
ATO Energysaving
Getting more with less
Is energy a precious thing?
** Scandinavian projects with impact **
Aldo van Tongeren

# ** *LET US GET MORE WITH LESS!* **

- ATO ENERGYSAVING: COMPANY FOUNDED IN 2015
- OWNER ALDO VAN TONGEREN.
  - DUTCHMAN, BORN 1968, LIVING IN NIJMEGEN/ NOVIOMAGUS
- EDUCATION :
  - BACHELOR OF ENGINEERING, APPLIED TECHNOLOGIES
  - MASTER OF SCIENCE, STRATEGIC MANAGEMENT
- EXPERIENCE: 25 YEARS IN CENTRIFUGAL PUMPS, FILTRATION TECHNIQUES AND HYDRAULICS
- MEMBER AND PRESENTER ON INTERNATIONAL CONFERENCES LIKE EUAC, AQUALITY, IAC
  - AND THIS ONE! 😁
- AQUALITY MANUAL NO. 7 PUMP SELECTION / NOISE

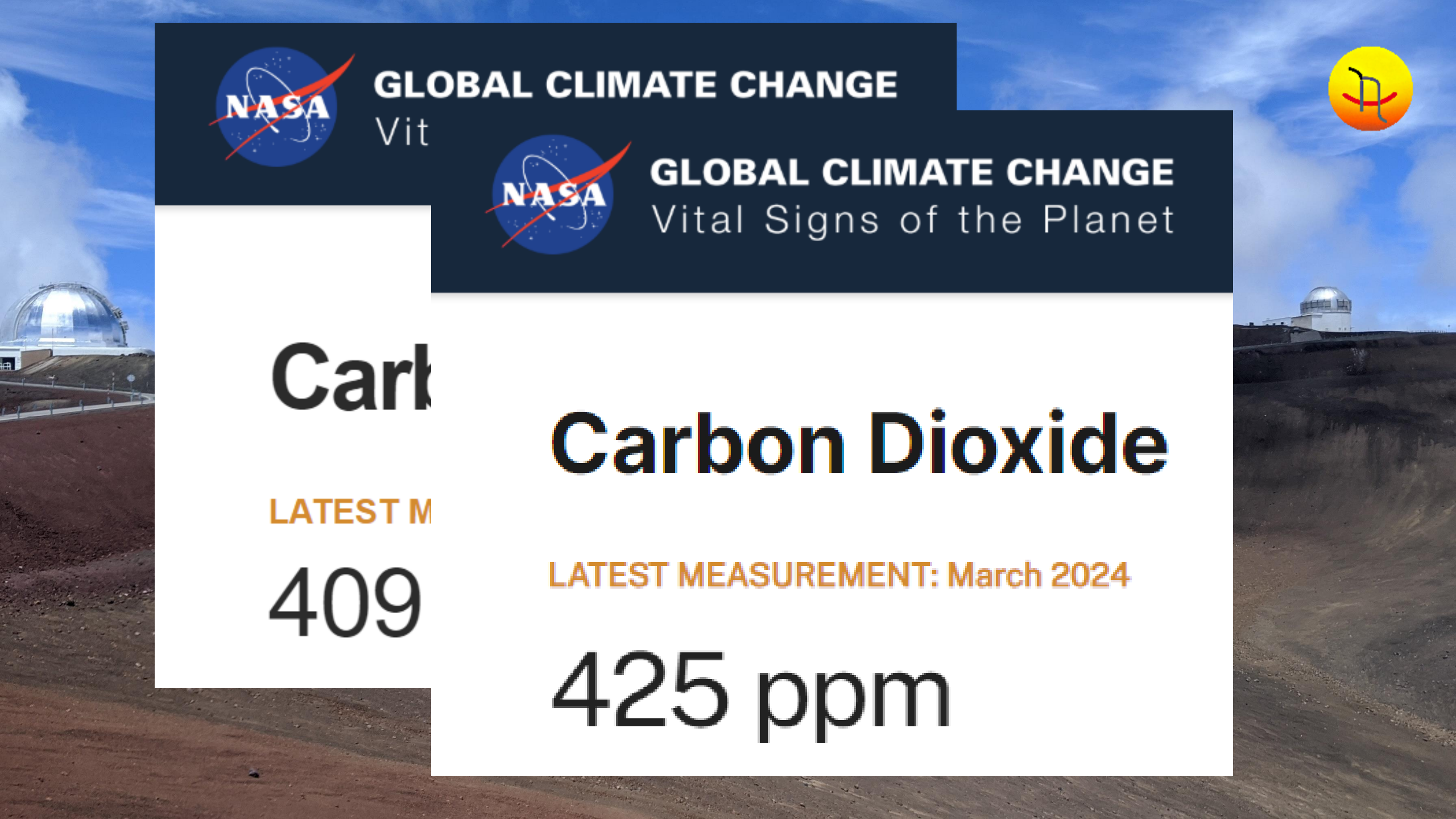
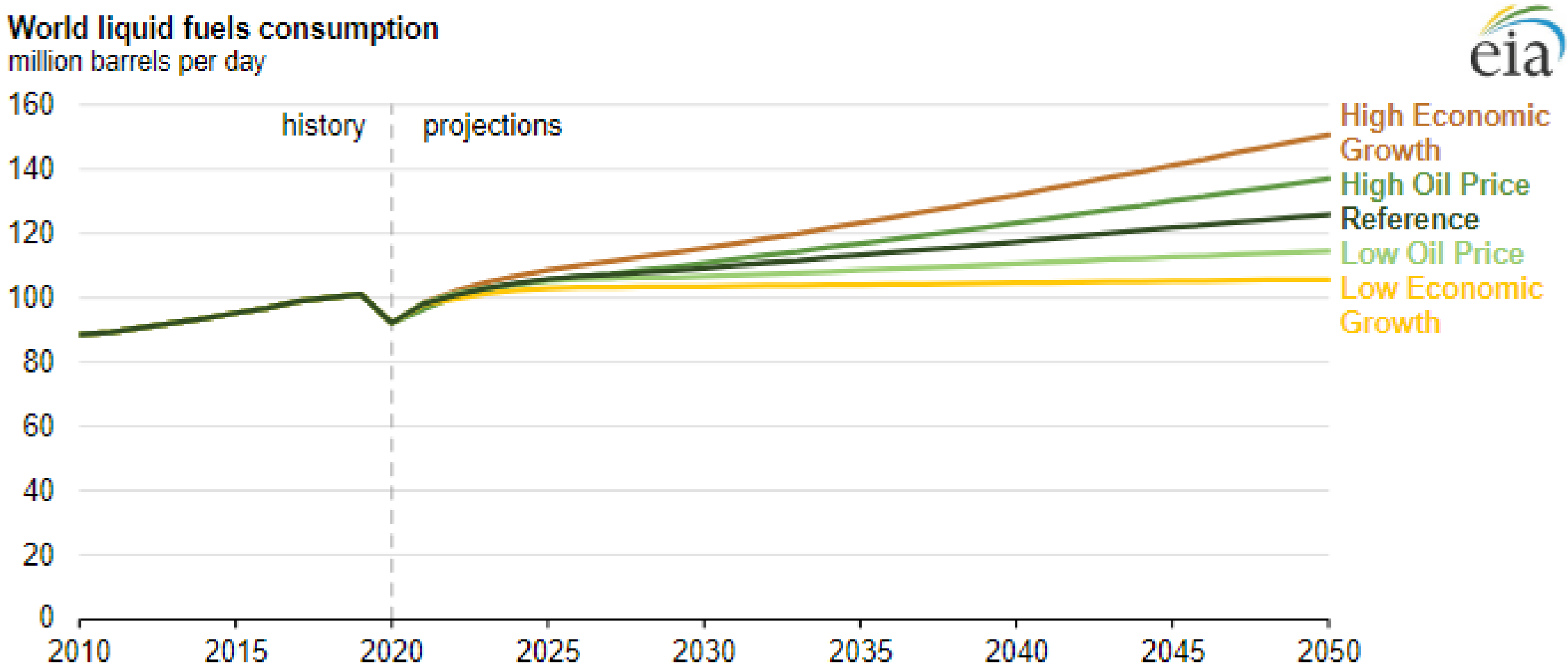

