



Fueled by CNG

The VelociRFTA Bus Rapid Transit System



Beginning in 2013, a whole different kind of animal will be unleashed into Colorado's highly congested corridor between Glenwood Springs and Aspen. Alternatively fueled from a domestic supply produced right here in Colorado, it will be sustained at a cost lower and more stable than any diesel contemporary. After over a decade of planning and development by the Roaring Fork Transportation Authority (RFTA), a new breed of dinosaur will be brought to life, taking a bite out of congested highway traffic and deftly responding to economic changes: It is a rapid-transit fleet of 22 VelociRFTA buses that operate entirely on compressed natural gas (CNG).

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A play on “velociraptor”, the VelociRFTA (pronounced ve’las-e-raf’ta) is a cutting edge Bus Rapid Transit system comprised of thirteen attractive stations that span 42-miles

of State Highway 82, a critical travel artery for many area commuters. VelociRFTA is the very first of its kind in any rural U.S. area, as most Bus Rapid Transit systems operate in urban areas that are typically just seven to ten miles long. This unique attribute was one of the reasons VelociRFTA recently earned the White House Champions of Change Transportation Innovators award.

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rail transit—but have significantly lower capital costs and, due to their flexibility, are more cost-efficient to operate and maintain. Bus Rapid Transit systems generally have dedicated right-of-way lanes and make fewer stops than traditional bus lines. Due to its many high-tech features, VelociRFTA will function with the precision of a commuter train, providing shorter travel times competitive with the private automobile. In turn, the system will attract more riders and reduce the number of commuter vehicles on the road.

The system will also feature leading-edge technologies such as real-time bus information and GPS tracking, automatic vehicle monitoring that will provide mechanics the ability to troubleshoot mechanical trouble from afar and allow riders the ability to determine how soon the next bus will arrive—from their smart phones.

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But what is arguably one of the most leading innovations is the fleet’s engine, a transition from the originally planned diesel to one alternatively powered by CNG. The decision to go with CNG rather than diesel was driven by economics and the volatility of the price of diesel. “We will be less reliant on foreign oil and hope to make RFTA more sustainable over the long term, keeping prices down for our riders,” says Dan Blankenship, CEO of RFTA.

The viability of investing in CNG buses for VelociRFTA was considered during the summer of 2011, at an Aspen Strategy Center Charrette. There, Blankenship and RFTA staff discussed the risks and advantages of CNG fueling with representatives from the Governor’s Energy Office (GEO), Clean Energy Economy for the Region (CLEER), CNG bus and engine manufactures, CNG infrastructure providers,



natural gas suppliers, the City of Aspen, and Pitkin County. From the meeting, a collaborative effort between local organizations was established and RFTA staff walked away convinced that using CNG for the RFTA fleet was something they should seriously evaluate.

“Our knowledge about the reliability of CNG engines in a high-altitude application had not kept pace with improvements in the technology,” says Blankenship, “and many of our concerns were addressed as an outcome of the Charrette.”

Before implementing the CNG transition project, with the oversight of the Federal Transit Administration, RFTA’s staff undertook an extensive due diligence process to determine the risks and benefits associated with making the investment in CNG. Some of them included:

1. Speaking with Utah Transit Authority, whose fleet operates at 6,000 feet of elevation. In 2010, Utah Transit Authority conducted a 2-week comparison of CNG, diesel-electric hybrid, and clean-diesel buses; the test results indicated the CNG vehicle outperformed its competitors in terms of acceleration and fuel economy. Utah Transit Authority now has 10 CNG buses on order and plans to acquire 90 more. They also spoke with transit properties in New Mexico, California, Idaho, and Wisconsin that are currently operating CNG buses and learned of no significant problems with them.

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2. Touring CNG fueling facilities at Denver International Airport and Transfort, in Fort Collins, where they learned personnel experienced few maintenance and operational problems with their CNG vehicles and facilities.

3. Confirming with CNG engine manufacturers the reliability and durability of their engines at high altitude.

It was also noted that CNG buses may be noticeably quieter than diesel buses.

4. Responding to questions posed by the City of Aspen Environmental Health Department regarding RFTA’s primary reason for pursuing CNG, which is to enhance its long-term economic sustainability due to serious concerns about future diesel cost increases. It was also noted that CNG buses may be noticeably quieter than diesel buses, reducing noise impacts in Aspen’s residential neighborhoods. CNG engines are fired by sparkplugs instead of compression, as their diesel counterparts are, thereby lowering engine noise by several decibels.

5. Developing with consultants CNG fuel cost estimates by determining the costs of the natural commodity, pipeline and other fees, compression operation and maintenance costs, the cost of electricity, and the amortized cost of capital required to install a CNG compressor station and to modify RFTA’s Glenwood Springs maintenance facility, to make it safe to fuel and maintain CNG buses indoors.



