

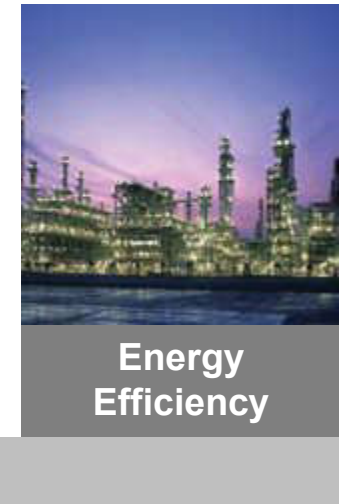
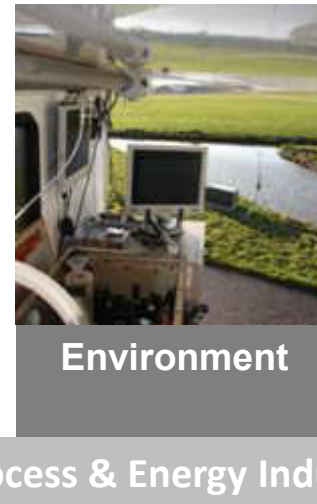
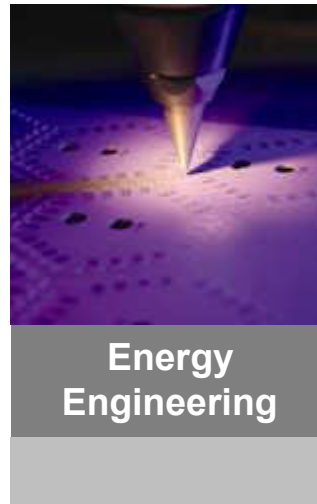
12th IEA Heat Pump Conference Rotterdam 2017:

Joint IEA HPT and IETS Workshop

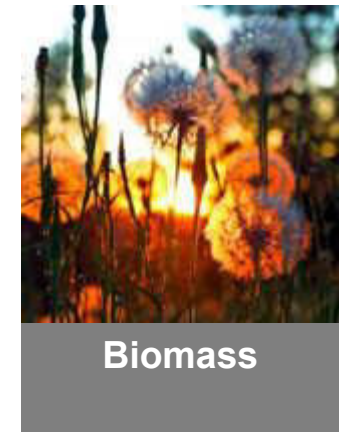
“Industrial Heat Pumps, the next phase” : introduction

