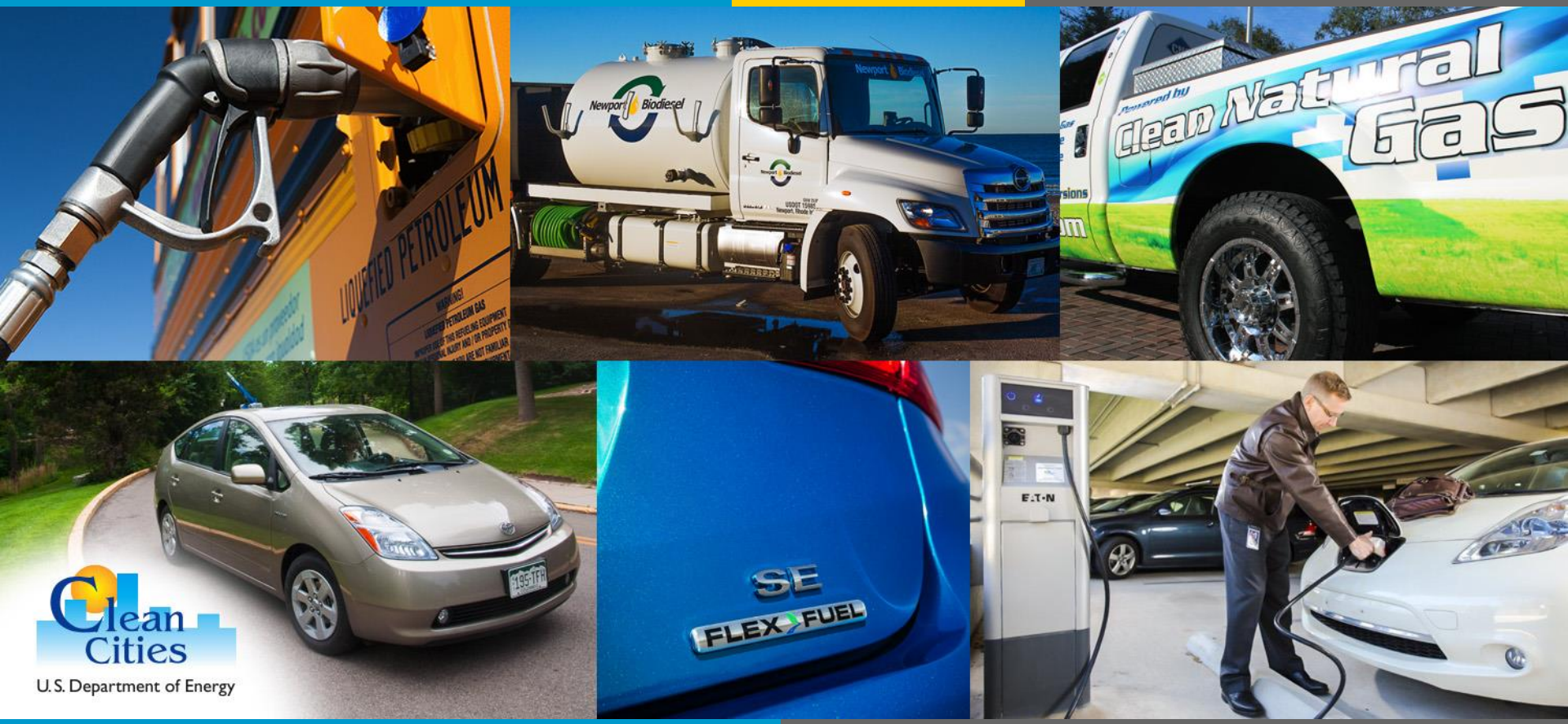
U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy



IdleBox: What's in It for EPA Advance?

January 25, 2017

Patricia Weikersheimer and Linda Gaines, PhD

Argonne National Laboratory

What Is DOE's Clean Cities?

Clean Cities advances the energy, economic, and environmental security of the United States by supporting local actions to cut petroleum use in transportation.

- Reduced petroleum consumption
- Reduced greenhouse gas (GHG) emissions
- Reduced dependence on imported petroleum

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Local Partnerships: Clean Cities Coalitions

- National network of nearly **100 local coalitions**
- **82% of the total U.S. population** lives within coalition boundaries
- Nearly **500,000 alternative fuel vehicles**

cleancities.energy.gov/coalitions/locations//

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Quick Refresher: What's Wrong with Idling?

- ***Idling in the U.S. uses more than 6 billion gallons of fuel at a cost of more than $20 billion each year.***
- Idling vehicles consume from 0.2 to 1+ gallons of fuel per hour.
- Idling vehicles emit and contribute to the formation of criteria pollutants.
- Each gallon of fuel burned produces about 20 pounds of carbon dioxide.
- Especially for heavy-duty trucks, idling increases vehicle maintenance costs and can shorten engine life.
- Idling may be against the law.

