Working with Private Industry to Turn Food Waste into Methane

Gerald L. Reid

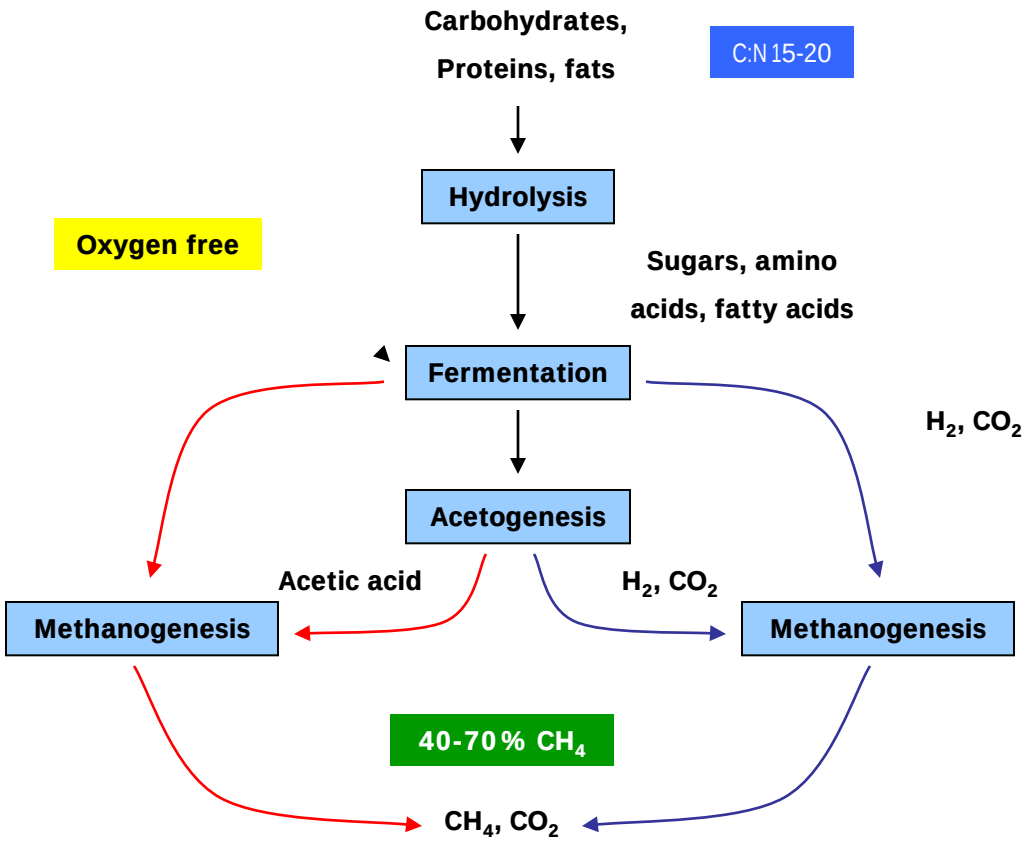
Research Center Administrators Society - Corpus Christi

