DTE Energy

DTE Energy Partnership

Giving you
the **insight**
by being **on-site**

IN AN ENERGY MANAGEMENT PROGRM

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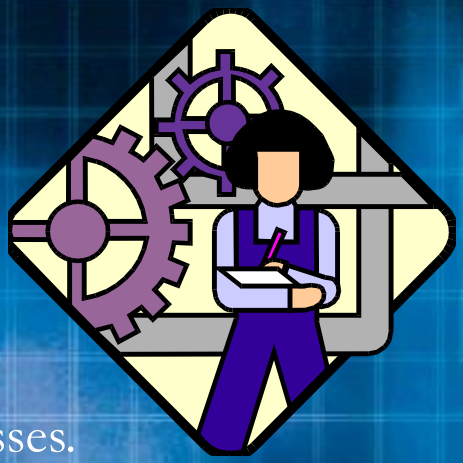
The DTE Energy

Energy Partnership Is:

It is an experienced and skilled team of over 50 engineers.

Working with Customers throughout Service Territory and specific location in North America



Their Goals are:

Identify and implement energy saving projects and processes.

Use best practices to develop an efficient strategy consistent with our client's objectives.

Audit Discussion

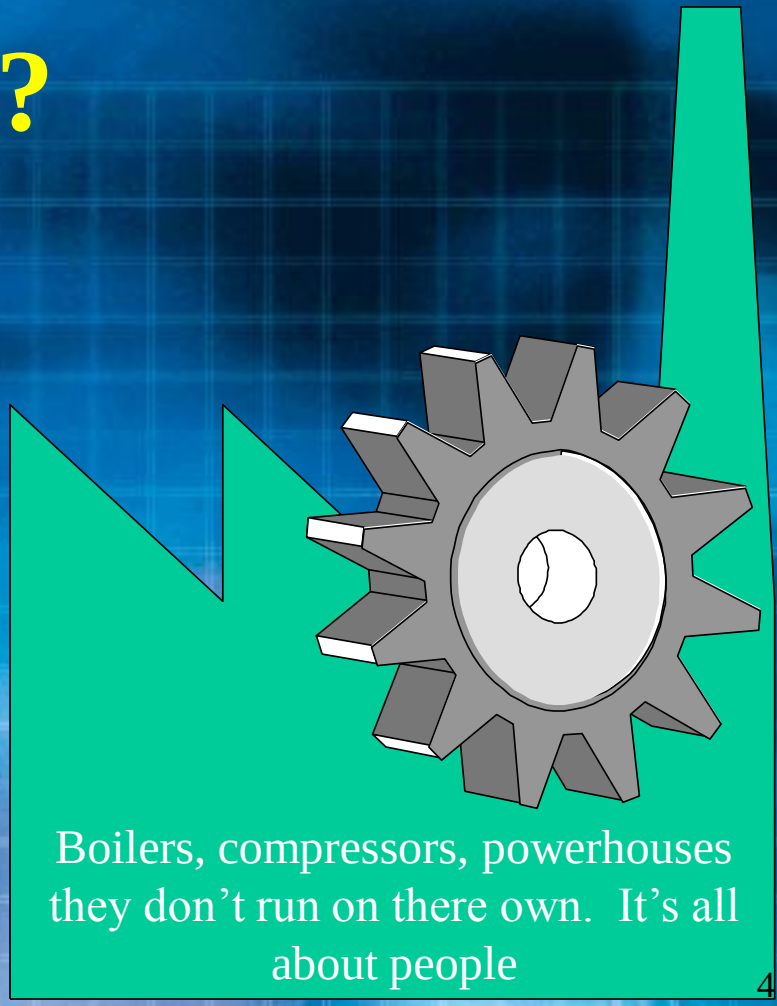
1. Auditing Objectives
2. Prerequisites
3. Plan
4. Tools Required
5. Data
6. Rule of Thumbs
7. Energy Optimization
8. Q&A

GOAL= Energy Reduction

How will you do It?

Focus on Opportunities

Energy is all about involvement



Boilers, compressors, powerhouses they don't run on there own. It's all about people

Commitment

- Top Level Management has to make the commitment for the program to work.
- All employees have understanding of potential savings cost
- All employees are needed to be on board for the program to work

Auditing Objectives

- Reduce Energy
- Reduce Maintenance
- Avoided Costs
- Facility Upgrade
- Operations Strategy
- Retro-commissioning
- Process Control
- Reduce Environmental Impact

Auditing Prerequisites

- Design and implement a plan that targets and reduces utility and other associated waste/costs.
- If you do not have the expertise internally hire an outside consultant with energy management experience.
- Identify the level of detail required.
- Perform walk-down of facility prior to audit

Auditing Prerequisites

Meter and document your monthly utility usage rate and utility costs. Remember: ***" You can't control what you don't know".***

- Primary Energy Sources:
  - Fuels - Natural gas, coal, propane, fuel oil
  - Electric
  - Water
- Secondary Sources:
  - Steam
  - Compressed Air
- Other Sources
  - Degree Day Data

Auditing Plan

- Scope definition
- Identify support requirements
- Identify metering and measurements to be taken.
- Retro-commissioning requirements
- Leverage “Best Practices”
- What are the deliverables?

