2026 PCA INTERNATIONAL CONFERENCE
SEPTEMBER 13–15 · LISBON

Pine Chemicals Industry

Global overview and Trends

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SAS Fonterines Consulting

Y2026: The State of Play

MACRO & GEOPOLITICS

Uncertainty — driven by geopolitics (Middle East, Russia/Ukraine) and US tariffs

Pulp demand — still weak

SUPPLY & CAPACITY

CTO fractionation — rates improving

CTO supply — tightening

De Ridder — Mainstream Pine Products has acquired the CTO fractionation site from Ingevity

MDF turpentine — on stream by year end

DEMAND

Rosin & rosin esters — demand lifted by the Middle East crisis

TOFA / CFA — sustained demand across biofuels and chemicals

Turpentine — sustained demand despite high prices

Geopolitics and weak pulp demand set the backdrop — tightening CTO supply meets resilient downstream demand

Portugal: A Long History of Pine Chemicals

13th century

Kings D. Sancho II, D. Afonso III and D. Dinis I create the Leiria pine forest to shield the city from the sand dunes

1475

The Earl of Vila Real is licensed to operate the Leiria pine forest and collect rosin extracts, mainly for naval stores

1790

At the request of the Marquis of Pombal, the first ovens (Ragusa/Sicily type) are installed to produce pine resin; replaced in 1822 by cylindrical metal ovens

Late 19th century

Tree-tapping techniques are imported from the South of France

1817–1890

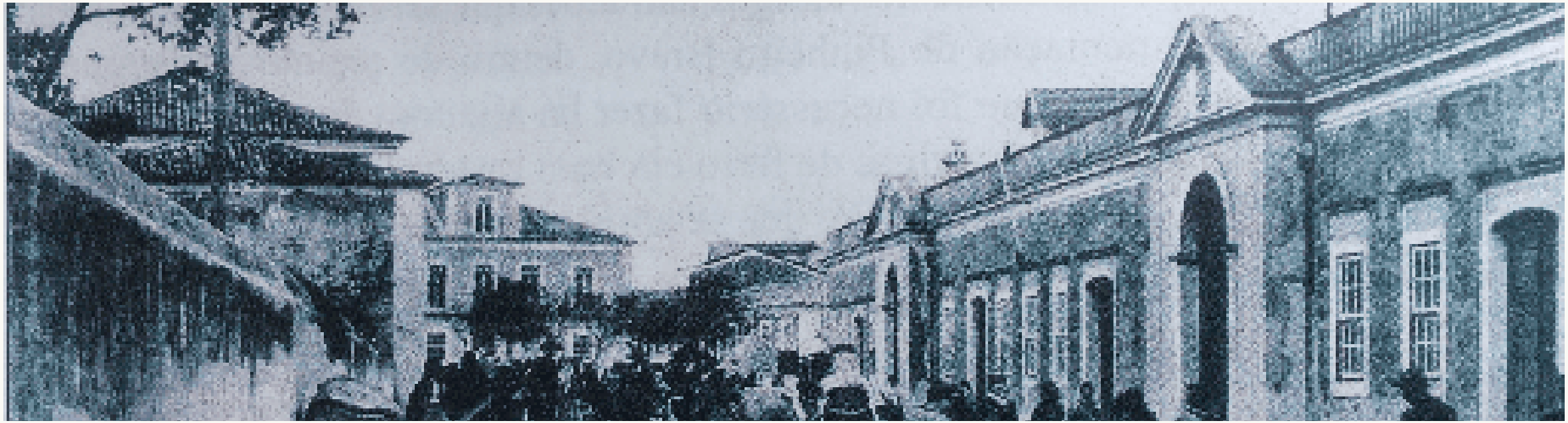
Sebastião Bethamio de Almeida (1817–1864), chemistry teacher, and Bernardino José Gomes (1817–1890), Forest Authority of Marinha Grande, founded the Portuguese rosin industry

1861/1862

The first modern plant is built in Marinha Grande (Leiria) to produce rosin and turpentine

Eight centuries of Portuguese pine: from royal forest planting to the first modern rosin and turpentine plant

The First Portuguese Rosin Factory (1861–1914)



The first modern Portuguese rosin and turpentine plant · Marinha Grande, Portugal

1861

Foundation

of an organised industrial site.

1880s

Expansion

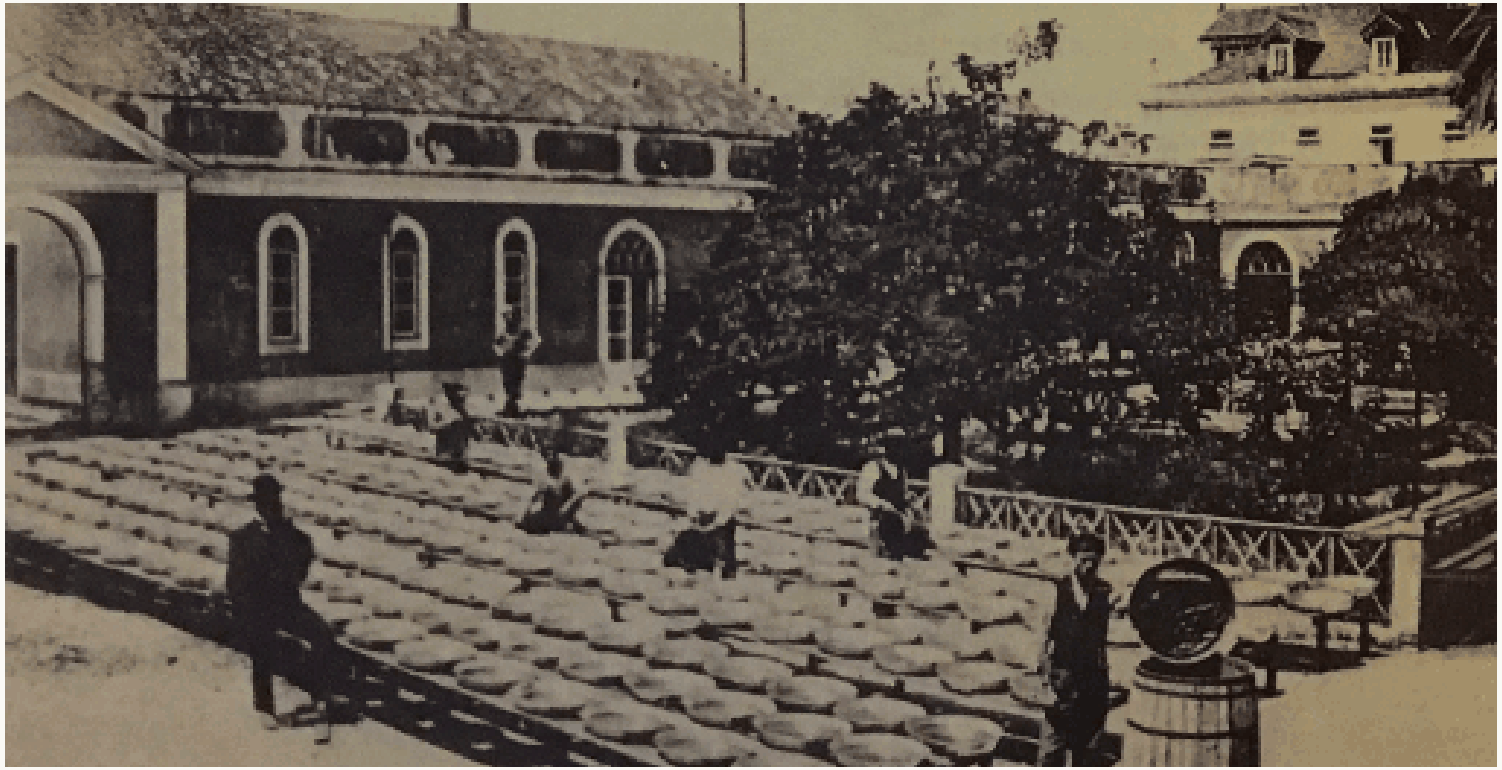
Pine tapping structures the forest economy of Leiria.