GLOBAL CLIMATE CHANGE
Vit
GLOBAL CLIMATE CHANGE
Vital Signs of the Planet
Carb
LATEST M
409
Carbon Dioxide
LATEST MEASUREMENT: March 2024
425 ppm

Figure 33.

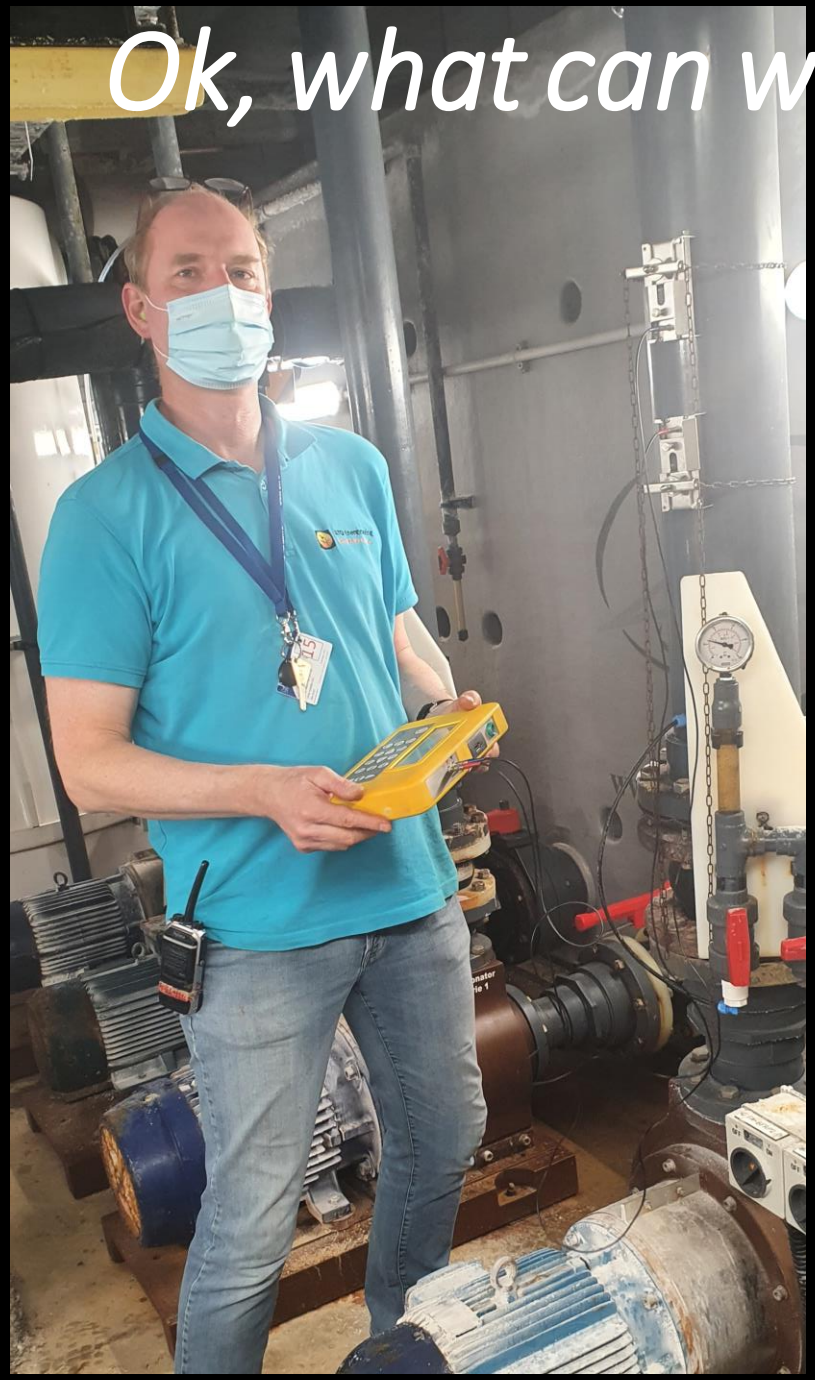
**World liquid fuels consumption**

million barrels per day




Source: U.S. Energy Information Administration, *International Energy Outlook 2021* (IEO2021) Reference case, Economic Growth cases, and

# *Ok, what can we do saving our (children's) future?*




- Project Atlanterhavsparken 2021

# Where to place the pump(s)??

Abyzz
Made in Germany

ARBO
THERMOPLASTIC
PUMPS
FILTERS

Bra
ELEKTRO

ATO Energysaving
Getting more with less

ATLANTERHAVSPARKEN
The Norwegian Aquarium

*Optimisation of hydraulics for reducing algae grow, lowering energy cost and reduction of maintenance*

Comfort

- Open system. Water directly from the fjord, 800 meter far, 42 meters deep.
- Cast iron pumps, not really corrosion resistant.
  - Replacement after 5 years.
- Seal pool 12 million liters was not included.
  - During summertime seal pools suffers from algae grow, which does compromise visitor experience.
- Noisy environment = safety/welfare risks.
  - In this case, Anton/ Rune-welfare! 😉


# Intake from fjord

Other goal:

Maintenance
- 50%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"Awareness for LSS"

# Pipe diameter calculations and so

## Scenario's for running supply pumps Seal pool

- Sea level low tide = -1,22 meter (Source Rune)
- Sea level high tide must be then ± +0,4 meter
  - (Source https://www.tideschart.com/Norway/More-og-Romsdal/Alesund/Weekly/ )
- Floor pump room = -3,25 meter
- Seal pool surface = + 2,0 meter

1. Differential height sea level to pool level =

**High tide -> ± 1,6 meters differential height between sea and seal pool**

**Low tide -> 3,22 meters differential height between sea and seal pool**

# Autumn and spring time

## a. Autumn or springtime

- Pipe work d315 SDR26 -> Internal passage is ± Ø 290mm
- Pipe work d280 SDR26 -> internal passage is ± Ø 260mm = 20% less area (!!)

Assumption is that in this time of the year ± 6000 lpm can do “the job”.

