# Assam Bio Refinery Private Limited
## (A JV of Numaligarh Refinery Limited, Fortum and Chempolis)

### Bamboo biomass to Ethanol and other platform chemicals

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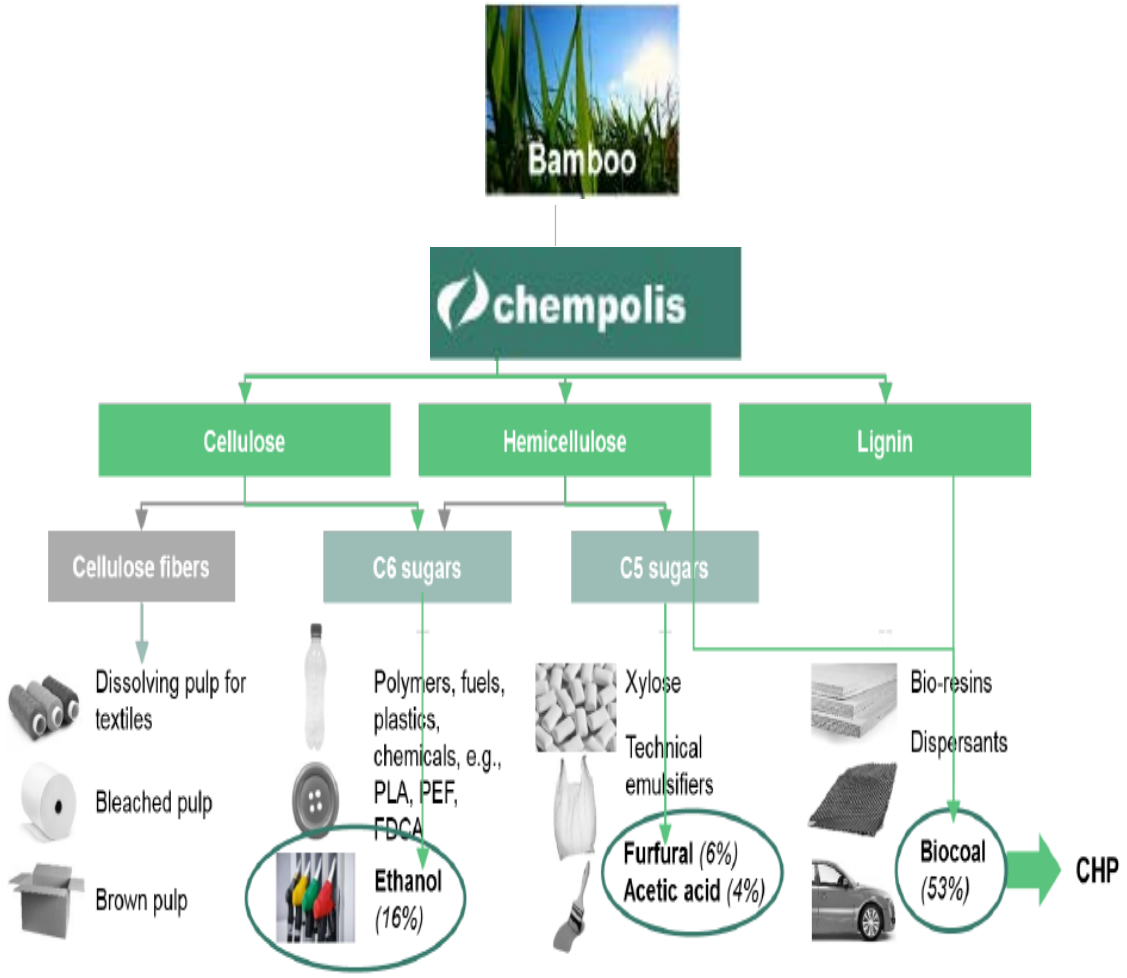
# Assam Bio Refinery: A Bio Refinery based on Fractionation technology with Bamboo as feedstock




**About Project:**

- Location: Numaligarh, Assam
- 5,00,000 MT of bamboo to be processed annually using Chempolis' fractionation technology to yield 48,900 MT of Ethanol; 18,600 MT Furfural/Furfural alcohol; 11,600 MT of Acetic Acid and excess power as well
- More than 55 million tons of bamboo availability in North East India; 66% of total bamboo resource of India
- Scheduled commissioning – end of 2021
- Financial closure achieved and construction started; Major Long Lead Items ordered
- Technology Provider: Chempolis; EPCM: Engineers India Limited

**End use of Products:**

- Ethanol to be used for blending in Motor Spirit (Petrol)
- Furfural/Furfural alcohol used in pharmaceutical, chemical, foundry, refractory and metals, agriculture and fragrance industry
- Acetic Acid, a very versatile chemical, used in adhesives, paints, textiles, agriculture,  plastic and pharma indutry

