



THE

NAVIGATOR

COMPANY





ROADMAP TO A CARBON
NEUTRAL COMPANY

-

New alternatives to reduce
CO₂ fossil emissions

June 2020



ROADMAP TO A CARBON NEUTRAL COMPANY

New alternatives to reduce CO₂ fossil emissions

- THE NAVIGATOR COMPANY
- ROADMAP 2035
- NATURAL GAS ALTERNATIVES

THE NAVIGATOR COMPANY

an integrated producer

TISSUE

130,000 tonne reels;
120,000 tonne finished
product

PAPER

1.6 M tonne of UWF
paper

ENERGY

2.5 TWh
electricity



R&D

Leader in the Production
of *Eucalyptus globulus*
clones

FOREST

110,000 ha of own
individually managed
forests

PULP

1.6 M t of pulp (BEKP)
(0.3 M market pulp)



EUROPEAN LEADER IN UWF

The Company is the largest manufacturer in Europe of uncoated woodfree paper (UWF) for printing and writing, the category that includes office paper, and the 6th largest producer worldwide.

The Navigator Company is also the leading European manufacturer of bleached eucalyptus pulp (BEKP).

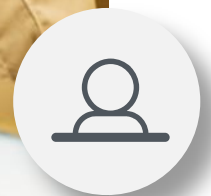
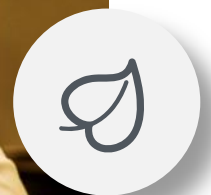
Annual turnover of around 1.6 billion euros, with foreign sales of 1.3 billion euros

91% of the Company's sales of paper, pulp and tissue are sold to 130 countries, across all five continents

The Company is the third-largest Portuguese exporter, representing approximately 1% of Portugal's GDP and 2.4% of national goods exported, and generates the greatest National Value Added.

Many of the resources that the Company uses are produced in Portugal and purchased from over **7,000 suppliers*** across all areas of the **Portuguese economy**





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PORTUGUESE NAVIGATOR
BRAND, **THE GLOBAL BEST-
SELLER** IN THE PREMIUM
OFFICE PAPER SEGMENT

The Company manages around **110
thousand hectares of woodlands**
and is Portugal's leading producer of
plants.

Its forest management has been
certified by **the PEFC (PEFC/13-23-
001 and by the FSC® (FSC -
C010852)**

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The company has a direct workforce
of **3,282 skilled employees**, as well as
indirectly generating a much larger
number of jobs, in particular in the
forestry, logistics, engineering services



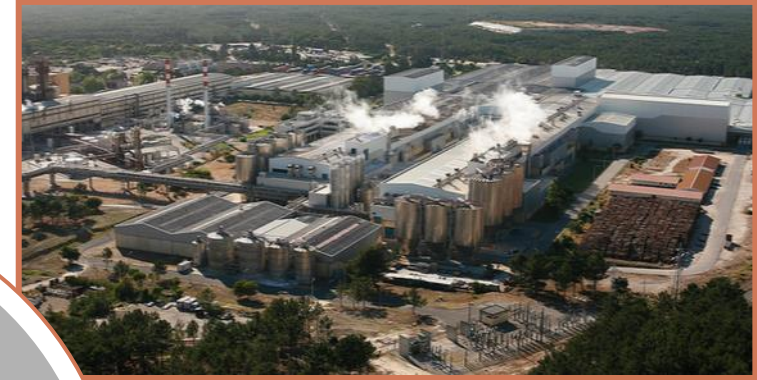
A marca da
gestão florestal
responsável



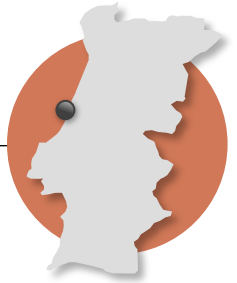
INDUSTRIAL FACILITIES



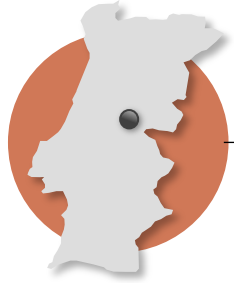
AVEIRO
Pulp (Market) – 350,000 tAD
Tissue Paper – 70,000 t reels; 55,000 t
converting



