

# Bion's New York State Integrated Biofuels & Cattle CleanTech Opportunity

*June 23, 2009*



# The Changing World of Agriculture

- Successful participation in agricultural markets increasingly involves:
  - Globalized competition
  - Increased scale of operations
  - Private sector investment
  - Operational integration with vertical supply chain participants
  - Decreased environmental footprint
- Example: Investment in China's Dairy Industry
  - Current industry: 1.3M farmers with 5 – 10 cows: fragmented with poor milk yields and low safety standards
  - Kohlberg Kravis Roberts (KKR) investing \$150M in Modern Dairy
  - Based on growth in demand for dairy, greater personal wealth and increasingly westernized tastes
  - Investment will build 20 – 30 large dairy farms ***with control over the whole dairy supply chain***

# Bion's Integrated Projects

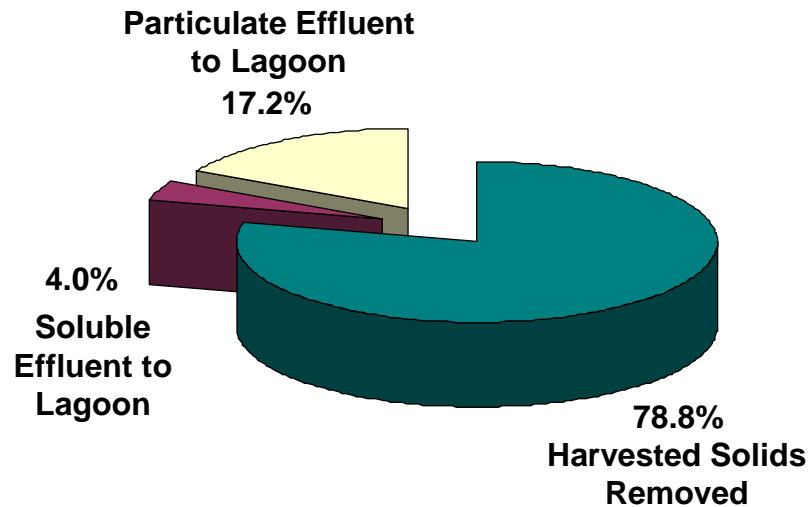
- Bion's proposed project for Oswego County will provide significant long-term, stable economic benefits to the region because it will be able to successfully compete in this new global marketplace.
- Project characteristics:
  - Large-scale
  - Closed-loop
  - Vertical integration of cattle finishing with processing with
  - Substantial generation of renewable energy
  - World-class environmental sustainability
- The enabler is Bion's patented and demonstrated comprehensive waste treatment technology!

# Bion's Waste Treatment Technology Performance

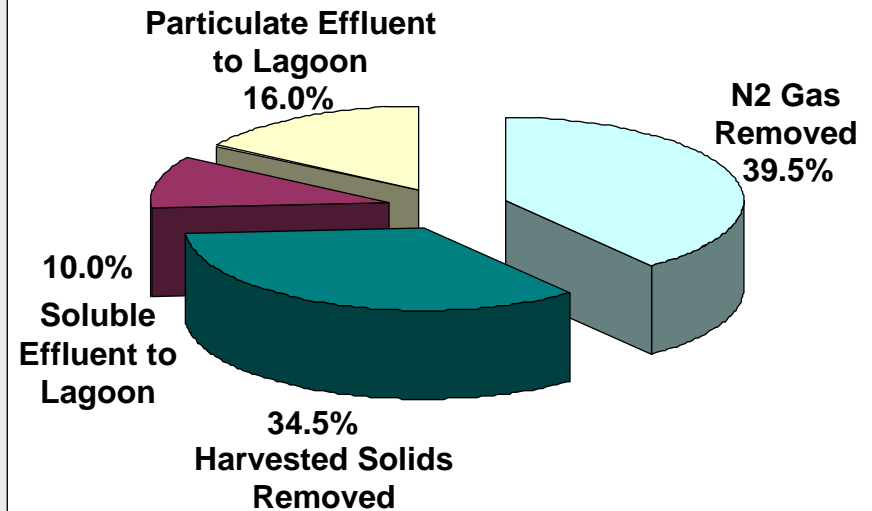
## Effluent Reductions

- On-farm P Levels Reduced by 79%; soluble fraction reduced to 4%
- On-farm N Levels Reduced by 74%; soluble fraction reduced to 10%

### Phosphorus Fate



### Nitrogen Fate



# Bion's Waste Treatment Technology Performance

Reduction in Air Emissions

## Bion Process Direct Emissions to Anaerobic Lagoon Direct Emissions

**REDUCTIONS**

<b>NH<sub>3</sub></b>	<b>99%</b>
<b>VOCs</b>	<b>98%</b>
<b>CH<sub>4</sub></b>	<b>94%</b>
<b>H<sub>2</sub>S</b>	<b>95%</b>
<b>NO<sub>x</sub></b>	<b>93%</b> (N <sub>2</sub> O)

