

**CITY OF RIVERSIDE
FINAL REPORT FOR CONTRACT #ML11036A**

Prepared for the Mobile Source Air Pollution Review Committee (MSRC)

Under the AB 2766 Discretionary Fund Work Program

Alternative Fuel

Compressed Natural Gas (CNG)

**Installation of a publicly accessible CNG station adjacent to the City's Water Quality Control facility (Acorn station), located at 5961 Acorn in Riverside
Reimbursement of Nine Heavy-Duty CNG Vehicles**

August 2017

Acknowledgements

The City of Riverside would like to acknowledge the following individuals and organizations associated with this project, who provided support or services to make the completion of this project possible:

City of Riverside Mayor Rusty Bailey
City of Riverside City Council
City of Riverside General Services Department
City of Riverside Public Works Department
City of Riverside Fire Department
City of Riverside Development Department Building and Safety Division
City of Riverside Community Development Department Planning Division
City of Riverside Model Clean City Committee
MSRC Project Staff

This report was submitted in fulfillment of contract ML11036A for Installation of a publicly accessible CNG station adjacent to the City's Water Quality Control facility (Acorn station), located at 5961 Acorn in Riverside and Reimbursement of Nine Heavy-Duty CNG Vehicles to the City of Riverside under the partial sponsorship of the Mobile Source Air Pollution Reduction Review Committee (MSRC). Work was completed as of 2016.

Disclaimer

The statement and conclusions in this report are those of the contractor and not necessarily those of the Mobile Source Air Pollution Reduction Review Committee (MSRC) or the South Coast Air Quality Management District (SCAQMD). The mention of commercial products, their sources or their uses in connection with material reported is not to be construed as either an actual or implied endorsement of such products.

Project Description and Work Performed

The purpose of this project was to replace diesel heavy-duty equipment and installation of a publicly accessible CNG station adjacent to the City's Water Quality Control facility (Acorn station), located at 5961 Acorn in Riverside, California. Specifications are as specified in Attachment 1: Purchase of nine (9) heavy-duty vehicles and Attachment 3, Fueling Station Specifications, which includes: Installing CNG fueling station to be installed pursuant to the contract and described as follows: The new station will include at least two (2) 500 scfm compressors, at least two (2) fast-fill dispensers (two (2) hoses per dispenser), at least five (5) dual hose time-fill posts, storage capacity of 33,000 scf. Fueling station installation includes plumbing gas supply and all necessary accessories. These projects meet the needs of the City of Riverside and provide cleaner operating vehicles and CNG for the City, community and businesses. The City leveraged AB2766 Funds to obtain a MSRC grant, which provided additional funding towards the additional costs.

Problems Encountered

There were project delays due to the adjustment of the project location. It was necessary to extend the project schedule for the CNG station construction by four (4) months. The original plans called for the CNG Station to be installed within the confines of the City's Water Quality Control Plant which required passing through a security checkpoint. For security reasons and improved vehicle flow/access, the corner site, previously owned by the Public Works Department, is located at the corner of Jurupa Avenue and Acorn Street. The site is easily accessible for both the public and City staff. The updated site is a corner lot and is considered a prime commercial site.



Figure 1 – Acorn Station Landscaping with Trees

It was necessary to substitute vehicles for reimbursement and extend the project schedule by 26 months in order to receive all the vehicles and place them in service. The needs of client departments changed and purchasing authority for heavy-duty vehicles is based on client fund availability.

| Original Award | Modification Request |
|------------------------|-----------------------------|
| (6) CNG Refuse Trucks | (5) CNG Refuse Trucks |
| | (1) 10-Yard CNG Dump Truck |
| (1) CNG Street Sweeper | No Change |
| (1) CNG Fuel Truck | No Change |
| (1) CNG Patch Truck | (1) CNG Roll Off Truck |
| Total 9 | Total 9 |

Vehicles Purchased

The following are descriptions of the vehicles purchased under this grant.

