

Idling Reduction Makes \$ense



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All kinds of vehicles can be guilty of *unnecessary* idling



Passenger vehicles

**Transit buses and motor
coaches**

All sizes of trucks

Off-road equipment

Aircraft

Marine vessels

Railroads



IDLING REDUCTION IS FOR EVERYBODY!

Petroleum use

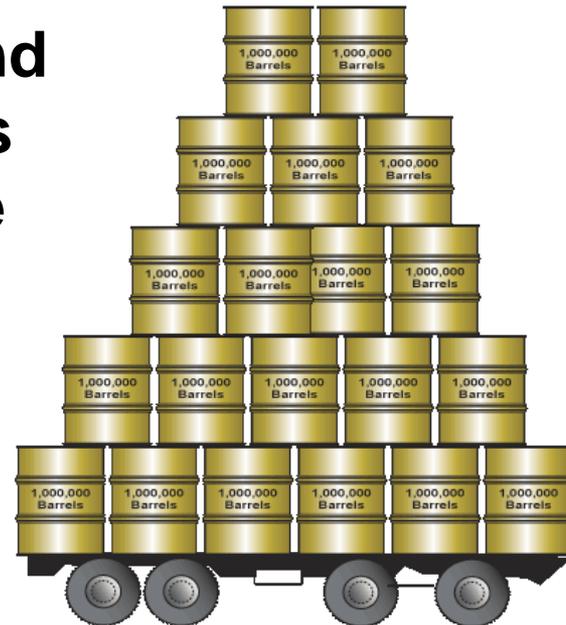
- Over 25 million barrels a year (>\$4 billion) for trucks idling overnight (~2% of heavy vehicle fuel)
- Equivalent to about 1% of our imports

Emissions

- 140,000 t NO_x, 2400 t CO, and 7.6 million t CO₂ from trucks
- Often near high or sensitive populations

Engine wear

- Reduces mileage to overhaul
- Added maintenance costs



Transportation consumes > 2/3 of our 7 billion bbl/y

Many vehicles have different reasons to idle

Trucks

- Warming up fuel, fluids, and the engine
- Keeping the driver comfortable during mandated rest periods
- Masking out noise and smells
- Keeping the driver safe



Buses

- Warming up fuel, fluids, and the engine
- Pre-heating or -cooling for passenger comfort



Passenger cars, too!

- Waiting at drive-through windows
- Pre-heating or -cooling for passenger comfort



Workday idling is also important

Long-duration idling occurs at

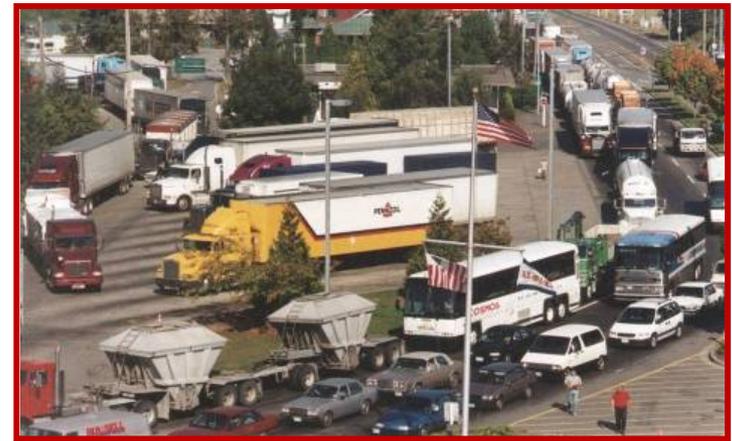
- Ports and terminals
- Busy delivery sites
- Border crossings
- Drive-through restaurants
- Tourist destinations (tour buses)



All truck types may idle during the day because

- Idling reduction devices do not enable slow movement in queue (“creep mode”)
- Arrivals are not scheduled