FIGUEIRA DA FOZ
Pulp (Integrated) – 650,000 tAD
Paper – 790,000 t



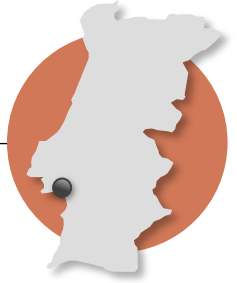
**The Navigator
Company**
operates 4 industrial
units on an
international scale,
using sophisticated
technology



VILA VELHA DE RÓDÃO
Tissue Paper – 60,000 t reels;
65,000 t converting



SETÚBAL
Pulp (Integrated) – 550,000 tAD
Paper – 775,000 t



ROADMAP TO A CARBON NEUTRAL COMPANY

In accordance with the Paris protocol and the National Roadmap to Carbon Neutrality, The Navigator Company has establish and ambitious goal to be carbon neutral in 2035



The **Paris Agreement** , where 195 countries undertake to limit global warming bellow 2°C from 2020 and **reduce fossil CO₂ emissions by 40% until 2030.**

The EU has establish a goal for a **climate-neutral Europe by 2050.**



Portugal, in the same framework, created the **Roadmap for Carbon Neutrality**, where will be established alternative, economically viable and socially acceptable trajectories, to reach **carbon neutrality until 2050.**



The Navigator Company's goal is more ambitious and we're aiming to achieve **carbon neutrality until 2035.**

ROADMAP TO A CARBON NEUTRAL COMPANY

The Navigator Company is committed to implement changes in its productive processes in order to minimize the use of fossil fuels, leading the company to CO2 neutral emissions until 2035.



