Save Energy Now LEADER Web Conference
Project Implementation Seminar Series

9 - Preparing for Project Implementation

Financing Project Implementation

Fred Schoeneborn, CEM, CEA
August 11, 2010

Agenda

- Seminar **Series Overview**
- **Recap Seminar # 8** – “Announcing the PRIZE”
- **Financing Project Implementation**

  Fred Schoeneborn - ORNL team

  Robert Varcoe – UAW & General Motors
- **Questions**/Future Seminars

Project Implementation Series

- **12** One-hour seminars assisting *Save Energy Now* LEADER Companies
- Conducted every **second Wednesday** of the month
- Focus on **real world** examples and solutions
- Practical **tools** made available
- **Peer** *Save Energy Now* LEADER participants

Announcing the PRIZE

- Address **WII-FM**
- **Calculate** the PRIZE
- Talk in **Business Language**
- Collect **Public Relations** benefits
- Highlight **Environmental** benefits
- Stress **Non-Energy** benefits
- **Publish** the PRIZE

FCS CONSULTING SERVICES, INC.

Sharing by Alcoa

- Noted **PRIZE** is $30 million for each 1% improvement
- Established an EM **structure**
- Pursued **support**
- **Listened** to what is being said
- Served as the "**glue**" for EE
- Noted **5 pillars** of EE
- Established a global energy efficiency **team**
- Tracked **Best Practice** implementation
- Identified the **keys** to successful execution

FCS CONSULTING SERVICES, INC.

Financing Project Implementation

- Enhance your typical **ROI calculation**
- Search for **tax incentives**
- Seek **third party incentives** from resource providers
- Obtain Local, State, and Federal **grants**
- Consider **Performance Contracting**

FCS CONSULTING SERVICES, INC.

Investment Strategy

- Make sure that the **playing field** is level
- Reflect the **lower risk** of energy saving projects
- Use **pilot projects** to facilitate replication
- Consider establishing a **Green Fund**
- Equate energy funding to **% of operating budget**

Plant Controller Perspective

- See projects as a **business opportunity**
- Include in the assessment **result meetings**
- Talk **business language** like Payback and ROI
- Make a **business case** not a technical energy case
- **Bundle** projects with various rates

FCS CONSULTING SERVICES, INC.

Plant Manager Perspective

- Can't spend **potential**
- **Question** one-year payback
- Focus on **personal payback criteria**
- **Corporate** may "**seize**" savings

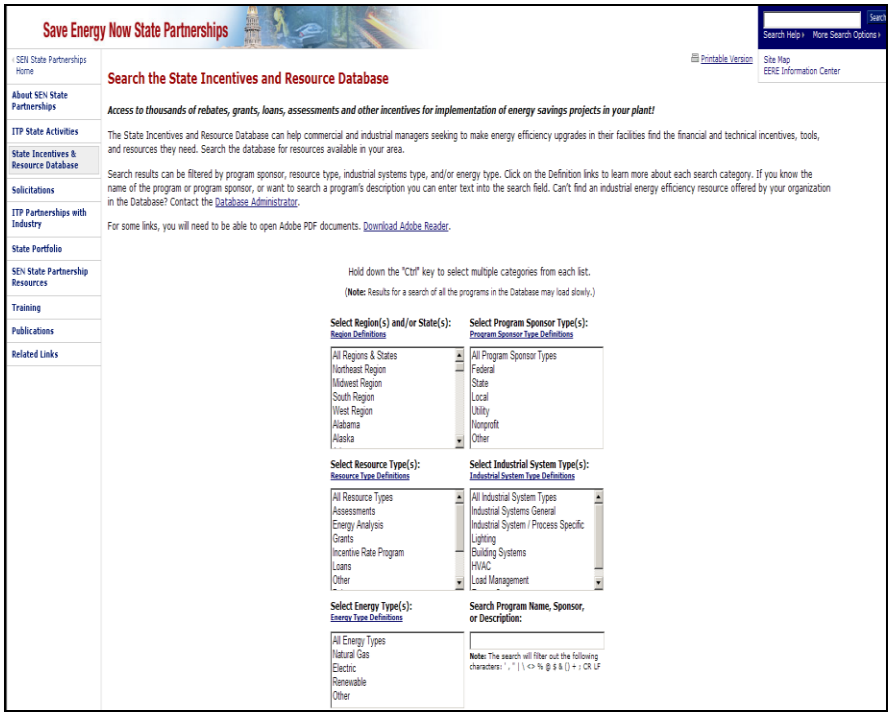
Tricks to Facilitate Funding

- Celebrate **no-cost projects**
- Assume **20%** of opportunities are typically no-cost
- Show a **schedule** of paybacks for all identified project
- Prepare for **yearend funding**
- Get the "**process folks**" to help you make the case

FCS CONSULTING SERVICES, INC.

