













**FUEL CELLS**  
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# Fuel Cell Buses

Project	Year	Location	Program	Bus Manufacturer/ Model	Fuel Cell Manufacturer	Engine Type	Fuel Cell Size/ Type	Range	Max. Speed	Fuel Type	Picture
AC Transit - ZEB Advanced Fuel Cell Bus	Planned	12 new next generation hybrid fuel cell buses for transit service in San Francisco's East Bay area	CARB ZEB/ DOE Technology Validation Program	Van Hool 40-ft buses	UTC Power	Fuel cell/ battery hybrid	PEM	N/a	N/a	N/a	
AC Transit - HyRoad	Deployed 2006 - present	3 buses placed in regular transit service in San Francisco's East Bay area	CARB ZEB/ DOE Technology Validation Program/ FTA National FC Bus Program	Van Hool A330 40-ft bus	UTC Power	Fuel cell/ battery hybrid	120 kW PEM	250-300 mi/ 402-483 km	70 mph/ 113 km/h	Compress. hydrogen @ 5,000 psi	
AC Transit - HyRoad	Deployed 2003 - 2004	1 bus placed in regular transit service in San Francisco's East Bay area	CARB ZEB/ DOE Technology Validation Program	Thor Thunder Power 30-ft bus	UTC Power	Fuel cell	60 kW PEM	200 mi/ 322 km	N/a	Compress. hydrogen @ 3,600 psi	
Ansaldo - Fuel Cell Bus	Shown in 1997	Subsequent demonstration was planned in Brescia, Italy but never took place	EQHPP Program	Macchi-Ansaldo city bus	De Nora (now Nuvera)	Fuel cell/ battery hybrid	45 kW PEM	186 mi/300 km	N/a	Liquid hydrogen	
Ansaldo - Fuel Cell Bus	Shown in 1994	Shown in Brussels, Belgium - the FC and components were housed in a trailer behind the bus	EUREKA Bus Project	Van Hool 59-ft, 80-passenger bus	Elenco Co.	Fuel cell/ battery hybrid	80 kW AFC	N/a	N/a	N/a	
Ballard - P2 Fuel Cell Bus	Project: 1993 - 1995	Commercial prototype	N/a	New Flyer 40-ft bus	Ballard	Fuel cell/ battery hybrid	200 kW PEM	250 mi/402 km	N/a	Compress. hydrogen	
Ballard - P1 Fuel Cell Bus	Project: 1991 - 1992	Proof of concept	N/a	New Flyer shuttle bus	Ballard	Fuel cell	100 kW PEM	100 mi/161 km	N/a	Compress. hydrogen	
Bayernbus I	Deployed in 2000 - 2001	Shown at Munich, Germany's Fuel Cell Day	N/a	MAN NL263 bus	Siemens-KWU	Fuel cell	120 kW PEM	124 mi/200 km	N/a	Compress. hydrogen @ 25 MPa	
Bayernbus II	Shown in 2000	Prototype, shown At Munich, Germany's Fuel Cell Day	N/a	NeoPlan N8012 bus	Proton Motor	Fuel cell	80 kW PEM	93-155 mi/150-250 km	48 mph/ 80 km/h	Compress. hydrogen	
BC Transit - Fuel Cell Bus Fleet	One bus trialed in transit service in 2008, 19 delivered in 2009	20 bus purchase. First bus has completed a field trial, 19 delivered in 2009 for transit service in Whistler, British Columbia, Canada and at 2010 Olympic Games	N/a	New Flyer H40LFR	Ballard	Fuel cell/ battery hybrid	150 kW PEM	249 mi/400 km	56 mph/ 90 km/hr	Compress. hydrogen @ 350 bar	
Beijing - Fuel Cell Buses	Deployed 2006 - present	3 buses deployed in regular transit service in Beijing, China	UNDP/ GEF / European Commission	Mercedes-Benz Citaro 40-ft bus	Ballard	Fuel cell	PEM	93-155 mi/150-250 km	43 mph/ 70 km/h	Compress. hydrogen @ 350 bar	

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Burbank – Fuel Cell Battery Dominant, Plug-in Hybrid Bus	Deployed in 2010	Bus initially runs on battery-power, then on fuel cell power when battery is depleted. Bus to be deployed in Burbank, California	CARB AFIP	Proterra HFC25 35-ft bus	Hydrogenics	Fuel cell/ battery dominant, plug-in hybrid	32 kW PEM	300 mi/ 483 km	60 mph/ 97 km/h	Compress. hydrogen @ 350 bar	
