Natural Gas Powered Refuse Trucks

Alternate Fuel Refuse and Recycling Trucks

Raymond P. Burke
January 24, 2008

cleanenergyfuels.com

Why Operate NG Trucks?

Cleaner
- Cummins ISLG engine meets 2010 EPA standards
- 20% reduction in GHGs

Cheaper
- Turnkey fuel cost, including infrastructure, is $0.50 to $1.00 per gallon less than diesel
- Commodity ("fuel") costs can be fixed for multiple years
- Truck operation costs are similar to diesel

Domestic
- 97% of NG servings U.S. is produced in North America
- We import 75% of our nation’s crude and refined products today!

cleanenergyfuels.com
Natural Gas Refuse Trucks

Private & Public Operators
Over 2,000 NG trucks in operation nationwide

- Waste Management
- Burrtec Waste
- CR&R
- Solano Garbage
- Consolidated Disposal
- Harrison Disposal
- Specialty Solid Waste
- Alameda County Industries
- Amador Valley Industries
- Norcal Waste
- Smithtown, NY: Garofalo, Jody Enterprises, Brothers Waste & Dejana
- Los Angeles
- County & City of Sacramento
- Fresno
- San Diego
- Long Beach
- Santa Monica
- Tulare
- Palo Alto
- Bakersfield
Compressed Natural Gas (CNG)

- Onsite station takes pipeline gas & compresses it to 3,600 psi for trucks
- Fast-fill
  - Similar to gasoline/diesel rate
- Time-fill
  - Fuels trucks while parked, typically in a few hours
  - Less to install and has lower operation costs compared to fast-fill station
- Combo
  - Provides both Fast- & Time-fill

Liquefied Natural Gas (LNG)

- Supercooled to -260F to store more energy within the same volume
- Available from Terminals, Utility Peak Shaving Plants, Purpose Built Liquefaction Plants, Gas Processing Plants and Landfill Gas Plants (new technology)
- Transported by trailers and stored onsite in larger storage vessels
CNG versus LNG

Pros
- CNG fuel price is 30-40% less, including infrastructure & operation costs
- For 60 equivalent gallons, LNG trucks are 400 pounds heavier than diesel
- Utility pipeline gas (CNG) is available in most areas

Cons
- LNG delivery and liquefaction costs in “some” markets may provide little cost savings compared to diesel
- For 60 equivalent gallons, CNG trucks are 1,000 pounds heavier than diesel

NG Compared to Diesel

Pros
- Quiet operation, >10 dba for both CNG & LNG
- Drivers & Mechanics prefer NG trucks because they’re quieter and cleaner to work on
- Multi-year fuel contracts available for both CNG & LNG
- Grants & Federal Tax credits will cover most of NG truck’s incremental cost

Cons
- Some garage retrofits maybe required (methane detection) by local Fire Agency
- Additional mechanic training
Grants

- Many states have air quality programs to assist new NG truck purchases
- Grants can be combined with Federal Tax Credit
- CE’s Grant Staff can apply and administer the reporting activities on behalf of the customer
- We have secured over $100 million in grant funding on behalf of our customers

Clean Energy Finance

- Subsidiary of Clean Energy
- Accelerate natural gas vehicle procurement process for fleets
- Competitive financing with understanding of market and financial incentives
- Full service approach for customers
Clean Energy Finance - Leasing Example

- **CNG Refuse Truck**
  - $250,000
  - 84 months
  - 2.75% interest rate*
  - $37,500 residual
  - $2,871 per month
  - Average monthly fuel savings = $312*
  - $2,559 per month with fuel savings

- **Diesel Refuse Truck**
  - $200,000
  - 84 months
  - 7% interest rate
  - $30,000 residual
  - $2,792 per month

* Lessor retains federal vehicle tax credit resulting in lower monthly payment
** 7,500 gallons/year with $.50/gallon savings

---

Raymond P. Burke
Vice President

rburke@cleanenergyfuels.com

office: (662) 493-2804
Cell: (714) 679-6132

www.cleanenergyfuels.com

cleanenergyfuels.com