

Recent Municipal Assessment Proves CNG Economically Feasible

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Two current significant trends in solid waste management are the transition by waste haulers and municipalities of their collection fleets from diesel to compressed natural gas (CNG) or liquefied natural gas (LNG) fuels and expanding investment in natural gas fueling stations. Waste collection manufacturers report that within the last three years, more than half of their new vehicle sales include those designed to burn natural gas.

The reasons for the conversion from conventional fossil fuels to natural gas include a variety of economic, environmental, and political considerations. Foremost among these is that natural gas produced in the United States appears to be the lowest cost alternative fuel source.

Traditionally, the price of a barrel of oil has been about six times that of a thousand cubic feet of natural gas. With the widespread use of fracking technology to recover significant quantities of natural gas, this ratio has jumped to as high as 12:1. Depending on geographic location and proximity to gas lines, the average price of natural gas today can cost \$1.50 to \$2.00 less per diesel gallon equivalent (DGE). Projections from government, corporate, and non-profit prognosticators suggest that natural

gas will continue to be plentiful and relatively cheap compared to diesel fuel.

Typical refuse truck fuel use averages between 8,500 to 10,000 gallons per year at an average fuel efficiency of 2.5 to 3 gallons per mile. Thus, the growing differential between natural gas and diesel fuel, municipal or hauler operated trucks can shave as much as 30 to 50 percent on fuel costs. What was once

trucks, the long-term replacement of the waste collection fleet is now underway. Several of the major waste hauling firms in the United States have already made capital replacement plans to replace their existing diesel-fuel refuse collection vehicles with natural gas vehicles as they are scheduled for replacement. A few municipalities as well are entering the arena as “early adopters” on this wave to natural gas.

Exhibit 1. CNG Advantages and Disadvantages

Advantages	Disadvantages
Lower fuel costs compared to diesel on an equivalent energy basis	Increased capital costs for fueling station and maintenance facilities and CNG fleet vehicles.
Reduced reliance on imported fossil fuels.	Potential decreased fleet availability (Time Fill).
Emissions compared to diesel fuel vehicles.	Increased O&M costs for fill station operation.
Reduced environmental controls and monitoring requirements	Reduced thermal efficiency
Lower engine noise	Reduced fuel economy
Ease of installation	Increased vehicle weight
Ease of fueling operation	Uncertain secondary resale market
Fully automated operation	
Safety	
Independence	
Engine durability	

prompted by environmentalism due to the promulgation by United States Environmental Protection Agency (USEPA) of new restrictive federal heavy-vehicle emission regulations has now been largely driven by the promise of significant long-term fuel savings.

With an estimated industry wide fleet of more than 175,000 vehicles, including traditional packer trucks, front-end loaders, automated side loaders, recycling trucks, and roll-off

Feasibility Assessment

There are both qualitative and quantitative factors in assessing whether or not CNG makes sense for a municipality’s solid waste collection fleet. Exhibit 1 lists some of the major qualitative advantages and disadvantages of CNG. To better quantify the CNG alternative, a pro forma life-cycle cost model can be used

to compare the cost-effectiveness of deploying a CNG vehicle fleet to a conventional diesel fleet. The pro forma model should include the life-cycle costs associated with using CNG versus diesel, including capital costs for fueling infrastructure (time fill or quick fill or combination thereof) and vehicle costs, operational and maintenance costs, fuel efficiency, and fuel costs. The payback and life-cycle savings will vary based on local fuel costs, tax incentives, credits, and

available federal, Florida and regional grants.

Economic Analysis

SCS has utilized its proprietary CNG Pro Forma Model to evaluate the economic feasibility of CNG for use by several Florida solid waste collection agencies. For simplicity sake, we assumed that the local government would purchase all of the new CNG vehicles at once. These new vehicles are currently more expensive than traditional diesel-powered vehicles. We have recently seen a premium of 20 percent on these

types of vehicles. For modeling purposes, we assumed reasonable estimates, capital costs for a time-fill station, Fleet Division maintenance improvements, and natural gas pipeline extension. Fuel costs were derived from current Henry Hub prices, and assuming a seven percent penalty for the less efficient CNG engines. The Model also assumes estimated operations and maintenance costs for the CNG station as compared to the current diesel fueling operation. Payback periods for the trucks have ranged from two to three years and seven to 10 years depending on the type of fuel station.

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