

Biogas to Vehicle Fuel

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Presented by:

Jim Walker, P.E.

Senior Client Manager, Cornerstone Environmental Group, LLC

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Presentation Outline

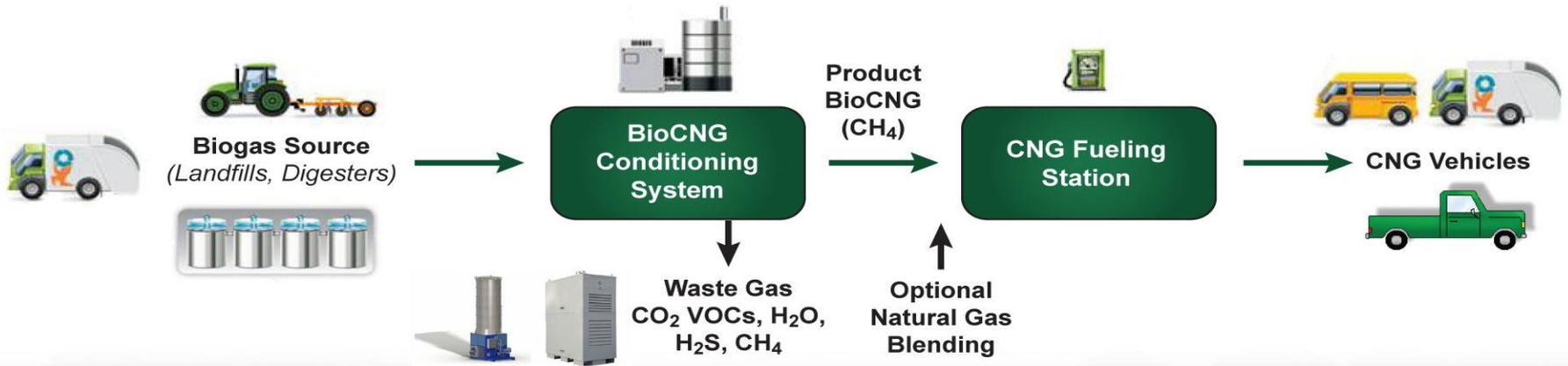
- Why an Alternative to Petroleum
- CNG Fuel
- The Alternative to CNG
- BioCNG Value
- Conclusion



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BioCNG Upgrade and Fueling System



Why an Alternative to Petroleum?

- Lower Cost
- Reduce Dependency on Oil Imports
- Use Fuel From A Domestic Source
 - Keeps \$ in the USA Economy
- Less Greenhouse Gas Emissions



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2013 Retail Gasoline and Diesel Prices
Dollars per Gallon Including Taxes
Midwest USA

