Clean Vehicle Solutions for Refuse Haulers Webinar

February 27, 2018, 1:30-2:30 pm

Hosted by Dallas Fort Worth Clean Cities Coalition

FOR AUDIO PLEASE CALL INTO THE CONFERENCE LINE
1-800-250-3900   Pin: 442318#
Agenda

- Fleet Partnership Success Story: City of Fort Worth, Texas & Waste Management
- Fleet Success Story: City of Denton, Texas
- Purchasing Opportunities: Metropolitan Area Planning Council
- Funding Opportunities: North Central Texas Council of Governments
City of Fort Worth & Waste Management of Fort Worth

Robert Smouse – City of Fort Worth
Code Compliance – Solid Waste Services Assistant Director

Houston Chambliss – Waste Management
Fort Worth General Manager
Back Ground Support for Greener Fort Worth

• Mayor Mike Moncreif signed the U.S. Mayors Climate Protection Agreement in 2007
• Sustainable Development Task Force 2009
• Sustainability Action Plan – 2010
Greening Efforts & Aims

- Promoting alternative transportation, including public transit and bicycling
- Improving energy efficiency in City facilities and their operations
- Using alternative fuel and fuel-efficient vehicles
- Encouraging businesses to adopt green practices in our community
- Increasing the diversion rate from the landfill
- Improved Planning and Development standards
Specific Actions for a Greener Fort Worth

• Comprehensive Solid Waste Management Plan 2013
• Residential Collection Agreement Renewal 2013
  • Support with CNG Collection Vehicles
  • Support with City’s CNG Slow-fill Fueling Station
Advancing Cleaner Solid Waste vehicles

3. **CNG Vehicles**
   Contractor agrees to convert its entire fleet of diesel powered collection vehicles that service the City under this Contract to compressed natural gas (CNG) not later March 31, 2016.

4. **New Facility**
   Contractor agrees to construct or move to a new collection and fleet maintenance facility within the City limits not later than March 31, 2016.
WM – Corporate Involvement & Experience

• 1995, The first 14 natural gas trucks, launched in Palm Desert California.
• 1997, 8 trucks deployed in Lancaster PA
• 2000, 120 LNG truck project in partnership with PGE.
• 2001-2006, 405 natural gas trucks deployed in SoCal South Coast Air district.
• 2007, WM CEO David Steiner commits to increasing fuel efficiency and reducing emissions by 15% by the year 2020.
• 2009, 122 natural gas trucks deployed in the City of Seattle, the largest single municipal refuse launch in US history. Trademarked “Clean N' Green”
• 2011, 1000 trucks in operation, Formalization of the WM CNG team, commitment to build $250MM in Stations over the next 5 years.
• 2012, efficiency and emission goal accomplished
• 2013, 50 stations completed and 3000 NGV’s in operation.
WM Natural Gas Program Awards

• Multiple “Green Fleet” Awards
• 2011, NGVA Global, Industry Achievement Award
• 2013, State of Washington, 5 Star Evergreen Award
• 2014, NGVA Global, International Champion Award
• 2017, ACT Expo, The “In it for the Long Haul” Award
WM’s Natural Gas Fleet Facts (Q2 2017)

- Natural gas vehicles: 6,000
- NG fueling stations: 100
- Stations open to public: 25
- 2017 Greenfield Stations 20
- 47 MM gals of Diesel displaced in 2016
- Over $1 Billion invested in NGVs and infrastructure
- 3 Renewable Natural Gas (RNG) production facilities
- RNG fuels 40% of NGV Fleet, reducing GHG’s by 80+%
WM – Fort Worth Project Details & Funding

• WM of Fort Worth was the 106th CNG site for Waste Management
• 25 of the 106 CNG sites are open to the public across North America
• WM has the largest fleet of heavy duty Natural Gas trucks in North America
• 6,525 Natural Gas trucks operating in communities across North America
• 43% of Waste Management’s fleet runs on Natural Gas
WM – Fort Worth Project Details & Funding

- 21.3 Million spent on new CNG trucks
- 9.425 Million spent on new facility
- 3.72 Million spent on CNG fueling equipment, plumbing, and “K” rails
WM – Fort Worth Project Refueling Infrastructure Details
• To retrofit existing shop with 10 bays would cost approx. $500k for code compliance, gas detection, etc.
• Additional technician training is required, before the operation is converted to CNG
WM – Fort Worth Project (Improvements Seen, Experience & Tips for Success)

**Maintenance Cost by Vehicle Type**

![Graph showing maintenance cost by vehicle type for Diesel and CNG.]

