

## **RNG Alternative Fuel**

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**Director** 

Department of Waste & Renewables

## **Dane County Waste & Renewables**



**Mission Statement:** 

To provide an efficient and cost effective solid waste management program which protects the environment and conserves natural resources.

## **Waste & Renewables Operations**

- □ 1 Active landfill & 2 closed landfills
  - 250,000 tons/yr
- 2 landfill gas facilities
  - LFGTE, CHP, CO2, RNG
- □ C&D MRF
- □ Clean Sweep
- □ Brush/logs program
- Tours, recycling events, needles program, etc.



## We've Been Busy!

### <u>Since 2012</u>

- Rapid Landfill Expansion Permitting
- □ New HHW Facility
- □ C&D Transfer Station
- □ New C&D MRF
- □ Constructed 4 Cells
- □ Capped 40 Acres
- □ 100 acres of Prairie
- □ Biogas Projects



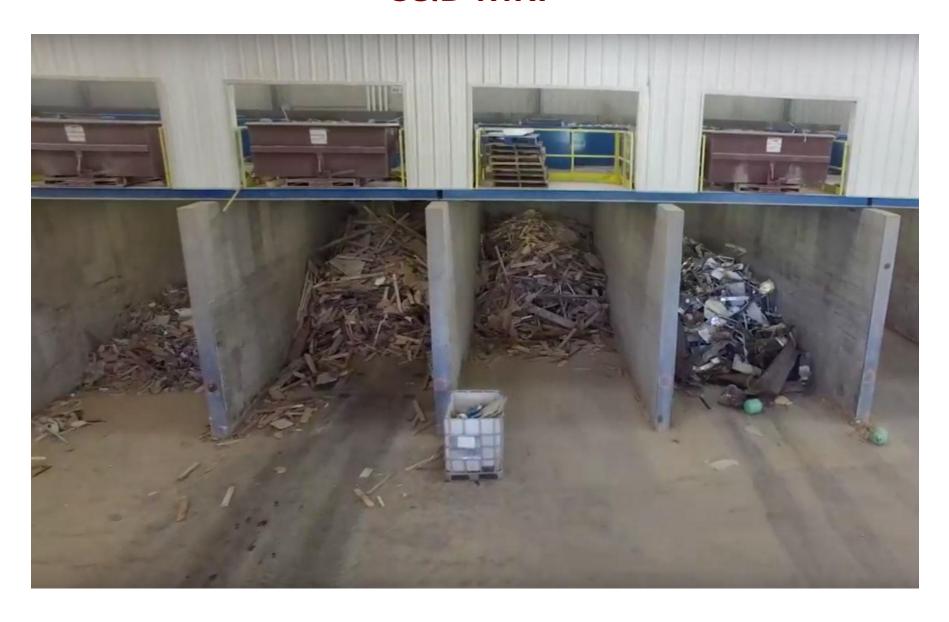
## **C&D MRF / Clean Sweep**



## **C&D MRF**



## **C&D MRF**



## **Liner Construction**



## **Cap Construction**



### **Dane County Biogas History**

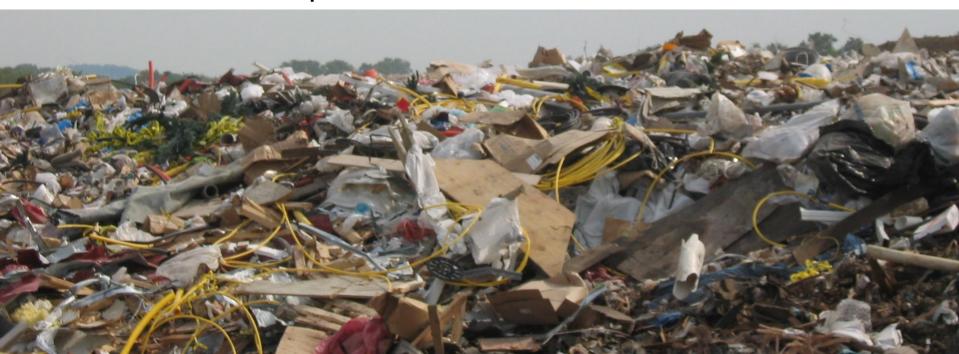
- □ Landfill Gas to Energy (LFGTE)
- □ Waste heat multiple buildings
- Manure digester projects
- □ Evaluated food waste digester
- □ RNG fueling station Pilot system & expansion
- □ High BTU pipeline grade gas
- □ CO2 Sequestration Pilot Project



## **Decomposing Waste Produces Landfill Gas**

Added Value?

