National Association of State Energy Officials
State Technologies Advancement Collaborative
Truck Stop Electrification
Project Status Report

January 6, 2005

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CONTENTS

Technology Background

There are approximately 4.2 million large diesel trucks in America and 1.3 million of them are long-haul trucks with sleepers. Drivers of these trucks have traditionally idled their engines during required rest periods or while waiting on loads. Drivers are required by law to rest eight hours for every ten hours on the road. A driver can also be required to wait up to twenty-four hours in some instances to pick up a load at a manufacturing plant or distribution facility. Idling engines provide power for air conditioning, heating and various household appliances that may be in the cab.

The Truck Maintenance Council of America Trucking Associations has reported that fuel consumption during idling can range from ½ gallon to 5 gallons per hour. Test conducted by IdleAiree Technology Corporation indicates that the average fuel consumption across all trucks tested was 1.1 gallons per hour while idling. It is estimated that each of the 1.3 million long-haul trucks will consume up to 2,400 gallons per year while idling. This is a major issue when the fuel security of the United States is considered.

Truck stops and other locations where trucks are idled for rest periods or while waiting on a load are generally located in urban areas. Most urban areas are dealing with poor air quality and noise pollution. Idling trucks are a contributor to both of these issues. Emissions from idling trucks include Nitrogen Oxides (NOx), Volatile Organic Compounds (VOC), Carbon Monoxide (CO), Carbon Dioxide (CO2) and Particulate Matter (PM).

In addition, Federal regulations require truck drivers to rest ten hours after spending a maximum of 11 hours on the road.

In response to this regulation, IdleAire Technologies Corporation, based in Knoxville, Tennessee, has developed and begun deploying a system that utilizes self-contained, external HVAC units to allow truck drivers to rest in their cabs without idling their engines during extended stops. IdleAire's Advanced Travel Center Electrification (ATE) technology provides each parking space with individual heating and cooling, 110-volt power, cable television, telephone service and Internet access. This technology does not require any truck modifications. A console connects to the truck via a window-mounted adapter to provide HVAC as well as telephone and Internet service, cable television and movies, and 110-volt electric power for small appliances. A simple window-mounted adapter assures proper mounting for most trucks.

This technology allows truck drivers to obtain the required hours of rest and have many of the comforts of home without running their engines, thus reducing the consumption of diesel fuel and the production of air pollution emissions. IdleAire has deployed more than 1,428 units at 23 travel centers (truck stops) and travel plazas across the country. Federal Department of Transportation CMAQ funding has been used to cover part of the costs at some of these projects.

Project Background

The State Technologies Advancement Collaborative Truck Stop Electrification Project is the result of a multi state / organization effort to reduce idling from heavy-duty vehicles along the interstate corridor in Georgia, North Carolina, and South Carolina. The original project application was submitted to the State Technology Advancement Collaborative as a proposal under solicitation number 03-STAC-1, within the Transportation Technologies Program Area.

Following award notification, the project partners went to work on project implementation. The South Carolina Energy Office, the Team Leader for the project, worked with the Team States (North Carolina and Georgia) and IdleAire Corporation to develop a final Project Management and Work Plan.

During the summer of 2004, IdleAire began construction of three Advanced Travel Center Electrification facilities at three separate locations along the I-85 corridor. By September of 2004, all three locations were complete and commencing full operations. Details of the three locations are below.

Petro # 29
Mebane, NC
I – 40/85, Exit 157
IdleAire ATE Units - 58
503 Buckhorn Road
Mebane, NC 27302

Anderson Truck Plaza
Anderson, SC
I – 85 & Hwy. 81
IdleAire ATE Units - 51
4611 North Hwy. 81
Anderson, SC 29621

Pilot Travel Center # 422
Newnan, GA
I – 85, Exit 41
IdleAire ATE Units - 51
1647 South Highway 29
Newnan, GA 3026

Project Partners and Roles

By mutual agreement, South Carolina Energy Office was designated as the Team Leader and was responsible for all project-related activities among and between the Team States. Each Team State identified a Project Manager, who was responsible for coordinating all project-related activities within their own state. The Team states are North Carolina, represented by the N.C. Department of Environment and Natural Resources, South Carolina, represented by Division of Air Quality; South Carolina Department of Health and Environmental Quality, Bureau of Air Quality; and Georgia, represented by the Georgia Environmental Facilities Authority (GEFA). IdleAire Technologies Corporation based in Knoxville, Tennessee was the private sector partner in this project and IdleAire had oversight of all major technical tasks including construction and design, engineering and permitting for deployment of this advanced technology.

