Vol. 7 - No. 3

U.S. DEPARTMENT of ENERGY

ALTERNATIVE FUEL NEWS

An Official Publication of the Clean Cities Network and the Alternative Fuels Data Center

From the Office of Energy Efficiency and Renewable Energy

Station Stories

Additions to the Clean Cities Station Locator database reflect the changing face of alternative fueling in America

PLUS:

Biodiesel Buying Co-ops

Clean Cities in Bangladesh

Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

Clean Cities Deputy Director Marcy Rood has helped the program establish roots in several developing countries. In this guest letter, she explains the purpose behind Clean Cities International.

Dear Readers:

I will never forget the first time I landed in Delhi, India in July of 2000. It was late, and the air was foggy and oppressive. I'm not often bothered by allergies, but my throat and eyes burned as we loaded my luggage into a taxi. As we made our way to the hotel, I could see women and children living on the streets with very little shelter; cows eating what seemed to be the last bit of greenery; and streets congested by noisy three-wheel rickshaws.

My first thought was, "What *am* I doing here? These people still need the basics—food, shelter, and clean water." Their plight seemed overwhelming, and my mission inconsequential. But soon I realized that everyone, irrespective of caste or station in life, needs clean air. And yes, the Clean Cities Program can play a part in improving life in the developing world.

Since then, I've returned to Delhi on several occasions, often accompanied by trainers and technical experts from the United States. Our mission has been to help establish a safe, clean fueling infrastructure in India, and much progress has been made. Delhi itself has taken bold steps toward that end, such as converting its own bus fleet to CNG. The city has announced plans to join us as an international partner.

Clean Cities International has made inroads in other developing nations including, most recently, Bangladesh. India's neighbor to the east is similarly poor, crowded, and burdened by extreme levels of air pollution. We've conducted CNG training in Dhaka, and a partnering relationship with that city is set to begin this year (see page 10 for details.)

We've conducted reverse trade missions in this country, welcoming foreign delegates to educational and networking events such as the World NGV Conference and our own annual convention. We've established valuable relationships with developed nations as well. (Read the latest about our relationship with CIVITAS, the bold environmental initiative of the European Union, on page 15.) We recently hosted a conference on LPG for vehicular use in Mexico City.

Our international work often leverages small amounts of DOE funding with much larger contributions from global organizations such as the United States Agency for International Development (USAID). In the Philippines, for example, an interagency agreement between USAID and DOE is crafted in part to help develop ways to make biodiesel from domestic coconut oil.

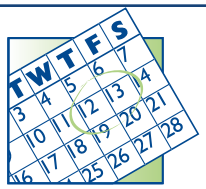
Why do we do it? The second most important reason, perhaps, is business development. Cultivating interest in alterative fuels abroad generates business for countless U.S. companies. Providers of fuel, dispensers, pipelines, and engineering services have already benefited from our efforts. To my knowledge, there is no other program to help the developing world systematically build safe and effective alternative fuel vehicle programs.

The most important reason for our international efforts is more fundamental. We are all part of this beautiful planet, connected in so many ways. Developing nations need not just technical and financial support. They need friends. Gandhi said, "Be the change you want to see in the world." I am grateful that this notion is embraced by so many people connected with the Clean Cities Program, both here and throughout the world.

Marcy G. Rood

Marcy Rood, Deputy Director

Clean Cities Program
U.S. Department of Energy



Upcoming Conferences and Events

9th Annual National Ethanol Conference
February 3-6, 2004
Washington, D.C.
Renewable Fuels Association
202-289-3835
www.ethanolrfa.org

Southeastern LPG Convention and International Exposition
April 3-6, 2004
Atlanta, Georgia
National Propane Gas Association
678-290-8262
www.npga.org

10th National Clean Cities Conference
May 2–5, 2004
Ft. Lauderdale, Florida
DOE Clean Cities Program
800-CCITIES
www.ccities.doe.gov

For more conference and event information, visit **www.ccities.doe.gov/events_cgi.shtml**

U.S. Department of Energy
Energy Efficiency
and Renewable Energy

About the Office of EERE

A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. By investing in technology breakthroughs today, our nation can look forward to a more resilient economy and secure future.

Far-reaching technology changes will be essential to America's energy future. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a portfolio of energy technologies that will:

- Conserve energy in the residential, commercial, industrial, government, and transportation sectors
- Increase and diversify energy supply, with a focus on renewable domestic sources
- Upgrade our national energy infrastructure
- Facilitate the emergence of hydrogen technologies as vital new "energy carrier's."

The Opportunities

Biomass Program—Using domestic, plant-derived resources to meet our fuel, power, and chemical needs

Building Technologies Program—Homes, schools, and businesses that use less energy, cost less to operate, and ultimately, generate as much power as they use

Distributed Energy & Electric Reliability Program—A more reliable energy infrastructure and reduced need for new power plants

Federal Energy Management Program—Leading by example, saving energy and taxpayer dollars in federal facilities

FreedomCAR & Vehicle Technologies Program—Less dependence on foreign oil, and eventual transition to an emissions-free, petroleum-free vehicle

Geothermal Technologies Program—Tapping the Earth's energy to meet our heat and power needs

Hydrogen, Fuel Cells & Infrastructure Technologies Program—Paving the way toward a hydrogen economy and net-zero carbon energy future

Industrial Technologies Program—Boosting the productivity and competitiveness of U.S. industry through improvements in energy and environmental performance

Solar Energy Technology Program—Utilizing the sun's natural energy to generate electricity and provide water and space heating

Weatherization & Intergovernmental Program—Accelerating the use of today's best energy-efficient and renewable technologies in homes, communities, and businesses

Wind & Hydropower Technologies Program—Harnessing America's abundant natural resources for clean power generation

To learn more, visit **www.eere.energy.gov**

ALTERNATIVE FUEL NEWS

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The fueling station database reflects an ever-changing mix.

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On the Cover: A celebration marked the July start of E85 sales at a Phillips 66 station in Santa Fe, New Mexico. Evolution and expansion of the nation's alternative fueling infrastructure are outlined on pages 4-7.

Are you getting what you need in the *Alternative Fuel News*?

