

Why Retrofit?

Protecting Public Health

- Clean diesel technologies can be deployed today to reduce the public exposure to diesel emissions.

Cost Effective Emissions Reductions

- Diesel retrofit can provide a significant benefit-to-cost ratio.
- Nonroad retrofits are extremely cost effective.

Broad Stakeholder Support

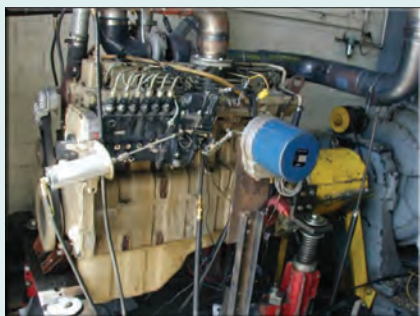
- Industry, government, and community and environmental groups agree - cleaning up diesel emissions is important.
- Have a shared responsibility for cleaning the air and improving public health.

Implementation Advantages

- Diesel retrofits can be implemented quickly.
- Resources and leveraged funds are available.

Testing

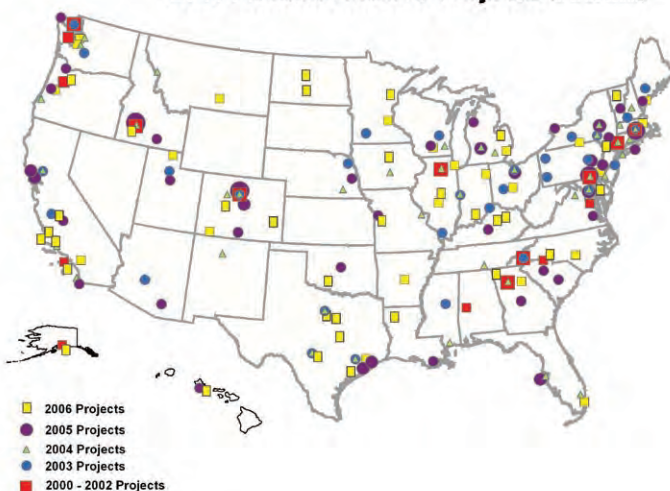
Retrofit Verification relies on data from engine testing on prescribed cycles. Here an engine is being used for testing a device at Southwest Research Institute for verification under the ETV Program.



Learn about the National Clean Diesel Campaign at:
www.epa.gov/cleandiesel

Marketing Opportunities for Verified Technologies

EPA Funded Retrofit Projects (as of 6/28/2007)

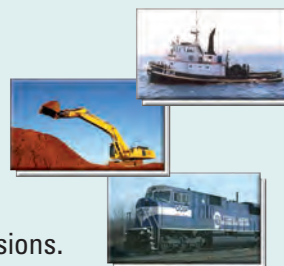


Since 2000, EPA has awarded over 175 grants, all of which require verified technologies. As the National Clean Diesel Campaign expands its scope of coverage of the existing fleet and as more funding becomes available, the demand for a wider variety of verified technologies will increase.

EPA is seeking to verify technologies for the following:

- Marine Engines
- Nonroad Equipment
- Locomotive Engines

EPA is also seeking to verify technologies that focus on reducing NOx emissions.



Tomorrow's Clean Technology Today

EPA420-F-07-031
August 2007

Retrofit Technology Verification

National Clean Diesel Campaign



 **EPA**
United States
Environmental Protection
Agency

National Clean Diesel Campaign



What is the Technology Verification Program?

EPA's Technology Verification Program of the National Clean Diesel Campaign (NCDC) is designed to evaluate the effectiveness of emission reduction technologies.

Through the verification process, EPA evaluates technology durability, and works with the manufacturer to identify engine operating criteria and conditions that must exist for the technology to achieve its verified reductions. Technologies that are shown to be effective are compiled on the Verified Technologies List

www.epa.gov/otaq/retrofit/verif-list.htm

The ETV program assists in developing testing protocols and verifying the performance of emission reduction technologies.

Program Objectives

- Review, test and verify the effectiveness of emission reduction technologies (i.e. after-treatment devices, fuels and fuel additives, and engine rebuild kits).
- Assist fleet operators in choosing the appropriate technologies that will reduce emissions of the vehicles / engines in their fleet.

Four Steps to Verifying a Technology

1. Application

To begin the process, manufacturers submit to EPA:

- Intent to Verify form
 - Application
- Both forms are available on EPA's Web site at: www.epa.gov/otaq/retrofit/verif-process.htm

EPA requires a clear explanation of:

- how the technology works
- the basis for emission reduction claims
- any potential unique testing needs
- operating criteria
- potential concerns for health or safety

2. Test Plan Preparation

A test plan is developed through the ETV program, based on the specific technology and manufacturer's intended market. On EPA's website, there are generic verification protocols which are the basis for testing devices, fuels, fuel additives and selective catalytic reduction (SCR) systems. Under these protocols, the Federal Test Procedure (FTP) is used to measure emissions. The engine, number of tests, fuels, devices, conditioning and other details are specified.

3. Testing

Prior to testing, the manufacturer provides to the test laboratory:

- a degreened device (25-125 hrs of operation),
- an aged device (1000 hrs of operation),
- test engine

EPA prefers the devices to be aged in the field. If this is not possible, the manufacturer can work with EPA to determine an aging plan. In some cases, an inspection and functional test may be required to ensure the unit is operating properly. Testing is conducted following one of three test protocols previously mentioned.

4. Data Analysis and Interpretation

Once testing is complete:

- The ETV program generates a report documenting the test program and results.
- EPA reviews this report, determines if the technology has qualified for verification, and assigns emission reduction levels.

It is important to note that this report is posted on EPA Web sites and is available to the public.

In-use Testing

Once technologies are verified and certain sales thresholds are met, the manufacturer is responsible for conducting in-use testing of those technologies. A certain number of devices with approximately 25% and 75% of their service life must be retrieved from vehicles / equipment and tested. Prior to retrieving devices, EPA will work with the manufacturer to select the appropriate sources of devices and to establish testing sequences.

Expanding Verification

The initial verification of technologies is typically limited to engine types and model years that are similar to the original test engine. Thereafter manufacturers may provide additional technical information, new applications, and conduct additional testing to expand the verified scope of coverage for the technology. The manufacturer must submit sufficient documentation to show any potential adverse effects which could include an engineering analysis of the upgraded product in lieu of test results.