Objective 1

100% of electricity production from renewable sources



Objective 2

Reduce emissions with cleaner technologies implementation



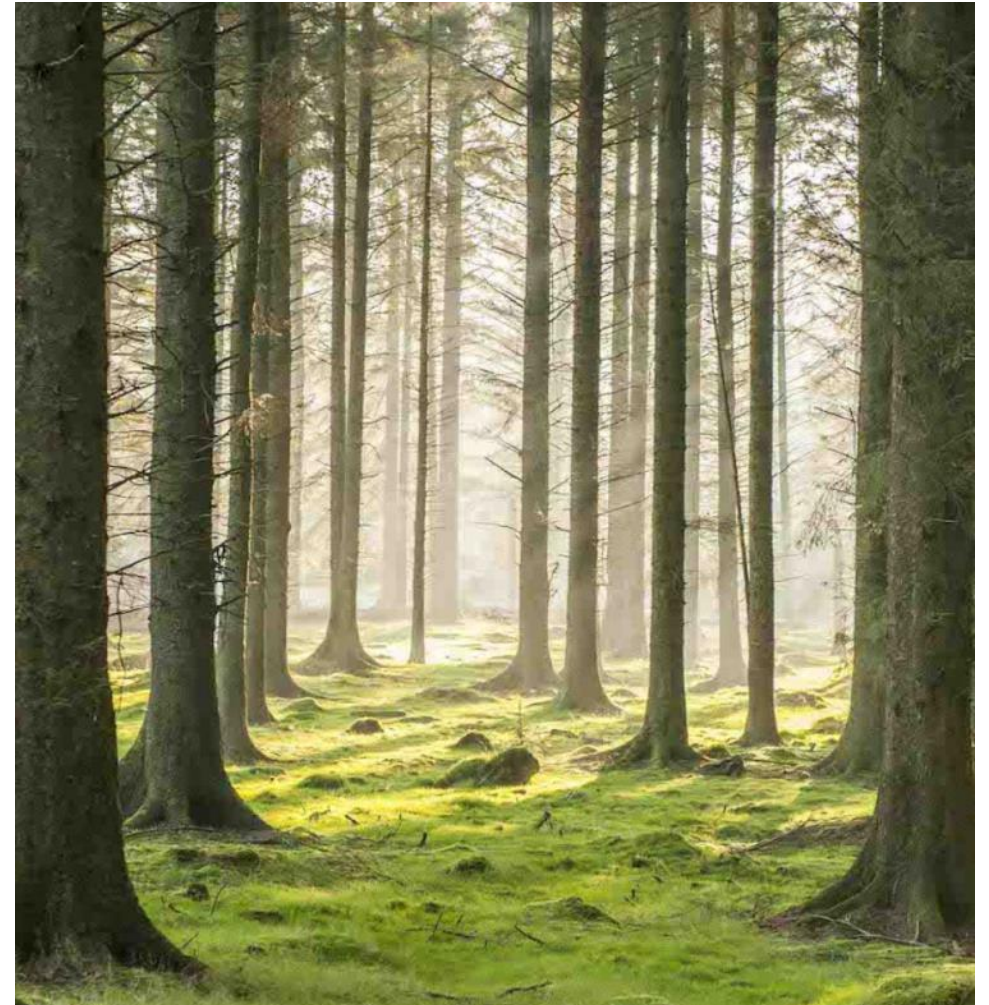
Objective 3

Reduce 15% specific energy consumption until 2025, based on 2015



Objective 4

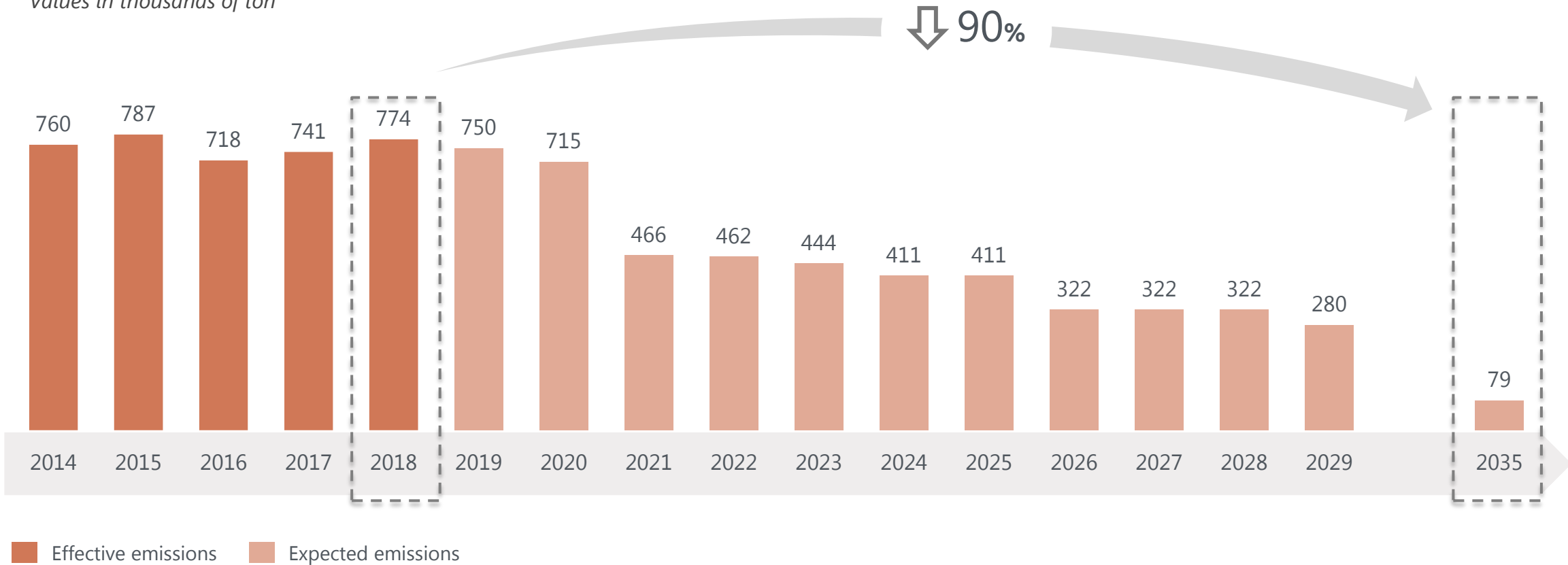
Offset of emissions that are not able to eliminate



CO₂ EMISSIONS

The successive measures will reduce 90% CO₂ emissions from 774 ktCO₂ in 2018 to circa 79 ktCO₂ in 2035. This residual value will be subject to offset.

