



**JAMES BROWN**  
(SEI)



**ELECTRIC HEATERS FOR  
ETES**



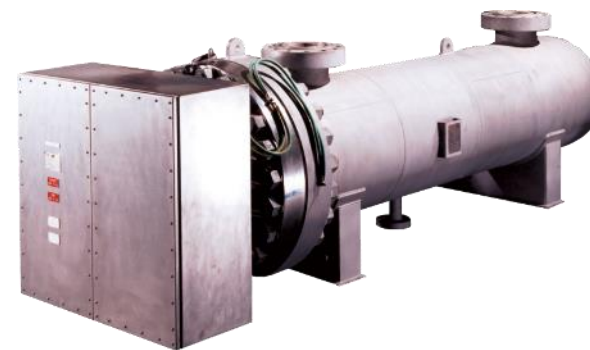
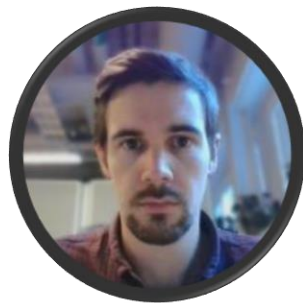
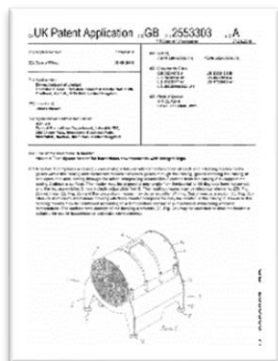
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# SEICO - An EXHEAT Group Company



- SEICO GmbH: one of eight companies within the EXHEAT Group
- Over 80 years experience designing heating and cooling solutions up to 1000 °C
- 2020: 311 Staff based in 5 countries
- 2020: €34.8m Group Turnover, with heaters & control panels in 147 countries
- James Brown – Technical R&D Manager



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# WHY SOLARSCO2OL?

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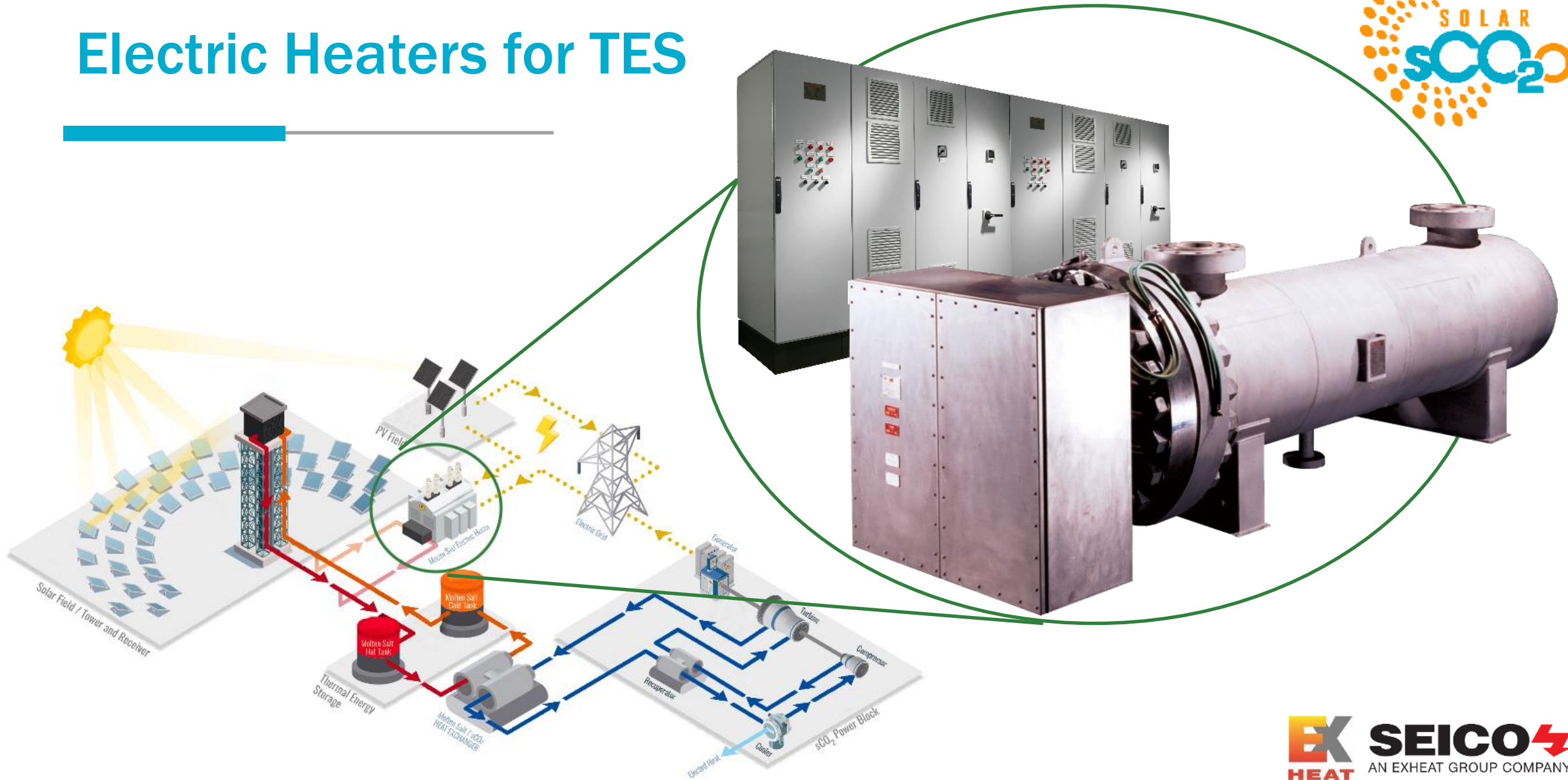
- Electric heaters are not ‘standard parts’
- Already an alternative to fired heating systems
- Working at the forefront of long term energy storage
- Creating new technologies
- Developing our understanding



