A variety of natural gas vehicles (NGVs) are in service in hundreds of communities across North America. They’re a proven, reliable and cost-effective alternative to traditional gasoline- and diesel-powered vehicles and they’re available today. Inside this special section to American City & County, learn how governments have implemented NGV programs that reduce vehicle emissions for improved air quality, lessen dependence on imported oil for greater energy security, and lower operating costs to make the most of their constituents’ taxes.

NGV America is a non-profit organization that promotes greater use of natural gas vehicles through outreach, education and technical assistance programs. For more information about this educational supplement or to learn more about how your community can implement an NGV program, contact Stephanie Yborra, Director of Marketing & Communications at 301-829-2520 or syborra@ngvamerica.org. NGV America, 400 North Capitol Street, NW - Suite 450, Washington, DC 20001. www.ngvamerica.org
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The natural-gas powered Honda Civic GX has earned a lot of appreciative fans. Fleet drivers love the fact that it’s, well, a Civic. Which means it’s comfortable, roomy and handles well. And they can take comfort in the GX’s host of safety features. Including six airbags and a 5-star frontal crash-test rating from the U.S. government. And, speaking of the government, when you add the Civic GX to your fleet, you may be eligible to enjoy significant savings from available purchase and tax incentives.

The GX is friendly to the planet as well, because it’s been named the cleanest internal-combustion vehicle on earth by the EPA. And since the natural-gas GX uses lower-cost domestic fuel, it’s leading the way to energy independence. To learn more, visit civicgx.com, or call 1-888-CC-Honda. The Civic GX.

You’re welcome.

*National Highway Traffic Safety Administration frontal crash test.† Federal and/or state. Check with your tax preparer or accountant.
City and county executives across North America are discovering that natural gas vehicles (NGVs) are a viable cost-effective solution to meeting the challenges of rising petroleum fuel prices, ever-stricter federal vehicle emissions requirements and the public’s expectation that their elected officials increase use of alternative energy to mitigate reliance on foreign oil.

From Maine to California, local governments are taking pro-active steps to help their communities diversify their transportation energy portfolio, leading by example by using NGVs in their own fleets and establishing mandates and incentives to help spur local businesses and consumers to do the same.

According to a report recently prepared for the US Department of Energy by the non-profit Clean Vehicle Education Foundation, vehicular natural gas use has climbed steadily, displacing 200 million gasoline-gallon equivalents (GGE) in 2005 and its well on the way to displacing 300 million GGE by year-end 2008.

The increased use of NGVs may be attributed to a combination of factors. The up-tick in worldwide demand for oil and uncertainty about supplies, especially from unstable regions, has steadily pushed crude oil prices up to levels thought unimaginable just several years ago. The effect at the gasoline and diesel pump is rippling through the U.S. economy and the problem is becoming more acute as the economies of China and other Asian countries heat up. For consumers, the fuel price increases are aggravating but, for public and private fleet operators, the consequences are devastating. Meanwhile the gap between the price of natural gas and oil continues to grow.

According to Washington, DC-based NGV America, a non-profit organization that advocates for greater use of NGVs, the price of a barrel of oil historically has been about six times that of a thousand cubic feet of gas. Today, that ratio has jumped to as high as 12-to-1.

Natural gas is abundant and domestic. Roughly 85 percent of the natural gas used in the United States is produced here and most of the rest comes from Canada. Less than 3 percent is imported as Liquefied Natural Gas (LNG) from a half-dozen countries.

Another reason for the increased use of NGVs is they’re incredibly clean. Natural gas is mostly methane, a simple molecule comprising just one carbon atom and four hydrogen atoms, making it an extremely clean and energy dense fuel with very few emissions. This is increasingly important as tough new federal emissions guidelines kick in on medium- and heavy-duty trucks and buses. Natural gas vehicles also produce far fewer greenhouse gas emissions than either diesel or gasoline vehicles. The clean burning attributes of NGVs are the primary reason so many transit agencies — and a growing number of airport and refuse fleets — are opting to switch to run on natural gas.