Would you like to subscribe to AFN, or cancel a subscription? Would you like to receive an email message whenever a new issue is posted online, rather than receiving a print copy by mail? AFN is usually available on the Clean Cities Web site before it's mailed. To view or download our latest issue as well as past issues, please visit **www.afdc.doe.gov/documents/altfuelnews**. You can email us at **ccities@nrel.gov**, or call 800-CCITIES. We welcome comments and suggestions about the content of AFN.

Station Stories

Additions to the database of AFV fueling stations come with stories of challenge and success.

The opening of public alternative fueling stations used to be big news. Unveiling new sites called for ribbon-cutting, balloons, and speeches, as supporters turned out to cheer the first fill-up with any non-petroleum fuel. Even adding E85 or biodiesel pumps at gasoline stations was often a cause for celebration.

In what can only be considered a success for alternative fuels, it's no longer that way. Grand openings don't always accompany expansion of the local infrastructure, says Yvonne Anderson, coordinator of the Central Oklahoma Clean Cities coalition. "It has become more commonplace," she says. The coalition still deploys PR tactics when new stations open around Oklahoma City. But often they're merely a hook to solicit media coverage of alternative fuels in general.

Growth in alternative fuels is evident to users of DOE's Alternative Fuel Station Locator (visit the Alternative Fuel Data Center at www.afdc.doe.gov and click on Refueling Sites). Its database is updated regularly. Most fuel types logged net gains in the 12-month period ending on October 31, 2003. Sellers of natural gas (especially CNG) were the exception, showing net declines during the 12-month period. While natural gas volume has risen steadily, the number of stations nationwide has fallen due to industry consolidation (more on page 6).

PIX 12827

The Dakota Ridge RV Center can supply propane for vehicle use as well as camping, says attendant Garland Wright.
Top: Amigo Oil's Phillips 66 station in Santa Fe, New Mexico celebrated the addition of E85 fueling with a grand opening in July.

Fuel Station Totals - *Reflects data in the AFDC Fuel Station Locator: www.afdc.doe.gov/refueling.html*

Fuel Type	11/1/2002	10/31/2003	Net Gain/Loss
LPG	3,395	4,004*	609
Biodiesel	33	126	93
E85	149	179	30
CNG	1,247	1,055	-192
LNG	74	73	-1
Electricity	839	875	36
Hydrogen	0	7	7

**Includes both new stations and stations newly identified*

LPG

The Dakota Ridge RV Center in Golden, Colorado offers propane (or "LPG," for liquefied petroleum gas) for sale to all vehicles—not just recreational vehicles that use it for onboard heating and cooking, but also propane-fueled cars and trucks. Because vehicle fueling is often a smaller portion of their business, these propane stations have sometimes been difficult to identify through the years. In the past year, special attention has been given to identifying all LPG vendors, resulting in many newly identified stations. More than 4,000 propane vendors are now listed the station locator database.

A small but growing part of the LPG business offers modern, convenient, credit card-enabled fuel dispensers at major brand service stations. Many are part of the Clean-FUEL USA Network, which includes stations in Arizona, California, Colorado, and Montana. A key player in that network is Clean Fueling Technologies, a dispenser manufacturer headed by Curtis Donaldson. With help from a grant from the state of Texas, the company plans to build six LPG stations along the 80-mile corridor between Austin and San Antonio.

Austin is also the site of a new, modern LPG station serving the city's airport. The state-of-the-art station was financed with grants from the city of Austin and the Propane Education and Research Council. It is used both by private motorists and airport vehicles, including a fleet of 29 shuttle buses. The station will dispense 1.3 million gallons of fuel per year, including 300,000 gallons of new sales. It is expected to be open by January 2004.

Biodiesel

The nation's biodiesel infrastructure expanded considerably during the 12-month period, adding a net total of 93 stations. Of those 93, thirteen are private sites operated by a single entity—the North Carolina Department of Transportation, which has prioritized biodiesel use in recent years. Biodiesel is growing rapidly both among consumers and in EPAct-regulated fleets. In the nation's State & Alternative Fuel Provider fleets alone, biodiesel use rose from less than 1 million gallons in 2001 to 2.66 million gallons in 2002.

Kelly Feil operates Click's Kicks 66, a modern Phillips station, in Boise, Idaho. Feil was asked by the state's Department of Water Resources to participate in a one-year biodiesel pilot program. The station hadn't sold diesel before, but it designated one tank and dispenser for B20. Now it sells 400-500 gallons per day. Waste management company BFI is an excellent customer, using the fuel in trash trucks. Several individuals buy it too. "People think it's great," says Feil. The interest of private motorists rises noticeably when prices drop. Feil's station has one big advantage, he says. It is Idaho's only retail seller of biodiesel.

Twenty miles from Boulder, Colorado is the town of Rollinsville. Barely a wide spot in the road, it has one restaurant, a post office, and the Rollinsville Country Store. Sold along with food and fishing tackle are five-gallon containers of B100 biodiesel fuel. The price is $13.75. Customers may borrow a funnel and fill up on-site, or take the jug home.

"We make three or four sales a week," says Christine Gellatly, who owns and operates the store with her husband. Customers include construction workers driving diesel pickup trucks and locals commuting to Boulder in passenger cars. "They buy it for environmental reasons, and they usually say something about reducing imported oil," says Gellatly. The store's fuel comes from Boulder Biodiesel, a member-owned cooperative that obtains the fuel from a distributor for Iowa-based West Central Soy.

HELP WANTED

Updating the Database

It's a big job maintaining the database that serves the Alternative Fuel Station Locator and Route Mapper. Existing data is verified annually, but many stations open, and some close, every day. Information about new sites comes from a variety sources including fuel trade associations, station owners and operators, press releases, and media coverage. Our best allies in the quest, however, are private individuals who use alternative fuels. The Clean Cities Program urges AFV drivers to let us know when a new station opens or an old one closes, or when you spot inaccuracies in our data. Call the National Alternative Fuels Hotline at 800-423-1DOE. For new stations, fill out the Refueling Stations Submission Form at www.afdc.doe.gov/refuel/stations_add.html.

Government agencies such as the National Park Service, with diesel buses serving Yellowstone, aren't the only consumers of biodiesel fuel. A growing grassroots movement of motorists is served by small sellers such as Christine Gellatly at the Rollinsville Country Store.

National Park Service/PIX 12854

PIX 12847

Clean Energy Fuels/PIX 12855

A net reduction in the number of CNG facilities nationwide stems from industry consolidation. Fewer, bigger sites—such as this Clean Energy Fuels station in Phoenix—have replaced many smaller ones.
Below: At Amigo Oil's modern Phillips station in Santa Fe, attractive signage helps create a mainstream image for E85.

