

## VALE Grant Pre-Application

**Project Title:** Electric Ground Service Equipment (eGSE) Infrastructure and Charging Stations

**Airport Code:** SFO

**Airport Name:** San Francisco International Airport

**Sponsor Name:** City and County of San Francisco

**Airport Contact:** Ronda Chu  
San Francisco International Airport  
P.O. Box 8097  
San Francisco, CA 94128  
[ronda.chu@flysfo.com](mailto:ronda.chu@flysfo.com)  
650-821-2823

## Introduction

This Pre-application is being submitted by the City and County of San Francisco (the City) to notify the Federal Aviation Administration (FAA) that the City will be requesting Voluntary Airport Low Emissions (VALE) Program funding in fiscal year (FY) 2019. The City would use this funding for the purchase and installation of 125 ground service equipment (GSE) electric charging ports together with supporting electrical infrastructure (collectively the Project) at San Francisco International Airport (the Airport). The Project would be Phase 1 of the City's Airport-wide GSE electrification strategy to promote the use of electric GSE (eGSE) at the Airport.

In FY 2017, the Airport experienced a 5% increase in passenger traffic from the previous year, representing a record number of over 55 million passengers. To accommodate the increase in passenger traffic and to improve the guest experience at the Airport, the City has completed a renovation of Terminal 2 and recently embarked on a \$2.4 billion Terminal 1 redevelopment project. As a committed member of the airport environmental community, the City plans to integrate low-emissions technology throughout the Airport's capital improvement program by promoting the use of eGSE at all terminal gates.

In early 2012, the FAA established a goal to “*achieve an absolute reduction of significant air quality health and welfare impacts attributable to aviation, notwithstanding aviation growth.*” This environmental goal is a core component of realizing FAA's objective of a Next Generation Air Transportation System (NextGen). This goal also creates an imperative to implement projects that reduce emissions and promote sustainability. As owner and operator of the Airport, the City is seeking a VALE Program grant to initiate Phase 1 of an Airport-wide GSE electrification strategy. The City's long-term goal is to provide electric charging infrastructure to all gates at the Airport and to encourage the use of eGSE instead of diesel-powered GSE, resulting in lower diesel emissions in the surrounding area.

## Project Description

The proposed electric charging ports and supporting electrical infrastructure improvements would be permanently located at boarding areas D (domestic) and G (international) at the Airport. Boarding area D is comprised of 14 gates and boarding area G has 12 gates. The recharging equipment would be available to any tenants that express interest. The locations of the charging ports and supporting infrastructure will be more precisely defined during the development of the VALE Program application.

The electric charging ports and supporting infrastructure would be Phase 1 of an Airport-wide GSE electrification strategy to allow for all gates to be equipped with the electrical infrastructure necessary to operate eGSE, thereby reducing fuel use and associated diesel emissions. The VALE Program Technical Report 7.0 (VTR 7.0) provides guidance for airport sponsors seeking VALE Program funding. All aspects of the VTR have been considered during the development of this Pre-application. Charging ports are powered by electricity, which is consistent with the VTR's declaration that electric-powered equipment have "zero-emissions."

The Project is eligible for 75% Airport Improvement Program (AIP) and VALE Program funding because the Airport is a large hub located in an area designated by the United States Environmental Protection Agency's National Ambient Air Quality Standards as marginal nonattainment for ozone, precursors of which are oxides of nitrogen (NO<sub>x</sub>) and volatile organic compounds (VOC), maintenance for carbon monoxide (CO) and moderate nonattainment for particulate matter with an aerodynamic diameter less than or equal to 2.5 microns (PM<sub>2.5</sub>).

## Cost Estimates

The Project is estimated to cost approximately \$9,000,000 based on conceptual engineering estimates. With 75% funding, the City anticipates requesting a grant of approximately \$6,750,000. Cost estimates will be revised with Project-specific estimates during development of the VALE Program application and will be replaced with bids for the final application submittal. Table 1 summarizes preliminary funding estimates for the Project.

**TABLE 1**  
**PRELIMINARY PROJECT FUNDING SUMMARY**  
*San Francisco International Airport*

Item	Total VALE Eligible Cost
Conceptual Project Estimate	\$9,000,000
Request Funding Amount (a)	\$6,750,000
Local Match Funding Amounts	\$2,250,000

a) Reflects a 75% federal cost share of total estimated VALE eligible costs.

