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ENERGY COMMISSION**



**CALIFORNIA
NATURAL
RESOURCES
AGENCY**

California Energy Commission

Clean Transportation Program

FINAL PROJECT REPORT

West Park Elementary School District Compressed Natural Gas School Bus Replacement

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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 GFO-17-607 to replace the oldest, dirtiest school buses in California. In response to GFO-17-607, the recipient submitted an application that was proposed for funding in the CEC's notice of proposed awards November 29, 2018 and the agreement was executed as ARV-18-017 on March 3, 2019.

ABSTRACT

West Park Elementary School District applied to receive grant funding under the California Energy Commission (CEC) Solicitation GFO-17-607 to replace two old, diesel-powered school buses. West Park Elementary School District was awarded funding for one replacement compressed natural gas bus. West Park Elementary School District placed a purchase order for one compressed natural gas bus with the grant funding received from the CEC and placed this bus into service in June 2020. The old, diesel-powered bus was dismantled and removed from service.

Keywords: West Park Elementary School District, grant funding, California Energy Commission, GFO-17-607, compressed natural gas,

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EXECUTIVE SUMMARY

West Park Elementary School District is a small, rural school district that provides 684 transitional kindergarten through twelfth grade students the support they need to succeed. West Park Elementary School District is in Fresno County within the San Joaquin Valley. The district consists of one elementary school and one charter school.

The pollution levels in the San Joaquin Valley are among the highest in the nation. The district strives to help reduce the emissions in California. The school district's priority has always been the students' well-being as well as their educational success. The district embraces continuous improvements to help keep students safe and healthy. West Park Elementary School District makes sure it is doing all it can for the environment to ensure that students are provided a safe area to learn and grow.

The West Park Elementary School District features a school bus fleet of three buses. Of the three school buses, two are compressed natural gas buses. The compressed natural gas fueling infrastructure and the district's school bus fleet are located and maintained at the Southwest Education Support Center in Caruthers.

CHAPTER 1: Introduction

Background

West Park Elementary School District, shown in Figure 1, has a student population comprised of 84.1 percent Hispanic and 15.9 percent non-Hispanic, shown in Table 1. English speaking students make up approximately 43.13 percent of the student body with the predominant language being Spanish, shown in Table 2. The majority of the students in West Park Elementary School District are from socio-economically disadvantaged families and 100 percent of the students receive the Free and Reduced Meal Program. The school district takes advantage of as many funding opportunities as they can to help the disadvantaged community they serve.

The pollution in the San Joaquin Valley is evident as it features some of the worst air quality in the nation. One of the goals of the district is to help reduce greenhouse gas emissions. Its priority is its students, and it embraces continuous improvements to help keep them safe and healthy, as well as reducing emissions emitted into the environment.

Figure 1: District Office at West Park Elementary School District



Source: West Park Elementary School District

Table 1: West Park Elementary School District Ethnicity Demographics

Ethnicity	Percentage
Hispanic	84.10%
Not Hispanic	15.90%

Source: West Park Elementary School District

Table 2: Distribution of Students by Grade

Grade	Percentage
Kindergarten	14.82%
Grade 1	11.05%
Grade 2	9.43%
Grade 3	12.13%
Grade 4	10.78%
Grade 5	11.05%
Grade 6	11.59%
Grade 7	10.78%
Grade 8	8.36%

Source: West Park Elementary School District

Table 3: Demographics of Student Language Fluency

Language Fluency	Percentage
English Only	43.13%
English Learners	41.78%
Initially Fluent English Proficient/ Reclassified Fluent English Proficient	15.09%

Source: West Park Elementary School District

Current Fleet

West Park Elementary School District contracts with South County Support Services Agency, located 17 miles away, for all the home-to-school transportation services. South County Support Services Agency runs and manages the fleet. The three-bus fleet is owned by West Park Elementary School District, two of which are operated with compressed natural gas (CNG). The bus procured by grant funding from the California Energy Commission (CEC) is shown in Figures 3, 4 and 5.