BVG – Fuel Cell Bus	Deployed 2006 - present	Deployed in regular transit service by Berlin, Germany transit agency, BVG	ZIP Program	Neoplan Artic 60-ft articulated bus	Proton Motor	Fuel cell/ battery hybrid	180 kW PEM	N/a	N/a	Liquid hydrogen	
Chicago Transit Authority - P3 Fuel Cell Bus	Deployed 1998 – 2000	3 buses deployed in regular transit service in Chicago		New Flyer 40-ft bus	Ballard	Fuel cell	205 kW PEM	N/a	N/a	Compress. hydrogen	
CityCell - Fuel Cell Bus Project	Deployed in 2003 in Madrid and 2004 -2006 in Turin	1 bus in transit service in Turin , Italy and showcased at Winter Olympics, another deployed in Madrid, Spain	N/a	Irisbus Iveco CityClass Fuel Cell Bus	UTC Power	Fuel cell/ battery hybrid	60 kW PEM	N/a	37 mph/ 60 km/h	Compress. hydrogen @ 35 MPa (Madrid) / 20 MPa (Turin)	
Clean Urban Transport Europe (CUTE) Project – P5 Fuel Cell Bus Demonstrations	Deployed 2003 - 2006; project extended in several cities under HyFLEET : CUTE	27 buses deployed, 3 per city, in regular transit service in Amsterdam, Madrid, Porto, Barcelona, Hamburg, London, Stuttgart Luxembourg, & Stockholm	N/a	Mercedes-Benz Citaro 40-ft buses	Ballard	Fuel cell	205 kW PEM	124-186 mi/ 200-300 km	N/a	Compress. hydrogen @ 350-450 bar	
Coast Mountain Transit – P3 Fuel Cell Buses	Deployed 1998 – 2000	3 buses deployed in regular transit service in Vancouver, British Columbia, Canada		New Flyer 40-ft bus	Ballard	Fuel cell	205 kW PEM	N/a	N/a	Compress. hydrogen	
CTTransit – Nutmeg Fuel Cell	Deployed in 2010	4-5 buses will be placed in regular transit service in Connecticut	FTA National FC Bus Program	40-ft. buses	UTC Power	Fuel cell/ battery hybrid	120 kW PEM	N/a	N/a	N/a	
CTTransit - Fuel Cell Bus	Deployed 2007 - present	1 bus in regular transit service in Hartford, Connecticut	DOE Technology Validation Program	Van Hool A330 40-ft bus	UTC Power	Fuel cell/ battery hybrid	120 kW PEM	N/a	N/a	Compress. hydrogen @ 5,000 psi	
Dalian University – Fuel Cell Bus	Shown in 2001	Prototype	N/a	N/a	N/a	Fuel cell	30 kW PEM	N/a	40 mph/ 65 km/h	N/a	
Dong Feng Motor Corp – Fuel Cell Light Bus	Shown in 2001	Prototype	N/a	Dong Feng light bus	N/a	Fuel cell	25 kW PEM	N/a	40 mph/ 65 km/h	Compress. hydrogen @ 25 MPa	
Dual Variable Hybrid Fuel Cell Bus Demonstration	Deployed in 2009	Columbia, South Carolina and Austin, Texas	FTA National FC Bus Program	Proterra	Hydrogenics	Fuel cell/ battery dominant, plug-in hybrid	32 kW PEM	300 mi/ 483 km	60 mph/ 97 km/h	Compress. hydrogen @ 350 bar	
Ecological City Transport Systems (ECTOS)	Deployed 2003-2006, extended to 2007 under HyFLEET : CUTE	Three buses deployed in regular transit service in Reykjavik, Iceland	N/a	Mercedes-Benz Citaro 40-ft buses	Ballard	Fuel cell	250 kW PEM	124 mi/ 200 km	52 mph/ 80 km/h	Compress. hydrogen	

Project	Year	Location	Program	Bus Manufacturer/ Model	Fuel Cell Manufacturer	Engine Type	Fuel Cell Size/ Type	Range	Max. Speed	Fuel Type	Picture
Ecobus	Deployed 2007 – present	APS Hydrogen Park in Phoenix, Arizona	Private purchase	New Flyer Invero	Hydrogenics	Fuel cell/ultra capacitor hybrid	180 kW PEM	N/a	60 mph/ 97 km/h	Compress. hydrogen @ 350 bar	
