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Biotechnology Industry Organization

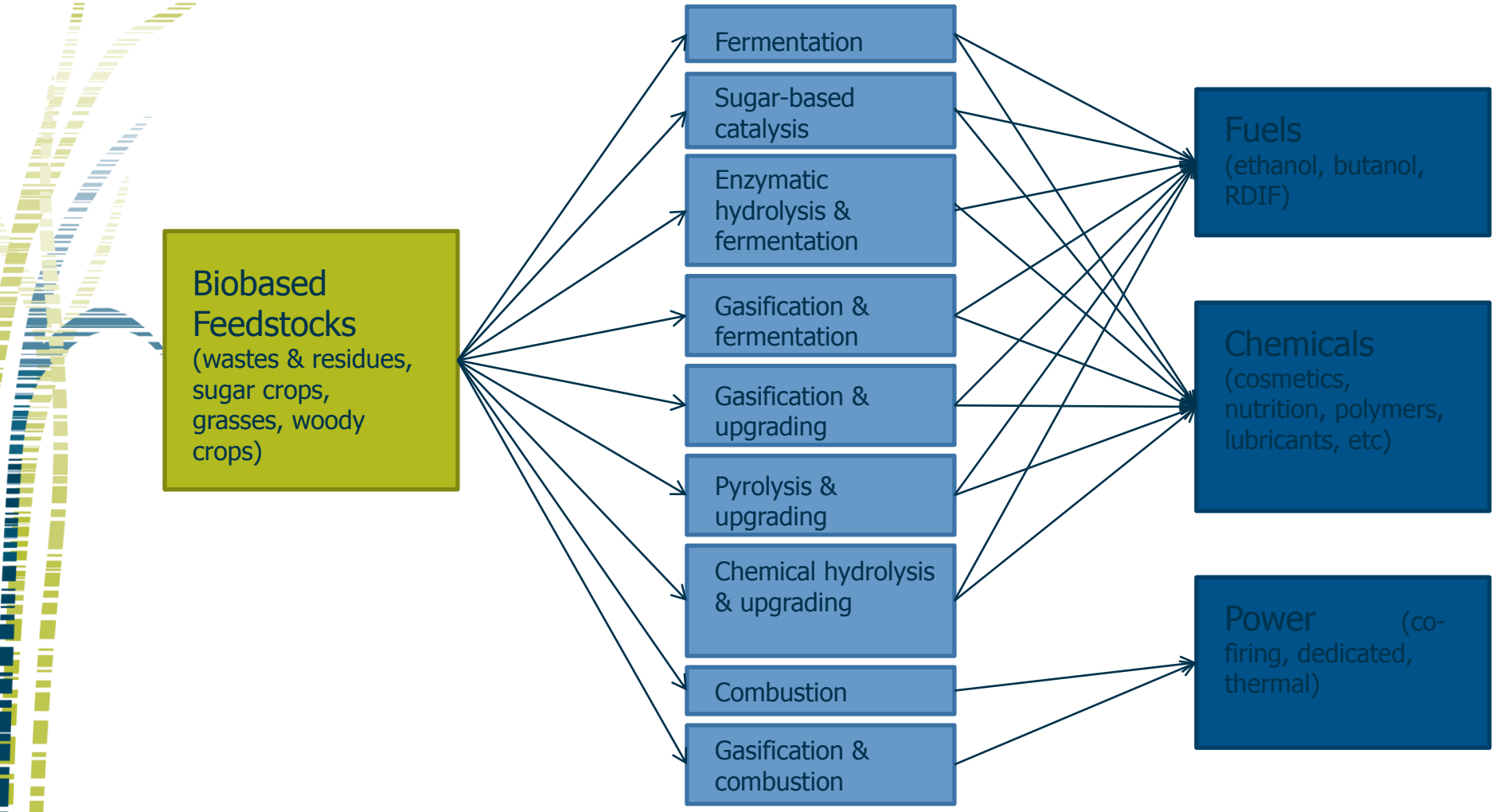
2012 Pacific Rim Summit on Industrial Biotechnology & Bioenergy

NEXT-GEN FEEDSTOCKS: GRASSES, REEDS, AND MACROALGAE

The Importance of Next-Gen Feedstocks

- Growth in demand
- Feedstock is #1 cost
- Requirements
  - Low cost
  - Scalable
  - Wide geographic range

Multiple Pathways



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steppe (stĕp)
A vast, semiarid grassland, as found in southeast Europe, Siberia, and central North America.