Get your TAM to assist you

- Maximize *Save Energy Now* State **Partnerships**
- Utilize **State Incentives** & **R**esources Database at http://www1.eere.energy.gov/industry/states/state_activities/incentive_search.aspx
- Apply for "**grants**"



Champion of Implementation

- Robert Varcoe
- UAW–GM/WFG Joint Task Teams Member
- UAW & GM
- Focus is on Implementation

Project Summary

UAW- GM WFG Joint Task Team

GM/WFG - Energy & Carbon Optimization Group

The U.S. Department of Energy

Industrial Technologies Program

"Save Energy Now"

Problem

- *Need to reduce Energy usage within General Motors to lower structural costs*
- *Meeting the Customer/Plant needs by providing options to meet Annual Budget requirements*

Opportunity

- *Partnering with the U.S. Department of Energy to perform (5) voluntary Energy Assessments within General Motors Facilities*
- *Identify specific energy reduction opportunities with calculated results and savings*
- *Promote customer enthusiasm by enhancing GM's image as an environmentally friendly manufacturer*

Teamwork

UAW – WFG Joint Task Team

U.S. Dept. of Energy

GM – WFG ECO Team

Plant Representatives

U.S. Dept. of Energy-Energy Experts

Onsite Teamwork

- ***Plant involvement included:*** ***(Site Utility Manager, U.S. DOE Energy Expert, UAW Skilled Trades, Energy Conservation Engineer, & Manufacturing Engineer Director)***
- ***Each assessment took a period of 2-1/2 days to complete***
- ***The Joint Task Team, WFG ECO Group and the U.S. Department Of Energy provided scheduling and support as needed***

Analytical Tools and Methods

Location, Date, & Types of assessments performed:

•LGR Assembly	2/24/09	Steam Assessment
•Flint SPO	6/16/09	Steam Assessment
•Orion Assembly	7/21/09	Pumping Systems
•Spring Hill Assembly	8/18/09	Pumping Systems
•Indianapolis MFD	8/25/09	Compressed Air

