Municipal “Green” Fleet Case Study

June 4, 2013

Northeast Diesel Collaborative
US EPA Webinar

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Fleet Motor Fuel Objectives

- Reduced fuel costs & emissions
- Use in new construction or retrofit
- Stress lifecycle cost over initial cost
Compressed Natural Gas Street Sweeper

1995 Ford / Elgin Sweeper

Two engines - one for propulsion, second for vacuum/sweeper

Cummins B5.9G- 190 HP and Chevrolet 3.0G- 115HP
Compressed Natural Gas

- **Diesel Gallon Equivalent** of $1.90 vs. $3.27+ (including electricity, but not capital costs)
- Lowered emissions
- Much quieter
- No underground fuel tank
- No environmental liability or UST operational issues
- Eliminates current diesel engine complexities with vehicles used in Pick up-and-Delivery service (DEF, exhaust regen., etc.)
- Dedicated CNG engines vs. bi-fuel
CNG Vehicle Costs

- Heavy Duty (Class 7 or 8) – between $25,000 and $50,000 premium over diesel

- Light and Medium Duty (Class 2 thru 6) $7,000 to $10,000 premium over gasoline engine. Could be *less* than diesel option!

- US EPA and/or DOE money thru NYSERDA to empirecleancities.org for entire incremental cost
CNG Refueling Station
CNG Cascade Storage Tanks
450 KW Natural Gas Parallel Genset
Natural Gas Genset

- Quieter than diesel, especially with hospital level silencing system
- Parallel system permits precise tailoring of power to load demand
- Cleaner than diesel without needing exhaust treatment
- Parallel system permits backup redundancy
- Use of single unit in less demanding applications promotes standardization
- Latest US EPA emissions regs. for stationary/standby engines - RICE
350 KW Diesel Standby Generator

- Replace aging diesel engine generator at Orchard Street Pump Station
- Kept as a backup
- Recycle old asphalt using CNG heater and asphalt reclaimer
Stationary Fuel Cell
CNG Fueling Stations

Location & Hours of Operation in the New York Area

MANHATTAN
BRONX
QUEENS
WESTCHESTER
DPW Central Vehicle Repair Facility – 65,000 Square Feet
CNG Maintenance Facilities

- nyserda.org search for “Guidelines for Maintenance Facilities”
- cleanvehicle.org search for “Modifications for Adding Compressed Natural Gas Vehicles…”
- Air Changes per Hour (major vs. minor maintenance)
- Heating (open flame) not less than 18” to the underside of the roof
New York’s First Hybrid Aerial Bucket Truck

- Eaton brand electric hybrid system
- Freightliner truck with Cummins 240hp diesel
- Hybrid drive 44kw electric motor - four Li-Ion batteries
- Fuel savings of 2,000 gallons per year
- Electrically operated PTO, used with diesel engine off
- Auxiliary power generation of 10,000 watts at 120V
Alcohol Refueling Station!?
Alcohol Refueling Station

- 1,000 Gal. Per tank: Above-ground double-walled
- Self-contained dispensing pumps, no external plumbing

Ethanol & Methanol
Flex Fuel Ford Ranger Pick-up

Ethanol Powered  (program started in 1978)
E-85 for POLICE CARS
Reduce Dependency on Fossil Fuels

- **AFV’s** (including hybrids and biodiesel)
- **Increase Vehicle Efficiency**
  - Fuel Efficient Drivelines
  - Lighter Weight Bodies
- **Reduce Usage**
  - Consolidate Fleet (Verify Need for Each Vehicle)
  - Eliminate Excess Idling
V6 Powered Police Cruisers
1993 Chevrolet V6 Police Car
Down ("right") Sizing

- Four Cylinder Diesel
- High Strength Low Alloy Steel Packer Body
- Aluminum/Fiberglass Cab
Compact Truck that Thinks it’s Full-Sized
Aluminum Dump Body (natural finish)
Polymer Lined Dump Body

- Aluminum body with “Quicksilver” polymer bed liner.

Non-Driven “pusher” axle
Improving Diesel Emissions

- Carefully specify the minimum engine size necessary to do the job. Analyze gearing, and usage

- Biodiesel (B20...) Displacement of over 30,000 gallons of diesel fuel annually

- Specify diesel exhaust after-treatment for off road equipment

- Retrofit Diesel Oxidation Catalyst (DOC) or Diesel Particulate Filters (DPF) to existing equipment (i.e.: Donaldson, Engelhard, Corning)
Morbark Tub Grinder/Shredder

760 hp diesel engine has four (!) Diesel Particulate Filters; 90% soot reduction
Gasoline vs. Diesel ??

Fuel Injected Ford V6 **Gasoline** Engine
- Low Weight
- Low Emissions
- Low Initial Cost
- Quieter
- Low Maintenance
- Avoid need for DEF
Extend Oil Change Intervals

- **Synthetic Fluids**
  
  (Less frequent fluid changes = less waste oil)
  
  - Valvoline Premium Blue engine oil
  - Castrol Transynd automatic transmission oil
  - Mobil synthetic axle and transfer case gear oil
Recap

- Most projects have three to five year payback; maximum of ten years
- Easier to incorporate in design of new equipment, but entirely possible to retrofit to existing
- Longer service life; reduced fuel consumption and pollution
- Stress lifecycle cost over initial cost
- Analyze everything from HVAC controls to roadway curbing!