Year 2013

Gasoline -

Regular

\$3.47

Midgrade

\$3.58

Premium

\$3.77

Diesel On-Highway - All Types

\$3.90

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CNG Fuel

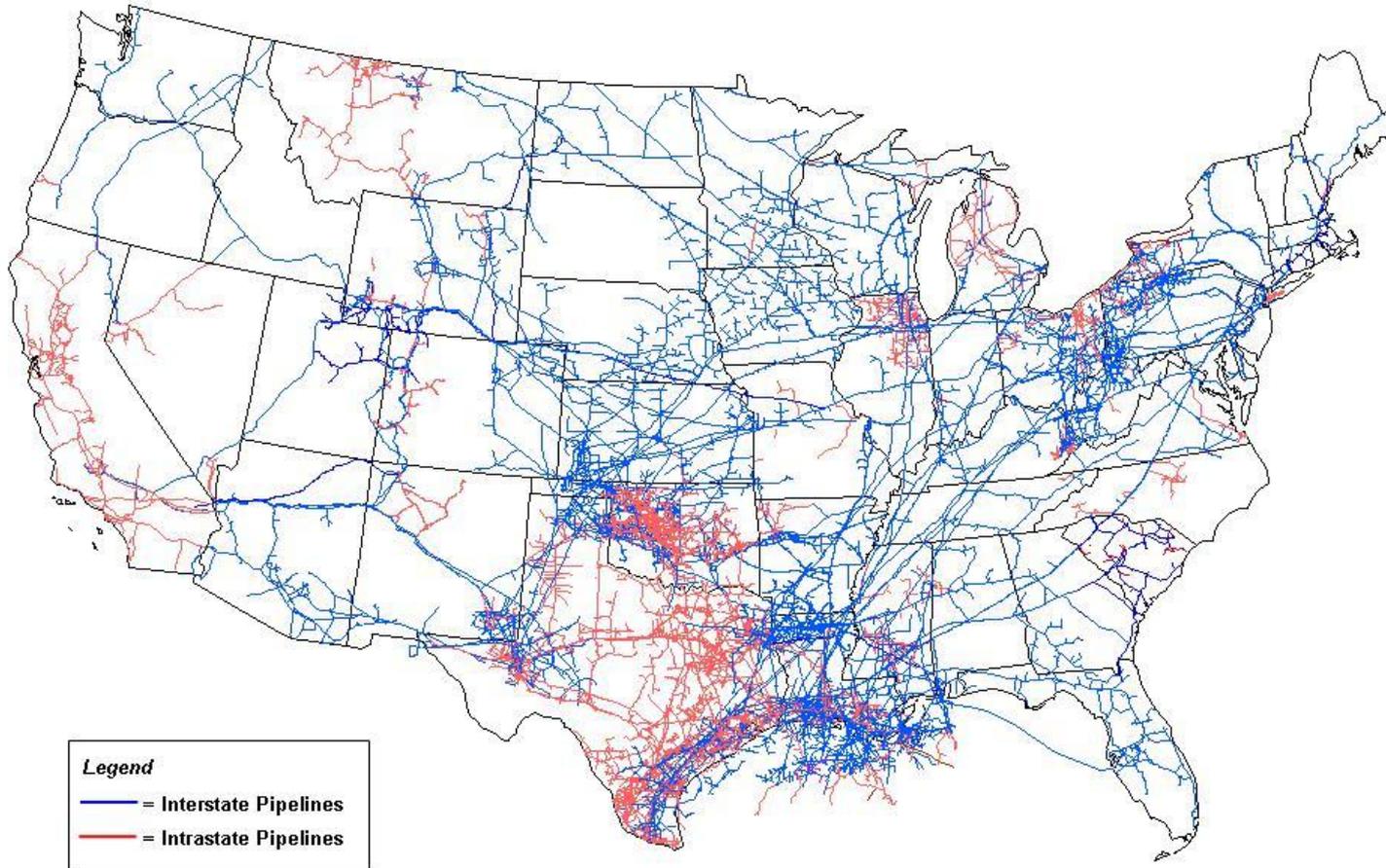
- In 2013, CNG was 42 percent less expensive than a gasoline gallon equivalent (GGE).
 - \$1.53 less per GGE
 - \$1.87 less per DGE
- CNG is abundant in the USA.

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CNG is Abundant in the USA

Natural Gas Highway



Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division, Gas Transportation Information System



Ford CEO – Alan Mulally

- Q: What else is in the future for Ford and the U.S. auto industry?
- A: ... *I think we're going to see more biomass fuels. I think we're going to see more natural gas vehicles...*



Wall Street Journal

“Truckers Tap Into Gas Boom”, October 30, 2013

- About 5% of all heavy duty trucks sold in 2014 will run on natural gas.
- Diesel-engine trucks get between 5-7 mpg and average 100,000 miles a year. Steve Palmer, vice president of transportation for Lowe's said, “We plan to have 100% of our fleet on natural gas by 2017”.
- In 2013, about 60% of all new garbage trucks purchased use CNG.



Why an Alternative to CNG?

