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**MESOC**  
OFFICE OF MANUFACTURING AND ENERGY SUPPLY CHAINS

# Lehigh University Industrial Assessment Center



## Program Information

- Lehigh University Industrial Assessment Center (IAC) is sponsored by the US Dept. of Energy – Office of Manufacturing and Energy Supply Chains
- We offer **FULLY SUBSIDIZED** energy efficiency studies and audits to small & medium manufacturers
- Provide workforce development to manufacturers and universities



## What is covered under the IAC Program?



Improve site energy and/or material efficiency



Improve site cybersecurity infrastructure



Improve site productivity



Reduce site waste production



Reduce site greenhouse gas emissions and/or nongreenhouse gas pollution

# Energy Audits at No Cost to your Facility

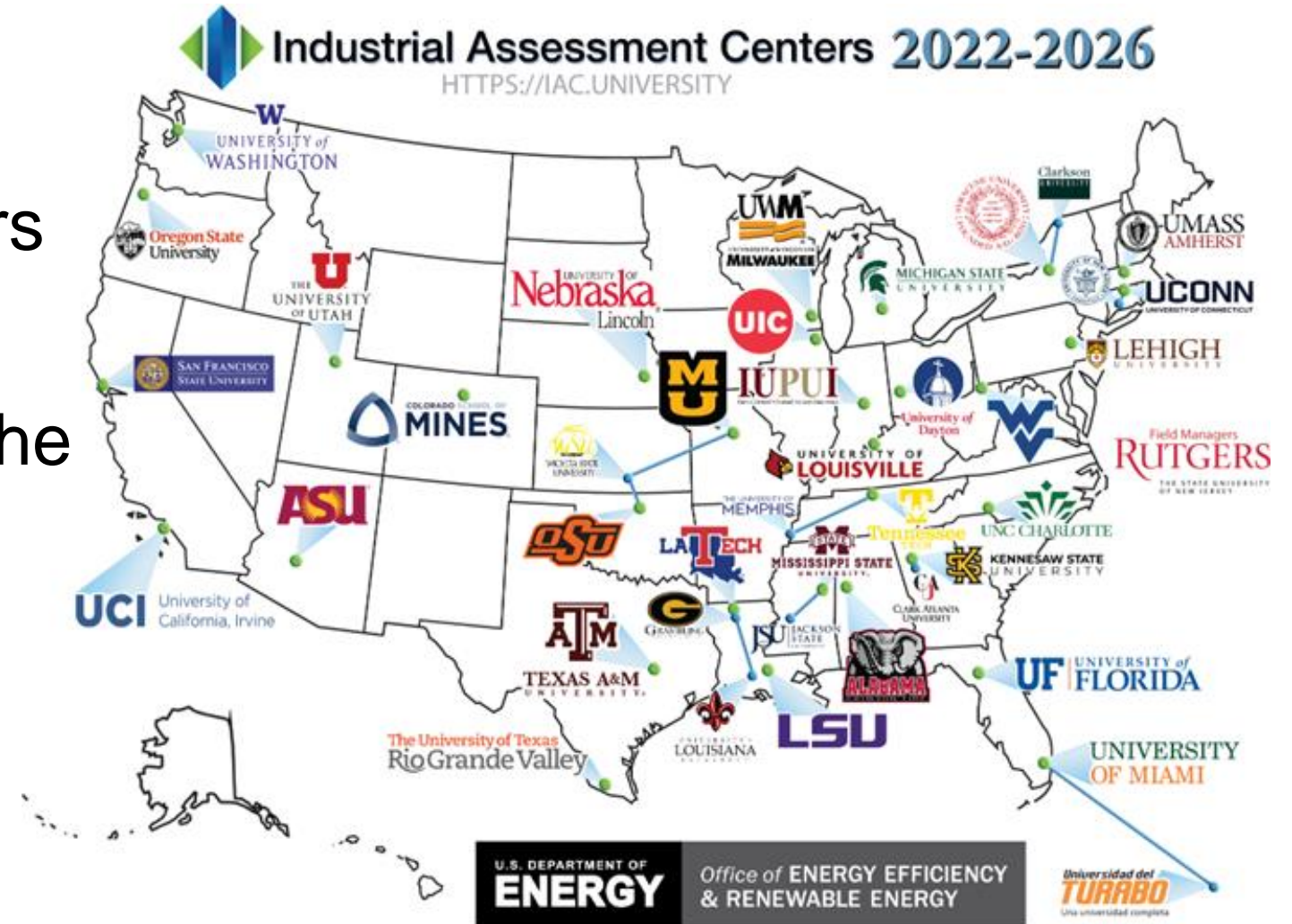
- Our team will work with yours to collect information & data to support our energy savings calculations (Both on and off site)
- Complete the “Implementation survey” to provide important metrics to DOE to continue asking for funding
  - DOE won’t consider audit complete until implementation survey is filled out
- **No obligation to implement any recommendations**
- **Process is anonymous (unless you wish to publicize)**