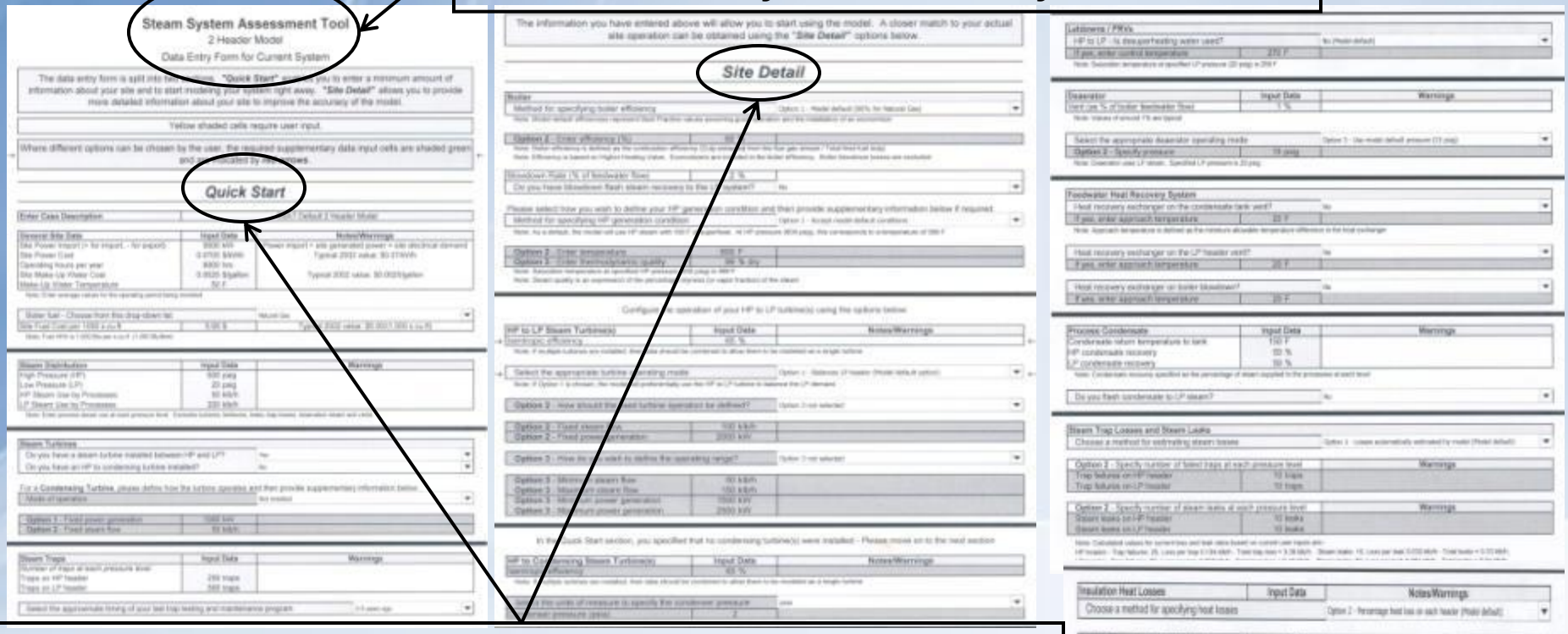
Analytical Tools and Methods

- *U.S. Department of Energy expert utilized and trained Plant personnel on the use of U.S. DOE software programs to model and analyze plant specific utility systems and manufacturing processes for potential improvement*
- *Plant specific processes and energy systems were identified in advance for analysis*
- *Results were documented, opportunities identified and potential savings calculated*

Analytical Tools and Methods

Steam System Assessment Tool (SSAT)

Steam System Data Entry Form



"Quick Start" enables you to enter a minimum amount of information about your site and to start modeling your system right away.

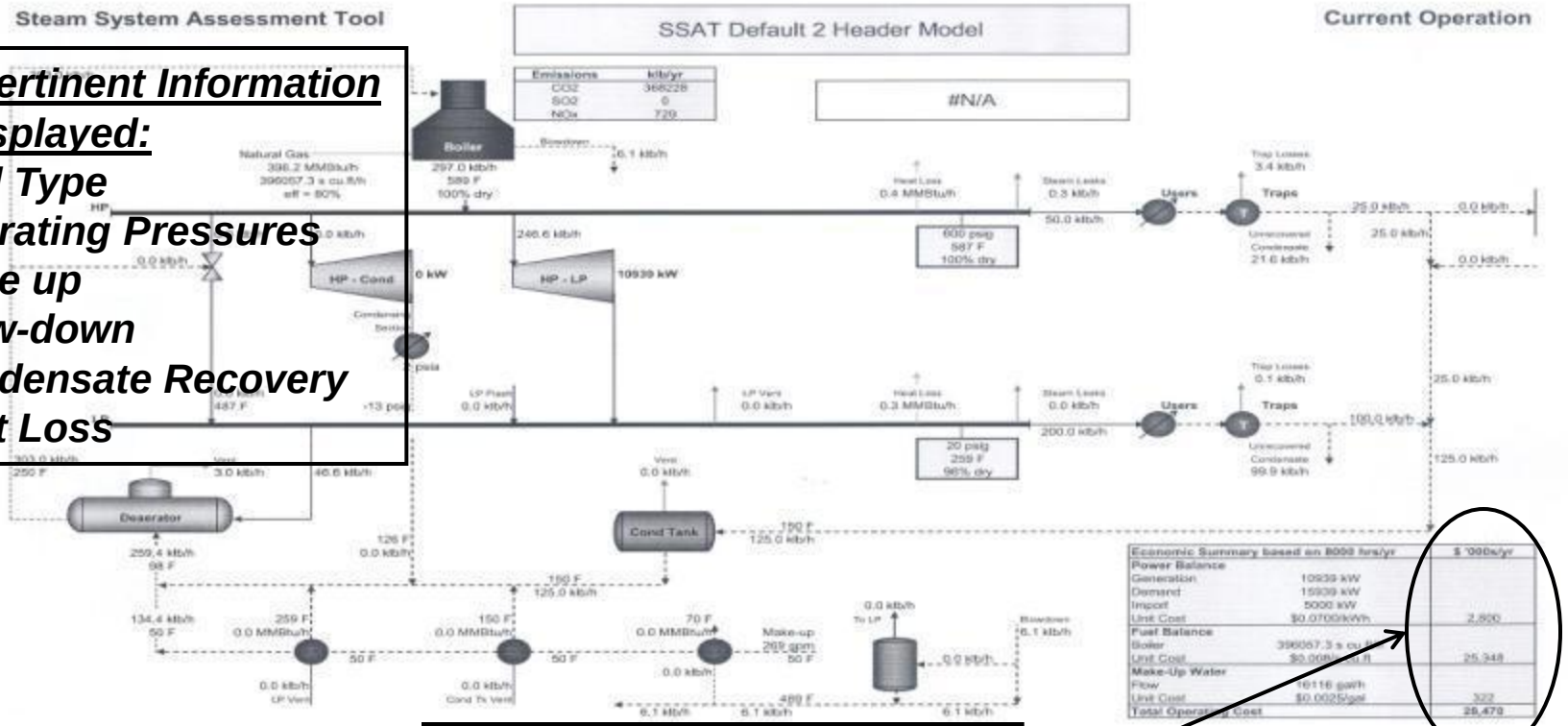
"Site Detail" allows you to provide more detailed information about your site to improve the accuracy of the model