Project Benefits

There are many benefits available to the area and the general public from the successful completion and operation of the TSE Project along the I-85 corridor.

1) Improved Air Quality. The elimination of truck engine idling has eliminated the associated emissions that lead to air quality problems in the area.

2) In addition, the TSE Project has also reduced the level of greenhouse gas and particulate matter emissions in the area. Therefore, the TSE Project has also served as a voluntary emissions reduction measure that has assisted the area in taking strides to meet the national ambient air quality standards.

3) Increased Highway Safety. Eliminating the need for idling engines during driver rest periods is conducive to safe highway performance. Drivers are able to rest in an environment without the vibrations, noise, and fumes from an idling engine. Accordingly, truck drivers will be better rested and driver fatigue will be reduced. This translates directly into safer drivers on the road.

4) Energy Independence. The TSE Project significantly reduces the use of diesel fuel by completely eliminating engine idling during driver rest periods. Eliminating this fuel usage reduces our dependence on foreign oil. IdleAire has saved more than 64,475 gallons of diesel fuel at the three I-85 locations.

5) Increased Public Revenues. The I-85 TSE Project created new local jobs, both in the short term during construction of the project and in the long term during operation and maintenance of the project. IdleAire currently has created fulltime equivalent jobs at the three I-85 locations. It is reasonable to assume that public revenues will flow from these jobs in the form of income taxes, sales taxes on construction materials, etc. Additional public revenues will also flow from the increased economic activity (food sales, fuel sales, etc.) that will occur at the travel center where the TSE Project is located.

6) Reduced Noise. A TSE Project reduces noise levels from idling truck engines in the immediate vicinity of the travel center where the project is located. This means a quieter local neighborhood.

7) Facilitate Economic Development & Highway Development. The successful accomplishment of this project has reduced ozone precursor emissions from mobile sources, thereby helping to achieve attainment of the ozone air quality standard and to improve public health. Attainment of the standard will reduce the adverse economic impacts of economic development sanctions that have been imposed on the area and facilitate highway development by providing mobile source emissions reductions that will help the area's transportation plans to meet transportation conformity requirements.

8) Reduced Trucking Industry Costs. Truck owners that use the I-85 TSE facilities will save the cost of fuel and maintenance related to idling and extend the life of their truck engine.

Usage and Emission Reduction Summary

The IdleAire ATE system allows a truck driver to completely shut down the engine, **eliminating the air pollution associated with idling** during layover periods in a travel center. IdleAire draws its power from the electric grid and even after adjusting for the emissions associated with the production of this electric power, IdleAire delivers substantial, measurable emissions reductions and provides superior driver comfort during rest periods to improve their attentiveness on the road. Table 1 outlines the usage data for the I-85 installations. Table 2 compares the emissions produced by idling trucks with the emissions generated by the electric utility to provide power for ATE operation.

IdleAire is collecting the usage and emission reduction data. The data below is from the three IdleAire locations along the I-85 corridor. The data is representative of figures up to December 31, 2004.

