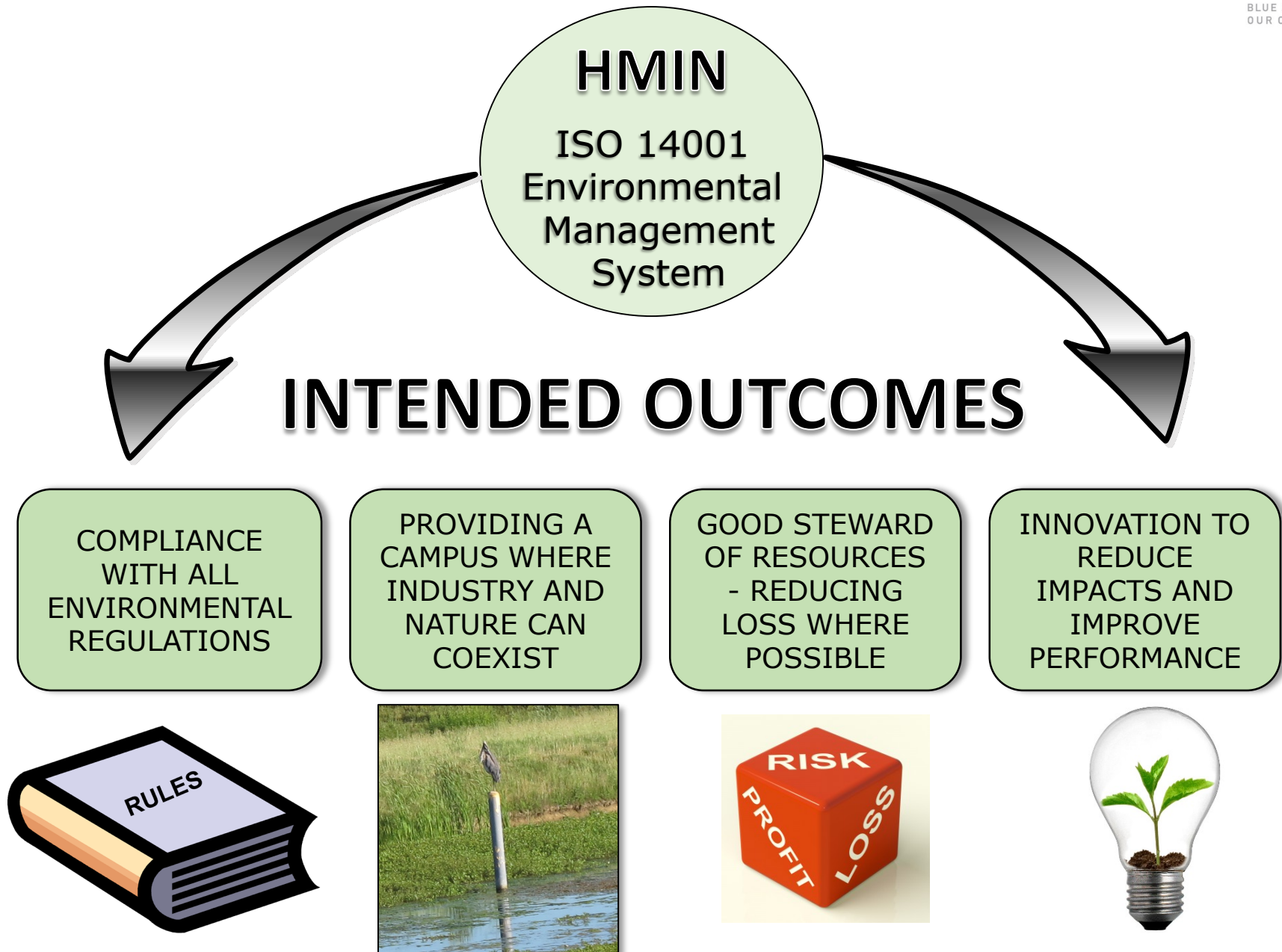


# **HONDA MANUFACTURING OF INDIANA ENVIRONMENTAL MANAGEMENT OVERVIEW**

**PARTNERS FOR POLLUTION PREVENTION MEETING  
JUNE 20, 2018**





**Coexisting**



# HMIN IS SITUATED ON 1600 ACRES IN GREENSBURG, IN



7 man made lakes and 2 man made wetlands  
Each lake about 15 acres – 25' deep



350 acres of leased agriculture



Two bald eagles frequent our property



We are home to migratory water fowl and herons

Stream Enhancement Projects





**Reduce Loss**

# HMIN – ENVIROMENTAL IMPROVEMENT PROCESS



## HMIN ENVIRONMENTAL Story Chart

94 Ki Reflections

PERFORMANCE

		○
		■
		▲
		○

COMPLIANCE OBLIGATIONS

		○
		○
		○
		○
		○

94 Ki Challenges

HM 2030 Vision - Environmental

Lead efforts to realize a carbon-free society

- Further advancement of energy-saving technologies and effective utilization of renewable energy
- Effective utilization of resources and proper waste treatment

NA 2030 Vision - Environmental

Be the leader in the environment

HMIN 2030 Vision - Environmental

Green Factory benchmark facility.

