July 3, 2013

Dear Commissioners:

We appreciate the opportunity to comment on Docket Number:13-057-02, the docket opened as an outcome of SB275, Energy Amendments, passed in the 2013 Utah Legislative session.

We understand that the commission has been directed to "explore and develop options and opportunities for advancing and promoting measures designed to result in cleaner air in the state through the enhanced use of alternative fuel vehicles."

Given the severity of the air pollution challengesthat Utah faces, and the significant contribution of the transportation sector to both our wintertime inversions and summertime smog (around half or more of the total pollutants), a careful examination of the possibilities for reducing those pollutant emissions is welcome.

Our principal goal in these comments is to share with you research and analysis which seeks to answer several broad questions: Are CNG vehicles a good pollution control investment? How do they compare with other alternatives, including Clean Diesel and Electric Vehicles (EVs)? How can government support this range of vehicles and help clean up our air?

Our understanding is that SB275 and the corresponding docket are primarily directed at fleet vehicles, i.e. buses, shuttles and more. Therefore, we'll start with that, before turning to look at the consumer vehicle market.

1. By far the most successful market penetration for CNG vehicles is into fleet vehicles. According to an Argonne National Laboratory report, "nearly 19% of the nation's full-sized transit bus fleet, or about 12,000 vehicles, operates on natural gas…" (http://www.afdc.energy.gov/pdfs/anl_esd_10-4.pdf) That same report notes "The Clean Vehicle Education Foundation estimates there are approximately 3,000 natural gas refuse haulers, 2,800 natural gas school buses, and 16,000–18,000 medium-duty NGVs (such as airport shuttles and delivery vans)."

   The question is: Are those vehicles a good investment? Do they return significant pollution reductionbenefits? At what cost? Are there alternatives on the market in 2013?

   Here's what makes answering that question challenging: While CNG heavy-duty vehicles such as buses are much cleaner than traditional diesel vehicles, new diesel vehicles have become much cleaner lately, because of federal regulations requiring ultra-low sulfur diesel fuel and pollution control upgrades to diesel motors. Our research into CNG and new diesel soon led us to a 2012 analysis entitled "Clean Diesel versus CNG Buses: Cost, Air Quality,

& Climate Impacts" from the energy consultant MJ Bradley. (http://www.catf.us/resources/publications/files/20120227-Diesel_vs_CNG_FINAL_MJBA.pdf)

The study performs a detailed analysis on the relative merit of the two kinds of buses. Let's start with the issue of cost: The buses themselves and the fueling stations cost tens of thousands of dollars more up front, but because CNG fuel prices are lower (saving a transit authority roughly $8-$10,000 a year in fuel costs) "the pay-back period on the incremental purchase cost of CNG buses and fueling infrastructure, compared to diesel buses, is between five and eight years." Because buses last an average of 12 to 15 years, CNG buses save authorities money during their final years on the road such that:

Life-time net savings to transit agencies that buy new CNG buses instead of new diesel buses could total $50,000 - $80,000 per bus over a transit bus' 12-15 year life, or an average of $4,200 - $5,300 per bus per year. This is equivalent to about a 14% reduction in annual fuel costs compared to diesel buses.

So they're cheaper, eventually, but are they cleaner than clean diesel, according to MJ Bradley? The short and surprising answer? No. First of all, it's important to note that both clean diesel and CNG vehicles are MUCH cleaner than old diesel buses. Both are significant improvements. Allow me to quote at length from MJ Bradley:

According to EPA's MOVES emissions model a 2012 model year diesel bus emits 94% less NOx per mile, 98% less PM, and 89% less HC than a model year 2000 (12-year old) diesel bus. A model year 2012 CNG bus emits 80% less NOx, 99% less PM, and 100% less HC than a model year 2000 diesel bus…. On a per-bus basis new CNG buses provide slightly greater PM and HC reductions, but lower NOx reductions, than new diesel buses.

