A NIDUS PORTFOLIO COMPANY

BIOMASS TO FURANICS PLATFORM

Bio Pacific Rim Summit
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Glucan Biorenewables Platform

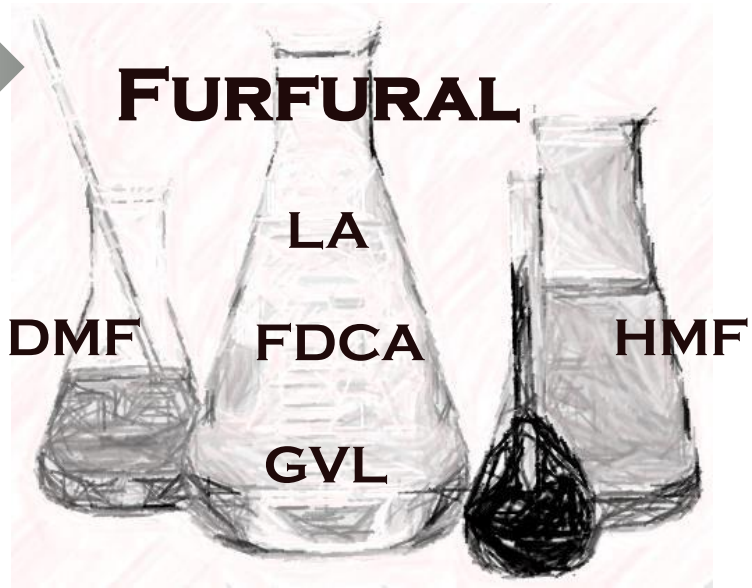
Catalyzed at CBiRC with Technology from the University of Wisconsin

Goal → Economically Viable Cellulosic Biomass Plants in North America

Biomass Versatility

Glucan Technology

Furanic Chemicals



Market: Significant Opportunity

Furan Platform

Who Cares?

>$3 billion

Furan Platform Opportunity

furfural

HMF

Furfuryl alcohol

DMF

FDCA

2MeTHF

PEF

>$500 million

Target Market

furfural (worldwide)

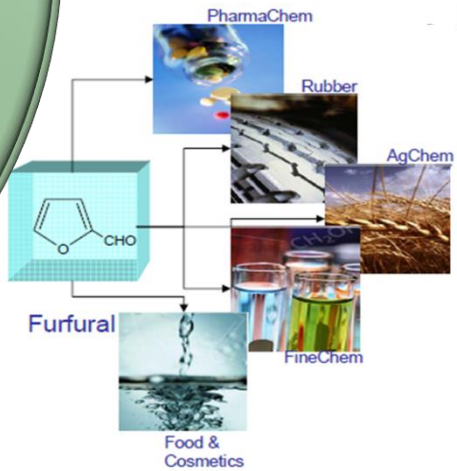
DMF (specialty & solvents)

$20 million

Proof of Platform

furfural (North America)

DMF (specialty)



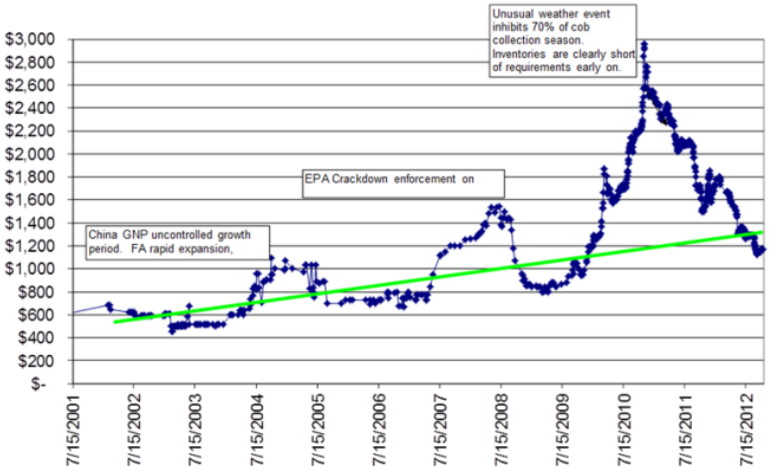
The Furfural Market Opportunity

GlucanBio's new furfural process is a game-changer

*GlucanBio's first commercial plant will deliver a reliable, **cost-competitive** source of furfural in North America.*

Current Furfural Market Dynamics

- No North American Production
- 70% of production in China
- Reliable supply concerns
- Erratic pricing over 10 years