1914

Plant closure

But the model spreads across the Portuguese pine belt.

The First Portuguese Rosin Factory (1861–1914)



THE SITE

Marinha Grande

Leiria · Portugal

1861–1914

The first modern Portuguese rosin and turpentine plant

An entirely manual industry, organised around the forest season

The First Portuguese Rosin Factory - Today

THE SITE TODAY

Today a contemporary art museum

Marinha Grande

Leiria · Portugal

The birthplace of Portuguese rosin has become a place of culture

28 JANUARY 2026 · PORTUGAL

Storm Kristin

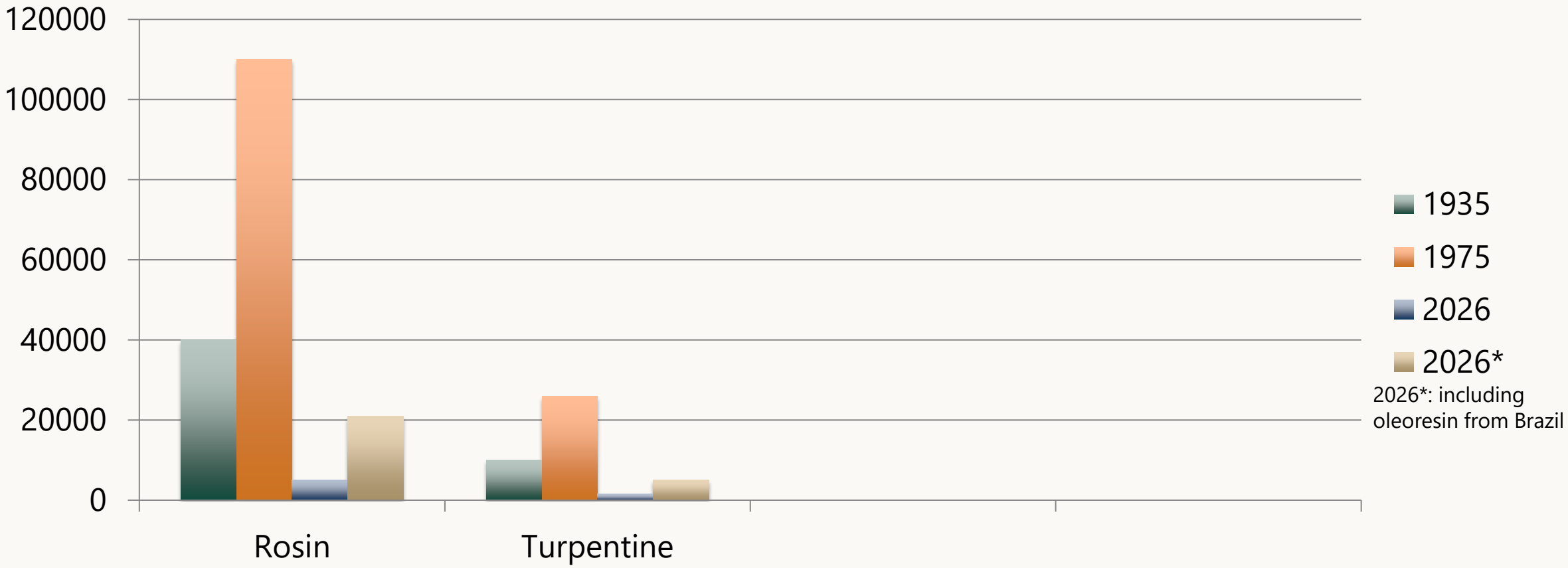
20%

of Portuguese pine oleoresin production affected

Climate risk is now a supply variable, not a footnote

Aftermath of the storm in the maritime pine forest

Gum Rosin and Turpentine Production in Portugal



Portugal: A Major Producer of Rosin Derivatives

5

main rosin upgrading plants

~110 KT

total capacity per year

IMPORTED FEEDSTOCK

40 KT / year

Tall oil rosin imported from Finland and Sweden

25 KT / year

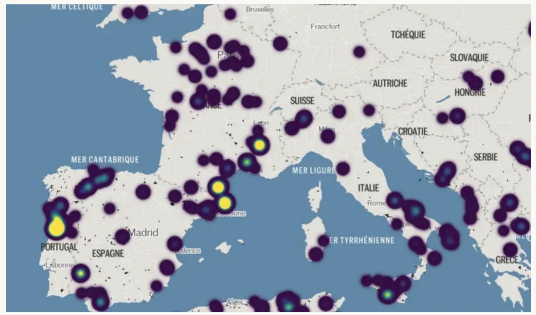
Pine oleoresin imported from Brazil and Argentina

20–30 KT / year

Gum rosin imported from Brazil and Argentina

Long-standing trade links with Brazil anchor Portugal's position as a major producer of rosin derivatives