February 7, 2011

Bringing Knowledge to Life

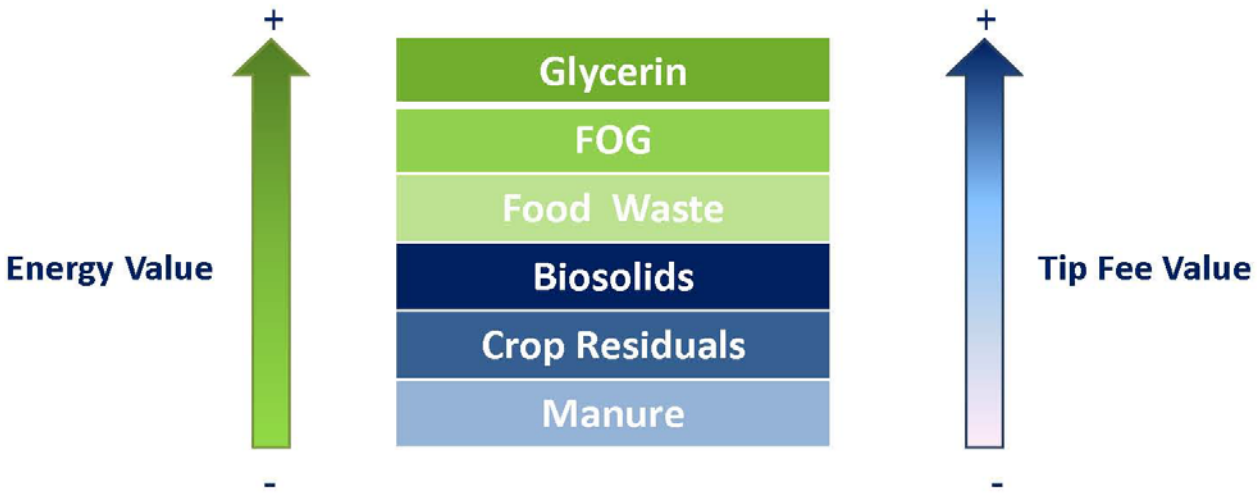
THE OHIO STATE UNIVERSITY
OARDC

Anaerobic Digestion Process



Biomass Value for Energy:

Which types of biomass are best for a digester?



Biomass recipes will differ based on the type and quantity of feedstock available in the region. **quasar's** laboratory on the OSU/OARDC campus validates biomass recipes to *guarantee* a system's energy potential for our customers.

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Ohio and Midwest Ideal for Methane Digestion

Mixture of Urban and Agriculture

Ag Biomass
Food Waste
Municipal (Biosolids)

Electric
Natural Gas
CNG

Fertilizer
Bedding
Compost

Result:

- Reduced GHG
- Cleaner Water
- Cleaner Air

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ABOUT quasar

- Ohio based waste-to-energy company
- Aggregation of the best anaerobic digestion technology available
- Produce energy & value added products from waste
- Laboratory & Engineering Facility on the OSU – OARDC campus
- Provide complete turn-key waste management solutions
- Dedicated to building systems based on US components
- 100+ years biosolids management experience
- Four facilities operating in Ohio and one under construction in Massachusetts

quasar's Mission … "To produce affordable renewable energy from commercial, municipal and agricultural biomass, while improving the environment."

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PROJECTS

Completed or In Progress

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- In December 2010 **quasar** initiated the commissioning of its fourth Ohio facility in Columbus. Operating facilities include:

Akron, Ohio - **Operational**
Wooster, Ohio /OSU-OARDC – **Operational**
Zanesville, Ohio – **Operational**
Columbus, Ohio – **Commissioning**
Rutland, Massachusetts – **Under Construction**
Dorset, Ohio – Comp Dairy Farm – **Coming Soon**

quasar's *operating facilities are exceeding design capacity by approximately 30% . . .*

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Ohio's Third Frontier

$2.3 mil voter approved initiative

Supports:

- Applied Research
- Commercialization
- Early-stage Capital Formation

Goal:

Create new technology based

- Products
- Companies
- Industries

Create seamless transition of ideas from the laboratory to the marketplace

Building an Industry

Ohio BioProducts Innovation Center

seepex.com
all things flow

Seaman Corporation

THE OHIO STATE UNIVERSITY
OARDC

BIOGAS TECHNOLOGIES UNLIMITED

Rockwell Automation

SIDWELL MATERIALS, INC.

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McCabe

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SYSTEMS

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SYSTEM DESIGN

Wooster, Ohio

Tank Capacity	550,000 gallons
Wet Tons	19,382 Tons / Year
Biomass Recipe	Manure, Food Waste, Crop Waste
Storage Tank	≈ 3 Days
HRT	≈ 28 Days
Energy Output	485 kW
Liquid Effluent	≈ 3.3 million Gallons / Year
Solids	≈ 4,710 Yards /Year
Renewable Energy Credits	3,500/ Year

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COLLABORATING FOR OHIO

OSU's ROLE

- **Partnership with The Ohio State University:** OARDC, OBIC, & ATI
- **Laboratory Management & Testing: quasar's** OARDC lab is managed by Dr. Yebo Li of OSU, graduate students and offers internships to ATI students
- **Groundbreaking 2011:** more than 9 locations across Ohio
  multiple facilities in other states

Developing quasar University: preparing students for jobs in Ohio's growing anaerobic digestion renewable energy industry by providing classroom training and hands-on experience at on campus anaerobic digestion systems.

