

Biobased Products from Pre-collected, Pre- processed Biomass[©]

**Philip Goodrich PE
Department of Biosystems and Agricultural
Engineering, University of Minnesota
goodrich@umn.edu**

**Products that can be made from
animal residuals (manure) or
what I like to call**

**"Pre-collected, Pre-processed
Biomass"©**

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Will approach in this way

High volume, low value products

Middle volume, middle value products

Low volume, High value products

?? volume, researchable products

High volume, low value products:

Liquid fertilizer

Solid fertilizer

Compost

Soil amendments

Bedding for cows





The Use of Certification to Enhance By-Product Acceptance

Presented by:

Ron Alexander, R. Alexander Associates, Inc.

By-Products Reuse

- **By-product usage has grown significantly, and it will continue to so**
- **Understand how to make useful products**
- **Understand how to use the products**
- **Understand societal benefits**

BUT... facility mistakes, lack of effort, poor marketing, etc. has led to problems with acceptance / market expansion



Middle volume, middle value products

Methane from bio digestion -->

Electricity, Methanol, Dimethyl ether

Synthesis gas

Processed nutrients for vegetable production

Animal feed

Bottled liquid nutrient tea from worm

composting

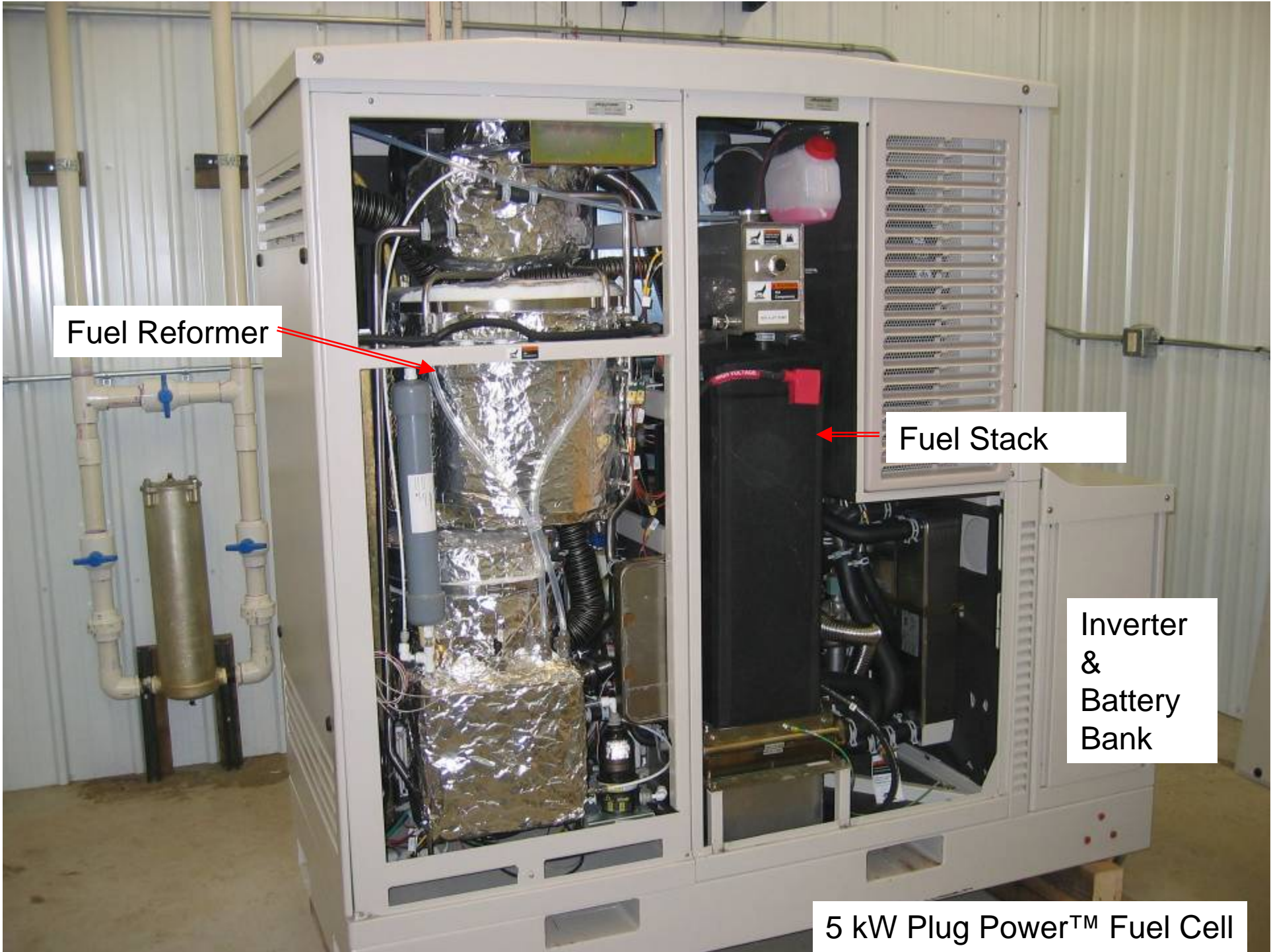
Plug-Flow Digester - A small “plug” of slurry is pumped into one end each day, causing a comparable amount to flow out of the other end into the storage basin in the background.



Methane Digester: To breakdown organic matter in the absence of oxygen to biogas, which is primarily CH_4 /methane, CO_2 /carbon dioxide, H_2S /hydrogen sulfide, and water vapor.

