

# Green Furnace



# Presenters

Erik Spolander

**CalorMet (CTO)**

**Education:** Bergskolan Filipstad  
and Högskolan Dalarna.

**Working experience:** SSAB, Volvo  
AB, Bulten AB, Bodycote AB

More than 20 years with heat  
treatment...

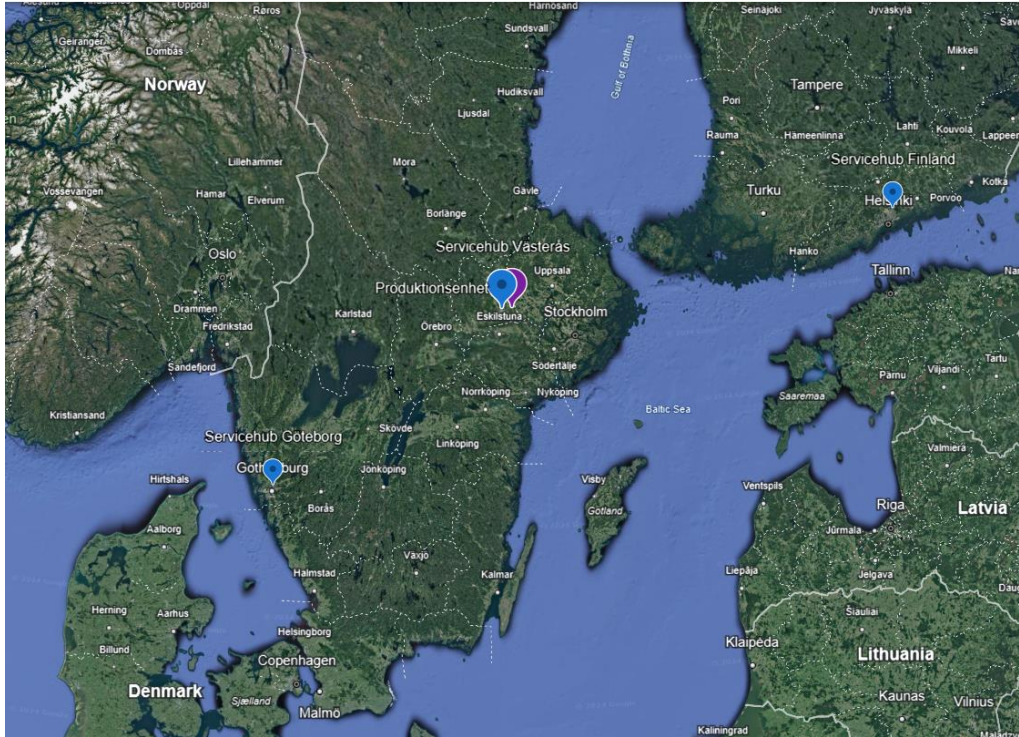
Paweł Okińczyc

**Seco/Warwick, Sales Engineer**

**Education:** University of Zielona Góra  
Institute of Mechanical Engineering

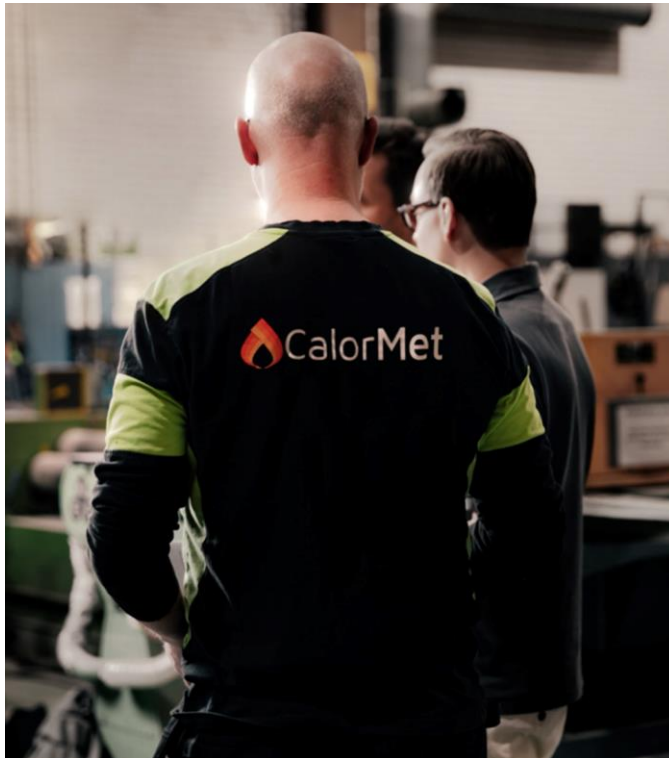
**Working experience:**  
Seco/Warwick

# CalorMet – In short



- Roots in **Sarlin** and Nordic Furnaces
- The company has delivered more than **2000 furnaces** and has **+90 years** of experience in industrial furnaces
- Annual turnover of approx. 120 miljoner
- About **40 employees**
- Manufacturing in Västerås
- **Two service centers** in Sweden
- Subsidiary in Finland
- **>300 customers** in the Nordic region
- Main owner Navigo Invest

