SESSION NO.: T1-24 TUESDAY, MARCH 16, 2010 ROOM NO.: 324

# Managing & Controlling Your Energy Costs


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BUILDING OPERATING MANAGEMENT'S NFMT
March 16-18, 2010 • Baltimore
INCLUDING
NFM&T CONFERENCE/EXPO
Maintenance SOLUTIONS NATIONAL EXPO
GREENTech conference & exposition
SAFE BUILDINGS EXPO

# The Energy Cost Reduction Process

# WHERE TO START

# KNOWLEDGE

## Do you know your utility spend by facility?

- Electricity
- Natural Gas
- Water
- Sewer

# ENERGY COST vs. PROFITABILITY

## Why is energy cost knowledge important?

# HOW ENERGY COSTS IMPACT PROFIT MARGIN

| | | |
|---|---|---|
| 1. | Annual Profit Margin | 5% |
| 2. | Annual Energy Costs | $100,000 |
| 3. | Annual Energy Savings | 5% |
| 4. | Savings Dollars | $5,000 |

Reduce Energy Costs by **$5,000**

**OR**

Increase Sales by **$100,000**

*($100,000 x 5% = $5,000)*

**Both strategies**
**reduce bottom line costs the same**

# GETTING STARTED

# ELECTRICITY

# BILLING DATA NEEDED

1. Utility Name
2. Account Number
3. Facility Address
4. Billing Period
5. Rate
6. Demand
7. Power Factor
8. Usage
9. Voltage
10. Bills: S/W

# TYPICAL ELECTRICITY SAVINGS

# 3-10%

# PLUS

- Protection from price spikes
- More predictable expense budgets

# ELECTRICITY RATE

## Rate Suitability is the Customer's Responsibility

| UTILITY, INC. | STATEMENT OF ELECTRIC SERVICE | ACCOUNT NUMBER |
|---|---|---|
| *For Inquires 24 Hours per Day* | COMPANY NAME: | DATE DUE: |
| *For Payment Locations Call:* | BILLING ADDRESS | TOTAL AMOUNT DUE: $5,920.82 |
| *Website:* | | NEXT READ DATE ON OR ABOUT: |
| *To Report a Power Outage:* | SERVICE ADDRESS: | DEPOSIT AMOUNT ON ACCOUNT: |

**GS-GENERAL SERVICE**

*ONDARY VOLTAGE / 440-3 PHASE)*

| METER READINGS | | | 1 TO JAN 31 | 30 DAYS |
|---|---|---|---|---|
| METER NUMBER | | 0672 | | |
| KWH PRESENT | (Actual) | 044335 | | |
| KWH PREVIOUS | (Actual) | 043127 | | |
| DIFFERENCE | | 1208 | | |
| CONSTANT | | 40 | | |
| TOTAL KWH | | 48320 | | |
| KW PRESENT | (Actual) | 4.175 | | |
| CONSTANT | | 40 | | |
| TOTAL KW | | 167 | | |
| KVA PRESENT | (Actual) | 6.95 | | |
| CONSTANT | | 40 | | |
| TOTAL KVA | | 278 | | |

| — ENERGY USE— | |
|---|---|
| DAILY AVERAGE USE | 1611 KWH / DAY |
| USE ONE YEAR AGO | 1439 KWH / DAY |

| | | | |
|---|---|---|---|
| CUSTOMER CHARGE | | 21.64 | |
| ENERGY CHARGE INCLUDING FUEL COST ADJUSTMENT | 48320 KWH @ 5.1263¢ | 2,477.03 | |
| DEMAND CHARGE | 250 KW @ 9.5299¢ | 2,382.47 | |
| TOTAL ELECTRIC COST | | | $4,881.14 |
| GROSS RECEIPTS TAX | @ 2.5% | | 122.03 |
| MUNICIPAL FRANCHISE FEE | @ 6.5% | | 317.27 |
| MUNICIPAL UTILITY TAX | @ 3.6% | | 175.72 |
| SALES TAX | @ 8.7% | | 424.66 |
| TOTAL CURRENT BILL | | | $5,920.82 |
| TOTAL DUE THIS STATEMENT | | | $5,920.82 |

