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# Bio-based Chemicals and Materials Market Trends and Outlook 2021

**ADVANCED BioSYSTEMS VIRTUAL WORKSHOP**  
**Growing the Bioeconomy in Uncertain Times**

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12 February 2021  
By Doris de Guzman  
Senior Consultant– Bio-Materials  
Tecnon OrbiChem

# Tecnon OrbiChem

Tecnon OrbiChem has been a world leader in providing data and analysis to the petrochemical industry since 1976. We are now one of the world's foremost marketing consultancies to the bulk chemicals, petrochemicals and plastics industries. We specialize in Chemical Intermediates, Synthetic Fibres and Resins.

## Third-Party Independence and Neutrality

**Tecnon OrbiChem** provides independent, third-party, expert assistance to chemicals producers and consumers, financial institutions and government agencies on projects and strategic issues. Our **Individual Project Studies** team advises customers on planning, marketing and market development, product diversification, mergers and acquisitions or divestments.

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## Solutions



- Monthly Consultancy Reports
- Historical Prices
- Plant & Project Reviews



- World Market Surveys
- Plant Data
- Historical Demand Data

# Bio-Materials & Intermediates

## Chemical Business Focus

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### CHEMICAL BUSINESS FOCUS

A MONTHLY ROUNDUP AND ANALYSIS OF THE KEY FACTORS SHAPING WORLD CHEMICAL MARKETS

CONTACT: DORIS DE GUZMAN  
Email: [doris.deguzman@orbichem.com](mailto:doris.deguzman@orbichem.com) Follow us on

**BIO-MATERIALS & INTERMEDIATES**  
INCLUDING BIO-BASED CHEMICALS, BIOPOLYMERS & THEIR PETROCHEMICAL EQUIVALENTS

**Special Report**  
Plant-based and chemically recycled-based plastics see strong growth momentum

**Hydrogen**  
Perstorp to produce renewable methanol and hydrogen

**Polystyrene**  
Collaboration activities remain strong in chemical recycling of polystyrene

**Ethanol, Ethylene and Derivatives**  
Cellulosic ethanol commercialisation lags behind HVO production developments

**Glycols**  
Braskem, Haldor Topsoe partnership advance demo-scale production of bio-MEG

**PET and Aromatics**  
CARBIO successfully produces PET bottles containing 100% recycled terephthalic acid

**Polyamides and Intermediates**  
Genomatica and Aquafil to build a demonstration-scale bio-PA6 facility

**Butanediols**  
BASF, BillerudKorsnäs collaborate on home-compostable paper laminate for flexible packaging

**Polyols and Polyurethanes**  
Covestro develops PU elastomers based on cardyon® CO<sub>2</sub>-based polyols

**Fatty Acids**  
Lack of shipping containers crimp US fatty acid imports

**Fatty Alcohols**  
Natural fatty alcohols market skyrocketed in November amid bullish raw material prices

**Glycerine**  
Europe, Asia glycerine prices face upward pressure

**Poly(lactic Acid (PLA) and Poly(hydroxyalkanoate (PHA)**  
Chinese PHA companies gear up for capacity expansion

**Cellulosic Fibres and Resins**  
Sappi, Birla Cellulose to provide a forest-to-garment traceability solution for brand owners

A monthly publication reporting market trends, pricing, and feedstock for Bio-based chemicals and their Petrochemicals counterpart



[www.greenchemicalsblog.com](http://www.greenchemicalsblog.com)

