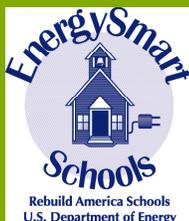


Rebuild America EnergySmart Schools Success Stories highlight schools and school districts that are making smart choices about energy, reducing energy and raising awareness of energy issues.

- New Building Design
- Existing Building Improvement
- Operation and Maintenance
- Renewable Energy Technologies
- Financing Building Improvements
- Energy Education
- Alternative Fuel Buses



## Rebuild Warwick, RI

### *Putting Biodiesel to the Test*

Warwick, RI, a historic city founded in 1642, is making history of a different kind today - as a leader in adopting cleaner burning biodiesel to meet the energy needs of its public schools. Produced domestically from products like soy and corn, biodiesel can help reduce our nation's reliance on foreign oil.

### The Challenge

Amid concerns about the health and environmental impacts of emissions from power plants and vehicles, the City of Warwick and Warwick Public Schools were committed to finding cleaner energy solutions to heat its schools and fuel its buses. Warwick Public Schools Energy Educator/Manager Robert Cerio, leader of the Rebuild Warwick partnership, decided to pilot test a blend of biodiesel and heating fuel to heat district schools. By pursuing biodiesel alternatives to heat schools, the City and the school district were trying something that had never been done in Rhode Island, nor anywhere else in the country. Adding to the challenge was the fact that the infrastructure was not in place to make biodiesel readily available in Rhode Island. And biodiesel - because it has not yet achieved significant market penetration - costs more than petroleum-based fuels currently in use.

### The Solution

Cerio proposed a three-year pilot program to test different blends of biodiesel and heating fuel to heat four different schools. The project drew strong support from Warwick Mayor Scott Avedesian and Warwick Public Schools Superintendent Robert Shapiro who share Cerio's commitment to reducing harmful emissions on behalf of City residents, particularly for the more than 12,000 children attending district schools. The Rhode Island Energy Office and the Northeast Regional Biomass Program provided important seed money through the U.S. Department of Energy's (DOE) Biomass Program.

After extensive testing, Cerio determined that a blend of 80 percent heating fuel and 20 percent biodiesel, known as B20, was the winning combination. The B20 blend used in the schools performed better than the conventional heating oil in terms of burner efficiency and emissions. Now in phase two of the pilot program, Cerio is evaluating the performance of various boilers using B20. The school district plans to expand this effort to use B20 to heat all 13 of its 29 school buildings that use heating oil.

### Biodiesel Emissions

In addition to mixing well with all types of heating oil, biodiesel blends well with transportation fuels and yields the same environmental benefits. Cerio launched a pilot program in January 2003 to test B20 on its fleet of 60 buses with the help of a grant from DOE's Clean Cities program.

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# Partnership Facts:

## **Name of Partnership:**

Rebuild Warwick, RI  
Led by the City of Warwick School  
Department Energy Office and the  
City of Warwick, RI.

## **Targeted Buildings:**

K-12 schools

## **Scope of Biodiesel Project:**

13 school buildings representing  
500,000 square feet  
60 school buses

## **Environmental Impact:**

10% to 20% reduction in emissions  
of carbon monoxide, particulate  
matter, hydrocarbons and sulfate.

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energy-saving technologies,  
visit the Business Partners  
section of the Rebuild America  
Web site: [www.rebuild.gov](http://www.rebuild.gov)  
or contact Rebuild America  
at: 252-459-4664.

For more information, visit the  
EnergySmart Schools Web site:  
[www.energysmartschools.gov](http://www.energysmartschools.gov).

Significant advantages of using biodiesel are that it does not generate sulfur dioxide, linked to greenhouse gases and that the amount of harmful particulates released is greatly reduced. It is also "as biodegradable as table salt or sugar," Cerio says.

On the health front, biodiesel reduces the compounds linked to cancer by 80 percent to 90 percent compared to petroleum diesel, according to the National Biodiesel Board (NBB). NBB asserts that biodiesel is the only alternative fuel to successfully complete the Tier I and Tier II health effects testing required by the U.S. Environmental Protection Agency under the Clean Air Act. In studies to determine the toxic levels of various fuels, biodiesel was the only one that didn't kill the laboratory rats exposed to it, Cerio notes.

Biodiesel emissions compared favorably to those of conventional diesel in tests by the EPA. Test results show that the use of B20 reduced harmful emissions as follows: carbon monoxide by 10 percent, particulate emissions by 15 percent, hydrocarbons by 10 percent, and sulfate emissions by 20 percent. Cerio notes that the EPA findings mirror his own experience in using B20 in both heating and bus fuel applications.

## **The Economics of Biodiesel**

Warwick Public Schools has offset the costs of using biodiesel by investing in oil futures to bring down the costs of the heating fuel that accounts for 80 percent of the mix. At this writing, regular heating oil costs \$1.39 per gallon and after buying futures, the per gallon price drops to \$0.805, according to Cerio. After adding in the 20 percent of biodiesel into the mix, the cost per gallon rises to \$0.875 per gallon, a 7 cents per gallon increase, but still 37 percent less than the regular price of heating oil. Cerio saves the school district additional money by mixing the biodiesel himself on site.

"Rhode Island is the first state in the country to use biodiesel to heat schools," Cerio says. "We want to be out in the forefront and help build an infrastructure to support the use of biodiesel. This is the right thing for the environment. We don't need to expose kids to pollutants like sulfur dioxide and carbon particulates to heat buildings and fuel buses."

In addition to its biodiesel program, Warwick Public Schools has undertaken a number of energy-saving initiatives. The culture of the school district is an energy-conscious one - from students to superintendent. Teaching tools that save energy include a 5kWh solar array, a solar car and a fuel cell. These efforts - combined with district-wide improvements such as lighting retrofits and an energy management system - have resulted in annual energy savings of \$500,000 during the past four years, according to Cerio.

**To learn more visit: [www.eere.energy.gov](http://www.eere.energy.gov).**

## **A Strong Energy Portfolio for a Strong America**

Energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.

EnergySmart Schools is a part of Rebuild America, a U.S. Department of Energy program that focuses on improving communities through energy-saving solutions.



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