

# W O R K S H E E T



## COST SAVINGS FROM GREEN ELECTRICAL PRODUCT SOLUTIONS

Use this worksheet to add up your savings for your commercial building or industrial plant project.

The Green Commercial Upgrades and Green Industrial Upgrades guides are an introduction to Green Electrical Products and Solutions that are proven to reduce electrical consumption and cut electrical costs for commercial buildings and industrial plants.

Here's how your organization and your customers can reduce electrical costs:

1. First, use the appropriate Green Upgrades guide and the check list on the last page to determine which energy-efficient products are appropriate for your particular project.
2. Using the examples on the following pages, as well as available manufacturer data, calculate the electrical savings for each green electrical product using your local electrical utility rate. This may be obtained by a discussion with your local electrical utility.



# Choosing the right green electrical products and systems can reduce electrical utilities costs by 20% to 30%.

## Calculate the cash-saving green electrical solutions that are right for you

Estimate your Total Annual Green Electrical Cost Savings by using the following formulas.

To determine your payback period in months: Divide your Total Green Electrical Equipment Costs by your Total Estimated Annual Electrical Cost Savings.

## ENERGY-EFFICIENT LIGHTING & ELECTRONIC BALLASTS

### ELECTRICAL SAVINGS EXAMPLE #1:

Ceramic Metal Halide (CMH) PAR Lamps offer 80-85% energy savings when used to replace halogen PAR lamps. In addition to energy savings they offer significantly longer lamp life—9,000-12,000 hours compared to 2000-5000—hours thus reducing both operating and maintenance costs. Using the calculation shown below, a facility with 1000 PAR Lamps could save over \$22,000 annually by switching to CMH PAR Lamps.

#### CALCULATION:

To calculate YOUR potential savings using Ceramic Metal Halide PAR Lamps:

Add up the total of all 100W Halogen PAR lamps specified for lighting throughout your entire facility:  = Total PAR Lamps

X 225 kWh of Electricity Saved per lamp by switching to Ceramic Metal Halide Lamps =  Total kWh of Electricity Saved for your facility

X \$0.10/kWh average electrical cost (or insert your electrical rate) =  **Your Annual Cost Savings by installing Green lighting.**

### ELECTRICAL SAVINGS EXAMPLE #2:

A 124,000-sq. ft. California warehouse installed a new high-efficiency high-bay lighting system upgrade which is generating > \$53,000 in annual utility cost savings. 175 probe-start metal halide fixtures, that represented an annual energy operating cost of more than \$72,000, were replaced with high-performance 32W T8 lamps and high-efficiency fixtures powered by high power factor ballasts resulting in a 50% reduction in electrical costs including a \$16,000 utility rebate. Project payback is less than 1.2 years.

#### CALCULATION:

To calculate YOUR potential savings using a similar high-efficiency/high power factor high bay lighting upgrade:

Determine your current annual electrical cost for facility lighting fixtures:

X 0.50 Then multiply your lighting cost by 50% potential cost savings =  **Your potential Annual Utility Cost Savings.**

## DAYLIGHT HARVESTING & WINDOW SHADE SYSTEMS

### ELECTRICAL SAVINGS EXAMPLE #3:

Studies performed by Lawrence Berkley Laboratory (LBL) have shown electrical savings to be as much as 45% when automatic daylight harvesting controls are connected to a whole building automation system controlling occupancy sensors. (Daylight harvesting is the use of digital photo sensors to detect daylight levels and automatically adjust the output level of electric lighting to create a balance, and save energy.)

#### CALCULATION:

To calculate YOUR potential savings using whole building automation, daylighting and sensors:

Your current electrical lighting cost if running all facility lights at 100% brightness during normal hours with no dimming =  per year

X 0.45 to calculate 45% potential savings =  Annual Electrical Savings using Green Electrical solutions.

## LIGHTING CONTROL SYSTEMS

### ELECTRICAL SAVINGS EXAMPLE #4:

A California university is saving up to \$200,000 per year on electricity costs by utilizing a combination of fluorescent lights, dimming and sensors. Outdoor parking lot and garage lights on the campus now operate at 50% brightness at night until triggered by motion sensors detecting movement. Cost savings are twofold: reduced maintenance due to longer life of dimmed bulbs, and up to 50% less energy consumption.