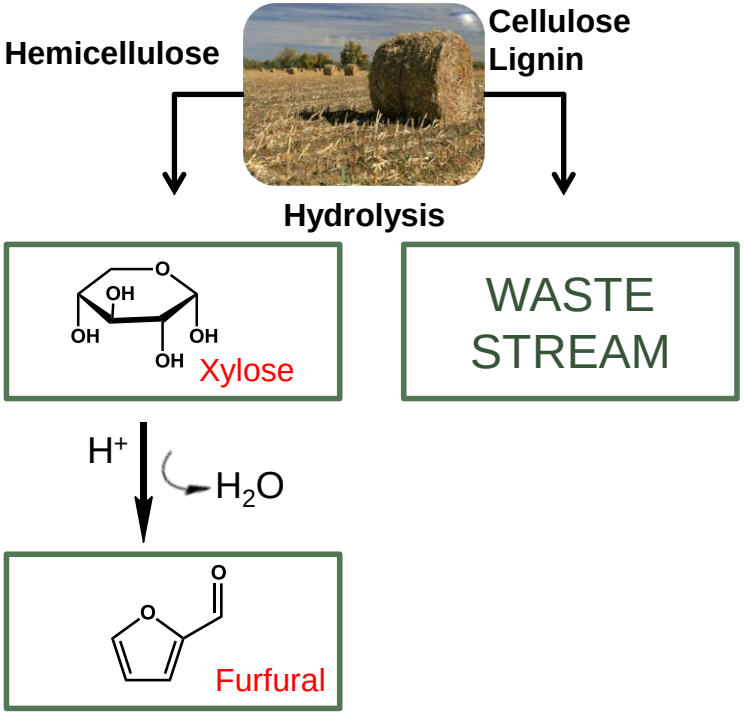


Furfural Pricing Over the Last Decade FOB China

Technology: Current Process

Typical furfural production

Existing furfural plants use a process that was first discovered in the early 1900's. The process is aqueous-based and energy-intensive producing significant waste streams. Over 70% of production is corn-cob based and located in China.



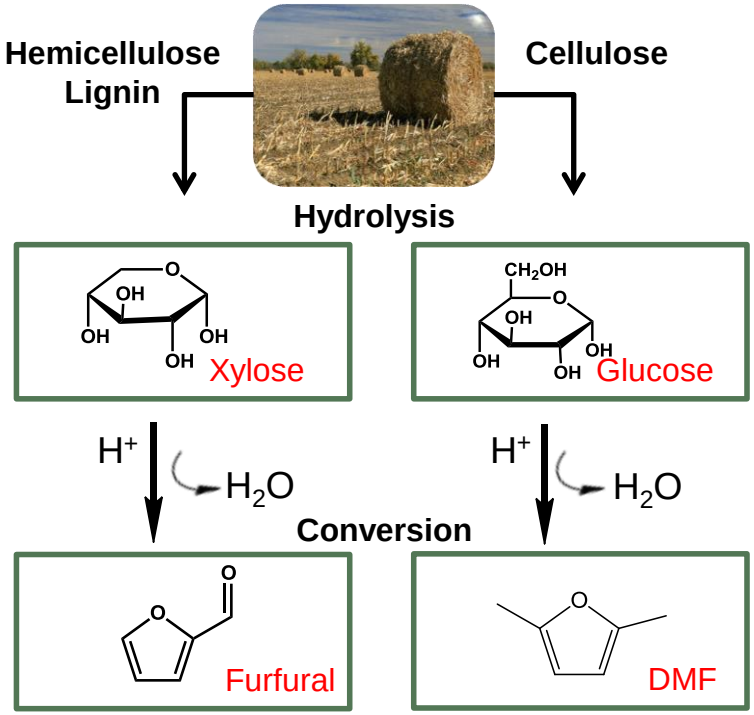
Technology: The GlucanBio Advantage

gamma-Valerolactone (GVL): a proprietary solvent system

Gamma-Valerolactone provides key advantages in both the hydrolysis reaction and conversion reaction enabling co-production of products, lower energy input and better yields.