ECO2Trans	Planned	Sunderland, UK	Project includes One North East, U. of Sunderland Shen Li High Tech, and AVID Vehicles	Two electric Gulliver U500EUK buses	Shen Li High Tech	Fuel cell/ ultra capacitor/ battery hybrid	N/a	N/a	N/a	N/a	
Electric Fuel Corporation/ General Electric – Zinc Air Fuel Cell Bus	Demo'd in 2001	On-road demonstration drives in Las Vegas by transit agency RTC and on a test track in Schenectady, New York	N/a	NovaBus. 40-ft bus	Electric Fuel Corp.	Fuel cell	Zinc Air Fuel Cell	N/a	N/a	N/a	
EXPO ZARAGOZA	3 midi-buses, summer of 2008-present	ExpoAgua Zaragoza, Spain	International Exposition 2008	Tecnobus Gulliver, 18-ft, 22 passenger	Hydrogenics	Fuel cell/ battery hybrid	12 kW PEM	124 mi/ 200 km	21 mph/ 33 km/h	Compress. hydrogen @ 200 bar	
Fraunhofer Institute for Transportation and Infrastructure Systems - AutoTram	Debuted in 2005	Prototype	N/a	Artic 80-ft bi-directional, 300-passenger bus	Ballard	Fuel cell	80 kW PEM	N/a	N/a	Compress. hydrogen @ 200 bar	
University of Alabama Ecobus	Planned from 2009 - 2011	Will be operated by the Birmingham-Jefferson County Transit Authority in Alabama	FTA	EVAmerica 30 ft bus	Hydrogenics	Fuel cell/ battery dominant plug-in hybrid	32 kW PEM	N/a	N/a	N/a	
Fuel Cells Czech Hydrogen Bus Project (FCZ H2-BUS)	Deployed in 2009	FCZ H2-BUS Prague, Czech Republic	FCZ H2-BUS	Skoda Electric Pilsen trolley bus	Proton Motor	Triple hybrid: fuel cell/ Battery/ ultracapacitors	N/a	N/a	N/a	N/a	
Georgetown University Generation III Bus Program	Planned	Revenue service in Chattanooga, Tennessee and Traverse City, Michigan	N/a	EVAmerica	Nucellsys	Fuel cell/ battery hybrid	N/a	N/a	N/a	Methanol	
Georgetown University Generation II Bus Program – Georgetown X1 Fuel Cell Bus	Project: 2001	Prototype, Demonstrated at SunLine Transit and the California Fuel Cell Partnership	N/a	Nova BUS 40-ft transit bus	Ballard	Fuel cell/ battery hybrid	100 kW PEM	350 mi/ 563 km	N/a	Methanol	
Georgetown University Generation II Bus Program – Georgetown/ UTC Fuel Cell Bus	Project: 1998	Prototype	N/a	Nova BUS 40-ft transit bus	UTC Power	Fuel cell/ battery hybrid	100 kW PAFC	350 mi/ 563 km	N/a	Methanol	
Georgetown University Generation I Bus Program	Project: 1994 - 1995	3 Test Bed Bus prototypes	N/a	BMI 30-ft transit bus	Fuji Electric	Fuel cell/ battery hybrid	50 kW PAFC	200-250 mi/ 322-402 km	55 mph/ 89 km/h	Methanol	


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Hamburg Fuel Cell Bus fleet	10 buses to be deployed in 2010	Hamburg, Germany	Hy-Solutions	Daimler Citaro Fuel Cell Bus	Daimler	Fuel cell/ battery hybrid	N/a	156 mi/ 250 km	N/a	Hydrogen	
Hickam AFB – Fuel Cell Shuttle Bus	Deployed 2004 - present	1 bus operated in routine service on- and off-base at Hickam AFB, Hawaii	DOE Technology Validation	El Dorado National RE-29E 30-ft shuttle bus	Hydrogenics	Fuel cell/ plug-in battery hybrid	20 kW PEM	125 mi/ 200 km	60 mph/ 97 km/h	Compress. hydrogen @ 5,000 psi	
HyChain Mini-Trans	3-bus, 3-year demo	Castille y León Spain; Emscher-Lippe, Germany and Herten & Bottrop, Germany	EC FP6 Lighthouse Project	Tecnobus Gulliver, 18-ft, 22 passenger	Hydrogenics	Fuel cell/ battery hybrid	12 kW PEM	125 mi/ 200 km	21 mph/ 33 km/h	Compress. hydrogen @ 200 bar	
