



INDUSTRIAL 12,13,14 OKT. 2021  
BRABANTHALLEN  
**HEAT+POWER**

# Empowering Sustainability



# Aardgasloze drogers

Energietransitie industrie

ir. Jan Grift rea

2050

2030





## Industrie

Chemie | Procesindustrie | F&B  
| Rubber & Kunststoff | Pharma |  
Diervoeding | Papier & Karton



## Land- en tuinbouw

Ondernemers & clusters |  
Glastuinbouw Nederland |  
Warmtenetten



## Grootzakelijke markt

Overheid | Woningcorporaties |  
Maatschappelijk vastgoed |  
Commercieel vastgoed

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## loopbaan

- '75- HTS Zwolle – wtb-energie
- '79- UT-wtb-energie&processen
- '84- IMT
- '90- M+I
- '00- Deerns
- '06- Energy Matters ↓
- '18- **BlueTerra Energy Experts B.V.**
- '20- **ook Docent Hogeschool Rotterdam**

Rea, lid werkgroep industrie Fedec





# Inhoud

- CO2-emissie drogen
- Resultaten studies
  - Petfood
  - Papierindustrie
  - Steam drying

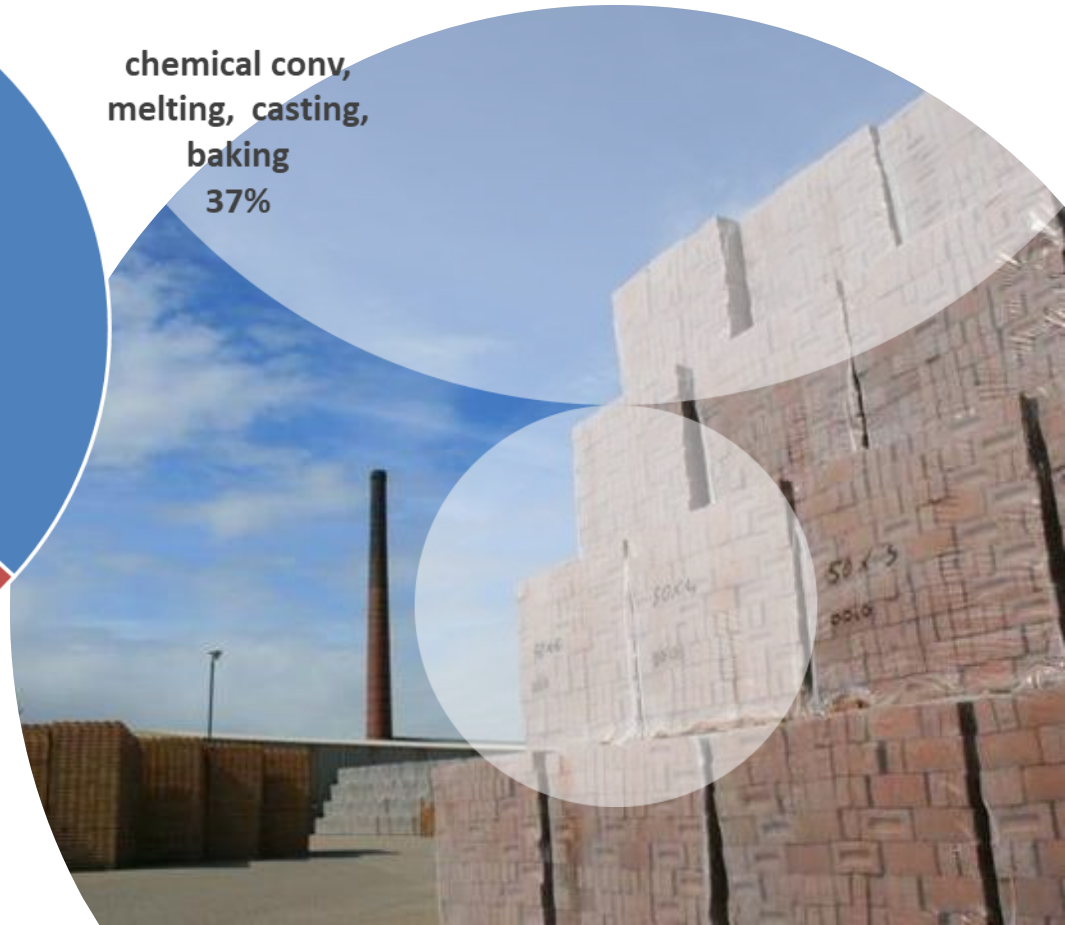
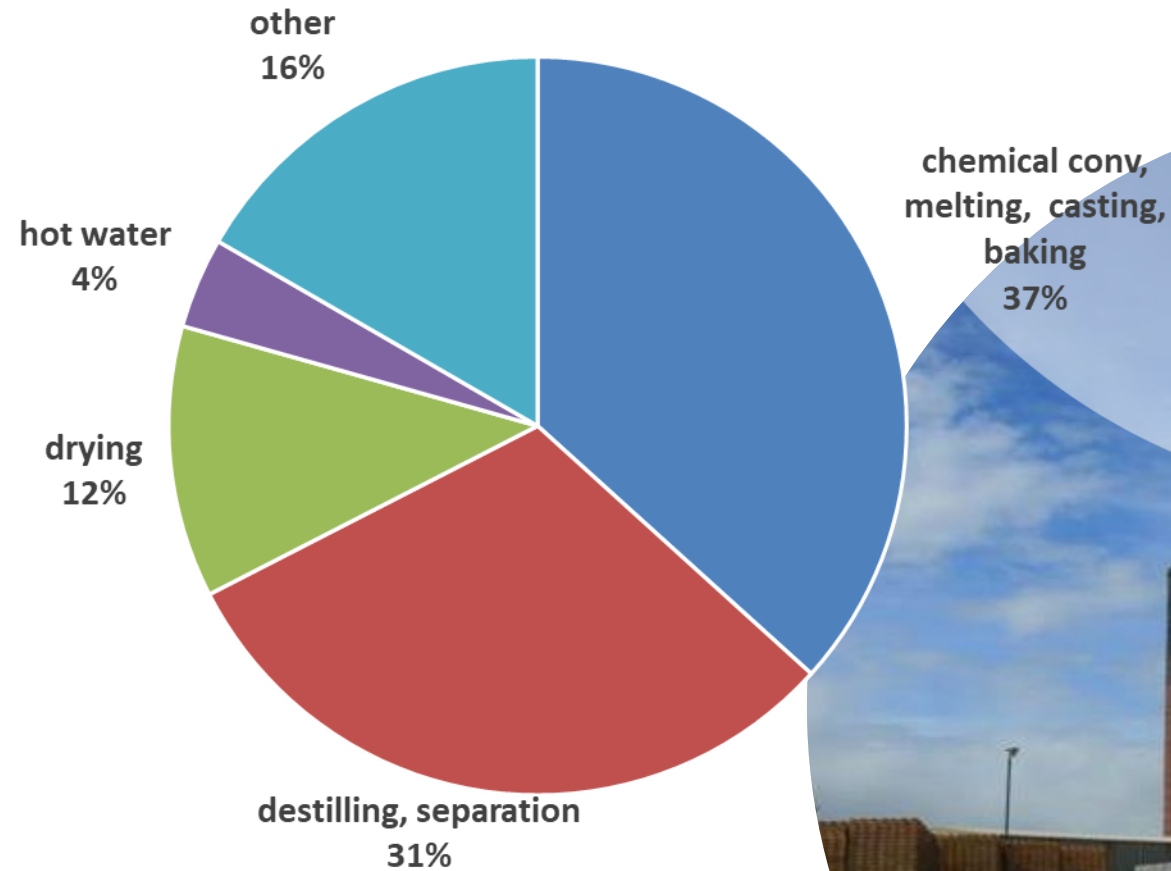




