

# SUSTAINABLE FEEDSTOCKS: ISSUES FOR PRODUCERS & BRAND OWNERS

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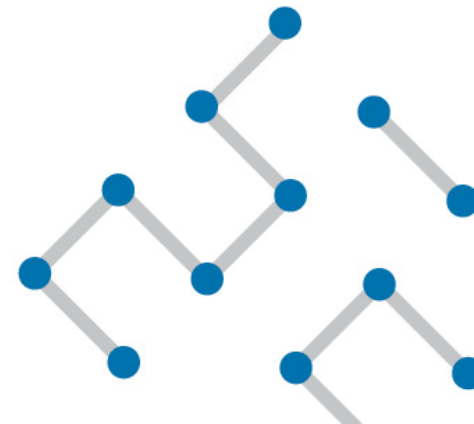
# Positive trends converging

- Industrial biotechnology products moving toward commercial deployment
- Consumer brand owners see them as a means to:
  - Reducing their supply chain carbon intensity
  - Reinforcing their brand sustainability attributes



# Upstream challenges

- Building supply logistics
- Dealing with an emerging supply chain
- Aggregating individual grower producers
- Establishing pricing power
- Anticipating sustainability needs
- Competing or non existing certification schemes



# Producer challenges

- Early stage technology development companies lack sustainability infrastructure
  - Stakeholders neither identified nor engaged
  - No metrics to follow or report
- Upstream supply is a secondary consideration
  - Conversion & capital efficiency is paramount
  - Cost is primary issue for grain derived materials
  - Availability & logistics for cellulosic biomass



# Brand owner challenges

- Brand reputation is paramount value creator
- Sustainability systems in place and robust
  - Stakeholders are engaged via long term alliances
  - Management is averse to decisions that put reputation at risk
  - Biofuels debate is a huge negative example
- Absence of any well established advocates for sustainable biobased economy that links the supply chain players



# Flavors of the reputation risk

- Grain derived raw materials for industrial uses
  - Food vs. fuel / food security
  - Land use change; direct and indirect
  - Ecosystem services deficit of production agriculture
- Cellulosic biomass
  - Habitat preservation & biodiversity
  - Land use change: food to dedicated energy crops
  - Deforestation



# Risk management tools

- Robust LCAs of upstream supply
- Stakeholder engagement for metrics
  - Baseline and continuous improvement goals
- Best practices defined, deployed, measured and benchmarked
- Certification schemes
- Robust academic research into issues
- Negotiated boundary conditions
  - Volumes, scales, timelines, transition states

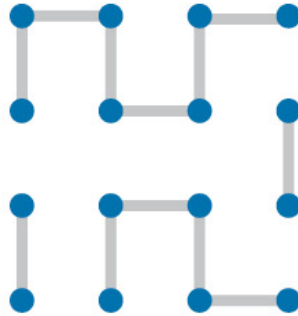


# Build on shared values

- Feeding people comes first
- Opinions based on facts
  - Disciplined LCAs to determine carbon intensity
  - Commitment to continuous improvement
- Open mindedness & pragmatic problem solving
  - Production agriculture is not monolithic
  - Environmental stakeholders are not all the same
- Assume good intentions







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