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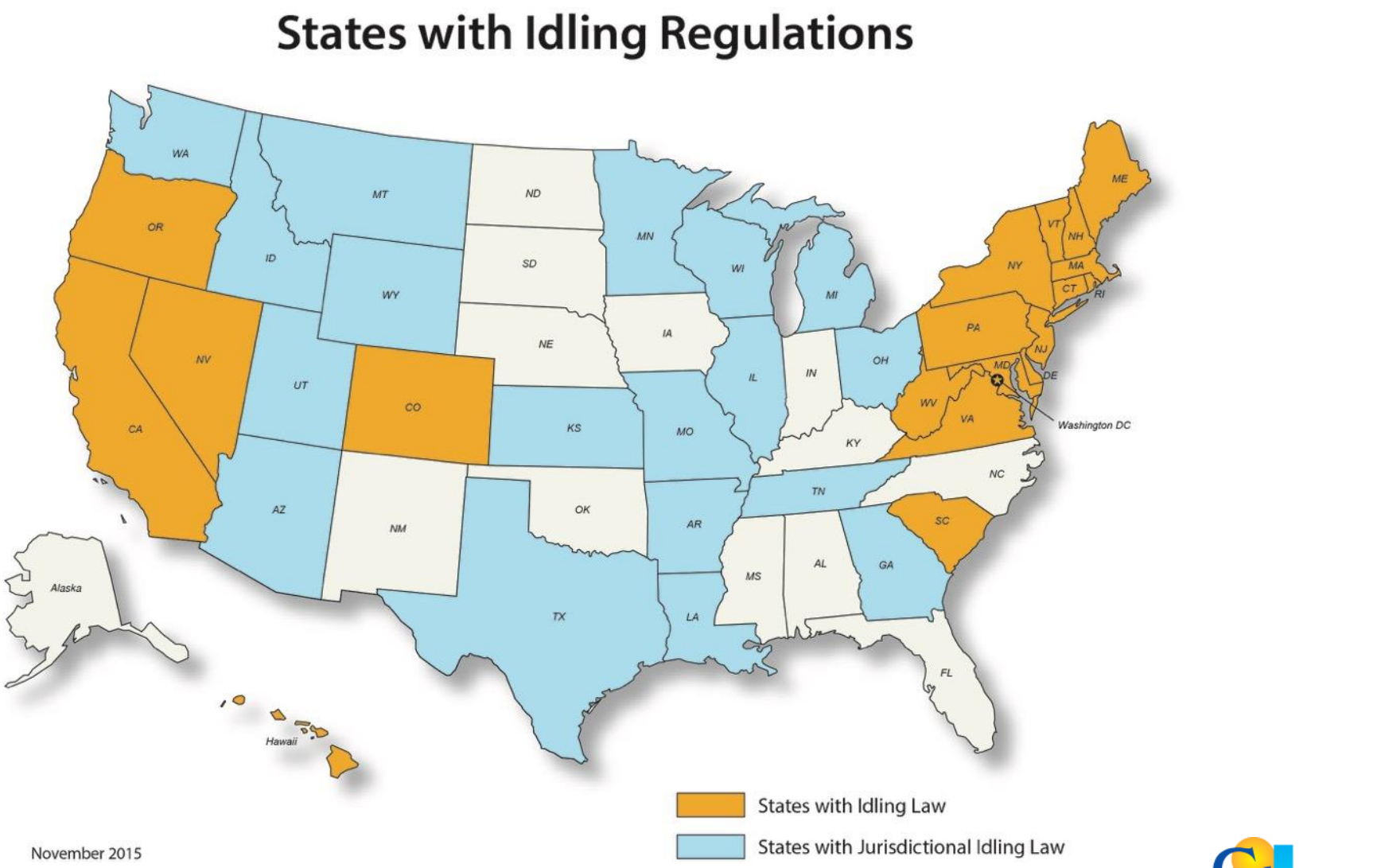
Also . . . Idling May Be Against the Law



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But . . . Idling Reduction Is More Complicated Than "Turn Off Your Engine"

- With passenger cars, the message may indeed be as simple "Turn the key."
- With vehicles that need power for nonpropulsion purposes, it's more complicated.
  - Vehicles that need power while stationary range from emergency vehicles to work trucks to long-haul, heavy-duty trucks.
  - The good news is that there are devices/technologies available that reduce or eliminate idling.
    - The ROI on these technologies will be a key factor in adoption and acceptance.

What Is IdleBox?

IdleBox is an **electronic, modular toolkit** to help you advance the acknowledged low-hanging fruit of fuel economy—**idling reduction**.

Modular for maximum flexibility.

Originally developed for use by Clean Cities coalitions only, IdleBox is **now organized to assist any person or organization seeking to to advance idling reduction.**

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What's in IdleBox?

- Information cards, tip sheets, and pledge forms
- Outreach letters and press releases
- PowerPoint presentations
- Poster and sign
- Idling calculator
- IdleBase (a database of idling laws)
- Technical reference materials
- And more . . .

