

GARBAGE TRUCK FLEETS

A GREAT WAY TO GO GREEN

Joanna D. Underwood

It's not often that garbage collection and recycling trucks are at the centre of an environmental good news story. But, they are today in the United States, and in a number of other countries around the world. These huge fleets are proving themselves able to be true pioneers in a shift to the clean alternative petroleum-free fuels of the future, helping clean up urban air, reduce greenhouse gases, and increase energy security for the communities they serve.

Why Focus on Refuse and Recycling Truck Fleets?

The more than 150,000 diesel refuse collection and recycling trucks on the streets in communities across the US perform one of the most important of public services. No city or town could function long were these trucks not there each and every day to cart away the tons of garbage and recyclables that households and businesses put out.

As essential as these fleets have long been, they have also been one of the most condensed sources of urban air pollution, emitting exhaust that contains soot, smog-forming nitrogen

oxides and a variety of carcinogens. These fleets are one of the main reasons that, for at least 160 million Americans, the air quality where they live violates health standards set by the US Environmental Protection Agency. One outcome is alarming rates of upper respiratory illnesses, especially among children and the elderly.

Further, at a time when nations around the world are concerned about how the remaining global supplies of oil will be allocated, and whether production can possibly grow beyond the current 84 million barrels a day, refuse fleets also consume huge amounts of petroleum-based diesel fuel. Averaging less than three miles per gallon, looking at US fleets, a single truck may burn between 9,000 to 12,000 gallons of diesel fuel a year.

With rapidly industrializing China and India, home to 2.3 billion people – one third of all the inhabitants of our planet seeking to lay claim to the remaining world oil supplies so they can build the kind of transportation systems that we have in the West – competition over oil, the most rapidly

dwindling fossil fuel, is steadily growing.

So, Where is the Refuse Fleet Good News Story?

The reason why refuse and recycling fleets are becoming such a good news story in the US is that they are playing a leading role in making a shift from diesel fuel to an alternative fuel option that seems perfectly suited for them: natural gas. This fuel has been a growing success for six reasons.

1. After 20 years of development, natural gas vehicle technology has become fully commercial for most light and heavy duty vehicles. That is why the number of NGVs has increased by 90 percent in the last three years worldwide – to more than 7.3 million vehicles. While the most sophisticated natural gas vehicle technology has been developed here in North America, at present we are behind many other countries – including Argentina, Brazil, Pakistan, India, and China – in taking advantage of it.

2. Natural gas is the most plentiful alternative fuel we have to rely on. It is plentiful in North America, and it is distributed around the world in areas that are friendlier to western interests than the areas in which oil is

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concentrated. In the US, since natural gas pipelines crisscross the country, accessing this fuel for transportation use is primarily a matter of extending lines and building vehicle refueling infrastructure.

3. For heavy duty refuse truck applications especially, a whole new industry has grown up in the last decade to support the shift to natural gas. Such companies are providing clean high performance heavy duty natural gas engines; as well as the refueling infrastructure for the growing natural gas vehicle industry.

4. Natural gas is the cleanest alternative fuel today. That is because it is mostly hydrogen. It contains four hydrogen atoms and just one carbon atom – unlike petroleum-based fuels, which are more than one-third carbon and contain a multitude of toxic constituents. With more and more of the world's people living in cities, natural gas use can be a key strategy for creating healthier environments. Because these trucks are 50 to 90 percent quieter than their diesel counterparts, they also improve the quality of life in the neighbourhoods they serve.

5. Natural gas use reduces greenhouse gas generation significantly. According to recent studies in California, these reductions can be from 20 to 25 percent.

6. Perhaps the greatest advantage of using natural gas today is that it paves the way to use of even cleaner and renewable fuels that will take us to a truly sustainable transportation future. Once commercial engines can take advantage of a gas rather than liquid fuel, and once natural gas refueling infrastructure is in place, they are set to take advantage of a range of options. Nearest on the horizon is biomethane, which is chemically just like natural gas, but is made from renewable sources – from the biogas coming from landfills, sewage treatment plants, and other organic waste sites.

While biomethane production and use has been rapidly expanding in Europe, powering hundreds of buses

and trucks today, and thousands more bi-fuel light duty vehicles, it is just being introduced in North America. Also in sight are options such as “hythane” fuel (about 80 percent natural gas and 20 percent hydrogen), which is much cleaner than natural gas alone, and in the longer term, hydrogen. Hydrogen will be largely extracted from natural gas – as it has been for the US space program for 40 years – until it can be made economically from water using renewable energy – a 100 percent sustainable solution.