Values in thousands of ton

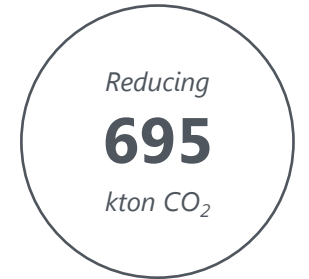
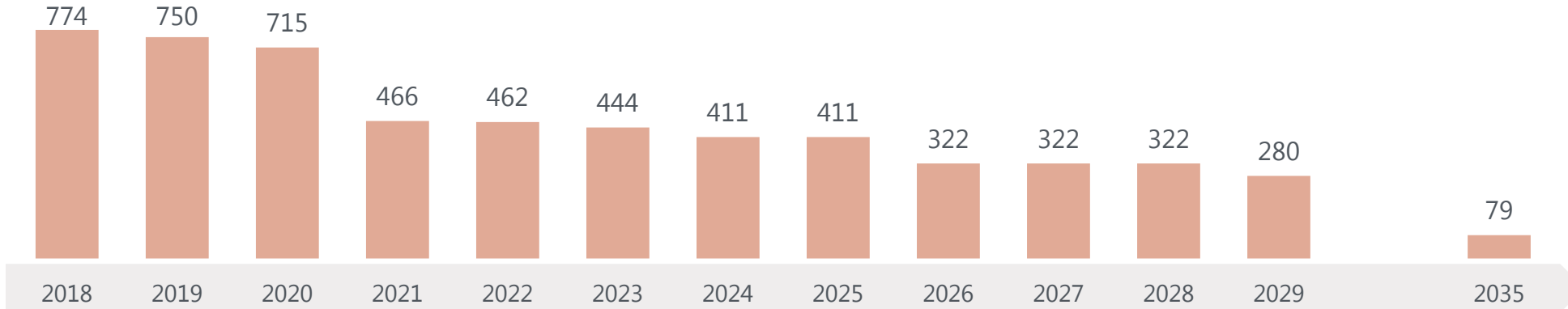




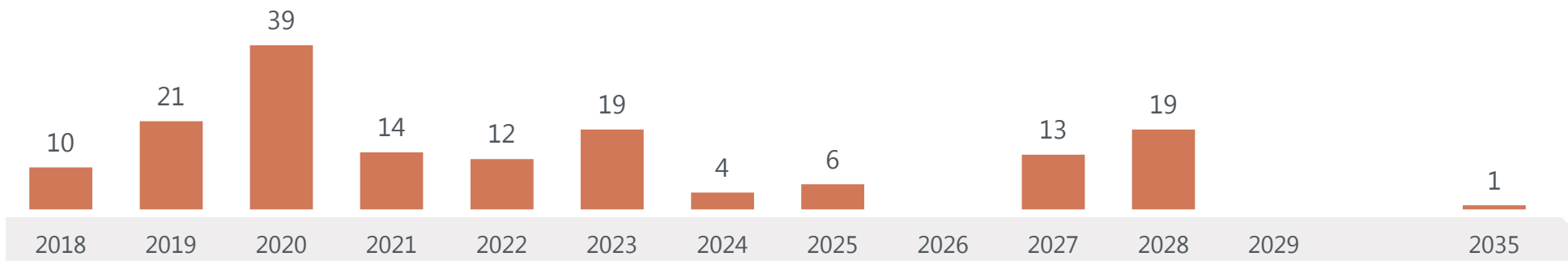
EMISSIONS REDUCTION VS CAPEX FORECAST

The range of measures to be implemented will allow reducing in circa 695 kton CO₂ emissions, from 2018 to 2035. Will be necessary 158 M€ CAPEX to achieve that goal.

