



**CALIFORNIA
ENERGY COMMISSION**



Clean Transportation Program
FINAL PROJECT REPORT

COTA STREET COMPRESSED NATURAL GAS FUELING STATION EXPANSION

Prepared for: California Energy Commission
**Prepared by: City of Corona (with the South Coast Air Quality
Management District)**



March 2023 | CEC-600-2023-012

California Energy Commission

Curtis Showalter
Jannet Loera Gutierrez
Robert Morin
Primary Author(s)

City of Corona
400 S. Vicentia Ave.
Corona, CA 92882
951-736-2266
[City of Corona Website](https://www.coronaca.gov/) (https://www.coronaca.gov/)

Agreement Number: ARV-10-054

Kay Williams
Commission Agreement Manager

Elizabeth John
Branch Manager
MEDIUM- AND HEAVY-DUTY ZERO EMISSION TECHNOLOGIES

Hannon Rasool
Director
FUELS AND TRANSPORTATION

Drew Bohan
Executive Director

DISCLAIMER

This report was prepared as the result of work sponsored by the California Energy Commission (CEC). It does not necessarily represent the views of the CEC, its employees, or the State of California. The CEC, the State of California, its employees, contractors, and subcontractors make no warrant, express or implied, and assume no legal liability for the information in this report; nor does any party represent that the use of this information will not infringe upon privately owned rights. This report has not been approved or disapproved by the CEC nor has the CEC passed upon the accuracy or adequacy of the information in this report.

ACKNOWLEDGEMENTS

The following team members contributed to the data analysis and writing of this report:

City of Corona

- Curtis Showalter, Administrative Manager
- Robert Morin, Principal Engineer
- Jannet Loera Gutierrez, Engineer

South Coast Air Quality Management District

- Phil Barroca, Air Quality Specialist
- Drue Ann Hargis, Senior Public Information Specialist

PREFACE

Assembly Bill 118 (Núñez, Chapter 750, Statutes of 2007) created the Clean Transportation 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 Clean Transportation Program for projects which develop infrastructure necessary to store, distribute, and dispense electricity, E-85, Biomass-based diesel, and natural gas. In response to PON-09-006, the recipient submitted an application which was proposed for funding in the CEC's notice of proposed awards June 10, 2011 and the agreement was executed as ARV-10-054 on November 8, 2011

ABSTRACT

Compressed natural gas offers many benefits to the world, including cleaner and less expensive fuels. With its increased popularity, one problem is that there are not a lot of facilities to offer these services. The city of Corona owns the only compressed natural gas fuel station expansion within a 12-mile radius. As a result, the city sought to successfully expand the fueling station located near the intersection of the I-15 and CA-91 by increasing the storage capacity and adding a dual hose fast fill dispenser. This will allow more convenient and faster fueling services to the community, traveling public and corporate fleet services, as well as allowing for the reduction of diesel consumption and vehicle emissions in California.

Keywords: Compressed natural gas, fast fuel dispenser, storage vessel

Showalter, Curtis, Jannet Loera Gutierrez, Robert Morin. 2023. *Cota Street Compressed Natural Gas Fuel Station Expansion*. California Energy Commission. Publication Number: CEC-600-2023-012

TABLE OF CONTENTS

	Page
Acknowledgements	i
Preface.....	ii
Abstract	iii
Table of Contents.....	v
List of Figures	v
List of Tables	v
Executive Summary.....	1
CHAPTER 1: Project Background and Objectives	3
Project Background	3
Objectives.....	3
CHAPTER 2: Scope of Work	4
Technical Tasks.....	4
Site Location	6
Fuel Throughput	6
CHAPTER 3: Results	8
Problems	8
Benefits.....	9
Conclusion	9
Glossary	10

LIST OF FIGURES

	Page
Figure 1: Previous Congested Conditions of CNG Station	3
Figure 2: New Dual Hose Fast Fill Dispenser	5
Figure 3: New Storage Vessels and Priority Valve Panel.....	5
Figure 4: CNG Station Location	6
Figure 5: Before upgrade, there would have been 3-4 vehicles deep waiting to fuel.....	8

LIST OF TABLES

	Page
Table 1: Total Gasoline Gallon Equivalent Consumed.....	7

EXECUTIVE SUMMARY

Under this grant agreement, the city of Corona expanded its existing public access compressed natural gas (CNG) Fueling Station located at 430 N. Cota Street. The existing public access CNG fuel station was opened in 2003. The station offers 24-hour access to CNG fuel for the community, traveling public, and corporate fleet services.

