



Argonne's Clean Cities Report: Tools and Resources Coming Soon

September 27, 2012

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What is Argonne National Lab?

- Direct linear descendent of University of Chicago Metallurgical Lab (controlled nuclear chain reaction)
- Designated a national laboratory in 1946, one of 17 major labs
- Operated by University of Chicago/Argonne LLC
- Pioneer of most civil nuclear technologies
- Perform multi-program/multi-disciplinary research

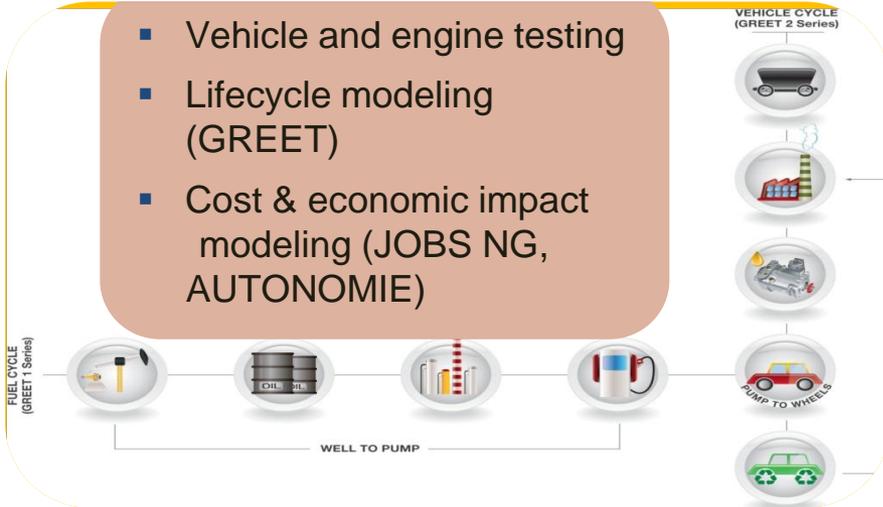


- ~\$600 M operating budget
- 2,800 employees
- 1,000 scientists and engineers
- 750 Ph.D.s

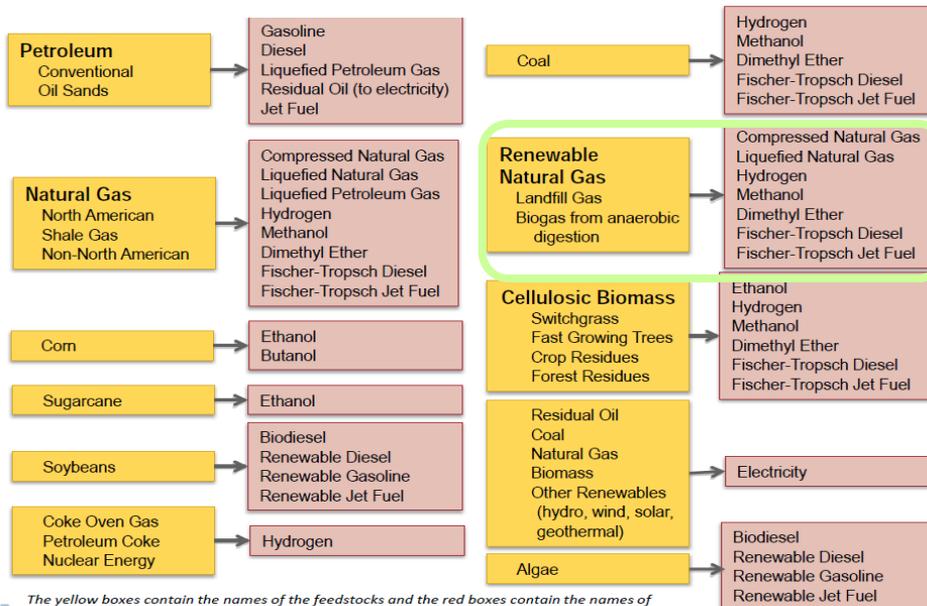
Argonne's Center for Transportation Research



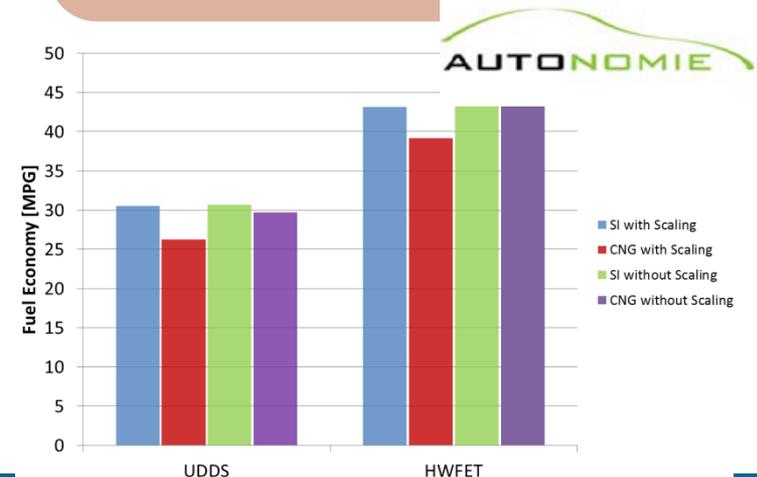
- Vehicle and engine testing
- Lifecycle modeling (GREET)
- Cost & economic impact modeling (JOBS NG, AUTONOMIE)



- Powertrain, fuel systems modeling (AUTONOMIE, Hardware In Loop)
- Support Clean Cities, USDRIVE, 21CTP, EcoCAR2 & other DOE partnerships/programs



The yellow boxes contain the names of the feedstocks and the red boxes contain the names of the fuels that can be produced from each of those feedstocks.