# 3rd Party Technology Reviews

## Technology Reviews beyond 3<sup>rd</sup> Party Review Demonstration

- USDA NRCS: 3 practice standards qualifying for EQIP
- Waterkeeper Alliance: “A Citizen’s Guide to Manure Treatment Technologies”
- The South Coast Air Quality Management District (SCAQMD): “...demonstrate significant emissions reductions from anaerobic manure storage lagoons. (less than one pound per cow per year)
- The San Joaquin Valley Dairy Manure Technology Feasibility Assessment Panel: of 44 technologies review, only one that mitigated N & P releases to water and N emissions to air AND have data to prove...
- The San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD): “determined that the Bion NMS technology is an approvable VOC and ammonia control option for dairies...”
- Dr. Hopke odor assessment for SLC
- PA DEP certification for nutrient credits in the Chesapeake Bay watershed

# Environmental Impacts from Livestock Agriculture

## ➤ **Currently Regulated**

- Globally:
  - Greenhouse gas emissions (methane)
- Regional:
  - Nitrogen effluent runoff promotes eutrophication on a basin-wide level
  - Airborne ammonia ( $\text{NH}_3$ ) from the facilities settles throughout a basin, contributing to issues of public health and downwind surface water nitrogen loading
- Local Community/Watersheds:
  - Phosphorus (P) runoff to fresh surface water bodies results in algae blooms
  - Nitrogen (N) contaminates groundwater through leaching and contributes to nutrient overload in salt water bodies
  - Endocrines can impact ground and surface water bodies
  - Pathogens can contaminate both ground and surface water bodies
  - Odors impair neighborhood quality of life
  - Air Emissions – Hydrogen sulfide ( $\text{H}_2\text{S}$ ), volatile organic compounds (VOCs), etc., contribute to odor and health concerns
  - Public Health – Ammonia emissions from CAFOs are now exempt from CERCLA/EPCRA reporting

# Impacts Treated by Bion Comprehensive Process

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# Bion's Cleantech Biofuels/Cattle Project Overview

## Upstate NY Integrated Ag Project

### Integrated Project Facilities:

- 72,000 beef cattle on feed (supplemental dairy as supported by local ag inputs)
- 50 million gallons per year ethanol facility or equivalent
- Bion Integrated Waste Management Technology
  - Biological nutrient removal
  - Renewable energy
- Slaughter / Further Process Facility

### Integrated Project Inputs

- Midwest corn: 22 - 25 million bushels per year
- Local / regional ag products
- Other inputs



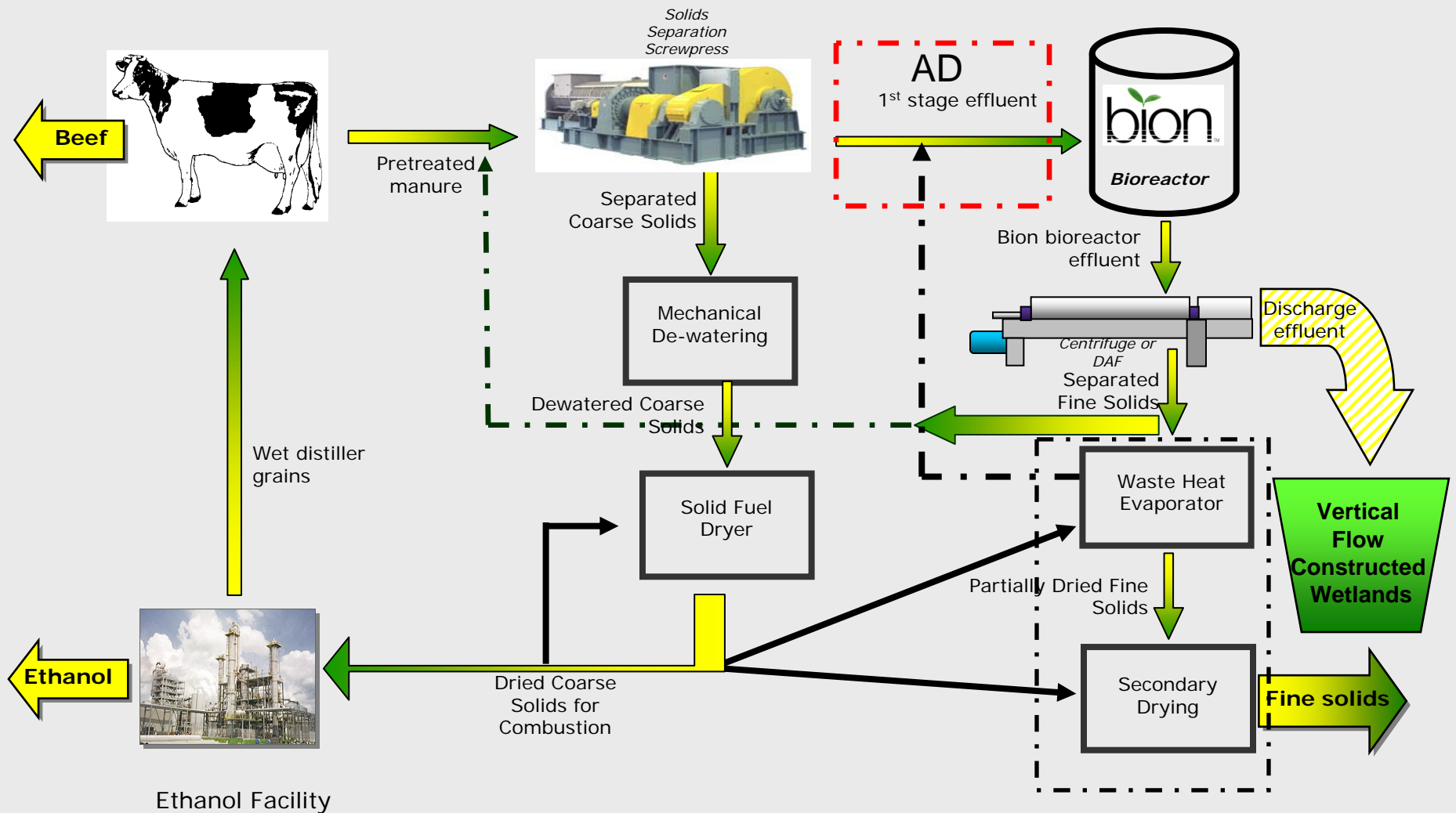
# Bion's Cleantech Biofuels/Cattle Project Overview

