



Impact of Industrial Assessment Centers on Manufacturing Industries

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BACKGROUND

- ✘ Industrial Assessment Center (IAC), Oklahoma State University(OSU) serving since 3 decades
- ✘ Service areas : Oklahoma, Kansas, Arkansas, north Texas
- ✘ Affiliates : Wichita State University,
University of Arkansas



HISTORIC DATA

- ✘ Data obtained from IAC database for Oklahoma State University
IAC (2007-2012)
- ✘ Total number of assessments: 52
- ✘ Total recommendations: 447



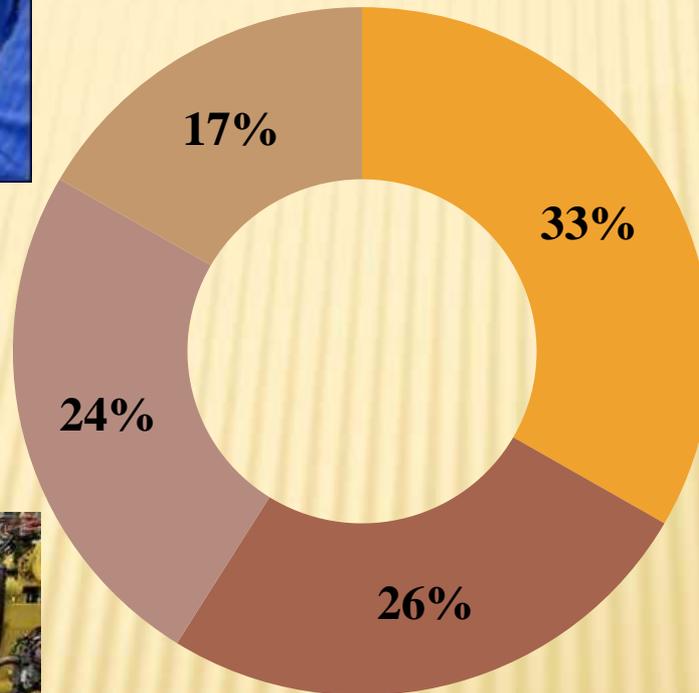
INDUSTRY SPECTRUM



Food and kindred products



Fabricated metal products



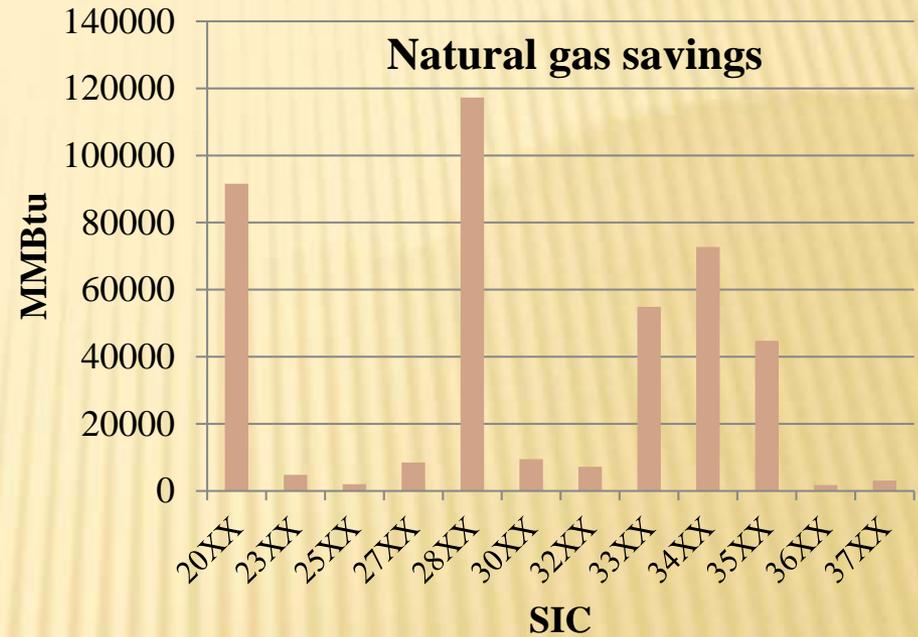
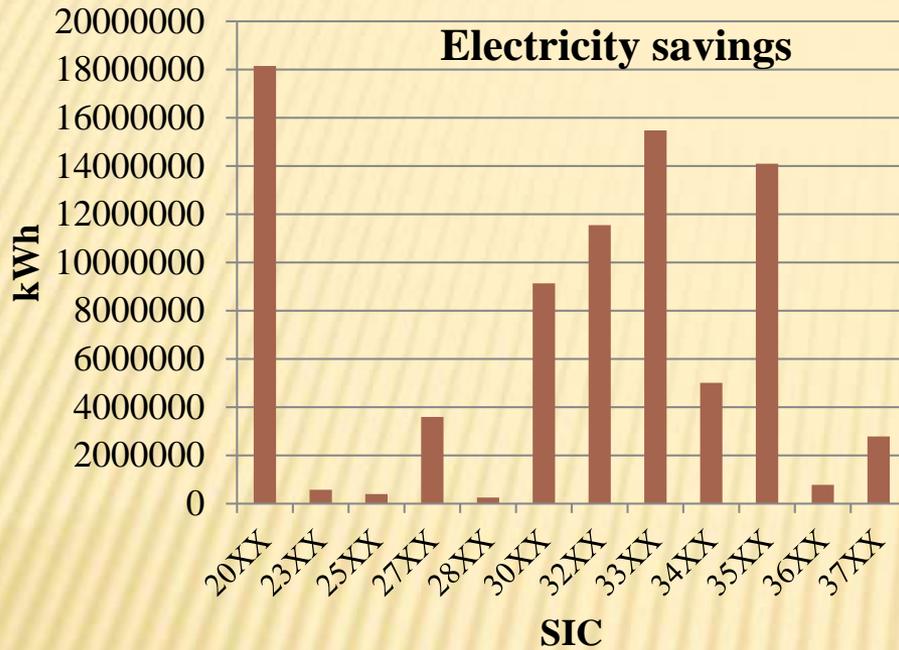
Transportation equipment