**Diesel vs CNG Downtime**

<table>
<thead>
<tr>
<th>Year</th>
<th>CNG Downtime per Unit</th>
<th>Diesel Downtime per Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.4</td>
<td>0.8</td>
</tr>
<tr>
<td>2</td>
<td>3.0</td>
<td>2.4</td>
</tr>
<tr>
<td>3</td>
<td>4.6</td>
<td>4.5</td>
</tr>
<tr>
<td>4</td>
<td>4.9</td>
<td>5.6</td>
</tr>
<tr>
<td>5</td>
<td>6.8</td>
<td>8.9</td>
</tr>
<tr>
<td>6</td>
<td>8.9</td>
<td>8.7</td>
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<tr>
<td>7</td>
<td>8.1</td>
<td>8.1</td>
</tr>
<tr>
<td>8</td>
<td>8.7</td>
<td>8.7</td>
</tr>
</tbody>
</table>

**Fuel Cost/DGE**

![Graph showing fuel cost per DGE for Diesel and CNG from 2006 to 2016.]

**Annual CNG Savings Per Vehicle**

<table>
<thead>
<tr>
<th>Year</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$5,427</td>
</tr>
<tr>
<td>2</td>
<td>$7,087</td>
</tr>
<tr>
<td>3</td>
<td>$11,158</td>
</tr>
<tr>
<td>4</td>
<td>$14,423</td>
</tr>
<tr>
<td>5</td>
<td>$20,386</td>
</tr>
</tbody>
</table>

1. Fuel efficiency penalty applied based on on-highway fuel efficiency penalty (15% penalty x 1/3 of miles)
2. Excludes downtime items that are vehicle-agnostic (i.e. flat tires, hydraulics, etc.)
We are transitioning large districts with over 75 trucks first and then the balance of the 425 sites that are capable.

We have developed fueling capabilities for our smaller sites down to as few as 16 trucks.

The alternative fuel and fleet industry recognizes that natural gas will be the best option for heavy duty vehicles for the foreseeable future.
City’s CNG Slow-fill Fueling Station
Future Actions for CNG Fuel & Vehicles

• Address Maintenance Limitations
• Heavy Equipment Vehicles
  • Illegal Dump
  • Transportation & Public Works
• Medium to Light Duty Vehicles
  • Animal Control
  • Code Enforcement
  • Environmental Management
  • Litter Abatement
Questions?
City of Denton
Alternative Fuels History

TERRY KADER, CPFP
FLEET SUPERINTENDENT
Biodiesel Production

Biodiesel Plant Located in City landfill

- Opened in March 2005
- Operated by BDI – Bio Diesel Industries of Greater Dallas Fort Worth
- World’s first Biodiesel plant powered by landfill methane
- Produced B100 until around 2009
- Biodiesel plant now operated by American Bio Source - production to begin this year
Biodiesel Use

First Used in the Landfill Operation

- Landfill Compactor – B99 direct from production plant - 2005
- Equipment bids specified B20 compatibility
- B20 used in all Landfill Equipment and Solid Waste Trucks - 2011
Alternative Fuel History
Alternative Fuel Site

Constructed in March 2011
- $1.2 million
- American Reinvestment and Recovery Act - $600K

Products Supplied
- Biodiesel – B20 Blend
- Ethanol E85
- Diesel Exhaust Fluid

Constructed Compressed Natural Gas Station
- $2.6 Million
- Opens – March 2018
CNG Refuse Vehicles