- ☐ Landfill Gas Components
  - Methane 55% ← Energy!!!
  - Carbon Dioxide 40%
  - Nitrogen 5%
  - Oxygen Less than 0.5%
  - VOCs, H2S, Siloxanes, H2O, etc
- ☐ Gas Temperature 80-120 F





### **Gas Collection**

### **Collection Pipes**

- Header Pipe
- Condensate
- Clean Outs





## **Options for Biogas Use**

- Medium BTU Direct Use
- □ LFGTE Electric Production
- □ High BTU / Pipeline Grade Gas/RNG
- Other Technologies
  - Waste Heat
  - Syngas / biodiesel
  - CO2, N2 Capture
    - EOR, dry ice, methanization

## **Use of Biogas as a Resource**









### What is CNG?

- □ CNG Compressed Natural Gas (methane)
- □ Compressed to 3600 psi
- Used as vehicle fuel



# What is RNG?

- CNG derived from biogas
- WWTP, digesters, landfills, etc

# Why RNG?

- □ Financial
  - Less than \$2.00/gallon
  - Less price fluctuation
  - Revenue source for landfills
- □ Domestic Fuel Source
  - Security
  - Local jobs
- □ Noise 80-90% reduction
- □ Safe
- □ Environmental Benefits





### **Environmental Benefits**

#### **Burns Cleaner**

- Vehicle maintenance
- 60–90% less smog-producing pollutants
- 30–40% less GHG emissions
- Lower carbon intensity



28100453 [RM] © www.vrsualphotos.com

### **Environmental Benefits**

Fuel	Carbon Intensity (gCO2e/MJ)
Gasoline	95.86
CNG from Pipeline	68.00
CNG from Digester	13.45
CNG from Landfill	11.26

http://www.arb.ca.gov/fuels/lcfs/121409lcfs\_lutables.pdf

### **Vehicles**

### □ 85+ vehicles in fleet

- Some dedicated
- F150s, F250s, F350s,
   Ford Fusion, Transit Connect,
   Plow Truck
- 10 Departments









## Dane County's Future – RNG

- Biogas from landfill and off-site biogas sources
- □ Gas is cleaned up
- Pipeline injection
- □ Off-load station clean lakes
- Started project January 2017
- □ Completion expected July 2019
  - already injecting gas today



### Dane County's Future – RNG

- County ownership
- □ Private O&M for first 3 years
- □ \$29M capital
- □ ~4 year pay back RIN markets fluctuate
- Revenue streams
  - Gas compared to frac gas
  - RINs (Renewable Identification Number)
    - Federal program: Renewable Fuels Standard (RFS)
  - LCFS (Low Carbon Fuels Standard)
    - California program

### Financial Pro Forma - RINS and LCFS

### <u>RINs</u>

- Renewable Identification Number
- □ EPA Renewable Fuel Standard (RFS) Program
- □ Energy Policy Act of 2005 & Energy Independence and Security Act of 2007 – 2022 "sunset"
- Requires a percentage of fuels sold in US to be renewable
- Very complex program for beginners
  - D3 v D5, nesting, cellulosic waiver credit, annual targets
  - Registration process, contracting process
- □ How it works on a project

### Financial Pro Forma - RINS and LCFS

### **LCFS**

- Low Carbon Fuel Standard
- California Program
- □ Reduce carbon intensity (CI) of transportation fuels
- Credits based on amount of carbon reduction
- □ CI score
- Market becoming flooded
- □ How it works on a project

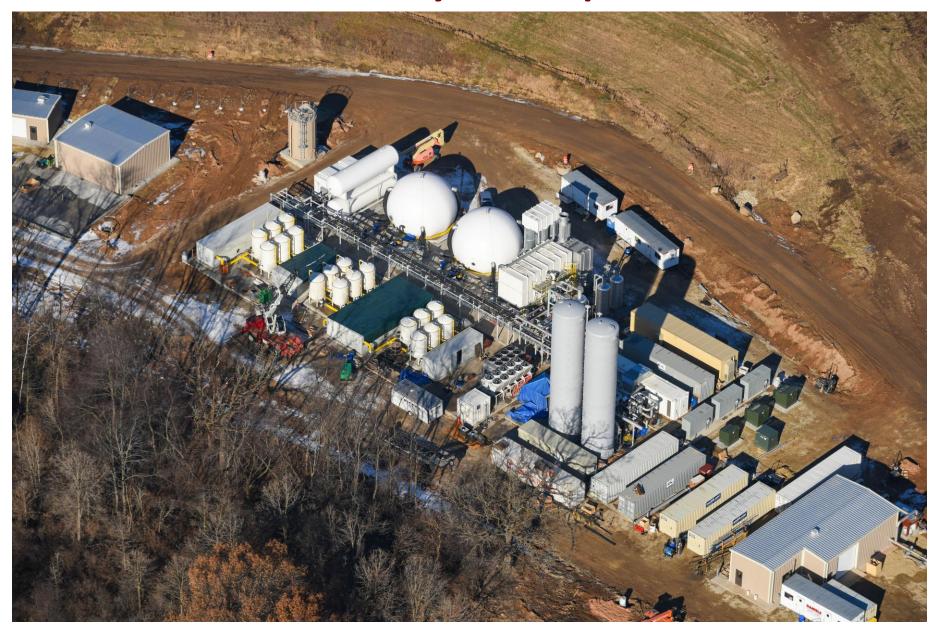














### Questions?

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