



West Virginia University

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Industrial Assessment Center

U.S. DEPARTMENT OF ENERGY

# Newsletter

## Executive Information

The work described in this newsletter is for the period of 02/01/2020 to 08/15/2020 based on the activities of the West Virginia University Industrial Assessment Center ([WVU-IAC](#)). The center supports and carryout activities that are funded by US DOE Industrial Assessment Center program, EPA's [Pollution Prevention](#) (P2) program and USDA's [Rural Energy Audit Program](#). The center promotes "efficiency improvement" through structured on-sight assessments that target energy efficiency, environmental and process waste, lean and smart manufacturing. Technical assistance and training is also provided to the interested entities. Our clients range from local small businesses in the rural settings to small and medium sized enterprises (SME) nationwide.

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## Overview of Programs

### IAC Program:

The [Industrial Assessment Center](#) at [West Virginia University \(WVU-IAC\)](#), is one of many centers around the country, funded by the [U.S. Department of Energy](#) to provide no-cost energy, waste, water, cyber security, and smart manufacturing assessments to small and mid- sized manufacturers. A team of students and professors do the engineering measurements in assessing how each facility utilizes energy and resources. Then, the [WVU-IAC](#) identifies the opportunities to save energy, reduce waste, and improve productivity through application of smart sensors and controls, and alleviate cyber security threats.

Small and medium sized manufacturers may be eligible to receive a no-cost assessment provided by the [WVU-IAC](#). The [WVU-IAC](#) team performs detailed process analysis to generate specific recommendations with cost and resource savings, implementation cost, and payback on investment. Within 60 days the plant receives a confidential report detailing the analysis, findings and recommendations.

Eligibility for IAC Assessment:

- Within Standard Industrial Codes (SIC) 20-39 and NAICS 33-39
- Water and waste water treatment facility or institutional facility
- Within 3 to 4 hour drive from Morgantown
- Gross annual sales below \$100 million
- Fewer than 500 employees at the plant site
- Annual utility bills more than \$100,000 and less than \$2.5 million
- No in-house professional staff to perform the assessment

More info about [IAC Program](#)

### WV Office of Energy Sponsored Energy Assessments (WVOE):

This program caters to all businesses and government organizations in West Virginia. Activities include energy assessment and benchmarking. The assessments are provided at no cost to the businesses and organizations.

Recent assessments include those conducted for Tri-State Electric & Machines located in Glen Dale, WV, [Capon Springs and Farms](#) located in High View, WV, [Tecnocap](#) located in Glen Dale, WV, [Brake Supply Heavy Equipment](#) located in Princeton, WV, [Doc's Tea](#) located in Inwood, WV and [AF Wendling's Foodservices](#) located in Buckhannon, WV. We sincerely thank [Ms. Karen Lasure](#), Program Manager at WVOE for continued support.

### U.S. EPA Pollution Prevention (P2) Program:

Reduction of waste at the source level by providing Technical Assistance and Training is one of the most effective methods to assist facilities with identification, development and adoption of [Pollution Prevention](#) (P2) approaches.

The [Industrial Management and Systems Engineering Program](#) at [West Virginia University](#) is offering Technical Assistance and Training Programs for the food and beverage manufacturing and processing facilities in the state of West Virginia to assist facilities with identification, development and adoption of Pollution Prevention (P2) methods.

Technical Assistance program involves on-site P2 assessments. The project team makes a planned visit to the facility to assess and gather data on energy, water, material and human use. The data and inputs from the facility managers is used to develop P2 recommendations. A detailed report based on the findings of the on-site visit are submitted to the facility within a few days from the on-site P2 assessment. The report contain several recommendations concerning

- Energy efficiency
- Water and material waste reduction

- Lean implementation
- Air Pollutant and Greenhouse Gas Evaluations

Training Workshops are organized to train businesses/facilities about the source reduction techniques to help them adopt and implement P2 approaches, and to increase the development, adoption, and market penetration of greener products and sustainable manufacturing practices.

- [Participate in the Technical Assistance program and/or Training Workshops](#)
- To learn more about the [P2 program](#)

### **USDA Program:**

This program is specifically designed to provide energy efficiency assistance to agricultural producers and for-profit small business located in the rural parts of West Virginia. The project team conducts on-site energy audits specifically developed for agricultural producers and rural small businesses and a detailed [energy assessment report](#) is submitted to the client.

**Eligibility:** Rural agricultural producers and for-profit small business are eligible to receive energy audit through this program. A for-profit small business is defined as any business that employs less than 500 people in a designated rural area and makes under a certain revenue based upon the type of business.

**Benefits:** Our energy audit recommendations can help save from 5 to 10 % of energy costs in areas of lighting, HVAC and building envelope thermographic analysis per year. The analysis of high energy consuming processes could result in even higher cost saving recommendations.

