



Unlocking Nature To Reshape our World

Reinventing Biofuels and Sustainable Materials

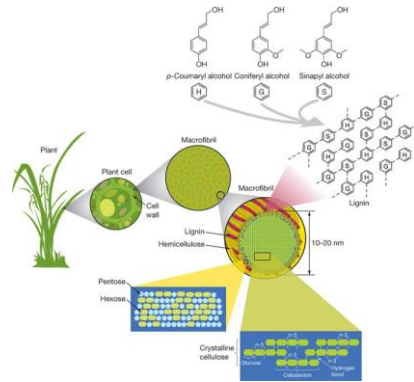
Scaling Up 2023

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Unlocking Nature's Energy

Lignocellulosic Biomass



Separation into constituents at **ambient pressure** and **ambient temperature**

Lignocellulosic Biomass

Lignin

Hemicellulose

Cellulose

Inorganics



Global Feedstock Availability

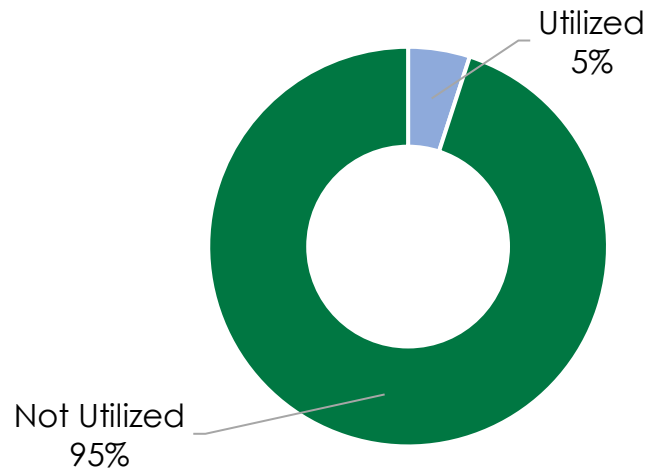
Lignocellulosic Biomass



- SixRing's feedstock is all lignocellulosic biomass (non-food), which is abundant, low-cost, and scalable
- Annual global production of lignocellulosic biomass is estimated to be **140 billion tons⁽¹⁾**.



Available Lignocellulosic Biomass



(1) Tripathi, N., Hills, C.D., Singh, R.S. et al. Biomass waste utilisation in low-carbon products: harnessing a major potential resource. *npj Clim Atmos Sci* 2, 35 (2019). <https://doi.org/10.1038/s41612-019-0093-5>
(2) GCB Bioenergy, Nov 2019 Integrated lignocellulosic value chains in a growing bioeconomy