Key Advantages

- Enables separation of sugars
- Feedstock agnostic
- Minimizes degradation
- Stable solvent system
- Solubilizes lignin
- Green solvent



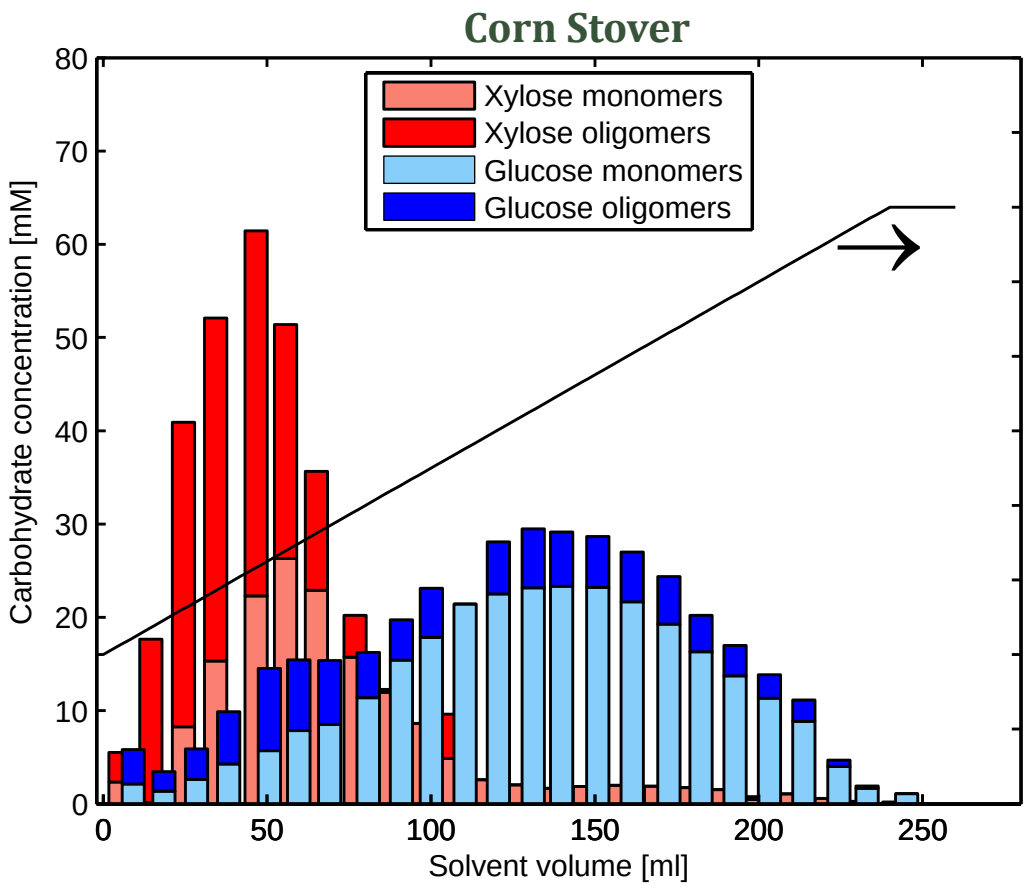
Technology: Front end Sugar Separation

GlucanBio

GVL provides a mechanism to separate hemicellulose and cellulose for further processing.

C5 yield, 90% (monomer+oligomers)

