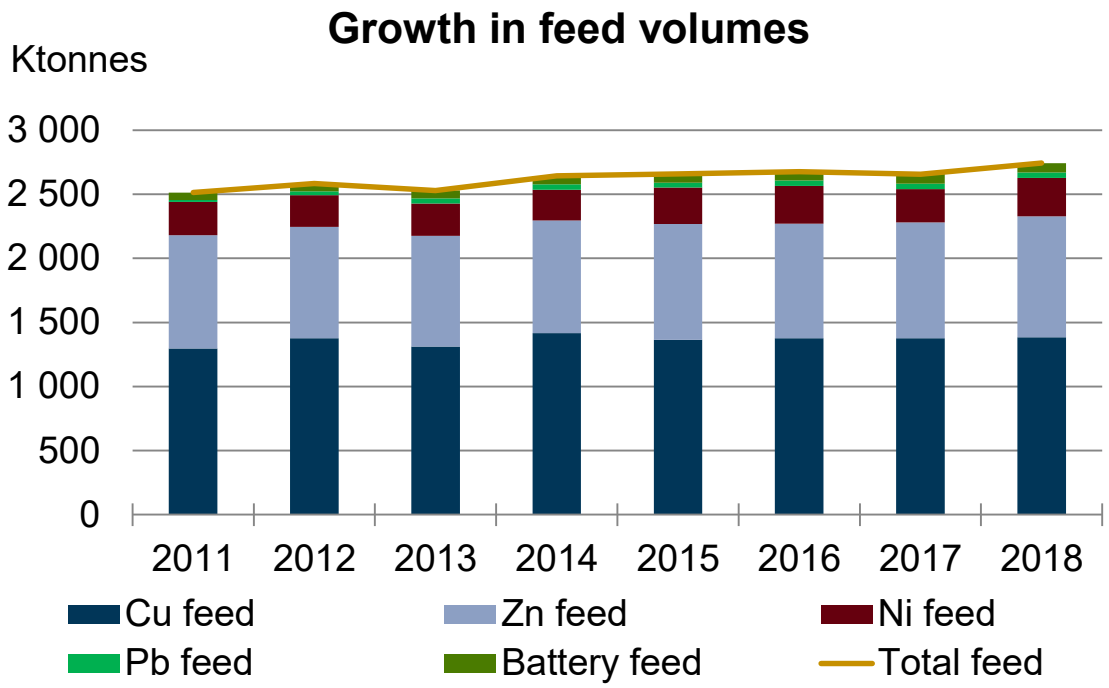
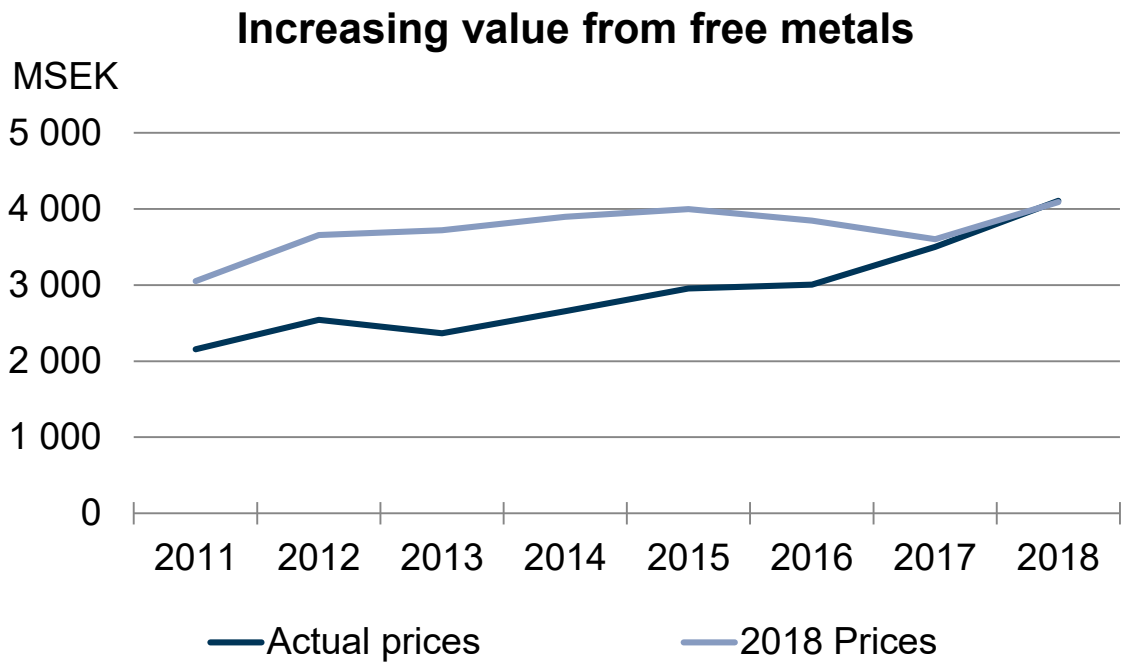
Growing within the circular economy