# CO2-emissie drogen

## CO2-emissie warmte industriesectoren

Heat consumption industry





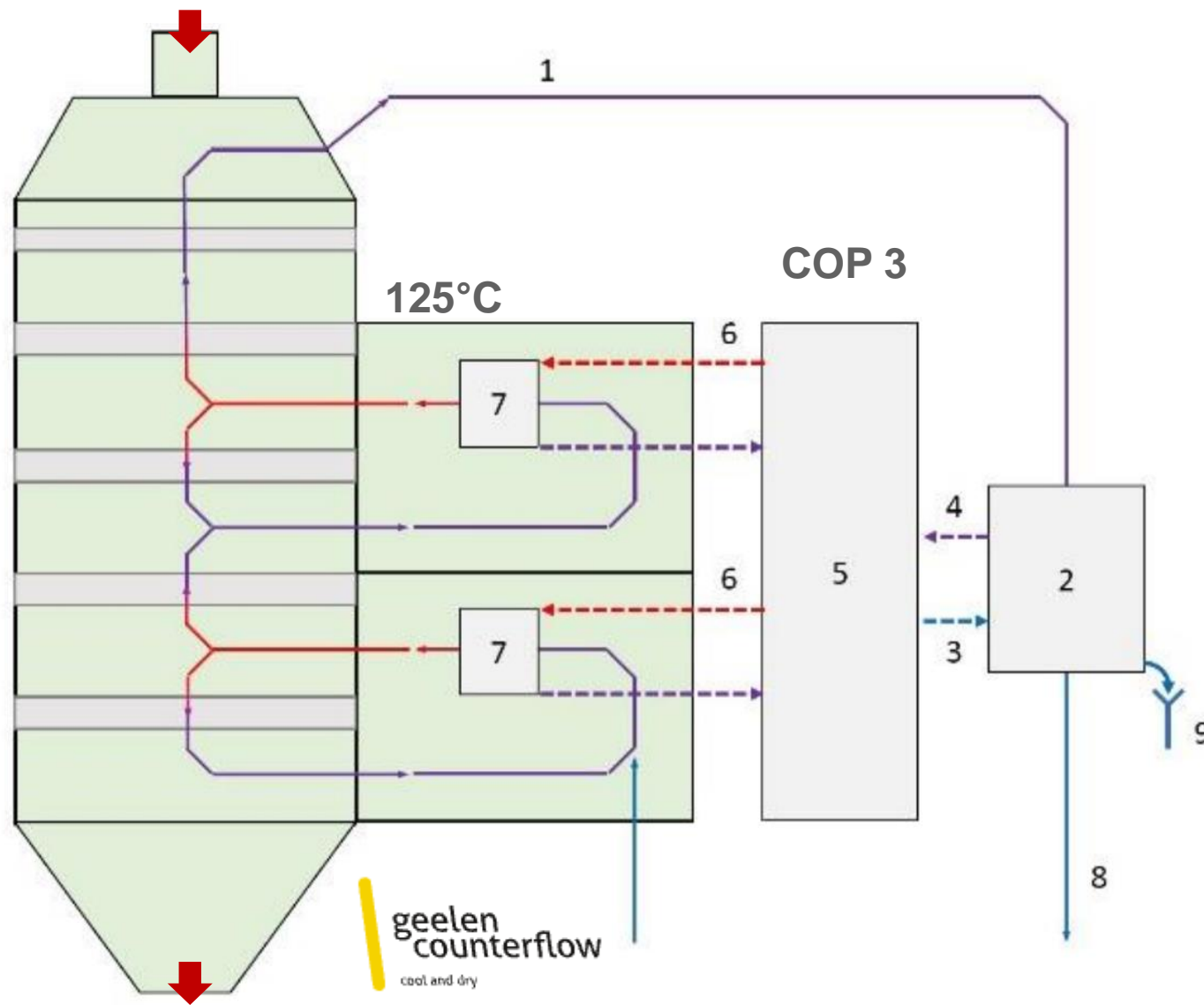
# Petfood droger

Geelen Counterflow (NL; prod. 11 ton/h)





