Pollution Prevention

West Virginia University

Welcome!

*W*elcome to the West Virginia University Pollution Prevention (P2) Newsletter. Inside, you will find information about

- Our team and the services we offer
- Industry specific tips for this quarter's National Area of Emphasis
- P2 best practices you can implement in your home or workplace

We hope that you will find this information valuable in your endeavors toward sustainability, energy efficiency, and pollution prevention.

Winter 2022 Industry Focus: Food and Beverage Manufacturing and Processing

What's New?

New Faces: Our Pollution Prevention team has several new faces. Dr. Ashish Nimbarte will continue to lead the group. We would like to welcome a new second-in-command, Dr. Christopher Moore, who will lead and manage the day-to-day project activities, and two new Graduate Research Assistances, Farzana Islam and Austin Harper. Dr. Thorsten Wuest will join our team to assist with the smart manufacturing based P2 initiative. Dr. Imtiaz Ahmed will join our team to develop machine learning and data-driven P2 approaches.

Check out the "Our Team" section to read more!

P2 Grantee Meeting: Dr. Nimbarte and Dr. Moore were privileged to attend the EPA P2 Grantee Meeting held December 6-8th in Washington, D.C. This event allowed us to meet with the P2 coordinators, researchers and professionals from all over the country. There were several interesting group discussions and presentations on topics related to different aspects of P2 and source reduction. The participation in this event provided us with information, techniques, and resources that will allow us to better assist our industrial partners in their P2 endeavors.

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Our Services

*T*he P2 program is housed in the Industrial and Management Systems Engineering (IMSE) department at WVU. The program has been funded since 2016 by federal grants with a focus on sustainability, productivity improvement, and environmental health.

On-Site Technical Assistance, Training, and Education: We can assist Small and Mid-Sized Enterprises (SMEs) in WV and the surrounding region with their productivity improvement goals. Specifically, we help the regional SMEs to develop source reduction recommendations by using the following P2 approaches:

♦ Smart manufacturing assessment to identify opportunities for digital technologies, Artificial Intelligence (AI) driven controls, and predictive analytics to conserve energy or natural resources.

♦ Clean and green assessments to identify and minimize waste streams using process input/output analysis.

♦ Greenhouse gas assessments to minimize air pollutant emission and carbon footprint.

♦ Waste, lean, and human factors assessments to minimize overproduction, supply-chain delays, transportation costs, inappropriate processing, excess inventory, unnecessary motion, and defects.

♦ Providing the SMEs with individualized carbon neutrality prediction models to pave the path for long-term P2 through sustainable operations.

SMEs in the following industrial sectors are eligible to receive our services :

♦ Food and Beverage Manufacturing and Processing (NAICS 311 and 3121)
♦ Chemical Manufacturing, Processing and Formulation (NAICS 325)
♦ Automotive Manufacturing and Maintenance (NAICS 3361, 3362, 3363, and 8111)
♦ Aerospace Product and Parts Manufacturing and Maintenance (NAICS 3364, 488190)
♦ Metal Manufacturing and Fabrication (NAICS 331,332)

The On-Site Technical Assistance will consist of a walk-through of the facility and process, where our team will evaluate your facility, equipment and processes, make observations, and collect data as needed. We will then provide an in-depth report including changes that can be implemented to improve your sustainability and save money. Contact Us to discuss a free on-site consultation!

Pollution Prevention Workshops and Roundtables: We will be hosting several workshops and roundtables throughout the following years. These opportunities will be announced as scheduled, so stay tuned!

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P2 @ Home

Save Water! A great way to help improve sustainability at home is by conserving water. Simple changes of habit like taking shorter showers, turning off the faucet while brushing your teeth, and putting a filled plastic bottle in your toilet tank are free and can have an immediate impact on water use, saving you money and protecting the planet. Other low-cost options like installing low-flow toilets and shower heads, using an automatic dishwasher instead of hand-washing dishes, and repairing any leaking faucets can save you over the long run.

