



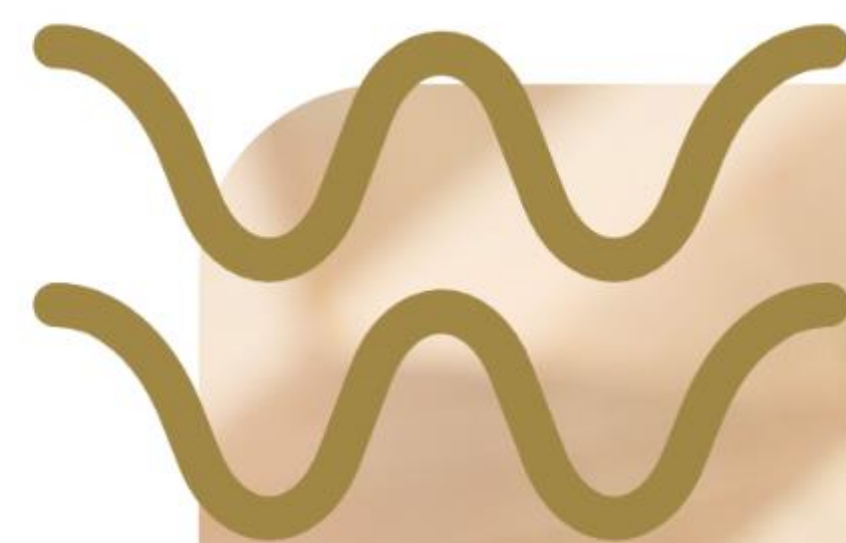
Assessing Sustainability and Market Viability of Thermochemical Biorefinery Products

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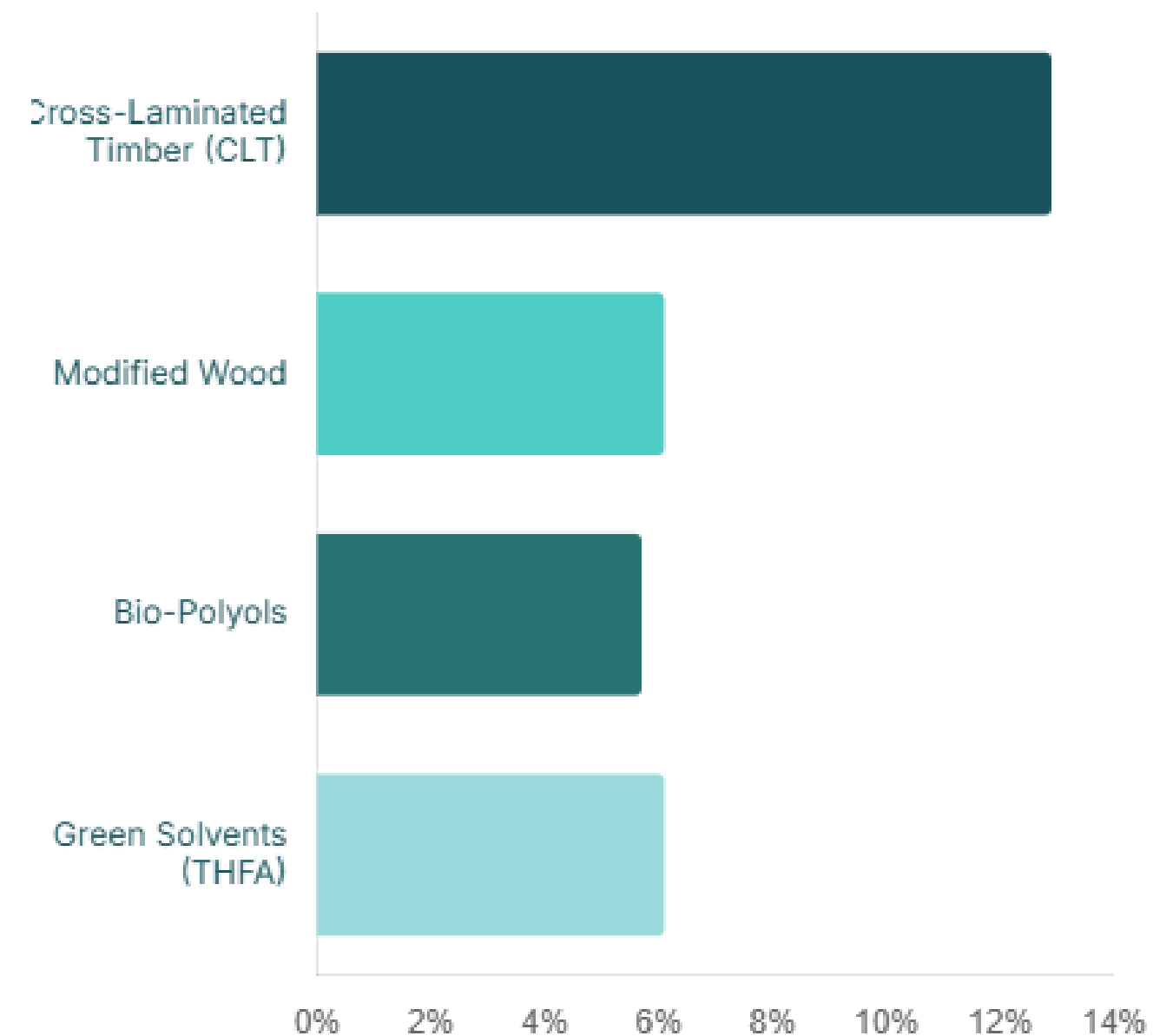
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The Market Imperative: Why Our Innovations Matter

