Kansas State University

How Kansas Wins With Sustainable Practices

Cris Brazil, PhD – Pollution Prevention Specialist

Pollution Prevention Institute

Pollution Prevention Institute (PPI)

- Since 1989
- K-State College of Engineering - Engineering Extension
- 100% grant-funded
- **Non-regulatory**

"The Pollution Prevention Institute's mission is to promote sustainability through environmental education and services to industry, institutions, and communities."

Small Business Environmental Assistance Program (SBEAP)

- Environmental compliance assistance (on-site, off-site)
- Small business focus (mostly under 100 employees)
- Free and confidential
- sbeap.org | 800-578-8898 | sbeap@ksu.edu

Pollution Prevention (P2) Program

- Technical assistance
  - Any size industry
- Internship program
- Workshops, seminars, and educational materials to spread P2 awareness

Why Sustainability matters to Small Businesses

- Cost savings and efficiency
- Regulatory compliance and liability reduction
- Brand reputation
- Employee attraction and retention
- Access to funding and incentives
- Long-term business resilience

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What Sustainability Means for Your Business?

Ask Yourself:

- What environmental impacts does my business have? (Energy use, waste, emissions, water consumption, etc.)
- What sustainability trends are affecting my industry?
- How do sustainability efforts align with my business values and long-term success?

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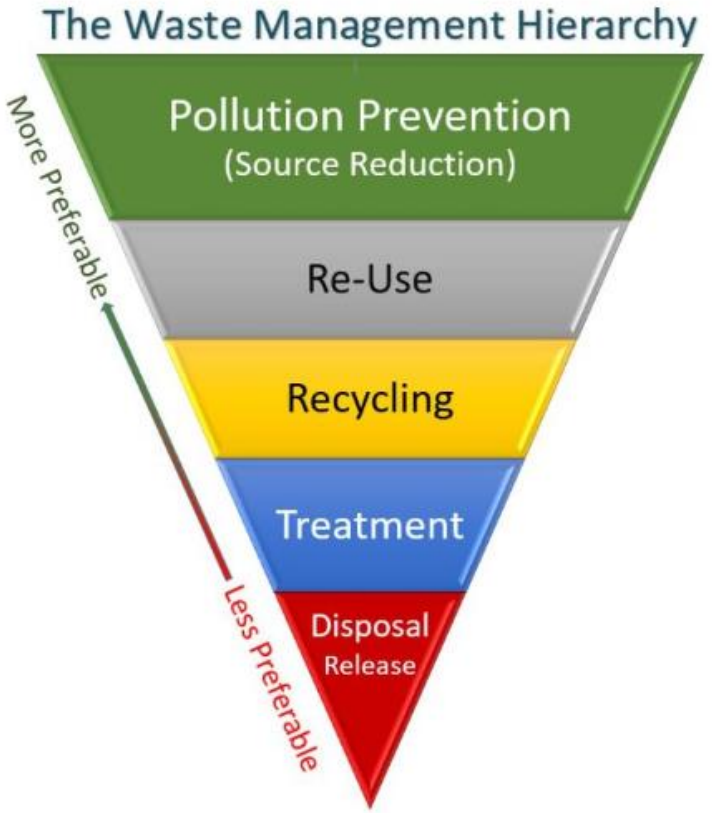
Pollution Prevention or P2

- Reducing or eliminating waste and pollution at the source
- Prior to treating or disposing of it

Change the material
Change the process
Change the technology



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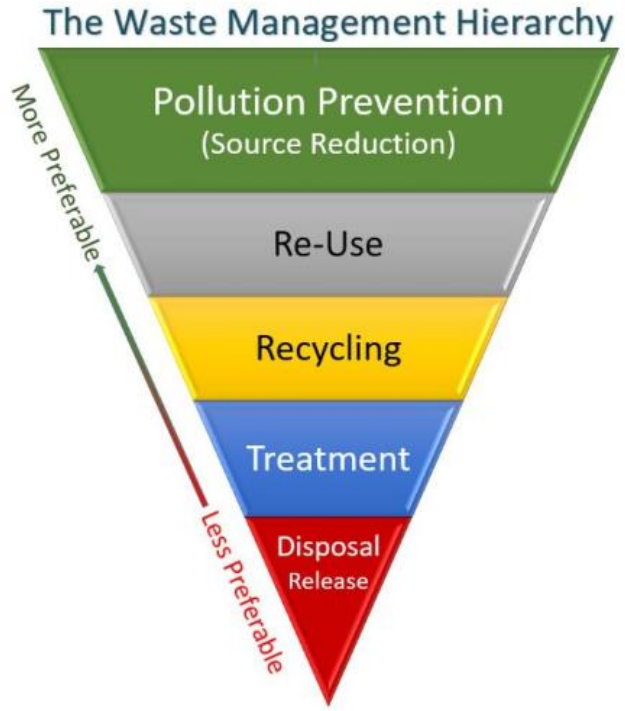
Where money hides

- The 4 big buckets:
  - Energy
  - Water
  - Materials/Chemicals
  - Compliance/Risk
- P2 practices can help!