Payment of your bill prior to the above due date will avoid a late payment charge of 1.5%

*OUR 24-HOUR OUTAGE NUMBER is the quickest way to report power outages – Just Call*:

# RATE – WHAT TO DO?

1. Look for alternative rates
2. Evaluate cost reduction potentials
3. Consider future usage
4. Evaluate alternative rates for "best fit"

# ELECTRICITY DEMAND

## Measured in kW

## 1 kW = 1,000 Watts

## Demand is –

## *Capacity Reservation*

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| METER READINGS | GS-General Service | *SECONDARY VOLTAGE (220 / 440-3 PHASE)* |

**DEMAND CHARGE 250 kW @ $9.5299 = $2,382.47**

| | | |
|---|---|---|
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| DIFFERENCE | | 1208 |
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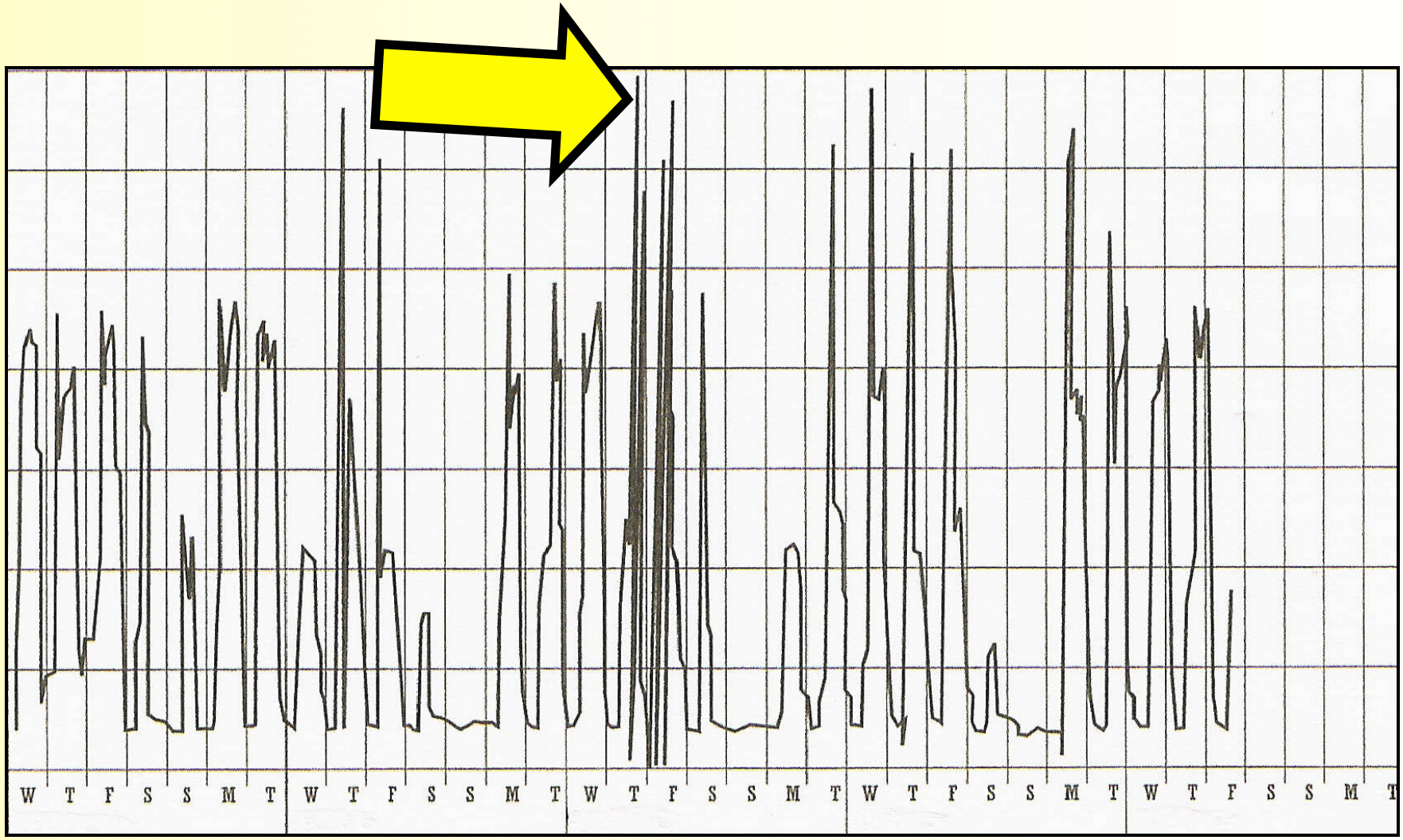
# STRIP CHART EXAMPLE