Last, but not least, NGVs are economical. An NGV’s purchase price is more than that of its gas or diesel counterpart, but its operating costs are so much lower that the savings over the life of the vehicle pay back the premium quickly and generate life-cycle savings that are hard to ignore. Recently enacted federal tax incentives for vehicles, fueling stations and natural gas fuel use — including measures that allow local governments to capture their value — have improved NGVs’ economic advantage.

Most cities and counties have purchased NGVs for their high-fuel-use centrally fueled fleets and vehicles that have high public visibility. While NGVs aren’t a silver bullet for every application, government executives and elected officials are finding that — in many cases — they’re the right choice, right now.
While the 2500 natural gas refuse trucks currently on the road account for only a small percentage of the 175,000 collection, recycling and transfer trucks in service today, a synergy of market factors is prompting municipal refuse departments and contract haulers that already use them to order more and catalyzing those that don’t use them to rethink their position.

One of the most important reasons for the move to natural gas is economics. Refuse truck duty-cycles, low mileage-per-gallon ratings and yearly engine operating hours translate into high fuel use. Typical refuse truck fuel use averages between 8500-10,000 gallons per year. With the growing differential between natural gas and diesel fuel (on an equivalent energy basis), city- or contractor-operated trucks can save as much as 30-50 percent on fuel costs. New federal tax incentives of up to $32,000 per truck significantly reduce the purchase price premium for natural gas trucks so the remaining premium is quickly paid back in operating savings, generating hefty savings over the rest of the life of the vehicle. Your payback and life-cycle savings will vary based on local fuel costs, tax incentives, credits and available federal, state and regional grants.

Other market drivers favoring natural gas refuse trucks include the fact that they’re cleaner and 90 percent quieter than diesel-powered trucks, two attributes that resonate with city and county residents.

As a pioneer in the NGV industry and a continuing force in the establishment of CNG refueling technologies, ANGI has built a reputation on delivering solutions that successfully satisfy customer’s specific refueling requirements and expectations, independent of size and scope of application.

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Peterbilt, Crane Carrier, Autocar and American LaFrance-Condor all offer the Cummins Westport 8.9-liter ISL-G natural gas engine. In addition, Emission Solutions Inc and Baytech Corporation have 7.6-liter and 8.1-liter gaseous fuel options to retrofit your International or GMC refuse trucks, respectively, and Westport Innovations offers the powerful 15-liter ISX-G for larger transfer truck applications.

While some jurisdictions, such as California’s South Coast Air Quality Management District (AQMD), use mandates that require municipalities and/or their contract haulers to purchase cleaner vehicles and fuels, others use incentives or establish innovative contract procurement policies that reward cleaner fleets. Requiring natural gas trucks and/or giving a higher rating to contractor proposals that include their use is an effective way to promote cleaner refuse fleets in your community.

Opposite: CNG-powered refuse truck in Smithtown, NY is one of 23 that went into service in 2007 as part of the town’s new “all CNG” contract refuse collection fleet. Top (inset): Norcal Waste driver fuels LNG tank on waste transfer truck. Above: Ontario is one of dozens of California communities that use clean quiet CNG refuse trucks like this autoloader with top-mounted CNG tanks.

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Highway & Energy Bill Eligible Available vehicle and fuel incentives lower capital and life-cycle costs.
School buses are the safest way to transport students to and from school, but chronic under-funding of school transportation budgets in many districts has resulted in a large number of older dirtier diesel school buses remaining in service. Even districts that adhere to a regular replacement schedule often keep school buses in operation for as long as 11-12 years—sometimes longer, which means that many school buses on the road today were manufactured when emission allowances were far more lenient than the standards that now apply. Public concern about the impact of diesel exhaust on children’s health, combined with the availability of federal, state and local grants, is prompting proactive school districts to accelerate replacement of their older diesel buses with newer cleaner ones. After evaluating their options, many administrators are choosing to buy natural gas school buses.

