Executive Information

The work described in this newsletter is for the period of 01/01/2019 to 02/28/2019 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-site 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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The newsletter is prepared by Mr. Pavan Kumar Koppula in collaboration with the WVU-IAC students.
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.

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

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**

- Eight on-site assessments have been completed during this cycle under IAC, P2, and USDA program’s.
- All the students working with WVU-IAC were awarded tuition scholarships for Spring 2019.
- Vivek Komarina Research Assistant staff member and Unique Karki, an MSIE student have joined the WVU-IAC in Spring 2019.
- Alexandra Davis, Lead Student of WVU-IAC received Student Research Award from U.S Department of Energy.
- WVU-IAC students received certificates from U.S Department of Energy.
- WVU-IAC students conducted a information sharing session at Westwood Middle School, Monongalia County, WV.
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

**WVU-IAC Assessment Recommendation  Huntington, WV**

**Install Smart Industrial Surge Protection**

Installing Industrial Surge protection to keep equipment and related processes up and running reliably without disruption or damage due to electrical surges.

**Energy Savings:** 6.66 MMBtu/yr Natural Gas consumption is reduced as a result 753 lbs of CO₂ emission is reduced.

**Implementation Cost:** $8,050

**Total Savings per year:**

- Energy Cost Savings: $139/yr
- Avoided Costs: $40,000/yr
- Total Annual Cost Savings: $40,139/yr

**Payback Period:** 3 months.

**WVU-IAC Assessment Recommendation  Clarksburg, WV**

**Install Smart Controls to Automatically Adjust the Boiler Firing Factor**

Install automated smart sensors and timer to adjust the firing factor of the boiler to conserve natural gas when possible.

**Energy Savings:** 1,896 MMBtu/yr Natural Gas consumption is reduced as a result 214,248 lbs of CO₂ emission is reduced.

**Implementation Cost:** $8,000

**Total Savings per year:**

- Energy Cost Savings: $14,168/yr

**Payback Period:** 7 months.
WVU-IAC Assessment Recommendation  Huntington, WV

Develop a Demand Monitoring System to Reduce Demand Cost

Installing a demand controller to monitor demand pattern, and schedule the equipment accordingly to reduce the demand cost.

**Implementation Cost:** $5,600

**Total Savings per year:** Demand Cost Savings: $5,472/yr

Total Annual Savings per year: $5,472

**Payback Period:** 13 months.

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P2 Assessment Recommendation  Huntington, WV

Improve the Controls on the Compressors

Increase in the efficiency of the compressor system by improving controls for the Air compressors. [AirMaster+ Best practice software tool](#) was used during analysis phase of this recommendation.

**Energy Savings:** 136,556 kWh/yr Electricity Consumption is reduced as a result 299,057 lbs of CO₂ emission is reduced.

**Implementation Cost:** $8,000

**Total Savings per year:** Energy Cost Savings: $8,930/yr

Total Annual Savings per year: $8,930

**Payback Period:** 11 months.

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P2 Assessment Recommendation  Fraziers Bottom, WV

Improve Productivity at Weigh Station with Engineering Improvements

Installing a weigh table (Weigh scale included) at the end of conveyors to reduce weighing time and increase productivity.

**Reduction of weighing time on one line:** 260 hrs/yr

**Implementation Cost:** $1,500

**Total Savings per year:** Equivalent Cost Savings: $7,800/yr

Total Annual Savings per year: $7,800

**Payback Period:** 3 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 Cyber Security Evaluation Tool (CSET). The CSET includes a selectable array of available standards for a tailored assessment of cyber vulnerabilities. Once the standards were selected and the resulting question sets answered, the CSET creates a compliance summary, compiles variance statistics, ranks top areas of concern, and generates security recommendations.

WVU-IAC is planning to use new cybersecurity assessment tool Industrial Control Systems Cybersecurity Assessment Tool provided by U.S Department of Energy. 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 (i.e 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 concern: Organizational:
- Identify individuals with system security roles and responsibilities.
- Make the system design and implementation process such that it defines the security roles and responsibilities for the users of the system.
- Appoint a senior security officer with the mission and resources to coordinate, develop, implement, and maintain an organization-wide security program.

Area of concern: Communication Protection:
- Cryptographic keys need to be established and managed using automated mechanisms.
- Maintain communication cryptographic mechanisms in comply with applicable regulatory requirements, policies, standards, and guidance.

Area of concern: System Protection:
- Define external boundaries of the system..
- Develop Enterprise architecture in consideration with security and the resulting risk.

Area of concern: Training:
- Provide basic security awareness training to all system users before authorizing access to the system.
- Review the effectiveness of security awareness training at least once a year..

Area of concern: Incident Response:
- Coordinate incident handling activities with contingency planning activities.
- Implement incident handling capability for security incidents that include preparation, detection and analysis, containment, eradication and recovery.
- Perform backups of a user level information on a defined frequency.
Center Activities

- **WVU-IAC** team conducted a **industrial assessment** at The Homer Laughlin China Company, Newell WV under IAC program.
- **WVU-IAC** team conducted an **energy efficiency study** on manufacturing equipment at Level 1 Fastners, Huntington WV.
- **WVU-IAC** team conducted a **industrial assessment** at Mister Bee Potato Chips Co, Parkersburg WV under P2 and USDA program.
- **WVU-IAC** team conducted a **industrial assessment** at EMI Corporation, Jackson Center OH under IAC program.
- **WVU-IAC** team conducted a **industrial assessment** at Goldsmith & Eggleton Inc, Wadsworth OH under IAC program.

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)**

Peer-Reviewed Papers Published through Assessment Inspired Research

The Team of IAC

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