Kerstin Konradsson, President Boliden Smelters

Value creation through growth and extraction of free metals…





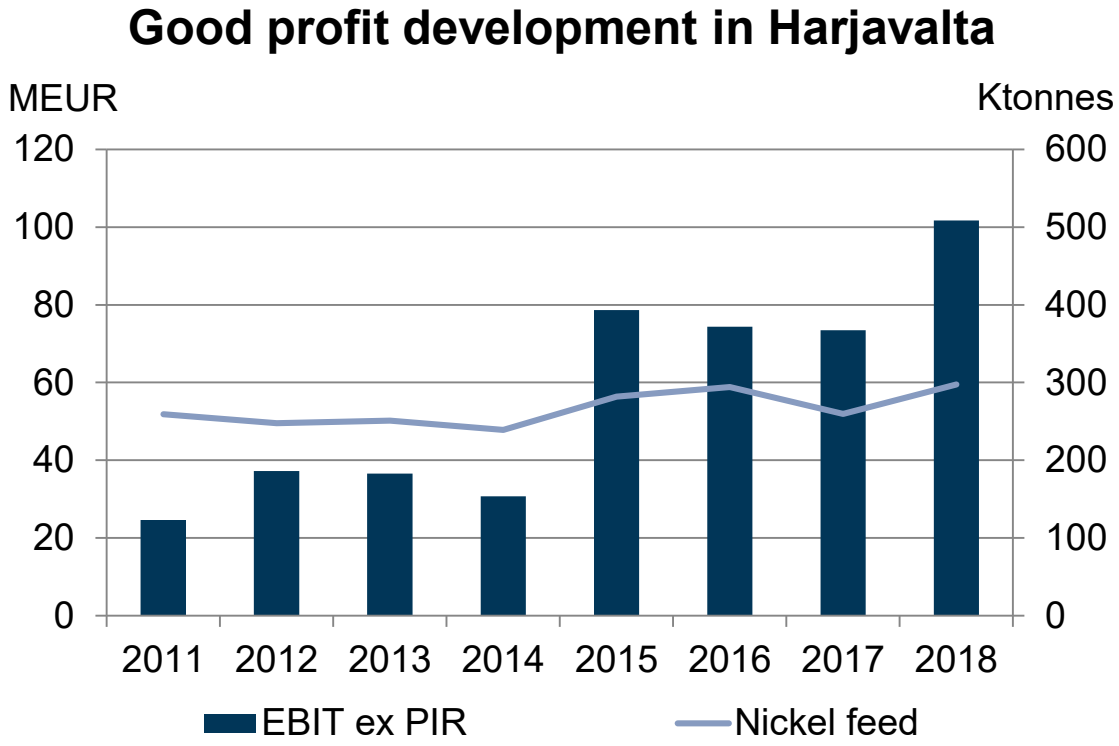
- Operational improvements
- De-bottlenecking, expansions
  - Expansion Odda 200 ktonnes zinc (175 ktonnes)