Alternative Fuels Vehicle Network/PIX 12856

E85

The nation's corn belt is best known for ethanol production and E85 fueling. But E85 has established roots in at least 26 states, thanks in part to grants from the National Ethanol Vehicle Coalition (NEVC). Nationwide, stations selling E85 experienced a net gain of 30 in the one-year period ending in October.

An E85 dispenser now serves customers in Santa Fe, New Mexico, at a Phillips 66 station owned by Amigo Oil. E85 fueling was added as part of a complete overhaul of the site, which was celebrated with a grand opening in July. An NEVC grant for the E85 dispenser was secured by Renewable Energy Partners, a nonprofit organization that also engineered the installation. The fuel is blended in Albuquerque with ethanol from Archer Daniels Midland, which delivers it by truck from the Midwest.

In its first few weeks, E85 sales were modest—fewer than 200 gallons per week. But public interest in the fuel was quite strong, says Richard Mason of Renewable Energy Partners. "People in Santa Fe are environmentally conscious," he says. Signage on the dispensers is so attractive, says Mason, that it has drawn much interest from motorists, including those driving gasoline-only vehicles. The station has had to devise ways to discourage people from buying E85 if their cars can't handle it.

Mason's organization is working with car dealers in Santa Fe to expand sales of used flexible-fuel vehicles, with an online marketplace at www.renewableenergypartners.org. A second E85 station in Santa Fe, at a more central location, will also sell B20.

NEVC grants also helped pay for E85 fueling at several Acorn Fuel Store sites in Colorado. "Most of the people buying E85 are repeat customers," says company operations manager Tom Mousaw. "I know there are a lot of other people who have flexible fuel vehicles and don't know it," he says.

Natural Gas

While other fuels move toward more diversified forms of distribution, natural gas sites seem to be moving toward ownership by fewer, stronger operators. The number of CNG and LNG stations experienced a combined net decline of 193 during the 12-month period. Many of the closed "stations," however, were private, slow-fill units operated by utility companies.

Some see the decline as a nationwide "right-sizing" of the sector. Many stations were ill fated from the start, says Jim Harger of California-based Clean Energy Fuels. Utility companies have often focused on municipal fleets

Costco/PIX 12826

Of the 90 Costco stores in California, approximately 68 offer EV charging. That state has adopted conductive charging as a standard, but Costco still provides paddle-type inductive chargers as well, for cars such as GM's EV1. The service is provided to customers at "no charge."

or individual consumers, with disappointing sales results. Successful natural gas stations must focus on serving large "anchor tenants" such as waste management companies. "Without an anchor tenant, the station doesn't make sense," says Harger.

Station closing details from the 12-month period confirm Harger's observation. Eleven stations operated in Ohio by East Ohio Gas were confirmed closed. Northern Indiana Public Service closed 10 NiSource stations in Indiana.

Consolidation of ownership is another factor in the net decline in natural gas station totals. Clean Energy Fuels has acquired certain chains of stations, including the Denver-based Natural Fuels sites. Some underperforming sites were closed in the process. Those that remain are bigger, better situated, and dispensing more fuel than ever per station and in total.

Although the number of natural gas fueling sites may have dropped, sales of the fuel nationwide are rising steadily. CNG and LNG sales in 2002 reached 113 million gasoline gallons equivalent (gge). That's an increase of 1.5 percent over the previous year. The 2002 total is up 74 percent from the 1997 total of 65 million gge.

EV Charging

The sale of new, fully street-capable all-electric vehicles in the United States has essentially stopped, at least temporarily, with the discontinuation of Toyota's RAV4-EV and Ford's line of TH!NK cars. But many "production" EVs and smaller neighborhood electric vehicles remain on the road, with the highest concentration in California. The 12-month period ending in October brought a net addition of 36 EV charging sites, raising the total known nationwide to 875.

The true total is much higher than that, says Enid Joffe of the Clean Fuel Connection, a company that installs the stations. Perhaps 2,000 chargers are in California alone, without even counting residential installations, she says. Public chargers have been put in parking garages, shopping centers, and airports. Many were installed with public funds and are available for use free of charge. Non-public sites are found at schools, military bases, government agencies, and utility companies.

EV charging is one of several forms of alternative fueling available to the public at San Diego's new Regional Transportation Center. (The state-of-the art RTC also sells biodiesel, natural gas, LPG, and E85 along with gasoline and low-sulfur diesel. See AFN 7-2, page 16.) Its EV chargers are free for public use, and usually all six are open, said an attendant. One regular customer has been known to settle in for a nap while fueling his Ford Ranger. A member of the San Diego Clean Fuels Coalition plugs in her Ford TH!NK City while conducting business at the RTC.

EV drivers in California can charge their vehicles at approximately 68 of the 90 Costco sales warehouses in the state. Costco charging sites include both inductive and conductive chargers, with two to six plug-ins per location. EV charging is free to Costco members. "We consider it a logical, valuable service we can offer. When people come to one of our warehouses, they usually stay a while," says Ed Fitzgerald, director of automobile-related sales for the company.

EV charging at Costco is neither on the increase nor declining, says Fitzgerald. "The automakers aren't offering electric vehicles any more, but there are still quite a few of them on the road in California." Outside of that state, EV charging is available at a few Costco sites in Georgia and Arizona. "Generally, we've put them where the vehicles are," he says.

Clubs and co-ops are focusing demand on select stations, buying fuel in bulk, and helping to reshape the market.

Biodiesel Buying Power

BiodieselNow.com/PIX 12857

Although fleets represent by far the biggest share of biodiesel fuel users nationwide, private motorists are a growing force in the biodiesel market. Motivated more by environmental concerns than by mandates, individuals are filling up at mainstream service stations whenever possible, and—when necessary—at more unlikely places such as industrial fuel sites, neighborhood grocery stores, and their own garages.

To ensure a steady fuel supply, some biodiesel users have formed co-ops and informal buying groups. "People are using a market mechanism to concentrate their buying power," says Gene Gebolys, president of the nation's largest biodiesel supplier, World Energy. Customers often promise their collective business to a single station, hoping to convince the operator it's worthwhile to dedicate a tank and dispenser to biodiesel.