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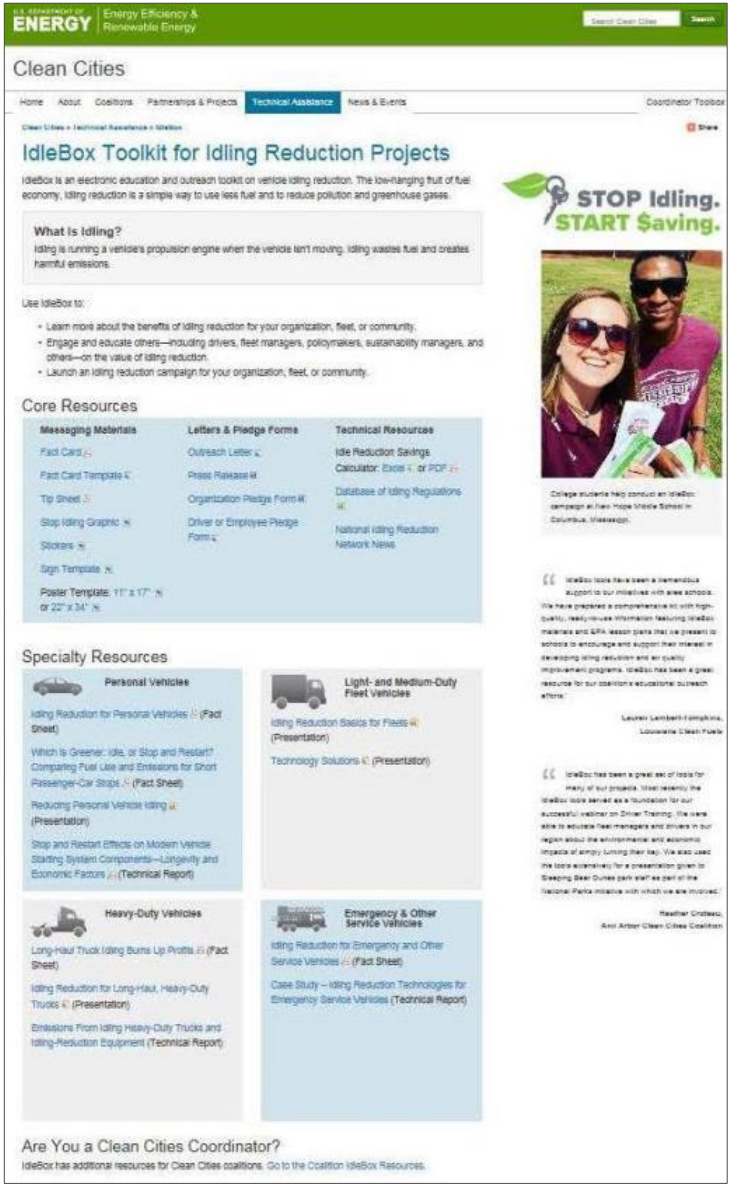
IdleBox Home Page: cleancities.energy.gov/idlebox



- IdleBox is organized by **Core Resources** and **Specialty Resources**.

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IdleBox Organization: Core Resources

Core Resources

Messaging Materials

- Fact Card
- Fact Card Template
- Tip Sheet
- Stop Idling Graphic
- Stickers
- Sign Template
- Poster Template: 11" x 17" or 22" x 34"

Letters & Pledge Forms

- Outreach Letter
- Press Release
- Organization Pledge Form
- Driver or Employee Pledge Form

Technical Resources

- Idle Reduction Savings Calculator: Excel or PDF
- Database of Idling Regulations
- National Idling Reduction Network News

Core Resources: Messaging Materials Examples

STOP Idling.
START $aving.

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Core Resources: Messaging Materials Examples, cont.

- **Sign** for loading, unloading, and parking areas
- **Poster** for employee areas

▲ *Sign*

▲ *Poster*

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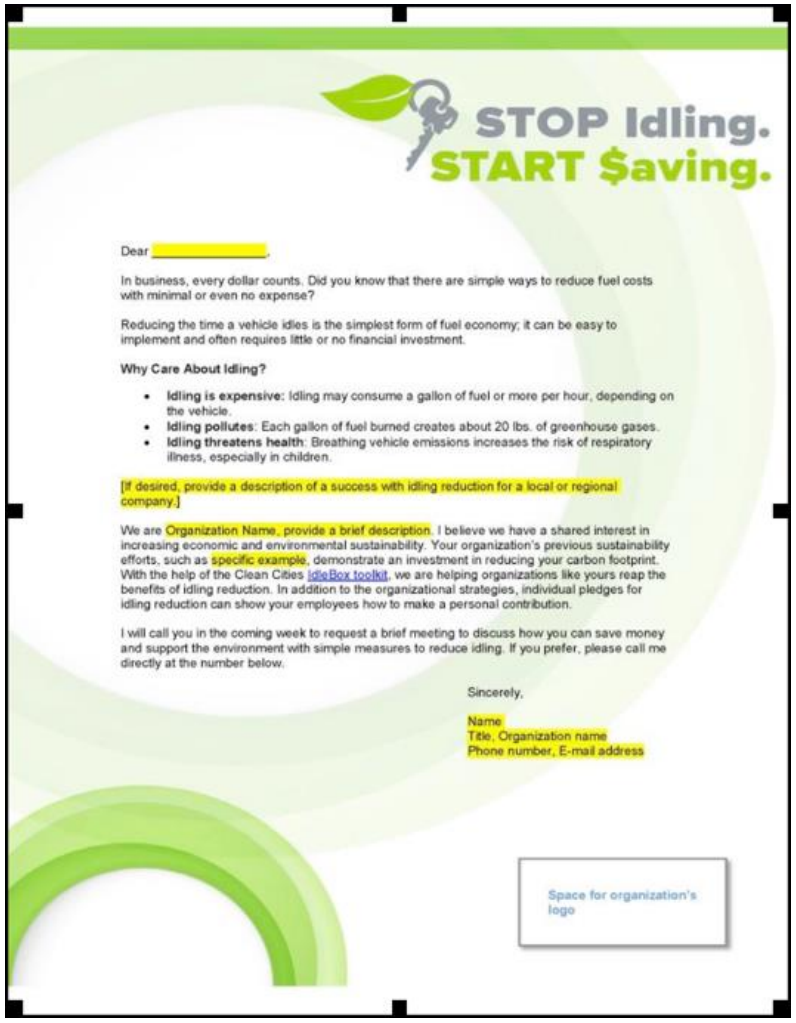
Core Resources: Letter/Pledge Form Examples



STOP Idling.
START $aving.

Dear _____,

In business, every dollar counts. Did you know that there are simple ways to reduce fuel costs with minimal or even no expense?