Sigrid Bollwerk
15 May, 2017

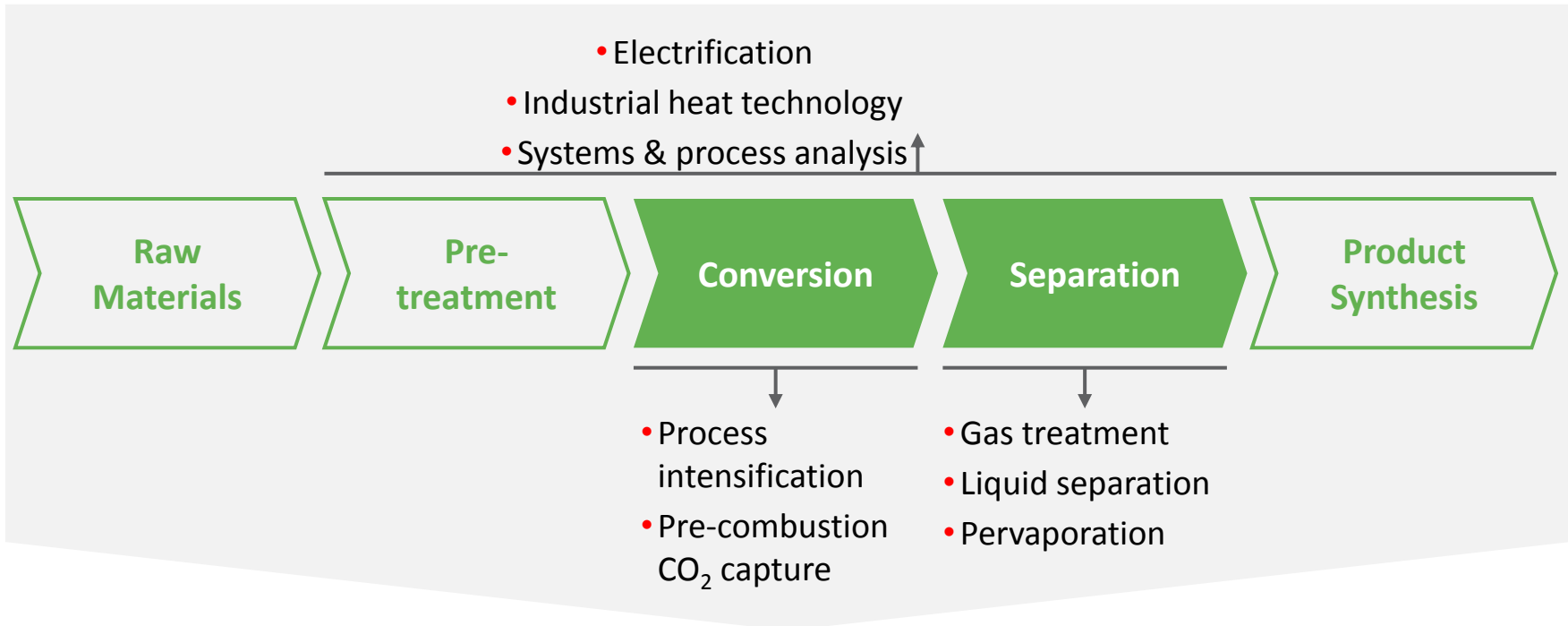
ECN R&D fields



Process & Energy Industry



Making Industry sustainable: ECN Technology for Energy Efficiency and Circular Economy



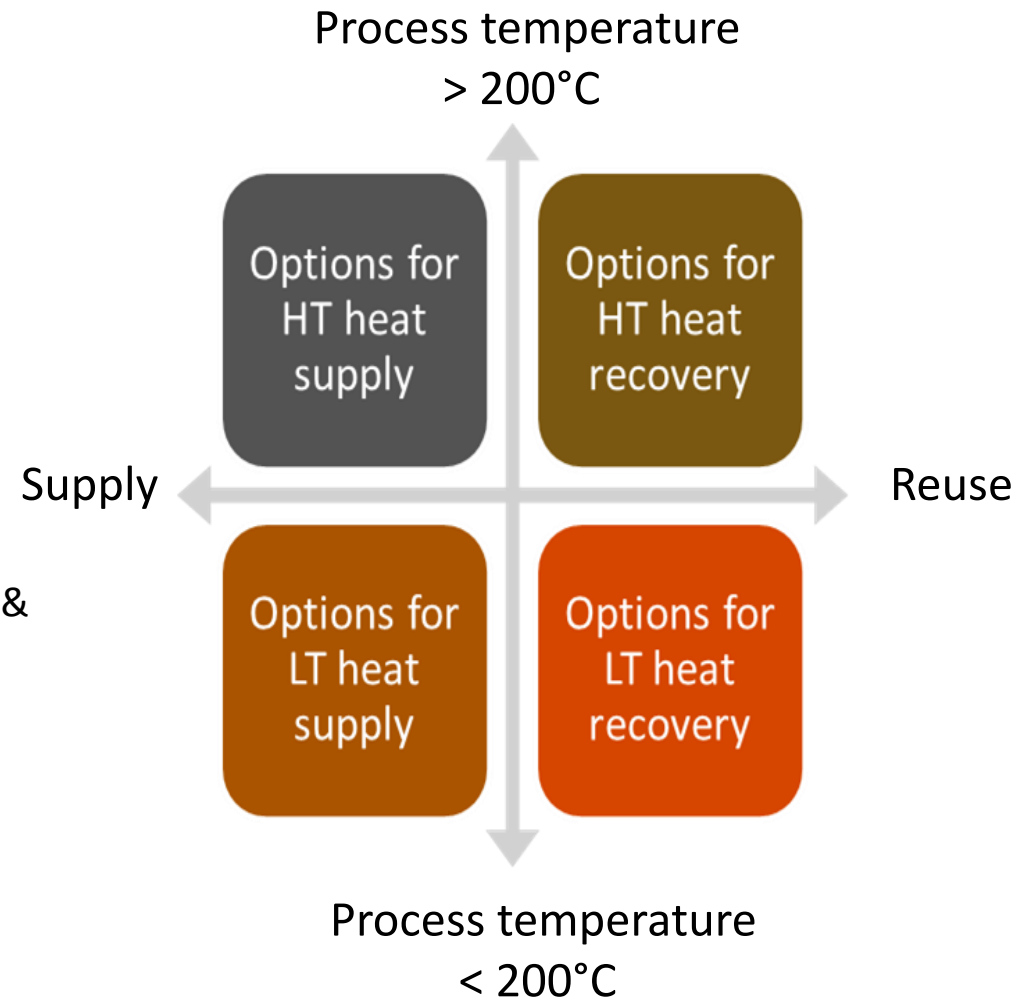
- » Lower costs
- » Higher yields
- » Lower energy consumption