A New Technology Rapidly Expanding

The fleet of new natural gas trucks in the US has expanded dramatically in the last eight years. The number of trucks powered by compressed natural gas (CNG) or liquified natural gas (LNG) doubled from about 700 in 2003 to 1,500 in 2005. The number of communities in which they were operating doubled as well from 26 to 57. We found fleets in Paris, Madrid, Sweden, Yokohama, Japan and in the Netherlands. In Madrid this year, 500 refuse trucks that have been operating on natural gas are being shifted to biomethane. Since 2005, research by Energy Vision has found the number of natural gas trucks is way over 2,000, and city after city is now exploring a move in this direction.

Smithtown, Long Island: A Community to Watch

While natural gas trucks were first used in the Western US, a community of 116,000 on Long Island in New York State, the Town of Smithtown, set the pace for the east coast. In January 2007, Smithtown became the first east coast community to shift to 100 percent natural gas refuse truck service. In mid-2006, Smithtown's municipal leaders were at the point of renewing the contracts they had with private waste hauling and recycling companies for a new seven-year term. It struck them that the unpredictability and the soaring price of diesel fuel would create eco-

nomical havoc for their community. Their impetus for looking at other fuels was economic in this case, rather than environmental.

In looking for another option, the Director of Environment, Russ Barnett, got hold of the report, *Greening Garbage Trucks*,¹ which traced the trend in use of alternative fuels – virtually all involving natural gas trucks and began to contact fleets to learn about their experience. Excited by what Barnett heard, Smithtown boldly put out its bid for a new contract, calling for haulers that would use only natural gas trucks.

The local haulers, none of whom had ever seen (let alone used) such trucks, were not happy. Some protested, but most scrambled to get the facts. Once they did, almost a dozen haulers responded to this bid (amazing Smithtown's leaders) and by January 2007 four local haulers had been awarded contracts, and had put 22 new clean quiet natural gas trucks into operation.

New natural gas trucks were \$50,000 to \$70,000 more than diesel trucks. However, federal tax incentives were able to cover 80 percent of the incremental costs, and an excise tax credit made natural gas fuel \$1.00 to \$1.50 cheaper than diesel.

Smithtown contracted with a company to upgrade and expand a small existing natural gas refueling station in the neighbouring town of Hauppauge, and that station is now the largest CNG refueling facility in the Eastern US.

Smithtown secured a seven-year fixed price contract for the gas to eliminate price uncertainty, and expects to displace more than 1.37 million diesel gallons over the life of the contract, to have saved more than \$200,000 in fuel costs in 2008 alone, and to reduce its particulate matter and NOx emissions by over 11 and 458 tons respectively over the seven years.

The high performance level achieved by the 22 CNG trucks in Smithtown and the economic and environmental benefits of this technol-

ogy led the municipal leaders in mid-2008 to adopt a new township policy – that every government vehicle purchased would be natural gas-powered, as long as a suitable model was available. The township, forging ahead in implementing this policy, has now ordered many more CNG vehicles, including two new six-wheel dump trucks/snowploughs, two vans are being upfitted with natural gas engines, and a new street sweeper and two light duty natural gas sedans are in the works.

Smithtown's success has led other towns on Long Island to come and see its fleets. One of them, Brookhaven, decided to turn its whole fleet of more than 80 trucks

over by January 2009. Officials from as far away as Pennsylvania and Quebec have come to see Smithtown's program for themselves.

Conclusion

Because of the transitional role that natural gas can play, especially now, opening the door to use of its renewable counterpart, biomethane, it is proving to be a very effective option – not only for refuse and recycling trucks, but for many other fleets ranging from transit and school buses, and produce and beverage delivery trucks, to fleets of vans and taxis. For refuse fleets, the opportunity to close the resource loop is particularly appealing, as trucks take

their wastes to a landfill and can then refuel right there, using a fuel made from the wastes they have deposited.

While there may be other ways to segue from gasoline dependency in the consumer car sector, involving plug-in hybrid vehicles drawing their fuel from renewable energy, the natural gas to biomethane to hydrogen path seems particularly well-suited for fleets that travel more or less fixed routes and return to a home base to refuel at night. And, refuse and recycling trucks are out there showing the way. [MW](#)

1 Available from Energy Vision.

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