What Are Cellulosic Sugars?

NON-FOOD STARTING POINT

Biomass: Wood

Biomass: Energy Crop; Agricultural residues

CHALLENGES

Routes pursued for decades

Acids

Enzymes

Economics have been a challenge
Why Do Cellulosic Sugars Matter?

The 3 V’s…

VOLUME

• Volumes of sugar for biobased growth are too significant to be supported by first generation food based sugar sources
Meaningful Transition Of Fuels & Chemicals To Biobased Routes Will Not Be Possible Without Cellulosic Sugars

Meeting the RFS mandate would require diverting 100% of the current sugar harvest from the world’s top three producers, plus an additional 4 MM tons of sugar.

Source: USDA, Congressional Research Service, Renmatix Analysis
Cellulosics Offer The Potential To Achieve A Significant Volume Of Sugars

U.S. THEORETICAL POTENTIAL OVER 1T LBS OF SUGAR

United States accounts for only:
- 39% of global corn residues
- 20% of global lumber harvest
- 14% of global cotton production
- 3% of global barley straw harvest
- 2% of global sugarcane bagasse
- <1% of global bamboo growth

Source: USDA/DOE Billion-Ton Study April 2005
Why Do Cellulosic Sugars Matter?

The 3 V’s…

**VOLUME**

- Volumes of sugar for biobased growth are too significant to be supported by first generation food based sugar sources

**VOLATILITY**

- Cellulosic sugars offer significantly reduced volatility compared to other sugar and carbon sources
Cellulosics Offer Significantly Lower Volatility Than Other Carbon Sources

2005-2012 QUARTERLY PRICE CHANGES

Source: Bureau of Labor Statistics, EIA, USDA

Biomass with significantly lower volatility
Why Does Renmatix Matter?
Only Renmatix Can Offer The Third V: Value

The 3 V’s

**VOLUME**
- Volumes of sugar for biobased growth are too significant to be supported by first generation food based sugar sources

**VOLATILITY**
- Cellulosic sugars offer significantly reduced volatility compared to other sugar and carbon sources

**VALUE**
- Only Renmatix can produce cellulosic sugars at a cost comparable to first generation sugar sources; a cost that will enable the biobased industry
Renmatix Has A Novel Approach: Supercritical Hydrolysis

**Enzymatic Hydrolysis**

- **Capex**
  - Speed of process (minutes vs. days)
- **Opex**
  - Lack of expensive consumables (enzymes)

**Acid Hydrolysis**

- **Capex**
  - Materials of construction, no acid recovery system
- **Opex**
  - Less consumables and resulting waste streams

**Gasification**

- **Capex**
  - Less complex system; no expensive catalysts
- **Opex**
  - Higher yield of carbon in biomass to useful products

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**Supercritical Hydrolysis**

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Flexible Process Technology Platform: Plantrose™ Process

Our platform is designed for flexibility.

Supercritical water platform for biomass conversion

- Woody biomass
- Agricultural residues
- Energy grasses
- Other waste sources

Sugar

Lignin
Renmatix Partners/Investors Bring Technical Skill, Strategic Validation, And Financial Support

- Series A and B fully funded by Kleiner Perkins; additional participation in Series C
- World leading venture capitalist John Doerr on Renmatix Board
- Series C led by BASF
- Invested $30M- far more than any other investment in a company of our stage
- Waste Management with significant investment of $25M
- Total Series C raise to date of $75M
Summary

• Cellulosic sugars, produced from a range of feedstocks, will enable the biobased industry
  ▪ Volume
  ▪ Volatility
  ▪ Value

• Renmatix has the winning approach to produce those sugars at the lowest cost