However, if the CNG buses do save money in the long run, they're a better overall bet, correct? Not necessarily, says MJ Bradley. Given that capital budgets are limited, and because clean diesel buses cost less than CNG buses plus CNG fueling infrastructure, a transit authority can buy a greater number of clean diesel buses up front – thereby getting more of the older, dirty buses off the road – than it could CNGs. By buying CNGs, a transit authority would save money in its operating budget eventually, but it would pollute more than the alternative strategy of putting its limited capital budget dollars toward clean diesel buses. Choosing CNG buses is a bottom line decision more so than an air quality one, by this analysis:

For every $10 million of capital funding, a transit agency could purchase approximately 26 new diesel buses or 21 new CNG buses (and associated fueling infrastructure), and retire an equivalent number of old buses. Given that a greater number of older, high emitting buses could be retired, fleet-wide

emission reductions of NOx, PM, and HC per dollar of capital funding could be 47%, 23%, and 11% higher, respectively, if new diesel buses are purchased than if new CNG buses are purchased.

Very interesting analysis. We hope the Commission carefully considers the real-life benefits of CNG buses, compared to alternatives on the marketplace, in its analysis.

Another quick point about fleet vehicles: A recent analysis from the *Financial Times* shows that among corporate fleets, CNGs remain a fairly modest percent of vehicles, for different reasons than those cited above by MJ Bradley. (http://ftalphaville.ft.com/2013/04/30/1473572/where-are-all-those-natural-gas-fleet-conversions/

The article notes that companies such as UPS, Fedex, Walmart, Frito Lay and Shell have made high-profile announcements about embracing CNG. However, when you look closely at their actual plans, they plan on switching very small numbers of vehicles.

The *Financial Times* offers a complex but interesting argument to explain why: Because the supply of CNG fuels remains quite small, companies are hesitant to make a switch, because of fear that increased demand would drive a cost increase, thereby wiping out CNG vehicles' main advantage. Those companies fear CNG fuel savings might be wiped out if CNG prices increase.

2. Now, let's turn to consumer vehicles: the cars and trucks that everyday Americans drive. We believe that SB275 and thus the Commission both contemplate investing funding in CNG infrastructure, not just to benefit fleets, butto benefit consumers who might choose a CNG vehicle and thus allegedly offer air quality benefits to all Wasatch Front residents.

   Our main goal in this section is to compare CNGs to another category of alternative fuel vehicles also available on the market: Electric Vehicles. First, let's state the obvious: EVs are cleaner than CNG vehicles. While CNG vehicles emit fewer pollutants than older gasoline or diesel vehicles, EVs emit none. The EPA has simple way for consumers to estimate the air pollution output of a new vehicle, in its Green Vehicle Guide (http://www.epa.gov/greenvehicles/Index.do). It ranks vehicles from 1 to 10, with 10 being the cleanest.

   The EPA gives the Honda Civic CNG an "8" while the EVs currently on the market (the Chevy Volt and Nissan Leaf) get a "10." According to a report from Argonne National Laboratory, natural gas vehicles "generally reduce smog-producing pollutants by 60–90%."

(http://www.afdc.energy.gov/pdfs/anl_esd_10-4.pdf) However, EVs reduce them by 100 percent.

3. EVs have several other clear advantages over CNGs. A recent article from *Forbes* magazine does an excellent job of comparing the two classes of vehicles (http://www.forbes.com/sites/michaelkanellos/2012/01/11/which-are-better-electric-cars-or-natural-gas-vehicles/). It relies on published research from reputable sources. It concludes that EVs are preferable for several key reasons:
    a. They're more efficient. Utility-scale power plants convert fuel to energy much more efficiently than do motors in individual vehicles. The *Forbes* article quotes from an MIT study (http://web.mit.edu/mitei/docs/reports/electrification-transportation-system.pdf): "*In general, 1,000 cubic feet (cf) of natural gas, converted to electricity, yields 457 miles in an EV. This same 1,000 cf in an NGV would only have a range of around 224 miles.*"
    b. They require much less infrastructure to "fuel" them. EVs can be charged at home, which offers obvious advantages to the vehicle owner. That home charge is slower than that at an electric power"rapid charge" fueling station, but that presents little problem to drivers who typically have hours each night when their vehicle isn't being used and who could charge their vehicles at home.