| Vehicle & Engine Year | Vehicle Make | Vehicle Model | Class 4 | Engine Make | Engine Model | Purchase Cost | Description |
|----------------------------------|---------------------|----------------------|----------------|--------------------|---------------------|----------------------|--------------------|
| 2014 | FREIGHTLINER | M2 | CNG | TYMCO | 500X | 340,434.40 | Sweeper |
| 2015 | AUTOCAR | ACX64 | CNG | Cummins | 320 HP | 233,270.50 | Roll Off Truck |
| 2015 | AUTOCAR | ACX64 | CNG | Cummins | 320 HP | 342,580.07 | Refuse Truck |
| 2015 | AUTOCAR | ACX64 | CNG | Cummins | 320 HP | 342,580.07 | Refuse Truck |
| 2015 | AUTOCAR | ACX64 | CNG | Cummins | 320 HP | 342,580.07 | Refuse Truck |
| 2015 | AUTOCAR | ACX64 | CNG | Cummins | 320 HP | 342,580.07 | Refuse Truck |
| 2015 | AUTOCAR | ACX64 | CNG | Cummins | 320 HP | 343,351.27 | Refuse Truck |
| 2016 | FREIGHTLINER | 114SD | CNG | Cummins | 320 HP | 220,377.67 | Dump Truck |
| 2012 | AUTOCAR | ACX64 | CNG | Cummins | 345 HP | 451,546.03 | Fuel Truck |

Emissions Benefits – Vehicle Emissions Reduction

The estimated reductions in oxides of nitrogen emissions for each vehicle is noted above. NOx is the only criteria pollutant that achieves a reduction for the project but rest assured it is the most important air pollutant to reduce. The project achieves approximately 20.61 pounds of NOx reduction per year, or approximately 0.12 ton per year. If you multiple the NOx reduction per vehicle times the anticipated useful life of each vehicle, you can calculate a total lifetime NOx reduction per vehicle. The typical useful life of a heavy-duty municipal vehicle is about 12 years, except for the CNG Fuel Truck, with a useful life of 20 years.

| Order Date | City ID Number | Vehicle & Engine Year | In-Serv Date | Description | Life Expectancy | NOx (lbs/year) | Lifetime Nox Reduction / Vehicle |
|--|----------------|-----------------------|--------------|----------------|-----------------|----------------|----------------------------------|
| 9/16/2016 | I071 | 2014 | 9/16/2016 | Sweeper | 12 Years | 1.79 | 21.48 |
| 8/27/2014 | J190 | 2015 | 3/17/2015 | Roll Off Truck | 12 Years | 4.27 | 51.24 |
| 2/25/2015 | J191 | 2015 | 5/22/2015 | Refuse Truck | 12 Years | 2.71 | 32.52 |
| 2/25/2015 | J192 | 2015 | 5/22/2015 | Refuse Truck | 12 Years | 2.89 | 34.68 |
| 2/25/2015 | J193 | 2015 | 5/22/2015 | Refuse Truck | 12 Years | 2.72 | 32.64 |
| 2/25/2015 | J194 | 2015 | 5/22/2015 | Refuse Truck | 12 Years | 2.66 | 31.92 |
| 2/25/2015 | J195 | 2015 | 2/22/2015 | Refuse Truck | 12 Years | 2.7 | 32.4 |
| 9/10/2014 | S149 | 2016 | 4/27/2015 | Dump Truck | 12 Years | 0.59 | 7.08 |
| 10/23/2012 | R046 | 2012 | 10/23/2012 | Fuel Truck | 20 Years | 0.28 | 5.6 |
| | | | | | | 20.61 | 249.56 |
| NOx Reduction in Tons / Life of Vehicles | | | | | | | 0.12478 |

Riverside remains committed to improving the public health, safety and welfare, including air quality. While some sources of air pollution are outside of the City's control, Riverside has become a recognized leader as a model clean air city. To this end, Riverside works to improve air quality through various strategies, including: encouraging use of alternative fuels, promoting increased use of public transit, minimizing commuting times and vehicle idling times, implementing measures to reduce ambient particulate matter, improving the urban forest, and diversifying energy resources. Since the 1980s, Riverside and its community partners have actively and aggressively adopted programs focused on improving air quality.

The Western Riverside County Clean Cities Coalition is a partnership between the City and neighboring municipalities working to educate the public in making clean air choices, promoting the use of sustainable fuels, and making the Inland Empire a place where people can breathe clean, healthy air. Creating an effective local governing board such as a Clean Air Advisory

Committee is another partnering opportunity for community members and civic leaders to direct air quality resources into programs that must benefit the City.

Photographs

Installation of the Acorn CNG Station was completed at the corner of Jurupa Avenue and Acorn Street in February of 2015 and the Grand Opening was held in March of 2016. This new CNG station is located at the opposite end of the City from the Corporation Yard CNG station. The location improves operational efficiencies for City departments and saves wear and tear on vehicles by providing the opportunity to refuel locally without traveling back and forth to the Corporation Yard. It also eases traffic congestion and wait times for customers as there are now two locations within the City to refuel CNG vehicles. Additionally, it provides a second CNG refueling location for disaster preparedness purposes as many Public Utilities and Public Works Department's heavy duty vehicles may respond in a disaster.



