KME
CONSORTIUM MATERIALS TECHNOLOGY

The
High-Temperature
Corrosion Center

KME720

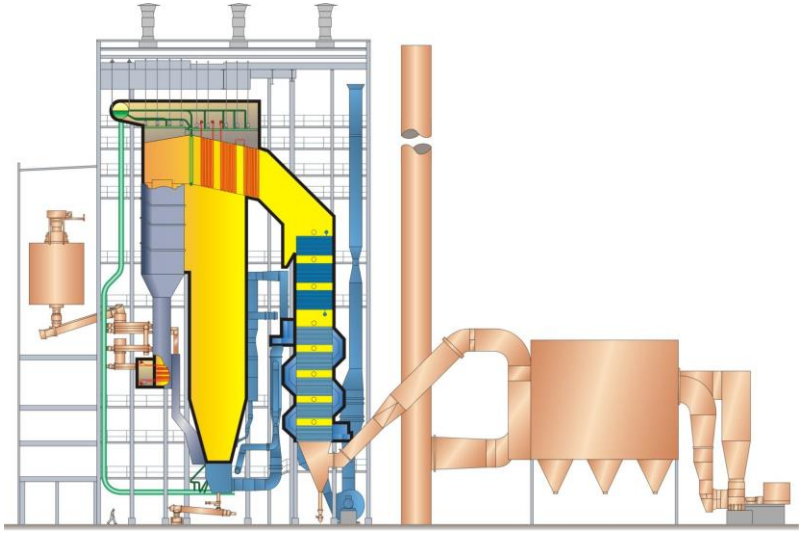
The effect of increased fractions of waste wood on water wall- and superheater corrosion - Combating corrosion by new materials and improved material selection

amec
foster
wheeler

kraftringen

SANDVIK

MH Engineering



Research topics in KME720

- How does the corrosiveness of the flue gas vary with the fuel mix? Comparison between two similar boilers using different fuels and the investigation of how a stepwise increase of the waste wood fraction is affecting the corrosion.
- Test the usability of novel FeCrAl alloys and coatings and compare these materials towards state-of-the-art stainless steels as well as conventional stainless steels and steels.
- Investigate the corrosivity of the superheaters in a boiler with horizontal design of the superheater section using clamp testing

Project Plan

1 How does the corrosivity of flue gas varies with fuel mix and with stepwise increase of waste wood

2 Test usability of FeCrAl alloys and coatings and comparison towards state-of-the-art SS and conventional SS and steels

3 Investigate corrosion of the superheaters in a boiler with horizontal design using clamp testing

Project group members - responsibilities

HTC (Chalmers)	Project leader. Responsible for short term corrosion testing, corrosion evaluation and analysis
Kraftringen AB	Responsible for boiler operation
Amec Foster Wheeler	Responsible for clamp installation, water wall probe testing and will perform corrosion evaluation and analysis
Sandvik Heating Technology	Providing materials
Sandvik materials Technology	Providing materials
MH Engineering	Providing materials

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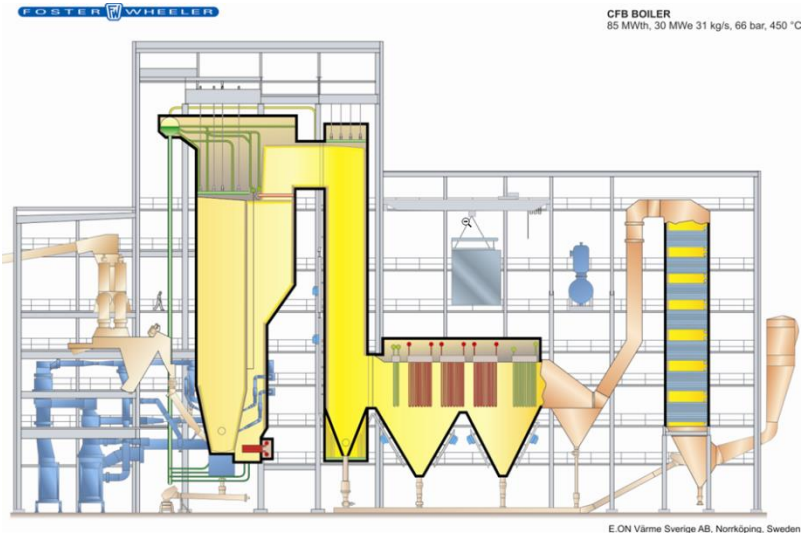
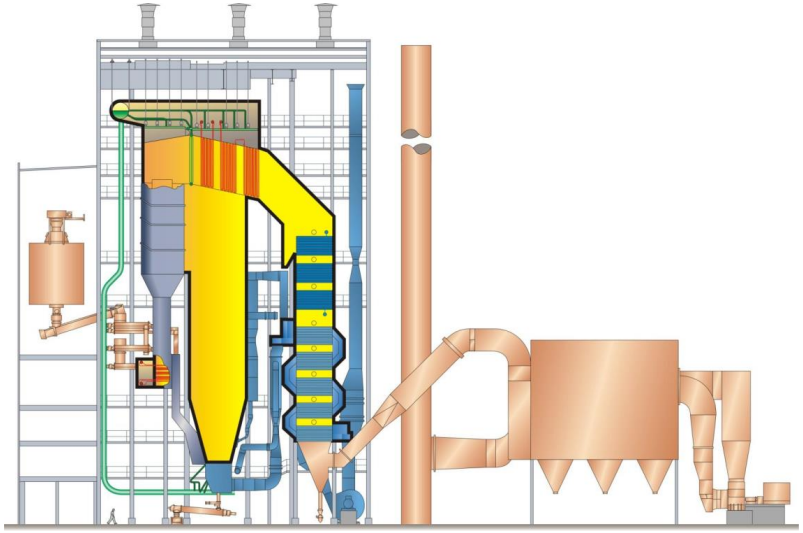
A great overlap with KME711