- Velocity through pipe work d315 = 1,5 m/s
- Velocity through pipe work d280 = 1,8 m/s

**Total needed head for d315**

**Total Head Calculator**

**Results**

| | | |
|---|---|---|
| Flow rate | 6000 | lpm |
| Calculated Head | 6.15 | m |
| NPSHa | 9.16 | m |

- With some extra restrictions, unforeseen -> ± 6,5 (high tide) up to 8 (low tide) meters head

**Total head needed for d280**

**Total Head Calculator**

**Results**

| | | |
|---|---|---|
| Flow rate | 6000 | lpm |
| Calculated Head | 7.81 | m |
| NPSHa | 9.16 | m |

- With some extra restrictions/unforeseen -> ± 8 up to 8,5 meters head

# Summer time! ☺

Assumption is that in this time of the year ± 10.000 lpm will do “the job”.

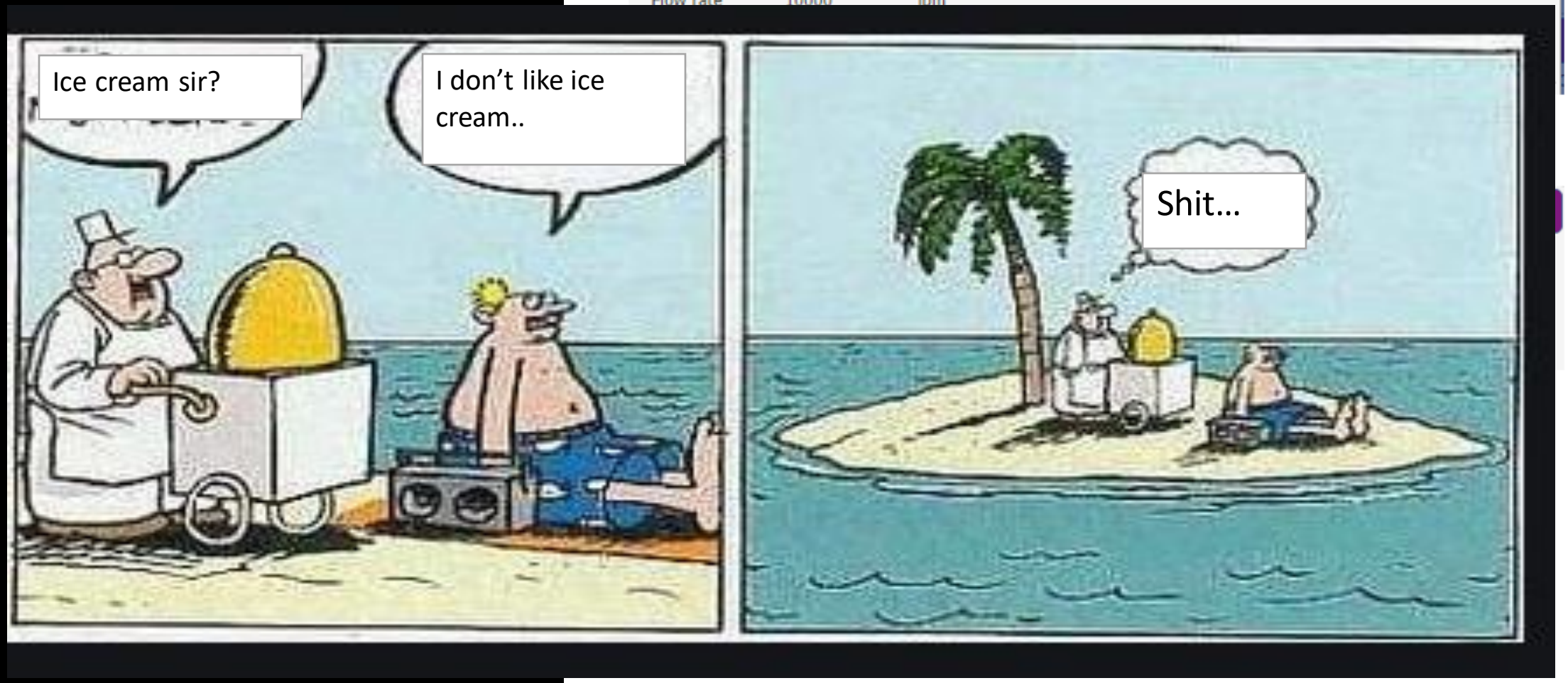
- Velocity through pipe work d315 = 2,5 m/s
- Velocity through pipe work d280 = 3,1 m/s

