



ATMO sphere





Ammonia at the heart of our new factory

Ammonia heatpump

Fine Food Meat 2, Colruyt Group

Bram Vanden Berghen

The group's mission

*“Reduce the group’s green house gas emission by 20%
by 2020, compared to 2008 levels”*



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The bigger picture



Fine Food Meat factory



Transport



Supermarket

Ammonia cooling



Liquid ice technology



Propane cooling



Sustainable cold supply chain



Ammonia cooling



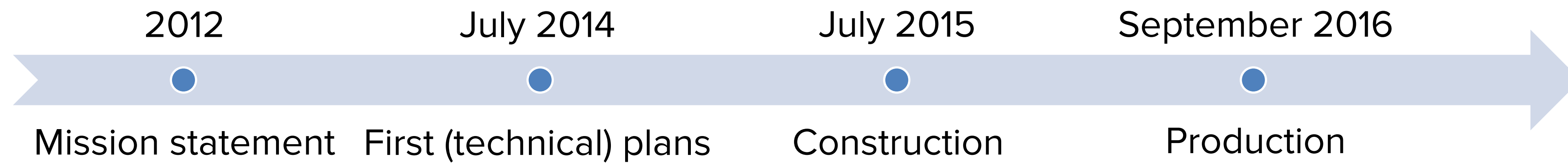
Liquid ice technology



Propane cooling