One such station is operated by Massachusetts-based Burke Oil. The company is engaged mainly in distributing petroleum fuel and lubricants to service stations operated by other companies. Its only proprietary station is located in Chelsea, near the headquarters of World Energy. Burke was asked both by World Energy and local owners of diesel-fueled cars to consider selling biodiesel at retail. It started dispensing B20 from an unused kerosene tank in mid-2002.

"I had no idea how popular it would be," says Ted Burke, vice president of sales for Burke Oil. The station now has approximately 75 retail customers buying 2,500 gallons of B20 biodiesel per month. Sales are growing rapidly, he says. "It's small compared to gasoline sales; not enough to build a business on," Burke admits. But demand has been strong enough for Burke Oil to install a new 2,000-gallon tank and dispenser strictly for biodiesel. The company also sells 150,000-200,000 gallons of biodiesel per year, delivered in bulk, to truck fleets.

Burke's retail customers include many enthusiast drivers of older diesel-powered Volkswagens. One is Nate Byrnes, a long-time biodiesel user who maintains a Web presence at BiodieselNow.com. Volkswagen does not endorse biodiesel use in the United States, however, and using it will void the manufacturer's new-car engine warranty. Diesel vehicles from other automakers include domestic pickup trucks and older Mercedes-Benz sedans. A comprehensive list of diesel vehicles made since 1960 is published at www.gobiodiesel.org/years.html.

Many biofueled diesel cars appeared at last year's opening of a biodiesel station in Chelsea, Massachusetts. Speakers included (from top) Gene Gebolys of World Energy, Ed Burke of Burke Oil, and biodiesel user Nate Byrnes.

General Motors recently authorized blends up to B5, which is 5 percent biodiesel, for use in certain drivetrain configurations of 2004 model pickup trucks including the Chevrolet Silverado (below).

Wieck Photo Database

City of Boulder/PIX 12825

Commercial biodiesel sales began in Boulder, Colorado with the September 2003 opening of a public B20 dispenser: From left: Bryan Flansburg and Paul Tabolt of the University of Colorado, Boulder Mayor Will Toor, and facility owner Joe Swank. The fuel comes from Blue Sun Biodiesel, a Colorado-based broker of biodiesel.

In the area around Chelsea and Boston, Byrnes says, Burke's station is the only retail site selling biodiesel. Before that facility went in, some diesel drivers were routinely taking four-hour Sunday trips to another supplier in Maine, returning with five-gallon containers filled with B100. Some still do that, he says, rather than settle for the B20 sold by Burke Oil.

In areas of the country where biodiesel isn't available at retail, motorists have taken matters into their own hands by forming cooperatives. The Connecticut Biodiesel Co-op, based near Hartford, typically keeps about 300 gallons of fuel on hand for its members. The fuel is acquired from World Energy and sold to members "at cost." It is delivered in 30- and 55-gallon drums to locations within a two-hour driving distance. Another, similar co-op is established near Trenton, New Jersey.

Home fueling and storage is a realistic option for many biodiesel users, says Dan Freeman, owner of Dr. Dan's Alternative Fuel Werks in Seattle, Washington. "They don't have to rely on an established service station," he says. "Biodiesel is not considered a hazardous material. It's no more dangerous than the vegetable oil in your kitchen." Freeman offers 275-gallon tanks and electric pumps for sale to individuals and co-ops. (Visit www.fuelwerks.com.)

He also sells biodiesel (as well as CNG) at his own location, where the primary business is auto repair. Biodiesel sales have been as high as 11,000 gallons per month, he says. "In my first year, my customers tended to be techies who found me on the Web. Usually they came in knowing more about biodiesel than I did," he says. Since then, his customer base has broadened. Many are recent converts to the fuel.

Some co-ops are personified more by community activists than auto enthusiasts. One is Colorado-based Boulder Biodiesel, which calls itself "a coalition of environmental scientists, citizen activists, students and permaculture design consultants who advocate the use of biodiesel as an alternative fuel source." The co-op was instrumental in persuading a wholesale fuel distributor in Boulder to sell biodiesel at a public retail site, which opened for business in September 2003. Boulder Biodiesel offers education and technical assistance to its members, and is experimenting with fuel production using waste grease from local restaurants.

Small producers aspiring to sell their own fuel face one important issue. Biodiesel sold commercially must meet ASTM D 6751, a quality standard defined by the American Society for Testing and Materials. To avoid the high costs of required testing, small-volume sellers usually purchase fuel for their members from larger distributors. All sellers, even small ones, are subject to motor fuel tax collection requirements.

Grease Works is an Oregon-based co-op that started out with plans to make fuel from waste grease. It was later re-organized as a "bulk buying club." Members pay annual dues of $75, which entitles them to a discounted price on fuel purchases. Those who choose home storage get free delivery, storage drums, and hand-operated pumps. On its Web site, Grease Works bills itself as "one of the most inspired grassroots organizations in the country." (Visit www.greaseworks.org.) Grease Works gets its fuel from Sequential Fuels, a distributor for World Energy.

To co-ops distributing biodiesel—even just to their own members—quality assurance is an important responsibility, says Linda Graham, coordinator of the Puget Sound Clean Cities Coalition. "Ultimately we want biodiesel to seem normal to people. That won't happen unless it's handled properly by everyone in the chain."

The role of co-ops within Clean Cities is also important, she says. "They're not for everybody, but they are definitely a step in the right direction. They're helping to expand alternative fuels beyond the realm of fleets, into the mainstream."

Clean Cities International News

Bangladesh

Clean Cities International advances CNG in Southeast Asia

ASG Renaissance/PIX 12858

Thousands of three-wheel rickshaws in Dhaka have been switched from two-stroke gasoline power to four-stroke CNG fueling, and many more are slated for conversion in the future.

Clean Cities has taken steps to induct the People's Republic of Bangladesh as an international member. The relationship will be launched formally at a kick-off meeting in late 2003. The meeting will be held in Dhaka, the nation's capital, following two visits to that city earlier this year by program representatives including Marcy Rood, who directs its international division.

Mutual interest between Clean Cities and Bangladesh began last year, after two-stroke engines were banned in Dhaka. Gasoline-fueled two-stroke engines emit much higher levels of air pollution than conventional four-stroke engines. They have long powered the three-wheel rickshaws serving the city, where pollution is among the world's worst. Many two-stroke engines have been replaced by four-stroke engines running primarily on compressed natural gas (CNG).