**Total needed head for d315**

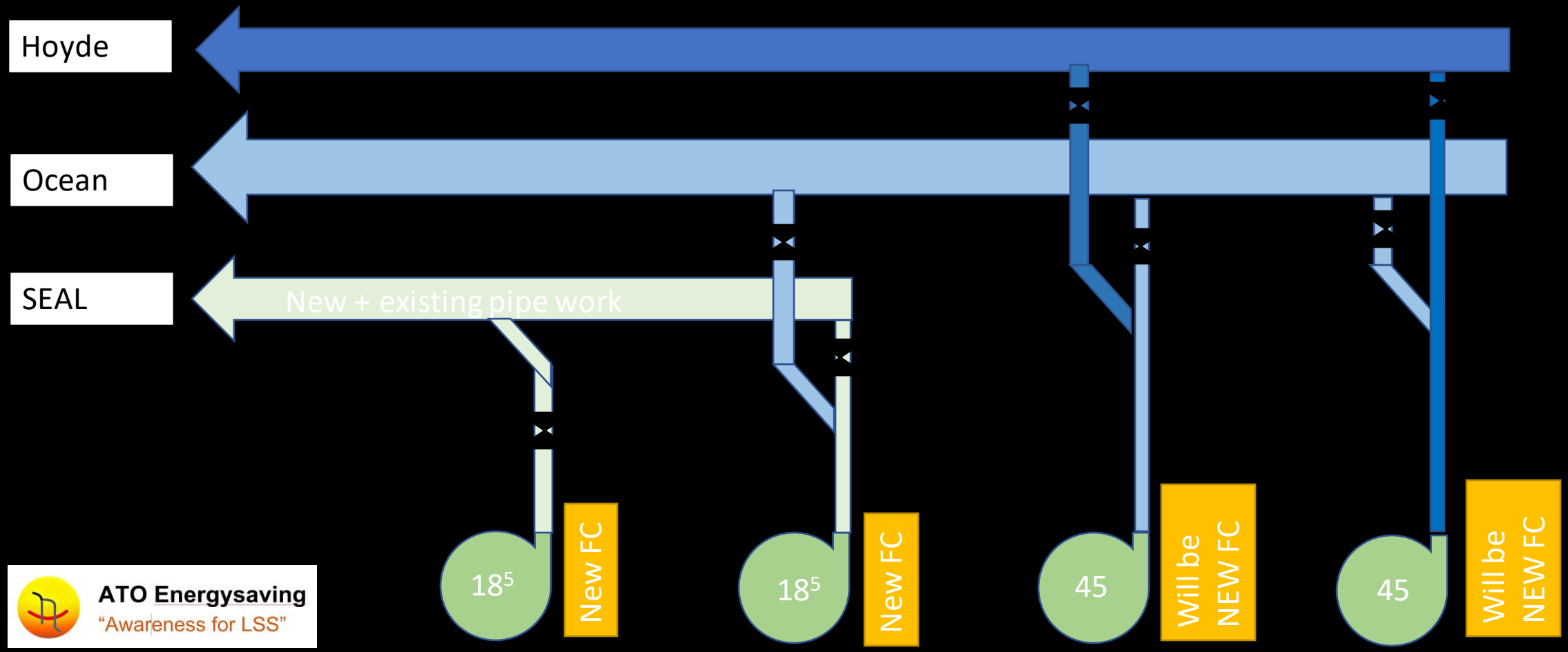
**Total Head Calculator** ×

**Results**

Flow rate 10000 lpm



# Schematic ARBO pumps in plant room

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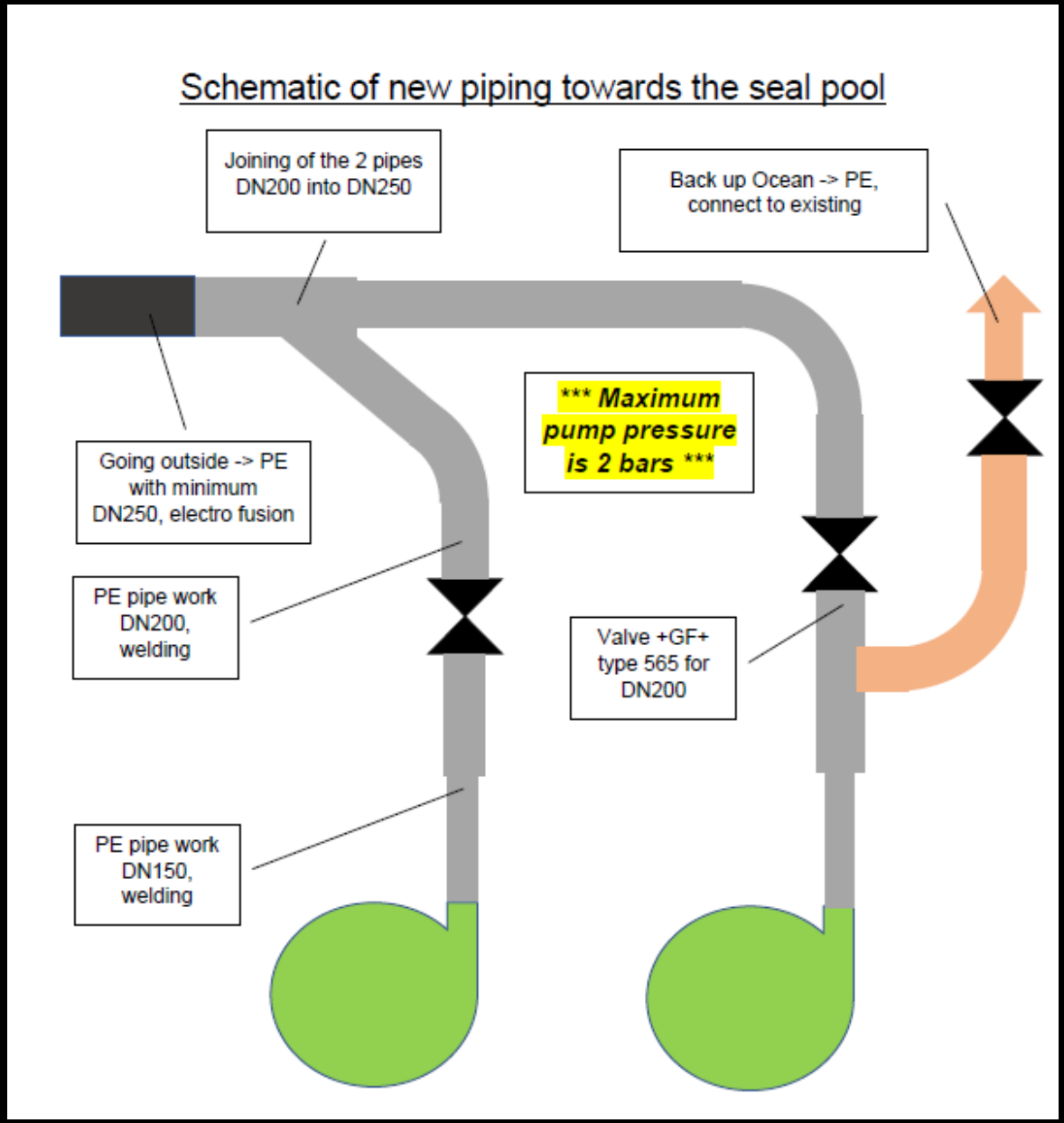
"Awareness for LSS"

20th of November sketch

- Pump outlet is DN 150 ○ Go from DN150 into pipe work DN 200 (Note -> INTERNAL measure! Probably d225)
○ Then place a valve in the DN200 section with a low resistance coefficient, like a +GF+ type 565.

- Join the 2 pipes with a Y shape, **at least** DN250 (= probably d280!) going out. ○ Enlarging the piping before and adding then other piping direct after would be acceptable.