In fact, more than 140 school districts now use natural gas school buses to transport students to and from school each day. Examples included Lower Merion School District in suburban Philadelphia, where 77 CNG buses roll out each morning, and Long Beach Public Schools on Long Island NY, which purchased 20 new CNG buses in 2004 and plans to purchase more, in part, with savings and fuel tax credits earned from their fueling station. Jordan Public School District in Utah has been a staunch advocate for CNG buses, testing their first units in 1992 and purchasing additional units over the years (their CNG bus fleet now numbers nearly 50). In 2007, Tucson Unified School District in Arizona started taking delivery of the first of what they plan to be a fleet of 70 CNG buses. These are just a few examples. School districts in New York, Michigan, Texas, Virginia, Wisconsin, Illinois and Oklahoma use CNG buses, as do dozens of districts throughout California.

The phase-in of EPA heavy-duty engine emissions requirements that started in 2004, ratcheted up in 2007 and due to tighten again in 2010, forced diesel buses to use a variety of engine control and exhaust after-treatment strategies that reduce fuel economy and performance and increase operating costs. Natural gas buses met (and exceeded) these require-
School districts looking to replace their buses should look into their natural gas options. Factory-built natural gas buses are available from dealers representing Thomas Built Bus and Blue Bird Corporation. Most of the premium for natural school buses is covered by an available $32,000 tax credit that may be taken by the dealer or third-party financing institution in consideration for a discount of the price charged to the district. In addition, several federal grant programs specifically target the replacement of older school buses with cleaner ones.

Because school buses sit idle at night, they’re good candidates for time-fill fueling systems, which cost less than fast-fill systems. Drivers returning from their last run don’t have to wait while their buses fill up. They just connect the nozzle and go home. On average, this can save up to fifteen minutes in labor on each bus each day.

While school administrators appreciate the clean aspects of their natural gas school buses, they really like the fact that they cost less to operate. On average, school buses use only 1,800-2,500 gallons of fuel per year, but every little bit of savings helps. School bus drivers like them because they have all the power they need and are quiet (as one driver recently quipped “quiet buses means quiet kids”). Parents like them because their children are in a healthier environment.

There are nearly 3000 school buses operating in communities across the nation. Above: This CNG school bus operated by the City of Charlottesville, VA fuels at the fast-fill station located at the city’s public works yard. Below: Lodi, CA USD school buses attached to time-fill fueling posts. The district’s CNG station also has fast-fill capability for “topping off” during the day.
Airport authorities across North America are using a variety of light-, medium- and heavy-duty NGVs to reduce their emissions profile to comply with federal and state air quality plans, and earn emissions offset credits for facility expansions. When an airport wants to expand its operations, e.g. add a terminal or increase its parking capacity, the federal government allocates emissions allowances for the project. If the airport anticipates that it will exceed this allowance, it has to find ways to offset those emissions through reductions elsewhere. Replacing gasoline- and diesel-powered vehicles with NGVs is a great way to achieve this goal while also helping to reduce reliance on oil and reduce airport operating costs.

Presently, there are 26 airports that use NGVs in their own fleet, about 15 of which are in California and the rest are spread out across the U.S. The most common NGV applications are airport-owned-and-operated buses that shuttle passengers from one terminal to another or to parking lots. Other duties commonly delegated to NGVs include airport security patrols, maintenance vehicles, employee transfer shuttles, dump truck/snow plows and runway sweepers. Several airports have even converted their grounds maintenance and construction equipment to run on natural gas and a few airports use natural gas powered baggage tugs.

About a dozen airports have also implemented policies that promote NGV use by private fleets doing business there, such as taxis, door-to-door limousine services and hotel and parking shuttles. For example, some charge these commercial operators lower per-trip airport access fees if they operate on natural gas. Other airports allow CNG taxis daily access to pick-up passengers while non-NGVs are limited to every-other-day access. Still others have instituted a “front-of-the-line” privilege to CNG taxis, providing them with greater opportunity to earn higher revenues and prompting non-NGV operators to make the switch. One airport has even implemented a “No CNG/No Pick-Up” taxi policy that allows only CNG-powered cabs to pick-up passengers at the terminals – all others may drop off but must then exit the facility without a fare-paying passenger.