Argonne's Clean Cities Team



Team Lead
Marcy Rood Werpy



EcoCAR 2
Dana Bubonovich



RNG/Jobs Analysis
Marianne Mintz



Water Footprint Analysis
May Wu



Analysis
Andy Burnham



Idle Reduction Team
Linda Stephens, Patricia Weikersheimer, Terry Levinson, Linda Gaines
(from left to right)



Electric-Drive
Dan Santini

- In the U.S., idling consumes about 6 billion gallons of oil, costing about \$20 billion!
- For rest-period truck idling alone, emissions total *more* than 130 tons of particulate matter (PM), 12 million tons of CO₂, 35,000 tons of NOx, and 36,000 tons of CO.
- Half of idling fuel losses are estimated to be from everyday (noncommercial) drivers.



At the June 2011 Clean Cities Stakeholder Summit, participants voiced a strong desire for more idling reduction education and outreach resources.

Argonne proposed:

- [Develop National Idle Reduction Campaign](#) with tools to help educate light- and medium-duty fleet owners and drivers (government, industry, public).
- Provide CCCs with a cohesive, **modular tool kit** on Idle Reduction (IR).

- 2011 CC Stakeholder Summit - Idling Reduction Alley Facilitated Session
- Benchmark campaigns
- CCC IR Poll
- Green Trucks Summit

- **67% response!!**
- **Desired Tools:** Flyers/fact sheet, facilitated outreach, brochures
- **Target Audiences:** Schools, general public, delivery fleets, municipal/local government

- Discussed Poll outcomes
- Gathered additional feedback
- Input on logo and tool specifics
- Identified existing tools as potential prototypes
- **IdleBox is born!**

An electronic, modular idling-reduction outreach toolkit, IdleBox includes:

- Materials you can use to engage and educate your stakeholders and other audiences
- Resources to help you advance your own knowledge for more-effective outreach



What's in IdleBox?



- Overview PowerPoint presentation
- “Technology solutions” PowerPoint module
- Idling calculators
- Downloadable files for:
 - Poster
 - Sign
 - Information card
 - Tip sheet
 - Outreach letters
 - Press releases
 - Policy forms
 - Pledge forms
 - Branded graphic templates
- Reference materials
 - IdleBase (database of idling laws)
 - Technical reference library
 - *National Idling Reduction Network News*
 - Links to related resources of interest, including:
 - Clean Cities coalitions’ local/regional idling reduction campaigns
 - Examples of others’ idling policies, pledge forms, etc.
 - Websites such as National Clean Fleets Partnership and EPA SmartWay’s Verified Idling Reduction Technologies

Idling Reduction Basics for Fleets

What Is Idling?

What Vehicles Idle?

Some Idling Is Difficult to Avoid

Much Idling is Wasteful

Why Care About Idling?

What Can YOU Do?

IdleBox Can Help!



STOP Idling.
START \$aving.



Idling Reduction Technology Solutions

Technology Options to Support Idling Reduction

Calculating Costs

Savings and Pay-back

Funding Resources



STOP Idling.
START \$aving.



Estimating YOUR Payback

The more you idle...
the more you SAVE!

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? If you start idling, look up the number in the table below.	Alternatively, how many hours each year might you use an IR device instead of idling?	What is the price of diesel fuel?	Available Idling Fuel Costs
	0.8 gallons/hour	2,000 hours/year	\$ 2.75/gallon	= \$ 4,400/year
2	How much does an oil change cost?	How many miles between oil changes?	What is your average fuel economy?	"Miles of idling" idling in the idling miles on your engine
	\$ 150	50,000 miles/oil chg.	6.1 miles/gallon	= 9,760 miles/year
3	How much does an engine overhaul cost?	How many miles between overhauls?	"Miles of idling" idling in the idling miles on your engine	Preventive Maintenance Costs
	\$ 10,000	500,000 miles/overhaul	9,760 miles/year	= \$ 48.80/year
4			"Miles of idling" idling in the idling miles on your engine	Overhaul Costs
			9,760 miles/year	= \$ 195.20/year
5				Total Avoidable Idling Costs
				= \$ 464.80/year

Calculate Costs for Idling Reduction (IR)

6	How much fuel is used by the IR device?	How many hours each year could you use IR device instead of idling?	Price of diesel fuel (should equal price listed at line 1)	Fuel cost for IR device
	0.2 gallons/hour	2,000 hours/year	\$ 2.75/gallon	= \$ 1,100/year
7			Maintenance cost for IR device	Operating Cost for On-board IR Device
			\$ 100/year	= \$ 1,200/year
8	Cost per hour to plug into EPS?	Enter hours plugged into EPS?	Cost to plug in	Total Operating Costs for IR
	\$ 2.00/hour	0 hours/year	\$ 0/year	= \$ 1,200/year
9	Calculate Savings from IR		Capitol cost of on-board IR device	Payback Time
			\$ 8,000	= 2.3 years

¹ IR Idling Reduction ² EPA, Diesel Fuel Pricing Table ³ Mile number of hours from line 2 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 in approximately how much fuel you use to idle. For example, 800 RPM with an air conditioning consumption about 0.64 gallons of fuel per hour. ¹	RPM	AC on	AC on 50%	AC on
	800	25	25	25
	800	25	25	25
	1000	25	25	25
	1100	25	25	25
	1200	25	25	25



A vertical poster with a green header and footer. The main text is 'STOP Idling. START \$aving.' with a key and leaf icon. Below are three bullet points with leaf icons. At the bottom, there are two circular callouts: one with text about fuel usage and another with the Clean Cities logo and U.S. Department of Energy text.

 **STOP Idling.**
START \$aving.

-  **IDLING IS EXPENSIVE > > >**
up to a gallon of fuel per hour in most vehicles
-  **IDLING POLLUTES > > >**
a gallon of fuel creates about 20 lbs. of greenhouse gases
-  **IDLING THREATENS HEALTH > > >**
breathing vehicle emissions increases risk of respiratory illness

Idling uses more fuel than restarting your engine

- Idling wastes **6 BILLION GALLONS OF FUEL** each year in the U.S.