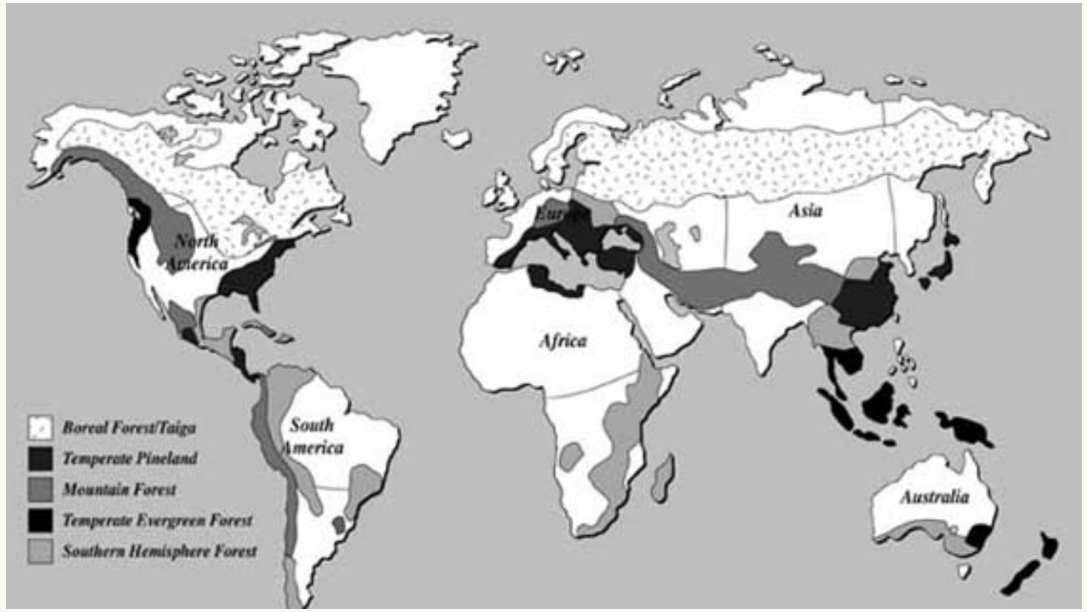
The World's Coniferous Forests



2 billion ha — 15% of global land area and the largest land biome

Record fires — drought, water stress and high temperatures are fuelling fires across Europe, Turkey, North Africa and North America; Canada: over 3 million ha burnt this year

USD 500 billion — needed globally for reforestation (Source: UN)



UN REPORT — JANUARY 2026

70% of aquifer systems are declining with no prospect of regeneration

The water cycle is now altered by human activity

4 billion people face water scarcity at least one month a year

AI will not provide drinking water once the springs run dry

Y2026 World CTO Fractionation Capacity: 1.88 MT (2.01)
Capacity in use: an estimated 1.5 million T

GLOBAL FOOTPRINT

Y2026: 18 (19) plants — Y1990: more than 30 plants

1 MT = 1 Million Metric T

CAPACITY BY REGION

Europe — 1,15 MT
7 Plants

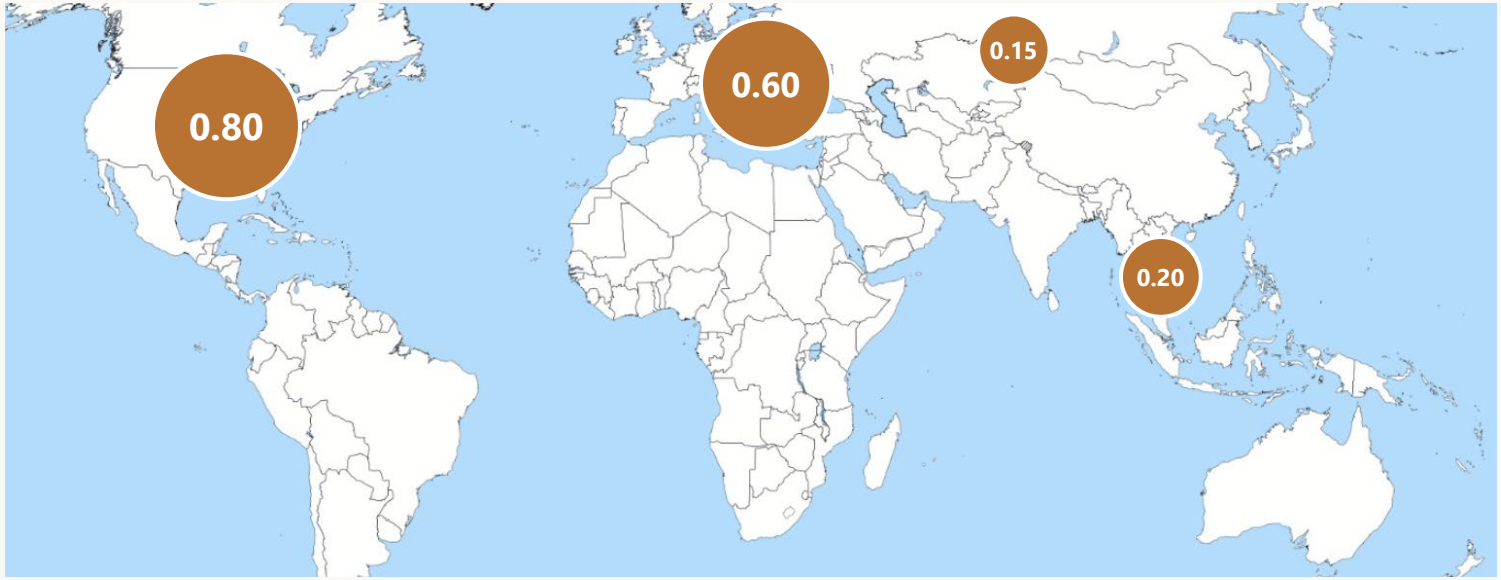
USA — 0.45 (0,58) MT
3 (4) Plants

Russia — 0.16 MT
4 Plants

CHN / JPN / NZL — 0.12 MT
China 2 · Japan 1 · NZ 1 Plants

Y2026 CTO Production: 1.75 Million T

GLOBAL FOOTPRINT



Bubble size = CTO production (MT)

