EE-17-2016

Smartrec

Full Title: Developing a standard modularised solution for flexible and adaptive integration of heat recovery and thermal storage capable of recovery and management of waste heat

Aim:

Waste heat is a significantly underused resource in the process industries. Secondary aluminium recycling and ceramic processing were identified as key examples with economically recoverable waste heat. Smartrec meets the inherent challenges (e.g. batch-based processes with corrosive particulate-laden flue gas over a wide temperature range) by the development of a standard, modular solution for the integration of heat recovery with thermal storage that valorises medium to high grade waste heat, adaptable to different temperatures and industries.

Concept:
Following an end-user analysis and characterisation of exhaust streams and waste products, a life cycle costing and assessment will be carried out with candidate molten salts selected for thermal storage and heat transfer fluid, validated by corrosion testing. A custom heat pipe heat exchanger will be modelled and designed around the requirements of heat transport capacity wick structure and capable of heat exchange with a molten salt pumping loop. This loop will include a dual media thermocline thermal storage system with cost/system modelling, validation and instrumentation incorporated. A pilot will be built in a secondary aluminium recycler and/or ceramic processor valorising high grade heat for continuous salt-cake recycling. Smartrec will be validated by integration with existing systems including a fully developed instrumentation framework. A knowledge-based tool, with all relevant parameters to model the system fully, will allow users to determine their needs & benefits and

integrate Smartrec in their own systems via an open access workshop.

Start date:
01/09/2016

End date:
31/08/2019