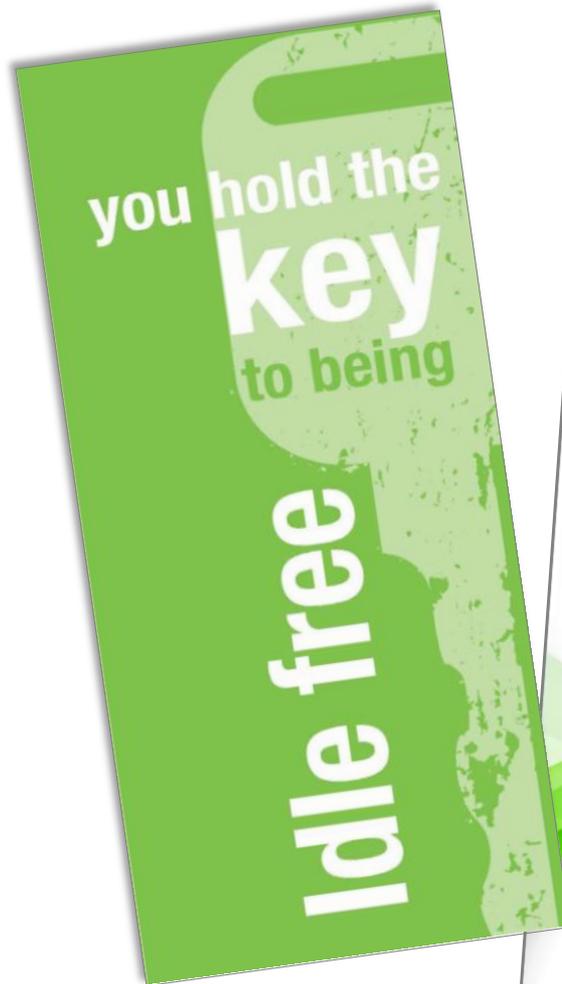

U.S. Department of Energy

A vertical sign with a green header and footer. The main text is 'STOP Idling. START \$aving.' with a key and leaf icon. Below is a large green circular graphic containing the text 'WE SUPPORT SAVING FUEL'. At the bottom, there is a circular callout with the Clean Cities logo and U.S. Department of Energy text.

 **STOP Idling.**
START \$aving.

WE SUPPORT SAVING FUEL


U.S. Department of Energy

A tip sheet titled 'STOP Idling. START \$aving.' with a green leaf and key icon. It contains sections for 'What Is Idling?', 'Why Care About Idling?', 'What Can YOU Do About Idling?', and the Clean Cities logo at the bottom.

STOP Idling. START \$aving.

What Is Idling?
Idling is running a vehicle engine when it's not moving. While some idling is hard to avoid, most idling is wasteful and avoidable.

Why Care About Idling?
Idling is expensive.
An idling car wastes up to .5 gallon per hour; a medium-duty truck may waste even more. While individual episodes may be small, the cumulative impacts of idling are large.

Idling pollutes.
Each gallon of fuel burned emits about 20 lbs. of carbon dioxide, a greenhouse gas.

Idling threatens health.
Tailpipe emissions contribute to the formation of ground-level ozone, which can damage lungs.

Idling can be against the law.
Idling laws differ by location, vehicle type/weight, fuel type, and outside temperature.

What Can YOU Do About Idling?

YOU CAN BE AWARE

- Turn off vehicles when not moving.
- When available, use waiting rooms at depots and assembly areas instead of idling.

YOU CAN EDUCATE DRIVERS

- Adopt an idling reduction policy.
- Ask drivers to make a pledge to reduce idling.
- Host an idling reduction workshop or driver training sessions.
- Post signs to remind drivers not to idle at your facility.



Clean Cities
U.S. Department of Energy



Date

Dear Fleet Owner:

In today's tough economy, every dollar counts. Did you know that there are simple ways to reduce fleet costs with minimal or even no expenses?

- > In 2011, UPS reduced idling time in fleet vehicles, saving 653,000 gallons of fuel.
- > Staples improved fuel economy in its delivery fleet with speed and idling controls.
- > Coca Cola piloted an idling reduction effort in it's tractor fleet that reduced fuel use by 4.5%

Idling reduction is the "low hanging fruit" of fuel economy because it is easy to implement and often requires no financial investment. We invite you to meet with us to ensure that your fleet is maximizing the benefits of idling reduction to realize optimal cost savings and support our environment.

We are Clean Cities Wisconsin, a regional coalition of the U.S. Department of Energy's national Clean Cities initiative. Our mission is to provide resources and technical assistance in the deployment of alternative and renewable fuels, idle-reduction measures, fuel economy improvements and new transportation technologies as they emerge.

Why care about idling?

IDLING IS EXPENSIVE > > >
up to a gallon of fuel per hour in most vehicles

IDLING POLLUTES > > >
a gallon of fuel creates about 20 lbs. of greenhouse gases

IDLING THREATENS HEALTH > > >
breathing vehicle emissions increases risk of respiratory illness

Please contact me or I will call you soon to set up a 30 minute meeting to discuss how your fleet can save money and support the environment with simple idling reduction measures.

Idling Reduction...we are the Solution!

John Smith
Clean Cities Wisconsin
jsmith@cleancities.org
111-222-3333



IdleBox Makes Idle Reduction Simple for Fleets

Reduce fuel consumption to support a cleaner environment

Contacts:

Your Name, Coordinator
XYZ Clean Cities
555-555-5555
your.name@xyzcleancities.com

City, State | Month Day, Year — Idling reduction is the "low hanging fruit" of fuel economy because it is easy to implement and often requires no financial investment. IdleBox is a new tool in the Clean Cities arsenal of resources to help light- and medium-duty fleets understand and implement idling reduction efforts to realize optimal cost savings and support a cleaner environment.

Dennis Smith, National Clean Cities Director, said on the introduction of IdleBox,

"IdleBox is a exemplary initiative that brings high quality information and tools to our over 100 Clean Cities Coalitions nationwide."

- What is idling?
 - Idling is running a vehicle engine when it's not moving.
 - While some idling is hard to avoid, most idling is wasteful and avoidable.
- Why care about idling?
 - **Idling is expensive:** up to a gallon of fuel per hour in most vehicles.
 - **Idling pollutes:** a gallon of fuel creates about 20 lbs. of greenhouse gases.
 - **Idling threatens health:** breathing vehicle emissions increases risk of respiratory illness.

continued...