# Warmtepomp geïntegreerde droger







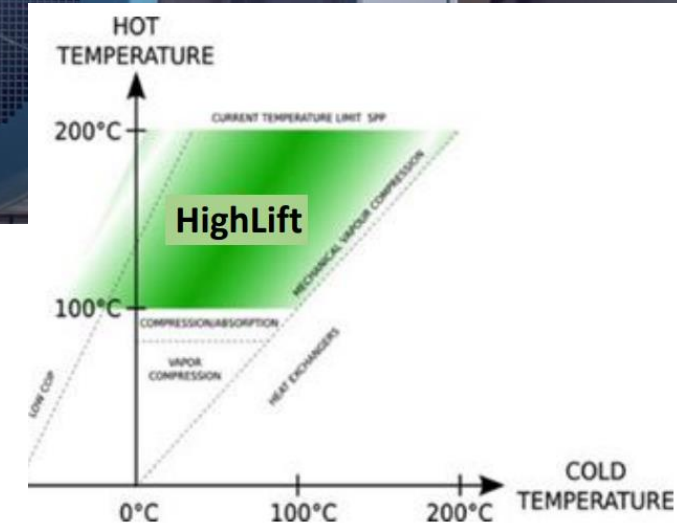
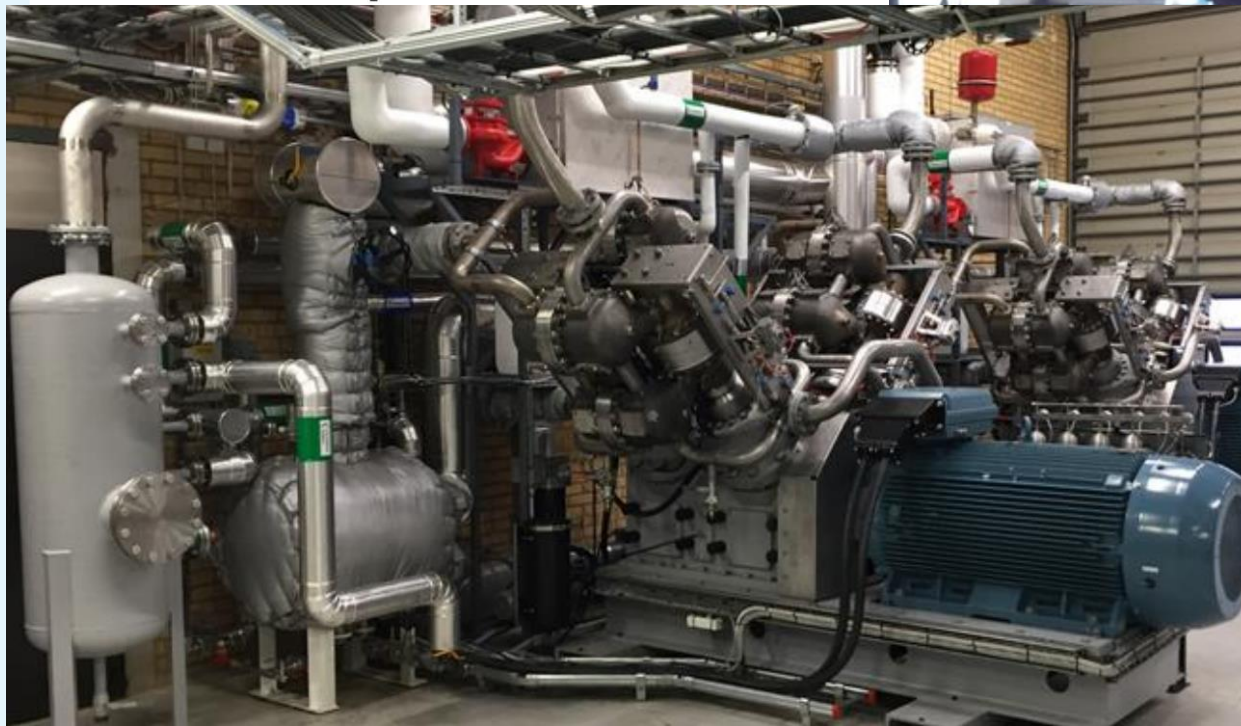