- Same boiler manufacturer, SH in a horizontal design
- Clamp testing, aiming at investigate same materials at same temperatures in the two projects
- Two different fuel mixes

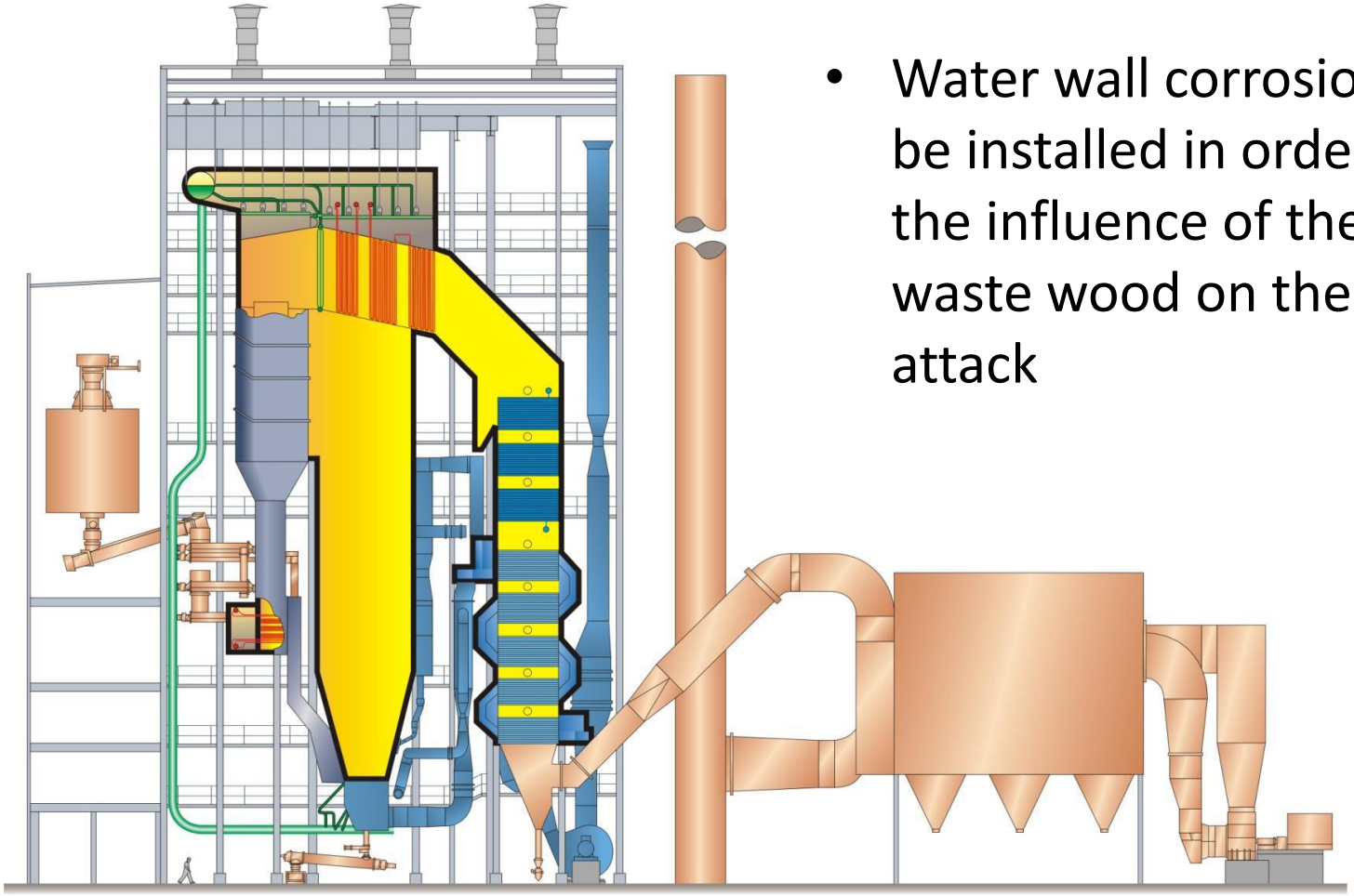


KME711 waste boiler



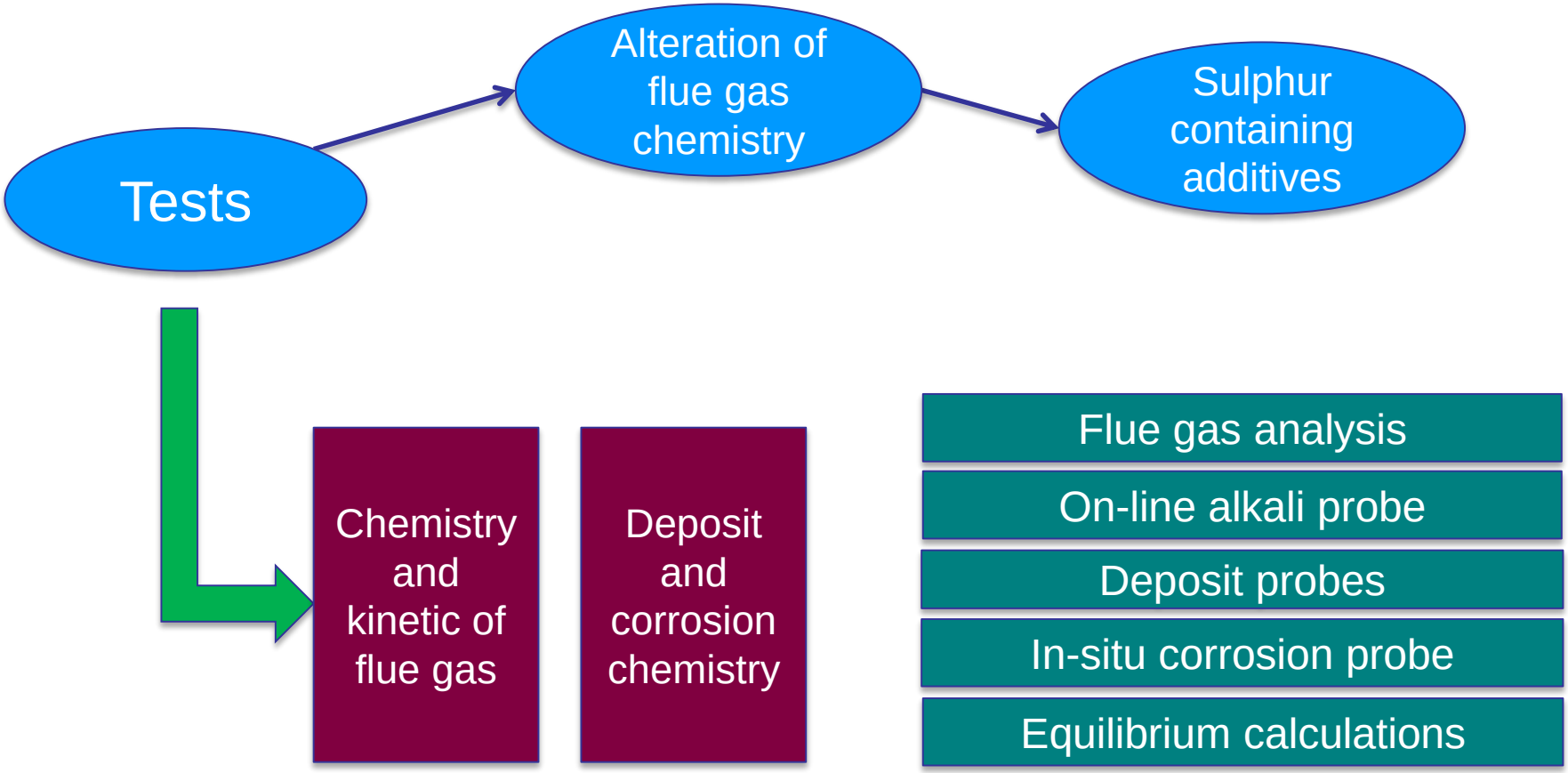
KME720 biomass/waste wood boiler

Water wall corrosion



- Water wall corrosion probe will be installed in order to study the influence of the share of waste wood on the corrosion attack

How does the corrosivity of flue gas varies depending on its temperature and chemistry?



