# Introduction to Dissheat workshop and the Dissheat project.

**Dissemination of the heating technology research results for emission minimization and process optimization towards todays fossil-free heating agenda – dissHEAT (G.A. 101057930)**

**Andreas Johnsson (Coordinator), Swerim**

Funded by the European Union

# ESTAD event on roadmap

dissHEAT

**9:00 AM**

Welcome and general dissHEAT-overview

Andreas Johnsson

**9:25 AM**

5 dissHEAT topics presentations: Findings, analysis and outlook

- Oliver Hatzfeld: Heating and burner technology
- Filippo Avellino: Modelling and control (level 2) of entire furnaces
- Nico Schmitz: Sensors and control (level 1), standards, regulations
- Hugo Uijtdebroeks: Materials in the furnace and product quality
- Andreas Johnsson, Gustav Häggström: Heat transfer, heat recovery, productivity, economy

**10:00 AM**

Hugo Uijtdebroeks: dissHEAT draft roadmap for future research

**10:10 AM**

Coffee break

Funded by the European Union

dissHEAT

**10:25 AM**

3 guest presentations: current questions in research on industrial heating and outlook

- Sustainable blast furnace gas firing in reheating furnaces
  Victor Cuervo (ArcelorMittal)
- Upcoming requirements and needs for heating from a Scandinavian perspective
  Jonas Engdahl (senior expert at SSAB and chairman of the Swedish iron and steelmaking association Jernkontoret´s focus area TO51- Energy and furnace technology)
- Sustainable heating technologies for today and tomorrows metal industry
  Enrico Malfa (Tenova)

**11:25 AM**

Panel discussion:
Panel list: Victor Cuervo, Jonas Engdahl, Enrico Malfa and Thomas Echterhof (IOB, RWTH-Aachen)
Topics:

- future research
- research gaps in industrial heating
- questions from dissHEAT and audience

**12:30 AM to 1:00 PM**

Hugo Uijtdebroeks: Internal summary and wrap up

Funded by the European Union

# About Dissheat

dissHEAT

This project is about elevating and **sharing the knowledge in the research area reheating of steel**. To bring **forward and promote HEU/RFCS/ECSC project results, innovations and knowledge** that has reached a smaller audience than it deserves and **scale-up the important outcomes and to share this with various stakeholders from industry, suppliers, policymakers and research.**

In short, the project has the opportunity to perform:

- A **critical review of past projects** by the re-organization of project results into selected groupings and **valorizing the findings**.
- **To share, promote and discuss the knowledge in workshops and seminars**. Gain important insights and indications of how to proceed
- **Develop a Roadmap** for future research activities with a clear path for technological progress. Especially linked to **carbon direct avoidance applications like $H_2$, electrical solutions, hybrid heating alternatives and flexifuel applications and their opportunities and challenges**

BFI

CRM GROUP

RINA

RWTH AACHEN UNIVERSITY

SWERIM

Funded by the European Union

Research Fund for Coal & Steel

# DissHEAT Partners

Funded by the European Union

**Oliver Hatzfeld**, BFI, is a Senior expert- Technology for Energy, Gas and Industrial Furnaces. Responsible for heating processes in steel and rolling mills

**Hugo Uijderbroeks**, CRM, has been involved in EU projects since 1994. Member of TGS 4 and TGA 2 committee. Expert in Hot and Cold rolling processes.

**Filippo Avellino**, RINA, is a senior engineer, focusing on the development of process models for the automation, the control and the simulation of the steelmaking plants.
**Davide Ressegotti**, RINA, is a R&D engineer, focusing on the development of models and simulation, with particular reference to the combustion and CFD.

**Thomas Echterhof,** RWTH, is a senior engineer and academic director of the Department for Industrial Furnaces and Heat Engineering
**Nico Schmitz,** RWTH, is Group leader of the combustion technology research group at the Department for Industrial Furnaces and Heat Engineering
**Elsa Busson** RWTH, is a research associate at the Department for Industrial Furnaces and Heat Engineering in the combustion technology group.