New York Power Authority (NYPA) Fuel Cell Bus Project	Planned	New York demonstration sites (sites not yet determined)	FTA National FC Bus Program	N.a	N/a	N/a	N/a	N/a	N/a	N/a	
Hydrogenics FC Hybrid Midibus	1 bus, deployed since the EHA Nov. 2005	Owned by Hydrogenics, deployed at major events Europe-wide	North Rhine - Westphalia	Tecnobus Gulliver, 18-ft, 22 passenger	Hydrogenics	Fuel cell/ battery hybrid	12 kW PEM	125 mi/ 200 km	21 mph/ 33 km/h	Compress. hydrogen @ 200 bar	
HyFLEET: CUTE	Deployed 2006 - 2009	Extension of CUTE, ECTOS and STEP -3 FC buses each in London, Madrid, Beijing, Perth, Amsterdam, Barcelona, Luxembourg, Reykjavik, and 9 in Hamburg. Project is completed. FC buses continue to operate in Amsterdam and Hamburg	N/a	Mercedes-Benz Citaro 40-ft buses	Ballard	Fuel cell	300 kW PEM	124-186 mi/ 200 – 300 km	N/a	Compress. hydrogen @ 350-450 bar	
Hyundai FCB II	Unveiled 2009	Seoul Motor Show	n/a	Hyundai Low Floor Aero City bus platform	Hyundai Motor Co.	Fuel cell	200 kW	225 mi/ 360 km	62 mph/ 100 km/h	Compress. hydrogen @ 350 bar	
Hyundai FCB I	Deployed 2006 - present	1 bus operated in routine service in metropolitan Seoul and Jeju Island, Korea. Hyundai has contract with Seoul to start supplying fuel cell buses starting in 2013.	N/a	27-passenger buses	Hyundai Motor Co.	Fuel cell/ battery hybrid	160 kW	186 mi/ 300 km	N/a	Compress. hydrogen @ 35 MPa	
Iveco – Fuel Cell Bus	Planned	Fleet trials planned in Milan and Mantova, Italy	ISEM Project	Iveco Europolis bus	Nuvera	Fuel cell/ battery hybrid	60 kW PEM	N/a	37 mph/ 60 km/h	Compress. hydrogen @ 250 bar	
Battery-Dominant Lightweight Fuel Cell Bus Project	Planned in 2011 for a 4-yr. demo	1 bus will be deployed in Albany, New York. Project with GE Research	FTA National FC Bus Program	N/a	Hydrogenics	Fuel cell/ battery hybrid	50 kW	N/a	N/a	N/a	
Massport/Logan Airport Fuel Cell Bus	Planned	1 bus will be deployed by MBTA serving Logan Airport, Boston, Massachusetts	FTA National FC Bus Program	40-ft bus	Nuvera	Fuel cell/ battery hybrid	82 kW	N/a	N/a	N/a	
London Hydrogen Partnership – Fuel Cell Buses	Planned in late 2010	5 fuel cell bus will be deployed in transit service in London, UK	N/a	Wright Bros.	N/a	Fuel cell/ battery hybrid	75 kW PEM	N/a	N/a	N/a	

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MAN – Fuel Cell City Bus	Deployed 2002 – 2003	Deployed in 9 months in Berlin, Germany, then 3 months in Copenhagen, Denmark and Lisbon, Portugal	THERMIE	MAN NL223 40-ft bus	Nuvera	Fuel cell/ battery hybrid	120 kW PEM	N/a	N/a	Liquid hydrogen	
MAN – Fuel Cell Bus	Deployed 2000 - 2001	1 bus deployed by transit agency VAG/Nuremberg in Nuremberg, Erlangen and Furth, Germany	Bavarian Fuel Cell Bus Project	MAN NL 263FC 40-ft bus	Siemens Power Generation	Fuel cell/ battery hybrid	120 kW PEM	155 mi/ 250 km	N/a	Compress. hydrogen @ 250 bar	
Marin Transit Fuel Cell Bus	2008	Golden Gate Transit, in partnership with AC Transit, operated the bus in transit service in Feb. & Mar. 2008	N/a	Van Hool	UTC Power	Fuel cell/ battery hybrid	N/a	N/a	N/a	N/a	
Munich Airport – Fuel Cell Bus	Deployed 2004 - present	1 bus deployed on scheduled route near the Munich Airport	H2argemuc	MAN A23 40-ft bus	Ballard	Fuel cell/ battery hybrid	68 kW PEM	155 mi/ 250 km	N/a	Compress. hydrogen @ 350 bar	