Daytime idling represents significant use of fuel



Several technologies can reduce idling but have pros and cons

Most could be used for all heavy vehicle modes

All reduce fuel use, emissions, and noise

⌘ **On-board equipment**

⌘ **Wayside units**

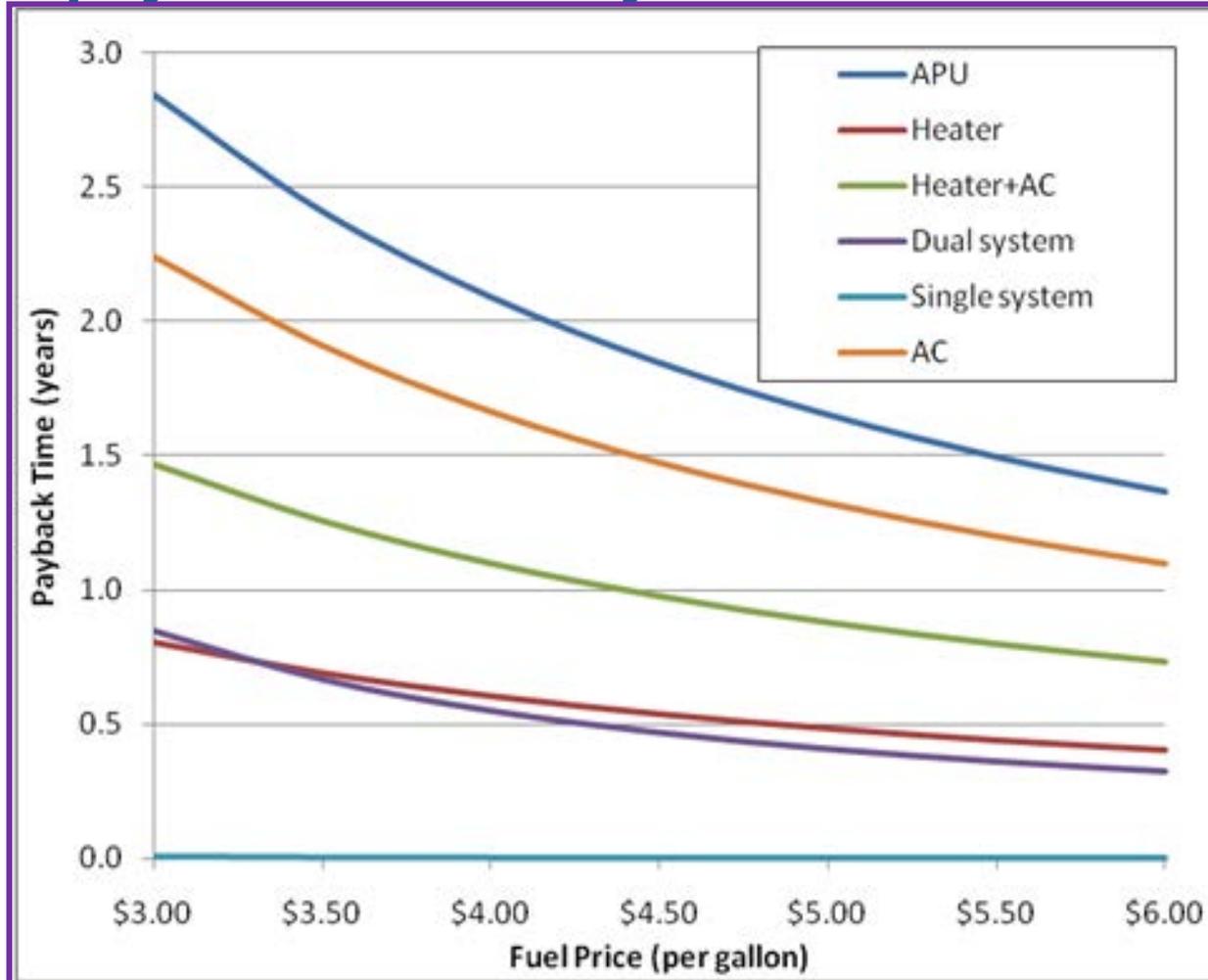
Equipment has pros and cons:

- **Cost**
- **Weight**
- **Level of service (seasonal, power for appliances)**
- **Availability at location**
- **Sleep disruption**



Idling reduction is low-hanging fruit

It pays for itself in 3 years or less!



Payback depends on operating practices



Fuel savings are main financial benefit

- Payback is faster if more idling hours are displaced
- When loans repaid, funds can be loaned again

Savings also accrue from reduced maintenance costs

- Routine maintenance can be performed less often without idling
- Mileage to overhaul can be increased without idling
- Worksheet for trucks is based on TMC RP 1108

Low-idling history should increase vehicle resale value

Device has residual value

Argonne NATIONAL LABORATORY **How Much Could You Save by Idling Less?**

Instructions: In each row, start at the left and fill in the blanks with information about your equipment and costs. Then multiply or divide as shown. Some answers are used again. Where you see an arrow, copy the answer into the blank at the end of the arrow, so you can use it in the next step.

