

# TORREBEL

energia e ambiente  
energy and environment

CENTRO **2020**

PORTUGAL **2020**



**45**  
anos  
years

## 45 years of experience in Engineering, Manufacturing and Installing Thermal Energy Systems



1<sup>st</sup> BIOFMET Stakeholders' Workshop  
Workshop on measurements of solid and liquid biofuel key parameters

2-3 June 2022, IST, Lisboa, Portugal

- **History**
- **Facilities & Location**
- **Mission, Vision and Core Values**
- **Customers and Main Industries**
- **Customers Around the World**
- **Markets Expansion**
- **Certifications**
- **Products**
- **Value Proposition**
- **Challenges and Solutions**

# History

# TORBEL

45 anos  
years

1977

Started as brick molds manufacturer for the construction industry

In August, Torres & Belo, Lda. firm is registered



1984

Using its own technology, began production of hot water biomass boilers



1993

TORBEL trademark created



1994

Wood dryers manufacturing



2010 Founders sold off the company

2013 Major shareholder takes full ownership of TORBEL

2015 15 MW Fluidized Bed Furnace



1977

1980s

1990s

2000s

2010s

2020s

2022

1978

Industrial aspiration and dedusting systems for the wood industry



1988

Under license of VYNCKE NV (Belgium) started to manufacture boilers for this recognized brand worldwide



2016

CSC, known thermal oil boilers and moving grate furnaces manufacturer, joined TORBEL group



2018

Steam Boilers Commissioning

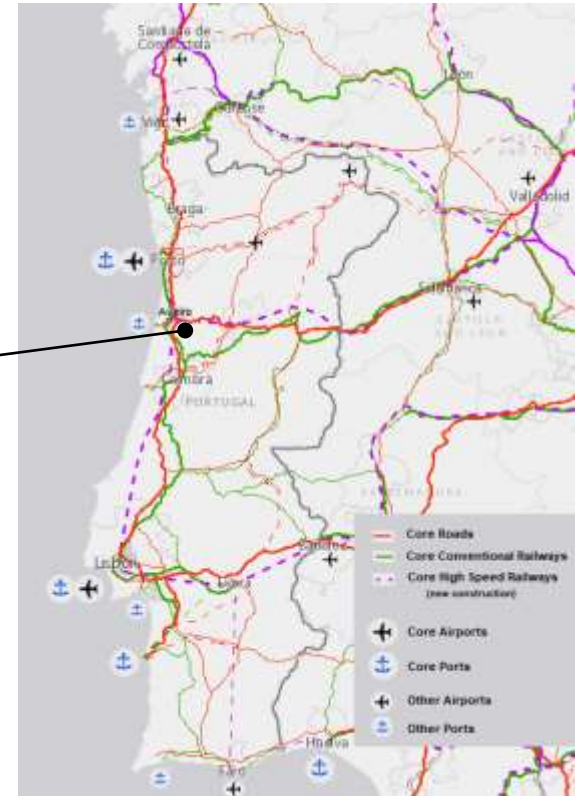


# Facilities & Location

45 anos  
years

- 14.500 m<sup>2</sup> of which 7.300 m<sup>2</sup> are occupied by industrial and administrative buildings
- Privileged location