Reducing the time a vehicle idles is the simplest form of fuel economy; it can be easy to implement and often requires little or no financial investment.

Why Care About Idling?

- **Idling is expensive:** Idling may consume a gallon of fuel or more per hour, depending on the vehicle.
- **Idling pollutes**: Each gallon of fuel burned creates about 20 lbs. of greenhouse gases.
- **Idling threatens health**: Breathing vehicle emissions increases the risk of respiratory illness, especially in children.

[If desired, provide a description of a success with idling reduction for a local or regional company.]

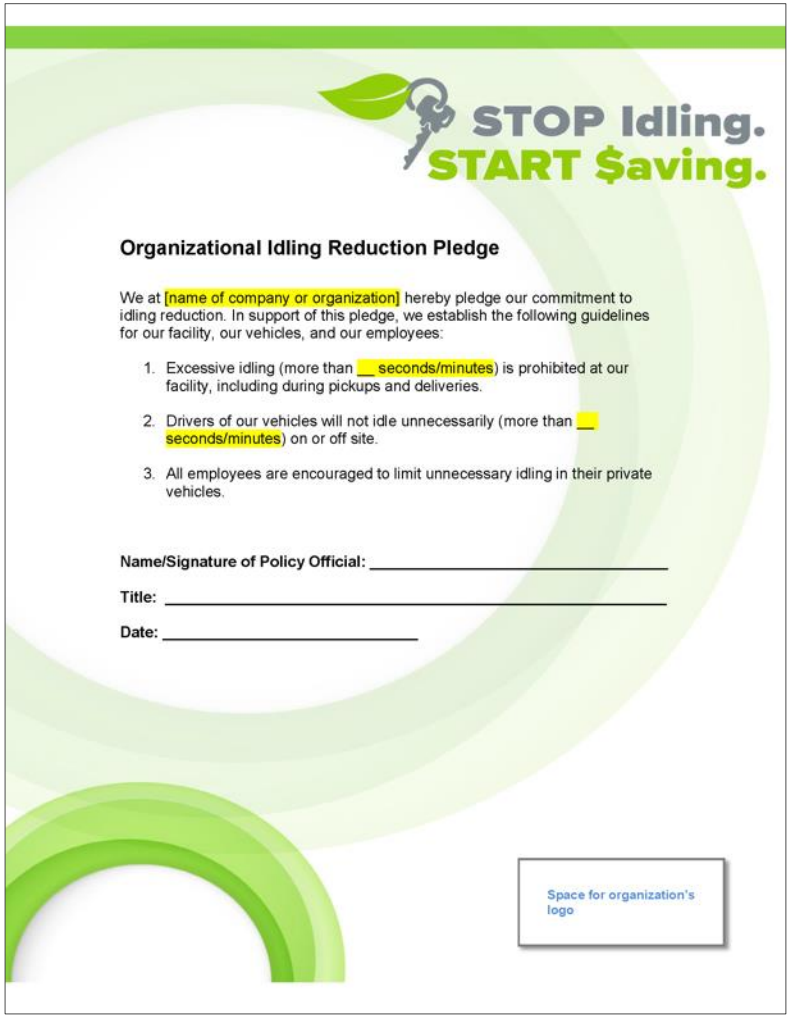
We are Organization Name, provide a brief description. I believe we have a shared interest in increasing economic and environmental sustainability. Your organization's previous sustainability efforts, such as specific example, demonstrate an investment in reducing your carbon footprint. With the help of the Clean Cities IdleBox toolkit, we are helping organizations like yours reap the benefits of idling reduction. In addition to the organizational strategies, individual pledges for idling reduction can show your employees how to make a personal contribution.

I will call you in the coming week to request a brief meeting to discuss how you can save money and support the environment with simple measures to reduce idling. If you prefer, please call me directly at the number below.

Sincerely,

Name
Title, Organization name
Phone number, E-mail address

Space for organization's logo



STOP Idling.
START $aving.

Organizational Idling Reduction Pledge

We at [name of company or organization] hereby pledge our commitment to idling reduction. In support of this pledge, we establish the following guidelines for our facility, our vehicles, and our employees:

1. Excessive idling (more than __ seconds/minutes) is prohibited at our facility, including during pickups and deliveries.
2. Drivers of our vehicles will not idle unnecessarily (more than __ seconds/minutes) on or off site.
3. All employees are encouraged to limit unnecessary idling in their private vehicles.