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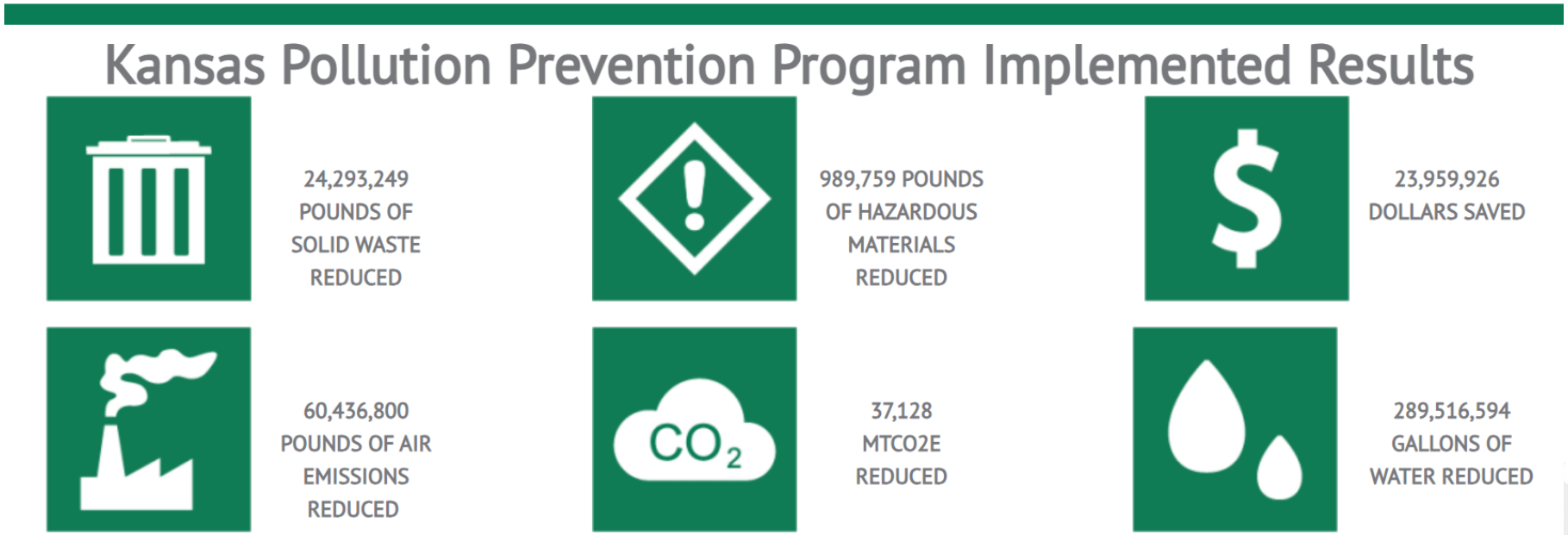
Impact

- 900+ projects
- Over $23 Million saved out of $94 Million from recommended projects
- 2025 Symposium presentations and case summaries available soon on our website



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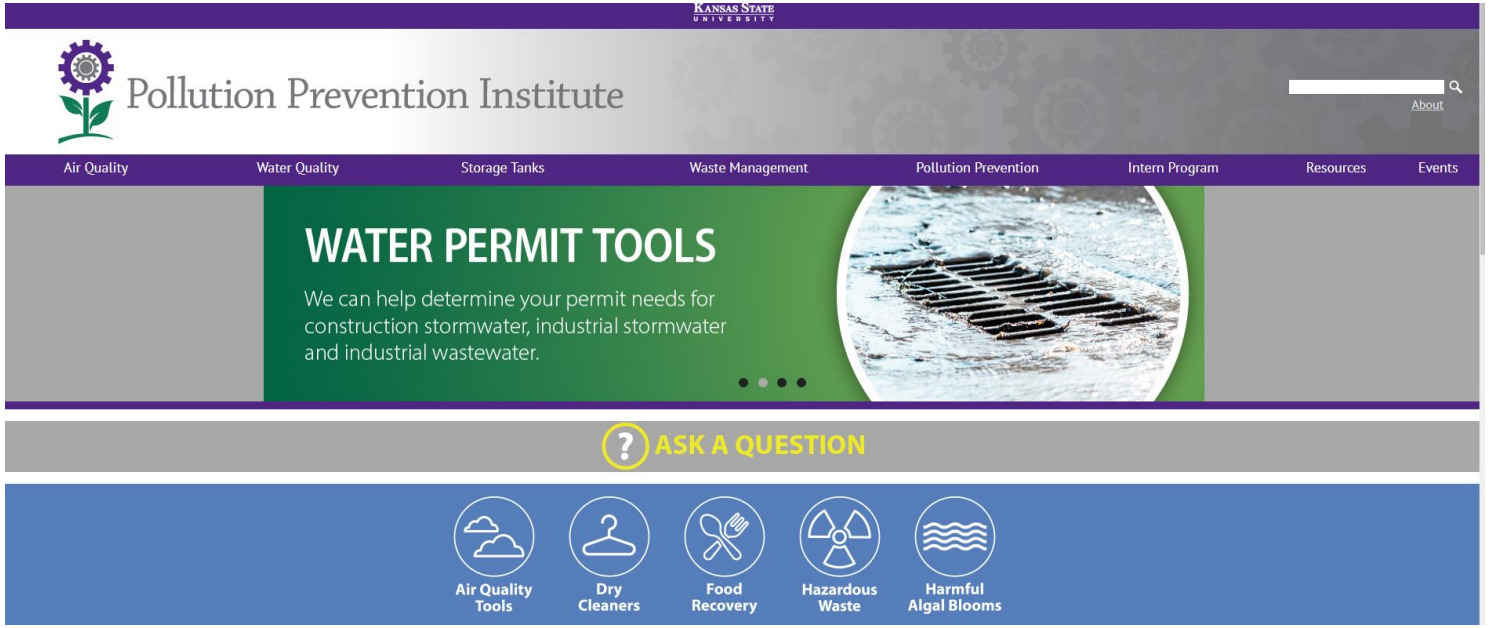
Resources

