

JUNE 1 - 3  
SKAGEN  
DENMARK

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Hårslev Industries A/S

# New Low Energy Fish Protein Concentrate Process



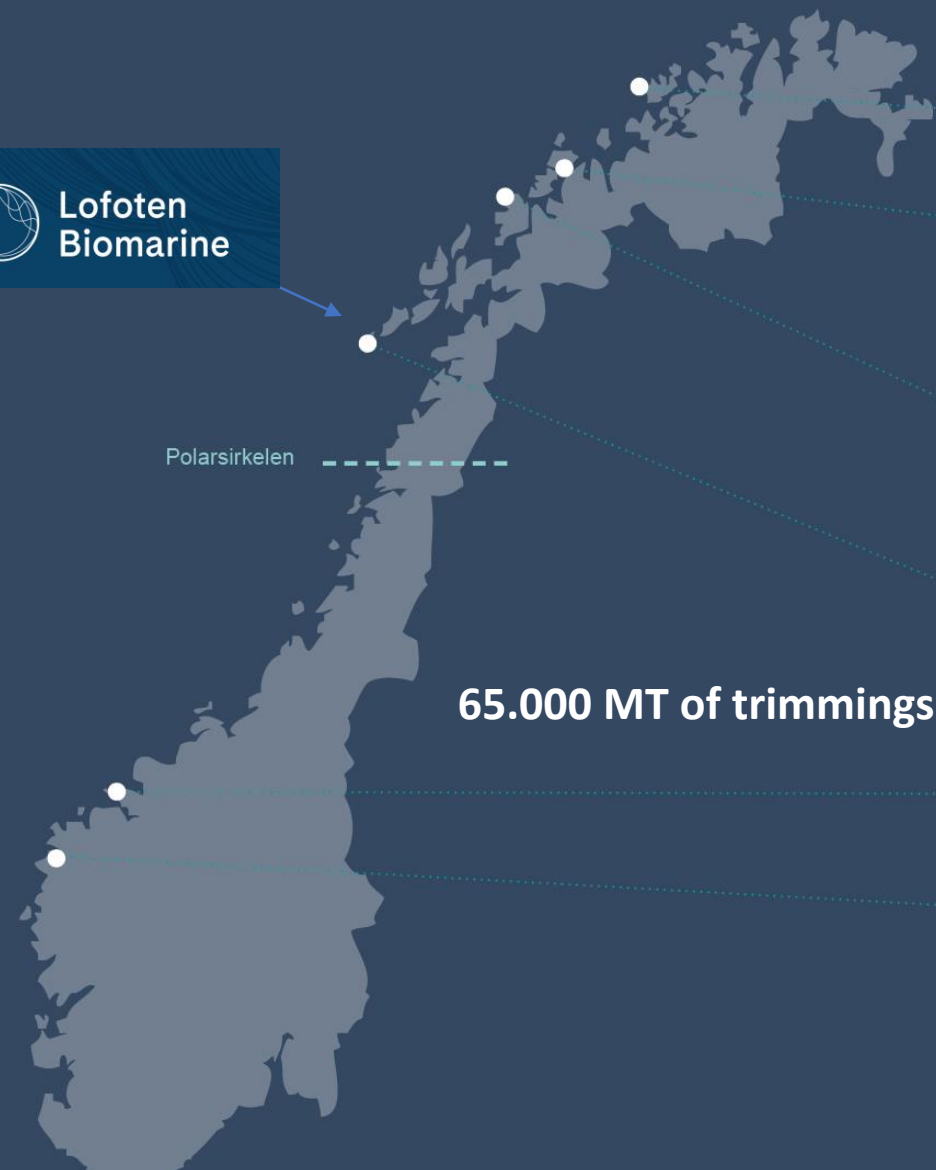


# Lofoten Biomarine

A part of the Nergård group



## LOKASJONER

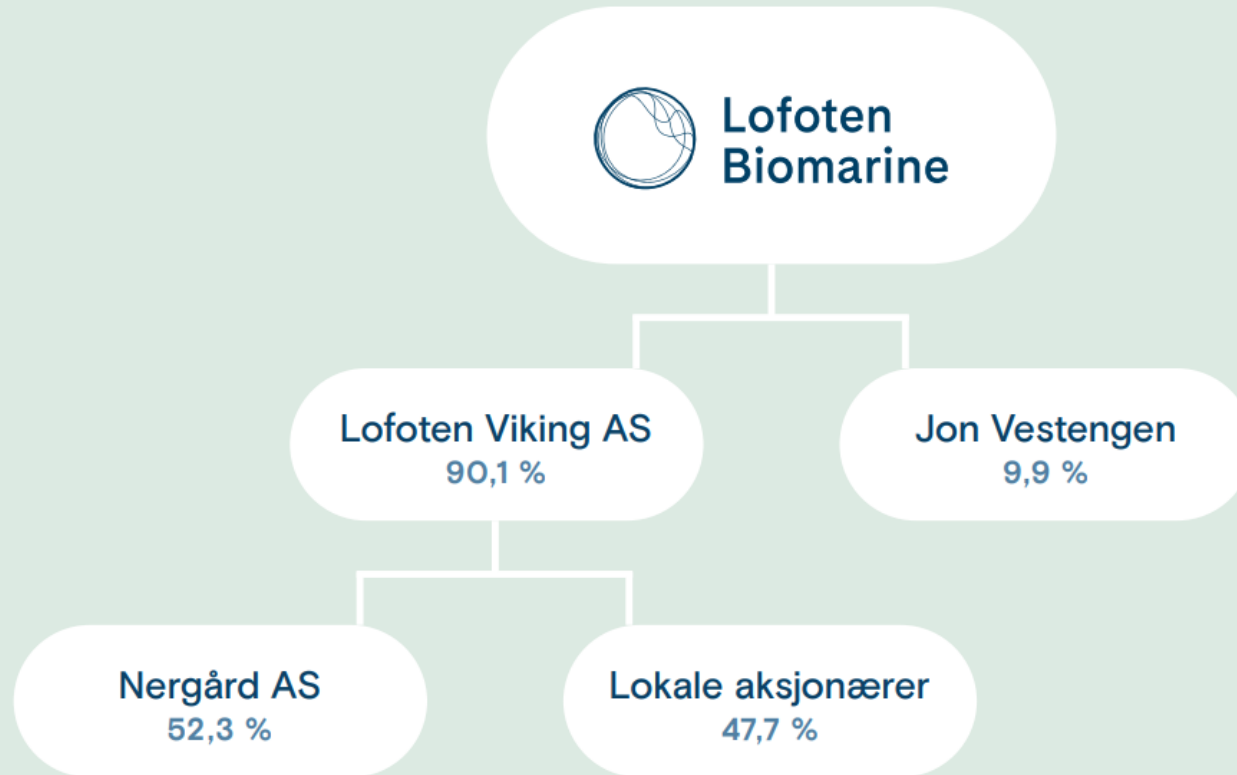


Polarsirkelen

65.000 MT of trimmings

- 1 **Sørøya**  
Nergård Sørøya AS
- 2 **Tromsø**  
Nergård AS – Head office  
Nergård Seafood AS – Sales  
Nergård Havfiske AS  
Global Sales AS
- 3 **Senja**  
Nergård Fisk AS  
Nergård Sild AS
- 4 **Værøy**  
Lofoten Viking AS
- 5 **Ålesund**  
Global Sales AS
- 6 **Florø**  
Global Florø AS

