

# Engineering Business Assistance Pollution Prevention (P2) Program

NEW MEXICO STATE UNIVERSITY

Jalal Rastegary

College of Engineering

Engineering New Mexico Resource Network



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**New Mexico State University**

# Engineering Business Assistance Programs

Pollution Prevention  
(P2 Program)

Environment, Energy, Economy  
(E3 Program also known Lean  
and Green)



United States  
Department of  
Agriculture



THE BORDERPLEX ALLIANCE



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NMRC  
NEW MEXICO RECYCLING COALITION



Energy, Minerals and Natural Resources Department

Office of Outreach and  
Recruitment



EPA



EDD  
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DEPARTMENT



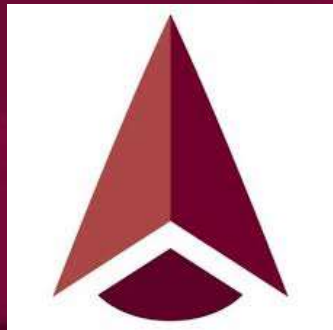
new mexico manufacturing  
extension  
partnership  
MEP



TRI-STATE



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## Other State Partners



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# What is P2?

- Any practice to Reduce, Eliminate, or Prevent pollution at its source
- Source reduction: Ounce-of-prevention approach to waste management
- Reducing pollution: Means less waste to control, treat, or dispose of.
- Less pollution: Means fewer hazards posed to public health and the environment, and less liability for the businesses



# Defining Lean

“A systematic approach to identifying and eliminating **waste (non-value added activities)** through continuous improvement by flowing the product at the pull of the customer in pursuit of perfection”

—The MEP lean network



# Defining Green

- A systematic approach to eliminating waste by optimizing use and selection of resources and technologies while lessening the impact on the environment
- Conserving natural resources
- Reducing carbon footprint
- Pollution Prevention (“P2”)
- Refuse, reduce, reuse, recycle (4Rs)
- Adopt renewable energy sources
- Energy conservation to reduce energy use and costs
- Consider “green” as an investment in the future



# Combining Lean & Green Manufacturing

## "Lean" Eliminates...

- **D**efects
- **O**verproduction
- **W**aiting
- **N**on-utilized resources
- **T**ransportation
- **I**nventory
- **M**otion
- **E**xtra processing

## "Green" adds...

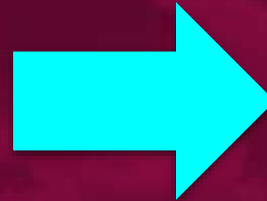
- **F**ull use of Raw Material
- **E**nergy Efficiency
- **W**ater conservation
- **E**liminating Toxic Material
- **R**eduction of:
  - Packaging Wastes
  - Emissions to Air and water
  - Solid & Hazardous Wastes
  - Regulatory obligations and risks



# Move from Reactive to Proactive

## Current Emphasis

- Pollution Cleanup
  - Waste Disposal (Bury or Burn)
  - Protecting Species
  - Environmental Degradation
  - Increased resource use
  - Population Growth
- Depleting and degrading natural capital



## Sustainability Emphasis

- Pollution Prevention (Cleaner Production)
- Waste Prevention and Reduction
- Protecting where species live (Habitat Protection)
- Environmental Restoration
- Less Wasteful (More Efficient) Resource Use
- Population stabilization by decreasing birth rates
- Protecting natural capital and living off the biological interest it provides

# Solid Waste Streams

- Paper
- Glass
- Metal
- Plastic
- Electronics
- Organic
- Construction/Demolition
- Hazardous
- Special/universal



# How is Solid Waste Managed?

- **Reduction** - reuse of materials and designing products to be reusable.
- **Recycling** - diverting resources from waste streams to recover or reuse the material.
- **Incineration** - burning of waste material to convert waste materials into heat, gas, steam and ash.
- **Energy recovery** – harnessing the energy content of waste products directly by using them as a combustion fuel, or indirectly by processing them into another type of fuel.
- **Landfill** - burying waste which is normally compacted first.

