DryFiciency  - Waste Heat Recovery in Industrial Drying Processes

Grant Agreement No 723576  - Energy Efficiency
Innovation Action H2020-EE-2016-2017

www.dry-f.eu
The DryFiciency Partners

- Austrian Institute of Technology, Project Coordinator, Austria
- Bitzer Kühlmaschinenbau GmbH, Germany
- EPCON Evaporation Technology AS, Norway
- European Heat Pump Association, Belgium
- ROTREX AS, Denmark
- SINTEF ENERGI AS, Norway
- Viking Heat Engines AS, Norway
- AGRANA STÄRKE GmbH, Austria
- Chemours Deutschland GmbH, Germany
- Fuchs Europe Schmierstoffe GmbH, Germany
- Mars GmbH, Germany
- RTDS Association, Austria
- Wienerberger AG, Austria
Motivation of DryFiciency

- to lead the European energy intensive industry to **high energy efficiency** and a **reduction of fossil carbon emissions**
- to **foster competitiveness**, improve security of energy supply and **promote sustainable production** in Europe.
- By **making use of waste heat potentials** of industrial drying and dehydration processes, the most energy intensive and wide-spread processes in a number of industrial sectors
TRL7 – Background R&D
Key goals of DryFiciency

- **Reduction of specific energy consumption** by 60-80% for drying/dehydration/evaporation processes, by recovering of waste heat
- 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
Technical objective of DryFiciency

- 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 **three 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
Research Approach of DryFiciency

**WP1: Boundaries**
- Component Scale: Key Components
  - Determination of boundary conditions
  - Definition of performance indicators
  - Development and adaption of key components (compressor, bearings, lubricant, etc)

**WP2: Components**
- Unit Scale: Heat Pump Packages
  - Development and design
  - Ordering and assembling
  - Function and quality test

**WP3: Heatpumps**
- Plant Scale: Demonstration Plants
  - Planning and layouting
  - Design and construction
  - Commissioning and test run
  - Operation of demonstrators
  - Validation of energy savings

**Phase 1**
(M1 - M20)

**Phase 2**
(M1 - M28)

**Phase 3**
(M30 - M48)
Industrial sectors of DryFiciency

Drying Dehydration

Air drying

Steam drying

Powder material

Rotary tumble dryer
Spray dryer
Flow stream dryer

Lumpy bulky material

Tunnel dryer
Chamber dryer

Rather bulky material

SHS dryer
Chamber/belt dryer

Paper industry
Petrochemical industry
Food industry
Plastic industry

Wood industry
Food industry

Food industry
Petrochemical industry
Paper industry

All relevant sectors considered
DryFiciency – vast market potential
Contact information

Dr. Veronika Wilk
Energy Department
Sustainable Thermal Energy Systems

AIT Austrian Institute of Technology GmbH
Giefinggasse 2 | 1210 Vienna Austria
T +43 50550 - 6494
M +43 664 88390018

Veronika.Wilk@ait.ac.at
http://www.ait.ac.at
www.dryficiency.eu