Who We Are

- NexSteppe is an expansion phase agricultural company
- We are developing proprietary seeds and feedstock supply solutions for the biofuels, biopower and bioproducts industries
- We use advanced breeding techniques and cutting-edge analytical technologies
- Our products are Dedicated energy crops – crops specifically optimized and purpose grown for the production of biofuels, biopower and bioproducts
- We focus scalability, reliability and cost-effectiveness
- The global market for these dedicated energy crop seeds is predicted to be >$10B by 2030

Our Products

Sugar Platform

Biomass Platform

Sweet Sorghum

- Sugar crop (can be crushed like sugarcane)
- Annual
- Rapid scale-up
- Low input requirements
- Wide geographic range

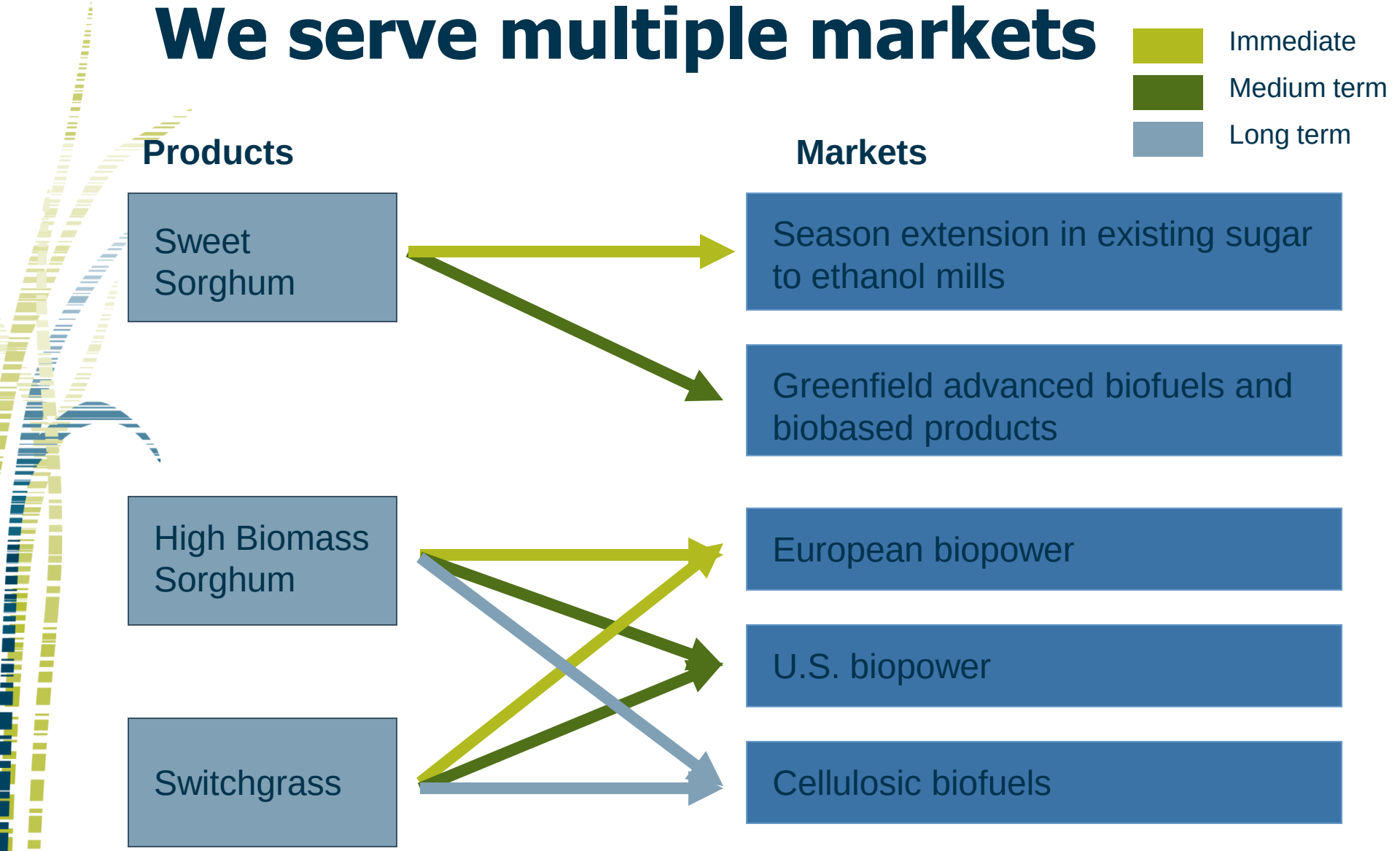
High Biomass Sorghum

- Biomass crop
- Annual
- High yield
- Low input requirements
- Wide geographic range