Y2026: 1.75 million T vs Y2021: 2.05 million T

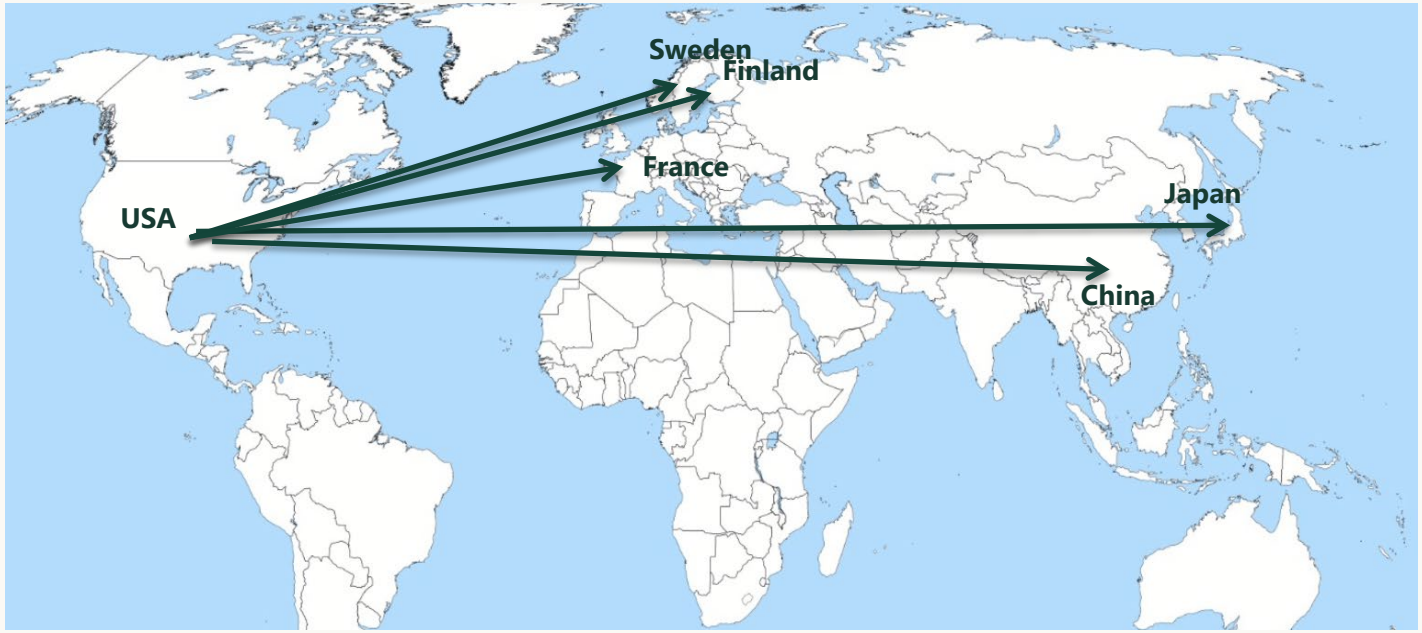
1 MT = 1 Million Metric T

PRODUCTION BY REGION

North America	0.80 MT
Europe	0.60 MT
Russia	0.15 MT
Rest of World	0.20 MT

CTO Exports from the USA - Y2026: About 300,000 T

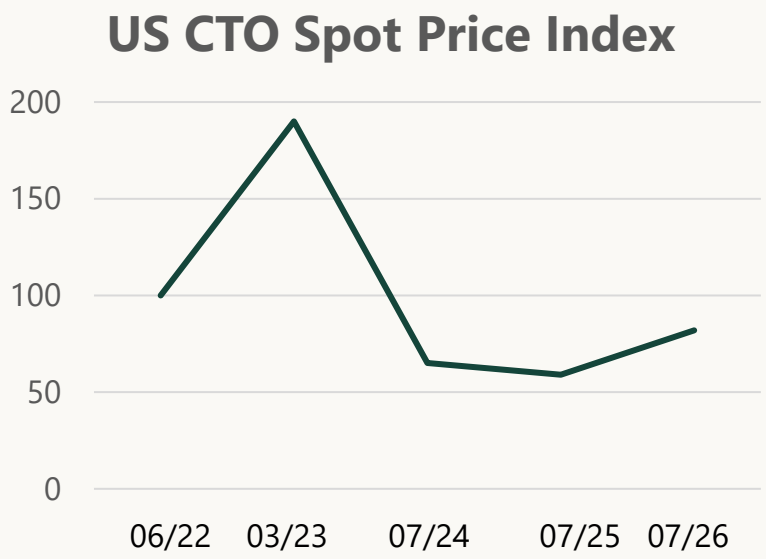
EXPORT FLOWS



Main destinations: Sweden and Finland

CTO PRICE TREND

06/22 → 07/26



Higher shipping costs weigh on export economics

Pulp and CTO: Market News

SUPPLY SHOCK

Russian CTO — 50,000 T no longer available to Europe because of the Russia/Ukraine war

Scandinavian mills — buying higher-priced domestic wood, mainly pine, instead of cheaper Russian birch; better CTO quality, but weaker profitability

US exports — at record highs, but shipping costs are rising

PULP UNDER PRESSURE

Demand — pulp demand remains weak

Capacity — continued mill closures, downtime and layoffs across the industry

Fibre Excellence — 2 mills (Tarascon and Saint-Gaudens, France, 500 KT of pulp) went bankrupt last April; Tarascon closed in July 2026 and talks continue on restarting Saint-Gaudens

CTO MARKET

Prices — CTO prices are firming

New CTO fractionation capacity ? - Mainstream Pine Products has acquired the De Ridder CTO fractionation site

Balance — supply is tightening; demand from fractionators, HVO and other uses is approaching, and may soon exceed, CTO production

Weak pulp economics and lost Russian volumes are tightening CTO supply — prices are firming as demand approaches production

Y2026 Gum Turpentine Production: 170,000 T

Y2023

- Weak demand from flavours and fragrances
- High inventories in Brazil
- Prices down