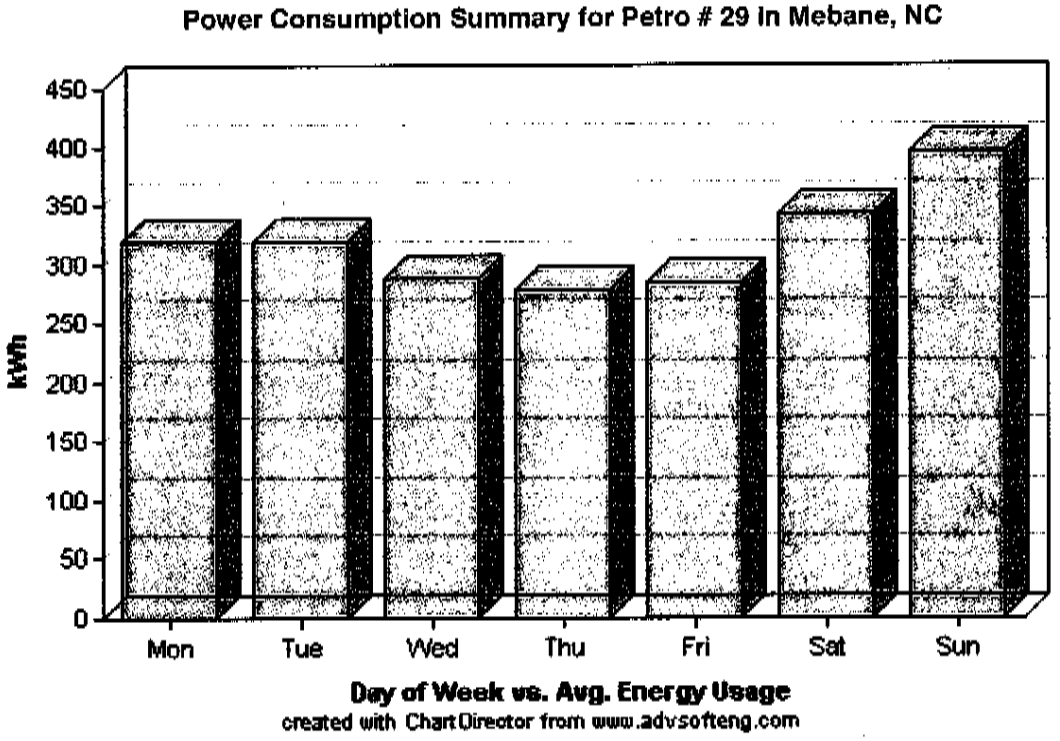
Table 1. Usage Data

ATE Units Operating	160
Hours Operated	64,475
Fuel Reduction	64,475 gallons

Table 2. Emissions Reductions[1]

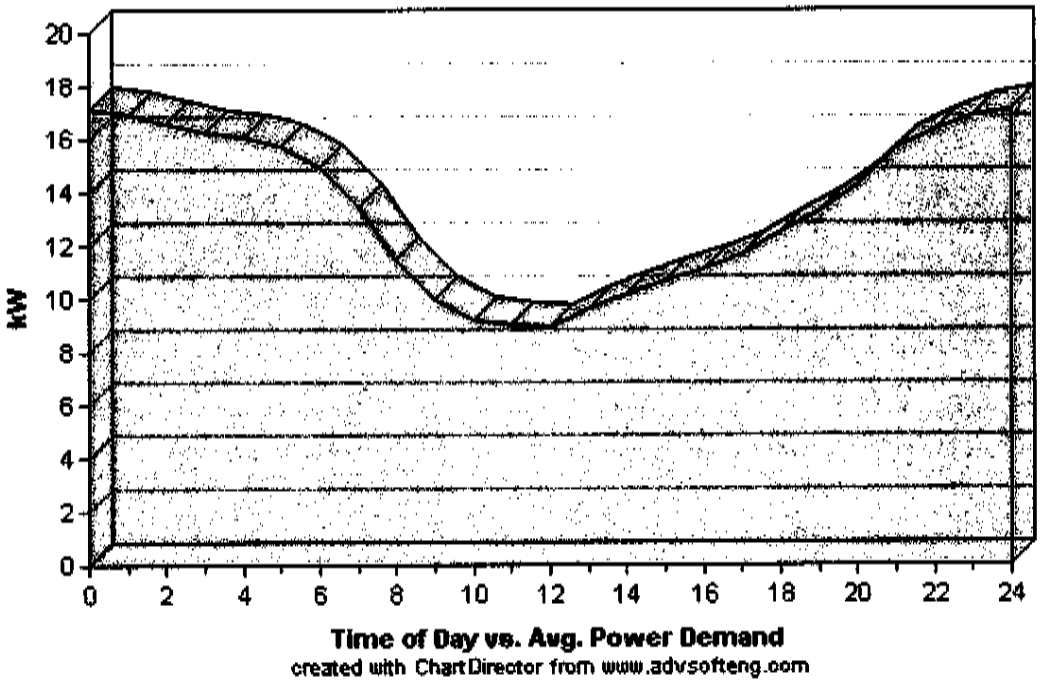
Emission	Total Idling Emission Reductions at Proposed Locations (metric tons/yr)	Emissions from Electric Generation for ATE Operation (metric tons/year)	Expected Net Emission Reductions (metric tons/year)	Percentage Reductions
NOx	8.70	0.11	8.60	98.8
PM	0.24	0.00	0.24	99.7
CO	3.62	0.01	3.61	99.8
VOC	0.44	0.00	0.44	99.8
CO2	670.35	60.43	609.92	91.0
Total	683.35	60.55	622.80	91.1
Total for Criterion Emissions (exclusive of CO2)	13.00	0.12	12.89	99.1