Industrial machinery and equipment



ENERGY SAVINGS OPPORTUNITIES



Electricity: Food, Industrial Machinery

Natural Gas: Food, chemical



CRUCIAL ENERGY CONSUMERS

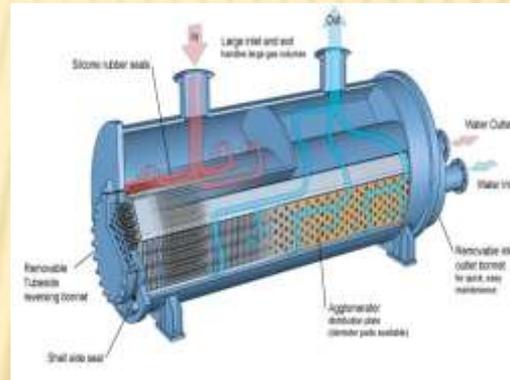
Lighting
25%



Compressors
25%



Waste heat recovery
10%



HVAC
14%

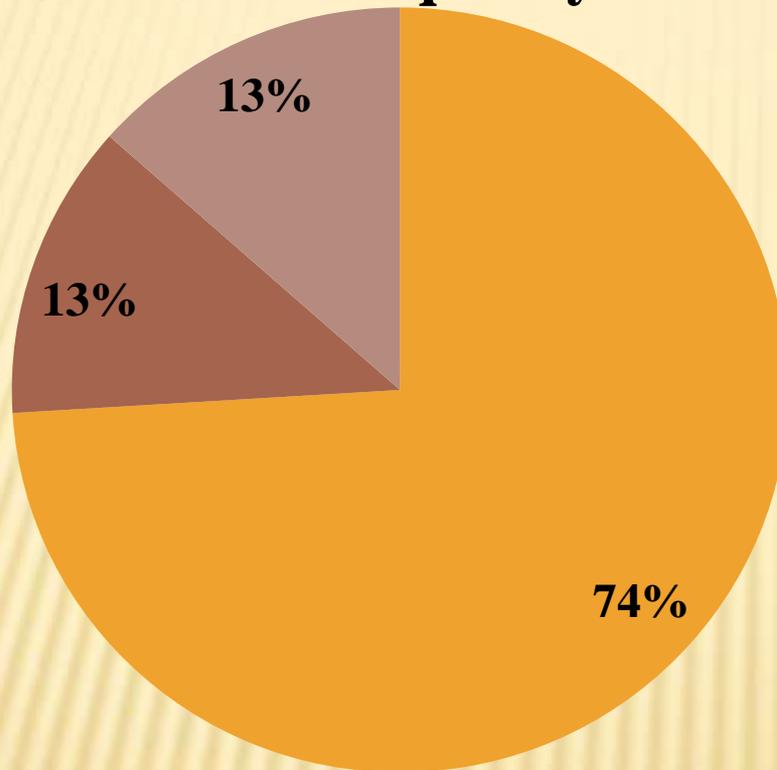


Others
26%



LIGHTING

Frequency of occurrence

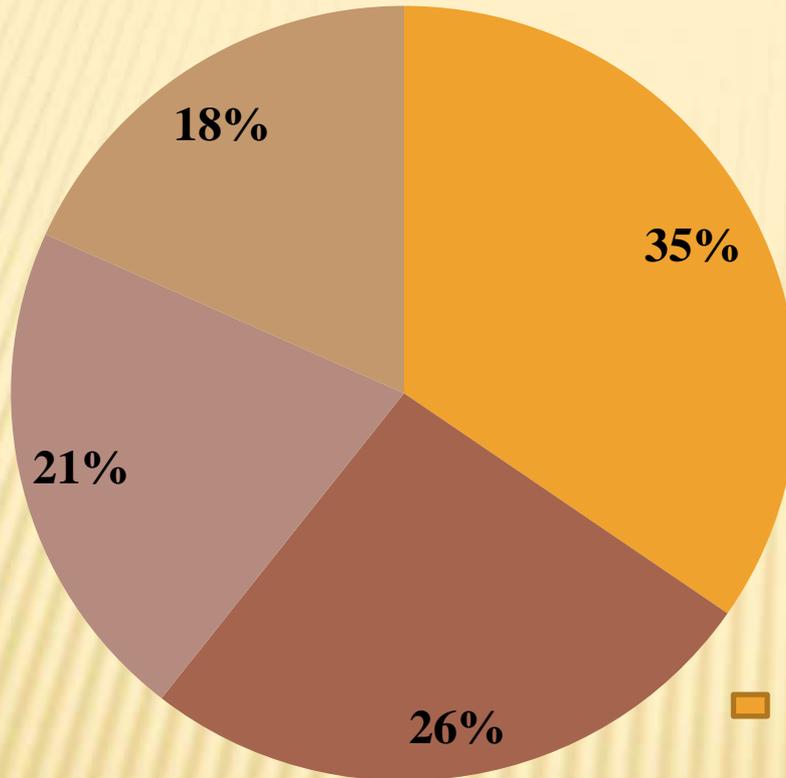


- Utilize higher efficiency lamps/ballasts
 - Use or replace with energy efficient substitutes
 - Install occupancy sensors
-
- Avg \$ savings : \$ 4000-6000/year
Payback period : 4-6years
 - Avg \$ savings : \$ 2000-3000/year
Payback period : 2-4years
 - Avg \$ savings : \$ 1000-2000/year
Payback period : 4-6years