**Engine
Generator set:**
Internal
combustion
engine with 135
kW 240 VAC
electrical
generator.





Fuel Reformer

Fuel Stack

Inverter
&
Battery
Bank

5 kW Plug Power™ Fuel Cell

Recovery and concentration of ammonia from swine manure using electrodialysis and reverse osmosis

Mondor M.¹, Masse L.², Ippersiel D.¹, Lamarche F.¹,
and Massé D.²

¹ Food Research and Development Centre, St-Hyacinthe

² Dairy and Swine Research and Development Centre, Lennoxville



Agriculture and
Agri-Food Canada

Agriculture et
Agroalimentaire Canada

Canada

Using Enhanced Biological Phosphorus Removal (EBPR) to Alter the Nitrogen:Phosphorus Ratio of Dairy Manure and to Minimize Nutrient Delivery to Receiving Waters

Mert B. Muftugil¹

Nancy G. Love¹

Katharine F. Knowlton²

July 01, 2005



¹Dept. of Civil and Environmental Engineering

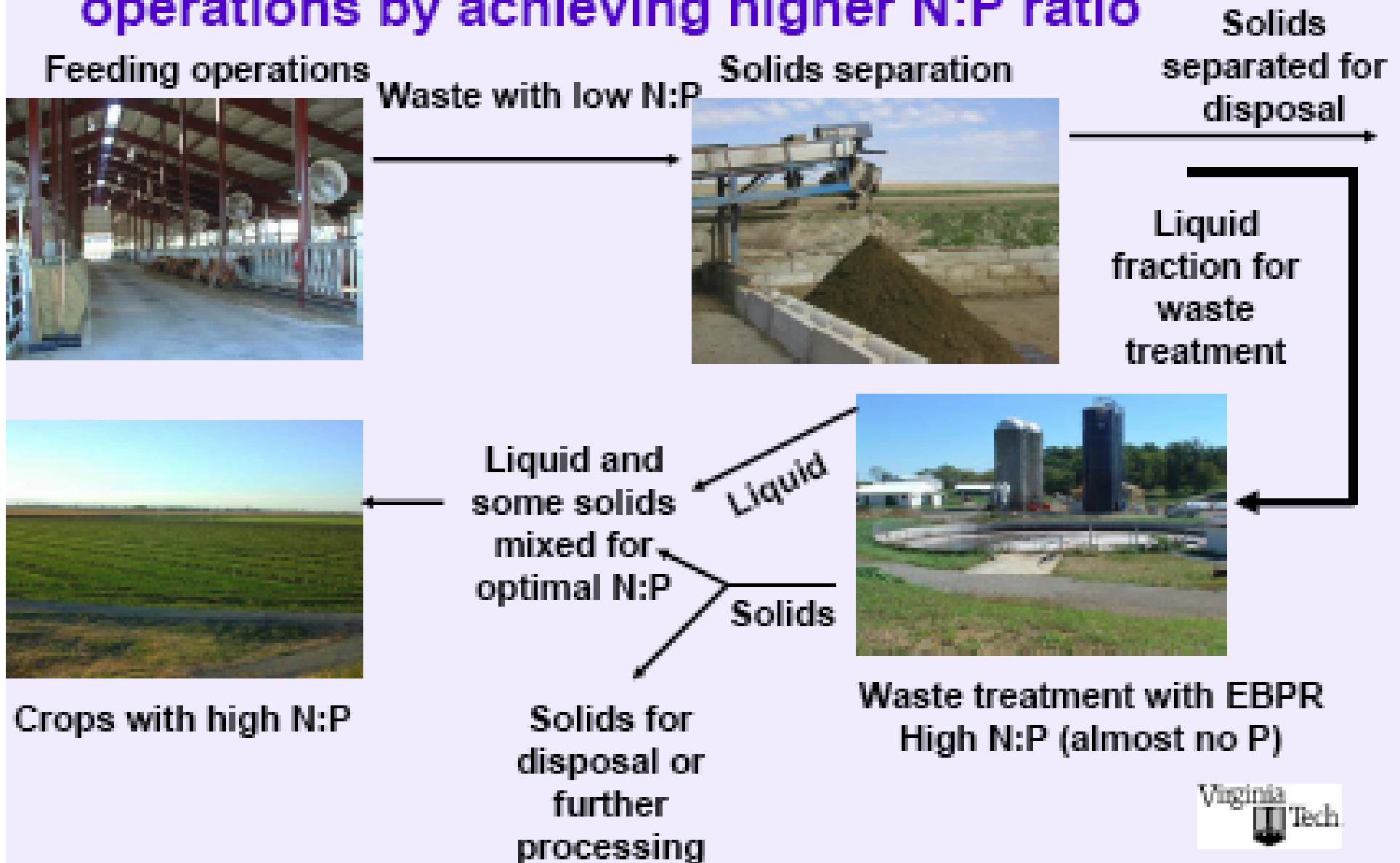
²Dept. of Dairy Science

Virginia Tech, Blacksburg, VA

CICEET The Cooperative Institute for
Coastal and Estuarine Environmental Technology



EBPR can be used for more effective dairy operations by achieving higher N:P ratio



Low volume, high value products

Trinkets made from dung

Bobble heads made from dung

Nutraceutical products extracted

Materials for biofilters

Material to happily feed plants



<http://www.endangeredfaeces.co.nz/unique-gift-ideas.php>

Cost = about \$7 plus shipping from New Zealand



The title 'nutraceutical' is a combination of 'nutritional' and 'pharmaceutical' and refers to foods that act as medicines.

? volume, Researchable products

Hydrogen from controlled digestion

Conversion of fiber to mats

Concentrated plant nutrients

Herbicides for invasive species

Bio fuels

High fiber materials for food industry

Summary

There are many products made from Pre-processed, pre-digested biomass

Need to:

Increase value of high volume products

Make more medium value products

Develop the high value products