**Andreas Johnsson**, Swerim, Sr. researcher. Responsible for RA Heating technologies
**Gustav Häggström**, Swerim, PhD Energy engineering. Heating technologies
**Joel Falk**, Swerim, PhD Energy engineering. Heating technologies

# Guest speakers

dissHEAT

Victor Cuervo holds a degree in **Mechanical Engineering** and another one in **Chemical Engineering**. In 2004 started its career in **ArcelorMittal** as reheating furnaces process engineer. During the last 13 years **works in Global R&D, in the field of energy efficiency and decarbonization of heating and combustion processes**. He has been supported the industrialization of developed technologies within the ArcelorMittal Group and collaborated in several European research projects partnerships.

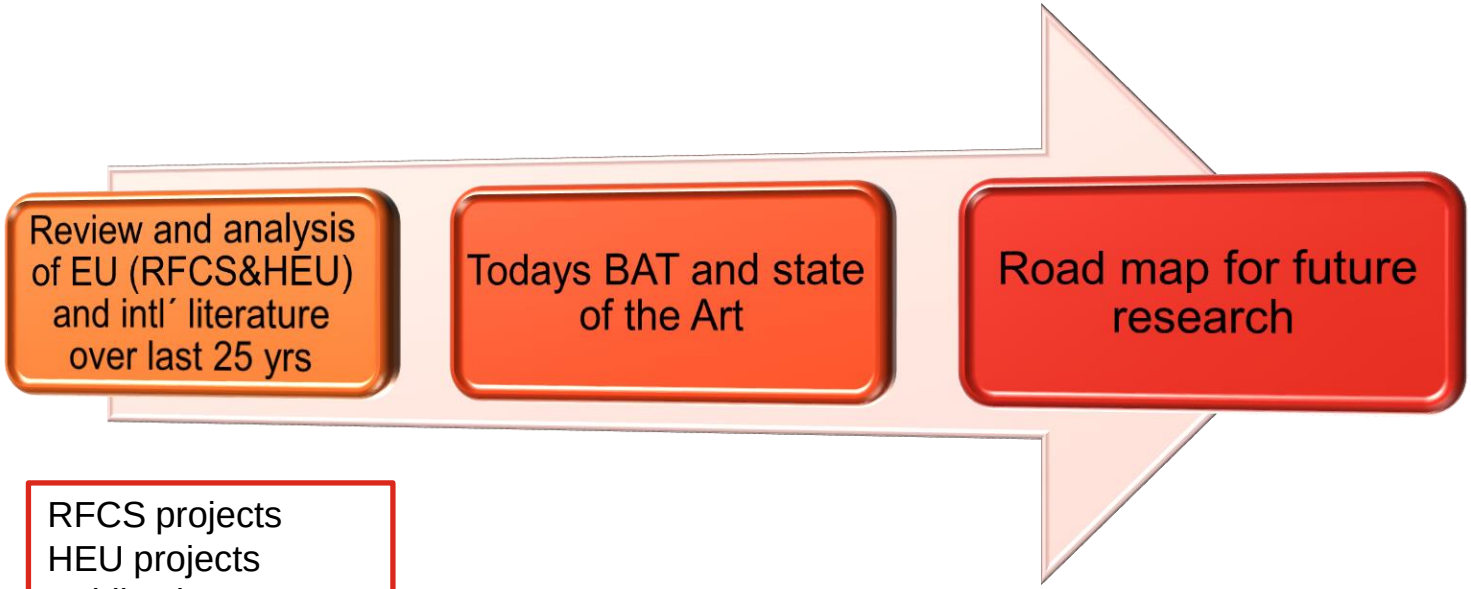
Jonas Lagergren, PhD. More then 30 years experience from the steel industry. **Specialist in Rolling techniques and roll development.** Works with strategic process development at SSAB HQ and Oxelösund. Involved in R&D.

