Navistar's Energy Goals and Tracking Mechanism

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About Navistar, Inc.

- Manufactures heavy and medium duty trucks, school buses, recreational vehicles, military vehicles, cement trucks and diesel engines. Support facilities include iron foundries, metal fabrication and fuel injector plants
- Annual energy procurement cost: $70 million
- Emits about 600,000 tonnes Scope I and II GHG Emissions
- Manufacturing facilities account for over 95% of total energy consumptions and GHG emissions
- Difficult to establish energy performance metrics due to diverse products, multiple produce lines within facility and low facility utilization rates

Navistar's Energy Conservation / GHG Reduction Goal #1

- Energy Goal for manufacturing facilities
  - 1% annual electric load reduction during production period
  - Achieve non-production to production period load ratio of 35% by 2013
- Tried and tested goal among manufacturing plants in automotive industry
- A realistic goal even if capital funding is hard to get
- Difficult to describe such goal to non-energy professionals
- Difficult to monitor progress without extensive metering network and energy tracking system
- Tracking progresses manually has resulted in critical delays to drive improvements

Navistar's Energy Conservation / GHG Reduction Goal #2

- GHG Reduction Goal:
  - 20% absolute GHG emission reduction by 2013, using 2008 as baseline year
- Goal is easy to understand by non-energy professionals
- Goal developed under the following assumption
  - Manufacturing facilities deliver on their energy consumption load reduction goals
  - Management approves $5 million Energy Fund
  - 2008 – 2013 sales forecast is within range
- Difficult to track interim progresses

Navistar's Energy Conservation / GHG Reduction Goal #3

- Joined Department of Energy's Better Plants Program in December 2011
- The Better Plants Program expects participants to reduce energy intensity 25% in 10 years
- Navistar's Energy Intensity Reduction Goal
  - 25% energy consumption intensity reduction between 2010 and 2020

Navistar's experience with the BP Program

- Received tremendous support from the Better Plants Program in developing facility and corporate energy intensities
- ENPL 2.0 Tool enables Navistar to develop a mechanism to accurately track facilities' energy conservation efforts
- This is the missing link for Navistar to track facilities' energy conservation efforts timely and accurately
- Started in January 2012 to include facilities' energy consumption intensity improvements in the monthly Environmental and Energy Scorecard reports to senior management

Development of Energy Performance Indicators

- Relentless in our efforts to achieve perfect correlation between energy formula and actual baseline energy consumption data
- Example: Navistar's Canoas Engine Plant assembles three types of engines (MS, HS and I-6), and also produces engine blocks and some other machining parts
- Conduct multiple regression analyses with various production variables
- This is the final formula:

  Energy (in MMBTU) = 0.161 x MS – 5.33 x I-6 – 0.624 x Blocks -53.543 x CDD + 0.008 x (MS * CDD) + 0.545 x (HDD * CDD) + 11475.723

- R square = 0.988 (Note the use of interactive variables)

Experiences in Using ENPL 2.0 Tool

- Escobedo Truck Assembly Plant
  - Paint shop, body shop and two near identical truck assembly lines, one for medium trucks (L1) and one for heavy duty trucks (L2)
  - Forecasting formula: Energy (MMBTU) = -1.469 L1 + 12.105 L2 – 12.306 HDD + 0.459 CDD + 33862.825
  - R square = 0.88287
  - Concerned about the un-even distribution to energy consumption forecast between Line 1 and Line 2
  - Per truck energy consumption reduced 25% 2011 vs. 2010. The formula only reflects a 2.4% reduction

Experiences in Using ENPL 2.0 Tool

- Indianapolis Iron Foundry
  - Major energy consumer
  - Extremely low production with 6-month of facility shutdown period during 2010
  - 2011 energy consumption intensity 28% higher than 2010
  - Results in corporate-wide energy consumption intensity increase of 5.7%
  - The formula may not work well outside the range of the baseline conditions

Treasure Hunt

NAVISTAR®

Treasure Hunt is an Energy Program Tool for Employees to Learn a Culture of Continuous Improvement to Reduce Energy, Cost and Emissions

Go and see

How is it Done

-On Site 3 day event where Cross Functional Teams Go out and Identify Energy Reduction Ideas

-Teams Identify, Analyze, Evaluate and Recommend Kaizen Ideas through Day to Day Operations

What are the Benefits:

-Enhance Employee Engagement

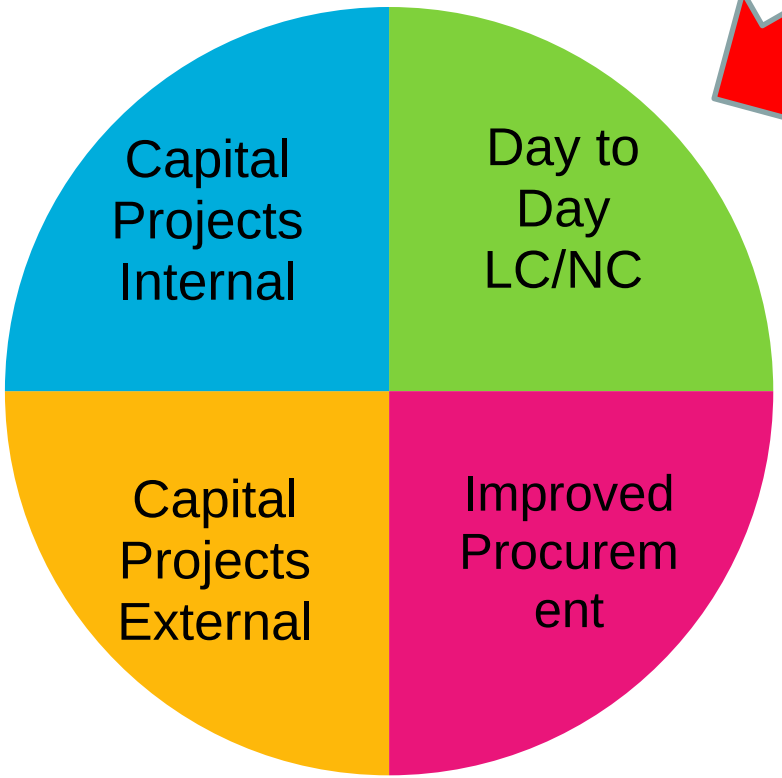
-Draw on Internal and External Expertise

-Enhance Employee Energy Awareness

-Share Best Practices-Learn From Each Other

-Reduce Cost and Improve the Environment

Energy Improvements: Where are they Initiated?



Primary Focus Area for Treasure Hunt Activity

Energy Audit vs. Treasure Hunt

- Audit:
  - Short term or one time activity
  - External resources
  - List of ideas-usually capital / hard to sustain behavior changes
  - Quantify savings / summary report in two weeks
- Treasure Hunt:
  - Data collection before activity
  - Continuous activity
  - Internal and external resources-3 day event with 2 way learning
  - List of ideas-usually operational
  - Quantify savings / summary report prior to closeout meeting

How to Track Ideas: Example Detail Sheet

Kaizen Location

Kaizen Title:	Lithe Ovens Low Set Point
Plant:	CCL
Shop:	
Process/Equipment:	Lithe Ovens Low Temp Set Points
Kaizen Type:	☑ Operational ○ Equipment Modification ○ Major Equipment
Kaizen ID #	
Plant ID#:	

Originating Location

Originator:	K. Hess		
Plant:	CCL	Cost Center:	
Dept:		Date:	
Phone #:			

Electric Utility Emissions Data			Gas Emissions
CO2	1.639	lbs/kWH	CO_2/MMBTU
SO2		lbs/MWH	114.2 lbs/MMBtu
Nox		lbs/MWH	

Resource

Check all that apply: →

Electricity ☑	Natural Gas ☑	Comp. Air ☐	Steam ☐	Chilled Water ☐	Water ☐	WWT ☐	POTW ☐	Other ☐

Kaizen Description

Background/Description: Adjust low temperature set points to 75% of the run temperature, interfaced to production line to heat to low set point when line is stopped or idle

Current Situation (Before Kaizen)		Projected Situation (After Kaizen)	
Production Hours	Non-Production hours	Production Hours	Non-Production hours
24 Hrs/Day	0 Hrs/Day	17 Hrs/Day	7 Hrs/Day
30 Days/Mo. Weeks/Yrs	0 Days/Mo. Weeks/Yrs	30 Days/Mo. Weeks/Yrs	30 Days/Mo. Weeks/Yrs
12 Months 7 Mo.	0 Months 7 Mo.	12 Months 7 Mo.	12 Months 7 Mo.
9 # of units	0 # of units	9 # of units	9 # of units

