Metso Outotec Webinar
10 June, 2021

Investing into a new e-Scrap smelter – factors to consider

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Stephen Hughes
Hannes Holmgren

Metso:Outotec

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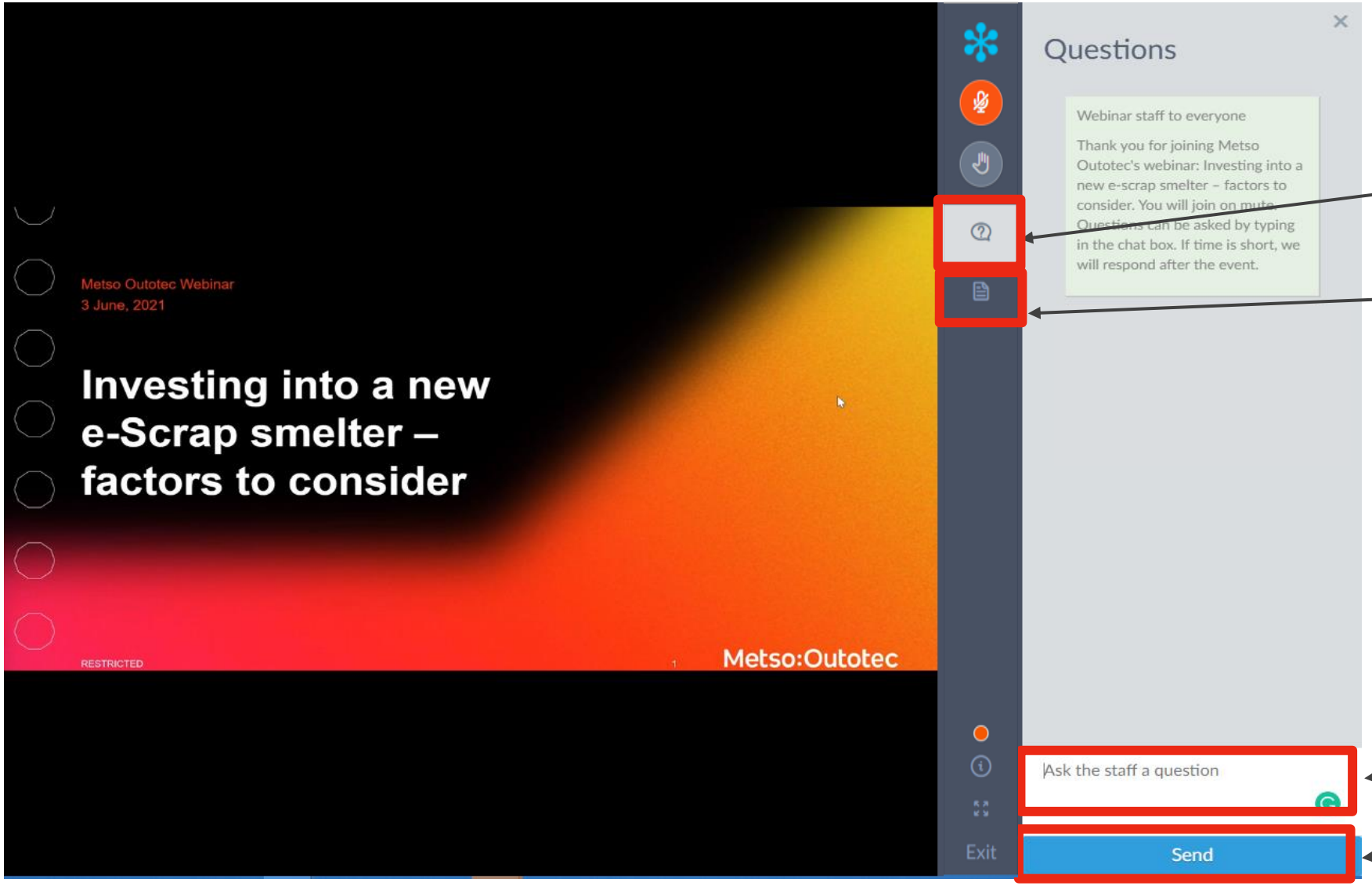
Agenda

- Practicalities
- Introduction and background
- Key questions
- Summary
- Q&A

Practicalities

- Our webinar runs for one hour
  - 40 minutes of presentation
  - 20 minutes of Q&A
- Questions can be asked by typing in the chatbox
- All questions will be answered at the end of the presentation in the Q&A session
- If we run out of time during Q&A, we will answer any questions post-event.
- A link to the webinar recording will be available on https://www.mogroup.com/events/
- Slides of the presentation are available for download

How to ask questions?



