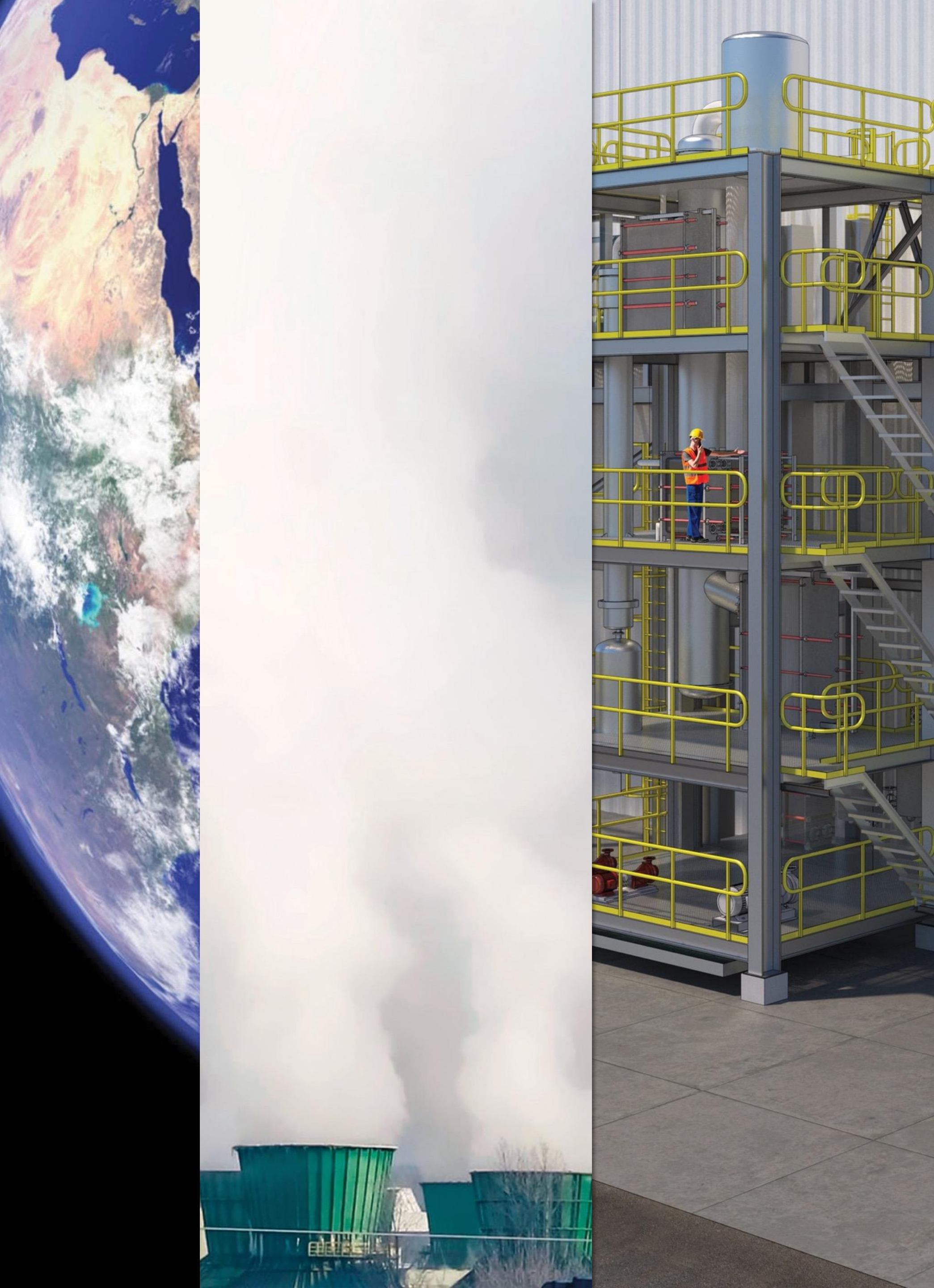




QPINCH

Reducing the Energy Intensity of the Chemical Industry by Converting Waste Heat into Process Heat

Singapore Energy Efficiency Symposium
for the Energy and Chemical Industry
October 16, 2019

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CCO & Co-founder
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Poll

How much heat energy going into a refinery
comes out as waste heat?

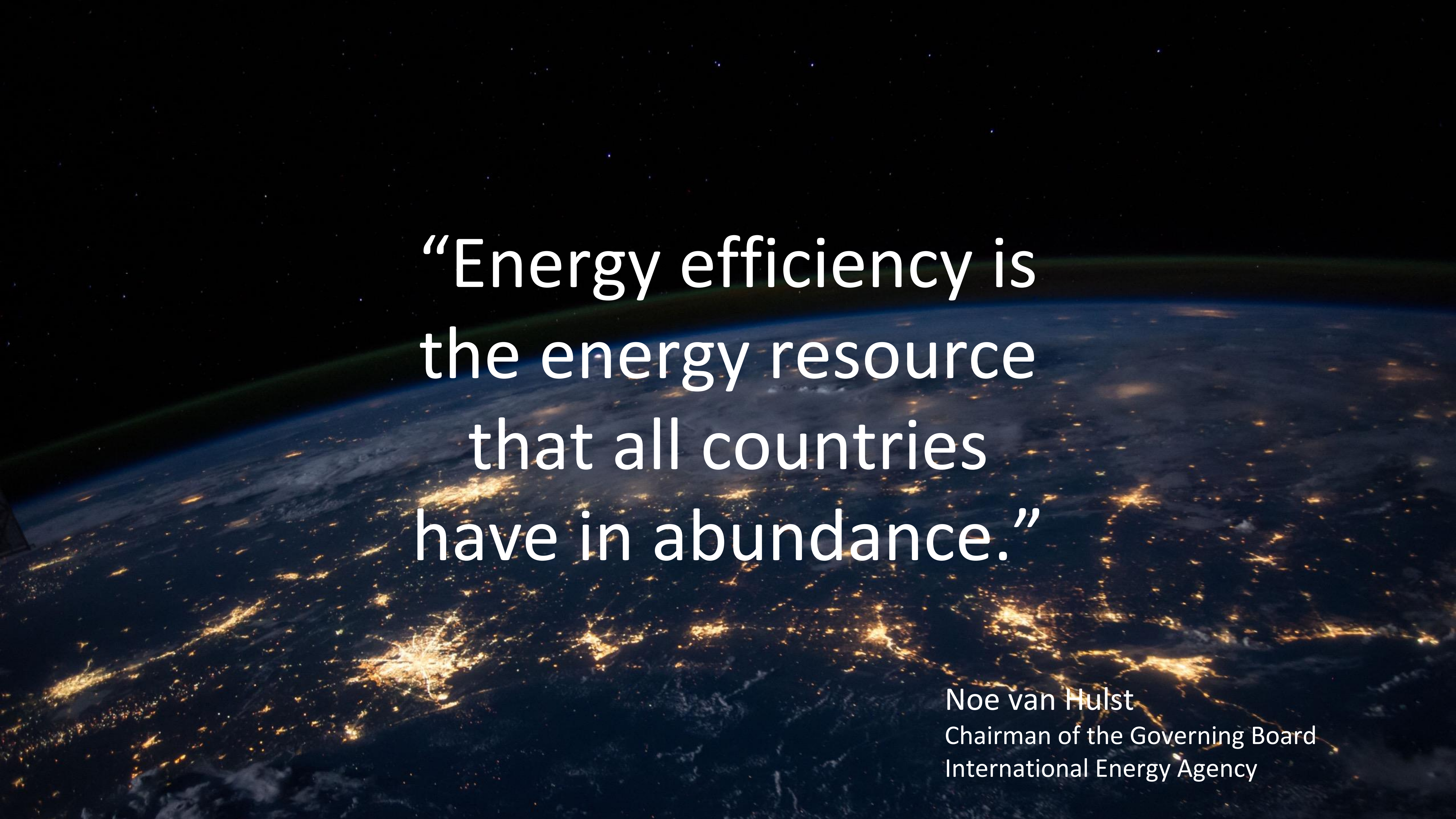
Multiple Choice Answers:

A) < 30%

B) 30 – 60%

C) 60 – 90%

D) > 90%



“Energy efficiency is
the energy resource
that all countries
have in abundance.”