Enrico Malfa holds a degree in **Aerospace Engineering**. In 2002, he joined Centro Sviluppo Materiali. **Currently, he is R&D Director of Tenova**, a Techint Group company, worldwide partner for innovative, reliable and sustainable solutions in metals and mining. Holds several institutional positions: **Chairman** of European Steel Technology Platform (**ESTEP**) **Focus Group Circular Economy**, **Member of Clean Steel Partnership Board**, **Member of Technical Group Steelmaking of RFCS**

Funded by the European Union

# Dissheat: Dissemination project under RFCS.

dissHEAT




RFCS projects
HEU projects
Publications
Selected, analyzed and evaluated

BFI

CRM GROUP

RINA

RWTH AACHEN UNIVERSITY

SWERIM

Funded by the European Union

Research Fund for Coal & Steel

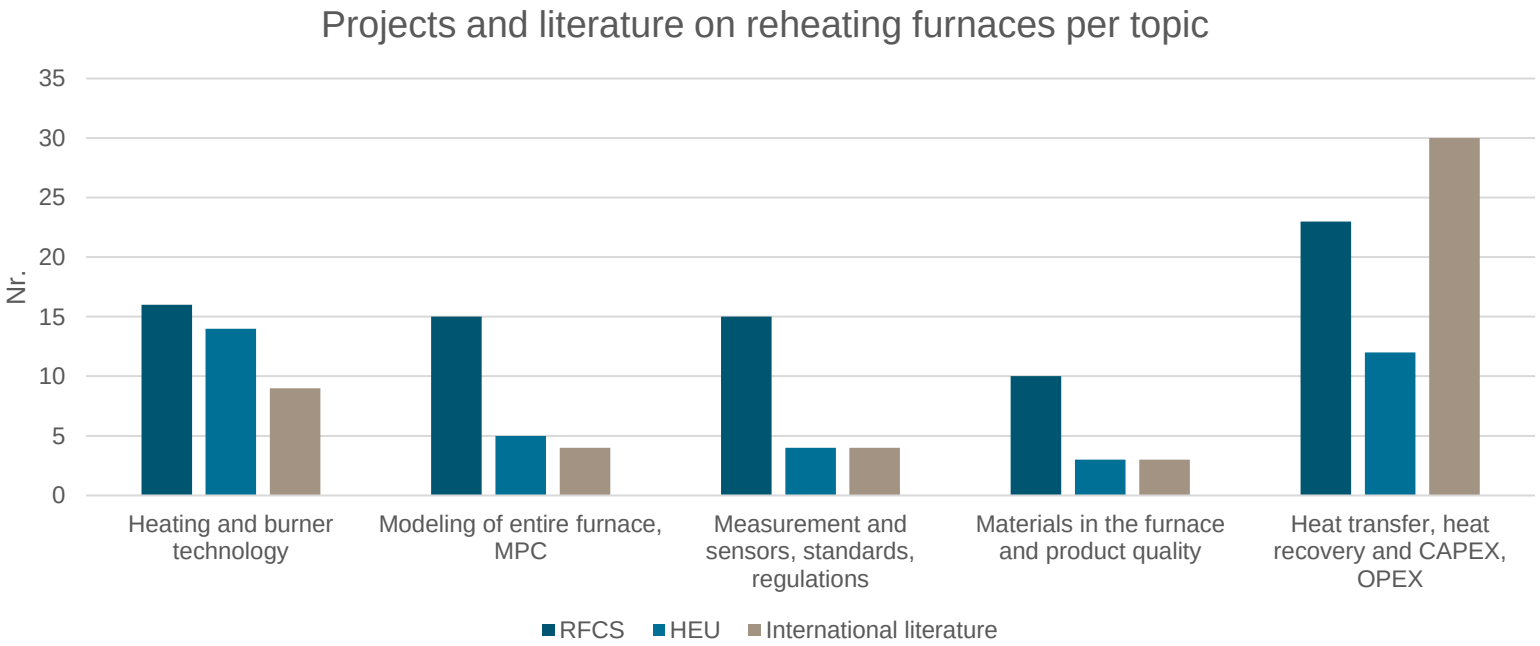
# Methodology

dissHEAT

- RFCS projects & HEU projects. Selected based on topic, reheating furnaces. Preformed over the last 25 years.
- Intl literature over last 25 years.
- Classified into 5 main topics or subgroups.
  - Heating and burner technology. BFI
  - Modeling of the entire furnace, level 2 control. RINA CSM-SpA
  - Materials in the furnace and product quality. CRM group
  - Sensors and control, standards, regulations. RWTH
  - Heat transfer, Heat recovery, CAPEX, OPEX. Swerim
- Thorough analysis and evaluation of the outcomes of the material. Classified into KPI´s, relevant. Special focus on low $CO_2$ heating
- SoA and BAT for each main topic compiled into a report. Current practices - report.
- Market needs, Roadmap. The future scenario- Reports.