In March 2012, RFTA staff recommended its Board of Directors immediately implement CNG. “The transition to CNG will help diversity the fuels RFTA

uses and provide a significant hedge against rising diesel prices—it’s insurance,” Blankenship says, adding, “We have access to abundant, domestic, reasonably-priced fuel—and natural gas is that fuel.”



Figure 1. Compressor Station rebar placement

The urgency surrounding the transition stemmed from the requirement that RFTA obtain the Federal Transit Administration's permission to immediately alter the order of eighteen diesel buses being purchased as part of

its \$25 million Very Small Starts grant. In order to obtain the Federal Transit Administration's blessing, RFTA had to assure them it could make the transition to CNG without delaying VelociRFTA's planned opening date of September 2013. Following the Board's authorization to move ahead, RFTA changed its order to CNG buses, selected contractors to install and construct the required CNG infrastructure, and retained a team of financial experts to assist with issuing bonds to pay for everything.

RFTA is planning to offer CNG from its fueling facility to other governmental agencies in the area.

RFTA received key funding to enact their CNG transition project: Encana awarded RFTA a \$365,000 grant to help defray a portion of the incremental cost to upgrade buses from diesel to CNG. Another \$1.6 million in grant funding was also awarded from the Federal Transit Administration's State of Good Repair program and \$4.2 million for buses will be provided from RFTA's Very Small Starts grant. The balance of the \$16.5 million in funding required for RFTA's CNG transition project will be funded using proceeds from local sales tax revenue bonds. Thanks to an award from the GEO, RFTA was able to issue \$6.65 million of its sales tax revenue bonds as Qualified Energy Conservation Bonds (QECCB's). Because interest payments on QECCB's are federally subsidized, RFTA was able to obtain a net effective interest rate on its bonds of 1.7%. Chesapeake Energy also offered a very competitive long-term natural gas fuel contract option to provide RFTA more certainty regarding the payback on its CNG investment.

In July this year, RFTA began construction on its CNG compressor station and facility modifications. The CNG equipment and facilities are scheduled to be fully operational before December. In January, RFTA will take delivery of four pilot CNG buses, which will provide maintenance and operations personnel invaluable experience working with the new technology at the high altitude. By June, after six months of testing, the rest of the VelociRFTA CNG bus fleet will be delivered. All 18 are slated to be introduced into the VelociRFTA service by September: "That will give us the fall season to test the Bus Rapid Transit system prior to going into the peak winter ski season," says Blankenship. Eventually by 2025, if savings and efficiencies go as predicted, RFTA will transition its entire fleet of 92 buses to CNG.

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In the meantime, an onsite CNG/natural gas training course has been scheduled for late October and early November for facilities and vehicle maintenance personnel, bus operators, and first responders.

RFTA is planning to offer CNG from its fueling facility to other governmental agencies in the area. "We are proud that we are going to make it possible for others to save money by benefitting from our investment," Blankenship says, "and they will be helping us defray our capital costs. It will be a huge win-win-win for them, RFTA, and taxpayers!"



“This Bus Rapid Transit project has been in the works for twelve years,” says Blankenship, “and during that time, we have experienced several major fuel price spikes that have wreaked havoc on RFTA’s budget and our fragile regional economy. High-priced fuel hurts everyone, and we are just one major natural or manmade disaster away from fuel shortages.”

RFTA has learned from its long-extinct namesake, and is confident VelociRFTA will prove the key to survival is the ability to rapidly adapt to changes in the economic

environment. “I want VelociRFTA, which will be the centerpiece of our transit services, to operate on an abundant domestic fuel that we can afford, so that our valley can continue moving, in any economy—no matter how high gasoline and diesel prices rise.”

So, beginning in 2013, the VelociRFTA’s nearly silent roar will resonate through Roaring Fork Valley’s scenic corridor—efficient, fast, affordable, and clean, with CNG fueling VelociRFTA’s powerful and innovative ride towards a thriving future.



**COLORADO
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Founded in 1984, the Colorado Oil & Gas Association’s (COGA) mission is to foster and promote the beneficial, efficient, responsible and environmentally sound development, production and use of Colorado oil and natural gas.

COGA is a nationally recognized trade association that aggressively promotes the expansion of Rocky Mountain natural gas markets, supply, and transportation infrastructure through its growing and diverse membership.

In 2012, COGA is emphasizing:

- A positive, proactive voice for the oil and gas industry in Colorado
- Public outreach to all stakeholders regarding the positive impacts of the industry
- The provision of industry education and networking, while increasing grassroots industry participation in political and regulatory developments and community engagement