- www.sbeap.org
- Kansas Energy Program
- Radon Program
- KSU Technical Assistance to Brownfields (TAB)



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Our website

- Air quality
- Water quality
- Storage tanks
- Waste management
- Pollution Prevention
- Intern Program
- Resources
- Events

Register to receive our monthly newsletter!

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Intern case summaries

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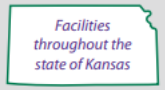
CIRCUIT RIDER

Intern: Remy Evans
Major: Biological systems engineering and environmental engineering
School: Kansas State University

Company background
The Kansas State University Pollution Prevention Institute, or PPI, 2024 circuit rider intern worked with six different facilities to reduce their energy use, identify compressed air leaks and assess chemical use. These facilities spanned various industries, including metal fabricating and finishing, IBC tote cleaning, and centralized mail delivery manufacturing.



Project background
A site visit to each company was scheduled and preliminary research was conducted to determine potential pollution prevention, or P2, projects. On-site visits were conducted to identify, assess and research P2 opportunities. After each visit, a detailed P2 report summarizing the recommended projects and strategies with the idea of enhancing economic and environmental outcomes was delivered to the company.

Incentives to change
There are environmental, community and employee health benefits from implementing P2 projects. The most common environmental impact reduction methods are reducing energy and water usage. Reductions in these areas can also result in companies saving money. Additionally, there are sustainability goals in place at many companies to reduce their environmental impact by a specific deadline.

SUMMARY OF 2024 P2 CIRCUIT RIDER INTERN RECOMMENDATIONS

Project	Annual estimated environmental impact	Estimated cost savings ($/year)	Status
LED conversion	334,150 kWh	$28,056	Recommended
Compressed air audit	307,817 kWh	$43,277	Recommended
Solar panels	1,136,019 kWh	$74,161	Recommended
Solvent recycling	12,599 lbs VOCs	$15,588	Recommended
Water recycling	76,050 gallons water	$1,521	Recommended
Boiler replacement	11,699 MCF	$151,080	Implemented
Total[1]	**1,777,986 kWh 76,050 gallons water 11,699 MCF 12,599 lb VOCs**	**$314,623**	
GHG reductions[1,2]	**1,720 $MTCO_2e$**		

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REDGUARD

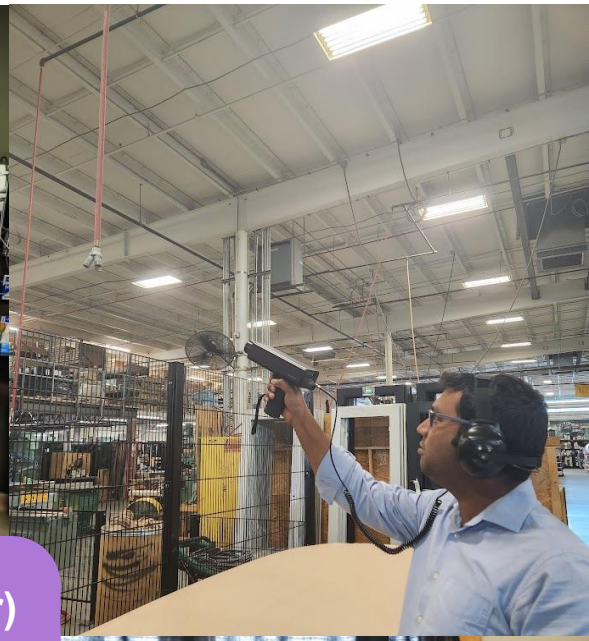
Intern: Franseira Maldonado Mundo
Major: Industrial systems and manufacturing engineering
School: Wichita State University

Company background
Redguard is part of the Lange group, founded in 1998 as a traditional portable storage and portable office unit provider in Wichita, Kansas. The Texas refinery explosion of 2005 showed the need for blast-resistant buildings. Redguard develops and manufactures blast-resistant units, which are sold to commercial and military customers locally and internationally with 30 locations across North America.