Open the chat box

Download the webinar slides

Type your questions here

Submit your questions

Presenters

Lauri Närhi, Head of Sales, BL Smelting

- Background in stainless steel and ferroalloys
- With Metso Outotec 2005-2008 and since 2012 in various roles

Stephen Hughes, Manager Sales, TSL Smelting

- 8 years copper smelter operations
- 24 years with Ausmelt/Metso Outotec in process engineering, project management and sales

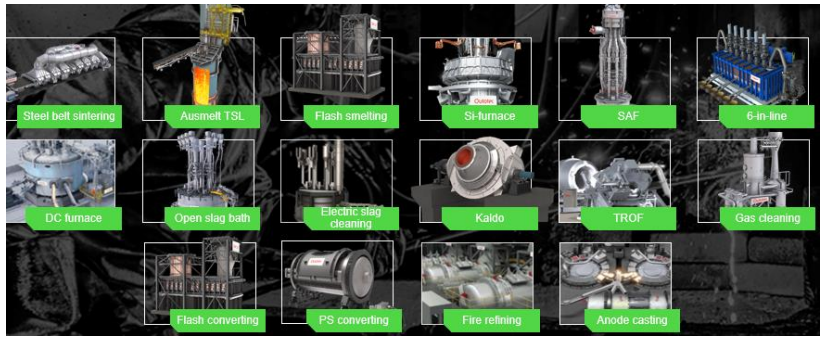
Hannes Homgren, Technology Manager Precious Metals & Kaldo

- 10 years copper smelter experience with primary and secondary operations
- 3 years with Metso Outotec in process engineering

Introduction and background

Introduction

- Metso Outotec is the frontrunner in sustainable technologies and e-scrap is a good example
- E-scrap generation grows and provides an interesting raw material source
- Metso Outotec eScrap solution:
  - Full product portfolio
  - R&D facilities for optimization
  - Based on references and experience



Background

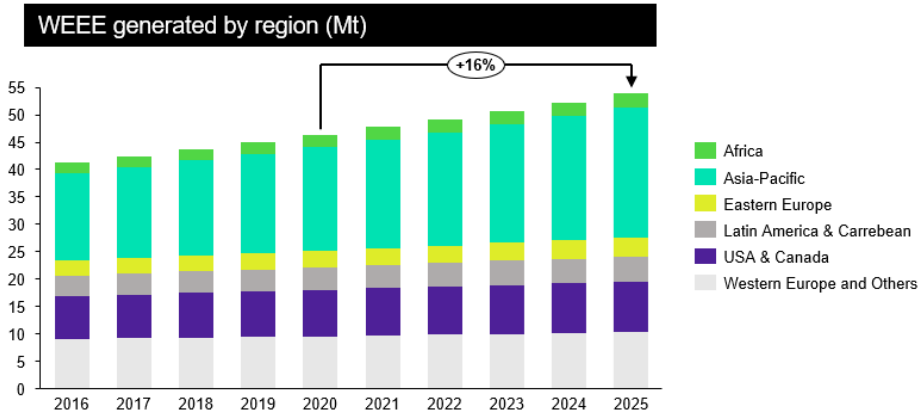
Outotec

E-scrap – Turning waste into gold

Online webinar

Stephen Hughes, Jan Stal

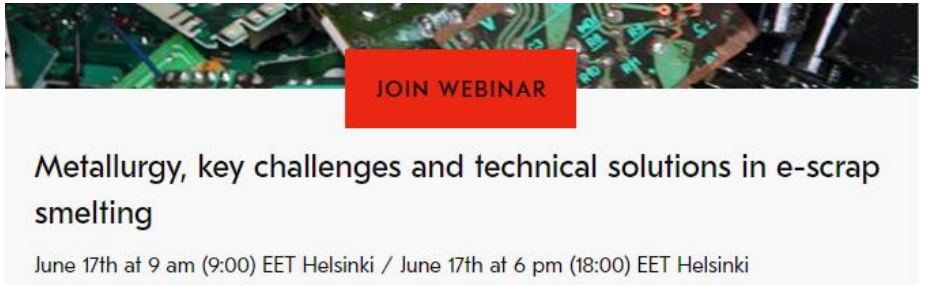
Webinar series in 2020



Market demand

Two webinar series about E-scrap:

Feasibility



Flowsheet development

Question:

Raw material effect in the feasibility

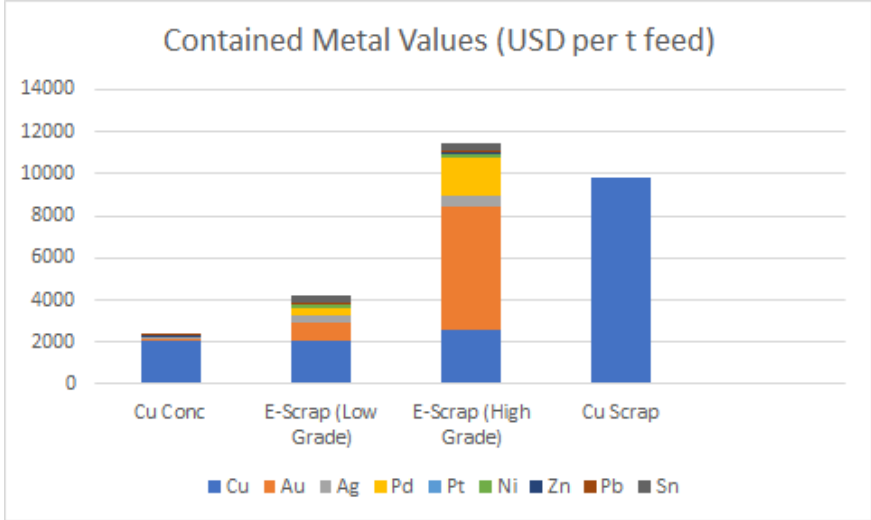
Commercial feasibility of smelting e-scrap