My Pledge to Idling Reduction

I, _____, hereby pledge that I will further protect myself, others and the environment by limiting nonessential idling. I will not unnecessarily idle (for more than 30 seconds) the commercial vehicle I drive and will turn off my engine whenever possible. I further pledge that I will not idle my own, private vehicle unless warranted for safety or health reasons.

Signature of Driver _____

Company _____

Business Name _____

Date _____



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Idling Reduction Policy

We at _____ hereby pledge our commitment to Idling Reduction. In support of this pledge, we are establishing the following guidelines for our facility, our vehicles and our employees:

- 1) Excessive idling (more than 30 seconds) shall be prohibited at our facility including deliveries and pick ups to our delivery dock.
- 2) Drivers of our commercial vehicles will not unnecessarily idle (for more than 30 seconds) turning off their engine whenever possible.
- 3) All employees will be encouraged to limit unnecessary idling (more than 30 seconds) in their own, private vehicles when on company premises, driving in service to the company and when offsite.

Signature of Policy Official _____

Name, Title, Company _____

Date _____



Clean Cities
U.S. Department of Energy



STOP Idling.
START \$aving.





U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy | VEHICLE TECHNOLOGIES PROGRAM

Idling is Not the Way to Go

Idling your vehicle truly gets you nowhere. It increases our dependence on petroleum, reduces the fuel economy of your vehicle, costs you money, produces pollutants, and wastes precious natural resources. Researchers estimate that idling from heavy-duty and light-duty vehicles combined wastes about 6 billion gallons of fuel annually. When you make an effort to turn off your vehicle, you're on track to doing something better for yourself, your wallet, your environment, and your community.



Likewise, when waiting for passengers, consider if the temperature is moderate enough for a good idea. Remember, idling wastes fuel and produces pollutants.

Modern Cars Don't Need to Idle

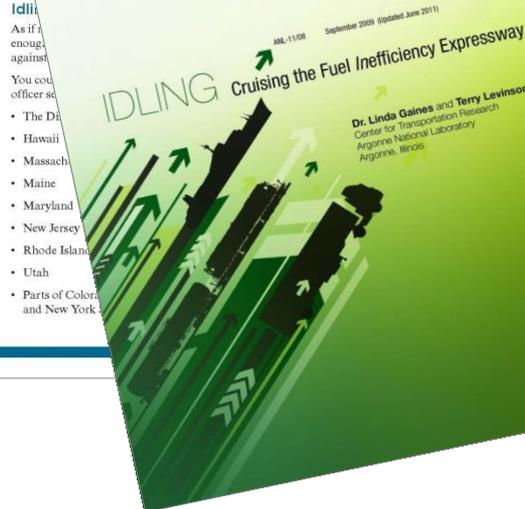
Advances in vehicle technology have eliminated much of the need for idling, making it easier than ever to avoid. Computerized controls in today's vehicles bring the engine and catalyst up to their operating temperatures more quickly when the vehicle is moving than when it is idling. The catalytic converter that reduces emissions also operates much sooner if the car is driven right away rather than idled. Even on the coldest day, it takes a modern vehicle less than 5 minutes to warm the engine if the car is moving. In contrast, it takes the engine almost twice as long to warm up if the car is merely idling. In moderate weather, the catalytic converter can even maintain its operating temperature and immediately resume emissions reduction if the driver restarts the car for up to 30 minutes after he or she turns off the ignition.

Similarly, today's gasoline and diesel vehicles alike do not suffer damage from turning the key on and off. Starters and batteries are much more durable than people believed they were in the past. In fact, today's owner's manuals, which usually contain information on how to get the best and most economical performance, generally do not recommend idling.

Consider Your Circumstances

Idling can often be avoided, but there are a few circumstances where it is acceptable.

Drive-through lines are a common place for vehicles to idle. If the line at the drive-through restaurant or bank is long, you should consider turning off your car while you wait. Or, you can park and go into the building.



National Idling Reduction Network News

October 2011

SOLICITATIONS FOR FUNDING AND AWARDS

[Brown text indicates a new entry, or updated information, since last month.]

ORGANIZATION	PROJECT	FUNDING	DEADLINE	WEBSITE
Energy Management	Carl Moyer Memorial Air Quality Standards Attainment Program	\$14 million	First come, first served.	http://www.baaqmd.gov/?sc_itemid=08F9594F-BF34-4A2A-BD38-9A3DDCCFF8F8
Department of Natural Resources	2011 Idle Reduction Devices Rebate Program	\$273,000 (as of October 24, 2011)	First come, first served.	http://daq.state.nc.us/motor/Rebates/
Green and Environmentally Efficient Trucking Association	GrEEen (Economically and Environmentally Efficient) Trucking Incentive Program	Can\$225,000	First come, first served through December 16, 2011	http://www.greentrucking.ca/
On-Road Board	On-Road Heavy-Duty Vehicle Loan Program	~\$48 million for loan guarantees	Rolling deadline until funds are awarded.	http://www.arb.ca.gov/ba/loan/on-road/documents/hdloanprogram.pdf
	Greenhouse Gas Offset Projects	\$6 million (as of January 2011)	Rolling deadline until funds are awarded.	http://www.climatetrust.org/apply.html
	Small Business Low Interest Loan Program	Indeterminate	Rolling deadline until funds are awarded.	http://www.energymaine.com/alt-work-for-small-business/loan-programs
	Small Business Auxiliary Power Unit (APU) Loan Program	\$110,000 (as of August 23, 2011)	Rolling deadline until funds are awarded.	http://www.pca.state.mn.us/sbiz7d9
California	Driver Recognition Program—Diesel Idle Reduction Campaign	N/A	Rolling deadline—the 15th of every month.	http://www.turnyourengineoff.org/campaign_recognition.html

- We're currently completing minor tweaks and revisions.
- When launched, IdleBox will be accessible through the Coordinator Toolbox on the Clean Cities website.
- In FY13, we'll add:
 - Widget version of the idling calculator worksheets
 - Modules to enable you to target other audiences (e.g., heavy duty fleets)
 - Idling reduction evaluation for fleets
 - Case Studies
 - Refinements based on your input—we look forward to your feedback on IdleBox's tools and potential additions!