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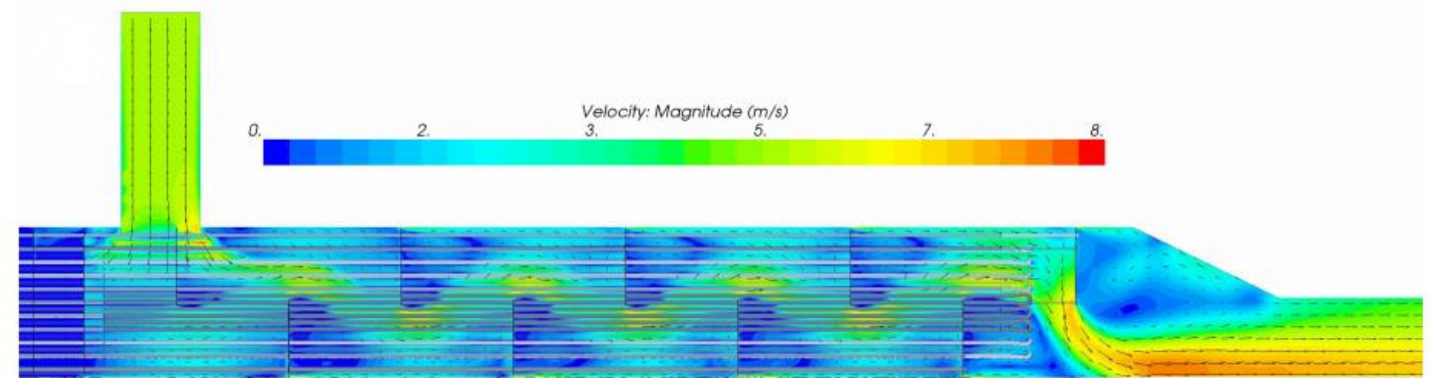
# Electric Heaters for TES