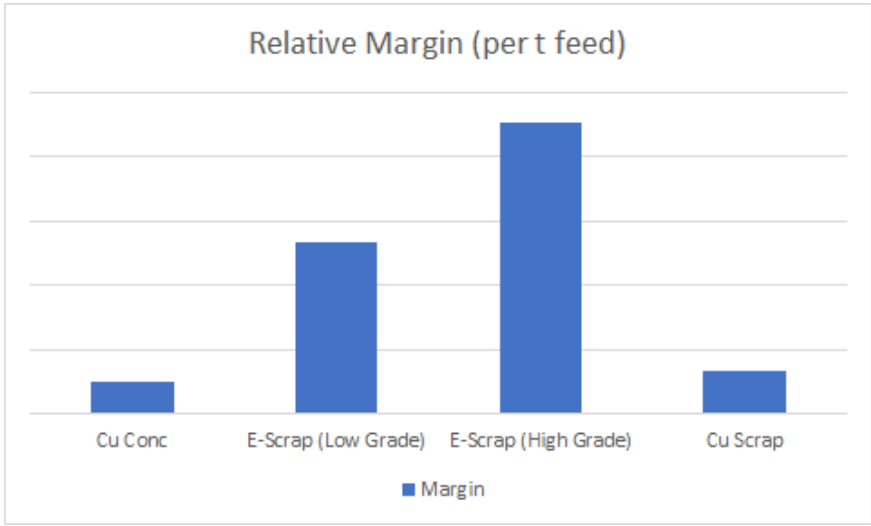
Fast growing feed supply – “Urban Mining”

- Growth in generation rates
- Legislative requirements
- Higher collection efficiencies
- Local sourcing opportunities

E-scrap potentially high margin material

- Higher treatment charges
- Free metal opportunities
- Higher penalties
- Green metal premiums





Commercial feasibility (cont.)

Key project drivers

- Access to sufficient raw material base
- Types of raw materials (margin mix)
- Higher margin materials, more difficult to treat, higher capex/opex
- Impact on economics

Each project opportunity needs to be assessed on its own specific circumstances

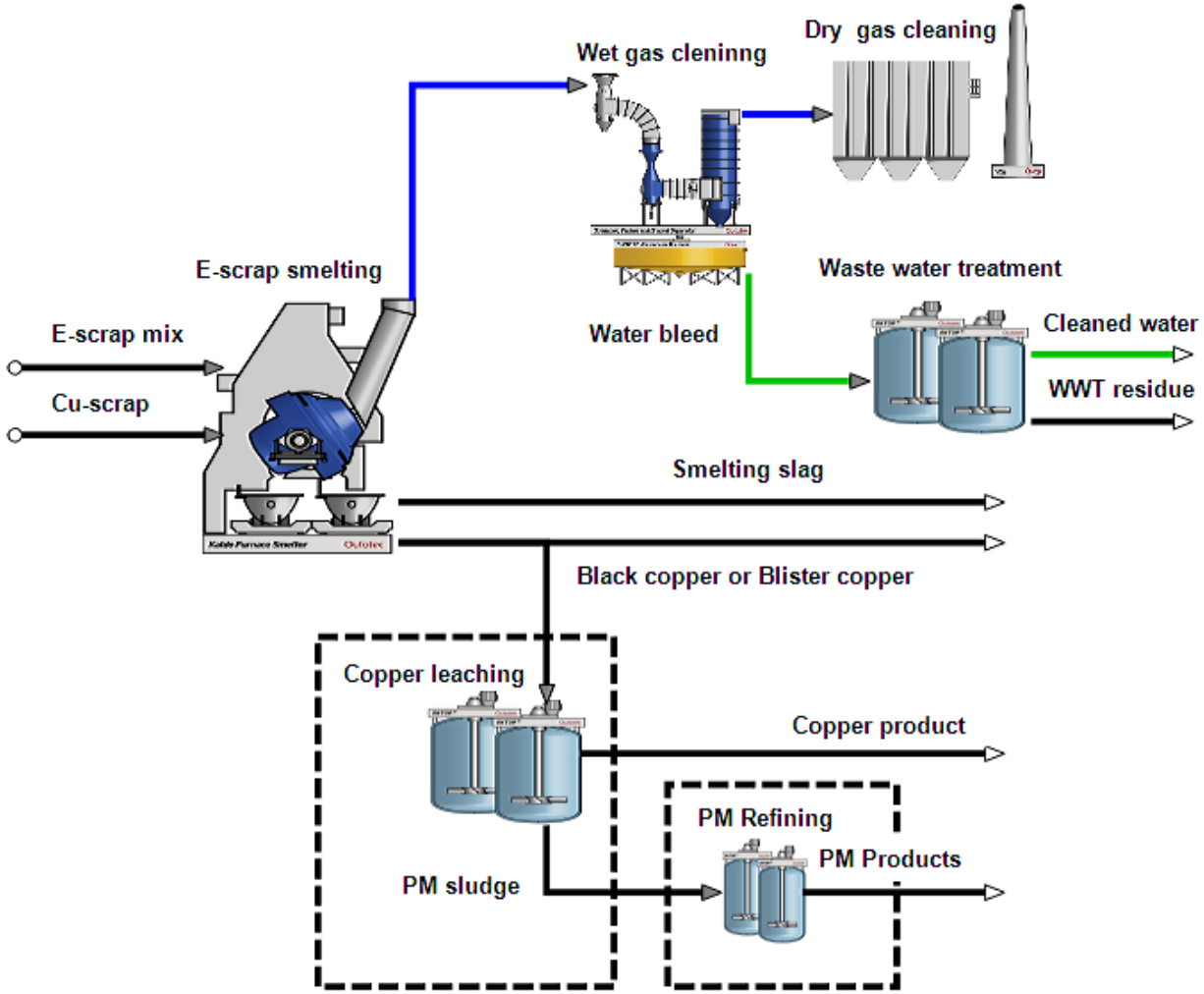
Importance of high quality initial market assessment and technical study work

