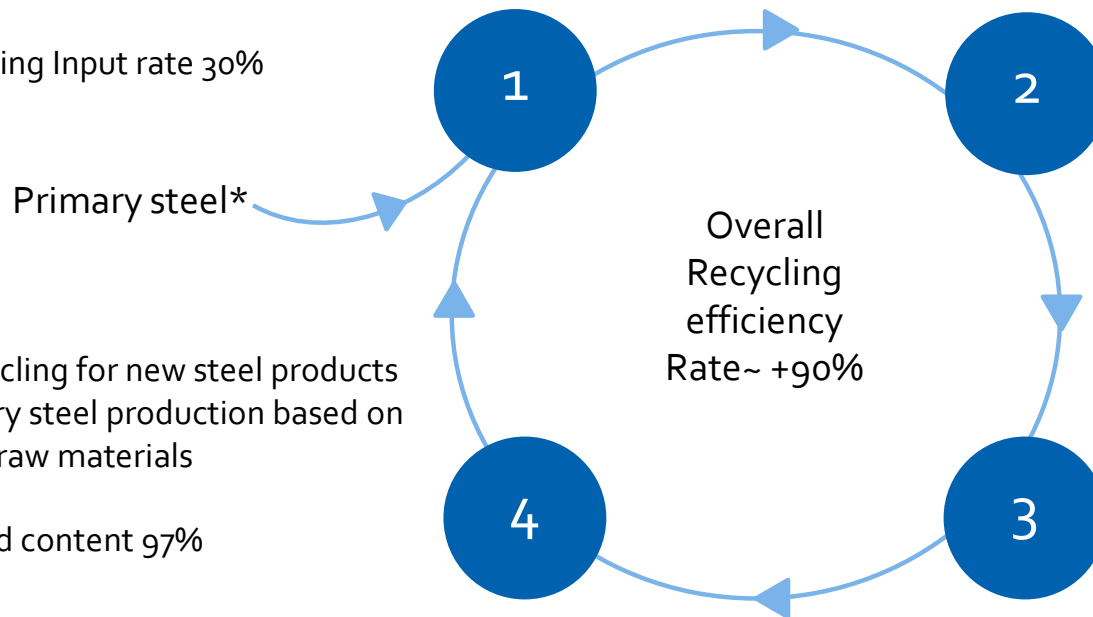
Use phase.

2. Steel at the End Of Life
  - Steel product reaches end of use phase and becomes available for recycling
  - Recovery for recycling

KPI: End of life collection rate ~95%

3. Recycling Process
  - Recycled steel processed and productized for raw material

KPI: Recycling processing rate 98-99%



# SCARCITY OF RECYCLED STEEL DRIVEN BY GROWTH

There's significant time lack between EoL steel availability for recycling and new steel production growth – it is also due to steel product long and efficient lifecycle

Currently availability of recycled steel matches the capacity fairly well

In coming years the steel industry green transition will steer demand more towards recycled raw materials

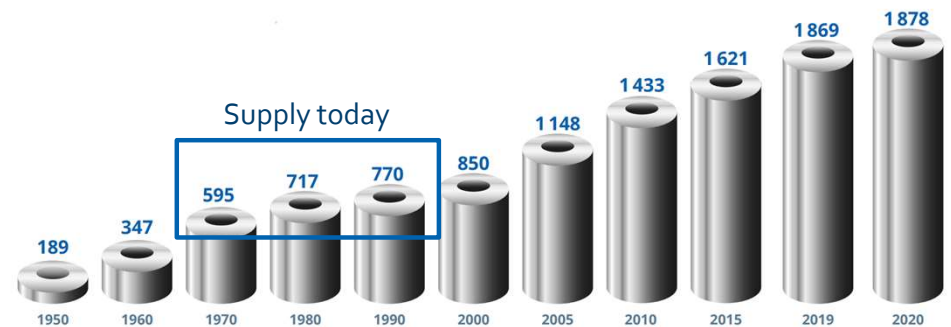
De-carbonization of steel industry will create new capacity for steel recycling and recycled steel will have robust demand

The “scarcity” of recycled steel will remain at least for the coming decades

Steel average lifecycle is app. +40 yrs.