Using the energy assessment report, the clients can apply for financial assistance through [USDA-REAP](#) grants and guaranteed loans programs. The grants range from \$1,500 to \$250,000, and cannot exceed 25% of total project costs. The maximum guaranteed loan is \$25 million, which may not exceed 75% of total project costs.

**Audit costs:** As a participant in this program the client is only expected to pay \$125 for a full energy audit of their facility and will receive a comprehensive [energy assessment report](#). This type of audit normally averages around \$3,000 but funding from the [USDA](#) covers the majority of the cost.

[More info about program](#)

## **A Glimpse of this Cycle**

- Nine on-site assessments have been completed during this cycle under IAC, P2, and USDA programs.
- Dr. Ashish Nimbarte, Assistant Director [WVU-IAC](#) recognized as "Outstanding Researcher of the Year/Senior" for the 2019-2020 academic year by [WVU Benjamin M. Statler College of Engineering and Mineral Resources](#).
- Dr. Deepak Gupta, [WVU-IAC](#) Alumnus honored with "[President's Distinguished Service Award](#)" by Wichita State University.
- [WVU-IAC](#) student Unique Karki joined as Senior Research Associate position at [Lawrence Berkeley National Laboratory](#).
- [WVU-IAC](#) student Josage Chathura Perera joined as Energy Efficiency Engineer at [Oak Ridge National Laboratory](#).
- Dr. Anne Mallow, [WVU-IAC](#) Alumnus honored with [IAC Alumni Award](#).
- Dr. Amir Abolhassani, [WVU-IAC](#) Alumnus honored with [IAC Alumni Award](#).
- Josage Chathura Perera, [WVU-IAC](#) student honored with [IAC Student Award](#).
- [WVU-IAC](#) students received certificates from [U.S Department of Energy](#).

## Recommendations from On-site Assessments

The [WVU-IAC](#) has conducted several assessments at various manufacturing facilities in the states of West Virginia and Ohio. The team has given several energy efficiency, lean, waste, water and smart manufacturer recommendations to improve the functionality of the manufacturing facilities.

### Sample Recommendations

#### **IAC Assessment Recommendation Huntington, WV**

##### **Install Smart Sensors to Shut Off the Fume Hoods During the Weekends**

Install smart sensors to shut off the fume hoods during the weekend and adjust the HVAC according to the demand. The recommendation will reduce the cost of running fume hoods and the HVAC .

**Energy Savings:** 462,882 kWh/yr Electricity consumption is reduced as a result 1,013,712 lbs of CO<sub>2</sub> emission is reduced.

**Total Savings per year:** Energy Cost Savings: \$32,679/yr.

**Implementation Cost:** \$11,750

**Payback Period:** 5 months.

#### **IAC Assessment Recommendation Morgantown, WV**

##### **Implement automatic modulation of VFDs in filtrate pump stations**

Install VFDs on the pumps in the pumping stations to improve modulation of their energy use and save energy .

**Implementation Cost:** \$10,000

**Energy Savings per year:** 132,631kWh/yr Electricity consumption is reduced as a result 290,462 lbs of CO<sub>2</sub> emission is reduced.

**Total Savings per year:** Energy Cost Savings: \$5027/yr

**Payback Period:** 24 months.

## **IAC Assessment Recommendation Prichard, WV**

### **Add Economizers on the HVAC Units**

Install Economizers to reduce energy consumed by the HVAC units.

**Energy Savings:** 452,685 kWh/yr Electricity consumption is reduced as a result 5,518,230 lbs of CO<sub>2</sub> emission is reduced.

**Implementation Cost:** \$16,000

**Total Savings per year:** Energy Cost Savings: \$22,091/ yr

**Payback Period:** 16 months

## **P2 Assessment Recommendation Bruceton Mills, WV**

### **Recover Carbon Dioxide from the Fermentation Process**

Recover carbon dioxide from the beer fermentation process and use it for carbonization and packaging and other in-house uses .

**CO<sub>2</sub> Produced :** 54lbs/week.

**Implementation Cost:** \$10,000

**Total Savings per year:**\$2,808/yr

**Payback Period:** 12 months.

## **P2 Assessment Recommendation Parkersburg, WV**

### **Install Make-Up Unit to the Kettle Fan**

Install make-up air unit for kettle fan to reduce heating and cooling load on HVAC unit.

**Energy Savings:** 61 MMBtu/yr Natural Gas consumption, and 395 kWh/yr Electricity consumption is reduced as a result 7,324 lbs of CO<sub>2</sub> emission is reduced.