Analytical Tools and Methods

Example of an Operating Model of Existing Steam System

All Pertinent Information is displayed:

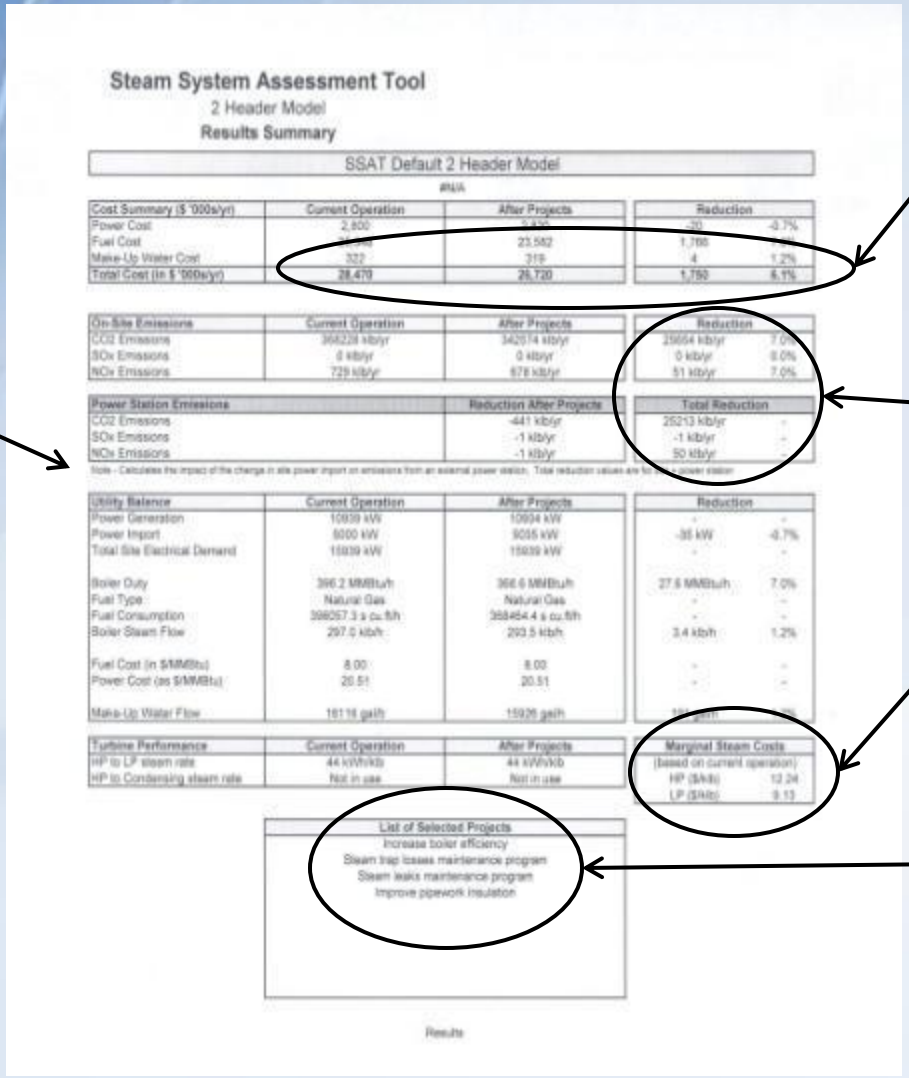
- ***Fuel Type***
- ***Operating Pressures***
- ***Make up***
- ***Blow-down***
- ***Condensate Recovery***
- ***Heat Loss***