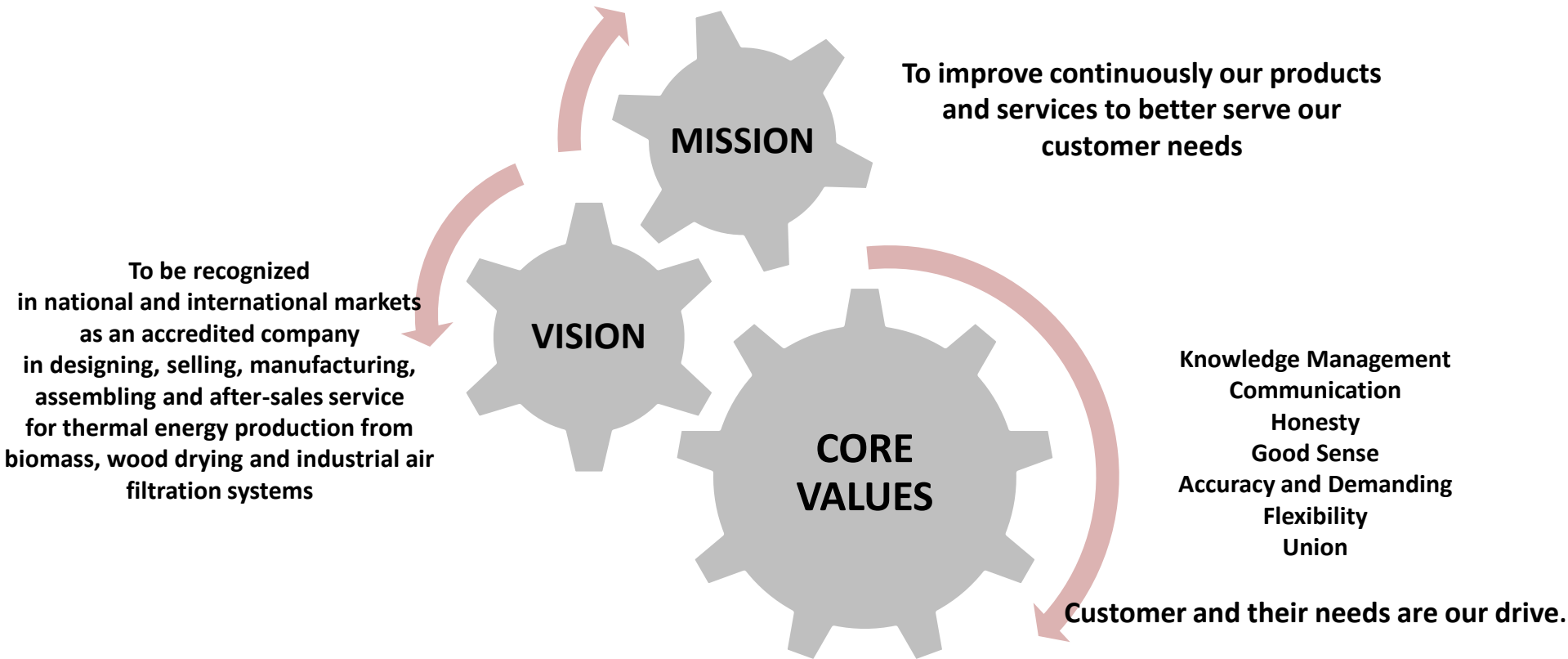
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Adapted from TENTec, EU (2022)



TORBEL



# Customers and Main Industries

45 anos  
years



Wood



Foundry



Food



Ceramic



Agriculture



Glass



Metalworking



Shoes



Cement



Cork



Tanneries



Plasters



Paper



Livestock



Textile

**TORBEL**

Since the beginning, TORBEL exports industrial biomass boilers and other systems to the 4 continents

- Portugal
- USA
- Mexico
- Gabon
- D. R. Congo
- Angola
- Chile
- Russia
- Poland
- France
- Spain
- Morocco
- Thailand
- Mozambique
- Brazil
- Venezuela
- Martinique
- Finland



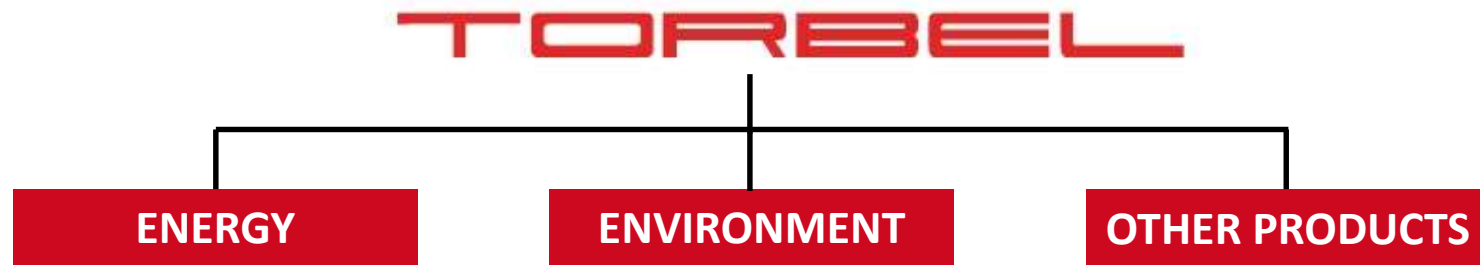


## **TORBEL seeks markets expansion through local partners, being active in:**

- France
- Spain
- Latin America (Spanish Speaking)
- USA and Canada
- UK
- Brazil

