



OFFROAD DIESEL RETROFIT GUIDANCE DOCUMENT

November 18, 2005

APPENDICES

RETROFIT PROGRAM SUPPORTING INFORMATION

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APPENDICES
WRAP OFFROAD DIESEL RETROFIT GUIDANCE DOCUMENT

TABLE OF CONTENTS

APPENDICES - RETROFIT PROGRAM SUPPORTING INFORMATION

APPENDIX A – WRAP Offroad Retrofit Program Member Contacts A-1

APPENDIX B – EPA NONROAD Model DescriptionB-1

APPENDIX C – Federal Funding ResourcesC-1

APPENDIX D – Industry and Retrofit Technology/Product Resources D-1

APPENDIX E – Other Retrofit Resource OrganizationsE-1

APPENDIX F – Emission Testing EquipmentF-1

APPENDIX A
WRAP OFFROAD DIESEL RETROFIT GUIDANCE DOCUMENT

APPENDIX A – WRAP OFFROAD RETROFIT PROGRAM MEMBER CONTACTS

State	Organization	Name	Phone	Email
AK	State Dept. of Environmental Conservation	Clint Farr	907-465-5127	clint_farr @dec.state.ak.us
AZ	State Dept. of Environmental Quality	Shawn Kendall	602-771-2349	
CA				
CO	State Dept. of Public Health & Environment	Doug Decker	303-692-3126	doug.decker@state.co.us
	State Dept. of Public Health & Environment	Shirleen Tucker	303-692-3109	shirleen.tucker@state.co.us
	Denver Regional Air Quality Council	Steve McCannon	303-629-5450	smccannon@raqc.org
	Denver Regional Air Quality Council	Ken Lloyd	303-629-5450	klloyd@raqc.org
ID	State Dept. of Environmental Quality	Jorge Garcia	208-373-0480	jgarcia@deq.state.id.us
	State Dept. of Environmental Quality	Leanord Herr	208-373-0457	lherr@deq.state.id.us
MT	State Dept. of Environmental Quality	Howard Haines	406-841-5252	hhaines@state.mt.us
	State Dept. of Environmental Quality	Trista Glazier	406-444-3403	tglazier@state.mt.us
NV	State Dept. of Conservation & Natural Resources	Sigurd Jaunarajs	775-687-9392	sjaunara@ndep.nv.gov
	Clark County Dept. of Air Quality Management	Dennis Ransell	702-455-1660	Ransel@co.clark.nv.us
NM	State Dept. of Energy, Minerals, and Natural Resources	Chris Wentz	505-476-3312	cwentz@state.nm.us
ND	State Dept. of Health	Tom Bachman	701-328-5188	tbachman@state.nd.us
OR	State Dept. of Environmental Quality	Kevin Downing	503-229-6549	downing.kevin@deq.state.or.us
	Lane Regional Air Pollution Authority	Sharon Banks	541-736-1056	sharon@lrapa.org
SD	State Dept. of Natural Resources	Rick Boddicker	605-773-6706	rick.boddicker@state.sd.us
UT	State Dept. of Environmental Quality	Ran Macdonald	801-536-4071	rmacdonald@utah.gov
WA	State Dept. of Ecology	Mike Boyer	360-407-6863	mboy461@ecy.wa.gov
WY				
	National Park Service	Elizabeth Waddell	206-220-4287	elizabeth_waddell@nps.gov
	Environmental Defense	Vickie Patton	303-440-4901	vpatton@environmentaldefense.org