Question:

What is the smallest scale?

Small scale eScrap smelter feasibility

- Reduce the number of process steps
- Focus on products with highest margins
- High value material raw material mix
  - ~10 000 t/year
  - Au and PGMs focus (>100 g/t)
- Low value material raw material mix of ~30 000 t/year
- Cost to process e-scrap approx. 200 EUR/tonne
- Process equipment CAPEX approx. 35 MEUR
- Local market conditions crucial for feasi bility

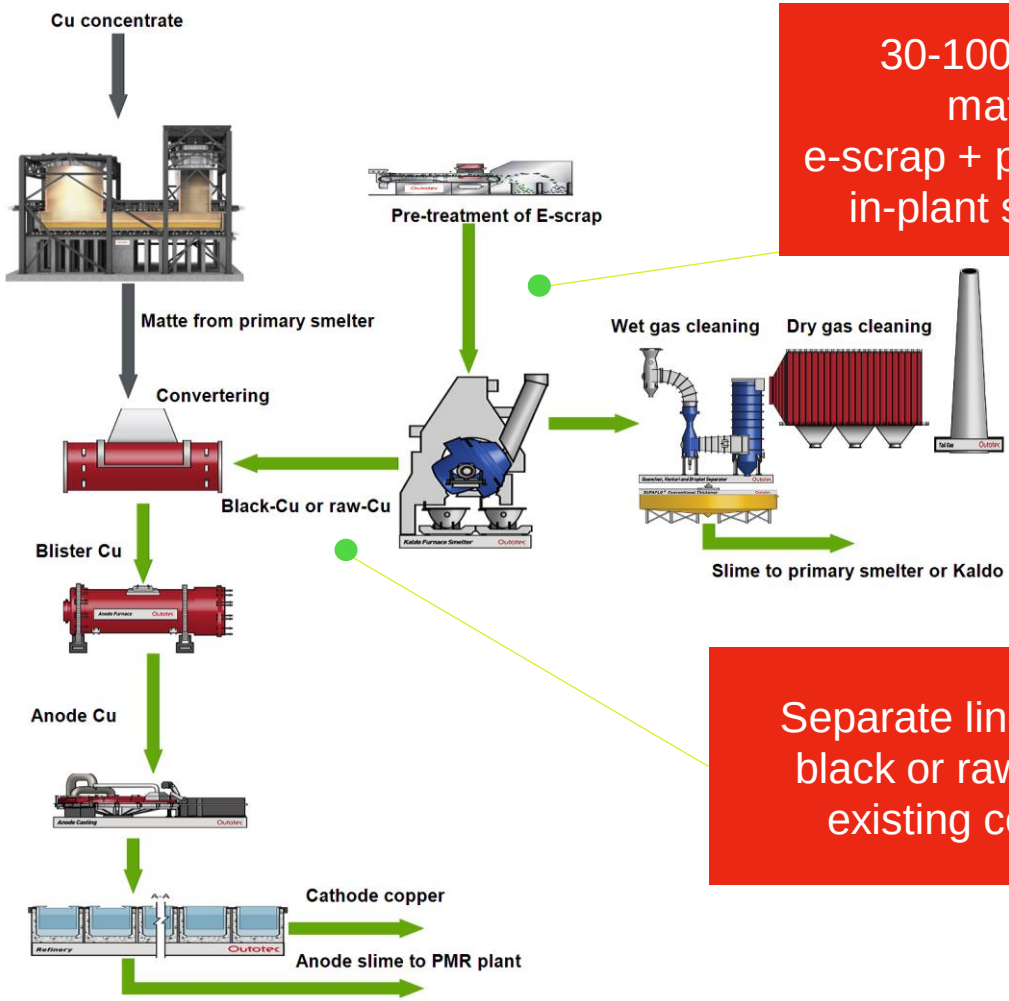


Question:

How to integrate an eScrap smelter?