Pipe going to the seal pool is d315 and so excellent

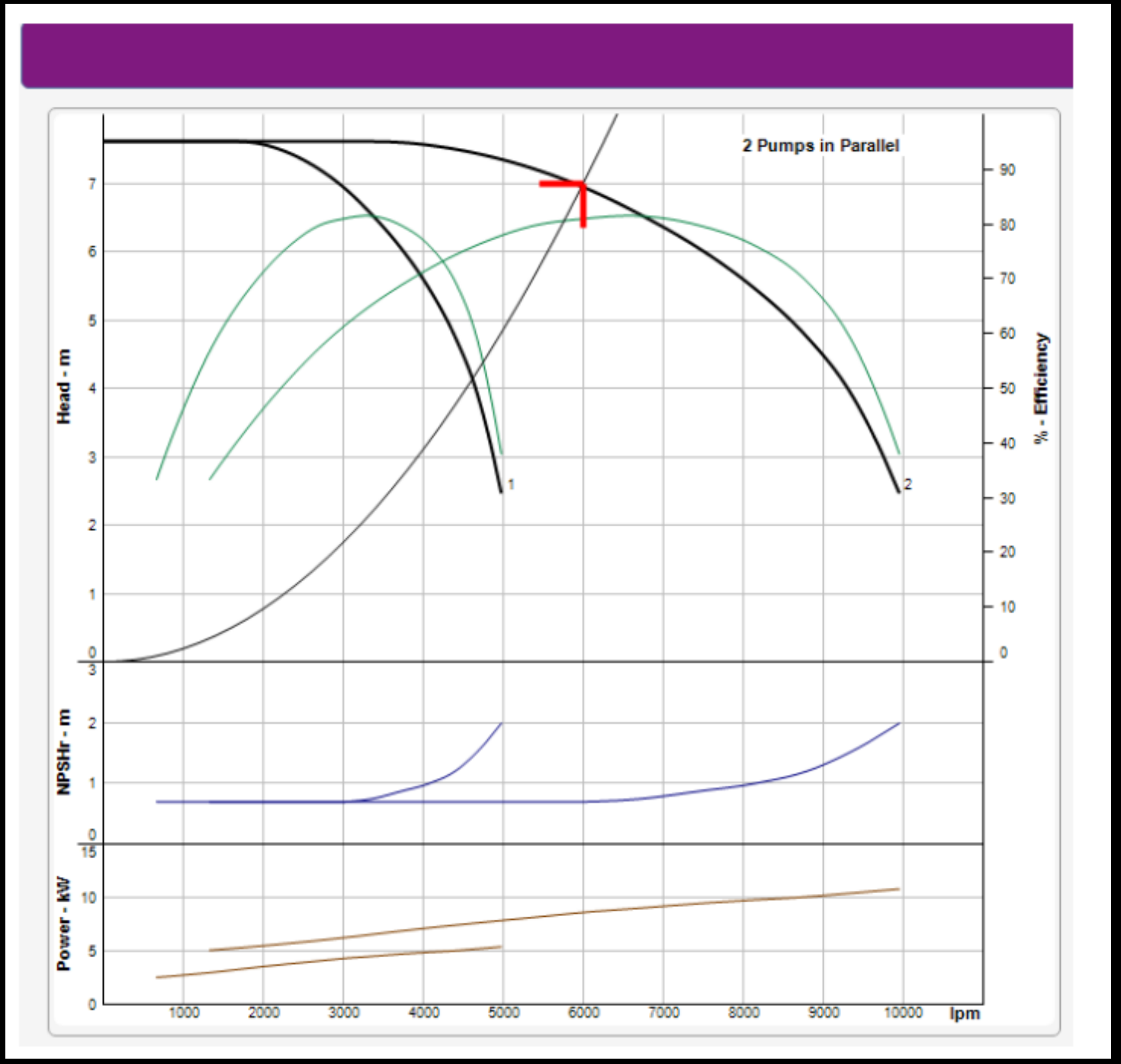


Pump speed forecast autumn and springtime:
6000 liters per minute

Approach: **BOTH PUMPS WILL RUN**

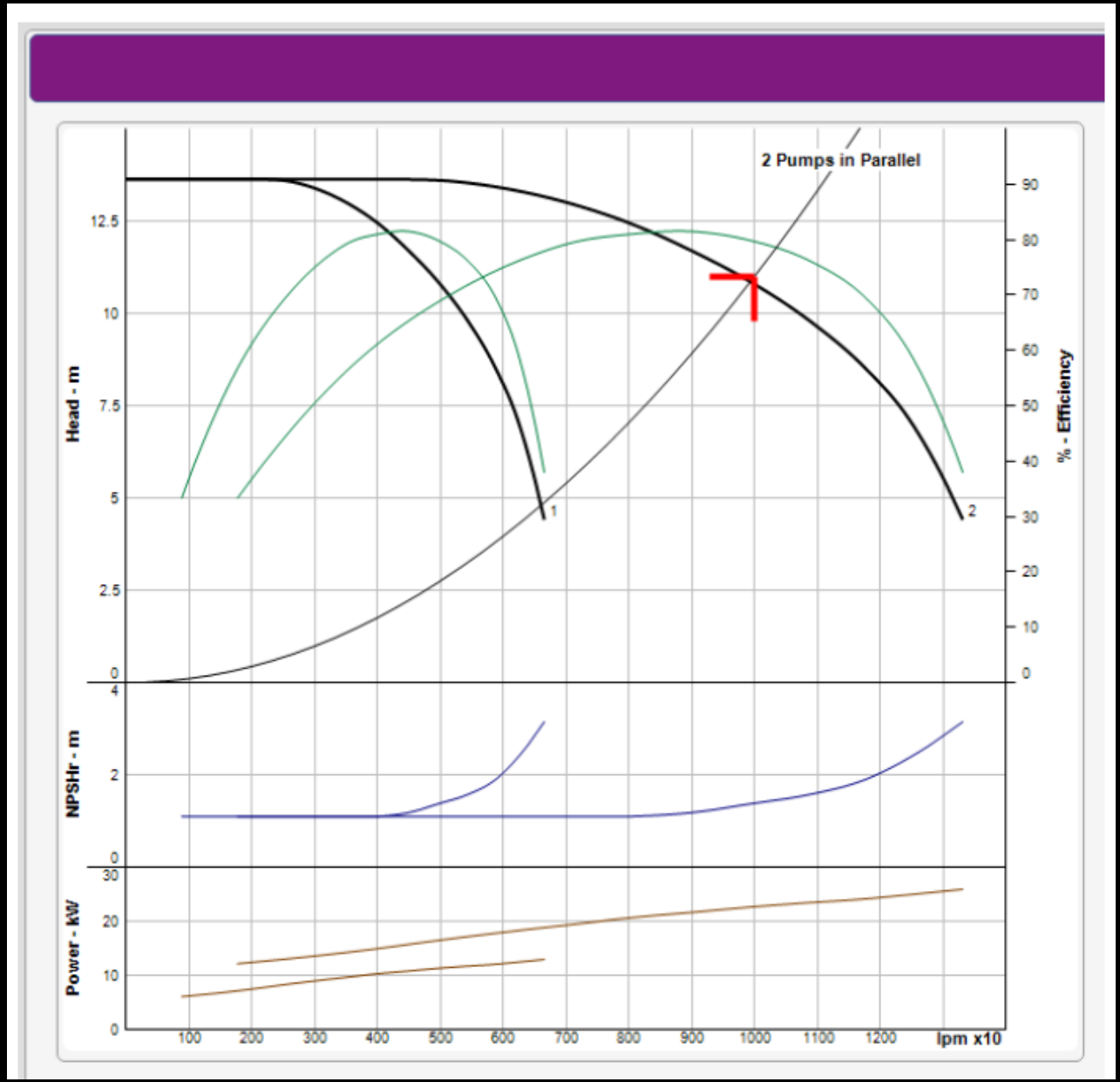
- This will be good for the pumps and the efficiency.

- Frequency controller speed forecast is 33 Hz
- Power usage for both pumps TOGETHER forecast 9 kW