Case study: Fine Food Meat 2 (FFM2) factory

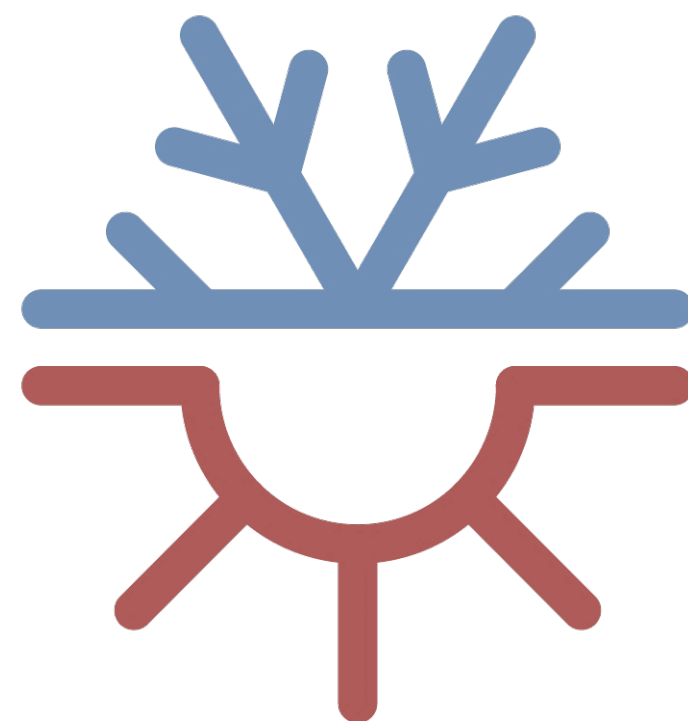


Combined Heat & Power (CHP) vs. heatpump

Cooling

Condensation temperature **20 – 42°C**

Condensation power approx. **7.5MW**



Heating

Requested water temperature **75°C**

Requested power approx. **1MW**

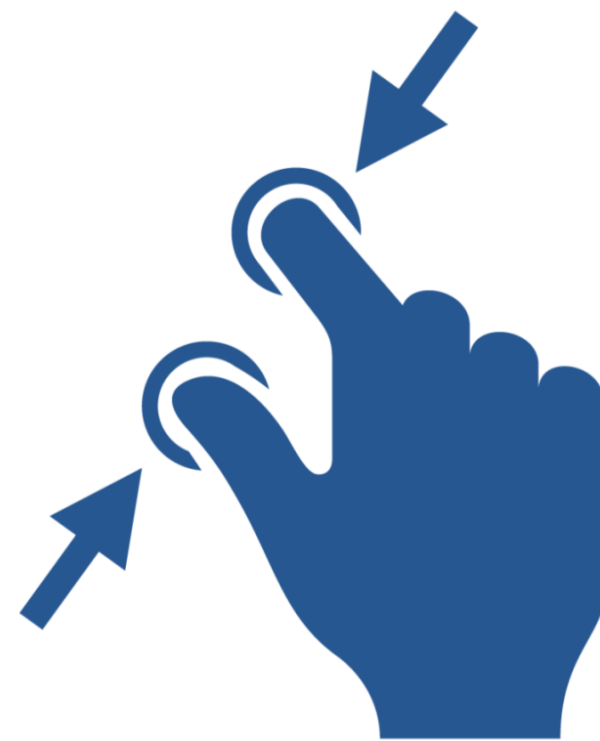


Road towards an ammonia heatpump



Since 2014: go for 100%
natural refrigerants

Ammonia
→ ODP = 0
→ GWP = 0



Space limitation

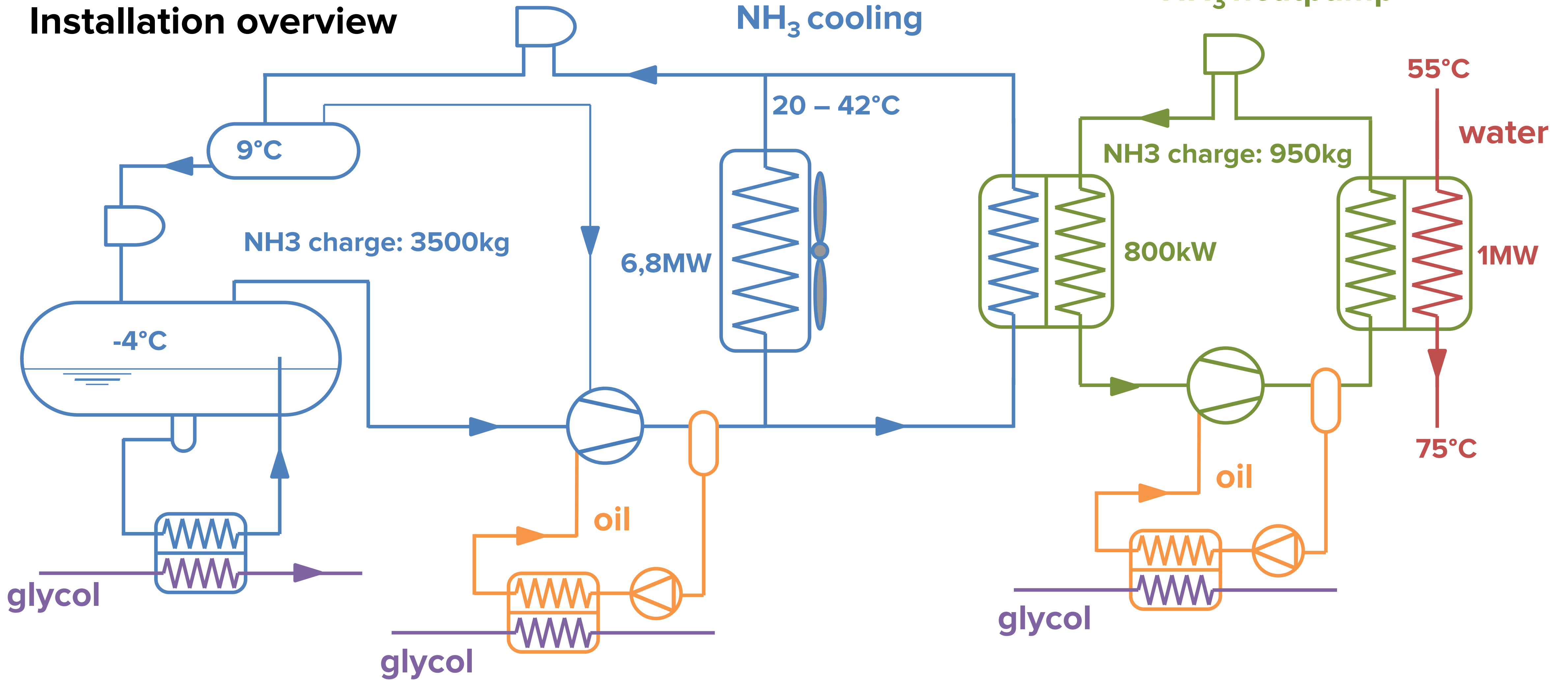
Cost reduction
→ Energy efficiency
→ Initial investment