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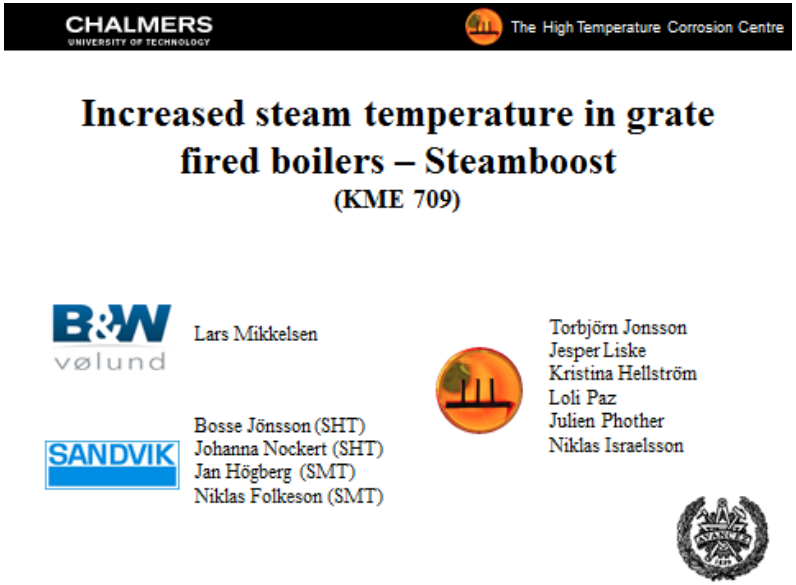

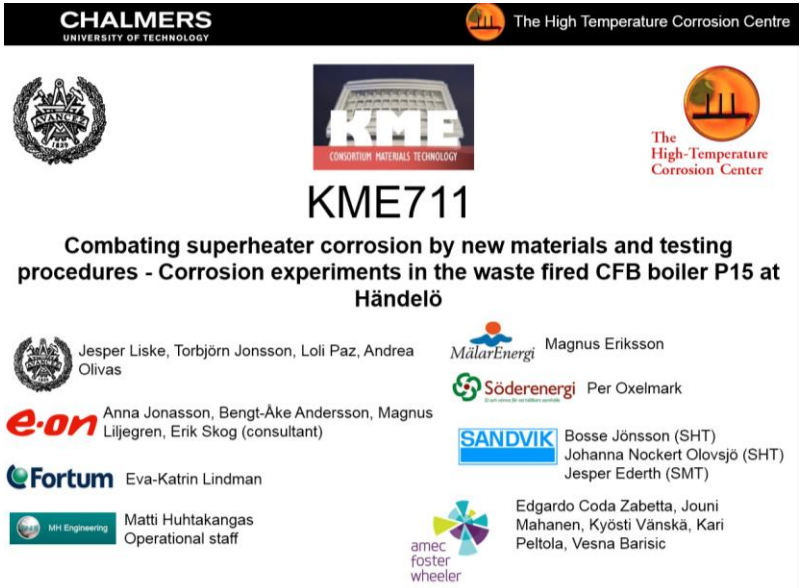

Test usability of FeCrAl alloys and coatings and comparison towards state-of-the-art SS and conventional SS and steels

- ✓ FeCrAl-Alloys
- ✓ High performance stainless steels
- ✓ Coatings → New coating technology: HVAF