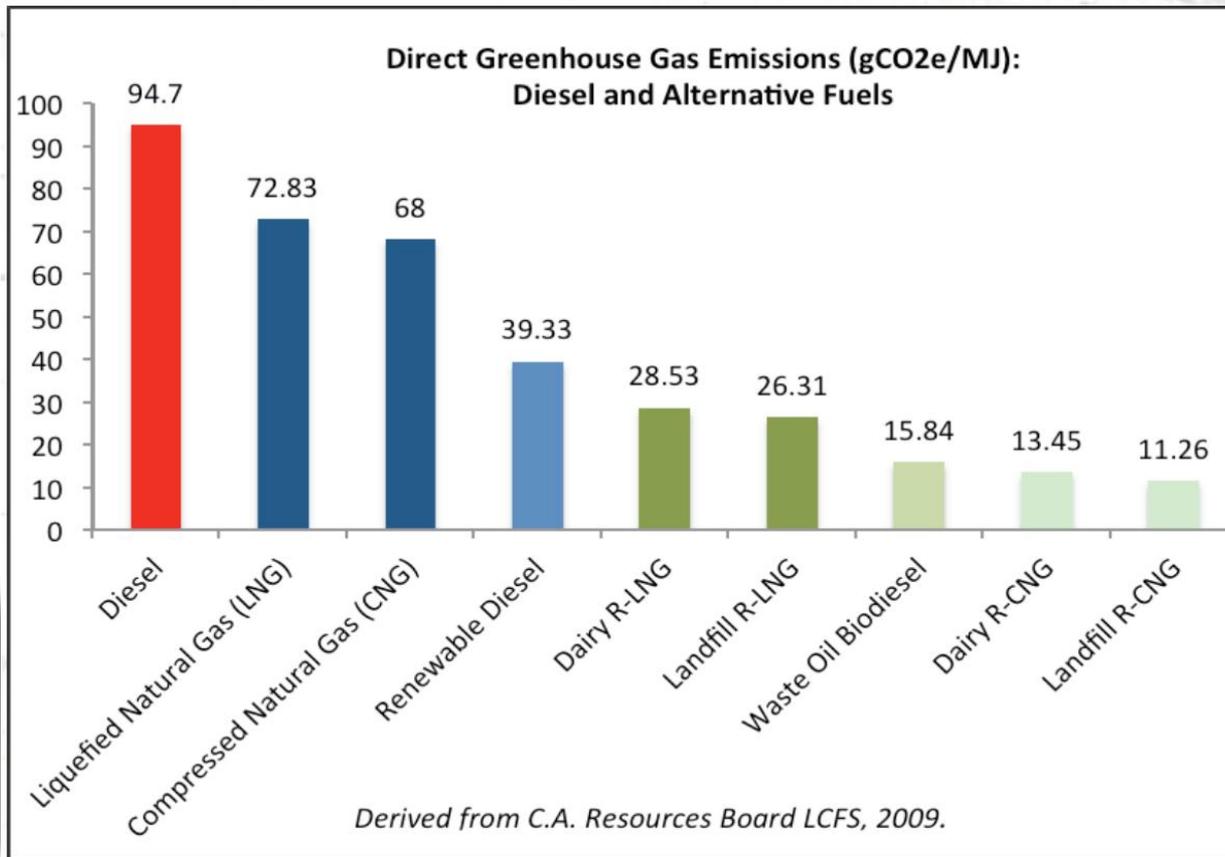
- Lowest Cost
- Fix Your Price Versus Being Tied to Commodity Pricing
- Use Fuel From A Local Source
 - Keeps \$ in Your Local Economy
- Lowest Greenhouse Gas Emissions



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Environmentally Superior Fuel



“RENEWABLE NATURAL GAS (RNG): The Solution to a Major Transportation Challenge,”
Energy Vision, New York, September 2012



BioCNG: Gas Treatment Process

- **Sulfur Removal**
- **Moisture and Particulate Removal**
- **Gas Compression and Chiller**
- **Siloxane and VOC removal** - Activated carbon
- **Carbon Dioxide Removal** - Membrane Process



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City of Riverview, Michigan

100 cfm LFG = 400 DGEs/day



Detroit Free Press 11/10/2013



Bob Bobeck, director of solid waste for the City of Riverview, fills up his vehicle with natural gas that has been transformed from the city landfill. The gas powers the city's police cars, other vehicles and is sold to other cities. Riverview is the first Michigan city to do so.