Name/Signature of Policy Official: _____

Title: _____

Date: _____

Space for organization's logo

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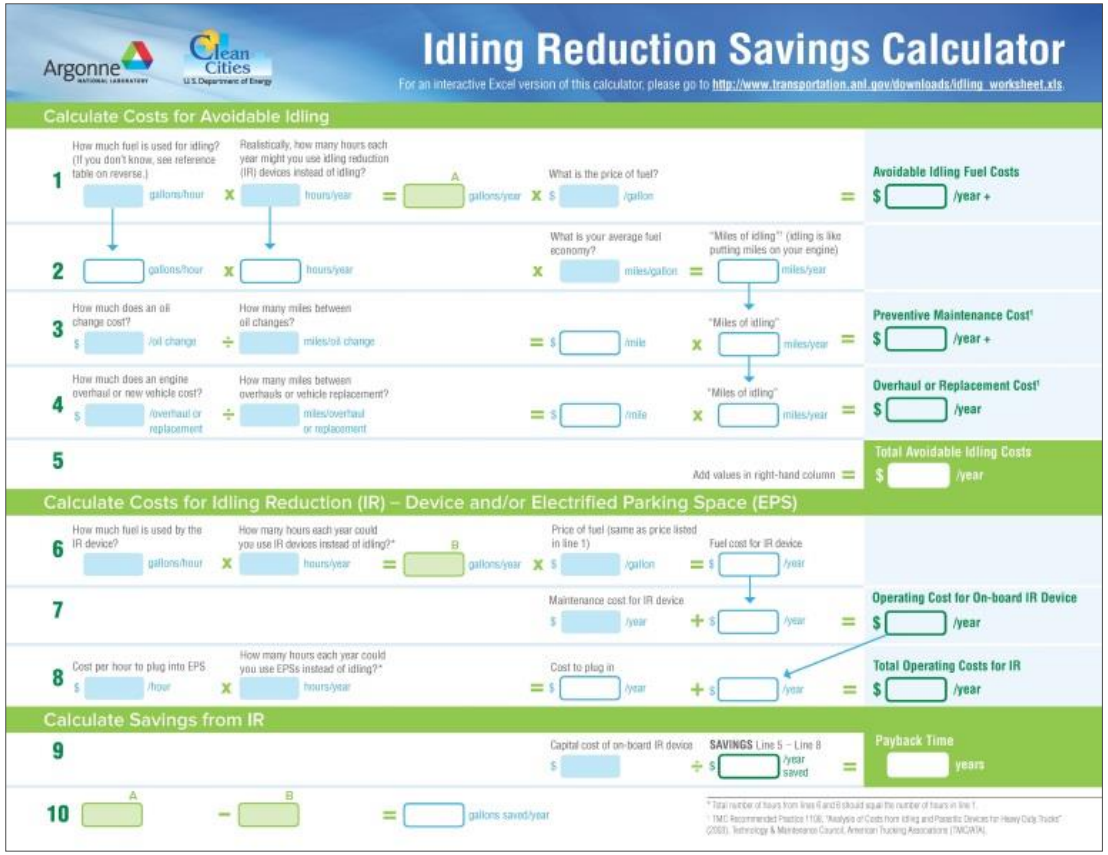
Core Resources: Technical Tool Example

Idle Reduction Savings Calculator

Share the **Idle Reduction Savings Calculator** to help fleet managers and others estimate how much they can save with idling reduction.



Idling Reduction Savings Calculator

For an interactive Excel version of this calculator, please go to http://www.transportation.anl.gov/downloads/idling_worksheet.xls

Calculate Costs for Avoidable Idling

1 How much fuel is used for idling? (If you don't know, see reference table on reverse.) gallons/hour x Realistically, how many hours each year might you use idling reduction (IR) devices instead of idling? hours/year = A gallons/year x What is the price of fuel? $ /gallon = Avoidable Idling Fuel Costs $ /year +

2 gallons/hour x hours/year x What is your average fuel economy? miles/gallon = "Miles of idling" (idling is like putting miles on your engine) miles/year

3 How much does an oil change cost? $ /oil change ÷ How many miles between oil changes? miles/oil change = $ /mile x "Miles of idling" miles/year = Preventive Maintenance Cost† $ /year +

4 How much does an engine overhaul or new vehicle cost? $ /overhaul or replacement ÷ How many miles between overhauls or vehicle replacement? miles/overhaul or replacement = $ /mile x "Miles of idling" miles/year = Overhaul or Replacement Cost† $ /year

5 Add values in right-hand column = Total Avoidable Idling Costs $ /year

Calculate Costs for Idling Reduction (IR) – Device and/or Electrified Parking Space (EPS)

6 How much fuel is used by the IR device? gallons/hour x How many hours each year could you use IR devices instead of idling?* hours/year = B gallons/year x Price of fuel (same as price listed in line 1) $ /gallon = Fuel cost for IR device $ /year

7 Maintenance cost for IR device $ /year + $ /year = Operating Cost for On-board IR Device $ /year

8 Cost per hour to plug into EPS $ /hour x How many hours each year could you use EPSs instead of idling?* hours/year = Cost to plug in $ /year + $ /year = Total Operating Costs for IR $ /year

Calculate Savings from IR

9 Capital cost of on-board IR device $ ÷ SAVINGS Line 5 – Line 8 $ /year saved = Payback Time years

10 A – B = gallons saved/year

* Total number of hours from lines 6 and 8 should equal the number of hours in line 1.

† TMC Recommended Practice 1108, "Analysis of Costs from Idling and Parasitic Devices for Heavy Duty Trucks" (2003). Technology & Maintenance Council, American Trucking Associations (TMC/ATA).

www.anl.gov/energy-systems/downloads/vehicle-idle-reduction-savings-worksheet

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Core Resources: Technical Tools Example, *cont.*

Argonne NATIONAL LABORATORY

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Idling Reduction Savings Calculator

For an interactive Excel version of this calculator, please go to http://www.transportation.anl.gov/downloads/idling_worksheet.xls.

Calculate

1

2

3

4

5

Calculat

6

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8

Calculat

9

10

How Much Fuel Is Used for Idling?

