Alameda-Contra Costa Transit District

September 30, 2015

Richard Corey
Executive Officer
Air Resources Board
Sacramento, CA 95814

Re: Hydrogen Production Pathway and Reporting

Mr. Corey,

Enclosed please find AC Transit's application for the 2B method of establishing a new pathway(s) under the California Low Carbon Fuel Standard. Included with the application are documents describing and recording the energy usage and processes at AC Transit's facilities for hydrogen production and dispensation. These documents will help facilitate the creation of a pathway required for us to report using the Low Carbon Fuel Standard Reporting Tool and Credit Bank & Transfer System.

AC Transit produces hydrogen fuel at its Division 2 facility located at 1177 47th Street, in Emeryville, California, for use in its fleet of 12 fuel cell powered electric buses. An electrolyzer manufactured by Proton located at Division 2 produces the hydrogen fuel. As an integrated part of the planning and construction of the fueling facility, AC Transit installed solar panels to produce the electrical power needed for the electrolyzer, offsetting the grid power usage and allowing AC Transit to produce hydrogen for fuel with zero greenhouse gas emissions.

With this submission I (Michael Hursh), on behalf of AC Transit, certify that the information in these documents is true and accurate to the best of my knowledge.

Please do not hesitate to contact my staff member Chris Andrichak at (510-891-4855, candrichak@actransit.org) should you have any questions or require further information. Thank you for your assistance in creating an accurate pathway for us to report our hydrogen production Cap and Trade credits.

Michael Hursh
General Manager

Detailed Life Cycle Analysis Report

Gaseous hydrogen produced using solar electrolysis in California

September 2015
Version 1.0
AC Transit

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1. Introduction

This document describes the energy and inputs necessary to produce compressed gaseous hydrogen produced via electrolysis at the 64 kg/24hr capacity facility located in Emeryville (also known as D2 facility). The D2 facility includes a proton electrolyzer (C-30 series) to produce hydrogen and compression units to compress hydrogen. AC Transit currently dispenses compressed hydrogen onsite to the fleet that includes HD Buses and LD vehicles.

AC Transit's hydrogen project also generates electricity from two solar installations. The collected rated output of the two solar installations are 425 kW and 510 kW, respectively. Since AC Transit is not claiming credits (i.e., REC or any other) for its solar electricity, AC Transit propose ARB consider that the generated solar electricity offsets the electrical energy required for electrolysis and H2 compression at the D2 facility.

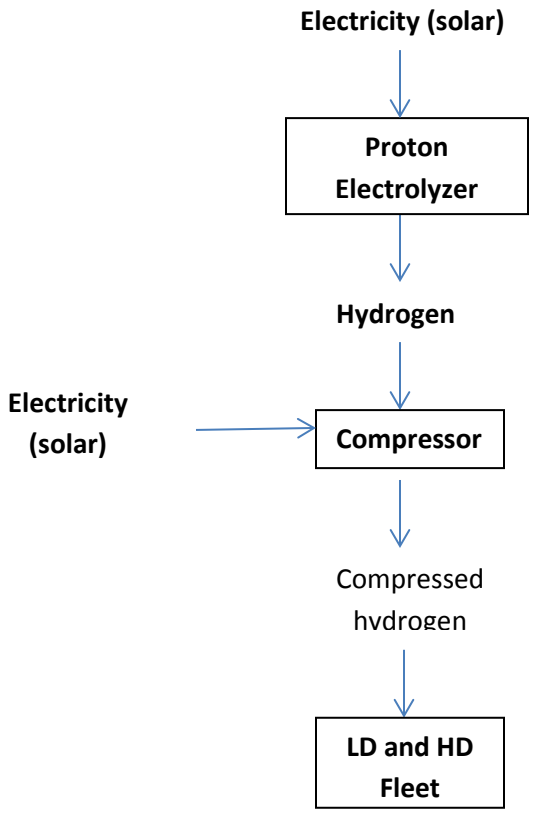


Fig. 1 WTT components of gaseous hydrogen

Figure 1 provides an overview of the AC Transit's hydrogen fuel pathway. Unless otherwise stated, all calculations related to electrolysis and compression are based on CARB default values in the CA-GREET 1.8b model. Lists of documents supporting the

unique values and processes reported in this document are included in Appendix of the application package. Since the pathway has not been registered under the RFS2, the RFS2 engineering report is not available.

The hydrogen pathway begins with electrolysis of water in a proton electrolyzer (C-30 series). The hydrogen from the proton electrolyzer is commingled with liquid hydrogen procured from outside. The hydrogen is then compressed at the two compressors located at the D2 facility. The compressor use electricity to compress hydrogen. The compressed hydrogen is finally dispensed to the fleet of heavy duty and light duty vehicles on-site.

Table A provides a summary of WTT and WTW carbon intensities with or without ILUC for AC Transit's pathway for hydrogen. As shown in Table A, the WTW CI with ILUC is 0 g CO2e/MJ.

Table A : Summary of Carbon Intensity (g CO2e/MJ)

Life cycle emissions components	Carbon intensity (gCO2e/MJ)
CI (WTT) excluding indirect land use emissions	0
CI (WTW) excluding indirect land use emissions	0
CI (WTW) including indirect land use emissions	0

2. CA-GREET Model Inputs for AC Transit's Hydrogen pathways

The following table shows the inputs to the CA-GREET 1.8b model for the D2 facility in Emeryville, CA using solar electricity as input to electrolysis and hydrogen production. The pathway name in the GREET model is Refueling Stations: Electrolysis to Gaseous Hydrogen.

Table B : CA-GREET Model Inputs

CA-GREET model sheet name	Cell number	Default value	AC Transit value	Comments
Fuel_Prod_TS	O187	71.5%	33.4%	Table 1
Fuel_Prod_TS	AU187	93.9%	83.3%	Table 1

3. Basis for input values

The input values present in this application are based on the 4-month period from May 2015 to August 2015. This period was selected based on the most recent monthly data that are available.

Electricity requirements for hydrogen generation (by electrolysis) plus compression are between the 39% to 71% of total solar electricity generated by AC Transit during the 4 summer months of 2015 for which data are available. Therefore, the facility is generating surplus solar electricity than required to offset the energy required by on-site hydrogen production and compression which is shown in Table C. Since AC Transit is not claiming credits for solar electricity, we propose ARB consider that electricity used in electrolysis and hydrogen compression as solar electricity.

Table C: AC Transit's solar electricity production and electricity consumption in hydrogen production

	Total consumption (kWh)	Total solar electricity production (kWh)	% consumption
May-15	55888	93532	59.8%
Jun-15	52437	135466	38.7%
Jul-15	62970	101072	62.3%
Aug-15	45101	63654	70.9%

Energy use in electrolysis: A C-30 electrolyzer unit requires, on average, 0.23 mmbtu of electricity per kg hydrogen produced based on 4 months of data.

Energy use in compressor: Hydrogen compression requires, on average, 0.02 mmbtu of electricity per kg of hydrogen compressed based on 4 months of data.

Hydrogen Production: The proton electrolyzer unit produces **750** kg/month of hydrogen (based on 4 months of data).

4. CA-GREET 1.8b model output , CI calculations, and analysis of results

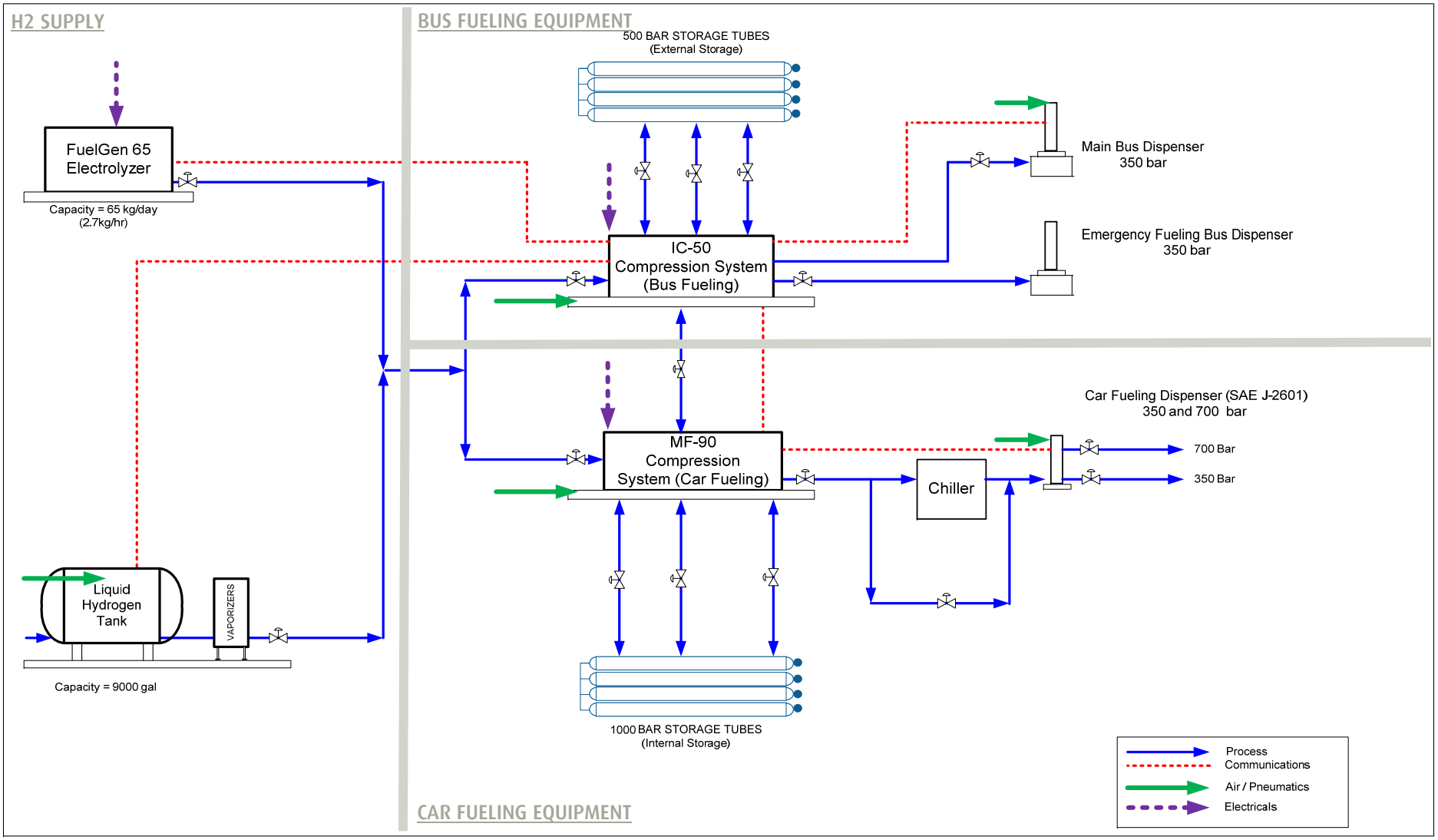
AC Transit's gaseous hydrogen pathway is a new pathway which requires a 2B path application. A breakdown of emissions by GHG type and production stages are shown in Table D. The hydrogen pathway is expected to have negligible impact on indirect land use change and hence the ILUC value is assumed as zero. The carbon intensity of the gaseous hydrogen pathway is 0 g CO2e/MJ.

Table D : WTW emission results

Emissions, g/MMBtu	Gaseous H2 Prod.	Gaseous H2 Compression	Total, g/MMBtu	Final CI, g/MJ
VOC	0	0	0	0
CO	0	0	0	0
CH4	0	0	0	0
N2O	0	0	0	0
CO2	0	0	0	0
gCO2e/MMBtu	0	0	0	0
Sub-Total (g CO2e/MJ)	**0**	**0**	**0**	**0**
Indirect land use factor (iLUC)				**0**
Total carbon intensity including ILUC				**0**

