

# Increased fuel flexibility and performance for boilers with challenging fuels

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## Increased fuel flexibility and performance for boilers with challenging fuels

- Calderys
- E.ON
- Energiforsk
- Falu Energi & Vatten
- Kanthal
- MH Engineering
- Mälarenergi
- Stockholm Exergi
- Swerea IVF
- Valmet
- Vattenfall
- *Energimyndigheten*

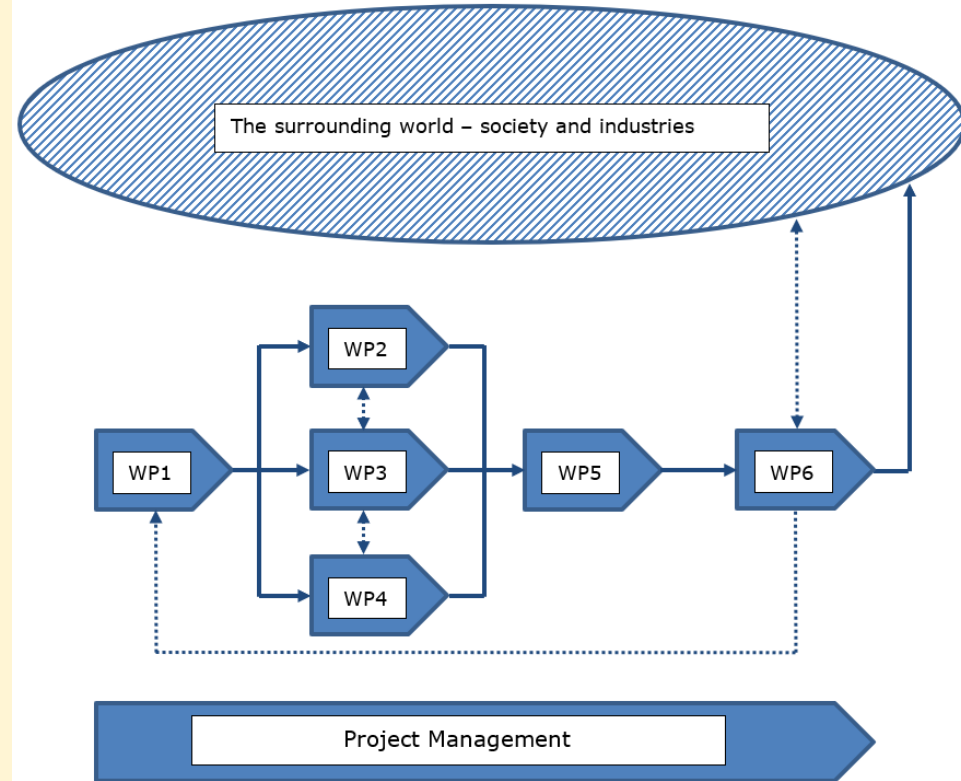
# Background

- Biomass-based fuels often imply an elevated risk of corrosion caused by chlorides and alkali metals
- Recycled wood and waste often contains paint, plastics and metals
  - This results in high content of heavy metals (e.g. Pb and Zn) and chloride causing increased corrosion



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- WP1 – Challenges and possibilities
- WP2 – Performance of cooled metallic parts
- WP3 – Performance of uncooled metallic parts
- WP4 – Refractories
- WP5 – Excellence in performance
- WP6 – Co-operation and communication



# Performance of cooled metallic parts

- Material performance will be investigated by metallographic evaluation of selected materials
- Testing in field and laboratory
- A temperature gradient will be present during testing in laboratory furnace by applying cooling on the backside of the test material

# Performance of uncooled metallic parts

- Many components other than tubing, and that are mostly uncooled, such as cyclone vortex finder, supports, hangers, plates, refractory anchors and nozzles, frequently experience short life.
- Being uncooled these parts operate at a high temperatures giving intrinsically different challenges compared to cooled parts, as e.g. condensed phases in the deposits are expected to be different.
- The work will include metallographic investigation of the performance of new advanced high temperature materials being exposed at targeted boiler positions.
  - Commonly used materials today that have showed to be susceptible to failure will be investigated for reference.

# Refractories

- Example of challenges encountered

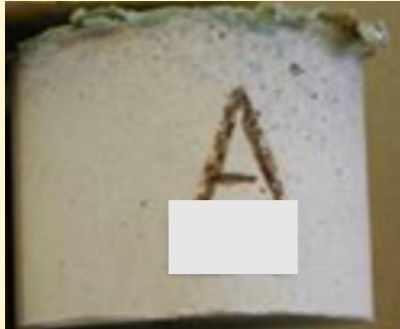
Calderys is acknowledged for providing the image





# Lab testing of refractories

- Example of “Cup Test” at Calderys’ Höganäs laboratory



Calderys is acknowledged for providing the images



# Selection of project goals

- To obtain new knowledge on how heavy metals in deposits influence corrosion of cooled parts
- To identify 1-2 coating candidates with the potential to improve the life performance by 20 %
- To obtain new knowledge on how corrosive fuel components degrade refractories
- To find improved ways of inspecting refractories allowing prolonged reliable operation
- To identify 1-2 refractory material candidates with the potential to improve the life performance by 20 %
- To achieve an understanding for when refractories are particularly beneficial to be used for protection of underlying metal and when other corrosion prevention methods may be attractive

Thank you for listening!