Clean Cities Workforce Development Program and EcoCar 2



Utah's Robin Erickson and intern Laura Wilson



Vince Sabatini, former EcoCAR student, became a Summer 2010 intern for the Greater Long Island Coalition. He now works for dSPACE, Inc. in Michigan



Dallas Fort-Worth Pamela Burns and intern Kimberlin To



Twin Cities' Lisa Thurstin and intern Courtney Blankenheim

Background of Clean Cities University Workforce Development Program



- Started in Summer 2010 with 25 Coalitions by the U.S. Dept. of Energy's Clean Cities Program
 - 130 different interns since Summer 2010
 - 53 Coalitions + Motorweek
 - 35 Coalitions this semester and next!
 - 8 interns have been hired by Coalitions & ~ 5 by industry
- Wanted to emphasize the importance of alternative fuels and advanced vehicle technologies to a younger generation and help provide resources to Coalitions to promote the Clean Cities mission
- Managed by Argonne National Laboratory
 - This partnership was formed through the EcoCAR series
 - www.ecocar2.org
 - www.greengarageblog.org
 - www.facebook.com/ecocar2
 - www.twitter.com/ecocar2

Summer 2013 Program:

January 7: RFP Released to Coalitions

February 8: Application Deadline, 5:00 p.m. PST

Feb. 15 (approximately): Coalitions that qualified for an intern are notified.

Feb. 18: Marketing research begins.

Feb. 25: Student application launches

March 15: Student application and resume submission deadline

March 18-22: Review resumes

March 22: Provide resumes to Coalitions

March 25 – April 12: Coalitions conduct interviews.

April 12: Coalition must notify ANL of their selection

May 29-30: CCUWDP Intro Webinar

June 3: Summer 2013 Program Starts

August 9: Summer 2013 Program Ends

Collaboration efforts include:

- Vehicle architecture announcements
- Speakers at stakeholders meetings
- Guests on radio shows and media events
- Hosting Odyssey Day
- Vehicle Ride and Drives
- Members of the Board
- EcoCAR 2 Sponsor Social & Recruiting Events



Purdue EcoCAR 2 during the 2012 South Shores Clean Cities Annual Meeting



Long Beach CC at the EcoCAR 2012 Year One Competition in Los Angeles

EcoCAR2 Collaboration with Clean Cities



- Each year, EcoCAR 2 teams will have the chance to work with a Clean Cities Coalition on a collaboration video.
- **Pittsburgh Region Clean Cities** and **Penn State University** won the award in 2012!
- We plan to institute a 1st, 2nd, and 3rd place for 2013—More opportunities to collaborate and win.



Rick Price, PRCC, meets with Penn State EcoCAR and is the keynote speaker at their vehicle architecture announcement ceremony

RNG Highlights with Argonne's Clean Cities Team

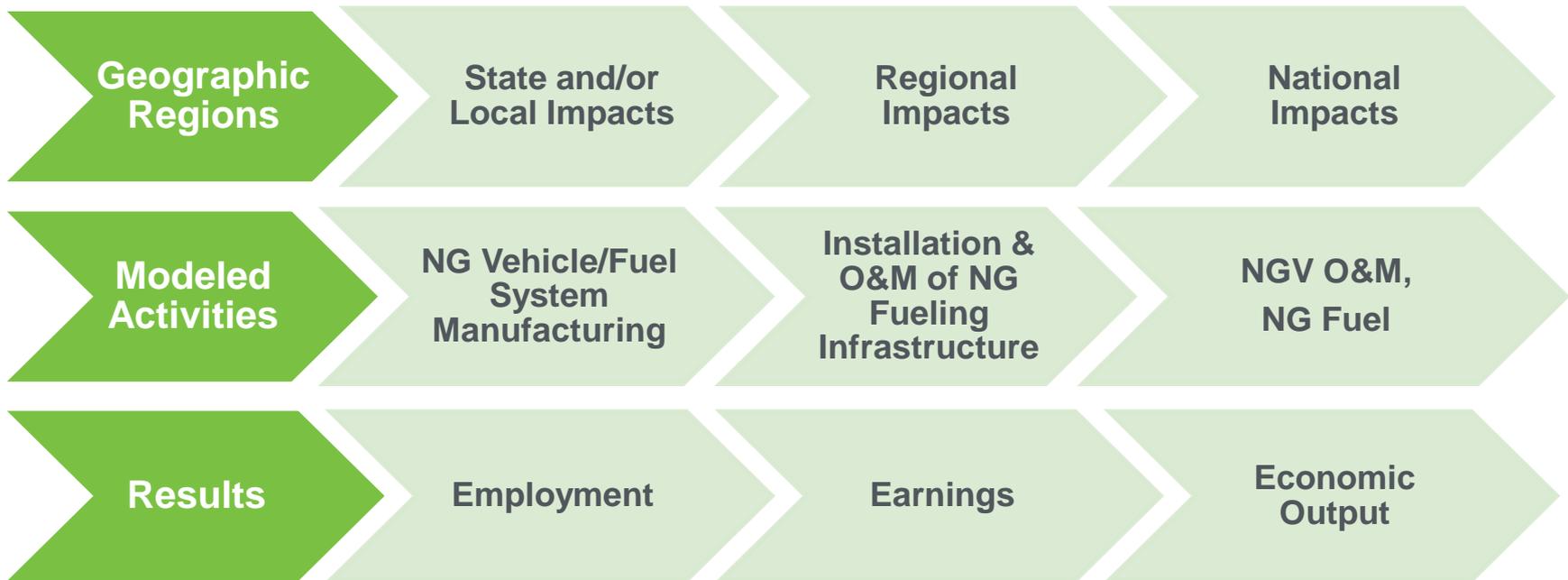


- Developing **data base** of operational and planned projects to produce high Btu gas from landfills, livestock- and food-based anaerobic digesters and wastewater treatment plants for pipeline injection or direct vehicle fueling. Updating/validating EPA's LMOP and AgSTAR databases (from voluntary reporting) and developing data on wastewater treatment and food-based projects
- Updating and expanding 2009 **white paper on renewable natural gas** with updated data on current and planned projects, GREET estimates of energy and GHG emissions from livestock digesters, and currently available incentives to promote RNG as a vehicle fuel. Draft report due by November 2012.
- Adding **wastewater-to-RNG pathways to GREET**. Estimating efficiency and yield by digester size and location; GHG emissions by process step and disposal method. Anticipate pathway completion by November 2012. Draft report due by December 2012.
- Presented overview and findings to Wisconsin and Western Washington Clean Cities, Biogas USA East, Biocycle.