# SHAREHOLDERS



# BASED ON SUSTAINABILITY

Lofoten Biomarine supports UNs 2030-agenda



**TARGET:**

Develop and utilise new modern process technologies use energy across businesses



**TARGET:**

Support Lofoten Green Islands, Build local society, create new jobs.



**TARGET:**

100 % use of all byproducts, create minimum waste



**TARGET:**

Zero emission factory, NO carbon footprint

NERGÅRD



# Location

- Værøy is Norway's 7. largest fishing harbour
- Close to Aquaculture market
- Close to fishing ground
- Large fresh water supply
- 30MW Hydroelectric power



# HIGH CO2-EMISSION BY TRADITIONAL PRODUCTION

## OLDER FACTORIES THAT ARE NOT ENERGY OPTIMISED

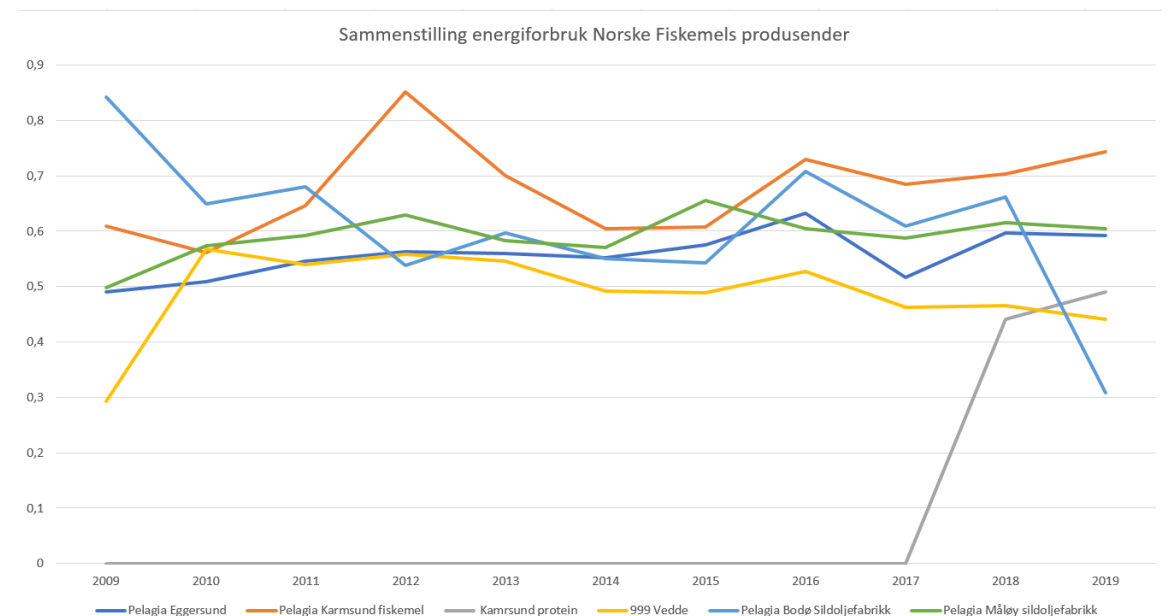
Production of marine proteins and oil are done in older factories without modern energy systems and low efficiency

## HUGE ENVIRONMENT EFFECTS

High CO2-footprint and discharge of other environmental gases causes an unnecessary environmental consequence.

## TRADITIONELLE FABRIKKER MED HØYT CO2-UTSLIPP

Average CO2-emission norwegian factories are in the area of 14 000 MT CO2 which corresponds to emission from 5 000 cars per factory.





# MARKET

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- Fish meal and oil
- Hydrolysates
- Proteine concentrates