Risk management

→ Experience since 1997
→ Own maintenance and
exploitation service
→ Quick detection

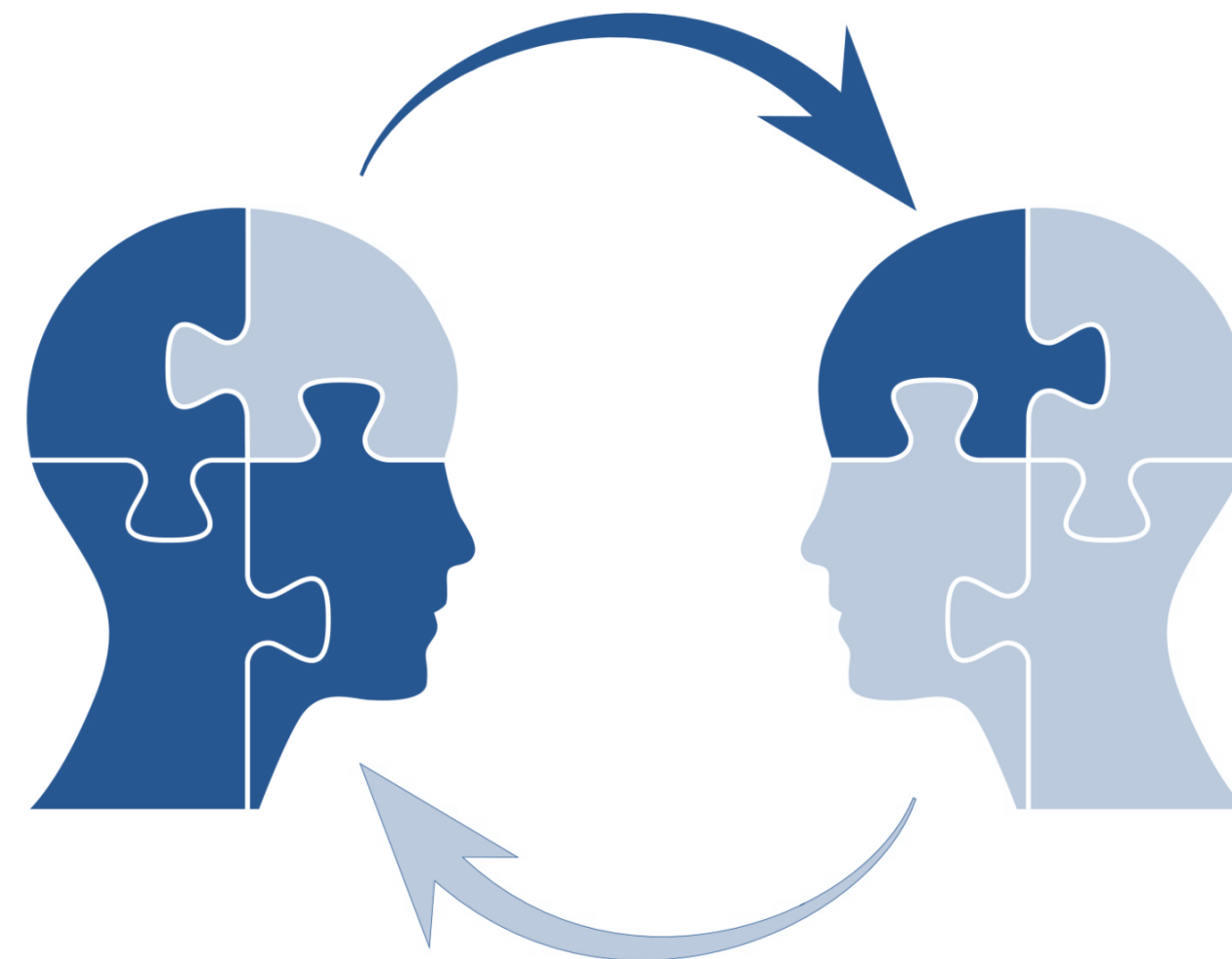
Installation overview



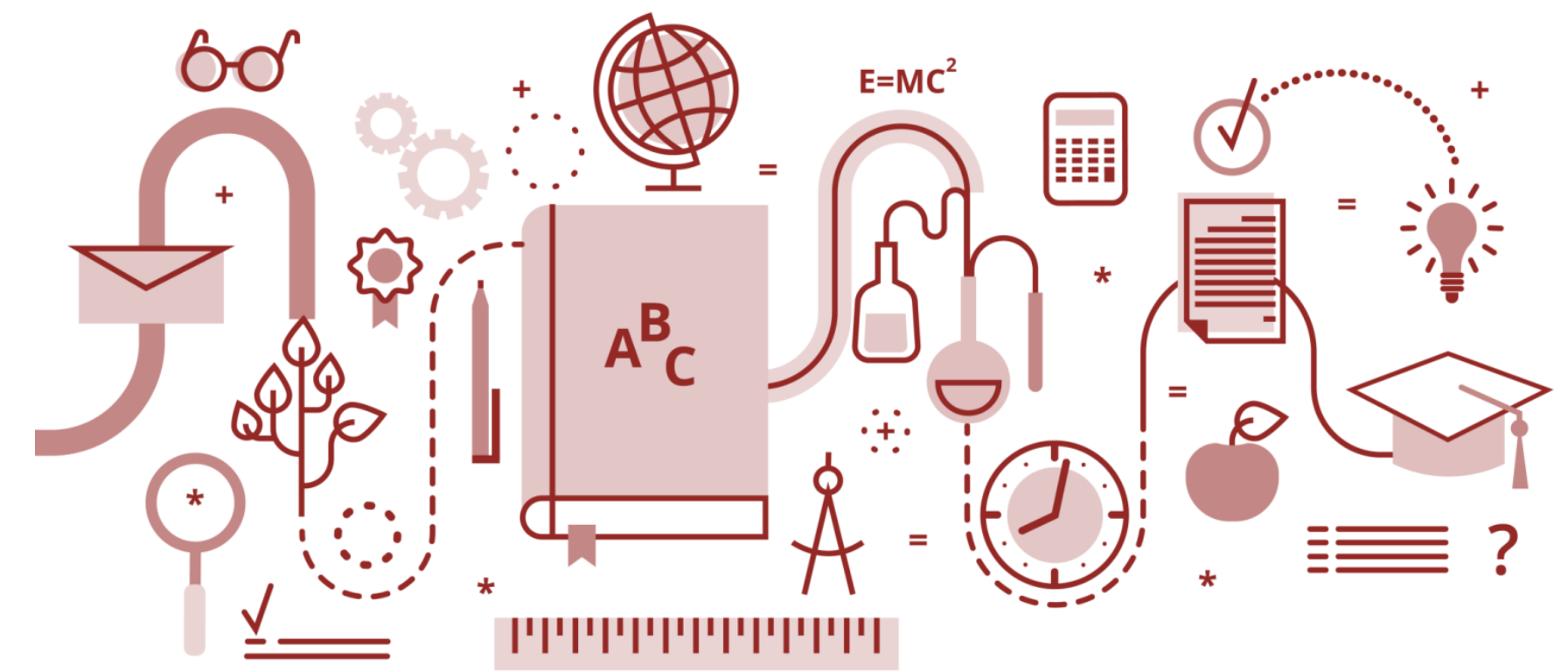
Challenges



Prediction evolution electricity
and gas prices



Sharing knowledge between