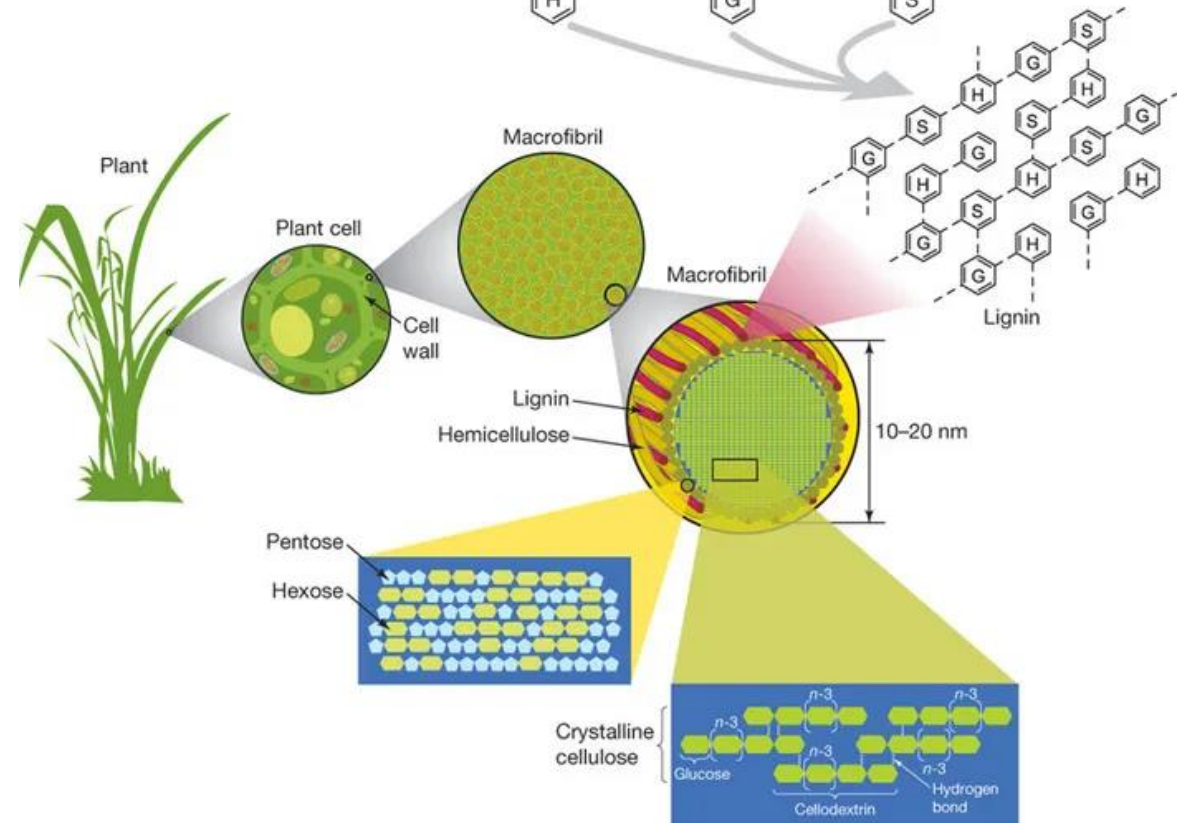
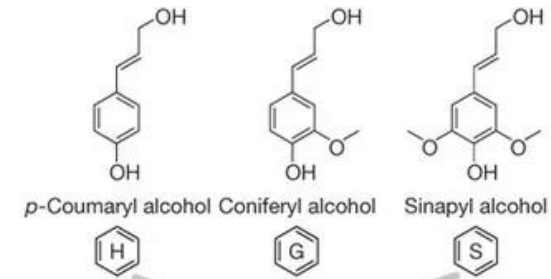
Lignocellulosic Biomass

3 Main Constituents

- **Lignin:** Lignin is a complex, three dimensionally crosslinked organic biopolymer

