













Next Generation Natural Gas Vehicle Projects (updated 7/25/05)

Prime Contractor [Chart #]	Project Type [Target class]	Engine	Technology	Targets/Results*	Emission Tests	Industry Contact	Sponsoring Agency Contact
TeleflexGFI 	Engine proof of concept [Class 3]	6.0L GM (286 hp/317 ft-lb)	SING stoichiometric w/TWC	Completed Demonstrated 0.08 NOx, 0.002 PM (FTP LD)	Completed FTP (LD)	TeleflexGFI, Alex Lawson alawson@teleflexgfi.com 519-576-4270	SCAQMD, Mike Bogdanoff mbogdanoff@aqmd.gov (909) 396-3254
Clean Air Power 	Engine proof of concept [Class 6-8]	12.0L Caterpillar C-12 (410 hp/1,250 ft-lb)	Dual-Fuel w/EGR & CDPF	Completed Demonstrated 0.54 NOx, 0.004 PM (ESC13)	Completed ESC13	Clean Air Power, HC Wong hcwong@cleanairpower.com (858) 332-4879	NREL, Mike Frailey mike_frailey@nrel.gov (303) 275-3607
Cummins Westport 	Engine proof of concept [Class 3-6]	5.9L CWI B-Gas Plus (230 hp/500 ft-lb)	SING lean burn w/LNA	Completed Demonstrated 0.15 NOx, 0.01 PM (AVL8)	Completed AVL8	Cummins Westport, Mark Dunn Mdunn@westport.com (604) 718-8319	SCAQMD, Mike Bogdanoff mbogdanoff@aqmd.gov (909) 396-3254
Cummins Westport 	Engine proof of concept [Class 8]	15.0L CWI ISXG (450 hp/1,650 ft-lb)	HPDI w/EGR & oxidation catalyst	Completed Demonstrated 0.6 NOx, 0.03 PM (FTP)	Completed FTP, ESC13, AVL8	Cummins Westport, Mark Dunn Mdunn@westport.com (604) 718-8319	NREL, Mike Frailey mike_frailey@nrel.gov (303) 275-3607
John Deere 	Near-term engine/vehicle development [Class 6-7]	8.1L JDPS NG 6081 (280 hp/900 ft-lb) in transit bus	SING lean burn w/advanced engine controls, LNG-capable injectors, & oxidation catalyst	Scheduled completion: March 2005 Targeting 1.2 NOx, 0.05 PM	Planned FTP, DF, CD	John Deere, Johannes Inzenhofer inzenhoferjohannes@johndeere.com (319) 292-7925	NREL, Richard Parish richard_parish@nrel.gov (303) 275-4453
Cummins Westport 	Near-term engine/vehicle development [Class 6-8]	8.9L CWI L-Gas Plus (320 hp/1,000 ft-lb) in refuse truck	SING lean burn w/advanced engine controls & oxidation catalyst	Completed Demonstrated 1.4 NOx + NMHC, 0.01 PM (FTP)	Completed FTP	Cummins, Mostafa Kamel mostafa.m.kamel@Cummins.com (812) 377-7253	NREL, Mike Frailey mike_frailey@nrel.gov (303) 275-3607
Cummins 	Engine laboratory development [Class 3-6]	8.3L CWI C-Gas Plus (310 hp/950 ft-lb)	SING stoichiometric w/EGR & TWC	Scheduled completion: June 2005 Targeting 0.2 NOx, 0.01 PM, 0.01 formaldehyde, 40% peak thermal eff.	Planned FTP AVL8	Cummins, Edward Lyford-Pike Edward.J.Lyford-Pike@Cummins.com (812) 377-4407	SCAQMD, Naveen Berry nberry@aqmd.gov (909) 396-2363
Mack 	Long-term engine/vehicle development [Class 6-8]	12L Mack E7G (325 hp/1,250 ft-lb) in refuse truck; transition to Volvo MG11	SING stoichiometric w/EGR & TWC	Scheduled completion: May 2005 Targeting 0.2 NOx, 0.01 PM; SCAQMD follow-on vehicle demo	Planned FTP	Mack Trucks, Inc., Ken Murphy kenneth.murphy.jr@volvo.com (301) 790-5594	NREL, Richard Parish richard_parish@nrel.gov (303) 275-4453 SCAQMD, Matt Miyasato mmiyasato@aqmd.gov (909) 396-3249