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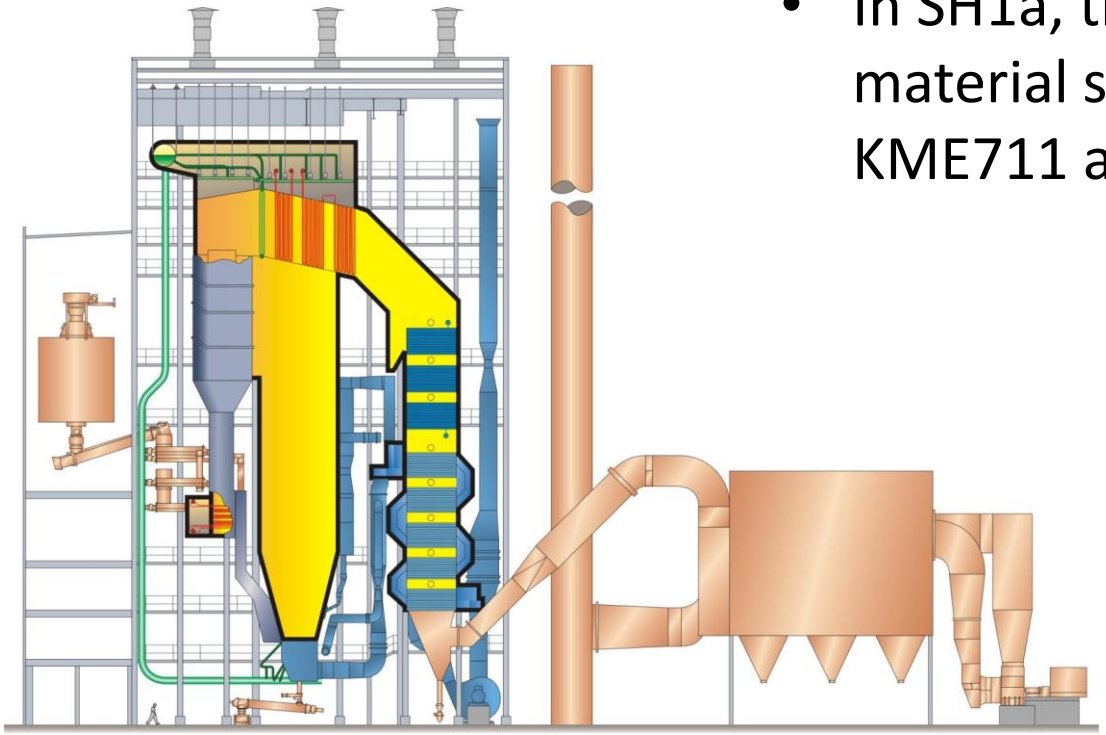
Yearly clamp exposures are performed



- In SH1a, the temperature and material selection is following KME711 as far as possible

- In SH2, we aim for higher temperatures (up to 550 ºC or even 600 ºC)

- Each year the amount of waste wood is increased

Planned activities

- New sets of clamp samples will be installed in summer 2016. Besides the materials already chosen earlier, FeCrAl model alloys are planned to be included

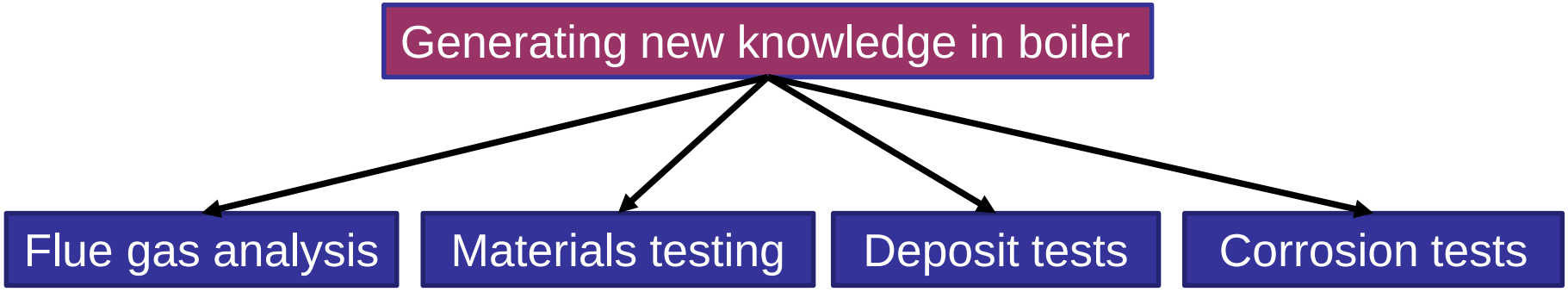
- The combined Eq. cal, insitu alkali probe, insitu corrosion probe, “traditional” probes are planned to be performed during 2016.

- Different water wall probe designs are discussed in order to start the water wall exposure in summer 2016. AmecFW and Kraftringen AB are discussing different possibilities of new measurement holes in the boiler.

Overall Goal of KME720

- Research strategy and correlation to KME goals

Improve plant economy by enabling an increased green electricity production and optimum material selection



KME goals:

- ✓ Verifying novel solutions in boiler design with respect towards corrosivity
- ✓ Increased steam parameters and thereby higher electrical efficiency
- ✓ Test improved material solutions – including alumina forming alloys and coatings