



*SUSTAINABLE
ENVIRONMENT
for QUALITY of LIFE*



TRUCKSTOP ELECTRIFICATION

What is it?

Truck stop electrification is one technology available to trucking fleets and truck stop operators to reduce fuel use and eliminate the emissions associated with long duration engine idling at truck stops. Truck drivers idle their engines at truck stops to heat or cool their cabins and to power appliances during mandatory rest periods. With truck stop electrification (TSE) trucks can connect with an external power grid to power these devices without idling their engines. If TSE is used at truck stops and rest areas, air pollution can be reduced and truck owners will save money in reduced fuel costs.

How long does this take to implement?

Because of the improvements required for TSE, implementing a TSE project could take several months to a year to implement. Careful planning and coordination with all parties involved is essential for a successful project.



This Action Item can be implemented as a

- POLICY
- ORDINANCE
- PROGRAM

Shared Impact and Benefits

- Air quality improves due to the reductions in emissions from less engine idling. Diesel exhaust from idling vehicles contains dangerous air pollutants, including: carbon dioxide, which contributes to global climate change; nitrogen oxides and volatile organic compounds, both of which contribute to the formation of ozone smog; poisonous carbon monoxide; and harmful particulate matter. According to a recent study by the Department of Transportation (DOT), the United States has approximately 5,000 truck stops with an estimated 320,000 truck parking spaces. Use of truck stop electrification can reduce emissions by 90% or more at these truck stops with a reduction of 24 tons of carbon dioxide and .34 tons of nitrogen oxides per truck annually.
- A reduction in engine idling can reduce engine maintenance and expand the life of the engine. Unnecessary idling of engines increases the wear and tear on an engine and can even cause engine damage.
- Engine idling wastes fuel and money. Studies by EPA and others suggest that long-haul combination trucks often idle up to eight hours per day, over 300 days per year. Typical combination trucks consume 0.8 gallons of diesel fuel during each hour of idling, using as much as 1,900 gallons of fuel each year per truck. A truck operator could save \$7,600 per truck annually at a cost of \$4.00 per gallon of diesel fuel.
- The Department of Transportation (DOT) mandates that for every 11 hours driving, a truck driver must rest for 10 hours. Without having to idle the truck's engine, drivers will be sleeping in a healthier and less noisy cabin area, allowing for more restful breaks. This improves on-road safety.
- Improved air quality results in less risk of respiratory health problems—such as cardiac problems or lung damage—in the population affected. This is also true for the drivers, who are able to avoid long-term exposure to pollutants that seep into the cabin.

The Bottom Line

- Using a heavy-duty truck engine to power cab amenities is inefficient. It consumes fuel unnecessarily, increases fuel costs and causes emissions that contribute to climate change and air pollution.
- Today's diesel engines do not need to idle for long periods of time before and after driving. Unnecessary engine idling also contributes to engine wear, which increases truck maintenance costs, and shortens engine life.
- Truck stop electrification provides a much-needed solution to the problem of unnecessary engine idling at truck stops and is a cost-effective way to cut air pollution.



Basic information

- Truck engine idling contributes to air pollution while wasting a significant amount of diesel fuel and money. Over a billion gallons of diesel fuel is consumed annually by truck and locomotive engine idling. Annually, 11 million tons of carbon dioxide, 200,000 tons of oxides of nitrogen, and 5,000 tons of particulate matter are emitted from these vehicles. This has a significant impact on our economy and our environment.
- Truck drivers idle engines at truck stops for three reasons: to heat or cool the cabin, to power accessories and to protect the engine in cold weather. TSE meets the needs of truckers while reducing engine idling at truck stops. In addition, TSE costs per hour at stand-alone systems are often in line with the equivalent cost of fuel that would have been consumed idling.
- Educating truck drivers and fleet operators about TSE should be a part of implementing any TSE project. It is difficult to change behaviors when cabin comfort is involved so informing drivers and operators of the advantages and savings of TSE is important.
- The greatest difficulty with TSE is availability. Truck manufacturers are reluctant to include on-board systems because of the lack of available electrical outlets, and truck stop operators are equally reluctant to introduce shore power truck stop electrification because of the lack of trucks equipped with on-board systems. While stand-alone truck stop electrification does not require on-board components, truck stop operators fear the lack of a customer base, resulting in few stand-alone TSE systems currently available. The EPA and other federal agencies are trying to increase the availability of TSE systems by awarding grants for demonstration projects in key travel corridors.
- In the 15 county metropolitan Charlotte region there are a total of 1,155 truck parking spaces that could benefit from TSE.
- Options for TSE include stand-alone systems that are owned and operated by the truck stop, and combined systems that require both on-board and off-board equipment.
 - Stand-Alone Systems**—In stand-alone systems, heating, ventilation, and air conditioning (HVAC) systems are contained in a structure above or beside the truck parking spaces. Connections from the HVAC system are attached to the truck window. Stand-alone systems are owned and maintained by private companies that charge an hourly fee. To accommodate the HVAC connection, a window template must be installed in the truck.
 - Onboard or Shore Power Systems**—Shore power systems provide electrical outlets that the trucks can plug into. To use shore power systems, the truck must be equipped with an inverter to convert 120-volt power, an electrical HVAC system, and the hardware to plug into the electrical outlet.
- Truck stop outlets are owned by private companies that regulate use and fees. On-board equipment is owned and maintained by the trucking company.

Costs

There are startup costs associated with the implementation of TSE technology. Shore power systems require an investment for the external connection at each truck parking space for a cost of \$2,500 per space. Trucks also need to be equipped with the required internal wiring, inverter system and HVAC system to take advantage of truck stop electrification for a cost of approximately \$4,000 per truck. These initial capital costs can be offset with fuel cost savings over the life of the truck or via grant or low-interest loan programs. Stand-alone TSE systems can cost approximately \$10,000- \$15,000 per parking space some of which can be offset by fees for hook-up or grants.