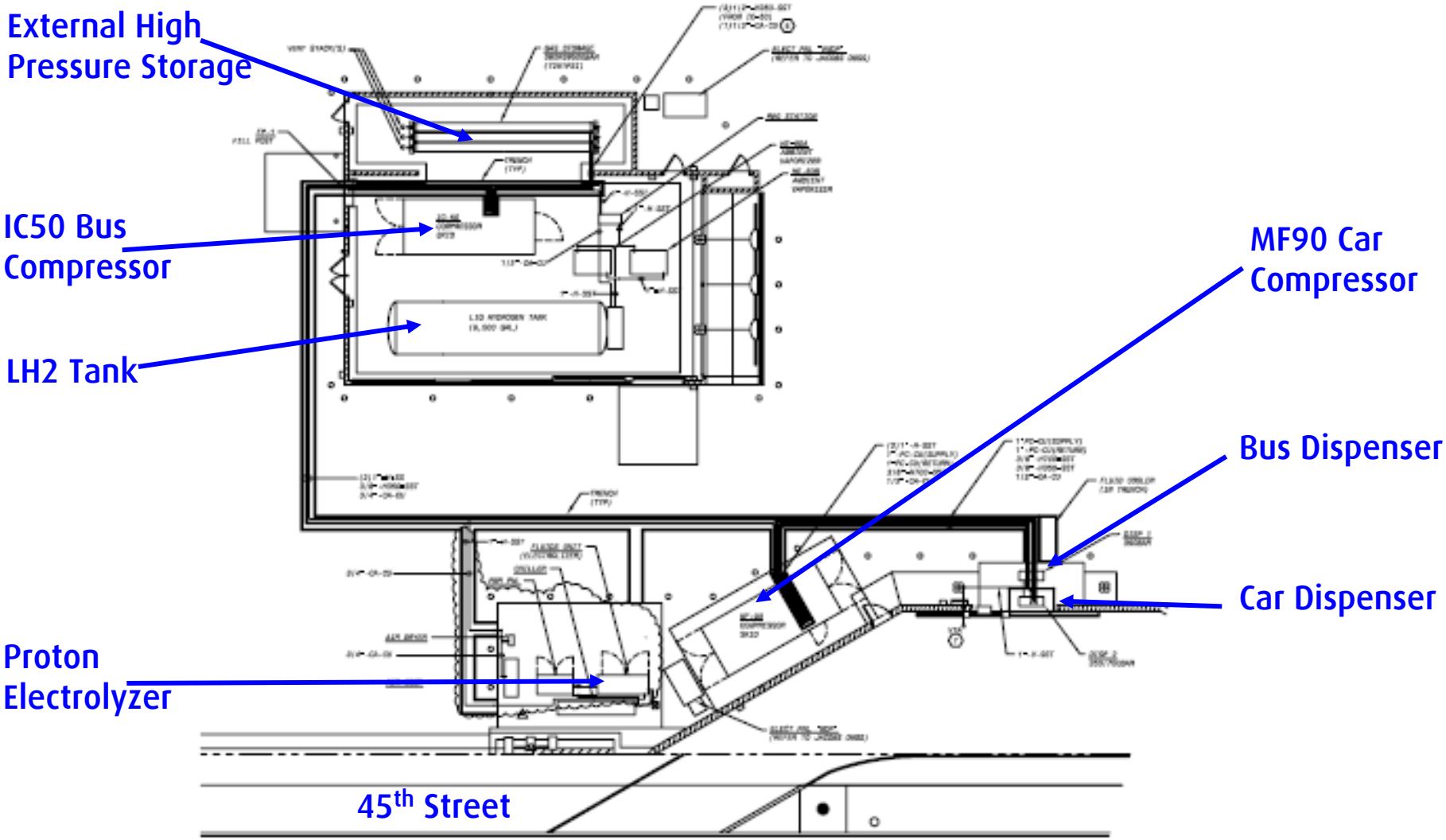
Appendix

Overall Process Block Diagram



Linde Plot Overview
AC Transit, Emeryville

THE LINDE GROUP



SOLAR PRODUCTION (kWh) 9/29/2015

2015	Central Maintenance Facility	D6	Both facilities combined
January	32,980		32,980
February	37,050		37,050
March	59,330		59,330
April	70,630		70,630
May	59,890	33,642	93,532
June	66,070	69,396	135,466
July	36,450	64,622	101,072
August	3,410	60,244	63,654
September	52,950	45,811	98,761
Total for Jan-Sept 2015	**418,760**	**273,715**	**692,475**
Monthly Average 2015	**46,529**	**54,743**	**76,942**
Anticipated Annual	**558,347**	**656,915**	**923,300**

Facility Rated Output

CMF	D6	
510.4	349.44	kW DC
92%	95%	inverter eff
467.11	331.968	kW AC

C Series

Hydrogen Generation Systems

Model	C10	C20	C30
DESCRIPTION			
	On-site hydrogen generator in two integrated, automated, site-ready enclosures. Dual-mode Operation (Selectable): • Load Following mode automatically adjusts output 0-100% to match demand. • Tank Filling mode operates with power-conservation mode during standby.		
ELECTROLYTE			
	Proton Exchange Membrane (PEM) - caustic-free		
HYDROGEN PRODUCTION			
Net Production Rate: Nm^3/hr @ 0° C, 1 bar SCF/hr @ 70° F, 1 atm SLPM @ 70° F, 1 atm kg per 24 hours	 10 Nm^3/hr 380 SCF/hr 179 SLPM 21.6 kg/24hr	 20 Nm^3/hr 760 SCF/hr 359 SLPM 43.3 kg/24hr	 30 Nm^3/hr 1140 SCF/hr 538 SLPM 65.0 kg/24hr
Delivery Pressure - Nominal	30 barg (435 PSIG)		
Power Consumed per Volume of Mass H_2 Gas Produced*	6.2 kWh/Nm^3 16.3 kWh/100 ft^3 68.9 kWh/kg	6.0 kWh/Nm^3 15.8 kWh/100 ft^3 66.7 kWh/kg	5.8 kWh/Nm^3 15.2 kWh/100 ft^3 64.5 kWh/kg
Purity (Concentration of Impurities)*	ISO 14687-1 Type 1 grade C ISO 14687-2 Type 1 grade D 99.9998% Water Vapor < 2 PPM, -72°C (-98°F) Dewpoint, N_2< 2 PPM, O_2< 1 PPM, All others undetectable		
Turndown Range	0 to 100% Net Product Delivery (Automatic)		
Upgradeability	Field Upgradeable to a maximum of 30 Nm^3/hr (1140 SCF/hr)		N/A
DI WATER REQUIREMENT			
Rate at Max. Consumption Rate	9 L/hr (2.4 gal/hr)	17.9 L/hr (4.7 gal/hr)	26.9 L/hr (7.1 gal/hr)
Temperature	+5°C to 40°C (41°F to 104°F)		
Pressure	1.0 to 4.1 barg (10 to 60 PSIG)		
Input Water Quality	ASTM Type II Deionized Water required, < 1 micro Siemen/cm (>1 MegOhm-cm) ASTM Type I Deionized Water recommended, <0.1 micro Siemen/cm (> 10 MegOhm-cm)		
HEAT LOAD AND COOLANT REQUIREMENT*			
Coolant	Liquid Cooled; Non-Fouling*		
Max. Heat Load	33.5 kW (114,307 BTU/hr) (9.6 tons refrigeration)	66.8 kW (227,931 BTU/hr) (19.0 tons refrigeration)	100.2 kW (341,897 BTU/hr) (28.6 tons refrigeration)
Coolant Temperature	5°C to 40°C (41°F to 104°F)		
Coolant Flowrate	Up to 110 L/min (24 gal/min)	Up to 229 L/min (50 gal/min)	Up to 411 L/min (90 gal/min)
Pressure Drop (at full flow)	Up to ~3.0 barg (~45 PSIG)	Up to ~3.0 barg (~45 PSIG)	Up to ~3.0 barg (~45 PSIG)

* Consult Proton Applications Engineering Department for specific requirements and options.

PROTON
THE LEADER IN ON SITE GAS GENERATION.

www.protononsite.com | T 203.949.8697 | F 203.949.8016 | Proton OnSite, 10 Technology Drive, Wallingford, CT 06492 | customerservice@protononsite.com

Model	C10	C20	C30
ELECTRICAL SPECIFICATIONS			
Recommended Breaker Rating	100 kVA	200 kVA	275 kVA
Electrical Specification	380,400,415 VAC, 3 phase, 50 Hz (+/- 10% from nominal voltage) 480VAC, 3 phase, 60 Hz (+/- 10% from nominal voltage)		
INTERFACE CONNECTIONS - Consult Mechanical Interface Diagram drawing, PD-9900-0014 for details -			
H_2 Product Port	3/8" Parker CPI™ compression tube fitting, SS		
H_2 Vent Port	1" Parker CPI™ compression tube fitting, SS		
DI Water Port	1/2" FNPT, SS		
Coolant Supply and Return Ports	Electrolyzer Enclosure: 1-1/2" MNPT, brass (Cell Stack); 1/2" FNPT, brass (Hydrogen Dryer) Power Supply Enclosure 3/4" MNPT, brass (Power Supply Cooling)		
Drain Port	1/2" FNPT, brass		
O_2 Vent Port	1" Parker CPI ™ compression tube fitting, SS		
Electrical	Electrical terminals inside supplied fused power Disconnect Box		
Communications	Ethernet		
CONTROL SYSTEMS			
Standard Features	- Fully automated - E-Stop - Automatic fault detection and system depressurization - Remote start/stop - On-board H_2 leak detection		
Remote Alarm	Form C relay, 5A, 250V, 150W Max. rated switching		
Remote Shutdown	Safety circuit trip		
ENCLOSURE CHARACTERISTICS			
Dimensions, W x D x H (Product)	Electrolyzer Enclosure: 2388 mm x 914 mm x 2007 (94" x 36" x 79") Power Supply Enclosure: 1880 mm x 914 mm x 2007 mm (74" x 36" x 79")		
Weight (Product)	2041 kg (4500 lbs)	2449 kg (5400 lbs)	2812 kg (6200 lbs)
IP Rating	Overall unit rating of IP56		
ENVIRONMENTAL CONSIDERATIONS - Do Not Freeze -			
Standard Siting Location	Indoor/Sheltered; level ±1°, 0 to 100% RH non-condensing; Non-hazardous/non-classified environment		
Storage/Transport Temperature	+5°C to 60°C (41°F to 140°F)		
Ambient Temperature Range	+5°C to 40°C (41°F to 104°F)		
Altitude Range - Sea Level to:	2000 m (6562 ft)		
Ventilation	Proper ventilation must be provided from a non-hazardous area at a rate in accordance with IEC60079-10, Zone 2 NE		
SAFETY AND REGULATORY CONFORMITY			
Maximum On-board H_2 Inventory at Full Production	0.10 Nm^3 4 SCF 0.009 kg	0.14 Nm^3 5.4 SCF 0.013 kg	0.16 Nm^3 6 SCF 0.014 kg
Cabinet Ventilation with Environment	Vent fan draws fresh air up to 8.5 m^3/min (300 ft^3/min)		
Noise dB(A) at 1 Meter	< 75		
Approvals	cTUVus, Tmark (ISO22734-1, UL508A) CE (PED, ATEX, LVD, Mach. Dir., EMC)		

OPTIONS

- Factory Matched RO/DI Water System
- Factory Matched Cooler/Chiller
- Dew Point Monitoring
- Low Ambient Temp. Package (-10 to 40°C)
- Equipment Orientation
- High Ambient Temp. Package (+5 to 50°C)
- Cold Ambient Temp. Package (-20 to 40°C)

Proton OnSite offers a wide range of options to tailor your HOGEN Hydrogen Generation System to meet your specific operational requirements. Please contact your local representative to discuss the current list of options available to best fit your needs.
Proton OnSite reserves the right to make changes to this product without further notice.

*Consult Proton OnSite Applications Engineering Department for proper installation guidelines.

PROTON ON SITE™

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Division 2 Facility:
The electrolyzer (Proton On-site C30) at D2 is rated at 64.5 kWh/kg of hydrogen produced and 65kg of hydrogen a day.

Energy path:
Stage 1: The electrolyzer uses water to produce hydrogen and oxygen in gaseous forms. The oxygen is vented.
Stage 2: The hydrogen from the electrolyzer goes directly into a manifold with the delivered liquid H2 and the resulting mix is sent to the two compressors. We have two compressors, one for buses (7700 psi) and another for cars (5000 psi and 10000 psi). Since there is no buffer tank for the electrolyzer, it only runs when the compressors run.
Stage 3: The bus side Linde IC-50 compressor outputs high pressure (7700 psi) hydrogen gas into storage tanks with a 360kg capacity. The light-duty side Linde MF-90 compressor (12200 psi) outputs into separate high pressure gas storage tanks with 28kg capacity.
Stage 4: The hydrogen is dispensed at pumps, 5000psi for the buses, 10000 or 5000 psi for the light-duty.

See included block diagram.

Electrical Power:
The Division 2 (D2) hydrogen station is powered by clean solar electricity. The solar panel installations specified are at our D6 facility in Hayward and the Central Maintenance Facility (CMF) in East Oakland, and were conceived of and installed as part of the D2 hydrogen station project. The collected rated output of the Division 6 (D6) (332 kW AC) and CMF (467 kW AC) solar installations is more than equal to the needs for production-compression-dispensing operations at D2. We do not get or trade RECs for the installation. Included in the application are an documents for an FTA grant and a CARB grant for the D2 station construction that describe the station would as powered 100% by renewable solar electricity. Based on at least the most recent five months of power output data from the solar facilities, the monthly combined average power output is nearly 77kWh, more than the 69.4kWh average monthly power consumed by the electrolyzer at D2.

The solar panels located at D2 on the canopy over bus dispenser are rated at 21 kWh and essentially power only the station lighting.

Division 4 Facility:
As mentioned, the electrolyzer installation at D4 is in process with operations expected starting January 2016. The D4 facility will use the same electrolyzer (Proton On-site C30) as D2.

Energy path:
Stage 1: The electrolyzer uses water to produce hydrogen and oxygen in gaseous forms. The oxygen is vented.
Stage 2: The hydrogen from the electrolyzer goes into a buffer storage tank, which allows the electrolyzer to produce H2 24/7 independent of fueling.
Stage 3: The buffer storage tank feeds into a manifold with the delivered liquid H2 and then into the Linde IC-50 compressor which outputs high pressure (7700 psi) hydrogen gas into storage tanks with a 360kg capacity.
Stage 4: The hydrogen is dispensed at 5000psi for the buses from the high pressure storage.

The main difference between the bus fueling at the two stations is that at D4 the H2 dispensers are installed alongside the diesel dispensers on the bus fueling islands for more regular and efficient FC bus operations.

Block diagram not yet available.