Auditing Plan

- Financial Analysis
  - Payback requirements
  - No cost / low cost
  - Capital investment
  - Performance Contracting
  - Avoided costs
  - Maintenance
  - Tax and Utility Rebates/incentives

Energy Audit Targets

Sustainable Savings

- Compressed Air Systems
- Lighting Systems
- Motor/VFD Systems
- Air Handling Equipment
- HVAC Systems
- Boilers and Steam Systems
- Chilled Water Systems
- Building Envelope
- DDC Controls

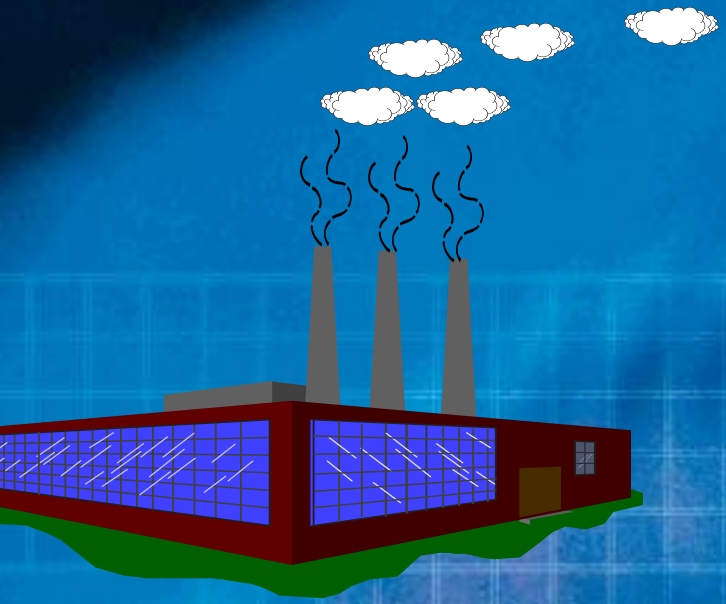
"Soft" Savings

- Downtime Energy Reductions
- Employee Awareness Programs
- Contract lower utility rates
- Power Factor
- Energy Management Systems (EMS/BMS)
- Create a Energy Reduction Plan annually
- Corporate Energy Policy

Tools Required

- Ultrasonic detector
- Various measuring devices
  - Thermometer
  - Laser measurement ruler
  - Light meter
  - Multimeter
  - Flow meter
- Camera
- Laptop computer