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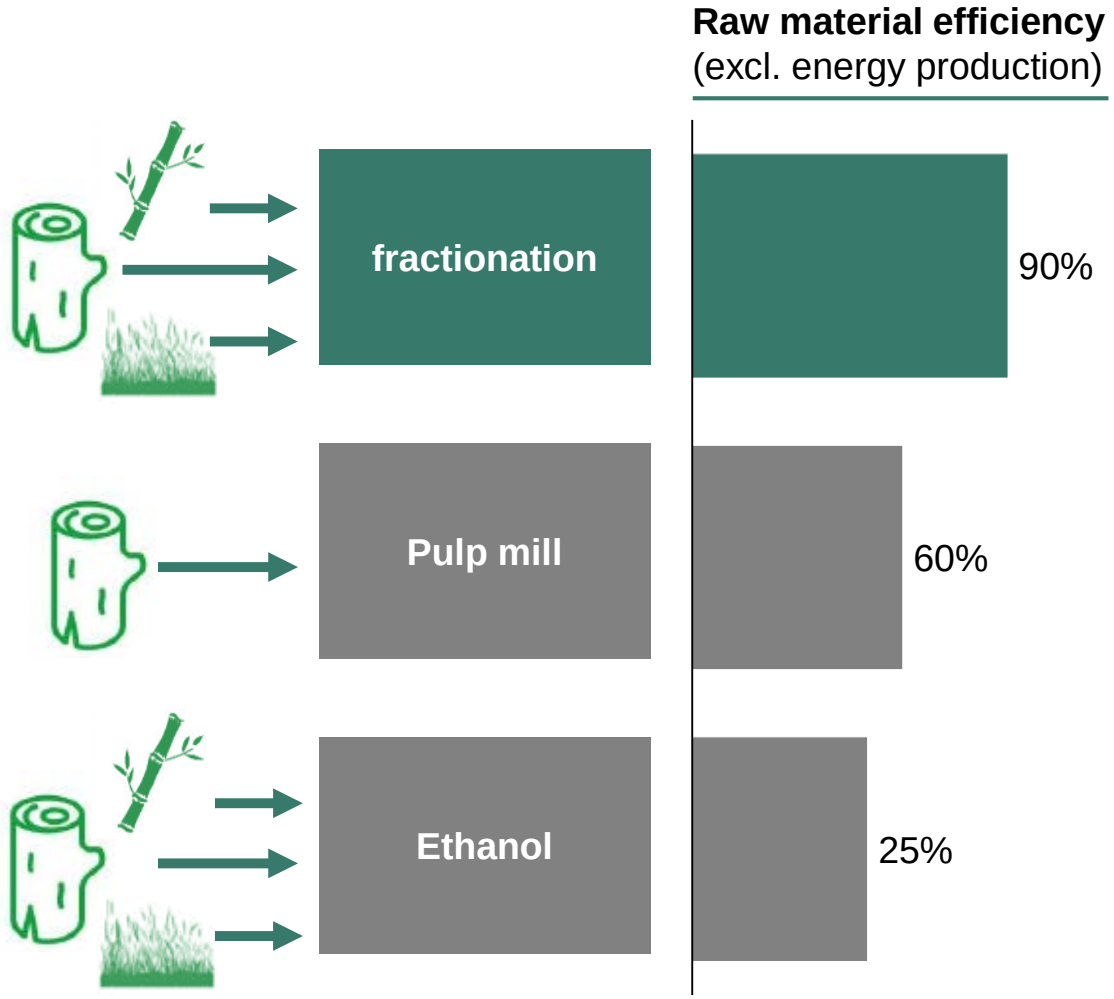
# The process delivers high yield, favorable pricing, small unit size & vast environmental benefits




**Technical benefits:**

- **Purity of all fractions**, enabling cost-effective production of end-products
- **Optimized properties of all fractions** (vs. conventional pulp mills: only pulp is optimized)
- **Smaller unit size** (e.g., 1/5) with at least the same feasibility as large pulp mills
- **Flexibility in raw material,** e.g., possibility to use **waste** (e.g., straw)
- Ability to **combine best parts of different technologies**

**Environmental benefits:**

- Possibility to **replace fossil raw materials** in huge variety of products (e.g., viscose & plastics)
- **Lower pollution** (i.e., $CO_2$) **& reduced water consumption**
- **Reduced land degradation & deforestation**

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# End use of Furfural, Acetic Acid and strategic partnership potential

## Furfural Alcohol

Agriculture

Pharmaceuticals

Foundry, Refractory, & Metals

Fragrance

Chemicals & Solvents

## Acetic Acid

Paints & Coatings

Textiles

Adhesives & Solvents

Plastic – Films & Sheets

Agriculture

Pharmaceuticals

PET Bottles

<u>Potential for collaboration with ABRPL</u>

- Technology tie up for Conversion of Furfural to Furfural alcohol
- Long term supply agreement or tie up for 2G Enzyme sourcing
- Long term tie up for formic acid sourcing

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# Thanks

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