



Exceeding Environmental Goals Through Internal Organization Strategies and Innovative Kaizen Ideas

Subaru of Indiana Automotive
The Industry Leader in Environmental Stewardship

Presented by:

Tom Easterday
Executive Vice President

Subaru of Indiana Automotive, Inc.



SIA Model Lineup



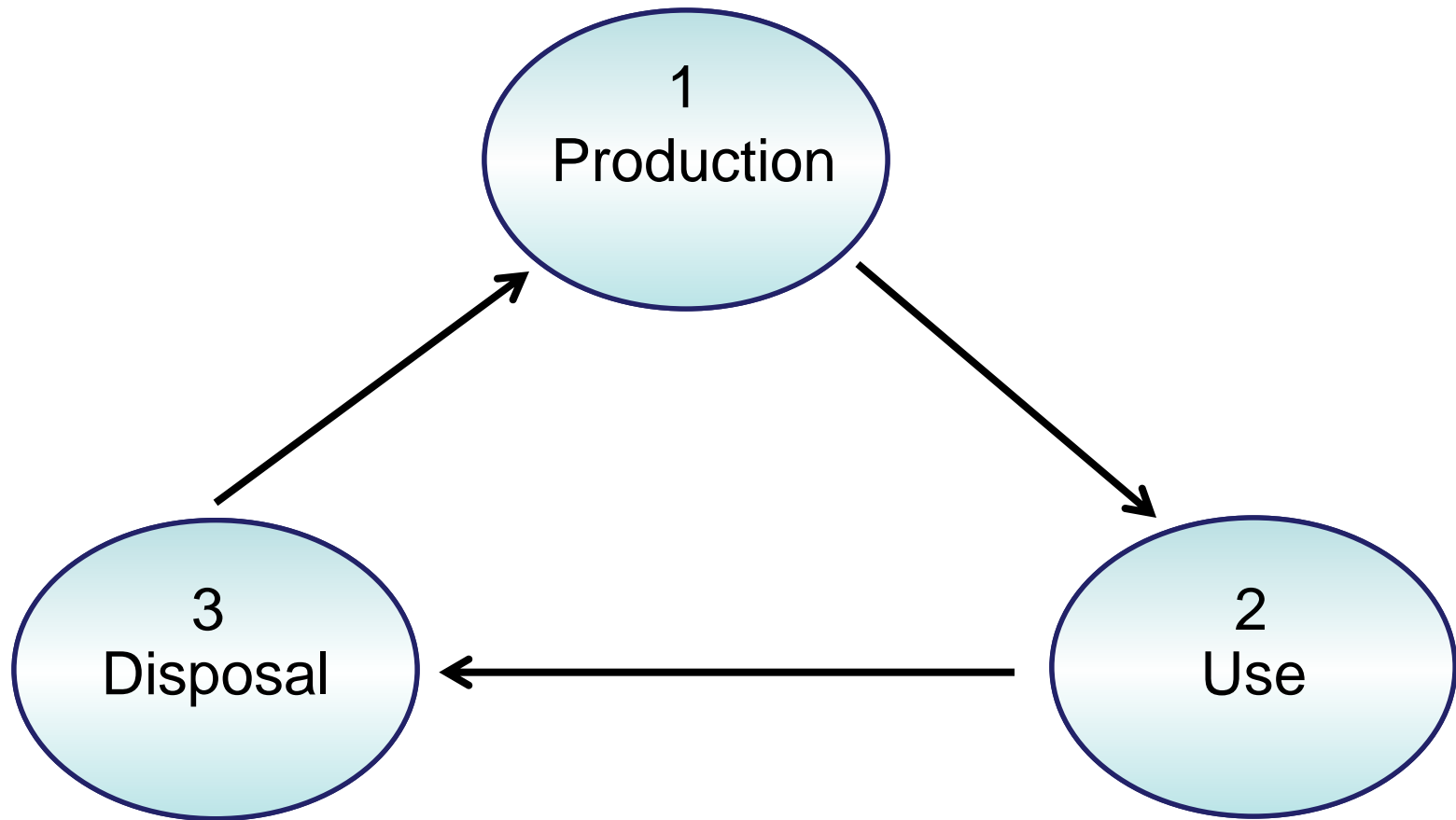
The only auto assembly plant in the U.S. to build vehicles for two of the top 4 brands on Consumer Reports' 2013 Automaker Report Cards.