Incentives to change
Redguard had previously participated in the Pollution Prevention Institute summer internship program in 2019, 2022 and 2023. The company is pursuing pollution prevention because they want to reduce overall operation costs, reduce environmental impact and show environmental commitment. Redguard's clients have asked about its carbon footprint, and the company wants to show a positive environmental image. Redguard wants to communicate the projects in its departmental newsletter, the facility tours for related businesses, articles in the association newsletter and presentations to association meetings, workshops and conferences.

SUMMARY OF 2024 INTERN RECOMMENDATIONS

Project	Annual estimated environmental impact	Estimated cost savings ($/year)	Status
Powder coat	2,956 lbs. of MEK 12,715 lbs. of VOC 1,026 lbs. of HAP	$98,451	Recommended
Lighting exchange	236,782 kWh 253 $MTCO_2e$	$24,554	In progress – 33 %
Water consumption reduction	526,100 gallons of water 77,920 kWh, 78 $MTCO_2e$	$10,823	Recommended
Solar panels	5,733 kWh 5 $MTCO_2e$	$32,722	Recommended
Solar panel water pump	5,733 kWh 5 $MTCO_2e$	$596	Not recommended
Total[2]	**2,956 lbs. of MEK 12,689 lbs. of VOC 1,026 lbs. of HAP 629,333 kWh 526,100 gallons of water**	**$167,146**	
GHG reductions[1,2]	**527 metric tons CO_2e**		



CE-690 - Industrial environmental sustainability course (1 credit-hour)

January 13-14, 2026: 9 a.m. – 3 p.m.

January 15, 2026: 9 a. m. – 11:30 a.m.

K-State Innovation Center, 2005 Research Park Circle, Manhattan

SBEAP air resources

sbeap.org/air-quality

Potential to Emit Calculation Spreadsheets

Access PTE tools (in Microsoft Excel format) designed to assist your facility in estimating its PTE from various operations including the following:

- Abrasive blasting
- Air curtain incinerators
- Boilers and furnaces
- Engines
- Grain elevators
- Hemp processing
- Painting and coating
- Plasma/laser cutting
- Welding

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Kansas air regulations

KANSAS SBEAP

Five steps to determine whether your facility needs an air permit.

The 1970 Clean Air Act (CAA) set national ambient air quality standards (NAAQS) for six "criteria" pollutants – sulfur dioxide (SO_2), nitrous oxides (NOx), carbon monoxide (CO), particulate matter (PM), lead (Pb), and ozone (regulated as volatile organic compounds or VOC). The CAA was amended in 1977 to authorize EPA standards for "prevention of significant deterioration" (PSD) to maintain good air quality where it already existed. Further amendments to the CAA in 1990 added, among other things, a program to regulate a list of 187 hazardous air pollutants (HAPs) called maximum achievable control technology (MACT) standards and Title V permits (also known in Kansas as Class I permits). Because the need for permits is based on a facility's potential emissions of either criteria or hazardous air pollutants, or both, many small businesses were required to obtain some type of operating permit. Although EPA has the regulatory authority for air permitting, it can delegate the authority or approve a state implementation plan giving authority to individual states. EPA has approved Kansas' air permitting SIP and thus has transferred air permitting authority here to the state. Consequently, the state of Kansas has the authority to issue permits for facilities within its borders.

Air operating permits

Two main types of permits are issued under the Kansas Air Quality Act – construction permits and operating permits. Construction permits are applicable to **projects** (new emission units and/or modification of existing emission units) and operating permits are applicable to the **entire facility**. In other words, for construction permits/approvals, the facility would be required to evaluate the increase in potential to emit (PTE) and applicable requirements for the project only. For operating permits, the facility would be required to evaluate the PTE and applicable requirements for the entire facility.

New or existing facilities that add new emission sources or modify existing emission sources of air pollutants (e.g., a new paint booth or a new natural gas oven), must evaluate these new or modified emission sources to determine whether they need a **construction permit** or **approval**. During preconstruction review, the Kansas Department of Health and Environment (KDHE), Bureau of Air (BOA) ensures that proposed construction projects at new and existing facilities can meet applicable Kansas and federal air quality requirements. A construction permit or approval is required BEFORE a facility can install and operate a new source or modify an existing source of air pollutants.