NASA Glenn consortium fuel cell bus powered by H2 from Lake Erie water	Planned	To be operated by Cleveland's GCRTA transit agency	Consortium	N/a	N/a	Fuel cell	N/a	Na	Na	N/a	Planned
Natural Resources Canada – Fuel Cell Bus	Deployed in 2006	Deployed by Winnipeg Transit	N/a	New Flyer 40-ft bus	Hydrogenics	Fuel cell/ battery hybrid	180 kW PEM	249 mi/ 400 km	N/a	N/a	
NEBUS – New Electric Bus	Shown in 1997	Prototype, shown in cities around the world, demonstrated 2 weeks in Oslo, Norway in 1999	N/a	Daimler-Chrysler 0405N bus	Ballard	Fuel cell	250 kW PEM	156 miles/ 251 km	N/a	Compress. hydrogen @ 300 bar	
North Rhine Westphalia fuel cell city bus	Planned in 2010	Cologne, Germany	Parner-German Minister of Economic Affairs	60-ft bus	Nedstack	Fuel cell hybrid	N/a	N/a	N/a	N/a	Planned
Oberstdorf – Fuel cell midi-bus	Deployed 1998 - present	Operates in the alpine spa resort town of Oberstdorf, Germany	N/a	Neoplan midi-bus	De Nora (now Nuvera)	Fuel cell/ battery hybrid	55 kW PEM	N/a	N/a	Compress. hydrogen	
Ostseebus Fuel Cell Midi-bus	1 bus deployed 2006 - present	Barth, Germany	Heliocentris Fuel Cells	NeoPlan 26-ft midi-bus	Hydrogenics	Fuel cell/ battery hybrid	2 x 16kW = 32 kW PEM	112 mi/ 180 km	43 mph/ 70 km/h	Compress. hydrogen @ 200 bar	
Rampini-Hydrogenics fuel cell bus	1 bus, development project, 2007/2008	Perugia, Italy	Rampini fuel cell bus project	Rampini ZEV Alé 26-ft, 44 passenger bus	Hydrogenics	Fuel cell	2 x 16kW = 32 kW PEM	105-118 mi/ 170-190 km	31 mph/ 50 km/h	H2 350 bar	
Rheinbahn Fuel Cell Hybrid Midibuses	2 midi-buses deployed 2006 - present	Operated in regular service by Rheinbahn at Messe Düsseldorf fairgrounds route, Germany	NRW Ministry of Transport / Public Transit	Tecnobus Gulliver, 18-ft, 22 passenger bus	Hydrogenics	Fuel cell/ battery hybrid	12 kW PEM	124 mi/ 200 km	21 mph/ 33 km/h	Compress. hydrogen @ 200 bar	
Rio de Janeiro Hybrid Fuel Cell Bus	Deployed in 2009	Urban transit use in Rio de Janeiro, Brazil, additional FC buses will be added	UNDP	Padron 40-ft bus	N/a	Fuel cell/ battery hybrid	210 kW	186 mi/ 300 km	N/a	N/a	
Santa Clara VTA/ SamTrans – Zero Emission Bus Demonstration Project	Deployed 2005 - present	3 buses deployed in San Clara County, California	CARB ZEB/ DOE Technology Validation	Gillig 40-ft buses	Ballard	Fuel cell	205 kW PEM	N/a	N/a	Compress. hydrogen @ 5000 psi	

Project	Year	Location	Program	Bus Manufacturer/ Model	Fuel Cell Manufacturer	Engine Type	Fuel Cell Size/ Type	Range	Max. Speed	Fuel Type	Picture
Scania – fuel cell midi-bus	Shown in 2001	N/a	N/a	Scania midi-bus	Nuvera	Fuel cell/ battery hybrid	N/a	N/a	N/a	N/a	
Sao Paulo - Fuel Cell Bus	Planned four-year deployment	First bus deployed in 2009, up to 5 buses will be deployed by transit agency EMTU	UNDP/ GEF	Daimler/ Evobus	Ballard	Fuel cell/ battery hybrid	58 kW PEM	186 mi/ 300 km	44 mph/ 70 km/h	Compress. hydrogen from electrolysis	
Shen Li High Tech Co.- Shen-Li No.1 City Bus	Deployed in 2008	2 buses transported Olympic athletes in Beijing, China. Developed in conjunction with Tsinghua University	High-Tech 863 Program	N/a	Shen-Li High Tech.	Fuel cell	100 kW PEM	>186 mi/ >300 km	>53 mph/ >85 km/h	N/a	