Energy Use

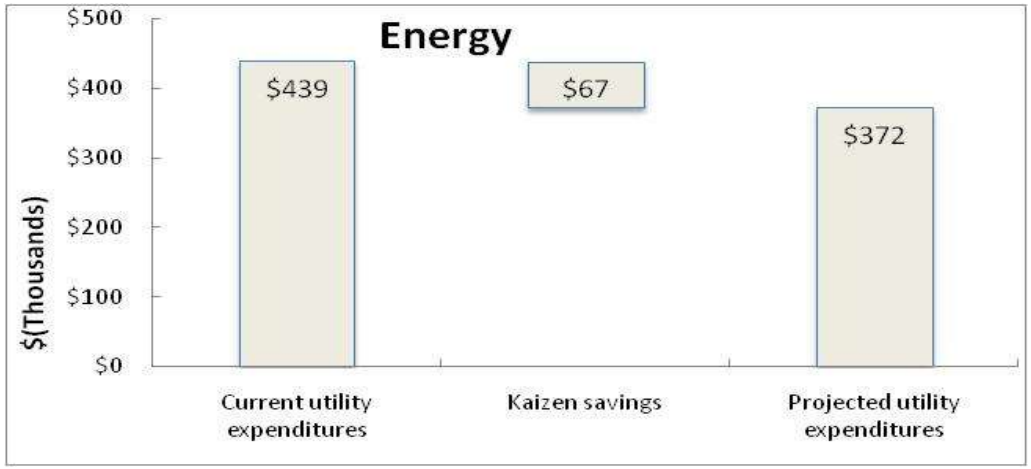
Energy units	Energy Use Before Kaizen (Energy units/yr)	Energy Use After Kaizen (Energy Units/yr)	Energy Savings (Energy Units/yr)
Electricity (kWh) Non-peak N	-	-	-
Gas (MMBtu)	7,631.9	3,918.5	4,113.4
Compressed Air (kSCF)	-	-	-
Steam (klb)	-	-	-
Chilled Water (kTon)	-	-	-
Water (kGal)	-	-	-
WWT (kGal)	-	-	-
POTW (kGal)	-	-	-
Other: Explain	-	-	-
CO_2 (metric tons)	395.4	182.3	213.1

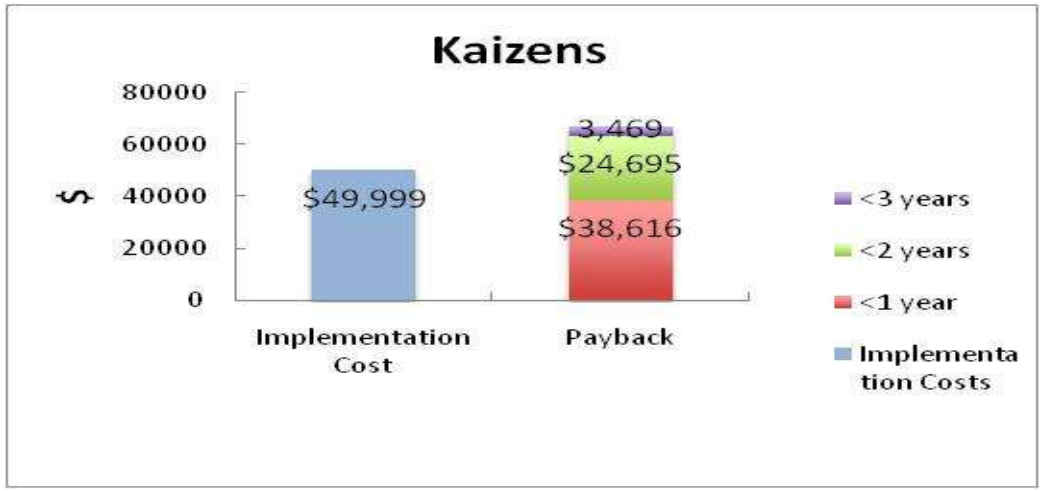
Cost / Savings

Implementation Cost		$/unit	Projected Annual Savings		
Engineering Services:		$ 8.07	Electricity (kWh)	$	-
Material:	$ -	$ 7.99	Gas (MMBtu)	$	32,865.31
Labor: Contract		$ 0.27	Compressed Air (kscf)	$	-
Labor: In House	$ 200.00	$ -	Steam (klb)	$	-
Other:	$ -	$ -	Chilled Water (kTon)	$	-
Other:	$ -	$ 6.13	Water	$	-
Other:	$ -	$ 4.34	WWT (kGal)	$	-
Other:	$ -	$ -	POTW (kGal)	$	-
		$ -	Other: Explain	$	-
Total:	$ 200.00		Total	$	32,865.31

Simple Payback Period (yrs): 0.01

TH Closeout Meeting Report (Example)





Treasure Hunt at the Garland Assembly Plant

- Pilot program with external coaching
- Conducted during April 2012 at Navistar Garland (TX) Assembly Plant
- 3-day event with 15 participants
- Identified potential energy savings equal 12% of facility's annual energy cost
- Overall simple payback less than 4 months
- Planning on one more "train the trainer" Treasure Hunt event in 2012
- Will expand the program to other manufacturing plants in 2013

Thank you!