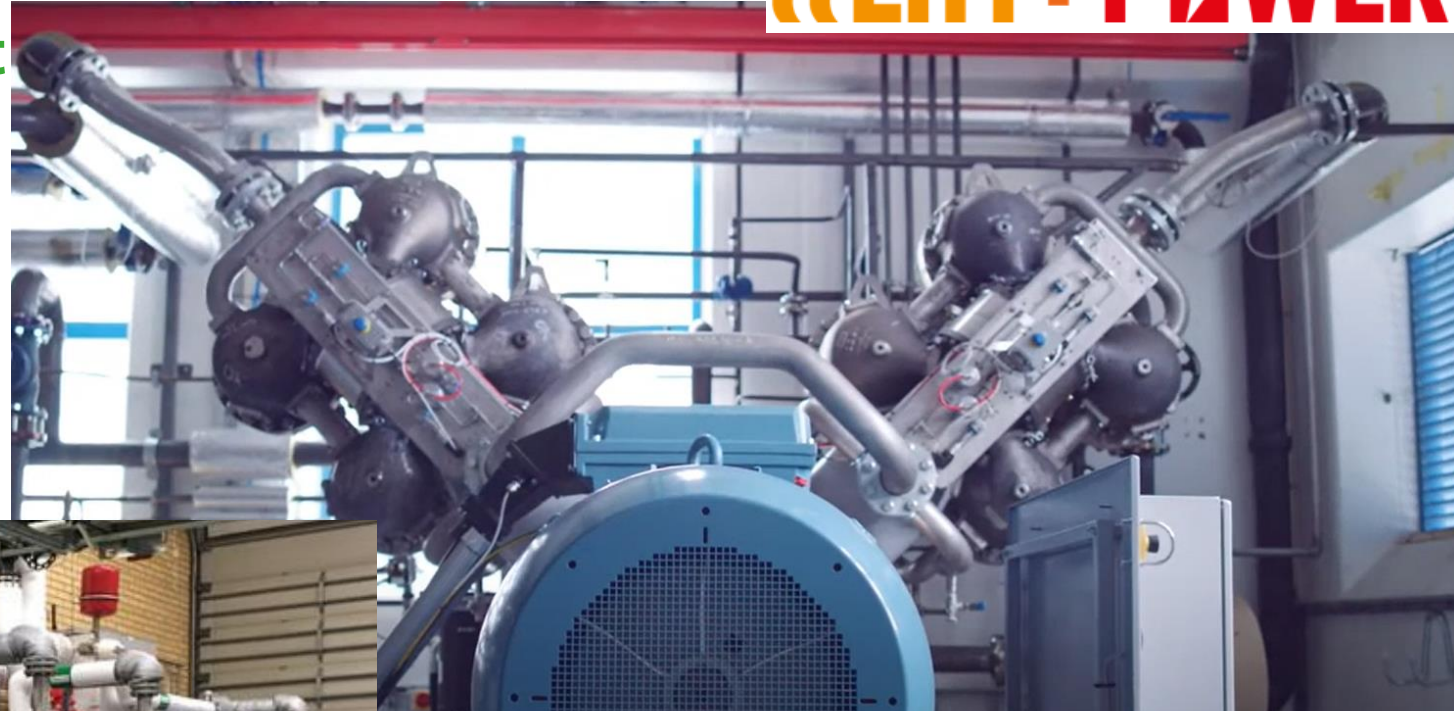
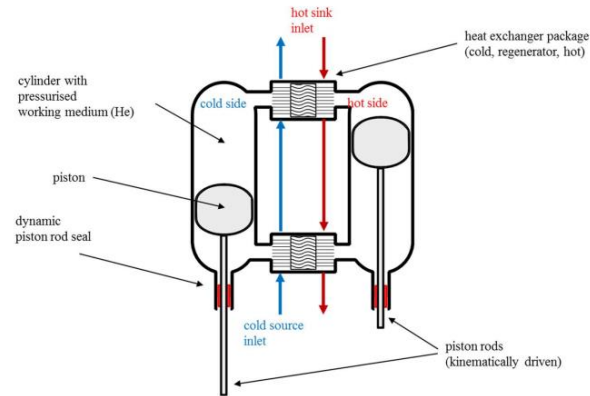
# HT warmtepomp; 200°C; ca 2 MW<sub>th</sub> Ochsner (O)