# DEMAND – WHAT TO DO?

1. Install data recorder
2. Analyze data
3. Take corrective action

# ELECTRICITY POWER FACTOR

## Power Factor is –

***Ratio of real power to apparent power***

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| METER READINGS | | | GS-General Service | *SECONDARY VOLTAGE (220 / 440-3 PHASE)* |
|---|---|---|---|---|
| METER NUMBER | | 0672132 | BILLING PERIOD: | JAN 01 TO JAN 31 30 DAYS |
| KWH PRESENT | (Actual) | 044335 | CUSTOMER CHARGE | 21.64 |
| KWH PREVIOUS | (Actual) | 043127 | ENERGY CHARGE INCLUDING FUEL COST ADJUSTMENT | 48320 KWH @ 5.1263¢ 2,477.03 |
| DIFFERENCE | | 1208 | **DEMAND CHARGE 250 KW@ $9.5299 = $2,382.47** | |
| CONSTANT | | 40 | COST | $4,881.14 |
| TOTAL KWH | | 48320 | GROSS RECEIPTS TAX | @ 2.5% 122.03 |
| KW PRESENT | (Actual) | 4.175 | MUNICIPAL FRANCHISE FEE | @ 6.5% 317.27 |
| CONSTANT | | 40 | MUNICIPAL UTILITY TAX | @ 3.6% 175.72 |
| **Total kW** | | **167** | SALES TAX | @ 8.7% 424.66 |
| | | | TOTAL CURRENT BILL | $5,920.82 |
| CONSTANT | | 40 | | |
| **Total kVA** | | **278** | TOTAL DUE THIS STATEMENT | $5,920.82 |
| DAILY AVERAGE USE | 1611 KWH / DAY | | Payment of your bill prior to the above due date will avoid a late payment charge of 1.5% | |
| USE ONE YEAR AGO | 1439 KWH / DAY | | *OUR 24-HOUR OUTAGE NUMBER is the quickest way to report power outages – Just Call*: | |

# SAMPLE BILLING ANALYSIS

## Power Factor Cost

**(250 – 167 kW) = Penalty of 83 kW**

**@ $9.5299 per kW = $790.98**

**16% OF TOTAL COST**

# POWER FACTOR – WHAT TO DO?

1. Determine Power Factor cost
2. Consider correction capacitors
3. Calculate cost vs. savings

# ELECTRICITY USAGE

## Usage (kWh) is –

## *Connected load times hours of usage*

*(1kWh = 1,000 Watts for 1 hr)*

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| CONSTANT | | 40 |
| **Total kWh** | | **48320** |
| KW PRESENT | (Actual) | 4.175 |
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| TOTAL KW | | 167 |
| KVA PRESENT | (Actual) | 6.95 |
| CONSTANT | | 40 |
| TOTAL KVA | | 278 |

**ENERGY CHARGE INC. FUEL COST ADJUSTMENT** 48320 kWh @ 5.1263¢ $2,477.03

| | | | |
|---|---|---|---|
| DEMAND CHARGE | 250 KW @ 9.5299¢ | 2,382.47 | |
| TOTAL ELECTRIC COST | | | $4,881.14 |
| GROSS RECEIPTS TAX | @ 2.5% | | 122.03 |
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# SAMPLE BILLING ANALYSIS

**kWh Charge ($2,477.03) = 50.7% of**

**Total Electric Cost ($4,881.14)**

# Where is the other 49.3% ?

# THE OTHER 49.3%

| | | | |
|---|---|---|---|
| • kWh Charge | $2,477.03 | 50.7% | |
| • kW Charge | $2,382.47 | 48.8% | |
| • Cust. Charge | $21.64 | 0.5% | |
| • Subtotal | $4,881.14 | 100.0% | kWh/kW/Cust. Chg |
| • Taxes | $1,039.68 | 17.6% | of $5,920.82 |
| • Billing Total | $5,920.82 | | |