# CalorMet – A full-service provider in industrial heat treatment



## **Spare parts**

Spare parts & consumables

## **Service**

Planned & on-demand

## **Project**

Renovation, modernization  
& sustainable solution

## **New Machines**

Furnaces & auxiliary equipment

# Seco/Warwick – In short



- 4 departments: VAC, CAB, RETECH, ATM
- 10 companies, 5 production hall
- About *600 employees in Europe*
- Manufacturing in Poland
- Standard and custom-designed equipment
- Around 50-60 vacuum furnaces per year
- R&D

# Demands and regulation

## European Green Deal

Reduce CO<sub>2</sub> footprint by 55% 2030 (compare by 1990) *Fit for 55*

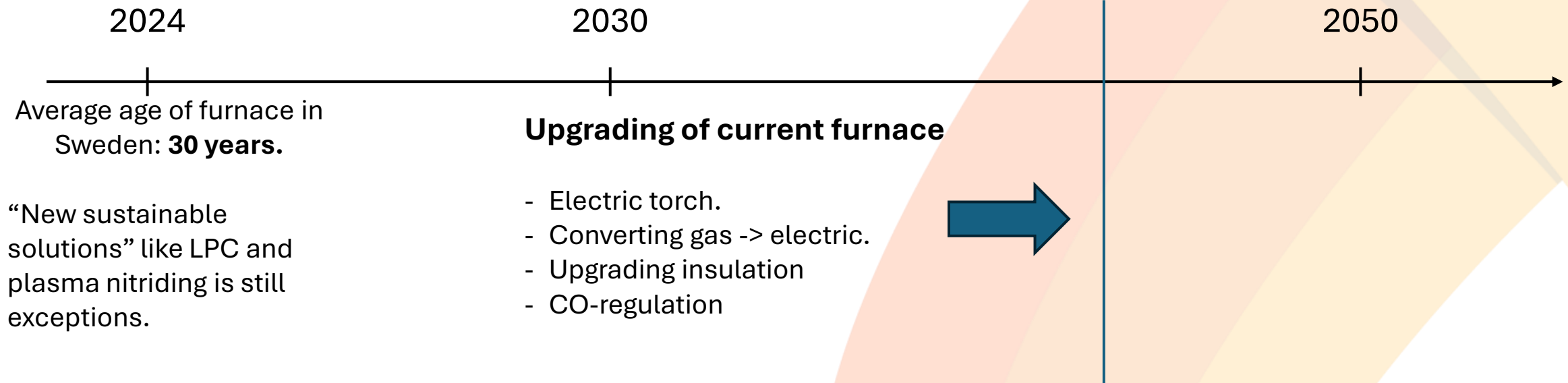
Net-zero greenhouse gas emissions across the EU by 2050.



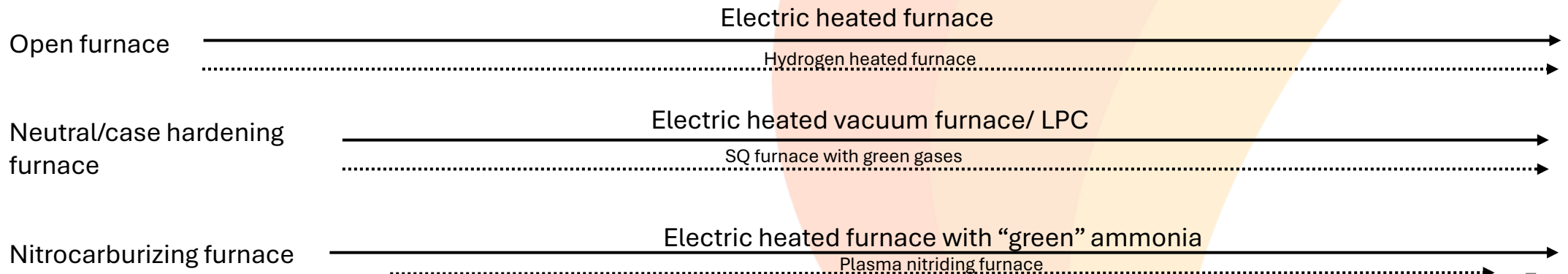
## Corporate Sustainability Reporting Directive, CSRD

CalorMet will start report according to CSRD during 2025.