Figure 2 - Acorn Station Grand Opening Ribbon Cutting



Figure 3 – Mayor Rusty Bailey at the Grand Opening



Figure 4 – Councilman Mike Soubirous at the Grand Opening



Figure 5 - Former General Services Director Kris Martinez being introduced at the Grand Opening



Figure 6 – CNG Dispenser at the New Acorn Station



Figure 7 – CNG Refuse Vehicle – MSRC Clean Transportation Sticker

Public Outreach

The City Council approves grants at public meetings, is live streamed to the public and published on YouTube.

The City Council approved a reimbursement grant agreement with the Mobile Source Air Pollution Reduction Review Committee Clean Transportation Funding (MSRC) in the amount of \$670,000 to offset the cost of Heavy-Duty Compressed Natural Gas (CNG) powered vehicles and installation of a CNG fueling station at the Water Quality Control Plant (WQCP) located at 5961 Acorn Street in Riverside.

The first section of the grant awarded by the MSRC is in the amount of \$270,000 for reimbursement to the City for nine (9) Heavy - Duty, CNG- powered vehicles being purchased by the Public Works and General Services Departments during FY2011/12, at \$30,000 per vehicle. The second reimbursement request approved by the MSRC is \$400,000 for installation of a high volume 24/7 publicly accessible CNG station at the City's WQCP. The station will consist of two compressors for fast filling vehicles at two hose dispensers, five dual time fill posts with 2 hoses each to allow refueling 10 heavy duty vehicles overnight. This second City CNG fueling station location will provide CNG for City vehicles, fueling for businesses and citizens, and promote the purchase and use of clean burning natural gas vehicles. This new CNG station will also continue the City's efforts in improving air quality for our citizens.

Additional Public Outreach Resources

1. Signage from the Corporation Yard CNG station advertising the Acorn Station location.
2. The Acorn Station is listed on www.cngpricesnow.com website and pricing is updated.
3. [City Watch Riverside - City Watch - New CNG station](#) - The City of Riverside announces the grand opening of a new CNG station off the corner of Jurupa and Acorn. http://riversideca.granicus.com/MediaPlayer.php?view_id=9&clip_id=2028
4. CNG Dispensing Instructions: www.riversideca.gov/traffic/cng-dispensing.asp
6. [News Release: Apr 10, 2012](#) ...The City of Riverside has one of the largest public access CNG fueling stations in SoCalGas' service territory. Its fleet has been recognized as one of the top 100 fleets in the U.S. and has one of the strongest Clean Cities coalitions in the nation.
7. The City has produced and aired a series of alternative fuel vehicle program informational videos which covers the City's CNG, electric, hydrogen and propane fuels. These routinely run on the City of Riverside's award winning Government Television (GTV).
 - a. To view the video about the Best Government Green Fleet in North America for 2012, visit: <http://www.riversideca.gov/videos/riversidetoday.asp> - the video is dated December 2012 and contains a video hosted by Martin Bowman, retired Fleet Operations Manager.

- b. To view the video about the 100 Best Fleets in North America for 2012, visit <http://www.riversideca.gov/videos/riversidetoday.asp> - the video is dated July 2011.
 - c. To view the video about the City of Riverside's use of the ZAP electric vehicle, visit <http://www.riversideca.gov/videos/riversidetoday.asp> - the video is dated September 1, 2010.
 - d. To view a video about the City's alternative fuel vehicle rebate program, visit <http://www.riversideca.gov/videos/riversidetoday.asp> - the video is dated July 2010.
8. The City works with Western Regional Council of Governments (WRCOG) to provide alternative fuel vehicle displays concerning 'Advancing the Choice' and other alternative fuel events throughout the region. Visit <http://www.wrcog.cog.ca.us/clean-cities> and https://cafcp.org/events/annual_advancing_choice_expo for more information.
9. The City recently worked with WRCOG and Clean Cities to provide a First Responder Safety Training sponsored by the National Alternative Fuels Training Consortium (NAFTC), Clean Cities and the U.S. Department of Energy. This alternative fuel vehicle safety training was provided NAFTC along with the City's contribution of alternative fuel vehicle displays and a presentation by the City's Fleet Operations Manager concerning the use of alternative fuel. Visit <http://www.wrcog.cog.ca.us/clean-cities> for more information.
10. In order to educate and engage the community, Riverside launched the weekly "Green Power Report" radio show and GreenRiverside.com website in 2007. Both award-winning media outlets provide Riverside residents with updates on City efforts to improve sustainability as well as information about simple ways to "go green", upcoming green events such as Earth Day, and Riverside's myriad incentive programs. Riverside created the Sustainability Workbook, available on the GreenRiverside.com website, which provides hundreds of tips and ideas on how to go green. The City also maintains a Twitter account, Facebook page and YouTube channel which provide updates on City events, sustainability measures and projects throughout Riverside and opportunities to get involved. Visit: <http://www.greenriverside.com/links-and-articles> or www.greenriverside.com/gpr, for more information.
11. The City's Green Leadership Summit event, held on February 1st, 2012, gathered over 60 representatives of local groups, schools, public and private entities to discuss progress toward the achievement of sustainability, as well as future steps. The Green Leadership Summit provides a venue for the sharing of experiences, expertise, strategies and ideas, and encourages collaboration for the development of a healthier city. <http://www.pe.com/2012/02/11/riverside-green-leadership-summit-held-at-cal-baptist/>
12. The Seizing Our Destiny Initiative-which is the Agenda for Riverside's Future, is on the Public Utilities website. A Livable Community is the website section where the Clean & Green Riverside tab takes you to all of the City's Green initiatives from the beginning with endorsement of the Sustainable Riverside Policy Statement. The Policy Statement leads to