- Volume growth
- Utilizing existing capacities
  - Silver concentrate from Kokkola reprocessed at Rönnskär
- Developing new technical capabilities
  - Nickel capacity in Pori

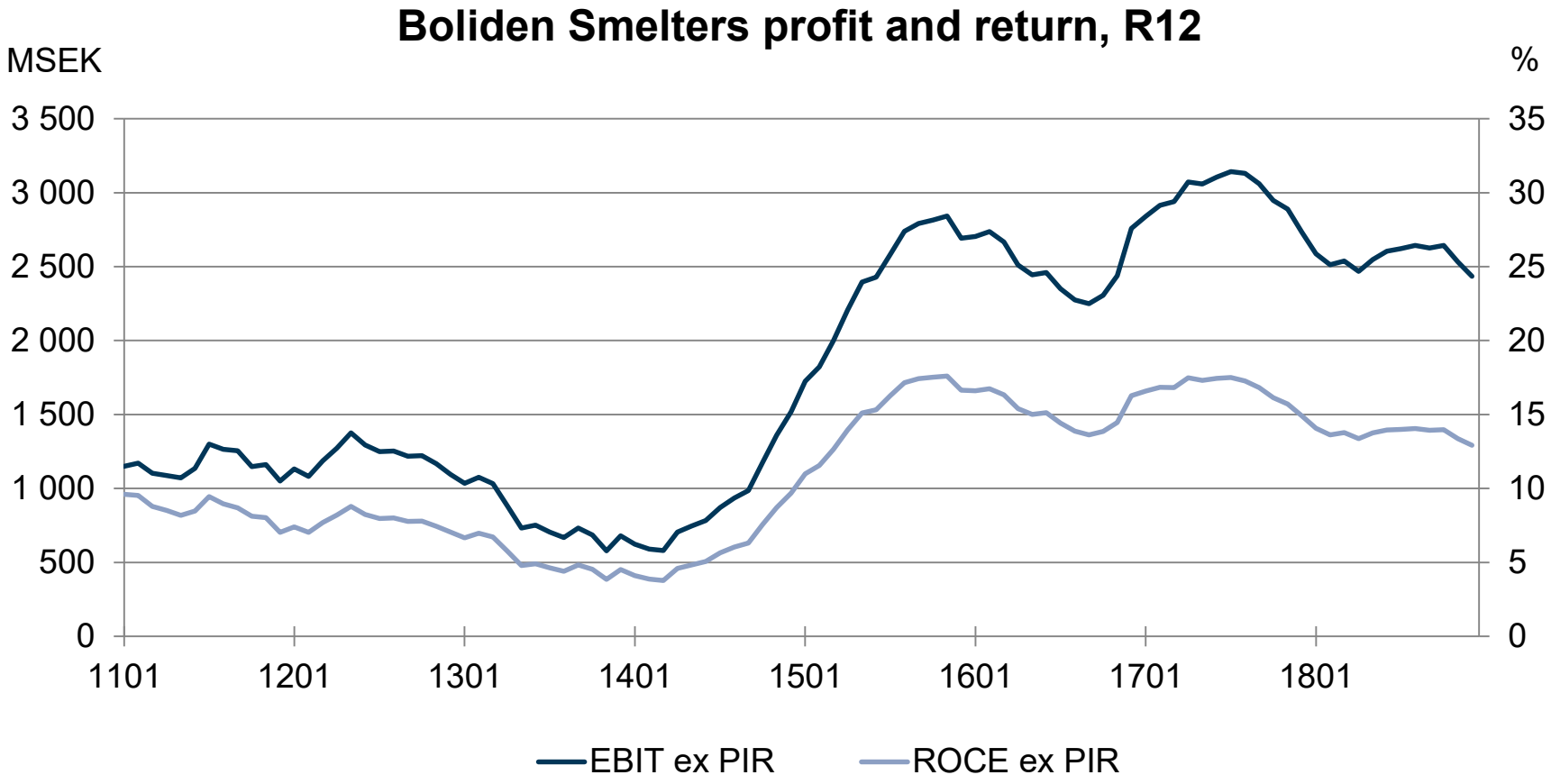
…in combination with a new business model for nickel