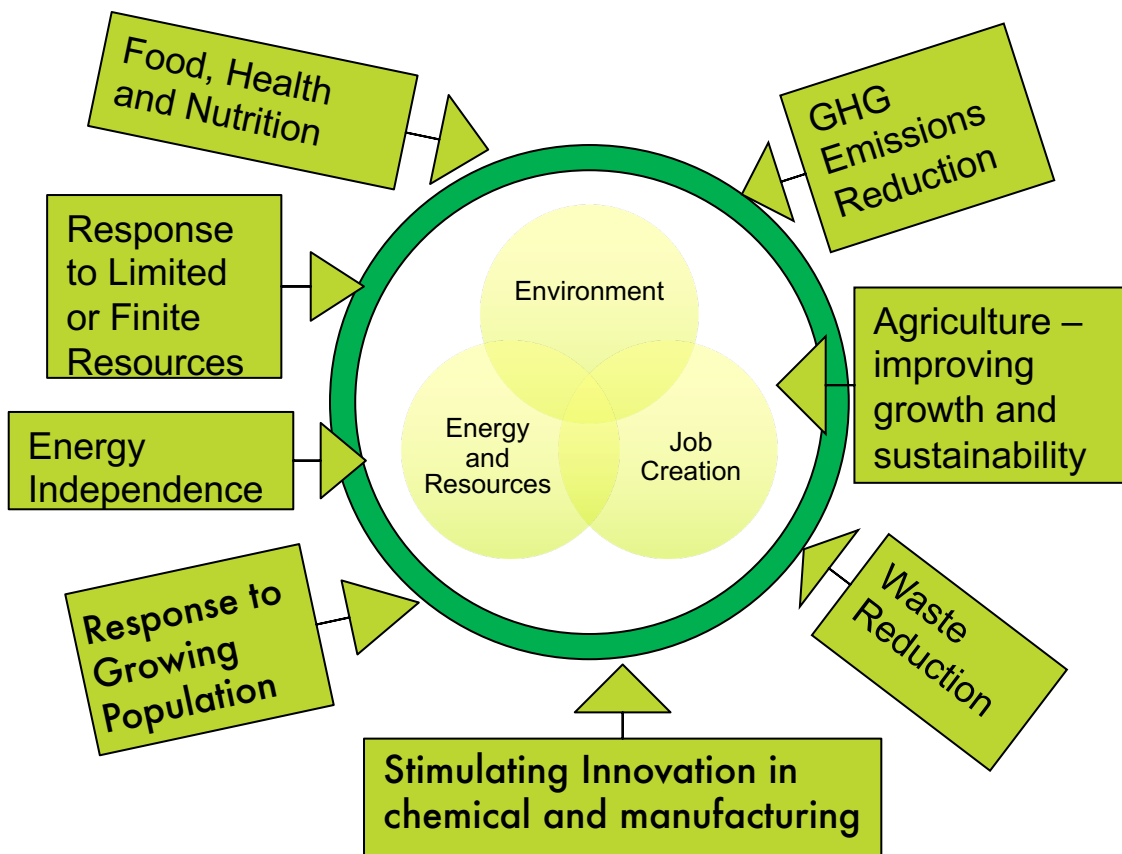
# What is Bioeconomy?

“Bioeconomy is broadly defined as the production, and utilisation of biological resources and innovations in order to provide sustainable goods and services in all economic sectors. Bioeconomy might contribute substantially to green growth, innovativeness and sustainable development. ”

- The First Global Bioeconomy Summit 2015

<http://gbs2015.com/>

## Key Drivers for Bioeconomy Initiatives



# Bio-based Chemicals and Bioplastics

## Market Situation in 2020

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### ❑ Global Pandemic Effects in the Chemical Industry

- Production Lockdowns and Trade Disruptions
- Slowdown in industrial, automotive and textiles demand
- Increase in health and hygienic products demand
- Reduced globalization of supply chain
- Accelerated Digitalization (E-Commerce, Block Chain)

### ❑ Global Pandemic Effects in Renewables

- Slowdown in R&D due to lockdowns
- Reduced fossil fuel use, refocus on alternative feedstock
- Surge in Recycling investments
- Focus on climate change issues, pollution and sustainability
- Green Financing, Bioeconomy/Circular Economy Initiatives