This CNG fueling station is the only one located within a 12-mile radius. In addition, the city of Corona's existing CNG fuel station facility consisted of only two Greenfield C3U gas compressors delivering a maximum throughput of 764 cu. ft. per minute, with a storage capacity of 36,000 cubic feet. This system served an existing public access CNG fuel station with a single fast fill dispenser with two hoses. The city's goal was to add an additional 36,000 cu. ft. of compressed natural gas storage (total of six tanks at 72,000 cu. ft. of storage) and an additional 2-hose fast fill dispenser at the public CNG Fuel Station. The city of Corona's contractor Go Natural Gas Inc. was responsible for the construction of the CNG Station facility upgrade, which became operational in September 2014.

The objective of the city of Corona in constructing this station is to provide the additional necessary infrastructure to provide more convenient and faster fueling services to the community, traveling public, and corporate fleet services, as well as allowing for the reduction of diesel consumption and vehicle emissions in California.

The successful expansion of this fueling station will provide the necessary infrastructure to fuel natural gas vehicles from the city and traveling public. This will promote a healthier environment using compressed natural gas instead of gasoline.

CHAPTER 1:

Project Background and Objectives

Project Background

City of Corona owns and maintains the only compressed natural gas (CNG) station within a 12-mile radius. The address of the station is 430 N. Cota Street near the I-15 and SR-91. The station provides convenient fueling for resident, traveling public, and corporate fleet. The station was constructed in 2003 and since then the fueling demands have constantly been increasing, as shown in Figure 1 during rush hours consumers wait for more than half an hour to get fuel. Due to this increase in demands the city became interested in expanding the station to provide greater compressed natural gas fueling capacity.

Figure 1: Previous Congested Conditions of CNG Station



Source: City of Corona.

Objectives

- Increasing the storage capacity for compressed natural gas and the installation of an additional dual hose fast fill dispenser.
- Making the necessary civil, mechanical, and electrical upgrades to support the expansion of the station
- Providing an incentive for corporate fleet services to use the facility; and
- Reducing air pollution from vehicles and implementing the California Air Act.

CHAPTER 2: Scope of Work

City of Corona's scope of work under Contract Number 12852 with the South Coast Air Quality Management District funded under CEC Grant Number ARV-10-054 included the installation, operation, and reporting of the Cota Street CNG fueling station. The CNG expansion doubled the existing storage capacity of 36,000 cubic feet of compressed gas. This allowed for the installation of an additional dual hose fast fill dispenser. The dispenser was an ANGI Series II dispenser with an advanced LCD display & electronics, integrated micro-processor mass flow, sequential and display electronics which eliminated remote components, weights and measures certified, three-bank sequencing, temperature compensation, and OPW P36 fill nozzles. Go Natural Gas Inc., working under the direction of the city, was responsible for the construction of the project:

Technical Tasks

The city of Corona completed several tasks to complete the proposed upgrades to the station.

Task 1: Project Management Plan

Design plans were completed by Fuel Solution Inc. under the direction of the city of Corona. There was a timeline for the project from planning to commissioning, but through the length of the project it changed. The project costs stayed close to the original proposed amount.

Task 2: Station Construction

The city of Corona procured and installed a dual hose fast fill dispenser, shown in Figure 2, three storage vessels, as shown in Figure 3, a card reader, and priority valve panel. The city managed the installation and implementation of all equipment by all subcontractors.

Figure 2: New Dual Hose Fast Fill Dispenser



Source: City of Corona

Figure 3: New Storage Vessels and Priority Valve Panel



Source: City of Corona.