The second type of permit – a **Class I or II air operating permit** – is required for major sources of air pollutants. A major source is defined as a facility with the potential to annually emit –

- 10 tons or more of any HAP;
- 25 tons or more of any combination of HAPs; or
- 100 tons or more of any other regulated air pollutant including SO_2, NOx, CO, PM_{10}, Pb, and VOC.

Air regulations can be complex and confusing to many business owners, particularly small business owners who frequently do not have the same resources to devote to environmental compliance as larger businesses do. Consequently, the Kansas Small Business Environmental Assistance Program (SBEAP), in conjunction with KDHE BOA has developed this fact sheet to describe in **five steps** how to determine whether your facility requires an air construction approval or permit, or an air operating permit.

Step 1: List all air pollution-emitting equipment or operations (emission unit or source) in your facility.

As defined by Kansas Administrative Regulation (KAR) 28-19-200(x), an emission source is "[a]ny machine, equipment, device, or other article or operation that directly or indirectly releases contaminants into the outdoor atmosphere." So, an emission source can be a

February 2021 **Pollution Prevention Institute**

SBEAP hazardous waste resources

sbeap.org/waste-management/hazardous-waste

Course: Kansas Hazardous Waste Handler Training

This online course was designed in partnership with the Kansas Department of Health and Environment (KDHE) to assist businesses and industries in meeting employee training responsibilities as required by **Kansas Administrative Regulations** (KAR).

Container management training video

Container management violations are some of the most frequently cited violations by Kansas inspectors. Watch this short video to learn how you can ensure the containers at your facility are managed in compliance with the requirement. You can also download the KDHE technical guidance document on container management

Hazardous waste determinations video

In this video, PPI's Nancy Larson walks you through hazardous waste determinations, how to document them and what to do if a waste is unknown.

Facility name_____

EPA I.D. #_____ Generator category_____

SBEAP water resources

sbeap.org/water-quality

Construction Stormwater Permit Tool

Construction activities that disturb one acre of land, either by itself or as part of a larger development need a Construction Stormwater Permit. All application and Notice of Intent forms must be submitted in KEIMS.

PROCEED TO EVALUATE YOUR CONSTRUCTION STORMWATER PERMIT NEEDS

Industrial Stormwater Permit Tool

Facilities in specific industries that store materials, waste or equipment outdoors are subject to industrial stormwater regulations administered by KDHE's Industrial Stormwater Program. These facilities must monitor and manage stormwater on their properties where stormwater may come into contact with harmful pollutants including toxic metals, oil, grease, de-icing salts and other chemicals. All application and Notice of Intent forms must be submitted in KEIMS.

PROCEED TO EVALUATE YOUR INDUSTRIAL STORMWATER PERMIT NEEDS

Industrial Wastewater Permit Tool

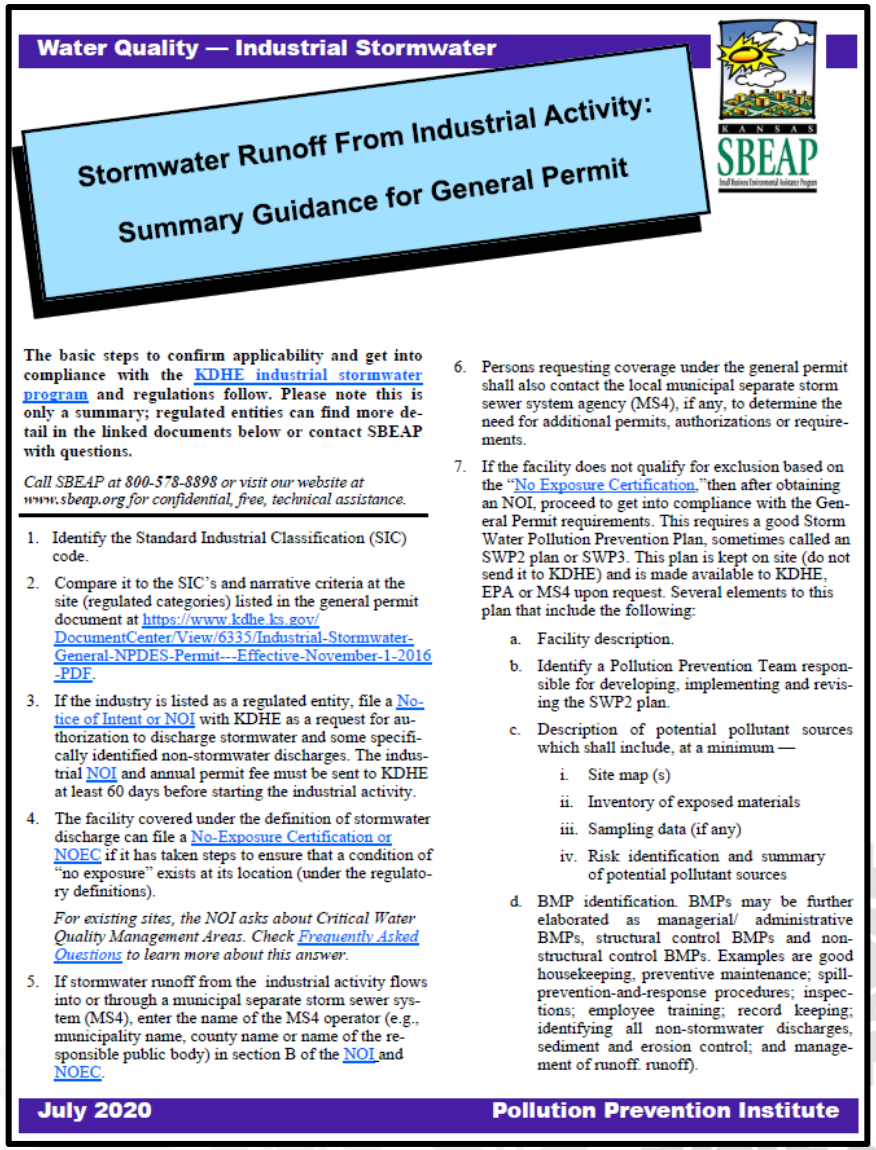
Industrial wastewater is generated by businesses through industrial processes. Some common examples include water used in cleaning parts, products or floors; cooling water; water mixed with oils or chemicals; water from butcher operations; and power washing water. Proper handling of industrial wastewater may require approvals and permits from KDHE BOW's Industrial Program Unit and your local sanitary sewer authority.All application and Notice of Intent forms must be submitted in KEIMS.