Benefits Of Energy Audit Program

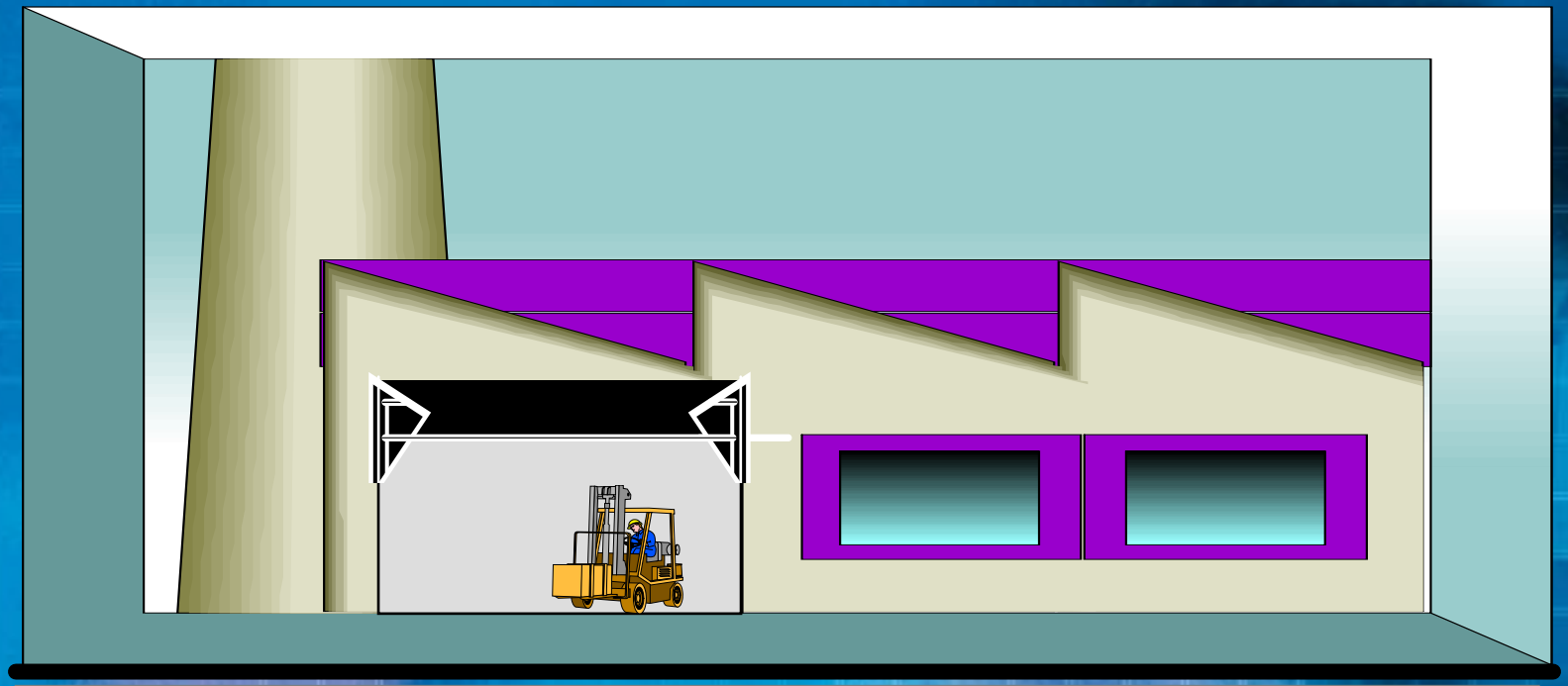


- Reduce Cost of Energy
- Prolong Life of Equipment
- Reduce Maintenance Expense
- Reduce the Nation's Consumption of Natural resources
- Improve Air Quality and the Environment
- Reduce Emissions

Some information about
Detroit Edison and its
Environmental efforts

Emission/Waste	Detroit Edison Average Pounds Per Megawatt-hour	Regional Average (IL,IN,OH and WI)
Sulfur Dioxide	9.1 pounds	19.9 pounds
Carbon Dioxide	1,705.9 pounds	2,117.2 pounds
Nitrogen Oxides	4.0 pounds	7.9 pounds
High-Level Nuclear Waste	0.0089 pounds	0.0074 pounds

Air Conditioning Loss..



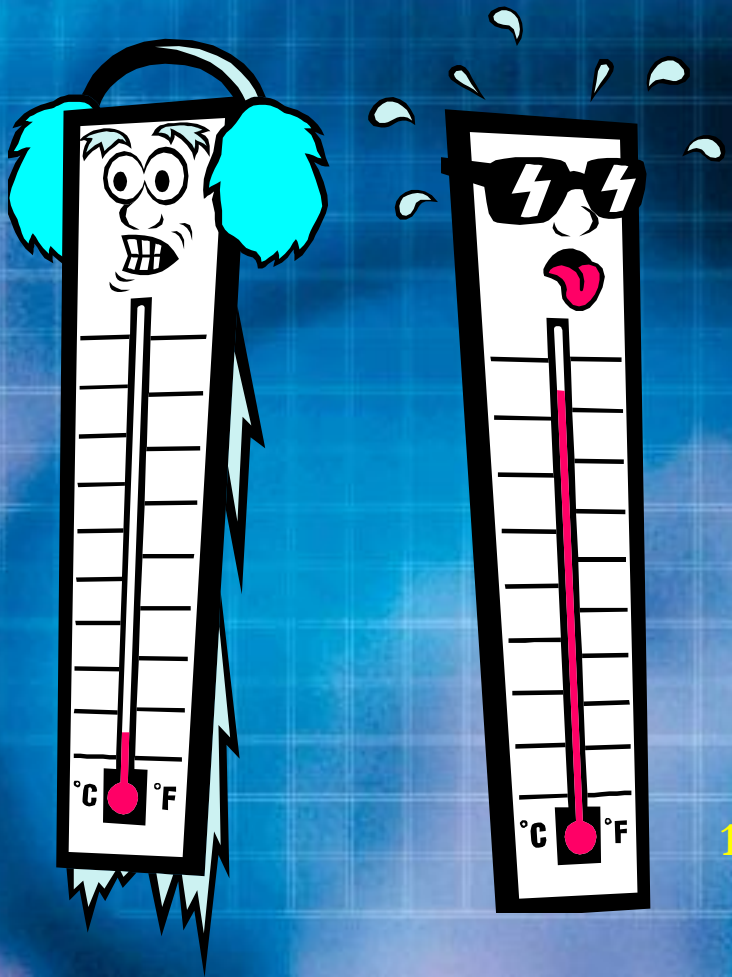
Roll Up Door Loss - $20,000/Door/Season - ($11.00/Hr)