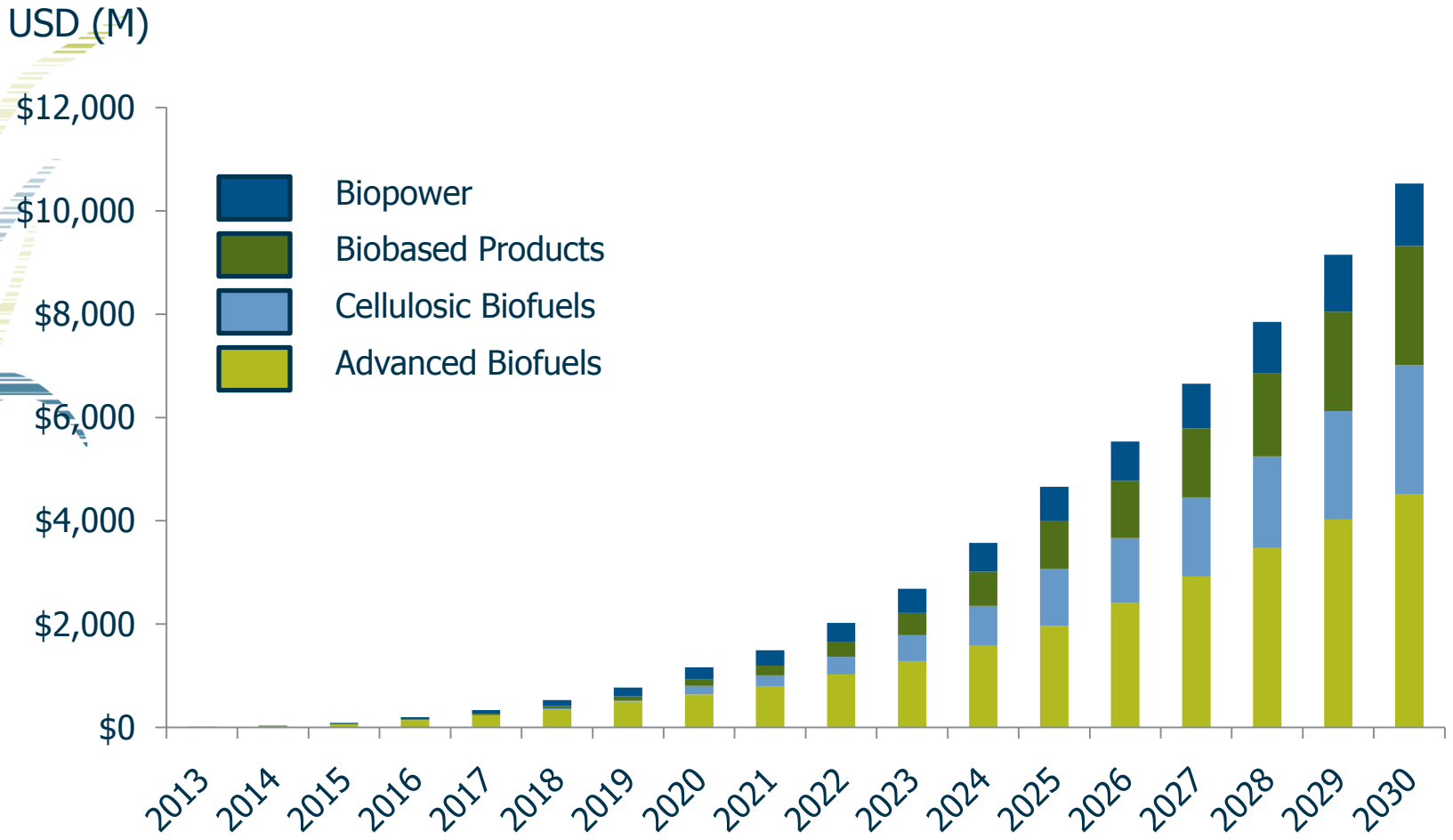
Switchgrass

- Biomass crop
- Perennial
- Seed propagated
- Low input requirements
- Wide geographic range