Task 3: Station Commissioning

The project was completed and opened to the public on September 17th, 2014. The city of Corona is working on the final report. City of Corona performed the start-up activities and all required testing to ensure the expanded fueling station was working properly.

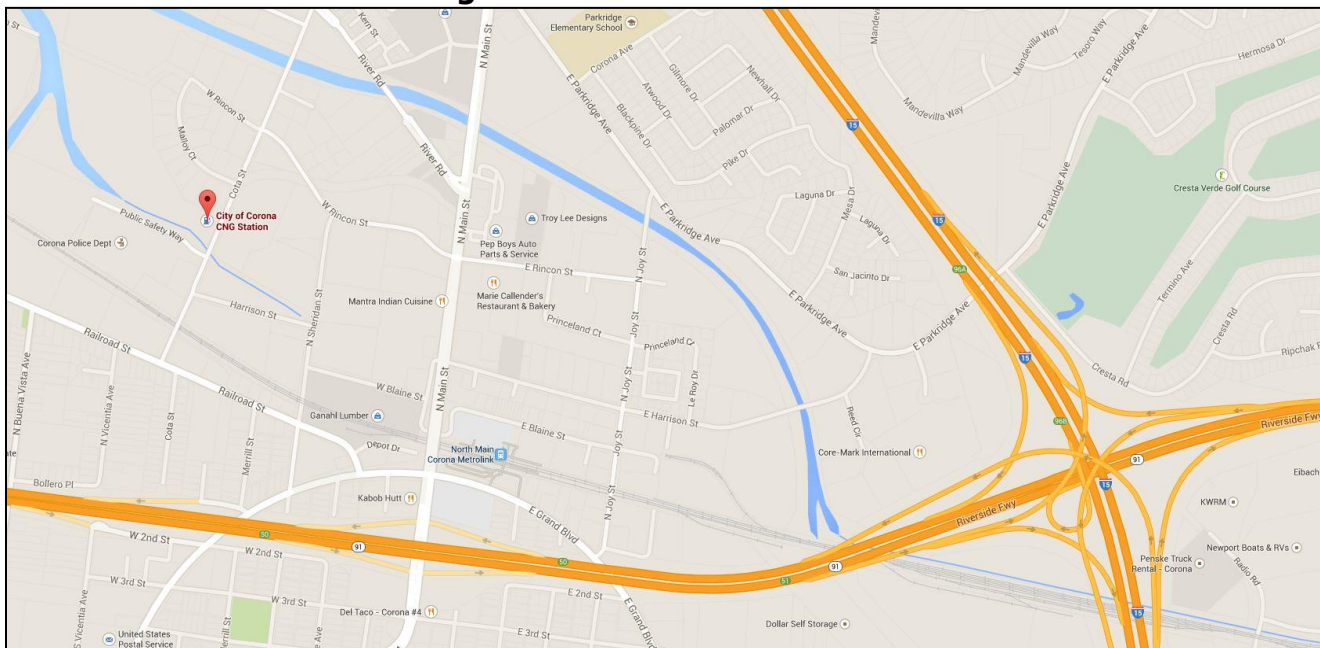
Task 4: Station Operation and Maintenance

The city of Corona continues to collect and analyze data on the station throughput and associated project emission benefits.

Site Location

Figure 4 shows the location of the CNG station, located in 430 N. Cota Street, Corona, CA 92880

Figure 4: CNG Station Location



Source: Google Maps

Fuel Throughput

The city of Corona's compressed natural gas fueling station became operational and opened to the public on September 17, 2014. As a result of the expansion of the facility more CNG vehicles can utilize the facility. October saw an increase in the total gallons of compressed natural gas consumed. While the city has infrequently experienced transaction counts this high before, the quantity is still atypically high. While the station is unmanned so visual assessments cannot be made, the city does occasionally have some fueling traffic from large, big rigs, as seen on Table 1 below, this may account for the spike in gasoline gallon equivalents (GGE) in October.