Funded by the European Union

# Relevant projects and literature on reheating furnaces, per subtopic




Funded by the European Union

# KPI´s we focus on

dissHEAT

## KPIs used. Besides project description and reference to project report

- Classification (success, partial success, failure)
- Practical application of results
- Follow up projects
- Research gaps
- TRL start- TRL end
- Number of industrial installations
- Energy consumption [GJ/t or % decrease]
- Productivity increase [t/h or %]
- CAPEX, OPEX [increase/decrease]
- Scale loss, or yield improvement [%]
- $CO_2$ emission reduction scope 1 and scope 2 [kg/t or %]
- Combustion efficiency improvement [%]
- Heat transfer improvement [$kW/m^2$]

Project related KPI

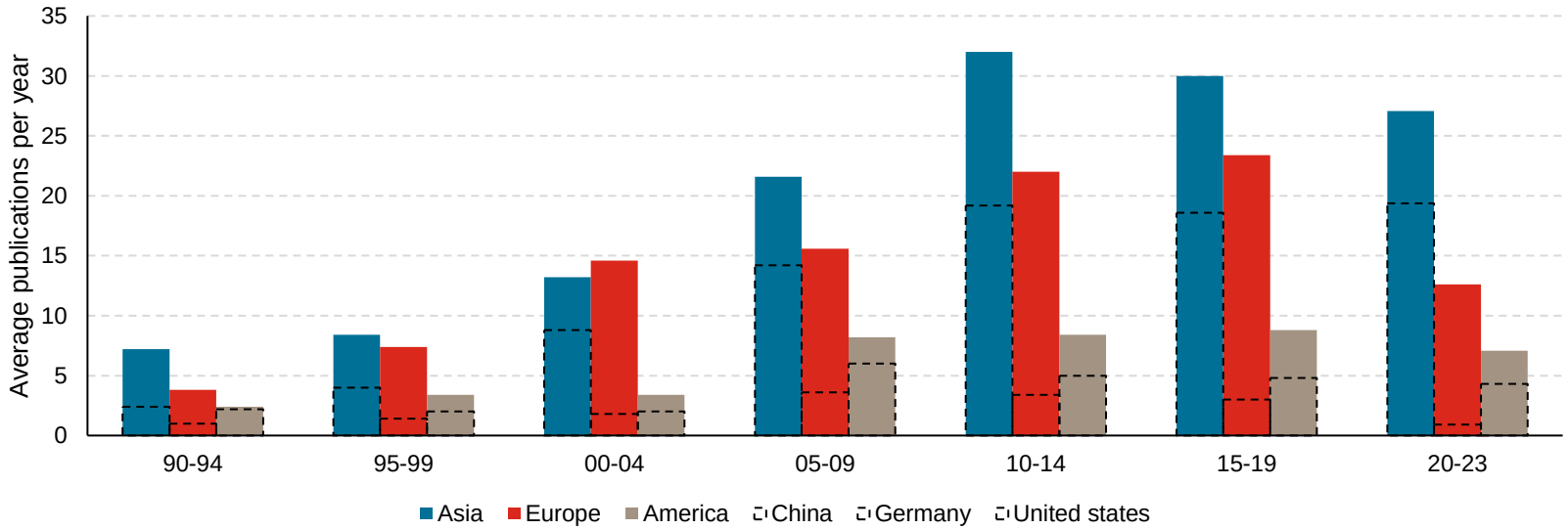
Process related KPI

Funded by the European Union

Scope 1 A reporting organization's direct GHG emissions.
Scope 2 A reporting organizations emissions associated with the generation of electricity, heating/cooling, or steam purchased for own consumption

