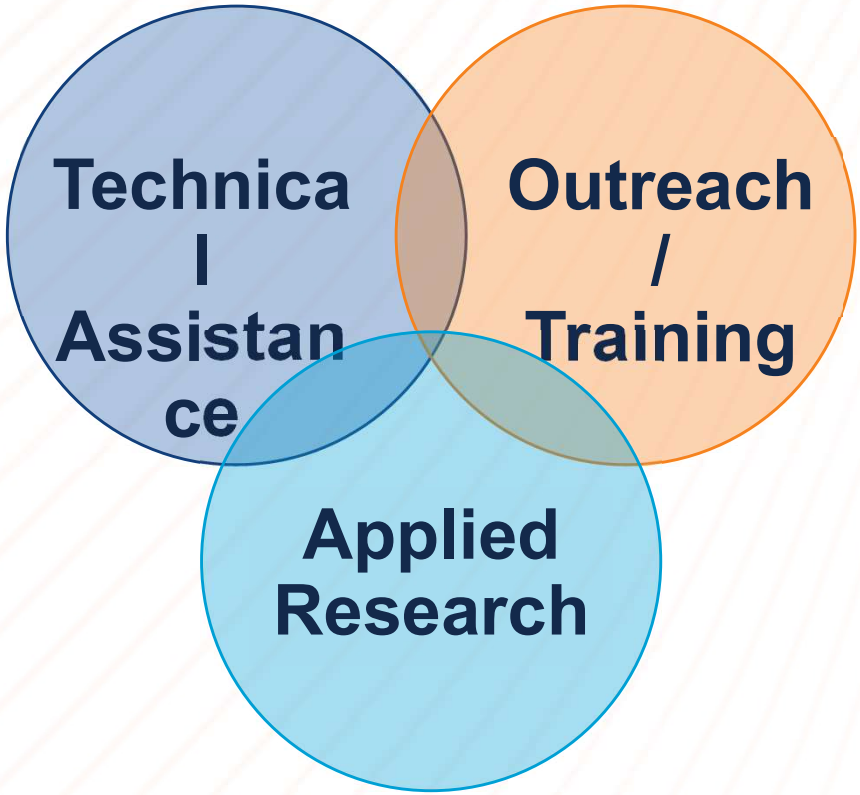
Illinois Sustainable Technology Center

Prairie Research Institute

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

ISTC Mission

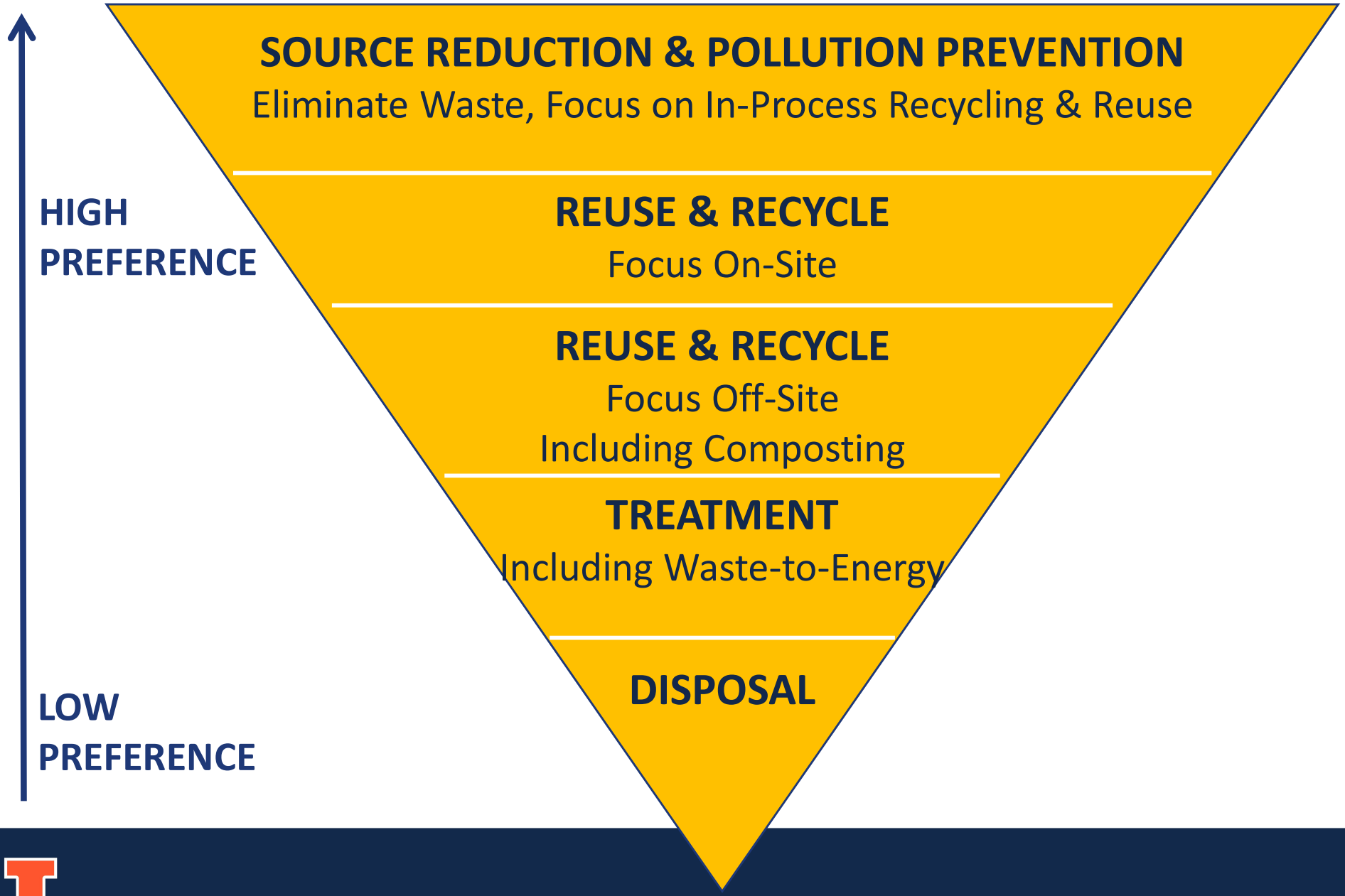
To encourage and assist citizens, businesses and government to prevent pollution, to conserve natural resources, and to reduce waste to protect human health and the environment in Illinois and beyond.



“If it can’t be reduced, reused, repaired, rebuilt, refurbished, refinished, resold, recycled or composted, then it should be restricted, redesigned or removed from production.”

Pete Seeger

Waste Management Hierarchy



“Waste isn’t waste until we waste it.”

will.i.am

ISTC's Technical Assistance Program (TAP) makes companies and communities more competitive and resilient with sustainable business practices, technologies, and solutions. TAP works at the intersection of industry, science, and government to help organizations achieve profitable, sustainable results.

Technical Assistance Process

Our Services

- Comprehensive Assessments
- Compliance Assistance
- Energy Efficiency
- Fostering Sustainable Behavior
- Implementation Assistance
- ISO 14000 Assistance
- Pollution Prevention (P2)
- Process Optimization
- Resilient Solutions (Climate Resiliency)
- Stakeholder Engagement & Education
- Supply Chain Sustainability
- Sustainability Planning
- Water Use Assessment & Benchmarking
- Water Testing & Auditing
- Waste Characterization & Management

Our Programs

- **Institutional Water Treatment** - Monitoring the condition of water using systems (boilers, cooling towers, chillers) to promote health, safety and efficiency through onsite and laboratory testing and analysis.

- **Renewable Energy Equipment Recover-Reuse** - Evaluate regional environmental and economic impacts on end-of-life equipment, model scenarios, and develop strategies to address effective recycling and repurposing of solar modules; utility-scale wind turbine blades; and energy storage and electric drive vehicle batteries at their end of useful life.

- **Public Water Infrastructure Plant Efficiency** - Illinois EPA's Office of Energy is teaming up with ISTC and Smart Energy Design Assistance Center (SEDAC) to help local municipalities reduce the cost of water and wastewater treatment. SEDAC and ISTC will provide free energy usage assessments to publicly-owned water treatment and wastewater treatment plants.

Our Programs

- **Water Efficiency and Conservation** - Focus on lasting change by employing water-saving demonstrations, pilot studies, and proven techniques that aid in adoptability, therefore increasing the likelihood of a permanent reduction in consumption and costs.