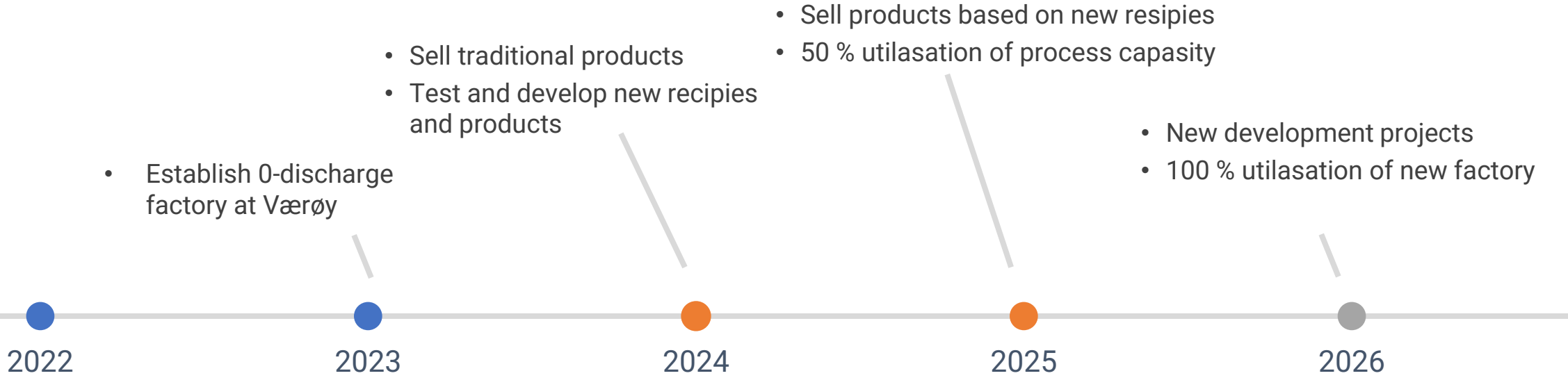


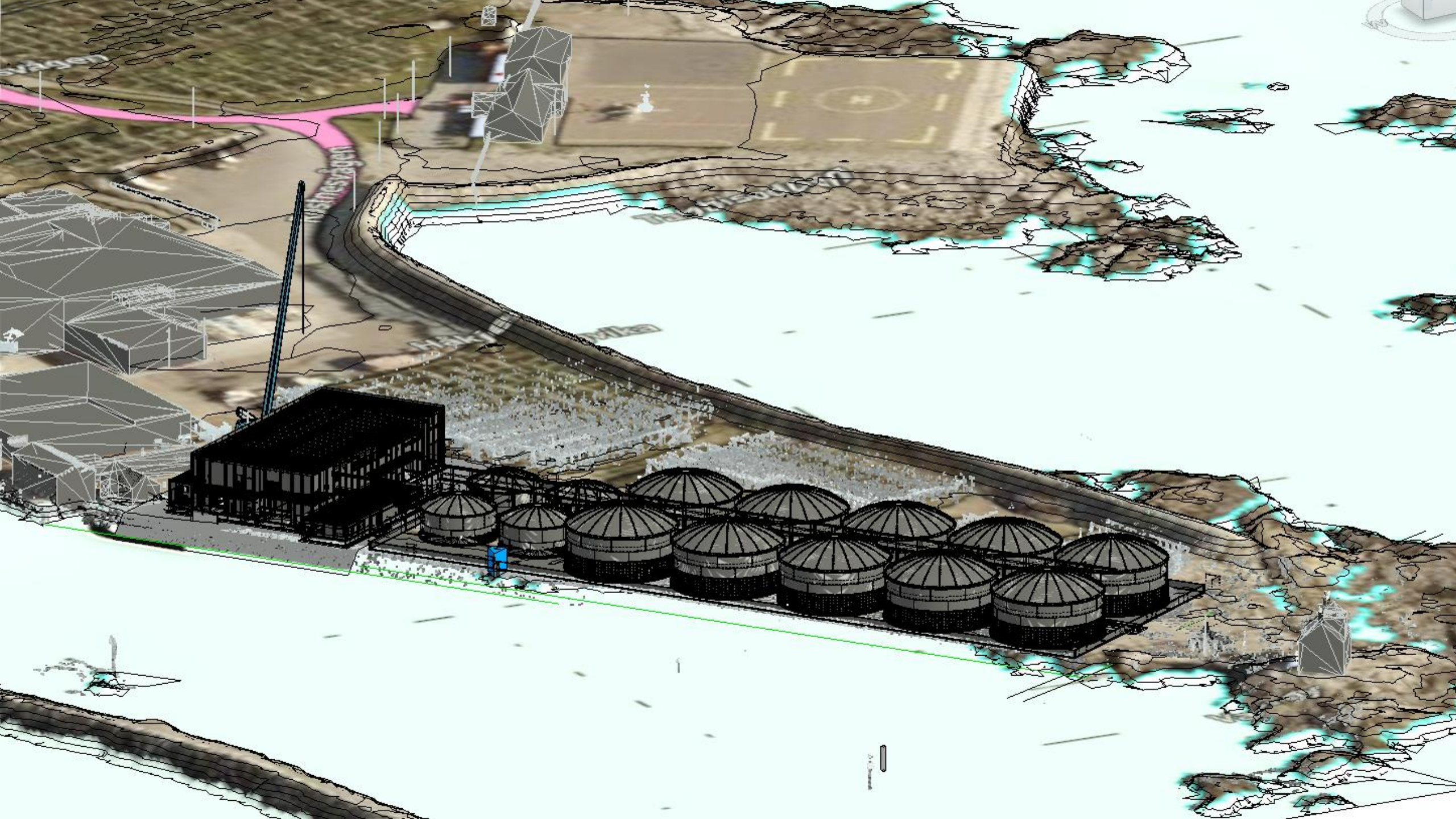


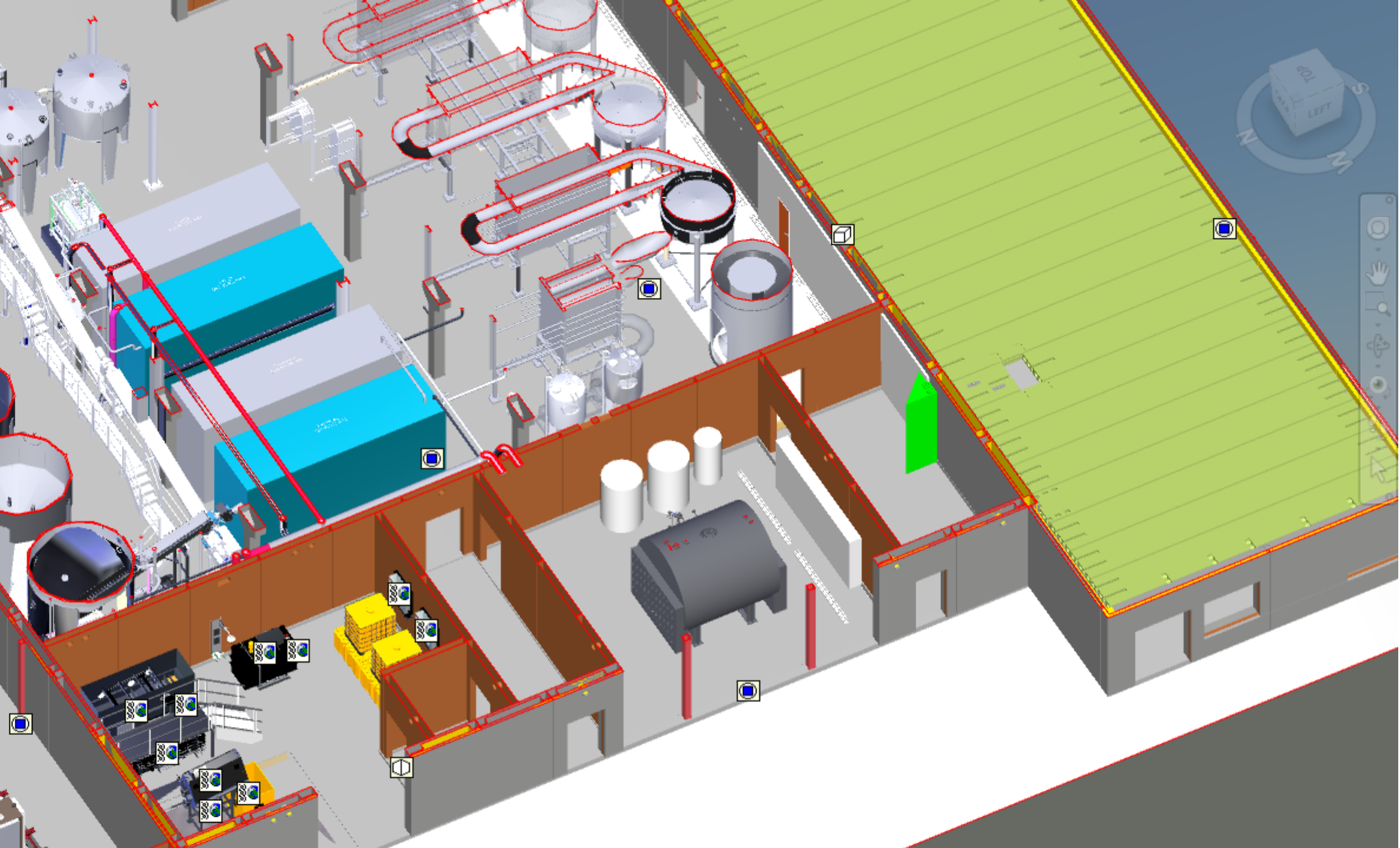
# TECHNOLOGY

- New freezing tunnels based on CO2 as refrigerant with excess heat emission to hot water (70deg).
- No steam factory
- Heatpump ready design
- Waste heat to district heat

