



California Energy Commission Clean Transportation Program

# FINAL PROJECT REPORT

# Lemoore Compressed Natural Gas Station

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# **California Energy Commission**

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### PREFACE

Assembly Bill 118 (Núñez, Chapter 750, Statutes of 2007) created the Clean Transportation Program, formerly known as the Alternative and Renewable Fuel and Vehicle Technology Program. The statute authorizes the California Energy Commission (CEC) to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change policies. Assembly Bill 8 (Perea, Chapter 401, Statutes of 2013) reauthorizes the Clean Transportation Program through January 1, 2024, and specifies that the CEC allocate up to \$20 million per year (or up to 20 percent of each fiscal year's funds) in funding for hydrogen station development until at least 100 stations are operational.

The Clean Transportation Program has an annual budget of about \$100 million and provides financial support for projects that:

- Reduce California's use and dependence on petroleum transportation fuels and increase the use of alternative and renewable fuels and advanced vehicle technologies.
- Produce sustainable alternative and renewable low-carbon fuels in California.
- Expand alternative fueling infrastructure and fueling stations.
- Improve the efficiency, performance and market viability of alternative light-, medium-, and heavy-duty vehicle technologies.
- Retrofit medium- and heavy-duty on-road and nonroad vehicle fleets to alternative technologies or fuel use.
- Expand the alternative fueling infrastructure available to existing fleets, public transit, and transportation corridors.
- Establish workforce-training programs and conduct public outreach on the benefits of alternative transportation fuels and vehicle technologies.

To be eligible for funding under the Clean Transportation Program, a project must be consistent with the CEC's annual Clean Transportation Program Investment Plan Update. The CEC issued PON-09-006 to provide funding opportunities under the ARFVTP for Alternative and Renewable Fuel Infrastructure. In response to PON-09-006, the recipient submitted an application which was proposed for funding in the CEC's notice of proposed awards May 17, 2010 and the agreement was executed as ARV-09-019 on November 18, 2010. Staff completed and closed the project October 31, 2013.

### ABSTRACT

In 2012, the City of Lemoore together with Lemoore Area Schools Transportation constructed a compressed natural gas fueling station at 857 Iona Avenue in Lemoore, CA to fuel both public and private vehicles in the area.

The station was designed by Aecom Technology Corporation and constructed by Amtek Construction using Angi Energy Systems equipment.

**Keywords**: Compressed Natural Gas, Lemoore Area Schools Transportation, Congestion Mitigation and Air Quality Funding, City of Lemoore

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### **EXECUTIVE SUMMARY**

The City of Lemoore and four area school districts constructed a compressed natural gas fueling station. The City of Lemoore and school districts are now able to fuel their own fleet vehicles with compressed natural gas, and the public now has the opportunity to use the compressed natural gas station as well.

The station was financed using a combination of nitrous oxide offset contributions from Leprino Foods Company, Congestion Mitigation and Air Quality Funding, and Clean Transportation Program funding. This combination of financing allowed the city and schools to build the station they needed, without having to make many concessions.

The station has been successful in providing the public with a place to fuel with compressed natural gas. While station usage from the city and schools was predicted, the public response has been much greater than anticipated. In the first six months of operation, the Lemoore compressed natural gas station dispensed 14,650 gallon equivalents of compressed natural gas.

# CHAPTER 1: Background

### The City of Lemoore and Lemoore Area Schools Transportation (LAST)

With rising diesel prices, compressed natural gas (CNG) is becoming more popular throughout the state and the country. For large vehicles such as school buses and refuse vehicles, CNG is one alternative fuel that works quite well. The City of Lemoore and LAST were feeling the effects of rising diesel prices on their budgets and operations.

The City of Lemoore is located in the Central Valley and has a population of 25,000. LAST's service area consists of four area school districts, Lemoore Union High School District, Lemoore Union Elementary School District, Central Union School District, and Island Union School District.

#### The Partnership

The City of Lemoore decided to partner with the four area school districts, mentioned above to construct a CNG Station. This grouping of interests was known as "The Partnership". The schools would use the station to fuel their CNG school buses, and the City of Lemoore would fuel their refuse vehicles. Together, they developed a Memorandum of Understanding that dictated the administration and operation of the station and presented the Memorandum of Understanding to five governing bodies, the Lemoore City Council and the four school boards. LAST offered a large area of land at their maintenance facility at 857 Iona Avenue, Lemoore, CA on which the facility would be constructed on.

In 2009, Leprino Foods Company, a cheese processing plant located in Lemoore, expanded their facility. During their expansion, they were given the option of paying money to the local air district to offset the emissions from the increased milk truck traffic, or contribute to a pollution reduction project in the area. They chose the latter option and donated \$425,000 to the City of Lemoore for the Lemoore CNG Station.