       Home charges may not be sufficient for drivers with longer commutes, however. (The Nissan Leaf has a range of roughly 75 miles, for example, so a commuter driving more than half that distance each way would need a mid-day charge. More on this below, but it's worth pointing out that only about 15 percent of Americans commute that far, according to Census data.) Such charges can be delivered at "rapid charge" stations thatare beginning to be built in cities and near workplaces.

       But even if you compare the "rapid charge" EV station to a CNG fueling station, the EVs come out far ahead, according to research cited in the *Forbes* article. A "fast charge" EV station can bring a battery up to 90 percent in about 30 minutes (http://www.forbes.com/sites/justingerdes/2013/02/26/estonia-launches-nationwide-electric-vehicle-fast-charging-network/) and cost $30,000 to $50,000, according to various reports. There are currently 10 such stations in the Salt Lake area (http://www.afdc.energy.gov/fuels/electricity_locations.html)Nationally, there are already more EV fuelingstations than CNGs, even though the former just entered the market (http://www.washingtonpost.com/blogs/wonkblog/files/2013/04/US-alt-fuel-station-inventory-AFDC-via-CleanCities.png).

Compare that to the cost of a CNG fueling station of about $750,000, according to Forbes. (http://www.forbes.com/sites/michaelkanellos/2012/01/11/which-are-better-electric-cars-or-natural-gas-vehicles/2/)

4. Here's one quick way to show that EVs have clear advantages over CNG vehicles: Consumers prefer them. Commercial CNG vehicles, namely the Honda Civic NG, the Dodge Ram 2500, the Chevy Silverado and the Ford F-250, have been on the market for years. And, yet, according to this Washington Post article, only 20,381 of the 14.5 million cars and trucks sold last year run on CNG. (http://www.washingtonpost.com/blogs/wonkblog/wp/2013/05/02/natural-gas-vehicles-havent-caught-on-yet-heres-how-that-could-change/)

   Comparatively, in their *very first year on the market,* more than 50,000 EVs were sold. Monthly sales totals in 2013 have jumped up to 7-8,000 a month. And the number of models on the market is about to increase significantly, up to about a dozen by the 2015 year.

   How many CNG vehicles are on the road in total? (Including not just CNG models, but traditional cars converted to CNG at a cost of $10,000 or more per vehicle?) About 112,000 according to Department of Energy data cited in this New York Times article. (http://www.nytimes.com/2013/04/12/business/energy-environment/russia-skips-hybrids-in-push-for-natural-gas-cars.html?pagewanted=all&_r=0)

   Thus, by the end of 2013, the number of EVs on the road will surpass CNGs. Clearly, consumers and the market are expressing which alternative fuel vehicle they prefer.

5. The main advantage that a CNG vehicle has over EVs is range: roughly 200 miles per fill-up. However, let's point out a few mitigating factors which demonstrate why EVs are taking off, despite concerns about range:
   a. Several of the EVs, including the popular Chevy Volt, are "plug-in hybrid electric vehicles," meaning that they have a back up internal combustion engine. That mitigates their pollution benefits somewhat (it puts the Volt at an average of 60-70 mpg (or electric charge equivalent) compared to 99 mpg for the Leaf) but has led to greater adoption among certain consumers very concerned about range.
   b. A significantly majority of trips are short enough that even the purely-electric Leaf with its 75-mile-round-trip range more than suffices, especially as a family's second commuter-only car. The Census recently released data on commuting distances (http://factfinder2.census.gov/faces/tableservices/jsf/pages/produc

> tview.xhtml?src=bkmk) and while the preponderance of so-called "mega-commutes" drew media attention, the truth is most Americans (about two-thirds) commute less than a half an hour to work each day. (Roughly 15-20 miles each way.) Combine that with school drop-offs and errands adding miles, and the EV still works on a single overnight charge for most daily drivers.