- Buildings & construction +50 yrs.
- Transport and logistics +23 yrs.
- Industrial applications & Machinery +18 yrs.
- Home appliances & white goods +15 yrs.

World crude steel production 1950 to 2020 (million tonnes)



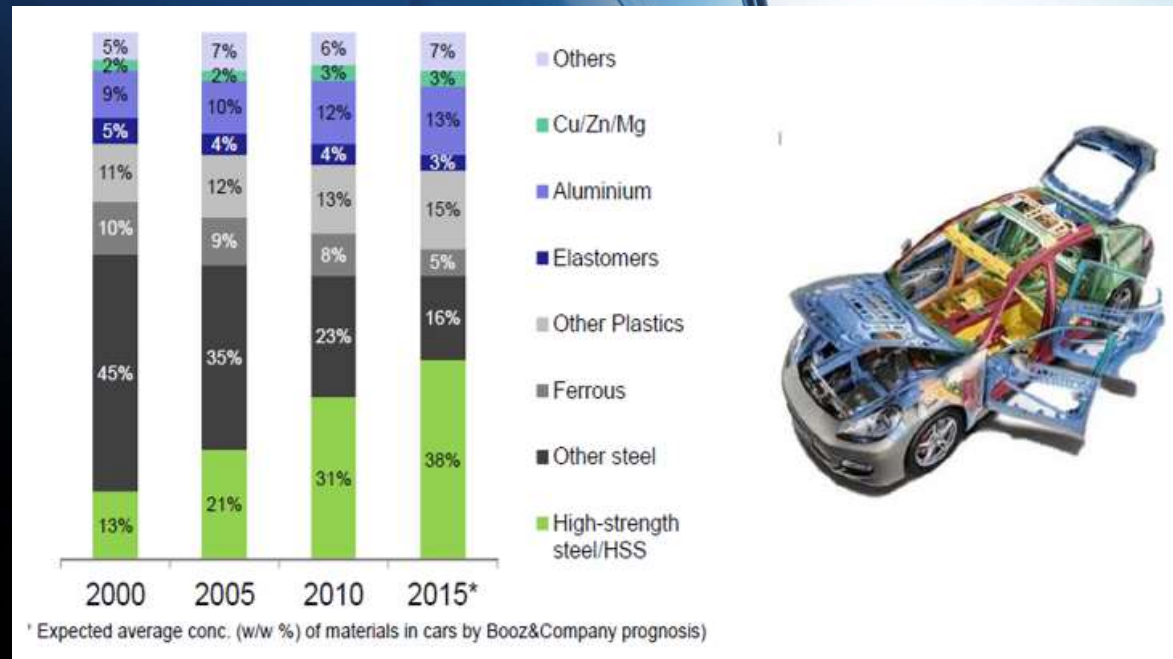


# THE END OF LIFE MATERIALS QUALITY CHALLENGE

## Materials complexity

End of life materials are becoming content wise more complex and fragmented

While our customer require high quality non-residual products



# WHAT WE AS RECYCLER CAN DO

Forerunner in circular economy

## Efficient recycling of steel

Improve the recovery rate further by investing in pre-sorting and handling.