APPENDIX C
WRAP OFFROAD DIESEL RETROFIT GUIDANCE DOCUMENT

APPENDIX C – FEDERAL GRANT FUNDING RESOURCES

As of May 2005

Agency/ Department	Grant Program/Description	Tribal Specific	Estimated Total Available	Project Limits	Due Date for Application	Potential Project Related to Diesel Emission Retrofits	Link
Department of Agriculture	The Scientific Cooperation Research Program funds long-term and short-term international collaborative research and exchanges that address concerns for food security, environmental stewardship, and agricultural trade.	Yes/Federally recognized tribal governments and other tribal organizations	Not Available	\$45,000.00	March 15	Cooperative effort to illustrate environmental benefits of using retrofit products with ag equipment.	http://fedgrants.gov/Applicants/USDA/FAS/FAS/USDA-GRANTS-122904-001/Grant.html
Department of Agriculture	The purpose of the Alaska Native-Serving and Native Hawaiian-Serving Institutions Education Grant Program is to promote and strengthen the ability of Alaska Native-Serving Institutions and Native Hawaiian-Serving Institutions to carry out education, applied research, and related community development programs. CSREES intends this program to address educational needs, as determined by each institution, within a broadly defined arena of food and agricultural sciences-related disciplines.	No/Higher Education	\$2,997,000.00	None	March 21	Develop education /outreach/ training project for diesel emission reduction and retrofit applications to ag equipment.	http://fedgrants.gov/Applicants/USDA/CSREES/OEP/USDA-GRANTS-123004-002/Grant.html
Department of Agriculture	Equity in Educational Land-Grant Status Act of 1994 Program provides funding for the 1994 Land-Grant Institutions to conduct non-formal education and outreach activities to help meet the needs of the Native American people and to provide essential services to their communities.	Tribal Colleges	\$2,811,840.00	\$100,000.00	January 14	Develop education /outreach/ training project for diesel emission reduction and retrofit applications to ag equipment.	http://fedgrants.gov/Applicants/USDA/CSREES/OEP/USDA-GRANTS-111604-001/Grant.html

APPENDIX C
WRAP OFFROAD DIESEL RETROFIT GUIDANCE DOCUMENT

Agency/ Department	Grant Program/Description	Tribal Specific	Estimated Total Available	Project Limits	Due Date for Application	Potential Project Related to Diesel Emission Retrofits	Link
Department of Agriculture	Technical Assistance to plan and implement forestry practices under the Environmental Quality Incentive Program (EQIP) provides technical and financial help to producers in planning, designing and implementing conservation practices that contribute to agricultural/forestall viability, water quality improvements, soil and plant health, wildlife habitat improvements and other natural resource enhancements. Applicants will be responsible for assisting NRCS in providing technical assistance necessary to plan and implement conservation practices to assist land users dealing with forest resource issues.	Yes/Federally recognized tribal governments and other tribal organizations	\$100,000.00	\$100,000.00	April 19	Develop education /outreach/ training/ and/or pilot retrofit project t for applications in forrested areas.	http://fedgrants.gov/Applicants/USDA/NRCS/23229/NRCS-VA-33A7-4-2/Grant.html
Department of Agriculture	Through Environmental Quality Incentive Program Assistance (EQIP) , farmers and ranchers may receive financial and technical help to install or implement structural and management practices on their land. The objective of EQIP is to optimize environmental benefits that: 1) reduce nonpoint source pollution, such as nutrients, sediment, pesticides, or excess salinity; 2) reduce emissions from agricultural sources that contribute to air quality impairments in non-attainment areas	Yes/Federally recognized tribal governments and other tribal organizations	\$60,000.00	\$25,000.00	March 3	Develop pilot retrofit projects for ag applications	http://fedgrants.gov/Applicants/USDA/NRCS/NCRS-CA/NRCS-9-CA-05/Grant.html

APPENDIX C
WRAP OFFROAD DIESEL RETROFIT GUIDANCE DOCUMENT

Agency/ Department	Grant Program/Description	Tribal Specific	Estimated Total Available	Project Limits	Due Date for Application	Potential Project Related to Diesel Emission Retrofits	Link
Department of Agriculture	Pollution Prevention Grant Program has projects funded under this program must seek to reduce sources of pollution or eliminate waste across all environmental media -- air, land and water.	Yes/Federally recognized tribal governments	\$480,000.00	\$100,000.00	March 15	Develop pilot retrofit projects for ag applications	http://fedgrants.gov/Applicants/EPA/OGD/GAD/R2DEPP-FO-05-06/Grant.html
Department of Commerce	The NOAA Environmental Entrepreneurship Program (EEP) is designed to strengthen the capacity of Minority Serving Institutions (MSIs) to foster student careers, entrepreneurship opportunities and advanced academic degrees in the sciences directly related to...fisheries, coastal, ocean, climate, atmospheric, environmental sciences, and remote sensing technology.	Tribal Colleges & Universities	\$6,000,000.00	\$500,000.00	October 29	Develop education /outreach/ training project for diesel emission reduction and retrofit applications.	http://fedgrants.gov/Applicants/DOC/NOAA/GMC/11481MSI EPP063004/Grant.html
Department of Energy	State Energy Program (SEP) grants. The goal of the U.S. Department of Energy's (DOE's) Clean Cities School Buses initiative is offering funding for the incremental costs of alternative fuel school buses and the cost of refueling sites for these buses to assist in decreasing the nation's dependence on petroleum by helping to grow the alternative fuels market.	No/State Governments	\$400,000.00	None	May 2	Develop alternative fuel-based retrofit projects (e.g., biodiesel).	http://fedgrants.gov/Applicants/DOE/PAM/HQ/DE-PS26-05NT42396-01C/Grant.html