Figure 3: West Park Elementary School District CNG Bus



Source: West Park Elementary School District

Figure 4: West Park Elementary School District CNG Bus



Source: West Park Elementary School District

Figure 5: Interior of West Park Elementary School District CNG Bus



Source: West Park Elementary School District

West Park Elementary School District has another CNG bus that is low-emission, helping reduce emissions that are harmful to the environment as well as the student population. This bus is also stored and maintained by South County Support Services Agency.

The Southwest Education Support Center is home to Southwest Transportation Agency and South County Support Services Agency. These agencies provide the same services to their member and associate member districts. Services provided by these two agencies include:

Transportation.

- Complete home-to-school contracts.
- Field trips statewide.
- Global Positioning System-equipped buses.
- Buses with DVD players and high-back seats.
- Bus lease.
- Substitute driver coverage.

Training.

- School bus driver classroom training.
- Original/renewal
- School bus driver behind-the-wheel training.
- In-service training.

Maintenance.

- Bus maintenance.
- Preventative maintenance inspections.
- Engine overhaul.
- Transmission replacement.
- Automotive Service Excellence school bus-certified mechanics.

Other services

- Installation of cameras, radios, and Global Positioning Systems.
- CNG fueling station.
- Street sweeping.

The Southwest Transportation Agency is a public joint powers authority that serves 10 school districts in southwest Fresno County. The agency was formed by five school districts in 1988 and added five associate member districts as part of South County Support Services Agency over the years. These transportation joint power authorities provide the safest, most cost-effective home-to-school transportation possible for rural school districts in a geographically isolated part of Fresno County. Current school districts served by the agencies include original members Alvina Charter School, Monroe School District, Caruthers Unified School District, Laton Unified School District and Riverdale Joint Unified School District. Associate members that are part of South County Support Services Agency include Kingsburg Elementary Charter School District, Pacific Union School District, Raisin City Elementary School District, West Park Elementary School District and Washington Unified School District.

When Southwest Transportation Agency opened in July 1988, it operated 27 routes transporting 2,000 students (one-way) per day. Today, both agencies operate 55 home-to-school routes, transporting an excess of 10,000 students per day while traveling more than 1.3 million miles per school year. The agencies also provide more than 1,959 extracurricular trips annually.

The agencies opened the Southwest Education Support Center, a 17-acre state-of-the-art facility in 2004, shown in Figures 6 and Figure 7. The facility consists of a 16,000 sq. ft.

operations and maintenance center, parking for 100 school buses, and a public-access park-and-ride parking area with more than 208 stalls. The agencies have been a pioneer in the advancement of CNG school buses in California. The cornerstone of the facility is a 15,000-gallon state-of-the-art public-access CNG fueling station. The opening of this station has allowed the agencies to expand its CNG school bus fleet from the original 10 CNG school buses received through the Katz Safe School Bus Program in 1991 to the operation of 51 CNG school buses today. The agencies are committed to operating a 100 percent natural gas fleet.

Figure 6: Southwest Education Support Center



Source: Southwest Transportation Agency

Figure 7: Aerial View of Southwest Education Support Center



Source: Southwest Transportation Agency

CHAPTER 2:

The Project

Project Background

The primary objective of the School Bus Replacement Program through the California Energy Commission is to replace old diesel school buses with new electric school buses. However, there may be eligible applicants with bus route profiles not suited for an electric school bus. To be considered for a new CNG school bus, eligible applicants must (1) complete a series of questions and (2) provide a route profile evaluation completed by an independent third party. The applicant's answers to the CNG application questions and the route profile evaluation must meet at least two of the CNG bus selection criteria.

CNG Bus Selection Criteria

To be eligible for a CNG school bus, an applicant must demonstrate that an electric bus would not be sufficient to meet the needs of the applicant's regular school bus routes. To demonstrate this, the applicant's route profile evaluation and the applicant's answers to the CNG application questions must establish at least two of the following criteria for the school district total bus fleet:

- Average route distance traveled daily exceeds 90 miles.
- More than 20 percent of service days have temperatures above 80 degrees Fahrenheit, or below 32 degrees Fahrenheit during the hours the bus is operated.
- Forty percent of routes are on roads with speed limits of 45 miles per hour or higher.
- Fifty percent of routes include a 15 percent grade.