## **New markets:**

- Turkey – market being followed closely
- Eastern Europe
- Others



## ENERGY

### Boilers

Biomass  
combustion

Energy  
recovery

Furnace

Hot air  
generator

Hot Water

Thermal Fluid

Steam

VB

HB

VT

LMT

LMR

LMSF

NM

VRQ

CV

#### Legend:

|      |                                     |
|------|-------------------------------------|
| VB   | Hot water – vertical boiler         |
| HB   | Hot water – horizontal boiler       |
| VT   | Vertical boiler                     |
| LMT  | Horizontal boiler                   |
| LMR  | Horizontal boiler – energy recovery |
| LMSF | Horizontal boiler - bottomless      |
| NM   | Horizontal boiler > 2MW             |
| VRQ  | Quick steam generator               |
| CV   | Steam generator                     |

## ENVIRONMENT

### Aspiration & Dedusting Systems

Bag Filters

Cartridge  
Filters

Cyclofilters

Hydrofilters

Cyclones

## Hot water boiler

Thermal Output: 200 kW – 5 MW\*

Biomass, liquid or gaseous fuel



## Thermal oil boiler

Thermal Output: 350 kW – 7 MW\*

Biomass, liquid or gaseous fuel



## Steam boiler

Output: up to 24 bar\*

Biomass, liquid or gaseous fuel



## Hot air generator

Thermal Output: 200 kW – 450 kW\*

Biomass



\* Higher by request

## Fixed grate furnace

Thermal Output: 200 kW – 5 MW\*

Biomass



## Fluidized bed furnace

Thermal Output: 1MW – 15MW\*

Biomass and waste



## Moving grate furnace

Thermal Output: 300 kW – 25MW\*

Biomass



\* Higher by request

**Bag filter, cyclones**



**Cartridge filter**



**Cyclofilter**



**Chemical filter**



**Hydrofilter**



Wood dryers



Silos and pneumatic transport



Moving floor



Screw conveyors



Special systems





# 2,9 MW Energy System, Tomato Production, Portugal

45 anos  
years



**TORBEL**

# 4,6 MW Energy System, Sawmill Industry, Spain

45 anos  
years



**TORBEL**

# 800 kW Thermal Oil Boiler, Metallurgical Industry, France

45 anos  
years



**TORBEL**

# 2,3 MW Thermal Oil Boiler, Services Industry, Portugal

45 anos  
years



**TORBEL**

# 2,3 MW Thermal Oil Bifuel Boiler, Cork Industry, Portugal

45 anos  
years



**TORBEL**

# 15MW Fluidized Bed Furnace, Pellets Industry, USA

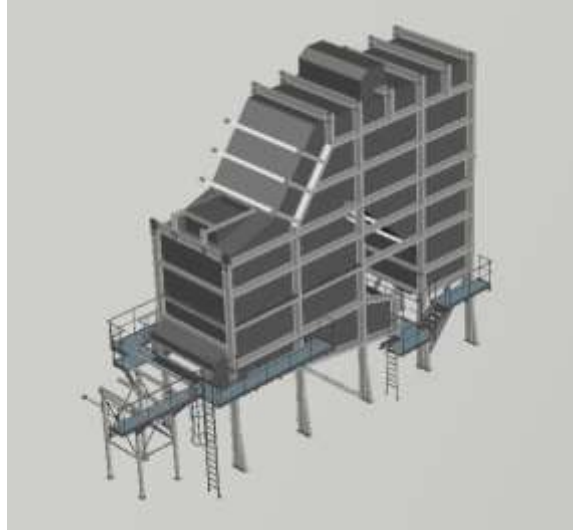
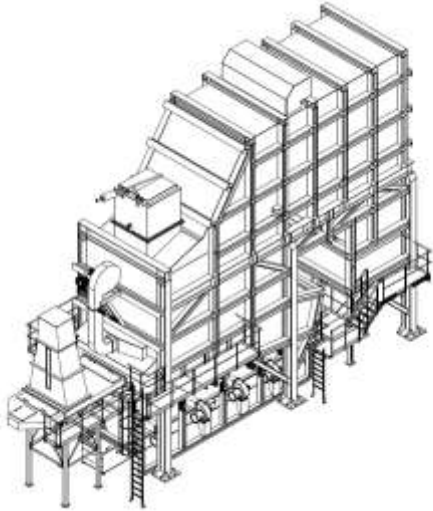
45 anos  
years