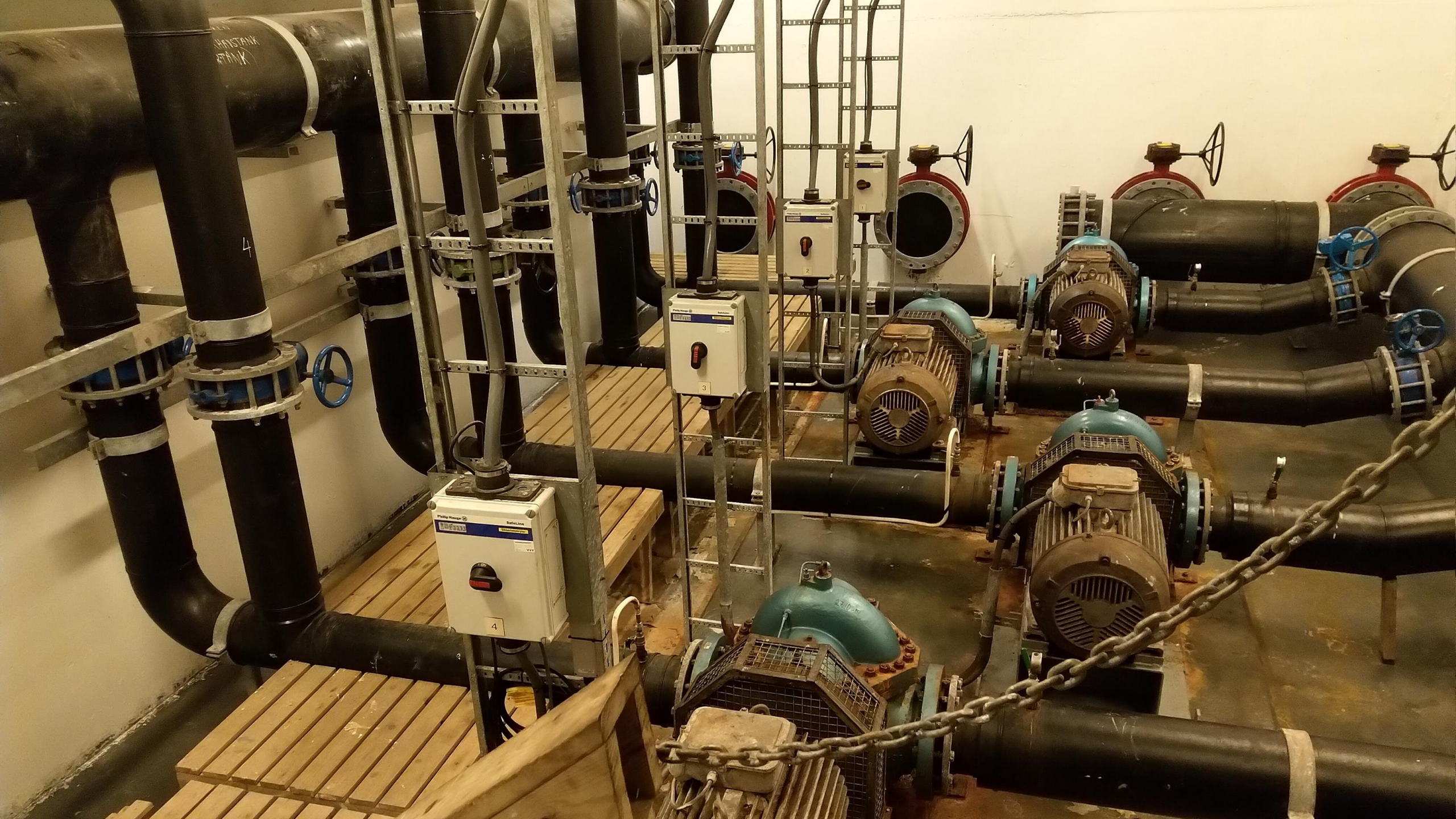
Pump speed forecast summertime:
Up to 8-10.000 litres per minute!

- Frequency controller speed forecast is 45 Hz
- Power usage for both pumps TOGETHER forecast 22 kW



# Planning

- Comfort installs the pipe work:
  - First the seal pool pumps 18,5kW
  - Old pumps can be taken out of service
- Bra Electro connects the pump to new FC etc.
- Continuing Comfort/Bra by old Ocean pump
  - New ARBO pump position 2 can take over Ocean
- Continuing by old Hoyde pump
  - New ARBO pump position 3 can take over Hoyde
- Installation of Abyzz AFC’s in week 15 /16
  - Covid-19? Alex available? Pipe work ready?
- And get the circus go into operation!



Høydetank
Stortank
Høydetank P4
Stortank P3
Selbukta P2
Selbukta P1
P1
P2
P3
P4

IDAR Design

Because we should care

IDAR Design

*Because we should care*

IDAR Design

Because we should care

Surface area = 490m²
If 75% coverted 360m²
Around 200 solar panels

Total 60.000 kWh per year

**AND**

**ANIMAL WELFARE**


2019



92 dB(C)

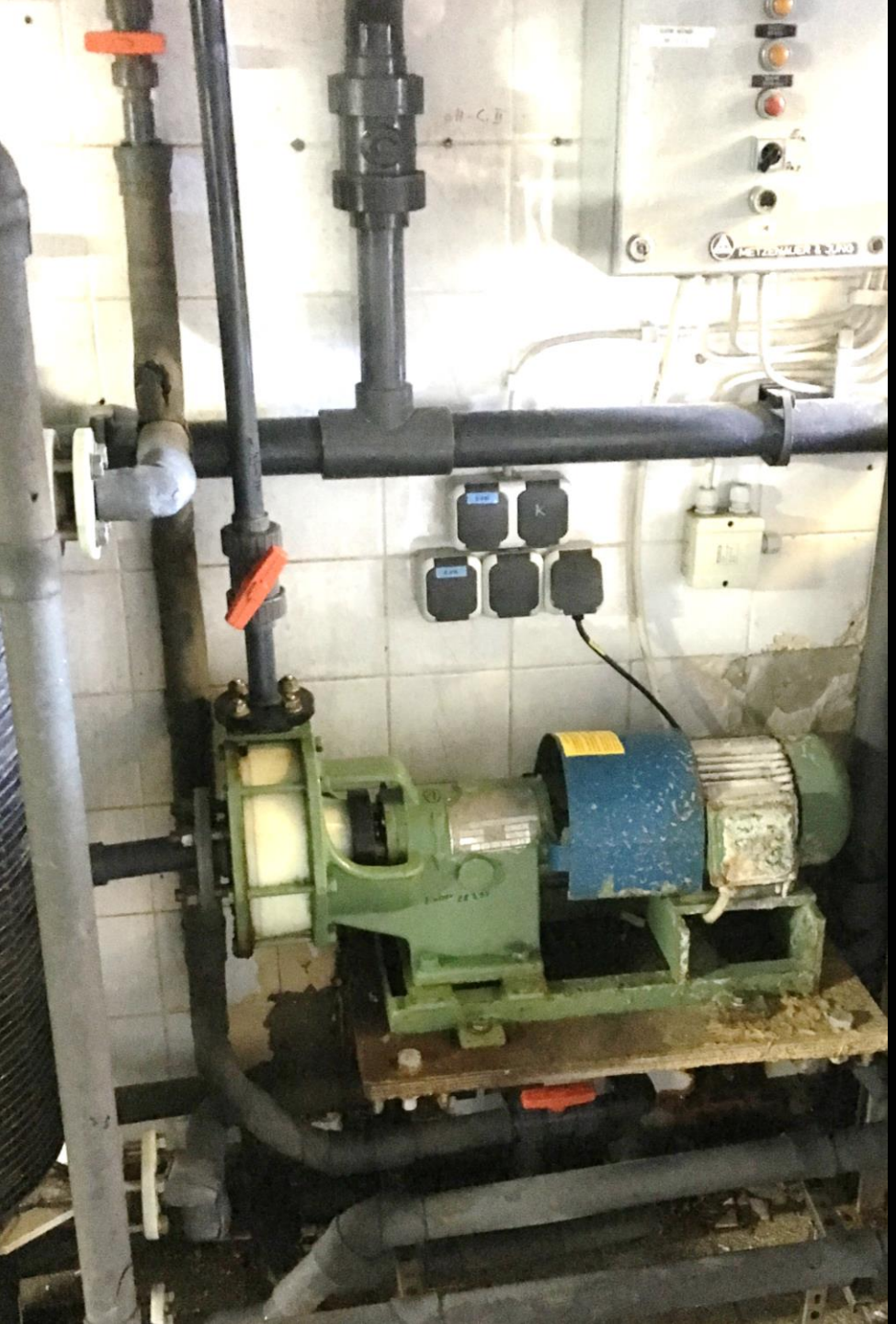
# Saving
# 20 dB(a)