# Reduce

*Waste Reduction* requires looking at the source of the waste to determine how it can be minimized by:

- Purchasing durable, long-lasting goods;
- Seeking products and packaging that are free of toxins;
- Redesigning products to:
  - Use less raw material in production
  - Have a longer life
  - Be re-used



# Reuse with Waste Exchange

Recovering the output of one waste stream to use as input for a manufacturing process.

Examples:

- Recovered glass in roadway asphalt (glassphalt).
- Recovered plastic in carpeting, park benches, and pedestrian bridges.



# Recycling Process

- Diverting recyclable materials that would otherwise be considered waste;
- Sorting and processing recyclables into raw materials such as fibers;
- Manufacturing these raw materials into new products;
- Purchasing recycled products completes the recycling loop.



# 3R's in Manufacturing

3rs can be used in all phases of manufacturing:

- Purchasing recycled-content materials and components wherever feasible;
- Use and reuse a variety of materials within production, assembly and packaging;
- Create secondary markets with usable by-products generated from waste streams.



# Environmental Metrics

- Energy Use
- Air Emissions
- Material Use
- Hazardous Waste Generation
- Chemical Use
- Solid Waste Generation
- Water Use
- Wastewater Discharges



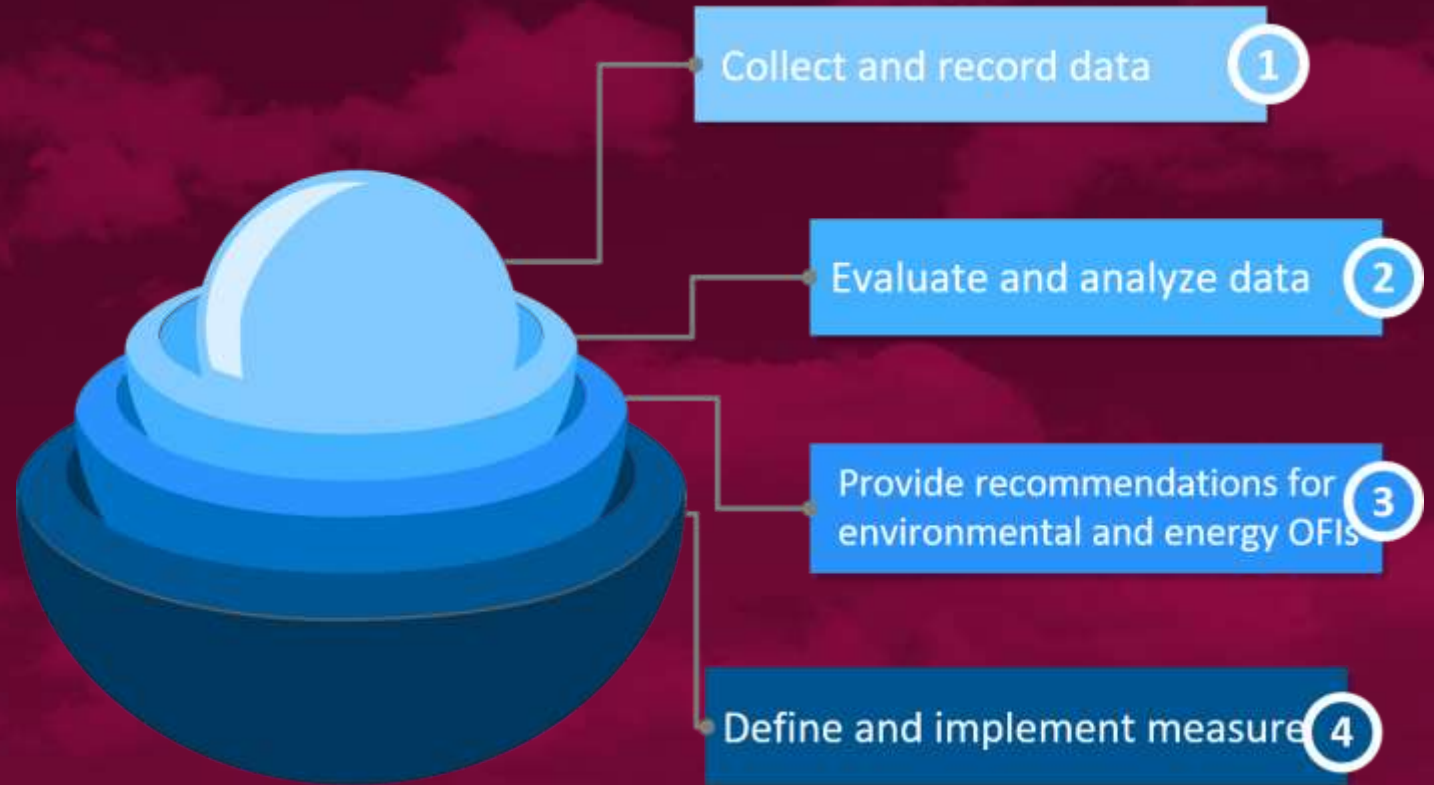


# WHAT DO WE DO?

An on-site P2 assessment includes P2 and energy-efficiency audit & P2/E2 feedback report with recommendations

## During the Assessment

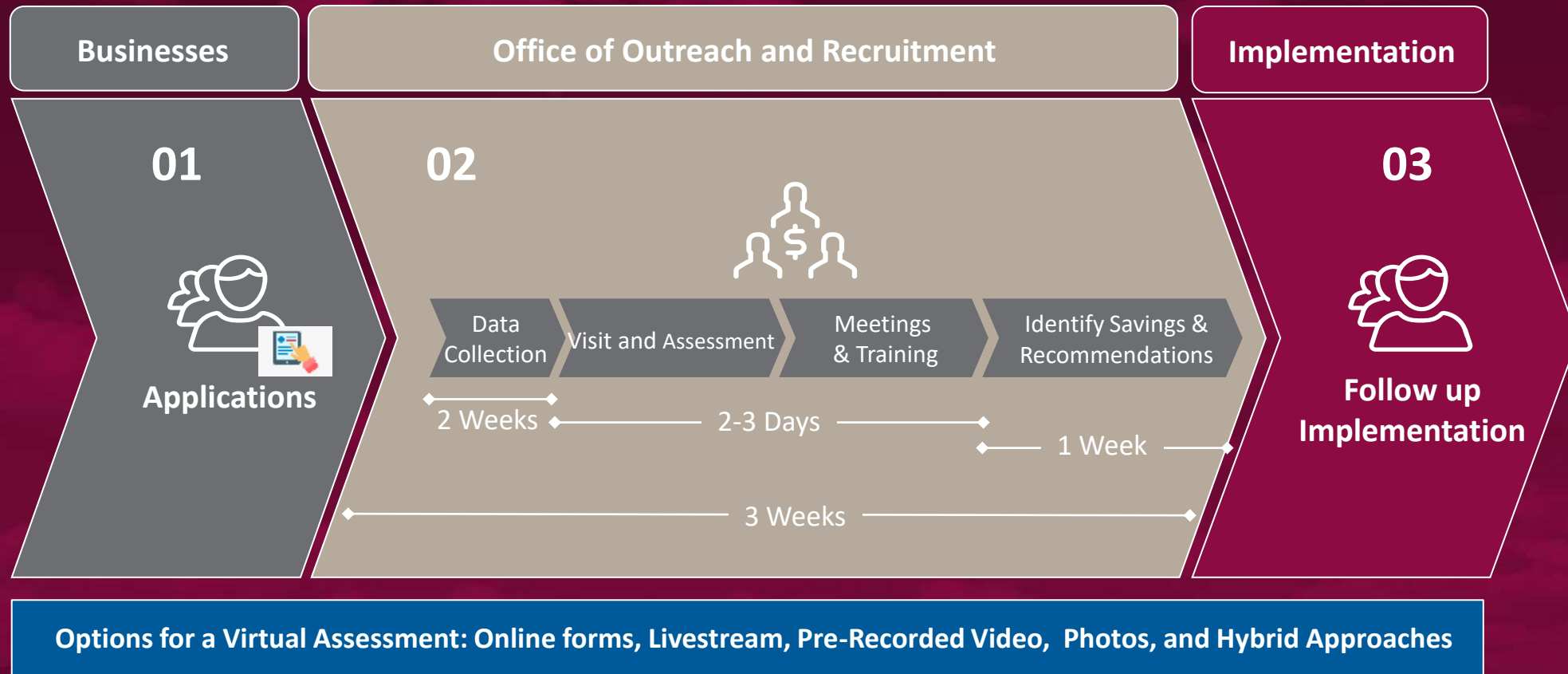
- Employs an Assessment Process that Moved Smoothly from Identifying Opportunities to Implementing Them
- Ensures that identified opportunities are understood by the owners
- Discuss next steps to increase implementation
- Obtain management review of feedback report