# Progress plan











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Processing Technology

# NEW LOW ENERGY FISH PROTEIN CONCENTRATE PROCESS



**HAARSLEV™**  
Processing Technology

# NEW LOW ENERGY FISH PROTEIN CONCENTRATE PROCESS

Key Elements of the FCP process.

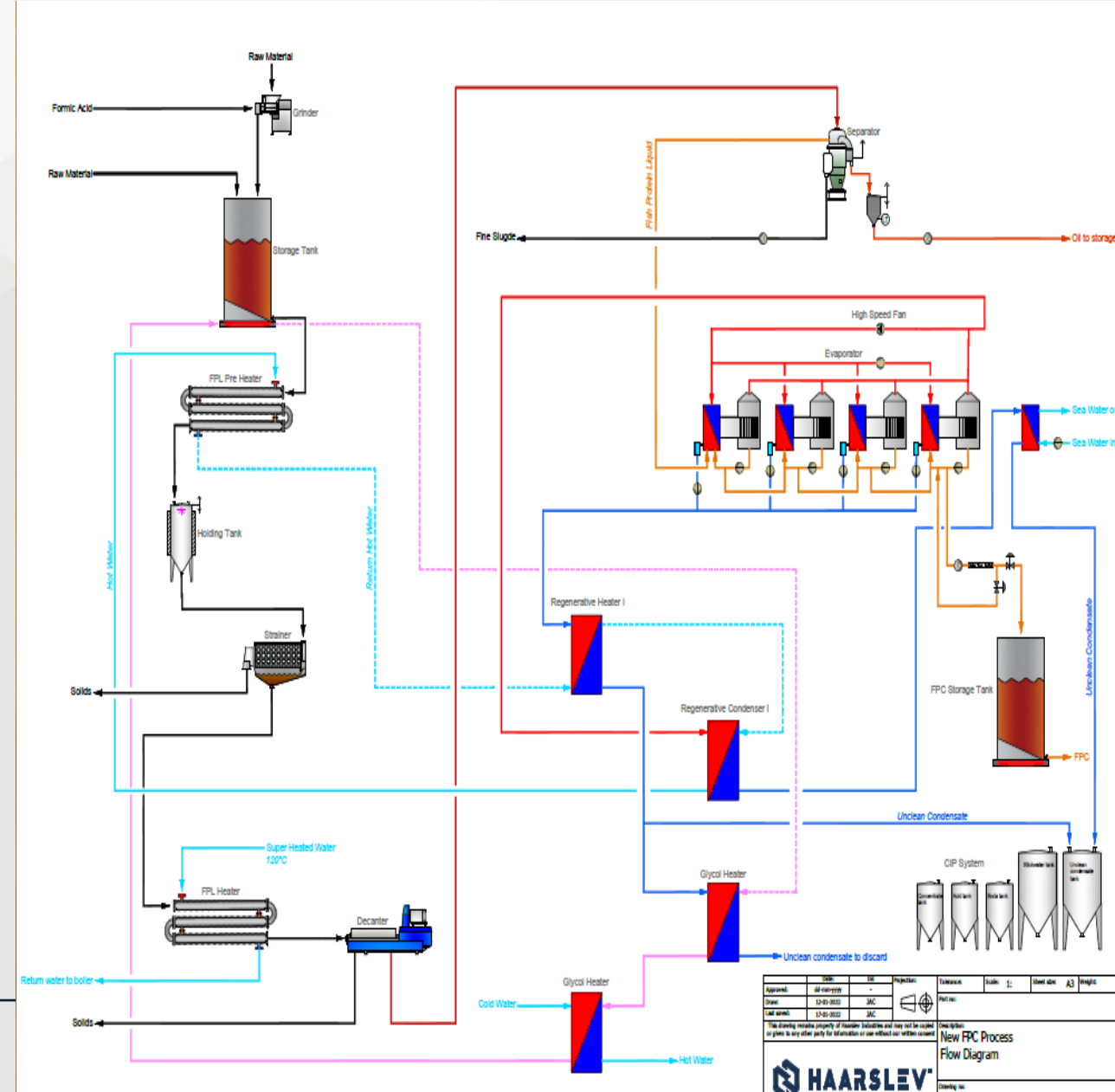
Jette Lund Kristensen

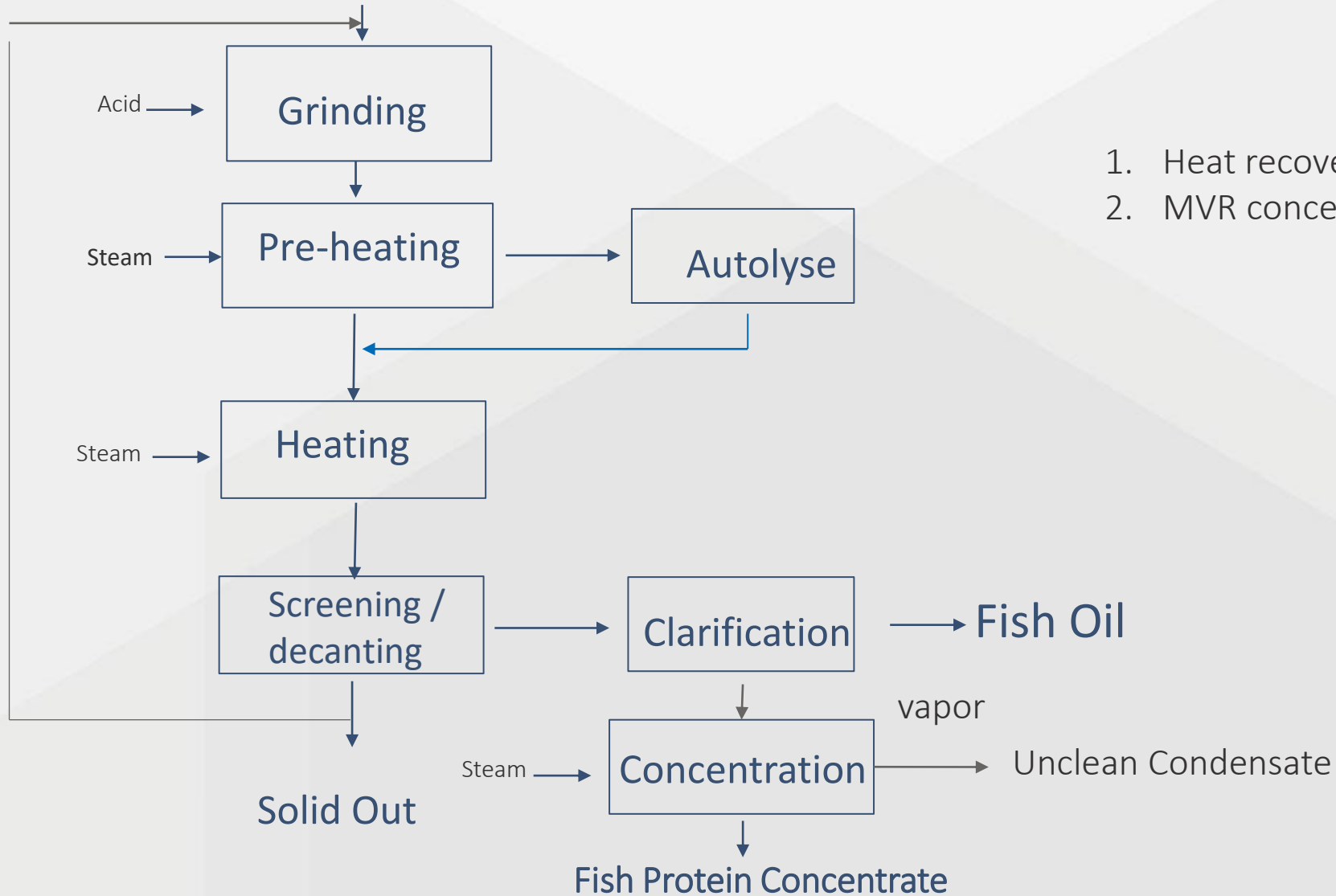