Shen Li High Tech Co. - Innovation I Fuel Cell Bus	Shown in 2006, deployment planned in 2009	Prototype – shown at Busworld Asia in 2006 – 3 to 6 buses will be deployed for transit service in Shanghai, China by 2009. Developed in conjunction with Shanghai Jiao Tong University	UNDP/ GEF	Suzhou King Long city bus	Shen-Li High Tech.	Fuel cell	100 kW PEM	N/a	48 mph/ 80 km/h	N/a	
Shen Li High Tech Co. – WanXiang fuel cell city bus	2007	Made under the co-operation with WanXiang automobile company	N/a	WanXiang bus	Shen-Li High Tech.	Fuel cell	N/a	N/a	N/a	N/a	
Shen Li High Tech Co. – Shenglong fuel cell city bus	2007	Demonstrated at 2nd China International Hydrogen Forum, under co-operation with Shanghai Shenglong automobile company	N/a	Shenglong bus	Shen-Li High Tech.	Fuel cell	N/a	N/a	N/a	N/a	
Shen Li High Tech Co. – ShengWo fuel cell city bus	2006	Participated in the Industry Exposition, 2006, under the co-operation with Shanghai ShengWo automobile company	N/a	ShengWo bus	Shen-Li High Tech.	Fuel cell	N/a	N/a	N/a	N/a	
Shen Li High Tech Co.- Ankai fuel cell city bus	2006	Demonstrating in Ankai factory of Hefei city, under the co-operation with AnHui Ankai automobile company	N/a	Ankai bus	Shen-Li High Tech.	Fuel cell	N/a	N/a	N/a	N/a	
Shen Li High Tech Co.- Higer fuel cell city bus	2006	N/a	N/a	Higer bus	Shen-Li High Tech.	Fuel cell	N/a	N/a	N/a	N/a	
Shen Li High Tech Co.- Sunwin fuel cell city bus	2006	N/a	N/a	Sunwin bus	Shen-Li High Tech.	Fuel cell	N/a	N/a	N/a	N/a	
Shen Li High Tech Co.- Qing Neng No. 1 fuel cell buses	2005	Qing Neng No.1 and No.3 buses have operated for over 60,000 km in China. Developed in conjunction with Tsinghua University	High-Tech 863 Program	36-ft shuttle bus	Shen-Li High Tech.	Fuel cell/ battery hybrid	60 kW PEM	N/a	43 mph/ 70 km/h	N/a	
Shen Li High Tech Co.- Qing Neng No. 3 fuel cell bus	2005	Qing Neng No.1 and No.3 buses have operated for over 60,000 km in China. Developed in conjunction with Tsinghua University	High-Tech 863 Program	36-ft shuttle bus	Shen-Li High Tech.	Fuel cell/ battery hybrid	100 kW PEM	N/a	53 mph/ 85 km/h	N/a	

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Shen Li High Tech Co.- Chuang Xin No.1 fuel cell city bus	2005	Operated between Fengxian District and Suzhou City, China, operated for over 13,000 km	High-Tech 863 Program	N/a	Shen-Li High Tech.	Fuel cell/ battery hybrid	75 kW PEM	99 mi/ 160 km	>56 mph/ >90 km/h	N/a	
Shen Li High Tech Co.- Preliminary fuel cell city bus	2004	Shown at 2 <sup>nd</sup> Int'l H2 Forum in Beijing, China, May 2004, operated more than 5,0 Developed in conjunction with Tsinghua University	UNDP/GEF and MOST FC City Bus Demo Program	Tsinghua University B-Type City Bus	Shen-Li High Tech.	Fuel cell	120 kW PEM	N/a	N/a	N/a	
Shen Li High Tech Co.- No. 863 fuel cell city bus	2004	Operated more than 5,000 km in China. Developed in conjunction with Tsinghua University	High-Tech 863 Program	Tsinghua University platform city bus	Shen-Li High Tech.	Fuel cell/ battery hybrid	50 kW PEM	93 mi/ 150 km	40 mph/ 65 km/h	N/a	
SunLine Transit – American Fuel Cell Bus Project – 6 <sup>th</sup> generation fuel cell bus	2010	Will be placed in regular transit service in 9 Coachella Valley, California cities	CARB ZEB/ FTA National FC Bus Program	New Flyer	UTC Power	Fuel cell/ battery hybrid	120 kW	N/a	N/a	Compress. hydrogen	