18-20MT Environmental Themes

Merge Energy Management into ISO 14001

- Off shift energy (95)
- Compressed air leak management (95)
- EM Assessment (95)

Treasure hunt for opportunities and loss id

Develop 2030/2050 energy down strategy

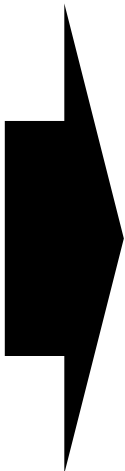
Water use balance and assessment

Environmental Metrics

KPI	Measure	95 Ki	96 Ki	97 Ki
Energy	GJ/unit	-1%	-1%	-1%
OS Energy	kwh	-10%	-5%	-5%
Water	Gal/unit	-5%	-3%	-2%
Waste	Lbs/unit	40	40	40
Compliance	Deviation	0	0	0

External/Future Influences

External/Future Challenges



94 Ki Reflections

PERFORMANCE

		○
		■
		▲
		○

COMPLIANCE OBLIGATIONS

		○
		○
		○
		○
		○

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External/Future Challenges

DEPT  
PLAN

DEPT  
PLAN

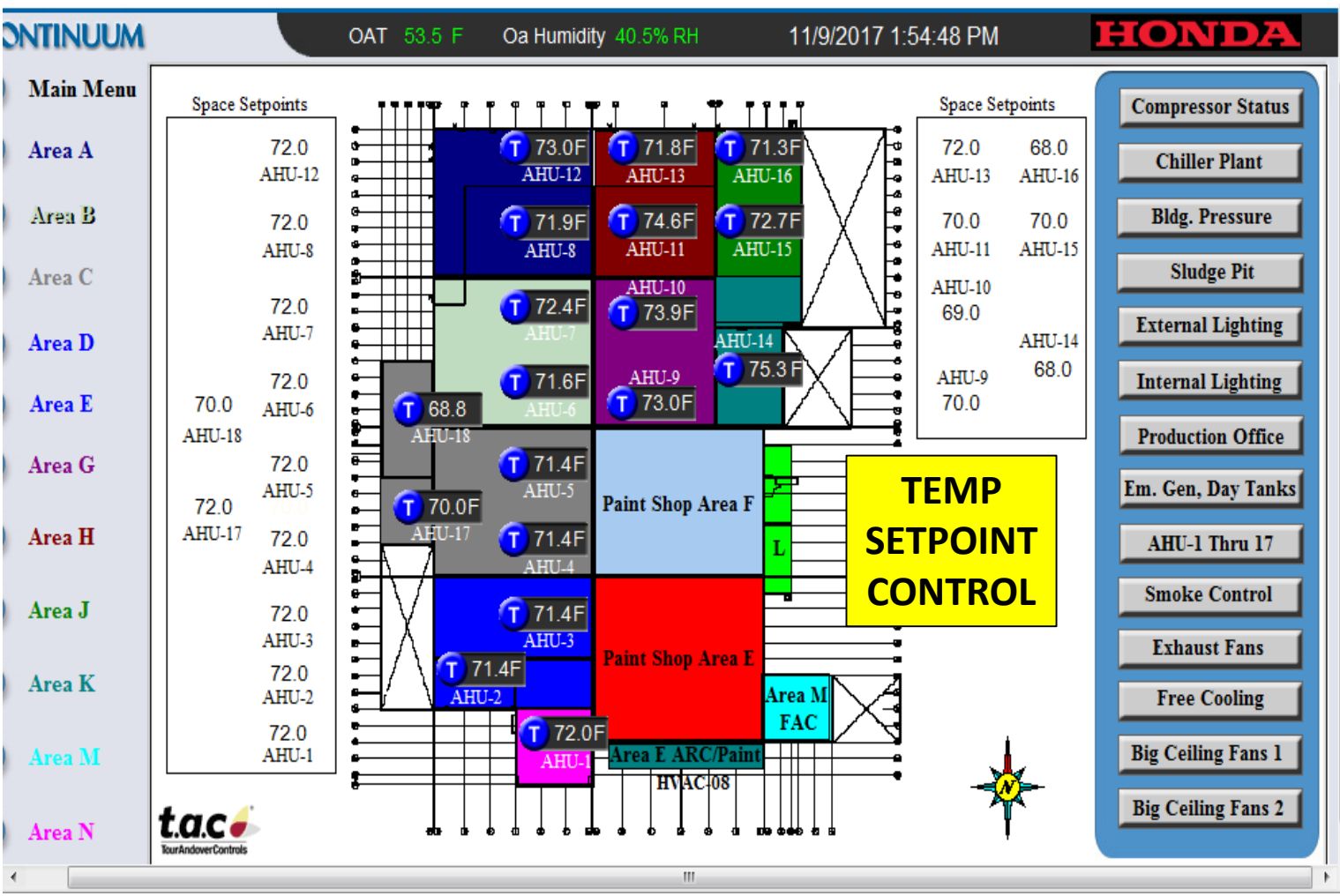
DEPT  
PLAN

DEPT  
PLAN

STRATEGIES ROLLED OUT TO DEPARTMENTS  
WHERE THE “REAL WORK” HAPPENS



# HMIN – ENERGY MANAGEMENT



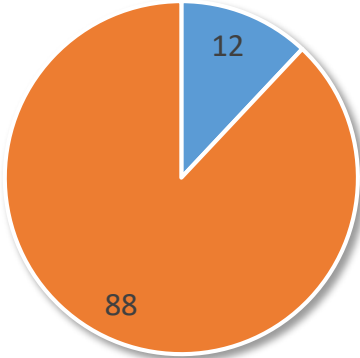
HMIN USES A COMPUTER BASED SYSTEM TO CONTROL SPACE TEMPERATURE, HI-BAY LIGHTING AND EXTERNAL LIGHTING. THIS CONTROL ALSO LIMITS ENERGY USE DURING NON-PRODUCTION BY TURNING LIGHTS AND HVAC OFF.