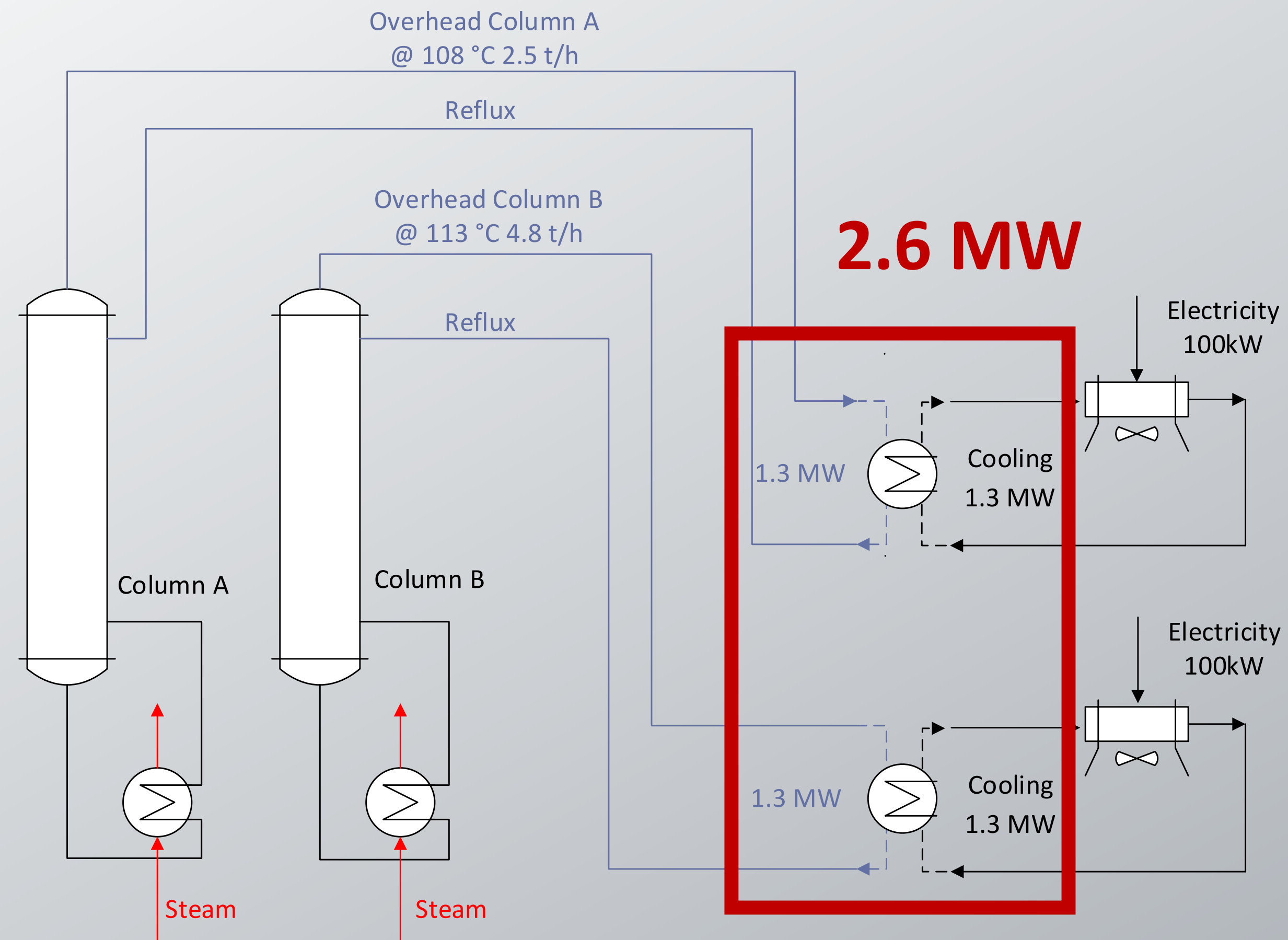
Noe van Hulst
Chairman of the Governing Board
International Energy Agency

A night-time photograph of an industrial facility, possibly a refinery or chemical plant, with several tall smokestacks emitting thick white plumes of smoke or steam. In the background, a city skyline is visible under a dark sky. The foreground shows a dark, silhouetted structure, likely a bridge or overpass.

**“Waste heat is energy
waiting to be harvested”**

Qpinch

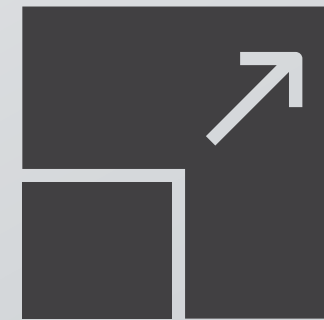
Waste heat in columns



Challenges



High temperature lift



Megawatt-scale



No Opex



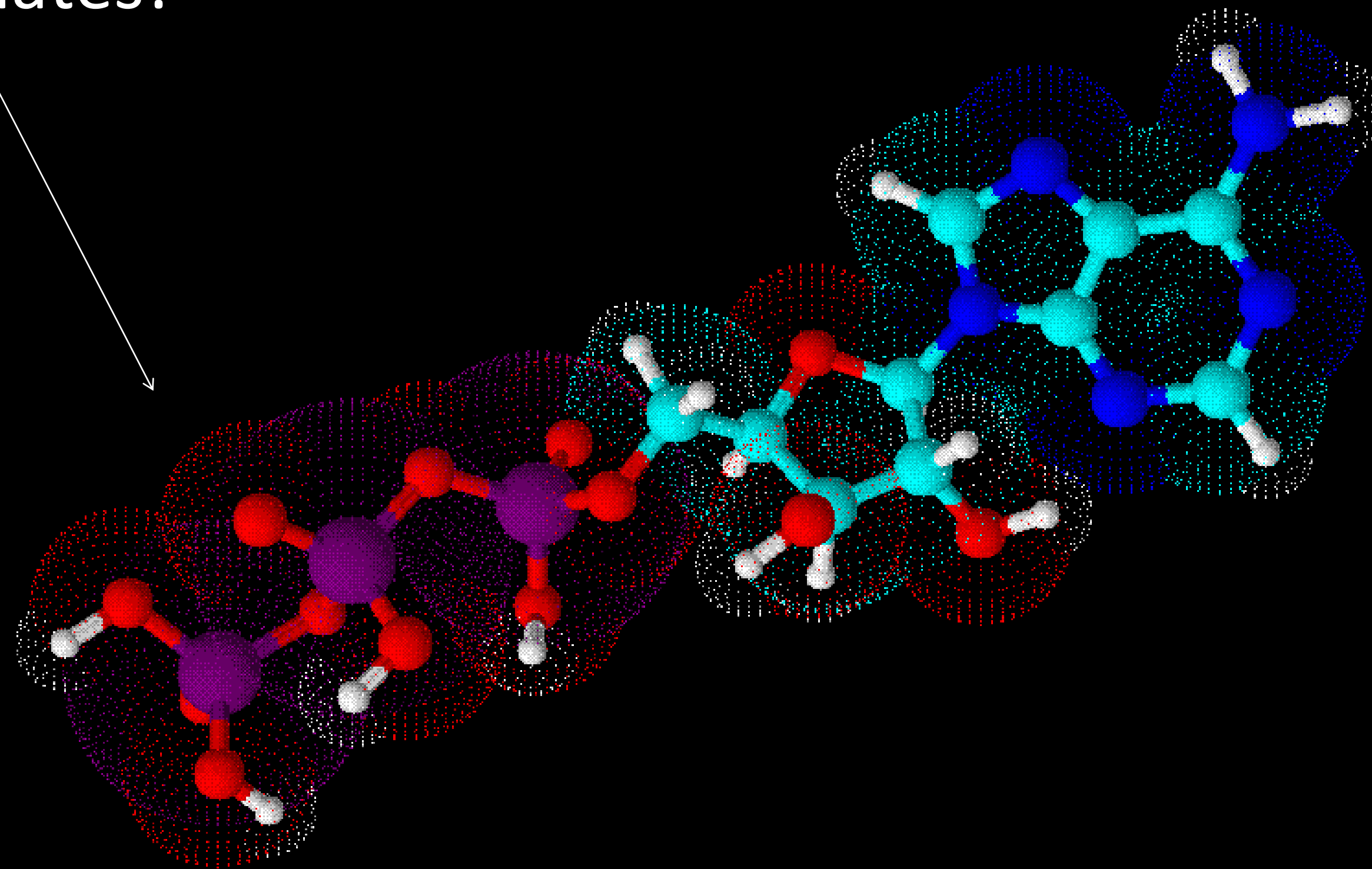
No solutions...

A blue-toned image of a jellyfish, possibly a moon jelly, floating against a dark background filled with numerous small, bright white dots, resembling a starry night sky or a microscopic view of a biological specimen. The jellyfish's bell is translucent with visible internal structures and a pattern of small white spots. Its tentacles are visible at the bottom.