The global economy is at a pivotal moment. A powerful combination of strict environmental regulations, shifting consumer values, and economic volatility is creating unprecedented demand for sustainable, bio-based materials. The NewWave project is strategically positioned to meet this demand, providing the very solutions the market is now seeking.

Projected Market Growth (CAGR 2024-2032)



Key sustainable sectors, such as mass timber and green solvents, are projected to experience robust growth, significantly outpacing many conventional material markets.

Regulatory Pressure

The EU Green Deal, REACH, and directives phasing out toxic chemicals (like creosote and formaldehyde) create a clear market void that our bio-based resins, solvents, and wood treatments are designed to fill.

Industry & Consumer Demand

The construction, furniture, and packaging industries are actively seeking low-carbon, non-toxic, and circular materials. Our CLT, NAF-MDF, and modified wood solutions directly answer this call.

Economic & Supply Chain Resilience

Our reliance on renewable biomass residues provides a sustainable, localized alternative to volatile fossil fuel markets, enhancing supply chain security and cost predictability for our partners.

The Market Imperative: Why Our Innovations Matter



Product Applications

Wood-Based Panels

Applications:

- ✓ MDF & particleboard manufacturing
- ✓ Cross-laminated timber (CLT)
- ✓ Structural composite lumber

Features:

Formaldehyde-free High strength Bio-based

Coatings & Finishes

Applications:

- ✓ Interior & furniture finishes
- ✓ Industrial protective coatings
- ✓ UV-curable systems

Features:

Low-VOC Durable Water-resistant

Adhesives & Resins

Applications:

- ✓ Structural wood adhesives
- ✓ General purpose bonding
- ✓ Composite manufacturing

Features:

Non-toxic Fast-setting Water-resistant

Green Solvents

Applications:

- ✓ Pharmaceutical processing
- ✓ Electronic component cleaning
- ✓ Industrial degreasing

Features:

Low toxicity Biodegradable Effective

Key Market Segments

Formaldehyde-Free Resins

Market drivers:

- Health & safety regulations
- Indoor air quality concerns
- Residential construction demand

Low-VOC Coatings

Market drivers:

- Green building standards
- Regulatory compliance
- Commercial construction demand

Green Construction Materials

Market drivers:

- Net-zero building initiatives
- LEED & BREEAM certifications
- Public procurement policies

Green Solvent Applications

Market drivers:

- Pharmaceutical industry demands
- Electronics manufacturing
- Workplace safety regulations

⚠ Market Entry Barriers

Performance Benchmarking

Demonstrating equivalence to established industry standards and performance metrics