## 600.000 kWh/y

Den Bla Planet
Copenhagen 2022

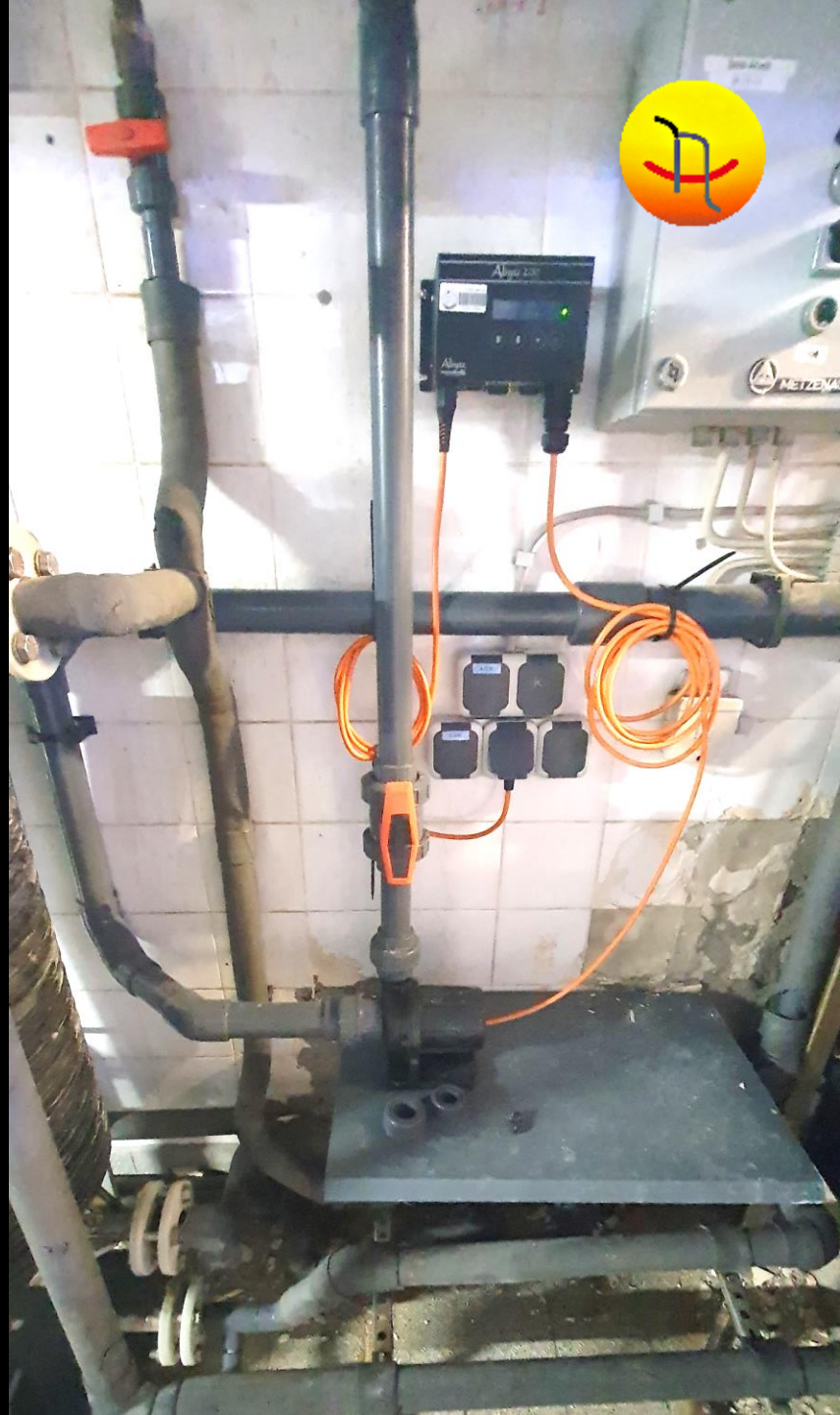
# Pump selection matters??