# Research activity over the last 30 years. Statistics.

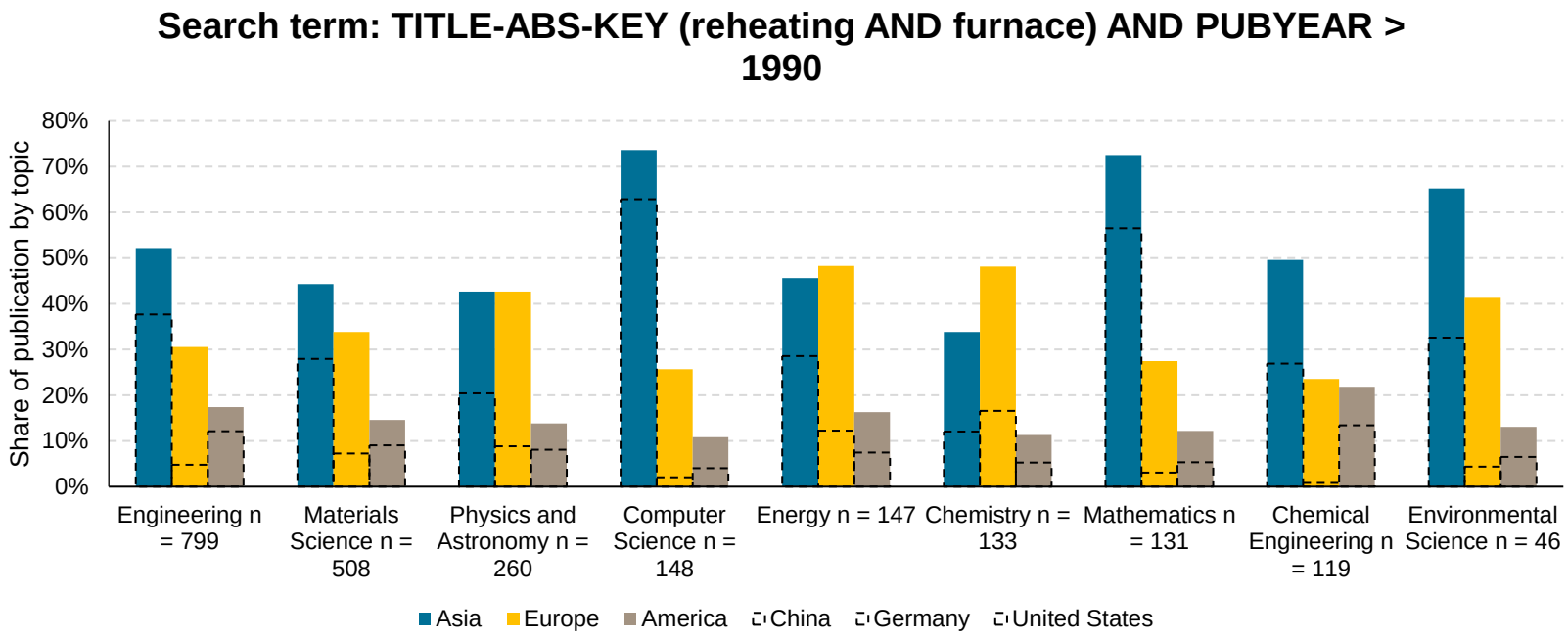
Search term: TITLE-ABS-KEY (reheating AND furnace) AND PUBYEAR > 1990