Y2024

- Improving demand
- Higher price level

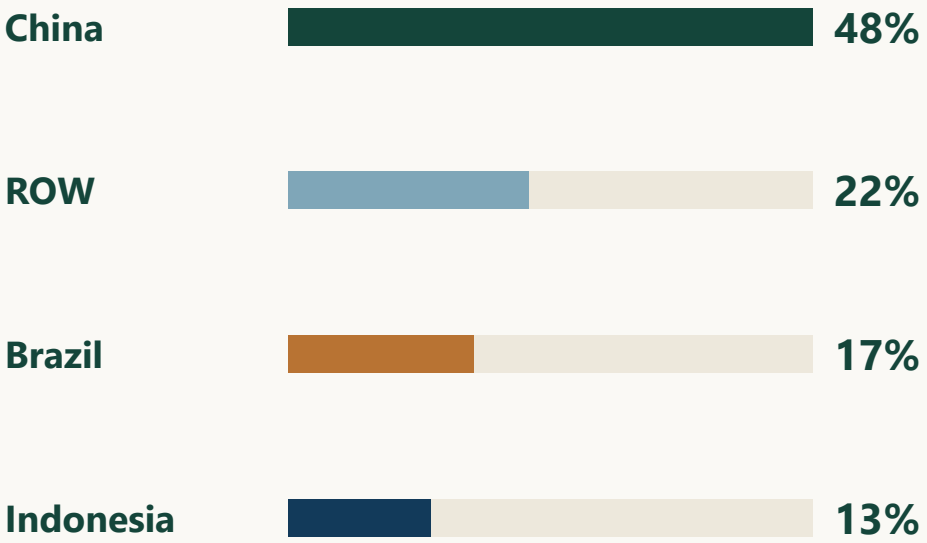
Y2025

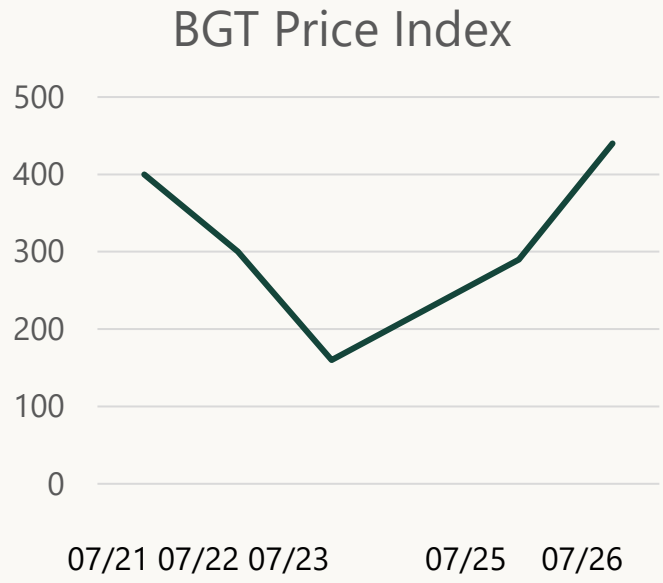
- High price level, steady demand

Y2026

- Prices still higher, demand steady

PRODUCTION SHARE — 170,000 T





Y2026 CST Production: 180,000 T*
(Y2021: 210,000 T) — 3–5 kg per T of softwood kraft pulp

PRODUCTION VOLUME

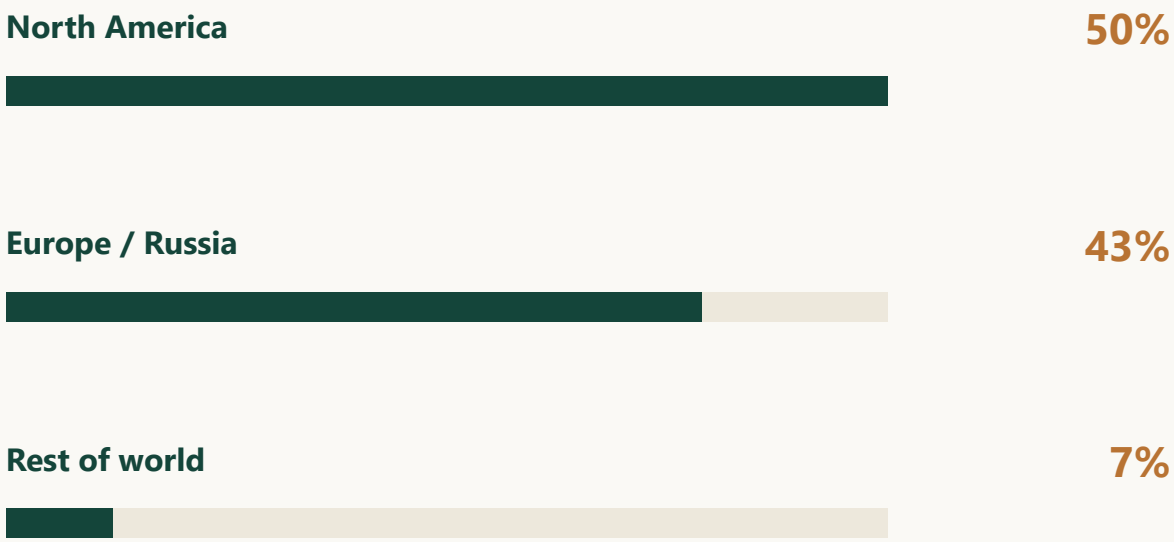
180,000 T
Y2026 estimated CST production