the Clean & Green Task Force, the Green Riverside Action Plan, the Task Force Report and the Mayor's Call to Action for a Sustainable Riverside. The City spreads the news around the City and the region about the importance of sustainability and what Riverside is doing. For more information, visit: <http://www.greenriverside.com/about-green-riverside/green-action-plan>.

13. Riverside's Public Utilities manages the City's electric vehicle program and has a wonderful website that shares information with staff and the community about the alternative fuel vehicle rebate program. Managed by the Public Works Department, the Alternative Fuel Vehicle Rebate Program is designed to encourage the purchase of alternative fuel or hybrid vehicles and to increase awareness of the benefits associated with driving a clean and green vehicle. This benefit is available to City employees. For more details, visit: <http://www.greenriverside.com/links-and-articles> and <http://www.greenriverside.com/green-rebate-programs>.
14. Directional signage was installed by Caltrans on the 91 freeway to inform staff and the public about the types, price and location of alternative fuel fueling stations.

Summary and Conclusion

Installation of the Acorn CNG Station was completed at the corner of Jurupa Avenue and Acorn Street in February of 2015 and the Grand Opening was held in March of 2016. This new CNG station is located at the opposite end of the City from the Corporation Yard CNG station. The location improves operational efficiencies for City departments and saves wear and tear on vehicles by providing the opportunity to refuel locally without traveling back and forth to the Corporation Yard. It also eases traffic congestion and wait times for customers as there are now two locations within the City to refuel CNG vehicles. Additionally, it provides a second CNG refueling location for disaster preparedness purposes as many Public Utilities and Public Works Department's heavy duty vehicles may respond in a disaster.

This new fueling station location provides CNG for City vehicles, fueling for businesses and citizens, and promotes the purchase and use of clean burning natural gas vehicles. The station consists of one compressor for fast filling vehicles at two dual hose fast fill dispensers, five dual hose time-fill posts that allows refueling of 10 vehicles overnight. The new station also continues the City's efforts to improve air quality for our citizens by providing a high volume 24/7 publicly accessible facility.

The volume of CNG sales have continued to grow over the years and proven to be a reliable benefit to the City, both environmentally and economically. Throughput at the Corporation Yard CNG station has increased from 4,000 gasoline gallon equivalents (GGE) when the station first opened in January 2004, to approximately 80,000 GGE per month (public and private sales) today. This station is one of the highest volume publicly accessible stations within the state of California. The station, along with the City's very progressive alternative fuel program, is one of the primary reasons the City was named the #1 Government Green Fleet in the nation in 2012, during the term of this grant.



Figure 8 - #1 Green Fleet in North America

The City successfully managed a design build agreement for the CNG fueling station. Since City staff maintains the CNG station at the Corporation Yard, the same equipment was specified for the new station in order to minimize maintenance expenses, staff training and spare part costs.



Figure 9 – Mayor Bailey Refueling a CNG Vehicle

Riverside is a municipal government that provides public services: public utilities-water/electric; public works-construction vehicles, refuse, sewers; parks-special transit, disabled/elderly; recreation-park maintenance. Fleet Management provides services in support of those services such as vehicle acquisition, disposal, maintenance, repair & environmental compliance. The Acorn Station is expected to increase service provision capacity and increase operational efficiencies through its location. It is anticipated that this new station will increase sales further by attracting new public consumers, particularly since it is located only half-mile off of Van Buren Boulevard.