- Good market conditions
  - High demand for nickel matte
- Volume growth
  - Operational improvements
  - De-bottlenecking

- Harjavalta 2018 EBIT > 1 BSEK

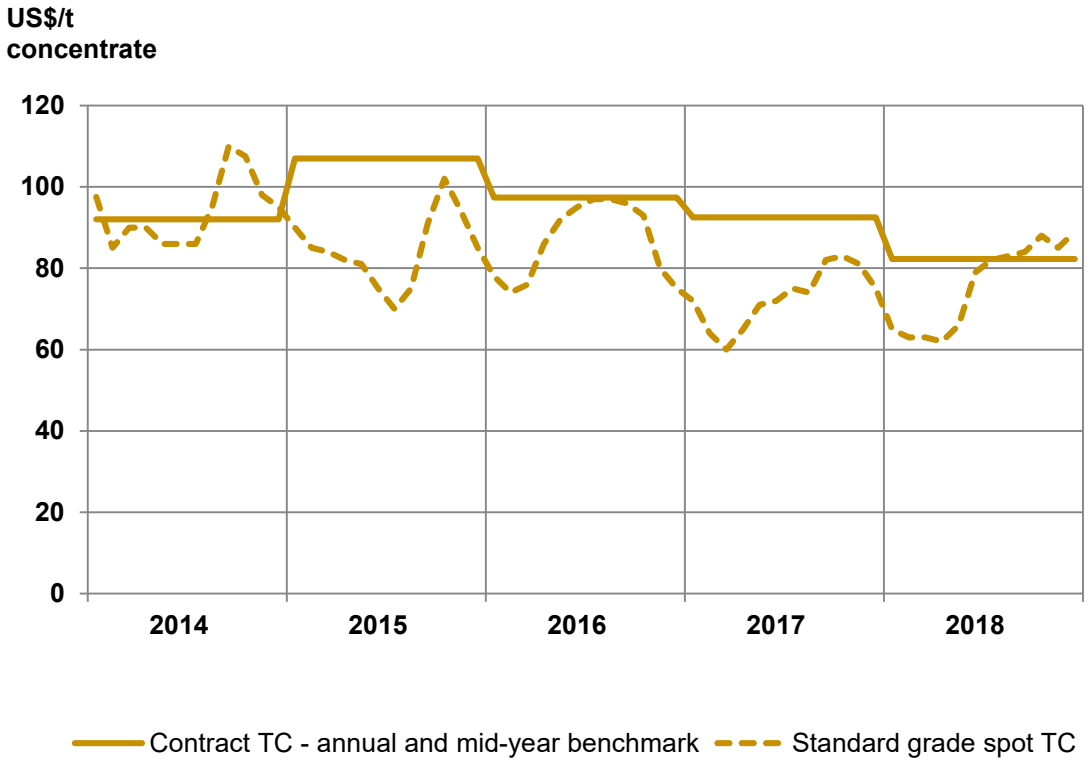


Our consistent strategy has delivered good returns…



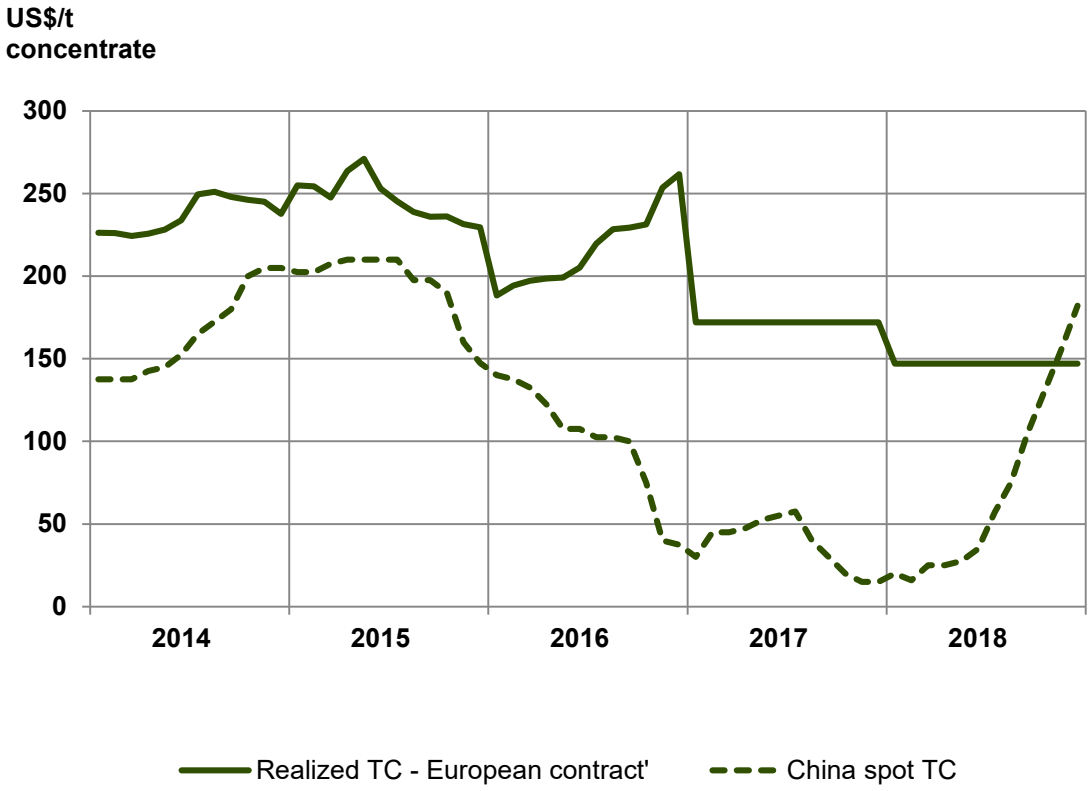
…despite weakening market conditions