Funded by the European Union

# Intl. literature over last 20 years. Statistics.

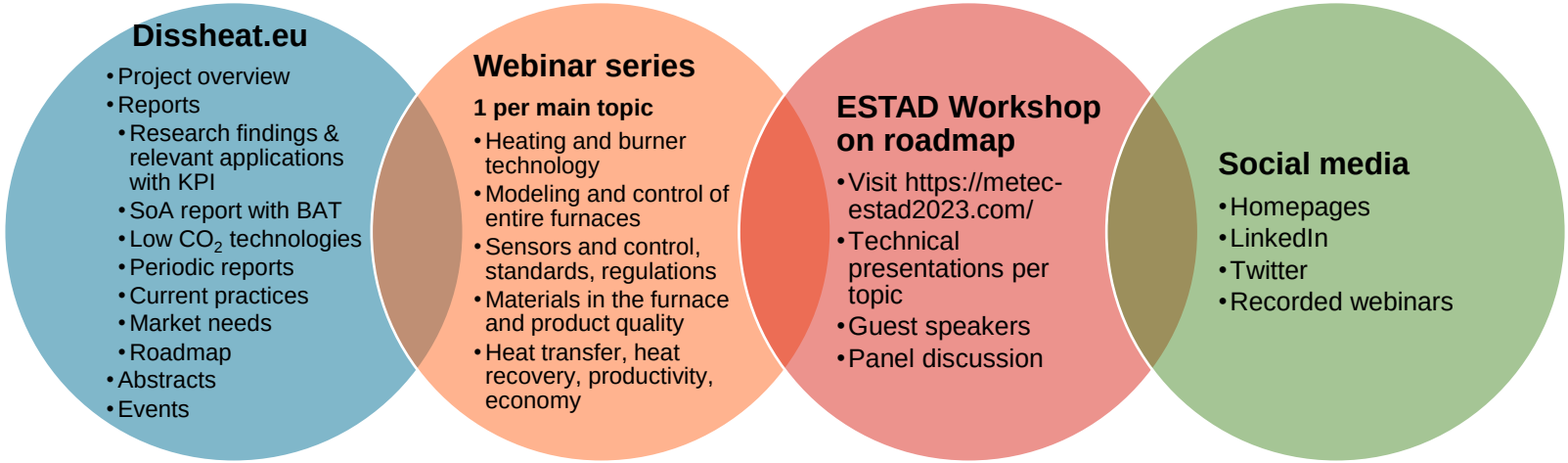
dissHEAT




Funded by the European Union

# Dissemination project

dissHEAT




Funded by the European Union

# Dissemination project

dissHEAT

BFI

CRM GROUP

RINA

RWTH AACHEN UNIVERSITY

SWERIM

Funded by the European Union

Research Fund for Coal & Steel

## Dissheat.eu

- Project overview
- Reports
  - Research findings & relevant applications with KPI
  - SoA report with BAT
  - Low $CO_2$ technologies
  - Periodic reports
  - Current practices
  - Market needs
  - Roadmap
- Abstracts
- Events

# Dissemination project

dissHEAT

BFI

CRM GROUP

RINA

RWTH AACHEN UNIVERSITY

SWERIM

Funded by the European Union

Research Fund for Coal & Steel

## Webinar series

**1 per main topic**

- Heating and burner technology
- Modeling and control of entire furnaces
- Sensors and control, standards, regulations
- Materials in the furnace and product quality
- Heat transfer, heat recovery, productivity, economy

# Dissemination project

dissHEAT

BFI

CRM GROUP

RINA

RWTH AACHEN UNIVERSITY

SWERIM

Funded by the European Union

Research Fund for Coal & Steel

## ESTAD Workshop on roadmap

- Visit https://metec-estad2023.com/
- Technical presentations per topic
- Guest speakers
- Panel discussion

# Dissemination project

dissHEAT

BFI

CRM GROUP

RINA

RWTH AACHEN UNIVERSITY

SWERIM

Funded by the European Union

Research Fund for Coal & Steel

## Social media

- Homepages
- LinkedIn
- Twitter
- Recorded webinars

# Important about todays workshop

dissHEAT

- Bring back ideas for the future roadmap. Every input is very welcome.
- A focus in the direction of necessary future research
- Questions for the invited speakers during the panel discussion
- Questions for us in the project group during the final wrap up. There is limited time in the program between presentations.
- The last 30 minutes mainly about the broader picture and how we want to proceed towards the future - challenges and opportunities
- Coffee. In front of the lobby- be back in time!

BFI

CRM GROUP

RINA

RWTH AACHEN UNIVERSITY

SWERIM

Funded by the European Union

Research Fund for Coal & Steel

dissHEAT

BFI

CRM GROUP

RINA

RWTH AACHEN UNIVERSITY

SWERIM

European Commission

Research Fund for Coal & Steel

**Thank you for the attention!**

**Stay informed**

www.dissheat.eu

# ESTAD event on roadmap

dissHEAT

**9:00 AM**

Welcome and general dissHEAT-overview

Andreas Johnsson

**9:25 AM**

5 dissHEAT topics presentations: Findings, analysis and outlook

- Oliver Hatzfeld: Heating and burner technology
- Filippo Avellino: Modelling and control (level 2) of entire furnaces
- Nico Schmitz: Sensors and control (level 1), standards, regulations
- Hugo Uijtdebroeks: Materials in the furnace and product quality
- Andreas Johnsson, Gustav Häggström: Heat transfer, heat recovery, productivity, economy

**10:00 AM**

Hugo Uijtdebroeks: dissHEAT draft roadmap for future research

**10:10 AM**

Coffee break

Funded by the European Union