



# Nova Biochem

Platform technology for the sustainable generation of  
bio-based chemicals from lignin using supercritical water

# Summary

---



**Nova Biochem is scaling a breakthrough process that transforms waste from the pulping industry into sustainable, bio-based chemicals for flavours & fragrances, adhesives, resins, coatings, plastics, and more**

- **Unlocking Potential:** The pulping industry burns 100 megatonnes of waste annually – our technology converts this waste into bio-aromatic chemicals which will start to displace part of the \$425 billion petro-aromatics market
- **Large environmental Impact:** Our solution has the potential to save a gigatonne of CO<sub>2</sub> emissions through sustainable, water-based chemistry
- **Proven Performance:** We have successfully scaled our process 33x in the last 6 months on time and on budget. We have validated the performance and are now ready to scale further.
- **Strong Backing:** We have the support of industry giants like UPM, Stora Enso and Syensqo. We have been funded to date by early-stage VC TSP Ventures and Innovate UK.
- **Low Friction Route-to-Market:** We have a clear scale-up plan from pilot plant to demo plant, set for 2026. We anticipate our demo plant will have throughput of 5,000 tonnes p.a., generate product worth £25m and cost £6.5m to build.
- **Funding Ask:** We are raising £2m to scale 25x to an integrated TRL7 pilot plant within 12 months.

Join us in our mission to transform waste into value and drive a sustainable future.

# Nova Biochem solves two global problems



1) Petrochemical production is polluting & heavily emitting (aromatics alone generate 700 megatons of CO<sub>2</sub> p.a.)



World's largest chemical companies are looking to transition chemical production away from crude oil but there are currently no viable alternatives for bio-aromatic chemicals

2) Paper industry burns 100 megatons of pulping waste (lignin) every year, emitting 235 megatons of CO<sub>2</sub>



Pulpers use recovery boilers to burn waste lignin and recover key chemicals. Due to high capex, these boilers are usually a bottle-neck  
Pulpers are operating on slim margins and hungry for alternative revenues streams

Lignin is the **only renewable source** of bio-aromatic compounds on the planet

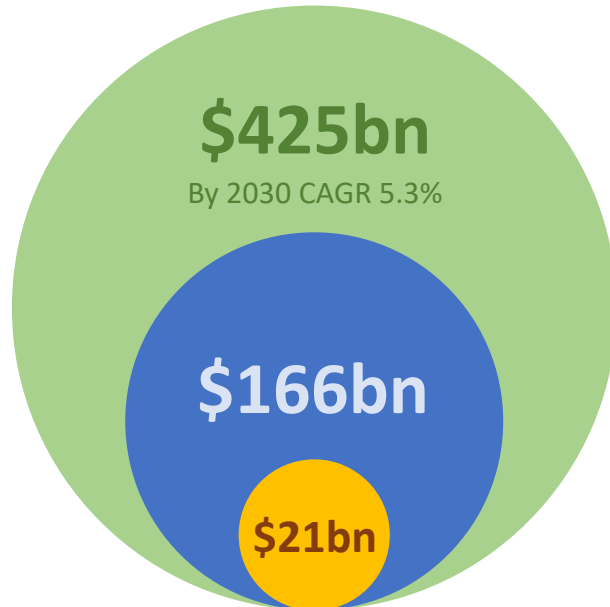
Nova Biochem converts raw-form lignin ('black liquor') into **high-value, sustainable** bio-aromatic chemicals

# This is a multi-billion dollar market opportunity



## Market Overview:

The family of BTX (Benzene/Toluene/Xylene) chemicals or 'aromatics' are typically derived from refining naphtha. They are the building blocks of materials like plastics, fabrics and adhesives and can be further refined into other chemicals. We plan to capture a proportion of this market with bio-based alternatives, with a primary focus on commoditised products.