# IAC Program Nationwide

- 35+ IACs across USA
- Coordinated by Rutgers University (who will be compliance checking the results of this study)
- <https://iac.university/>



# IAC Program Nationwide

- Conducting assessments since 1978
- Over 21,000 assessments & 157,000 recommendations
  - Around 7 recommendations per report
- 51% implementation rate
  - Our center will work with you to study appealing recommendations resulting from this site visit



# IAC Program At Lehigh



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- Established in 2001 – 20+ years
- Over 450 assessments
- Our average energy saving per assessment is 4-8% of the plant's annual energy bill
- We can typically save aggressive plants 15% of their annual energy bill
- Run by Lehigh Mechanical Engineering Faculty
  - Center Director: Dr. Alparslan Oztekin
  - Founder & Assistant Director: Dr. Sudhakar Neti
  - Co-Director: Dr. Ebru Demir



Packard Laboratory, Lehigh University  
Department of Mechanical Engineering &  
Mechanics



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# IAC Program At Lehigh

- 150 mile range – can do multiple facilities or recommend to another center
- Team consists of ME faculty, graduate, and undergraduate students





# Typical Energy Assessment Process

- Pre-plant visit
  - Initial contact with customer
  - Energy usage analysis based on 12 month bills
- Plant visit (Remote & on-site)
- Post plant visit process



# Plant Visit Process

- Initial Interview
  - Verbal walkthrough of plant (less noisy, more time for discussion)
  - Come up with list of recommendations
- Plant Tour
  - Collect data and generate RFI to assist energy saving calcs
- Final Interview
  - Choose ~8 top performing recommendations from our list
  - Discuss details of how to implement



# Post Plant Visit

- Expect an RFI within a week from the site visit
- In 6-8 weeks (depending on availability of data) a detailed report outlining potential recommendations is prepared and submitted for compliance checking
- Each recommendation provides:
  - Energy and Cost savings, and CO2 savings
  - Implementation cost estimate (using quotes/industrial catalogues)
  - Simple Payback Period (ROI)



# Example Report Summary Table

ARC No.	Description	Annual Savings		Annual Cost Savings	Implementation Cost	Pay Back Period (yrs)
AR 1 2.4236.2	Repair Leaks in Compressed Air Lines	Electricity Demand	9,639 kWh (99 MMBtu) 23 kW	\$1,762	\$1,400	0.8
AR 2 2.7142.3	Switch to LED Lighting	Electricity Demand	21,344 kWh (220 MMBtu) 44 kW	\$3,863	\$5,799	1.6
AR 3 2.7261.3	Install Programmable Thermostats in Manufacturing Area	Electricity Natural Gas	5,134 kWh (53 MMBtu) 11 MMBtu	\$1,010	\$1,600	1.6
AR 4 2.4231.2	Reduce Compressor Set Pressure	Electricity Demand	4,897 kWh (50 MMBtu) 12 kW	\$896	\$2,000	2.3
AR 5 2.4226.2	Install New Compressor Package with Variable Frequency Drive (VFD)	Electricity Demand	26,482 kWh (273 MMBtu) 64 kW	\$4,840	\$18,014	3.8
AR 6 2.7425.1	Upgrade Existing Black Roof with Higher R Value White Insulation	Electricity Demand Natural Gas	42,118 kWh (435 MMBtu) 82 kW 32 MMBtu	\$7,995	\$37,000	4.7
AR 7 2.2443.1	Use Compressor Exhaust to Heat During Winter Months	Natural Gas	38 MMBtu	\$474	\$2,500	5.3
<b>Total</b>		<b>Energy CO2</b>	<b>1,215 MMBtu 39 metric tons</b>	<b>\$20,840</b>	<b>\$68,313</b>	<b>3.3</b>



