

# Anaerobic Digesters for Kentucky Dairies

Opportunities for Generating Green Energy , Carbon Credits  
and Producing “ Carbon Neutral “ Products ”

Dr. Subodh Das , Founder & CEO

**Phinix,LLC**

Lexington, Kentucky

**EXECUTIVE TASK FORCE ON BIOMASS AND  
BIOFUELS DEVELOPMENT IN KENTUCKY**

Frankfort, KY

November 4, 2009



## Phinix, LLC Offers the Following Products and Services

Based in Lexington, KY ( Minority Business Enterprise)

Carbon Management & Trading ( Partnering with First Climate , LLC )

Recycling & Recycling- Friendly Processes & Products

Development of Renewal Energy Projects fro Landfills, Waste-to-Energy  
and Dairy Farms



## **Dr. Subodh K Das : CEO & Founder – Phinix, LLC**

25 Years of Manufacturing and Aluminum Industry Experience

Experienced in Building and Managing Industry/Academic/Government Consortia

10 Years of Academic Experience at the University of Kentucky ( Founded Aluminum Consortia : CAT, SECAT , CSAI – Sloan Foundation )

Recognized and Published Expert in Aluminum Recycling and Development of Recycle –Friendly Aluminum Alloys



# Market Potential

## Dairy Farms

## No. of Cows

Number of Dairy Farms in Kentucky

976

Kentucky

90,000

Robey Dairy Farms , Adairville

1,400

Coral Hill Dairy , Glasgow

1,000

Woodall Farms , Quality

650

Stanley Wilson ,Cave City

500

Wm. Crist, Jr., Glasgow

500

Joe Bertram ,Glasgow

400

Don Kinslow ,Glasgow

400



# INTRODUCTION

- Methane emissions occur wherever animal waste created
- Liquid manure management systems create oxygen free environments to capture methane
- Digester breaks down carbon based molecules to methane
- Livestock waste contributes about 8% of methane / CO2 emissions
- Emissions generated from the agriculture sector are not subject emission reporting
- Great opportunities exist to install methane capturing and conversion units to produce process heat and electricity
- Supports –
  - Governor's " Intelligent Energy Choices for Kentucky's Future - Kentucky's 7-Point Strategy for Energy Independence " (November 2008 )
  - Strategy 2: Increase Kentucky's use of Renewable Energy & Strategy 3: Sustainably Grow Kentucky's Production of Biofuels