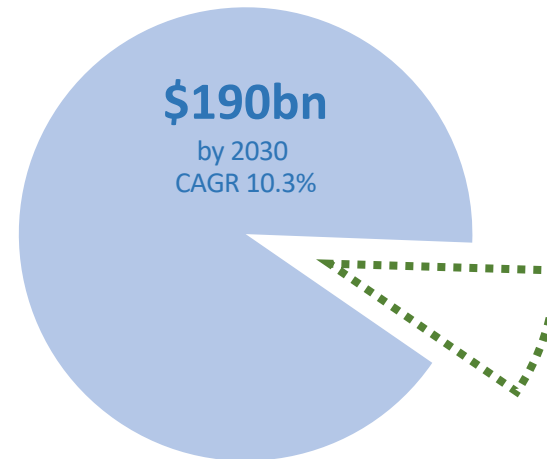
**Petrochemical aromatics market**

**Total potential market for bio-aromatics from black liquor**

**Tier 1 products market (entering 2026)**

## Bio-Based Chemicals:

The overall market for bio-based chemicals is steadily growing. We plan to help with its growth by being the first company to offer bio-aromatic chemicals at scale.



**Total bio-based chemical markets**

**Nova's Bio-based aromatic chemicals**

## Competitive Advantage

- Functionalised bio-aromatics
- Sustainable source
- Scalable to compete with petrochemicals

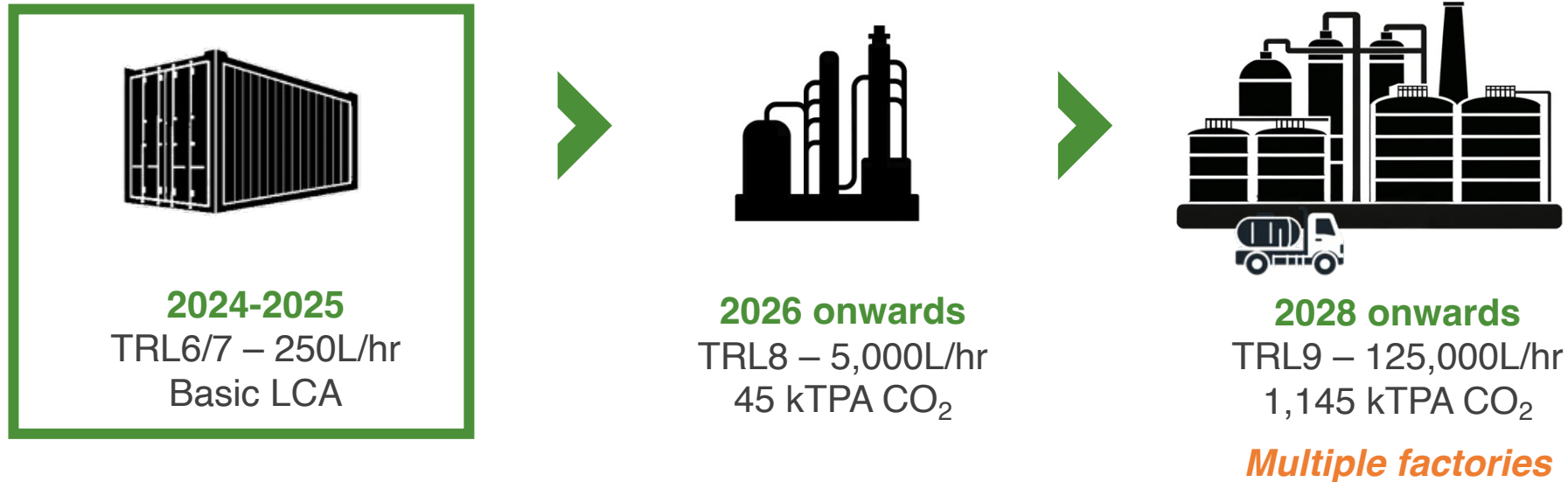
# Credible path to gigatonne carbon savings



**Ambition:** Create a technology to save a **gigatonne of CO<sub>2</sub>** emissions utilising 100 million tonnes p.a. of lignin waste