Thermostat Settings

1 Degree = 2% Energy Savings

Winter Setting

Heating Season
Decrease
Thermostat Setting
1 degree saves 2% energy



Summer Setting

Cooling Season
Increase
Thermostat Setting
1 degree saves 2% energy

Principles of Efficient Lighting Design

- Meet target light levels
- Efficiently produce light
- Efficiently deliver light
- Automatically control lighting operation

Typical light levels (I.E.S.):

- Parking lot……2 Footcandles
- Hallways……..10 Footcandles
- Factory floor...……..30 Footcandles
- Offices……..50 Footcandles
- Inspection...……100 Footcandles
- Operating room...……..1000 Footcandles

Lighting Project Case Study

- Retrofitted 5,800 (4) lamp T12F40 fixtures with (2) lamp T8F32 w/electronic ballasts and new reflector.
- This project resulted in
  - No decrease in quality or light level.
  - Reduced demand 750 kW
  - Lowered energy usage 4,561,378 kWh
  - $19.6k in reduced maintenance costs
  - 2.6 years simple payback

Steam

Steam Trap Audit
Industrial Plant Example

Total Steam Trap inspected 476

Results:

# of Leaking traps:	59	12%
# of non operating traps:	237	50%
# of Operating properly traps:	180	38%

This results in 13,667,000 Lb.. of steam wasted per year or $123,043

* 1000Ib = $9.00

Steam Leaks

Leak Size	-	$/year
1/16 inch		$162
1/8 inch		$652
1/4 inch		$2,606
3/8 inch		$5,870
1/2 inch		$10,424

Condensate Leaks`

Leak Size	-	$/year
1/4 inch		$24,000
1/2 inch		$60,000
3/4 inch		$111,000
1 inch		$185,000

24Hr/Day, 365 days/year
50 LB. Steam Pres

Electrical Motors

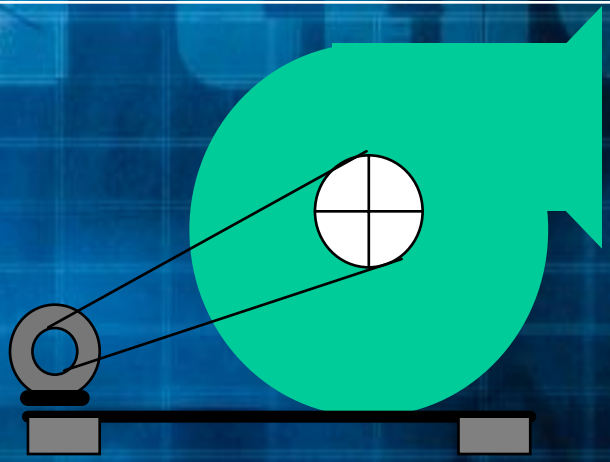
- Electric motors account for about three-quarters of total electricity use in industry and half of electricity use in commercial and industrial buildings.
- New motors are available in standard and high efficiency models. A high-efficiency motor will cost more than a standard one, but electricity savings can quickly pay back this cost difference.

ELECTRIC MOTOR EFFICINCIES			
	Efficiency		
Motor Horsepower Rating	Standard Motor	Efficient Motor	$ savings /yr
10	85.0	89.0	$ 173
20	87.5	90.5	$ 248
30	88.5	92.0	$ 421
40	89.5	92.5	$ 474
50	90.0	93.0	$ 586

* assuming $0.05/kWh
* year = 365 days

Rule of Thumb
Electrical Cost to Operate Motors

$1/HP/Day



50 HP Motor
$15,430/Year

* assuming $0.05/kWh
* year = 365 days

Leaving On Electrical Equipment Unnecessarily Is Costly

Cost of electricity during non production time.