St. Landry Parish, Louisiana

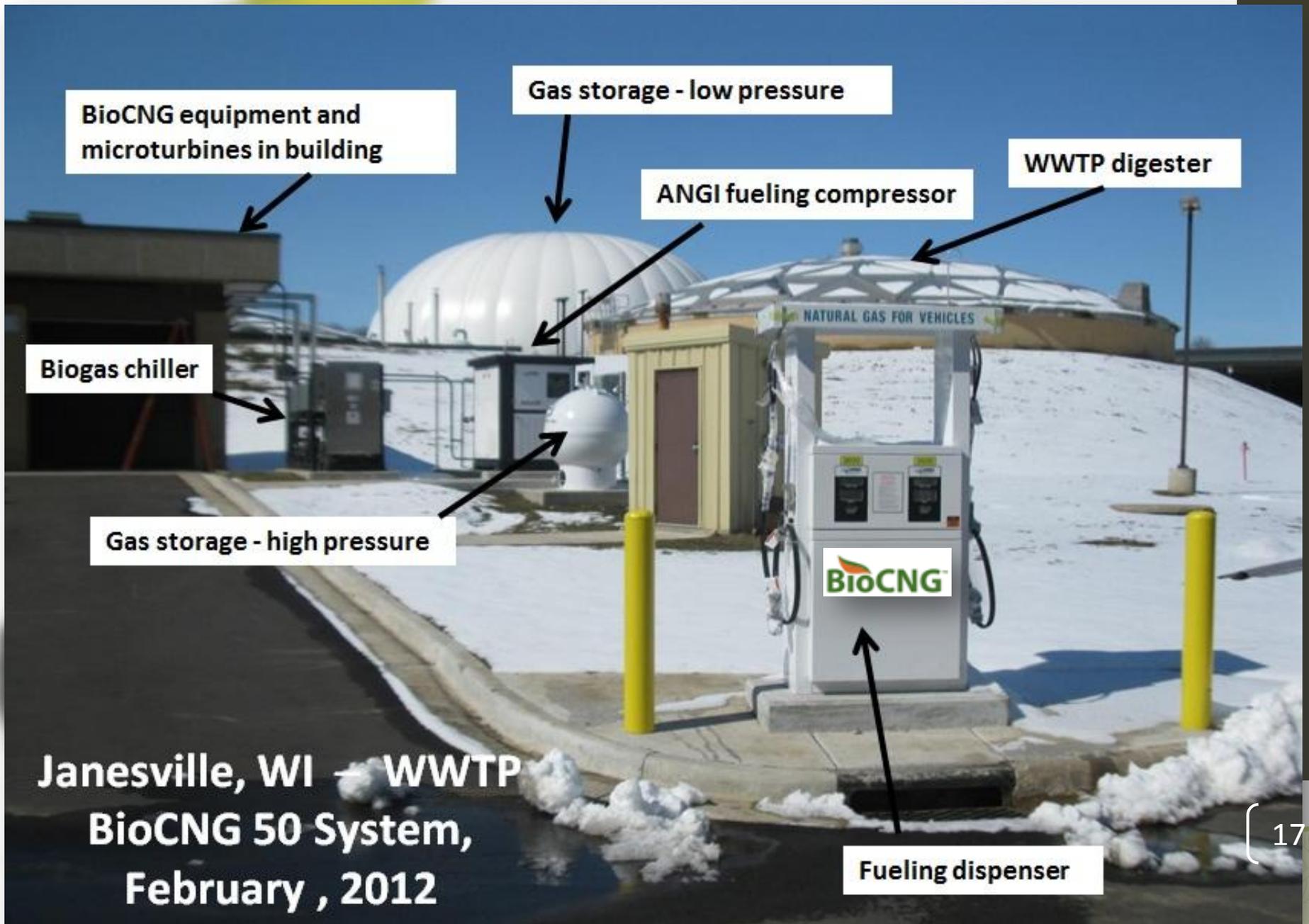
50 cfm LFG = 175 DGEs/day

BioCNG Fueled Truck

Clean World Partners, Sacramento California , Food Waste Digester



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BioCNG equipment and microturbines in building