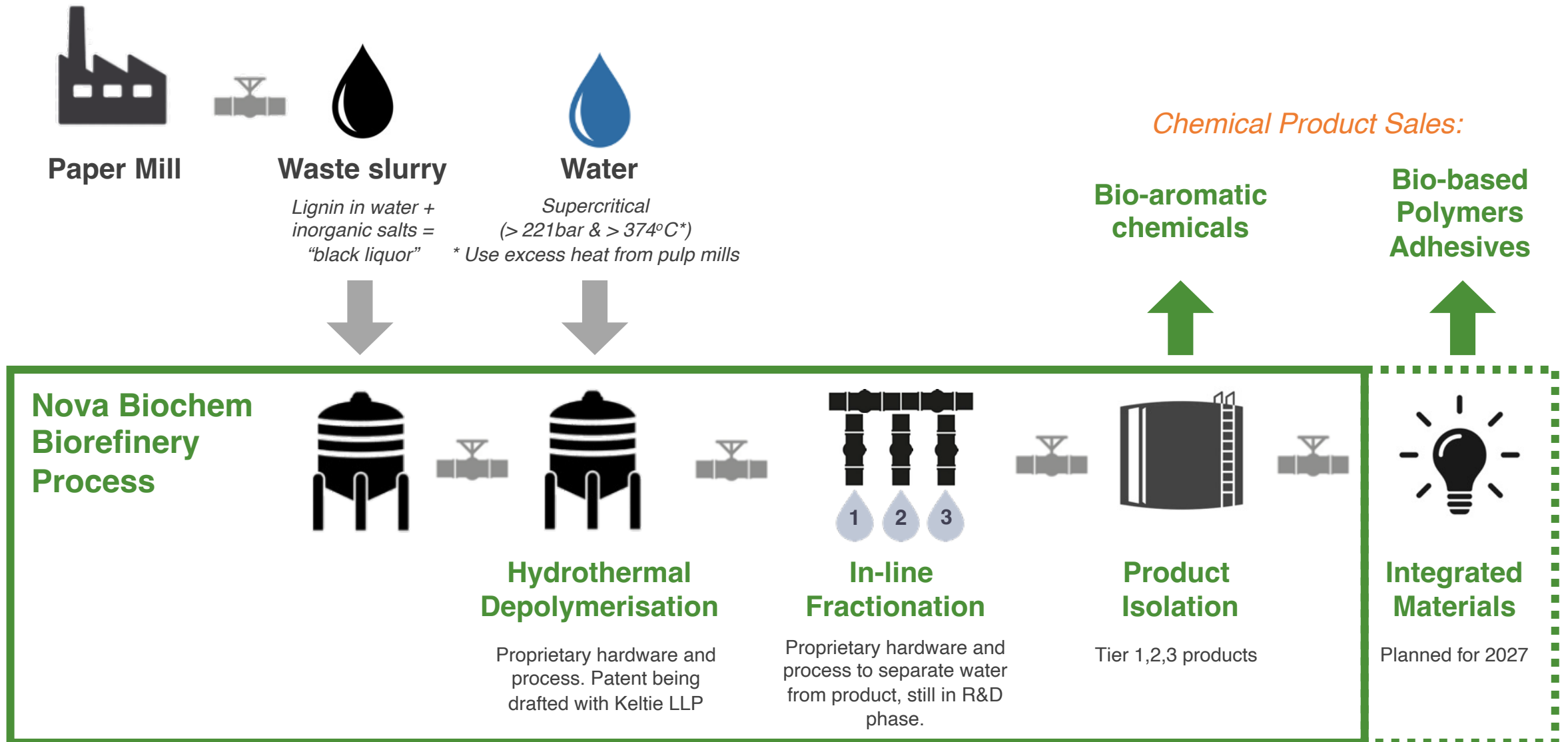
- **Primary saving:** 235m tonnes p.a. of CO<sub>2</sub> from not burning lignin
- **Secondary saving:** 704m tonnes p.a. of CO<sub>2</sub> from displacing petroleum-derived chemicals

