Energy Rebates – How to Get Involved

CA-NV AWWA 2013 Fall Conference: Session 17

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Introduction

- DNV KEMA recently merged to DNV GL
- LEED AP in Building Design & Construction (USGBC) and Certified Energy Manager (AEE)
- Senior Engineer in Energy and Sustainability for 9 years
  - Located in Reno, NV
  - Administer the Sure Bet Program for NV Energy
    - Electric Retrofit Program
    - New Construction Electric Program
    - Natural Gas Retrofit Program
- Assist customers in calculating energy savings and understanding program components and program energy analysis.

How to Get Involved with Utility Rebates

- Determine what type of project you will be doing
- Contact your utility and see what they have available
- Look at an application and see where you “fit” in
- Need to know what the cost and savings will be
- May want to know what some of the terms on the application mean
- Where can you get help if needed?

Don’t worry, this session will help you with all of these topics!

Where To Start

- Need to know where you are
- Determine where you want to go
- Verify what you expect to achieve
- Assess what you did

Getting Started

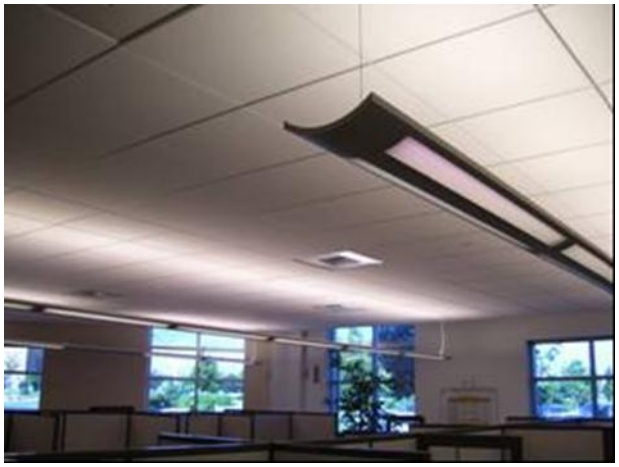
- Know your Power Bill
  - Kilowatt – kW
    - kW is equal to 1,000 Watts
    - Watt is a unit of power
    - Watt measures a rate of energy conversion or transfer (power or demand)
    - Watt = Amps (current) x Volts
    - kW is the basis for the demand charge

Getting Started - Continued

- Kilowatt hour – kWh
  - kWh is a unit of energy which is the amount of kW used over a period of time
  - Energy delivered by electric utilities is usually expressed and charged for in kWh
  - kWh = kW x hours of operation

- Average $/kWh can be determined for your facility from your power bill
- $/kWh can be used to calculate what it costs you to operate any equipment at your facility from lights to air conditioning

Getting Started - Continued

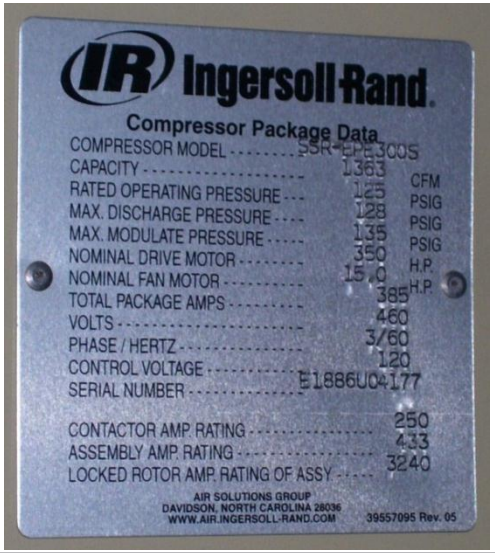


- Lighting Energy Use Example
  - 5000W of Lighting = 5 kW (demand)
  - Assume used for 9 hours per day
  - 5 kW x 9 hours = 45 kWh (energy)
  - Assume 45 kWh x 5 days/week = 225 kWh/ week
  - Annual kWh use = 225 kWh/week x 52 weeks/yr = 11,700 kWh annually