Elwood Haynes in his first car in 1894

Photo courtesy of the Elwood Haynes Museum Archives, for "Elwood Haynes," an Indiana Local Legacies project

Lifecycle of the Automobile





Honda Civic CNG



Toyota Highlander Hybrid



Toyota Prius



Subaru XV Crosstrek Hybrid

Recycling A Subaru

STEEL

Steel from cars is recycled to make new automotive parts, construction materials and consumer products.

Aluminum

Aluminum from cars is recycled to make new items including car parts and consumer goods.

Plastics

Many new plastic car parts are made from plastics recycled from vehicles as well as from other sources, and can be recycled again.

Engine

Steel, iron and aluminum are recycled from engine and driveline components recycled plastic and nylon fibers are used to make new engine components.

Catalytic Converter

Precious metals, such as platinum, are recycled to make jewelry and new automotive parts.

Polymer (Acrylic) Tail Lamp Lens

Plastic polymers recycled from vehicle lamp assemblies are reused to make new parts.

Glass

Windshields and glass are recycled to make new windows for cars, homes and buildings, as well as glass containers and other household products.

Copper

Electrical wiring is made using recycled content and can be reused to make new wire.

Tires

Rubber from tires is recycled to make playground surfaces, garden mulch and new tires.

Carpet Padding

Sound deadening materials are made from recycled blue jeans, scrap fabric and carpeting.

Fluids

Antifreeze, gasoline, oil and brake fluids are recycled and reused.

Bumper Cover

Recycled polymers are used and can be recycled again to make containers and outdoor furniture.

Battery

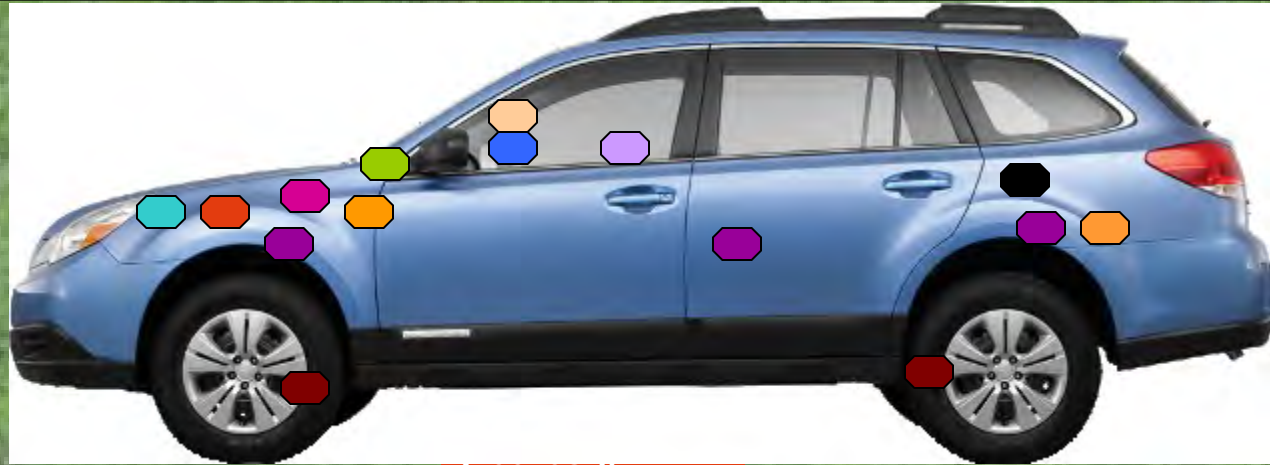
Resold or recycled materials are used to make new batteries.



Recycling A Subaru

Reuse of Auto Parts

Body panels, doors, engines, drivetrain components, electronics and interior items are removed at automotive dismantlers to be resold as used.



Steering Wheel

The steering wheel column can be dismantled and sold as used.

Seats

The seats can be dismantled and sold as used.