## *Current Fundraise*



**Long term ambition:** address the 5bn tonnes p.a. of agricultural ligno-cellulosic waste with the potential save up to 45bn tonnes of CO<sub>2</sub> [trials start 2025]

# Our process is sustainable, scalable & economically compelling

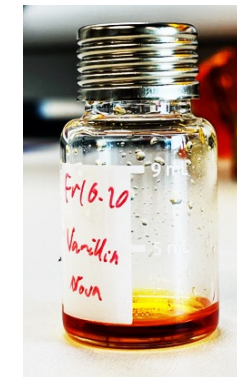
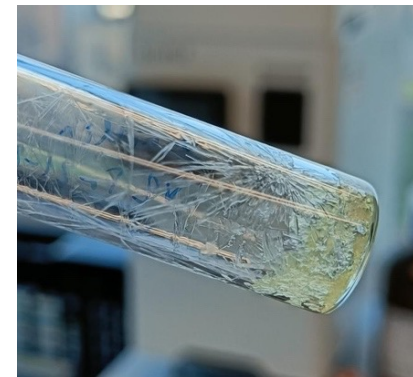


# Scaled from PoC (TRL 4) to Prototype (TRL 5) in 6 months



We used the pre-seed funding to successfully scale the depolymerisation reactor by **33x** using our novel mixing reactor. Crucially, we maintained the target conversion yields of black liquor to aromatic compounds (oligomers and polymers) with reduced char build-up. Product / water separation trials showed promising results and are in active development.

**Optimisation is ongoing but we are ready to scale to TRL 6**



Large prototype commissioned and operational at Nottingham University

Outputs: Vanillin fraction / crystals

# Technology Roadmap targeting rapid commercialisation



## Current Fundraise

### Proof of concept

2023 (TRL4)



#### Good yields observed

30g/hr – lab prototype  
(University of Valladolid, Spain)

Complete

- ✓ Team 2FTE (inc. Nova Biochem co-founder)
- ✓ Off-the-shelf hardware used
- ✓ Proof of concept design
- ✓ Performance used in modelling



### Pre-Seed (£0.45m)

+£0.22M Innovate UK  
Q4 2023 (TRL4 → 5)



#### Innovation Scaled

1kg/hr - large prototype  
(University of Nottingham)

Ongoing

- ✓ Team 5FTE
- ✓ Hardware operational
- ✓ SOPs drafted
- ✓ Validated performance
- ✓ Patents being drafted
- Edge cases examined



### Seed (£2m)

+0.54M Innovate UK  
Q3 2024 (TRL5 → 7)



#### System Scaled

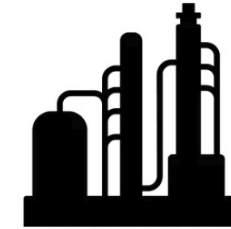
25kg/hr - integrated pilot  
(Nova Biochem facility,  
Nottingham)

- Team +7FTE
- Build pilot
- Integrated tests (Sweden)
- Validated performance
- Update / new patents
- Off-take agreements



### Series A

+ application for €7.5M CBE JU grant  
Q3 2025 (TRL7 → 8)



#### Integrated System Scaled

5,000 tonne/year Demo  
Target £25M revenue (61% EBITDA)  
(Client's location, [Finland])

- Team +10(UK) +20(FI)
- Build demo plant
- Endurance testing
- Validated performance
- Product sales
- Cash flows validated

# Low friction route-to-market with industry partners



## Supply

We anticipate integrating our biorefineries directly into paper pulping operations, sharing in the economics but de-risking feedstock supply and leveraging shared infrastructure.

We are holding letters of support from leading paper and forestry products companies. Nova Biochem is currently processing their lignin.



UPM, Finland, €12bn



Stora Enso, Finland, €12bn

## Demand

We intend to partner with large chemical manufacturers and distributors. Our planned sales channels include direct, via distributors and partnering with manufacturers.

Our initial products are known commodities with existing markets and clear pricing. In the future, we aim to develop our own new materials.

