RESEARCH ON USE OF COMPRESSED NATURAL GAS AS A FUEL SOURCE FOR TOWN OF MOUNTAIN VILLAGE VEHICLES

When considering the use of Compressed Natural Gas (CNG) as an alternate fuel source for our vehicle fleet in Mountain Village at least four areas were identified that needed to be taken into account:

1. Vehicle conversion
2. Fueling stations
3. Return on investment ("ROI"), and
4. Environmental impacts.

We have set forth our research and findings accordingly with a final section indicating our observations and conclusions. We would be happy to sit down and discuss this matter further with the committee at your convenience.

1. Vehicle Conversions

In a discussion with Wes Biggers, owner of Fuel Tek Conversion Corp. in Commerce City, we learned that converting any vehicle older than 2010 is not recommended. The reason being that since 2010, the conversion technology is far superior to the older conversions allowing the vehicle to meet the required EPA standards and no significant loss in performance or mileage. Very few of the latest technology kits are being made for the older vehicles. The largest obstacle in doing a conversion is finding the space to put the fuel tanks needed to store the CNG. A 10 gallon CNG tank will allow a range of 100 miles if the vehicle gets 10 miles to the gallon. With our employee shuttles traveling 150 miles per day the tank capacity would need to be 15 to 20 gallons. The space need for the tank would be approximately 36" x 40" x 20".

There is an approximate 10 percent loss in efficiencies running on CNG compared to gasoline. This is most noticeable during acceleration. Altitude effects CNG equipped vehicles the same as it does gasoline. There is a loss in horse power but it is no worse than gasoline.

A tax credit may be available to non taxable entities through the State of Colorado. It is expected to be around 35 percent for 2013. More research needs to be conducted to confirm this.

a. Vans

   We were unable to find any passenger vans being offered with CNG from the factory. A conversion is possible at a cost of $12,000 to $13,000 per vehicle. Due to the design of the body of the vans, we have been told the tanks need to go inside the rear of the van. For the 15 passenger vans the rear seat would need to be removed to allow the installation of the tanks, thus making them a 12 passenger van. On the 12 passenger van it may be possible

to fit the tanks in the rear without removing the rear seat. The town does not currently have any vans that are 2010 or newer. With the five new 2013 vans to be secured primarily through grant funds next year, this opens the door to the possibility of a conversion.

b. Yukon/Suburban ("SUVs")
We were unable to find any SUVs being offered by any manufacturers CNG-ready from the factory. A conversion is possible at a cost of $13,500 per vehicle. Two tanks measuring 18" x 40" each with a combined capacity of 15 gallons would be installed in the rear cargo area of the vehicle. The town does not currently have any SUVs newer than 2008.

c. Pickups
For the first time General Motors is offering CNG-ready pickups available through the Colorado state bid. The cost for a three-quarter ton 4 x 4 pickup with CNG is $33,534 compared to a similar non CNG pickup at $21,198 for a difference of $12,336. A conversion to CNG for pickups is available at a cost of around $12,000 - $13,000 per vehicle. Slight modifications have been done to the engine by GM to better perform with CNG. Two feet of the cargo bed space is replaced with a fuel tank. This would convert a standard eight-foot pickup bed into a six-foot pickup. Both the conversion and the GM factory pickups put the tank in the bed. Mountain Village currently has two pickups 2010 and newer.

d. Diesel trucks
Conversions are available for diesel trucks from the factory. They are full time CNG and not available as a multi-fuel. The cost for a CNG fuel dump truck would be $50,000 more than a standard diesel.

2. Fueling Stations

At this time, there are only two CNG fueling stations in western Colorado, one in Rifle and one in Grand Junction, both of which are private/public joint ventures. Costs of installing a station range from $350,000 to $900,000. In Grand Junction, the station was installed at a cost of approximately $900,000 but was partially funded by a $675,000 grant from the Governor's Energy Office. The Rifle facility was installed by Kirk Swallow, a gasoline and diesel distributor, at his privately owned Phillips 66 station. Both locations had buy-in from local governmental entities as well as the private sector to assure their success. In Grand Junction, the private sector operates the fast fuel side of the business and the city owns and operates the fleet side. Rifle, while privately owned, has commitments from local businesses and Garfield County.

