



## Challenge X 2008 Team Technologies and Configurations

TEAM	HEV ARCHITECTURE	ENGINE	FUEL	TRANSMISSION	ENERGY STORAGE	MOTOR
Michigan Technological University	Through-the-road Parallel	2.0-L 4 Cylinder Spark Ignition	Reformulated Gasoline	4-speed Automatic	COBASYS, Nickel Metal Hydride - 288V	50 kW Solectria AC Induction Transaxle
Mississippi State University	Through-the-road Parallel	1.9-L GM Direct Injection Turbo Diesel	Bio Diesel (B20)	GM F40 6-speed Manual	Johnson Controls, Nickel Metal Hydride - 330V	45 kW Ballard Integrated Power Transaxle
The Ohio State University	Through-the-road Parallel	1.9-L GM Direct Injection Turbo Diesel	Bio Diesel (B20)	Aisin-Warner AF40 6-speed Automatic Transaxle	Panasonic, Nickel Metal Hydride - 300V	67 kW Ballard AC Induction Transaxle / 10.6 kW Kollmorgen Brushless DC Generator
Pennsylvania State University	Post Transmission Parallel	1.3-L GM Turbo Diesel	Bio Diesel (B20) & Hydrogen	Aisin AF33-5, 5-speed Automatic	Lithium Tech, Lithium Ion - 300V	78 kW Solectria AC - 42 AC Induction
Rose-Hulman Institute of Technology	Power Split	2.5-L 4 Cylinder Direct Injection Turbo Diesel	Bio Diesel (B20)	Custom Rose Hybrid 1-Mode Transmission (RH1T)	COBASYS, Nickel Metal Hydride - 336V	(2) 70 kW Azure AC Induction Motors
San Diego State University	Through-the-road Parallel	1.9-L GM Direct Injection Turbo Diesel	Bio Diesel (B20)	GM F40 6-speed Manual	Panasonic, Nickel Metal Hydride - 400V	150 kW AC Propulsion AC Induction
Texas Tech University	Parallel Hybrid	2.4 L GM Ecotec VVT	Ethanol (E85) & Hydrogen	GM 4T45E, 4-speed Automatic	COBASYS, Nickel Metal Hydride - 36V	4 kW GM Belt-Alternator-Starter
University of Akron	Series Parallel 2 by 2	1.9-L 4 Cylinder Diesel Turbo Direct Injection	Bio Diesel (B20)	Direct Shift Gear Box (DSG) 6-speed Manumatic	Nesscap, Ultracapacitor Bank - 370V	67 kW Ballard Integrated Power Transaxle / 36 kW Siemens Permanent Magnet Generator
University of California – Davis	Pre-Transmission Parallel Plug-In Hybrid Capable	1.5-L Atkinson Spark Ignition	Ethanol (E85)	UC-Davis Custom Continuously Variable Transmission	GIA Lithium Technology, Lithium Ion-346 V	75 kW UQM Permanent Magnet - Front / 60 kW ENOVA AC Induction - Rear
University of Michigan	Series Hydraulic	1.9-L GM Direct Injection Turbo Diesel	Bio Diesel (B20)	Fixed Gear Reduction	Hydraulic Accumulators	Hydraulic 80 cc/rev & 55cc/rev Bent Axis Variable Displacement
University of Tennessee	Through-the-road Parallel	1.9-L GM Direct Injection Turbo Diesel	Bio Diesel (B20)	GM F40 6-speed Manual	Johnson Controls, Nickel Metal Hydride - 288V	67 kW Ballard AC Induction Transaxle
University of Texas at Austin	Through-the-road Parallel	1.9-L GM Direct Injection Turbo Diesel	Bio Diesel (B20)	GM F40 6-speed Manual	Johnson Controls, Nickel Metal Hydride - 42V	5 kW Hitachi AC Induction Belt-Driven Alternator/Starter
University of Tulsa	Through-the-road Parallel	1.9-L GM Direct Injection Turbo Diesel	Bio Diesel (B20) & Hydrogen	GM F40 6-speed Manual	COBASYS, Nickel Metal Hydride - 288V	67 kW Ballard AC Induction Transaxle
University of Waterloo	Series Fuel Cell Electric	65 kW Hydrogenics HyPM Fuel Cell	Hydrogen	Fixed Gear Reduction	COBASYS, Nickel Metal Hydride - 288V	(2) 67 kW Ballard AC Induction Transaxles
University of Wisconsin – Madison	Through-the-road Parallel	1.9-L GM Direct Injection Turbo Diesel	Bio Diesel (B20)	GM F40 6-speed Manual	Johnson Controls, Nickel Metal Hydride - 288V	45 kW Ballard Integrated Power Transaxle
Virginia Tech	Split Parallel	2.3-L Saab Turbo Spark Ignition	Ethanol (E85)	GM 5-speed Manual	COBASYS, Nickel Metal Hydride - 336V	52 kW Ballard AC Induction Transaxle / 8kW MES AC Induction Belt-Alternator/Starter
West Virginia University	Through-the-road Parallel	1.9-L GM Direct Injection Turbo Diesel	Bio Diesel (B20)	Aisin-Warner AF40 6-speed Automatic Transaxle	Maxwell, Ultra-cap - 750 kJ	(2) PML Wheel Hub Motors / 18 hp AC Induction Generator