Stereo

The stereo can be dismantled and sold as used.

Engine & Transmission

The engine and transmission can be dismantled, reconditioned and sold as used.

Gas Tank

The gas tank can be dismantled and sold as used.

Fenders & Doors

Fenders and doors can be dismantled and sold as used.

Battery

The battery can be sold as used or recycled.

Tires

Tires can be reused. Worn tires can be shredded, cleaned and recycled into playground surfaces and garden mulch.

Fluids

Antifreeze, gas, oil and brake fluid can be recycled and reused.

Starter

The starter can be dismantled, reconditioned and sold as used.

Windshield Wiper Fluid

Windshield wiper fluid can be drained for reuse.

Metals/Steel

Magnets are used to separate the ferrous (e.g., iron and steel) from non-ferrous (e.g., aluminum) metals. The recovered ferrous metals can be recycled to produce new steel. More than 14 million tons of steel from end-of-life vehicles is recycled each year.

SIA Environmental Milestones & Awards

1994 – 1st Auto Assembly Plant to ban all indoor smoking

1998 – 1st Auto Assembly Plant in U.S. to be ISO 14001 certified

2003 – 1st Auto Assembly Plant in U.S. to be designated a Backyard Wildlife Habitat by the NWF

2003 – Indiana Governor's Award for Environmental Excellence Recycling/Reuse

2004 – 1st Auto Assembly Plant in the U.S. to reach Zero Landfill

2006 – Indiana Governor's Award for Environmental Excellence Five Years Continuous Improvement

2007 – EPA WasteWise Gold Achievement Award for Industrial Recycling

2008 – EPA WasteWise Gold Achievement Award for Climate Change

2009 – EPA WasteWise Gold Achievement Award for Community Involvement

2011 – Urban Wheel Award for Greenest Automaker in America

2011 – American Manufacturing Strategies Award for Greenest Manufacturing Plant in America

2012 – 1st Auto Assembly Plant in U.S. to be ISO 50001 certified

2012 – Finalist for Global Sustainia Award



REDUCE

REUSE



RECYCLE

REDUCE

- ❑ 56.77% Reduction in TRI Emissions since 2000
- ❑ 31.12% Reduction in CO2 Emissions since 2000
- ❑ 27.85% Reduction in VOC Emissions since 2000
- ❑ 41.38% Reduction in Steel Scrap since 2000
- ❑ 52.07% Reduction Waste Generated since 2000

*All reductions are in lbs./unit

Reduction Projects



Steel

**Size Customization &
Coil Placement**

***102 lbs./unit Annual
Reduction in Waste Generated***



Filtercake

Commercially Reused in Cement
***4.27 lbs./unit Annual Reduction
In Waste Generated***

Ultrasonic Weld Testing

The old method of testing weld quality was to literally tear apart the vehicle to determine the strength of each weld. The use of innovative ultrasonic weld testing has many advantages.



Advantages of Ultrasonic Weld Testing:

- Reduction in steel scrap (waste generated)
- Cost savings
- Quality improvement
- Efficiency improvement
- Ergonomic/safety improvement



CO2 / Energy Use Reduction (Since 2000)

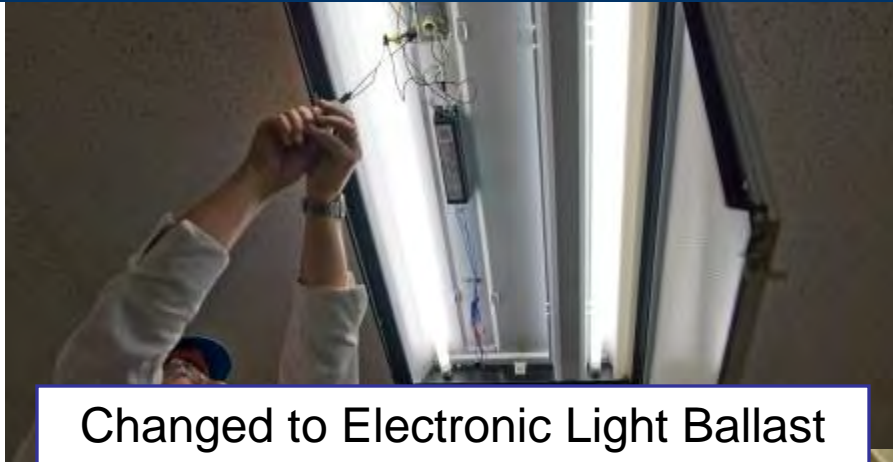
One of the best ways to reduce CO2 emissions is to reduce your use of energy. This also results in a cost savings and could result in quality and efficiency improvement. These additional benefits from an environmental kaizen are known as “green dividends.”