First Purchase – 2014

Support Vehicles
  ◦ 5 - ¾ ton GM Pickups

Refuse Trucks
  ◦ 1 – Knuckle Boom Brush Truck
  ◦ 4 – Roll Offs
  ◦ 5 – Rear Loaders
  ◦ 6 – Front Loaders
  ◦ 9 – Automated Side Loaders
Benefits

Biodiesel
- Clean Fuel Systems
- Increased Lubricity
- Lower Cost
- Sustainability

CNG
- Lower Cost Fuel
- Reduced Emissions
- Quiet Engine Operation
- Engine Maintenance – No DPF Issues
Challenges

Biodiesel

◦ Initial Fuel Filter Changes
◦ Cold Weather Operation

CNG

◦ Fueling Infrastructure Cost
◦ Timing – Vehicle Purchases vs Fueling Infrastructure
◦ Engine Maintenance and Tank Inspections
◦ Technician Training
◦ Facility Modifications
◦ Specific Engine Oil
Annual Alternative Fuel Use

Biodiesel – B5 and B20 combined
- 350,000 gallons
- 230 vehicles

Ethanol
- 15,000 gallons
- 285 vehicles

CNG
- 41,000 DGE
- 30 Vehicles
Questions
Clean Technology for Refuse Haulers
Purchasing Opportunities to Green Your Fleet in 2018!

Megan Aki
Metropolitan Area Planning Council (MAPC)

February 27, 2018
ABOUT MAPC

Regional Planning Agency

101 cities and towns

90+ employees

Wide range of planning expertise
Regional Energy Projects
- ESCO Procurement
- Regional Solar Initiative
- LED Streetlight Purchasing Program
- Community Electricity Aggregation
- Green Mobility Program
- Energy Resiliency

Climate and Energy Planning
- Connecting municipalities with incentives + plug-and-play programs
- Community energy and climate baselining, planning, and strategizing
- Outreach programming and education
- Net Zero Planning

Energy Technical Assistance
- Grant Writing
- Green Communities Designation
- Methane Leaks
- Solar Permitting and Zoning
- State and Local Policy
- Net Zero Guidance & Education
Accelerate the deployment of alternate fuel vehicles (AFVs) by reducing their incremental costs and building fleet capacity to plan procurements.

Propane, electric, and natural gas vehicles and infrastructure.
Massachusetts Statewide Contracts

Alternative Fuel Options on VEH102
STATEWIDE CONTRACTS

OSD maintains contracts procured for specific commodities and services which may be used by any executive department or eligible entity.

These contracts follow “Best Value Procurement.”

MGL Chapter 30B

• Cities and towns and others must follow M.G.L. c. 30B, although they may purchase from OSD statewide contracts.
• per M.G.L. c. 7, §22A and M.G.L. c. 30B, §1(c).
**ELIGIBLE ENTITIES**

**PUBLIC ENTITIES NATIONWIDE**

<table>
<thead>
<tr>
<th>Municipalities</th>
<th>Public libraries</th>
</tr>
</thead>
<tbody>
<tr>
<td>State agencies</td>
<td>Public schools</td>
</tr>
<tr>
<td>Ind. public authorities/quasi-public agencies</td>
<td>Public higher ed.</td>
</tr>
<tr>
<td></td>
<td>Public hospitals</td>
</tr>
<tr>
<td></td>
<td>Public purchasing cooperatives</td>
</tr>
<tr>
<td></td>
<td>Non-profit certified orgs. working with Massachusetts</td>
</tr>
</tbody>
</table>
VEH102: Statewide Contract for Advanced Vehicle Technology

Category 1
CHARGING STATIONS

Category 2
IDLE REDUCTION

Category 3
AFTERMARKET CONVERSIONS
VEH102: Statewide Contract for Advanced Vehicle Technology

Category 1
CHARGING STATIONS

Category 2
IDLE REDUCTION

Category 3
AFTERMARKET CONVERSIONS
Hydraulic Hybrid Energy Recovery System (ERS)

1. BRAKING generates energy
2. STORE ENERGY with hydraulics
3. ACCELERATION uses the energy

Source: National Fleet Hybrids
Refuse Haulers 26k-50k GVWR range
Flexible makes/models

Up to 30% **INCREASE** in fuel economy

Up to 30% **REDUCTION** in CO₂ emissions

Up to 50% **REDUCTION** in NOₓ emissions
MAPC’s Green Mobility Group
Purchasing Program

Upcoming Opportunities & Next Steps
GROUP PURCHASE BENEFITS

Access bulk discounts.