**Implementation Cost:** \$1900

**Total Savings per year:** Energy Cost Savings: \$507/yr

**Payback Period:** 45 months.

## Cyber Security

Cyber terrorism is a real and growing threat. Standards and guides have been developed, vetted, and widely accepted to assist with protection from cyber attacks. [WVU-IAC](#) has conducted cyber security assessment for one of the participating SMEs using the Industrial Control Systems Cyber Security Assessment Tool. The tool promotes awareness of cybersecurity risk areas associated with Industrial Control Systems (ICS) in industrial facilities. Tool includes 20 simple questions to characterize ICS and plant/facility operations and produces a preliminary assessment of risk (high, medium, or low). It also generates a customized list of action items to help improve preparedness for a cybersecurity event .

### Recommendations given using CSET Tool

#### **Area of concentration: People:**

- Work with your vendor to determine how strong their internal security practices are and whether or not their remote access is a risk for your plant. Consider implementing an enhanced login procedure for vendors to be able to access systems remotely.
- Critical equipment should be protected with firewalls, secure hardware that does not allow for memory transfer with USBs or other external media devices, and alarms that sound when operating under unusual parameters.
- Speak with your vendors about their cybersecurity training, practices, and certifications. Consider adding a clause requiring cybersecurity training in future contracts with vendors.
- Develop training procedures for vendors who work on-site that inform them about cybersecurity best practices. You could also develop guidelines on what equipment vendors are allowed to bring into your facility/plant to increase on-site security.

#### **Area of concentration: Process**

- Work with your plant manager to create a central repository, containing information on all IT systems and ICS. Consider maintaining this resource offline, separate from the plant's IT system (i.e., on an isolated computer, on a mainframe, or in a physical file), to ensure that information remains accessible when the IT system is shutdown during a cyberattack or system outage.
- Explore which, if any, software programs have the ability to schedule automatic scanning of equipment and select those settings.
- Consider restricting the use of external media devices for cybersecurity issues to reduce contamination.

#### **Area of concentration: Technology:**

- Install firewalls to control data flow between different machinery components and ICS computers.
- Ensure that remote connections are made using a virtual private network or VPN. Consider implementing an enhanced login procedure for vendors to be able to access systems remotely.
- Regularly scan PCs for malware and viruses. For added protection, consider isolating the PCs from internet and email to avoid outside contamination .

## Center Activities.

- [WVU-IAC](#) conducted a Training Workshop on “[Energy Efficiency Energy Benchmarking Productivity Improvement and Pollution Prevention\(P2\)](#) ” in Sutton, WV.
- [WVU-IAC](#) conducted an [EPA Pollution Prevention\(P2\)](#) session in [PACK EXPO East](#) held in Pennsylvania Convention Center, Philadelphia PA.
- [Dr. Bhaskaran Gopalakrishnan](#) attended the annual IAC Directors’ Meeting conducted from July 28, 2020 to July 29, 2020.
- [WVU-IAC](#) team conducted an industrial assessment at a metal fabrication facility in Glen Dale, WV.
- [WVU-IAC](#) team conducted an industrial assessment at an insulation products manufacturing facility in Inwood, WV.
- [WVU-IAC](#) team conducted an industrial assessment at a plastic tube manufacturing facility in Akron, OH.
- [WVU-IAC](#) team conducted an industrial assessment at a metal closures manufacturing plant for glass jars and bottles in Glen Dale, WV.
- [WVU-IAC](#) team conducted an industrial assessment at a resort in High View, WV.
- [WVU-IAC](#) team conducted an industrial assessment at a meat processing facility in Buckhannon, WV.
- [WVU-IAC](#) team conducted an industrial assessment at a water treatment chemicals manufacturing plant in Charleston, WV.
- [WVU-IAC](#) team conducted an industrial assessment at a metal manufacturing plant in Princeton, WV.

## Resources available for efficiency enhancement

- 1) [AIRMASTER+](#)
- 2) [Pumping System Assessment Tool](#)
- 3) [Fan System Assessment Tool](#)
- 4) [Mechanical Insulation Assessment and Design Calculators](#)
- 5) [Steam System Tool Suite \(SSTS\)](#)
- 6) [Industries Facilities Scorecard](#)
- 7) [Plant Energy Profiler/Integrated Tool Suite \(ePEP\)](#)
- 8) [Combined Heat and Power\(CHP\) Application Tool](#)
- 9) [NOx and Energy Assessment Tool \(NxEAT\)](#)

## Partners of WVU-IAC:

[WV Office of Energy](#)  
[WV ASHRAE](#)  
[WV MEP](#)

[USDA](#)  
[Oakridge National Laboratory](#)  
[AMP-Ohio](#)

[EPA](#)  
[WV DEP](#)  
[EEWV](#)

# The Team of WVU-IAC



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