Reduction in CO2 per Unit:	31.12%
----------------------------	--------

Reduction in Electricity per Unit:	25.19%
------------------------------------	--------

Reduction in Natural Gas per Unit:	43.00%
------------------------------------	--------

Generating Innovative Green Dividends Through Energy Kaizens



Lighting Reduction Project



BEFORE:

Identified the need to replace T-12 fixtures with more efficient T-8 fixtures.



Lighting Reduction Project



AFTER:

- Reduction in kwh usage
- Reduction in CO2 emissions
- Cost savings
- Better illumination

Return on Investment =
Less than 1 year



REUSE

<input type="checkbox"/> <u>Engine Plant Return Project*</u>	<u>7,882 tons</u>
<input type="checkbox"/> <u>Pallets</u>	<u>83 tons</u>
<input type="checkbox"/> <u>Oil & Oil Absorbent</u>	<u>57 tons</u>
<input type="checkbox"/> <u>Solvent Reuse</u>	<u>52 tons</u>

Total 2012 = 8074 tons**

*Includes cardboard, Styrofoam, steel braces and plastic

**Does not include standard returnable packaging or containers

Approximately 1,450,977 caps reused in 2012



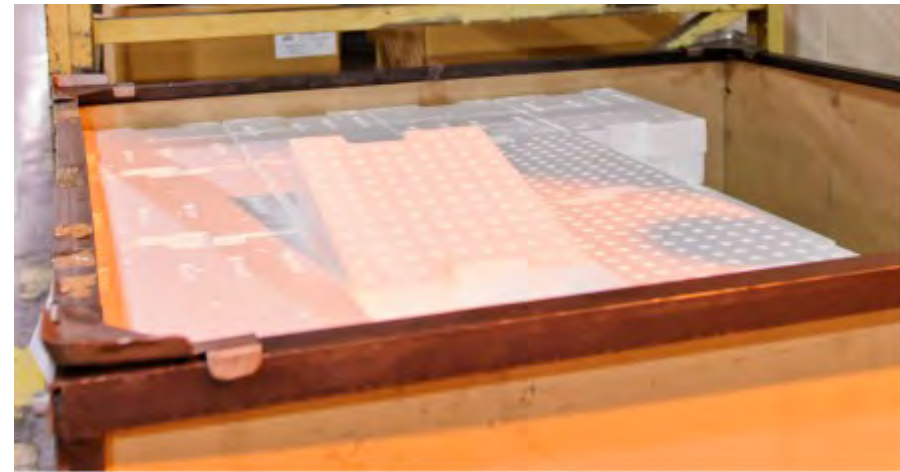
Automatic Transmission Caps



Rear Transmission Caps



Engine Packaging Reuse Project

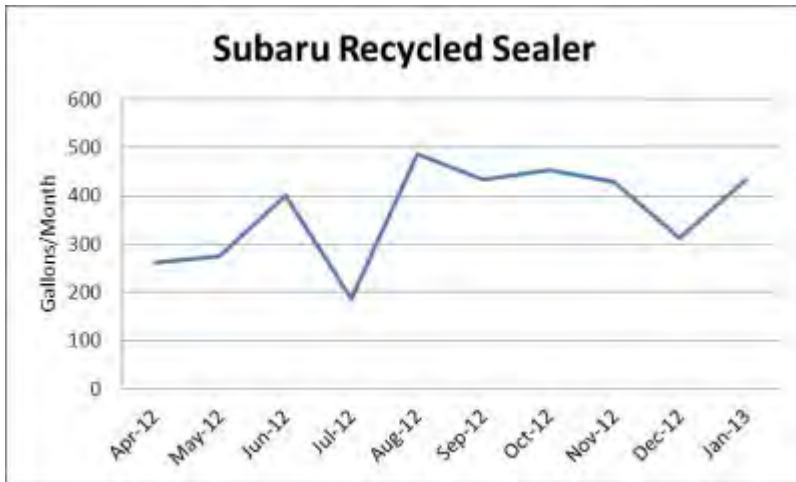


**This piece has made
10 trips to Japan!**
**670 tons of Styrofoam®
returned to Japan in 2012**

**Savings =
\$1.3 Million**



