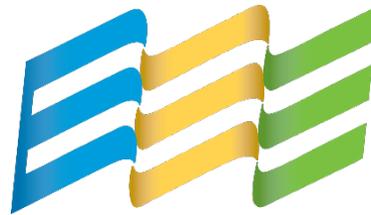


# E3 PROGRAM IN INDIANA



ECONOMY  
ENERGY  
ENVIRONMENT

**PURDUE**  
UNIVERSITY  
MANUFACTURING EXTENSION  
PARTNERSHIP

- 2014 - Partnered with IDEM to develop Indiana's first E3 Program Pilot
- 4 companies selected to participate
- Each company received training & assessments totaling \$24k in value

# E3 PROGRAM



ECONOMY  
ENERGY  
ENVIRONMENT

## Technical Training & Assessments

- **Lean Value Stream Assessment**
- **Environmental Waste Stream Assessment**
- **Carbon Footprint Analysis**
- **Facility Energy Assessment**

# TIME & PERSONNEL COMMITMENT

Assessment	# of days On-Site	# of Participants	Participant Type	Prep Work Required
<b>Lean VSM Training &amp; Assessment</b>	2 days	6 - 16 people	People involved in the process to be Value Stream Mapped are needed. Others may include top management, department heads, associates from area, etc.	E3 Pre-Assessment Survey
<b>Environmental Waste Stream Training &amp; Assessment</b>	2 days	6-16 people	People involved in the process to be Value Stream Mapped are needed. Others may include top management, department heads, associates from area, etc.	Discuss possible processes/ waste streams to be analyzed
<b>Carbon Footprint Analysis</b>	0.5 - 1 day	1 person	Person(s) knowledgeable in the facility systems and energy use	Energy Data
<b>Facility Energy Assessment</b>	1 - 2 days (depending on size of the facility)	1 person	Person(s) knowledgeable in the facility systems to escort energy assessment team	Energy Data
<b>Intro to Energy/ Environ. Management Systems Training</b>	0.5 day	6-16 people	People involved in mid- to upper-level management from various departments	N/A

# SUMMARY



## Cumulative Assessment Summary:

- **Key Lean Opportunities: \$695,500** Savings
- **Energy Savings Opportunities: \$332,000** Savings
- **W.A.S.T.E. Stream Opportunities: \$514,300** Savings
- **Greenhouse Gas Emissions Reductions: 18,216 Tons**  
CO<sub>2</sub>-Eq

# SUMMARY



## Cumulative Assessment Summary:

	Lean VSM Savings	Energy Audit	W.A.S.T.E. Stream	CO2-Eq Reduced	Total \$ Savings
Company #1	\$87,500	\$81,600	\$40,300	15,890 tons	\$209,400
Company #2	\$174,400	\$145,800	\$239,000	1,620 tons	\$559,200
Company #3	\$201,600	\$6,200	\$108,800	82 tons	\$316,600
Company #4	\$232,000	\$98,400	\$126,200	626 tons	\$456,600

# CASE STUDY #3

## Fabricator of Reusable Steel Racks for Automotive Parts



# CASE STUDY #3

**Fabricator of Reusable Steel Racks for Automotive Parts**

**Working 7:00am-4pm 5-6 days/wk**

**Annual production= 7,000 units +**

**No. Employees = 90**

**Annual Elec. Cost = \$37,644**

**Annual Nat. Gas Cost = \$12,053**



# CASE STUDY #3

## Assessment Summary:

### Key Lean Opportunities

- Pull Kanban component supermarket: **\$12k savings from inventory reduction + \$15k reduction in overproduction**
- Standardize hardware in prototype: **Savings TBD**
- Set up QCO: **\$800 savings**
- Move sub-assembly to end of each line: **\$18k savings**
- Decrease days of RM inventory / JIT: **\$116k savings**
- **Install FIFO conveyor flow from Line to Wash...**