Integrated primary and e-scrap smelter

- Increase flexibility of smelter to optimise raw material supply base
- Enable treatment of higher margin materials and in plant secondaries
- Leverage off existing site infrastructure and operational know-how
- Utilise existing copper stream to absorb impurities
- Impurity management needs proper consideration and attention
- Investments also needed in development of feed supply network, sampling and feed preparation equipment

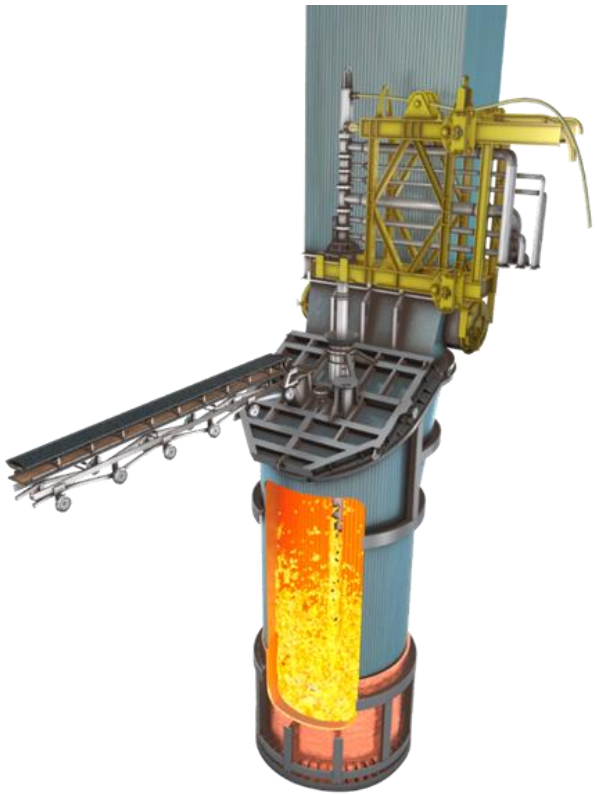


Question:

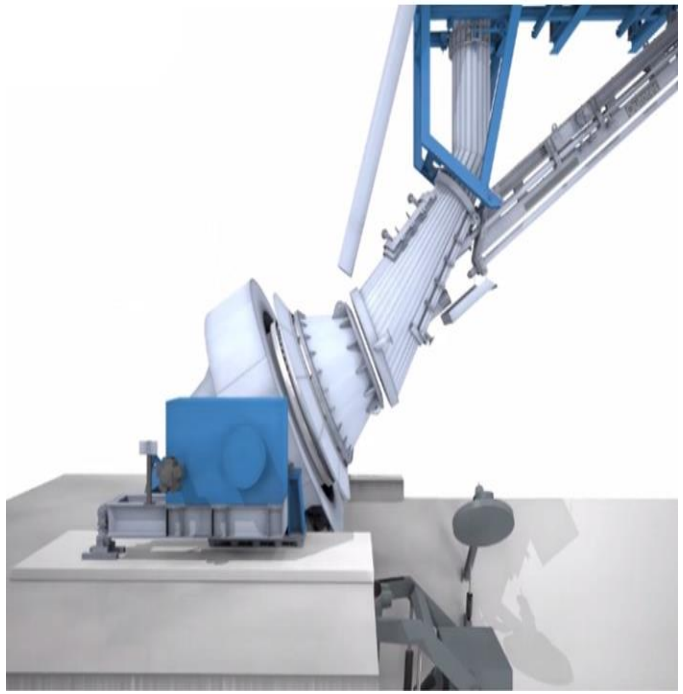
Ausmelt TSL or Kaldo TBRC?