APPENDIX C
WRAP OFFROAD DIESEL RETROFIT GUIDANCE DOCUMENT

Agency/ Department	Grant Program/Description	Tribal Specific	Estimated Total Available	Project Limits	Due Date for Application	Potential Project Related to Diesel Emission Retrofits	Link
Department of Energy	State Energy Program (SEP), Clean Cities Idle Reduction Technologies. This sub-opportunity seeks projects that promote the reduction and/or elimination of idling by heavy-duty vehicles and/or school buses through the use of idle reduction technologies. Projects that deploy and evaluate on-board technologies to provide hotel loads, such as cab heating and cooling, are of special interest.	No/State Governments	\$400,000.00	None	May 4	Develop retrofit projects involving the use of idle reduction technologies.	http://fedgrants.gov/Applicants/DOE/PAM/HQ/DE-PS26-05NT42396-01E/Grant.html
Department of Health and Human Services	Mining Occupational Safety and Health Research applications are sought that investigate the broad issues of mining safety and health through population-based or laboratory research projects that are focused on mining safety related to diesel exhaust exposure.	Yes/Federally recognized tribal governments and other tribal organizations	\$1,000,000.00	\$150,000.00	March 15	Develop education /outreach/ training project for diesel emission reduction and retrofits for mining applications.	http://fedgrants.gov/Applicants/HHS/NIH/NIH/RFA-OH-05-005/Grant.html
Department of Transportation	The Tribal Technical Assistant Program will assist in developing and implementing new transportation technologies and administrative procedures at the tribal level.	Yes/Federally recognized tribal governments	Not Available	None	August 28	Develop pilot retrofit projects for transportation applications related to tribal interests.	http://fedgrants.gov/Applicants/DOT/FHA/HAAM/DTFH61-03-H-00114/Grant.html
Department of transportation, Federal Aviation Administration	VALE Program provides funds for reducing ground emissions at commercial service airports.	Tied to airport locations	\$5,000,000	\$500,000	Application cycle	Develop pilot retrofit projects for onroad and offroad applications related to airport ground service equipment.	http://www.faa.gov/arp/environmental/VALE/Index.cfm

APPENDIX C
WRAP OFFROAD DIESEL RETROFIT GUIDANCE DOCUMENT

Agency/ Department	Grant Program/Description	Tribal Specific	Estimated Total Available	Project Limits	Due Date for Application	Potential Project Related to Diesel Emission Retrofits	Link
Department of Transportation Federal Highway Administration	Congestion Mitigation and Air Quality (CMAQ) Improvement Program grants can fund 80% of projects that will assist an area in reducing transportation-related emissions.	Typically support emission reduction projects in EPA air quality nonattainment or maintenance areas.	TBD (average \$1.35 billion per year)	Varies	Application cycle	Develop pilot retrofit projects for onroad and/or offroad applications related to transportation (e.g., ports).	www.fhwa.dot.gov/environment/cmaq
Environmental Protection Agency	Collaborative Diesel Emission Reduction Project grants support regional collaborative demonstration projects that reduce diesel emissions and protect human health and the environment.	Yes/Tribal listed	\$1,000,000.00	\$250,000.00	February 11	Develop pilot retrofit projects for onroad and offroad applications.	http://fedgrants.gov/Applicants/EPA/OGD/GAD/EPA-GRANTS-122104-001/Grant.html
Environmental Protection Agency	Pollution Prevention Grants Program dollars are targeted at State and Tribal technical assistance programs that address the reduction or elimination of pollution by businesses across all environmental media: air, land, and water.	Yes/Federally recognized tribal governments	\$5,000,000.00	\$150,000.00	May 26	Develop pilot retrofit projects for onroad and offroad applications related to tribal interests.	http://fedgrants.gov/Applicants/EPA/OGD/GAD/EPA-GRANTS-041204-001/Grant.html
Environmental Protection Agency	The purpose of this grant program is to provide funding for tribal air pollution control programs and projects which support tribal air quality assessment and the development of tribal air program capacity.	Yes/Tribal listed	\$2,500,000.00	None	NOT CURRENTLY LISTED	Develop pilot retrofit projects for onroad and offroad applications related to tribal interests.	http://fedgrants.gov/Applicants/EPA/OGD/GAD/EPA-GRANTS-112904-001/Grant.html