Transition towards sustainable high-temperature heat

- Renewable sources
 - Biomass/gas (HT)
 - Renewable electricity (HT)
 - Geothermal heat (LT)
- Re-use options
 - Conversion to process heat
 - Heat pump technology
 - Conversion to electricity
 - Storage

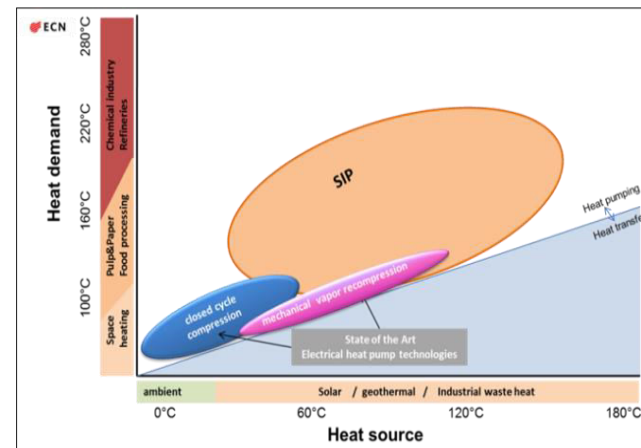
=> Efficient and cost effective heat conversion & storage technology : INCUBATE

=> Dutch platform for the Acceleration of Sustainable Heat Management in industry: DASH



Heat management for sustainable heat systems

- ECN Portfolio of heat pump technologies for the recovery of industrial waste heat and upgrading to high-temperature. Focus on high temperature and flexibility.
- Heat storage technology for high-temperature industrial applications
- R&D support for heating & drying related technology development



ECN heat recovery technology development

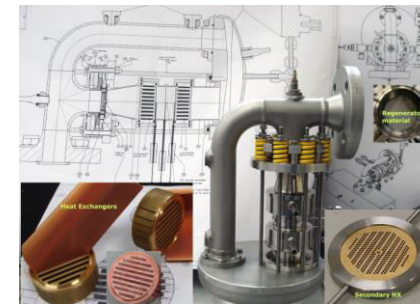
- Thermochemical systems
 - (Hybrid) waste heat driven heat transformer
 - Sorption heat pump for drying applications
 - High-temperature heat storage



- Thermoacoustic systems
 - High-temperature heat driven heat pump
 - Waste heat driven heat transformer
 - Electrically driven heat pump



- Compression systems



ECN presentations during 12th IEA Heat Pump Conference Rotterdam 2017

Wednesday, 17 May 2017

“Test results R600 pilot heat pump “ by Anton Wemmers

“Heat recovery in milk powder drying by using a liquid sorption process”
by dr. Michel van der Pal

Thursday, 18 May 2017

“Development of a thermoacoustic heat pump for distillation column”
by dr. Hasan Tijani

“Waste Heat recovery in industrial batch processes: analysis of combined heat storage and heat pump application” by dr. Robert de Boer

Joint IEA HPT and IETS Workshop

Industrial Heat Pumps, the next phase program



- **Introduction**

Short introduction to the workshop – Sigrid Bollwerk (ECN – NL)

The role of heat pumps for deep decarbonization of industrial processes - Prof Simon Harvey (Chalmers University of Technology - S)

Flexible heat supply and sustainability – Jan Grift (Energy Matters – NL)

Heat from the cold – Fons Pennatz (KWA – NL)

- **Industrial Cases**

Case 1 – presented by Norbert Koot from Cargill Industry

Case 2 – presented by Chris Versteegh from Heineken beer breweries

Case 3 – Presented by Ton van Haasteren from Smufit Kappa paper and pulp industry

Case 4 – Presented by Cees Biesheuvel from DOW Chemical

- **Pannel discussion**

Pannel discussion Q & A and wrap up in plenary session

Thanks for your attention!