Copper treatment charges



Source: CRU

Zinc treatment charges



We continue to invest in and expand our copper operations

Harjavalta acid plant

Copper cathodes

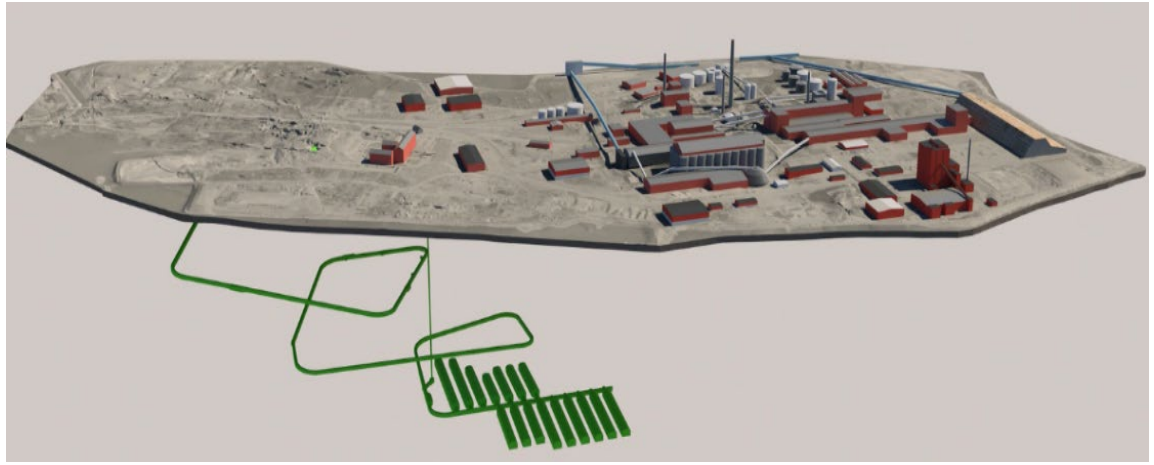
- Investing in a new acid plant in Harjavalta enables potential expansion in copper and nickel
  - 90 MEUR
  - New capacity Q2 2019