Calculate Costs for Avoidable Idling

1 How much fuel is used for idling? **2** Realistically, how many hours each year might you use IR devices instead of idling?¹ **3** What is the price of diesel fuel?

$\text{[] gallons/hour} \times \text{[] hours/year} \times \$ \text{[] /gallon} = \$ \text{[] /year} +$ **Available Idling Fuel Costs**

2 How much does an oil change cost? **4** How many miles between oil changes? **5** What is your average fuel economy? **6** "Miles of idling"² (idling is like putting miles on your engine)

$\text{[] gallons/hour} \times \text{[] hours/year} \times \text{[] miles/gallon} = \text{[] miles/year}$

3 How much does an engine overhaul cost? **7** How many miles between overhauls? **8** "Miles of idling"

$\$ \text{[] /oil chg.} \div \text{[] miles/oil chg.} = \$ \text{[] /mile} \times \text{[] miles/year} = \$ \text{[] /year} +$ **Preventive Maintenance Costs¹**

4 How much does an engine overhaul cost? **7** How many miles between overhauls? **8** "Miles of idling"

$\$ \text{[] /overhaul} \div \text{[] miles/overhaul} = \$ \text{[] /mile} \times \text{[] miles/year} = \$ \text{[] /year} =$ **Overhaul Costs¹**

5 Add right-hand column = \$ [] /year **Total Available Idling Costs**

Calculate Costs for Idling Reduction (IR)

6 How much fuel is used by the IR device? **7** How many hours each year could you use IR devices instead of idling?¹ **8** Price of diesel fuel (should equal price listed in line 1) **9** Fuel cost for IR device

$\text{[] gallons/hour} \times \text{[] hours/year} \times \$ \text{[] /gallon} = \$ \text{[] /year}$

7 Maintenance cost for IR device **8** Cost per hour to plug into EPS² **9** Enter hours plugged into EPS² **10** Cost to plug in

$\$ \text{[] /year} + \$ \text{[] /year} = \$ \text{[] /year}$ **Operating Cost for On-board IR Device**

$\$ \text{[] /hour} \times \text{[] hours/year} = \$ \text{[] /year} + \$ \text{[] /year} = \$ \text{[] /year}$ **Total Operating Costs for IR**

Calculate Savings from IR

9 Capital cost of on-board IR device **10** Savings Line 5 - Line 8 **11** Payback Time

$\$ \text{[]} \div \$ \text{[] /year saved} = \text{[] years}$

¹ IR: Idling Reduction ² EPS: Electrified Parking Space ³ Total number of hours from lines 6 and 8 should equal the number of hours in line 1

How much fuel is used for idling (gallons/hour)?

Locate your idling engine RPM and the percentage of time you run your air conditioning (AC) while idling. The corresponding number is approximately how much fuel you use to idle. For example, 2000 RPM with no air conditioning consumes about 0.64 gallons of fuel an hour.^{1,2}

RPM	AC off	AC on 50%	AC on
800	.64 gal/hr	.70	.76
900	.73	.79	.85
1000	.81	.87	.94
1100	.92	.98	1.05
1200	1.03	1.09	1.15

¹ Analysis of Costs from Idling and Parasitic Devices for Heavy Duty Trucks. Technology and Maintenance Council Recommended Practice Bulletin 1108, issued 2/95 (reprinted 2003 by TMC/ATA).
² Liberty, N.P., J.P. Wallace, C.J. Brodzick, H.A. Dreyer, and D. Spierling, "Modeling Auxiliary Power Options for Heavy-Duty Trucks: Engine Idling vs. Fuel Cells," Society of Automotive Engineers 2004-01-1475, October 2004.