We hope that the above analysis – and the supporting documents – demonstrate the following: EVs are not just a superior consumer vehicle when it comes to pollutants, but in many other criteria as well. And EVs are succeeding in the marketplace much more quickly than CNGs have over a much longer time frame.

All of this analysis brings us back to a conclusion in the MIT report cited above. (http://web.mit.edu/mitei/docs/reports/electrification-transportation-system.pdf): According to the *Washington Post*, "The MIT report suggested that it might just be easier and more efficient to use America's natural gas to power electric cars rather than set up an entirely new fueling infrastructure. And, so far, the country is nudging along in exactly that direction."

Let's turn now to looking at what direction Utah is going on: How does the state support CNGs vs. EVs?

6. The answer is that state policy overwhelmingly favors CNGs over EVs, despite the fact that the former pollutes more and has lagged in the marketplace. Below are three examples (although we are aware of additional state CNG programs not listed below, we will seek to address thesein a filing to the Commission at a later date).

   First of all, the state offers a tax credit of up to $2,500 for CNG vehicles (both conversions and purchases of new vehicles), yet only offers $605 for the purchase of a qualifying electric vehicle. It's impossible to argue that CNGs offer more air quality benefits than EVs, let alone four times as great. In addition, of course, CNGs require a costly and elaborate infrastructure to fuel them, much more so than EVs (which can typically be recharged at home).

   Second, a modest program run by the Division of Air Quality – the Clean Fuel Vehicle Grant and Loan Program, which awarded $250,000 in 2012-13 – apparently only funded CNG "street sweeper, snow plow, aerial tower lift, refuse trucks, and buses" purchases, according to the program's Web site. (http://www.cleanfuels.utah.gov/grants/grantsintro.htm)

   Third, the state allows individual consumers to "purchase CNG from a state-operated fueling station if there are no commercial fueling stations that meet the geographical needs of the individual or entity and there is not an emergency that

requires the state to reserve CNG for use by state or emergency vehicles." (http://www.afdc.energy.gov/laws/laws/UT/tech/3253) The cost for those facilities was paid for by taxpayers, obviously, and serves to subsidize the CNG fuel costs.

7. Clearly, then, the State of Utah already provides considerably more support for natural gas vehicles and infrastructure than for electric vehicles, even though electric vehicles appear to deliver more air quality benefits, more efficient use of energy, and are more popular among consumers. Given that, here are several policy recommendations:

- We requestthatthe Commission include in its findings recommendations for how the state can support EVs, given all of the reasons we offer above. They're superior at controlling pollutants, require less state support and are already gaining greater consumer support.

We would like to echo the policy recommendations already put forth by our colleagues at the Southwest Energy Efficiency Project and Utah Clean Energy. In their initial comments, they've done a terrific job of elucidating how the state can – and should – support EVs. We'll simply copy their list of recommendations found on p. 2 & 3 of their initial comments:

- **Allow the commercial resale of electricity for vehicle charging**, without invoking Commission regulation to facilitate the availability of public charging stations;
- **Create an EV electricity rate tariff** unconnected to current tiered rates that will incentivize off-peak charging and not penalize a household with an EV for high levels of electricity use compared to households without EVs;
- **Bring parity to the State tax credit for electric vehicles and natural gas vehicles** (currently set at $605 for electric vehicles and $2,500 for natural gas vehicles);
- **Create EV-ready requirements in building codes**, requiring that new garages and parking lots have conduit available for EV charging stations;
- **Implement an annual decal fee on electric vehicles**, a portion of which will be used to pay a fair share of roadway infrastructure costs, aportion of which will be invested in providing publically available charging stations;
- **Support adoption of EVs in government fleets** when EVs are appropriate to the fleet's needs and cost effective compared to a gasoline vehicle;
- **Develop a strategic plan for deployment of EV charging infrastructure**, including direct current quick charging stations to address range anxiety; consider cooperative effort with neighboring states on interstate highways.

We appreciate the opportunity to offer initial comments on Alternative Fuel Vehicles in Utah. We look forward to continuing to offer input as this process moves forward.

Sincerely,

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