design and maintenance team



New technology →
learning curve

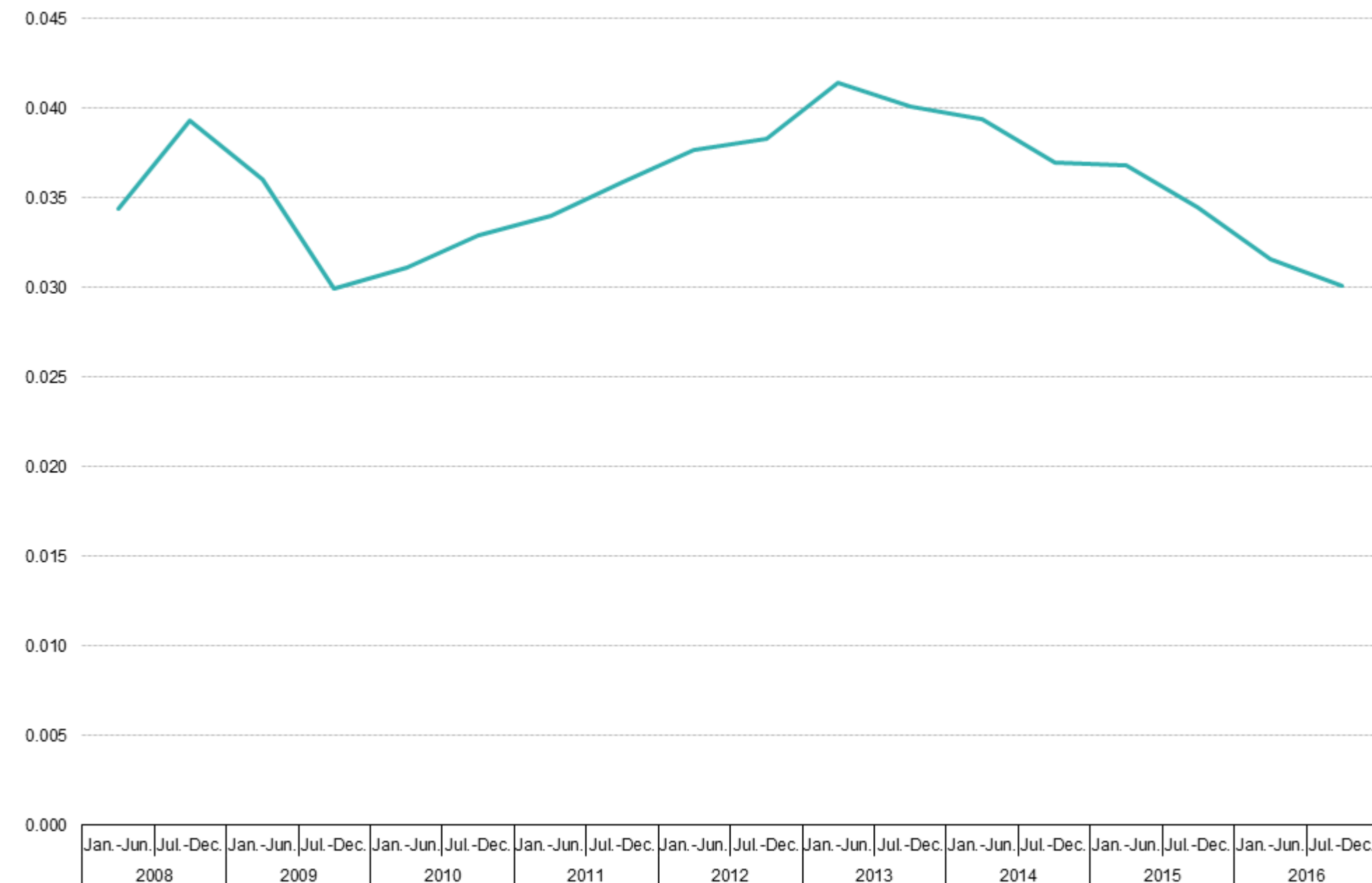
Estimated IRR

Assumptions

- Price electricity: +1% / year
- Price natural gas: +2% / year

Based on measurements: IRR = 10.5%

Pay back time: 11.3 years

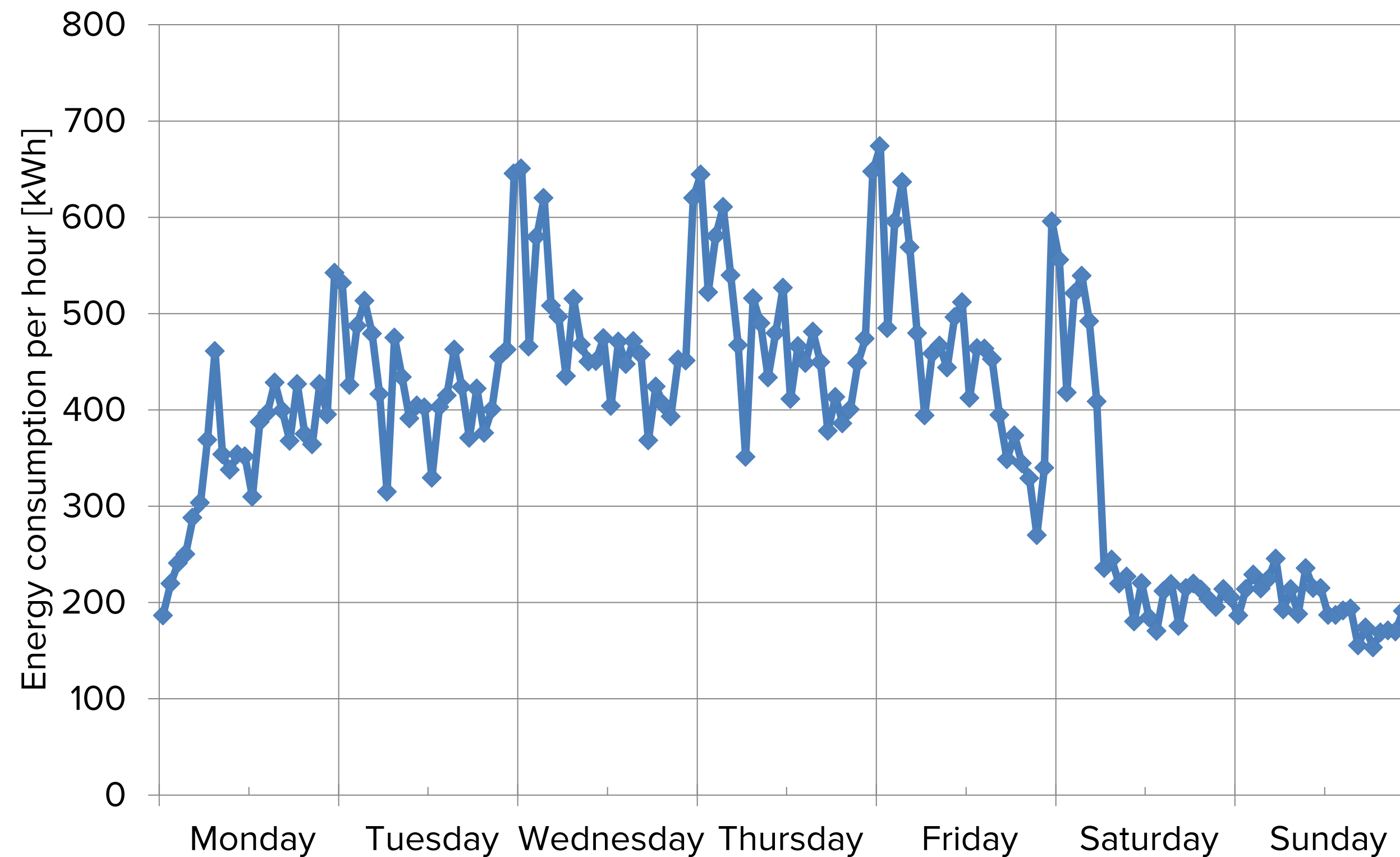


Note: annual consumption: 10 000 GJ < consumption < 100 000 GJ. Excluding VAT.
Source: Eurostat (online data code: nrg_pc_203)

Development of natural gas prices for industrial consumers, EU-28, 2008-2016 (EUR per kWh)

Actual status

Average hot water consumption [kWh]
(June – August 2017)



Average consumption

Weekdays (Summer): 10.6 MWh/day

- Day (4am – 10pm): 420 kW
- Peak (11pm – 3am): 580 kW

Yearly consumption

3 700 MWh/year

CO₂ emission reduction

> 850 tons CO₂ eq./year



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Thank you very much!