# WHAT DO WE DO?

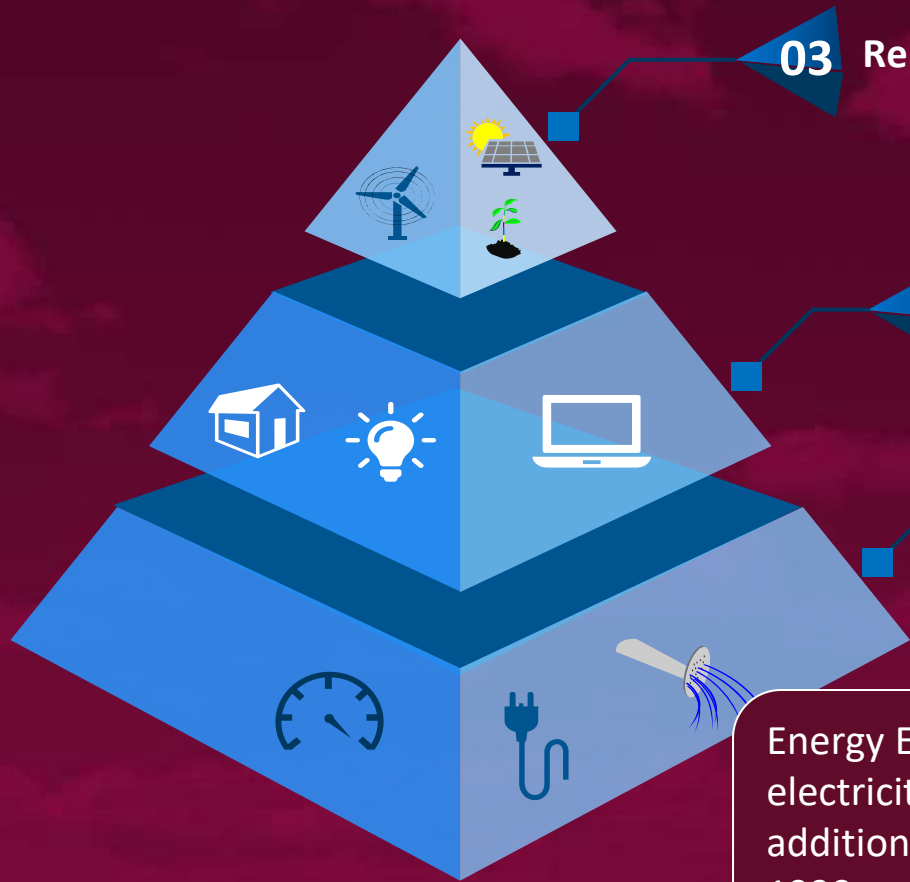
On-site P2 / E3 assessments for pollution prevention and energy-efficiency for businesses

- Assessment Process focused on identifying operational efficiencies using business-specific data and delivery of customized report with recommendations for adoption.
- Meet with business management team to review recommendations and discuss steps for implementation.
- Obtain management review of feedback report
- Conduct 6-month post-assessment follow-up.



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# Conducting Energy Audit to find OFI for Energy Saving



## 03 Renewable Energy

- Solar power
- Wind Power
- Geothermal Power
- Biomass Energy

## 02 Energy Efficiency

- Using energy more wisely or efficiently using technology that requires less energy to perform same function

## 01 Energy Conservation

- By saving or using less energy
- by changing energy wasting habit and lifestyles

Energy Efficiency could provide one-third of total expected electricity generation needs by 2030 avoiding the need for an additional 487 large power plants. Combined with the gains since 1990, savings could amount to an output of 800 power plant by 2030 (ACEEE)