Technology selection for e-scrap smelting

Ausmelt TSL



Kaldo TBRC



Feed mix

Continuous / Batch ⟷ **Batch / Campaign**

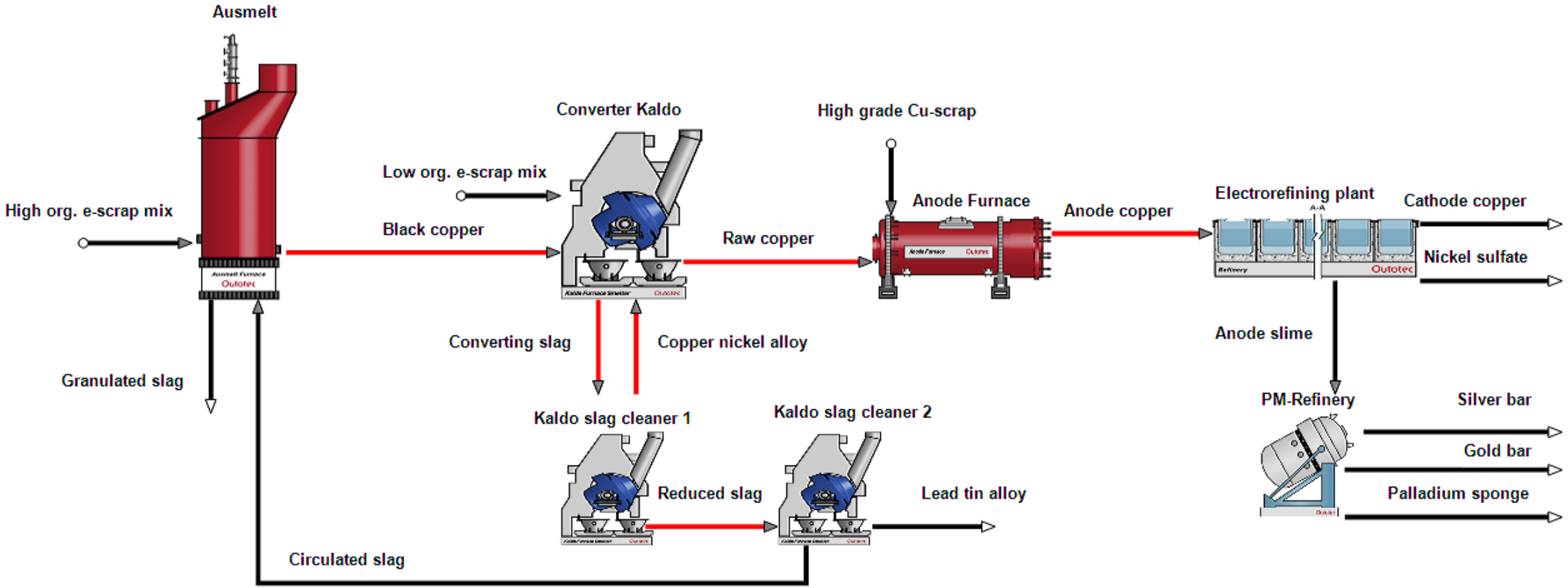
Complex raw materials (Size, quality, impurities)

Campaign life ⟷ **Simpler furnace**

Customer preference

Higher capacity ⟷ **Lower capacity**

Combined flowsheet for large scale - Best of both worlds



Question:

Environmental factors to consider?

Environmental factors to consider

The Challenge:

Many harmful impurities:

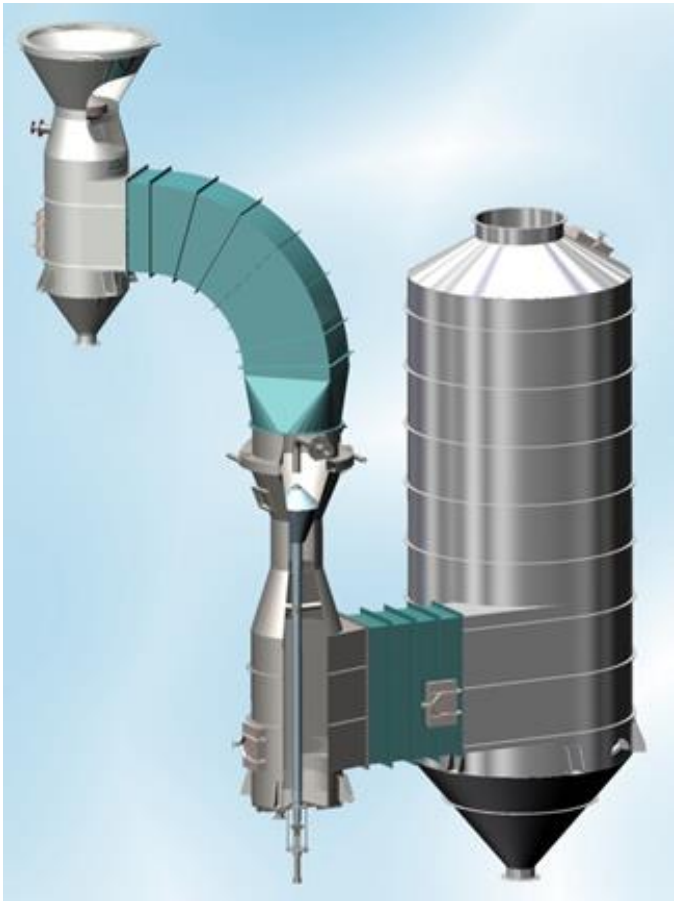
- Metal fumes
- Dioxins
- NOx
- Halides
- Mercury
- Lead

eScrap smelter gas cleaning

The solution:

- Metso Outotec optimizes gas cleaning integrated with smelting

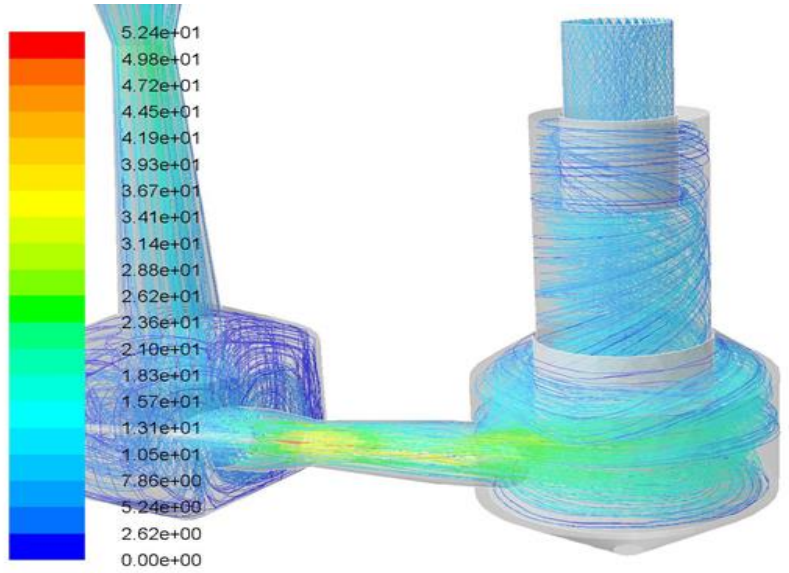
- Combined Wet/Dry gas cleaning:
  - Minimize/avoid formation of dioxin
  - Halide removal
  - Dust control
  - Mercury and NOx removal



Minimizing waste is key

Waste minimization:

- Bi-products (Lead and Tin)
- Waste-water treatment
- Zero-liquid discharge
- Slag applications



Question:

Can you utilize the slag?

Can you utilize the slag ?

- Aim for zero waste
- Slag can be used in certain applications e.g. grit blasting, cement additive and construction aggregate. However, composition and properties must be checked and suitable.
- Integrated smelter vs stand alone
- Slag cleaning as opportunity
  - maximise recovery of copper and PM’s
  - to recover tin and lead
  - improves utilization possibilities

Question:

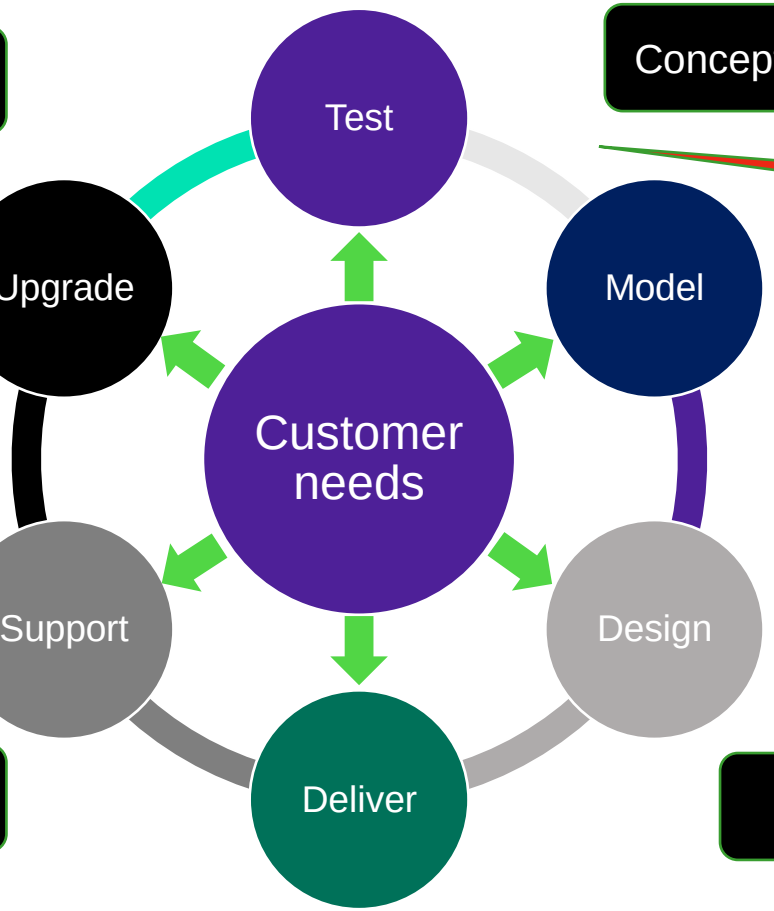
How Metso Outotec can support development of an E-scrap project?

Project phases and how Metso Outotec can support

Modernization

Optimization

Advisory Services



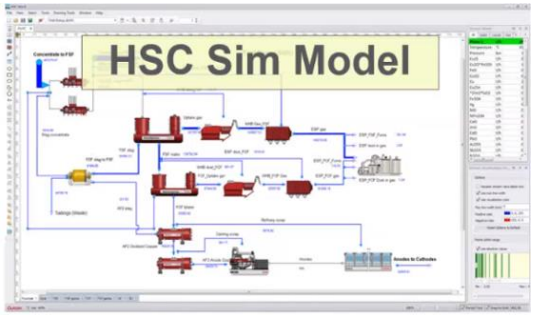
Conceptual study

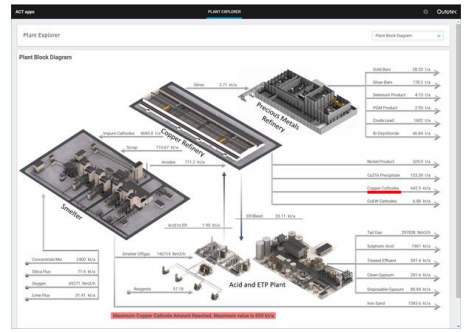
Webinar 2

Feasibility study

Basic Engineering

EPS package





Summary

The feasibility depends on multiple factors - raw material availability and quality is critical