Source: Airport Commission of the City and County of San Francisco, 2018

## Emission Reduction and Cost Effectiveness Estimates

The City anticipates that the 125 electric charging ports will support 166 eGSE at the Airport. Based on the City’s internal planning documents, it is expected that eight eGSE would be available to serve the aircraft at each gate of boarding area G and five eGSE would be available to serve the aircraft at each gate of boarding area D. To serve aircraft at boarding area G, the City plans to have the following eGSE types at each of the 12 gates: one belt loader, four baggage tractors, one aircraft tractor, and two cargo loaders. To service aircraft at boarding area D, the City plans to have the following eGSE type at each of the 14 gates: two belt loaders, two baggage tractors, and one aircraft tractor. Table 2 details the number and type of eGSE that will use the 125 electric charging ports.

**TABLE 2**  
**eGSE ALLOCATION BY BOARDING AREA**  
*San Francisco International Airport*

GSE Type	Number of Gates	GSE per gate	Total GSE
<b>Boarding Area G</b>			
Belt Loader	12	1	12
Baggage Tractor	12	4	48
Aircraft Tractor	12	1	12
Cargo Loader	12	2	24
		<i>SubTotal</i>	96
<b>Boarding Area D</b>			
Belt Loader	14	2	28
Baggage Tractor	14	2	28
Aircraft Tractor	14	1	14
		<i>SubTotal</i>	70
		<b>Grand Total</b>	<b>166</b>

*Note: eGSE composition for gates at boarding areas G and D are obtained from the City planning document titled “AIRPORT WIDE GSE ELECTRICAL INFRASTRUCTURE AND EQUIPMENT” published on June 8, 2016.*

Source: The City and County of San Francisco, 2018

Emissions reduction estimates compare a Baseline Scenario to a Low-Emissions Scenario. The difference of the two scenarios represents an estimation of the Project’s emission reductions. The Baseline Scenario reflects the amount of pollutants emitted while using 166 diesel-powered GSE at boarding areas D and G. The Low-Emissions Scenario reflects the use of 166 eGSE. It is expected that the diesel-powered GSE would be replaced with electric counterparts for the following GSE type: 26 aircraft tractors, 40 belt loaders, 24 cargo loaders, and 76 baggage tractors. In the Low-Emissions Scenario, it is expected that the Project components will not generate any emissions as they are electrically-powered and have “zero emissions” according to the VTR 7.0. The emission reductions were estimated using a preliminary methodology that will be revised using more precise inputs upon development of the VALE Program application.

The preliminary emissions reduction estimates and cost effectiveness values were calculated over the useful life of each piece of equipment in the Project. The useful life of belt loaders and cargo loaders is

11 years. The useful life for baggage tractors and aircraft tractors is 13 and 14 years, respectively. Total emission reductions associated with the Project are summarized in Table 3.

**TABLE 3**  
**PRELIMINARY EMISSION REDUCTIONS AND COST EFFECTIVENESS VALUES**  
*San Francisco International Airport*

Emission Reductions (tons)						
NO <sub>x</sub>	VOC	NO <sub>x</sub> +VOC	CO	SO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
358.12	23.41	381.53	449.84	0.36	2.14	2.08
Cost Effectiveness (\$ per ton)						
NO <sub>x</sub>	VOC	NO <sub>x</sub> +VOC	CO	SO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
\$25,000	\$384,000	\$24,000	\$20,000	\$24,969,000	\$4,202,000	\$4,332,000

*Note: Emission reductions and cost effectiveness values are calculated over the expected useful life of the eGSE and are based on conceptual cost estimates. Cost effectiveness values are rounded to the nearest one thousand.*

Source: Haley & Aldrich, Inc., 2018

## Next Steps

The proposed Project represents Phase 1 of a multi-phase Airport-wide GSE electrification initiative for use at every terminal gate at the Airport. To ensure the long-term success of the City’s eGSE initiative, it intends to apply for VALE Program funding, on an annual basis, over the next several years to support the purchase and installation of electric charging stations. Accordingly, securing VALE Program funding for Phase 1 is an essential step towards providing charging stations at every gate of the Airport and fulfilling the long-term goals of the City.

For FY 2019 VALE Program funding, the City will move forward in preparing a draft VALE Program application for review by the Bay Area Air Quality Management District (BAAQMD) that will include final emissions estimates and engineer’s cost estimates. In addition, the City intends to prepare a final VALE Program application for submittal to the FAA that will include actual bids for Phase 1. The City will continue to pursue VALE Program funding for the Project unless otherwise formally notified by the FAA.