# HMIN – OFF SHIFT ENERGY MANAGEMENT

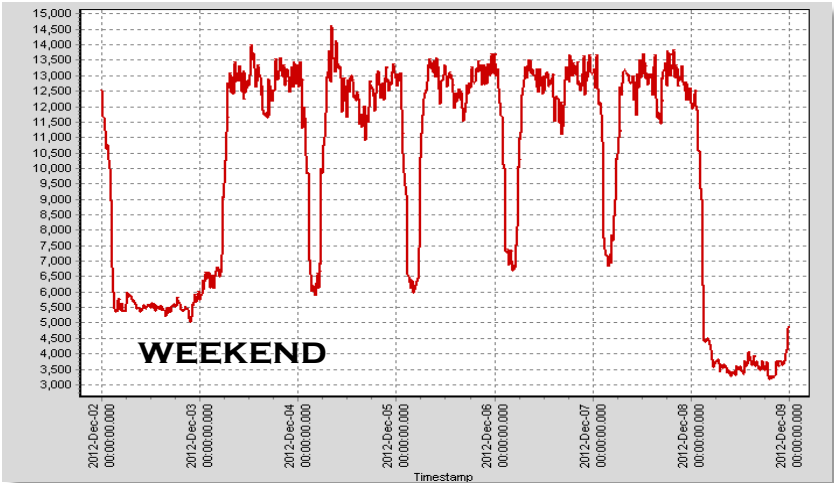
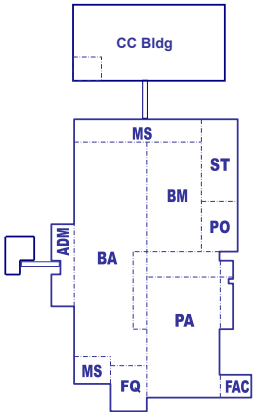


HMIN USES ABOUT 12% OF ITS ELECTRICITY DURING NON PRODUCTION TIMES – OFF SHIFT ENERGY.

THIS IS PURE LOSS.



EACH DEPARTMENT IS CHALLENGED WITH AN OSE REDUCTION TARGET OF 10% COMPARED TO THE PREVIOUS YEAR



HMIN HAS AND EXTENSIVE ELECTRIC MONITORING SYSTEM TO HELP DEPARTMENTS MANAGE ENERGY USE - ESPECIALLY DURING NON PRODUCTION HOURS.



NON PRODUCTION KW BETWEEN SHIFTS 3:00 AM TO 5:30 AM

TARGET KW 300

ACCUMULATED KW

## PAINT BUMPER

CURRENT PA BP KW USE 463

NON PRODUCTION KW WEEKEND

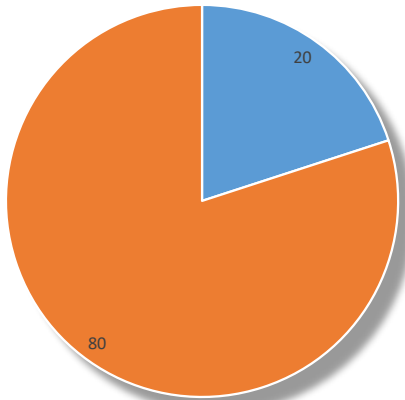
TARGET KW 300

ACCUMULATED KW

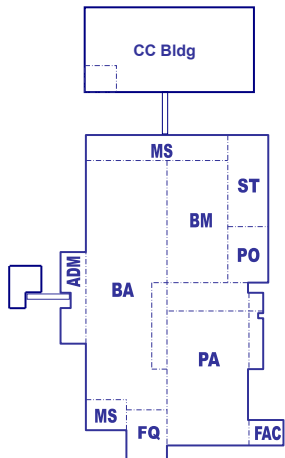


# HMIN – COMPRESSED AIR LEAK MANAGEMENT

HMIN LOSES ABOUT 20% OF ITS COMPRESSED AIR THROUGH LEAKS.



EACH DEPARTMENT IS CHALLENGED TO REDUCE COMPRESSED AIR USE BY 10% COMPARED TO THE PREVIOUS YEAR



AIR LEAK LOSS		
SIZE	CFM	LOSS/YR
1/32"	1.6	\$227
1/16"	6.5	\$922
1/8"	26	\$3690

EDUCATE ASSOCIATES ON THE LOSSES ASSOCIATED WITH AIR LEAKS.