# Anaerobic Digester Advantages

## Larger Benefits

Generate sellable electricity from Methane

Use Methane in lieu of Natural Gas as transportation fuel

Produce waste heat / hot water as byproduct

Sell voluntary carbon credits and promote “Carbon Neutral” product

## Incremental Benefits

Reuse /Sell digested liquid effluent as fertilizer to increase crop yields

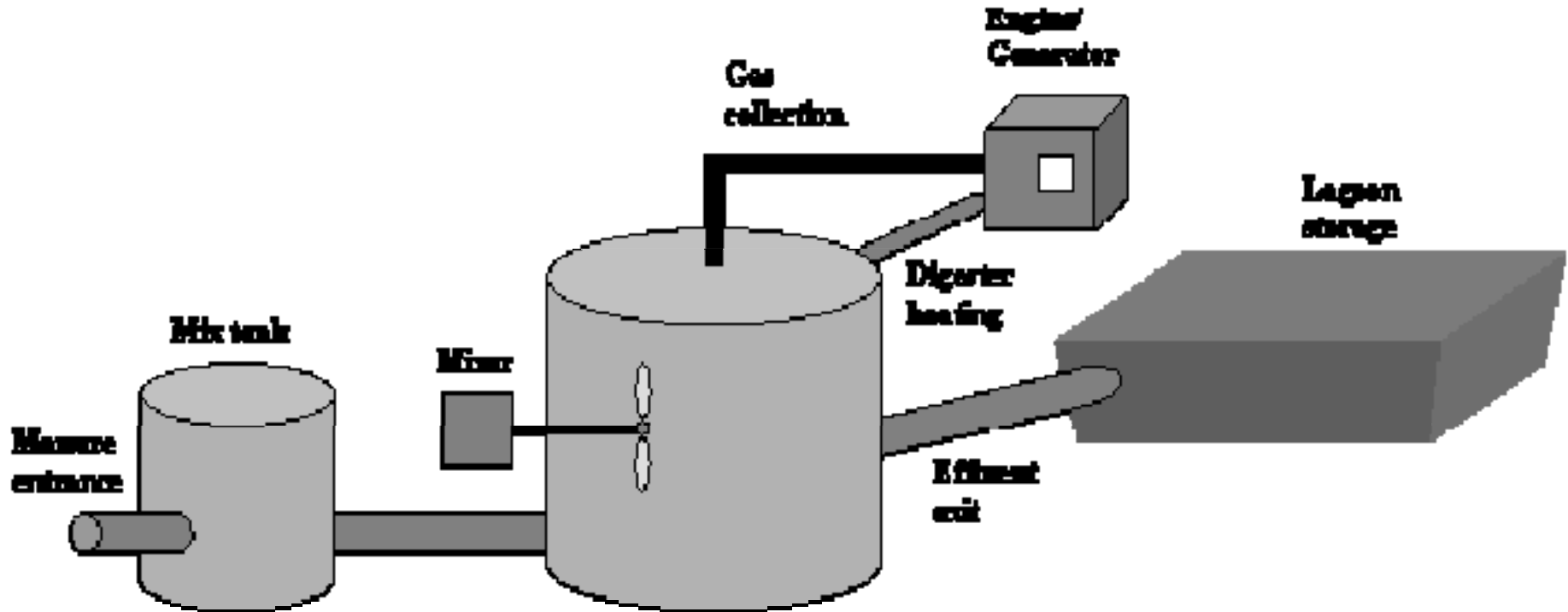
Reuse/Sell solids for bedding

Reuse/Sell solids as peat moss substitute , flower pots material, nutrient fertilizer