Cultivating a Clean Cities presence in Bangladesh, and plans to improve its air quality, were made possible through funding from several sources. Both trips to Dhaka to date were sponsored by the United States Agency for International Development (USAID), which will also fund the Clean Cities kick-off meeting. Concurrent with that meeting will be a small trade show for U.S. companies to display their capabilities. Financing for actual improvements in the country will come from the Asian Development Bank, the United Nations Development Program, the Bangladesh government, and other sources. USAID-Bangladesh has guaranteed private loans to CNG businesses to buy infrastructure components and vehicle conversion kits.

Dhaka is home to more than 10 million people. It is expected to become the world's second largest city within a decade, according to USAID. Like India (its neighbor to the west), Bangladesh is largely poor and densely populated. At present approximately 140 million people live in the country, in an area similar in size to the state of Wisconsin. Its gross domestic product per capita is $370. In joining Clean Cities as an international partner, Dhaka follows the lead of India's capital, Delhi, which announced plans to join the program earlier this year.

Joining Clean Cities will help Bangladesh bring about "environmentally focused improvement in the energy sector," said Bruce McMullen, a senior energy advisor in USAID's office in Dhaka. Cutting pollution is one of several objectives. Bangladesh also intends to reduce the need for imported oil by developing its own abundant natural gas resources. The nation has proven reserves of 18 trillion cubic feet (tcf) of natural gas, plus an estimated 32.1 tcf undiscovered. Its gas reserves put it 38th among approximately 100 nations listed in *Oil & Gas Journal* data published by DOE's Energy Information Administration (see www.eia.doe.gov/emeu/international/gas.html#WorldReserves). By comparison, natural gas reserves are 183 tcf in the United States, which ranks fifth worldwide.

Air quality improvement in Bangladesh will focus in large part on building pipelines and CNG stations, said Rood. "In the foreseeable future, they envision a corridor of CNG stations connecting Dhaka with the nation's second largest city, Chittagong." Three major CNG stations will be located along the 200-mile corridor. Built within Dhaka will be three more major stations for trucks and buses, and 60 smaller ones for cars and rickshaws. Plans include converting 10,000 vehicles to CNG, and purchasing 300 CNG buses and 2,000 rickshaws fueled by CNG.

Installing the Infrastructure

Several U.S. companies have expressed interest in building the nation's new CNG infrastructure, according to Rood. Among them are Hanover Compressor, Tulsa Gas Technologies, and ANGI International. Cummins is interested in supplying engines for natural gas-fueled buses.

PIX 12859

PIX 12860

Above: Entrepreneurs and public officials in Dhaka have been trained in CNG station design by Leo Thomason (shown), working with consultant Greg Zilberfarb. *Right:* Bill McGlinchey inspects the CNG cylinder in a rickshaw as Marcy Rood of Clean Cities International looks on.

Prospects for international expansion are always welcome at Tulsa Gas Technologies, said company vice president Charles Sewell. The Oklahoma-based company makes dispensers and equipment for CNG fueling stations. Business has been sluggish in the United States, because of slowing demand for new CNG fueling sites, he said. But significant growth has occurred in other countries including India, Pakistan, and Egypt. Co-owner Tom Sewell, his brother, has visited Bangladesh to cultivate new business.

Accompanying Rood on the year's first trip to Bangladesh, in August, were Greg Zilberfarb of ASG Renaissance; Leo Thomason of the Natural Gas Vehicle Institute; and Bill McGlinchey of AFV Consulting. One thing they noticed immediately, said Zilberfarb, was evidence of recent, rapid growth in CNG fueling. Thousands of three-wheel rickshaws and many other vehicles have been converted to CNG. Many fueling stations had already been built. "The problem is that there are no standards," he said. "It looks a lot like the U.S. in the 1980s."

The lack of standards for nozzles on fuel dispensers, for example, results in many mishaps. Generally these systems use a probe that must be held firmly in place during fueling, rather than the locking type used in developed countries. Usually the fit is sealed with an O-ring, but there is no universal diameter. Drivers have taken to carrying adapter kits to handle the array of fueling equipment they'll encounter, said Zilberfarb. "But we witnessed many incidents where the O-ring blew right off the probe."

Long Lines

Filling stations in the country are plagued by long lines of cars. The push to increase the number of CNG stations nationwide has resulted in perhaps 2,000 permits for new stations, said Zilberfarb. Many were granted to entrepreneurs with no experience in the design, installation, and maintenance of high-pressure fueling equipment. CNG stations in Bangladesh tend to be undersized and inappropriately designed, with compressors that aren't up to the task. The equipment fails frequently, and many vehicles leave the station with their tanks only partially filled.

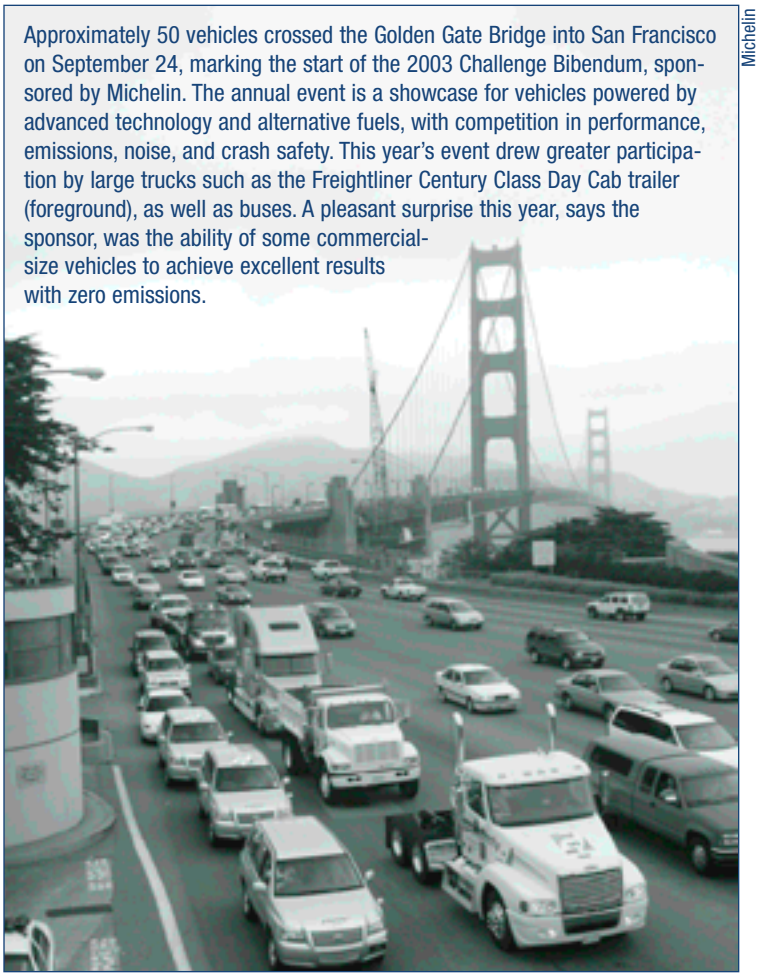
Codes and standards were the subjects of talks in August between McGlinchey and Bangladesh officials including the Chief Inspector of Explosives, charged with enforcing safety codes pertaining to fueling stations. His advice was to "look toward the future," and consider adopting international standards now in development at the United Nations or ISO 9000 standards from the International Organization for Standardization.