# The furnaces now, 2030, and 2050



## New furnaces

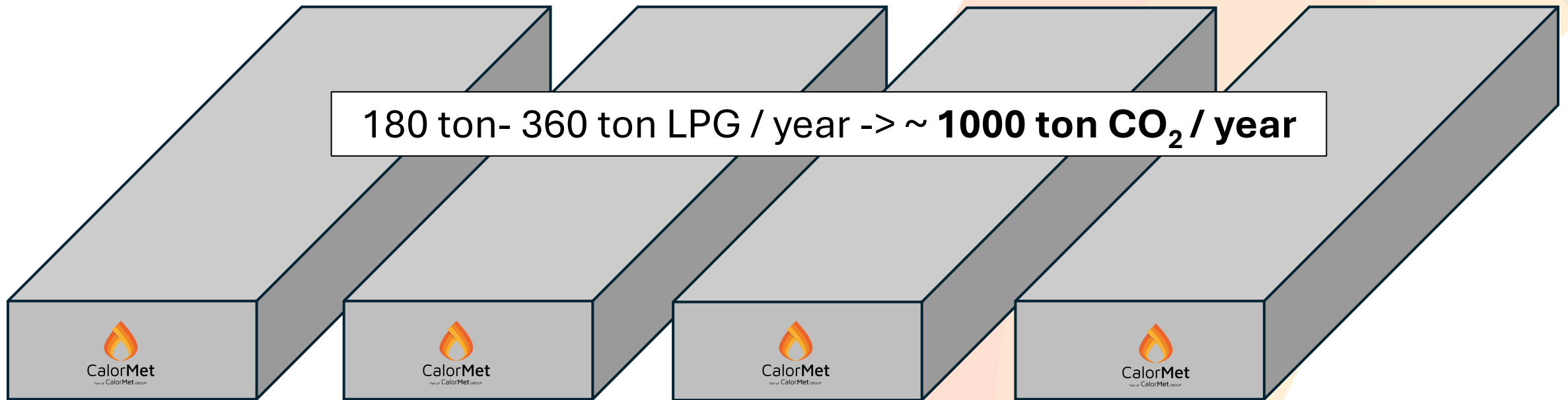


# Converting gas to electric heated furnace

**10.000 – 20.000-ton** steel heated to **1180°C** in **4 furnaces** (total furnace volume 800 m<sup>3</sup>).

Converted from LPG heated -> Electric heated

180 ton- 360 ton LPG / year -> ~ **1000 ton CO<sub>2</sub> / year**



# Handling of exhaust gas

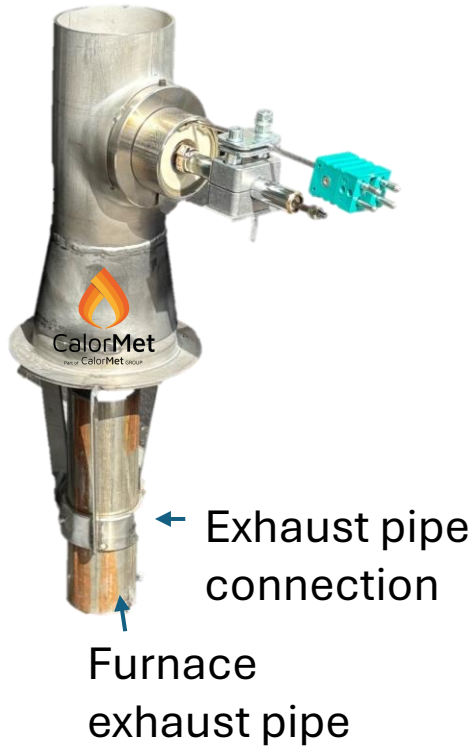
Ca **3 ton CO<sub>2</sub>** per year and burners



# Sustainable solutions – upgrading of current furnace

(Electric torches)

**Jerrex electric torch JET 1**



**Jerrex electric torch HP**



Minor change: NO need of recertifying CE-marking of the furnace.