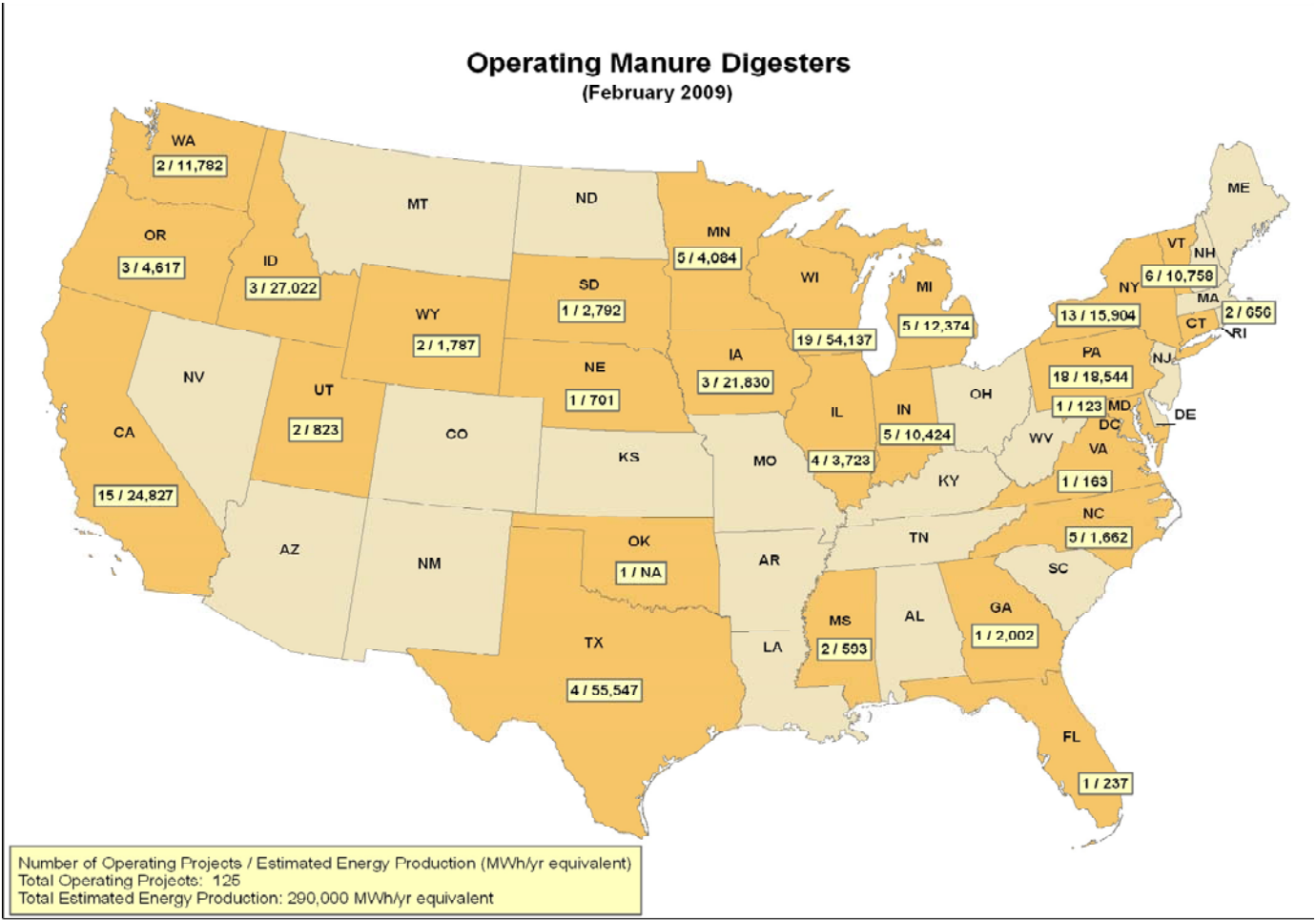


# TYPICAL FARM APPLICATION

Kentucky has NO Anaerobic Digester in Operation



## Operating Manure Digesters (February 2009)





## METHANE POLLUTION

The United Nation Intergovernmental Panel on Climate Change estimates of green house gas (GHG) impacts conclude:

**The global warming potential of methane is 21 times more destructive than carbon dioxide.**



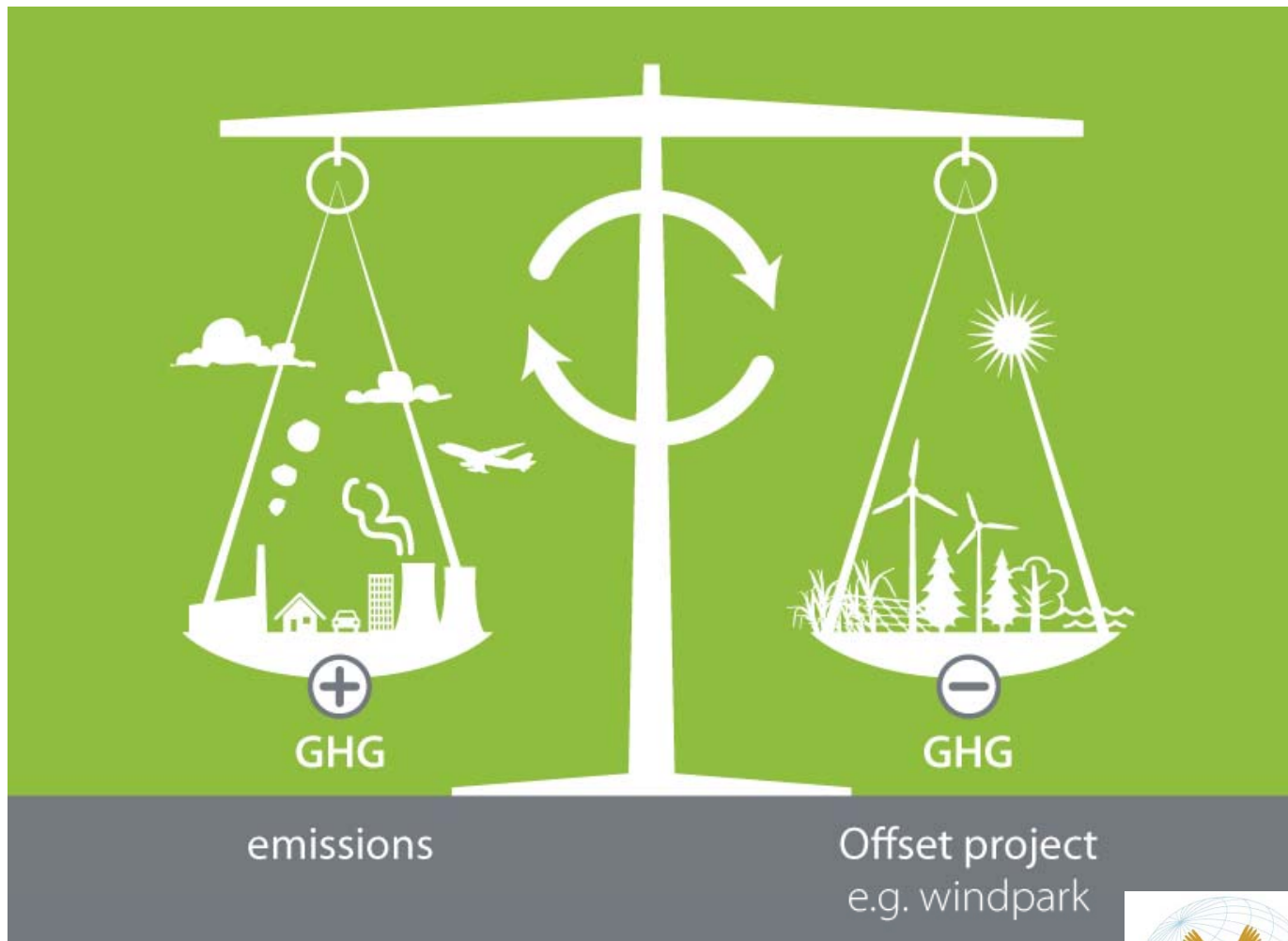
# **GLOBAL CARBON MARKET**

The Carbon Trading Market has roughly doubled in value every year since 2006 creating an excellent opportunity for dairy farmers to:

- 1. Capture and sell these credits for cash**
  - 2. Create energy and heat for use farm**
  - 3. Create a sustainable model for their industry**
- US \$32 Billion (2006)
  - US \$64 Billion (2007)
  - US \$ 120 Billion (2008)



# The Principle of Climate Neutrality



## Carbon and Energy Economics

# Cows	Type	MTCO2E	Carbon Value	kW	Energy Value
1	One	10	\$50	0.3	\$52
100	Average	1,000	\$5,000	30	\$5,200
500	Large	5,000	\$25,000	150	\$26,000
1,000	Optimum	10,000	\$50,000	300	\$52,000
90,000	Kentucky	900,000	\$4,500,000	27,200	\$4,680,000

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MTCO2E = Metric Tonnes of Carbon Dioxide Equivalent

Carbon Value = **\$ 5 per Metric Tonne** of Carbon Dioxide Equivalent

Energy Value = **\$0.02 per kWh**



# Stake Holders Interviewed/Contacted

(May-October 2009)

**Maury Cox:** Executive Director , Kentucky Dairy Development Council



**Tim Hughes :** Senior Policy Analyst , Kentucky Office of Agriculture Policy

**Scott Maas :** United States Department of Agriculture, Rural Development

**Dr. Scott Shearer:** College of Agriculture, University of Kentucky

**Frank Moore,** Director of Biofuels, Kentucky Energy and Environmental Cabinet



# Partners

**Phinix,LLC, Lexington, Kentucky**  
Project Developer / Manager



**Interested Kentucky Dairy Farms throughout KY**  
Project Implementer



**effEnergy, LLC , Somerset, Kentucky**  
Technology Developer / Provider /Access to European Technology



**Anaerobic Digester Company**  
Selection and discussion with a suitable partner underway

**First Climate , San Francisco, California**  
Carbon Management Service Provider  
Access to Global Digester Technology



## **PATH FORWARD**

- **Assess potential of methane collection and conversion to usable and sellable energy including the potential of Carbon Credits**
- **Design and engineer “ affordable, modularly , adaptable and scalable “ systems designed for Kentucky Dairy Farms needs**
- **Estimate the economics of the digester process as well as the potential for carbon credits**
- **Form a consortium of interested Kentucky Dairy Farms and qualified academic partners**
- **Approach Kentucky’s and United States Departments of Agriculture for seed funding and legislative support for state –wide efforts ( need a contact person)**
- **Prepare research proposals for major funding from private and public sources**
- **Help Kentucky Dairy Farms become economically competitive by attaining “carbon neutral” and “energy surplus” status.**



## CONTACT INFORMATION

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