210,000 T
Y2021 baseline — a 14% decline

3–5 kg
CST yield per tonne of softwood kraft pulp

*Including 20,000 T of CST from CTO

REGIONAL SPLIT OF OUTPUT



North America main supplier of CST

MDF Turpentine: A New Production Facility Starts Up

SCALE & TIMING

120 KT+

worldwide potential per year

End of Y2026

production start-up

WHY IT MATTERS

Feedstock

MDF feedstock is mainly softwood from coniferous trees

Environment

Resolves environmental issues at MDF plants

Quality

Sulphur-free, like gum turpentine

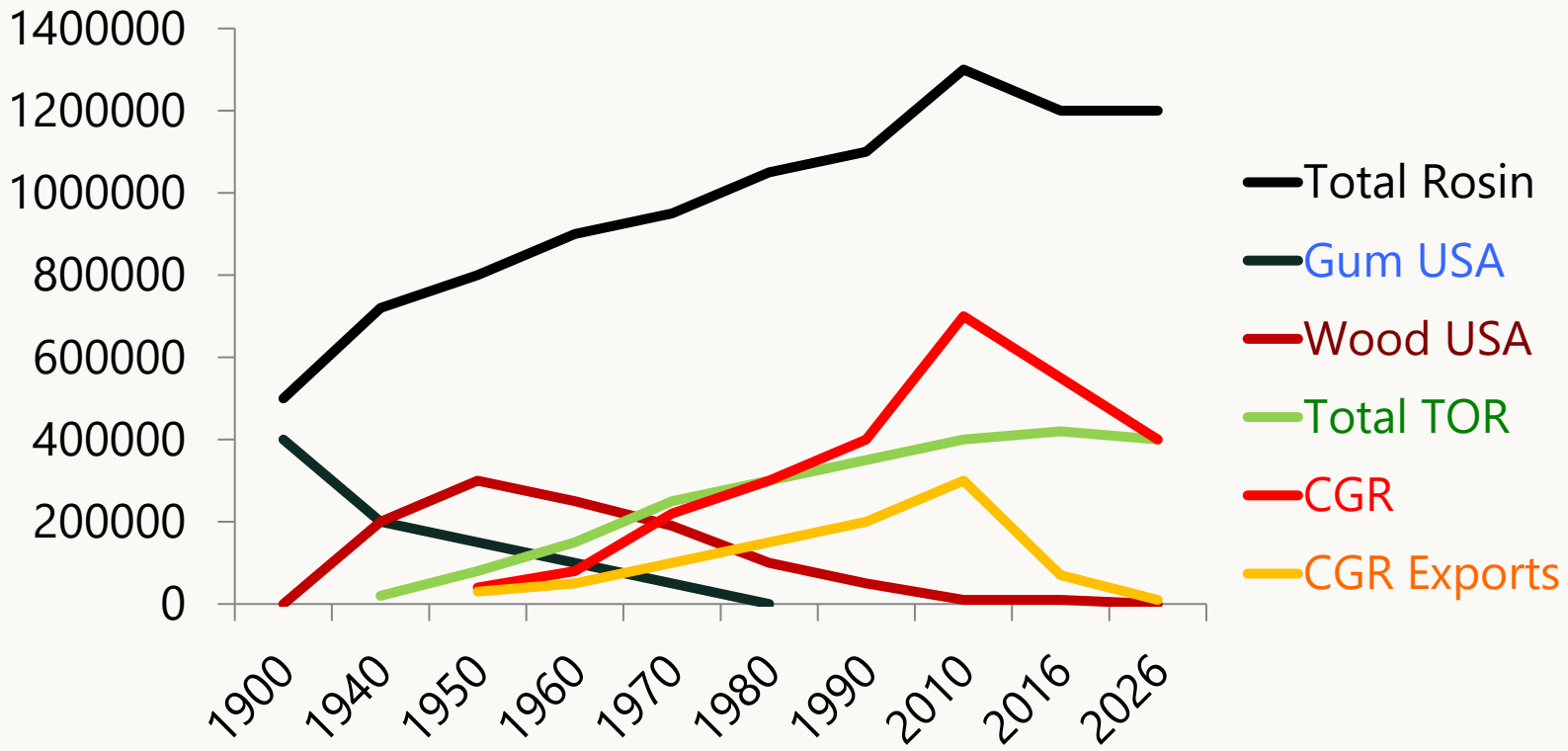
Variability

Yield and composition depend on origin and tree species

Full details in Prof. Bernd Bungert's presentation

Rosin Production - Y2026 total: 1,200,000 T

PRODUCTION HISTORY 1900–2026



KEY MILESTONES

1,200,000 T
Y2026 total rosin production

1,300,000 T
peak reached in Y2010

500,000 T
in Y1900

Over the past decade Rosin production has held flat, HCR production has doubled

Y2026 Global Gum Rosin Production: 810,000 T

MARKET NOTES

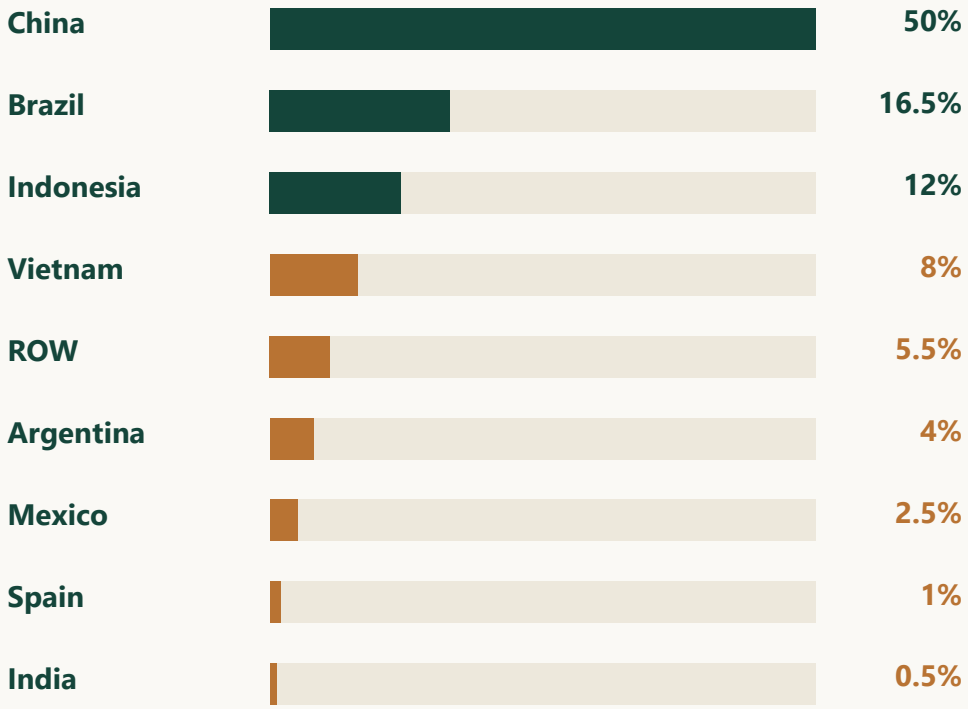
China

- Oleoresin production in South China is back to normal after the July typhoon

Brazil

- Oleoresin prices rising; rosin prices up sharply compared to last year, but competitively priced TOR and US tariffs may create downward pressure

PRODUCTION SHARE BY COUNTRY

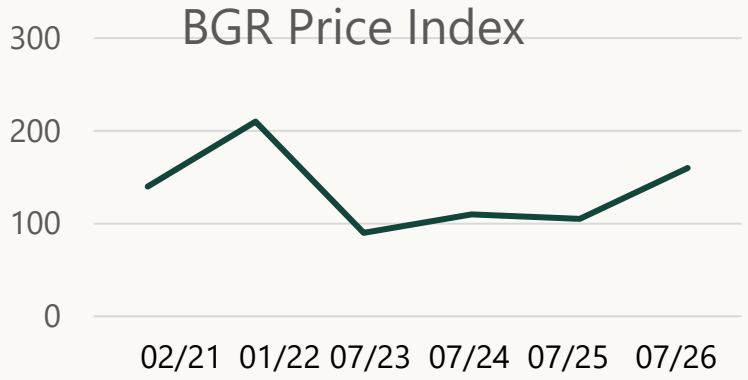


China alone accounts for half of global gum rosin output

ROW & PRICE TREND

ROW :
Portugal
Africa*
Greece
Madagascar
Fiji
Russia
USA ...