3-Juni 2022



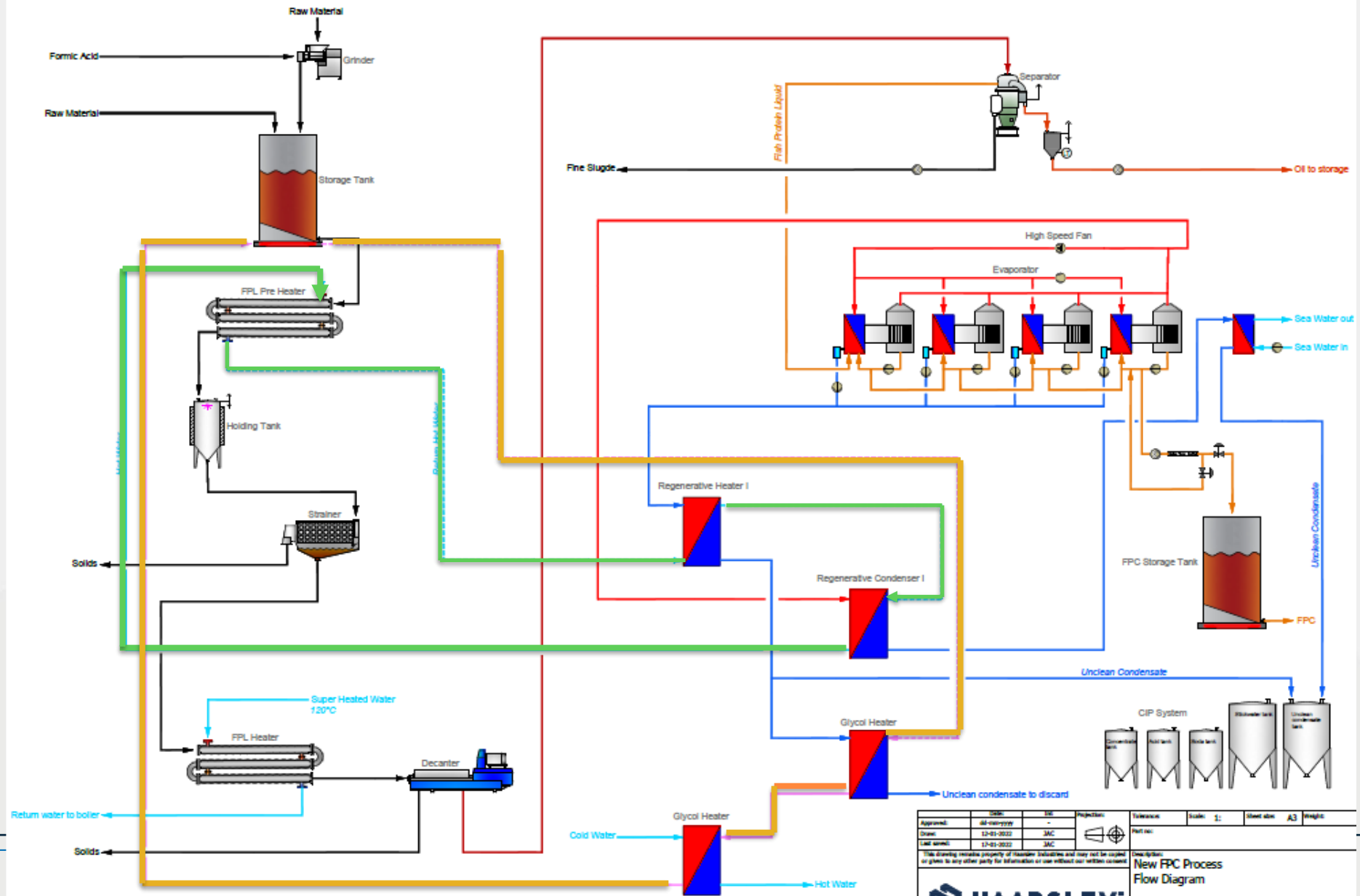
## Challenges for a new FCP process:

1. Feed capacity 50 t/h, 5 days a week.
2. Various product oil content from trimmings with 2- 22 %
3. Not allowed to use steam
4. Absolute minimum water consumption
5. No stop during week days, back up plan/ solution.
6. Closed system
7. Full CIP
8. Building height limitation