SOME DEPARTMENTS HAVE IMPLEMENTED AIR LEAK TAGGING PROGRAMS



DEPARTMENTS HAVE ADOPTED ULTRASONIC LEAK DETECTION SURVEYS INTO THEIR PREVENTIVE MAINTENANCE EFFORTS

















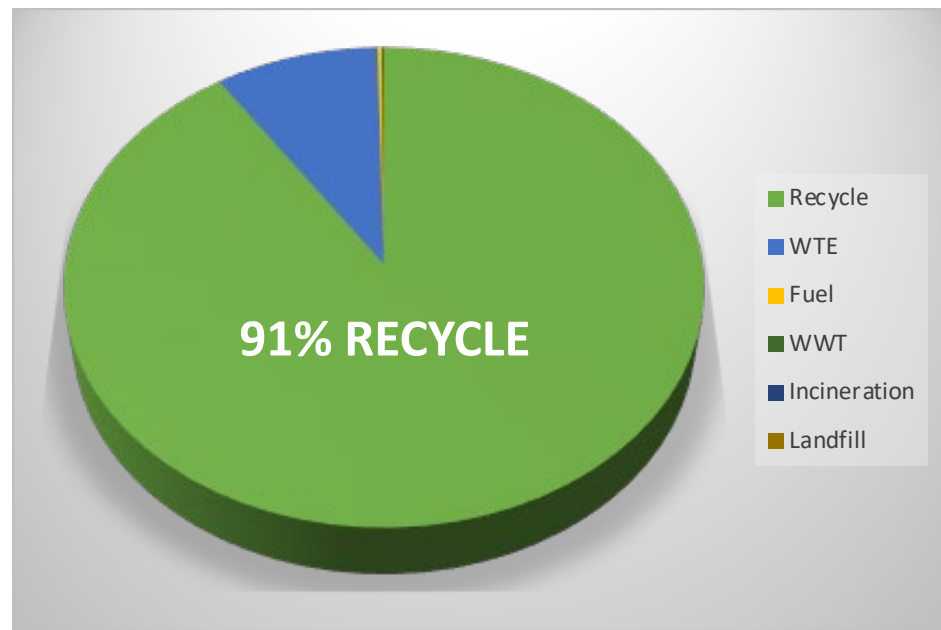


**HMIN HAS BEEN  
RECOGNIZED AS AN  
ENERGY EFFICIENT  
AUTO PLANT THROUGH  
THE US EPA ENERGY  
STAR PROGRAM.**

**HMIN FIRST  
RECEIVED THIS HONOR  
IN 2012.**

# HMIN – WASTE MANAGEMENT OVERVIEW

WHAT	LBS/YR	HOW
Clip Steel	28.8 million	
Cardboard	1.88 million	
Scrap Metal	1.27 million	
Pallets	1.21 million	
Paint Sludge	0.84 million	
Gen Trash	0.81 million	
TPO	0.56 million	
WW Sludge	0.51 million	
Café Trash	0.43 million	
Bumper PO	0.41 million	
Package PO	0.30 million	
Trash TPO	0.26 million	
 Recycle  Waste to Energy		



**40 MILLION POUNDS OF WASTE ARE GENERATED PER YEAR - 91% RECYCLED**

**HMIN WORKS WITH OUR WASTE CONTRACTOR AND ITS PARTNERS TO FIND INNOVATIVE RECYCLING OPTIONS**



# HMIN – SOLVENT RECYCLING

## TWO KINDS OF PAINT



PAPO USES BOTH  
WATER-BASED PAINT  
AND SOLVENT-BASED  
PAINT

## ROBOT CLEANING



**26 ROBOTS SPRAY SOLVENT-BASED PAINT**

THOSE ROBOTS ARE FLUSHED  
WITH **“PURGE” SOLVENT** EACH  
TIME THEY SPRAY PAINT

## RECYCLING PURGE SOLVENT



RECOVERED SOLVENT  
SENT BACK TO  
SUPPLIER FOR  
REFURBISHING AND  
BLENDED WITH  
VIRGIN SOLVENT TO  
MEET SPECIFICATIONS

60% OF SOLVENT USED IS REUSED SOLVENT – EQUAL  
TO APPROXIMATELY 27,000 GALLON PER YEAR.

## SOLVENT RECOVERY



USED PURGE SOLVENT IS  
RECOVERED AND  
COLLECTED IN TOTES

**PAPO USES 3,000-4,000  
GALLONS OF PURGE  
SOLVENT EACH MONTH**

90% OF THE USED PURGE  
SOLVENT IS RECOVERED



**PAINT DEPARTMENT  
LAUNDERS AND REUSES**  
175,000 RAGS/YR  
126,000 PAIR GLOVES/YR  
46,000 TOWELS/YR  
40,000 SUITS/YR