## Strategy: Why Upstate New York?

- Large population and markets nearby
  - Current NYS market for ethanol at 400 million gallons per year
  - Value-added market for specialty beef - branded / traceability
- Saint Lawrence Seaway- a transport alternative
  - Competitive corn transport system
  - Export market gateway
- Underutilized agricultural resources for hay / other ag inputs
  - Over 250,000 acres fallow cropland identified in north country
  - Calves shipped out of region for backgrounding / finishing
- Renewable Energy
  - NYS Renewable Energy Portfolio provides incentives and creates a market
  - Available alternate renewable energy feedstocks

# Bion Integrated Biofuels / Cattle Finishing Project

## Cattle / Ethanol Facility Integration



# Bion's Cleantech Project Overview

## Project Value Drivers

- A Cleantech project of this scale supports
  - Traceability
  - Branding
  - Food security
  - US and foreign consumer demand
- “Certified” through the US EPA Environmental Technology Verification Program (ETV)
- Resulting in significant economic benefits to the region

# Bion Integrated Biofuels / Cattle Finishing Project

## The Regional Opportunity

**There is no other Cleantech opportunity in NYS with this significance or potential for economic impact.**

- Capability of infrastructure buildout based on Bion's project becomes the driver of significant economic development
  - Once in place, enhanced regional infrastructure will support continued expansion to volume levels that will support processing facilities
  - Increased requirement for cattle feedstock / production of feed inputs
  - Processing facilities- slaughter and food preparation
- Entrance of CleanTech industries w/ renewable energy hold the ability to utilize the natural resources of the region to create an economic engine that provides long-term, non-transferrable jobs
- NYS Controller has committed over four years \$500M of NYS Pension Fund to NYS Cleantech projects that will generate jobs in NYS with Credit Suisse as one of the prime managers.

**Result: National Ag CleanTech Leadership**

# Bion's Cleantech Project Overview

## Significance to Upstate New York: Driver of Economic Benefits

- Creates demand for ag outputs that will be used locally
- Enables marginable farmland return to production for hay, corn, etc.
- Engine for creation of “non-transferable” jobs:

Projected Project Employment *		
Project Component	# of Employees	Total Annual Wages
Ethanol Production	33	\$1,755,000
Bion Technology Platform	42	\$2,035,000
Beef Feeding Operation	85	\$3,355,000
Freight & Trucking	<u>28</u>	<u>\$1,160,000</u>
<b>Total Project Direct Employment</b>	<b>188</b>	<b>\$8,305,000</b>

\* *Projections do not include:*

*Economic multiplier from conversion of fallow cropland to production*

*Employment from cattle slaughter/process facility: 400 additional jobs*

# ASK: Active Local Support

- State Support
  - NYS nutrient trading program;
  - Renewable energy equivalent;
  - Level NYSERDA playing field;
  - Loan guarantees: subsidies to be amortized over time so state enjoys tax benefits while providing some subsidy---win win
- Federal Support
  - Legislation that will provide funding for this specific project initially and for subsequent opportunities, specifically
    - livestock waste renewable energy credits;
    - corn based cellulosic ethanol equivalent; and
    - EPA ETV
  - All three tied to environmental benefit while attracting support from the livestock states-- i.e. NE---Terry

Thank You

