Pollution Prevention

West Virginia University

Welcome!

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

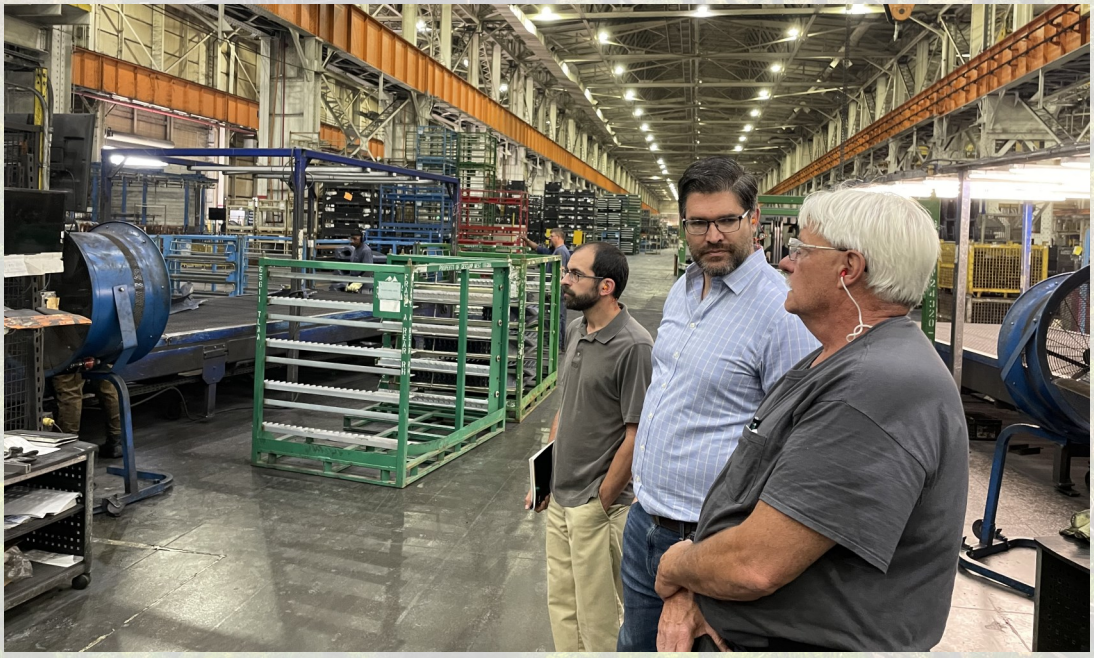
- Our team and the services we offer
- Industry specific tips for this quarter's National Area of Emphasis
- P2 best practices you can implement in your home or workplace

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

Summer 2023 Industry Focus: Chemical Manufacturing, Processing and Formulation

What's New?

Making a Difference: Our team has been busy performing energy assessments and P2 assessments all over the state of West Virginia. Since our last newsletter, we completed USDA energy assessments and technical assistance reports for six facilities and provided preliminary P2 site visits to three facilities. In total, we made 18 individual recommendations with a total implementation cost of $929,000 and a payback period of 4.5 years, resulting in an energy cost savings of $205,900 per year while reducing electricity, natural gas, and propane use by 1,653 MWh, 2,877 MMBtu, and 545 gallons per year, respectively.



Dr. Moore and Dr. Wuest visiting Gestamp in Charleston, WV to explore source reduction opportunities.

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Our Services

The 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

Lightbulb Moment! Conserving electricity at home not only saves you money, but also indirectly reduces CO_2 emissions. One great way to save electricity is to use more efficient lighting and turn off lights when they are not in use. A single 40-watt incandescent bulb running continuously for a year will use 350 kWh of electricity, costing approximately $28. Replacing the incandecent bulb with an efficient LED bulb will save 300 kWh of electricity and save $24. Replacing incandescent bulbs with LED bulbs throughout your home quickly pays for itself in energy savings. Turning off lights when not in use, even efficient LED lights, will further your savings.

DIY Substitutes! Some of the chemicals you may use in your home can be hazardous. Check out these do-it-yourself substitutes and alternative methods that are safer and just as effective as the products you buy at the store:

- Drain cleaner: Use a plunger or plumber's snake.
- Glass cleaner: Mix one tablespoon of vinegar or lemon juice in one quart of water. Spray on and use newspaper to dry.
- Furniture polish: Mix one teaspoon of lemon juice in one pint of mineral or vegetable oil and wipe furniture.
- Rug deodorizer: Liberally sprinkle carpets with baking soda. Wait at least 15 minutes and vacu um. Repeat if necessary.
- Silver polish: Boil 2-3 inches of water in a shallow pan with one teaspoon of salt, one tea spoon of baking soda and a sheet of aluminum foil. Submerge silver and boil for two to three more minutes. Wipe away tarnish and repeat if necessary.
- Mothballs: Use cedar chips, lavender flowers, rosemary, mints or white peppercorns.

P2 @ Work

Consider the Climate! Adjusting the climate of your workspace can help protect the climate of the planet. In the summer, a nice cool 72F workspace sounds great, but raising the setpoint on the thermostat to 74F should not make the space uncomfortable and can save quite a bit of energy. Every degree the thermometer is raised can save 1-2% on energy bills. Likewise, tolerating slightly cooler temperatures in the winter can show a similar energy and cost savings.