Who needs to be involved in implementation?

- Truck stop owner/operators
- Trucking companies
- Drivers
- Appropriate governmental agencies if seeking funding for project
- Local government officials
- State Air Quality and Energy officials
- TSE technology providers



FAQs

- Q: Is it important to warm up an engine with a long idle period?**
- A:** Today's engine manufacturers routinely suggest a warm up time of less than five minutes. In fact, running an engine at low speed (idling) causes significantly more wear on internal parts compared to driving at regular speeds.
- Q: What are the truck maintenance and engine wear costs at idle?**
- A:** The trucking industry has analyzed the impact of idling on engines, both in terms of maintenance and engine wear costs. Long-duration idling causes more oil and oil filter deterioration and increases the need for more oil and filter changes. Similarly, the longer the idling time, the sooner the engine, itself, will need to be rebuilt. The trucking industry estimates that long-duration idling costs the truck owner at least \$1.13 per day, based on the need for more oil changes and more frequent overhaul costs.

Who's doing this?

In October, 2004, EPA and local officials announced the awarding of a \$100,000 grant to assist in funding a TSE project at Derrick's Travel Plaza in Salisbury, NC. This grant is the first of its kind in the Piedmont/Western North Carolina. The project will provide new jobs, healthier conditions for truckers and cleaner air for the region. The projects is moving forward with an expected completion date of early 2009.

In 2004, the National Association of State Energy Offices awarded a grant to energy and environmental agencies in North Carolina, South Carolina and Georgia to install 150 electrified parking spaces at truck stops along the Interstate 85 corridor.

Since 2000, EPA has funded several demonstration TSE projects including truck stops in Hunts Point, New York and Gary, Indiana. For more information about these projects and for contact information see <http://www.epa.gov/smartway/idle-demo.htm>

For a listing of Truck Stop Electrification sites—
www.eere.energy.gov/cleancities/idle/progs/tse_listings.cgi

Vendors

CabAire
Cranford Manufacturing
IdleAire
Shurepower

- Q: Can a TSE project be eligible for Department of Transportation (DOT) funding under the Congestion Mitigation and Air Quality Improvement (CMAQ) program?**

A: Yes, a TSE project could be eligible for DOT funding under the CMAQ program. Under the basic provisions of CMAQ, the project must demonstrate emission reductions and the idle-reduction project must be located within, or in close proximity to and primarily benefiting, a non-attainment or maintenance area. The project must also come from a conforming transportation plan and TIP. Funding for such projects may be carried out under the public-private partnership provisions of the program. For more information about the CMAQ program see <http://www.fhwa.dot.gov/environment/cmaqpgs/index.htm>

Resources

SmartWay Transport Partnership: Reducing engine idling is an important component of EPA's SmartWay Transport Partnership, a collaborative voluntary program between EPA and the freight industry that will increase the energy efficiency and energy security of our country while significantly reducing air pollution and greenhouse gases. The Partnership creates strong market-based incentives that challenge companies shipping products, and the truck and rail companies delivering these products, to improve the environmental performance of their freight operations.

Clean Cities Idle Reduction Program: Understanding the different TSE technologies is essential to developing a successful TSE project. The Clean Cities Idle Reduction Program provides a list of manufacturers and available technologies.

Inclusion of TSE Projects in State implementation Plan (SIP): State and local governments may want to use the emission reductions resulting from implementing an idling reduction technology for meeting emission reduction requirements may be included in an attainment or maintenance SIP, or transportation conformity determination.

Grants: There may be government funds available to assist your idle reduction/TSE project. CMAQ (Congestion Mitigation and Air Quality) funds are also available for implementation of these public-private partnerships in non-attainment areas.

For More Information

EPA's SmartWay Transport Partnership:
<http://www.epa.gov/smartway/idling.htm>

Clean Cities Idle Reduction Program:
www.eere.energy.gov/afdc/vehicles/idle_reduction.html



Action Steps

1. Truck fleets should examine engine-operating records to determine the percent of time spent idling to determine the potential fuel and cost-saving benefits of TSE. Truck fleets may also check the availability of truck stop electrification facilities along frequent truck routes.
2. Any party interested in a TSE project should research the availability of grants or other funding for the project.
3. Evaluate the available TSE technologies and costs associated with each technology.
4. Contact key officials, fleet operators and truck stop owners involved with a current TSE project to learn from their experiences.
5. Pursue grant or loan programs, as appropriate.
6. Implement the improvements required for the chosen TSE technology.
7. Educate and train drivers and fleet operators on TSE and the benefits of reducing engine idling at truck stops.
8. Track fuel savings for fleet.

Intersecting Interests



CLEAN AIR POLICY

An effective clean air policy should identify sources of pollution and promote cost-effective, feasible actions for improving air quality. TSE is an example of a positive solution to improve air quality.



ENHANCED OZONE AWARENESS

TSE can reduce diesel emissions during peak commuting times, which helps keep ozone concentrations from rising to dangerous levels.



IDLE REDUCTION POLICY

TSE is a technology to reduce engine idling at truck stops and could be a component of any anti-idling policy or program.



DIESEL FLEET EMISSION REDUCTION

TSE is one means of reducing diesel fleet emissions. It can be part of a total program that includes Diesel Oxidation Catalysts, Particulate traps and other technologies and practices.



CLEAN CITIES

Clean Cities coalitions promote programs, including idle reduction program like TSE, to reduce the amount of petroleum used in the US.

Tracking Progress

Let Centralina Council of Governments know when you have implemented this action by contacting Carol Lewis at 704-348-2730 or clewis@centralina.org

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