Electrical Power:
All Division 4 (D4) buildings and facilities are powered by the electricity produced by two Bloom ES-5700 Energy Servers, rated at 210 kWh each. The Bloom boxes are fed by a minimum 75% mix directed biogas per the PG&E Self-Generation Incentive Program (SGIP) we are operating under, and have actually been running at 100% biogas. The biogas is provided through a contract with BP. We expect that even with the increased load when the electrolyzer comes online we will still be able to run at 100% biogas.

Attached PG&E energy report shows that D4 entire facility electrical usage went from using roughly 1.4MWh from PG&E (positive overall usage) per year to generating same amount on-site (negative overall usage) per year after Bloom Energy Servers came online. Bloom energy output data shows a rounded average of 270,000 kWh produced per month in 2015 so far, with an expected average full-year output of 3,240,000 kWh, more than double the facility usage and in-line with the overall usage going from 1.4MWh used to 1.5MWh generated per year.

Alameda-Contra Costa Transit District Rick Fernandez, General Manager

May 22, 2009

Mr. Walter Kulyk
Office of Mobility Innovation
Federal Transit Administration
Washington, DC

RE: Transit Investments for Greenhouse Gas and Energy Reduction Grant (TIGGER)

Dear Mr. Kulyk:

It is with great pride that we submit this proposal to complete the funding for the Bay Area's *Advanced Zero Emission* demonstration project.

Our program has recently expanded to include the procurement of twelve (12) new hydrogen buses, two new fueling stations; one located in Emeryville, California and the other proposed for funding in the FTA TIGGER program at our Seminary facility in Oakland, California, and two new hydrogen-safe maintenance bays. One of the fueling stations will be powered by solar energy which we are also seeking funding for in the FTA TIGGER program.

This advanced demonstration project, Zero Emission Bay Area (ZEBA), is a coordinated effort of the five largest bus operators in the San Francisco Bay Area. The demonstration project is led by AC Transit and includes Santa Clara Valley Transportation Authority, Golden Gate Bridge, Highway, and Transportation District, San Mateo County Transit District, and San Francisco Metropolitan Transportation Authority.

Our funding partners include the Air District, the Metropolitan Transportation Commission, the California Air Resources Board and the Federal Transit Administration. Two letters of support for this project from our partners are attached.

The total cost of the project is $55.4 million. With support from our funding partners, we've been able to raise $39 million so far. We are seeking funding from the TIGGER program to address elements of the project not yet funded. These include:

Project Description	**Federal Request**
Oakland Hydrogen Station	$8,000,000
Photovoltaic Solar Panels	$6,400,000
Emeryville Hydrogen Maintenance Bay	$2,000,000
Total Federal Request	**$16,400,000**

AC Transit has been helping to develop hydrogen technology since 1999, when we began fueling and operating our first prototype fuel cell vehicle. Since then, our hydrogen demonstration program has grown into what has been considered by many to be the most comprehensive such program in the world featuring:

1600 Franklin Street - Oakland, CA 94612 - **TEL** (510) 891-4753 - **FAX** (510) 891-7157
www.actransit.org

- A fleet of nine (9) fuel cell passenger vehicles
- A fleet of three (3) fuel cell buses
- On-site hydrogen production
- On-site hydrogen dispensing
- On-site maintenance
- First responder trainings (over 600 regional first responders trained to date)
- Public education developed in collaboration with UC Berkeley's Lawrence Hall of Science and Humboldt State University's Schatz Energy Research Center

We are committed to fulfilling all the terms of the FTA's TIGGER program.

Please contact my staff members Jaimie Levin, Director of Alternative Fuels and Marketing at (510) 891-7244/jlevin@actransit.org or Kate Miller, Manager of Capital Development, Legislation, and Grants at (510) 891-4859/kmiller@actransit.org should you have any questions or require additional information.

Sincerely,

Rick Fernandez
General Manager

RF/KM
Encl;

DOT FTA

U.S. Department of Transportation Federal Transit Administration

Application

Recipient ID:	1632
Recipient Name:	ALAMEDA-CONTRA COSTA TRANSIT DISTRICT
Project ID:	CA-77-0003-00
Budget Number:	3 - Budget Approved
Project Information:	Photovoltaic Capacity Installation

Part 1: Recipient Information

Project Number:	CA-77-0003-00
Recipient ID:	1632
Recipient Name:	ALAMEDA-CONTRA COSTA TRANSIT DISTRICT
Address:	1600 FRANKLIN STREET , OAKLAND, CA 94612 2806
Telephone:	(510) 891-4777
Facsimile:	(510) 891-7157

Union Information

Recipient ID:	1632
Union Name:	AFSCME-Council 57, Local 3916
Address 1:	1900 Embarcadero Cove, Suite 3
Address 2:	
City:	Oakland, CA 94606 5300
Contact Name:	Lisa Harlow
Telephone:	(510) 436-2257
Facsimile:	
E-mail:	lisa.harlow@ca.afscme57.org
Website:	www.afscme57.org

Recipient ID:	1632
Union Name:	IBEW
Address 1:	3063 Citrus Circle
Address 2:	PO Box 4790

City:	Walnut Creek, CA 94596 0000
Contact Name:	Lula Washington
Telephone:	(510) 933-6060
Facsimile:	
E-mail:	
Website:	www.IBEW1245.com

Recipient ID:	1632
Union Name:	ATU-LOCAL 192
Address 1:	8640 Enterprise Way
Address 2:	
City:	Oakland, CA 94621 0000
Contact Name:	Claudia Hudson
Telephone:	(510) 635-0192
Facsimile:	(510) 635-6539
E-mail:	chudson@atu192.org
Website:	www.atu192.org

Part 2: Project Information

Project Type:	Grant
Project Number:	CA-77-0003-00
Project Description:	Photovoltaic Capacity Installation
Recipient Type:	Transit Authority
FTA Project Mgr:	Philoki Barros
Recipient Contact:	Kate Miller -510-891-4859
New/Amendment:	None Specified
Amend Reason:	Initial Application
Fed Dom Asst. #:	20523
Sec. of Statute:	77-Engy In
State Appl. ID:	None Specified
Start/End Date:	-
Recvd. By State:	Feb. 23, 2010
EO 12372 Rev:	Not Applicable
Review Date:	None Specified
Planning Grant?:	NO
Program Date (STIP/UPWP/FTA	Dec. 31, 2010

Gross Project Cost:	$6,400,000
Adjustment Amt:	$0
Total Eligible Cost:	$6,400,000
Total FTA Amt:	$6,400,000
Total State Amt:	$0
Total Local Amt:	$0
Other Federal Amt:	$0
Special Cond Amt:	$0
Special Condition:	None Specified
S.C. Tgt. Date:	None Specified
S.C. Eff. Date:	None Specified
Est. Oblig Date:	None Specified
Pre-Award Authority?:	Yes
Fed. Debt Authority?:	No
Final Budget?:	No

Prm Plan) :	
Program Page:	None Specified
Application Type:	Electronic
Supp. Agreement?:	No
Debt. Delinq. Details:	

Urbanized Areas

UZA ID	UZA Name
60060	SAN FRANCISCO--OAKLAND, CA

Congressional Districts

State ID	District Code	District Official
6	7	George Miller
6	8	Nancy Pelosi
6	9	Barbara Lee

Project Details

This application is funded as follows:

This project will provide $6.4 million FTA Transit Investment for Greenhouse & Energy Reduction ARRA funds to AC Transit's HyRoad Program Component 2- Installation of 693 KW DC of photovoltaic solar panels to generate ôgreenö hydrogen at its Central Maintenance Facility, located at 106th Avenue and East 14th Street, Oakland, California. Combined with AC Transit's already-installed solar capacity, these solar panels will produce the renewable electricity equivalent to that will be required to produce 180 kg/day of "green" hydrogen at the already-funded production and dispensing facility in AC Transit's Emeryville Division.

Upon completion, this project will replace 952,028 KWhs per year of grid electricity and reduce AC TransitÆs greenhouse gas emissions by approximately 469 tons of CO2e annually.

The grant activities are a categorical exclusion under NEPA.

Earmarks

Earmark Details

Earmark ID	Earmark Name	Orig. Balance	Amount Applied
D2009-GGER-002	Photovoltaic capacity instal	$6,400,000	$6,400,000

Number of Earmarks: 1

Total Amount Applied: $6,400,000

Date Sent for Release: 2/24/2010 4:28:54 PM

Date Released: 2/3/2010

Security

No information found.

Part 3: Budget

Project Budget

	Quantity	FTA Amount	Tot. Elig. Cost
SCOPE			
114-00 BUS: SUPPORT EQUIP AND FACILITIES	2	$6,400,000.00	$6,400,000.00
ACTIVITY			
11.41.02 ENG/DESIGN - MAINT FACILITY	0	$500,000.00	$500,000.00
11.44.02 REHAB/RENOVATE - MAINTENANCE FACILITY	2	$5,750,000.00	$5,750,000.00
11.72.03 FORCE ACCOUNT - PROJECT MGMT	0	$150,000.00	$150,000.00
		Estimated Total Eligible Cost:	**$6,400,000.00**
		Federal Share:	**$6,400,000.00**
		Local Share:	**$0.00**

OTHER (Scopes and Activities not included in Project Budget Totals)

None

SOURCES OF FEDERAL FINANCIAL ASSISTANCE

UZA ID	Accounting Classification	FPC	FY	SEC	Previously Approved	Amendment Amount	Total
60060	2009.26.77.EN.1	00	2010	77	$0.00	$6,400,000.00	$6,400,000.00
						Total Previously Approved:	**$0.00**
						Total Amendment Amount:	**$6,400,000.00**
						Total from all Funding Sources:	**$6,400,000.00**

Alternative Fuel Codes

11.14.00	BUS: SUPPORT EQUIP AND FACILITIES	Fuel Cell

Extended Budget Descriptions

114-00	BUS: SUPPORT EQUIP AND FACILITIES	2	$6,400,000.00	$6,400,000.00
The project funds will be used to install the solar panels on AC`s Central Maintenance Facility (CMF)located in Oakland, California. The original proposal was to develop at least a 700 kW solar system to power the electrolyzer and the electrical requirements for the hydrogen station at the CMF. This was based on the preliminary analysis that the CMF location would fully support this power rating. Upon the completion of engineering and design work and receiving the bids from contractors, AC Transit found out that the CMF location will only support a 500 kW system. As a result of a very competitive market and significant reductions in solar prices, building a 500 kW system will leave a balance of approximately $2 million in FTA funds. With FTA Regional Office's approval, AC Transit will use the projected balance to install additional solar panels at the Hayward Division to develop the solar energy system to reach the 700 kW rating as proposed in the original grant proposal.				
11.41.02	ENG/DESIGN - MAINT FACILITY	0	$500,000.00	$500,000.00
The project will fund engineering and design for installation of photovoltaic solar panels at AC Transit`s Central Maintenance Facility and D6 Hayward Facility.				
11.44.02	REHAB/RENOVATE - MAINTENANCE FACILITY	2	$5,750,000.00	$5,750,000.00
The project will install photovoltaic solar panels on AC Transit`s Central Maintenance Facility and D6 Hayward Facility. Installation at both facilities is categorically excluded under II(c)-19.				
11.72.03	FORCE ACCOUNT - PROJECT MGMT	0	$150,000.00	$150,000.00
The project will fund in-house staff to manage the Installation of Photovotaic Capacity Project.				

Changes since the Prior Budget

FTA Change Amounts

Code	Description	Previous FTA Total	Change in FTA Total	Current FTA Total
114-00	BUS: SUPPORT EQUIP AND FACILITIES	$6,400,000	$0	$6,400,000
11.41.02	ENG/DESIGN - MAINT FACILITY	$500,000	$0	$500,000
11.44.02	REHAB/RENOVATE - MAINTENANCE	$5,750,000	$0	$5,750,000

	FACILITY			
11.72.03	FORCE ACCOUNT - PROJECT MGMT	$150,000	$0	$150,000

Eligible Change Amounts

Code	Description	Previous Eligible	Change in Eligible	Current Eligible
114-00	BUS: SUPPORT EQUIP AND FACILITIES	$6,400,000	$0	$6,400,000
11.41.02	ENG/DESIGN - MAINT FACILITY	$500,000	$0	$500,000
11.44.02	REHAB/RENOVATE - MAINTENANCE FACILITY	$5,750,000	$0	$5,750,000
11.72.03	FORCE ACCOUNT - PROJECT MGMT	$150,000	$0	$150,000

Change in Quantity

Code	Description	Previous Quantity	Change in Quantity	Current Quantity
114-00	BUS: SUPPORT EQUIP AND FACILITIES	1	1	2
11.41.02	ENG/DESIGN - MAINT FACILITY	0	0	0
11.44.02	REHAB/RENOVATE - MAINTENANCE FACILITY	1	1	2
11.72.03	FORCE ACCOUNT - PROJECT MGMT	0	0	0

Change in Amendment Control Totals

Description	Previous Amount	Change in Amount	Current Amount
Gross Project Cost:	$6,400,000	$0	$6,400,000
Adjustment Amount:	$0	$0	$0
Total Eligible Cost:	$6,400,000	$0	$6,400,000
Total FTA Amount:	$6,400,000	$0	$6,400,000
Total State Amount:	$0	$0	$0
Total Local Amount:	$0	$0	$0
Other Federal Amount:	$0	$0	$0
Special Condition Amount:	$0	$0	$0

