



Using Employees to Engage in Energy Reduction in their Workplace

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***Rockwell
Collins***



Is this what your company looks like at night?



Photo courtesy of [Bionic Bong](#)



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Agenda

- About Rockwell Collins
- Energy Waste
- Event Process
- Event Forms
- Comparison to energy audits
- Summary

Objective: To give you ideas for how to conduct a lean event to engage and empower employees to help reduce energy

Why are you here?

Rockwell Collins



- A global company operating from more than 60 locations in 27 countries
- 19,000 employees on our team
- Provides navigation, communications and display products and systems for military and commercial customers

Lean ElectronicsSM

- Started in 1998
- Heavy on Lean tools initially
- Incorporated Six Sigma tools in 2007
- Lean ElectronicsSM is an umbrella over all continuous improvement
 - Theory of Constraints (TOC), Six Sigma, Lean, Total Quality Management (TQM), Change Management, etc
- Lean events serve the following purposes:
 - Educational opportunities to learn
 - Networking/collaboration among diverse groups
 - Achieve dramatic improvements in a short time period

Use existing lean program to reduce energy waste



What kind of energy is considered waste?

Value added

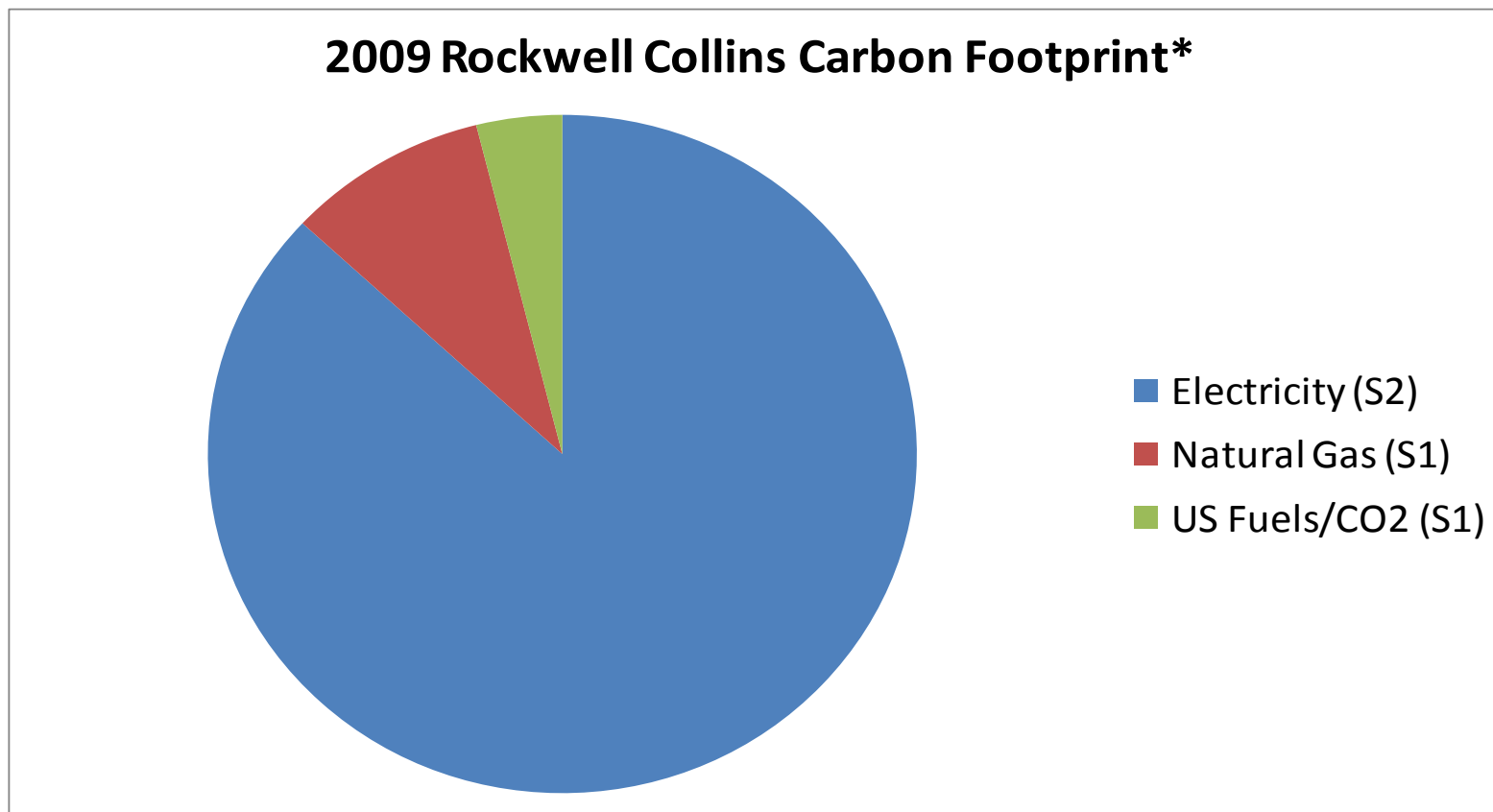
- ✓ Electricity to automatically place parts on a board
- ✓ Water usage to clean the outside of product
- ✓ Electricity to create bid proposal
- ✓ Heat to keep employees comfortable