Building best recycling service network

## Maximizing customer value

We offer life cycle data, like product carbon footprints and handprints

Secure sustainable supply chain by providing transparency and traceability

## Best in class recycling capability

Investments to further increase the recovery and recycling rates

Building new capacity to generate more high-quality recycled steel

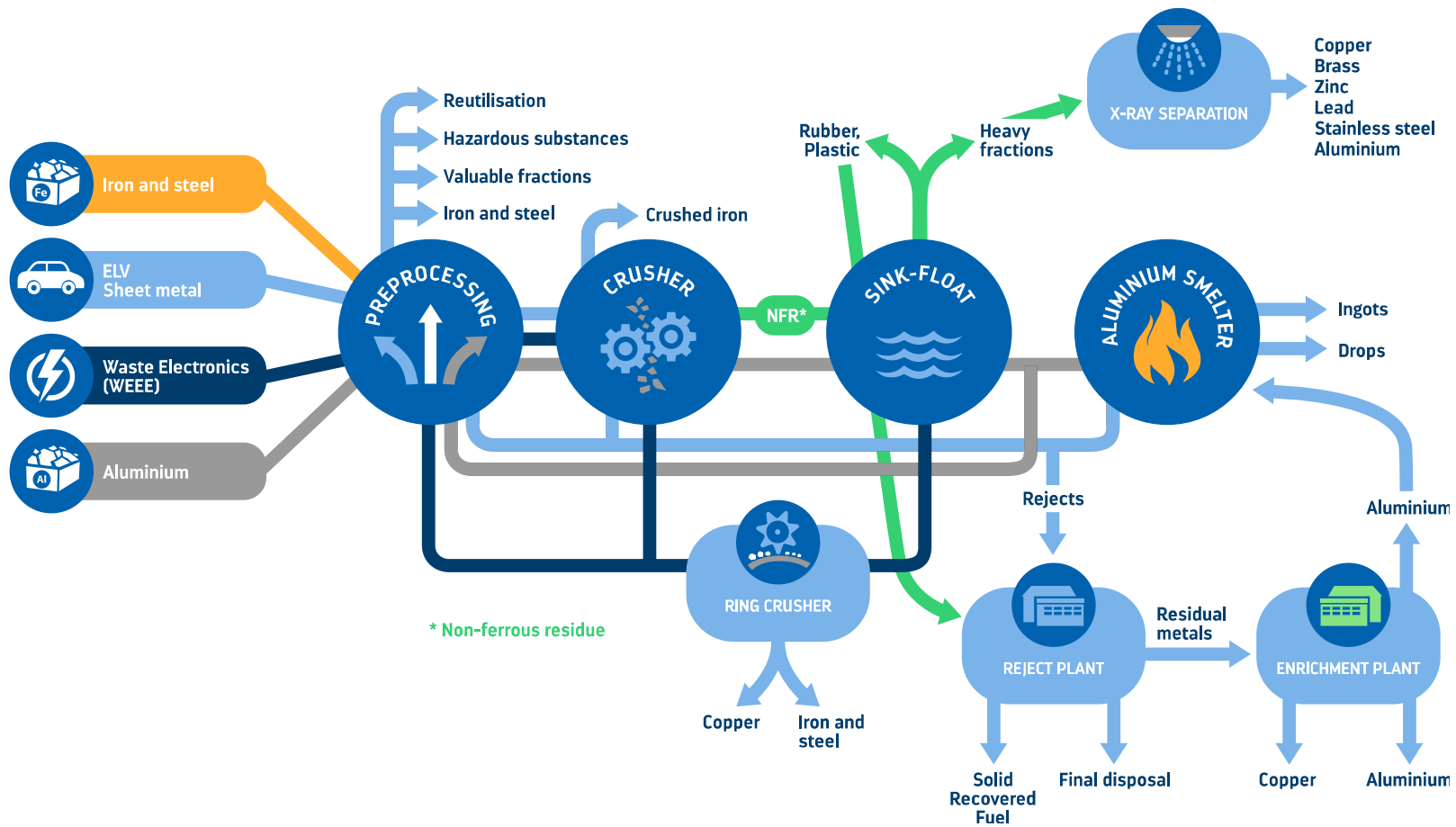
## Maximising the life cycle

Productizing recycled steel raw material to better fit customer "recipe".