# Bio-based Chemical and Bioplastics Market Situation in 2020

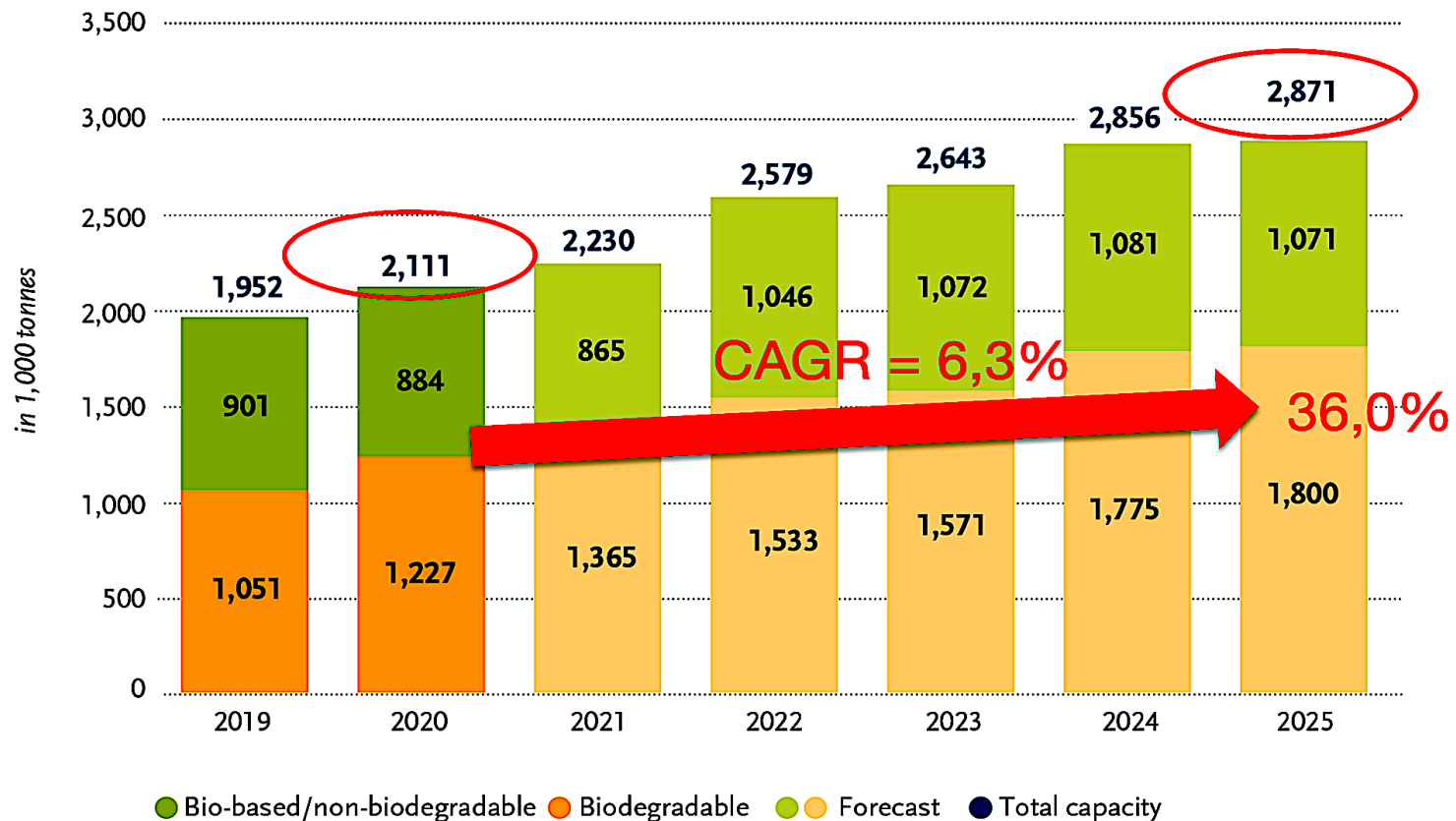
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- ❑ Surge in Renewable chemicals and plastics investments
  - Single-Use Plastic Products Ban
  - Brand Owners Sustainability Commitments
  - Reduction of Technology Risks
  - Government Tax Credits, Federal Grants
  - Consumer preference for bio-based and sustainable materials
  - Localized production favors bio-based markets
  
- ❑ Risks for renewable carbon investments
  - Volatility in government-mandated policies
  - Feedstock uncertainties
  - Price premiums
  - Consumer confusion and Greenwashing