Impact: ●●●●●

Mitigation: Third-party validation & performance data

Production Scale-Up

Achieving cost-effective industrial scale production while maintaining quality

Impact: ●●●●●

Mitigation: Strategic manufacturing partnerships

Supply Chain Integration

Disrupting established industry supply chains and relationships

Impact: ●●●●●

Mitigation: Industry alliances & drop-in solution approach

Regulatory Approval

Securing necessary certifications and regulatory clearances for market access

Impact: ●●●●●

Mitigation: Early engagement with regulatory bodies

Market Entry Drivers



Certification Schemes

Blue Angel, Nordic Swan



Sustainability Goals

Corporate ESG initiatives



Regulations

Health & safety standards



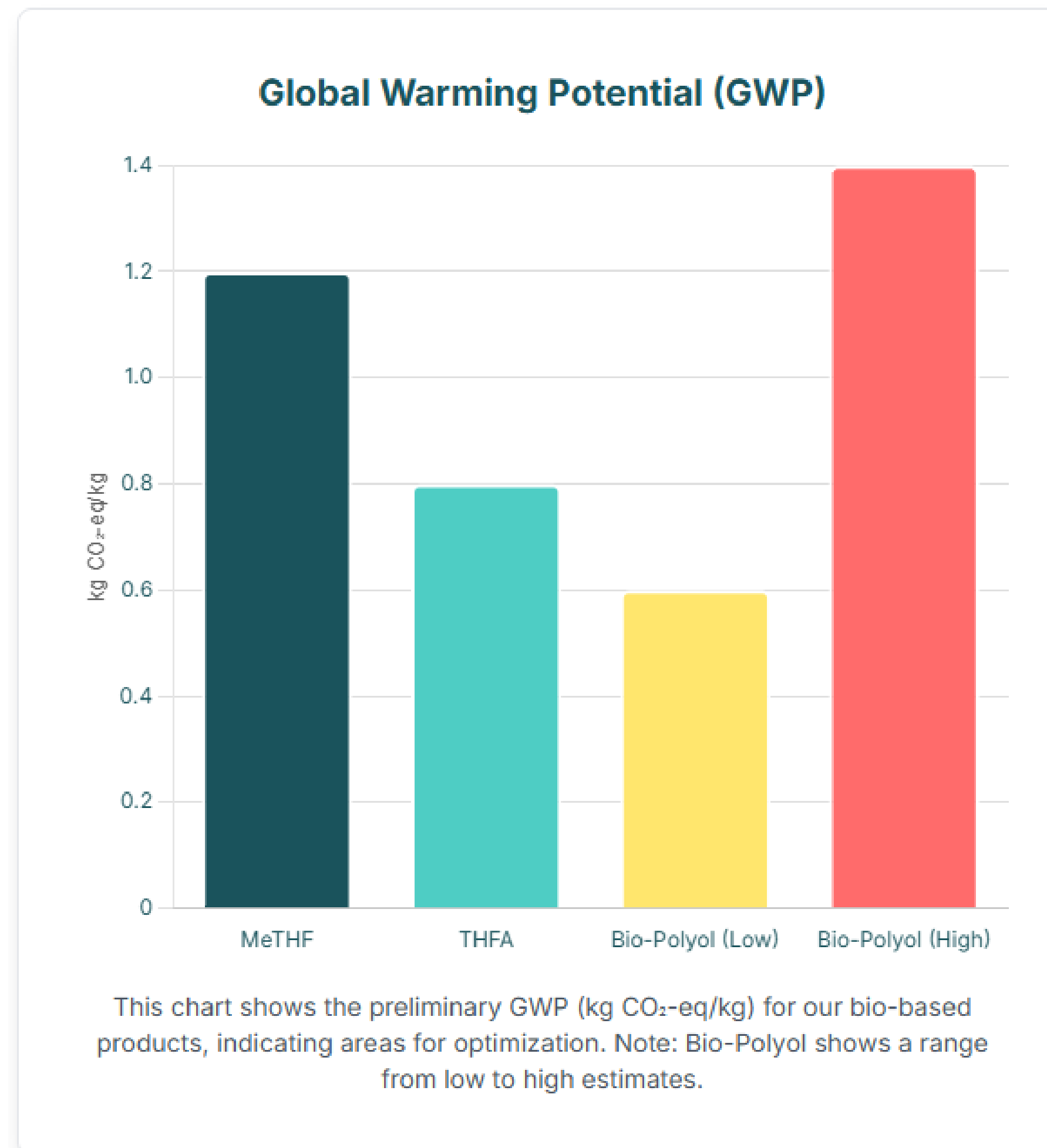
Consumer Demand

Health-conscious products



Environmental Footprint Analysis

Preliminary Life Cycle Assessment (LCA) results highlight the environmental performance of our key value chains. This data is crucial for identifying hotspots and validating the benefits of our bio-based approach.