West Park Elementary School District was able to successfully demonstrate meeting the criteria set forth by the California Energy Commission (CEC) and be awarded the grant to replace the old diesel school bus with a new CNG school bus.

West Park Elementary School District had owned the diesel bus replaced since 1996 and was in service for more than 19 years. West Park then had to rely on another district's bus fleet to continue providing home-to-school transportation to the district's students. Because of the association with South County Support Services Agency, West Park was able to continue providing home-to-school transportation to its students with minimal interruption. Since West Park Elementary School District is in a disadvantaged, low-income rural community, the district had not been able to acquire the funding necessary to replace the inoperable bus. The district had applied to various grants through the California Air Resources Board Rural School Bus program and was ranked 483 on the Year 2 ranking list in 2017. When West Park Elementary School District received notification of the School Bus Replacement program through the CEC, West Park Elementary School District sought Southwest Transportation Agency's help in applying for the grant to replace the old diesel school bus with a new CNG school bus.

Obstacles/Delays

The acquisition and placement of service of the new CNG school bus faced several issues that contributed to the delay of the project completion. In normal times, the physical delivery of purchased school buses takes a few months from the date the order is placed to the actual delivery of the school bus. The COVID-19 pandemic played an enormous factor in not only the delivery of the new school bus, but the placement in service. There were numerous delays from the manufacturer, A-Z Bus Sales, in obtaining the parts to build the bus to the specifications requested by West Park Elementary School District.

Since the purchase/acquisition was made through a piggyback bid in place with South County Support Services Agency, there was no need to go through a bidding process in purchasing the new school bus. The piggyback allowed the quick ordering of the bus from the date West Park Elementary School District received notification of being awarded the California Energy Commission School Bus Replacement grant.

It did, however, take more than nine months to receive the new school bus. Once the school bus was received, it was noted that the air-conditioning unit was not working, and the bus was returned to A-Z Bus Sales for repairs in May 2020. The repairs to the air-conditioning unit were made, and the bus was returned to the school district and placed into service in June 2020.

Data Collection

When placed into service, over a six-month period, the CNG replacement bus traveled 18,624 miles. The replaced diesel fuel bus had a miles-per-diesel-gallon average of 5 miles as well as a total diesel fueling capacity of 100 gallons. The average and capacity equate to 3,725 gallons of diesel fuel used over six months. The total CNG used for the six-month period was 3,461 gallons. The conversion of CNG gallons to diesel gallon equivalent (DGE) is 860 DGE. This amount equates to a reduction of 2,865 gallons of diesel over six months. The health benefits from this displacement of diesel are significant. Over a six-month period, this results in a reduction of 166 pounds of oxides of nitrogen (NO_x), 8.40 pounds of particulate matter 2.5 (PM_{2.5}), and 3.13 tons of greenhouse gas (GHG) emissions. Over the 20-year life of the replacement CNG school bus, the total reductions of emissions would equate to 5,032.95 NO_x, 254.70 pounds of PM_{2.5}, and 95.08 tons of GHG emissions. The operating and maintenance cost to power this bus was equal to \$0.65 per mile. The total operating cost for the six-month reporting period was \$12,105.60. The previous operating cost for the replaced diesel bus was \$0.79, which would represent a six-month total cost of \$14,712.96. This represents a six-month operating cost savings for the district of \$2,607.36.

CHAPTER 3:

Conclusion

The acquisition of the new CNG school bus was vital to the long-term success and continued home-to-school transportation for West Park Elementary School District students. Not only is it saving the district time and money, but it is helping reduce the amount of emissions placed into the environment. West Park Elementary School District is striving to contribute to California's overall goals of decreasing greenhouse gas emissions. The district's next goal is to continue applying for funding that would allow the district to replace the remaining old diesel school bus with a new CNG school bus. West Park Elementary School District is dedicated to doing its part to help California achieve cleaner air.

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.