Use Safer Chemicals! Dig under your sink. Are the cleaners and disinfectants labeled with EPAs "SaferChoice" or "Design for the Environment" designations? If not, those chemicals could be damaging to the environment. Replace your usual cleaners and disinfectants with those bearing the EPA "SaferChoice" or "Design for the Environment" certifications. These products are tested to ensure they are safe for the environment and still perform as well as expected.
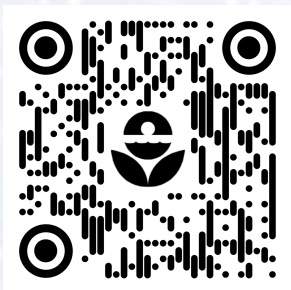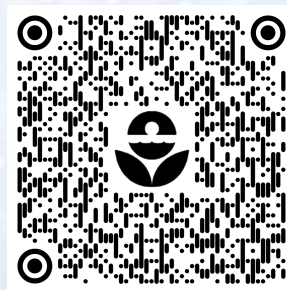
EPA SaferChoice   **Design for the Environment**

P2 @ Work

Make it an Email! Before you press that print button, consider whether printing is even necessary. Is there another method that can be used to distribute this content? Most information can be distributed by email, without the unnecessary expense of printing. Eliminating unnecessary printing can save you money and keep the trees standing tall.

Look for the ENERGY STAR Label! When purchasing computers and printers for the office, look for products that bear the ENERGY STAR label. Products bearing the ENERGY STAR certification are energy efficient, saving you money while saving the planet.
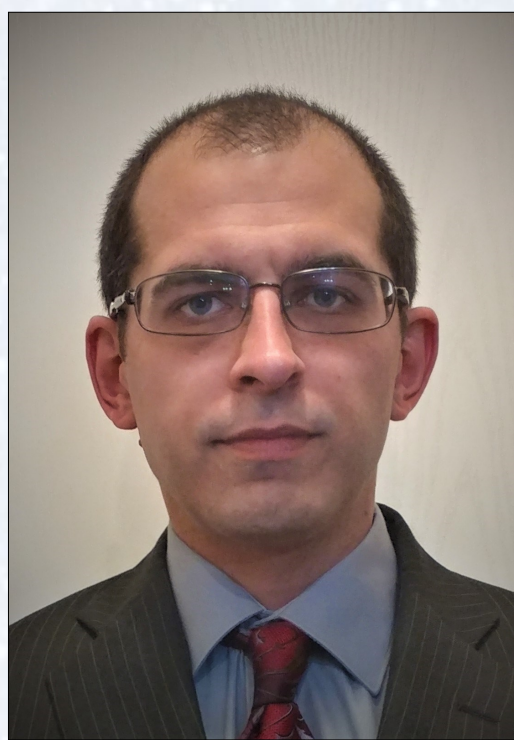
ENERGY STAR

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Our Team

Dr. Ashish Nimbarte, Professor and Chair of the Industrial and Management Systems Engineering (IMSE) Department at WVU, has been serving as the principal investigator of the P2 program. Dr. Nimbarte has significant experience in conducting and implementing source reduction using the E4 (Economy, Energy, Environment, and Ergonomics) paradigm. He has led and successfully completed several P2 assessments for a variety of small, medium, and large-sized businesses to assist them with the identification of potential sources of waste associated with energy, materials, water, and human use. He is also an experienced educator and has successfully organized multiple training workshops and conferences at the local, regional and international levels.

Dr. Christopher Moore, Research Associate in the Industrial and Management Systems Engineering (IMSE) Department at WVU, will be managing the day-to-day operations of the program. Dr. Moore has 5 years of experience in industrial productivity improvement consulting with a focus on time studies, process efficiency, and human factors. Dr. Moore has performed consulting services for over 50 clients, including site visits to over 20 clients, including retail, warehousing, pharmaceutical, foundries, food processing/production, and various other industries. He is a Certified Six Sigma Green Belt and OSHA-30 hour certified.