APPENDIX C
WRAP OFFROAD DIESEL RETROFIT GUIDANCE DOCUMENT

Agency/ Department	Grant Program/Description	Tribal Specific	Estimated Total Available	Project Limits	Due Date for Application	Potential Project Related to Diesel Emission Retrofits	Link
Environmental Protection Agency	Assistance Agreement for Environmental Justice and Air Permitting Workshops solicits proposals from state, local, multi-state, tribal agencies and non-profit public or private organizations or institutions, for a partnership project that (1) develops and delivers a training workshop that increases the awareness within environmental justice communities of permitting programs that affect air quality and (2) develops and delivers a training workshop that brings together governmental, community, academic, and advocacy groups and representatives to discuss emerging issues related to the Clean Air Act's Title V operating permits program.	Yes/Tribal listed	\$80,000.00	None	March 25	Develop education /outreach/ training project for diesel emission reduction and retrofits related to tribal interests.	http://fedgrants.gov/Applicants/EPA/OGD/GAD/OAR-OAQPS-ITPID-05-02/Grant.html
Environmental Protection Agency	Supports projects to improve environmental protection for Tribes in Alaska. Key elements of the solicitation are for solid, hazardous waste, air, and water implementation; provide training to conduct water, sediments, and soil sampling; address community emergency response needs; community wide clean up; solid waste training; and the development of culturally-relevant environmental education materials.	Yes/Tribal listed	\$1,024,000.00	\$250,000.00	NOT CURRENTLY LISTED	Develop education /outreach/ training project for diesel emission reduction and retrofits related to Alaskan tribal interests.	http://fedgrants.gov/Applicants/EPA/OGD/GAD/EPA-GRANTS-011905-001/Grant.html

APPENDIX C
WRAP OFFROAD DIESEL RETROFIT GUIDANCE DOCUMENT

Agency/ Department	Grant Program/Description	Tribal Specific	Estimated Total Available	Project Limits	Due Date for Application	Potential Project Related to Diesel Emission Retrofits	Link
Environmental Protection Agency	The purpose of the Tribal National Pollutant Discharge Elimination System (NPDES) Program is to conduct and promote the coordination and acceleration of investigations, training, demonstrations, surveys and studies relating to the causes, effects, extent, prevention, reduction and elimination of pollution.	Yes/Tribal listed	\$275,000.00	\$90,000.00	March 11	Develop education /outreach/ training project for diesel emission reduction and retrofits.	http://fedgrants.gov/Applicants/EPA/OGD/GAD/EPA-GRANTS-021005-001/Grant.html
Environmental Protection Agency	State and Tribal Assistance Grants (STAG) are available to assist in achieving compliance with environmental regulations.	Yes/Tribal listed	Not available	\$50,000- \$200,000	July 30	Develop pilot retrofit projects for onroad and offroad applications related to regional haze reduction.	http://cfpub.epa.gov/compliance/state/grants/stag/
Environmental Protection Agency	The Community Action for a Renewed Environment (CARE) Program is a new and unique community-based, community driven, multimedia demonstration program designed to help communities understand and reduce risks due to toxic emissions from all sources.	Yes/Tribal listed	\$1,500,000 for FY 2005	\$1,500,000	May 20	Develop education /outreach/ training project for diesel emission reduction and retrofits.	www.epa.gov/air/grants/05-01.pdf
Environmental Protection Agency	The Tribal Environmental Education Outreach and Support Program solicits proposals for the development of an education outreach program designed to reach tribal students and develop their understanding of and interest in pursuing careers in air quality and environmental programs in general.	Yes/Tribal listed	\$200,000 for FY 2005	\$200,000	May 27	Develop education /outreach/ training project for diesel emission reduction and retrofits.	www.epa.gov/air/grants/05-10.pdf

APPENDIX C
WRAP OFFROAD DIESEL RETROFIT GUIDANCE DOCUMENT

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Environmental Protection Agency	The Tribal Community: Reducing Toxic Air Pollutants (RFA) Program seeks proposals for conducting education, training and outreach on the application of voluntary methods that effectively reduce the risk of human exposure to both indoor and outdoor toxic pollutants in Tribal communities.	Yes/Tribal listed	\$100,000	\$33,000- \$100,000	May 4	Develop education /outreach/ training project for diesel emission reduction and retrofits.	www.epa.gov/air/grants/05-07.pdf
Environmental Protection Agency	The Truck Engine Idle Reduction Technology Demonstration Program provides funds to evaluate idle reduction technologies to achieve emission reductions and energy savings from the transportation sector.	Yes/Tribal listed	\$5,000,000	\$500,000- \$3,500,000	June 6	Develop pilot retrofit idle reduction project for onroad and offroad applications related to regional haze reduction.	www.epa.gov/air/grants/05-09.pdf
Environmental Protection Agency	National Clean Diesel Campaign Demonstration Assistance Agreements provide funding assistance to develop partnerships that demonstrate the applicability and feasibility of implementation of EPA and CARB verified retrofit technologies in nonroad vehicles and equipment.	Yes/Tribal listed	\$800,000	\$50,000- \$200,000	July 1	Develop pilot retrofit projects for onroad and offroad applications related to regional haze reduction.	www.epa.gov/air/grants/05-14.pdf