CO₂ Expected Emissions
Values in thousands of ton

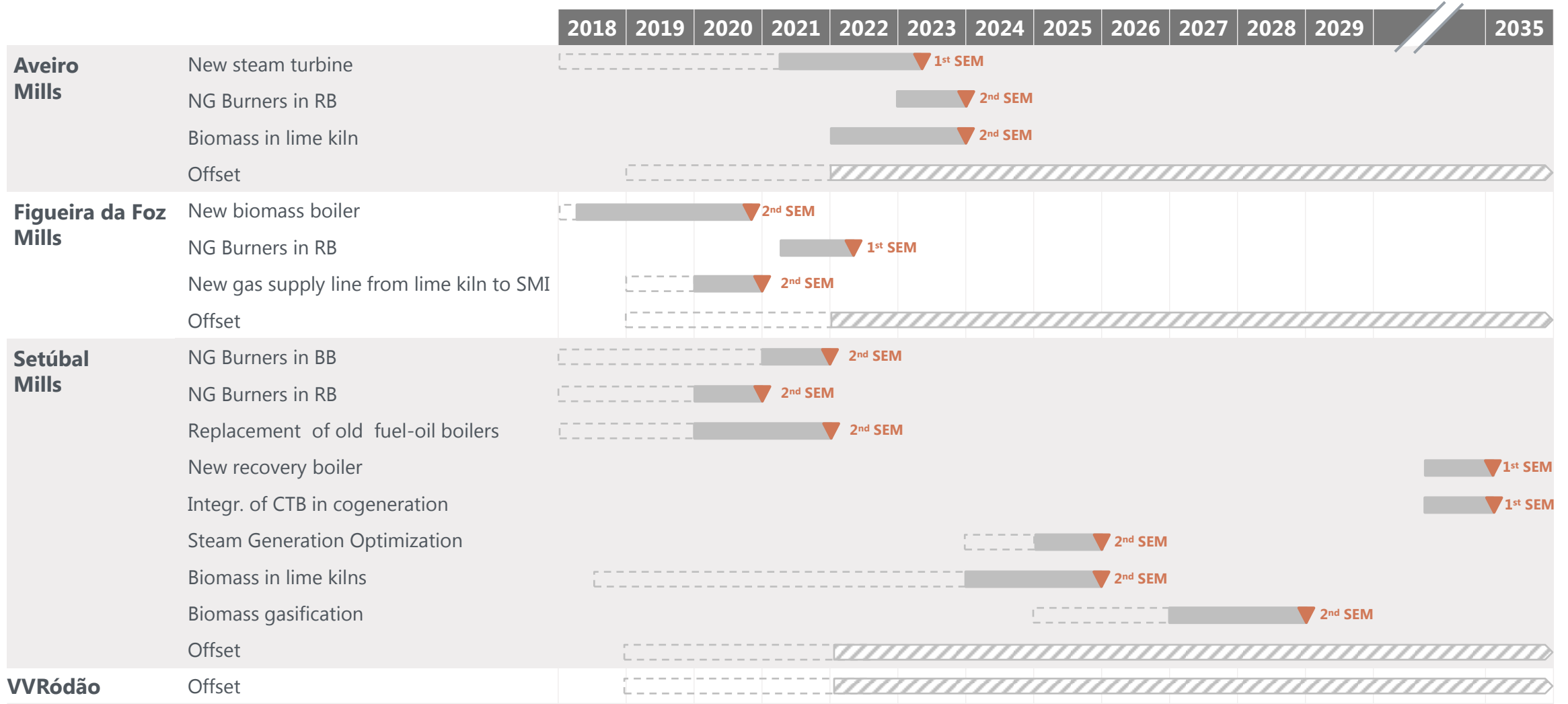


CAPEX
Values in millions eur



ACTION PLAN

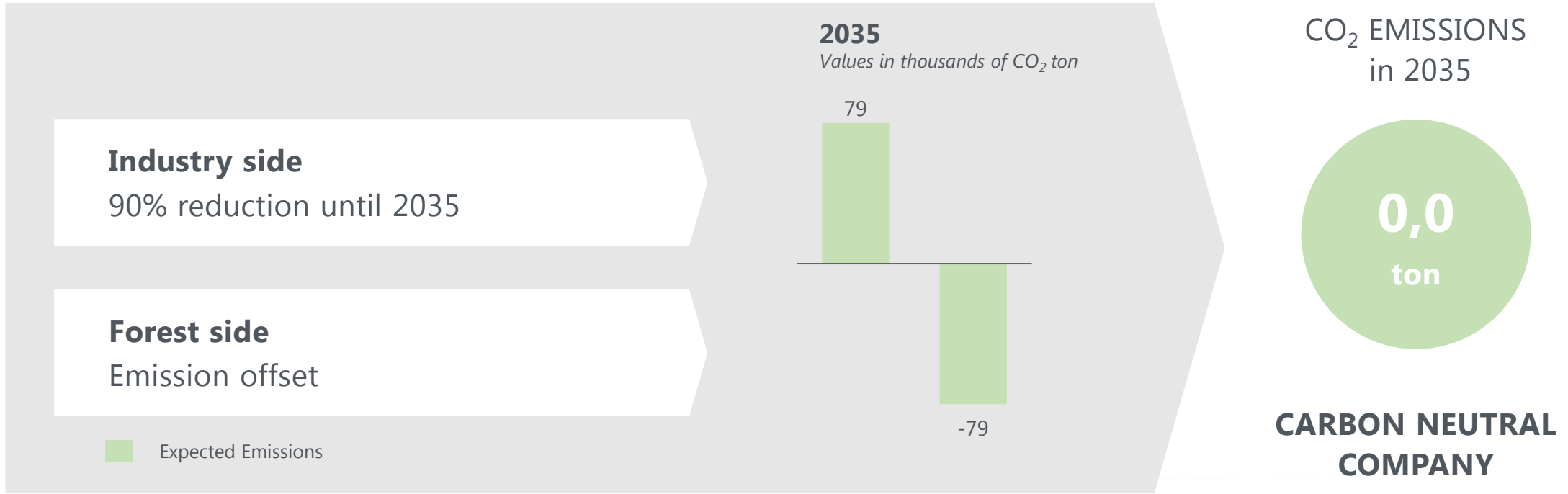
An action plan implementation is foreseen, with emphasis on a new biomass boiler, a new cogeneration, lime kilns conversion to use biomass and replacement of fuel with natural gas.