[1] The emission factors for CO and VOC come from EPA's Mobile6 Emissions Model to estimate the emissions from idling trucks. NO_x and PM factors are calculated based on 2004 EPA Guidance. Diesel CO_2 emission values are based on Argonne models. Electric emissions for CO, NO_x, PM, and VOC come from Argonne's GREET model; CO_2 from EPA breakout by region.



(Figure 1) Average Energy Usage: Day of Week vs. Avg. Energy Usage

Figure 1 shows the daily average power demand of the Mebane facility. Truckers are stopping primarily in the evening and nighttime to use the spaces, as shown in Figure 2. Much, but not all of the hours of highest consumption fall during the typical "off-peak" period of 10:00 pm to 6:00 am.



(Figure 2) Average Power Demand vs. Time of Day

Power Consumption Summary for Anderson Travel Plaza in Anderson, SC

(Figure 3) Average Energy Usage: Day of Week vs. Avg. Energy Usage

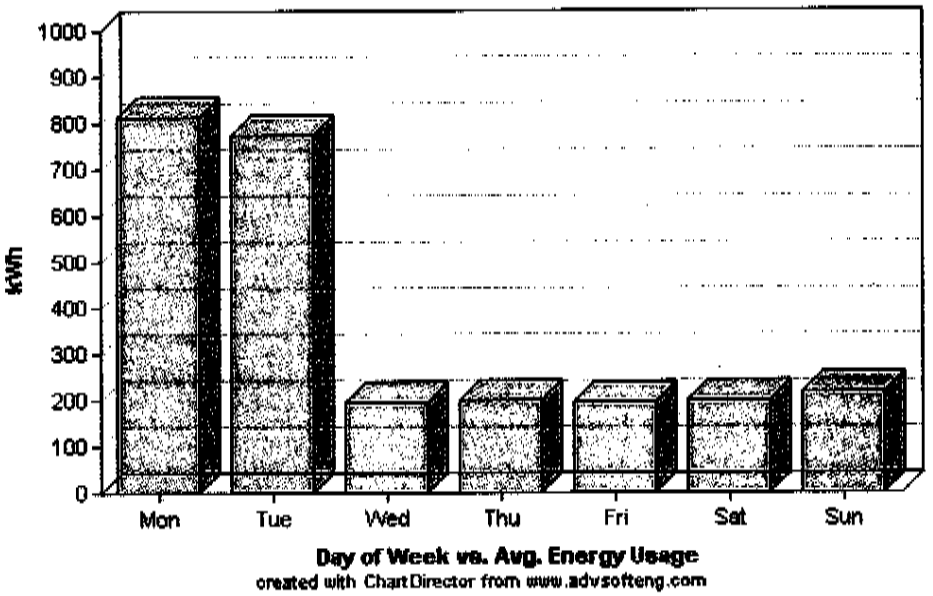
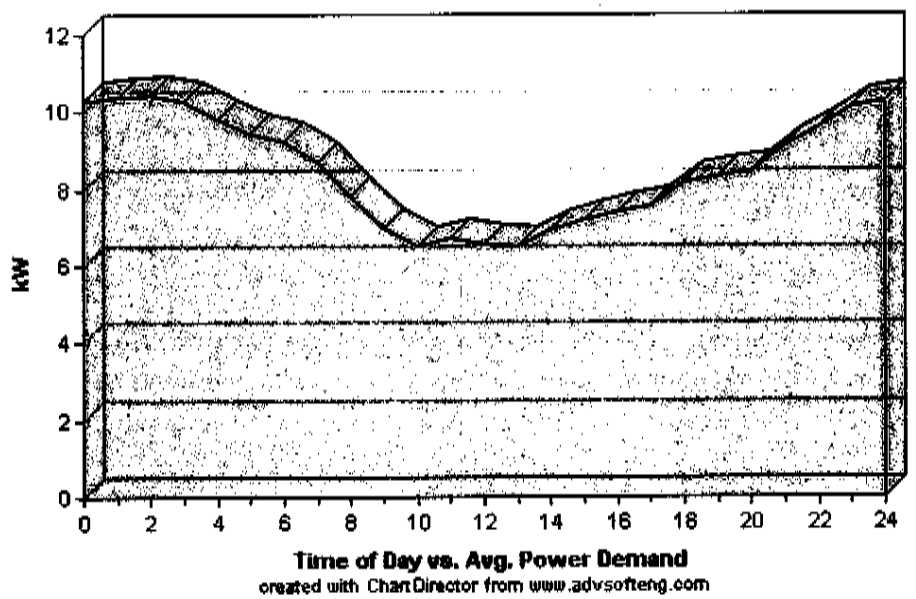