We serve multiple markets



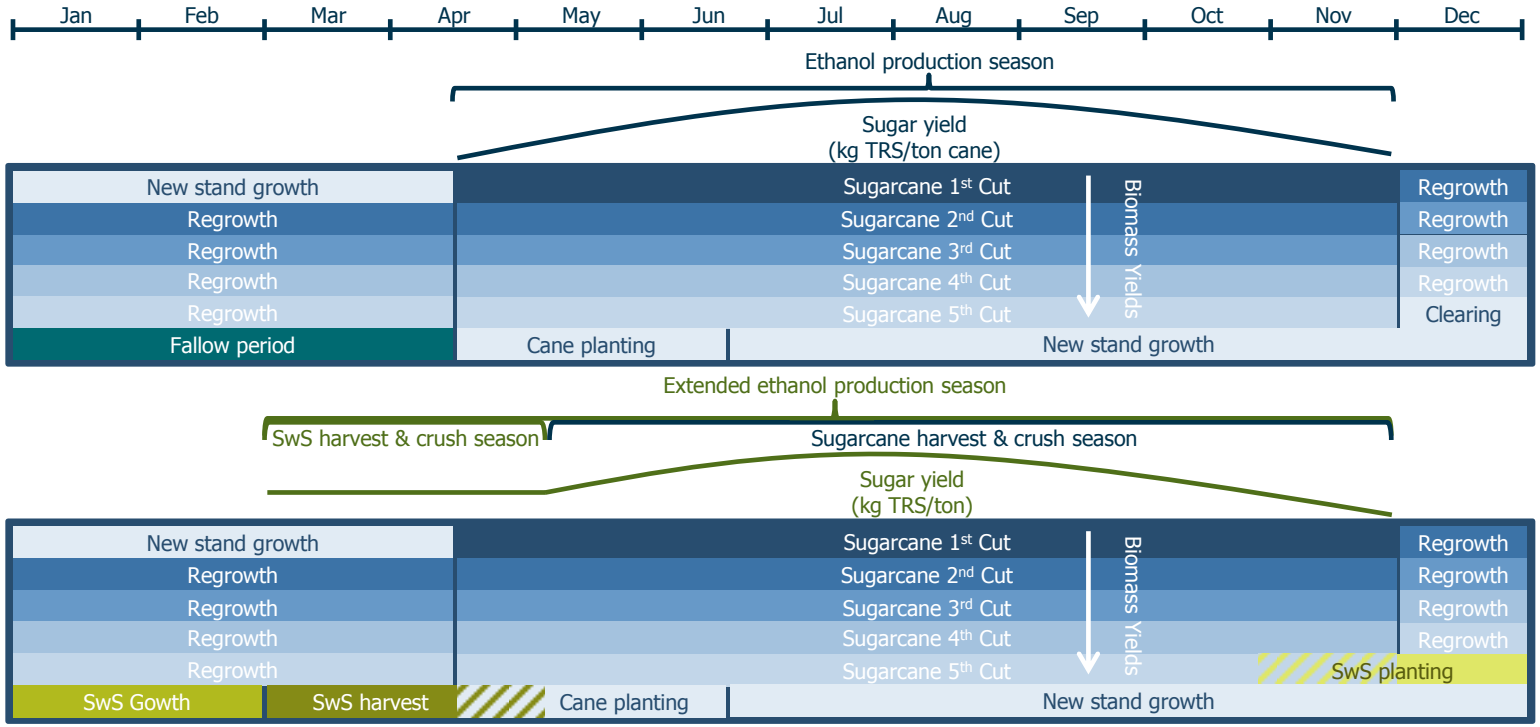
Dedicated Energy Crop Seed Market



>$200M addressable market by 2016; $1.9B by 2022, >$10B by 2030

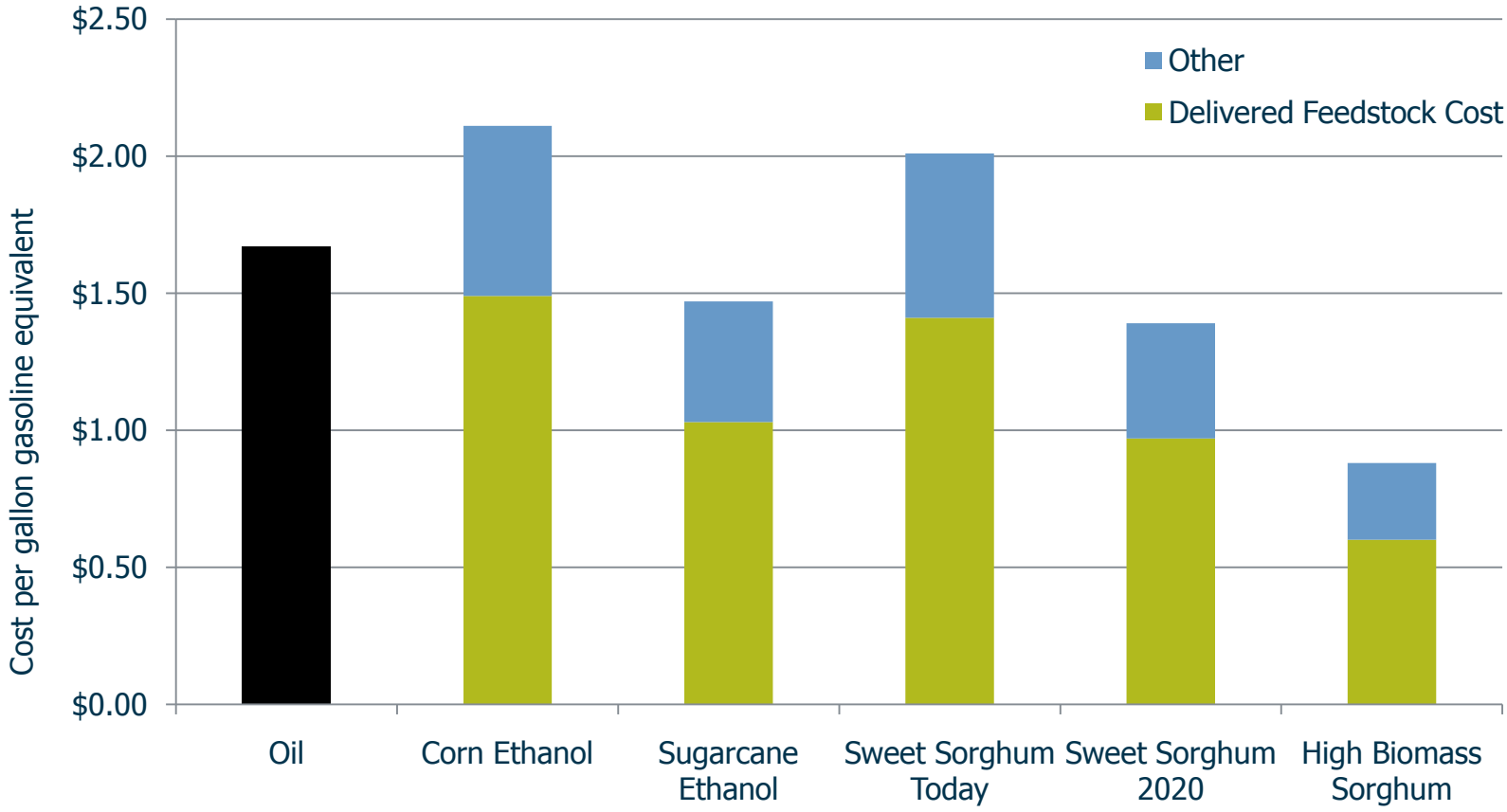
Season Extension in Brazil

- Season extension provides significant incremental benefits to mill owners using their existing resources
  - Improves yield on CAPEX by increasing utilization of existing crushing, fermentation and power generation capacity when it would otherwise be sitting idle
  - Uses land that would otherwise be sitting fallow or collecting de minimis rent from growth of low value cover crops
  - Provides access to higher ethanol prices before the bulk of crushing capacity comes online
  - Delays timing of start of a portion cane harvesting providing higher sugar yields from cane