Gas storage - low pressure

WWTP digester

ANGI fueling compressor

Biogas chiller

Gas storage - high pressure

BioCNG

Fueling dispenser

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



BioCNG Skid in Southern Climate

Manufactured in Dubuque Iowa



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BioCNG's Winter Enclosure

Protection from the Elements



Value of BioCNG – Case #1

- **Small Fleet - 8 trucks, each at 60 DGE per day**
- **Proforma - \$1.3 Million Capital**

O&M and Amortization =	\$1.99/DGE
Road Tax =	\$0.52/DGE
RIN's =	-(<u>\$0.79</u>)/DGE
Federal Credit =	-(<u>\$0.50</u>)/DGE
Total	\$1.22/DGE
Avoided Cost for Diesel =	-(<u>\$3.68</u>)/DGE
Savings =	-(<u>\$2.46</u>)/DGE

Annual Savings = \$307,000

Payback = 4.2 years

BioCNG 100
@ 124,800
DGE's per
Year (87%
of capacity)

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Value of BioCNG – Case #2

- **Mid Fleet - 18 trucks, each at 60 DGE per day**
- **Proforma - \$1.8 Million Capital**

O&M and Amortization =	\$1.56/DGE
Road Tax =	\$0.52/DGE
RIN's =	-(<u>\$0.79</u>)/DGE
Federal Credit =	-(<u>\$0.50</u>)/DGE
Total	\$0.79/DGE
Avoided Cost for Diesel =	-(<u>\$3.68</u>)/DGE
Savings =	-(<u>\$2.89</u>)/DGE

BioCNG 200
@ 287,000
DGE's per
Year (100%
of capacity)

Annual Savings = \$829,000

Payback = 2.1 years



Typical Questions

- Are CNG vehicles proven and reliable?
 - Yes, Many Committed Manufacturers
 - Honda, Ford, GM, Dodge, Cummins, and many more
- What CNG fleets operate in the Midwest ?
 - UPS
 - Lowes
 - Waste Management
 - City of Riverview
 - Dane County
 - Cornerstone
 - And many many more...



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Typical Questions

- Will RIN's Disappear? - No
 - \$40 billion in annual sales of ethanol, distillers grains, and services.
 - 209 operating ethanol plants.
 - Supports over 400,000 jobs now.
 - Drives a \$500 billion increase in America's farm assets since 2007
 - Encourages investment in rural communities across the country.
 - The US saved \$50 billion in imported fuel costs in 2011.
 - By 2022, it is forecasted to create 800,000 jobs.



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BioCNG Conclusions

- Proven technology
- Lowest cost fuel
- Long term fixed fuel cost
- Meets CNG specs
- Complies with engine manufacturers warranties
- Lowest carbon footprint (greenest fuel)
- Small biogas quantity required

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Next Steps

1. Survey your fleet.

- Target vehicles that get <10 mpg or operate more than 20,000 mpy
- Tally the amount of fuel these vehicles use annually

2. Find a source of biogas near your fleet.

- Landfill <http://www.epa.gov/lmop/projects-candidates/>
- Wastewater treatment plant <http://www.biogasdata.org/facilities/search>
- Farm digester <http://epa.gov/agstar/projects/index.html>
- Food digester

3. Prepare an economic pro forma.

- Capital and O&M costs
- Estimate payback
- Compare to your current fuel costs



www.biocng.us

845-695-0215 Mike Michels

630-410-7202 Kay Turgeson

913-706-8467 Larry Lundine




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Environmental Group, LLC