Sealer Reuse Project



ANNUAL SAVINGS

\$16.32/gallon
x 4,800 gallons
= **\$78,336**

No need for off-site recycling.



Bumper Reuse Project



All bumper scrap and defective bumpers are fed into the bumper regrind machine and then the reground plastic is placed back into the bumper injection molding machine.

BENEFITS OF BUMPER REUSE

*Annual cost savings = **\$140,000**

*No need for off-site recycling



RECYCLE

❑ <u>Steel</u>	30,116 tons
❑ <u>Cardboard & Paper</u>	1,632 tons
❑ <u>Various Plastics & Foams</u>	467 tons
❑ <u>Drum-Solid Distillation</u>	210 tons
❑ <u>Drum-Fuel Blending</u>	70 tons
❑ <u>Used Oil</u>	59 tons
❑ <u>Waste Paint & Solvent</u>	47 tons
❑ <u>Pop Cans & Bottles</u>	52 tons
❑ <u>Glass</u>	20 tons
❑ <u>Weld Slag/Grind Dust</u>	15 tons
❑ <u>Tires</u>	8 tons
❑ <u>Light Bulbs</u>	14 tons
❑ <u>Batteries</u>	7 tons
❑ <u>Solvent Soaked Rags</u>	7 tons
❑ <u>Aluminum</u>	13 tons
❑ <u>Electronics</u>	8 tons

Total 2012 = 34,745 tons

Recycling Rate = 99.9%

RAILROAD TIES TO GARDEN GNOMES



Subaru of Indiana Automotive, INC 2012 RECYCLING BENEFITS

28,100 MATURE TREES

This represents enough saved timber resources to produce more than 348,159,000 sheets of newspaper!

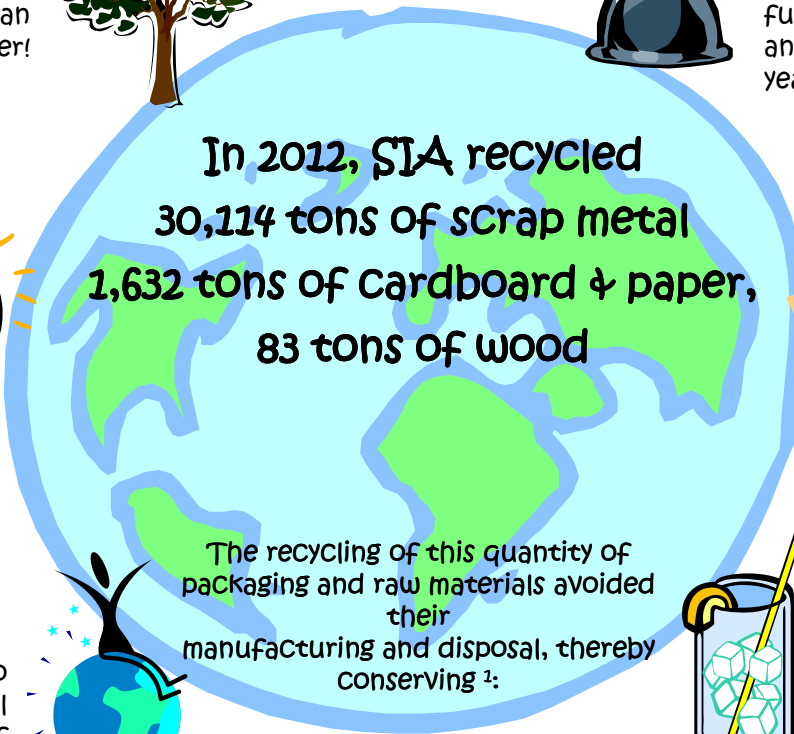


755,000 GALLONS OF OIL

This represents 17,976 barrels of No.2 fuel oil. This is enough energy to heat and cool more than 3,742 homes for one year!