Getting Started - Continued

- Motor Energy Use Example
  - kW = Amps x Volts x √3 x Power Factor / 1000W/kW
  - Rated Amps = 385
  - Rated Volts = 460
  - Power Factor ~ 0.80 (estimate)
  - kW = 385A x 460V x √3 x 0.8 / 1000W/kW = 245 kW
  - Estimate hours of use at 12 hours/day
  - kWh = 245kW x 12hrs/day = 2,940 kWh/day
  - 2,940 kWh/day x 5 days/wk x 52 wk/yr

    Annual Use = 764,400 kWh annually



Where To Start

- ✓ Need to know where you are
- ❑ Determine where you want to go
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Prioritizing

- What do you use the most at your business?
  - Interior Lighting
  - Exterior Lighting
  - Motors, Pumps and Fans
  - Air Compressors
  - Heating Ventilation & Air Conditioning (HVAC)
  - Office Equipment

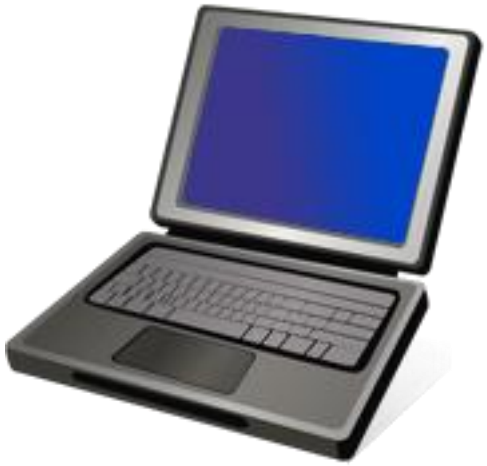
- How can you better control what you use?
  - Motion/Occupancy Sensors
  - Photo Cells
  - Variable Speed Drives
  - High Efficiency Equipment

What Do You Want or Need to Change?

- Start with the option that you use the most
- Know what to expect
  - Typical or Average Savings
  - Cost of project
  - How it will affect your bottom line
    - Simple Payback –> Cost / Annual Savings
      - Example
      - Cost of project = $3000
      - Annual kWh & kW savings = $950
      - Utility Incentive = $450
      - Simple Payback = ($3000 - $450) / $950 = 2.7 years

What Do You Want or Need to Change?

- Be informed, get information from:
  - Utility
    - Incentive programs
      - Prescriptive
        - Specifications that need to be followed
      - Custom
        - kW and kWh savings
        - On-peak and off-peak savings
  - Contractor/Vendor
  - The Internet
- Secure the funding & get management approval



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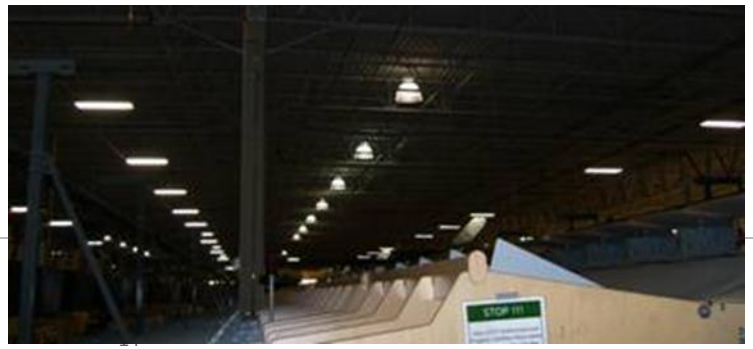
- ❑How to assess what you did

High Bay Lighting Retrofit Example

- Assume 75, 400W Metal Halide Fixtures
  - 400 W MH uses about 458W with ballast
- Retrofitted with 75, 4-lamp, T5HO high bay fixtures at 234W
- Incentive is calculated at $0.30 per Watt removed.
  - Watts removed/saved = 75 fixtures x (458W – 234W) /fixture = 16,800 Watts.
  - Incentive = 16,800W x $0.30/W = $5,040
- Cost of fixture is about $155 (with recycle fee) or about $225 with installation. Assume installed cost. Cost = $225 x 75 fixtures = $16,875