# HT warmtepomp; 200 °C; ca 0,75 MW<sub>th</sub>

## Olvondo (N) SPP HighLift

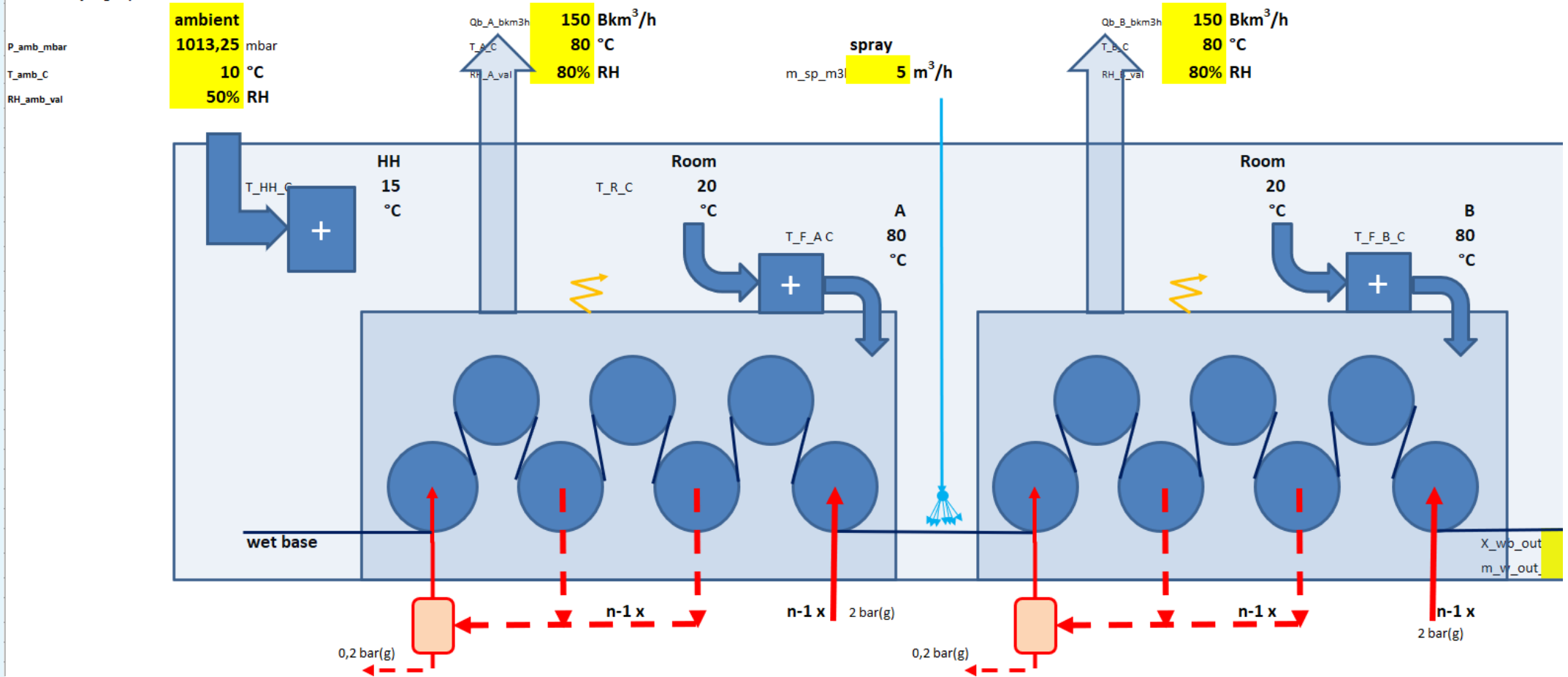




# Papier industrie (studie)

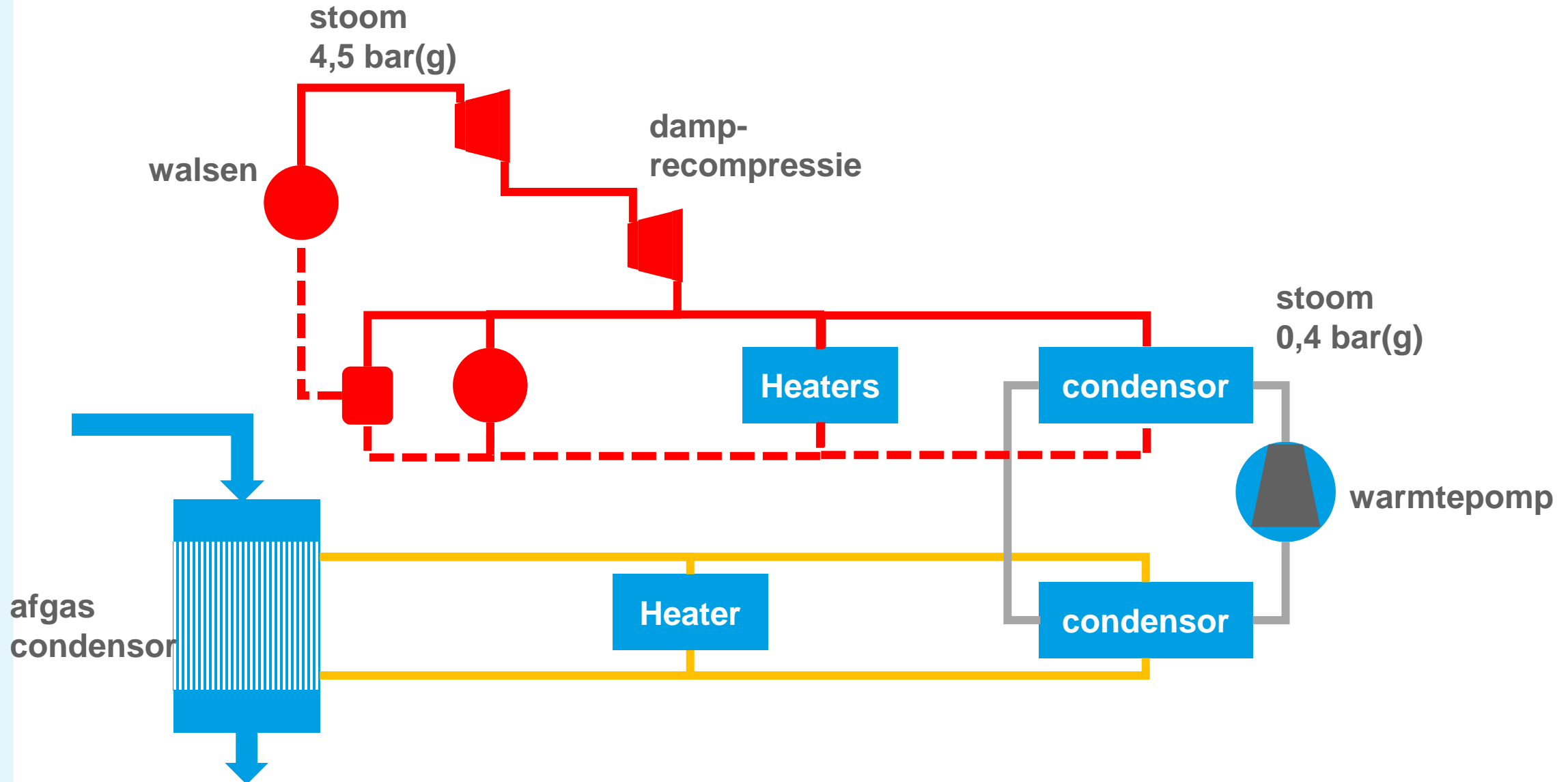
## Cascade warmtepomp

Casebeschrijving Papierfabriek





# Cascade warmtepomp papierdroger





# Super heated steam drying - paper pulp



Year of Manufacture: 2016  
Country: Sweden  
Customer: Paper Industry

Application: Steam recycling  
at paper pulp  
drying with  
overpressure  
steam dryer

Inlet Steam: 3.2 bar<sub>a</sub>  
Outlet Steam: 16 bar<sub>a</sub>  
Steam Flow Rate: 2 x 8 t/h

El. Power Demand: 2 x 1,325 kW<sub>el.</sub>  
Heat Load Steam<sub>out</sub>: 2 x 5,600 kW<sub>th</sub>