The key to any successful airport-based natural gas vehicle program is a convenient fueling facility, located either on property or nearby. While some airports’ fueling facilities are located “behind-the-fence,” thus, not available to private fleets, the trend is to build...
publicly accessible stations. At Phoenix International Airport, for example, Clean Energy (a private CNG fuel retailer) operates several stations including two that allow taxis and shuttles and private individuals to fill up and pay by credit card. Trillium, another private CNG station O&O services company, has a similar operation at its CNG station at San Francisco International. San Jose International Airport (SJC) owns a public access CNG station (maintenance and operations are contracted through Pinnacle CNG), which is conveniently located on the main entrance thoroughfare. It serves the needs of the airport’s own bus fleet as well as private vehicles including more than 125 taxis and a number of hotel shuttles. SJC recently announced inauguration of an innovative program that will help private fleets pay for conversion of their vehicles to run on natural gas.

Fuel Solutions provides comprehensive and objective design consulting services to fleet owners considering implementing or expanding CNG or LNG fueling infrastructure, including needs analysis, design-build specifications, engineered construction drawings, RFP development. Also consulting for garage modifications and petroleum fueling.

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Milana Corp. is committed to creating and developing the AFV market in the State of Utah to facilitate the transition from petroleum dependence to a more diversified economy by coordinating related industries and advocating supportive policy initiatives.

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gs are well suited to a variety of fleet applications across all city and county government departments. Using them in your fleet not only improves air quality and reduces dependence on oil, it also makes the most of your budget resources and sets an example for residents and business in your community. Most government fleet vehicles return to central yards or fueling depots each evening, and those that don’t (e.g. sedans or pick-up trucks that go home with employees) usually operate within the local area, which means they’re never far from your natural gas fueling station(s).

Compacts like the American Honda Civic GX are used by social service case workers, parking enforcement officers, code officials and other inspectors and general administrative pool car duties. The full-size Crown Victoria is used by a number if police forces and its counterparts, the Lincoln Town Car and Mercury Grand Marquis, are a good fit for senior executives. Ford and GM pick-up trucks and cargo vans (both available through qualified EPA-/CARB-certified suppliers) are useful in nearly every department from facilities maintenance to public works, and their passenger vans and shuttles are great for employee vanpools and a variety of community transport services.

Natural gas-powered medium-duty and heavy-duty step-vans and work trucks from vocational truck dealers representing Chevrolet, GMC, Isuzu, Freightliner, Sterling, International and Workhorse are used every day by city utility departments, transportation crews, facilities maintenance workers,
A wide variety of light-, medium- and heavy-duty NGVs are available for just about every government fleet application.

grounds maintenance and other public works/fleet personnel. Factory-built natural gas-powered refuse trucks are available from Peterbilt, Crane Carrier, Autocar and American LaFrance-Condor (see Refuse, page 4) as are street sweepers from trusted manufacturers Elgin, Tymco, Schwarze and Allianz-Johnston. And more than a dozen shuttle, bus and trolley suppliers have natural gas-powered units to meet your needs as well (see Transit, page 12). For more information about all the available natural gas-powered vehicles and engines, visit www.ngvamerica.org/resources_tools/index.html
Moving America Forward

More than 11,000 natural gas-powered transit buses and community shuttles operate in urban and suburban settings across North America and hundreds more on order will hit the streets in the coming year. In fact, about one-in-five transit buses ordered by cities and counties last year was specified to run on natural gas.

Natural gas buses have a proven track record of clean, reliable and cost-efficient service at more than 125 transit agencies in major markets like Los Angeles, Phoenix, Atlanta, Washington, New York and Boston, smaller cities like Syracuse (NY), State College (PA), Arlington (VA) and Gwinnett County (GA), and dozens of small communities. These numbers are projected to increase as transit agencies that use natural gas buses build on their successes and new ones join the trend. The growing market preference may be attributed, in part, to the new generation of advanced natural gas engines, which have improved performance while meeting – and exceeding – EPA’s tough new emissions requirements.

Meanwhile, “clean diesel” proponents continue to grapple with complex new emissions strategies and rising fuel prices that push diesel bus operating cost even higher.