- **Zero Waste -** An approach to the way materials are handled through their entire life cycle. We provide a variety of cost-effective, sustainable material management services to assist clients with striving toward to achieve zero waste. Services include:

  - Enhanced Waste Audits
  - Waste Management Planning
  - Composting/Anaerobic Digestion
  - Stakeholder Engagement

ISTC Grant Programs

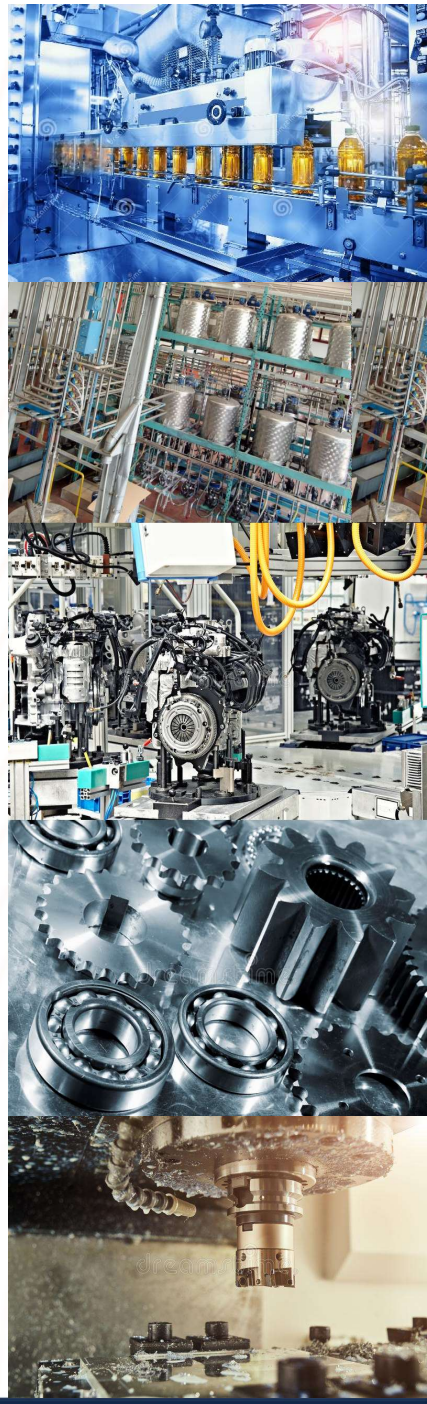
Source Reduction Assistance Program (SRAP) & Illinois Conservation of Resources and Energy (ICORE)

- **On-site technical assistance**
  - Reduce Hazardous Inputs/Identify Energy Efficiency Opportunities
  - Conservation of Resources/Reduce Business Costs
- **Fully funded by U.S. EPA - NO COST TO PARTICIPANTS**
- **ISTC not a regulatory agency**
  - Reporting to USEPA anonymized – only report aggregate measures
  - Option to develop case study from project

Triple Bottom Line

Industry Sectors

- **Food and Beverage**
  Manufacturing and Processing
- **Chemical**
  Manufacturing, Processing and Formulation
- **Automotive**
  Manufacturing and Maintenance
- **Aerospace**
  Product and Parts Manufacturing and Maintenance
- **Metal**
  Manufacturing and Fabrication
- **Direct suppliers may also qualify**