Electrical Item	***Op. Cost/yr****	***Op.Cost/ Production***	***Op.Cost/ Non_Production***
400 Watt HPS Light (100)	$20,367	$6,045	$14,322
150 Watt HPS Light (100)	$7,665	$2,340	$5,325
1 Electric Line Fan (200Watt) (50)	$4,380	$1,300	$3,080
4’ Fluorescent Fixture (2 Lamps) (200)	$8,000	$2,000	$6,000
30 HP Pump (10)	$98,020	$29,090	$68,930

* assuming $0.05/kWh
* year = 365 days
*Production = 5days @ 10 hr per day

Compressed Air System

- Surveys reveal that a quarter of all compressed air produced is wasted through leaks.
- Ultrasonic instrumentation makes it quick and easy to spot leaks in a compressed air system.
- The potential for leaks exists anywhere there is compressed air piping and equipment.

Rules of Thumb

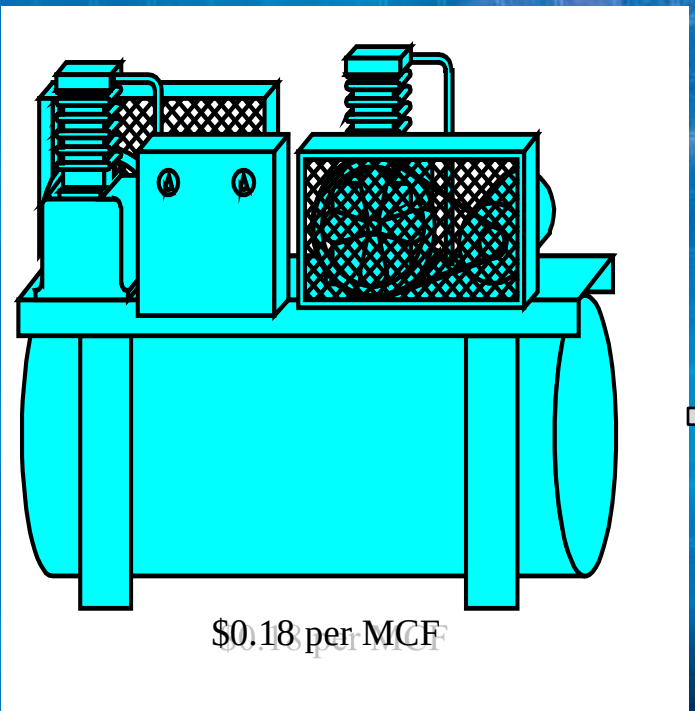
• $589 / year Leak (1/16”)	Can not be seen or heard
• $2,359 / year Leak (1/8”)	Can be felt but not heard
• $9,436 / year Leak (1/4”)	Can be felt and heard

⌘Ignoring a **1/4"** compressed air leak is equivalent to ignoring three hundred sixty (60-watt) light bulbs that are burning 24 hrs. per day, 7 days per week. ($9,460.80 per year)