Change in Project Control Totals

Description	Previous Amount	Change in Amount	Current Amount
Gross Project Cost:	$6,400,000	$0	$6,400,000
Adjustment Amount:	$0	$0	$0
Total Eligible Cost:	$6,400,000	$0	$6,400,000
Total FTA Amount:	$0	$0	$6,400,000

Total State Amount:	$0	$0	$0
Total Local Amount:	$0	$0	$0
Other Federal Amount:	$0	$0	$0
Special Condition Amount:	$0	$0	$0

Part 4. Milestones

11.41.02 ENG/DESIGN - MAINT FACILITY 0 $500,000 $500,000

	Milestone Description	Est. Comp. Date
1.	Ph2 - RFP/IFB Issued	None Specified
2.	Ph2 - Contract Award	None Specified
3.	Ph2 - Contract Complete	None Specified
4.	RFP/IFB Issued for Engineering	Jul. 01, 2009
5.	Contract Award	Sep. 01, 2009
6.	Contract Complete	Nov. 30, 2009

11.44.02 REHAB/RENOVATE - MAINTENANCE FACILITY 2 $5,750,000 $5,750,000

	Milestone Description	Est. Comp. Date
1.	Ph2 - RFP/IFB Issued	None Specified
2.	Ph2 - Contract Award	None Specified
3.	Ph2 - Contract Complete	None Specified
4.	RFP/IFB Issued	Dec. 01, 2009
5.	Contract Award	Feb. 01, 2010
6.	Contract Complete	Apr. 30, 2010

11.72.03 FORCE ACCOUNT - PROJECT MGMT 0 $150,000 $150,000

	Milestone Description	Est. Comp. Date
1.	Ph2 - Project Start	None Specified
2.	Ph2 - Project Complete	None Specified
3.	Project Start	Jul. 01, 2009
4.	Project Complete	Apr. 30, 2010

Part 5. Environmental Findings

114102 ENG/DESIGN - MAINT FACILITY	0	$500,000	$500,000

Finding No. 1 - Class II(c)

C01 - Engineering/Design/Planning/Tech.Studies

Activities which do not involve or lead directly to construction, such as planning and technical studies; projects for training and research programs; planning activities eligible for assistance listed in 23 U.S.C. 134, 135, and 307(c); planning activities related to approval of a unified work program and any findings required in the planning process pursuant to 23 C.F.R. Part 450, activities for state planning and research programs pursuant to 23 C.F.R. Part 420; engineering to define the elements of a proposed action or alternatives so that social, economic, and environmental effects can be assessed.\n\n

114402 REHAB/RENOVATE - MAINTENANCE FACILITY	2	$5,750,000	$5,750,000

Finding No. 1 - Class II(c)

C19 - Install purchase maintenance equipment

Purchase and installation of operating or maintenance equipment to be located within the transit facility and with no significant impacts off the site.

117203 FORCE ACCOUNT - PROJECT MGMT	0	$150,000	$150,000

Finding No. 1 - Class II(c)

C16 - Program Admin. & Operating Assistance

Program administration, technical assistance activities, and operating assistance to transit authorities to continue existing service or increase service to meet routine changes in demand.

Part 6: Fleet Status

Fixed Route

		Before	Change	After
I.	**Active Fleet**			
	A. Peak Requirement	535	-3	532
	B. Spares	111	4	115
	C. Total (A+B)	646	1	647
	D. Spare Ratio (B/A)	20.75%	-133.33%	21.62%

II.	**Inactive Fleet**			
	A. Other	0	0	0
	B. Pending Disposal	0	0	0
	C. Total (A+B)	0	0	0
III.	**Total (I.C and II.C)**	646	1	647

Fix-ed route fleet includes 42 min buses. Source: FY 2009 preliminary NTD report submitted on October 28, 2009

Paratransit

		Before	Change	After
I.	**Active Fleet**			
	A. Peak Requirement	41	1	42
	B. Spares	0	0	0
	C. Total (A+B)	41	1	42
	D. Spare Ratio (B/A)	0.00%	0.00%	0.00%
II.	**Inactive Fleet**			
	A. Other	0	0	0
	B. Pending Disposal	0	0	0
	C. Total (A+B)	0	0	0
III.	**Total (I.C and II.C)**	41	1	42

Fleet data are from AC Transit FY 2008-09 NTD Original Submission on October 28, 2009. The number of mini buses were confirmed by Maintenance Management on 11/19/2009.

Part 7. FTA Comments

General Review

Comment Title:	ARRA/Tigger Special Conditions
Comment By:	Ingrid Libao
Date Created:	Dec. 18, 2009
Date Updated:	None Specified
Ref Section:	Unknown
Comment:	1) The project scope of work and budget should be consistent with the project description as announced by the FTA in the TIGGER project selection. The milestones schedule should be consistent with the original schedule proposed in the grantees TIGGER proposal submissions to FTA. A scope of work that varies from the selected projects is not acceptable, even if that project activities are part of the original TIGGER proposal submission to FTA and not selected for funding. 2) In order to ensure that the reporting requirements on the impacts of the TIGGER program are met, FTA will track individual project performance to see if projected energy reduction and greenhouse gas reductions are achieved, and to see the overall impact of

	the TIGGER funding on reducing the energy and emission of TIGGER recipients. In some instances FTA will work with VOLPE and other organizations to verify the emissions and energy savings. ò The recipient agrees to cooperate with FTA efforts to collect and verify data on the energy and greenhouse gas emissions savings as a result of the project implementation. This includes cooperating with FTA offices or their designated representatives of FTA, in collecting data and developing reports or publications on the TIGGER program and projects. ò The recipient will notify FTA in a timely manner of any schedule, funding, or project team issues. FTA reserves the right to redirect project activities. ò The recipient will ensure that each project team complies with prevailing safety codes and standards with respect to the technology implemented with TIGGER funds. 3) Some of the projects selected for TIGGER funding identified individual companies and/or organizations to carry out the project activities. Identification of suppliers or team members in the project proposal does not automatically constitute preapproval of a sole source arrangement. FTA may allow teams In some instances, upon request, as proposed in the TIGGER proposal submissions, to remain in tact if those are in the best interest of FTA. 4) TIGGER projects are subject to DBE requirements. Currently all TIGGER grants with $250,000 in contracting opportunities must comply with the DOTÆs DBE regulations. 5) Projects should be awarded by March 31, 2010 or FTA reserved the right to reallocate funds. All TIGGER funds must be obligated by September 30, 2010.

Comment Title:	New Comment
Comment By:	Lucinda Eagle
Date Created:	Dec. 08, 2009
Date Updated:	Feb. 22, 2010
Ref Section:	Project Overview
Comment:	

Part 8: Results of Reviews

Type:	Error
Location:	Milestones
Description:	At least one Milestone was specified which does not have an estimated completion date.
Instructions:	Open the Milestones window and ensure that all milestones specified have an estimated completion date.

Part 9: Agreement

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL TRANSIT ADMINISTRATION

GRANT AGREEMENT
(FTA G-16, October 1, 2009)

On the date the authorized U.S. Department of Transportation, Federal Transit Administration (FTA) official's electronic signature is entered for this Grant Agreement, FTA has Awarded Federal assistance in support of the Project described below. Upon Execution of this Grant Agreement by the Grantee named below, the Grantee affirms this FTA Award, and enters into this Grant Agreement with FTA. The following documents are incorporated by reference and made part of this Grant Agreement:

(1) \"Federal Transit Administration Master Agreement,\" FTA MA(16), October 1, 2009, http://www.fta.dot.gov/documents/16-Master.pdf
(2) The Certifications and Assurances applicable to the Project that the Grantee has selected and provided to FTA, and
(3) Any Award notification containing special conditions or requirements, if issued.

FTA OR THE FEDERAL GOVERNMENT MAY WITHDRAW ITS OBLIGATION TO PROVIDE FEDERAL ASSISTANCE IF THE GRANTEE DOES NOT EXECUTE THIS GRANT AGREEMENT WITHIN 90 DAYS FOLLOWING THE DATE OF THIS FTA AWARD SET FORTH HEREIN.

FTA AWARD

FTA hereby awards a Federal grant as follows:

Project No: CA-77-0003-00

Grantee: ALAMEDA-CONTRA COSTA TRANSIT DISTRICT

Citation of Statute(s) Authorizing Project: 77 - PL 111-5 - Transp. Invest/Greenhouse Gas & Energy Red. - Economic Reco

Estimated Total Eligible Cost (in U.S. Dollars): $6,400,000

Maximum FTA Amount Awarded [Including All Amendments] (in U.S. Dollars): $6,400,000

Amount of This FTA Award (in U.S. Dollars): $6,400,000

Maximum Percentage(s) of FTA Participation:

Percentages of Federal participation are based on amounts included in the Approved Project Budget, modified as set forth in the text following the Project Description.

U.S. Department of Labor Certification of Public Transportation Employee Protective Arrangements:

Original Project Certification Date: 2/22/2010

Project Description:

Photovoltaic Capacity Installation

The Project Description includes information describing the Project within the Project Application submitted to FTA, and the Approved Project Budget, modified by any additional statements displayed in this Grant Agreement, and, to the extent FTA concurs, statements in other documents including Attachments entered into TEAM-Web.

Awarded By:

Leslie Rogers
Regional Administrator
FEDERAL TRANSIT ADMINISTRATION
U.S. DEPARTMENT OF TRANSPORTATION
03/02/2010

EXECUTION OF GRANT AGREEMENT

The Grantee, by executing this Grant Agreement, affirms this FTA Award; adopts and ratifies all statements, representations, warranties, covenants, and materials it has submitted to FTA; consents to this FTA Award; and agrees to all terms and conditions set forth in this Grant Agreement.

By executing this Grant Agreement, I am simultaneously executing any Supplemental Agreement that may be required to effectuate this Grant Agreement.

Executed by:
Kate Miller
Mgr Capital Planning & Grant Administrat
ALAMEDA-CONTRA COSTA TRANSIT DISTRICT
03/03/2010

CA-77-0003-00 Quarterly Narrative Report

Jul. 01, 2012 through Sep. 30, 2012
As Of Dec. 13, 2012
MS/P Report Submitted , FFR Submitted

Part 1: Recipient Information

Project Number:	CA-77-0003-00
Recipient ID:	1632
Recipient Name:	ALAMEDA-CONTRA COSTA TRANSIT DISTRICT
Address:	1600 FRANKLIN STREET , OAKLAND, CA 94612 2806
Telephone:	(510) 891-4777
Facsimile:	(510) 891-7157

Part 2: Project Information

Project No:	CA-77-0003-00
Brief Desc:	Photovoltaic Capacity Installation
FTA Project Mgr:	Philoki Barros
Start/End Date:	-
Gross Project Cost:	$6,400,000
Adjustment Amt:	$0
Total Eligible Cost:	$6,400,000

Total FTA Amt:	$6,400,000
Total State Amt:	$0
Total Local Amt:	$0
Other Federal Amt:	$0

Part 3: Federal Financial Report

Financial Status

	Previous	This Period	Cumulative
A. Federal Cash on Hand at Beginning of Period			$0
B. Federal Cash Receipts			$23,000
C. Federal Cash Disbursements			$23,000
D. Federal Cash on Hand at End of Period			$0
E. Total Federal Funds Authorized			$6,400,000
F. Federal Share of Expenditures	$3,400,584	$0	$3,400,584
G. Recipient Share of Expenditures	$0	$0	$0
H. Total Expenditures(F + G)	$3,400,584	$0	$3,400,584
I. Federal Share of Unliquidated Obligations			$0
J. Recipient Share of Unliquidated Obligations			$0
K. Total Unliquidated Obligations(I + J)			$0
L. Total Federal Share (F + I)			$3,400,584
M. Unobligated Balance of Federal Funds (E - L)			$2,999,416
N. Total Recipient Share Required			$0
O. Remaining Recipient Share to be provided N - (G + J)			$0
P. Federal Program Income on Hand at Beginning of Period			$0
Q. Total Federal Program income earned			$0
R. Federal Program income expended in accordance with the deduction alternative			$0
S. Federal Program income expended in accordance with the addition alternative			$0
T. Federal Program income expended on allowable Transit Capital and Operating expenses			$0
U. Federal Unexpended Program income (P + Q - R or s or T)			$0

Indirect Expense

Type	N/A
Rate	0.00%
Base	$0
Amount Charged	$0
Federal Share	$0

Part 4. Milestone/Progress Report

Project Status Overview

Current Project Status Update 07/01/2012 - 9/30/2012(Report No.11):

AC Transit Project #2037(Phase 2): RFQ for A&E work was released to the public on 8/28/12 and the response period closed on 9/27/12. Six responses were received. Moving forward, responses will be scored, interviews conducted and the contract negotiated by early December. The contract award is planned to be approved by the BOD on Dec 12, 2012.

NOTE: For next reporting quarter we will create a second set of ALIs for the Phase 2 project. The dates recorded for this quarter represent the dates for the Phase 1 project.

Reviewed by P. Chu 8/20/12

Current Project Status Update 04/01/2012-06/30/2012(Report No.10):

AC Transit Project #2037(Phase 2):For phase two, a consultant seismic study for AC Transit of other facility locations was completed on 12/31/2011 which eliminated the roof of D2 as a viable location. The location has now shifted to D6 where there is adequate room. An RFQ for A&E work on the system should be issued by the end of July 2012, and awarded by 9/1/2012.