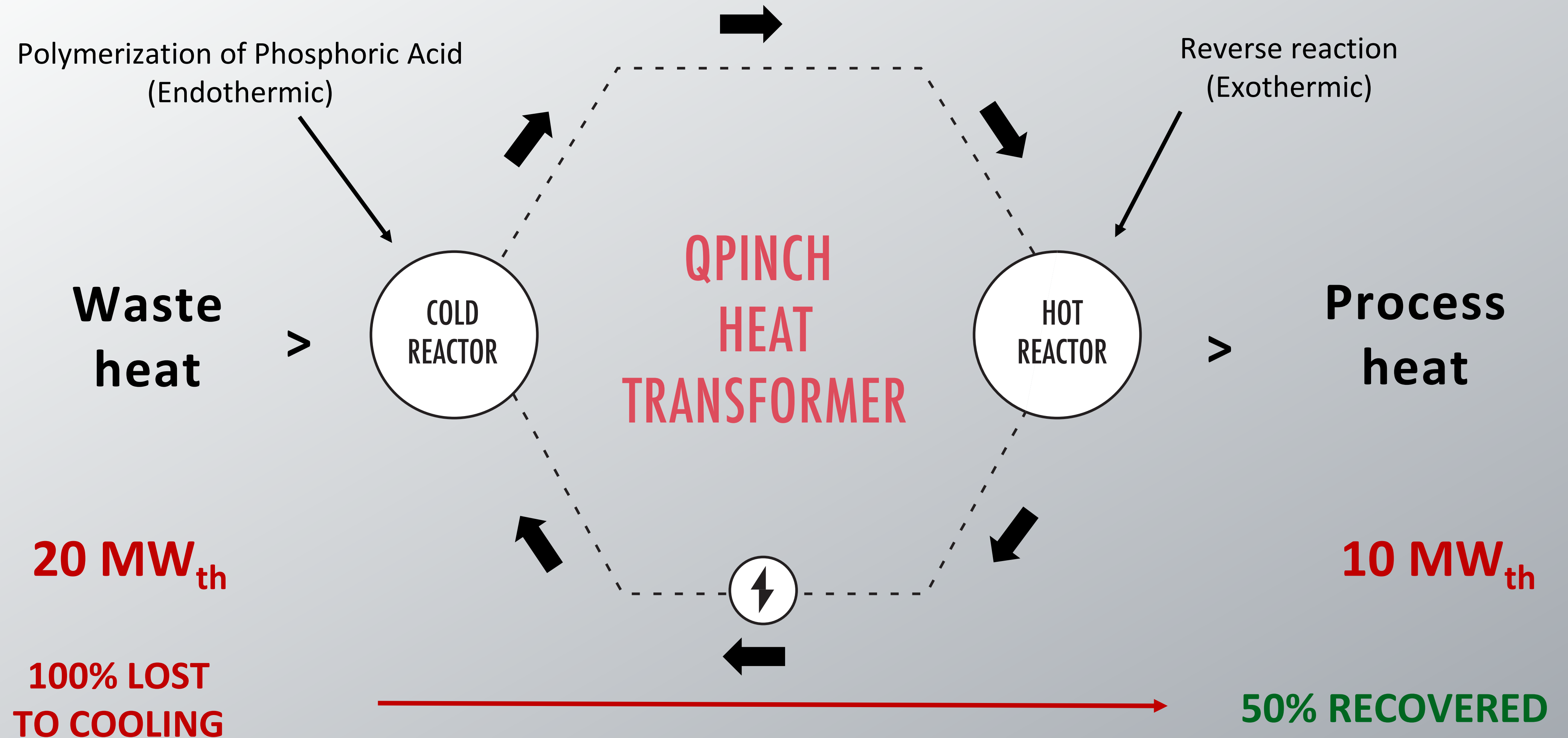
... So we looked at nature!

Microscopic scale: ATP-ADP Cycle

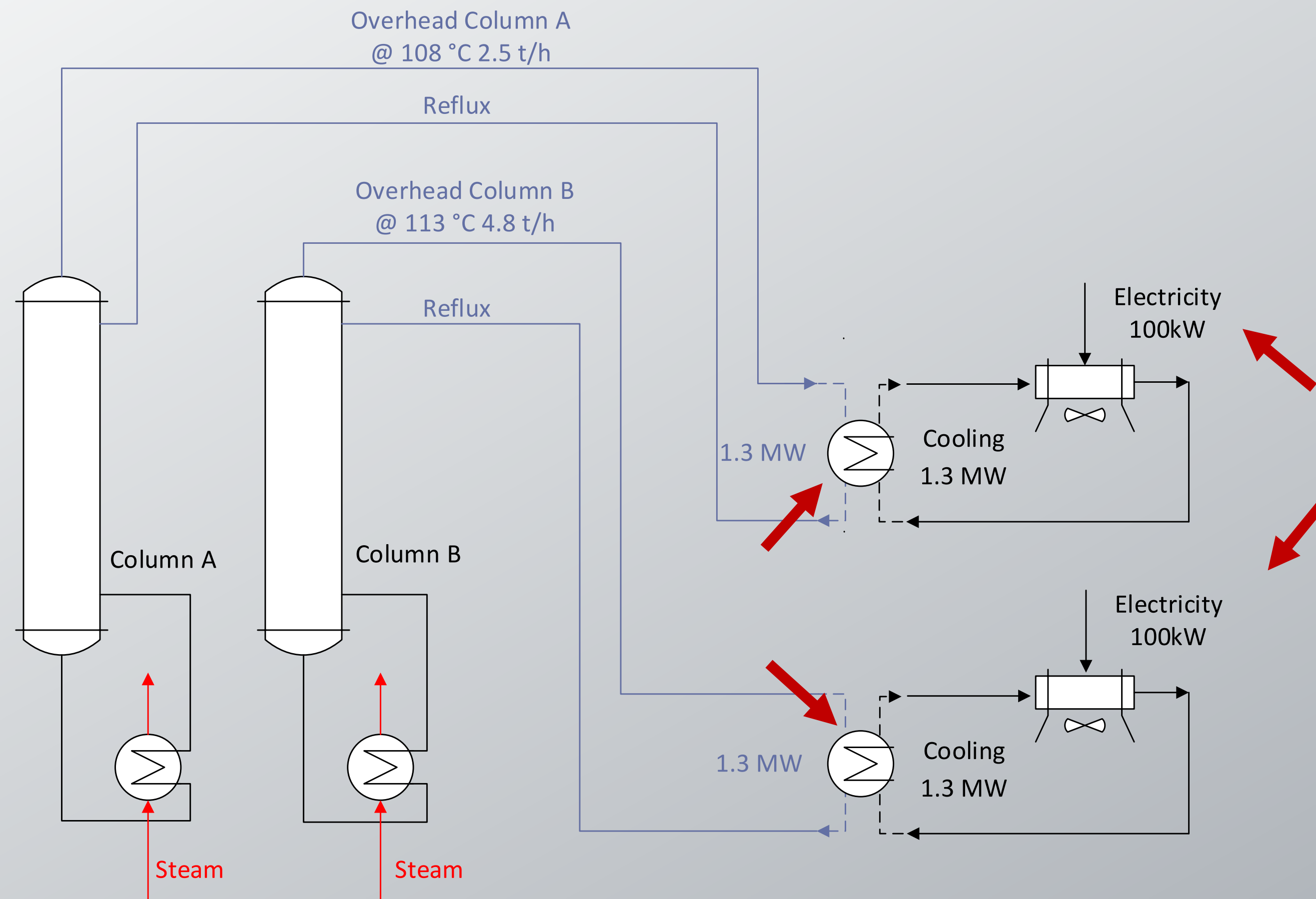
Phosphates!