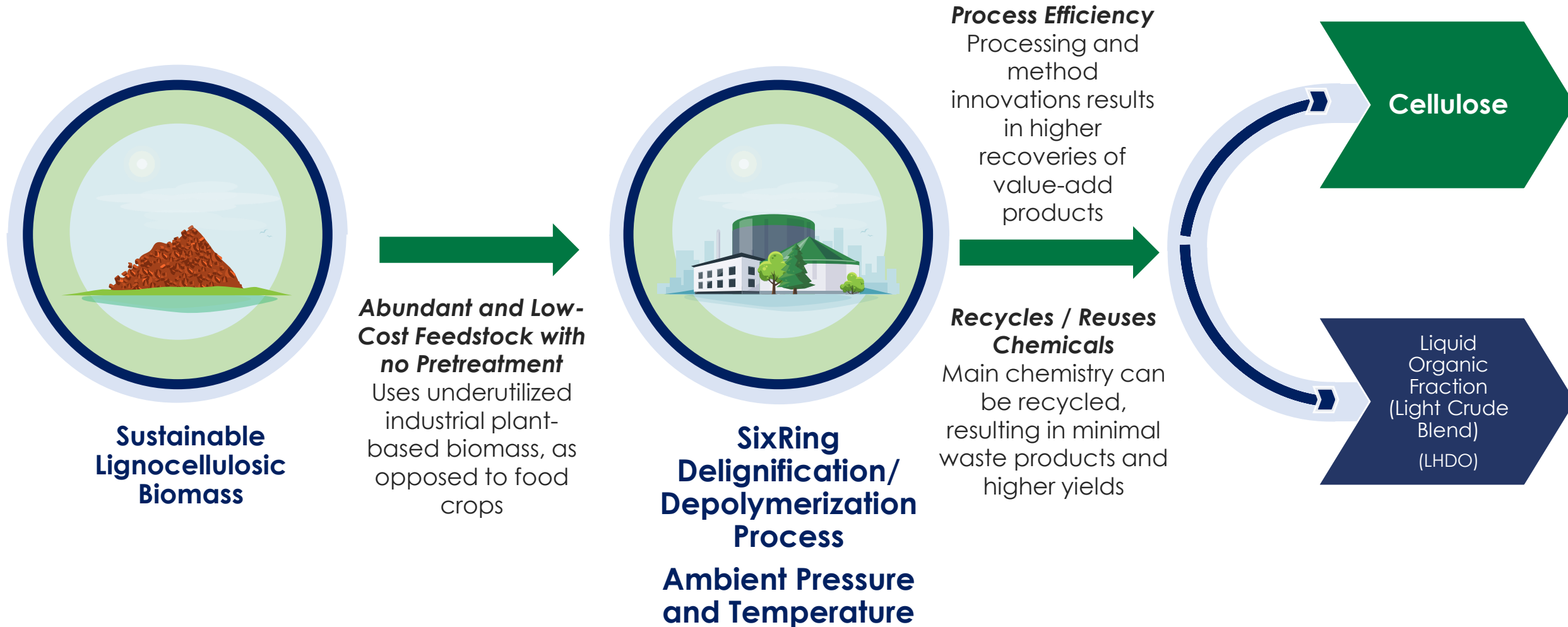
- **Hemicellulose:** A branched, low molecular weight, amorphous heteropolymeric polysaccharide

- **Cellulose:** A linear, high molecular weight, semi-crystalline homopolymeric polysaccharide (D-glucose)



SixRing Technology

The Process



Feedstock Sources - Industrial Biomass



Forestry and Exotics:

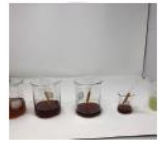
- Hardwood and softwood
 - i.e., wood chips, sawdust, purpose-grown, etc.
- West Coast hog fuel
 - high saline content bark
- Bamboo
- Nut shells and husks
- Coconut shells and husks
- Processed palm residue

Underutilized Agricultural Materials and Straws:

- Corn Stover
- Rice Straw
- Canola Straw
- Flax
- Hemp
- Alfalfa
- Bagasse
- Rice hulls



SixRing Journey: A Snapshot



Benchtop Experiment

Perform feasibility tests at lab scale [1-2L]

PILOT PLANT GROWTH TIMELINE



March 2020

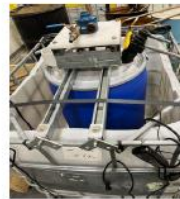
Sept 2020



Buchi Reactor

Run scale up reactions on a 10L vessel

March 2021



Barrel Reactor

20:1 scale up using a 200L barrel to validate lab results

Sept 2021



Commission First Demo Unit Reactor

Commission first reactor with a capacity of 2000L.

Aug 2023



Scale Up Esterification Process

- Scale up esterification with a 2000L SS reactor
- 2m3 flash evaporator
- Pilot a liquid/liquid column from Koch Modular

Mar 2023



Commission Continuous Digester

Design and built a digester to produce continuous flow. Filed provisional patents

Aug 2022



Commission 2 more Reactors

Commission a 5000L SS reactor and 2000L reactor

Nov 2023



20,000 L Reactor Scale Up

Commission a 20KL reactor to de-risk commercial scale up and verify chemical consumption



SixRing Pilot Facility

- Licensee feedstock analysis
- IP generation
- High value product development
- Process optimization



SixRing Enables 2 Independent Pathways to SAF