We are holding a letter of support from one of the leading speciality chemicals companies. They will be a key partner in product testing and pricing validation.



Syensqo, Belgium, €7bn  
Former Solvay

Other collaboration Partners:



LIXEA

sappi



BASF

CRODA



# Our founding team



**Emre Demirkaya**

PhD in chemical engineering  
5+ years of experience



**Alex Novitskiy  
(CEO)**

PhD in chemistry  
10+ years in finance and management



**Sergey Soshin**

PhD in engineering  
20+ inventions

## Partners:



IMPERIAL



## Consultants / Advisors:



**Tom Huddle**  
FT engineer / University of Nottingham



**Andrew Danby**  
FT technologist / BDC



**Svetlana Makusheva**  
PT Accounting



**Ed Lester**  
Advisor supercritical water engineering  
25+ years / University of Nottingham



**Eduardo Perez**  
Advisor lignin chemistry 20+ years / UCM



**Alain Frix**  
Advisor chemical markets, 30+ years



**Mark Gronnow**  
Advisor process development / BDC

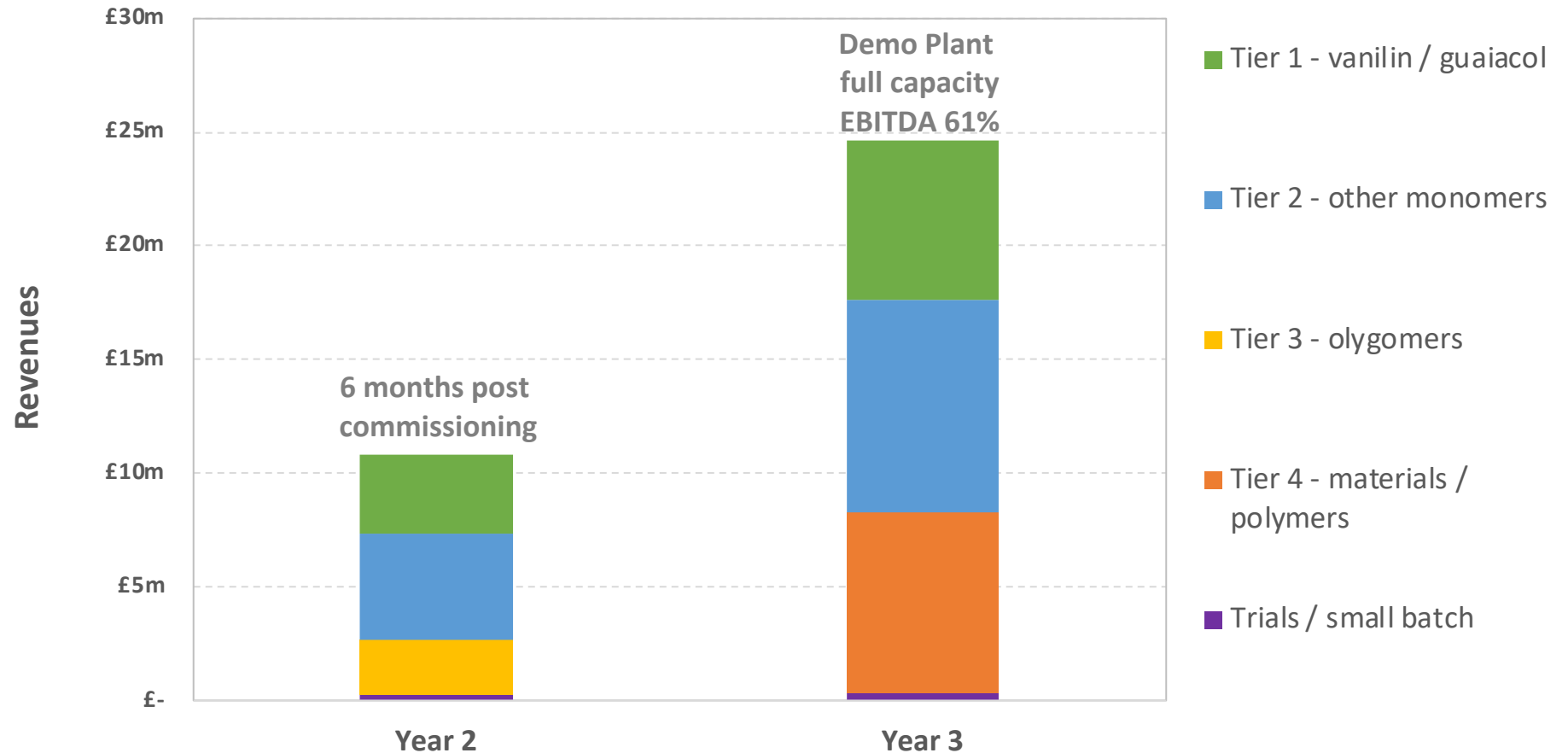
# Capital light and highly scalable business model