AC Transit Project #1826: (Phase 1) Installation of solar panels at the CMF was completed as previously reported.

Reviewed by P. Chu 5/25/12

Current Project Status Update- AC Transit Project #1826: 01/01/2012-03/31/2012(Report No.9): For phase two, a consultant seismic study for AC Transit of other facility locations was completed on 12/31/2011, and in the interim period the project manager has been working with various stakeholders to identify the best facility location. The Division 6 facility in Hayward is currently being looked at as the location for the phase two installation.

Reviewed by P. Chu 2/24/12

Current Project Status Update (AC Transit Project #1826: 10/01/2011-12/31/2011(Report No.8) Phase 1: Construction began with a `notice to Proceed` on December 7, 2010 which included shop drawing and equipment submittals. Equipment procurement lead time is longer than originally anticipated and completion is planned by July 28, 2011. Phase 1 construction began on 04/11/2011. Completion of construction of phase 1 was planned for 7/28/2011 with commissioning complete by 8/30/2011. Phase 1 was completed on time and the system was

commissioned on schedule. This phase of the project is now complete and closed out.

Phase 2: Seismic study was completed by the end of 2011. Review of sites in consultation with stakeholders to select best location is continuing.

Reviewed by P. Chu 12/21/11.

Current Project Status Update (AC Transit Project #1826: 07/01/2011-09/30/2011(Report No.7)
WITH RESPECT TO PHASE 1 - An Invitation to Bid was issued on 8/12/2010 and a contract was awarded on 10/15/2010. On-site construction began on 02/15/2011 and the construction was complete prior to the 07/28/2011 milestone date. The system commissioning was complete and the system was in service before the 08/30/2011 milestone. This phase of the project is now in the closeout phase. WITH RESPECT TO PHASE 2 (Identification of site and installation of additional solar panels) - A siesmic study is now underway to help determine the best locations for the additional solar installation. Once the study is complete, expected before 12/31/2011, we will select the best location for phase 2 implementation. At that point, project milestones will be established and design will begin.

Reviewed by P. Chu 8/22/11.

Current Project Status Update: 04/01/2011-06/30/2011(Report No.6)

Completion of construction of phase 1 is planned for 7/28/2011 with commissioning complete by 8/30/2011. Phase 2: In July-2011, Seismic evaluation contract to be submitted to General Manager for approval of seismic study at D2-Emeryville.

Phase 2 will commence once a seismic study at D2 is completed which is just now being commissioned. Once completed, an RFQ for design services will be issued.

Reviewed P. Chu 5/24/11.

Current Project Status Update: 01/01/2011-03/31/2011(Report No.5)
Solar Panel - AC Transit project # 1826: Phase 1 construction began on 04/11/2011. We are planning for system commissioning to begin on 6/15/2011 and this first phase of the project is to be completed and operational by 6/30/2011. Phase 2 will follow when phase 1 is completed. Phase 2 construction will begin in July 2011.

Reviewed by P. Chu 2/9/11.

Current Project Status Update: 10/01/10-12/31/10 (Report No.4)
Solar Panel - AC Transit project # 1826
Construction began December 1, 2010 with shop drawing and equipment submittals. Equipment procurement lead time is longer than originally anticipated and completion is planned by June 30, 2011. Phase 2 will follow when phase 1 is completed.

11/12/10 - I have reviewed the information reported in the MPR for the quarter ended 9/30/10, 4th quarter FY-2010 and noted that for ALI: 11.41.02, all milestones need revised or actual completion dates and for ALI: 11.44.02, the milestone for RPF/IFR Issuance needs revised or actual completion dates. /s/ P. Barros, Program Manager, FTA-Region IX

Current Project Status Update: 07/01/10-09/30/10 (Report No.3)
Solar Panel - AC Transit project # 1826

The District issued an Invitation to Bid for phase 1 of the project on 8/12/2010 and six qualified bids were received by 9/16/2010 when the bid closed. A contract was awarded on 10/14/2010 to the lowest qualified bidder. Actual construction is set to begin on December 31, 2010 and be completed with 5 months.

Project Cost Variances:
Item
Phase 1 Engineering and Planning / 80% complete/ Original cost $340,000/Revised Cost Est $ 315,000/Final cost TBD/ Comments: Planning & Engineering complet-Permit pending.
Phase 1 Construction / 0% complete / Original cost $3,000,000/Revised Cost Est $2,650,000/ Final Cost TBD/ Comments: Revised Estimate based on Fixed Price bid.
Phase 1 CA/CM/PM / 15% complete/ Original cost $130,000/Revised Cost Est $175,000/ Final Cost: TBD / Comments: Values based on Contract Agreements.
Phase 2 Engineering and Planning / 0% Complete /Original cost: $300,000/ Revised Cost Est $300,000/ Final Cost TBD
Phase 2 Construction / 0% complete / Original cost $2,500,000/ Revised Cost Est. $2,500,000/ Final Cost TBD
Phase 2 CA/CM/PM / 0% Complete / Original cost $125,000/Revised Cost Est $125,000 / Final Cost: TBD

Scheduled milestones or completion dates:
Item: Begin Construction / Original Milestone Date: 9/31/2010/ Revised date : 12/01/2010 / Reason for delay: Extention of bid period requested by bidders because of the lead time associated with special solar panels / Proposed Problem Resolution: Alternative Panels were approved.
Outstanding claims exceeding $100,000: NONE

Reviewed by P. Chu 8/3/10.
Current Project Status Update: 04/01/10-06/30/10 (Report No.2)

-11.44.02 Project No.1826. PhotoVoltaic Capacity Installation:Engineering completed. The project will go out to bid in August. Construction will commence in November.

Current Project Status Update: 01/01/10-03/31/10 (Report No. 1)

-11.44.02 #1826. PhotoVoltaic Capacity Installation:
PhotoVoltaic Capacity Installation: This project provides $6.4 Million in FTA Transit Investment for Greenhouse & Energy Reduction ARRA funds to AC Transit`s HyRoad Program Component for the installation of 693 KW-DC of photovoltaic solar panels to generate `green` hydrogen at the Central Maintenance Facility. Preliminary design and lay out of solar panels on appropriate roof structures at the facility has begun.

		Quantity	FTA Amount	Elig. Proj. Cost
11.41.02	ENG/DESIGN - MAINT FACILITY	0	$500,000	$500,000

	Milestone Description	Orig. Est. Comp. Date	Rev. Est. Comp. Date	# Rev	Actual Comp. Date	Cont. Code
1.	RFP/IFB Issued for Engineering	7/1/2009			8/12/2010	
2.	Contract Award	9/1/2009			10/14/2010	

3.	Contract Complete	11/30/2009	11/30/2011	3	8/30/2011	
4.	Ph2 - RFP/IFB Issued		8/28/2012	1	8/28/2012	
5.	Ph2 - Contract Award		12/14/2012			
6.	Ph2 - Contract Complete		9/30/2013			

		Quantity	FTA Amount	Elig. Proj. Cost
11.44.02	REHAB/RENOVATE - MAINTENANCE FACILITY	2	$5,750,000	$5,750,000

	Milestone Description	Orig. Est. Comp. Date	Rev. Est. Comp. Date	# Rev	Actual Comp. Date	Cont. Code
1.	RFP/IFB Issued	12/1/2009	8/15/2010	1	8/12/2010	
2.	Contract Award	2/1/2010	10/1/2010	1	10/14/2010	
3.	Contract Complete	4/30/2010	8/30/2011	4	8/30/2011	
4.	Ph2 - RFP/IFB Issued		5/1/2013			
5.	Ph2 - Contract Award		6/26/2013			
6.	Ph2 - Contract Complete		9/30/2013			

		Quantity	FTA Amount	Elig. Proj. Cost
11.72.03	FORCE ACCOUNT - PROJECT MGMT	0	$150,000	$150,000

	Milestone Description	Orig. Est. Comp. Date	Rev. Est. Comp. Date	# Rev	Actual Comp. Date	Cont. Code
1.	Project Start	7/1/2009			7/1/2009	
2.	Project Complete	4/30/2010	9/30/2011	5	9/30/2011	
3.	Ph2 - Project Start		5/1/2012		5/1/2012	
4.	Ph2 - Project Complete		9/30/2013			

Grant Agreement and Authorization Form
Hydrogen Refueling Station

Alameda Contra Costa Transit District
Grant Agreement # GHHS 001

California Air Resources Board
04/03/09

Grant Agreement and Authorization Form
Hydrogen Refueling Station
Fiscal Year 2007-08

Project Title: Establish Demonstration Hydrogen Refueling Stations

Grant Recipient Name: Alameda-Contra Costa Transit District **Tax: ID# 94-1492636**

Authorized Official:
Rick Fernandez
Title:
General Manager
Address:
1600 Franklin Street
Oakland, CA 94612
Phone#:
(510) 891-4777

Grant Award:
$2,700,000.00
Total Project Cost:
$5,560,000.00
Time Period:
06/30/08 – 6/30/12
Grant Number:
GHHS 001

The undersigned parties agree to the terms and conditions as set forth in this Grant Agreement (Agreement). The following documents are attached and incorporated as part of this Agreement and take precedence in the following order:

Exhibit A: RFP 06-618 Establish Demonstration Hydrogen Refueling Stations Solicitation
Exhibit B: Scope of Work
Exhibit C: Proposal
Exhibit D: Budget Detail and Estimated Invoice Schedule
Exhibit E: Proposer's Cost Sheet
Exhibit F: Special Terms and Conditions
Exhibit G: Additional Provisions
Exhibit H: Final Report Format

The undersigned parties agree to comply with the requirements and conditions contained herein. The undersigned parties certify under the penalty of perjury that they are duly authorized to bind the parties to this Grant.

California Air Resources Board:

Marie Stephans 4-21-09
Signature of Authorized Official **Date**

Name: Marie Stephans
Title: Chief,
Administrative Services Division

Grant Recipient:

5/6/09
Signature of Authorized Official **Date**

Name: Rick Fernandez
Title: General Manager

EXHIBIT A: 06-618 Request for Proposal
Establish Demonstration Hydrogen Refueling Stations
Inserted as a separate document

EXHIBIT B: SCOPE OF WORK

A. The Alameda-Contra Costa Transit District (Grantee) agrees to design, build, operate and maintain a new hydrogen refueling station (Station). The new Station will meet the following environmental requirements, capacities, and specifications. The new Station should begin operation on or about April 30, 2010 and remain operational for three (3) years after commissioning. The Grantee shall provide reports during the entire three (3) years of operation. The Air Resources Board (ARB) will provide co-funding for the design, construction, and operation of the hydrogen station and ARB will have no fee title interest to the hydrogen station.

The Grantee shall build a new demonstration hydrogen refueling station in Emeryville, California. The Station will be located on Alameda-Contra Costa Transit District (AC Transit) at 1177 47th Street, Emeryville, CA 94608. The Station will have a capacity to dispense at least 60 kilograms of hydrogen per day, five (5) days per week at both 350 barg and 700 barg, and will utilize hydrogen derived from 100% renewable sources. The Station will be co-located with a second hydrogen fueling facility capable of producing approximately 150 kg/day exclusively for transit and heavy duty vehicle use. However, the Air Resources Board (ARB) co-funding provided through this Grant Agreement will only be utilized for the light duty public use vehicle site. The Station will be built in accordance with the Grantee's proposal entitled, "Establish Demonstration Hydrogen Refueling Stations" which is incorporated as Exhibit C: Proposal, and complies with the following requirements for the Station:

1. Environmental Requirements

   - 30% Reduction of Greenhouse Gas emissions relative to gasoline
   - No Increase in Toxic Pollutant emissions
   - 50% decrease in criteria pollutants (ROG + NOx)

2. Capacities and Specifications

   - Produce capacity of no less than 60 kg/day, five days a week
   - Able to perform 3 consecutive 5 kg, 10,000 psi fills in 45 minutes (10 min/max fill)
   - Able to perform 3 consecutive 5 kg, 5,000 psi fills in 25 minutes (6 min/max fill)
   - Ability to provide real-time reporting of station status and remote monitoring of station alerts
   - Filling communications hardware as per SAE-2799
   - Dispense fuel cell grade hydrogen per SAE J-2719 or equivalent at nozzle
   - Nozzle geometry compliant with SAE J2799 for 70 MPa and SAE 2600 for 35 MPa
   - Break away coupling installed between dispenser and vehicle
   - 70 MPa fueling must meet "fueling specifications for 70 MPa compressed Hydrogen Vehicles, Release contained in Appendix 6 of RFP 06-618) incorporated by reference

3. Siting Requirements

   - Station site – must be able to show title or legal access to land or real property with documentation (grant deed, deed) to be provided to ARB at time of award
   - Station location – located in four existing clusters San Francisco Bay Area, Sacramento Area, Los Angeles Area and San Diego Area not less than 5 miles from nearest public station unless demand justified

EXHIBIT B, continued

- Convenient ingress/egress, well lit retail appearance
- Station operation from 6:00 A.M to 10:00 P.M, seven days per week
- Universal PIN access or similar customer ID process
- No personal protection equipment required
- Station meets all codes, standards and regulations that govern hydrogen-fueling stations (NFPA 52 and others)
- To qualify for the energy station/H2 fueling station option fuel cell must generate at least 25kw and meet minimum hydrogen station storage and generation metrics
- Community Involvement plan provided
- Provides for public access to all OEM vehicles and approved conversions
- Vehicles which will use station identified to ensure thruput
- Meets or will meet all performance and safety standards set by Authorities Having Jurisdiction (AHJ)

B. Deliverables

After the final approval and execution of the contract with the California Air Resources Board, the selected proposer must communicate with this project's ***Grant Manager, Michael J. Kashuba*** the progress of the station construction and upon completion of construction the operation of the station. To ensure this takes place in a regular manner, the following deliverables will be required:

Construction Reporting

- Immediately following contract signing, representatives from all major partners will begin biweekly coordination meetings, in person or via conference calls.