The year's second mission to Bangladesh was in October, this time with the specific purpose of training. Thomason and Zilberfarb conducted a three-day course on CNG fueling station sizing and design. Attending the course were approximately 35 entrepreneurs and public officials. What they found most interesting, said Thomason, were discussions of fueling station design options, fuel, quality, and temperature compensation. Also covered were techniques for sizing critical station components, and strategies to reduce long lines of vehicles waiting to fill up.

The October training was just a start, said Thomason. "We plan to develop and implement a long-term self-sustaining program in which trainers in Bangladesh will be able to educate designers, construction companies, mechanics, and station operators about the critical elements of fueling station sizing, design, operation, and maintenance." Accompanying the train-the-trainer campaign will be course curriculum development to facilitate skill transfer about building and equipping appropriate CNG fueling facilities.

For general information on Bangladesh, visit www.usaid.gov/bd/bangladesh.html.

From the Automakers



Michelin

Approximately 50 vehicles crossed the Golden Gate Bridge into San Francisco on September 24, marking the start of the 2003 Challenge Bibendum, sponsored by Michelin. The annual event is a showcase for vehicles powered by advanced technology and alternative fuels, with competition in performance, emissions, noise, and crash safety. This year's event drew greater participation by large trucks such as the Freightliner Century Class Day Cab trailer (foreground), as well as buses. A pleasant surprise this year, says the sponsor, was the ability of some commercial-size vehicles to achieve excellent results with zero emissions.

Hybrids lead Fuel Economy Guide ratings

All three hybrid-powered passenger cars sold in the United States rank best in their classes for fuel economy, according to the ratings published by the federal government. The figures appeared in the 2004 edition of the *Fuel Economy Guide*, released in October by DOE and the U.S. Environmental Protection Agency.

Honda's hybrid Insight and Civic, respectively, now top the two-seater and compact car categories. The Insight earned the best fuel economy status among all cars, rated at 60 mpg in city driving and 66 on the highway. The Toyota Prius, another hybrid, ranks best among mid-size cars. BMW's gasoline-fueled Mini-Cooper takes top honors in the category of mini-compact cars.

Other category leaders include the Chevrolet Malibu, Ford Focus Wagon, Ford Ranger, and two diesel-fueled Volkwagens—the Jetta Wagon and New Beetle—when equipped with five-speed manual transmissions. The guide rates vehicles for all available engine and transmission configurations. AFVs are grouped together among others of the same fuel-type. A special section provides information on hydrogen fuel cell vehicles, and lists the Honda FCX as only fuel cell vehicle certified for emissions by EPA.

Print copies of the guide will be available at auto dealerships, credit unions, and public libraries nationwide. It is available in its entirety online at www.fueleconomy.gov.

Seattle adopts GM transit buses

General Motors recently unveiled a new diesel-electric hybrid drivetrain for use in transit buses, and simultaneously announced the purchase of 235 buses so-equipped in transit districts serving Seattle, Washington. Using the buses will save 750,000 gallons of fuel annually, say officials of the King County and Puget Sound transit agencies.

The 60-foot articulated buses are made by New Flyer, and are driven by a parallel-hybrid system from GM Allison Electric Drives. Compared to the diesel-powered buses they are replacing in Seattle, the new buses produce 90 percent lower particulate emissions and 60 percent fewer emissions of carbon monoxide and oxides of nitrogen, GM says. The buses deliver superior torque, with dual electric motors that launch the vehicle from a stop.

Using hybrid drives in buses is part of a GM strategy to focus fuel-saving technology where it is needed most. Replacing a conventional bus with a hybrid saves as much fuel as replacing 40 passenger cars with hybrids, the company says. The new GM Allison

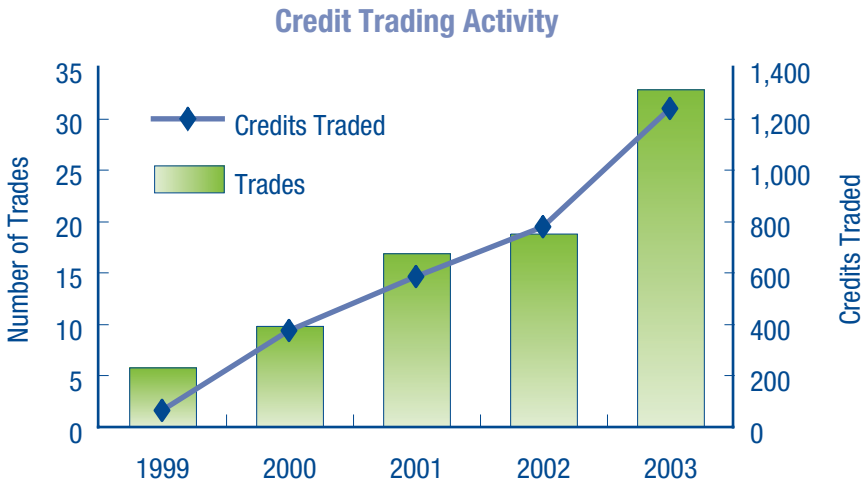
General Motors/PIX 12861

drive system is compatible with contemporary vehicle architecture, and can be used in non-articulated buses, suburban coaches, military vehicles, and medium- and heavy-duty trucks. The system is in pilot programs in Philadelphia, Minneapolis, Portland, Houston, Salt Lake City; Austin, Texas; Hartford, Connecticut; Newark, New Jersey; and Orange County, California.