2011-12 Brazil Field Days

Sorghum Feedstock Costs



Notes: Oil at $70/barrel, high biomass sorghum costs assume maturation of cellulosic conversion technologies

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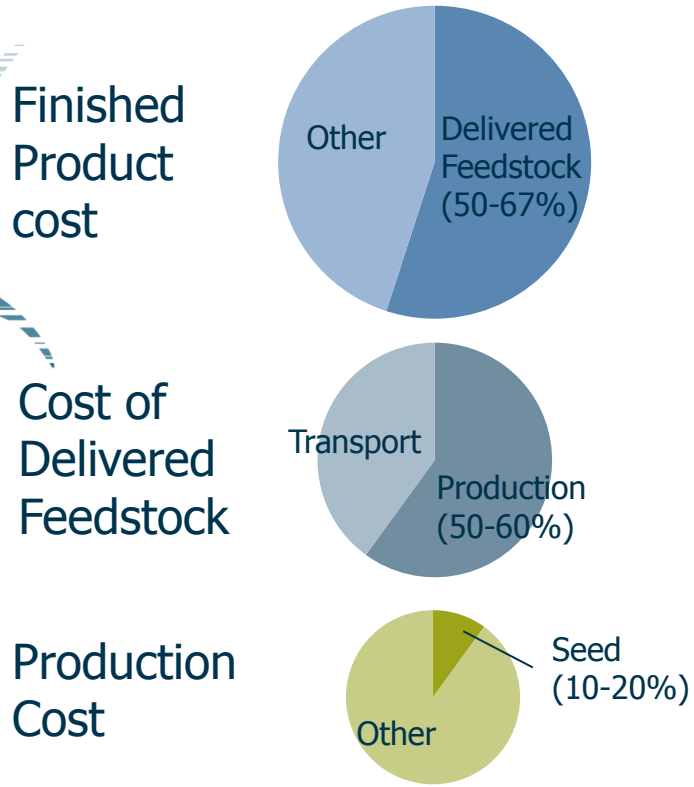
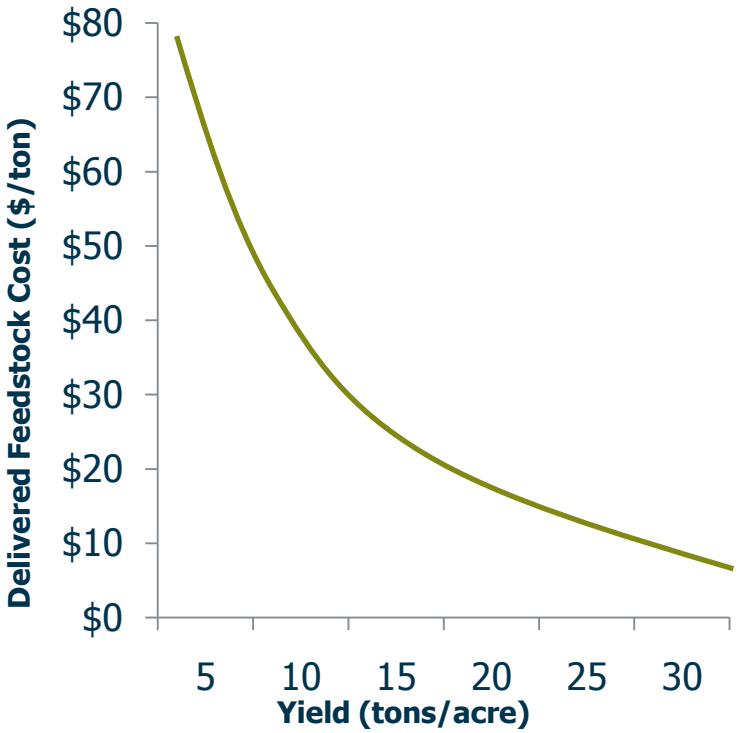
Yield is a Major Economic Lever

Seed cost as a % of total cost



Seed price will average ~5% of the total cost of biobased products or biofuels . . .