Study Phase Implementation In continuous

CO2 EMISSIONS OFFSET

Despite all possible emission reductions predicted, 79 kton of CO2 remain. For these, we will rely on our forest to offset the yearly remaining emissions, in order to achieve carbon neutrality.



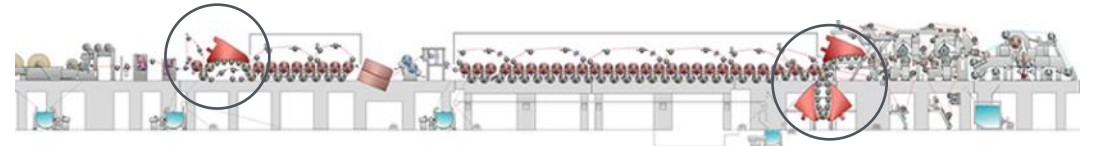
IMPORTANCE OF NATURAL GAS ALTERNATIVES

High availability, clean combustion and lower emissions are the natural gas characteristics that difficult its substitution in The Navigator Company's pulp and paper mills, ...

Remaining types of natural gas consumers, whose emissions will be offset and key characteristics

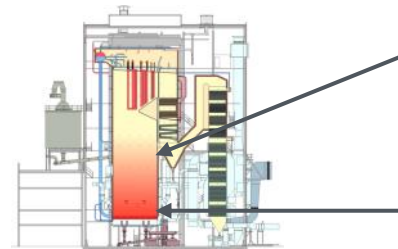
PAPER MACHINES

- Clean combustion without contaminants
- Impingement drying temperatures above 250°C



START-UP and BACKUP BURNERS

- Fast response/startup
- High availability



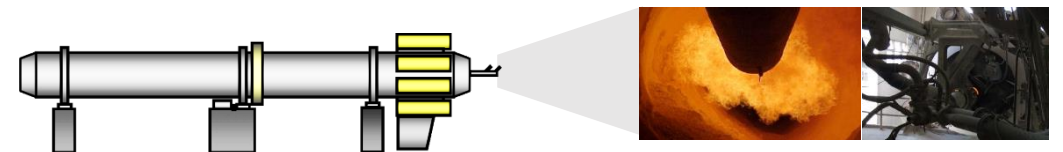
LOAD BURNERS

START-UP BURNERS



LIME KILN

- In one of our kilns, its geometry is only suitable to natural gas or fuel oil
- Biomass conversion not possible without lime production capacity loss

