

Cost Effective Conversion of Biogas to Bio-CNG (RNG)



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Opportunities for Small as well as Large Scale Biogas to RNG Projects

- Opens up chances where they didn't exist before
 - Small landfills, WWTP and organics digesters
 - Wasted biogas at larger sites
- Lower Capital Costs
- Multiple Financing Opportunities

It's affordable now!

Why Bio-CNG?

- Prices paid for renewable electricity are plummeting
- Prices for diesel and gasoline are rising
- Desire for energy independence and control

Hundreds of billions of cubic feet of biogas wasted every year!

Primary Targets for BioCNG Vehicles

- Heavy-duty freight trucks
- Transit buses/shuttle buses/school buses
- Major metro fleet management and public works departments
- Trash, recycling, cement and other vocational work trucks
- Medium-duty delivery and commercial service trucks:
 - Telecom – food – beverage – snack food – newspapers
 - linen/laundry – grocery – furnishings/appliances – office products
- Taxis and light-duty service vehicles

The more fuel used – the quicker the payback

BioCNG Benefits

- Significant savings over gasoline and diesel
 - 25-50% of current gas/diesel cost
- Local, green, renewable fuel source
 - Up to 90% GHG reductions v. gas and diesel
 - Significant VOC, PM, and air toxics reductions
 - Realize the full potential of renewable fuel and GHG credits
- Control your future!
 - Fossil-based CNG costs will rise in the future
 - Biogas-based CNG (RNG) costs are locked in

BioCNG System Economics

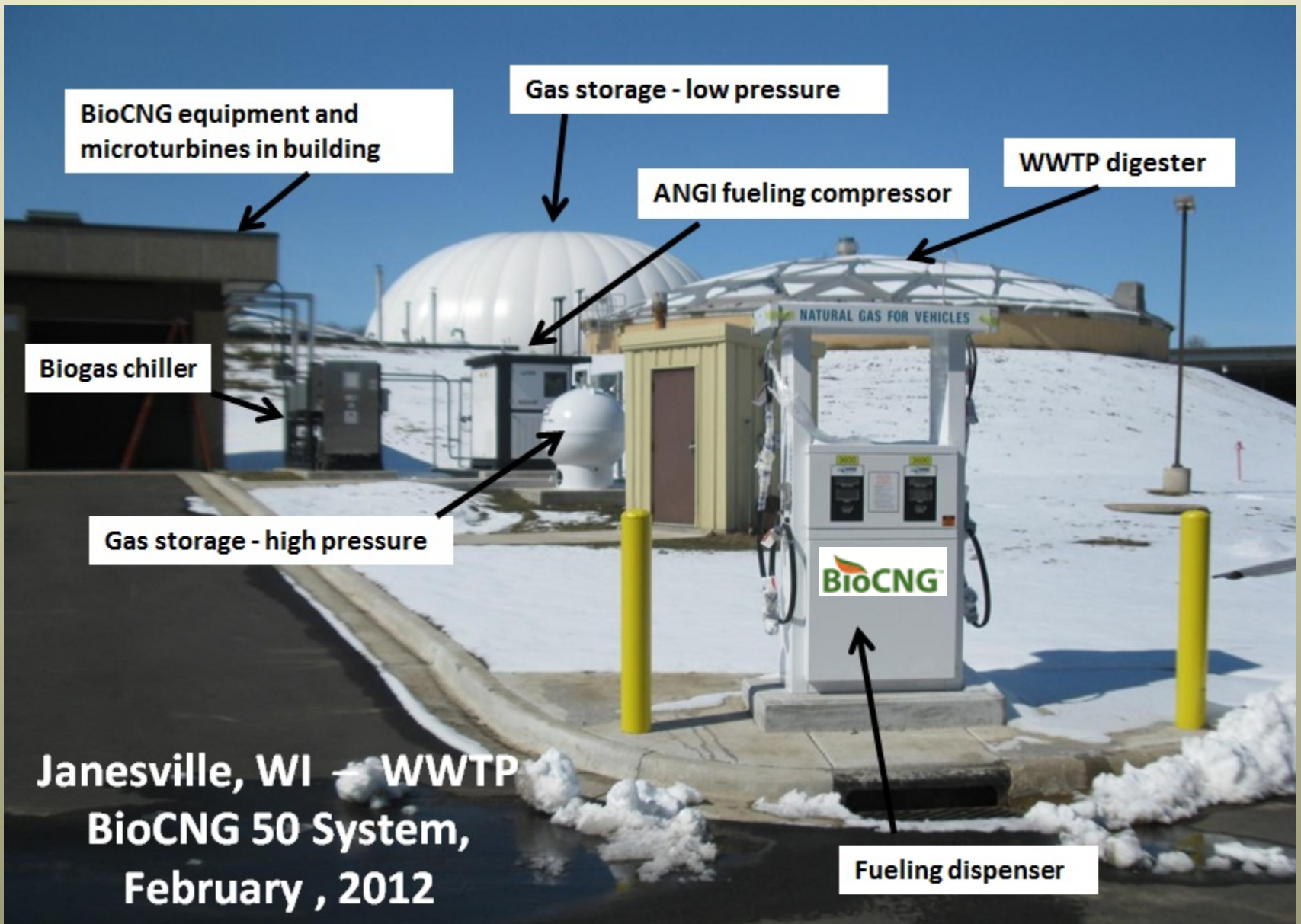
- Produce BioCNG at ~\$1.50 per GGE
 - Cost is about half that (\$0.75 GGE) with currently available federal renewable fuel credits
- Vehicle conversions
 - Large trucks – waste, buses, semis - \$30-40K
 - Passenger vehicles/pick ups - \$9-15K
 - New CNG vehicles – 10-20% higher (coming down)
- With gas and diesel at \$3.50-4 gallon...
payback expected at between 1 and 5 years