### **Early Challenges**

#### **Funding Challenges**

The \$425,000 grant from Leprino Foods Company for the CNG station helped, but that money was not enough to build the station the community needed. The City of Lemoore staff began the process of applying for grants. In 2010, the city was awarded the AB118 grant from the CEC in the amount of \$200,000. In addition, the city applied for and received \$292,000 in Congestion Mitigation and Air Quality Funding through Kings County Association of Governments and administered through Caltrans. The Partnership now had enough money to design and build a station that would fit their needs.

#### **Design Challenges**

The Partnership originally wanted to construct the CNG station on a design-build turnkey basis, where one contractor would engineer the station as well as build it. However, Caltrans, who administers the Congestion Mitigation and Air Quality grant, does not allow for design-build projects. In order for the Partnership to keep the \$292,000 in Congestion Mitigation and Air Quality money, a different approach was needed.

In March 2011, the partners released a job application in order to seek out a CNG station engineer that had the qualifications necessary to help with the construction of the CNG station. An engineer was hired and the project ran smoothly after that.

# CHAPTER 2: Construction

Engineer, Bill Black with AECOM, designed a CNG station to fit the needs of the Partnership. The school district already had nine CNG school buses and the City of Lemoore had two CNG vehicles on order. The station was sized to be able to fill 10 school buses and 10 City vehicles each night.

Plans for the project were ready to bid in July 2011 and a contract was awarded to Amtek construction in August 2011. The first step was for Amtek to order the CNG equipment, which had a 4-6 month lead time.

Construction on this project commenced in March, 2012 and continued until the project was substantially complete in September, 2012. The station has been operational since then. Amtek Construction continued to work on punch list items through April, 2013, when the final invoice and retention payment were paid.

### **The Equipment**

Contractor, Amtek Construction furnished the equipment for the CNG station through ANGI Energy Systems (ANGI). The station (Figure 1) includes the following:

- ANGI Model NG50E 75 standard cubic feet per minutes compressors
- American Society of Mechanical Engineers storage vessels
- PSB Industries Model MG SR-10-2 DDP inlet regenerating gas dryer
- Two-hose ANGI Series II Fleet Dispenser with 3 Bank sequencing hose
- Priority and Time-Fill Meter System
- 10 two-hose ANGI time fill post

### Figure 1: CNG Station Equipment



Source: Lemoore Area Schools Transportation

# CHAPTER 3: Results

The CNG station has been used by the City of Lemoore's two CNG vehicles, Lemoore Area Schools Transportation's nine CNG school buses, Kings Area Rural Transportation buses, and members of the general public with CNG vehicles. The City of Lemoore and LAST utilize the time-fill part of the station where the vehicles hook up to the filling posts when they are done for the day and a timer turns the compressors on and fills up the vehicles overnight when electricity rates are lowest. The other users utilize the fast-fill portion of the station which is similar to a regular gas station where gas is received within minutes. The station (Figure 2) takes major credit cards as well as our own fleet card. The set public price per gallon is \$2.36.

The following is the first six months of usage at the Lemoore CNG Station:

Total	14,650
Public Use	1,057
KART	1,902
LAST	9,815
City of Lemoore	1,876
User	Gallon Equivalents (GE)



Figure 2: Lemoore CNG Fast-Fill Station

Source: Lemoore Area Schools Transportation

# CHAPTER 4: Future Plans

As the use of the station increases, the partners may decide to increase the station's output capacity. The station was originally sized for the expected CNG use in ten years, and should be on track to serve that use. However, if the public use increases more than anticipated, it may be warranted to add another compressor. Those needs will be assessed as they present themselves.

### GLOSSARY

ALTERNATIVE AND RENEWABLE FUELS AND VEHICLE TECHNOLOGY PROGRAM (ARFVTP) – Also known as the Clean Transportation Program, was created by Assembly Bill 118 (Nunez, Chapter 750, Statutes of 2007), the program with an annual budget of about \$100 million supports projects that develop and improve alternative and renewable low-carbon fuels, improve alternative and renewable fuels for existing and developing engine technologies, expand transit and transportation infrastructures, and establishing workforce training programs, conduct public education and promotion, and create technology centers, among other tasks.

CALIFORNIA DEPARTMENT OF TRANSPORTATION (Caltrans) - Responsible for the design, construction, maintenance, and operation of the California State Highway System, as well as that portion of the Interstate Highway System within the state's boundaries.

COMPRESSED NATURAL GAS (CNG) - Natural gas that has been compressed under high pressure, typically between 2,000 and 3,600 pounds per square inch, held in a container. The gas expands when released for use as a fuel.

LEMOORE AREA SCHOOLS TRANSPORTATION (LAST) - Responsible for safely transporting students in the Lemoore Area Schools Districts.1

<sup>1</sup> Lemoore Area Schools Transportation Department (https://www.luhsd.k12.ca.us/Page/396)