Save time & money.

Lead by example.
Accelerated Time-Based Discounts

**Volume-Based Discounts**

**DAY 1 – DAY 30**
3%

**DAY 31 – DAY 90**
1.5%

**DAY 91 – DAY 180**
0%

**Volume-Based Discounts**

- 6+ vehicles
- 20+ vehicles
- 100+ vehicles

**Volume-Based Discounts**

- 6+ vehicles
- 20+ vehicles
- 100+ vehicles

**Volume-Based Discounts**

- 6+ vehicles
- 20+ vehicles
- 100+ vehicles
ROUND 1 RESULTS (2017)

- **28** vehicles
- **11-19%** discounts
- **$1-2k** per vehicle
- **25-30%** average fuel economy improvement
UPCOMING ROUND 2 (2018)

Electric Vehicle Charging Stations

Electric Vehicles

Aftermarket Conversion Technology
TIMELINE

Exact timing subject to change, per community purchasing needs

- **JAN**
  - Community interest survey open

- **FEB**
  - Kick-Off Webinar 2/15

- **MAR**
  - Workshop with VEH102 Vendors TBD

- **APR**
  - Determine specs

- **MAY**
  - TBD

- **JUNE**
  - Issue aggregate statement of work TBD

- **AUG**
  - Submit purchase orders & coordinate installs

- **SEP**
  - TBD

- **OCT**
  - TBD

- **NOV**
  - TBD

- **DEC**
  - TBD
Thank you!

If you’re interested in participating in MAPC’s Group Purchasing Program, fill our community interest survey at:

www.surveymonkey.com/r/GreenMobility

Megan Aki
Clean Energy Analyst, MAPC
617-933-0795
maki@mapc.org
Funding Opportunities for Vehicle and Fueling Infrastructure Projects

DALLAS-FORT WORTH CLEAN CITIES WEBINAR:
CLEAN VEHICLE SOLUTIONS FOR REFUSE HAULERS
February 27, 2018
Texas Emissions Reduction Program (TERP)

Administered by the Texas Commission On Environmental Quality (TCEQ)

Objectives Of TERP:

• Reduce Emissions From Pollutants
• Prevent Areas in the State from Violating National Ambient Air Quality Standards
• Advance Technologies that Reduce Nitrogen Oxides (NO$_x$)
• Support the Increased Use of Alternative Fuels

Since 2001, TERP has Reduced Over 171,495 Tons NO$_x$
TERP Impact By Region

$1.14 Billion Funded Since 2001
(Regional Funding Shown in Millions)

Dallas/Fort Worth: $384.6M
Houston/Galveston: $461.7M
Beaumont: $45.3M
Tyler/Longview: $33.1M
El Paso: $4.4M
Austin: $16.7M
San Antonio: $3.3M
Corpus Christi: $9.8M
Victoria: $4.9M

Total Funding Received
- $3 Million - $4 Million
- $5 Million - $9 Million
- $9 Million - $45 Million
- $46 Million - $91 Million
- $92 Million - $461 Million
- TERP Eligible Counties

North Central Texas Council of Governments
September 2017
Source: Texas Emissions Reduction Plan
Biennial Report (2015-2016)
A Report to the 85th Texas Legislature
# Vehicle Funding: Medium/Heavy-Duty Vehicles