AIR COMPRESSORS

Frequency of occurrence



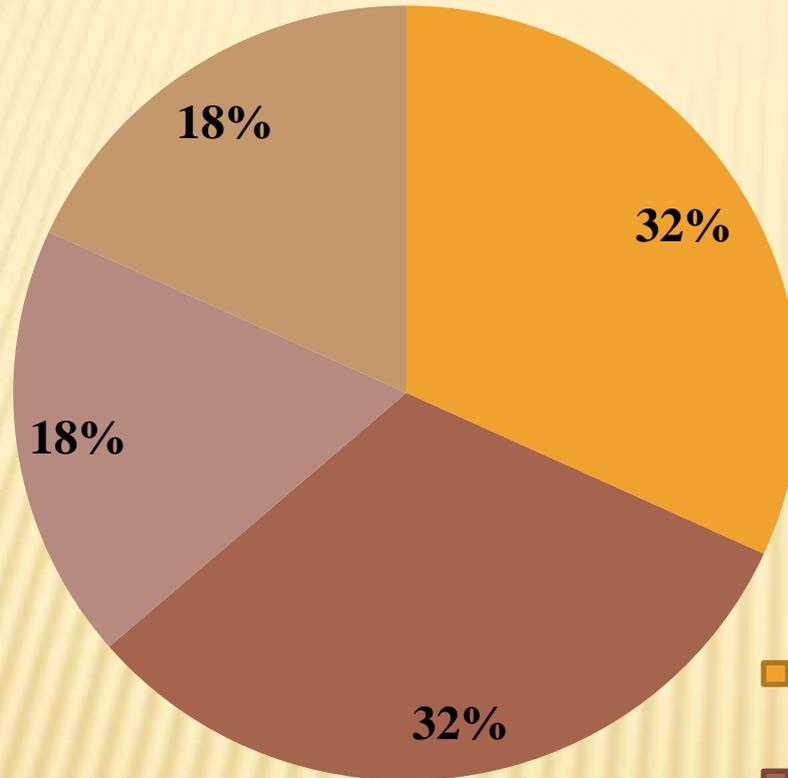
- Implementation of regular air leak maintenance program
- Fresh air intake for air compressors
- Use adjustable frequency drive for variable compressor loads
- Reduce pressure of compressed air to the minimum required

- Avg \$ savings : \$ 4000-6000/year
Payback period : 0.2-1year
- Avg \$ savings : \$ 6000-8000/year
Payback period : 2-4years
- Avg \$ savings : \$ 2000-4000/year
Payback period : 1-3years



HVAC

Frequency of occurrence



■ Install
Timers/Thermostats

■ Install economizer on
HVAC unit

■ Replace existing HVAC
units with higher
efficiency model

■ Shut off cooling if cold
outside air will cool
process

■ Avg \$ savings : \$ 3000-5000/year
Payback period : 0.5-2years

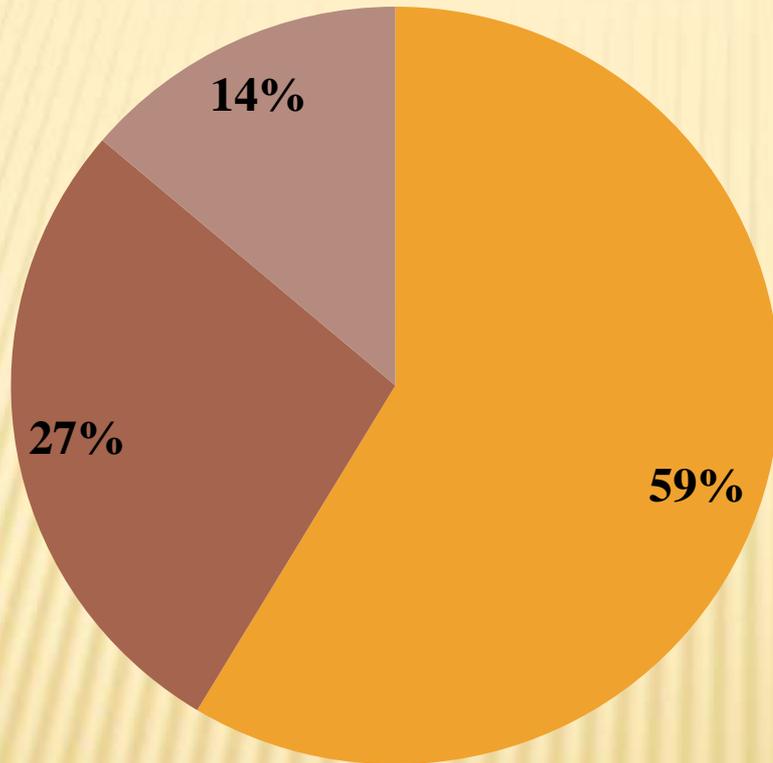
■ Avg \$ savings : \$ 6000-10,000/year
Payback period : 3-5years