Assessment Focus Areas

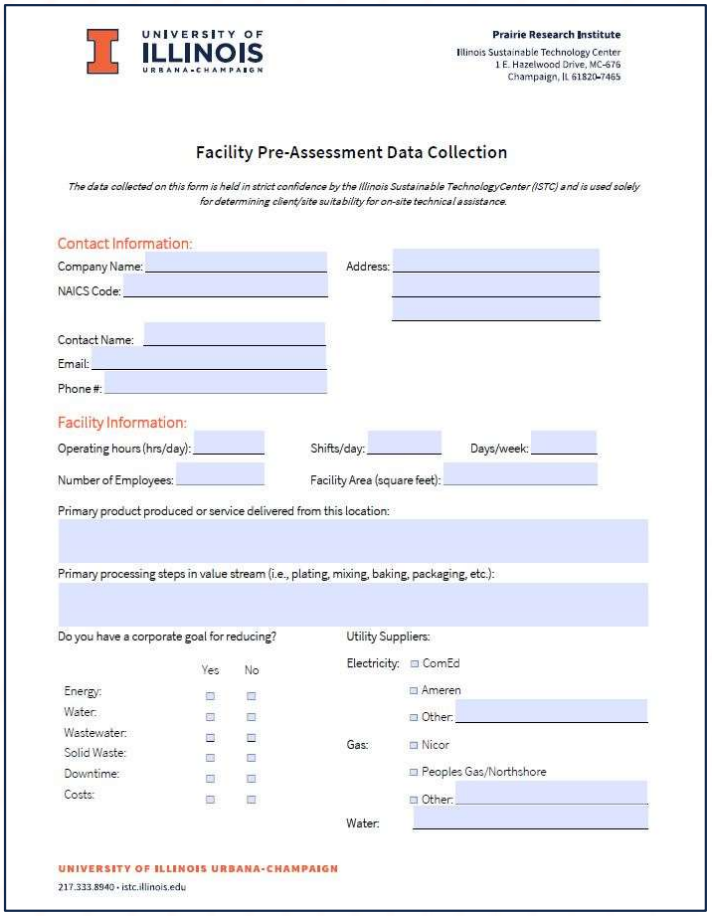
- **Efficient Resource Use**
  - Electricity
  - Natural Gas
  - Water/Wastewater
  - Product Inputs/Outputs
- **Cleaning & Sanitation Practices**
- **Operational/Maintenance Cost Reductions**
- **Environmental Health & Safety**
- **Process Optimization**
- **Renewable Energy Opportunities**
- **Emerging Technologies**

Participation Process

Initial Meeting | Opportunity Assessment | Report on Findings | Implementation Support | Project Review

Initial Meeting

- Introduce facility business operations/discuss project goals
- Review participant expectations
- Brief walk-through for basic facility processes
- Pre-Assessment Data Collection Form
- Provide facility baseline data (utility and waste)



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Champaign, IL 61820-7465

Facility Pre-Assessment Data Collection

The data collected on this form is held in strict confidence by the Illinois Sustainable TechnologyCenter (ISTC) and is used solely for determining client/site suitability for on-site technical assistance.

Contact Information:

Company Name: _____ Address: _____

NAICS Code: _____

Contact Name: _____

Email: _____

Phone #: _____

Facility Information:

Operating hours (hrs/day): _____ Shifts/day: _____ Days/week: _____

Number of Employees: _____ Facility Area (square feet): _____

Primary product produced or service delivered from this location:

Primary processing steps in value stream (i.e., plating, mixing, baking, packaging, etc.):

Do you have a corporate goal for reducing?

	Yes	No
Energy:	☐	☐
Water:	☐	☐
Wastewater:	☐	☐
Solid Waste:	☐	☐
Downtime:	☐	☐
Costs:	☐	☐

Utility Suppliers:

Electricity: ☐ ComEd ☐ Ameren ☐ Other: _____

Gas: ☐ Nicor ☐ Peoples Gas/Northshore ☐ Other: _____

Water: _____

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Participation Process

Initial Meeting | **Opportunity Assessment** | Report on Findings | Implementation Support | Project Review

Opportunity Assessment

- **Confirm baseline resource use and waste**
- **Thorough on-site facility/process review**
- **Targeted review of facility objectives**
- **Scheduling per COVID restrictions**
- **Fact finding and data collection**

Participation Process

Initial Meeting → Opportunity Assessment → **Report on Findings** → Implementation Support → Project Review

Report on Findings

- **Present facility assessment report (in person or virtual)**
- **Opportunities/recommendations for**
  - Energy reductions
  - Water/wastewater reductions
  - Hazardous material replacement and/or reduction
  - Waste reductions
- **Estimated implementation costs/ROI**

Participation Process

Implementation Support

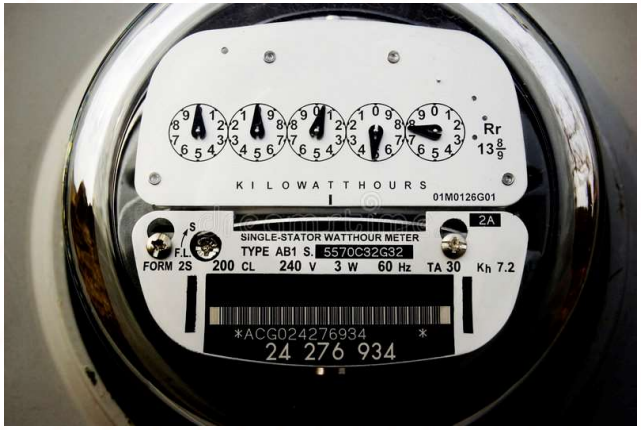
- **Technical assistance for recommendation implementation**
- **Conduct demonstrations and/or pilot evaluations to encourage adoption of available technologies**
- **Assist with identifying viable vendor stakeholders**