What is JOBS NG?

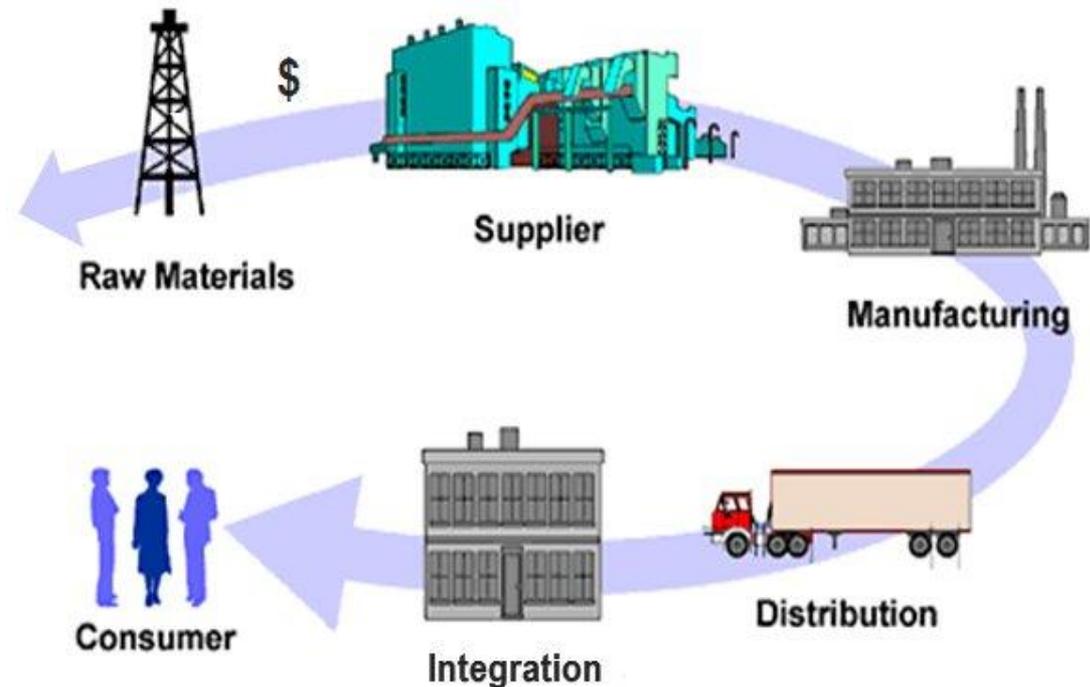


JOBS NG (JOBS and economic impacts of Natural Gas) is a user-friendly spreadsheet-based tool that calculates the near-term economic impacts of natural gas vehicles and fueling infrastructure



How does JOBS NG work?

- ▶ User specifies application (vehicle conversion, fuel station), geography (state/region/US) and target number units deployed
- ▶ User can specify additional cost and operating parameters or use defaults
- ▶ **JOBS NG** contains equations representing effect of expenditures along relevant supply chains on earnings, output and employment
- ▶ **JOBS NG** calculates direct, indirect and induced jobs, wages and sales from production, installation, operation and fueling of equipment



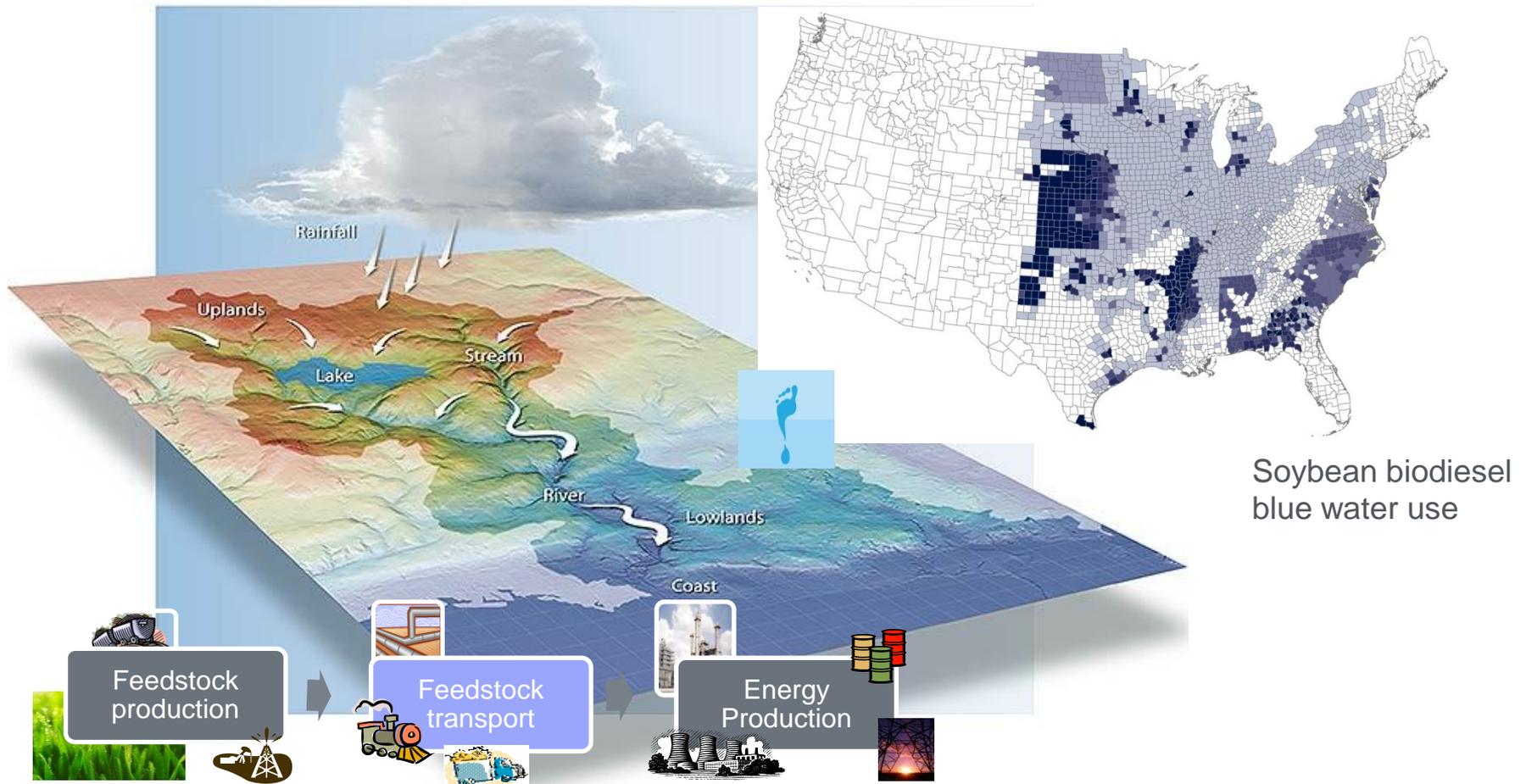
Jobs are created at each stage of vehicle production/conversion, fuel infrastructure, vehicle O&M & fuel supply chains (direct+indirect) plus from re-spending \$ in economy (induced)