# USAGE – WHAT TO DO?

1. Analyze facility

2. Determine kWh reduction potential

3. Consider energy-efficient equipment

# USAGE REDUCTION ITEMS

1. Project design criteria
2. HVAC efficiencies
3. Motor size / efficiency
4. Electronic ballasts

# ELECTRICITY VOLTAGE LEVEL

## TYPICAL VOLTAGE LEVELS

**Secondary – (440 volts or less)**

**Primary – (over 440 volts)**

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**SECONDARY VOLTAGE 220 VOLTS**

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GS-General

| BILLING PERIOD: | JAN 01 TO JAN 31 | 30 DAYS |
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# VOLTAGE LEVEL – WHAT TO DO?

1. Calculate savings opportunities
2. Consider the following:
    - Lease transformer
    - Purchase transformer

# GETTING STARTED

# NATURAL GAS

# BILLING DATA NEEDED

1. Utility Name
2. Account Number
3. Facility Address
4. Billing Period
5. Rate
6. Gas units used
7. If transportation
   a) bank status
   b) actual usage
8. Bills Required

# POTENTIAL COST REDUCTION ITEMS

1. Rate appropriateness
2. Type of service
3. Usage variables

# NATURAL GAS – WHAT TO DO?

1. Analyze billing history
2. Evaluate usage patterns
3. Identify large variables

# FIRM vs. INTERRUPTIBLE NATURAL GAS

## FACT

- FIRM SERVICE **is not** 100% non-interruptible
- INTERRUPTIBLE SERVICE **may not be** 100% interruptible

# INTERRUPTION HISTORY

1. How many
2. How long
3. When
4. Where
5. Future

# WHAT TO DO – NATURAL GAS INTERRUPTIBLE SERVICE?

1. Combine Firm & Interruptible
2. Onsite backup

# NATURAL GAS USAGE VARIABLES

1. Hourly
2. Daily
3. Weekly
4. Monthly

# CONTROLLING NATURAL GAS COSTS

1. Monitor actual usage
2. Determine reasons for variations
3. Minimize variations

# DEREGULATION

## UTILITIES INVOLVED?

- Electricity
- Natural Gas

## What is involved?

## COMMODITY ONLY

# HOW DEREGULATION WORKS

1. Changes the commodity portion of the utility bill to a non-utility provider

2. Requires the customer to arrange for commodity purchases

# COMMODITY INFORMATION

1. Commodity cost is generally 50-70% of total utility bill

2. Commodity purchases from non-utility providers will not necessarily reduce costs

# DEREGULATION FACTS

***Deregulation does not assure -***

1. **Lowest energy cost**
2. **Most efficient energy use**

# IMPORTANT SUPPLIER CONTRACT PROVISIONS

1. Assignments
2. Billing details
3. Contract time period
4. Credit requirements
5. Customer load
6. Price
7. Terms/Definitions
8. Type of service: F / I

# THE ENERGY COST REDUCTION PROCESS

# BENEFITS OF REDUCING ENERGY COSTS

1. Reduction of current energy costs
2. Preparation for future energy costs

# WHAT ABOUT USAGE EFFICIENCY?

# ELECTRICITY USAGE

## CONSIDER

1. Energy efficient process changes
2. Energy Management Systems
3. Onsite distributed generation

# NATURAL GAS USAGE

## CONSIDER

1. Burner & exhaust stack efficiencies
2. Heat recovery opportunities
3. Modular boiler applications
4. Onsite backup

# A WINNING ENERGY COST REDUCTION STRATEGY

1. Develop an energy cost reduction process
2. Prioritize savings opportunities
3. Be persistent
4. Allow time for results

# THE ACTION PLAN

## The Customer

## MUST BE INVOLVED

## DOING NOTHING

## WILL INCREASE

## Energy Costs & Risks

# CUSTOMER INVOLVEMENT INCLUDES KNOWING:

1. Energy expenses
2. Energy usage
3. How to analyze energy costs