Vehicle Type	Class	Fuel Type	Size Indicator		Idling Fuel Use (gal/h)		Source
			Engine Size (l)	GVWR (lb)	No load	With load	
Passenger Car (Ford Focus)	1	G	2	–	0.16	0.29	ANL 1
Passenger Car (Volkswagen Jetta)	1	D	2	–	0.17	0.39	ANL 1
Passenger Car (Ford Crown Victoria)	1	G	4.6	–	0.39	0.59	ANL 1 & 2
Medium Heavy Truck	6	G	5–7	19,700–26,000	0.84	–	WVU
Delivery Truck	5	D	–	19,500	0.84	1.1[1]	NREL
Tow Truck	6	D	–	26,000	0.59	1.14[2]	ORNL
Medium Heavy Truck	6–7	D	6–10	23,000–33,000	0.44	–	WVU
Transit Bus	7	D	–	30,000	0.97	–	ORNL
Combination Truck	7	D	–	32,000	0.49	–	ORNL
Bucket Truck	8	D	–	37,000	0.90	1.50[2]	ORNL
Tractor-Semitrailer	8	D	–	80,000	0.64	1.15[3,1]	TMC

D = diesel, G = gasoline, Gal = gallon(s), GVWR = gross vehicle weight rating, h = hour(s), l = liter(s), lb = pound(s), PTO = power take-off.
[1] High idle.
[2] PTO on.
[3] Air conditioning on.

Sources

ANL 1: Stutenberg, K., and Lohse-Busch, H. "APRF [Advanced Powertrain Research Facility at Argonne National Laboratory] Conventional Vehicles Snapshot Study." Presentation to U.S. DOE, December 2, 2012.

ANL 2: Rask, E.; Keller, G.; Lohse-Busch, H.; et al. (2013). "Final Report: Police Cruiser Fuel Consumption Characterization." Work performed by Argonne National Laboratory for the Illinois Tollway Authority.

NREL: National Renewable Energy Laboratory Project Draft Final Report for the Period August 1, 2012, through March 31, 2014, "Data Collection, Testing and Analysis of Hybrid Electric Trucks and Buses Operating in California Fleets." ARB Agreement Number 11-600, NREL Contract Number FIA-12-1763, April 15, 2014.

ORNL: Lascurain, M.B.; Franzese, O.; Capps, G.; et al. (2012). *Medium Truck Duty Cycle Data from Real-World Driving Environments: Project Final Report* (ORNL/TM-2012/240). Work performed by Oak Ridge National Laboratory for the U.S. DOE.

TMC: TMC Recommended Practice 1108, "Analysis of Costs from Idling and Parasitic Devices for Heavy Duty Trucks" (2003). Technology & Maintenance Council, American Trucking Associations (TMC/ATA).

WVU: Khan, ABM S.; Clark, N.N.; Gautam, M.; et al. (2009). "Idle Emissions from Medium Heavy Duty Diesel and Gasoline Trucks." *Journal of the Air & Waste Management Association* (59:3) 354–359.

Other Idling Reduction Resources

- IdleBox www.cleancities.energy.gov/idlebox
- IdleBase http://cleancities.energy.gov/idlebase
- *National Idling Reduction Network News* energy.gov/eere/vehicles/vehicle-technologies-office-national-idling-reduction-network-news
- Argonne National Laboratory http://www.transportation.anl.gov/engines/idling.html
- Alternative Fuels Data Center http://www.afdc.energy.gov/conserve/idle_reduction_basics.html

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Specialty Resources

Specialty Resources

Personal Vehicles

Idling Reduction for Personal Vehicles (Fact Sheet)

Which Is Greener: Idle, or Stop and Restart? Comparing Fuel Use and Emissions for Short Passenger-Car Stops (Fact Sheet)

Reducing Personal Vehicle Idling (Presentation)

Stop and Restart Effects on Modern Vehicle Starting System Components—Longevity and Economic Factors (Technical Report)

Light- and Medium-Duty Fleet Vehicles

Idling Reduction Basics for Fleets (Presentation)

Technology Solutions (Presentation)

Heavy-Duty Vehicles

Long Haul Truck Idling Burns Up Profits (Fact Sheet)

Idling Reduction for Long-Haul, Heavy-Duty Trucks (Presentation)

Emissions From Idling Heavy-Duty Trucks and Idling-Reduction Equipment (Technical Report)

Emergency & Other Service Vehicles

Idling Reduction for Emergency and Other Service Vehicles (Fact Sheet)

Case Study – Idling Reduction Technologies for Emergency Service Vehicles (Technical Report)

Specialty Resources: Personal Vehicles

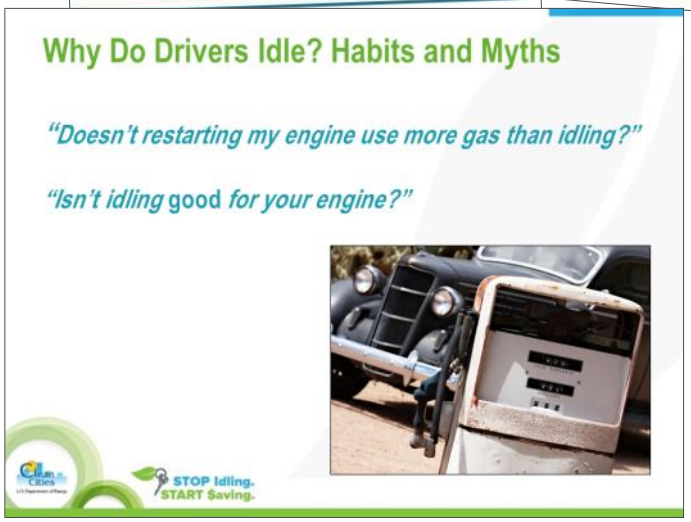
Personal Vehicles

Idling Reduction for Personal Vehicles (Fact Sheet)

Which Is Greener: Idle, or Stop and Restart? Comparing Fuel Use and Emissions for Short Passenger-Car Stops (Fact Sheet)

Reducing Personal Vehicle Idling (Presentation)