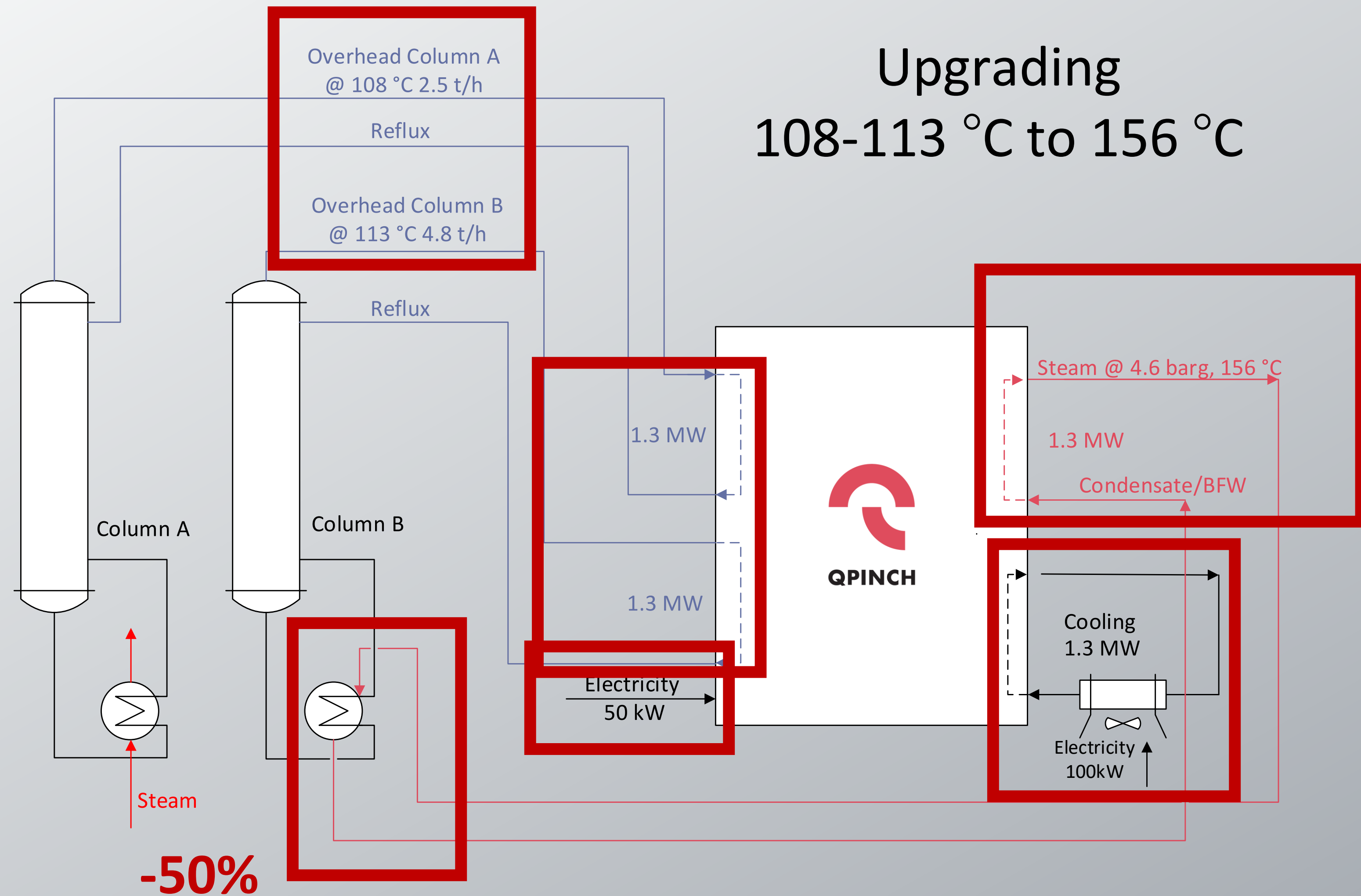
Industrial scale



Waste heat in columns

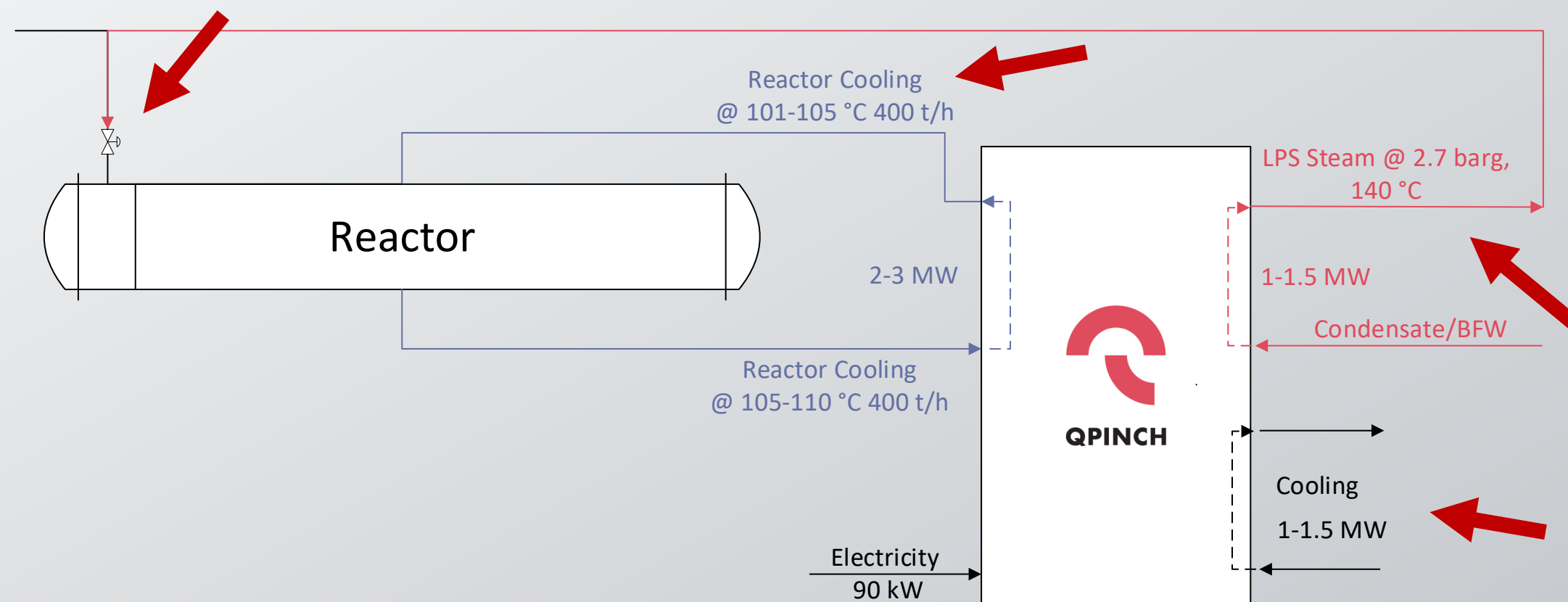


Case 1 | Port of Antwerp

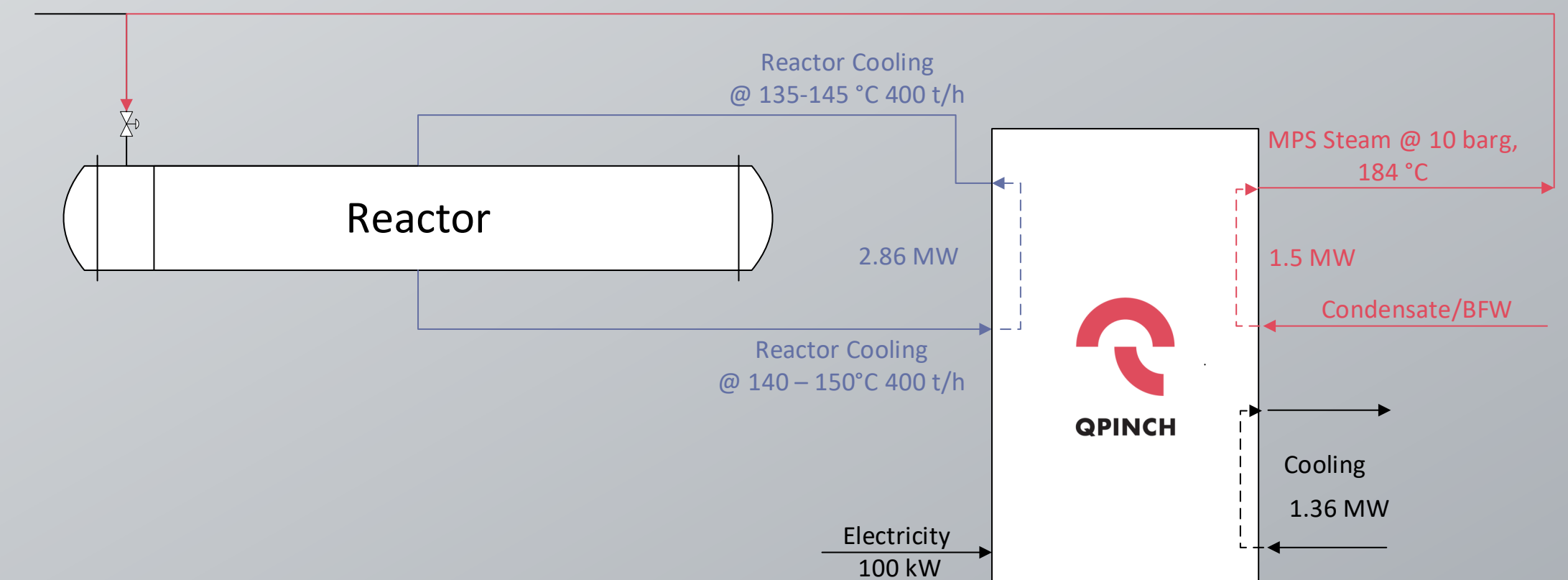


Case 2 | Port of Antwerp

Campaign A
105-110 °C to 140 °C

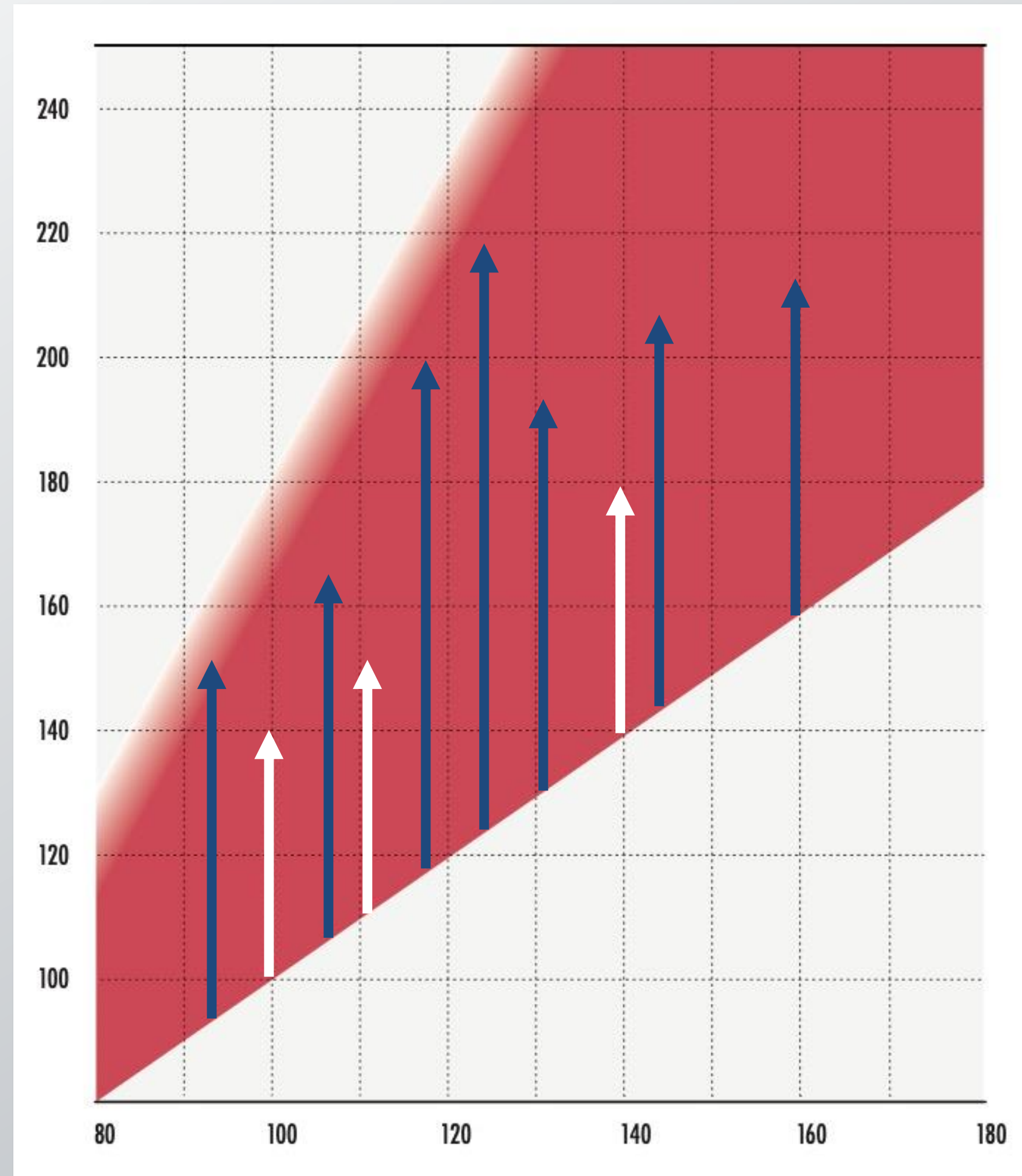


Campaign B
135-145 °C to 184 °C



Business Cases

Output
Process Heat (°C)



Input
Waste Heat (°C)

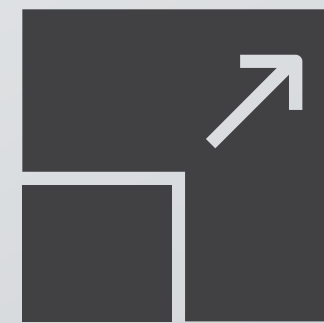
**We cover 90%
of the
business cases**

Challenges Overcome



High Temperatures

- T Lift of 50 to 100+ °C
- T Output up to 220 °C (for now)
- Steam or other process heat



Megawatt-scale

- Simple design
- Unlimited scalability
- Latent and sensible heat
- Add-on



No Opex

- No electricity needed
- Savings in cooling, water,...

Benefits

Operations

- **8 600+** operational hours
- **30+** year lifespan
- **Debottlenecks** cooling and steam
- **One solution** generating **big savings**

Economics

- $\cong$ **No Opex** = Pure Savings
- **Real impact** on cost curves
- **Increased outputs**
- **Hedge** against CO₂ tax

Environment

- **Saves 2 000 to 4 000 t CO₂/MW year**
- (Equiv. emissions of 1 500 – 3 000 cars)
- **Get paid** to reduce CO₂



Keep Discovering

سابک
سابقہ



Questions?

On Your Executives' Mind: Decarbonization

REDUCE

Part of your DNA!
Optimize the Process



No Opex
Avoid CO₂

SUBSTITUTE

Replace fossil fuels
with alternatives
(electrification...)