Non-value added

- X Lighting for office area on overtime to fix a document that wasn't done right the first time
- X Air conditioner replacement due to neglect of maintenance
- X Test equipment left on overnight when not being used
- X Overhead projectors left on in conference room

The customer does not want to pay for non-value added energy waste!

Reduce Carbon Footprint by 15%



ES&H Dept Needed Bottoms Up Approach

Conservation is the key

- Conservation programs are more cost-effective to implement than any other capital investment, retrofit or renewable energy project
 - Should be done first, before anything else



This requires involvement from all employees!

Energy “Go and See” Event created

- **Go and See** = Go to where the work is being done to find and resolve problems (Gemba)
- **Energy “Go and See” Events** = Walk through the work area at different times of day to observe how energy is being used
- **Intended Outcomes of Events**
 - Identify opportunities related to energy with action plans
 - Collect data to measure, validate and report to help support improvements
 - Engage employees
 - Educate about company usage and goals
 - Interactive discussions about behaviors
 - Communication strategy and plan
 - Set foundation for culture change

Energy Go and See Process

Prep Work

- 1) Off hours observations
- 2) Case for change
- 3) Define cross-functional team
- 4) Prepare for event

Conducting Event

- 5) Kickoff training
- 6) Conduct the event
- 7) Organize and prioritize opportunities

Follow Up

- 8) Review action items
- 9) Establish roles and responsibilities
- 10) Communicate successes



Prep Work

- Review utility bills and trends to support need for event (Case for Change)
 - Previous energy audits performed?
- Review list of primary energy drivers (Prioritization)
- Determine right team members to drive behavior changes
 - Think about opponents and influencers
- Plan and coordinate event logistics
 - Delay event if right people aren't available



Map building to substations

Conducting Event

- Four primary “Go and See” sessions (can vary by facility)
 - **Off shift**
 - Typically held on weekends
 - **Start-up**
 - Beginning of 1st shift
 - **Working time**
 - Including breaks
 - **Shut down/Transfer**
 - Between shifts or at end of shift
- Break into appropriate groups and review defined area
 - Need mix of process and technical experts, fresh set of eyes, and different levels of organization