Several of the leading bus manufacturers, including North American Bus Industries (NABI), Orion, New Flyer and Blue Bird offer natural gas engines in their heavy-duty transit buses. These may be ordered to run on compressed natural gas (CNG) or liquefied natural gas (LNG). The right fuel for your community will depend on your location and site-specific considerations. In addition, there are about a dozen second-stage shuttle manufacturers (referred to as ‘upfitters’) that offer natural gas units ranging in size from 15-passenger vans to 30-passenger medium-duty buses. Smaller vans, shuttles and buses are great for ADA and other demand-response duties, for use in community feeder routes to primary transit resources, shuttling seniors to shopping, healthcare and community centers, and university transportation applications. On the light-duty side, natural gas-powered cars, vans and pick-up trucks are great for bus driver exchange duties at the end of sched-
diesel buses, operate at far lower decibel levels. 2010-compliant low emission natural gas engines, which produce only one-sixth the smog-inducing NOx that the latest “clean diesel” buses produce. Your transit system patrons who don’t pay federal motor fuels excise tax credit anyway, the credit is paid out in the form of a federal motor fuels excise tax credit that went into effect in late 2006 provides natural gas fueling station operators with a $.50 per gallon credit on the fuel, further improving the economic advantage over diesel buses. For tax exempt organizations like transit authorities, which don’t pay federal motor fuels excise tax credits, the credit is paid out in the form of a U.S. Treasury “rebate” check. Transit operations large and small are using the credits to lower operating costs and invest in additional natural gas units.

Looking to the future, transit agencies in California, Vancouver and elsewhere are experimenting with blends of CNG and hydrogen to further lower emissions, and to obtain experience with hydrogen fuels for what many predict will be a partially hydrogen-based transportation future. In addition, natural gas-powered heavy-duty hybrid buses are in use in Denver and new units incorporating the latest drive train, energy storage and control technology are being field-tested in San Diego.

When it comes to fuel costs and emissions requirements, the road ahead is likely to get tougher before it gets any easier. Transit operations evaluating their options should consider moving away from petroleum-fueled fleets and investigate the benefits of running their fleet on natural gas.
The following natural gas companies are available to answer your NGV questions.

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**Fill’er Up**

One of the keys to a successful NGV operation is a well-planned and well-run fueling infrastructure. The following is meant to help you evaluate your options.

Natural gas is available in two forms, compressed natural gas (CNG) or liquefied natural gas (LNG). Generally, CNG is available wherever local natural gas service is available and requires compression and dispensing equipment. Vehicular-grade LNG is produced in a cryogenic process at a few production plants then transported to customers’ fueling sites. Transportation costs will weigh heavily in whether this option is economically viable for your operation. As additional LNG plants come online, its use as a vehicular fuel will grow. The rest of the discussion that follows applies to CNG.

If existing fueling infrastructure is already available in your market, this may be your best fueling option. It may be operated by the local gas distribution company (LDC) or an independent natural gas fuel provider, or it might be a station run by another nearby public or private NGV fleet that is willing to allow use of its natural gas fueling facility. Work with the station operator to make sure the existing station can handle added fueling requirements and, if necessary, investigate options to upgrade capacity.

If use of existing fueling infrastructure is not convenient or economical, it may be better to build a new station. You can make the station private access only, i.e. for use only by your own vehicles, or you may provide “outside-the-fence” fuel dispensing capability to other area fleets and consumers. Installation of this type of public fueling capability promotes alternative fuel use in your community. Generally, the more NGVs and fuel dispensed, the better the operational economies of scale and amortization of your investment in equipment.

The size and cost of your natural gas fueling station can vary based on: 1) the number of vehicles to be fueled, total daily fuel requirements and maximum hourly flow rate; 2) whether time-fill, fast-fill or both capabilities are needed; 3) the level of remote station monitoring and diagnostics capability desired; 4) the type and sophistication of data collection/payment processing system at the dispenser; 5) the real estate space required; 6) availability, quality and pressure of gas service; 7) amount of back-up fueling or required system redundancy; and 8) site-specific factors such as permitting, site improvements and/or other requirements.

The basic cost components of fueling are: (1) natural gas – either purchased on the open market through a broker or via the LDC’s bundled rate, (2) the LDC’s delivery charge and related meter and account fees, (3) compression, (4) station equipment (or the cost of capital to buy it), (5) service and maintenance, and (6) local, state and federal taxes (if applicable).