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Recent market information is hard to find

ATRI 2006 survey showed 36% of drivers have on-board equipment

ATRI 2009 study noted

- ⌘ **Payback for APUs longer than expected**
- ⌘ **Idling was still high in winter and summer**

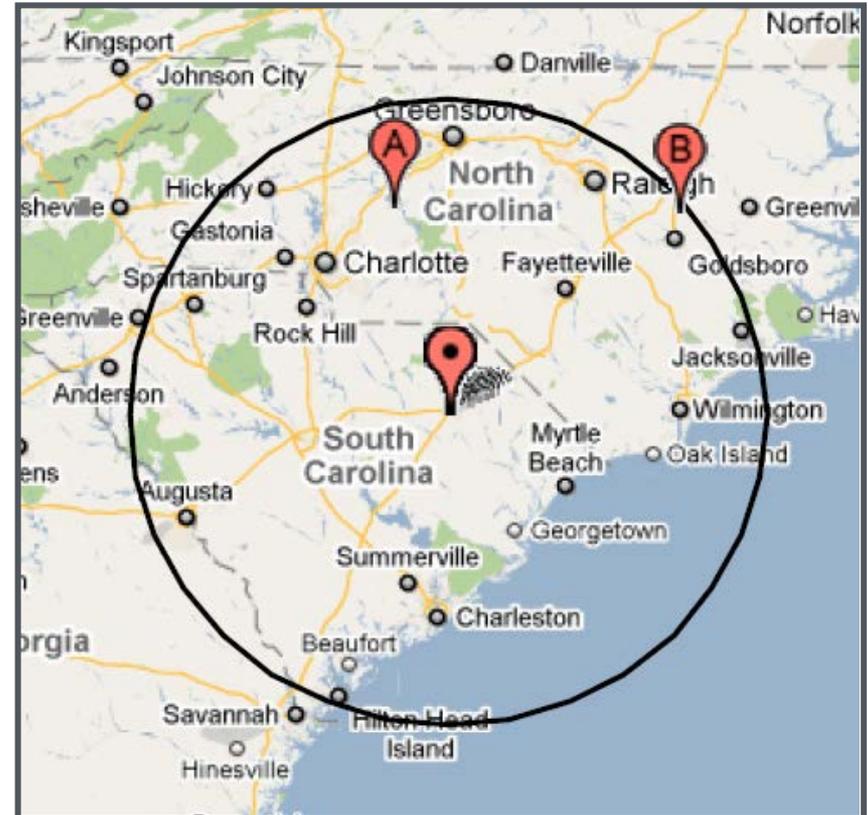
FleetOwner (March 1, 2009) found

- **86,000 units sold**

No trade association exists to gather data so calling companies is the only way to get information

Data are needed on

- **Industry growth and failures**
- **Idling practices in different sectors**



CabAire and Shorepower locations within 150 miles of Kenly, SC

We've noticed some trends

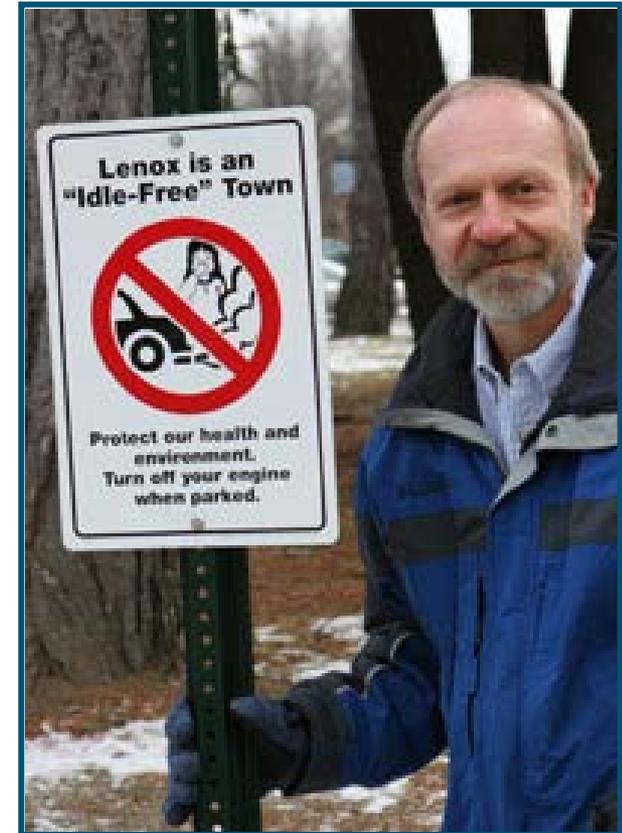
Sales of equipment depend on fuel prices and availability of capital