**TORBEL**

# Moving grate

45 anos  
years



**TORBEL**

# 14MW Moving Grate Furnace, Pellets Industry, Portugal

45 anos  
years



**TORBEL**



# 14MW Moving Grate Furnace, Pellets Industry, Portugal

45 anos  
years



**TORBEL**

# Dedusting System, Water Taps Foundry, Portugal

45 anos  
years



**TORBEL**

# Dedusting System, Cements Industry, Portugal

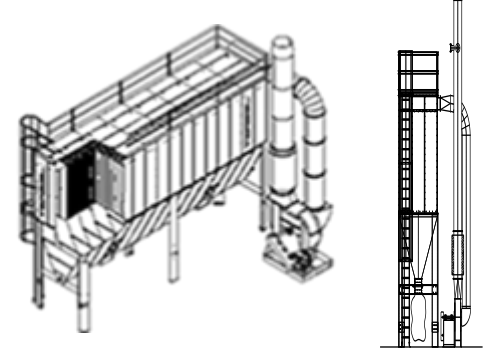
45 anos  
years



**TORBEL**

# Dedusting System, Composites Industry, Portugal

45 anos  
years



**TORBEL**

# Dedusting System, Small Size Boilers Manufacturer, Portugal

45 anos  
years



**TORBEL**

# 400 kg/h Quick Steam Generator, Food Industry, Portugal

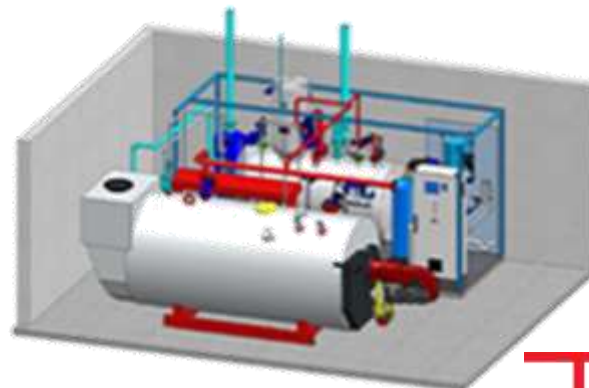
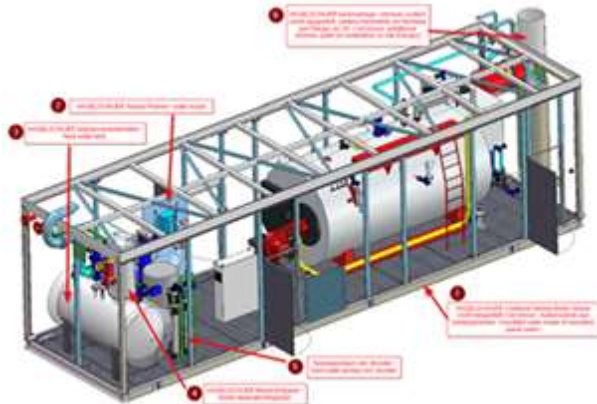
45 anos  
years



**TORBEL**



- Saturated steam generator
- Natural gas or fuel oil
- Water treatment modules
- Renting or buying



# 0,6 to 20 t/h Mobile Steam Generator

45 anos  
years

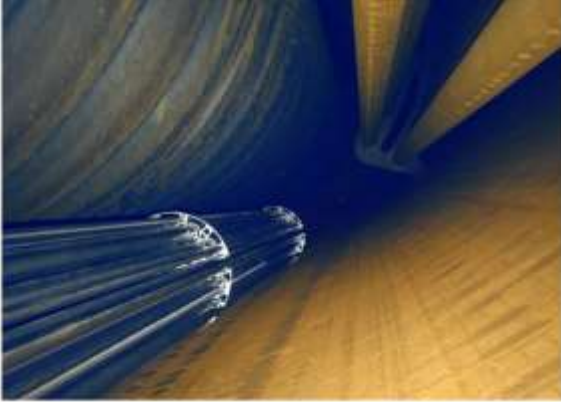


- Container / Skid
- Plug-in concept (ready-to-connect)
- Renting or buying



**TORBEL**





Electrical Resistance  
Heating Elements

- Combination of gas-fired boiler system and electrical heating energy
- Continuous Steam Generation



Gas burner



- Ready-to-connect
- Compact / One skid
- Modular parts
- Customer-specific requirements



Water Treatment Modules



Complete Feed Water Treatment Modules  
to Boiler connection

## Developing, manufacturing and installing

Industrial air filtration systems,  
for industrial processes

**Over 40 years of experience**



Industrial thermal energy production  
systems from biomass fuels

**Over 35 years of experience**



Wood drying kilns, for the wood industry

**Over 25 years of experience**



enable TORBEL to offer customized solutions, attending to very specific customers' needs, with a robustness and a reliability proved by systems delivered for many years.