Participation Process

Initial Meeting → Opportunity Assessment → Report on Findings → Implementation Support → **Project Review**

Project Review

- **Collect metrics for grant reporting**
- **Identify savings and resource reductions from implemented recommendations**
  - Water reductions
  - kWh reductions
  - Therm reductions
  - $MTCO_2E$ reductions
  - Waste reductions
  - Cost savings



Example Recommendations Table

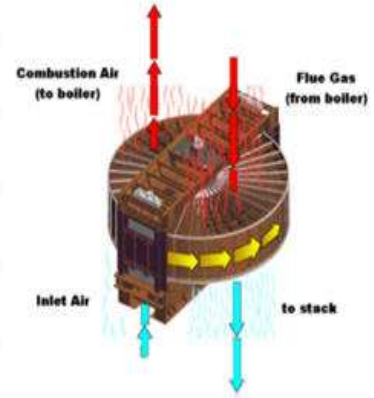
Illinois Food Manufacturer

Description	Annual Savings				Cost Considerations				
	kWh	Therms	Gallons H_2O	Dollars	Install Cost	Tax Benefit	Incentive	Net Cost	Payback (years)
Combined Heat and Power (CHP)	4,466,600	(24,557)	--	$171,200	$1,070,900	$107,100	$412,700	$551,100	3.22
Solar Array Installation	2,557,000	--	--	$217,300	$3,300,000	$1,943,700	$2,548,000	(1,191,700)	0
Reuse Non-Contact Cooling Water	(151,600)	--	31,271,400	$22,700	$168,200	--	--	$168,000	7.41
Rainwater Recovery	--	--	3,389,000	$7,100	$28,656	--	--	$30,000	4.23
Totals	6,872,000	(24,557)	34,660,400	$418,300	$4,567,756	$2,050,800	$2,960,700	$(442,600)	--

Common Opportunities

Steam Generation/Distribution

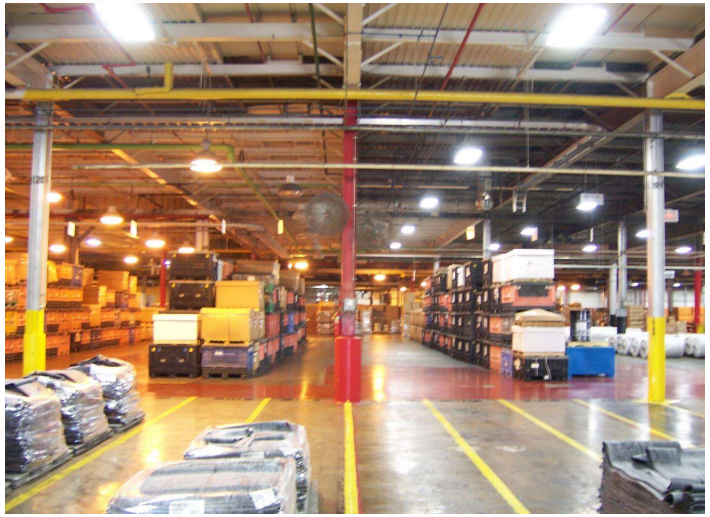
- Steam trap surveys – repair/replace
- Economizers/combustion air preheater, blowdown heat recovery
- Boiler tune-up
- O_2 trim, HE burner, turbulator
- Condensate return
- Pipe insulation



Common Opportunities

LED Lighting Upgrades

- **LEDs consume ~50% less electricity than traditional lighting sources**
- **Standard T8 fluorescent lamp uses ~250 watts; equivalent LED solution uses ~130 watts**
- **According to U.S. DOE report in August 2020:**
  - Estimated ~30% LED adoption as of 2018
  - LEDs expected to reach ~86% of all



Common Opportunities

VFD Installation: Motors, Pumps, Fans, and Blo

- Improve process control and save energy
- 20% reduction of motor speed = 50% energy savings
- Reduced load on equipment = longer life