Federal News

On the Rise

Trading of EPAct credits by State & Alternative Fuel Provider fleets has risen steadily along with their AFV acquisition rates



A key feature of the Energy Policy Act (EPAct) of 1992 was the ramping up of its vehicle acquisition requirements. State & Alternative Fuel Provider (S&FP) fleets were mandated to gradually increase their annual AFV purchase rates, topping out at 90 percent for fuel providers and 75 percent for state fleets.

EPAct also created a credit system to reward fleets that comply early or exceed their requirements. The system is designed for flexibility, allowing fleets with excess credits to sell them to others that fall short. Credit-trading has proliferated among S&FP fleets. It has ramped up in correlation with the required AFV acquisition rates. The table above outlines the steady ascent of credit trading since 1999.

It would be too modest, however, to attribute the rise in credit trading strictly to escalating AFV requirements, says DOE Alternative Fuel Transportation Program regulatory manager Linda Bluestein. "We're doing more to engage the fleet managers, to help them understand and meet their obligations." Such help includes contacting fleets directly and publishing an annual report. Also provided are an ongoing newsletter for stakeholders, and updates to the S&FP section of the EPAct site at www.ott.doe.gov/epact/state_fleets.shtml.

Bluestein's office consults directly with fleet managers on matters of regulatory compliance. EPAct credits apply only to covered S&FP fleets, not to federal fleets. Nationwide, about 300 S&FP entities are affected. "We get calls from corporate fleet managers and even private individuals saying, 'I bought an AFV. Can I sell the credit to someone?' We tell them, 'Not unless you're part of an eligible state or fuel provider fleet.'" Independent brokers are allowed to facilitate trades if both parties are eligible.

For most eligible fleets, credit selling isn't an everyday occurrence. "Fleets that have exceeded their requirements usually bank their credits," says Bluestein. Credits can be saved up for use in future years, in case the fleet's AFV acquisition efforts don't make the grade in the future. Dozens of fleets have accumulated excess credits in this fashion. Those interested in selling are listed at www.ott.doe.gov/epact/progs/public_rpt.cgi.

Credit trading represents DOE's intent to be "flexible" in enforcing EPAct mandates, Bluestein says. "Some fleets aren't in a position to comply as easily as others, maybe because a certain fuel isn't available locally or they can't arrive at exactly the right vehicle mix."

One fleet operator that has sold credits frequently is KeySpan Energy. The New York-based utility is one of the nation's largest distributors of natural gas. A company policy says its light-duty vehicle acquisitions must be limited to CNG vehicles. As a result, it typically accumulates hundreds of credits per year. KeySpan was involved in at least six trades in a one-year period ending in August 2003. The smallest was the sale of a single credit. The largest was the sale of a 332 credits to TXU Corporation, an investor-owned, publicly traded utility based in Dallas.

Credit selling is considered "a way to help other utilities and state fleets meet their mandates," says Carolyn Mackin, a KeySpan employee who negotiates trades with buyers. It is also a welcome source of revenue. According to industry sources, trades have been negotiated in a range "from the hundreds to the thousands" of dollars per credit.

Representing TXU in trades with KeySpan was John Matlack. That company has bought more than 450 credits (all from KeySpan) in the past three years. "We've also directly acquired most types of AFVs including CNG, propane, electric vehicles, and even hybrids, and used them in our fleet where it made good sense," says Matlack. The company's compliance strategy also includes using biodiesel. Buying EPAct credits "helps us meet our mandates in an economically feasible way," he says.

Clean Cities Roundup

GLCCC/PIX 12862

Douglas Faulkner of DOE (standing, right) presents a plaque to Lansing Mayor Tony Benavides at the Greater Lansing Clean Cities Coalition designation ceremony. Seated (from left) are Clean Cities Director Shelley Launey; Vincent Parish, Michigan Dept.of Agriculture; Bob Swanson, Michigan Dept. of Consumer and Industry Services; Doug Dittrich, General Motors; Jody Pollock, Michigan Corn Growers Association; and Jim Sygo, Michigan Dept. of Environmental Quality.

New coalition takes root in Michigan

The Clean Cities Program's newest coalition includes Michigan's capital city, Lansing, and other nearby communities. Stakeholders of the Greater Lansing Clean Cities Coalition gathered for an official designation ceremony on the steps of the State Capitol in September.

The Lansing-based group itself is not new, says coordinator Bill Wolfe. For seven years, members have worked to implement alternative fuels and AFVs in central Michigan. Approximately 135,000 gallons of non-petroleum fuels are sold annually in the area. Approximately half of the total is LPG. The other half consists mostly of biodiesel and a small amount of E85.

After seeking Clean Cities status on two previous occasions, the group succeeded this year by demonstrating substantial local support for alternative fuels. Stakeholders of the coalition include car dealers, fuel suppliers, a utility company, a transit district, several state and local agencies, the American Lung Association, and Michigan State University. Lansing Community College, another stakeholder, offers an AFV technician degree program.

Other stakeholders include the cities of Lansing, East Lansing, St. John, and the St. John School District. Lansing leads the coalition, contracting with Wolfe, a retired mechanical engineer, to be its full-time coordinator. The September designation ceremony was attended by Douglas Faulkner, DOE Principal Deputy Assistant Secretary, office of Energy Efficiency and Renewable Energy.

Salt Lake coalition wins Clean School Bus USA grant

The Salt Lake Clean Cities Coalition was named one of 17 recipients of this year's Clean School Bus USA grants from the U.S. Environmental Protection Agency (EPA). The $350,000 grant will help a large school district replace many of its oldest diesel-powered buses with CNG-fueled buses.

The grant resulted from a community service project by students from the University of Utah. An application was drafted with guidance from coordinator Beverly Miller. Their approach was to "tell a compelling story on the very first page of the proposal," says Miller. "Give the readers a reason to want to read on, a reason to see just how you propose to do what the story says."

A CNG bus typically costs $35,000 more than a diesel bus—approximately $110,000 versus $75,000. The $350,000 grant amount will pay the incremental cost of 10 buses fueled by CNG. The buses will go to the Jordan School District, which already has 20 CNG buses obtained in large part with DOE support.