- **Technical Expertise and Experience**  
Decades in business dealing with a vast variety of industries
- **Customization Capacity**  
Taylor made (nothing is limited to a technical sheet)
- **Construction Quality**  
Heavy duty equipment, detail focused construction, lasting above the average of the European Competition
- **Quick Delivery Response**  
Within weeks instead of months as the majority of the competition
- **Low Price**  
50% cheaper than equivalent German solutions, 30% cheaper than Italian equivalent solutions

**Value for money – Probably the best in the market**

# Challenges we face on biomass systems design

45 anos  
years

- **Types of biomass**
- **Biomass variability**
- **Biomass size**



**BIOMASS  
FUEL SPECS**

**CUSTOMER**

- **Customer profile**
- **Customer activity knowledge**
- **Fuels used**

**EQUIPMENT  
REQUIREMENTS  
AND SPECS  
ADJUSTEMENT**

- **Biomass quality**
- **Feed water treatment and quality control**
- **Comply operation guidelines**
- **Proper Automation & Control settings**
- **Good maintenance and equipment cleaning**

**TORBEL**

## Fuel used will affect all process

- Design and engineering
- Manufacturing
- Assembly
- Process control
- After sales
  - Maintenance
  - Equipment cleaning
  - Fine tuning

**Overfire... Less is better**



Customer requirements: **Hot water boiler, 2MW**  
**Wood chips**

## What we need to know

- Biomass size: P31\* (wood chips' main fraction  $\leq 31,5\text{mm}$ )
- Moisture content: M30\* ( $M_{ar} \leq 30\%$ )
- Material density: BD150\* ( $\text{Bulk density}_{ar} \geq 150 \text{ kg/m}^3$ )
- Ash content: A3.0\* ( $A_d \leq 3,0\%$ )
- $\text{LHV}_d \geq 15\text{MJ/kg}$
- Ultimate analysis (C, H, N, S, O content)



## SELECTION and DESIGN of:

- Combustion chamber
- Heat exchanger
- Combustion Air ducts and fans
- Auxiliary components (e.g. moving floors, screw conveyors,...)
- Automation & Control programming and settings
- Filters – initially supplied or as a future option

\*according to ISO 17225-1 and ISO 17225-4



Online monitoring of:

**Moisture content**

**LHV**

Ash content

Mass flow

Biomass size

Impact on



- System flexibility for different types of solid biofuels
- Fuel consumption
- Combustion control - primary and secondary combustion air
- Feeding problems
- Energy Management and Energy Efficiency improvement
- Emissions Control

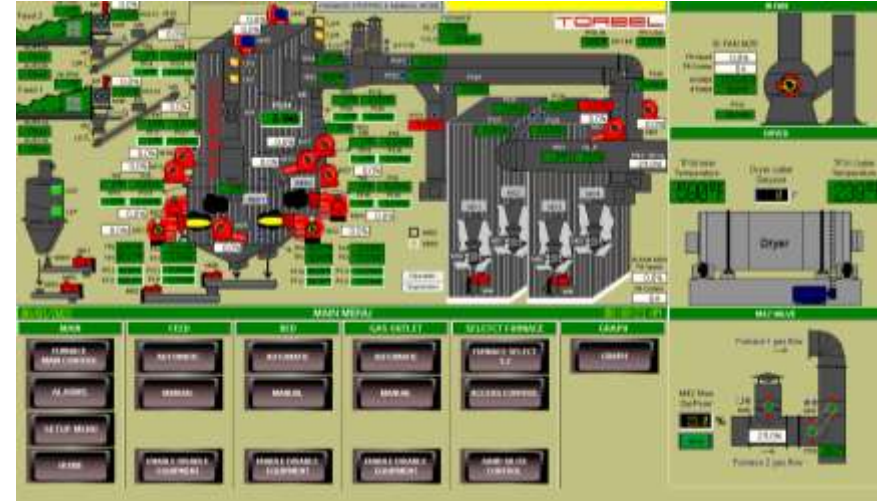


## Portugal, Spain and France markets

- Short information on biomass specs
- Biomass samples rarely provided
- Biomass heterogeneity

## USA market

- Biomass characterization is very important
- Available for early input when designing and engineering systems



Portugal to USA

## To overcome missing data about biomass characterization...

- We ask for biomass samples
- We design independent furnaces (~~more flexible to biomass variations~~)
- More demanding primary and secondary combustion air control

## In the future...

Solutions and devices for online accurate measurements and control of fuel specs



# Thank You

for Your Attention



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