



DRYficiency - Waste Heat Recovery in Industrial Drying Processes

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Drying

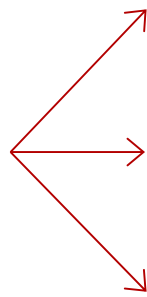
a very energy intensive process step in brick production



- About 25% of worldwide industrial energy demand is for drying processes
- The required temperature level therefore is 80-200°C
- About 85% of all dryers are convective air dryers fired with fossil fuels
- Only few dryers recover latent energy from the dryer exhaust air
- With the help of heat pumps it is possible to recover the evaporation energy and to reduce the specific energy consumption significantly



triple action @



DryPump: 2015 - 17, national funded R&D project

DRYficiency: 2016 - 20, European funded R&D project

LERS: 2016 - 17, in-house financed project

Purpose

Reduction of fossil carbon emissions by waste heat recovery to foster competitiveness, improve security of energy supply and guarantee sustainable production in Europe.



Kick off meeting Sep. 6th 2016

Period: Sept. 2016 - Sept. 2020
Budget: 6.4 Mill. EUR
Funding: 5.0 Mill. EUR

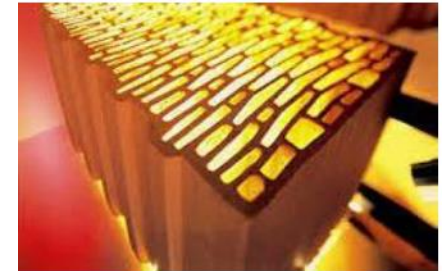


European project H2020 EE17

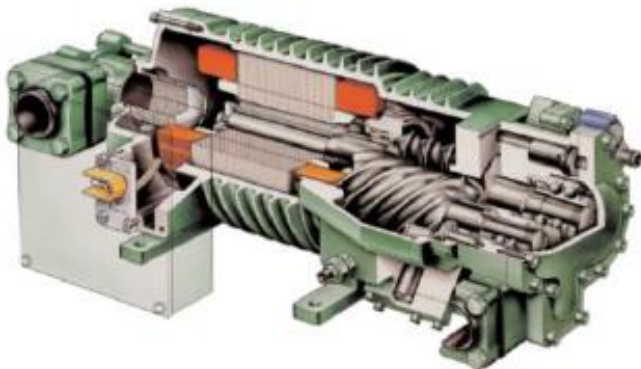
Key goals of DRYficiency



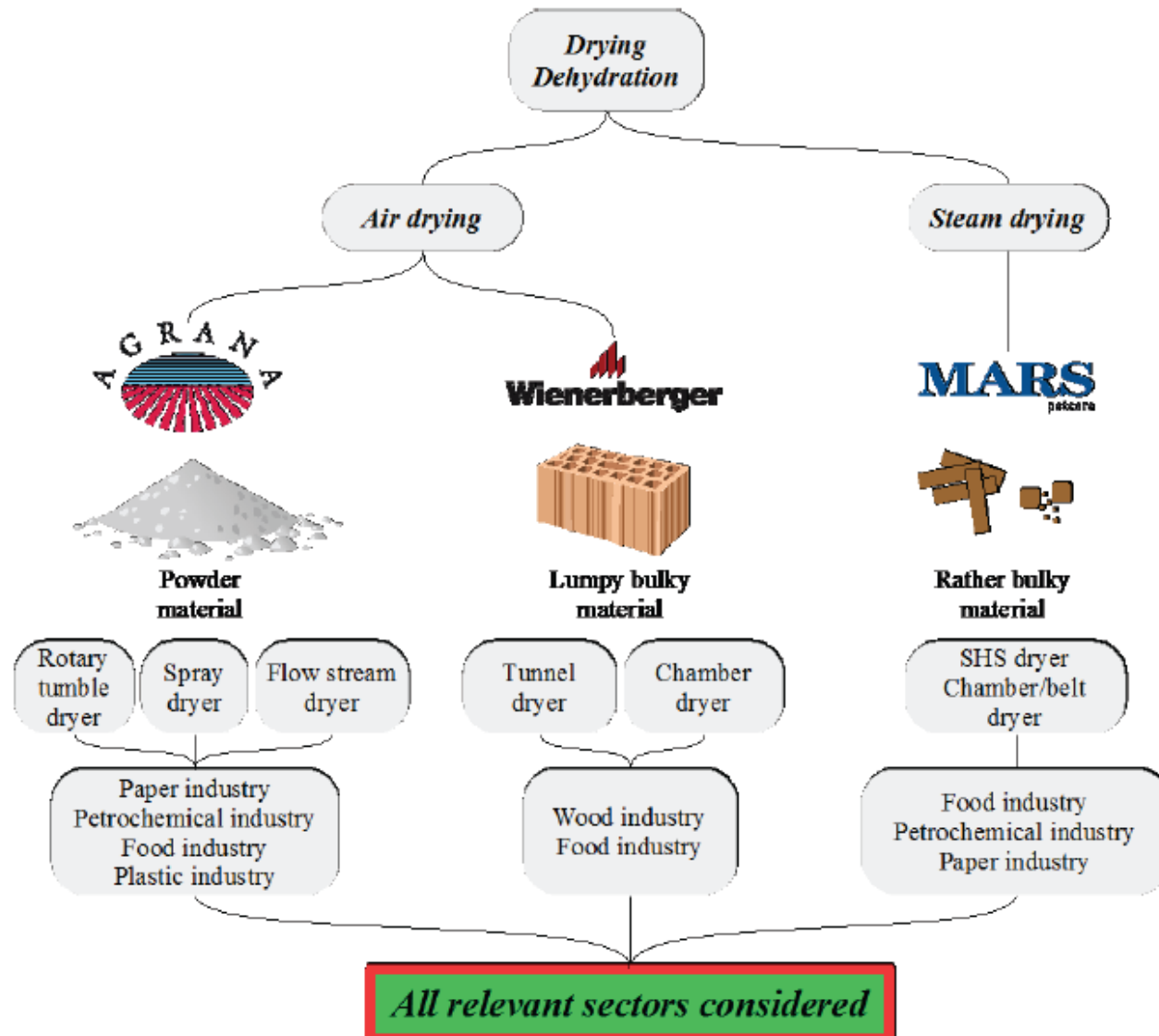
- **Reduction of specific energy consumption** for drying/dehydration/evaporation processes, by recovering of waste heat by 60-80 %
- Phase-in of renewable energy sources into thermal processes ideally resulting in **CO2-free production**
- Development of **cost-efficient high temperature industrial heat pumps** for industrial thermal processes with minimum global warming potential (GWP) & minimum negative environmental impact
- **Increasing competitiveness** of the European industry
- Become the **leading pioneers** by being the first to deliver to market