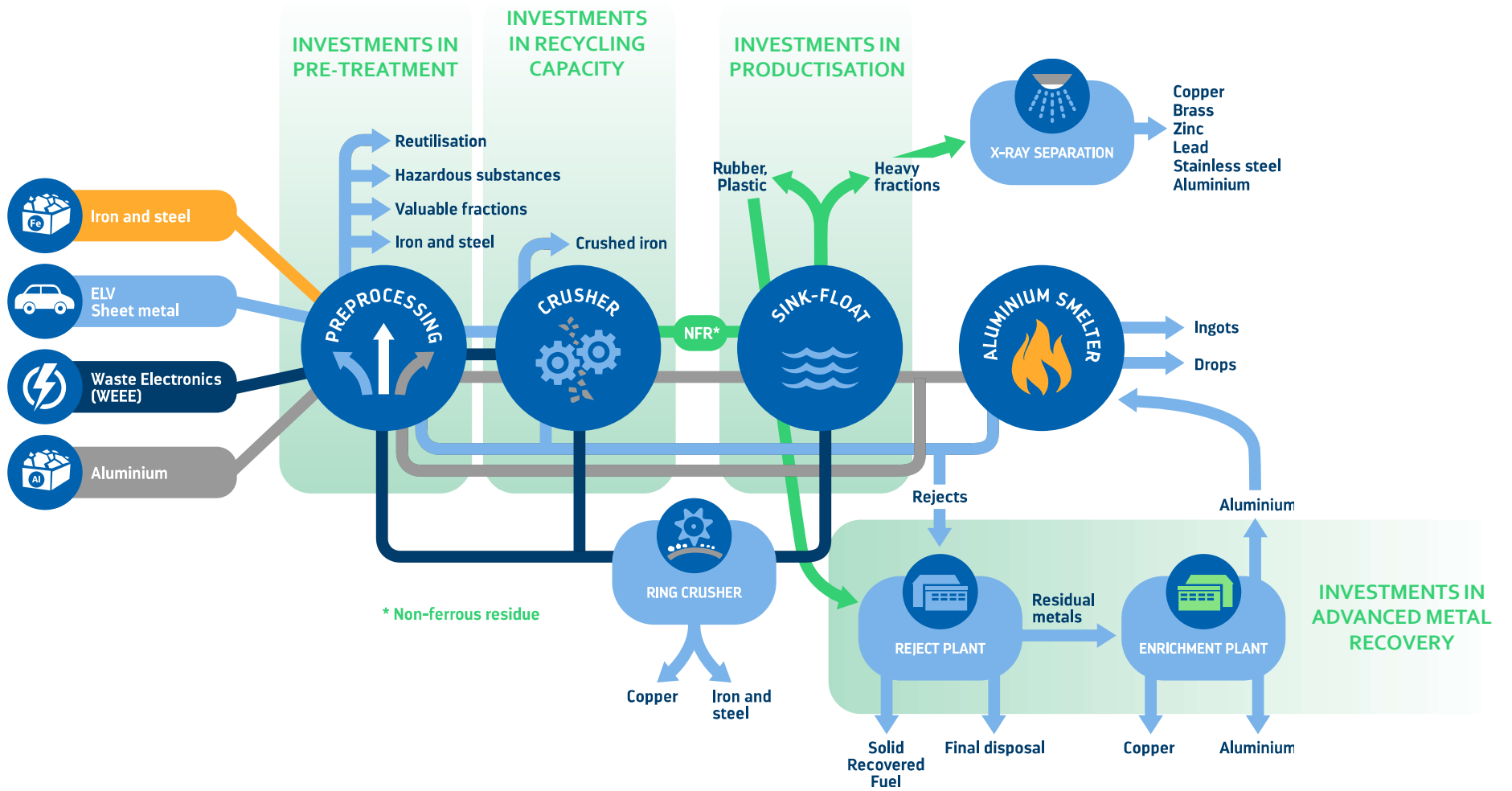
Tailoring the fractions enable efficiency gains, sustainability and higher recycled content non-residual steels.