# Post Plant Visit

- Typical factors involved in the implementation of our recommendations are:
  - Financial issues, such as cost of capital involved, Payback period, Other factors (Business environment etc.)
- During the interim period after report submission, we are available for clarifications of recommendations
- Our team will reach out in 6 months regarding the implementation report – we'll ask whether you **know or think** you will include a recommendation in future financial planning





# IAC Implementation Grant Program



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# Provision Summary: IAC Implementation Grants (BIL 40521.b1)



~\$80M in funding available



Grants awards of up to \$300,000 per manufacturer, at a 50% cost share;  
Criteria: 50% impact/feasibility; 25% financial need + cost share; 25% community benefits



Small and medium-sized manufacturer: a gross annual sales of less than \$100M (within tax group), and annual energy bills between \$100,000 - \$3,500,000



To address recommendations by IACs, DOE Combined Heat and Power TA Partnerships, or other assessments deemed equivalent by DOE



# IAC Implementation Grants Program: Two Parallel Workstreams

## Workstream 1: Implementation Grants Funding



Provide **federal funding** to eligible SMMs to implement recommendations made **in IAC or CHP TAP assessments** starting in 2018, or **qualified third-party assessments** starting in 2021

## Workstream 2: Third-Party Assessor Qualification



Identify entities interested in qualifying as a “**third-party assessor that provides an assessment equivalent**” to an Industrial Assessment Center or CHP TAP assessments

## When To Apply?

- IAC grant program **operates on a rolling basis** and may be submitted at any time through the year, with reviews after the following deadlines
  - ❑ December 31, 2023
  - ❑ March 31, 2024
  - ❑ June 30, 2024
  - ❑ September 30, 2024

## How To Apply?

- In contrast to traditional DOE funding opportunities, IAC grant program has a **very simple and straightforward application form and process** via submittable
  - **Workstream 1 Application**
  - **Workstream 2 Application**

## Have Additional Questions?

- Click [here](#) to see the latest **frequently asked questions (FAQs)**. If you have additional questions, please contact ENERGYWERX: [info@energywerx.org](mailto:info@energywerx.org)