- Are State, Census Region, and National geographies needed? How about a local geography?
- Are potential users interested in where natural gas vehicles are manufactured (do they anticipate new vehicle manufacturing to come to their areas) or are they most interested in deployment and use of natural gas vehicles?
- Are users interested in net economic impacts (which can only be estimated on the national level) or are they mostly interested in gross impacts of natural gas vehicles and fueling?
- Which vehicle types are users most interested in? Tool currently has transit buses, school buses, refuse trucks, sedans, and generic user-defined categories for light or heavy duty (where user supplies all information for a vehicle type of their choice). Heavy-duty long-haul vehicles are a potential future addition to the model.
- Are users interested in modeling vehicles and stations simultaneously?
- Which station types are users most interested in? Tool currently has CNG fast fill and CNG time fill, with LNG and LCNG as potential future additions.

- Completed contract negotiations with RCF Financial & Economic Consulting.
- Developed conceptual design of **JOBS NG** tool.
- Identified key sectors and relevant RIMS (Regional Input-Output Modeling System) multipliers.
- Formed Advisory Group of Clean Cities coordinators to assist with model design, functionality and beta testing. Held first call with four initial members. Have since added 2 more (additional members welcome).
- Secured Utilimarc AFV fleet data.
- Initial model release planned for Dec. **JOBS NG 1.0** will be limited to:
 - CNG fueling stations
 - OEM and QVM/upfitter CNG vehicles
 - State, regional and national geographies.
- Next year, **JOBS NG** will be expanded to include:
 - LNG fuel
 - Long haul trucks
 - LNG and LCNG fueling stations
 - Vehicle conversions?
 - Local geographies??

Water Footprint Tool

Examine the Growing Issue of Water Use in Energy Production



- A user friendly, visual, and dynamic tool for water resource, water use, and water quality with national coverage.

Purpose

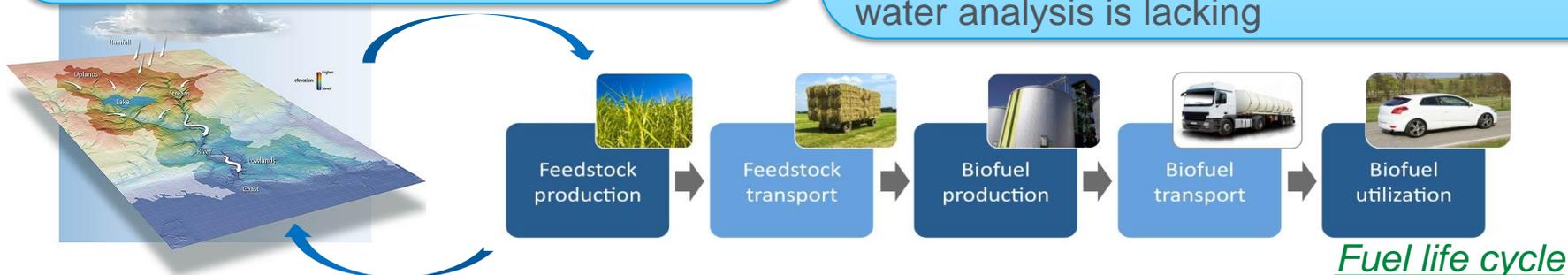
- Quantify relationships between energy production and the water quality and water resource availability needed to examine the long-term sustainability of biofuels, alternative fuels, other renewable fuels, and emerging fuel sources.

Project Goal

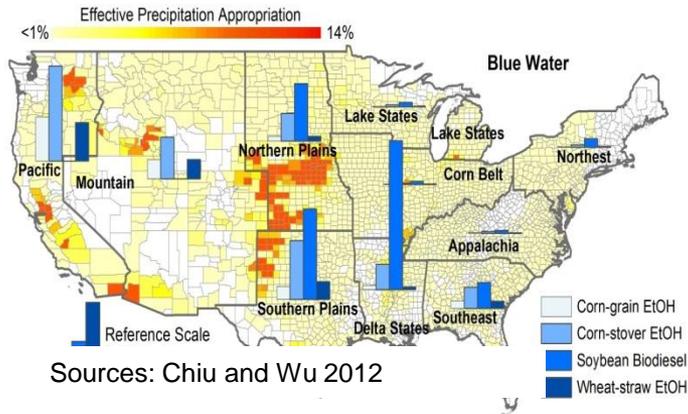
Develop a spatial-explicit analytical framework to account for the life-cycle water footprint of fuel production at regional and national scale.