<table>
<thead>
<tr>
<th>Program</th>
<th>Eligible Activities</th>
<th>Funding Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>TERP Clean Fleet Program*</td>
<td>Replace at Least 10 Diesel Vehicles with Alternative Fuel or Hybrid</td>
<td>Maximum 80% of Total Vehicle Cost</td>
</tr>
<tr>
<td><em>(Expected Spring 2018)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TERP Natural Gas Vehicle Grant Program*</td>
<td>Replace/Repower Heavy- or Medium-Duty Vehicle with Natural Gas</td>
<td>Maximum 90% of Incremental Cost of Natural Gas Vehicle</td>
</tr>
<tr>
<td><em>(Expected Spring 2018)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TERP Emissions Reduction Incentive Grant</td>
<td>Replace/Repower/New Purchase/Retrofit Heavy-Duty Vehicles and Equipment</td>
<td>Maximum 80% of Eligible Costs</td>
</tr>
<tr>
<td><em>(Expected Spring 2018)</em></td>
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</tr>
</tbody>
</table>

*Program Changes Made In 2017 Legislative Session, Senate Bill 1731
Potential Funding – Volkswagen Settlement

TCEQ Now Accepting Comments on Environmental Mitigation Plan!
If Any Projects are of Interest be Sure to Submit Comments

<table>
<thead>
<tr>
<th>Eligible Vehicle/Equipment Types</th>
<th>Eligible Activities</th>
<th>Maximum Funding Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 8 Waste/Dump Trucks</td>
<td>Replace or Repower Existing Diesel Trucks/Equipment</td>
<td>40% for Repower</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25% - 50% for Replacement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>75% for All-Electric</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100% if Government Owed</td>
</tr>
</tbody>
</table>

Electric Vehicle Charging Infrastructure is Eligible for Funding As Part of a Project to Replace/Repower with Electric Vehicle/Equipment – if Needed
<table>
<thead>
<tr>
<th>Program</th>
<th>Eligible Activities</th>
<th>Funding Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>TERP Alternative Fueling Facilities Program (Deadline: March 29, 2018)</td>
<td>Install Alternative Fuel Infrastructure in the Clean Transportation Zone</td>
<td>Up to 50% of Project Cost, Limited to a Maximum of $600,000</td>
</tr>
</tbody>
</table>
North Texas Clean Diesel Fleets 2018

Expected to Open in March!

Eligible Entities:
- Local Governments
- Private Companies who Contract with Local Governments
  Must Adopt RTC Clean Fleet Policy or Similar

Eligible Activities | Maximum Funding Threshold
---|---
Replace On-Road Diesel Trucks*  
16,000 GVWR and Up;  
Model Year 1995-2006;  
(Also Model Year 2007-2009 if Replacing with Electric) | 45% Cost if New is Electric

35% Cost if New is Powered by Engine Certified to CARB Optional Low-NOx Standards  
(Both Natural Gas and Propane Engines Currently Available)  

25% Cost for All Others

CARB = California Air Resources Board
Have A Project Idea? Let Us Know!

NCTCOG Identifying Demand for Projects in DFW

www.nctcog.org/airquality

On Volkswagen Page:
“Get Involved!: Potential Fleet Project”
NCTCOG Expects to Apply for 2018 Clean Diesel National Grant Round

Eligible Projects Types Include:
- Exhaust Control Technologies
- Engine Upgrades and Certified Remanufacture Systems
- Verified/Certified Cleaner Fuel Use
- Idle Reduction Technologies
- Aerodynamic Technologies and Low Rolling Resistance Tires
- Engine and Vehicle Replacements
- Clean Alternative Fuel Conversion

If you are Interested in a Project Type Let us Know

We will Apply on Behalf of the Region and Could Include Your Project in Our Proposal
Sign Up For Email Updates!

Go to: www.nctcog.org/aqfunding

See what NCTCOG Has Already Funded and Sign Up for Email Updates!
Contact Information

Allix Philbrick
Air Quality Planner
(817) 695-9249
APhilbrick@nctcog.org

www.nctcog.org/aqfunding

AQgrants@nctcog.org

North Central Texas Council of Governments

Dallas-Fort Worth CLEAN CITIES
Thank you to our DFWCC Sponsors!