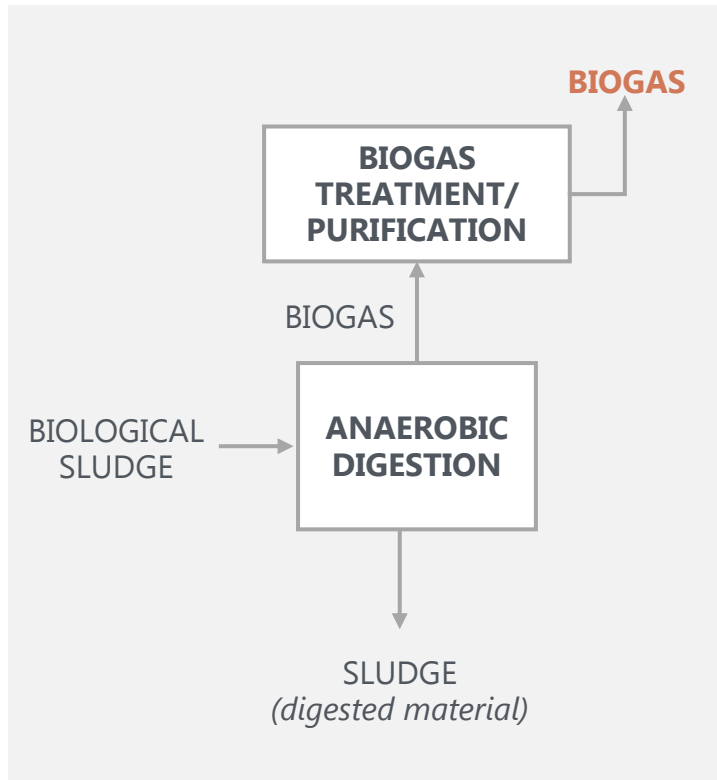


IMPORTANCE OF NATURAL GAS ALTERNATIVES

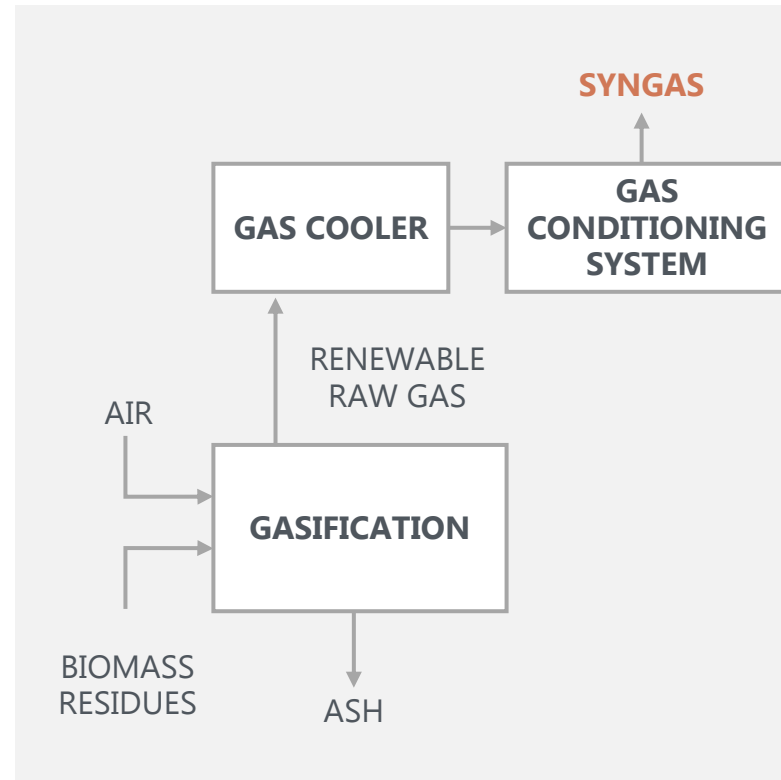
... However we're evaluating alternatives for it's replacement with similar characteristics renewable fuels, such as biogas, syngas from biomass gasification or power-to-syngas technologies.