PROCEED TO EVALUATE YOUR INDUSTRIAL WASTEWATER PERMIT NEEDS

Septic Tank

Currently, there is no online tool for wastewater management, but the Local Environmental Protection Program (LEPP) helps local authorities develop plans to protect water quality. These plans includes county environmental codes focused on septic systems and wells, and also addresses broader issues like wastewater management, non point source pollution, landfill planning and public water supply protection. To learn more, visit KDHE's LEPP page. The EPA's SepticSmart programs educates homeowners about the proper system care and maintenance all year long. Proceed to SepticSmart educational materials.

LEARN MORE ABOUT WASTEWATER MANAGEMENT



Water Quality — Industrial Stormwater

KANSAS SBEAP

Stormwater Runoff From Industrial Activity: Summary Guidance for General Permit

The basic steps to confirm applicability and get into compliance with the KDHE industrial stormwater program and regulations follow. Please note this is only a summary; regulated entities can find more detail in the linked documents below or contact SBEAP with questions.

Call SBEAP at 800-578-8898 or visit our website at www.sbeap.org for confidential, free, technical assistance.

1. Identify the Standard Industrial Classification (SIC) code.
2. Compare it to the SIC's and narrative criteria at the site (regulated categories) listed in the general permit document at https://www.kdhe.ks.gov/DocumentCenter/View/6335/Industrial-Stormwater-General-NPDES-Permit---Effective-November-1-2016-PDF.
3. If the industry is listed as a regulated entity, file a Notice of Intent or NOI with KDHE as a request for authorization to discharge stormwater and some specifically identified non-stormwater discharges. The industrial NOI and annual permit fee must be sent to KDHE at least 60 days before starting the industrial activity.
4. The facility covered under the definition of stormwater discharge can file a No-Exposure Certification or NOEC if it has taken steps to ensure that a condition of "no exposure" exists at its location (under the regulatory definitions).

   For existing sites, the NOI asks about Critical Water Quality Management Areas. Check Frequently Asked Questions to learn more about this answer.
5. If stormwater runoff from the industrial activity flows into or through a municipal separate storm sewer system (MS4), enter the name of the MS4 operator (e.g., municipality name, county name or name of the responsible public body) in section B of the NOI and NOEC.
6. Persons requesting coverage under the general permit shall also contact the local municipal separate storm sewer system agency (MS4), if any, to determine the need for additional permits, authorizations or requirements.
7. If the facility does not qualify for exclusion based on the "No Exposure Certification," then after obtaining an NOI, proceed to get into compliance with the General Permit requirements. This requires a good Storm Water Pollution Prevention Plan, sometimes called an SWP2 plan or SWP3. This plan is kept on site (do not send it to KDHE) and is made available to KDHE, EPA or MS4 upon request. Several elements to this plan that include the following:
   a. Facility description.
   b. Identify a Pollution Prevention Team responsible for developing, implementing and revising the SWP2 plan.
   c. Description of potential pollutant sources which shall include, at a minimum —
      i. Site map (s)
      ii. Inventory of exposed materials
      iii. Sampling data (if any)
      iv. Risk identification and summary of potential pollutant sources
   d. BMP identification. BMPs may be further elaborated as managerial/ administrative BMPs, structural control BMPs and non-structural control BMPs. Examples are good housekeeping, preventive maintenance; spill-prevention-and-response procedures; inspections; employee training; record keeping; identifying all non-stormwater discharges, sediment and erosion control; and management of runoff. runoff).