Nova Biochem will build and operate biorefineries as Joint Ventures with paper pulping mills who will share in the capex / opex and profits. Nova Biochem will be responsible for running and maintaining the core process and selling the chemicals

## Demo Plant Economics:

- Throughput – 5,000 tonnes p.a. of lignin
- Installed capex - £6.5m
- Revenue - £25m
- EBITDA - £15m (61% margin)
- Payback period < 24 months



# The ask



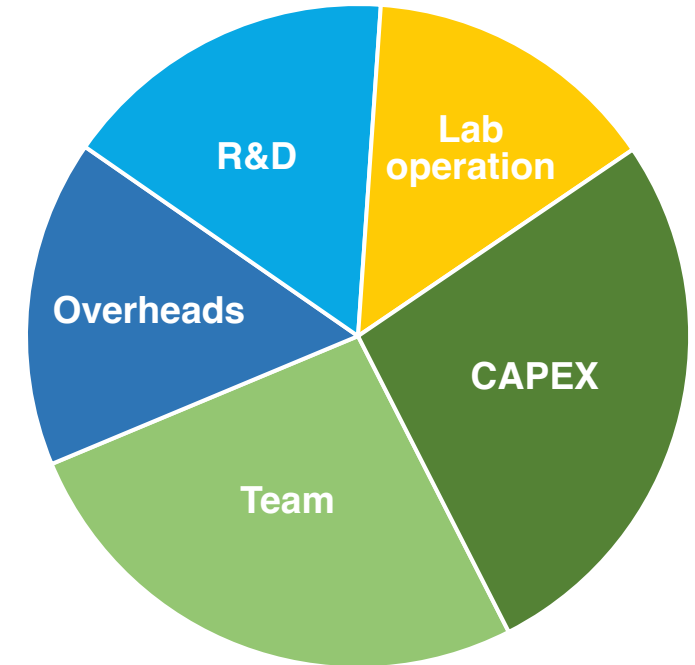
## Raising £2m Seed Round (EIS)

### Use of Funds & Key Milestones:

- 18 months runway
- Continue rapid advancement in technology readiness
- Secure demo plant site and offtake agreements for initial product
- Design and build TRL7 pilot system (trialled at pulp mill)

### Additional funding to accelerate our development:

- Currently applying for EU CBE JU grant of €7.5m to design and commission 5,000 tonnes p.a. demo plant
- Ongoing discussion with paper pulpers around co-funding / hosting the demo plant



Backed by:



# Disclaimer

---



Investment in the Company carries substantial risk and may involve special risks that could lead to a loss of all or a substantial amount of such investment. Unless prospective applicants for shares fully understand and accept the nature of the Company and the potential risks inherent in the Company they should not invest in the Company. A prospective investor should consider carefully whether an investment in the Company is suitable for themselves in the light of their personal circumstances, the economic climate and the financial resources available to them. There can be no assurance that the Company's objectives in respect to any of its funds will be achieved and investment results may vary substantially over time. As such, an investor's capital may be at risk.



## Join our journey

For more information, please contact Alex at  
[anovitskiy@nova-biochem.com](mailto:anovitskiy@nova-biochem.com)