When investing in a new LPC furnace

***SECO/WARWICK***

INVENTION MEETS RELIABILITY

# CO<sub>2</sub> EMISSION IN CARBURISING PROCESSES



**Atmosphere Carburizing:**

**15 m<sup>3</sup>/h ENDO atm = 6 kg/h CO<sub>2</sub>**  
**= 50 tons/y CO<sub>2</sub>**

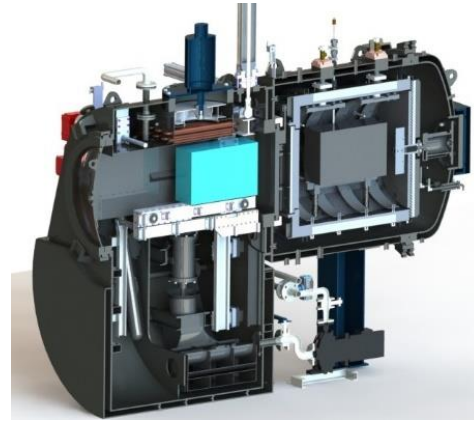
**Vacuum carburizing, LPC:**  
**Acetylene= 0,0 kg CO<sub>2</sub>/kg**



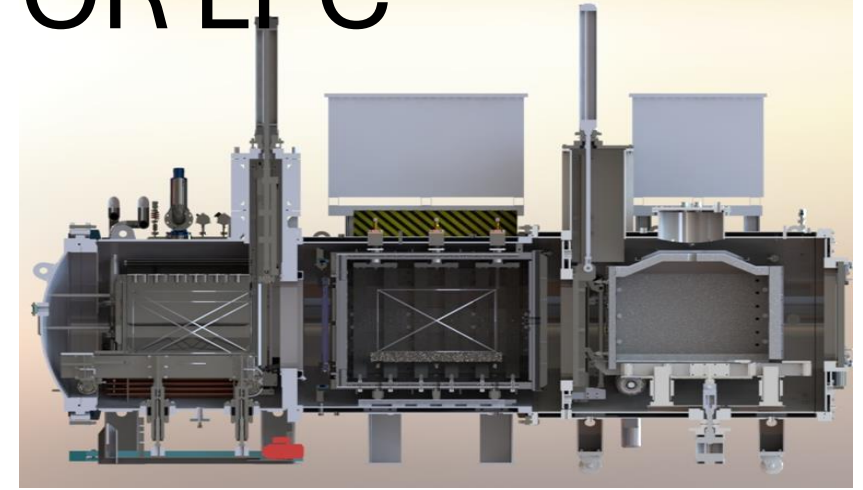
# POTENTIAL EQUIPMENT FOR LPC



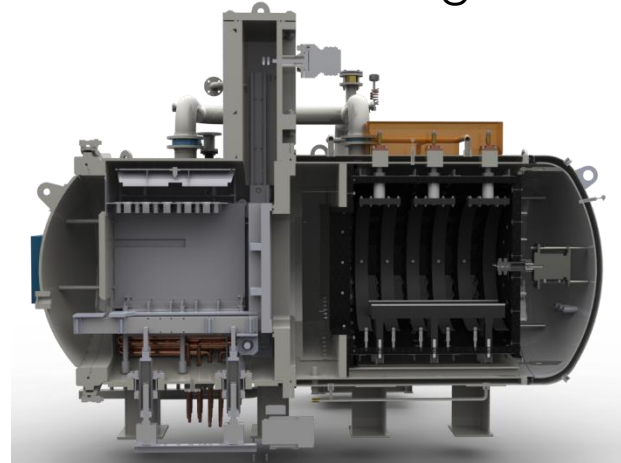
**Single chamber**  
**Gas** Quenching  
15 bar



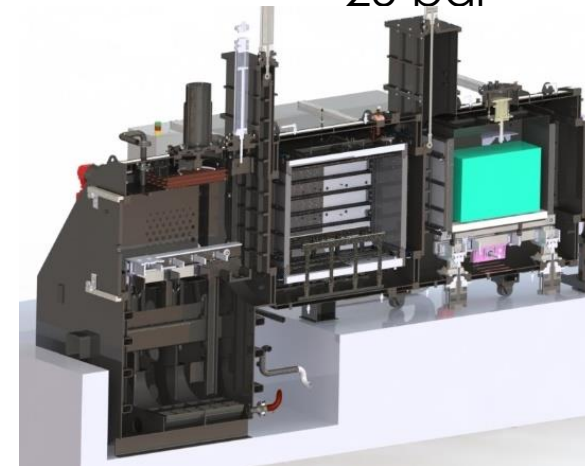
**Double quenching**  
**Oil** hardening