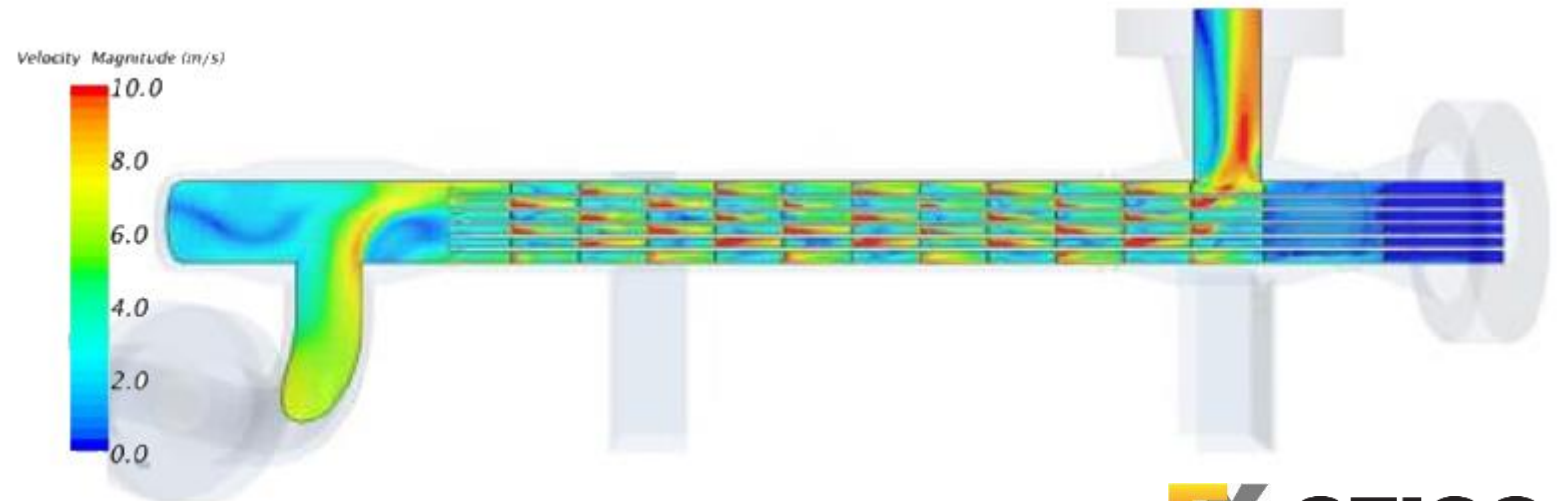
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# Electric Heater Challenges

- Low flow areas
- Localised hot spots
- Increased pressure drop
- Variable flow rates and temperatures



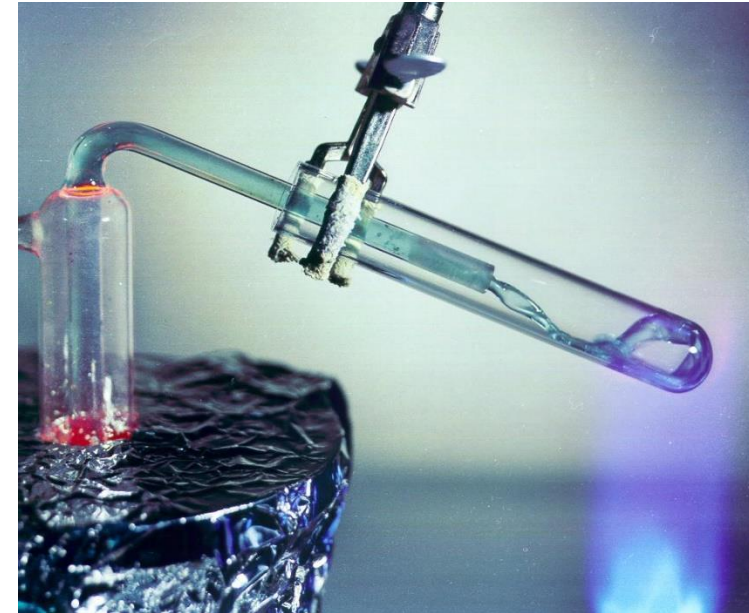
Velocity profiles within a segmental baffled (above), and an unbaffled (below) electric heaters