#### CALCULATION:

To calculate YOUR potential savings using dimming and sensors:

Determine your current electrical lighting cost if running all facility lights at 100% brightness:  per year

X by the % of projected dimming for your application (X 0.20, 0.30, 0.50, etc.) =  Your potential Annual Utility Cost Savings using dimming.

## ENERGY-EFFICIENT MOTORS & ADJUSTABLE SPEED DRIVES (ASDS)

### ELECTRICAL SAVINGS EXAMPLE #5:

Savings in electrical costs for electric motor operation can be substantial. In a comparison between two 40Hp motors running 80 hours per week at a cost of \$0.10 per kWh, a NEMA Premium motor with 94.5% efficiency saved nearly \$1000 per year compared to a motor with 88% efficiency. Payback for a 40 Hp NEMA Premium motor will average 20 months if electrical costs are \$0.10 per kWh.

### ELECTRICAL SAVINGS EXAMPLE #6:

By installing three 200-horsepower Variable-Frequency Drives (VFDs) to control motor-driven fans, a Texas company reduced electrical costs more than 50% per motor and saved \$10,000 per month, while enjoying a payback in less than six months.

#### CALCULATION:

To calculate YOUR potential savings using VFDs (or ASDs) to control motors:

Number of motors to be installed in building:

X Projected electrical cost to run each motor at full speed without installing a VFD/ASD per year (for the greatest accuracy, it is best to actually measure motor electrical usage with and without a VFD) =

Total Energy Cost

X 0.50 to determine the 50% savings that can be attained =

Annual Electrical Cost Savings by installing Green VFDs/ASDs.

## ELECTRICAL ENERGY MONITORING & MANAGEMENT SYSTEMS

### ELECTRICAL SAVINGS EXAMPLE #7:

A 100,000 sq. ft. all-electric ski area lodge installed a submetering system at the main service entrance to monitor 1200 Amps at 480V. The submetering system electronically communicates detailed energy-use data directly to the energy manager's host PC via the company's existing Ethernet backbone. The PC can automatically track the amount used, and thereby help the manager determine the total electrical cost. This submeter has recorded \$72,000 in annual energy savings over the most recent four-year period.

All Calculations are only used as examples of potential energy cost savings based on suggested applications. In order to develop specific energy cost savings and payback periods, projections should include calculations using specific manufacturer product data and project specifications.

# Cost-saving green electrical product solutions

Reduce your electrical operating costs by selecting energy-efficient Green Electrical Products and using this Worksheet to Calculate examples of projected savings.

## GREEN POWER DISTRIBUTION

- 1 Building power & energy management systems
- 2 Integrated panelboards
- 3 Paralleling switchgear
- 4 Integrated switchboards
- 5 Submetering equipment & software
- 6 Uninterruptible Power Systems (UPS)
- 7 NEMA Premium energy-efficient motors
- 8 Adjustable Speed Drives (ASDs) / Variable Frequency Drives (VFDs)
- 9 Electrical generation & Solar power systems
- 10 Busway / Power bus
- 11 Power factor correction capacitors & filters
- 12 NEMA TP-1 transformers & reduced-voltage starters
- 13 Ethernet / IP-based power monitoring



## GREEN LIGHTING & LIGHTING CONTROL

- 14 Intelligent lighting control systems
- 15 Lighting control panels
- 16 Dimmers
- 17 Occupancy sensors
- 18 Daylight harvesting systems & Window shade systems
- 19 Energy-efficient lamps T8 /T5 & fixtures
- 20 Compact Fluorescent Lamps (CFLs)
- 21 Electronic dimming ballasts
- 22 Photocontrols
- 23 Timeclocks
- 24 Light Emitting Diode (LED) lamps & exit/emergency lights
- 25 Shatter-resistant lighting



## GREEN AUTOMATION & COMMUNICATIONS

- 26 Automated building systems
- 27 Integrated facilities controls & diagnostics monitoring systems
- 28 Wireless or Ethernet-based control systems, PoE, & VoIP
- 29 Enclosures with cooling
- 30 Fiber optic cables
- 31 Wire and cable with flame retardant insulation