Stop and Restart Effects on Modern Vehicle Starting System Components—Longevity and Economic Factors (Technical Report)



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Specialty Resources: Light- and Medium-Duty Fleet Vehicles

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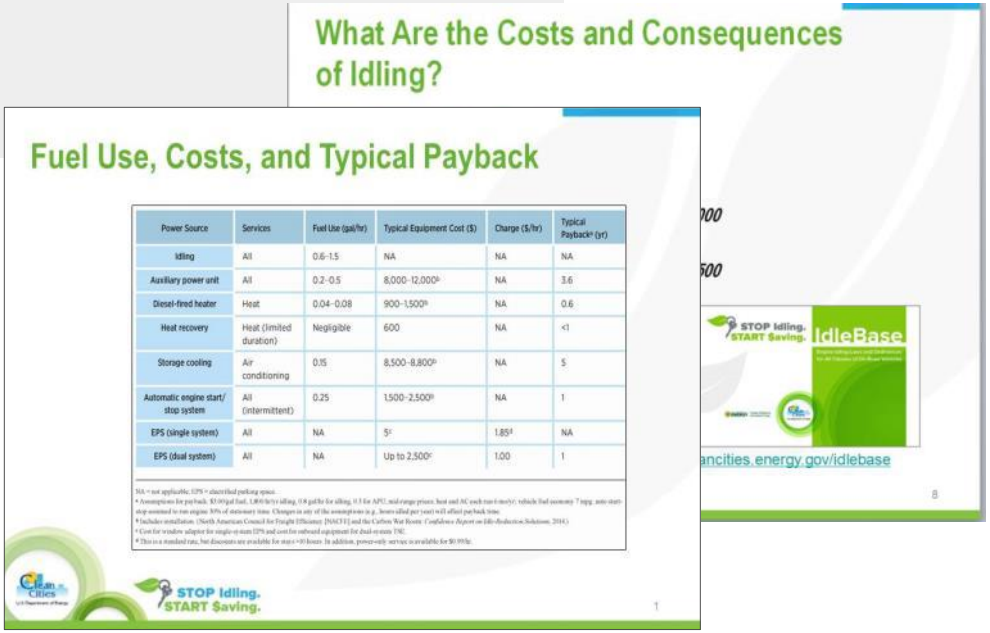
Specialty Resources: Heavy-Duty Vehicles



http://www.afdc.energy.gov/uploads/publication/hdv_idling_2015.pdf

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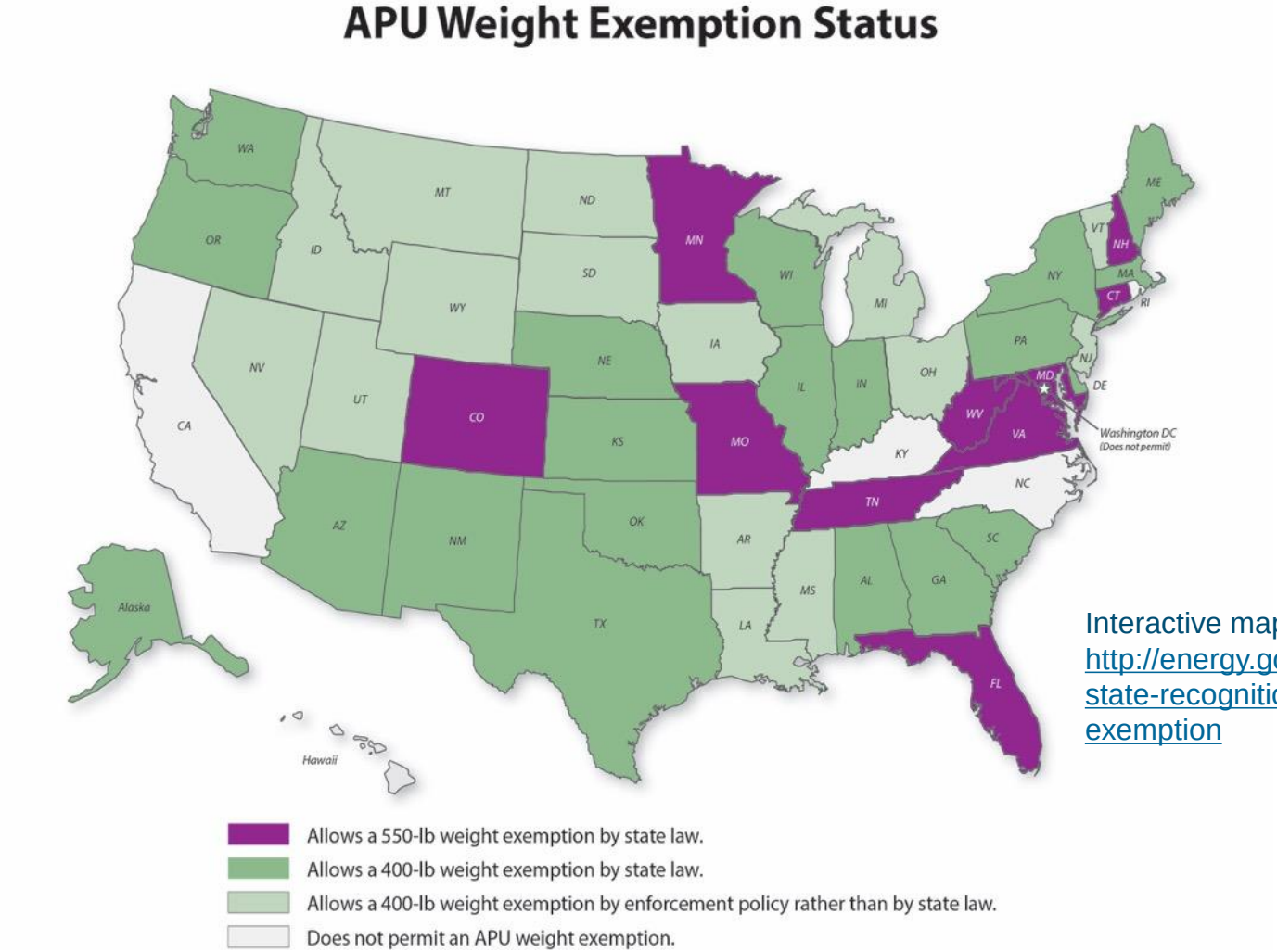
Specialty Resources: Heavy-Duty Vehicles, *cont.*