- From the beginning of the project, forward a copy of all training, performance, specification manuals, schematics, operator, maintenance and troubleshooting manuals to ARB staff as soon as practical.

- Immediate submittal of incident reports. Please use reports as developed by the California Fuel Cell Partnership incident reports as contained in Appendix 1 of Exhibit A, Station Solicitation.

- Monthly status reports will be scheduled and conducted via teleconference line with staff and management of the Sustainable Transportation Technologies Branch. Meeting summaries must be provided via email.

- Quarterly progress meetings between key station and ARB personnel, held on-site if necessary. Submittal of written notes/summary of meeting required.

Operations Reporting

- Monthly status reports will be held in person or via teleconference line with staff and management of the Sustainable Transportation Technologies Branch. Meeting summaries must be provided via email.

EXHIBIT B, continued

- Immediate submittal of incident reports. Please use reports as developed by the California Fuel Cell Partnership incident reports as contained in Appendix 1 of Exhibit A, Station Solicitation.

- Quarterly infrastructure station reports will be required once the station is operational. The format and content should follow but not need to be identical to those developed Quarterly progress meetings between key station and ARB personnel, held on-site if necessary. Submittal of written notes/summary of meeting required by the National Renewable Energy Laboratories (NREL) Infrastructure – Quarterly Individual Site Template Revision: D. Reports to be submitted include the following: Individual Site Summary, Site Managers Log, On-Site Hydrogen Production Cost Log, Maintenance Log, Safety Log, Hydrogen Purity Log, Refueling data, On-site Hydrogen Production Efficiency Summary, Reformer Log, Electrolyzer Log, Compression Log, Storage and Dispensing Log, and for hydrogen energy stations, C-production Log. Examples of these spreadsheets are contained in Appendix 2 of Exhibit A, Station Solicitation.

- Quarterly written progress reports that summarize project status, achievement of milestones, preliminary findings, deviations from plan, new recommendations if any, financial summary and invoices due to the ARB.

- Quarterly progress meetings between key station and ARB personnel, held on-site if necessary. Submittal of written notes/summary of meeting required.

- Final report – must describe the highlights and challenges of what was involved in successfully establishing the station. The report must contain description of each of the main stages involved from planning through completion and operation of the station. The report must include list of recommendations that might benefit the construction of a station of similar design in the future. A draft of the final report must be submitted to ARB staff for review and comment at least sixty (60) days before the submission of the final report.

C. Project Representatives

The Project Representatives during the term of this Agreement will be:

State Agency: Air Resources Board	Grantee: AC Transit
Name: Michael Kashuba	Name: Joe Callaway
Phone: (916) 323-5123	Phone: (510) 891-7220
Email: mkashuba@arb.ca.gov	Email: jcallaway@actransit.org

Direct all Administrative inquiries to:

State Agency: Air Resources Board	Grantee: AC Transit
Section/Unit: Administrative Services Division	Section/Unit:
Attention: Zinaida Malchenko	Attention: Rick Fernandez
Phone: (916) 324-9907	Phone: (510) 891-4777
Fax: (916) 322-9612	Fax: (510) 891-4705
Email: zmalchen@arb.ca.gov	Email: rfernandez@actransit.org

EXHIBIT C: PROPOSAL
Inserted as a separate document

EXHIBIT D: BUDGET DETAIL AND ESTIMATED INVOICE SCHEDULE

1. Invoicing and Payment

A. For services satisfactorily rendered, and upon receipt and approval of the invoice for each completed task, the State agrees to provide co-funding to the Grantee towards actual expenditures incurred in accordance with Exhibit E, Proposer's Cost Sheet, which is attached hereto and made a part of this Agreement.

B. Invoices shall include the Agreement Number and shall be submitted in triplicate no more than monthly in arrears to:

Air Resources Board
P.O. Box 1436
Sacramento, CA 95812-1436
Attn: Accounting Section

2. Budget Contingency Clause

A. It is mutually agreed that if the Budget Act of the current year and/or any subsequent years covered under this Agreement does not appropriate sufficient funds for the program, this Agreement shall be of no further force and effect. In this event, the State shall have no liability to pay any funds whatsoever to Grantee or to furnish any other considerations under this Agreement and Grantee shall not be obligated to perform any provisions of this Agreement.

B. If funding for any fiscal year is reduced or deleted by the Budget Act for purposes of this program, the State shall have the option to either cancel this Agreement with no liability occurring to the State, or offer an agreement amendment to Grantee to reflect the reduced amount.

3. Prompt Payment Clause

Payment will be made in accordance with, and within the time specified in, Government Code Chapter 4.5, commencing with Section 927.

11. Cost Detail

Estimated costs of various hydrogen station project components including labor, site preparation, testing/certification, capital equipment costs, maintenance costs, real estate cost share allowance, travel, permits, outreach, and other are itemized in Attachment 3 – AC Transit Cost Sheet.

Summary

As described, ACT plans to develop a 350/700 bar, 60 kg/day system utilizing 100% renewable energy for hydrogen generation on-site at its Emeryville bus service facility. Estimated costs for project critical elements can be summarized as follows:

- Labor $236,000
- Site Preparation $200,000
- Testing/Certification $25,000
- Capital Equipment $4,512,640
- Maintenance Costs $220,320
- Other Direct Costs $24,000
- Cost Share Committed $245,000

Cost Spreadsheet

The AC Transit Cost Sheet as defined in the RFP is completed and shown in Attachment 3 of this proposal.

Exhibit E: Proposer's Cost Sheet

ATTACHMENT 3
AC Transit Cost Sheet

	Description	Hours	Rate ($/hr)	Total
LABOR				
Program Manager	See Section 7. Management Plan	65	$ 175	$ 11,375
Project Managers	See Section 7. Management Plan	250	$ 150	$ 37,500
Consultant Costs	See Section 7. Management Plan	600	$ 150	$ 90,000
Engineering Staff	See Section 7. Management Plan	600	$ 135	$ 81,000
Technicians	See Section 7. Management Plan	125	$ 90	$ 11,250
Clerical	See Section 7. Management Plan	75	$ 65	$ 4,875
Overhead Rate	(Included Within Above 'Rate')			$ -
Fringe Benefits	(Included Within Above 'Rate')			$ -
			Sub Total	$ 236,000
COST FOR ITEMIZED TASKS				
Site Preparation	All Civil Works			$ 200,000
Station Design			(Included Above Under 'Labor' Category)	$ -
Testing/Certification				$ 25,000
Renewable Generation System Design			(Included Above Under 'Labor' Category)	$ -
			Sub Total	$ 225,000
CAPITAL EQUIPMENT COSTS				
Dispensers				$ 72,500
Purifier/Chiller	700 bar related equipment			$ 475,000
Storage				$ 200,000
Compressor				$ 160,140
Reformer/Electrolyzer				$ 600,000
Photovoltaic/Wind/Other				$ 3,000,000
Additional Equipment				$ -
Hydrogen Fuel Cell				N/A
Information Kiosk/Collateral Materials				$ 5,000
			Sub Total	$ 4,512,640
MAINTENANCE COSTS				
Routine Service				$ 220,320
Warranty Costs				
Other				
			Sub Total	$ 220,320
OPERATING COSTS				
				$ -
			Sub Total	$ -
REAL ESTATE COST SHARE ALLOWANCE				
	See Appendix for Certified Appraisal			$ 245,000
			Sub Total	$ 245,000
OTHER DIRECT COSTS				
Travel				$ 3,000
Operations/Maintenance				
Fuel Trucking/Transportation				
Other				
Permits				$ 20,000
Pre-Permit Outreach				$ 1,000
			Sub Total	$ 24,000
Other	Contingency (10%)			$ 100,000
FUNDING SOURCES	AC Transit District Capital Funds*			$ 2,862,960
			GRAND TOTAL COSTS	$ 5,562,960
			ARB Match Funds Requested (Max 60% of Grand Total)	$ 2,700,000

Signature of Proposer: 6/12/08

*Contact: Kate Miller, Manager of Capital Development, Legislation, and Grants
1600 Franklin Street
Oakland, CA 94612
510-891-4859
Kate Miller (kmiller@actransit.org)

EXHIBIT F: SPECIAL TERMS AND CONDITIONS

1. Excise Tax

The State of California is exempt from federal excise taxes, and no payment will be made for any taxes levied on employees' wages. The State will pay for any applicable State of California or local sales or use taxes on the services rendered or equipment or parts supplied pursuant to this Agreement. California may pay any applicable sales and use tax imposed by another state.

2. Settlement of Disputes

A. In the event of a dispute, Grantee shall file a "Notice of Dispute" with ARB within ten (10) days of discovery of the problem. Within ten (10) days, the ARB shall meet with the Grantee and Project Representative for purposes of resolving the dispute.

B. Any dispute concerning a question of fact arising under the terms of this Agreement which is not disposed of within a reasonable period of time by Grantee and State employees normally responsible for the administration of this Agreement shall be brought to the attention of the Executive Officer or designated representative of each organization for resolution. The decision of the State Executive Officer or designated representative shall be final.

C. In the event of a dispute, the language contained within this Agreement shall prevail over any other language including that of the proposal.

D. The existence of a dispute not fully resolved shall not delay Grantee to continue with the responsibilities under this Agreement which is not affected by the dispute.

3. Potential Subcontractors

Nothing contained in this Agreement or otherwise, shall create any contractual relation between the State and any subcontractors, and no subcontract shall relieve the Grantee of his responsibilities and obligations hereunder. The Grantee agrees to be as fully responsible to the State for the acts and omissions of its subcontractors and of persons either directly or indirectly employed by any of them as it is for the acts and omissions of persons directly employed by the Grantee. The Grantee's obligation to pay its subcontractors is an independent obligation from the State's obligation to make payments to the Grantee. As a result, the State shall have no obligation to pay or to enforce the payment of any moneys to any subcontractor.

Grantee shall not subcontract any services under this Agreement without prior approval of the State.

4. Stop Work Order

State reserves the right to issue an order to stop work in the event that a dispute should arise, or in the event that State gives Grantee a notice that the Agreement will be terminated. The stop-work order will be in effect until the dispute has been resolved or the Agreement has been terminated.

EXHIBIT F continued

5. Termination

A. In addition to the rights under Exhibit C of the Standard Agreement, State reserves the right to terminate this Agreement at its sole discretion at any time upon thirty (30) days prior written notice to Grantee.

B. In the case of early termination, Grantee shall submit an invoice in triplicate and a report in triplicate covering services to termination date, following the invoice and progress report requirements of this Agreement. A copy and description of any data collected up to termination date shall also be provided to State.

C. Upon receipt of the invoice, progress report, and data, a final payment will be made to Grantee. This payment shall be for all State-approved, actually-incurred costs that in the opinion of State are justified, and shall include labor, and materials purchased or utilized (including all non-cancellable commitments) to termination date, and pro rata indirect costs as specified in the proposal budget.

6. Amendments

ARB if appropriate reserves the right to amend this agreement for additional time and/or additional funding.

7. Mutual Hold Harmless Clause

MUTUAL HOLD HARMLESS CLAUSE: The Grantee shall be responsible for damages caused by the negligence of its officers, employees and agents. ARB shall be responsible for the damages caused by the negligence of its officers, employees and agents. The intent of this paragraph is to impose responsibility on each party for the negligence of its officers, employees and agents.

EXHIBIT G: ADDITIONAL PROVISIONS

1. DVBE Audit

Grantee agrees that the State or its delegate will have the right to review, obtain, and copy all records pertaining to Grantee's compliance with the Disabled Veteran Business Enterprise (DVBE) requirements as contained in Public Contract Code sections 10115 et. seq. Grantee agrees to provide State or its delegate with any relevant information requested and shall permit State or its delegate access to its premises, upon reasonable notice, during normal business hours for the purposes of interviewing employees and inspecting and copying such books, records, accounts, and other material that may be relevant to a matter under investigation for the purpose of determining compliance with the DVBE requirements. Grantee further agrees to maintain such records for a period of three years after final payment under this Agreement.

2. Travel and Per Diem

A. Any reimbursement for necessary travel and per diem shall be at rates not to exceed those amounts paid to State of California employees as set forth by Department of Personal Administration rules and regulations, or verification supplied that indicates such rates are not available to Grantee.

B. No travel outside the State of California shall be reimbursed unless prior written authorization is obtained from State.

All travel related expenses shall be computed in accordance with the Department of Personnel Administration (DPA) rules and regulations. Such rates shall not exceed those paid to State employees.

To claim expenses receipts must be submitted. For more detailed information on travel costs see http://www.dpa.ca.gov/jobinfo/Short-TermTravel/method.shtm and http://www.dpa.ca.gov/jobinfo/Short-TermTravel/mileagereimbursement.shtm. For more detailed information on lodging see http://www.dpa.ca.gov/jobinfo/Short-TermTravel/lodging.shtm. For more detailed information on meals see http://www.dpa.ca.gov/jobinfo/Short-TermTravel/meals.shtm.