Common Opportunities

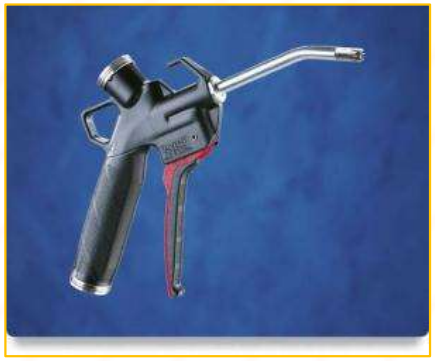
Cooling Towers

- Can be large energy consumer depending on system demand, equipment age, motor performance, fans, and maintenance
- Improvements to maintain water quality
- Reductions in volume of water required for industrial equipment cooling needs

Common Opportunities

Compressed Air

- Expensive to produce
- 8-10% of electricity used is converted to usable energy
- Many systems waste ~30% of compressed air through leaks, poor maintenance, poor control, and poor application planning
- More efficient/safe



Common Opportunities

Water Efficiency: Flow Reduction

- **Green Pre-Rinse Nozzles**
  - 75% less hot water than traditional pre-rinse spray nozzles; maintains same water pressure
  - Typical pre-rinse nozzle = 3 gpm
  - Green nozzle = 0.64 gpm
- **Dual flush valves**
- **Flush volume control**

Common Opportunities

Water Efficiency: Reuse RO Reject

- **Replace old filters – save water and money**
- **Reuse RO Reject**
  - Floor scrubber
  - Irrigation
  - Non-contact process water
  - Roof cooling
    - Roof cooling systems spray fine mist of water on roof intermittently during hot summer days; evaporation keeps building from getting hot

Next Steps

- **Schedule initial on-site scoping meeting**
- **Complete the Facility Pre-Assessment Data Collection Form**
- **Schedule the full on-site Assessment**

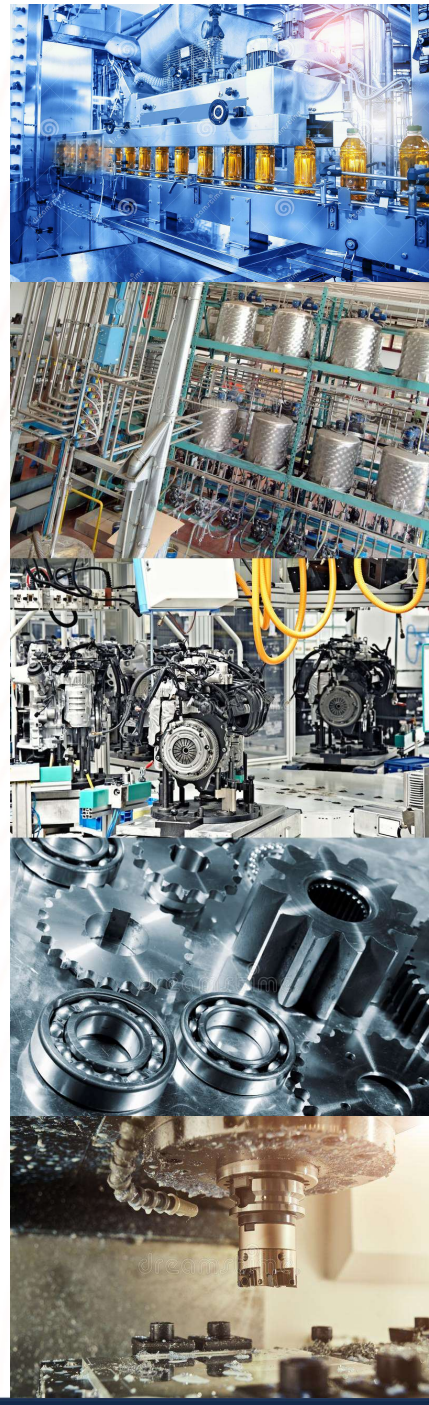
Additional Information:

istc.Illinois.edu/techassist

Schedule a visit:

go.Illinois.edu/schedule-site-visit

Questions?



“Do not go where the path may lead, go instead where there is no path and leave a trail.”

-Ralph Waldo Emerson

“If I had a hammer…”

Pete Seeger

"You ARE the hammer! What kind of future will YOU build?

Thank You

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