High Bay Lighting Retrofit Example - Continued

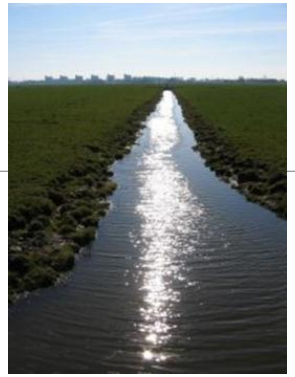
- Assume 3,200 hours operation annually.
  - Annual Energy Savings kWh = 16,800W / 1000W/kW x 3,200 hrs = 53,760 kWh annually
  - Annual Energy Savings $ = 53,760kWh x $0.115/kWh = $6,182
    - $0.115/kWh is a combined/blended kW and kWh number
- Simple Payback = ($16,875 (installed cost) - $5,040 (incentive amount) / $6,182 (annual energy savings) = 1.91 years.
- Payback would be less and kWh savings greater if motion sensors are installed on each fixture
  - Potential incentive of $20 per sensor
  - Additional ~ 40% reduction in energy use

Variable Speed Air Compressor Example

- Replace 100 hp standard air compressor with a 100hp VSD air compressor
- The kW and kWh savings
  - Received from vendor or logged data = 37kW and 317,256 kWh
  - Annual $ saved = 317,256kWh x $0.115 = $36,484 annually
- Utility Incentive = $18,722
  - Custom incentive
    - On-peak kWh and non on-peak kWh savings
- Project cost = $54,450

- Simple Payback = ($54,450 - $18,722) / $36,484/yr = 0.98 yrs

Custom - Unique Site Project



- Project - Improve Flow through a Supply Canal
  - Improvements increased capacity and annual availability.
  - Before, the canal flow was limited by the amount of available freeboard, which is the vertical distance between the water surface and the top of the canal channel.
  - Because the canal runs through several residential and commercial areas, the freeboard needs to be maintained at a safe level to prevent flooding.
  - Because parts of the canal freeze in the winter time, there is a certain amount of time each year when the canal is not available.

Custom Unique Site Project - Continued

- The Canal is one of two ways that water is supplied from the river to the water treatment plant.
  - Since the Canal is gravity fed, the water supplied by the canal is “free”.
  - The other method to supply water is through a Pump Station, which has 4,000 horsepower of pumping capacity.
  - The more water that can be supplied by the canal, the less water needs to be pumped thus saving energy and possibly demand.
- Improvements included two flume replacements, deepening and concrete lining the channel in several locations, installation of concrete box channel, and installation of adjustable weirs and ice booms in two locations.

Custom Unique Site Project - Continued

- The first phase project, completed in May 2010, improved flow from 55 million gallons per day (MGD) to 80 MGD.
  - This resulted in annual energy savings of 2.8 million kWh
  - The project received a utility incentive of $82,500.
- The second phase of the project was completed in 2013 and improved flow from 80 MGD to 95 MGD and reduced the expected canal down time from 28 days per year to 14 days per year.
  - The savings and incentive are still being evaluated, energy savings are projected to be 560,000 kWh
  - Utility incentive is projected at $33,000

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Assessment

- Was the project installed as expected?
- Are the hours of use and kWh calculations correct and as expected?
- Is the operation of the equipment as expected?
- Were the costs as quoted?
- Is there a reduction on the utility bill?
  - Look for reductions in kWh, not necessarily in total $
  - Are any environmental conditions the same?
  - Did anything else change at the same time?

Assessment - continued

- Some results don’t have direct measurements
  - Is the lighting better?
  - Are there lower maintenance costs?
  - Is production better or increased?
- Do employees comment on the change?
- Is the boss happy?

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Energy Use Summary

- Turn it off
- Control it
- Maintain it
- Use it wisely
- Make informed decisions when replacing it
- Get involved in utility rebates!

Questions?