Harvest & Transportation Cost vs. Yield Density*

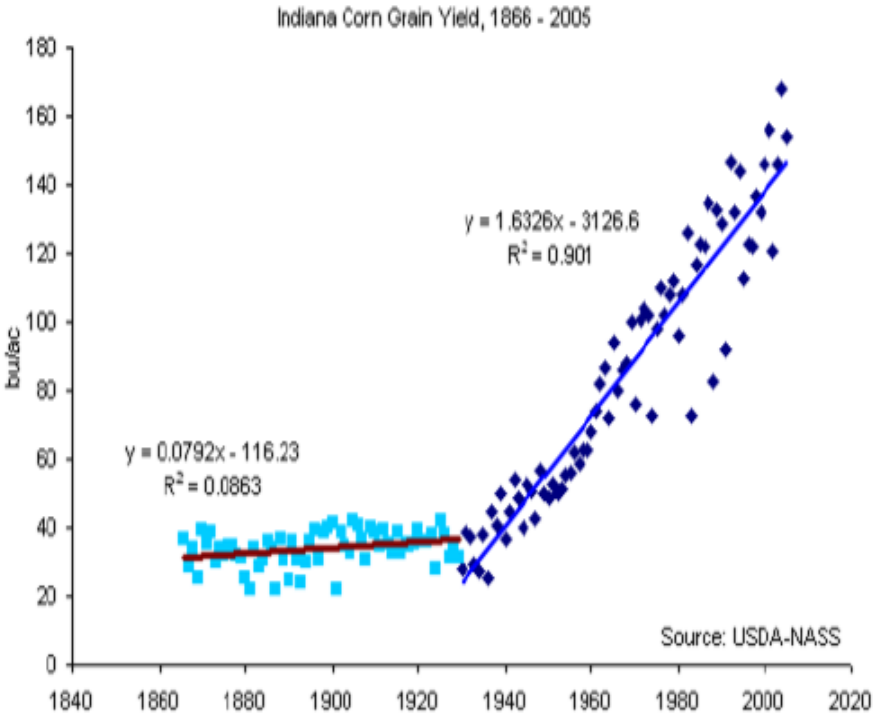


. . . but can have a major impact on total feedstock cost

*Illustrative

Why Hybrids

Hybridization can result in both heterosis (hybrid vigor) and highly consistent outcomes