Work Remotely! Allowing office-based employees to work remotely has many great benefits for the employer, employees, and the environment. Eliminating the need to commute to work reduces transportation-related emissions and saves the employee the time and cost to commute to work. Reducing occupancy in the facility can reduce heating, cooling, and lighting costs. Employees that desire working remotely are often happier and more productive when allowed to work remotely. Additionally, since employees cover their own energy bills at home, it is more likely that they will embrace energy-efficient practices.

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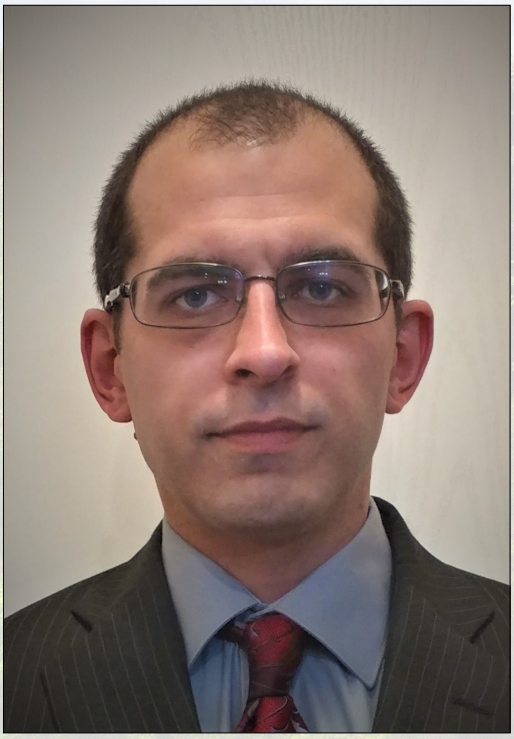
Our Team

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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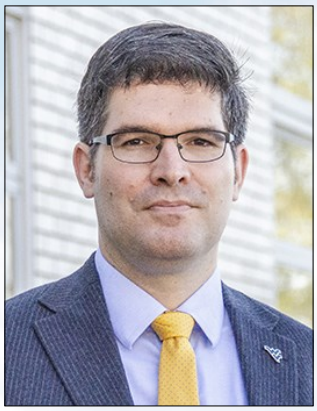
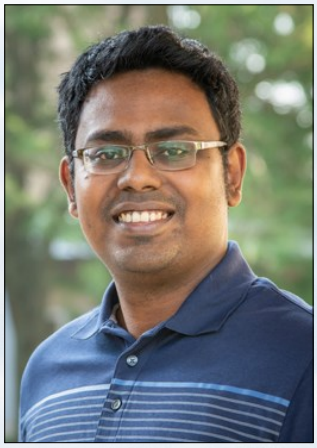
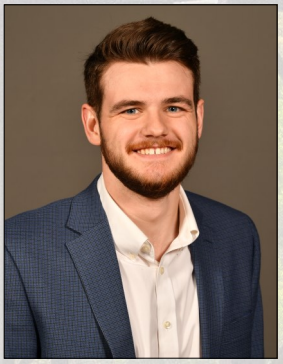


Dr. Thorsten Wuest is an Associate Professor in the IMSE Department at WVU. He is globally recognized as one of SME's 20 most influential professors in smart manufacturing. His research focuses on smart manufacturing, machine learning/AI and hybrid analytics, Industry 4.0, and sustainable, closed-loop 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.

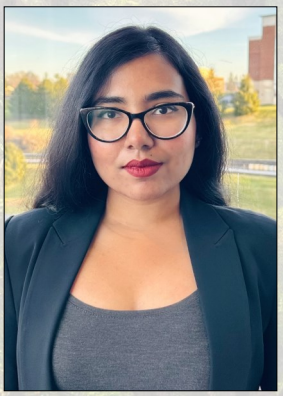


Dr. Imtiaz Ahmed is an Assistant Professor in the IMSE Department at WVU. His research interests are data science, machine learning, and quality control with application in smart manufacturing, P2, energy systems, and supply chain. He received his Ph.D. in Industrial Engineering from Texas A&M University 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

❖ Chemical Manufacturing, Processing and Formulation ❖

- **Implement a Just-In-Time (JIT) material supply process:** A Just-In-Time (JIT) material supply process is a great way to reduce inventory levels of hazardous chemicals and minimize the risks associated with their storage. By implementing a JIT process, materials are only ordered and delivered as needed, rather than being stockpiled in large quantities. This can not only save money on storage costs but also reduce the likelihood of accidents such as leaks or spills that could harm both the environment and individuals. Implementing a JIT material supply process can be a smart and practical solution for reducing inventory levels of hazardous chemicals while also improving operational efficiency and minimizing the risk of accidents.
- **Optimize Production Schedules:** Optimizing production schedules can be an effective way for chemical manufacturers to reduce their use of hazardous chemicals like nitrobenzene and minimize waste generation. By developing production schedules that prioritize equipment and material consistency, manufacturers can minimize the need for frequent equipment and material changes that can lead to increased waste and the use of hazardous chemicals.
- **Discontinuing use of Coal-fired Boilers:** By discontinuing the use of coal-fired boilers, chemical manufacturers can reduce their greenhouse gas emissions and minimize their impact on the environment. This can also help to improve air quality and reduce the risk of respiratory illnesses in nearby communities. Furthermore, discontinuing the use of coal-fired boilers can also be a cost-effective solution for chemical manufacturers. The installation and maintenance costs associated with coal-fired boilers can be significant, and the cost of fuel can be volatile. Switching to cleaner and more efficient energy sources can help manufacturers to reduce their energy costs over the long term.

Contact Us!

WVU P2 Website

Inquire about Service

Questions & Comments

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