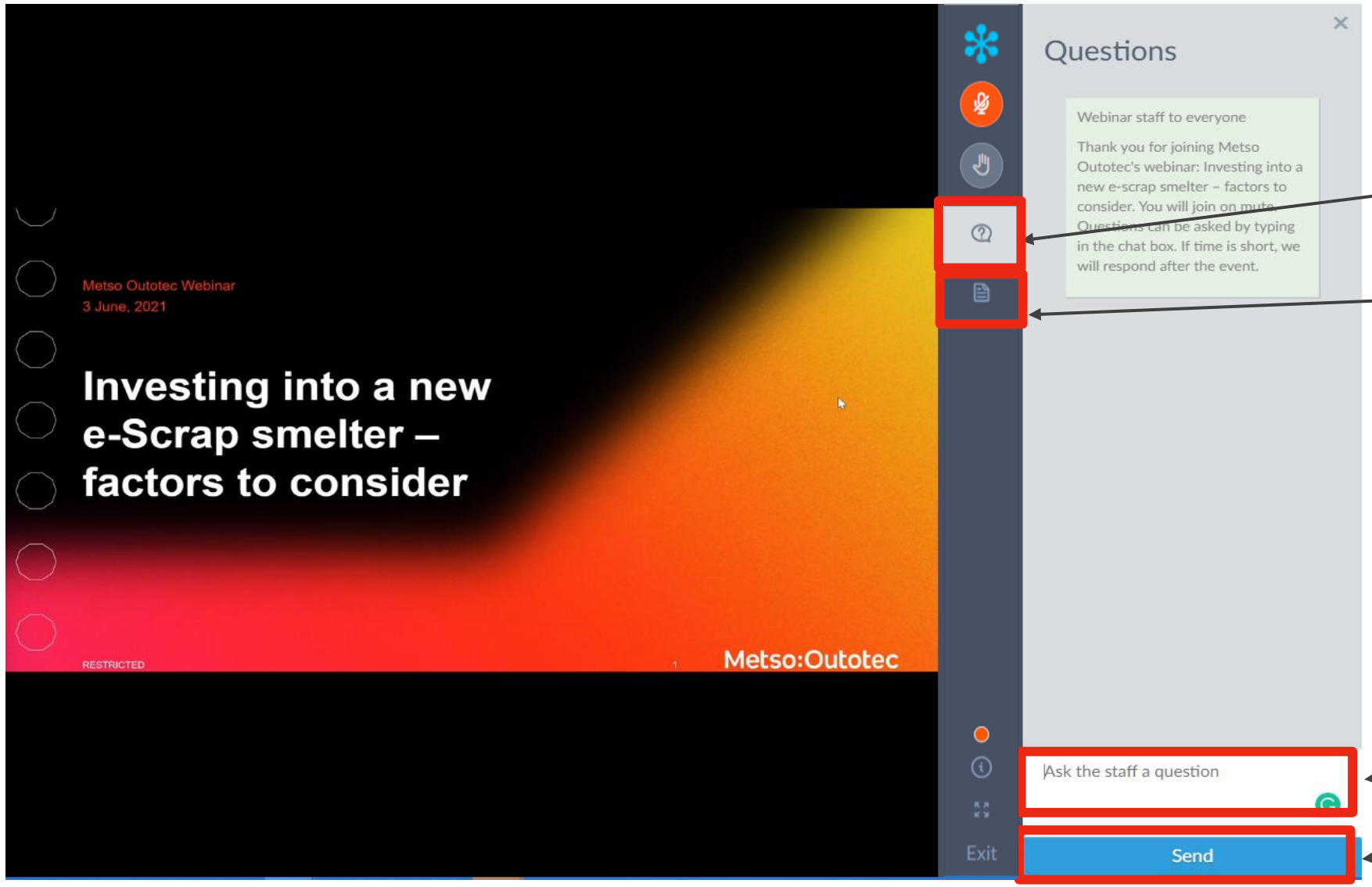
Sustainable long term operation requires proper care for the environment

Metso Outotec has the knowhow and capabilties to support the whole lifecycle of a plant

Please join our next Webinar on June 17th

Q&A?

How to ask questions?



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Join our second eScrap webinar:

Metallurgy, key challenges and technical solutions in e-scrap smelting

Thursday, June 17th
(2 sessions to serve different time zones)

- 9 am EET > REGISTER HERE

- 6 pm EET > REGISTER HERE

Partner for positive change

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