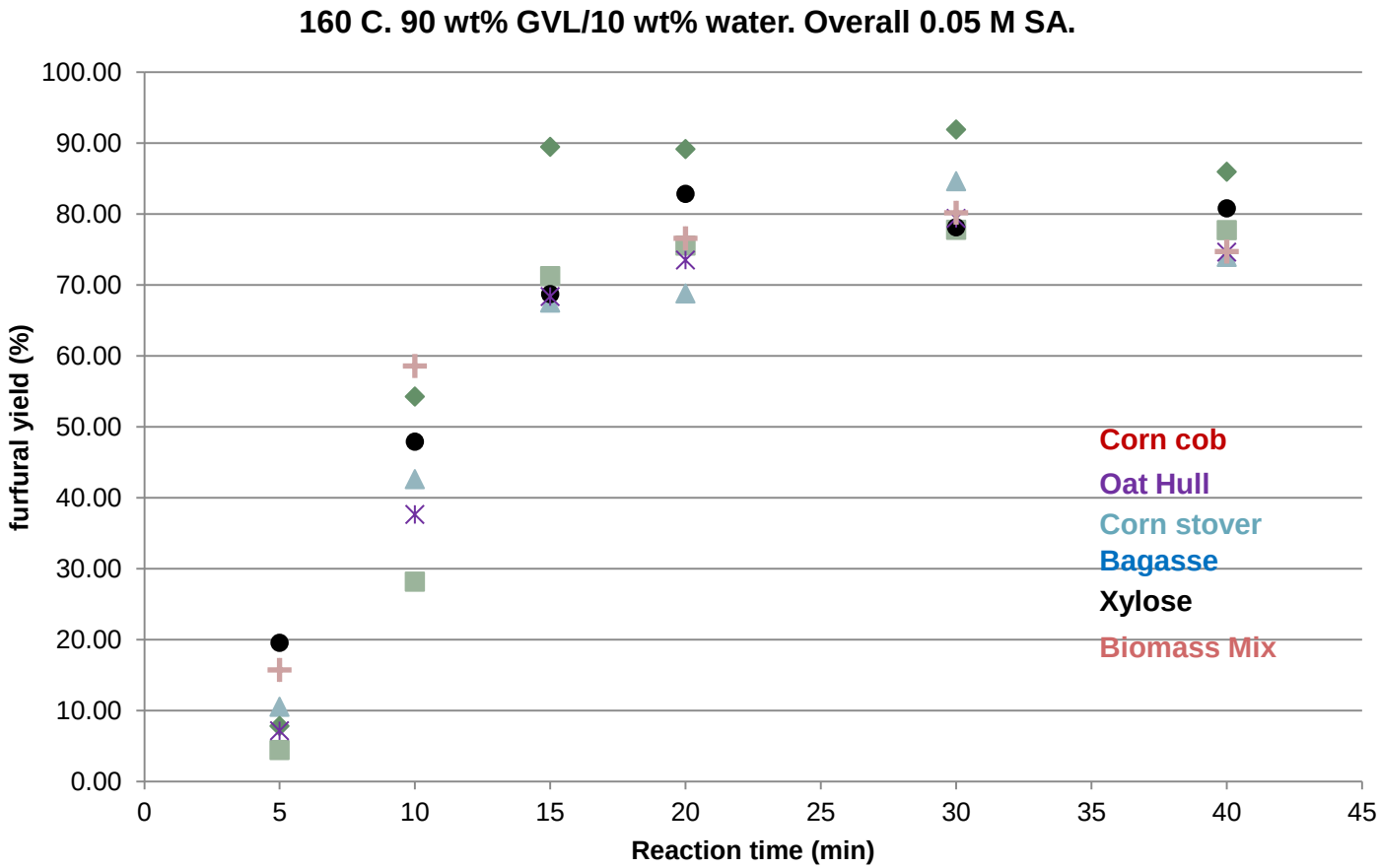
C6 yield, 80% (monomer + oligomers)



Technology: Feedstock Versatility

Consistent Yields

Technology is feedstock agnostic providing the opportunity to partner with multiple companies.



Cost Improvement Opportunity

Low Cost Producer Strategy

GlucanBio

Techno-Economic modelling shows we can be competitive in the market

Operating Costs for China Production*	
Raw Material (50% – 60%) 10/1	$600
Operating Cost	$490
Energy (~65%)	$320
Total Cost	$1090
Gross Profit Margin (10% - 15%)	12%
Furfural Price - FOB China	$1220
Freight (to Memphis)	$300
Delivered Price	$1520