The number of EPS is growing very slowly (now about 1,000 spots, down from about 8,000, for 500,000 trucks)

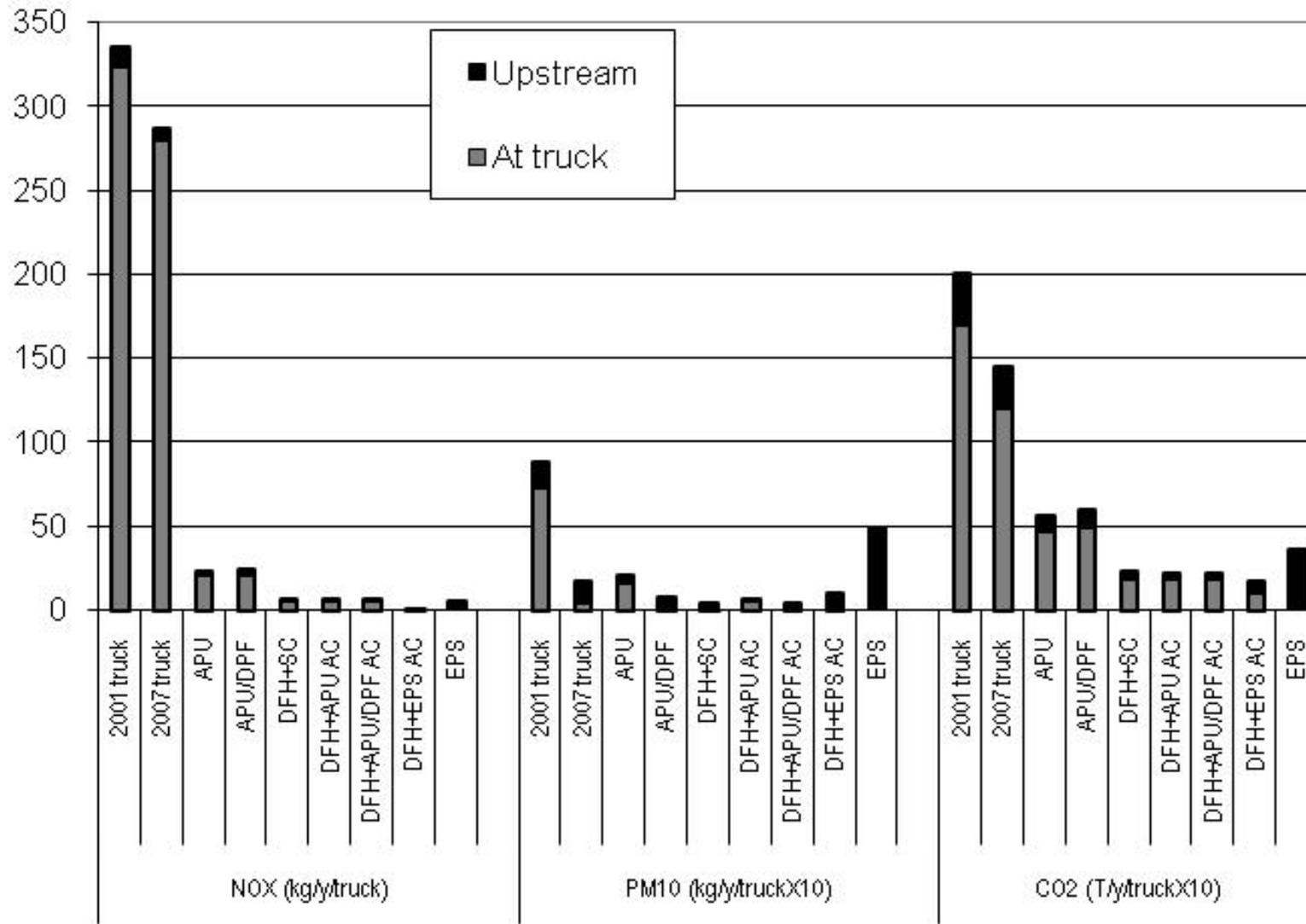
Anti-idling laws are becoming more common

Economic conditions have led to company failures and purchases by stronger companies

More states are adopting the 400-pound weight exemption for APUs



Idling reduction technologies reduce emissions



More needs to be done to overcome technology and other barriers

Technology

- Idling reduction equipment needs to be built into the truck as OEM equipment
- Fuel economy and emissions regulations will apply to idling reduction equipment