In 2012, SIA recycled
30,114 tons of scrap metal
1,632 tons of cardboard & paper,
83 tons of wood



The recycling of this quantity of packaging and raw materials avoided their manufacturing and disposal, thereby conserving 1:



114,908,000 KW-HRS OF ELECTRICITY

This is enough power to fulfill the annual electricity needs of more than 14,013 homes!



39,100 GALLONS OF GASOLINE

This is enough gasoline to drive 1,094,800 miles in A Subaru Outback.

66,200 CUBIC YARDS OF LANDFILL AIRSPACE

This represents enough airspace to fulfill the municipal waste disposal needs for a community of 85,001 Americans for one year!



11,424,000 GALLONS OF WATER

This represents enough water to meet the daily freshwater needs of 152,320 Americans

NOTE: Each ton of fiber recycled conserves: 17 mature trees; 463 gallons of oil; 24 gallons of gasoline; 4,100 kw-hrs of electricity; 7,000 gallons of water, 3.5 cubic yards of landfill airspace. Each ton of pallets recycled conserves 5.1 mature trees and 3.5 cubic yards of landfill airspace. Each ton of scrap metals recycled conserves 3,590 kw-hrs of electricity and 2.0 cubic yards of landfill airspace. Sources: U.S. Environmental Protection Agency, Institute of Scrap Recycling Industries, Gaylord Corporation, Ford Motor Company, and Waste Management.

Keys to Achieving Environmental Goals

- Associate Kaizen Suggestions
 - generating cost savings by eliminating waste (muda)
 - creative ideas for re-use and recycling
 - proactive involvement in environmental management system
 - innovative ideas for sustainability

Kaizen (or continuous improvement) activities are an integral part of the development and implementation of lean ideas, processes and practices.



Keys to Achieving Environmental Goals

- Establish a management system
 - Utilize ISO 14001 and 50001
 - Top management involvement in approving company-wide and section plans and targets
 - Regular reporting on targets and results to top management

Use of ISO Certified Management Systems

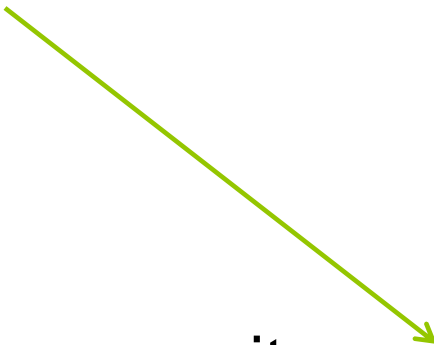


SIA was the first auto assembly plant in the United States to achieve ISO 9001 (Quality), ISO 14001 (Environmental) and ISO 50001 (Energy) certification. These standards provide organizations with management strategies to improve quality, enhance environmental stewardship, increase energy efficiency, reduce costs and improve overall performance.

Motivate Management Through Measurement

- Develop a system to measure the waste being generated
 - Make sure it is accurate
- Level the playing field
 - Pounds of waste per unit, per capita
- Make managers accountable
 - Reporting at monthly meeting
 - Weekly top management tours
- Provide further motivational tools
 - Incorporate performance targets into bonus system

HERITAGE INTERAC



Material	Location				Gondola #	Weight	Gondola #
CB	X	29.5	Y	15.5			
CB	X	29.5	Y	21.5			
CB	X	30	Y	3			
CB	X	30	Y	9.8	131	109	
CB	X	30	Y	12.8			
CB	X	30	Y	21.5	023	40	
CB	X	30.5	Y	4.5			
CB	X	30.5	Y	6.5			
CB	X	30.5	Y	7	037	56	
CB	X	30.5	Y	7.5			