3. Evaluation of Grantee

Performance of the Grantee under this Agreement will be evaluated. The evaluation shall be prepared on Contract/Grantee Evaluation Sheet (STD 4), and maintained in the Agreement file. For consultant agreements over $5,000, a copy of any negative evaluations will be sent to the Department of General Services, Office of Legal Services.

4. Progress Payments

In computing the amount of any progress payment, the State shall determine what Grantee has earned during the period for which payment is being made on the basis of the Agreement terms, but shall retain out of such earnings, an amount equal to 10 percent thereof, pending satisfactory completion of the entire agreement. However, if the Agreement consists of the performance of separate and distinct tasks, then any funds so withheld with regard to a particular task may be paid upon completion of that task.

EXHIBIT G continued

Progress payments are permitted for tasks completed under this contract. Ten percent (10%) of the invoiced amount shall be withheld pending final completion of each task. Any funds withheld with regard to a particular task may be paid upon completion of that task.

5. Computer Software

Grantee certifies that it has appropriate systems and controls in place to ensure that State funds will not be used in the performance of this contract for the acquisition, operation or maintenance of computer software in violation of copyright laws.

6. Meetings

A. Initial meeting. Before work on the Grant Agreement begins, Grantee will meet with the State's Project Representative and other staff to discuss the overall plan, details of performing the tasks, the project schedule, items related to personnel or changes in personnel, and any issues that may need to be resolved before work can begin.

B. Progress review meetings. Grantee and appropriate members of his or her staff will meet with the State's Project Representative at monthly intervals to discuss the progress of the project. This meeting may be conducted by phone, if appropriate.

C. Technical Seminar. The Grantee will present the results of the project to ARB staff at a seminar in Sacramento if necessary.

7. Reports and Data Compilations

A. With respect to each invoice period, Grantee shall forward to the Project Representative an electronic copy of the progress report and mail one copy of the progress report with each invoice. (Do not use Express Mail.) When e-mailing the progress report, the "subject line" should state the Grant Agreement number and the billing period. Each progress report will begin with the following disclaimer:

> The statements and conclusions in this report are those of the Grantee and not necessarily those of the California Air Resources Board. The mention of commercial products, their source, or their use in connection with material reported herein is not to be construed as actual or implied endorsement of such products.

B. Each progress report will also include:

1. A brief narrative account of project tasks completed or partially completed since the last progress report.
2. A brief discussion of problems encountered during the reporting period and how they were or are proposed to be resolved.
3. A brief discussion of work planned, by project task, before the next progress report.
4. A graph showing allocation of the budget and amount used to date for each task.
5. A graph showing percent of completion for each task.

EXHIBIT G continued

C. If the project is behind schedule, the progress report must contain an explanation of reasons and how Grantee plans to resume the schedule.

D. Ninety days prior to contract termination date, Grantee will deliver to State five (5) bound copies of a draft final report for review by ARB staff. The reports may be stapled or spiral bound, depending on size. The draft final report will conform to Exhibit H.

E. Within forty-five (45) days of receipt of State's comments on the draft final report, Grantee will deliver to the Grant Manager two (2) copies of the final report incorporating all reasonable alterations and additions requested by the State and Grant Manager. Upon approval of the amended final report by the State's Project Representative, Grantee will within two (2) weeks, deliver to State two (2) **UNBOUND** originals and a final report incorporating all final alterations and additions. The final report will conform to the Grant Agreement Final Report Format, Exhibit H.

F. Together with the final report, Grantee will deliver a copy of the report on CD, using Microsoft Word and a set of all data compilations as specified by the ARB Grant Manager.

G. Grantee's obligation under this Agreement shall be deemed discharged only upon submittal to and acceptance by the State of the final report, electronic copy of the final report, and all required data compilations.

H. No reports, professional papers, information, inventions, improvements, discoveries, or data obtained, prepared, assembled, or developed by Grantee pursuant to this Agreement shall be released or made available, except to ARB, without prior written approval of State while the Agreement is in force. State's consent shall not be unreasonably withheld.

8. Priority Hiring Considerations

Grantee shall give priority consideration in filling vacancies in positions funded by this Agreement to qualified recipients of aid under Welfare and Institutions Code Section 11200.

9. Forced, Convict, and Indentured Labor

No foreign-made equipment, materials, or supplies furnished to State pursuant to this Agreement may be produced in whole or in part by forced labor, convict labor, or indentured labor. By submitting a proposal to State, Grantee agrees to comply with this provision of the Agreement.

10. Sole Proprietor

If signing this Agreement as a sole proprietor, Grantee certifies they are not an alien that is ineligible for state and local benefits, as defined in Subtitle B of the Personal Responsibility and Work Opportunity Act (8 USC 1601, et. seq.)

11. Insurance

A. Grantee shall furnish to State a certificate of insurance stating that liability insurance of not less than $1,000,000 per occurrence for bodily injury and property damage liability combined is presently in effect for Grantee.

EXHIBIT G continued

B. Grantee agrees that the bodily injury liability insurance herein provided for shall be in effect at all times during the term of this Agreement. In the event said insurance coverage expires at any time or times during the term of this Agreement, Grantee agrees to provide, at least thirty (30) days before said expiration date, a new certificate of insurance evidencing insurance coverage as provided for herein for not less than the remainder of the term of the Agreement or for a period of not less than one year. New certificates of insurance are subject to the approval of the Department of General Services, and Grantee agrees that no work or services shall be performed prior to such approval. The State may, in addition to any other remedies it may have, terminate this Agreement on the occurrence of such event.

The certificate of insurance must include the following provisions:

1. The insurer will not cancel the insured's coverage without thirty (30) days prior written notice to State; and
2. The State of California, its officers, agents, employees and servants are included as additional insured, but only insofar as the operations under this Agreement are concerned.

12. Copyrightable Materials

A. ARB reserves the right to any copyrightable materials developed under this Agreement. Upon acceptance of the copyrightable materials developed under this Agreement, and payment of the sums then due under the terms of the Agreement, ARB shall have the sole and exclusive right, title, and interest (including trade secret and copyright interests) in the copyrightable materials. Grantee and his or her subcontractors hereby assign(s) all rights, title, and interest (including trade secret and copyright interest) in any copyrightable materials developed under this Agreement to ARB.

B. ARB, at its discretion, may grant a nonexclusive and paid-up license to Grantee and his or her subcontractors to use said copyrightable materials. Grantee and his or her subcontractors agree to cooperate with and assist ARB to apply for and to execute any applications and/or assignments reasonably necessary to obtain any patent, copyright, trademark, or other statutory protection for all copyrightable materials.

C. Grantee and his or her subcontractors shall not disclose any copyrightable materials, any of the deliverables thereof, or any portion thereof, to any other organization or person without the written consent of ARB.

D. Grantee and his or her subcontractors shall not use the copyrightable materials, any of the deliverables thereof, or any portion thereof, in any other work performed by this Agreement subject to any license granted without the written consent of ARB.

E. Grantee's obligations under this provision shall survive the expiration or termination of this Agreement.

EXHIBIT G continued

13. Recycling

A. Grantee agrees to use janitorial supplies (if necessary and when required) containing recycled paper products only.

B. Grantee agrees to use recycled paper only, unless the proposed printing job cannot be done on recycled paper.

C. Grantee agrees to use recycled solvents.

14. Confidentiality

It is expressly understood and agreed that information Grantee receives from State in performing its obligations under this Agreement may be deemed confidential by State. Therefore, Grantee agrees to:

A. Observe complete confidentiality with respect to such information, including without limitation, agreeing not to disclose or otherwise permit access to such information by any person or entity in any manner whatsoever.

B. Ensure that Grantee's employees, agents, representatives, and independent contractors are informed of the confidential nature of such information and ensure by agreement or otherwise that they are prohibited from copying or revealing, for any purpose whatsoever, the contents of such information or any part thereof, or from taking any action otherwise prohibited under this section.

C. Not use such information or any part thereof in the performance of services to others or for the benefit of others in any form whatsoever whether gratuitously or for valuable consideration, except as permitted under this Agreement.

D. Notify State promptly and in writing of the circumstances surrounding any possession, use or knowledge of such information or any part thereof by any person other than those authorized by this paragraph.

EXHIBIT H: FINAL REPORT FORMAT

The Final Report (Report) is a summary record of the station construction, operation and its overall performance over the entire period. The Report must be well organized and contain certain specific information. The ARB's Mobile Source Control Division (MSCD) reviews all Final Reports, paying special attention to the Abstract and Executive Summary. If MSCD finds that the Report does not fulfill the requirements stated in this Exhibit, final payment for the work completed may be withheld. This Exhibit outlines the requirements that must be met when producing the Report.

Note: In partial fulfillment of the Final Report requirements, the Grantee shall submit a copy of the Report on a CD in PDF format and in a word-processing format, preferably in Word. This is in addition to the submission of any paper copies required. The CD shall be clearly labeled with the Grant Agreement title, ARB Grant Agreement number, and the words "Final Report", and the date the report was submitted.

Legibility. Each page of the approved Final Report must be clearly legible.

Binding. The draft Report, including its appendices, must be either spiral bound or stapled, depending on size. The revised Report and its appendices should be spiral bound, except for two unbound, originals.

Cover. The Grantee will provide a standard cover.

Two-sided. To conserve paper, both the draft Report and the revised Report, should be printed on both sides of the page.

Title. The title of the Report should exactly duplicate the title of the contract unless a change is approved in writing by the Project Representative.

Spacing. In order to conserve paper, copying costs, and postage, please use single or one-line (1) spacing.

Page size. All pages should be of standard size (8 ½" x 11") to allow for photo-reproduction.

Large tables or figures. Foldout or photo-reduced tables or figures are not acceptable because they cannot be readily reproduced. Large tables and figures should be presented on consecutive 8 ½" x 11" pages, each page containing one portion of the larger chart.

Color. Color presentations are not necessary; printing shall be black on white only where ever possible.

Corporate identification. Do not include corporate identification on any page of the Final Report, except the title page.

Unit notation. Measurements in the Reports should be expressed in metric units. However, for the convenience of engineers and other scientists accustomed to using the British system, values may be given in British units as well in parentheses after the value in metric units. The expression of measurements in both systems is especially encouraged for engineering reports.

Section order. The Report should contain the following sections, in the order listed below:

EXHIBIT H continued

Title page
Disclaimer
Acknowledgments
Table of Contents
List of Figures
List of Tables
Abstract
Executive Summary
Body of Report
References
Glossary of Terms, Abbreviations, and Symbols
Appendices

Page numbering. Beginning with the body of the Report, pages shall be numbered consecutively beginning with "1", including all appendices and attachments. Pages preceding the body of the Report shall be numbered consecutively, in ascending order, with small Roman numerals.

Title page. The title page should include, at a minimum, the contract number, contract title, name of the principal partners, Grantee organization, date, and this statement: "Prepared for the California Air Resources Board and the California Environmental Protection Agency"

Disclaimer. A page dedicated to this statement must follow the Title Page:

The statements and conclusions in this Report are those of the Grantee and not necessarily those of the California Air Resources Board. The mention of commercial products, their source, or their use in connection with material reported herein is not to be construed as actual or implied endorsement of such products.

Acknowledgments. Only this section should contain acknowledgments of key personnel and organizations that were partners or otherwise associated with the project. The last paragraph of the acknowledgments must read as follows:

This Report was submitted in fulfillment of [ARB contract number and project title] by [Grantee organization] under the [partial] sponsorship of the California Air Resources Board. Work was completed as of [date].

Table of Contents. This should list all the sections, chapters, and appendices, together with their page numbers. Check for completeness and correct reference to pages in the Report.

Abstract. The abstract should tell the reader, in non-technical terms, the purpose of the station, and scope of its operation, describe the work performed, and present the results obtained and conclusions. The purpose of the abstract is to provide the reader with useful information and a means of determining whether the complete document should be obtained for study. The length of the abstract should be no more than about 200 words. Only those concepts that are addressed in the executive summary should be included in the abstract.

EXHIBIT H continued

Executive Summary. The function of the executive summary is to inform the reader about the important aspects of the work that was done, permitting the reader to understand the project without reading the entire Report. It should state the objectives of the project and briefly describe the operations used, results, conclusions, and recommendations for design or operations changes for future stations. All of the concepts brought out in the abstract should be expanded upon in the Executive Summary.

Conversely, the Executive Summary should not contain concepts that are not expanded upon in the body of the Report.

- The Executive Summary will be used in several applications as written; therefore, please observe the style considerations discussed below.
- Limit the Executive Summary to two pages, single spaced.
- Use narrative form. Use a style and vocabulary level comparable to that in Scientific American.
- Discuss the results rather than listing them.
- Avoid jargon.
- Define technical terms.
- Use passive voice if active voice is awkward.
- Avoid the temptation to lump separate topics together in one sentence to cut down on length.

The Executive Summary should contain four sections: Background, Methods, Results, and Conclusions.

The Results Section. The Results section should be a single paragraph in which the main findings are cited and their significance briefly discussed. The results should be presented as a narrative, not a list. This section must include a discussion of the implications of the work for the Board's relevant regulatory programs.

Conclusions and Lessons Learned Section. This section should be relatively short. This should be presented as both a narrative and short lists. Include a short discussion of recommendations for further stations.