Small Scale BioCNG Landfill Project

- 100 cfm is 1/10th the size of average LFGE project
- Biogas Input - 100 cfm of landfill gas (55% methane)
- BioCNG Production
 - 470 Gasoline Gallon Equivalents (GGE) produced per day
 - 12,000 GGE per month (~150,000 GGE per year)
 - Enough fuel for 5-8 trash trucks (or 40-50 passenger vehicles)
- Fuel Savings
 - Assuming savings of \$2 gallon on gasoline/diesel costs
 - **\$300,000 in annual fuel savings**
- Renewable Fuel Credits
 - Assuming \$0.63 per GGE
 - **~\$90,000 per year**

BioCNG System Basics





Janesville, WI - WWTP
BioCNG 50 System,
February, 2012

Fueling dispenser

BioCNG equipment and microturbines in building

Gas storage - low pressure

WWTP digester

ANGI fueling compressor

Biogas chiller

Gas storage - high pressure

Biogas Clean-Up and Upgrade



BioCNG Compression and Storage



BioCNG Fueling



NYS Incentives for CNG

- **Alternative Fuel Bus and Infrastructure Funding**

The New York State Energy Research and Development Authority (NYSERDA) administers the Clean Fueled Bus Program, which provides funds to state and local transit agencies, municipalities, and schools for up to 100% of the incremental cost of purchasing new alternative fuel buses and associated infrastructure.

- **Alternative Fuel Vehicle (AFV) Technical Assistance**

NYSERDA manages the New York State Clean Cities Sharing Network (Network), which provides technical, policy, and program information about AFVs.

- **Alternative Fuel Vehicle (AFV) and Fueling Infrastructure Technical Assistance**

NYSERDA Flexible Technical (FlexTech) Assistance Program provides assistance to public, private, and not-for-profit organization fleet managers who want to evaluate the feasibility and cost of adding AFVs and fueling facilities to their operations.

NYS Incentives Continued

- **Alternative Fuel Tax Exemption and Rate Reduction**

CNG fuel that is used exclusively to operate a motor vehicle engine is exempt from state sales and use taxes. The exemption and rate reduction are in effect until September 1, 2014.

Utility/Private Incentives:

- **Natural Gas Vehicle (NGV) and Plug-In Electric Vehicle Technical Assistance**

National Grid provides technical assistance for CNG vehicle adoption and infrastructure development. These services are only available to current or potential National Grid customers.

Point of Contact

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More info on all the above - <http://www.afdc.energy.gov/fuels/laws/3253/NY>

For more information...

www.biocng.us

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