THE OHIO STATE UNIVERSITY OARDC

THE OHIO STATE UNIVERSITY AGRICULTURAL TECHNICAL INSTITUTE

OBIC

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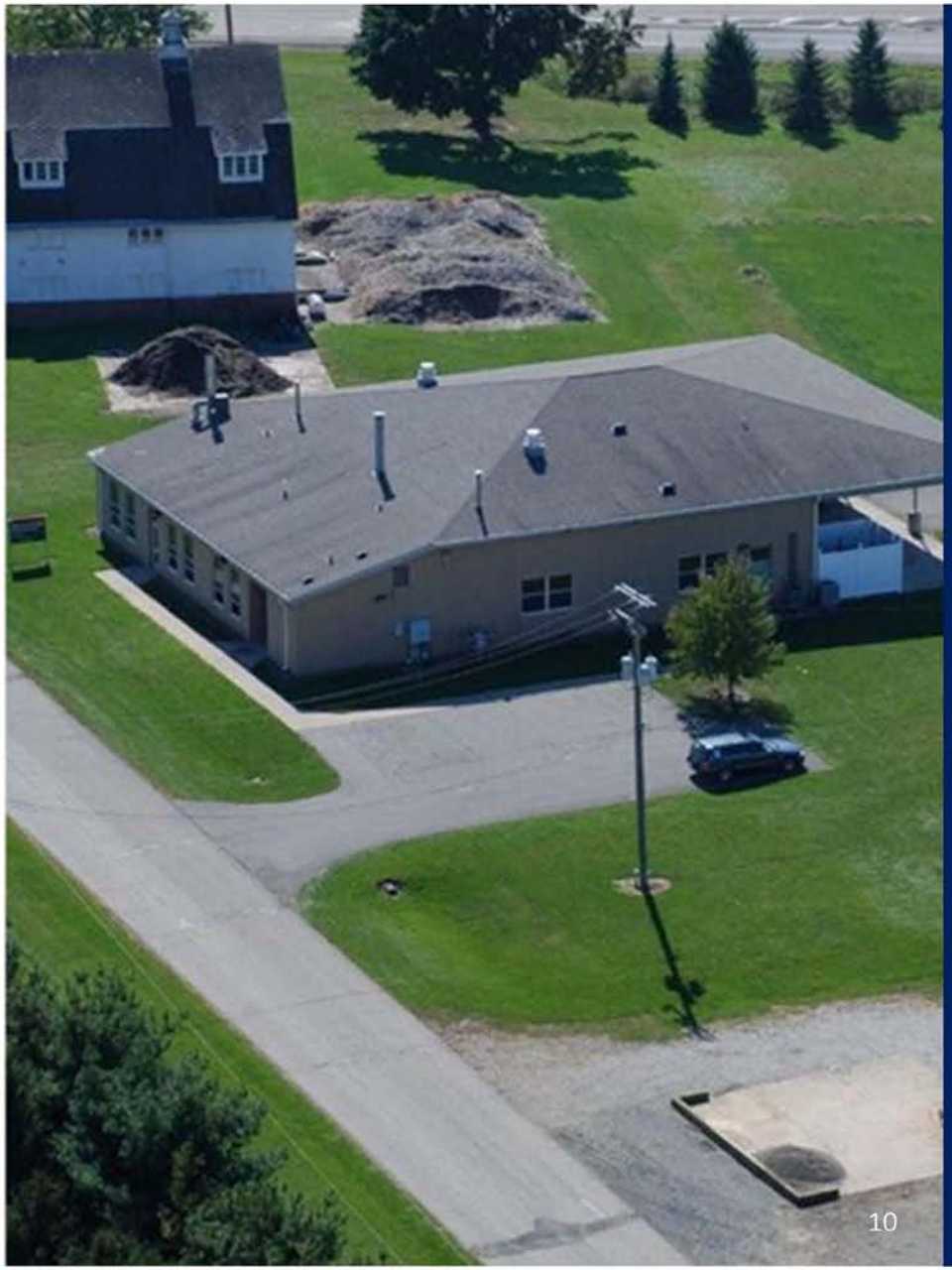
quasar 's state-of-the-art laboratory is located on the OSU-OARDC campus in Wooster, OH where we benefit from third party overview from university faculty.



LABORATORY

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LAB CAPABILITIES

- Full service research & development laboratory
- Modeling large scale digestion facilities with pilot scale digesters
  - Forecast energy & product values of organic biomass
  - Optimize biomass recipes
  - Full reporting on stability, production and commissioning
  - Determine efficient start-up and operations plan
- Dedicated laboratory staff in partnership with The Ohio State University's Agricultural Research & Development Campus – Wooster, OH

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BIOPRODUCTS and BIOENERGY RESEARCH LABORATORY

Current Projects:

BIOENERGY –

iADs to optimize co-digestion

BIOFUELS-

pretreatment of corn stover for ethanol production

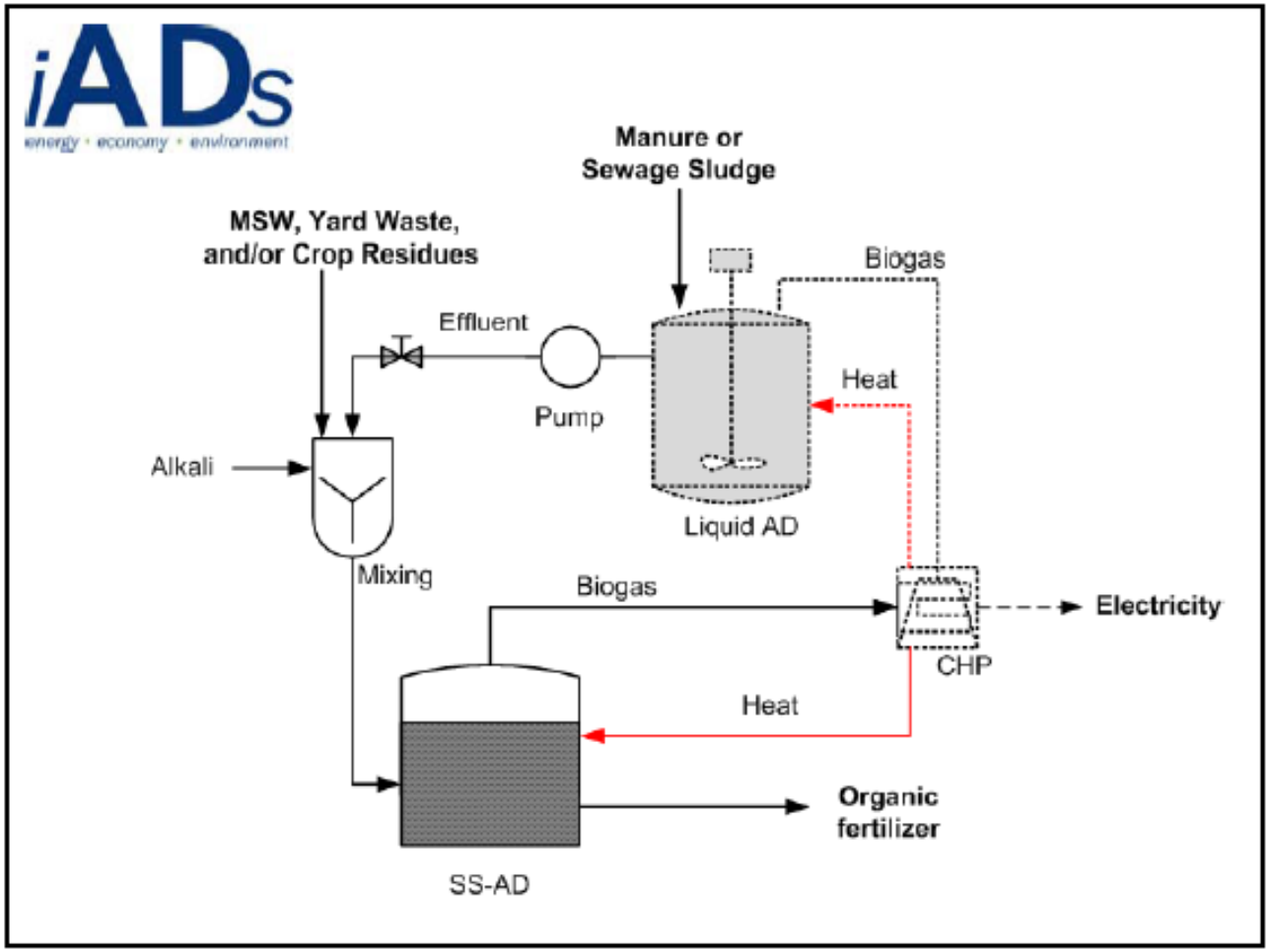
BIOPOLYMERS –

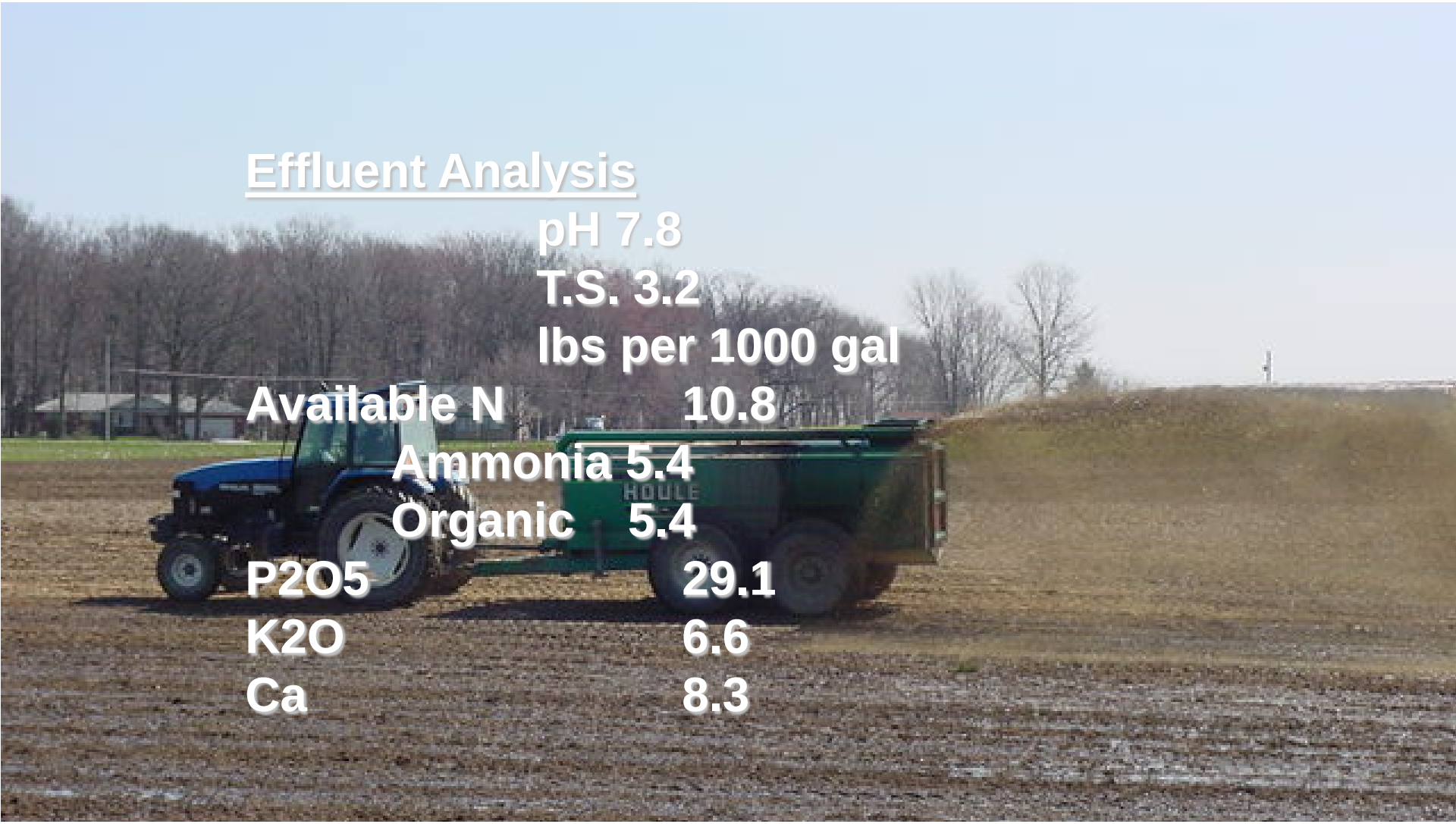
polyurethane foam from soybean processing waste

ALGAE –

from industrial CO_2
use of anaerobic digestion effluent

iADs – Integrated Anaerobic Digestion System





Effluent Analysis

pH 7.8

T.S. 3.2

lbs per 1000 gal

Available N	10.8
Ammonia	5.4
Organic	5.4
P_2O_5	29.1
K_2O	6.6
Ca	8.3

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OHIO'S OPPORTUNITY

RENEWABLE ENERGY FROM BIOMASS

- [1]Ohio can support 6,447 anaerobic digestion waste-to-energy facilities that can produce: **Natural Gas** - $1.92 Billion *or*
  Electricity - $1.62 Billion *or*
  CNG - $2.53 Billion

- These facilities represent $15.3 Billion in investment that will:

Energy: Promote Energy Independence
Economy: Create Green Jobs
Environment: Reduce Greenhouse Gas Emissions

- By training the next generation of technicians now, we can be prepared to answer the growth of this industry with a ready and able workforce
- This isn't about building biogas plants – it's about building a new industry for Ohio.

1. Based on a study supported by The Ohio State University

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Questions ???

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