Fleet operators have a number of station ownership and operations options. Some city and county governments choose to own and operate their stations outright. While this option may be viewed as offering...
the potential for the greatest savings, it also incurs the highest risk as all aspects of station management including fuel procurements, daily operations, maintenance and repairs as well as administrative burdens are borne by the fleet operator. Another option is to partner with a private firm to build, operate and maintain a station for a fee that is usually charged on GGE basis. Yet another option is to outsource the station completely, contracting a firm to build, own and operate a station on city property (often under a lease-to-buy option), including procurement of the natural gas, with all costs bundled into a contracted price per GGE.

Your “best option” will depend on current and projected NGV fleet size and fuel throughput, your government’s contractual parameters and/or limitations, available funding and financing and lease options, your experience with natural gas fuel purchasing and your fleet/facilities mechanics’ capabilities in operating and maintaining CNG equipment. Internal management culture also will play a role, e.g., tolerance for risk and/or willingness to partner with others for fueling services in order to maintain focus on core competencies.

There are resources to help you assess your fueling station requirements and evaluate your options. U.S. Department of Energy Clean Cities Coalition coordinators can direct you to station design resources as well as assist you in identifying and securing grants that can help pay for stations and vehicles. To contact your nearest Clean Cities Coordinator or access a list of fuel providers, vendors and qualified station consultants, visit www.cleanvehicle.org or www.ngvamerica.org.

### Summary of Federal NGV Tax Incentives

The following tax credits ARE available to tax exempt entities:

#### Vehicle Tax Credits (effective January 1, 2006)

- Income tax credit goes to buyer: equal to 50-80% of incremental cost of new, dedicated NGV and/or the cost to upfit an existing vehicle for dedicated operation on natural gas.
- Credit is based on emissions level and Gross Vehicle Weight Rating (GVWR).
- If buyer is tax exempt, seller may take credit (discount to tax exempt is negotiable issue).

  Light-duty vehicle (up to 8,500 lbs GVWR): 
  Credit range: $2,500-4,000

  Medium-duty vehicle (8,501-14,000 lbs GVWR): 
  Credit range: $5,000-8,000

  Medium-Heavy-duty vehicle (14,001-26,000 lbs GVWR): 
  Credit range: $12,500-20,000

  Heavy-duty vehicle (over 26,000 lbs GVWR): 
  Credit range: $20,000-32,000

#### Fuel Use Credit (effective October 1, 2006)

- A motor fuel excise tax credit of 50 cents per gallon of liquefied natural gas (LNG) or gasoline-gallon-equivalent of compressed natural gas (CNG)
- Credit is payable to seller. If customer is “seller/user” of gas, tax credit goes to customer
- Credit is paid regardless of whether user pays excise tax. (i.e., tax exempt organizations qualify for credit)
- New laws increase CNG and LNG excise tax (for taxable sales) to same as gasoline and diesel, respectively

#### Fueling Station Credit (effective January 1, 2006)

- Income tax credit goes to buyer: equal to 30% of refueling equipment up to $30,000 per location
- If buyer is tax exempt, seller may take credit (discount to tax exempt is negotiable issue)
- Up to $1,000 tax credit for home NGV fueling appliance
When it comes to protecting the environment and public health, the choice is clear.

Natural gas is the new green standard for transportation fuel.

It’s cleaner
- up to 20% or more lower greenhouse gas emissions than diesel

It’s good for the community
- significantly lower health-damaging pollutants (heavy-duty natural gas vehicles meet 2010 EPA emission standards — now)

It’s cheaper
- costs up to $1 less per gallon than diesel

It’s renewable
- methane from landfills and other sources can be converted to natural gas fuel

It’s good for America
- 98% of natural gas fuel is produced in North America

It’s Clean Energy
- Clean Energy is the leading provider of natural gas for transportation in the United States and Canada, enabling low-cost, state-of-the-art, environmentally friendly fleet operations for the transit, refuse, airport, taxi, trucking, port and other key markets.

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