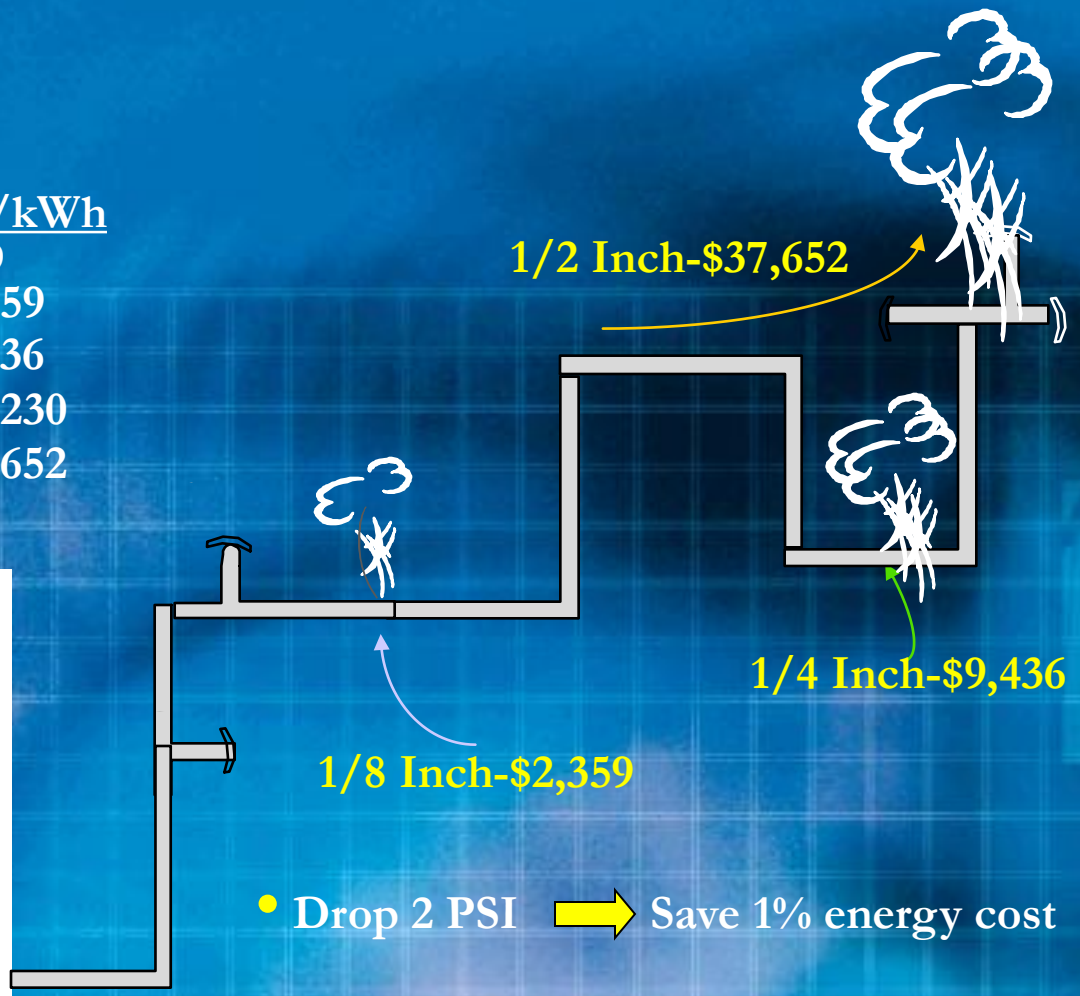
* assuming $0.05/kWh
* year 365 days

Compressed Air Leaks Are Costly

24Hr/Day-100 PSI - 0.05/kWh	
1/16 inch	$589
1/8 inch	$2,359
1/4 inch	$9,436
3/8 inch	$21,230
1/2 inch	$37,652