Figure 1 shows the daily average power demand of the Anderson facility. Truckers are stopping primarily in the evening and nighttime to use the spaces, as shown in Figure 2. Much, but not all of the hours of highest consumption fall during the typical "off-peak" period of 10:00 pm to 6:00 am.

(Figure 4) Average Power Demand vs. Time of Day



Power Consumption Summary for Pilot # 422 in Newnan, GA

(Figure 5) Average Energy Usage: Day of Week vs. Avg. Energy Usage

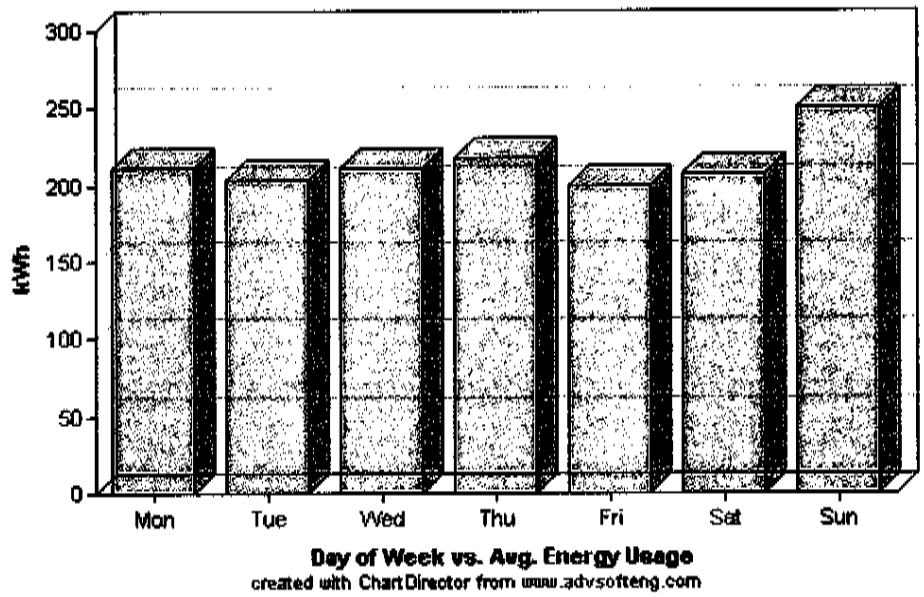
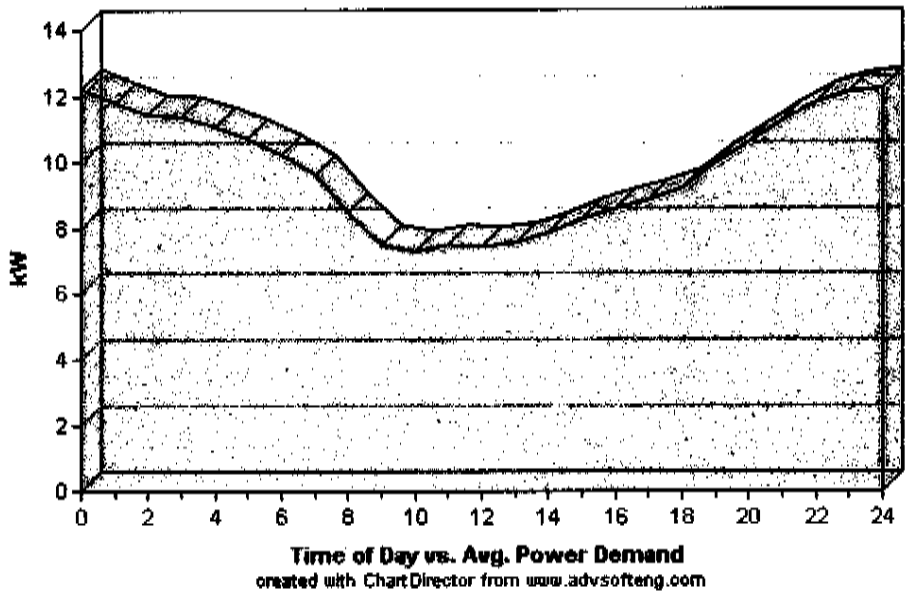