Table 1: Total Gasoline Gallon Equivalent Consumed

Month	Total Gallons Metered GGE	Transaction Count	Public Transaction Count	City Transaction Count	Timefill GGE	Facility Uptime	TOTAL GGE CONSUMED
August	39,421.30	4791	4514	277	1701	100%	41,122.00
September	33,794.32	4132	3868	264	4451	100%	38,245.32
October	42,357.58	4711	4517	211	3,863	100%	46,220.80
November	36,985.45	4290	4130	160	4129	100%	41,114.40
December	38,606.70	4618	4405	213	2176	100%	40,783.20
January	39,255.58	4683	4482	206	1741	100%	40,996.58
Average	38,403.49	4538	4319	222	3010	100%	41,413.72

Source: City of Corona CNG Station.

Based on the average throughput of GGE consumed per month, the city of Corona is responsible for a high level of emission reduction benefits for the area and the whole state of California. Fuel dispensed in the prior year period had a monthly average of 30,432.41 GGE, so demand on the station has steadily grown and the upgrade was intended to address this demand.

CHAPTER 3:

Results

The city of Corona completed the installation of the storage vessels and an additional dual hose fast fill dispenser. The station is open serving the residents of Corona, traveling public, and corporate fleet services, as shown in Figure 5. The fueling station is now able to serve more consumers at the same time and in a faster time.

Figure 5: Before upgrade, there would have been 3-4 vehicles deep waiting to fuel



Source: City of Corona.

Problems

During the design phase of the project, there were some delays due to subconsultants not performing and to the amount of time the different parties were taking for the review of the plans. During the construction everything ran smoother; the concrete pad was built for the storage vessels; vessels were installed; lights were relocated; fast-fill dispenser and card reader were installed; and other required civil improvements were constructed. There were minor issues that were addressed in a rapid and efficient way.

First, the CNG dispenser shipping container was received in damaged condition as it fell during transport; however, there are no obvious signs of damage. The city contacted the manufacturer immediately upon receipt. The manufacturer has stated they would address any problems with the dispenser in an expeditious manner if any problems were found. Then on Saturday September 13th, the CNG station started experiencing issues with pressure drops. The contractor modified some of the pressure settings and was able to get the system stable and operational. On September 15th, 2014 the installation of the new dispenser was completed, tested, and fully operational. On September 17th, the credit card reader and business account were established, and the dispenser was opened to the public and fully

commissioned. The next day, the dispenser had issues with the westerly hose plus the dispenser was making a loud noise. The dispenser was temporarily shut down and repaired immediately. Even though, there were some minor problems, all of them were addressed and the station is fully functional.

Benefits

The Cota Street CNG fuel station expansion provided increased storage capacity of compressed natural gas and an additional fast fill dispenser. This upgrade allows for the convenient use of more CNG vehicles, which benefit the environment and public health. CNG burns cleaner than natural gasoline or diesel and produces fewer emissions of hydrocarbons, oxides of nitrogen, carbon monoxide, and carbon dioxide. CNG is also less expensive than gasoline or diesel.

Conclusion

The city of Corona remains dedicated to reducing emissions and expanding its CNG facilities by constructing additional compressed natural gas fueling stations.

GLOSSARY

CALIFORNIA ENERGY COMMISSION (CEC)—The state agency established by the Warren-Alquist State Energy Resources Conservation and Development Act in 1974 (Public Resources Code, Sections 25000 et seq.) responsible for energy policy. The Energy Commission's five major areas of responsibilities are:

1. Forecasting future statewide energy needs
2. Licensing power plants sufficient to meet those needs
3. Promoting energy conservation and efficiency measures
4. Developing renewable and alternative energy resources, including providing assistance to develop clean transportation fuels
5. Planning for and directing state response to energy emergencies.

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.

GASOLINE GALLON EQUIVALENT (GGE)—The amount of alternative fuel it takes to equal the energy content of one liquid gallon of gasoline. GGE allows consumers to compare the energy content of competing fuels against a commonly known fuel—gasoline. GGE also compares gasoline to fuels sold as a gas (natural gas, propane, and hydrogen) and electricity.