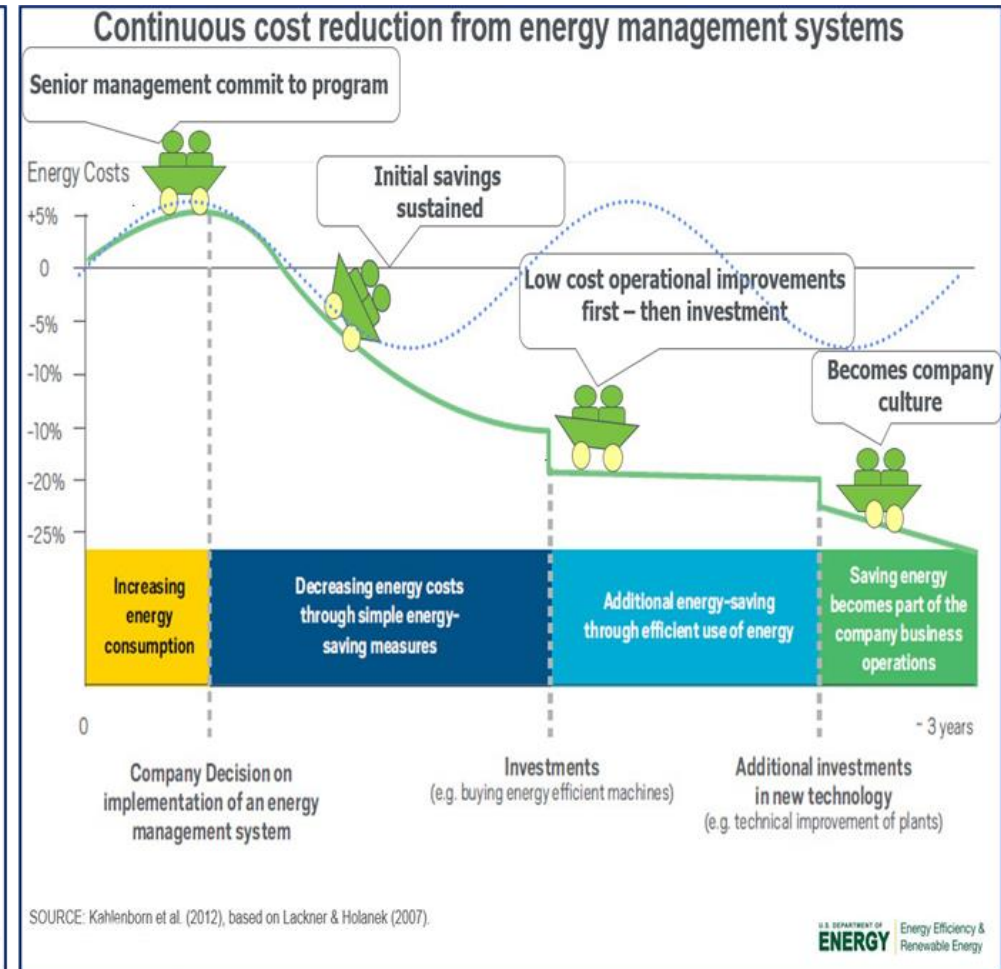
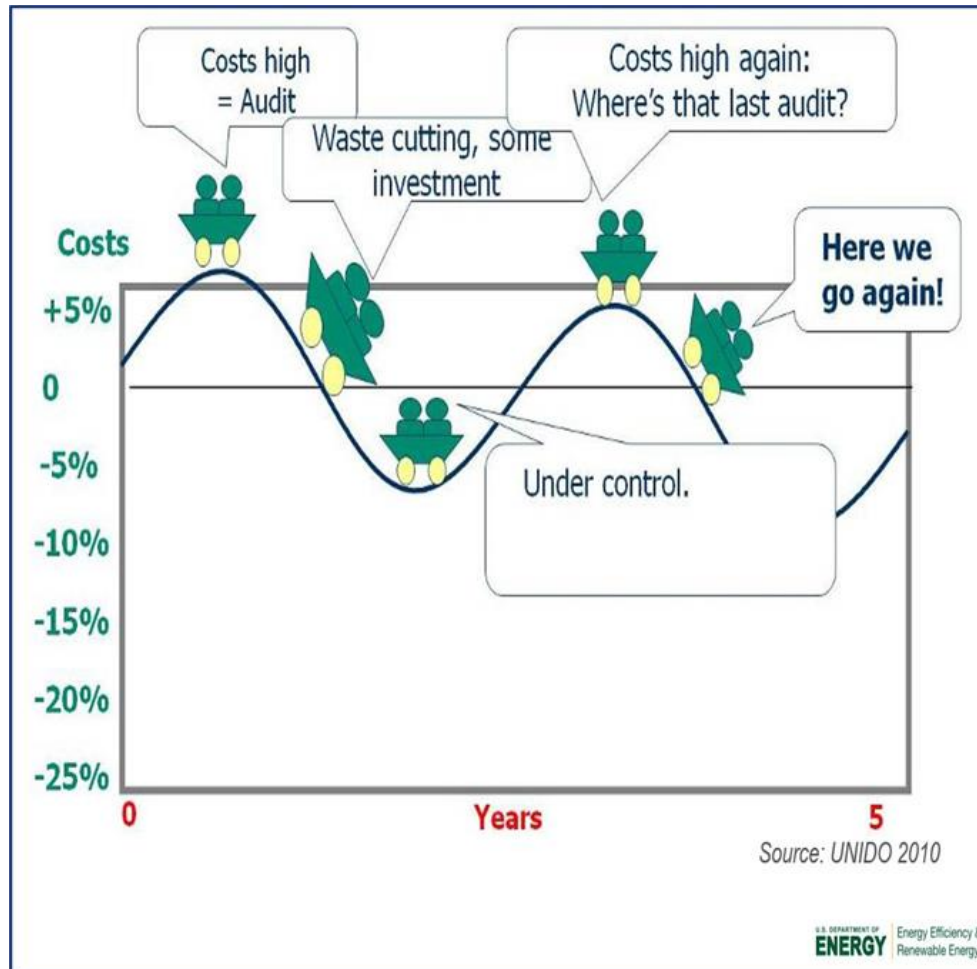
# Other Resources for Clients