Focus Areas

Building Envelope	Lighting	HVAC&R	Office Areas	Process Areas	Restrooms
<u>Dock Doors</u> <ul style="list-style-type: none"> •Drafts •Timers •Sealed (Light) •Birds •Open when shouldn't be •Damage •Dust, dirt, mildew 	<u>Overhead</u> <ul style="list-style-type: none"> •Controls (Access) •Responsibility •Why on •Task and overhead on •Too bright/dim •Type of bulb 	<u>Heating</u> <ul style="list-style-type: none"> •Extreme temp. •Elec. heaters/ fans. Why? •Varying temp. •Too humid/dry •Controls (Access) •Excessive blowers/noise- when? Freq. 	<u>Computer Monitors</u> <ul style="list-style-type: none"> •Left on when no one around – Freq. <u>Refrigerators. Microwaves. Coffee Makers, Ice Machines</u> <ul style="list-style-type: none"> •Timers •Left on when not supposed to 	<u>Equipment</u> <ul style="list-style-type: none"> •Standby/ Controls •Insulation where applicable •Left on when no one around – Freq. Why? •Do employees know which equip can be turned off 	<u>Toilets/ Urinals</u> <ul style="list-style-type: none"> •Leaks •Flush too long/short •Motion sensors •Working properly
<u>Entrance Doors</u> <ul style="list-style-type: none"> •Light around frame •Dust, dirt, mildew •Open when shouldn't be 	<u>Task</u> <ul style="list-style-type: none"> •On when no one around – Freq. •Prevalent area •Type of bulbs •Non-RC supplied task lighting? Why? 	<u>Compressed Air</u> <ul style="list-style-type: none"> •Hissing/ leaks •Pressure drop for tools •System size 	<u>Printers/ Copiers/ Projectors</u> <ul style="list-style-type: none"> •People printing double sided when possible •Projectors left on 	<u>Process</u> <ul style="list-style-type: none"> •Work done off peak hours •Staggered start-ups •Water/ material waste 	<u>Sinks</u> <ul style="list-style-type: none"> •Leaks •Aerators •Motion sensors •Working Properly
<u>Roofing Systems (F)</u> <ul style="list-style-type: none"> •Water Leaks •Damage (insulation/ walkway) •Left hardware 		<u>Unit Heaters (F)</u> <ul style="list-style-type: none"> •Dirty coils •Outside coil plugging 	<u>Personal Fans/ Space Heaters</u> <ul style="list-style-type: none"> •Left on when no one around – Freq. 		<u>Hand Dryers, Paper Towels</u> <ul style="list-style-type: none"> •Hand dryers or Paper Towels
<u>Windows</u> <ul style="list-style-type: none"> •Draft •Caulked •Area hot? •Condensation •Dust, dirt, mildew •Light around frame 	<u>Specialty</u> <ul style="list-style-type: none"> •Parking lights on when daylight is sufficient •Timers/Controls •Display/Track Lights •On during off times 	<u>Packaged Rooftop Equip. (F)</u> <ul style="list-style-type: none"> •Correct cfm ratings •Last adjustment/ cleaning for gas burners •Last filter change •Condition of units •Area changes that could affect AHU •Economizers •Time of day setbacks 	<u>Vending Machines</u> <ul style="list-style-type: none"> •Energy misers •Lamps on all the time 	<u>Shower/ Changer Areas</u> <ul style="list-style-type: none"> •Does restroom have one •Leaks •Low flow shower heads •Use too much/little water 	
<u>External Wall Systems</u> <ul style="list-style-type: none"> •Draft •Cold feet/hands •Condensation •Damage •Dust, dirt, mildew 			<u>PDA's/ Phone Changers. Radios</u> <ul style="list-style-type: none"> •Smart strips/ Controls 		<u>Trash Cans</u> <ul style="list-style-type: none"> •Recyclable materials (paper, bottles/cans, etc.) being thrown away



Observation Sheet

Date: _____ Time of Day: _____ Area: _____ Observer: _____

Building Envelope	Lighting	HVAC&R
Office Areas	Process Areas	Restrooms

Follow Up

- Action Planning
 - Goal of 3 projects per event
 - Goal of saving an estimated minimum of \$5k per project
 - Larger capital projects provided to Facilities Dept
- Sustainment achieved through “Area Energy Management Plan”
 - Rules, guidelines, behaviors and expectations going forward to minimize energy waste



How does it compare to energy audits?

- Intend is to find the “low hanging fruit”
 - Observations require little technical knowledge
- Employee engagement and education
 - Learn importance of energy to the company
 - Share event and observations with co-workers
 - Take ownership of the solutions
- Non-technical, behavior-based solutions
 - Capital investments are identified, but not the goal
- Less costly
 - Employee time and some overtime is initial investment


Start with Go and See approach, then have audit performed

EPA - Energy Use Quick Checklist

- Old lighting systems (T-12, yellow/blue/greenish hue lighting, incandescents)
- Unnecessary lights/heat on, possible over-lit areas, or less lighting possible with better placement?
- Standard efficiency pumps, motors, fans, belts
- Motors, fans, pumps running idle when not needed
- Throttled pumps and fans to control flow rate
- Older refrigeration/heating systems, space heating
- Older kilns/ovens (including baffles, fans, etc.)
- Listen/feel for air leaks, especially at connections
- Read readily visible air capacity and pressure gauges for high pressure drops through lines and equipment)
- Aged compressed air and supplied air systems, or throttle controls, poppet valves
- Using compressed air to dry parts, other poor choices
- Air compressor running when not needed
- No evidence of heat recovery from coolant waters, ovens, other low grade or higher-grade heat
- Onsite wastewater treatment (possible to reduce generation of wastewater, and thus, energy to treat)
- Uninsulated ovens, kilns, heater bands on extrusion, etc.

Summary

- Energy conservation is the best and most cost-effective way to reduce energy usage
- Use Energy “Go and See” event format to start engaging employees to conserve energy
- Conduct formal energy audits with experienced personnel after event improvements are implemented
- **Please share and discuss this presentation with your Facilities and ES&H personnel**



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