

# Natural Gas Powered Refuse Trucks

*Alternate Fuel Refuse  
and Recycling Trucks*

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## 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!

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## 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



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## 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



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## 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



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## Clean Energy Finance- Leasing Example

- ▶ CNG Refuse Truck
    - \$250,000
    - 84 months
    - 2.75% interest rate\*
    - \$37,500 residual
  - ▶ Diesel Refuse Truck
    - \$200,000
    - 84 months
    - 7% interest rate
    - \$30,000 residual
  - ▶ \$2,871 per month
  - ▶ \$2,792 per month
  - ▶ Average monthly fuel savings = \$312\*
  - ▶ \$2,559 per month with fuel savings
- \* Lessor retains federal vehicle tax credit resulting in lower monthly payment  
\*\* 7,500 gallons/year with \$.50/gallon savings

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