APPENDIX D
WRAP OFFROAD DIESEL RETROFIT GUIDANCE DOCUMENT

APPENDIX D – INDUSTRY AND RETROFIT TECHNOLOGY PRODUCT RESOURCES

Nonroad Engine Emission Control Technology Vendors			
Company	Contact	Technology	EPA or ARB Verified
Argillon	Gary G. Keefe 678.341.7532 Fax: 678.341.7509 gary.keefe@argillon.com www.argillon.com	SCR SCR/DPF SCR/DOC	
ArvinMeritor	Chuck Knott 812.341.2000 Fax: 812.341.2350 Chuck.Knott@ArvinMeritor.com www.arvinmeritor.com	DOC DPF SCR	
Catalytica Energy Systems	Troy Kinney 480.556.5585 Fax: 480.315.3745 Tkinney@CatalyticaEnergy.com www.CatalyticaEnergy.com	LNC/DPF/FI	
Caterpillar	Patrick Mohrman 309-578-8321 Fax: 309-578-7152 Mohrman_patrick_f@cat.com www.cat.com	DOC DPF Machine Repower	DOC* DPF***
Cleaire	Tim Taylor 916.296.7049 Fax: 916.371.2849 Tim.Taylor@cleaire.com www.cleaire.com	DPF/LNC, Flash/DPF Flash/DOC	DOC/Flash* DPF/Flash* DPF/LNC*
CleanAIR Systems, Inc.	Michael H. Roach 505.474.4122 Fax: 505.474.4046 mhrbig@ix.netcom.com www.cleanairsys.com	DPF (stationary applications) DOC	
Clean Diesel Technologies, Inc	James Valentine 203.327.7050 Fax: 203.323.0461 jvalentine@cdti.com www.CDTI.com	DOC/FBC Flow-through filter (FTF)/FBC	DOC/FBC* FTF/FBC*
DCL Int'l, Inc.	John Muter 905.660.6451 ext. 297 jmuter@dcl-inc.com www.dcl-inc.com	DOC DPF	
Donaldson Company	Julian Imes 952.887.3730 Fax: 952.887.3937 imes@mail.donaldson.com www.donaldson.com	DOC, DOC/Crankcase Emission Control (CEC) DPF, DPF/CEC	DOC* DOC/CEC* DPF*

APPENDIX D
WRAP OFFROAD DIESEL RETROFIT GUIDANCE DOCUMENT

Company	Contact	Technology	EPA or ARB Verified
Engelhard Corp	Kevin Hallstrom 732.205.6489 Fax 732.205.5687 Kevin.hallstrom@engelhard.com www.engelhard.com	DOC DPF	DOC* DPF*
Environmental Solutions Worldwide, Inc	Frank Haas 905.695.4141 ext. 255 Cell 416.318.7675 Fax 905.695.5014 phaas@cleanerfuture.com www.cleanerfuture.com	DOC FTF	FTF*
Extengine Transport System	Phillip Roberts 714.774.3569 Fax: 714.774.3569 roberts@extengine.com www.extengine.com	FTF SCR/DOC SCR/DPF	SCR/DOC**
Fleetguard Emission Solutions	Amy Boerger 812.377.3745 Fax: 812.377.3745 Amy.R.Boerger@Fleetguard.com www.fleetguard.com	DOC DPF FTF DPF/LNC	Uses verified DOC*, DPF*, FTF*, and DPF/LNC* technologies
International Truck & Engine	Thomas L. Trueblood 312.836.3932 Fax: 312.836.3937 Thomas.trueblood@nav-international.com www.internationaldelivers.com	DOC DPF Reflash	Uses verified DOC* and DPF* technologies
Johnson Matthey	Marty Lassen 610.341.3404 fax: 610.341.3116 lassem@jmusa.com www.matthey.com	DOC, DPF, EGR/DPF, SCR/DPF	DPF* DOC* EGR/DPF*
Kleenair Systems, Inc.	Lionel Simons 949.955.3492 lsimons@kair.com www.Kair.com	SCR DPF	
Lubrizol/ECS	Kevin Brown 905.853.5500 ext. 316 Fax: 905.853.5801 kfb@lubrizol.com www.corporate.lubrizol.com	DOC DPF Emulsion	DOC*** Emulsion*** DOC/Emulsion** DPF (passive)* DPF (external regeneration)**
Miratech	Nick Detor 714.773.0848 ndetor@miratechcorp.com www.miratech.com	SCR NSCR DPF	Technologies used in stationary source applications
Nett Technologies, Inc	Wayne Borean 800.361.6388 ext. 103 Fax: 905.672.5949 wborean@nett.ca www.nett.com	DOC DPF	
STT Emtec	Alex Gorel 908.720.9770 Fax: 732.981.8083 Alex.Gorel@sstemtec.com www.STTEmtec.com	EGR (must be used with DPF)	EGR/DPF*