Less Opex
Displace CO₂

CAPTURE

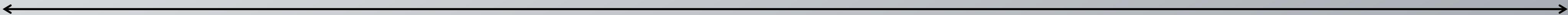
Address the Residual

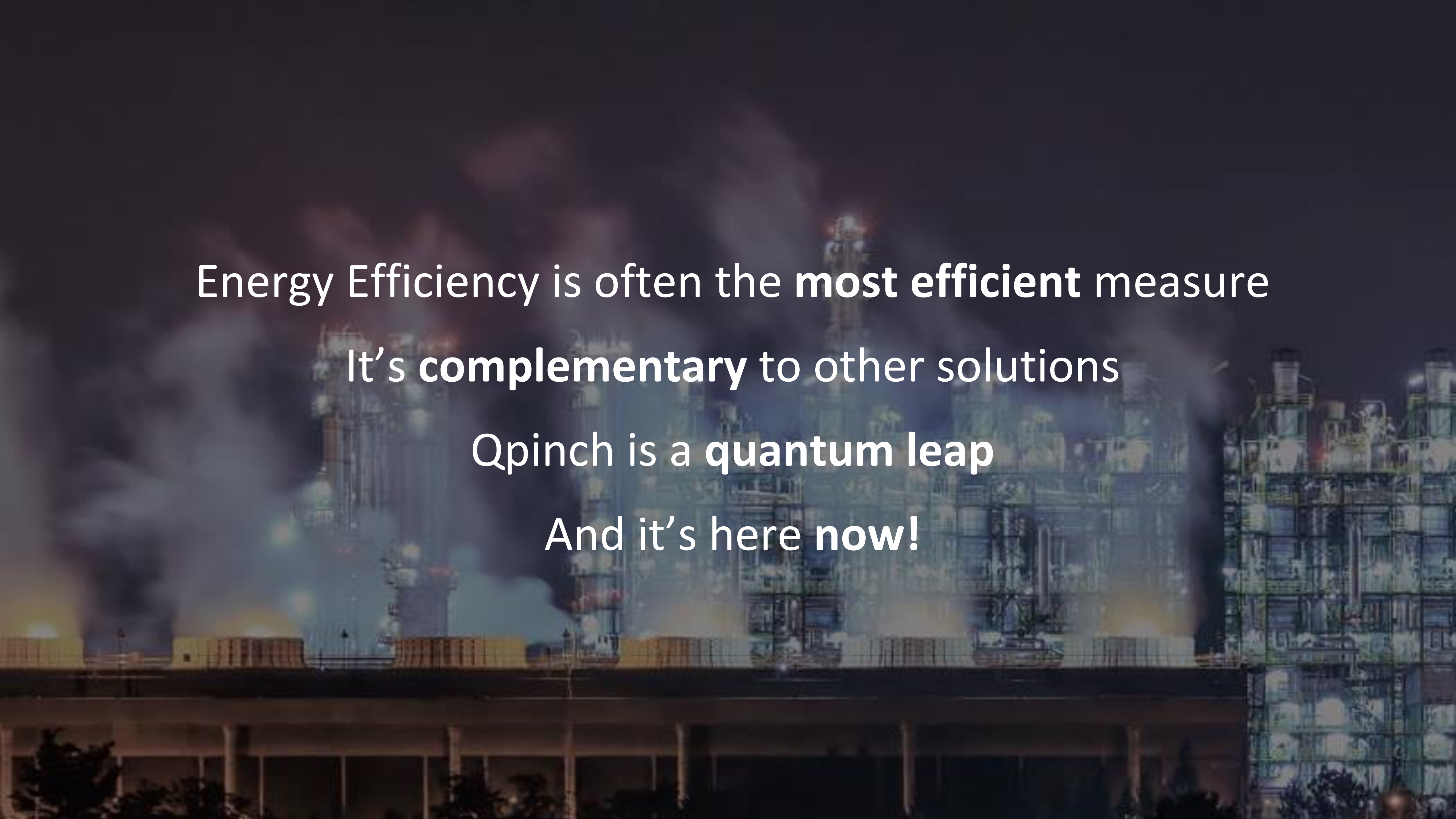


Much Opex
Remove CO₂

FASTER
POSITIVE CASH FLOW

SLOWER
NEGATIVE CASH FLOW



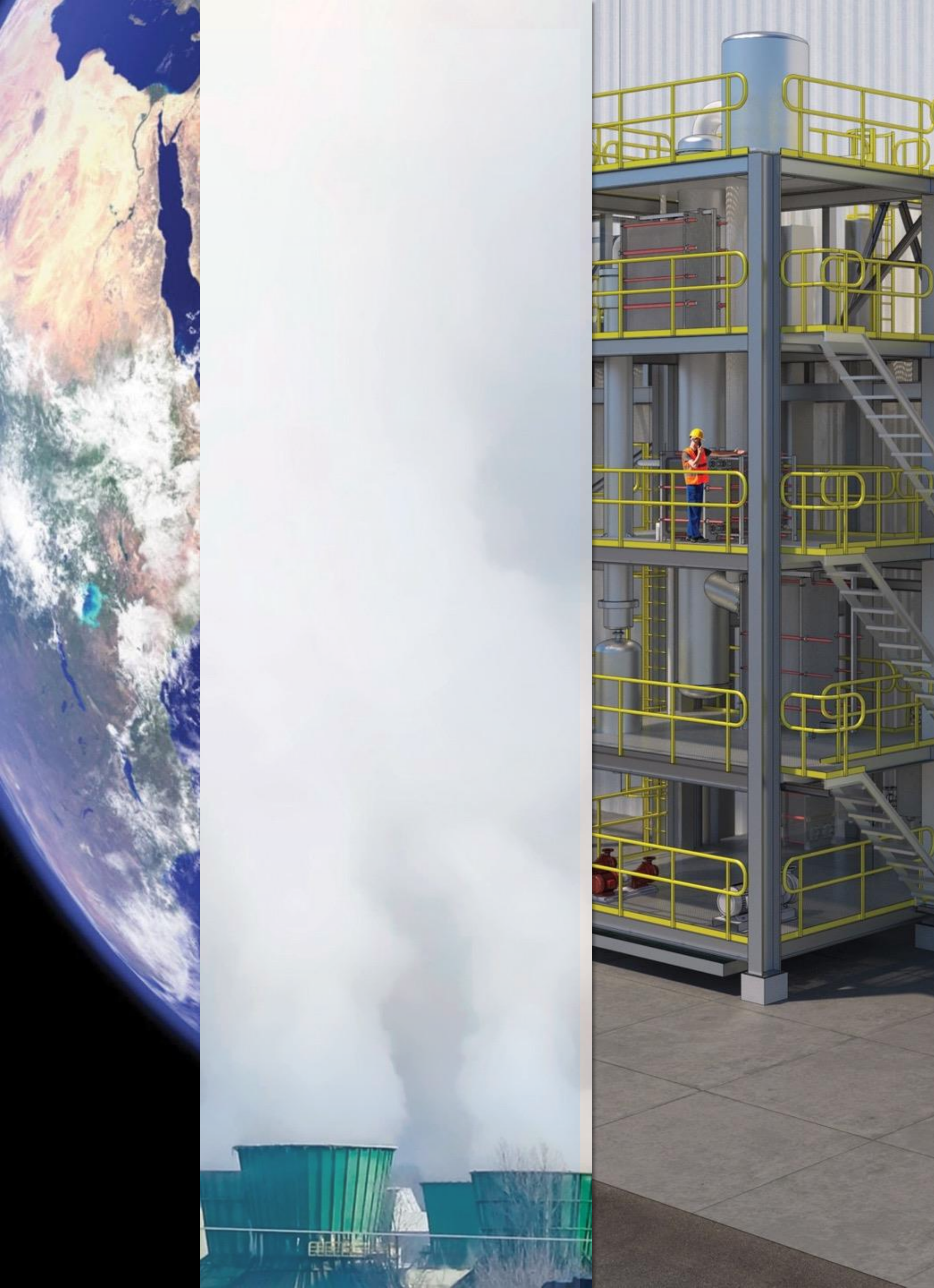


Energy Efficiency is often the **most efficient** measure

It's **complementary** to other solutions

Qpinch is a **quantum leap**

And it's **here now!**



QPINCH

Talk to us!

Christian Heeren, CCO & Co-founder

Erik Verdeyen, Chief Evangelist

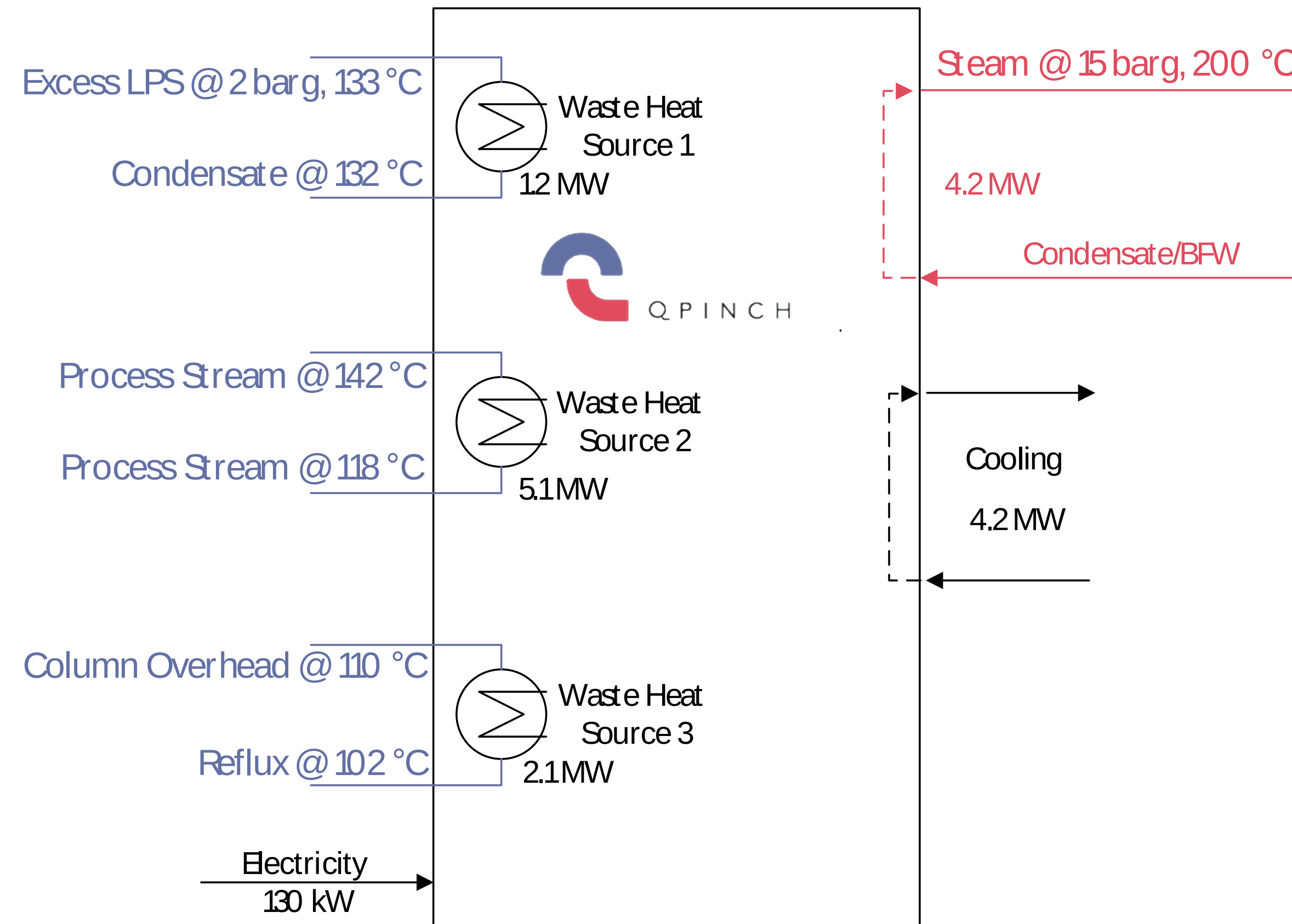
www.qpinch.com

[linkedin](#)