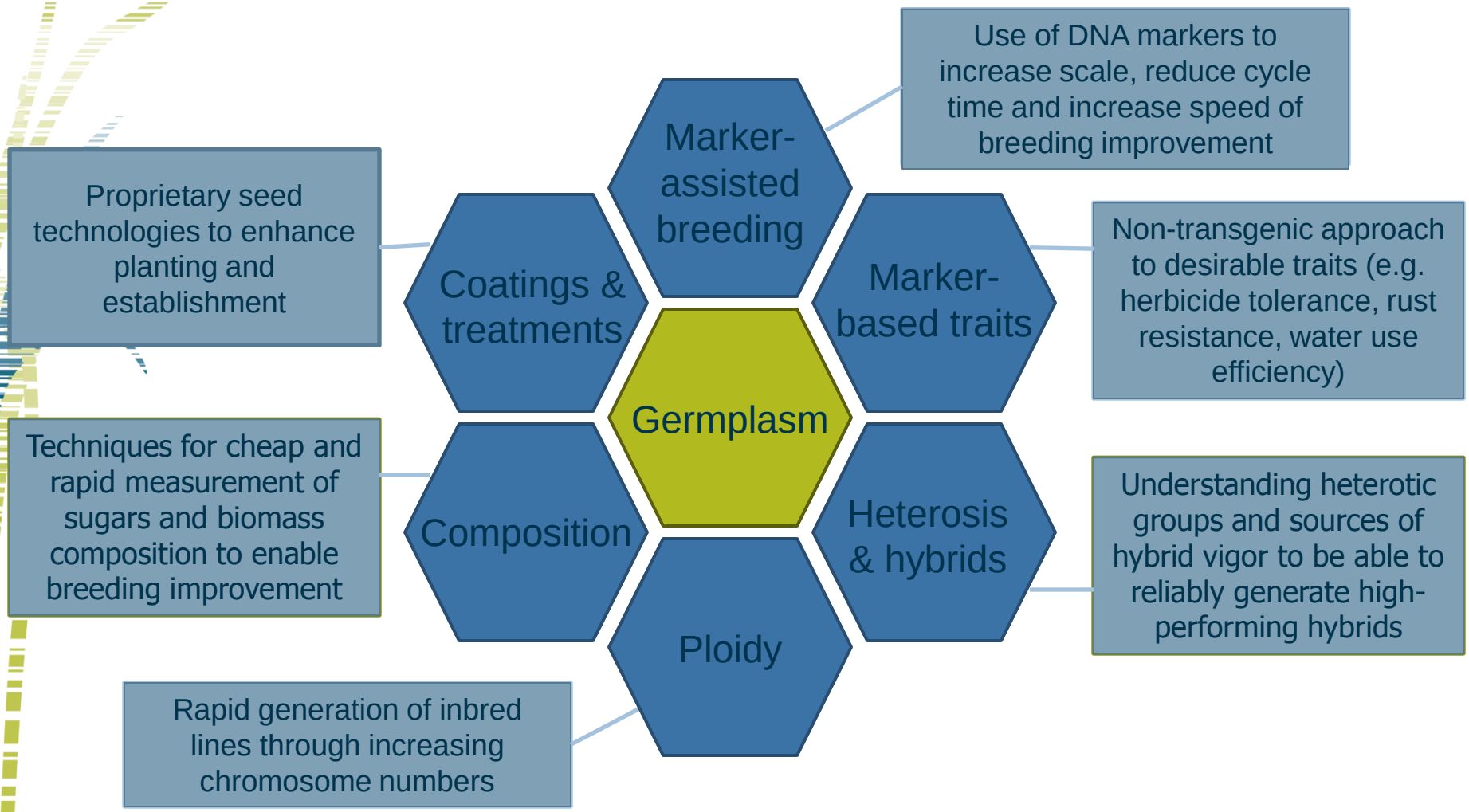


Modern breeding has improved corn yields more than fourfold since the introduction of the first hybrids in the 1930s

Why Sorgum?

- Huge genetic diversity
- Broad geographic adaptation
- Rapid breeding and product development cycle
- Established hybrid systems
- High-yielding
- Hardy – lower water, nitrogen requirements
- Seed propagated
- Easy to establish

Multi-Technology Platform



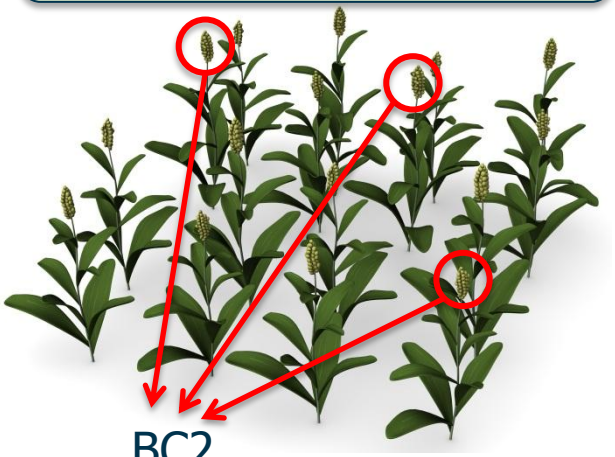
Marker Assisted Breeding

P_1 X P_2

P_1 X F_1

BC1

Visual Selection of BC1 plants that most closely resemble P1 – multiple selections are advanced to BC2



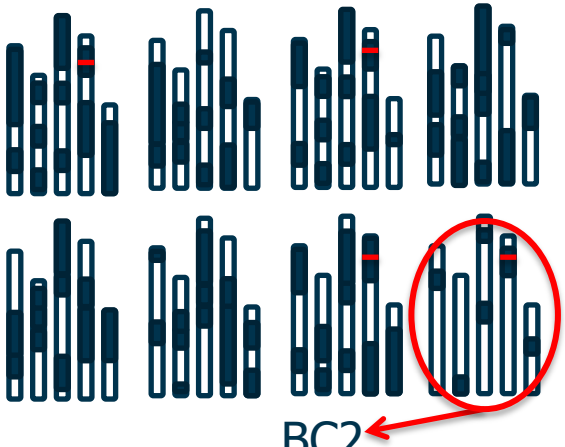
BC2

P_1 X P_2

P_1 X F_1

BC1

Positive selection for red gene + counter selection against P2 genome to select plants with most P1 markers and smallest % of P2



BC2

Key Advantages of the NexSteppe Approach

- Utilizes existing infrastructure and supply chains
- Highly leveraged approach to cost reduction
- Rapid rate of development
- Highly capital efficient
- Extremely scalable
- Sustainable

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