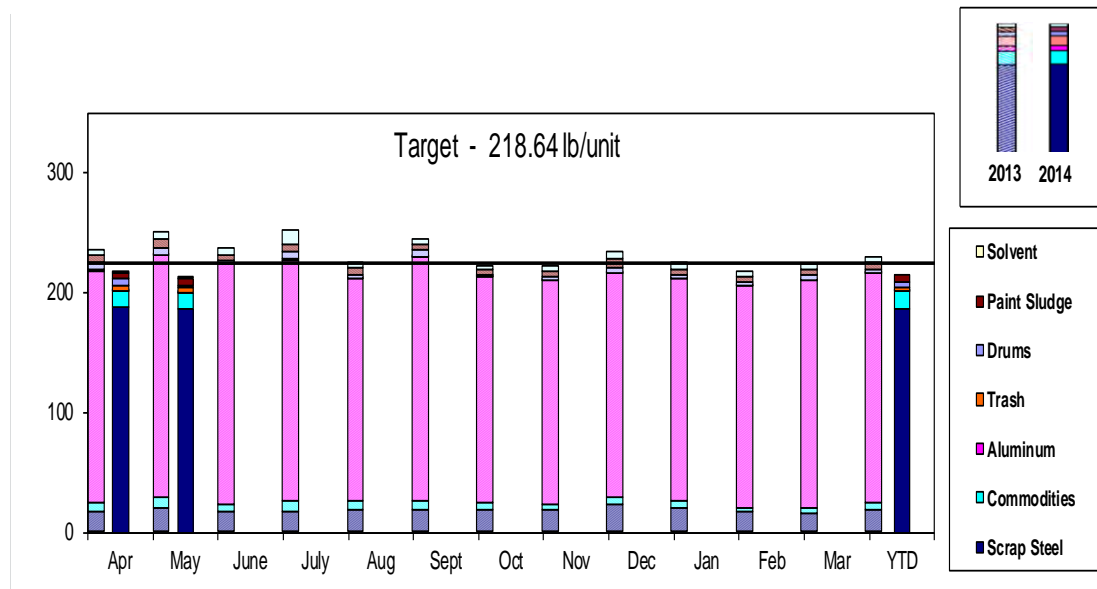
Section Environmental and Energy Board


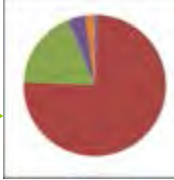


Each section has an environmental and energy board that contains the following:

1. Section plan;
2. Environmental and energy policies;
3. Sustainability targets and results; and
4. Associate Kaizens.

Environmental Compliance Oversight Committee



2014 FY	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	YTD	FY 2013
Drums	5.95	2.40	<div>Commodities Breakdown</div>  <div>Scrap Steel Breakdown</div> 										4.20	3.13
Paint Sludge	5.66	5.20											5.43	5.49
Solvent	0.38	0.54											0.46	0.40
Trash	3.86	3.86											3.86	5.33
Commodities	13.94	13.71											13.83	16.61
Scrap Steel	187.39	186.15											186.78	187.54
Aluminum	0.07	0.20											0.13	0.08

- Meets every month
- Top management and section managers
- Reports on plant and section environmental targets and results
- Reports on improvement activities (Kaizen)

Top Management Safety/Environmental/Energy Tour



Every week top management goes to a different section and reviews that section's plan and progress towards achieving safety, environmental and energy goals.

Two key parts of each week's tour are having the Section Managers explain their target/results and the Team Leaders explain their kaizen activities.



Keys to Achieving Environmental Goals

- Cooperation of Suppliers/Affiliates
 - elimination of unnecessary packaging
 - investment in re-usable containers
 - switch to recyclable packaging materials
 - over 80% are ISO 14001 certified
 - all Subaru affiliates in North America are ISO 14001 certified



Keys to Achieving Environmental Goals

- Assistance of Heritage Interactive
 - on-site collection/sorting of recyclable materials
 - advice on recyclable/reusable materials
 - creation of markets for recyclable materials



What's Next at SIA

- Additional Energy/CO2 Reduction
- Further Water Reduction/Reuse
- Elimination of All Hazardous Chemicals
- Increase Use of Composting
- Expansion of Alternative Energy Projects
- Restoration of Native Prairie Grass Areas