Operating Cost Data of Steam System

Analytical Tools and Methods

Example of Assessment Results Summary



Steam System Assessment Tool
2 Header Model
Results Summary

SSAT Default 2 Header Model

#N/A

Cost Summary ($ '000s/yr)	Current Operation	After Projects	Reduction	
Power Cost	2,800	2,800	-20	-0.7%
Fuel Cost	25,050	23,582	1,766	7.0%
Make-Up Water Cost	322	319	4	1.2%
Total Cost (in $ '000s/yr)	28,470	26,720	1,750	6.1%

On-Site Emissions	Current Operation	After Projects	Reduction	
CO2 Emissions	366228 klb/yr	340074 klb/yr	25654 klb/yr	7.0%
SOx Emissions	0 klb/yr	0 klb/yr	0 klb/yr	0.0%
NOx Emissions	729 klb/yr	678 klb/yr	51 klb/yr	7.0%

Power Station Emissions	Reduction After Projects	Total Reduction	
CO2 Emissions	-441 klb/yr	25213 klb/yr	-
SOx Emissions	-1 klb/yr	-1 klb/yr	-
NOx Emissions	-1 klb/yr	50 klb/yr	-

Note - Calculates the impact of the change in site power import on emissions from an external power station. Total reduction values are for the power station

Utility Balance	Current Operation	After Projects	Reduction	
Power Generation	10939 kW	10904 kW	-	-
Power Import	9200 kW	9235 kW	-35 kW	-0.7%
Total Site Electrical Demand	15939 kW	15939 kW	-	-
Boiler Duty	396.2 MMBtu/h	368.6 MMBtu/h	27.6 MMBtu/h	7.0%
Fuel Type	Natural Gas	Natural Gas	-	-
Fuel Consumption	398057.3 s cu.ft/h	358464.4 s cu.ft/h	-	-
Boiler Steam Flow	297.0 klb/h	293.5 klb/h	3.4 klb/h	1.2%
Fuel Cost (in $/MMBtu)	8.00	8.00	-	-
Power Cost (as $/MMBtu)	20.51	20.51	-	-
Make-Up Water Flow	16116 gal/h	15926 gal/h	190 gal/h	1.2%

Turbine Performance	Current Operation	After Projects	Marginal Steam Costs	
HP to LP steam rate	44 kWh/klb	44 kWh/klb	(based on current operation)	
HP to Condensing steam rate	Not in use	Not in use	HP ($/klb)	12.24
			LP ($/klb)	9.13

List of Selected Projects
Increase boiler efficiency
Steam trap losses maintenance program
Steam leaks maintenance program
Improve pipework insulation

Results

Before and After Operating Cost Comparison

Estimated Emissions Reduction

Marginal Steam Cost (based on current operation

List of selected Proposed Projects

Improvement - Change

- *Summary report issued to Plant Management & UAW identifying system improvements and calculated savings*

ENERGY SAVINGS SUMMARY INFORMATION GMVM Lansing Grand River Steam Assessment					
Identified	Savings/yr				
	Savings	kWh	MMBtu	Fuel Type	N,M,L
Covert to Zirconium Oxide Bath	$85,000		8,800	Coal	M
Insulate Paint Shop Roof	$50,600		5,200	Coal	M
Install Demand Control Ventilation at Paint Shop	$62,200		6,400	Coal	M
Shut Down Building 66 Air Handling Units at Night and Weekends	$182,000		18,800	Coal	N
Remove Pressure Reducing Valve and Use Low Pressure Steam Directly	$24,000	1,267,000	-5,400	Electricity/ Coal	M
Implement Steam Trap Maintenance Program	$3,000		300	Coal	N
Run Turbine/Generator Instead of the PRV from Mid May to Mid October	$38,000	1,983,000	-8,400	Electricity/ Coal	N
Total	$444,800	3,250,000	25,700		