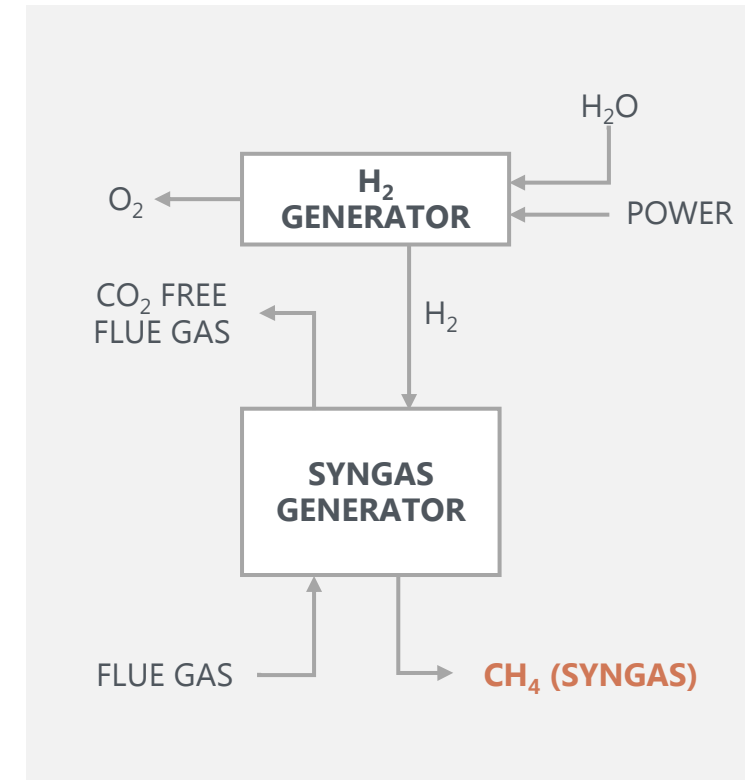
BIOGAS



BIOMASS GASIFICATION



POWER - TO - SYNGAS



IMPORTANCE OF NATURAL GAS ALTERNATIVES

All of the different technologies have positive and negative aspects. In the end the final solution can be one of these alternatives or a mix of technologies, for example a combination of biogas and power-to-syngas solutions



BIOGAS

- ✓ Proven technology, already implemented in several pulp mills
- ✓ Operation track record available.
- ✓ Suppliers with operation and maintenance capabilities
- ✗ Biogas production depends on pulp and paper processes stability
- ✗ Biogas needs to be cleaned in order to avoid contamination issues (H₂S)



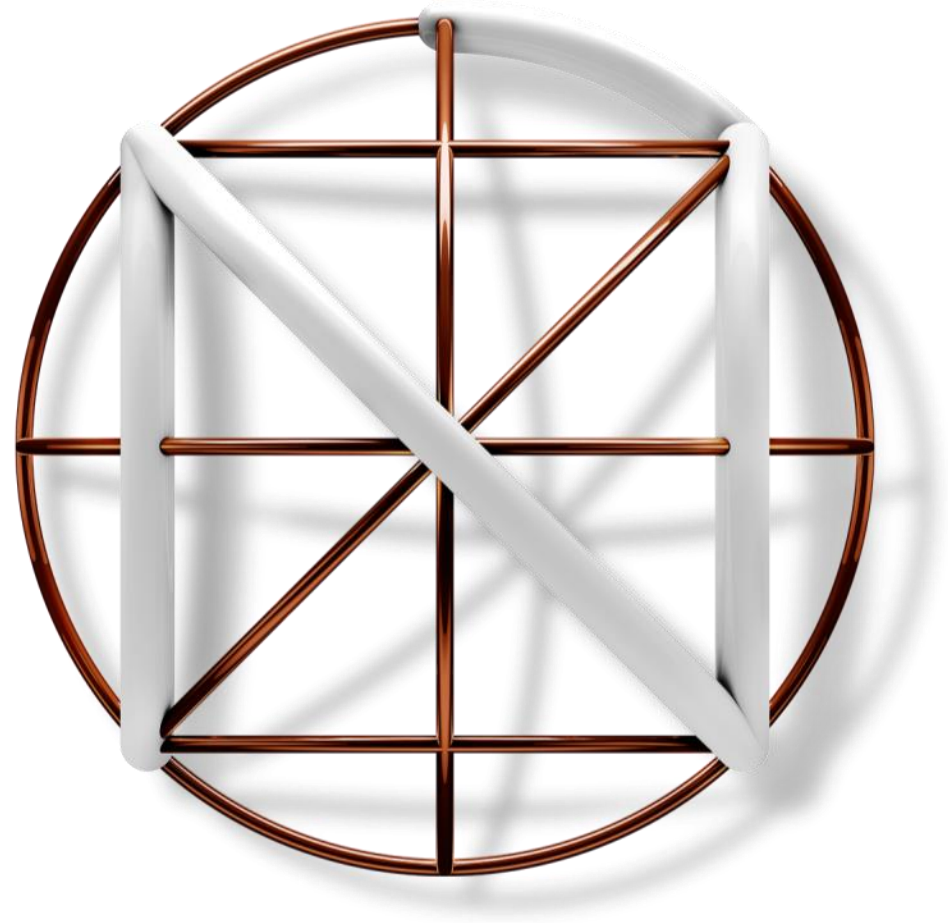
BIOMASS GASIFICATION

- ✓ Gasification plants integrated in pulp mills that consume bark and wood residues and produce gas to lime kilns
- ✗ Not suitable to eucalyptus bark due to its difficult handling, which has impact on feedstock availability
- ✗ Requires long shutdown and startup times (days) when maintenance works are necessary



POWER – TO – SYNGAS

- ✗ In early stage of development and implementation
- ✓ Flexible H₂ generation that allow power variation in order to reduce renewable generation variability
- ✓ O₂ consumption in pulp mill processes (e.g. bleaching and delignification)



THANK YOU