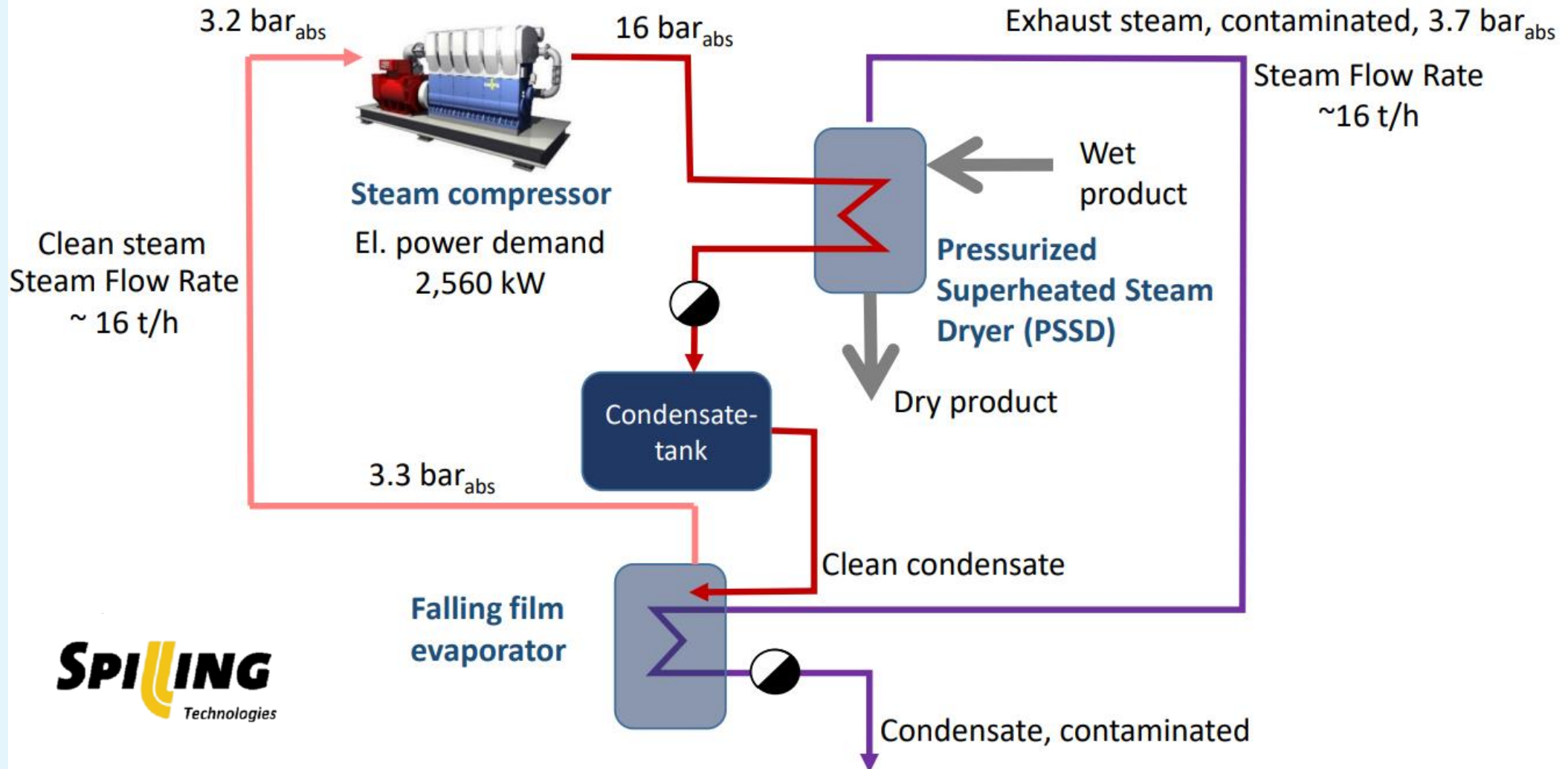
COP: ~4.2





# Superheated steam drying paper pulp

- Principle „Steam Recycling in Closed Steam Cycle“



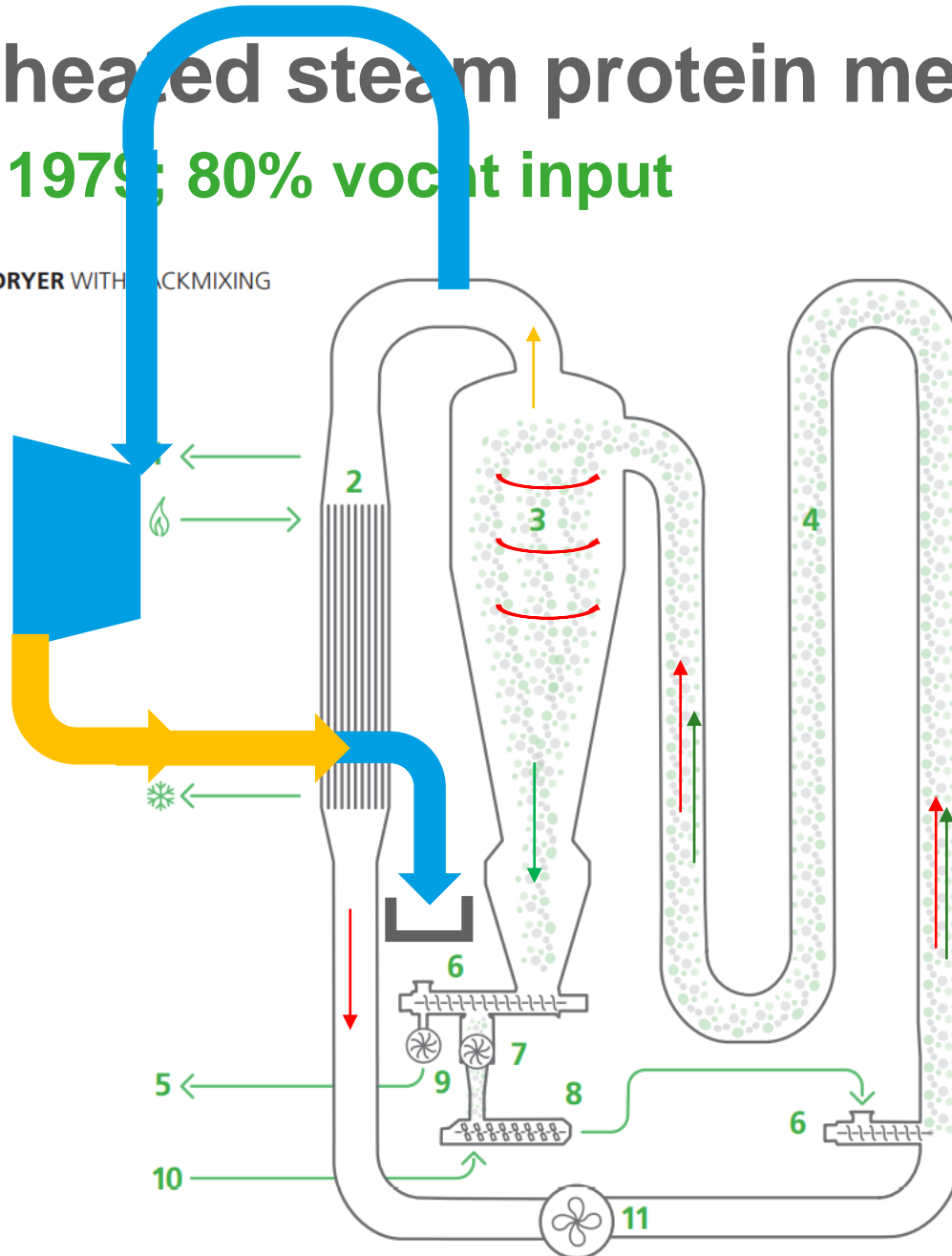


# Super heated steam protein meal dryer

0,15 t/h; 1979; 80% vocat input

SUPERHEATED STEAM DRYER WITH BACKMIXING

- 1 Generated steam
- 2 Superheater
- 3 Cyclone
- 4 Drying ducts
- 5 Dry sludge
- 6 Screw conveyor
- 7 Rotary valve
- 8 Mixer
- 9 TroMaxx rotary valve
- 10 Wet sludge
- 11 Fan