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Dr. Thorsten Wuest is an Associate Professor in the IMSE Department at WVU. He is globally recognized as one of SME's 20 most influential professors in smart manufacturing. His research focuses on smart manufacturing, machine learning/AI and hybrid analytics, Industry 4.0, and sustainable, closed-loop product lifecycle management (PLM). Dr. Wuest has co-authored three books and more than 150 refereed journal and conference articles, gathering over 5,000 citations to date. His research is funded by NSF, NIST, DoE, and others. In recent years, Dr. Wuest has been diligently working on initiatives focused on improving the productivity of regional SMEs. He also serves on the Advisory Board of WVU Industrial Extension.

Dr. Imtiaz Ahmed is an Assistant Professor in the IMSE Department at WVU. His research interests are data science, machine learning, and quality control with application in smart manufacturing, P2, energy systems, and supply chain. He received his Ph.D. in Industrial Engineering from Texas A&M University in 2020. During his Ph.D. work, he was heavily involved in developing predictive models using real data from manufacturing facilities. He worked as a member of the software research team in ABB group, a leading digital technology automation company, to model real hydropower plant data. He has also developed renewable energy (solar power) prediction model using real industry data. Dr. Ahmed won several scholarly awards, including the best paper and best poster award.

Austin Harper is a Master's student in the Department of Industrial and Management Systems Engineering at West Virginia University After completing his Bachelor's degree in Industrial Engineering in 2020 at WVU, he worked for 2 years as an Operational Excellence Engineering Contractor focusing on lean principles, project management, and facility layout planning for a medical device company in Huntington, WV.

Farzana Islam is a Master's student in the Department of Industrial and Management Systems Engineering at West Virginia University. She graduated from Bangladesh University of Engineering and Technology with a major in Industrial Engineering and has two years of work experience in the manufacturing and service industries, working as a project coordinator for human resources transformation projects such as ERP implementation and competency frameworks roll-out projects. She has led projects that promote sustainability through the reduction of carbon footprint generated by the supply chain network in her role as a planning officer in the manufacturing industry.

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Industry Tips

❈ Food and Beverage Manufacturing and Processing ❈

- **Optimize Cleaning-in-Place processes:** Cleaning-in-Place systems are a great way to save the expense of teardown and reassembly of equipment, but operators tend to err on the side of caution and use more water and cleaning products than needed cleaning this equipment. This process can often be optimized to reduce the use of water and caustic chemicals. Retrofitting Cleaning-in-Place processes to capture and reuse water is another affordable option to reduce water use. When multiple rinses are used in a cleaning process, the final rinse water can be reused for the first rinse of equipment.

- **Produce only what you will use:** In our experience, food and beverage manufacturers tend to over-produce intermediary products/ingredients to ensure that later processes can run uninterrupted. If waste from over-producing is a regular occurrence, this is a source of waste that can easily be controlled. Any over-production that gets disposed is a significant expense that is adding zero-value – the labor cost, raw ingredients, processing, and disposal are all losses.

- **Fix refrigerant leaks:** Refrigerant leaks in cooling and freezing systems can have a significant impact on the efficiency and energy use of the equipment. Additionally, ammonia releases can be dangerous for the health and safety of your employees and the environment, and inefficiency in your refrigeration or freezing systems can lead to product loss and potentially necessitate product recalls. Identifying and repairing refrigerant leaks can save money and help avoid future losses.

Contact Us!
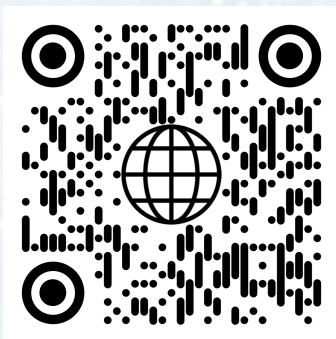
WVU P2 Website
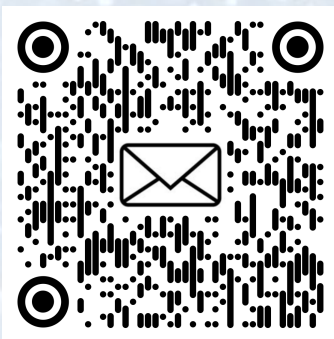
Inquire about Service

Questions & Comments

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