**WELD DEPARTMENT  
LAUNDERS AND REUSES**  
267,000 PAIR GLOVES/YR  
200,000 SLEEVES/YR

**SAFETY GEAR IS SENT TO THE LAUNDRY AND REUSED MULTIPLE TIMES BEFORE  
IT NEEDS TO BE REPLACED**

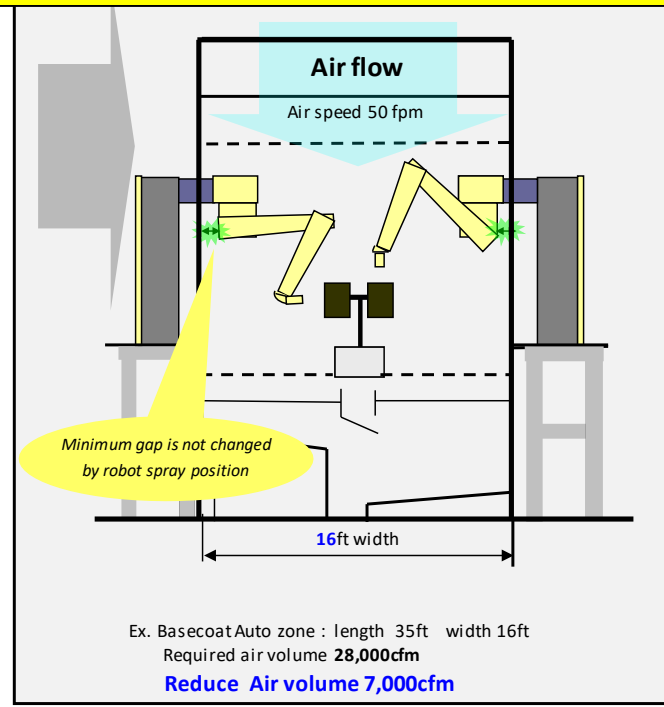
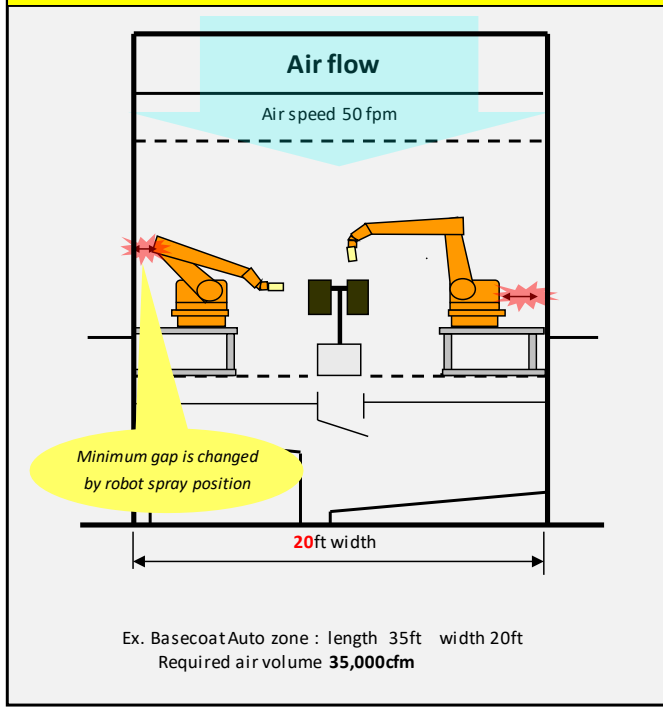