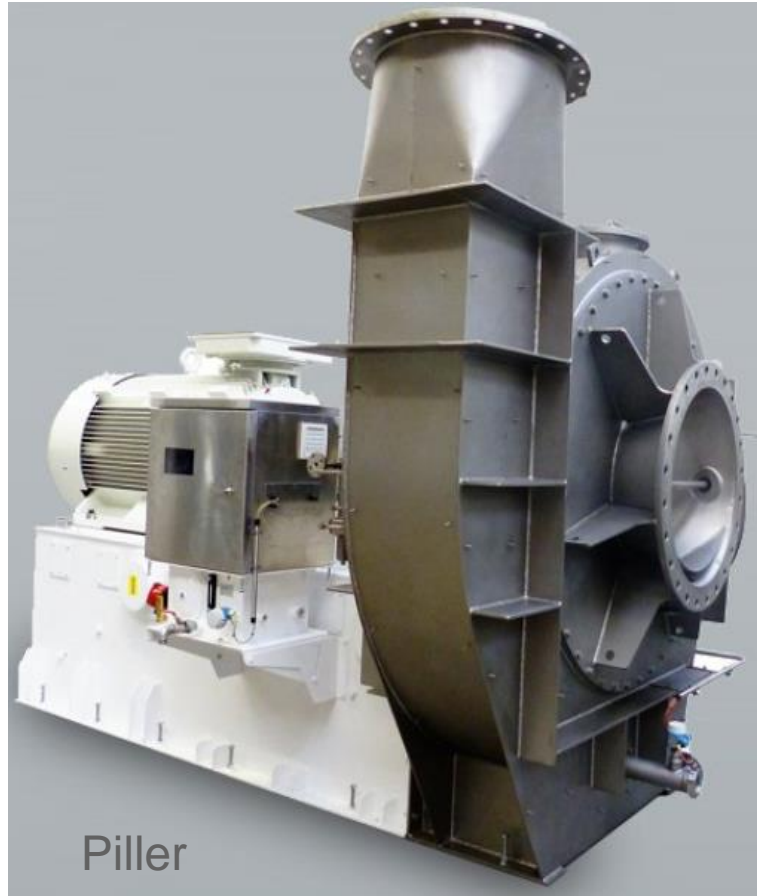
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 E-post: info@swedishexergy.com | www.swedishexergy.com



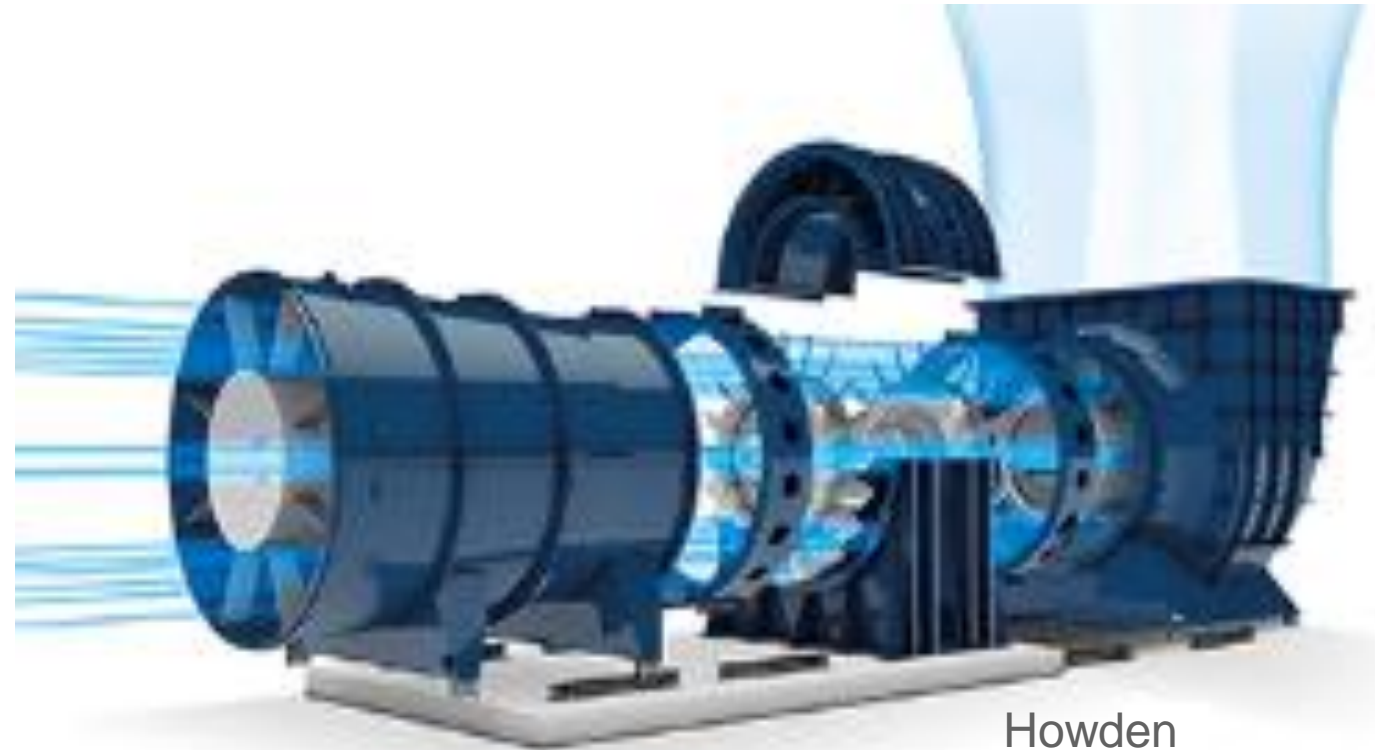


# Open warmtepompen

## Meertraps centrifugaal en axiaal compressoren



Piller



Howden





# Conclusies

## Geïntegreerde wamtepomp drogers

- Procesintegratie rond unitoperation aantrekkelijk : stekkerklaar
- Steam drying energetisch het best
  - Mogelijk ander product



# BlueTerra

Energy Experts

[blueterra.nl](http://blueterra.nl)