Resource Intensity Hotspots

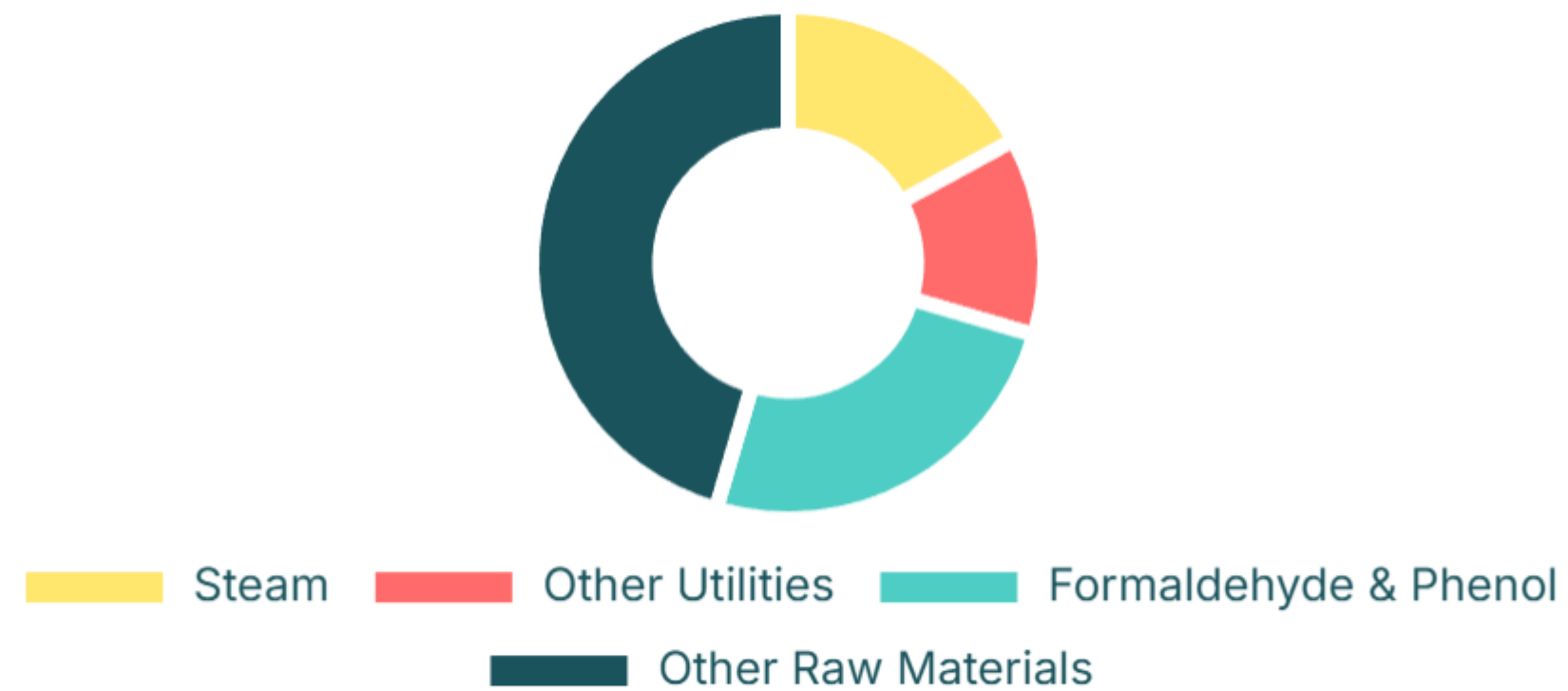
-  **Water & Energy Use:** Critical in resin & furanic pathways. High demand in FPBO processing & wood impregnation.
-  **Wastewater:** Treatment for Chemical Oxygen Demand (COD) is being developed.
-  **Key Finding:** Resource intensity varies significantly across pathways, offering clear targets for optimization.



Preliminary Cost Analysis

Our initial economic analysis identifies key cost drivers and investment areas. Understanding these hotspots is the first step toward achieving our goal of producing bio-based products at costs within 10% of their fossil-based alternatives.

Annual OPEX Breakdown



Steam and heat related operations are the largest operational expense (65% of utilities), followed by raw materials. Formaldehyde & Phenol constitute 91% of resin input costs. We are working to fully replace the Formaldehyde.

Identified Economic Hotspots



Raw Materials

Formaldehyde, phenol, and furfural derivatives are costly and environmentally intensive.



Energy Use

Fossil steam is a major cost driver and a primary contributor to the carbon footprint.



Catalysts

The need for robust catalysts increases both CAPEX and poses environmental burdens.



Reducing Environmental & Cost Impacts

We have developed targeted strategies to address the identified hotspots, aiming to improve both the economic viability and the environmental profile of our processes through innovation and efficiency.

Materials Strategy

- Replace formaldehyde with lignin-derived alternatives or HMF.
- Reduce aromatic use in polyol formulations to limit cost and toxicity.

Energy Efficiency

- Implement heat recovery systems across all processes.
- Replace fossil steam with biomass and biogas boilers.

Catalyst Innovation

- Recover and reuse metal catalysts (especially nickel-based).
- Investigate low-temperature catalysis to reduce energy input.

Water Use & Treatment

- Integrate anaerobic microbiome systems for wastewater valorization.
- Deploy closed-loop water systems where feasible.



Questions?

Thank you!

 New Wave Project

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