Africa
Y2026 volume mainly from Uganda: 14 KT
Y2027 potential growth: Uganda +10 KT, Mozambique +10 KT

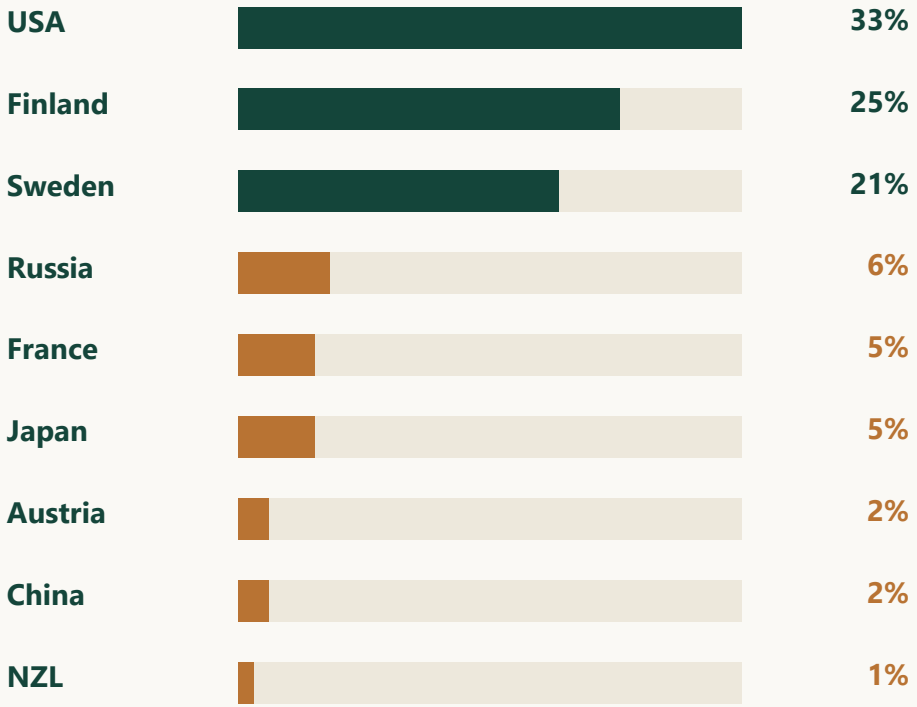


Y2026 Global Tall Oil Rosin (TOR) Production: 400,000 T

MARKET DRIVERS

- **Rising CTO fractionation rates** follow stronger rosin demand
- **TOR prices up in line** with CTO and BGR increases

PRODUCTION SHARE BY COUNTRY



KEY FIGURES

400,000 T
Y2026 production

450,000 T
Y2021

350,000 T
Y2024

Nordic and US output covers close to 80% of global TOR production

Rosin Consumption by Market Segment

- **Adhesives and road marking:** demand for natural resins is picking up
- **Rosin ester prices** are rising with TOR and gum rosin
- **Hydrocarbon resins:** softening prices after the Q2 peak may weigh on rosin ester demand

MARKET SEGMENT	2017	SHARE 2026	
Adhesives, road marking	40%	55%	+15 pts
Ink resins	30%	15%	-15 pts
Paper sizing	10%	10%	stable
Emulsifier for rubber	10%	10%	stable
Beverages, CG, cosmetics, others	10%	10%	stable

Adhesives and road marking now drive the market — ink resins have halved their share since 2017

Y2026 TOFA/CFA Production: 440,000 T

Y2025

Volumes — higher on improving CTO fractionation rates

Europe — demand from coatings still weak

USA — stable to slightly lower demand

Prices — higher US prices support European TOFA imports

Tariffs — despite US tariffs, American buyers keep buying European TOFA

HVO — improving CFA demand in Europe

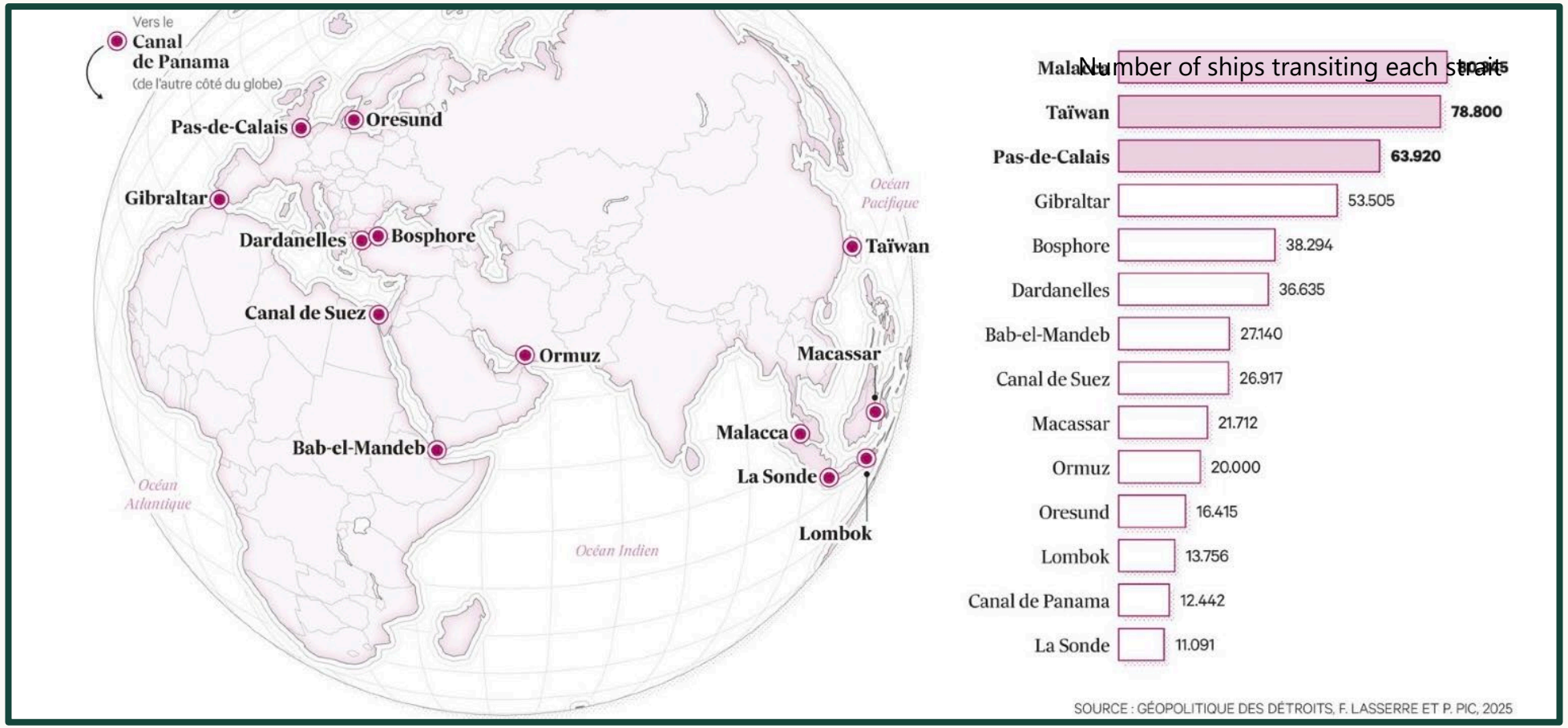
Y2026 — OUTLOOK

Volumes — still rising with CTO fractionation rates

Demand — steady, firming CFA/TOFA demand supports higher prices, especially in Europe

