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# Creating Value through Sustainable Manufacturing

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# Sustainable Manufacturing for Mid-Sized Manufacturers

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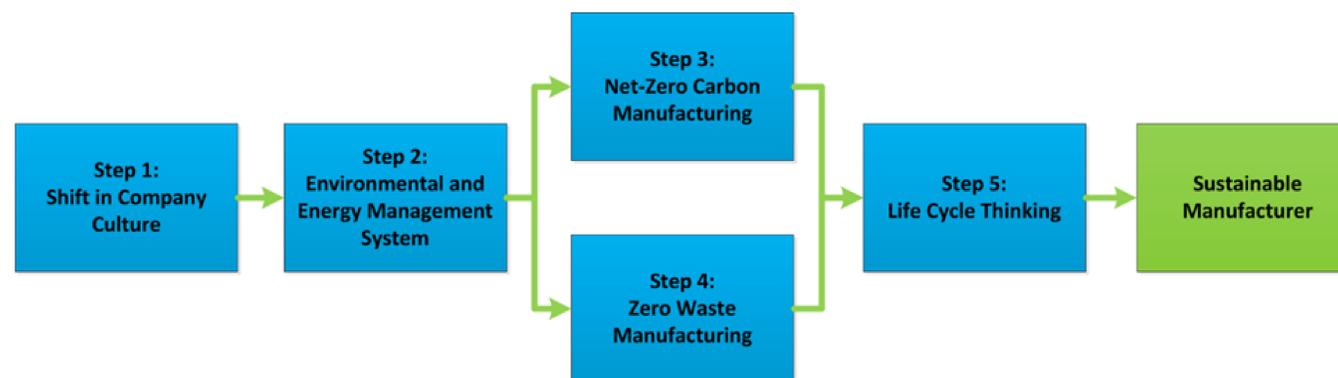
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**Research Objectives:** To define sustainable manufacturing for mid-sized manufacturers and develop a framework to facilitate the transition from business as usual to sustainable manufacturing.

## Motivation

- Industrial manufacturing is responsible for 30% of greenhouse gas emissions in the United States
- UD-IAC has conducted 950+ energy assessments and is looking to expand its services



## Case Study UD 0941



## Sustainable Manufacturing

- The transformation of Earth's resources into valuable goods and services, while cultivating a greater quality of life and safeguarding our environment

### 1. Company Culture

- Ford Motor Company at Dearborn reduced heating and cooling loads by 5% by installing a green roof, which also improves air quality, increases wildlife habitation, reduces urban heat effect, and reduces storm water runoff
- Melink Corporation incentivizes employees to purchase electric cars

### 4. Zero Waste Manufacturing

- Zero Waste International Alliance allows for 10% to go to landfill
- UD-IAC developed the Material Efficiency Guidebook to easily and consistently identify savings

Resources/Principles	Raw materials	Water	Chemical Agents	Process Scrap	Packaging	Equipment
Reduce						
Reuse						
Remanufacture						
Recycle						
Redesign						
By-product synergy						
Waste to energy						

### 2. Management Systems

- The Plan-Do-Check-Act (PDCA) cycle establishes a process for manufacturers to achieve their goals

### 3. Zero Carbon Manufacturing

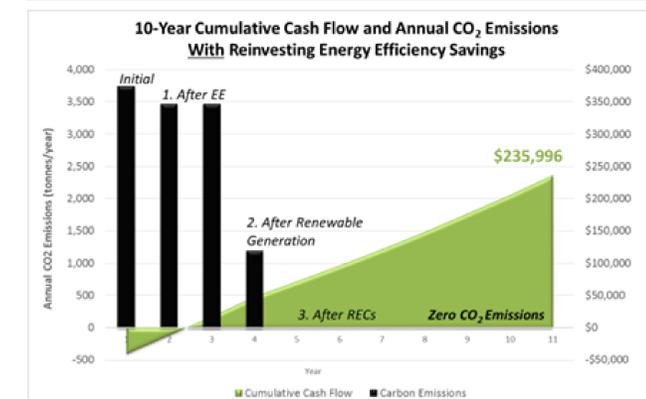
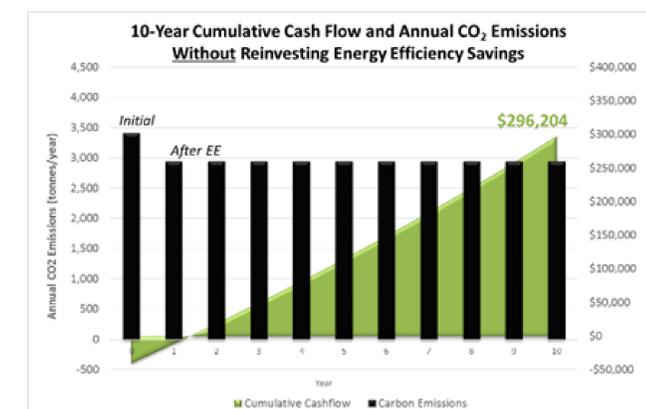
- An energy-efficient manufacturing facility where the actual CO<sub>2</sub> emitted is less than or equal to the CO<sub>2</sub> offset

### 5. LCA - Truck Manufacturer

- About 92% of lifecycle energy is consumed in the combined use and fuel cycle
- Production and assembly account for 7% and 1% of energy use
- Greatest gains are from improving product (rather than process) efficiency

## Roppe Case Study

- Roppe Corporation: "We're not just committed to making better products—we're dedicated to making a positive impact on the environment as well"
- Roppe has begun to meet their goals by hiring a sustainability manager, performing product LCA, continuously improving resource efficiency, and reinvesting in their community through scholarships funded by recycling efforts
- A couple months after a UD-IAC audit, Roppe has implemented more than half of the assessment recommendations



## Conclusion

- Ultimately, sustainable manufacturing is not about limiting growth and living in austerity, but producing goods and services that create abundance and prosperity