■ Avg \$ savings : \$ 5000-8000/year
Payback period : 4-6years



WASTE HEAT RECOVERY

Frequency of occurrence



■ Recover waste heat from compressors

■ Use waste heat to preheat combustion air

■ Use waste heat to cogenerate electricity and heat

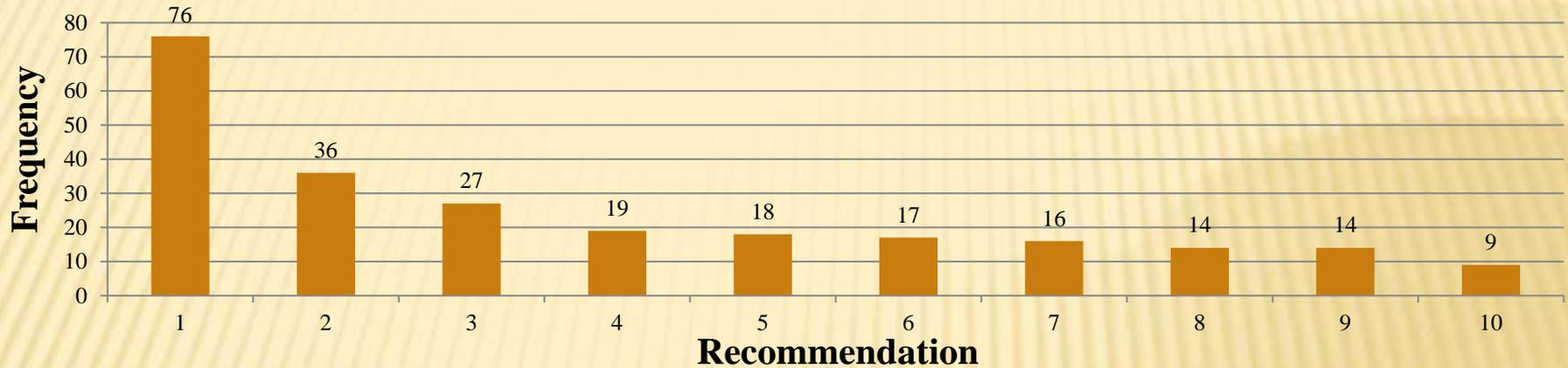
■ Avg \$ savings : \$ 3000-5000/year
Payback period : 1-3years

■ Avg \$ savings : \$ 6000-10,000/year
Payback period : 3-5years

■ Avg \$ savings : \$ 7000-10000/year
Payback period : 8-10years



MOST FREQUENT RECOMMENDATIONS



No.	Recommendation
1	UTILIZE HIGHER EFFICIENCY LAMPS AND/OR BALLASTS
2	ELIMINATE LEAKS IN INERT GAS AND COMPRESSED AIR LINES/ VALVES
3	INSTALL COMPRESSOR AIR INTAKES IN COOLEST LOCATIONS
4	REDUCE THE PRESSURE OF COMPRESSED AIR TO THE MINIMUM REQUIRED
5	USE MULTIPLE SPEED MOTORS OR AFD FOR VARIABLE PUMP, BLOWER AND COMPRESSOR LOADS
6	RECOVER HEAT FROM AIR COMPRESSOR
7	INSULATE STEAM / HOT WATER LINES
8	INSTALL OCCUPANCY SENSORS
9	INSTALL OUTSIDE AIR DAMPER / ECONOMIZER ON HVAC UNIT
10	INSTALL SET-BACK TIMERS