# Innovation



# HMIN ENV – PAINT BOOTH INNOVATION

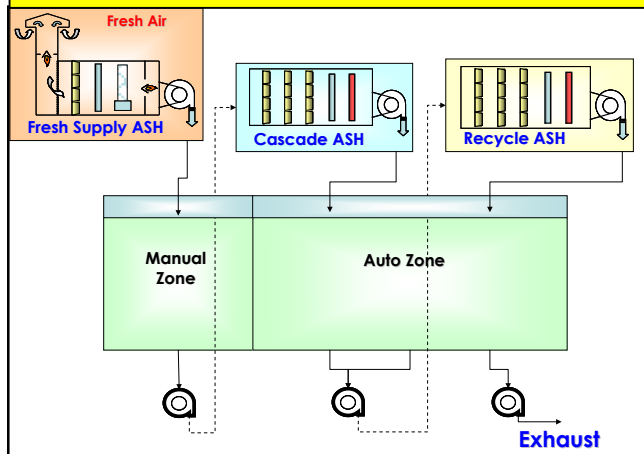
## Booth Design



**BOOTH  
WIDTH  
DOWN BY  
4 FEET**

**REDUCES  
AIR FLOW  
BY AND  
ENERGY  
SAVINGS  
~20%**

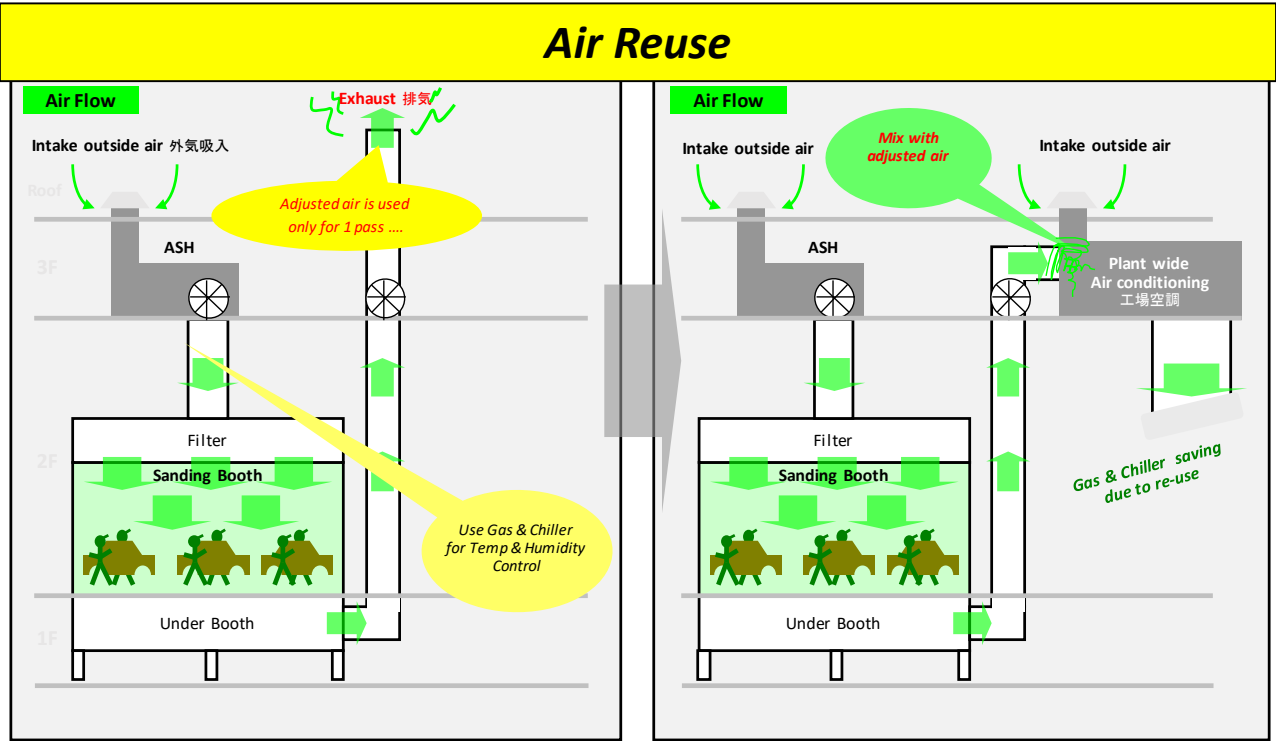
## Cascade air flow



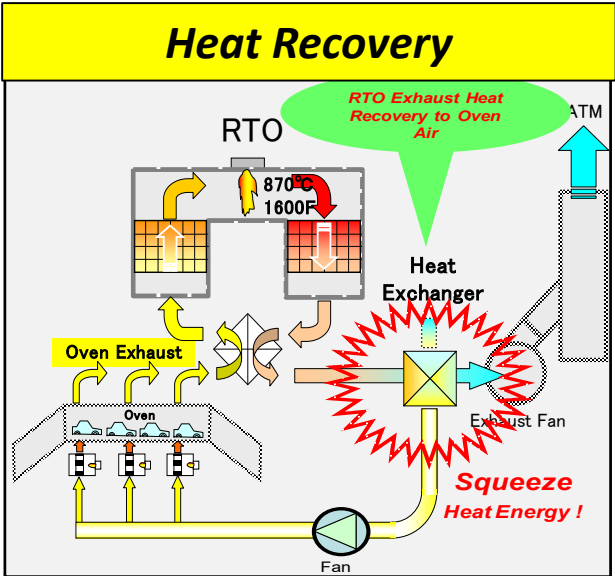
**FRESH AIR INTAKE  
TEMPERED ONCE**

**STABLE CONTROL**

**REDUCES AIR FLOW  
AND ENERGY ~45%**

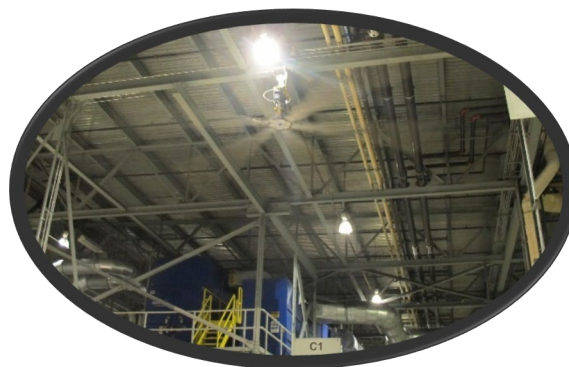
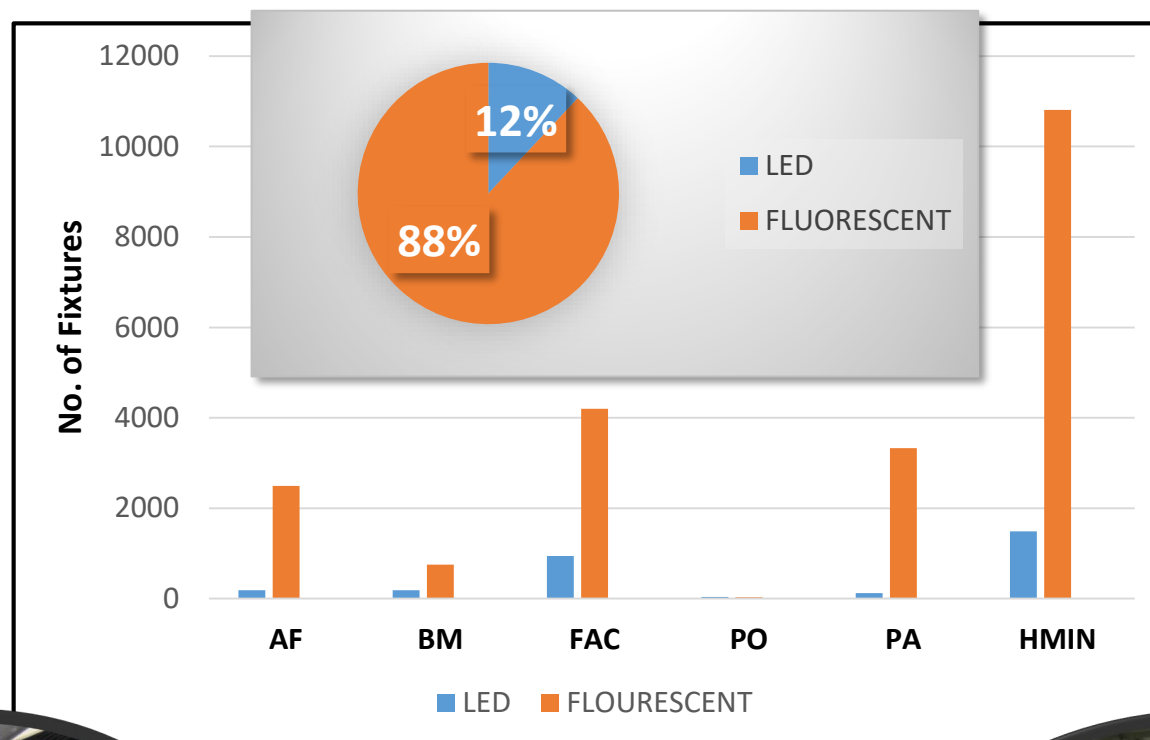