1. Heat recovery needed
2. MVR concept for evaporation

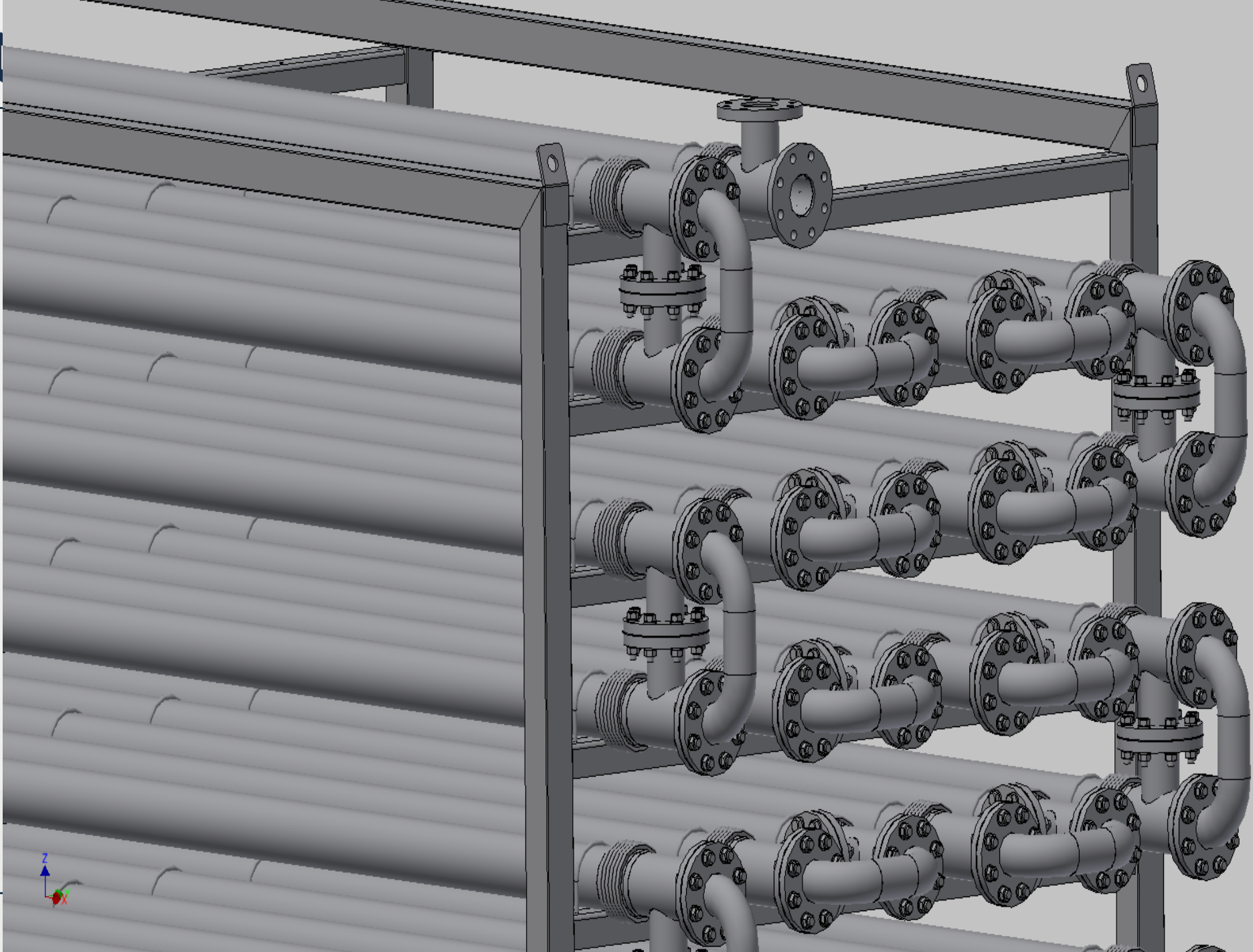


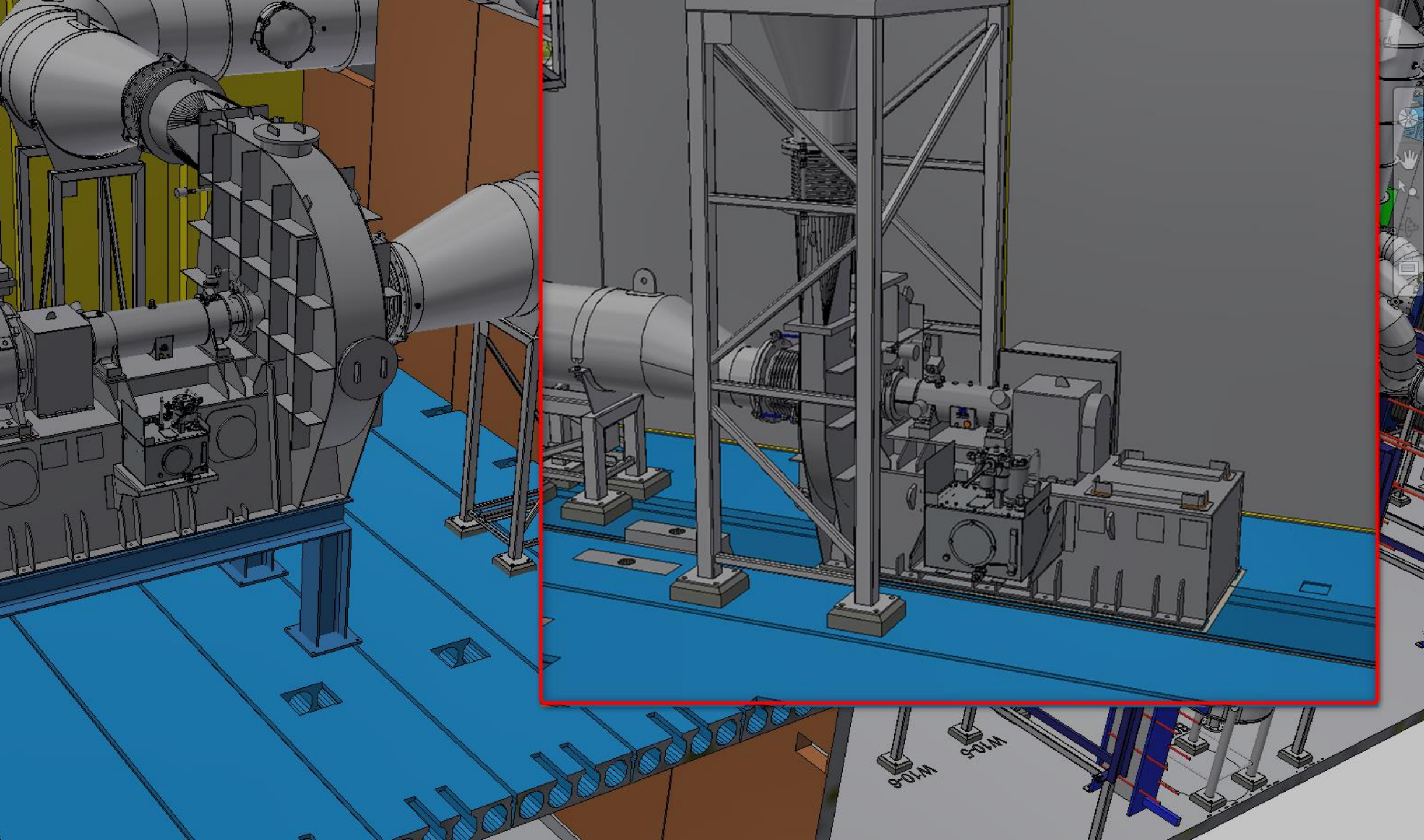