**Triple chamber**  
**Gas** Quenching  
25 bar



**Double chamber**  
**Gas** Quenching  
25 bar



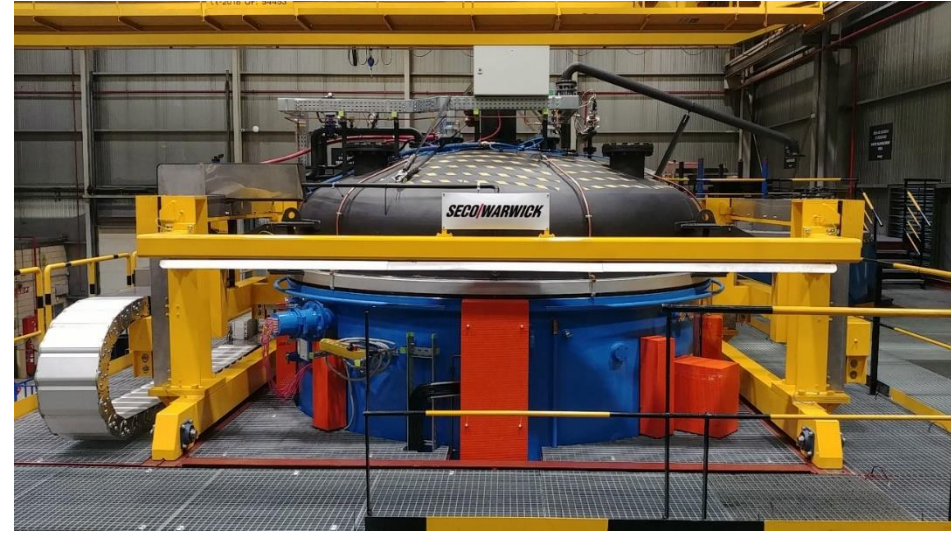
**Triple chamber**  
**Oil** hardening

# ENERGY SAVING- FUNCTIONALITIES

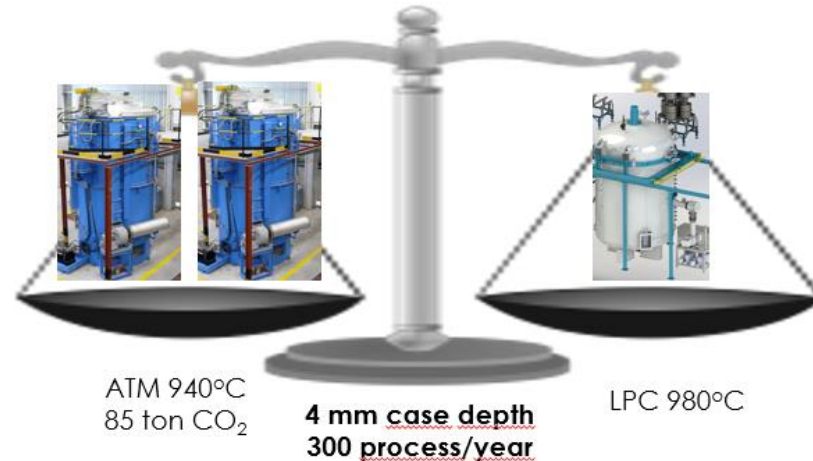
- THERMAL PACKAGE + LIGHTER EQUIPMENT ITEMS
- SWITCHING OFF PUMPS DURING PROCESSES
- HEATING & COOLING POWER CONTROL
- ELECTRICAL PACKAGE –MOTOR CLAS OF IE3 (PREMIUM)
- CONTROL PACKAGE- PROCESS OPTIMIZATION



# NEW TYPE OF PIT FURNACE



What is the difference?



# Summary

A green furnace is a furnace which are most likely electric heated with no or low consumption gas containing carbon.

There will be a transition in the heat treatment industry during the coming years.

CalorMet together with our partners, as a full-service provider have knowhow and experience to support the industry to succeed in reaching the CO<sub>2</sub>-target for 2030 and 2050 by:

- Upgrading current furnaces.
- Changing to equipment