APPENDIX E – OTHER RETROFIT RESOURCE ORGANIZATIONS

A. General Information on Retrofit Technologies/Federal Government Initiatives

- EPA Voluntary Diesel Retrofit Program
<http://www.epa.gov/otaq/retrofit/index.htm>
 - Project Map
<http://www.epa.gov/otaq/retrofit/projectmap.htm>
 - Idling Reduction
<http://www.epa.gov/otaq/smartway/idling.htm>
 - Clean School Bus USA
<http://www.epa.gov/otaq/schoolbus/>
 - Anti-idling
<http://www.epa.gov/otaq/schoolbus/antiidling.htm>
- EPA Clean Diesel Campaign
<http://www.cleanfleetsusa.net/>
- Federal Highway Administration Congestion Mitigation and Air Quality Improvement Program
<http://www.fhwa.dot.gov/environment/cmaq/>
- Federal Aviation Administration Airport Environmental Program
<http://www.faa.gov/arp/environmental/index.cfm>
 - Voluntary Airport Low Emissions Program
<http://www.faa.gov/arp/environmental/VALE/Index.cfm>
 - Inherently Low-Emission Airport Vehicle Pilot Program
<http://www.faa.gov/arp/environmental/ileav/>
- Clean Air Task Force
<http://www.catf.us/>

B. Verified Retrofit Products

- California Air Resources Board Diesel Emission Control Verification
<http://www.arb.ca.gov/diesel/verdev/verdev.htm>
 - Level 1 Verified Technologies
<http://www.arb.ca.gov/diesel/verdev/level1/level1.htm>
 - Level 2 Verified Technologies
<http://www.arb.ca.gov/diesel/verdev/level2/level2.htm>
 - Level 3 Verified Technologies
<http://www.arb.ca.gov/diesel/verdev/level3/level3.htm>

- EPA Technology Verification Program
<http://www.epa.gov/etv/index.html>
 - Verified Technologies
<http://www.epa.gov/etv/verifications/verification-index.html>

C. City/State/Regional Retrofit Programs

- California Air Resources Board Diesel Risk Reduction Program
<http://www.arb.ca.gov/diesel/mobile.htm>
- California Air Resources Board International Diesel Retrofit Advisory Committee
<http://www.arb.ca.gov/diesel/idrac.htm>
- California Air Resources Board Public Transit California
<http://www.arb.ca.gov/msprog/bus/bus.htm>
- California Department of Transportation Clean Air Initiative
<http://www.dot.ca.gov/hq/eqsc/CleanAir/cleanair.htm>
- Connecticut Clean Air Construction Initiative
http://www.i95newhaven.com/pooverview/environ_init.asp
- Massachusetts Voluntary Diesel Retrofit Program
<http://www.masspike.com/bigdig/background/airpollution.html>
- New York Heavy Duty Diesel Vehicle I/M Program
<http://www.dec.state.ny.us/website/dar/bms/hddv.html>
- New York Ferry Retrofit Program
www.nymtc.org/ferry_site/LISfiles/nescaum.pdf
- New York Local Law 2003/077
http://www.nyccouncil.info/pdf_files/bills/law03077.pdf
- New York Department of Transportation Clean-Fueled Snowplow
http://www.eere.energy.gov/cleancities/progs/new_success_ddown.cgi?138
- Texas Clean Fleet Program
<http://www.tnrcc.state.tx.us/air/ms/tcf.htm>
<http://www.tnrcc.state.tx.us/air/ms/houston.pdf>
- Texas Emission Reduction Program
<http://www.tnrcc.state.tx.us/oprd/sips/terp.html>
- Sacramento Metropolitan Air Quality Management District
<http://www.airquality.org/>
- South Coast Air Quality Management District
<http://www.aqmd.gov/>
- Bay Area Air Quality Management District
<http://www.baaqmd.gov/>

- Puget Sound Clean Air Agency
<http://www.pscleanair.org/>
- City of Houston Emissions Reductions Plan
<http://www.houstontx.gov/mayor/cleanair.pdf>
- West Coast Collaborative
<http://www.westcoastdiesel.org/>