Why it is needed

- Water sustainability is increasingly seen a key environmental issue in the development of emerging fuels
- Heterogeneity of water resource and water use across the U.S. affects major production decisions
- Competing water use from multiple sectors (power, agriculture, urban) compounds effect on water resource and wastewater discharge
- User friendly spatial analysis tool for water analysis is lacking



Water Footprint Tool Accomplishment Since 2007



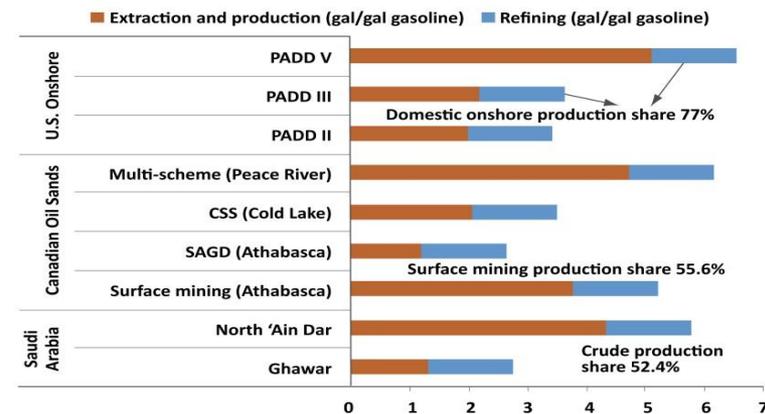
Demonstrated Expertise

- Developed analysis of water use in the production of **biofuel** produced from corn grain, stover, soybean, perennial grass, algae, and woody feedstock at county scale for the U.S.
- Developed analysis of water use in the production of **petroleum fuel** (conventional and oil sands) and generation of **electricity** from various fuel sources.
- Developed coding for a **web-based water footprint tool** for conventional biofuels ethanol and biodiesel (partially **supported by Clean Cities**).

Water Footprint Tool Features

Climate, land cover, direct and indirect water use, multiple production pathways, spatial display

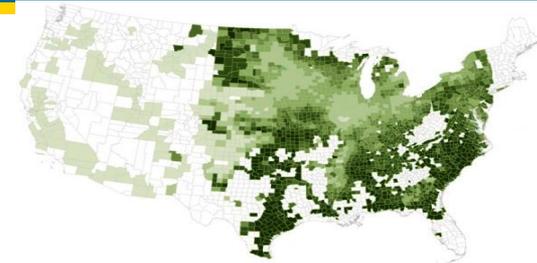
- Three webinars; invited talks at national and international conferences.
- Biofuel water consumption work was cited by two GAO reports.
- Three peer-reviewed journal publications, two Argonne technical reports, and a power-water model with more than 180 downloads.



Sources: Wu, et al. 2009

Benefits

- Provides stakeholders (clean cities network) a **tool** that contributes to full environmental assessment (*GHG, water, land*) across fuel production supply chain for conventional, renewable, and emerging fuels.
- Facilitates decision makers to incorporate local water resource constraints in **site selection for new projects**, in addition to economic and infrastructure considerations.
- Supports policy makers to compare and evaluate potential **impacts of energy policies on natural resource** by analyzing **trade-offs** between energy production, water use, and water quality at regional scale and identifying potential area for sustainable production



FY13 Plan

- Implement method to consider co-product contribution to the water footprint of soybean-based biodiesel
- Testing the web-model by clean cities coordinators and prepare for model roll-out
- Develop **shale gas water footprint** at selected site and pathway into the web model

Electric Drive Highlights with Argonne's Clean Cities Team



In 2012

Organized two main events on Plug-in Electric Drive:

- EVS-26: Clean Cities Plug-In Electric Vehicle Community Readiness Partners Discussion Group
- National Governors Association (NGA): State and Local PEV Workshop, Getting Ready Together

Serve on the Illinois Plug-in Electric Vehicle Task Force

Multiple Research Papers by D. Santini

In 2013

“Harmonizing Policies the Promote Technological Innovation and Fund the U.S. Road Network.” Center for Climate and Energy Solutions (C2ES), collaborating with D. Santini

Summary Report on Lessons Learned from PEV Community Readiness Partners (C2ES)

NGA Spring Meeting on PEVs or NGVs
Signage Best Practices Web Page



We Revised the Charging Pyramid to Illustrate Complexity of Plug-in Vehicle Charging

- Last year coordinators expressed interest in tool to examine costs and benefits of “Green Fleet Technologies” for certification/consultation programs
- Major effort has been data collection building off existing tools:
 - GREET Fleet for petroleum use and GHGs
 - Diesel Emission Quantifier/MOVES for tailpipe emissions
 - Vehicle Cost Calculator and VICE for costs
- Other data collection includes ARRA reporting, Utilimarc database, and literature review
- Beta release of Green Fleet Tool will include:
 - Fuel (petroleum) consumption
 - GHG emissions
 - Criteria air pollutants emissions
 - Fuel, vehicle, and maintenance costs
- Tool will allow Coordinators to:
 - Develop a baseline for LDVs and HDVs fleets
 - Compare actual AFV options for specific vocations

- Detailed survey data was collected from several grant recipients to examine specific fuel/vocation combinations
 - CNG refuse trucks (Groot, Allied Waste, and City of Milwaukee)
 - LNG regional haulers (Enviro Express)
 - Propane school buses (Gloucester and several TX school districts)
- Working with Energetics to write up case studies with emphasis on:
 - Petroleum displacement and GHG benefits
 - Cost savings
 - Lessons learned and best practices

- Always looking for coordinator/stakeholder participation in tool development
 - JOBS NG
 - Water Footprint Tool
 - Green Fleet Tool
- Please contact Marcy (mroodwerpy@anl.gov) or Andy (aburnham@anl.gov) if you are interested