- Expanding Harjavalta to 620 ktonnes feed (560 ktonnes) & Pori to 170 ktonnes cathodes (153 ktonnes)
  - 45 MEUR
  - New capacity Q1 2020
- Expanding Rönnskär to 725 ktonnes feed (650 ktonnes)
  - 350 MSEK
  - New capacity Q1 2021

NEW BOLIDEN

We are developing our technical capabilities and environmental performance at Rönnskär…

Rönnskär leaching plant



Rönnskär underground repository

- Investing in a leaching plant to recover free metals from intermediates and reduce waste volumes
  - 750 MSEK
  - Start-up Q4 2020
  - 25 ktonnes of lead sulphate
  - 25 ktonnes of copper/zinc sulphate

- Building a unique underground repository for sustainable storage of waste classified as hazardous
  - 650 MSEK
  - Start-up Q4 2020
  - ~400 ktonnes stabilized waste

…and investing in new capabilities to recover more metals and to recycle plastics

Rönnskär silver separation

- De-bottlenecking silver capacity at Rönnskär
  - 60 MSEK
  - Start-up Q3 2019
  - 66 tonnes silver

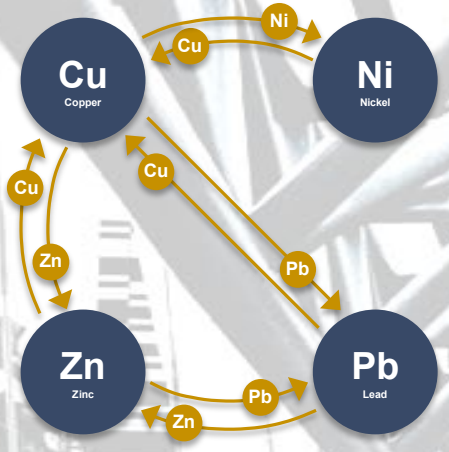
Bergsöe plastic separation

- Building a plastic separation plant in Bergsöe to recycle plastics and de-bottlenecking lead production
  - 105 MSEK
  - Start-up Q4 2019
  - 3.5 ktonnes plastics
  - 2.5 ktonnes lead

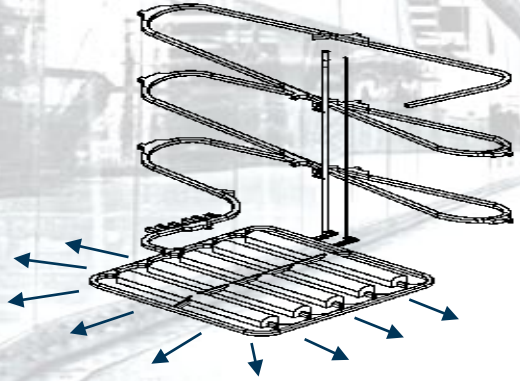
We are well positioned for future growth within the circular and sustainable economy…

High capabilities to treat complex primary and secondary raw materials

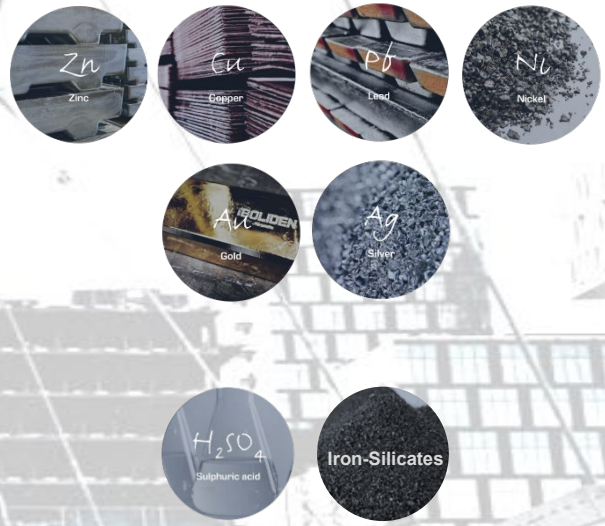
Production built on operational excellence, expansions and technology development