D. International Retrofit Programs

- Switzerland BUWAL Approved Particulate Filter List
http://www.umwelt-schweiz.ch/buwal/eng/fachgebiete/fg_luft/vorschriften/industrie_gewerbe/filter/index.html
- Ministry of the Environment of Japan Motor Vehicle Exhaust Emission Standards
<http://www.env.go.jp/en/lar/regulation/mv.html>
- Clean Air Initiative in Latin American Cities
http://www.cleanairnet.org/lac_en/1415/channel.html
 - Bus Retrofit Systems
<http://www.cleanairnet.org/infopool/1411/article-33900.html>
 - Trucks Retrofit Systems
<http://www.cleanairnet.org/infopool/1411/article-33918.html>
- CANMET Mining & Mineral Sciences Laboratories
<http://www.nrcan.gc.ca/mms/canmet-mtb/mmsl-lmsm/mmsl-e.htm>
- Tokyo Metropolitan Government Master Environment Plan
<http://www.kankyo.metro.tokyo.jp/kouhou/english2003/index.html>

E. Industry/Supplier Representatives

- Diesel Technology Forum
<http://www.dieselforum.com/>
- Manufacturers of Emission Controls Association
<http://www.meca.org/jahia/Jahia>
- Environmental Solutions Worldwide Inc.
<http://www.cleanerfuture.com/>
- DieselNet
<http://www.dieselnet.com/>
- American Association of Port Authorities
<http://www.aapa-ports.org/>

F. Verified Retrofit Product Suppliers

- **Lubrizol**
 - AZ Purifier and AZ Purimuffler
<http://www.lubrizol.com/enginecontrol/>
 - PuriNOx
<http://www.lubrizol.com/PuriNOx/default.asp>
- **Donaldson**
<http://www.donaldson.com/en/index.html>
- **Cleaire**
<http://www.cleaire.com/>
- **Extengine**
<http://www.extengine.com/index.html>
- **Environmental Solutions Worldwide Inc.**
<http://www.cleanerfuture.com/products/>
- **Johnson Matthey**
<http://www.johnsonmatthey.com/>
- **Engelhard**
<http://www.engelhard.com/>

G. Idle Reduction

- **EPA Voluntary Diesel Retrofit Program**
<http://www.epa.gov/otaq/schoolbus/antiidling.htm>
- **New York State Energy Research and Development Authority**
<http://www.nyserda.org/programs/transportation/truckstopelec.asp>
- **Clean Cities Program Idle Reduction**
<http://www.eere.energy.gov/cleancities/idle/>

H. Diesel Exhaust Health Effects and Air Quality Impacts

- **STAPPA/ALAPCO**
<http://www.4cleanair.org/DieselTrucks.pdf>
- **Health Effects Institute**
<http://www.healtheffects.org/Pubs/diesum.htm>
- **Environmental Protection Agency**
<http://www.epa.gov/ebtpages/humahealtheffects.html>
- **California Air Resources Board**
<http://www.arb.ca.gov/research/health/health.htm>

APPENDIX E
WRAP OFFROAD DIESEL RETROFIT GUIDANCE DOCUMENT

- American Lung Association
<http://www.lungusa.org/site/apps/s/content.asp?c=dvLUK9O0E&b=34706&ct=461711>