Figure 10 - The First Acorn Station Customer



Figure 11 - Acorn Station Time Fills

As previously noted, the volume of CNG sales at the original Corporation Yard CNG station has grown over the years and proven to be a reliable benefit to the City, both environmentally and economically. Throughput at the Corporation Yard CNG station has increased from 4,000 gasoline gallon equivalents (GGE) when the station first opened in January 2004, to approximately 80,000 GGE per month (public and private sales) in 2017. The Corporation Yard station is one of the highest volume publicly accessible stations within the state of California, which justified the need for the Acorn station.

The goals of this project was to build a second CNG fueling station with one compressor for fast filling vehicles at two hose dispensers and five dual time-fill posts to refuel 10 heavy duty

vehicles overnight. This second 24/7 publicly accessible CNG fueling station will provide fueling for businesses, citizens and promote the purchase and use of clean burning natural gas vehicles. This project was intended to continue the City’s efforts to improve air quality in the community and provide a second location, on the opposite side of the City from the Corporation Yard, to improve operational efficiencies for City departments by providing an additional location for City vehicles to refuel without having to drive back to the Corporation Yard. The City Council approved this project and authorized \$1,200,000 for the station construction and approved the \$400,000 matching grant from the MSRC to offset installation costs and \$270,000 to offset the cost of heavy-duty CNG vehicles

At the conclusion of construction at the Acorn CNG Station, the station began informal operation in February 2015. The table below shows the increase in the number of transactions, volume in gallons and revenue. Below is a table and chart noting the amount of increase from February through September 2015. Based on future expectations, this station will positively add to Riverside’s environmental and economic growth.

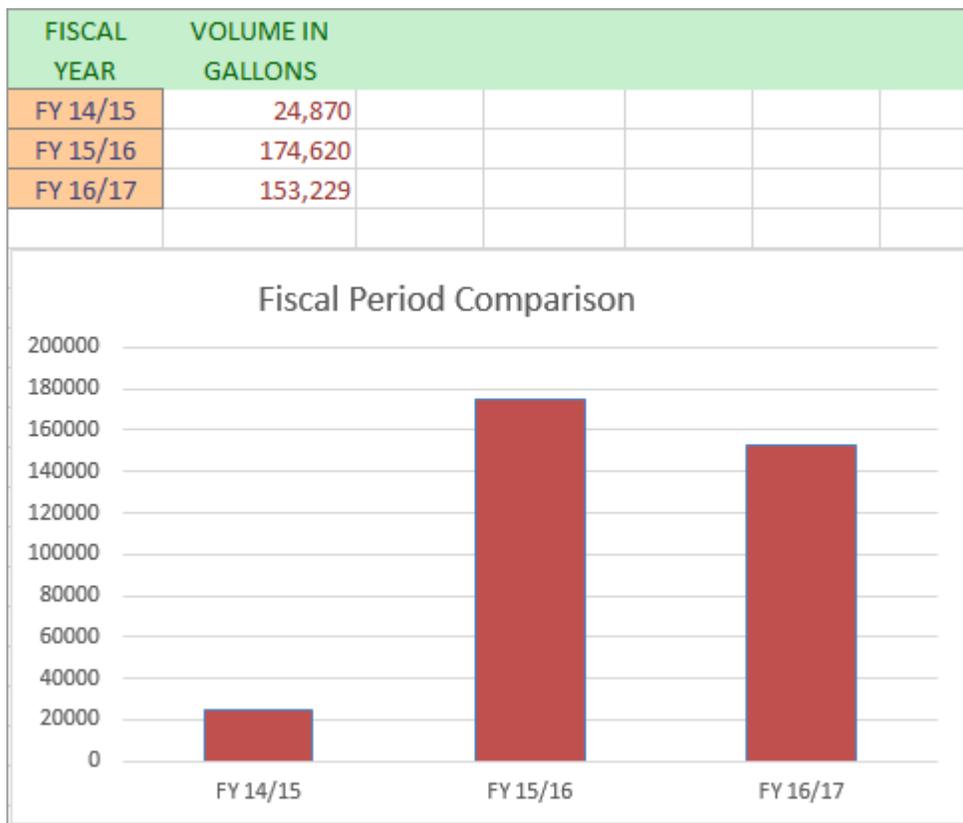


Figure 12 - Acorn Station Throughput Volume Increase Comparison – FY 14/15 through 16/17

City of Riverside produced a turnkey CNG station and now has a second, reliable CNG station at the water district facility location six miles off the 60 freeway. The size of the station is based primarily upon the number of natural gas buses (school district client) planned to be fast filled either during the morning or late afternoon daily. As the local school districts begin

replacing their older school buses and increase the number of CNG buses, there will be a large enough station to rapidly refuel these buses and any other vehicles from business and the public.