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# ISO 50001 & DOE ISO 50001 Ready Program





# IAC Cybersecurity Vulnerability Assessment

- <https://iac.university/cybersecurity>
- Simple excel tool to determine attack vectors and response plan to common attacks
- Many factories have been hit by ransomware
- NIST documents help standardize defense methods



Source: N. Hanacek/NIST



# Better Plants Program

- Membership Options
  - Requires cooperate commitment
- Free Training Sessions:
- Bootcamp (Decarbonization & Energy Efficiency)
  - <https://energybootcamp.ornl.gov/>
  - <https://decarbbootcamp.ornl.gov/>
- Virtual In-Plant Trainings
  - <https://bptraining.ornl.gov/>
- DOE MEASUR TOOL
  - <https://www.energy.gov/eere/iedo/measur>



# IAC Database of Anonymous Reports



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# Search IAC Assessments



19,736  
matching assessments

Center

State

Year

Products

SIC  NAICS

[Filter](#) [Reset](#)

ID	Year	Products	Reccs	Plant Energy	Recommended
				Costs	Savings
<a href="#">WV0617</a>	2021	Metal Stamped Parts	10	\$175,027	\$24,360
<a href="#">SD0622</a>	2021	Sheet and Plate metal components	4	\$142,266	\$30,460
<a href="#">IP0153</a>	2021	Waste Water Treatment	4	\$389,034	\$41,194
<a href="#">IC0253</a>	2022	Caps	5	\$2,247,163	\$110,336
<a href="#">UU0195</a>	2022	Animal Feed	9	\$339,162	\$46,440
<a href="#">LS2205</a>	2022	Rice	6	\$211,878	\$9,055
<a href="#">UA0249</a>	2021	Jet Fuel Filter	5	\$159,617	\$28,974
<a href="#">MI0400</a>	2021	Food Products	8	\$494,882	\$49,917
<a href="#">MA0829</a>	2022	plastic bags	7	\$939,535	\$59,466
<a href="#">IP0152</a>	2021	Machined parts and PEO coated parts	5	\$376,431	\$24,050
<a href="#">DL0199</a>	2021	Uniforms and Garments	13	\$111,611	\$37,000





# IAC Assessment: CL2111

Sponsored by:  
 U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy  
 ADVANCED MANUFACTURING OFFICE

IAC Center	Clemson University
Assessment Year	2021
Principal Product	Railroad Products
NAICS	336510 - Railroad Rolling Stock Manufacturing
SIC	3743 - Railroad Equipment
Sales	\$1,000,000-\$5,000,000
# of Employees	58
Plant Area (Sq.Ft.)	161,000
Annual Production	32,000 Units
Production Hrs. Annual	2,130
Location (State)	SC

Source	Yearly Cost	Usage	Unit	Unit Cost
Electricity Usage	\$65,152	1,713,600	kWh	\$0.04
Electricity Demand	\$93,532	7,668	kW-months/year	\$12.20
Electricity Fees	\$9,912	-	\$	-
Natural Gas	\$16,837	208,675	MMBtu	\$0.08
<b>TOTAL ENERGY COSTS</b>	<b>\$186,631</b>			
<b>RECOMMENDED SAVINGS*</b>	<b>\$12,654</b>			
<b>IMPLEMENTED SAVINGS*</b>	-			

\*Non-energy impacts included in savings. See recommendations below

# Description	Savings Cost	Status	Electricity Usage		Electricity Demand	
			\$	kWh	\$	kW-months/year
01: 2.7142 UTILIZE HIGHER EFFICIENCY LAMPS AND/OR BALLASTS	\$5,665 \$4,684	?	\$3,518	87,960	\$2,146	176
02: 2.7135 INSTALL OCCUPANCY SENSORS	\$1,957 \$3,255	?	\$1,957	48,930	-	-
03: 2.4231 REDUCE THE PRESSURE OF COMPRESSED AIR TO THE MINIMUM REQUIRED	\$512 -	?	\$266	6,640	\$246	20
04: 2.7261 INSTALL TIMERS AND/OR THERMOSTATS	\$3,930 -	?	\$3,930	98,253	-	-