Legislative

- No harmonization exists among the many anti-idling regulations
- Not every state has adopted the 400-pound weight exemption for APUs

Institutional/Financial

- No trade association exists for idling reduction equipment manufacturers or vendors of electrified parking spaces
- Many fleets and truck drivers have bad credit and cannot afford to buy equipment





NIRNN is a free monthly electronic newsletter that shares up-to-date information on idling reduction

Plus,

- ⌘ Technical analyses with the City of Chicago**
- ⌘ Recovery Act grants and cooperative agreements**
- ⌘ Informational meetings**
- ⌘ Outreach campaign**
- ⌘ Revamp of AFDC and Argonne idling reduction websites**
- ⌘ Start-up and emissions measurements**

There's more to do to influence the marketplace



Educate vehicle operators about benefits

Hold workshops on idling reduction

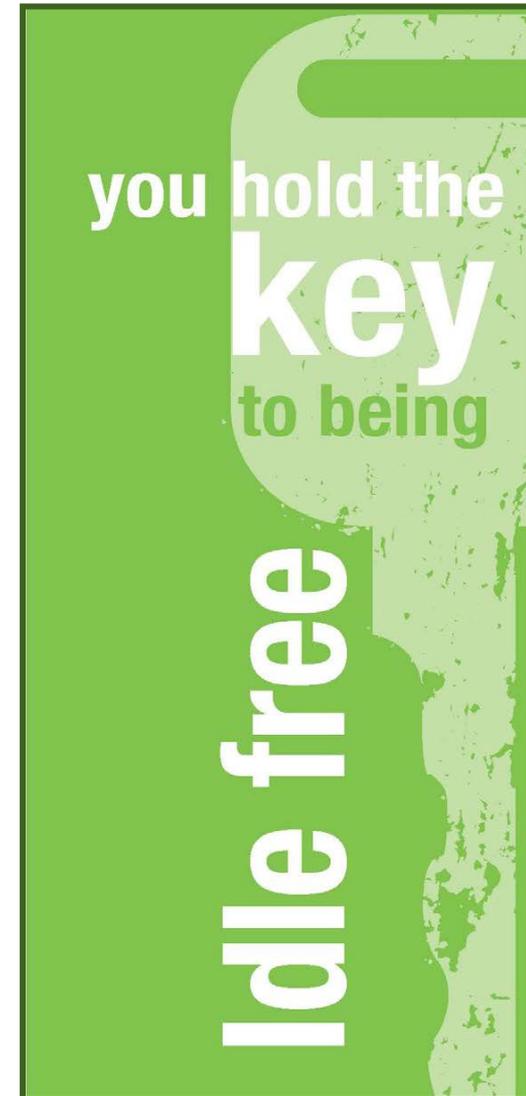
Serve as local clearinghouse for unbiased information

Help match technologies to user needs

Encourage loan or lease programs

Create consistent information and materials

Create issue papers and idling information cards for handouts

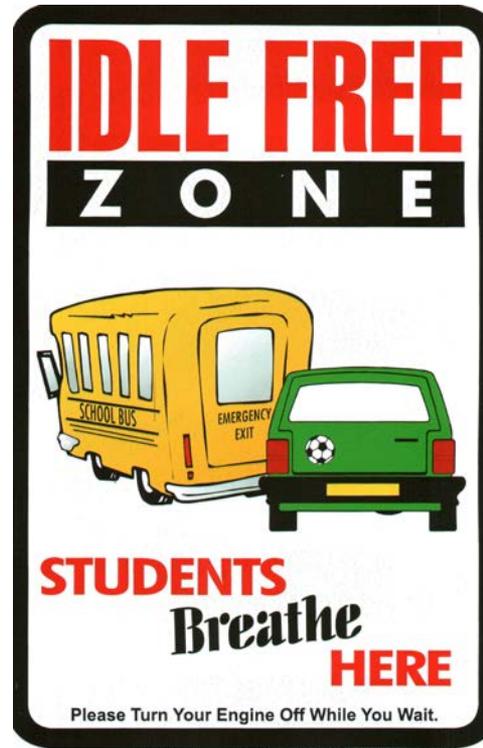


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And please don't idle unnecessarily!