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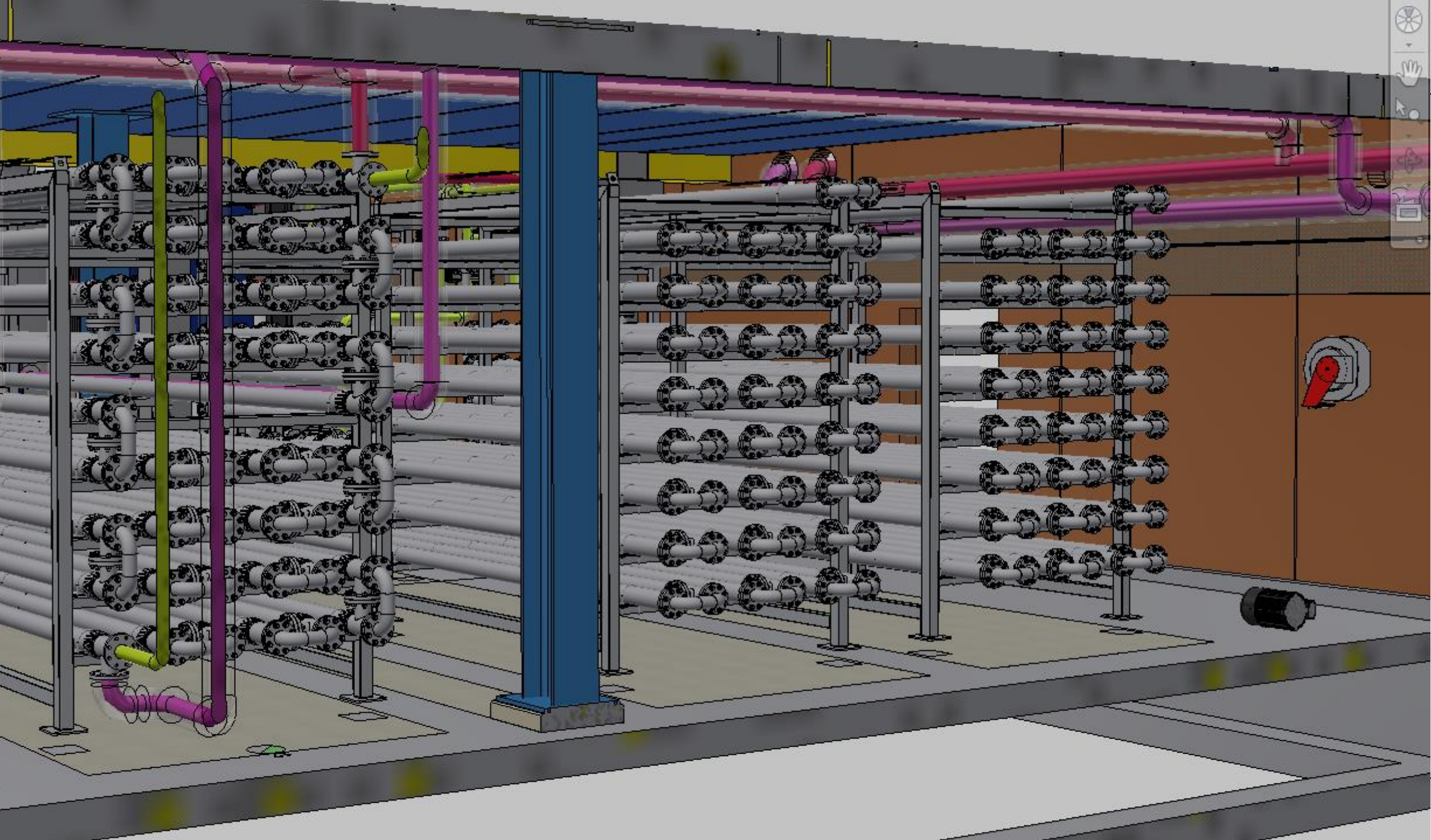
Title: New FPC Process Flow Diagram  
 Scale: 1:1  
 Sheet size: A3  
 Weight:

- Processing bony material that needs to be pumped and process without settling at a flow of 50 m<sup>3</sup>/h.
    - ✓ Bones in water settles due too low velocity
    - ✓ Important in the raw material and heating stage
  - Ph adjustment solubilize protein and bone material.
    - ✓ Protein easy solubilize completly
    - ✓ Bone mass is more slow proccess and form calcium chart.
    - ✓ Not same solubization degree on bone mass
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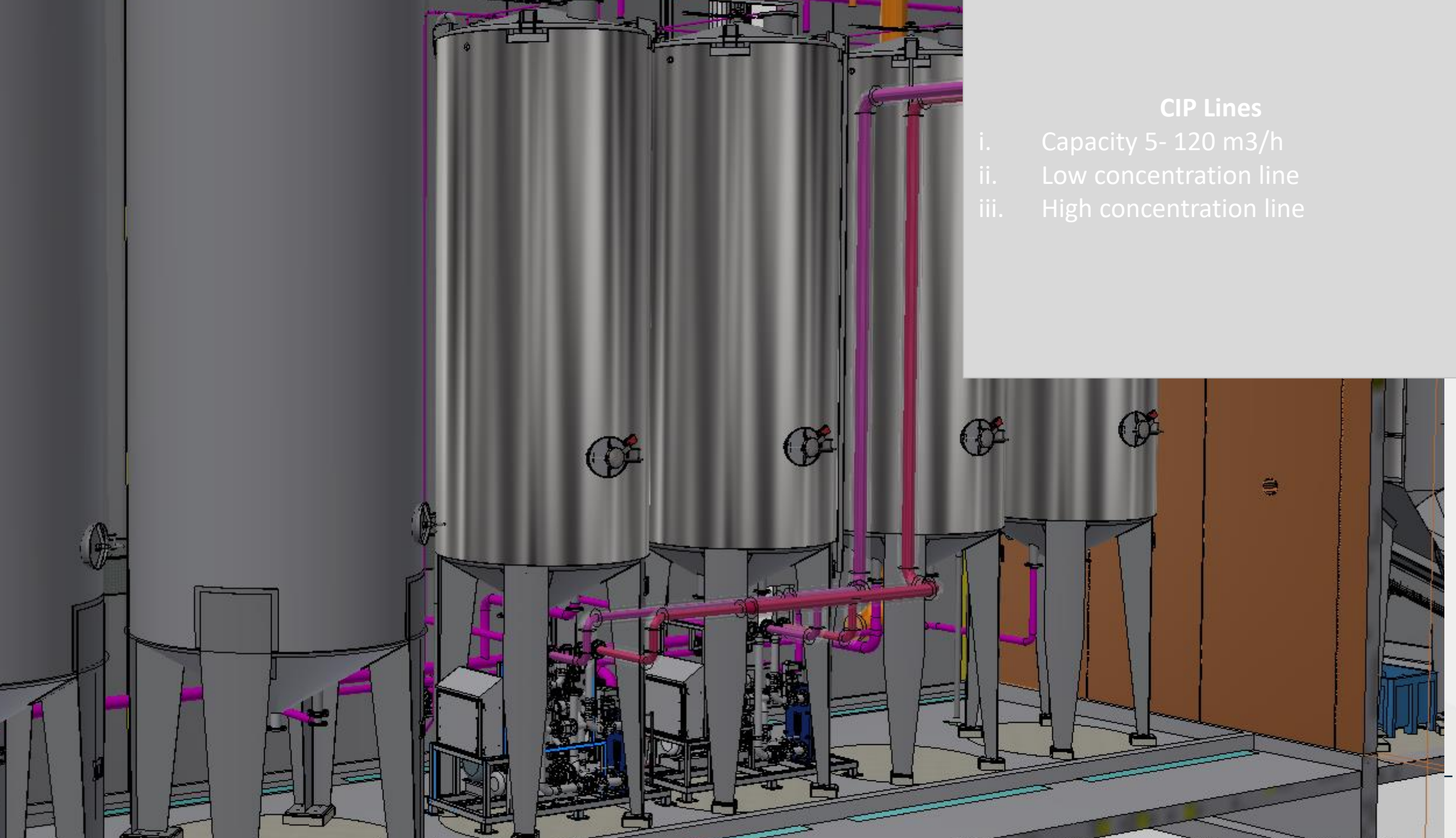


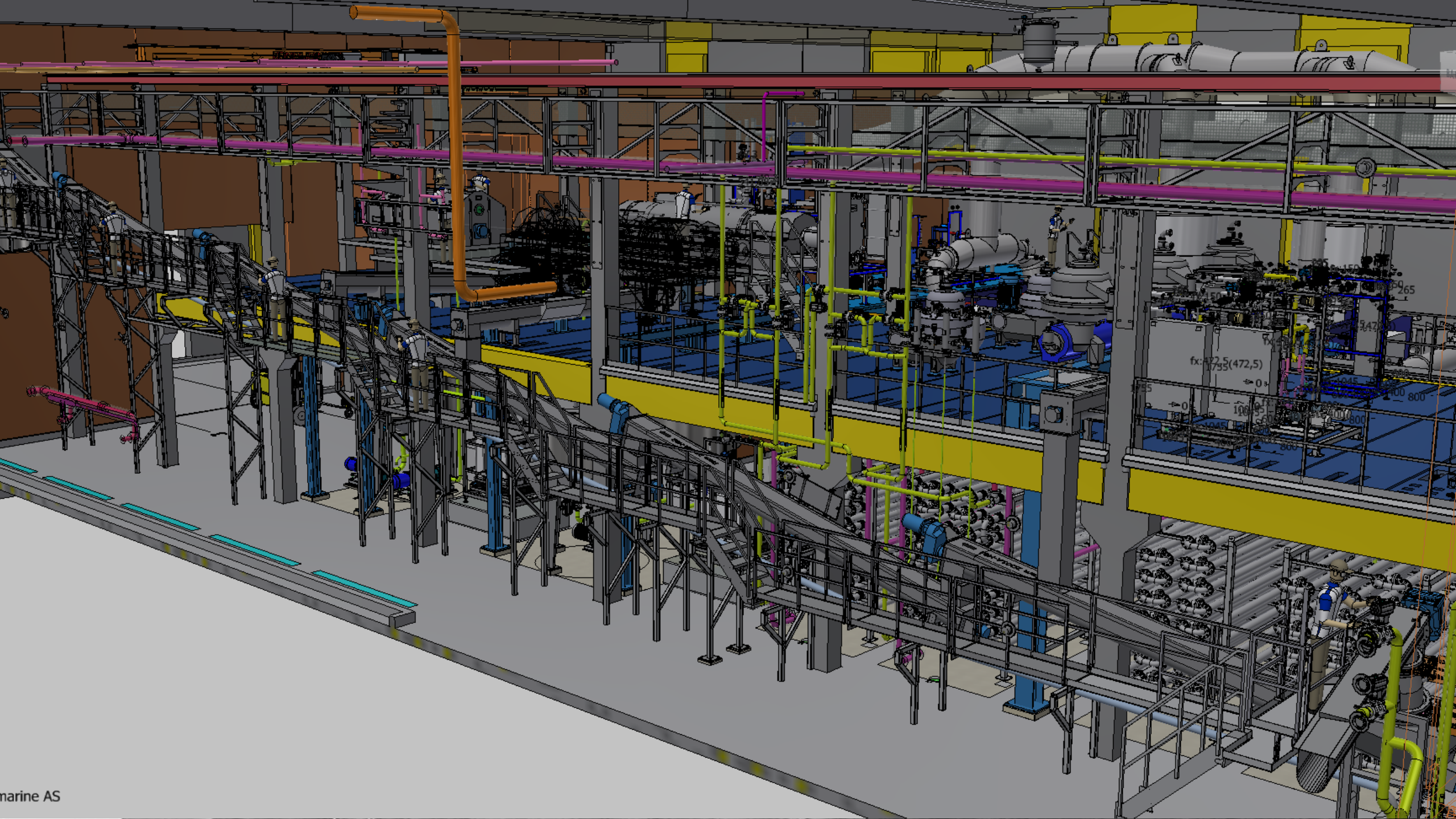




### CIP Lines

- i. Capacity 5- 120 m<sup>3</sup>/h
- ii. Low concentration line
- iii. High concentration line





1. We have designed the plant and used Jon's recommendation to equipment
    - i. The plant operates without steam.
    - ii. Heating is done with hot water 120 oC.
  
  2. Heating medium hot water done by electricity . Nearby further heat pumps to be implemented.
  
  3. Evaporation by mechanical high- speed fans.
    - I. Dual fan set to operate with a flash stage 4 for extra high concentration.
    - II. Flexibility to take one stage out for CIP during production
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Heat consumption:

MRV consumption:

Installed power:

