SusPIRE

- Call: H2020-EE-18-2015
- Start/end date: 1\textsuperscript{st} October 2015/1\textsuperscript{st} October 2018
- Partners:
1. The EU/ SPIRE needs

In EU 20-50% of the energy used in energy intensive industries is lost in residual flows/SPIRE aims at increasing the economic competitiveness of waste heat recovery and develop ready-made practical solutions.

2. The Project Solution

Develop a global energy recovery system in one industrial plant. It will be based on an in cascade energy recovery set of technologies and a smart energy recovery methodology.

3. Value to Customers

The system will allow a reasonable pay back of 3-5 years considering a 20% of energy savings and a mayor integration of the companies by symbiosis in industrial parks or urban areas depending of their location.

4. How will this happen?

An scenario of surplus energy commercialization to third parties will be deployed. This will be the basis for application in other industrial cases.
What are the **key expected sustainability impacts** of SusPIRE?

**Baseline:** The plan under study has a yearly energy consumption of 10.865 MWht and has significant energy requirement in the form of heat for climatization and for different process stages. The plant is located near living areas and institutional buildings.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Baseline</th>
<th>Expected Impact</th>
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<tbody>
<tr>
<td><strong>Total energy consumption of the plant of gas and electrical energy</strong></td>
<td>The plant has a yearly energy consumption of 10.865 MWht</td>
<td>Reduce energy consumption in a 20.29% by means of using energy from residual heat streams</td>
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<td><strong>Energy capture from residual heat streams</strong></td>
<td>Energy in residual heat streams is of 3150 MWht and is discarded.</td>
<td>The project aims at capturing the 70% of the residual heat (2.205 MWht).</td>
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<td><strong>Available energy to be used in plant</strong></td>
<td>A significant demand of low temperature energy in form of heat or cooling is required in the plant.</td>
<td>Around 1.600 MWht is expected to be used in plant process stages and for buildings conditioning.</td>
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<td><strong>Energy to be commercialized to third parties</strong></td>
<td>The company is currently integrated into a surrounding living area and social buildings.</td>
<td>The very near sports center can use 1550 MWht of captured energy for its facilities.</td>
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<tr>
<td><strong>Energy recovery efficiency and process rejection and recovery rates</strong></td>
<td>The climatization and heat consumption of the plant affects to the rejection and recovery rate of final products</td>
<td>The smart data management system will empower energy recovery reducing at the same time scrap and recovery rates</td>
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*Core SPIRE indicator*
What outputs or learning from SusPIRE could have value for other SPIRE projects here?

• The introduction of highly conductive nanoparticles in Phase Change materials (PCM) and Heat Transfer Fluids (HTF) increase the efficiency of heat exchangers.
• The use of silicon based heat transfer fluids for application at around 350ºC in high temperature heat exchangers require the use of significant security measures, such as control pressure systems, safety valves and redundant pumps.
• The new design of High temperature heat exchangers and low temperature heat exchangers could have a significant application in gas furnaces and boilers, mainly if they incorporate this elements in their initial design.
• Calculation shows that ground allows seasonal storage of heat and efficient heat interchange for heating and cooling industrial facilities.
• The smart data management system requires the incorporation of a significant set of process variables and to introduce new sensors for process control. The expert knowledge is only needed for the main variables selection, apart from that, the system is capable to predict final results and to define actuation protocols if necessary.
Don’t throw away your heat, just capture, store, reuse and share it.
Contact

Project coordinator email: jordi.hernando@pcb.es
Project technical coordinator email: fsantos@azterlan.es
Exploitation manager email: ted.crowston@dowcorning.com
Project website: http://suspire-h2020.eu