Co-Production spreads raw material costs over more product volume

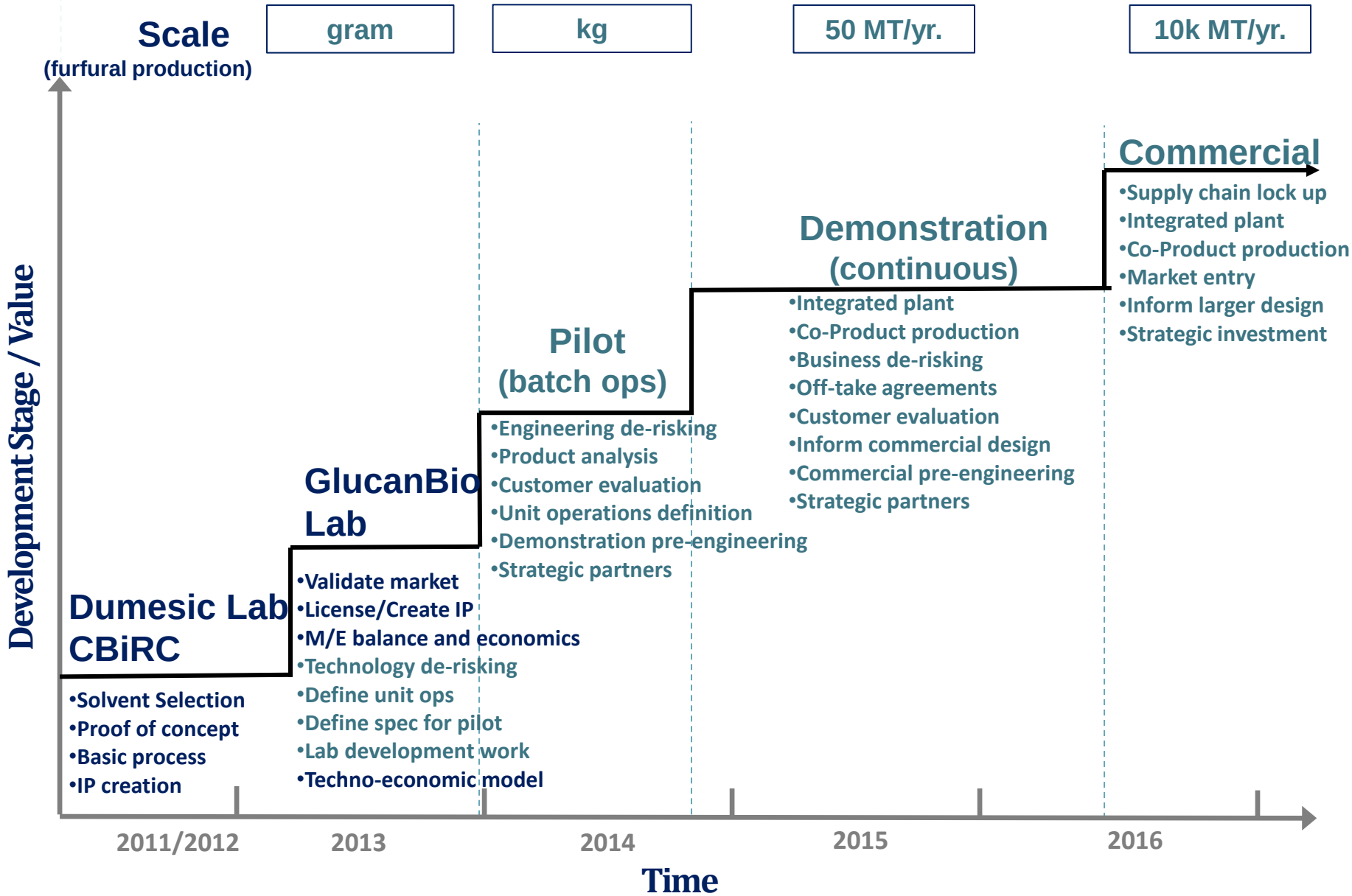
Improves yields reduce input cost (7.5/1)

Solvent versus aqueous process significantly reduces energy costs

Manufacturing in North America will save on transportation costs

**Estimated with input from PennAKem and validated by International Furan*

GlucanBio De-risking and Scale-up



GlucanBio Team

Experienced Start-up Team

GlucanBio team has significant experience in catalysis, engineering scale-up, intellectual property management and early stage commercialization

Vicki Gonzalez
CEO

Jeff Fornero Ph.D.
VP Engineering

David Alonso Ph.D.
Director R&D

James Dumesic Ph.D.
Founder, leading expert in catalytic conversion, founder of Virent

Brent Shanks Ph.D.
Founder, Director, CBiRC, 10 years with Shell Oil, catalysis expertise

Duke Leahey
IP & Licensing

<u>Advisory Board</u>

- Vicki Holt
  - Former CEO of Spartech
- Terry Sutter
  - Executive Advisor, Aurora Capital
- Pat Moore
  - Former CEO Smurfit Stone, ADM Board member
- Peter Keeling
  - Founder, Innovation Director, CBiRC

Strategic Partners

Company is Seeking $2MM in Series A Funding

Strategic Partners

- ✓ Nidus Partners
  - Bunge, Monsanto, and Novozymes
- ✓ Wisconsin Alumni Research Foundation
- ✓ NSF Phase I
- ✓ NSF Phase IB
- ✓ JDA with Large Petrochemical Company
- Furfural Strategic Partner – In discussion
- Raw Material Strategic Partner – In discussion
- NSF Phase II