Rising fractionation volumes meet firming demand

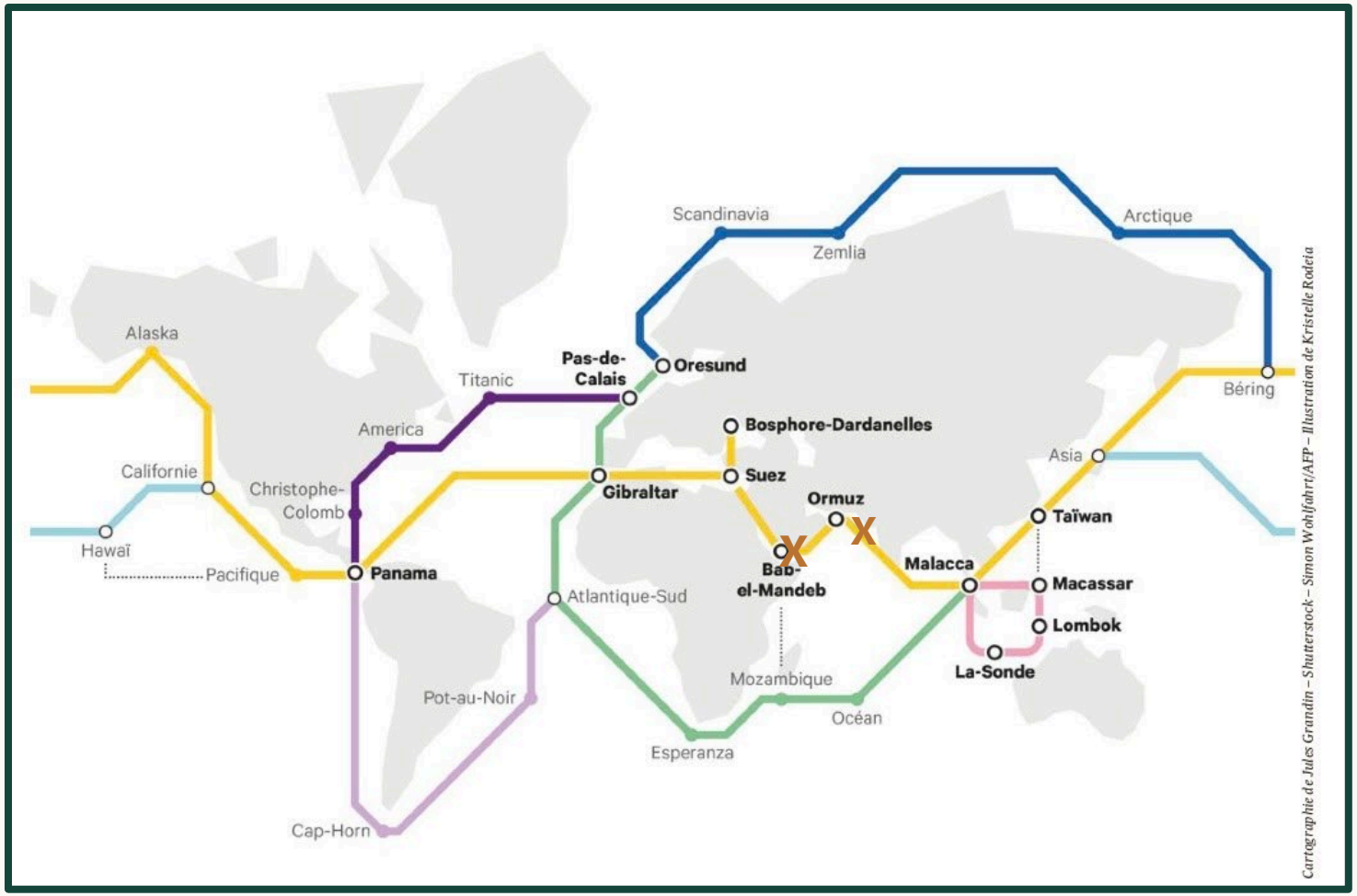
14 Strategic Straits Control World Trade



Les Echos

Commercial Maritime Routes

Maritime trade carries 90% of world trade
37% of naphta passes through the Strait of Hormuz



Source: Les Echos

HYDROCARBON RESINS · KEY FIGURES

3.5 MT
Global HCR capacity

85%
of that capacity located in Asia

2.4 MT
Actual HCR production

Asian capacity depends on shipping lanes through Hormuz

Impact of the Middle East Crisis on Pine Chemicals

THE TRIGGER

37%

of naphta transits the Strait of Hormuz

Asia — and China in particular — is badly affected

Naphta supply risk feeds straight into the pine chemicals chain

PINE CHEMICALS IMPACT

Hydrocarbon resins: feedstock shortage across the value chain

Hydrocarbon resin prices: up

Rosin esters: growing demand as substitution accelerates

Rosin ester prices: up on energy, chemical (pentaerythritol) and rosin cost increases

Diesel & kerosene: prices up — kerosene rose 110% last March

ENERGY & SAF SIGNAL

The gap between kerosene and SAF is narrowing (**Europe, last March**)

Kerosene	**EUR 1,300/T**
SAF from cooking oils	**EUR 1,500–2,500/T**
e-fuels	**EUR 6,000–8,000/T**

A positive signal for CFA demand in HVO

The 2030 mandate of 6% SAF is achievable, but the 2% e-fuel share is not — late investment and uncertain profitability may cap e-fuels at 0.7%, so the target will need renegotiation

Outlook for the Pine Chemicals Industry

SUPPLY & PRICING

CTO fractionation — rates continue to improve

CTO supply — tighter supply may create upward price pressure

Rosin esters — stronger demand may be offset by softening HCR prices, given the vast HCR overcapacity in Asia

DEMAND & OUTLOOK

Europe — steady CFA demand for HVO

MDF turpentine — sulphur-free, a new source for flavours, fragrances and terpene resins

Geopolitics — uncertainty persists around the Middle East and US tariffs

Many challenges and uncertainties ahead — but the fundamentals of pine chemicals remain strong

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THANK YOU

Pine Chemicals Industry — Global overview and Trends

Questions & discussion welcome

Fonterines Consulting