APPENDIX F
WRAP OFFROAD DIESEL RETROFIT GUIDANCE DOCUMENT

APPENDIX F – EMISSIONS TESTING EQUIPMENT

Make/Model	Measurements	Limitations	Advantages	Cost	Comments
ATS Emission 5 Gas Analyzer	HC, CO, CO ₂ , O ₂ , NO _x , AFR & Lambda	Wired; 5 sensors	Certified to BAR-97; 1.5 to 2 second delay from sample to display	\$3,995	Includes software and technical support for 1 year
ECOM J2K	O ₂ , CO, NO, NO ₂ , SO ₂ (calculates CO ₂)	5 sensors	+2% accuracy; wireless	\$5,000-\$9,000	Price dependant on configuration and options
EMS Model 8000-5	HC, CO, CO ₂ , O ₂ , NO _x	Palm Pilot with Bluetooth required; no display	Wireless to 30 feet; no laptop required	\$3,995	1-3 year warranty
EMS Model 5001-4	HC, CO, CO ₂ & O ₂ (upgrade for NO _x avail)	Wired; 4 sensors; 9 second response	Certified to BAR-97	\$4,395	3 year warranty
EMS Model 5001-5	HC, CO, CO ₂ , O ₂ , NO _x	Wired; 5 sensors; 9 second response	Certified to BAR-97	\$4,995	3 year warranty
Horiba MEXA-324J	CO & HC	Wired; 10 second response	Warms up in 5 minutes		
Horiba MEXA-554J	CO, HC, CO ₂ , O ₂ , AFR & Lambda	Wired; 10 second response	Certified to BAR-97		Optional attached printer
testo 350	O ₂ , H ₂ , NO & NO ₂ (sensor upgrades avail)	Wired; 6 sensors	+2% accuracy; can link up to 8 analyzers to 1 controller	\$8,495	Comes as a kit (includes cases, extra filters, manuals); 1-2 year warranty
Sensors, Inc SEMTECH-D	HC, CO, CO ₂ , NO & NO ₂	70 lbs; +3-4% accuracy	Measures while vehicle is driven; data can be retrieved via cell or internet link		EPA's PEMS; can be installed in most light and heavy duty vehicles
Sensors, Inc SEMTECH PM-300	PM	0.3 to 2+ micron; 1 sec sampling rate	Measures while vehicle is driven; gasoline and diesel applications		Internal dilution tunnel

APPENDIX F
WRAP OFFROAD DIESEL RETROFIT GUIDANCE DOCUMENT

Make/Model	Measurements	Limitations	Pros	Cost	Comments
Mustang "Dyno-to-go"	Engine characteristics	6,000 lbs max axle; 2,800 lbs	5 gas analyzer; opacity meter; AFR; OBD	\$55,660	80 psi air requirement
Mustang MD-SMK-DT	Opacity	1% accuracy; 0-100% opacity	Weather resistant		Integrated with Mustang dynamometers
Telonic Berkeley TBM300	Opacity (RPM, bar press, oil temp avail)	1% accuracy; 0-100% opacity	SAE J1667 compliant; includes pass/fail limits	\$4,995	Internal printer
AutoLogic Model 310-0322	Opacity	0-100% opacity	SAE J1667 compliant	\$5,395	Includes PC software and carrying case
Omitec PDA4GBD	HC, CO, CO2, O2, RPM, AFR (NOx avail)	Wired; 4 sensors; 4 second response	Certified to BAR-97; operates off of vehicle battery		Connects to other Omitec PDA equipment
Omitec PDA5GBD	HC, CO, CO2, O2, NOx, RPM, AFR	Wired; 5 sensors; 4 second response	Certified to BAR-97; operates off of vehicle battery		Connects to other Omitec PDA equipment
Omitec PDASM1100	Opacity, RPM	1% accuracy	Less than 4 minute warm-up		1 year warranty; software update capability
Wager 6500	Opacity, density	25' connecting cable	SAE J1667 compliant; stores 100 tests		Includes carrying case and printer interface
Wager 7500	Opacity, oil temp, RPM	Operating temp range 0-50C	SAE J1667 compliant		Replacement for the 6500; optional printer
Nova 7462	CO & HC	Wired; 2 sensors	Certified to BAR-97; plug-in smoke meter	\$3,170	Built-in printer
Nova 7463	CO, CO2 & HC	Wired; 3 sensors	Certified to BAR-97; plug-in smoke meter	\$3,850	Built-in printer
Nova 7464	O2, CO, CO2 & HC	Wired; 4 sensors	Certified to BAR-97; plug-in smoke meter	\$4,950	Built-in printer

APPENDIX F
WRAP OFFROAD DIESEL RETROFIT GUIDANCE DOCUMENT

Make/Model	Measurements	Limitations	Pros	Cost	Comments
Nova 7465	O2, CO, CO2, HC, NOx	Wired; 5 sensors	Certified to BAR-97; plug-in smoke meter	\$6,220	Built-in printer
TSI Scanning Mobility Particle Sizer	PM	2.5-1000 nm; 50-300 second measuring time	60-600 second cycle time	\$50,000-\$90,000	Requires computer with 10Mb free space
Red Mountain Smoke Check 1667	Opacity		SAE J1667 compliant; no warm-up time; used by state governments		Weather does not affect test results
Argonne Real-Time Portable Exhaust Analyzer	PM, density		Real-time measurements; 1/20 second sampling	\$30,000-\$60,000	Uses Laser-Induced Incandescence (LII)
CE-CERT Mobile Heavy-Duty Diesel Emissions Laboratory	O2, CO, CO2, HC, NOx & PM	Currently used for Class 8 trucks only	Certification of trailer is higher than that of smog check	\$6,000/day; \$1,200/day travel + \$1.75/mile	Mobile, but based at the University of California - Riverside