# Molten Salt Challenges



- Closed loop system
- Degradation of the salts
- Corrosion to the heater elements
- Solidification if allowed to cool



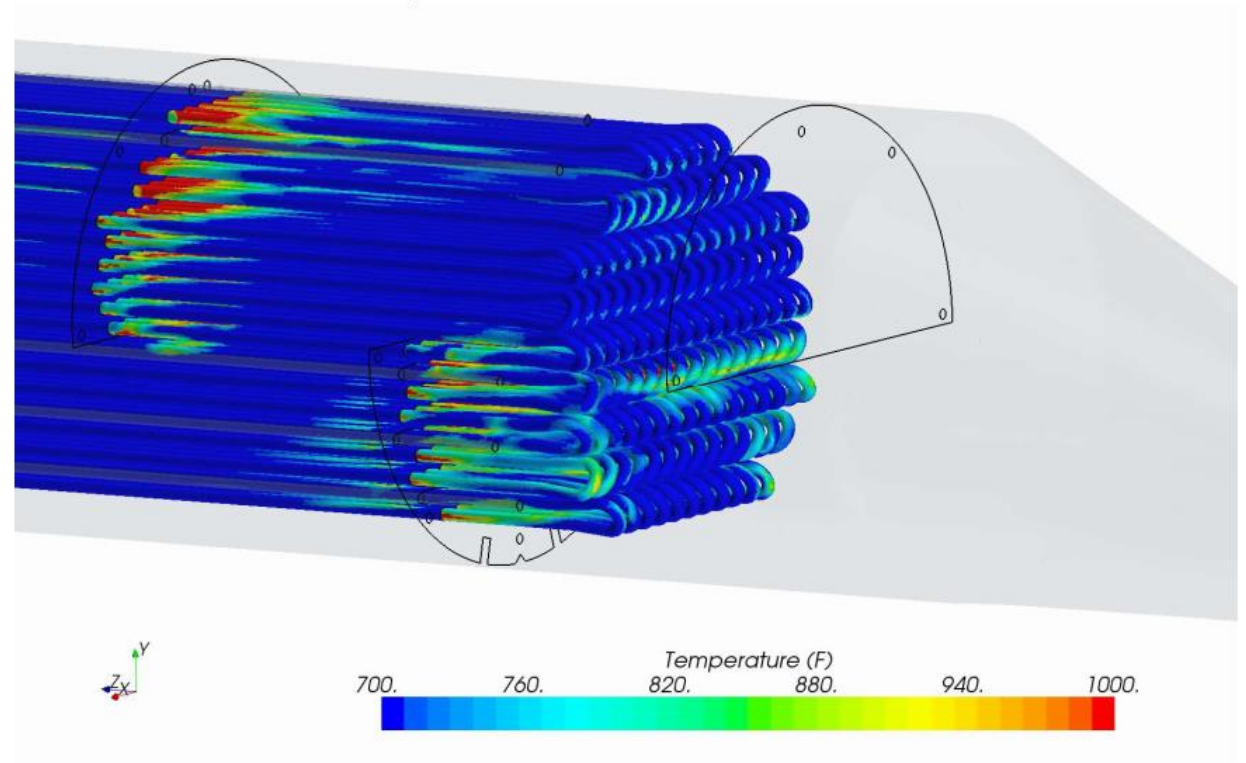
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# Electric Heater Design Options

- Standard control options
- Additional control options
- Re-designing baffles
- Changing the design of the elements

Flow Temperature: Contours of Surface Temperature, clipped by crescent minimum temperature



# Beyond SOLARSCO2OL



- Advancing knowledge whilst increasing the TRL of EH-TES Systems
- Further development of electric heaters for TES applications
- Leads to future collaborations in all areas of TES
- Commercially available solutions for molten salts
- Open avenues for SEICO and investigate other concepts of TES with electric heaters



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# Thank you for your time!

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