The Grand Junction facility is primarily a slow fill facility with built-in storage capabilities to handle a few fast fuel fill ups. The way this works is the Grand Junction fleet is plugged in overnight and is slowly refueled by morning. When a fast fuel customer fuels up the station can handle the one or two fast fuel demands but once the storage tanks are drained down the next fast fuel up will take 30 minutes as the compressor is sized for cost efficiencies. A compressor compresses the natural gas to a pressure of 50,000 psi for storage. As the compressor increases in size to handle the fast fuel requests, the cost of electricity to run the bigger pump starts to drive up the overall price per GGE. Tim Barker, fleet manager with the city of Grand Junction, said the electric cost is what drives up the overall gallon gasoline equivalent (GGE) costs - not the price of the gas. The more vehicles you fill up the more the electric demand charge is spread-out thus lowering the price per GGE you pay. When Grand Junction first opened the station it cost around $6 per GGE but now that they have more users it's averaging

around $1.12 per GGE. This price reflects the gas and the electricity costs. The $2.60 per GGE as seen around the state is the price set by the private sector with the profit built in.

Fueling stations come in many configurations and sizes. Most are custom designed for each site. A fueling station approximately 40-feet long and 12-feet wide would be recommended for a fast fuel station to fit the needs of TMV. The TMV shop area has limited space and would not be a good fit for a regional fueling station. The additional traffic to the Meadows would certainly add congestion to a predominately residential area. As a comparison the Grand Junction facility is approximately 120' x 35'.

3. Return on Investment

Currently the price of CNG around the state of Colorado is $2.60 per GGE. It is impossible at this time to determine what the cost would be for Mountain Village but we will assume for these calculations it will be similar to the $2.60 per GGE. The current cost of a gallon of gasoline for the TMV is $2.76 per gallon. Converting the employee shuttles seems to make the most sense as they generate the greatest mileage of all of our vehicles. We did not calculate into my examples the cost of the fueling station, only the cost of the vehicle conversion. Because the town is tax exempt and therefore does not pay road tax on gasoline, the return for the town would be considerably longer than the general public.

We randomly picked vans from the employee shuttle program to use as a topic of this discussion. Shuttle 1202 used 148 gallons of gas last month being driven 2,573 miles. Assuming this is normal usage that's 1,776 gallons of gas/year. With a savings of 16 cents per gallon the savings for a year is $284.16. Using $12,500 as a conversion cost the ROI would take place in 44 years. Another example is shuttle 1211 which used 332 gallons of fuel last month being driven 5,724 miles. Using similar assumptions as the first example, the ROI is 20 years.

If the town could see a savings of $1 per gallon, the ROI for shuttle 1202 example would be cut to 7 years, and the shuttle 1211 example would be 3 years. The ROI in all cases could be greatly improved if we are able to ascertain if we are eligible for the 35% tax credit as a tax exempt entity.

4. Environmental Impacts

Compared to gasoline CNG-burning vehicles emit:

- 25% less carbon dioxide
- 90-97% less carbon monoxide
- 35-60% less nitrogen oxide (smog-forming)
- Fewer toxic and carcinogenic pollutants
- Little or no particulate matter
- No evaporative emissions (fuel tank top-offs escaping into the atmosphere)

5. Observations and Conclusions

Due to the lack of fueling stations, it would not make sense to go with a purely CNG powered vehicle and all vehicles would need to be multi-fuel.

Currently, we believe that only the employee shuttles generate enough mileage to be considered for a pilot study.

A regional fueling station located at a central location such as the Conoco or next to it on County property, available as both a public/private station, seems the most logical opportunity at this point. Regional participation is a must as studies show that a fueling station needs 300-500 vehicle fill-ups per week to be profitable.

Grant funding to build a fueling station and offset vehicle conversion cost appear to be available, however, the I-70 corridor has been the state's focus to date.

From a dollar value only, it appears that the cost of conversion does not make sense unless the savings per gallon of fuel reaches a dollar or more. This does not factor in the positive environmental impacts which need to be considered but we have not attempted to place a value on at this time.

CNG stations do not have road taxes attached to the price per GGE. A sticker is purchased through the State of Colorado annually to cover the road tax. The state has no mechanism to tax vehicle owners who may have a home fuel station so the taxes are collected through the purchase of this sticker. The cost is around $80 per year for a small to medium size vehicle.

We can certainly continue to pursue this opportunity but believe it will be a long term project and will require the participation of the other regional governments together with the private sector.