July 2020 **Pollution Prevention Institute**

And what are some of those P2 practices?

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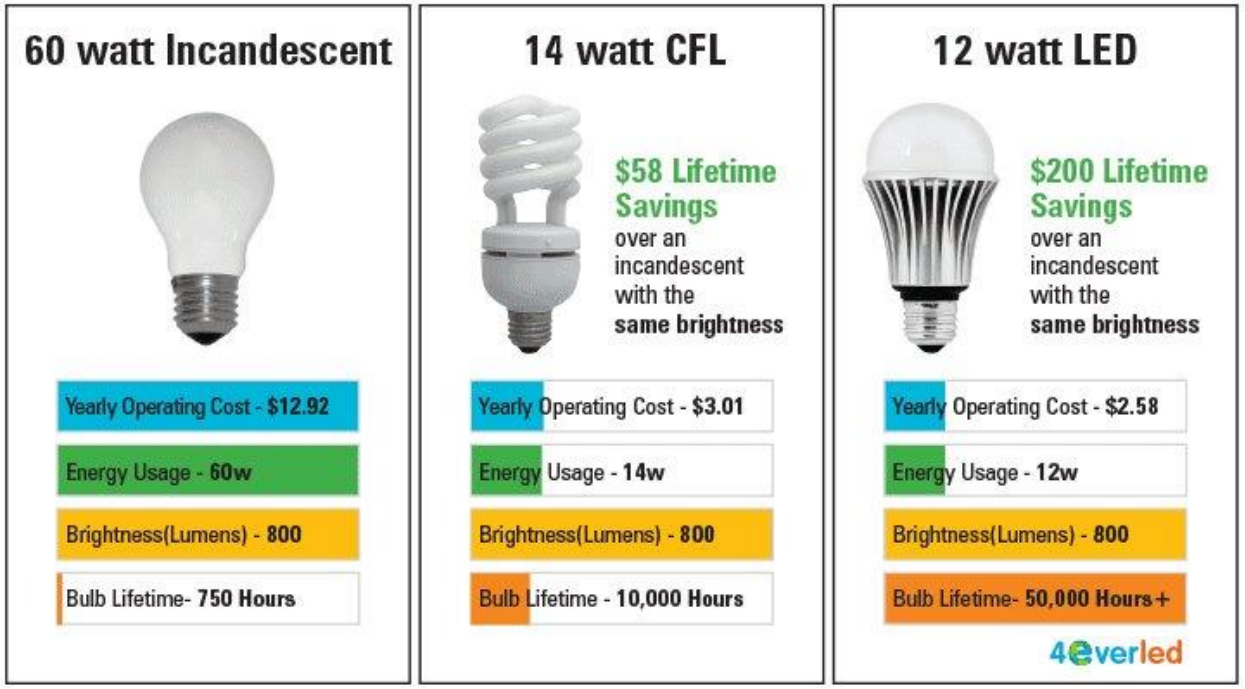
P2 ideas to reach your goals

- Energy efficiency
  - LED lighting
  - Lighting sensors
  - Thermostats
  - Energy audits
  - Solar panels
  - Energy efficient appliances
  - Building envelope



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Savings from switching to LEDs

SUMMARY OF 2024 P2 INTERN RECOMMENDATIONS			
Project	**Annual estimated environmental impact**	**Estimated cost savings ($/year)**	**Status**
Compressed air audit	436,545 kWh 423.1 $MTCO_2e$	$17,641	In Progress
Water conservation	651,469 kWh 3,145,517 gallons of water 631.4 $MTCO_2e$	$93,952	In Progress
Steam condensate reuse	531,222 kWh 14,788,876 gallons of water 514.9 $MTCO_2e$	$70,995	In Progress
LED lighting	299,628 kWh 290.4 $MTCO_2e$	$13,167	In Progress
Solar panel installation	91,361 kWh 88.6 $MTCO_2e$	$4,556	In Progress
Total	**2,010,225 kWh 17,934,393 gallons of water**	**$200,311**	
GHG reductions[1]	**1,948 $MTCO_2e$**		

[1]EPA P2 GHG Calculator with Cost, November, 2022

BIRLA CARBON

Intern: Kh M Asif Raihan
Major: Industrial and Manufacturing Systems Engineering
School: Kansas State University

OR

13,283 trees!!

