

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



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



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**



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



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



Get your TAM to assist you

- Maximize *Save Energy Now* State **Partnerships**
- Utilize **State Incentives & Resources Database** at http://www1.eere.energy.gov/industry/states/state_activities/incentive_search.aspx

- Apply for “grants”



Save Energy Now State Partnerships

Search the State Incentives and Resource Database

Access to thousands of rebates, grants, loans, assessments and other incentives for implementation of energy savings projects in your plant!

The State Incentives and Resource Database can help commercial and industrial managers seeking to make energy efficiency upgrades in their facilities find the financial and technical incentives, tools, and resources they need. Search the database for resources available in your area.

Search results can be filtered by program sponsor, resource type, industrial systems type, and/or energy type. Click on the Definition links to learn more about each search category. If you know the name of the program or program sponsor, or want to search a program's description you can enter text into the search field. Can't find an industrial energy efficiency resource offered by your organization in the Database? Contact the [Database Administrator](#).

For some links, you will need to be able to open Adobe PDF documents. [Download Adobe Reader](#).

Hold down the "Ctrl" key to select multiple categories from each list.
(Note: Results for a search of all the programs in the Database may load slowly.)

Select Region(s) and/or State(s): Region Definitions	Select Program Sponsor Type(s): Program Sponsor Type Definitions
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All Resource Types Assessments Energy Analysis Grants Incentive Rate Program Loans Other	All Industrial System Types Industrial Systems General Industrial System / Process Specific Lighting Building Systems HVAC Load Management
Select Energy Type(s): Energy Type Definitions	Search Program Name, Sponsor, or Description:
All Energy Types Natural Gas Electric Renewable Other	<input type="text"/> <small>Note: The search will filter out the following characters: ' ' < > % & \$ () + / CR LF</small>

Champion of Implementation

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





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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”



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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*



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GM
Worldwide
Facilities Group



Teamwork

UAW – WFG
Joint Task Team



U.S. Dept. of
Energy

GM – WFG
ECO Team

Plant
Representatives

U.S. Dept. of Energy-Energy Experts



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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***





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Analytical Tools and Methods

Location, Date, & Types of assessments performed:

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



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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

The information you have entered above will allow you to start using the model. A closer match to your actual site operation can be obtained using the "Site Detail" options below.

Quick Start

The data entry form is split into two sections. "Quick Start" allows 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.

Yellow shaded cells require user input.

Where different options can be chosen by the user, the required supplementary data input cells are shaded green.

Site Detail

Select the appropriate turbine rating mode.

Option 1 - Rating of header (Header shaft output)

Option 2 - How should heat turbine operation be defined?

Option 3 - How should heat turbine operation be defined?

Option 4 - How should heat turbine operation be defined?

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Option 100 - How should heat turbine operation be defined?