- To elaborate technically and economically **viable solutions for upgrading idle waste heat streams to process heat streams** at higher temperature levels up to 180°C
- Key elements of the solution are **two advanced high temperature vapour compression heat pumps**
 - => a closed loop heat pump for air drying processes and
 - => an open loop heat pump for steam driven drying processes



Industrial sectors of DRYficiency



Current status

Installation site:	Pottelberg, raw material pre-dryer (drum dryer)
Exhaust air conditions:	dewpoint temperature 55 - 65 °C
Target temp.:	93 - 120°C (hot water cycle)
Electr. capacity:	Bitzer compression heat pump 150-300 kW _{el}

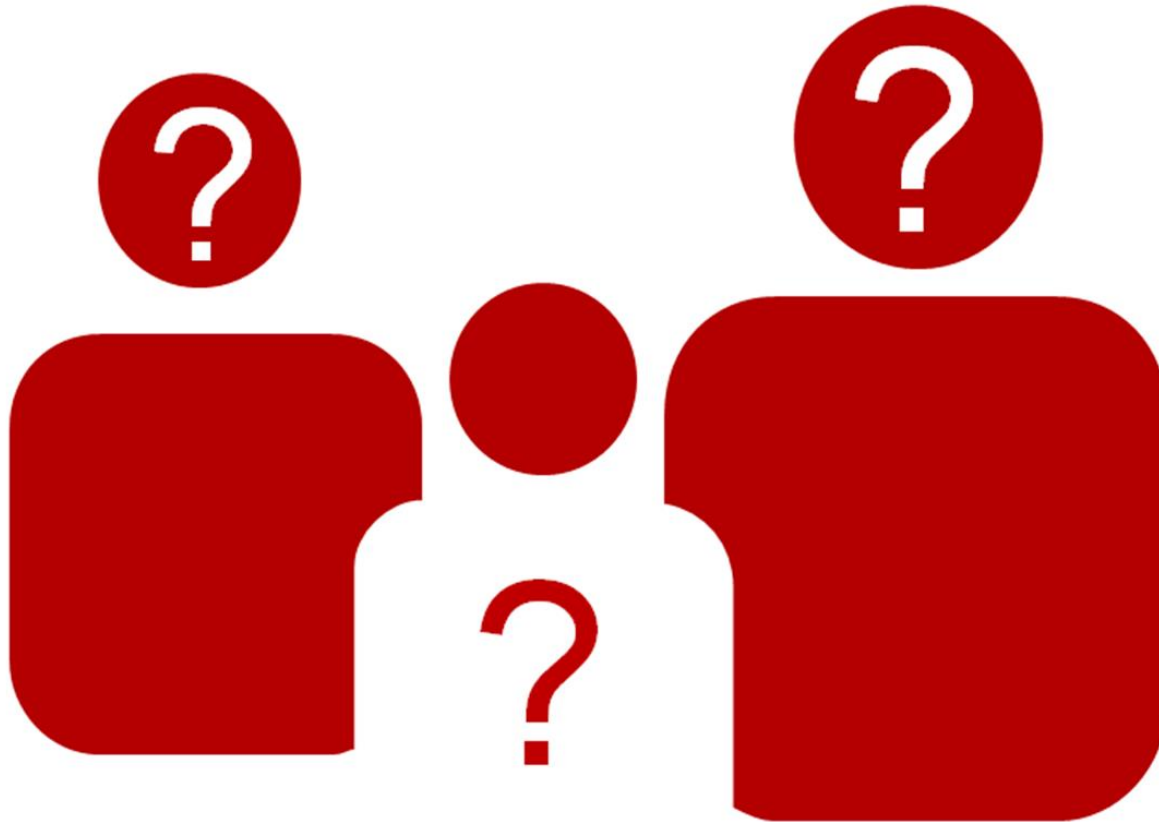


source: Allgaier GmbH

Time table

Planning, engineering and construction:	Jan - Dec 2017
Delivery and installation of heat pump:	2017 / 2018
Demonstration phase:	2018 - 2020
Next action:	Identification of most appropriate heat sinks

Any Questions?



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Thank you.