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In this case:

Profit

Planet

People

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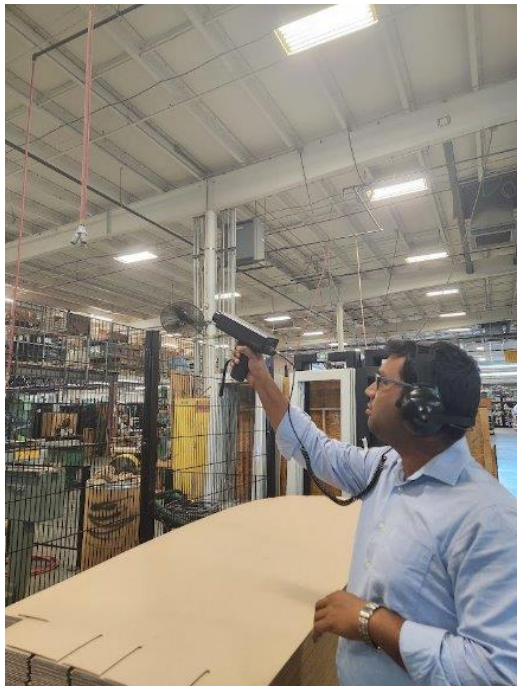
Energy Efficiency

- Motors – VFD
  - Reduced energy consumption
  - Prolonged equipment lifespan
  - Lower maintenance costs, heat
- Compressed Air Systems – Audits
  - Big energy hogs
  - Lower efficiency systems
- Boilers, ovens
  - Sizing, insulation, technology (electric vs gas)
- Heat recovery



PPI Intern using the ultrasonic leak detector

Boiler replacement case
Annual reduction:
11,699 MCF,
$151,080
Net reduction of 623 MTCO2e*
*Electric heaters generating 15 MTCO2e

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Air Leaks Cost $$

*Based on 100 PSI, $0.25 / CFM, 8760 hours / year

Electricity

1 leak of 1/16” diameter can cost $846.00 per year

A larger leak of 1/8” diameter can cost $3,389 per year

Waste

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Savings from Solar Panels

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BIRLA CARBON

Intern: Kh M Asif Raihan
Major: Industrial and Manufacturing Systems Engineering
School: Kansas State University

OR

4,217 trees!!

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Water Conservation – how?

- Reduce losses
  - Repair leaking faucets, toilets, nozzles, etc.
  - Repair leaks in pipes and steam systems
- Reduce use
  - Shut off processes when not in use
  - Install low-flow and automatic shut-off options
- Water reuse
  - Grey water as a pre-rinse in cleaning cycles
  - Grey water used in irrigation

Grey water is used water without toxic chemicals and/or excrement

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More P2 ideas to reach your goals

- Hazardous materials reduction
  - Look for safer chemical alternatives
  - Be more efficient with chemical usage
- Waste reduction
  - Durable goods
  - Composting
- Signage can go long ways!
- Assign responsibility for sustainability tasks to specific employees

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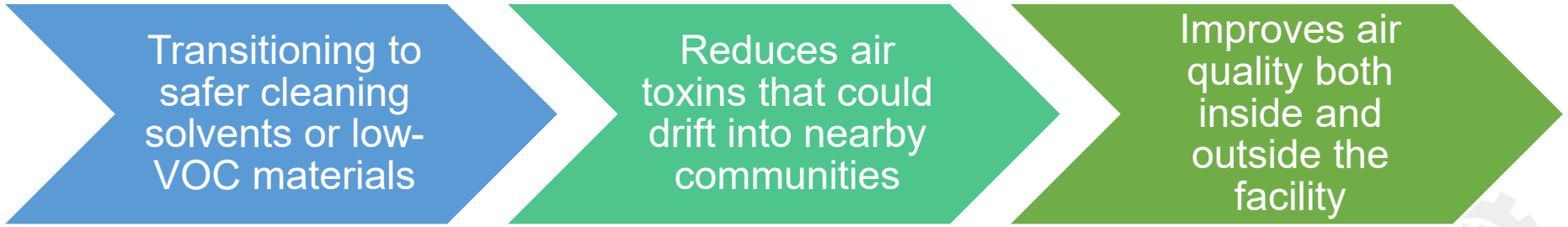
Cleaner Operations
=
Healthier Communities

- You can make choices - like using safer chemicals, improving waste management, and enhancing energy efficiency
  - That reduce pollutants and create healthier environments for nearby residents



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How much would be my payback period for a LED lighting project?

Do my space need a lighting sensor?

Should I get aerators?

How much am I paying per kWh?

Do my floor cleaning supplies contain hazardous chemicals? If yes, what could I replace them with?

What other P2 projects can I do?

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Key takeaways

- Sustainability is achievable for any size businesses
- Pollution Prevention (P2) is the best approach
- K-State PPI is here to help you!

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Thank you!

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1-Minute Feedback

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