\$ SAVINGS FOR MOST FREQUENT ARs

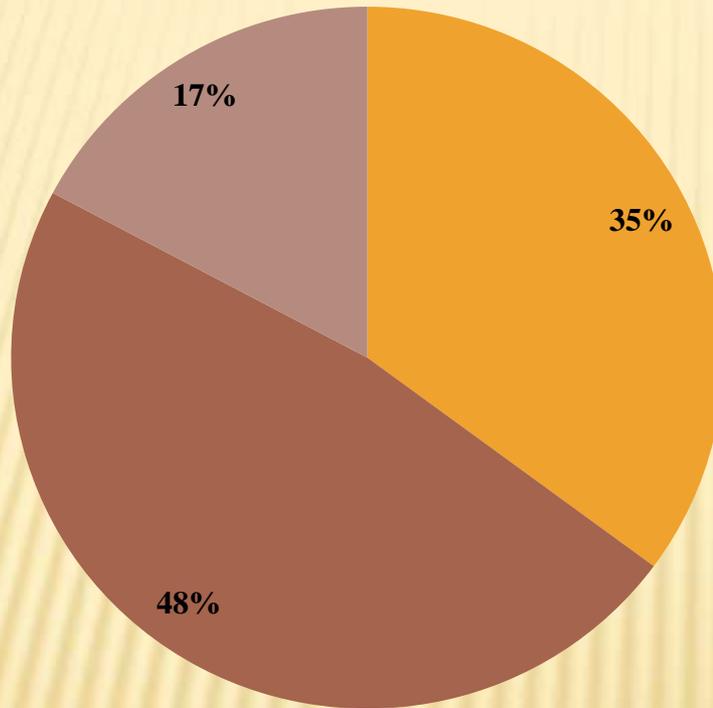


Sr.	Description	\$ Savings
1	ELIMINATE LEAKS IN INERT GAS AND COMPRESSED AIR LINES/ VALVES	674948
2	INSTALL COMPRESSOR AIR INTAKES IN COOLEST LOCATIONS	512347
3	RECOVER HEAT FROM AIR COMPRESSOR	258559
4	UTILIZE HIGHER EFFICIENCY LAMPS AND/OR BALLASTS	211329
5	INSTALL OUTSIDE AIR DAMPER / ECONOMIZER ON HVAC UNIT	70184
6	INSULATE STEAM / HOT WATER LINES	69109
7	INSTALL SET-BACK TIMERS	59463
8	INSTALL OCCUPANCY SENSORS	59211
9	REDUCE THE PRESSURE OF COMPRESSED AIR TO THE MINIMUM REQUIRED	45146
10	USE MULTIPLE SPEED MOTORS OR AFD FOR VARIABLE PUMP, BLOWER AND COMPRESSOR LOADS	35490



REALIZATION RATE

Implementation status



- Implemented recommendations
- Non - implemented recommendations
- Implementations under consideration



IMPLEMENTED RECOMMENDATIONS

Driving Factors

- ✘ **Low payback period**
- ✘ Air leaks - average payback 0.2 years
- ✘ High efficiency lamps and ballasts - average payback 4 years
- ✘ **Corporate initiatives**
- ✘ **Technical expertise**



PATHWAY AHEAD

Assistance in pre assessment preparation

- ✘ Identify the major energy consuming equipments for specific industry
- ✘ Identify possible recommendations by focused analysis
- ✘ Identify the implemented ARs and focus on those areas
- ✘ Study the energy trends of that industry
- ✘ Identify energy efficient techniques/equipments for that industry



PATHWAY AHEAD

During the assessment

- ✘ Focus on major consumers - Lighting, Compressors, Waste Heat Recovery
- ✘ Analyze the process to get better understanding of system

Post assessment

- ✘ Work towards achieving lower payback period to encourage implementation of recommendations
- ✘ Research and work on new tools and techniques



THANK YOU