SunLine Transit – American Fuel Cell Bus	Planned deployment from 2009 - 2011+	1 bus will be placed in regular transit service in the Coachella Valley, California	CARB ZEB/ DOE Technology Validation	Thor/ El Dorado National EZ Rider low floor bus	Ballard	Fuel cell/ battery hybrid	75 kW PEM	N/a	N/a	Compress. hydrogen	Planned
SunLine Transit - Fuel Cell Bus	Deployed 2006 - 2010	One bus placed in regular transit service in the Coachella Valley, California	CARB ZEB/ DOE Technology Validation	Van Hool A330 30-ft bus	UTC Power	Fuel cell/ battery hybrid	120 kW PEM	300-350 mi/ 483-563 km	N/a	Compress. hydrogen	
SunLine Transit – Thunder Power Fuel Cell Bus	Deployed 2002 - 2003	One bus placed in regular transit service in Palm Springs, California	CARB ZEB	Thor/ El Dorado National EZ Rider low floor bus	UTC Power	Fuel cell/ battery hybrid	60 kW PEM	150-200 mi/ 241-322 km	55 mph/ 88 km/h	Compress. hydrogen	
SunLine Transit – ZEBus / P4 Bus	Deployed 2000 – 2001	Tested for 13 months	CARB ZEB	New Flyer 40-ft bus (P4 bus)	Ballard	Fuel cell/ battery hybrid	205 kW PEM	225 mi/ 362 km	N/a	Compress. hydrogen @ 3600 psig	
Sustainable Transport Energy for Perth (STEP) – EcoBus	Deployed 2004-2006, extended to 2007 under HyFLEET : CUTE	3 buses deployed in regular transit service in Perth, Australia	N/a	Mercedes-Benz Citaro 40-ft buses	Ballard	Fuel cell	250 kW PEM	124 mi/ 200 km	48 mph/ 80 km/h	Compress. hydrogen	
Toyota-Hino FCHV-BUS	Deployed 2006 - present	3 buses shuttle passengers between the passenger terminal and airplanes on the tarmac at Nagoya, Japan's Centrair Airport	Japan Fuel Cell Bus Demonstration Program	Toyota/ Hino Motors 34.5-ft bus	Toyota	Fuel cell/ battery hybrid	180 kW PEM	155 mi/ 250 km	N/a	Compress. hydrogen @ 350 bar	
Toyota-Hino FCHV-BUS2 (improved version)	Deployed Mar.- Sept.2005	8 buses were deployed as a shuttle at Aichi Expo in Japan	Japan Fuel Cell Bus Demonstration Program	Toyota/ Hino Motors 34.5-ft.bus	Toyota	Fuel cell/ battery hybrid	180 kW PEM	155 mi/ 250 km	48 mph/ 80 km/h	Compress. hydrogen @ 5000 psi	

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Toyota-Hino - FCHV-BUS2	Deployed 2003 - 2004	1 bus placed in regular transit service by the Tokyo Metropolitan Transportation Service	Japan Fuel Cell Bus Demonstration Program	Toyota/Hino Motors 34.5-ft bus	Toyota	Fuel cell/ battery hybrid	180 kW PEM		48 mph/ 80 km/h	Compress. hydrogen @ 350 bar	
Toyota-Hino - FCHV-BUS1	Shown in 2001	Prototype, driven on test course in Japan	Japan Fuel Cell Bus Demonstration Program	Toyota/Hino Motors 34.5-ft bus	Toyota	Fuel cell/ battery hybrid	90 kW PEM	>186 mi/ >300 km	>48 mph/ >80 km/h	Compress. hydrogen @ 25 MPa	
Tsinghua University/ Nanyang Technological University fuel cell bus	Deployed in 2010	1 bus, shuttled athletes & officials during Youth Olympic Games in Singapore, tested beforehand in Suzhou, China	N/a	N/a	N/a	Fuel cell/ battery hybrid	N/a	N/a	N/a	N/a	
Tsinghua University – fuel cell light bus	Shown in 2001	Developed in conjunction with Beijing Green Power Co. (battery manufacturer)	N/a	Light bus 12-passenger vehicle	N/a	Fuel cell/ battery hybrid	20 kW PEM	120 mi/ 193 km	48 mph/ 80 km/h	Compress. hydrogen	