"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

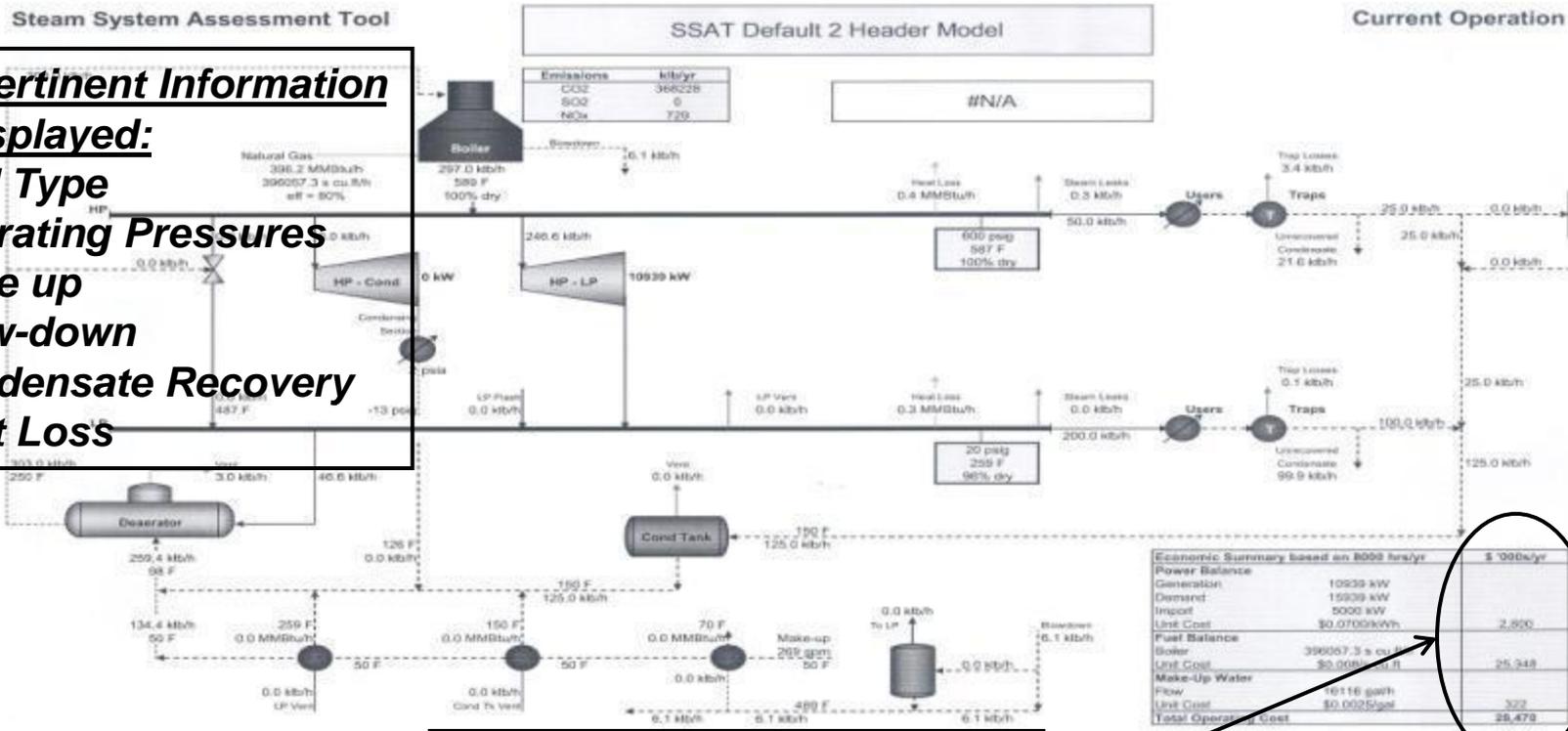


Analytical Tools and Methods

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				
AWA				
Cost Summary (\$ '000/yr)		Current Operation	After Projects	Reduction
Power Cost	2,800	2,324	-476	-17.0%
Fuel Cost	2,500	23,562	1,780	7.1%
Make-Up Water Cost	322	218	-4	-1.2%
Total Cost (in \$ '000/yr)	38,470	26,720	1,780	4.6%

On-Site Emissions		Current Operation	After Projects	Reduction
CO ₂ Emissions	36,228 kbt/yr	34,214 kbt/yr	-2,014 kbt/yr	5.6%
SO _x Emissions	8 kbt/yr	0 kbt/yr	-8 kbt/yr	100%
NO _x Emissions	729 kbt/yr	678 kbt/yr	-51 kbt/yr	7.0%

Power Station Emissions		Reduction After Projects		Total Reduction
CO ₂ Emissions	-	-441 kbt/yr	-	25213 kbt/yr
SO _x Emissions	-	-1 kbt/yr	-	-1 kbt/yr
NO _x Emissions	-	-1 kbt/yr	-	50 kbt/yr

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

Utility Balance		Current Operation	After Projects	Reduction
Power Generation	10939 kW	10939 kW	-	-
Power Input	8000 kW	5055 kW	-2945 kW	-37.1%
Total Site Electrical Demand	15939 kW	15939 kW	-	-
Boiler Duty	396.2 MMbtu/h	366.6 MMbtu/h	-29.6 MMbtu/h	7.5%
Fuel Type	Natural Gas	Natural Gas	-	-
Fuel Consumption	398257.3 cu.ft/h	358424.4 cu.ft/h	-39832.9 cu.ft/h	-10.0%
Boiler Steam Flow	297.5 kbt/h	293.5 kbt/h	-4.0 kbt/h	-1.3%
Fuel Cost (in \$/MMbtu)	8.00	8.00	-	-
Power Cost (in \$/MMbtu)	26.51	20.51	-6.00	-22.6%
Make-Up Water Flow	16118 gal/h	15926 gal/h	-192 gal/h	-1.2%

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



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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.***



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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*



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GM
Worldwide
Facilities Group



Environmental Impact Results - 2009

- ***CO₂ reduction identified opportunities of ~ 8,980 Tons per Year***
- ***CO₂ reduction implemented of ~ 4,928 Tons per Year***
- ***This represents a step towards reducing GM's 2008 carbon footprint of ~ 5,423,000 Tons CO₂/year in the USA***



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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***



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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***



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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

Source: EPA CONFERENCE DALLAS, TX 2004

Keith Willis, Ph.D, CEM, BEP

Data from FEMP, BLCC Program



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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***



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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