# Bioplastics Demand and Capacity Surge

## ...Biodegradables lead the pack

### Global production of bioplastics

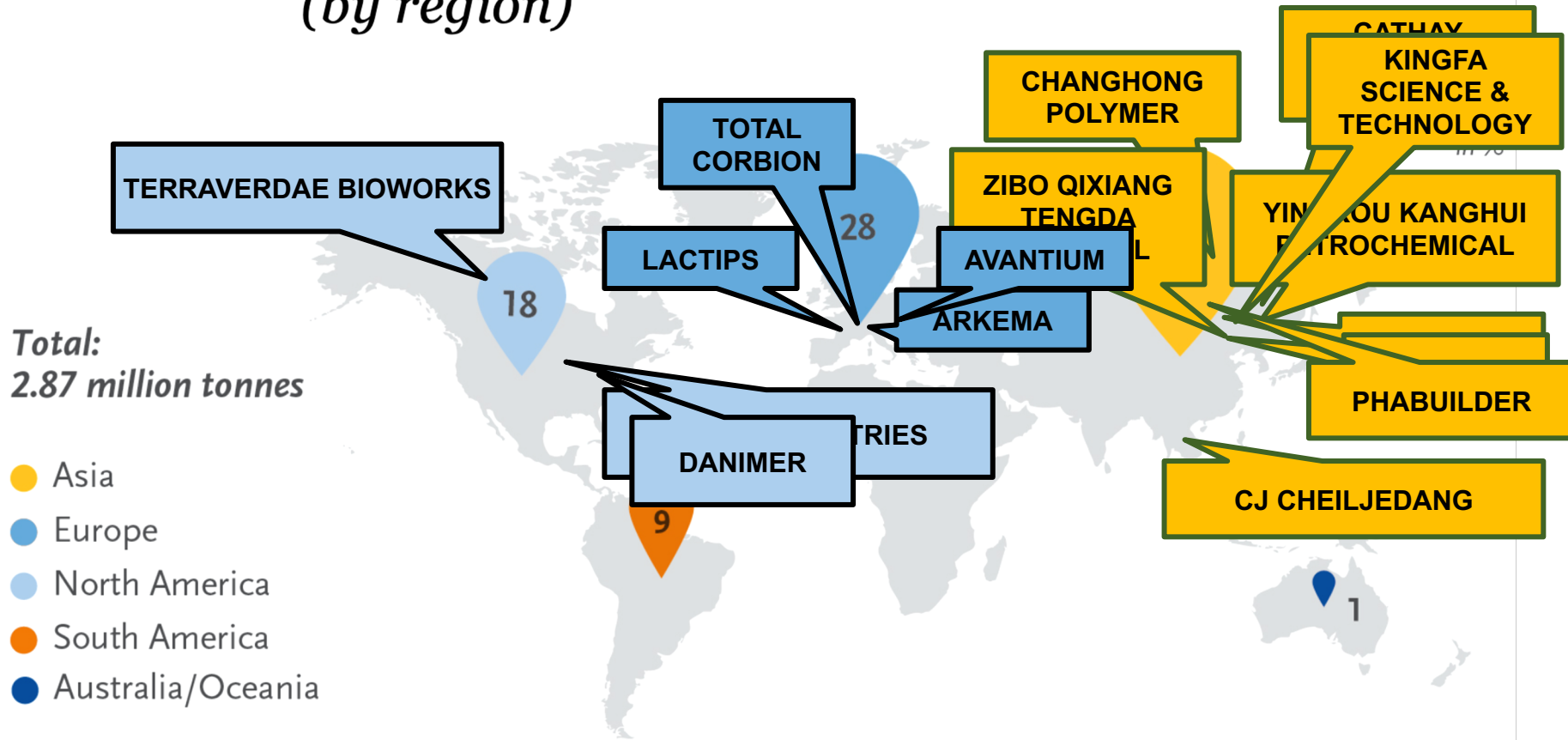


Source: nova-institute, EU Bioplastics Conference 2020

# Bioplastics Demand and Capacity Surge

## ...more capacity news in the past three months

### Global production capacities of bioplastics 2025 (by region)



Source: nova-institute, EU Bioplastics Conference 2020, Tecnon OrbiChem



# Rising Bio-based Building Blocks Demand

## ...more bio-based monomers supply needed

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- Global Lactic Acid/Lactides supply is tight as PLA demand rises
- Projected additional PBS capacity = More succinic acid demand
- Cathay Biotech to increase bio-LCDA and 1,5 PDA capacity for huge bio-PA investment
- Increasing sebacic acid supply in response to price volatility
- Increasing bio-MEG/MPG/FDCA capacity for bio-polyester/bio-PET and future PEF demand
- New feedstock sources for renewable ethylene/propylene
- Rising R&D on new feedstock sources for PHA
- Expanding 1,3 PDO production for sustainable textile