**RECYCLE  
AIR FROM  
SANDING  
BOOTH  
TO AIR  
MAKE UP  
SAVES  
GAS AND  
ELECTRIC**



**PREHEAT  
OVEN AIR  
WITH RTO  
HEAT  
EXCHANGER**

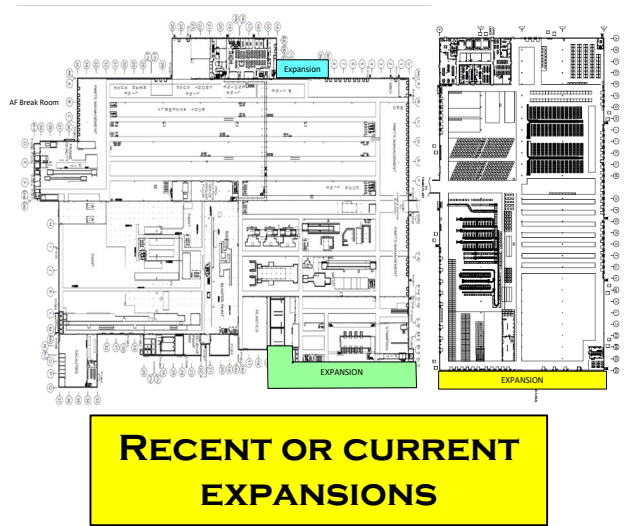
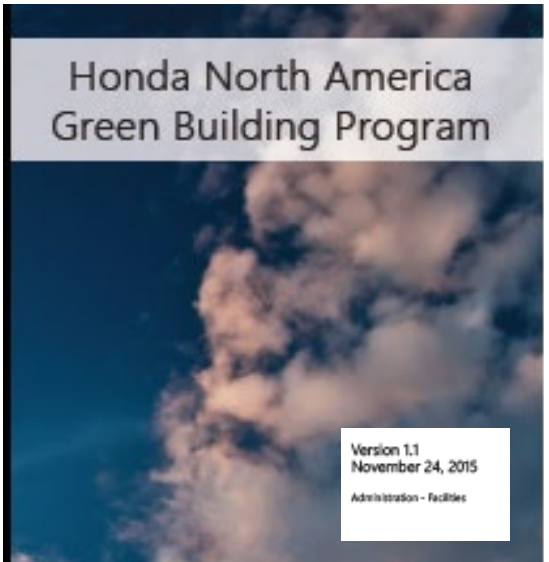
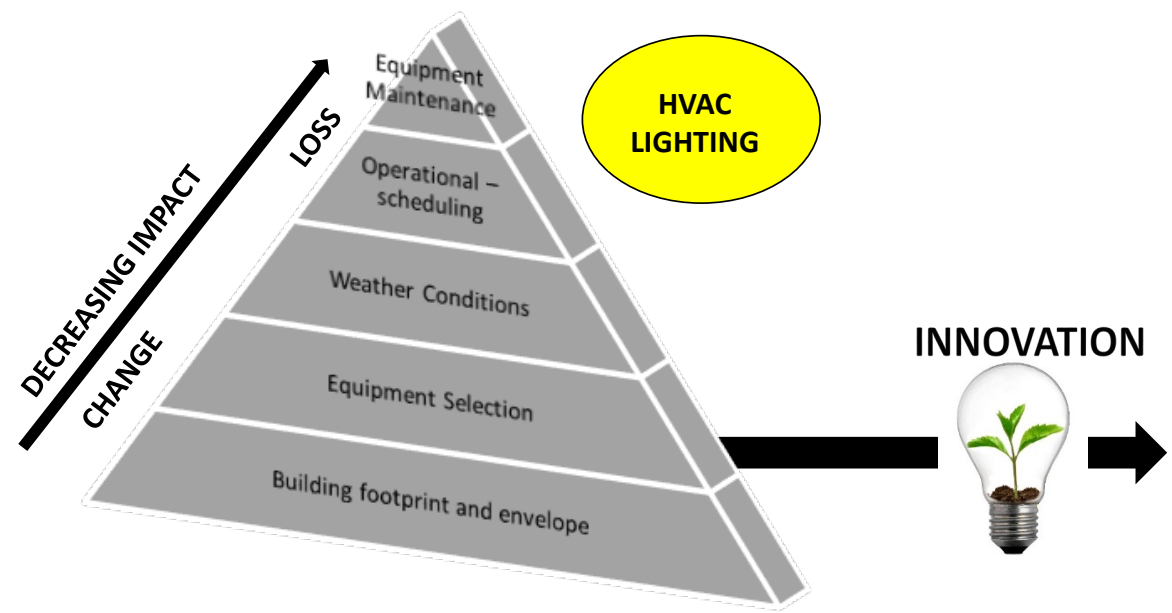
# HMIN ENV – LED LIGHTING CONVERSION