University Clinic (Klinik) Hamburg-Eppendorf (UKE)	Delivered in December 2009	1 bus deployed at hospital complex in Hamburg, Germany	Project of City-State of Hamburg	Tecnobus Gulliver, 18-ft, 22 passenger	Hydrogenics	Fuel cell/ battery hybrid	12 kW PEM	124 mi/ 200 km	21 mph/ 33 km/h	Compress. hydrogen @ 200 bar	
University of Delaware – Zero Emission Fuel Cell Hybrid Bus	Planned	Phase 4 fuel cell hybrid bus is in development	N/a	30-ft, 32 passenger	N/a	N/a	N/a	N/a	N/a	N/a	
University of Delaware – Zero Emission Fuel Cell Hybrid Bus	Planned	Phase 3 fuel cell hybrid bus is in development	N/a	30-ft, 32 passenger	N/a	Fuel cell/ battery hybrid	Two 19.4 kW fuel cells	N/a	N/a	N/a	
University of Delaware – Zero Emission Fuel Cell Hybrid Bus	2009	Shuttle bus deployed by University of Delaware	N/a	22-ft/22 passenger	Ballard	Fuel cell/ plug-in battery hybrid	Two 19.4 kW fuel cells	N/a	N/a	N/a	
University of Delaware – Zero Emission Fuel Cell Hybrid Bus	2007	Shuttle bus deployed by University of Delaware	N/a	EBus 22-ft shuttle bus	Ballard	Fuel cell/ plug-in battery hybrids	19.4 kW PEM	250 mi/ 402 km	45 mph/ 72 km/h	N/a	
University of Glamorgan	2007, Deployed 2008	Pontypridd, Wales, UK. Uses tribrid configuration of fuel cell, battery and ultra capacitors	Wales Accelerate Clusters	IVECO Daily	Hydrogenics	Fuel cell/ battery tribrid	12 kW PEM	150 mi/ 241 km	90 km/h 55 mph	Compress. hydrogen @ 200 bar	
University of Rome "La Sapienza"	2006-present	1 midi-bus deployed in Rome, Italy	CIRPS-Interuniversity research centre for sustainable development	Tecnobus Gulliver, 18-ft, 22 passenger	Hydrogenics	Fuel cell/ battery hybrid	12 kW PEM	124 mi/ 200 km	21 mph/ 33 km/h	Compress. hydrogen @ 200 bar	
University of Texas - Fuel Cell Hybrid Bus	Planned in 2011	1 bus	N/a	Proterra 35 ft, 37 passenger bus	N/a	Fuel cell/ plug-in battery hybrid	N/a	N/a	N/a	N/a	
University of Texas - Fuel Cell Hybrid Bus	Deployed in 2007	1 bus serving the University of Texas, Austin	N/a	EBus 22-ft shuttle bus	Ballard	Fuel cell/ plug-in battery hybrid	20 kW PEM	200 mi/ 124 km	N/a	N/a	

Project	Year	Location	Program	Bus Manufacturer/ Model	Fuel Cell Manufacturer	Engine Type	Fuel Cell Size/ Type	Range	Max. Speed	Fuel Type	Picture
Fort Lewis/Dept. of Defense fuel cell bus pilot project	Planned	Bus will transport staff around Ft. Lewis and between Ft. Lewis and McChord AFB (Washington)	Defense Logistics Agency's H2 Fuel Cell R&D Program	Proterra 35-ft. bus	Hydrogenics	Plug-in battery-electric bus with fuel cell range extender	Two 16 kW PEMs	N/a	N/a	N/a	Planned
UTC Power / Van Hool - Hybrid Fuel Cell Bus	Deployed starting June 2007	Bus continuously deployed in various locations in Belgium and the Netherlands	N/a	Van Hool 43-ft bus	UTC Power	Fuel cell/ battery hybrid	120 kW PEM	250-300 mi/ 402-483 km	70 mph/ 113 km/h	Compress. hydrogen @ 5,000 psi	

## Buses with Fuel Cell Auxiliary Power Units (APUs)

Compound Hybrid Fuel Cell Bus	Planned	Bus will use a fuel cell APU coupled with diesel engine. 1 year demo planned at San Francisco MUNI.	N/a	40-foot Daimler Orion bus	Hydrogenics	Fuel cell APU	2x12 kW or 16 kW (TBD) PEM	N/a	N/a	N/a	N/a
Hybrid APU for H2-ICE bus	Testing in 2008	Hybrid fuel cell APU with ultra capacitors for energy storage. Provides onboard power, AC and heat. Photo at right shows rooftop location of fuel cell APU. Deployed in Germany	N/a	MAN	Hydrogenics	Fuel cell APU	16 kW PEM	N/a	N/a	N/a	