# CASE STUDY #3

## Assessment Summary:

### Key Lean Opportunities

- Install FIFO conveyor flow from Line to Wash...
- \$42k inventory savings
- Labor savings of \$60k annually w/ 3 fewer forklifts!
  - Free up labor for production
- Increased production capacity expected to add \$1M in sales



# CASE STUDY #3

**Assessment Summary:**

**Key Lean Opportunities**

**\$201,600+ Savings  
+ Future \$1M Sales**

# CASE STUDY #3

## Assessment Summary:

### Energy Savings Opportunities

- Lighting – occ. sensors
- Compressed Air – leak detection & repair
- HVAC – programmable thermostats



# CASE STUDY #3

**Assessment Summary:**

**Energy Savings Opportunities**

**\$6,200+ Annual Savings**  
**12% Reduction!**

# CASE STUDY #3

## Assessment Summary:

### W.A.S.T.E. Stream Opportunities

**Water**



**Air**



**Solid**



**Toxicity**  
**Chemical**



**Energy**



- Change plant layout to lower propane usage
  - **\$69k** in annual savings
  - Reduced combustion of Propane in lift trucks: **12,173 lbs** annually
  - GHG emissions reduced by 36,461 lbs every year!
  - Improved safety with fewer lift trucks operating, and less hazardous materials and waste generation.
- Reduce tipping fees by recycling cardboard, plastic, etc.
  - HDPE recycling generating **\$3-5k in new revenue!**
  - Better policies reduced metal **scrap 20%**
  - **7,000 lbs less** metal purchased!
- Exploring changing welding wire to reduce manganese emissions

# CASE STUDY #3

## Assessment Summary:

### W.A.S.T.E. Stream Opportunities

- Switch to water based paint
  - Reduction in time required to comply with SQG regulations: 62 hours (\$930)
  - Cost savings in switching to **water-based paint: \$26,500** annually
  - Eliminate VOC emissions from 14,400 gallons of oil based paint: 9,216 pounds
  - Eliminate purchase and use of: 156 gallons of acetone & 70 gallons of xylene (\$4,165)
  - Reduction in **hazardous waste generation: 5,400 pounds** annually (\$2,970)
- Reduce water use in wash (20,000 gal/yr)
  - Reduction in potable water use: 13,700 gallons annually (\$1,370)



# CASE STUDY #3

## **Assessment Summary:**

### **W.A.S.T.E. Stream Opportunities**

**\$108,800+**  
**annual savings**

# CASE STUDY #3

## Assessment Summary:

### Greenhouse Gas Emissions Opportunities

- Current GHG emissions = 451.4 Metric Tons of CO<sub>2</sub>-equivalent
- **Eliminate 62 Tons of CO<sub>2</sub>-eq annually**
- Increase energy efficiency via energy improvement projects
- Minimize burning of fossil fuels (e.g. propane lift trucks)
- Minimize transport distances fueled by natural gas, diesel, or other nonrenewable energy sources (including electricity generated by coal)
- Reduce use of oil-based paints and chemical thinners/cleaners

# CASE STUDY #3

## Assessment Summary:

### Greenhouse Gas Emissions SAVINGS

The sum of the greenhouse gas emissions you entered above is of Carbon Dioxide Equivalent. This is equivalent to:

62 Metric Tons

#### Greenhouse gas emissions from



# SUMMARY



## Cumulative Assessment Summary:

- Key Lean Opportunities: **\$695,500** Savings
- Energy Savings Opportunities: **\$332,000** Savings
- W.A.S.T.E. Stream Opportunities: **\$514,300** Savings
- Greenhouse Gas Emissions Reductions: **18,216 Tons** CO<sub>2</sub>-Eq

# CONCLUSION

**For more information, please contact:**

**Kelly Weger, RA, LEED AP**

**Lead Project Manager - Sustainability**

**[weger@purdue.edu](mailto:weger@purdue.edu)**

**734.320.5908**