# Rising Bio-based Building Blocks Demand

## ...Focus on low-volume specialty markets

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Coatings/Adhesives/  
Solvents



Lubricants/Base  
Oils/Hydraulic  
Fluids/Corrosion  
Inhibitors



Household Cleaning  
Products/Detergents/  
Surfactants



Animal Feed/  
Nutrition  
Ingredients/Protein  
Alternatives



Fertilizers/  
Biopesticides



Cosmetics/Personal  
Care/Flavors and  
Fragrances



Pharmaceuticals/  
Biomedical  
materials



Environmental solutions in  
branded textiles, shoe  
wear

# Bio-based Building Blocks Feedstock

## ...New Renewable Carbon Sources

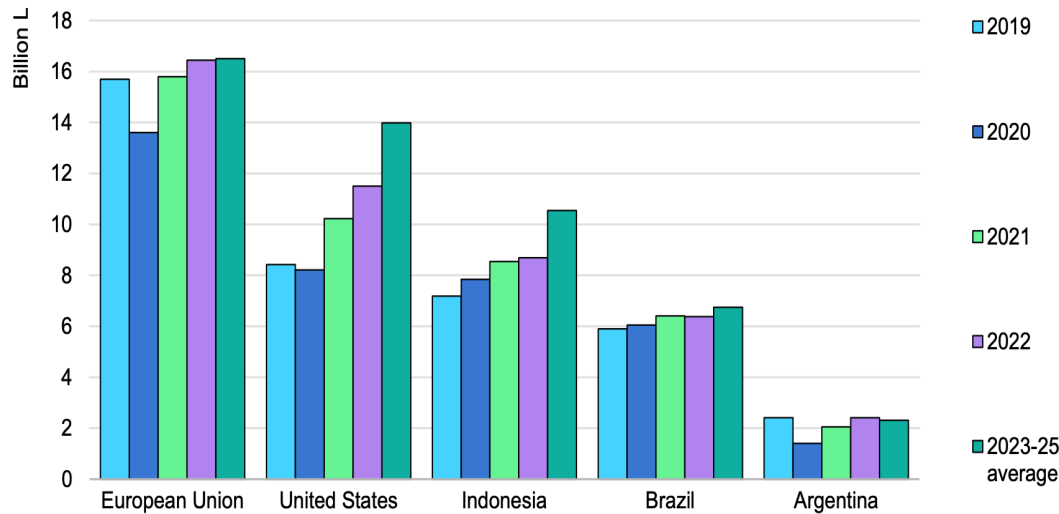
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- Bio-based Naphtha and Propane as co-products from Renewable Diesel process
- Crude from pyrolysis-based plastic recycling
- Monomers from chemical recycling of waste plastics
- Ethanol from microbial fermentation of CO-rich waste gas
- Methane from gasification of biomass, MSW
- PHA from methane-rich waste gas, algae and carinata oilseed
- Phenolics from lignin
- Cellulosic sugar from woody biomass, sugarcane bagasse, corn stover
- Hydrogen from electrolysis

# Rise of Renewable Diesel

...Oil firms continue towards the biofuel path

Biodiesel and HVO production overview, key global markets



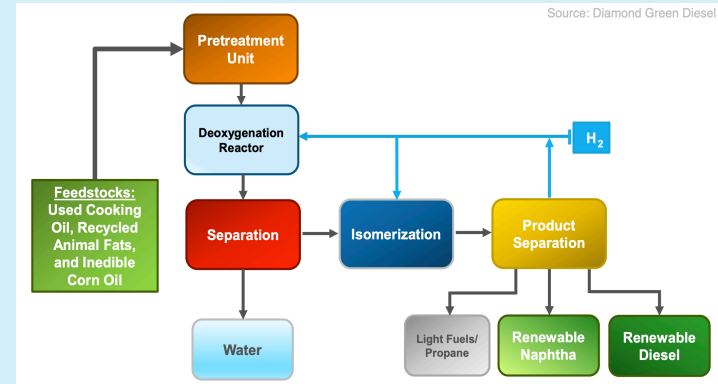
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- Neste
- Total
- Eni
- Repsol
- Preem
- PKN Orlen
- St1 Oy
- Pertamina
- Valero
- Marathon Petroleum
- Phillips 66
- Holly Frontier