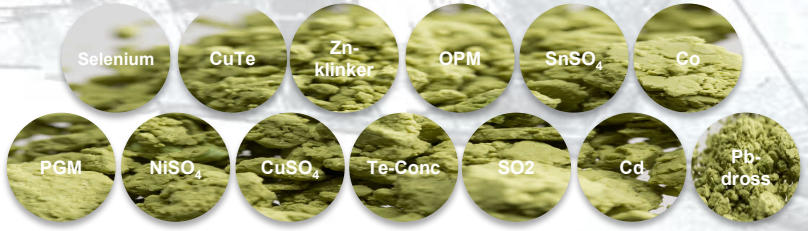


Building sustainable waste deposits



A broad product portfolio focusing on minimizing waste





…and we will play an increasing role as this economy develops

Zn Zinc

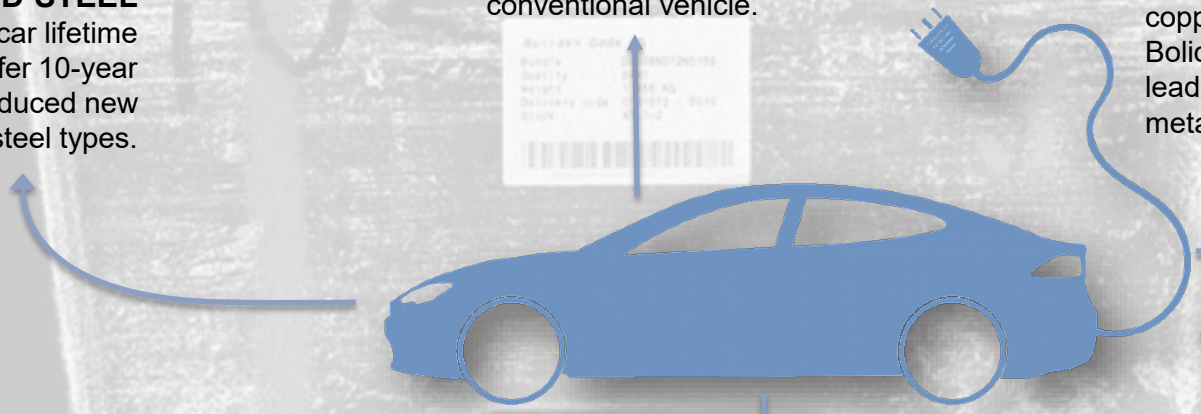
GALVANISED STEEL
Protecting zinc coatings increase car lifetime allowing manufacturers to offer 10-year corrosion warranties for weight-reduced new steel types.

Cu Copper

WIRING, BATTERY AND MOTORS
Battery electric vehicles uses 80 kg of copper: 4 times more than a conventional vehicle.

Au Gold **Ag** Silver **Cu** Copper **Pd** Palladium

CIRCUIT BOARDS
Every car built today includes several computers, which all require a circuit board. Circuit boards have a significant amount of copper, gold and silver. Also palladium is used in circuit boards. Boliden with its operations in Rönnskär and Harjavalta is a world leading recycler of circuit boards, and a producer of the necessary metals.



Ni Nickel **Co** Cobalt **Cu** Copper

LITHIUM-ION BATTERIES
The Li-Ion batteries contains large amounts of Cu, Ni and Co sulphates. All elements are mined and sold by Boliden.

Pd Palladium **Pt** Platinum **Rh** Rhodium

CATALYTIC CONVERTER
Pd and Pt are used in a vehicle's catalytic converter to reduce harmful emissions, including hybrid vehicles. Zero-emission fuel cell vehicles make use of a Pt catalyst.

Pb Lead

LEAD-ACID CAR BATTERIES
Boliden Bergsöe is one of Europe's largest recycler of lead-acid car batteries.

Source: Eurometaux, World Bank

NEW BOLIDEN