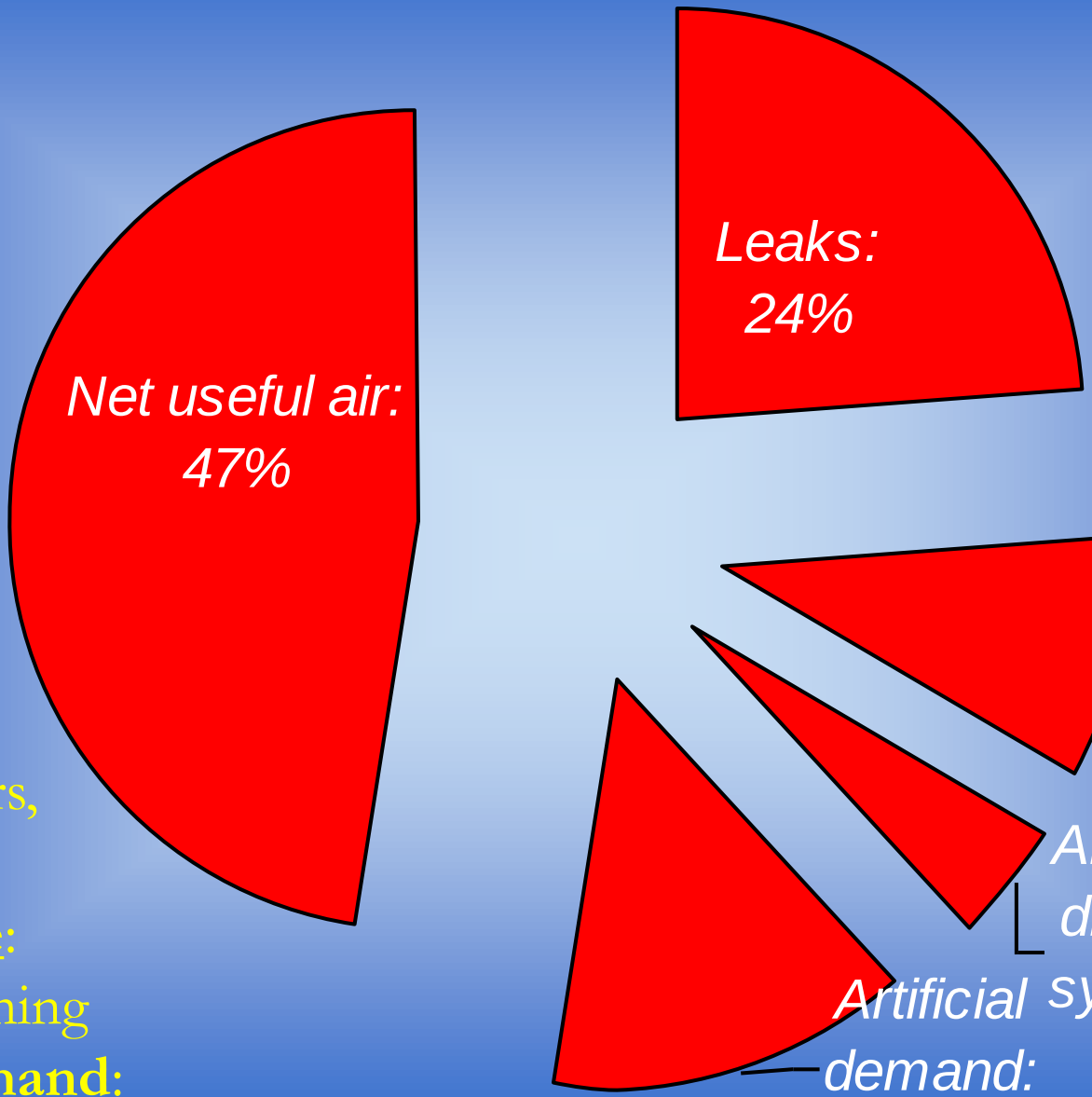


$0.18 per MCF



- Drop 2 PSI ➡ Save 1% energy cost
- 100 HP Compressor full load non stop per year is costing approximately $30,000/Year

Typical Components of Demand



Leaks:
-In line, headers, distribution...
Inappropriate:
-Cooling, Cleaning
Artificial Demand:
-Pressure 106 psi where only 88 psi are needed

Cost of Water Leaks

Water Leaks	Year
1/8 inch	$180
1/4 inch	$575
1/2 inch	$949
3/4 inch	$1,743

Energy Management System (EMS)

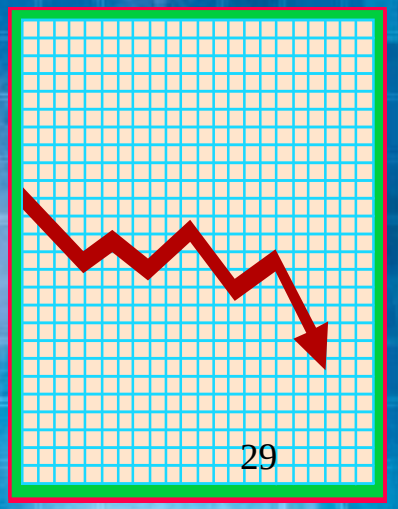
- Centrally located computer screen
- Ties in all DDC leads to specific equipment
- Controls Air Distribution Systems
- Controls Lighting Systems
- Controls HVAC
- Controls Chilled Water Systems
- Reduces Utility Costs

Environmental Impacts

- Reducing utility costs reduces the amount of coal needed for power plants.
- Reducing coal usage prolongs our nation's coal supply.
- Reducing power plant output reduces the stack output of pollutants.

Saving 10,000 kWh

- Reduces 20.9 tons of carbon monoxide
- Reduces 107 lb.. Of sulfur dioxide
- Reduces 45 lb.. Of nitrogen oxide
- Pollution associated with the emissions of more than 2.8 cars
- Equivalent of planting more than 3.8 Acres of trees



What's next….

PA 295

- Michigan Public Act 295 (PA 295)
- Passed October 2008
- Requires investor owned utilities, municipalities, and rural electric cooperatives to institute energy optimization programs

DTE Energy Participation

- Lower customer bills
- Reduce energy demand throughout Michigan
- Help protect the environment
- Helps motivate as well as offset the costs of investment when upgrading to or replacing with energy efficient products

Customer Benefits

- Provides long term energy savings
- Lowers electric/gas bills compared to less efficient equipment
- Reduces your carbon footprint

How does it work?

- Michigan utilities are running programs to help customers save energy
  - Education and awareness
  - Rebates and incentives to use more efficient products
- The programs are operated by expert firms, and use local labor and products as much as possible
- The cost of these programs is being paid through a utility bill surcharge dedicated to these programs

Program Offerings

- **Prescriptive Incentives**
  - Predetermined measures and incentives for industrial and commercial customers for the installation of specific energy efficient equipment for numerous applications
  - Incentives typically average 20% to 50% of the incremental cost of purchasing qualifying technologies

- **Custom Incentives**
  - Custom incentives are determined on a case-by-case basis and are paid per unit energy saved ($0.08/kWh and/or $4/MCF)

- **New Construction & Renovation**
  - Incentives are available for up to $3,000 for whole building modeling
  - Additional incentives are determined based on modeling results showing that energy efficiency exceeds ASHRAE 90.1-2004 standards by 10%