Body of Report. The body of the Report should contain the details of the research, divided into the following sections:

Introduction. Clearly identify the scope and purpose of the station. Provide a general background of the project.

Project details. Describe the various phases of the project, the station development and operation. Describe the design and construction phases of the station, materials, equipment, testing, performance, operation, maintenance, reliability, etc. Describe quality assurance and quality control procedures.

Results. Present the results in an orderly and coherent sequence. Summarize using graphs and charts the station report data presented in Appendices 1 and 2. This should include a summary record of average fuelings per day, fuelings per month, and average vehicle fueling times for both 350 and 700 bar pressures. Where possible, present historical geographical data on vehicles using the station. Present maintenance and cost summaries. Describe statistical procedures used and their assumptions.

EXHIBIT H continued

Summary and Conclusions. This section should be relatively short. This should be presented as both a narrative and short lists. Include a short discussion of recommendations for further stations.

Recommendations. Use clear, concise statements to recommend (if appropriate) future station development that is a reasonable progression of the study and can be supported by the results and discussion.

References. Please list these together in a separate section, following the body of the Report

List of inventions reported. If any inventions have been reported, or publications or pending publications have been produced as a result of the project, the titles, authors, journals or magazines, and identifying numbers that will assist in locating such information should be included in this section.

Glossary of terms, abbreviations, and symbols. When more than five of these items are used in the text of the Report, prepare a complete listing with explanations and definitions. It is expected that every abbreviation and symbol will be written out at its first appearance in the Report, with the abbreviation or symbol following in parentheses [i.e., carbon dioxide (CO_2)]. Symbols listed in table and figure legends need not be listed in the Glossary.

Appendices. Related or additional material that is too bulky or detailed to include within the discussion portion of the Report shall be placed in appendices. If a Report has only one appendix, it should be entitled "APPENDIX". If a Report has more than one appendix, each should be designated with a capital letter (APPENDIX A, APPENDIX B). If the appendices are too large for inclusion in the Report, they should be collated, following the binding requirements for the Report, as a separate document. The Project Representative will determine whether appendices are to be included in the Report or treated separately. Page numbers of appendices included in the Report should continue the page numbering of the Report body. Pages of separated appendices should be numbered consecutively, beginning at "1".

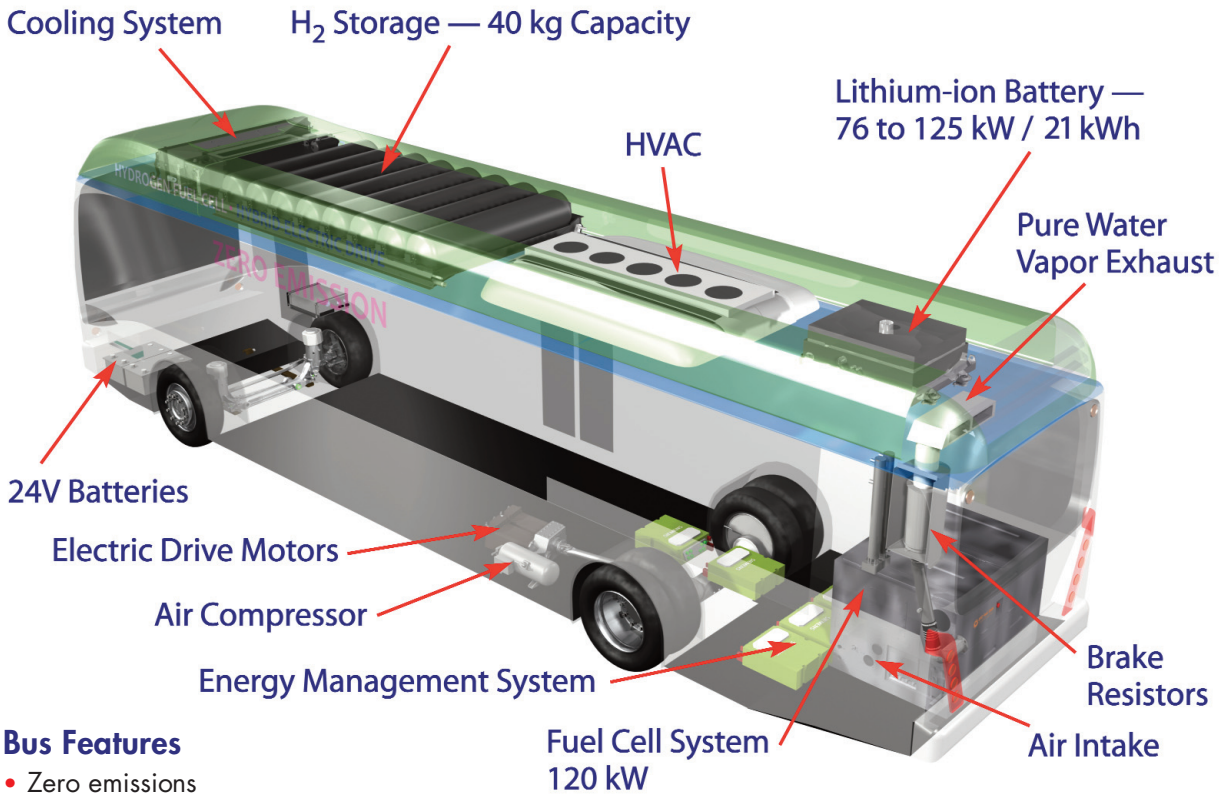
Taking the HyRoad

...With Zero-Emission Technology

Driven by a desire to protect the health and the environment of the communities we serve, AC Transit has spent over a decade developing and implementing advanced, zero-emission transportation technology.

Zero-Emission Vehicles

AC Transit operates twelve 40' hybrid-electric fuel cell buses, each powered by a 120 kW UTC fuel cell system. The buses use lithium-ion batteries and hybrid-electric technology to store regenerative braking energy and provide up to 125 kW of booster power. Fuel cells do not burn the fuel they use. Instead, they combine hydrogen with oxygen from the air electrochemically to produce electricity and emit only water vapor.



Bus Features

- Zero emissions
- Quiet, all-electric drive
- Regenerative braking
- Twice the energy efficiency of diesel
- Low floor for easy entrance and exit

System Specifications

Length/Width/ Height:	40 feet/102 in./136 in.
Curb Weight:	31,400 pounds
Gross Vehicle Weight:	40,000 pounds
Capacity:	29 seated, plus 2 wheelchairs; 33 seated without wheelchairs; 25 standees
Wheel Base:	22 ft. 5.29 in.
Fuel Cell Power:	120 kW
Drive System:	Series Hybrid Electric
Battery Energy/ Capacity:	21 kWh / 29 Ah
Vehicle Control:	VDO KIBES 32 Multiplex System via SAE CAN J1929
Operating Range:	220-240 miles

Components

Bus Chassis:	Van Hool A300L Fuel Cell
Model Year:	2010
System Integration:	Van Hool
Electric Propulsion:	Siemens ELFA Drive System; two 85 kW AC traction motors
Power Plant:	UTC Power PureMotion® 120
Fuel Storage:	8 Dynetek Type 3 tanks (aluminum core with carbon fiber-wrapped exterior; 40 kg Gaseous Hydrogen Stored at 5000 psi/350 bar
Traction Battery Pack:	EnerDel Lithium Ion Batteries 76 kW to 125 kW Charge and Discharge Power 21 kWh energy storage
Heating/ Air Conditioning:	Carrier-Sutrak AC 136 AE
Brakes:	4 wheel Knorr Disc Brakes, Air Actuated
Emissions Equipment:	Zero Emission Vehicle – none required

AC Transit's Stationary Fuel Cell System

- Provide electric power at an average efficiency of 52%, compared to the mid to high 30s of standard grid power
- Will reduce greenhouse gas emissions by more than 1,500 tons/year
- Save over $3 million in energy costs over 10 years

Overall, the Oakland fueling station, funded with grants from the California Energy Commission and the California Air Resources Board, will have the capacity to produce and dispense 360 kilograms of hydrogen per day, with the capability of doubling capacity by adding additional compressors and storage.

Advanced Compression Technology

Max Fueler 90: Primarily for passenger car fueling, Linde's oil-free piston compressor, Max Fueler 90, allows for the quick, safe, and efficient fueling of hydrogen vehicles to 350 or 700 bar. Equipped with dual compressors for high reliability, it is capable of fueling four or more vehicles per hour, depending upon vehicle service pressure, state of charge and size of vehicle tanks.

Ionic Compressor 50: Primarily for bus fueling, Linde's ionic compression technology replaces a conventional metal piston with a specially designed, nearly incompressible ionic liquid. Benefits include low energy consumption, low noise level, and no contamination of the hydrogen gas.

About Landfill Gas: As organic materials decompose in landfills, they emit methane, an even more potent greenhouse gas than carbon dioxide. Capturing that methane before it goes into the atmosphere prevents some amount of global warming. Using that methane as a source of hydrogen for fuel cell vehicles prevents even more climate change.

About Solar Electrolysis: Using clean, renewable, solar electricity (produced onsite) to separate water into hydrogen and oxygen demonstrates the completely renewable potential of fuel cell technology. In fuel cells, the hydrogen and oxygen are recombined, producing electricity for vehicles, and the same amount of water that went into the system in the first place. Beyond powering a fleet of buses, this technology shows one way to store solar or wind-generated electricity for later use.

Energy Stations

AC Transit's on-site energy stations demonstrate the capability for using "renewable" hydrogen—hydrogen produced from biogas or using solar-powered electrolysis. The stations also feature the latest advancements in compression and dispensing technology, enabling buses to be refueled at rates up to 5 kilograms/minute—a time comparable to refueling diesel buses.

Emeryville Station—Demonstrating Solar Electrolysis

In Emeryville, we dispense hydrogen made both from natural gas, and from water and solar electricity. Thanks to a major grant from the California Air Resources Board, one dispenser is accessible to the public for fueling passenger cars. Overall, this station has the capacity to rapidly fuel 12 buses consecutively with more than 30 kilograms of hydrogen each, and 20 or more cars per day. While Linde's car fueling system has a daily capacity of 240 kilograms, local permitting restricts fueling to no more than 20 cars per day.

Oakland Station—Demonstrating Biogas-fed Stationary Fuel Cells

In Oakland, we are taking an innovative approach to producing hydrogen, as well as providing on-site electrical power to AC Transit's largest operating division. With a $6 million grant from the Federal Transit Administration, we have installed a 420 kW stationary fuel cell system that was commissioned in March of 2013. Directed Biogas—collected from landfills—feeds the fuel cells, which in turn supplies clean electricity to the entire facility. Electricity from the stationary fuel cells also powers an electrolyzer to produce 65 kilograms of hydrogen per day for the zero-emission bus fleet.

THE LINDE GROUP
Linde
HYDROGEN FUEL CELL
ZERO
A

B

C

D
E
LIQUID HYDROGEN
NO SMOKING
WARNING
HYDROGEN
NO SMOKING

D
F
We deliver.
Linde

Emeryville Station Key Components

Solar Electricity: 21 kW on site; 1.324 MW at other AC Transit properties; approximately 1,720 MWh of electricity per year; will reduce greenhouse gas emissions by more than 900 tons/year

Electrolyzer: Proton PEM Electrolyzer; 65 kg/day

Compression: Linde IC50 Ionic Compressor and MF90 Mechanical Dry-Running Compression with advantages in through-put and efficiency

Liquid Storage: 9,000 gallons (2,400 kilograms*)

Gaseous Storage: 360 kg @ 7,777 PSI for bus fueling; 28 kg @ 13,000 PSI for light-duty fueling

Dispensers: Linde Bus-Fueling and Car-Fueling Integrate dispensers with controls and authorization and point-of-sale system for public fueling. Cars can be fueled in 3-5 minutes, buses in 6-8 minutes.

Equipment Shown in Page 5 Photo

- A H_2 Storage for Buses
- B ICE 50 Bus Compressor
- C 9,000 Gallon Liquid Storage Tank
- D Vaporizer
- E Solar Panel
- F MF90 Car Compressor & Storage
- G Electrolyzer

Seminary Station Key Components

Renewable Energy: On-site generation by biogas; creates renewable energy for use in station and adjacent facility. This took our Seminary Division off the grid.

Electrolyzer: Proton PEM Electrolyzer (will be operational by end of 2015) generating 65 kg/day

Compression: Linde IC50 Ionic Compressor

Liquid Storage: 9,000 gallons (2,400 kilograms*)

Gaseous Storage: 360 kg @ 7,777 PSI for bus fueling

Dispensers: Linde Bus-Fueling Integrate dispensers with controls and authorization; buses can be fueled in 6-8 minutes. The installation of H_2 dispensers at the existing fuel island is a big step towards commercialization because H_2 buses can now be fueled in the same way as our diesel fleet.

Equipment Shown in Page 5 Photos

- A H_2 Fuel Dispenser
- B High Pressure Gaseous Storage
- C Stationary Solid Oxide Fuel Cell
- D Vaporizer
- E Liquid H_2 Storage
- F Liquid H_2 Delivery

**One kilogram is equivalent in energy content to one gallon of gasoline.*

For more information about
AC Transit's environmental initiatives,
please visit **actransit.org/environment**
or follow our updates on Twitter
@act_environment

Alameda-Contra Costa Transit District
1600 Franklin Street
Oakland, CA 94612