**PHASED CONVERSION TO LED LIGHTING THROUGHOUT PLANT**



# HMIN – GREEN BUILDING STANDARD



Appendix A: Honda NA Green Building Program Required Measures

PROJECT PLANNING AND MANAGEMENT APPROVAL		
PRIMARY ASHRAE 90.1-2013 STANDARD		
Energy Analysis	E1.01	Perform energy analysis for the building project.
Building Envelope	E2.01	Use demand control ventilation (DCV) for high occupancy spaces consistent with Section 6 of ASHRAE 90.1-2013 or NRCB 2001.
Energy Efficiency Controls	E3.01	Design HVAC duct and piping insulation in conformance with Section 6 of ASHRAE 90.1-2013 or NRCB 2001.
Interior Lighting Technologies	E4.01	Optimize design interior lighting systems to meet maximum LPD allowances on a space-by-space basis.
Interior Lighting Controls	E4.02	Select interior lighting controls to meet maximum LPD allowances on a space-by-space basis.
Exterior Lighting Controls	E5.01	Use full cutoff shielding for all non-LED fixtures.
Commissioning	E6.01	Develop owner's project requirements and basis of design documents.
	E6.02	Perform system testing.
	E6.03	Develop a commissioning report.

## RESULT

- HVAC ✓
  - LIGHTING ✓
  - DOORS ✓
  - WALLS/ROOF INSULATION X
- COST BENEFIT 340 YEARS**

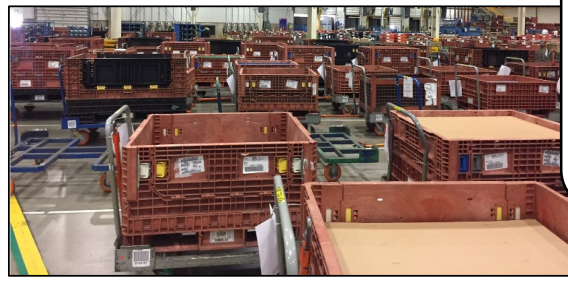
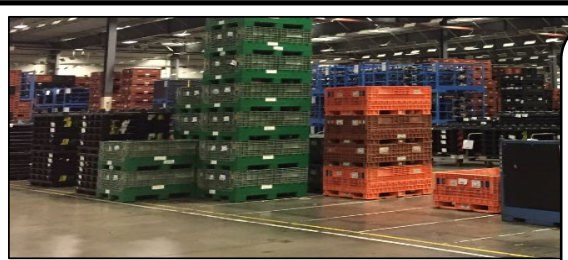
# HMIN – RETURNABLE PACKAGING STORY

## Returnable Packaging



The HMIN Purchasing Packaging Team works with Suppliers to Design & Develop Returnable Packaging

## Consolidation Center



In the CC packs are unloaded to build trains that are delivered to line side.

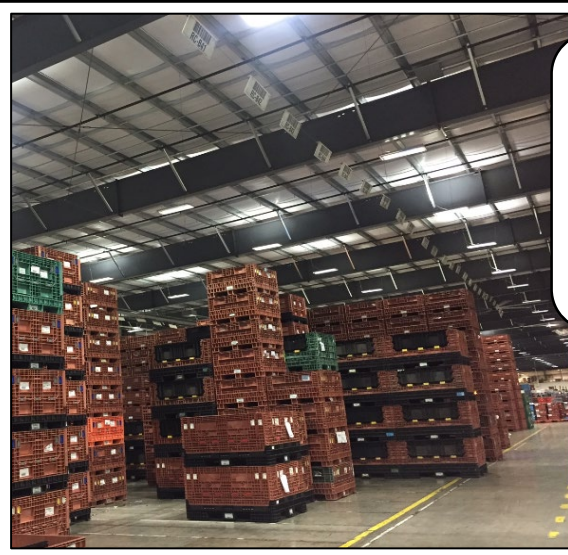
## Reuse – Repair - Recycle



About 300,000 reusable containers are in circulation at any time.

Damage containers are repaired or sent out for recycling

## RCC



Packs are returned to the CC & shipped back to OEM

# HMIN ENV – REFRIGERANT CONVERSION



CURRENTLY MOST VEHICLES USE HFC 134A AS THE MVAC REFRIGERANT

EU LAW REQUIRED THE MANUFACTURE OF MOTOR VEHICLES WITH CLIMATE FRIENDLY MVAC BY 2017

US LAW REQUIRES MANUFACTURE OF MOTOR VEHICLES WITH CLIMATE FRIENDLY MVAC BY 2021

GLOBAL WARMING POTENTIAL OF HFO-1234YF IS 357 TIMES LESS THAN THAT OF HFC-134A

Environmental Impacts of MVAC Refrigerants		
Refrigerant	Global Warming Potential (GWP)	Ozone Depleting?
CFC-12	10,900	Yes
HFC-134a	1,430	No
HFC-152a	124	No
HFO-1234yf	4	No
CO <sub>2</sub> (R-744)	1	No

\*GWP values are from the Intergovernmental Panel on Climate Change Fourth Assessment Report: Climate Change 2007



Source: US EPA Bulletin 430-F-13-041, September 2013



SAVES 0.65 METRIC TONS CO<sub>2</sub>E FOR THE INITIAL CHARGE OF EACH VEHICLE

SAVES 165,000 METRIC TONS CO<sub>2</sub>E YEAR FOR ALL VEHICLES PRODUCED AT HMIN.

(EQUIVALENT TO INDIANA ELECTRIC FOR 22,000 HOMES PER YEAR)



# QUESTIONS