CLEAN FUEL PARTNERS

RENEWABLE ENERGY ECOSYSTEMS

Biogas Panel – BRD TAC

ANAEROBIC DIGESTION

AUGUST 17, 2016

CLEAN FUEL PARTNERS

RENEWABLE ENERGY ECOSYSTEMS

DO GOOD FOR THE ENVIRONMENT,

AND DO WELL ENOUGH FINANCIALLY

TO *KEEP* DOING GOOD

CLEAN FUEL PARTNERS BACKGROUND

2014

Incorporated
Fall 2014

Visited Dane County
Project in July 2015

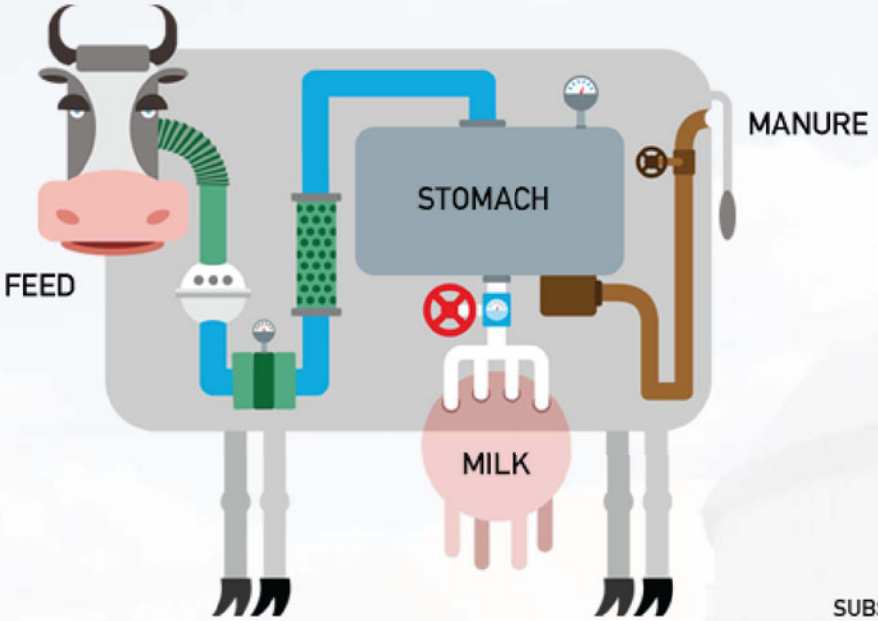
Closed Sale
Winter 2015

2016

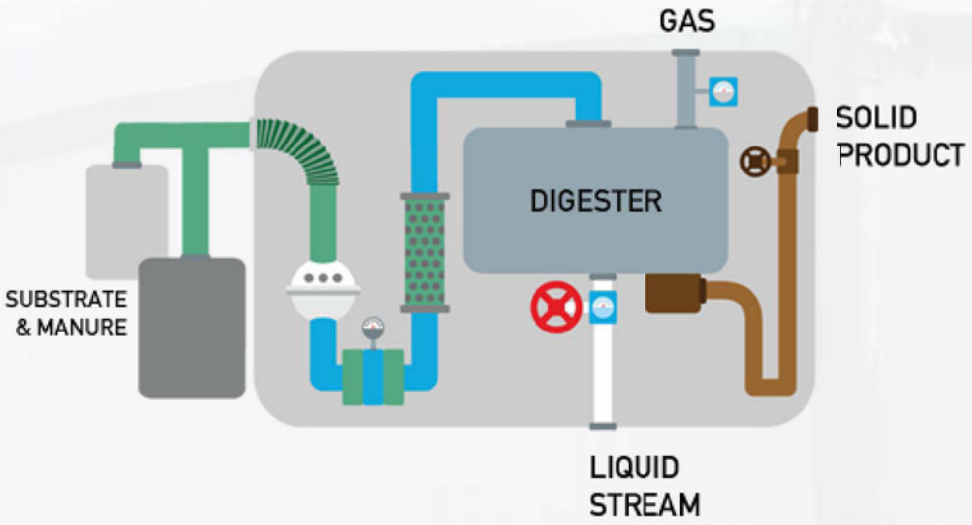
Sought projects, new or existing

Research and experience led us
to pursue anaerobic digestion
and downstream treatment

ANAEROBIC DIGESTION 101



- Simple process- mechanical replication of a stomach.



- Nutrient recovery is the next wave

ANAEROBIC DIGESTION 101

- Traditional Financial Dynamic

- Few projects have been done without subsidy
- Basic project types
  - MANURE-ONLY
    Issue with manure: A portion of the energy has been removed by the animal to keep it alive and produce milk
  - MULTIPLE WASTE STREAMS
    Multiple stream projects generate more gas, but are more complicated.
- Most projects produce electricity
  - Capital provided based on a long-term offtake contract

DANE COUNTY PROJECT

- $14 million cost, $4 million provided by Wisconsin through Dane County
- Clean Fuel purchased the facility in December 2015
- Multiple waste stream project
- Requires phosphorous removal of 60%, escalating over time

DANE COUNTY PROJECT

INTAKE

- Three farms deliver 75,000 gallons of manure and 3,000 gallons of solids per day
- 7,000 gallons of fats, oils and greases per day

CAPACITY

- Three 1.25 million gallon complete-mix tanks

OUTPUT

- 2 mW of generating capacity
- Solids separated and sold as bedding to farms outside the watershed
- Liquid returned to farms for spreading

DANE COUNTY PROJECT

CLEAN FUEL PARTNERS IMPROVEMENTS

- Purchased and installed new roof on idle digester before closing in December 2015
- Since acquisition:
  - Brought idle digester back on-line
  - Purchased new, larger centrifuge (fiber separation)
  - Substantial deferred maintenance
- Actively considering test operations for biogas uses, nutrient recovery and fiber uses
- In our hands, manure processed up 18%, electricity produced up 38% and phosphorous removal up 38%

THE FUTURE OF AD

- We are in the organic waste processing business – AD/Biogas is only part of it. Our success depends on throughput
- Quality substrates are important and harder to find
- Increasing pressure on farms, governments and waste generators to clean up discharge streams
- New projects will continue to be complicated:
  - Multiple stakeholders involved
  - Financial challenge of making treatment technologies work at small scale

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