Project # 4

Improvement - Change

- *Detailed opportunities outlined and implemented*

Project 4: *Shut down Building 66 (AHU) Air Handling Units at night and weekends*

- *Building 66 AHUs were operating 24/7. The estimated existing energy use including Domestic Hot Water (DHW) was 9.7% of the total steam use or 30 million pounds of steam.*
- *Estimated savings $182,000 or 14 million pounds of steam usage*
- *This is equivalent to a reduction in the purchase of 18,800 mm Btu of coal fuel. The US DOE Steam System Assessment Tool (SSAT) was used to estimate energy savings.*

Energy Savings Results - 2009

- *(5) Plant Energy Assessments completed*
- *(19) Specific savings opportunities identified*
- *$908,069 in savings opportunities identified*
- *$535,302 implemented savings to date based on 2009 assessment findings*

Environmental Impact Results - 2009

- CO_2 reduction identified opportunities of ~ 8,980 Tons per Year
- CO_2 reduction implemented of ~ 4,928 Tons per Year
- This represents a step towards reducing GM's 2008 carbon footprint of ~ 5,423,000 Tons CO_2/year in the USA

Maintaining the Improvement

- *A spreadsheet of all opportunities is kept and shared by the GM-WFG Energy & Carbon Optimization Group*
- *The opportunities are identified as near-term, mid-term, and long-term according to payback period and are reviewed for implementation based on current business plan*
- *The implementation status is documented and savings are reported out to the Joint leadership*

Project Funding Criteria

- *Primarily the Manufacturing Plants fund individual projects directly from their local budgets due to low cost and high payback impact.*
- *Larger projects requiring capital funding may be supported from HQ centrally for initiatives that meet specified payback and selection criteria. (ESPI) Energy Saving Project Implementation*

History of UAW-GM Involvement

- *2009 marked the 5th Year of UAW-GM participation in the U.S. Department of Energy "Save Energy Now" program*
- *The UAW-GM partnership is the # 1 participant*
- *Total of 42 Assessments completed & 218 Energy Savings Opportunities identified*
- *Total of $21.6 Million Dollars in Potential Savings identified to date*
- *Over $6.6 million Dollars in savings have been implemented over the past 5 years*

Pollution/Emission Savings:

		DOE 2005-09	
CO 2 (Tons)	1.28	**341,046**	Ozone Contributor
SO 2 (Tons)	0.0108	**850**	Acid rain Contributor
Nox (Tons)	0.0055	**433**	Smog Contributor
mmhg (Tons)	0.0000001	**0.01**	Mercury

One (1 kWh) reduction is equal to:

Trees	0.000175	**102,817**	Mature 14 yr old tree
Cars	0.00015	**88,129**	Removing from road
Gas (gal)	0.090725	**53,303,055**	Gallons of Gasoline

Sourc: EPA CONFERENCE DALLAS, TX 2004

Keith Willis, Ph.D, CEM, BEP

Data from FEMP, BLCC Program

Going Forward in 2010

- *The UAW and GM have been officially accepted into the "Save Energy Now"* **LEADER Program**
- **Commitment to:**
  - *25% Energy Savings over 10 Years*
  - *U.S. DOE commitment of resources*
  - *Public Relations events*

Questions

Feedback

- **Welcome** comments regarding Seminar Series
- Seminars are **your sessions**
- Make seminars **meaningful** for you
- Feedback aids **continuous improvement**
- Send **comments to** Lindsay Bixby at: lbixby@bcs-hq.com

Next Seminar in the Series

- **September 8**, 2010
- **2:00 p.m.** Eastern
- **Measuring energy achievements**
- Guest Speaker from ArcelorMittal
- Please **register**

Your Implementation Case Studies

- Let DOE help you **CELEBRATE**
- Highlight **Accomplishments in Implementation**
- **Recognize** your team's efforts