Clean School Bus USA is a cost-shared grant program administered by EPA. Congress authorized $5 million of the agency's budget to assist school districts in upgrading their bus fleets. This year's grant competition drew more than 120 applications requesting nearly $60 million in funds. The chosen projects will demonstrate a variety of ways to reduce pollution from school buses, and will remove more than 200,000 pounds of diesel particulate matter from the air in the next 10 years, according to EPA.

CNG Bookmobile

Seattle's vehicle fleet includes more than 200 natural gas vehicles including, most recently, a CNG-fueled bookmobile. Operated by the Seattle Public Library, the bookmobile travels to daycare centers, retirement homes, and nursing facilities, bringing books to people who can't travel because of age, disability, or illness. Funding was provided in part by the Puget Sound Clean Cities Coalition, leveraging a grant from DOE's State Energy Program. With a John Deere natural gas engine installed on a chassis from Thomas Built Buses, the bookmobile is part of Seattle's Clean Green Fleet Action Plan, an initiative to implement alternative fuels and improve fuel economy in the city fleet. Visit www.pugetsoundcleancities.org.

City of Seattle/PIX 12863

Memo from CIVITAS: Let's work together

Erin Russell-Story

At the annual conference of the Clean Cities Program in May, Erin Russell-Story was named Outstanding Coordinator for 2003. In five years of involvement with the program, Russell-Story first helped lead Northeast Ohio's coalition to its Clean Cities designation in 1999, then became coordinator of a coalition serving the state of Vermont. As part of the honor, she was dispatched to this year's annual meeting of CIVITAS. (Europe's sweeping clean-transport initiative was profiled in the previous edition of AFN; visit http://afdcweb.nrel.gov/pdfs/afn7_2.pdf#civitas.) Following is Russell-Story's report from the October meeting, held in Graz, Austria.

CIVITAS stands for CIty-VITAlity-Sustainability, and by definition it is much broader in scope than the Clean Cities Program. Partner cities in CIVITAS promote alternative fuels within larger program goals such as reducing the use of single-occupancy vehicles, expanding mass transit, and encouraging pedestrian and bicycle traffic in neighborhoods and urban centers.

During my visit to Graz, that obvious difference between the two programs was pointed out to me by several CIVITAS coordinators. And in general, they expect their integrated approach to be more successful in addressing issues of air quality, petroleum dependence, and city livability.

To me, the CIVITAS partner cities do seem to be experiencing tremendous success in AFV market penetration-especially considering that the program has existed for only a few years. For example, Berlin has put more than 80 CNG taxis on the road in just two years. That's impressive progress toward a goal of 300 CNG taxis citywide. Germany already has 350 CNG fueling stations.

Stockholm is the standout example in my opinion. The city has buses running on ethanol that's produced in Sweden. It also has an ambitious plan to make biogas from city wastewater. When that project is complete, the inner city ethanol buses will move to the suburbs while the new biogas buses go into use in the city center.

While CIVITAS cities have some enviable successes, however, they are also experiencing challenges that may sound familiar. Rotterdam has had problems with prototype vehicles, and it now uses only more mature technologies. Rome remains committed to electric vehicles, but electric transit buses greatly outnumber privately owned EVs. Nantes and other cities have had difficulties persuading automakers to produce the kinds of vehicles that stakeholders want. Meanwhile, automakers attending the October conference expressed concerns about low AFV sales volume.

Some CIVITAS participants are asking the European Commission to define alterative fuels and "clean fuels," and to facilitate communication about product availability with the auto industry. Fuel neutrality is an issue within CIVITAS, as in Clean Cities. But some stakeholders believe Europe should focus on just one fuel.

It was striking to see both the similarities and the differences between CIVITAS and Clean Cities. I was equally impressed by the desire of CIVITAS partners to share their ideas, strategies, and experiences with their American counterparts. They urged me to take home the message of multi-modalism; expand Clean Cities to include all forms of transportation. But they were also very eager to learn about the use of AFVs in our country.

Several CIVITAS coordinators hope to attend the 2004 Clean Cities Conference next May in Ft. Lauderdale. I urge Clean Cities stakeholders at our conference to seek out CIVITAS representatives and spend as much time with them as possible. I would also encourage DOE to remain in close contact with the European Commission, to jointly address issues facing both programs. Together, the two programs represent a much larger vehicle market.

Thanks to DOE for the opportunity to represent Clean Cities abroad, and to learn more about Europe's impressive clean transportation initiative. Participants in both programs have a great deal to learn from each other. Air quality and petroleum dependence are global concerns, and creating a cross-Atlantic alliance may produce global solutions.

CIVITAS Cities

Alternative Fuels Data Center
National Renewable Energy Laboratory
1617 Cole Blvd., MS/1633
Golden, CO 80401-3393

AFV shuttle prototype visits Washington

A modern prototype of the traditional Yellowstone National Park tour bus stopped at the United States Capitol in September, following its debut at Yellowstone and visits to several national parks. A demo of the vehicle was given to funding agencies and about 30 U.S. legislators. Billed as a "low-emission shuttle bus of the future," it is expected to be manufactured with several optional engines. Natural gas fueling is planned, and other alternative fuels including propane, ethanol, and biodiesel are being considered.

With the look and feel of traditional Yellowstone buses, the new vehicle design features "theatre seating" sloped downward from back to front. Seating options would accommodate 18 to 32 passengers. The floor is low for easy entry and exit, with a ramp to accommodate passengers in wheelchairs, in compliance with the Americans with Disabilities Act. A retractable roof would allow greater outdoor visibility. Snow tracks might be developed for winter mobility.

Collaborating in its development are DOE's Idaho National Engineering and Environmental Laboratory (INEEL), the Federal Transit Administration, and the National Park Service. Strong support for the project comes from the Greater Yellowstone/Teton Clean Cities Coalition, which has an equally strong interest in clean transportation, according to coordinator Sharon Roh. The coalition encompasses parts of three states, with two national parks and several cities connected by interstate highway corridors.

Prospects are good for use beyond Yellowstone, says INEEL project leader Kerry Klingler. "While the development of the prototype is the result of a need by the National Park Service for a year-round transit vehicle that could be used for park operations, market analysis indicates the vehicle will have broad application in municipal transit and private-sector transportation as well."

INEEL/PIX 12865

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