# OUR RECYCLING PROCESS







# PRODUCTIZATION AND QUALITY

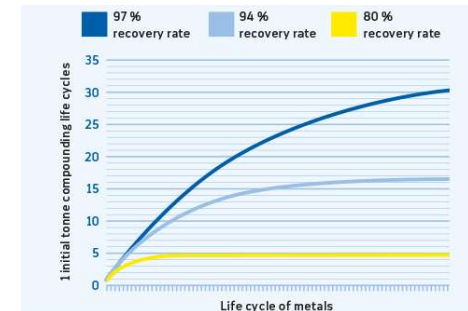
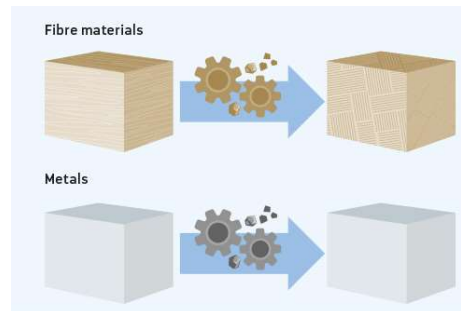
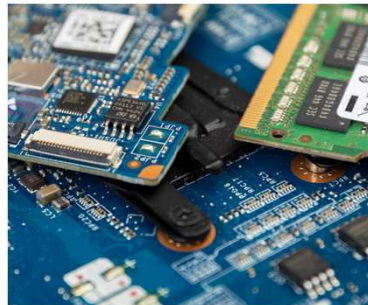
Enabling our customers to improve their recycling efficiency

- For example in case of Stainless Steel
  - Stainless steel has main steel grades as Austenitic, Ferritic, Martensitic with some special grades like duplex
  - Even though they are all stainless steels by definition - the chemical composition is different
  - Some grades the desired alloying element can be unwanted impurity in other grade
  - We have and continue to invest in leading technologies for detecting different grades and separation of impurities
  - By having capability to separate these grades more in detail based on material content helps our customers greatly to increase their scrap ratios
  - Besides the significant reduction in greenhouse gas emissions, increased recycling rates saves energy and conserves natural resources

**Co-operation and joint research with customers is key to success!**

# BOOSTING CIRCULARITY IN WIDER SCOPE

With the aim of whole life cycle “end-to-end” optimization



## Efficient recycling

- Maximize recovery rates
- Producer responsibility agreements
  - Sorting waste where it is generated
  - Steering towards circularity

## Circular economy

- Safeguard recycling industry competitiveness and investments
- Remove obstacles of recycling. Secure free and sustainable trade.

## Recycled content

- Steer and incentivise recycling in value chains.
- For example:  
Carbon credits for recycling or by setting “recycled content” targets

## Proactive partnerships

- Promote Ecodesign:
- “New products should be designed for recycling – currently we design recycling for existing products”



# STRONG COMMITMENT

through ambitious targets

## OUR CLIMATE TARGETS

- Kuusakoski Recycling's own operations carbon neutral by 2035 (scope 1 and 2)
- Entire value chain carbon neutral by 2045 (scope 1,2,3)

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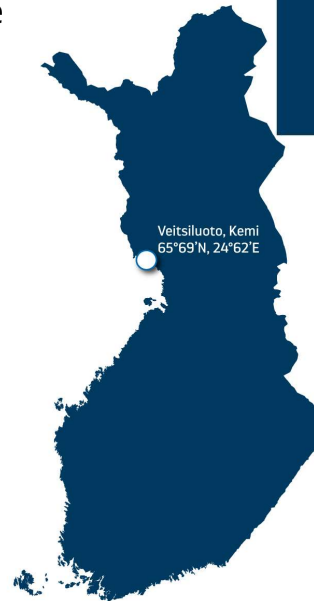


In 2022, we created a climate roadmap for Kuusakoski's carbon footprint with key milestones.

# NEW 100% CARBON FREE RECYCLING PLANT

## Concrete step towards the green transition

- Responds to growing demand for recycled metals in Finland and Sweden
- Increases the annual steel recycling capacity of Kuusakoski by 25%
- Enables emission reductions across value chain some 150 000 t CO<sub>2</sub>
- Enhanced recyclability through high tech facility
  - The pre-treatment technology for more pure recycled raw materials
  - Enable higher recycled content in the production of high performance steels
  - With our investment, our customers can increase the share of recycled materials and further improve steel life-cycle.
  - Dependency on primary raw materials and environmental burden of steel production chain will be reduced



Close to our customers

Location optimal for customer service and de-carbonisation



**RESTORING VALUE**