Challenge 1: Siemens ENERGY – Utilizing low-temperature waste heat for electricity and steam production

About the Company

Siemens Energy AG's Division for Industrial Steam Turbines and Generators is headquartered in Görlitz. Siemens Energy manufactures industrial steam turbines at four main sites worldwide, which are delivered as generator turbine sets or mechanical drives. Controlled from Görlitz, more than 4,200 employees work on development, production, project management and sales, mainly at the sites in Brno, Czech Republic, Vadodara, India, and Jundai, Brazil. Siemens Energy's knowledge, many years of experience in various industrial sectors, and close networking of its globally positioned division make it the Market and technology leader in the field of industrial power plants. The integration of the core product into industrial processes, especially in steam and heating processes, is a clear core competence and is the focus of the expertise.

Transformation Processes in the Industry

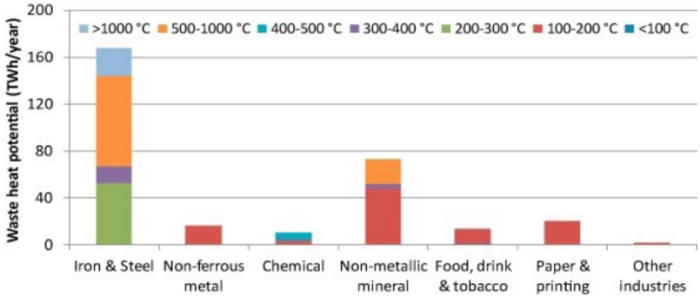
The transformation processes in the Industry are fostering a more sustainable business. Therefore, emissions during the operation of industrial plants but especially also during power production shall be reduced. We want to support enhancing energy efficiency at the factories of our customers by utilizing environmentally friendly technologies to generate electricity out of low-temperature waste heat sources. By this, we decrease fuel demands and save GHG emissions.

Challenges in these Transformation Processes

The main challenge is to identify approaches and solutions to utilize low-temperature waste heat sources for electricity production, ideally for steam production. Efficient conversion from heat to power is the key challenge because only a small temperature difference can be utilized. The proposed technologies should have reached a Technology Readiness Level of 6 or higher.

First Processes to Be Addressed

Depending on the industry sector, different waste heat sources can be utilized (as shown in the figure below).



Source: https://www.sciencedirect.com/science/article/pii/S1359431117347919

Therefore, the following technical parameters should be reached:

- temperature level of 100°C-200°C
- Utilization of a thermal power of 1-50 MWth (or higher)
- Use of waste heat sources such as flue gas, hot water, hot air, saturated steam and other waste heat sources
- low operating and investment costs

Targeted benefits

Benefits will be, to improve our sustainability, to open up new markets for us and our partners, in the best case to get some economic advantages and to increase our energy efficiency. Therefore, we need partners and technology providers with the same mindset: Decarbonize the industrial sector to fight climate change and improve energy efficiency to reduce energy consumption and carbon dioxide emissions worldwide.

It would be very helpful if we could visit a demonstration plant. If you have built a demonstrator with a power output of 100kW or higher and you are searching for an industrial customer to build up a demonstrator at a higher power level (>1MW), please feel free to contact us.

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