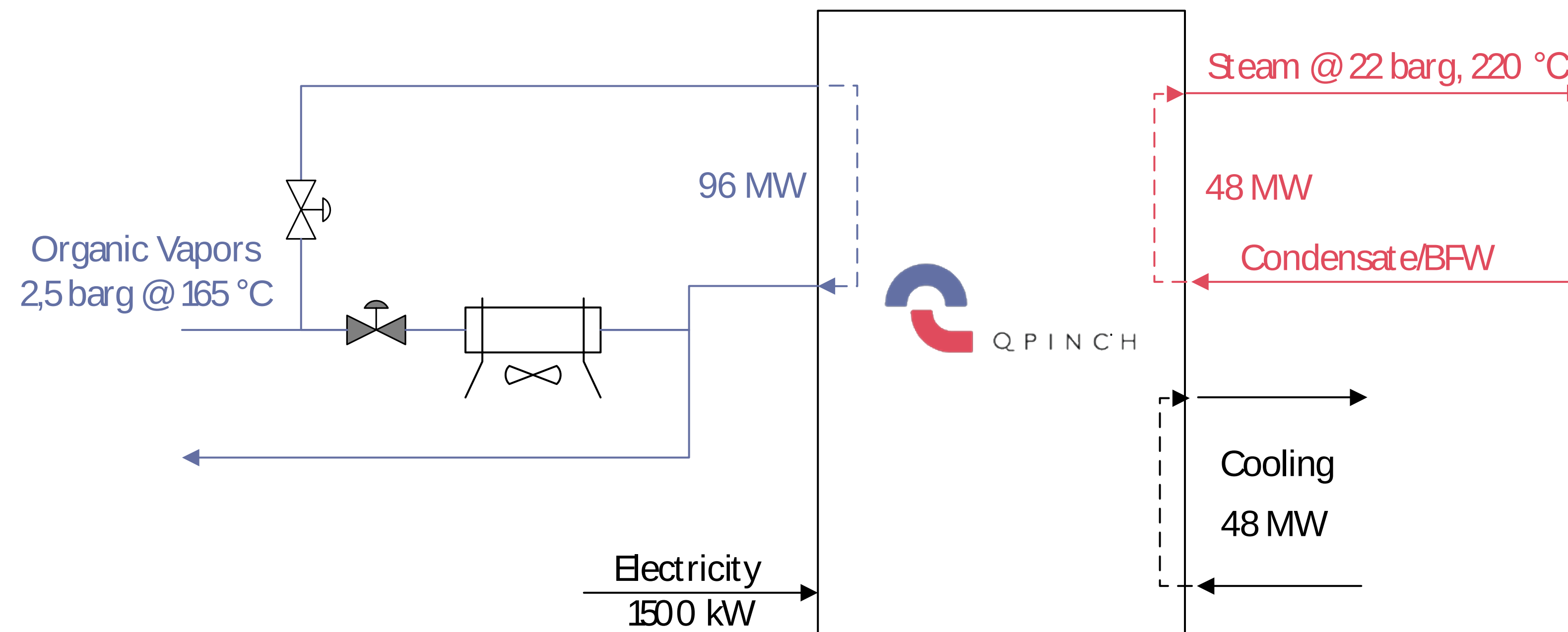
[facebook](#)