Pilot Programs

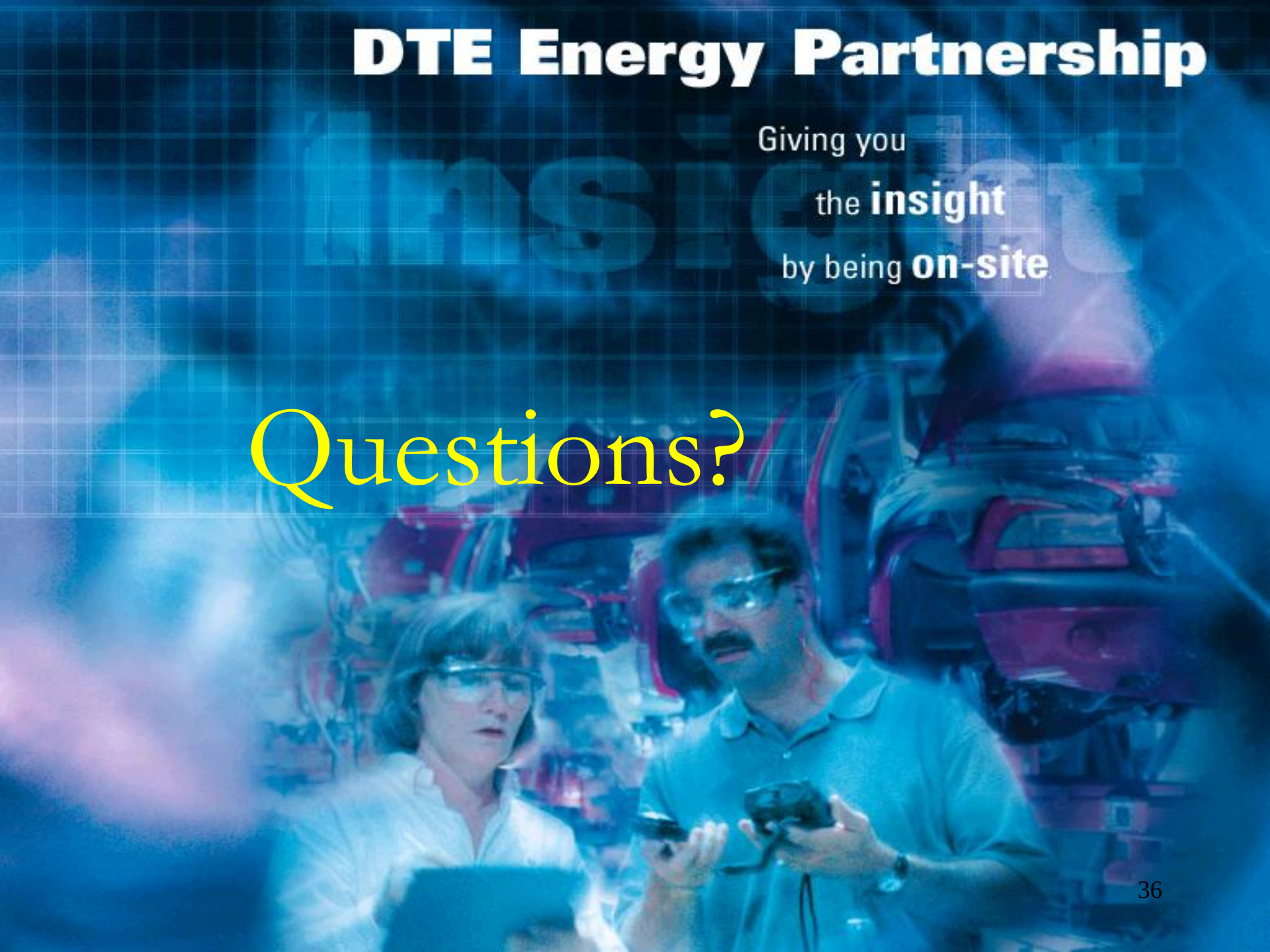
- As provided by MPSC Order, “Utilities may designate up to five percent of the energy optimization budget for:
  - Pilot programs
  - Future energy optimization program development
  - To assess “emerging technologies”

Why Pilot?

- To test new commercialized products and/or services, in order to measure actual energy savings and cost effectiveness.
- To test price points and market acceptance.
- To identify new measures within an existing energy optimization program, or to introduce a new program if there is not a related offering in existence.

Pilot Programs

- Pilot opportunities are screened and prioritized based on potential energy savings and cost effectiveness.
- The most promising pilot proposals are “fielded,” monitored, measured and evaluated.
- Examples of pilot proposals include:
  - PC power management
  - LED Community lighting applications
  - Commercial weatherization for non-profits
  - M2G boiler controllers
  - Compressor control and monitoring systems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Questions?