Composting





SIA's Prairie Grass Project



[illegible]

Subaru S★T★A★R★S★ Program



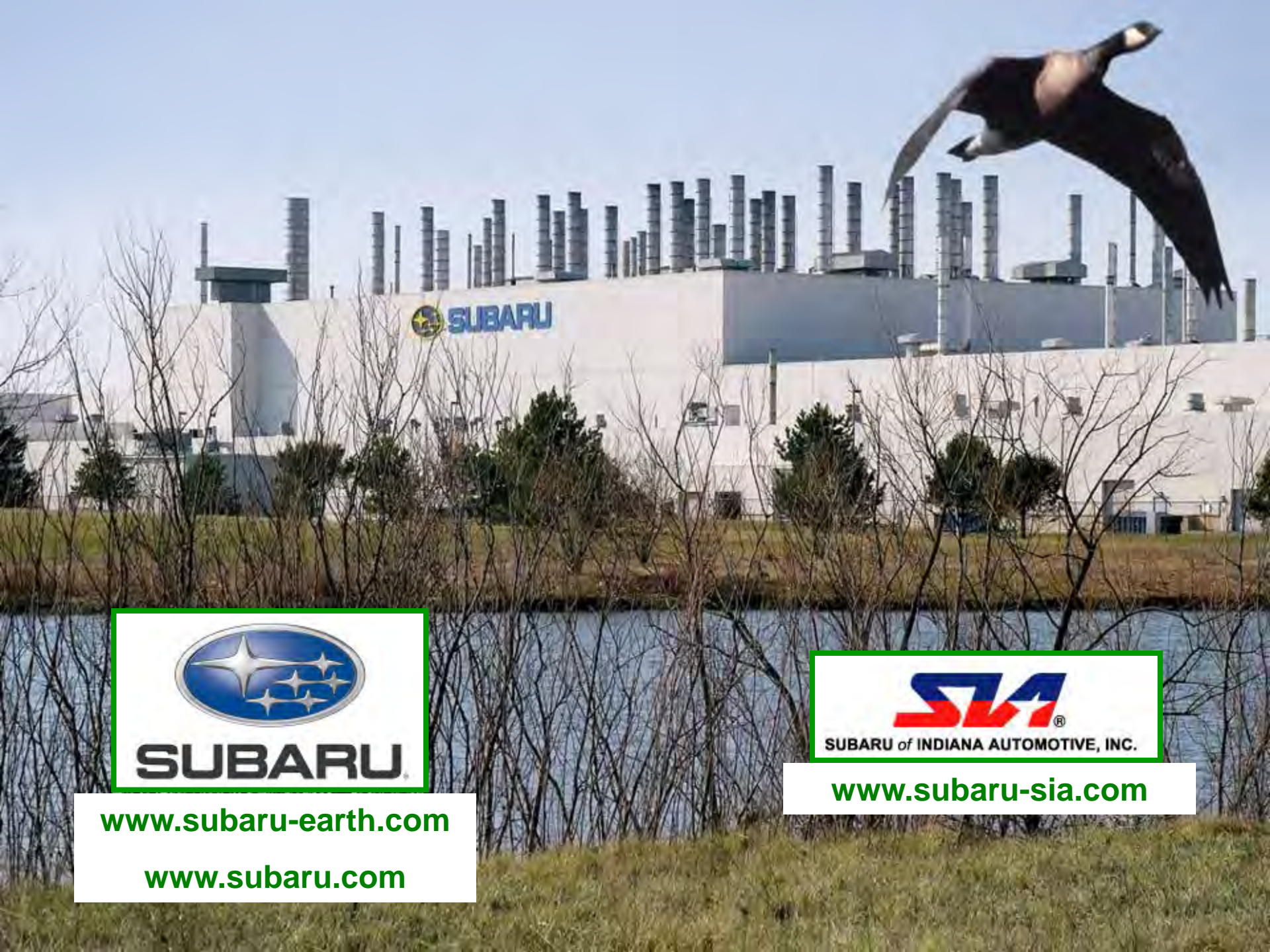


SLA









www.subaru-earth.com

www.subaru.com



www.subaru-sia.com