Prime Contractor [Chart #]	Project Type [Target class]	Engine	Technology	Targets/Results*	Emission Tests	Industry Contact	Sponsoring Agency Contact
Mack 	Engine laboratory development [Class 6-8]	11L Volvo (325 hp/1,250 ft-lb)	SING stoichiometric w/VVT, EGR, & TWC	Scheduled completion: August 2005 Targeting 0.2 NOx, 0.01 PM	Planned Mack 16	Mack Trucks, Inc., Todd Reppert todd.reppert@volvo.com (301) 790-6716	NREL, Josh Taylor josh_taylor@nrel.gov (303) 275-4439
Westport 	Near-term engine/vehicle development [Class 8]	15L Cummins ISX (450 hp/1650 ft-lb)	HPDI w/EGR & oxidation catalyst	Scheduled completion: mid 2006 Targeting 1.2 NOx, 0.01 PM	Planned FTP	Westport, Graham Williams GWilliams@westport.com (604) 718-6486	NREL, Richard Parish richard_parish@nrel.gov (303) 275-4453
Cummins Westport 	Engine laboratory development [Class 6-8]	8.9L CWI SI/EGR (320 hp/1,000 ft-lb)	SING stoichiometric w/EGR & TWC	Scheduled completion: end 2006 Targeting 0.2 NOx, 0.01 PM	Planned FTP	Cummins, Mostafa Kamel mostafa.m.kamel@Cummins.com (812) 377-7253	NREL, Richard Parish richard_parish@nrel.gov (303) 275-4453
TBD 	Near-term engine/vehicle development [Class 6]		SING stoichiometric w/EGR & TWC	TBD	Planned FTP	TBD	NREL, Richard Parish richard_parish@nrel.gov (303) 275-4453
Cummins Westport	NGV Market Assessment	N/A	Assessment & integration study to determine commercial market opportunities	Completed Produced preliminary NGV design development report	N/A	Cummins Westport, Scott Baker sbaker@cumminswestport.com (604) 718-2025	SCAQMD, Mike Bogdanoff mbogdanoff@aqmd.gov (909) 396-3254
TIAX	Component proof of concept	N/A	Catalyzed glow plug	Completed Demonstrated catalyzed glow plug technology	N/A	TIAX, JP Mello mello.john@tiax.biz	NREL, Bob Rehn robert_rehn@nrel.gov (303) 275-4418

*All emissions figures given in g/bhp-h.

CDPF—catalyzed diesel particulate filter; EGR—exhaust gas recirculation; HPDI—high-pressure direct injection; LNA—lean-NOx adsorber; SING—spark-ignited natural gas; TWC—three-way catalyst; VVT—variable valve timing.

Emission Tests (Heavy-duty unless otherwise noted)

ESC13: 13-mode European Stationary Cycle—steady state testing on engine dynamometer
 AVL8: 8-mode AVL cycle—steady state testing on engine dynamometer
 Mack 16: 16-mode proprietary Mack cycle—steady state testing on engine dynamometer
 FTP: Federal Test Procedure—transient testing on engine dynamometer
 FTP (LD): Federal Test Procedure—transient testing on engine dynamometer for light-duty vehicles
 DF: Deterioration Factor—transient testing on engine dynamometer
 CD: Chassis dynamometer testing of vehicle

Reports

- See the NGVTF library for related reports www.nrel.gov/vehiclesandfuels/ngvtf/publications.html
- For final reports on the completed TeleflexGFI and Cummins Westport engine research projects, contact M. Bogdanoff.