Q&A Backup Slides

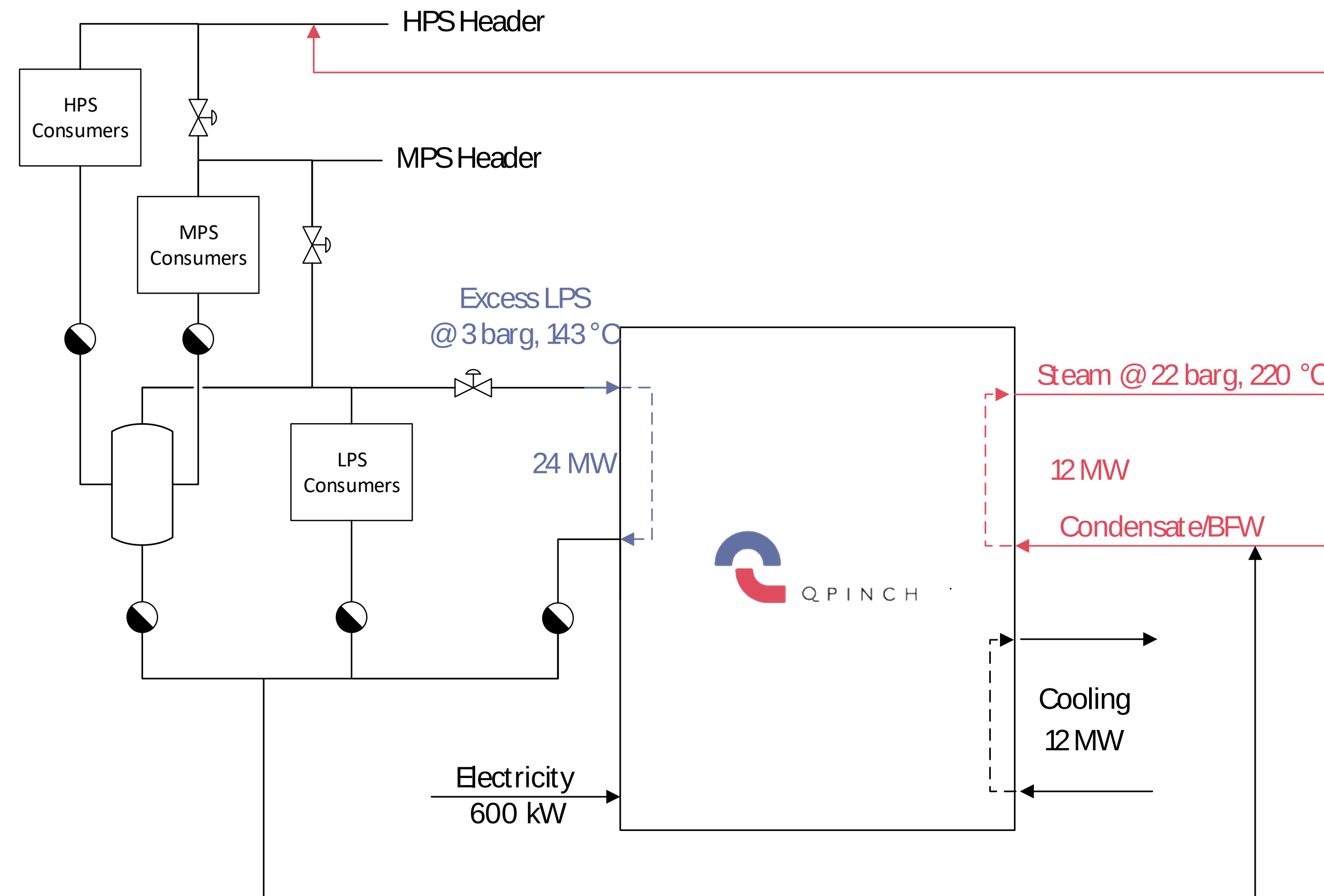
Input stream combo



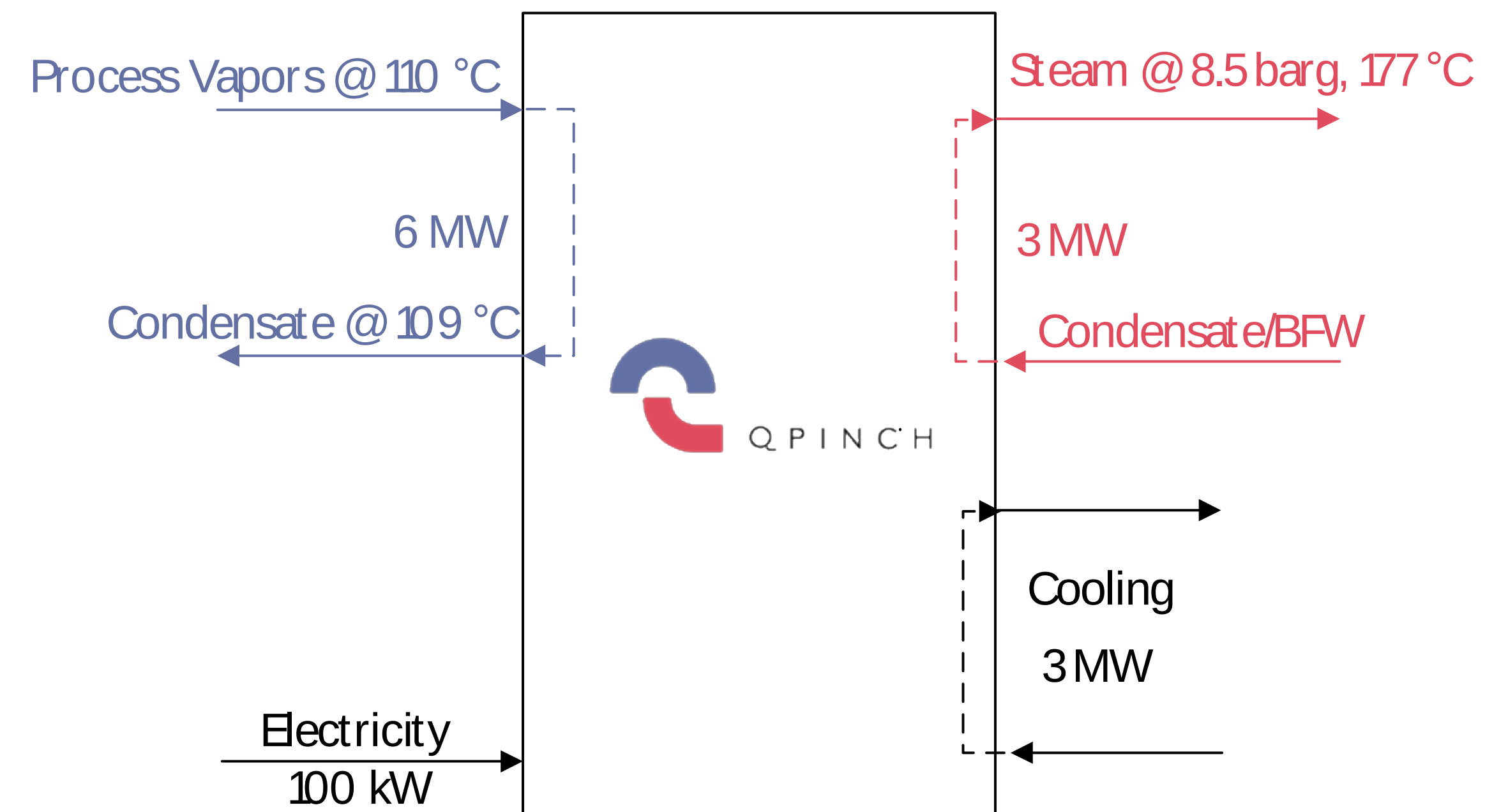
Easy retrofit



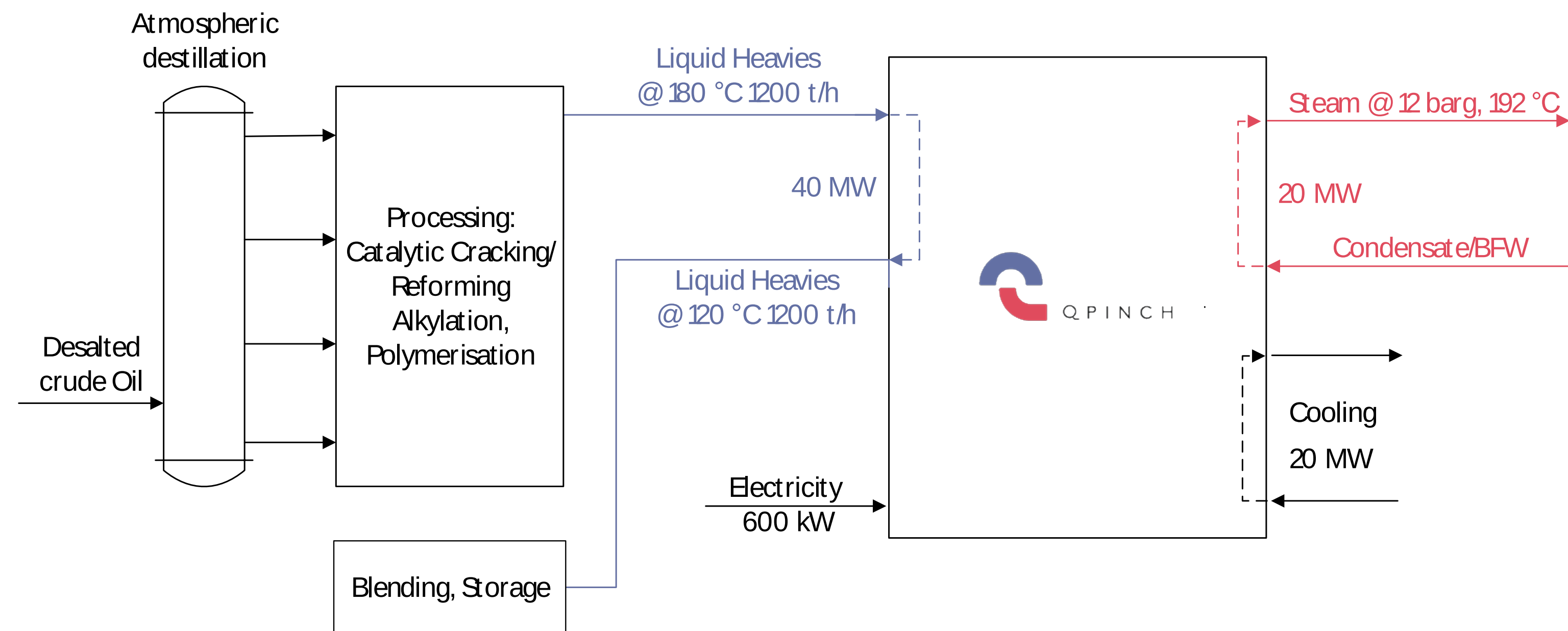
Steam network integration



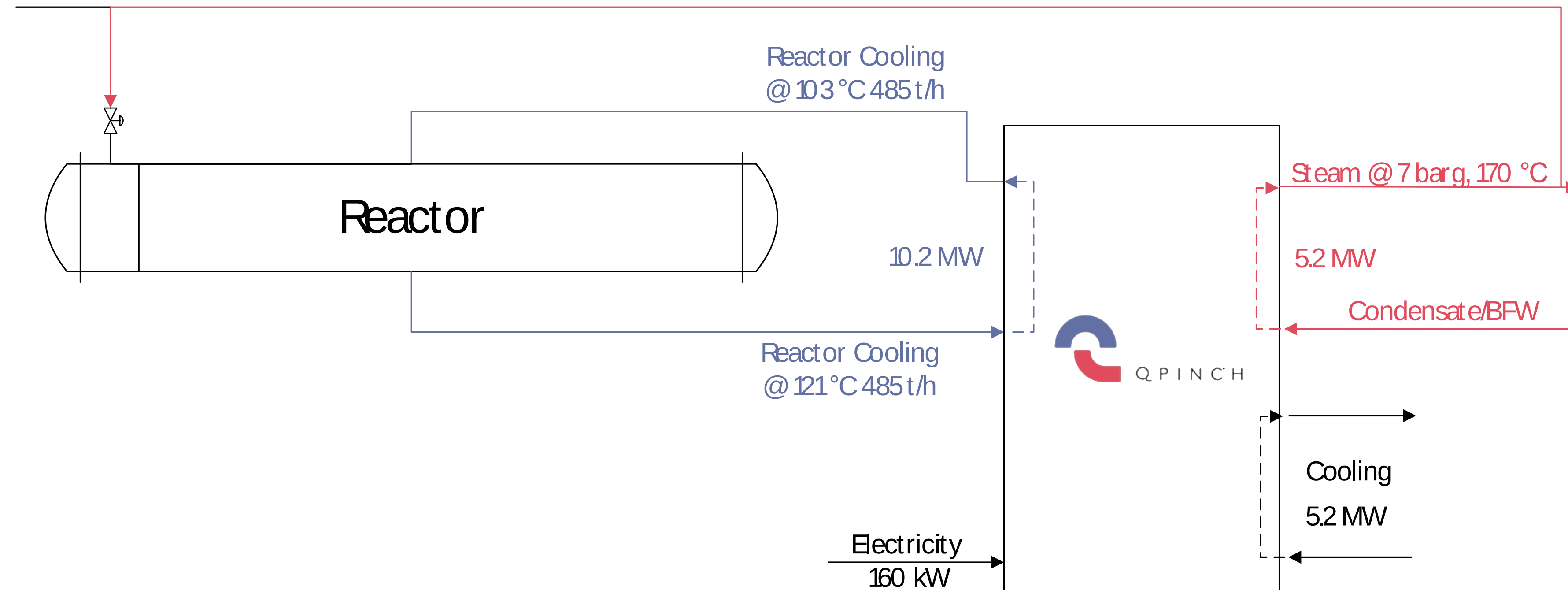
Process vapors high



Refinery



Exothermic reaction



Distillation column

