SMART HEAT Inc.

WASTE HEAT RECOVERY SINK:
HUMIDIFICATION OF INDUSTRIAL PROCESS FLOWS

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ENERGY-WATER NEXUS

It’s very important that energy efficient technologies would not consume additional water.
“ESCAPING” WATER and LOST ENERGY

Water managements concept of (3R):
- Reduce
- Reuse
- Recycle

by classification:
- grey water
- sewage water
- stormwater

unconsidered:
- evaporated water ("baking loss")

WHR source:
- high t-surfaces
- hot product
- heated liquid
- exhaust gases (vapor) - high vapor content

Bakery oven (developed concept)

Fluidized bed dryer

Since evaporation water from the product consumed considerable portion of combustion energy, the baking process is similar to drying process.
Our solution is to recycle escaping water and lost energy through the process.
Proofer air preparation is optimal heat sink for waste energy recovery. For recycling the exhaust' condensate may be used for technical water service.
Replacing Boiler Service with WHR System requires technical changes.

- **Cooling with condensation** available for proofer air heating and saturation
- **Cooling avoiding condensation** available for proofer air heating
- **Available heat for steam generation**

**Stack gas:**
- Sensible heat
- Latent heat

**Proofer air:**
- Sensible heat
- Latent heat

**Exhaust-to-Proofer Heat recovery system (1998)**

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HEATING AND HUMIDIFYING OF PROOFER AIR

Film-wise Air Saturation Method was selected for developing WHR system.

Methods of air humidification:
- Steam spraying
- Water spraying

Heat exchanger:
Condensing-evaporative

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Conventional bakery consumes fuel for oven heating and steam generation.

Developed solution reduces oven fuel consumption and recycles waste heat to replace boiler service.