Lighting

Building /Construction

Heating & Cooling

Energy Star Equipment

Fuel efficiency

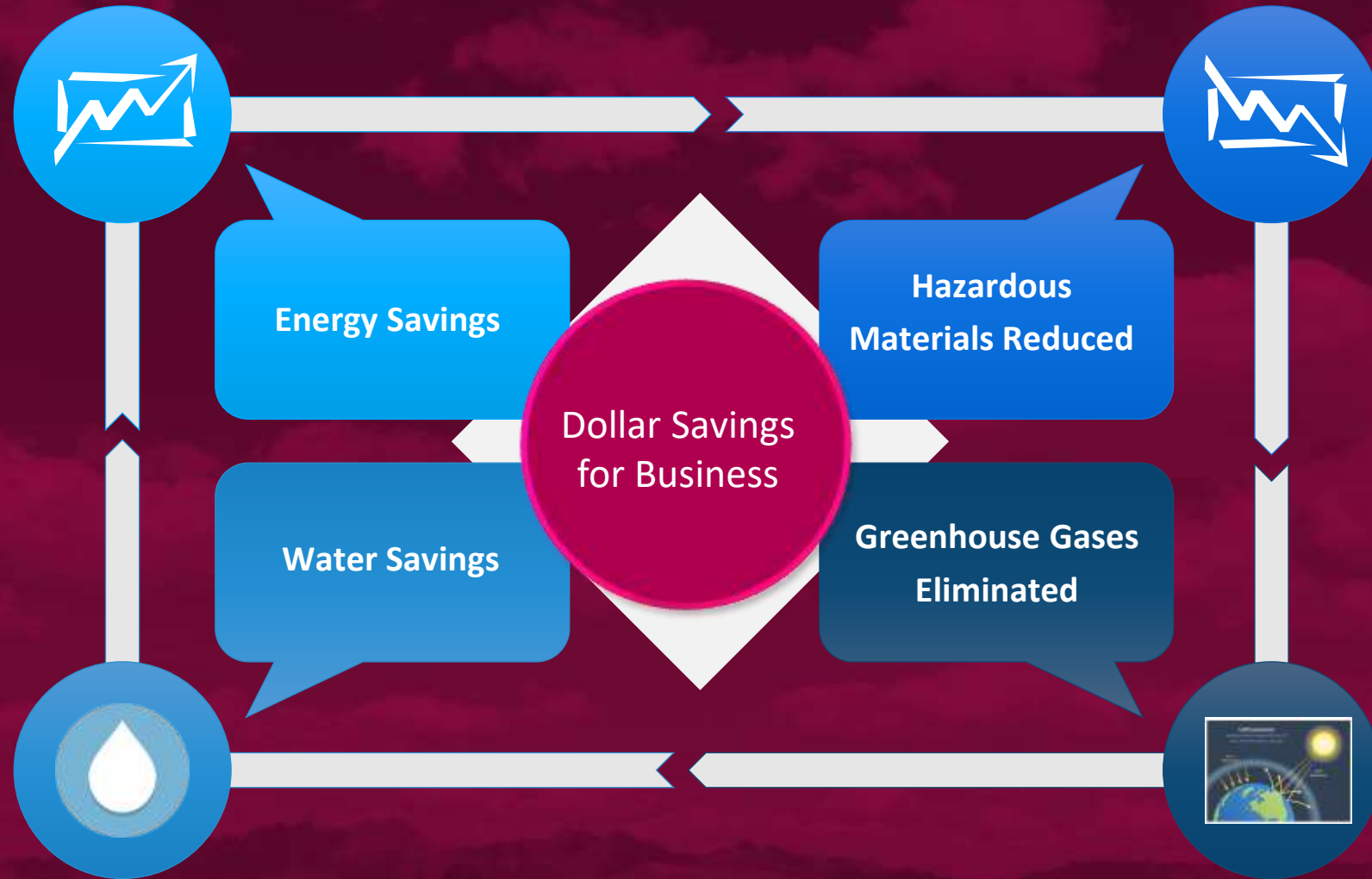
HVAC Ventilation

Automated Controls

Refrigeration

Renewable Energy

# Assessment Results Presentation



# Implementation Follow up and Resource Availability

## Recommendations for No-Cost Savings

- Process improvements
- Operational maintain
- Employee training

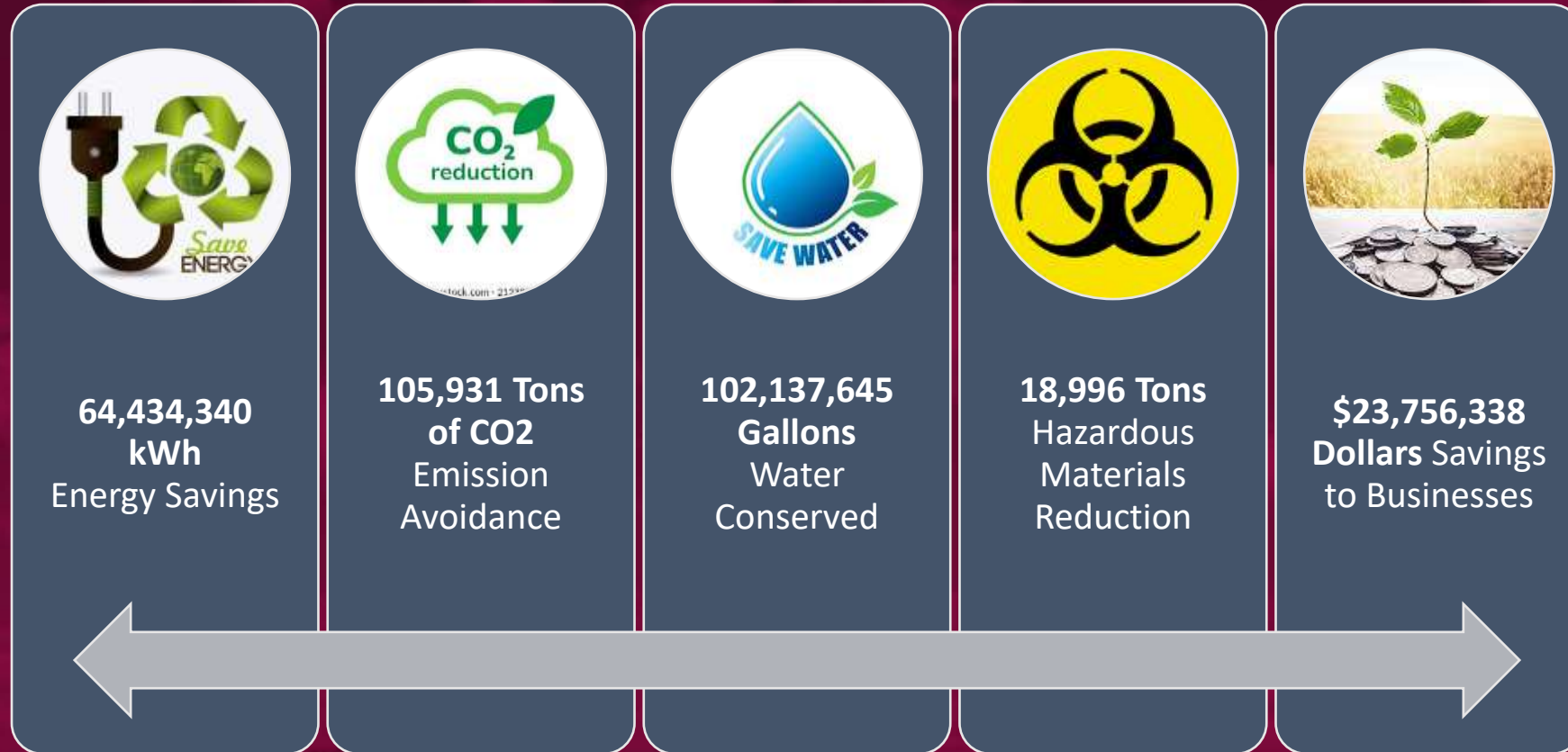
## Recommendations for Strategic Investments

- Equipment upgrades
- Facility renovation
- Facility layout and design
- Renewable energy integration

## Available Resources

- USDA Loans and Grants (REAP)
- Utility Companies Rebates
- Water Saving Incentive

# Program Impact Since 2015



# Thank you

Jalal Rastegary

Phone: 575 646 1510

<https://engrbusinessassistance.nmsu.edu/>

Email: rastegar@nmsu.edu



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