



**New technologies for utilization of heat recovery in large industrial systems,  
considering the whole energy cycle from heat production to transformation,  
delivery and end use**

**RIA Research and Innovation action - GA n°680738**

# The project partners

The Indus3Es project, received funding in the frame of Horizon 2020 TOPIC EE-18-2015: New technologies for utilization of heat recovery in large industrial systems, considering the whole energy cycle from heat production to transformation, delivery and end use.

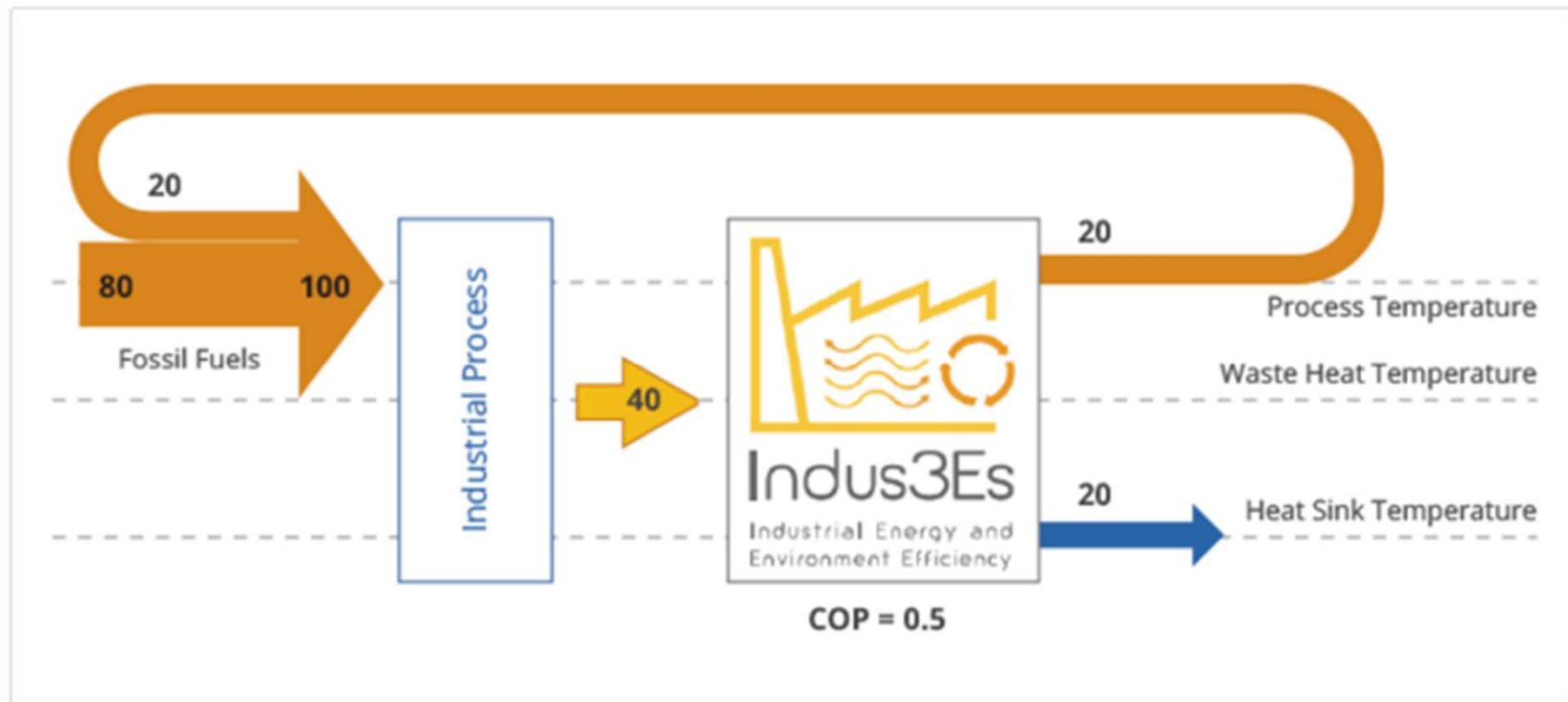


Large quantities of waste heat are continuously rejected from industries. Most of this waste energy, however, is of low-quality and is not practical or economical to recover it with current technologies:

- The Indus3Es project will develop an innovative Absorption Heat Transformer (AHT) for this purpose, focused on low temperature waste heat recovery (below 130°C, referred to a recovered waste heat source temperature).
- The Indus3Es System will effectively recover and revalorize almost 50% of the low temperature waste heat, increasing quality of the waste source to the required temperature and reusing it again in the industrial process.

The main objectives are:

- to develop an economically viable solution for industry, appropriate for existing plants and adaptable to various industrial processes.
- The developed system will be demonstrated in real environment in Tüpras, the main petrochemical industry in Turkey, enabling to analyze besides integration aspects, operational and business issues.
- Indus3Es System will be defined and optimized for different specificities in different sectors and industrial processes, for which up-scaling of the demonstrated technology and replication studies will be performed.



- One of the first activities performed in the framework of the Indus3Es project was the analysis of applicability of the developed technology in different potential industrial processes.
- For this purpose, the different sectors were analyzed in depth, focusing principally on temperature levels, capacities and possible heat sources and heat sinks, which can suit AHT requirements. Results showed that many industrial processes are suitable for integration of AHT technology.
- Sectors which are especially promising are the petrochemical, pulp&paper, and ceramics sector; followed by water and non-ferrous sectors, where it can be integrated in special applications. Cement and steel sectors showed too high temperatures for AHT integration.

- Some processes of interest for integration of AHT in the petrochemical industries include their use in distillation columns or combination of AHT in heat exchanger networks, having a high potentiality to be used in these kinds of plants, due to the amount of hot and cold streams and the high capacity of the processes.
- Regarding the pulp&paper industry, it is possible to recover heat from the steam leaving the cyclones in the pulping process, to be revalorized and used in the drying section. In the ceramics sector, heat recovery from the exhaust gases of the cooling process could be used to drive an AHT, for energy use in the drying chamber.
- AHT can be used in the water sector in certain processes, such as multi-effect distillation and multi-stage flas distillation processes, or water desalination. Finally, in the non-ferrous sector, AHT integration could be more difficult, but the possible applications would be linked to cooling systems and external steam grids close to the waste heat generation.







The screenshot shows the Indus3Es website homepage. At the top left is the logo with the text "Industrial Energy and Environment Efficiency" and "Indus3Es". To the right are buttons for "PRIVATE AREA" and a search bar. A navigation menu includes "HOME", "ABOUT INDUS3ES PROJECT", "IMPACT", "PARTNERS", "RESOURCES", "NEWS AND EVENTS", and "CONTACT". The main heading is "Indus3Es Project" followed by the subtitle "New technologies for utilization of heat recovery in large industrial systems". Below this is a yellow button that says "Read more about Indus3Es". At the bottom of the main content area is a horizontal strip of images showing various industrial scenes: a factory interior, a worker with a valve, a circular flow diagram, a large industrial tank, workers in safety gear, a heat exchanger, a worker in a hard hat, and a flare.

Indus3Es – Industrial Energy and Environment Efficiency

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Indus3Es Newsletter

Subscribe now to have access to the Indus3Es newsletters and many other project resources.

# Thank you for your attention



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PNO, as innovation and technology transfer organisation, will lead dissemination and communication activities and will support companies in exploitation issues, ensuring the project impact among the stakeholders and preparing a favourable framework for future exploitation of the project results, assuring alignment and smooth flows of information and providing close integration with Europe's research and innovation programmes, platforms and organisations.



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