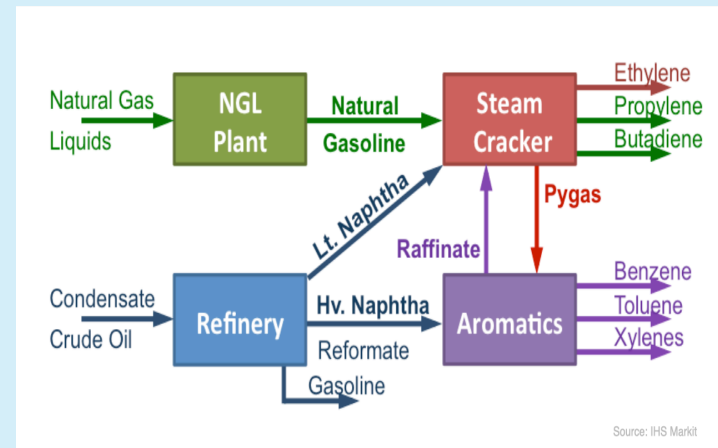
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# Cracking the Naphtha code

## Hydrotreatment of Fats and Oils



## Petrochemical Process



## 2021 Trends: Renewable Chemicals and Materials

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- Decarbonizing chemical processes and products
- Surge in certifications for supply chain tracing and sustainability
- Further Digitalization (Block chain, E-Commerce)
- Environmental Regulations will take hold
- Recycling Investments worldwide continue
- Tightening relationship between agriculture and chemical industries
- Increasing popularity of Green financing
- Rising production for biodegradable/compostable plastics
- Increase R&D on waste-based feedstock
- E-cars = Less gasoline → Less crude oil → Less petrochemicals



FOREST2MARKET



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BETTER INTELLIGENCE. BETTER DECISIONS.

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Contact information:  
Doris.de-Guzman@orbichem.com

**Corporate Headquarters**  
15720 Brixham Hill Ave #550  
Charlotte, NC 28277 USA  
T +1 704.540.1440  
[www.orbichem.com](http://www.orbichem.com)  
[www.forest2market.com](http://www.forest2market.com)  
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# Forest2Market: Products & Services

## PRICING & ANALYSIS

- Wood Raw Material Benchmarks
- Lumber Price Report & Benchmark
- Stumpage Pricing
- Price Forecasts

## TRENDS & ANALYSIS

- Timber Supply
- Precipitation
- Global Economic

## PARTNER PRODUCTS

- Sawmill TQ by The Beck Group
- Madison's Lumber Reporter
- Industry Edge's Wood Market Edge

## SERVICES

- Supply Chain Optimization
- Strategic Consulting
- M&A Advisory & Due Diligence
- Custom, Confidential Market Research
- Long-term Availability & Cost of Supply Studies
- Industry Reports for Trade Associations

The Foundation: SilvaStat360

# Fisher International: Products & Services

ASSETS	TRENDS	BENCHMARKS	SERVICES
<ul style="list-style-type: none"><li>• Mill Information</li><li>• People &amp; Email</li><li>• Fiber Production</li><li>• Paper &amp; Market Pulp Capacity and Furnish</li><li>• Water &amp; Waste Treatment</li><li>• Equipment &amp; Automation</li><li>• Corrugated</li><li>• News &amp; Projects</li></ul>	<ul style="list-style-type: none"><li>• Production</li><li>• Consumption</li><li>• Trade</li><li>• Prices</li><li>• Demographic Series</li><li>• Interactive Forecasts</li><li>• Capacity Trends</li></ul>	<ul style="list-style-type: none"><li>• Cost</li><li>• Viability</li><li>• Energy</li><li>• Carbon</li><li>• EBITDA</li></ul>	<ul style="list-style-type: none"><li>• iCRM</li><li>• Virtual Mills</li><li>• Strategy Consulting—One Time and Retainer</li><li>• Strategic Forecasting</li></ul>

The Foundation: FisherSolve Next