Interactive map at http://energy.gov/eere/vehicles/map-state-recognition-auxiliary-power-weight-exemption

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Specialty Resources: Emergency & Other Service Vehicles

Emergency & Other Service Vehicles

Idling Reduction for Emergency and Other Service Vehicles (Fact Sheet)

Case Study – Idling Reduction Technologies for Emergency Service Vehicles (Technical Report)

http://www.afdc.energy.gov/uploads/publication/idling_emergency-service_vehicles.pdf

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IdleBox Tool: IdleBase

cleancities.energy.gov/idlebase

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IdleBox Tool: IdleBase, cont.

A	B	C	D	E	F	G
Illinois						
	Type of Vehicle	**Idling Restriction**	**Exemptions**	**Consequences of Infraction**	**Regulation**	**Resources**
Counties in the Chicago Area: • **Cook** • **DuPage** • **Lake** • **Kane** • **McHenry** • **Will** • **Aux Sable and Goose Lake Townships in Grundy** • **Oswego Township in Kendall** **Counties in the Metro East St. Louis Area:** • **Madison** • **St. Clair** • **Monroe**	Diesel vehicles ≥8,000 lbs	10 minutes/hour	Traffic conditions or controls. Prevent a health or safety emergency. Emergency or law enforcement purposes. Service or repair. Government inspection. Idling necessary to operate auxiliary equipment to accomplish intended use of vehicle. Guarding contents of armored vehicle. Bus can idle a maximum of 15 minutes/hour to maintain passenger comfort. Resting in sleeping berth. Mechanical difficulties out of control of operator. Airport ground control support. Buses owned by public transportation authorities on bus route. Implements of husbandry. Electric utility service vehicles. If temperature <32F or >80F, idle limit to 30 minutes/hour while in queue.	$90 for first conviction. $500 for second or subsequent conviction in 12-month period. Fines are divided and paid to 3 groups, dependant on the county that wrote the ticket.	625 Illinois Compiled Statutes (ILCS) 5/11-1429	http://www.ilga.gov/legislation/ilcs/fulltext.asp?DocName=062500050K11-1429
City of Chicago	Diesel-powered vehicles	3 minutes/hour	Emergency vehicles providing health and safety services. Airport support vehicles necessary for airport operations. Engine running is necessary to operate auxiliary equipment to accomplish the intended use of the vehicle. Vehicles standing with engine running for purpose of service, repair, or inspection. Vehicles standing in traffic. Air conditioning if temperature >80F or heat if temperature <32F. Operation of APU or generator set. Mechanical requirements or difficulties out of operator's control. Vehicles standing due to automatic regeneration of diesel particulate filters or pre-shutdown cooling required by engine manufacturer.	$250 per violation	Chicago Municipal Code, Section 9-80-095	http://www.cityofchicago.org/dam/city/depts/doe/general/ESB_PDFs/StandingLimitOrdinanceAsPassed.pdf

National Idling Reduction Network News

Want to follow potential funding opportunities? Subscribe!

http://energy.gov/eere/vehicles/vehicle-technologies-office-national-idling-reduction-network-news

To subscribe, visit the link above or e-mail pweikersheimer@anl.gov

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IdleBox in Use

IdleBox has a range of uses, from policy development to fleet outreach to messaging to the general public.

West Palm Beach, Florida, used IdleBox materials for the launch of its no-idling policy for public utility vehicles (November 2014).

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IdleBox in Use, cont.

Bank of Utah used IdleBox materials to encourage its drive-through-window users to shut down rather than idle while waiting in line (February 2015).

http://www.good4utah.com/news/midday/how-you-can-reduce-air-pollution/205564819

IdleBox in Use, cont.

"At **ComEd**, we used the IdleBox toolkit to create posters and information cards that were used for an internal education program. Employees provided feedback that the anti-idling booth was their favorite of the day, and many said that they were going to change their behavior to limit or reduce idling of their personal vehicles after hearing about the impacts."

–Marla Westerhold of the Environmental Department at ComEd, Illinois' largest electric utility.

Wrapping Up: Organizing an Idling Reduction Campaign

- Target audience
- Strategy
- Messaging

Success with IdleBox: Tips from Clean Cities Coalitions

- Seek collaborative partnerships with other organizations that will benefit.
- Start with closest stakeholders/partners and build from those successes.
- Reach out to new audiences knowing that success will take multiple “touches.”
- Consider outreach to nontraditional fleets (e.g., Meals on Wheels).
- Use IdleBox to assist in ordinance development and outreach to local media.

IdleChat

We welcome your questions, feedback, and comments!

Work sponsored by the Clean Cities Program, U.S. Department of Energy's Office of Vehicle Technologies, to which we give our thanks.

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