Figure 1 shows the daily average power demand of the Newnan facility. Truckers are stopping primarily in the evening and nighttime to use the spaces, as shown in Figure 2. Much, but not all of the hours of highest consumption fall during the typical "off-peak" period of 10:00 pm to 6:00 am.

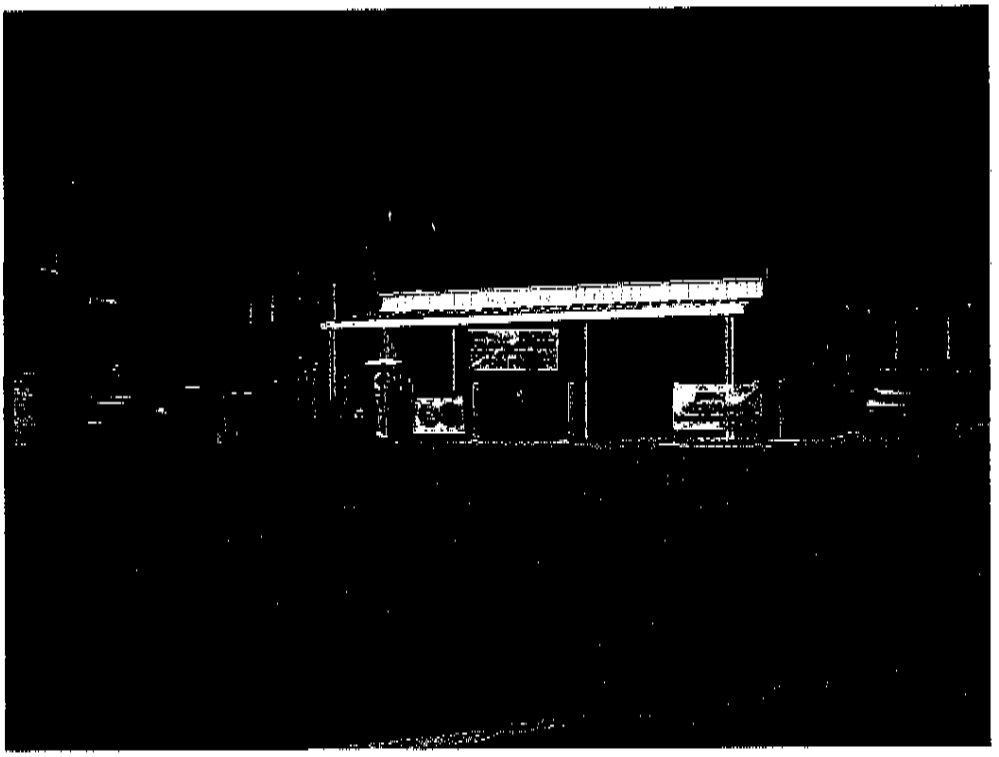
(Figure 6) Average Power Demand vs. Time of Day



Photos

Anderson Travel Plaza Location

Pilot Location in Newnan, Georgia



Petro Location in Mebane (Grand Opening)