# Pump selection matters!!!



# Really!!

DC Pumps Abyzz



# 20X less energy usage

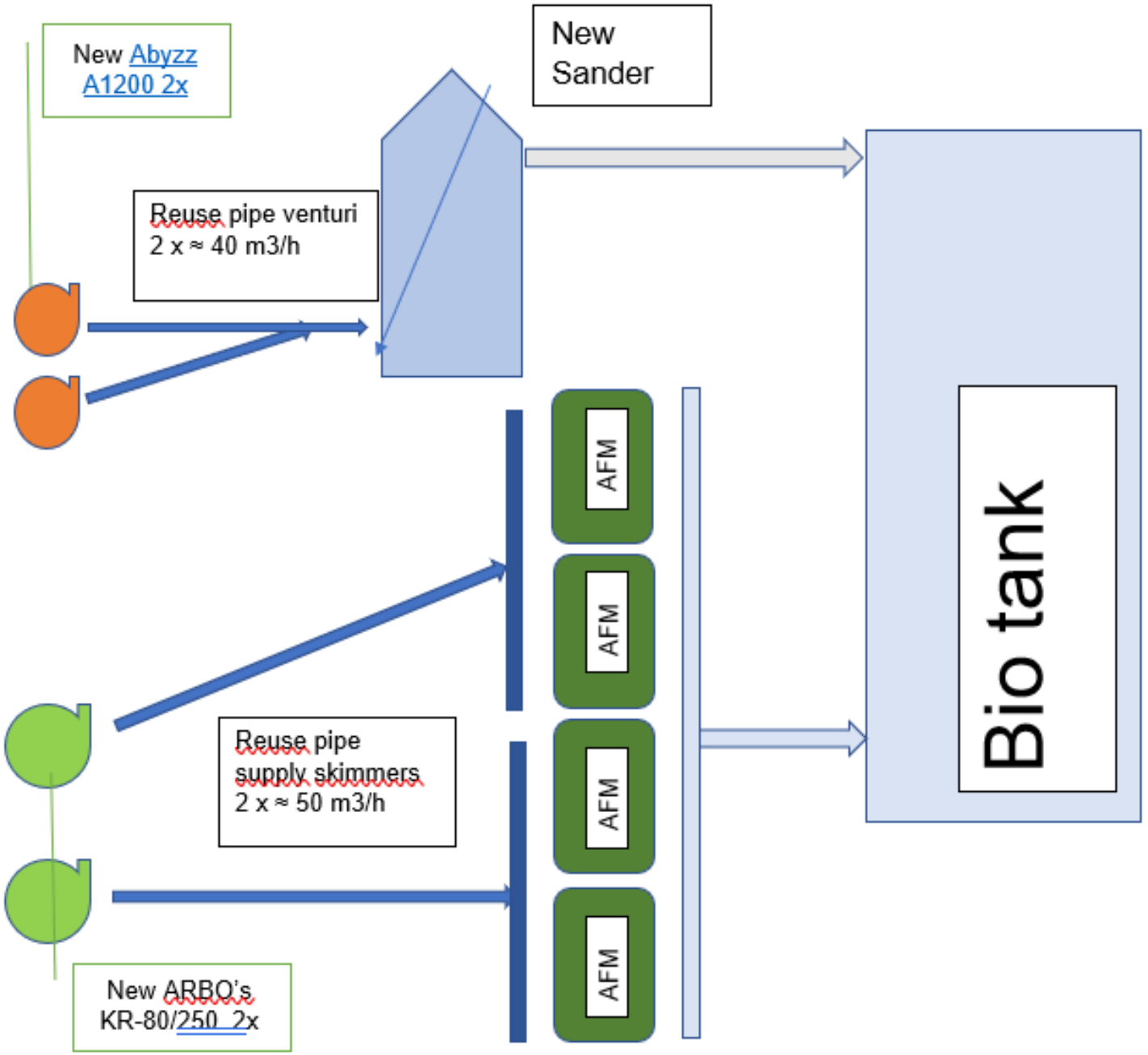
# Project Denmark

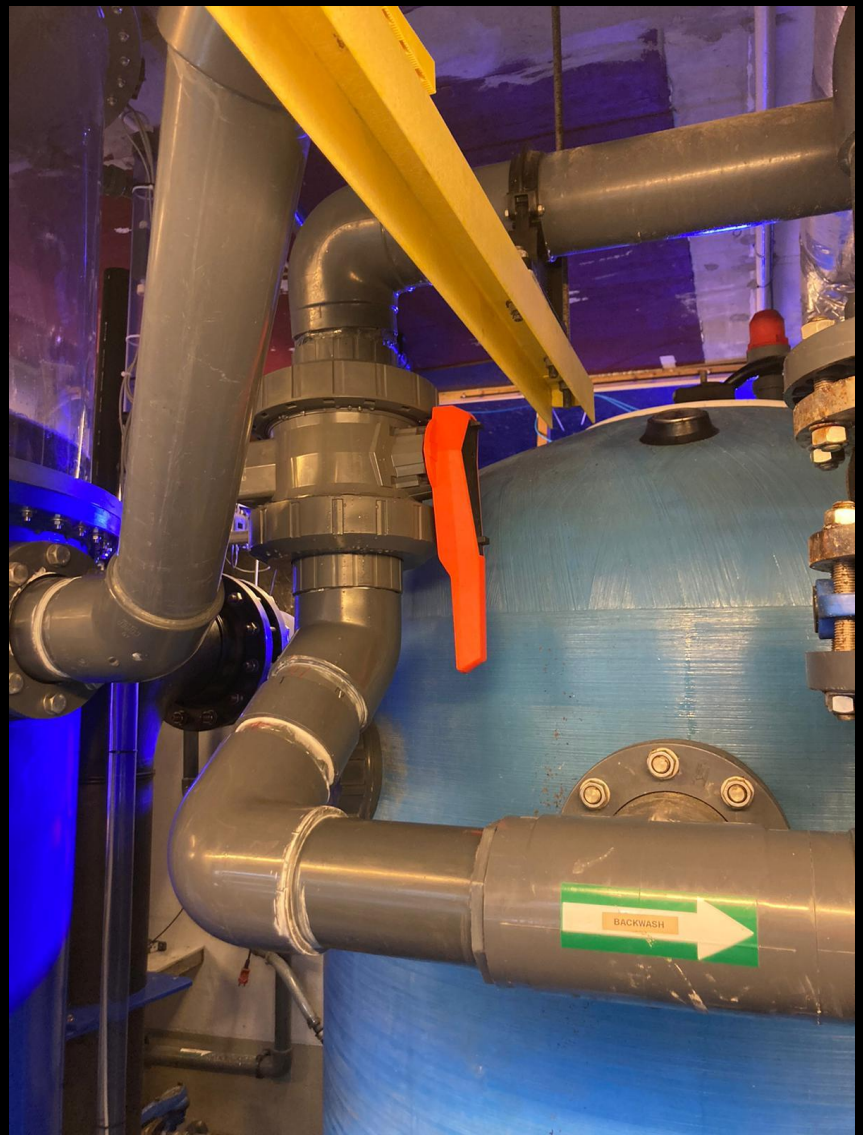
# First step: Audit 2019


SANDFILTER
Code RS
1
BACKWASH

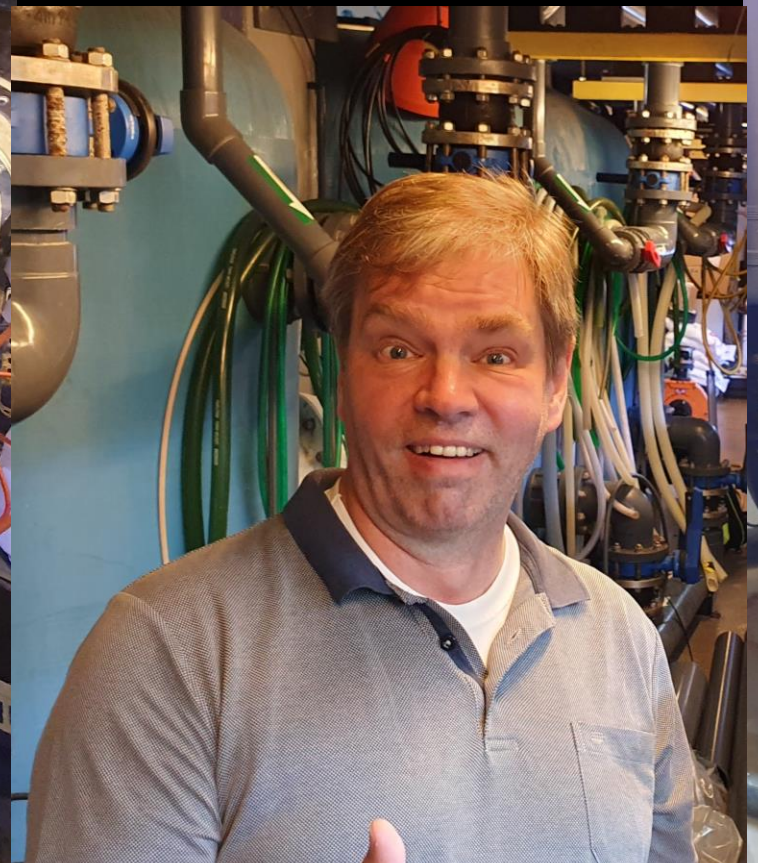
# Second step: AFM in 2022

# Third step: Pipe work and LSS design



Fourth step 2023:
High efficiency stuff:
pumps & just 1 skimmer~~s~~



Result..

-60%

€ $

SAVE ENERGY

# Reclaim in UK before

Reclaim after

75% reclaim of backwash water

Energy and costs saving

Do it simple

Keep it simple

# Even though energy is in abundance...

# It is precious!


Please do not hide

# Thanks for your attention!

Aldo

Ευχαριστώ!

Merci bien!

Vielen Dank!

Tusen takk!

Kiitos!

Teşekkürler!

Dank u wel!

¡Gracias!

Thank you!