

# Lake States TAPPI

Bridgewood Conference Center

Neenah, WI

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## Lighting Upgrades: Things to Consider

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Lighting Design Solutions

# Things to Consider

- **What is the “most efficient” lighting?**
- **What comprises a system analysis?**
- **Reviewing a past project.**
- **Consider funding sources**
- **Look at the Energy Policy Act (EPACT)**
- **Summary – how it works**

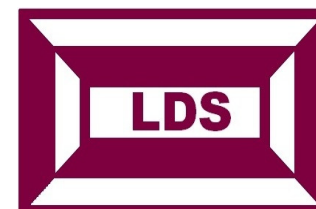


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# What is the most efficient lighting system?

- Better light quality?
  - Safer
  - Higher color rendering
  - higher light levels
- Lowest Energy costs?
  - Continuous low energy costs
  - Only 2 ways to save energy – reduce wattage or reduce operation
- Easiest to maintain system?
  - Longer lamp life reduces maintenance costs
  - Lumen depreciation
- Lowest long term costs?
  - Warranties on new installations reduce cost
  - Energy cost
  - Maintenance cost
- Payback is not always the most efficient way to look at a project.
  - One system may offer the quickest payback but not be the least expensive system to operate in the long term. Maintenance costs may catch up on low performance upgrades

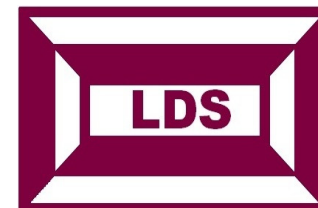


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# What comprises a system analysis?

- Best Practice - Completely examine the existing system
  - Define tasks being completed and select the right light levels
    - Warehouse, production, color rendering, inspection, support areas
  - Thorough understanding of tasks and operations, then identify where to reduce energy
    - Reduction of fixture wattage
    - Reduction of operation time
    - A combination of both
  - Propose the best lighting system for area
    - Tasks Performed
    - Operating hours
    - Installed costs
    - Maintenance costs
    - Energy savings



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# What comprises a system analysis?

- Best Practice - Completely examine the existing system
  - A system analysis will have the following details
    - Existing electrical system layout & fixture placements
    - New lighting system with point by point illumination calculations
    - Existing energy costs compared to projected new energy costs – using actual energy costs
    - Task vs. light requirements – put the light where you need it, rob wattage where you don't need it
    - Consider Automatic controls. Verify if they will help or possibly hinder the task in the area. Don't just rule them out!

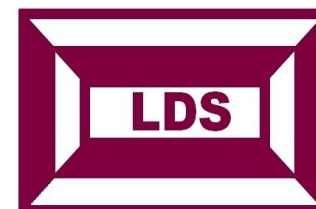


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# Calculate the Project Energy Savings

CUSTOMER NAME:	Existing Lighting System			Switch control	Occupancy Sensor		
				Mfg. Area	Warehouse		
Actual Customer Analysis	400 WATT HPS SYSTEM	F96HO 2 LAMP T12 SYSTEM		4 LAMP T5HO SYSTEM	4 LAMP T5HO SYSTEM		Occupancy sensor turning
Fixture Name	400	2/35W HO		4/ 54W	4/ 54W		
Watts per system	465	222		234	234		
Lamp life hours	20,000	12,000		36,000	36,000		
# Fixtures	205	8		49	172		
Total Watts/hour	95325	1776		11466	40248		
Electrical Rate	0.065	0.065	Current System Energy Cost	0.065	0.065	New System Energy Cost	Proposed system Savings
Operating hours Day	24	24		24	14.4		
Operating Day a week	5.4	5.4		5.4	5.4		
Operating Weeks per Year	52	52		52	52		
	\$	\$	\$	\$	\$	\$	\$
Annual energy costs	41,756.93	777.97	42,534.90	5,022.66	10,578.33	15,600.99	26,933.91
Project fixture & lamp cost		\$ 49,041.00					
Wisconsin Focus/energy Incentive		\$ 12,540.00					
Project net		\$ 36,501.00					
Payback		1.3 year					



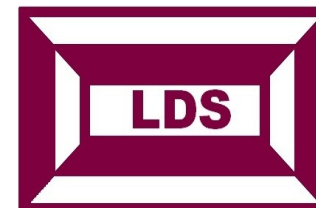
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# Calculate the Project Energy Savings

## Project analysis:

- Projected Energy reduction of 63%
  - Actual reduction was 74%
  - Occupancy sensors reduced operation more than anticipated
- Warehouse light levels increased 15%
- Production area light levels increased more than 42%
- Focus on Energy incentives were maximized
- It would meet EPACT requirements (covered later)
  - Tax deduction of \$74,063.40
  - Warehouse power densities were calculated at .4 watts / ft<sup>2</sup>
  - Production power densities were calculated at .6 watts / ft<sup>2</sup>



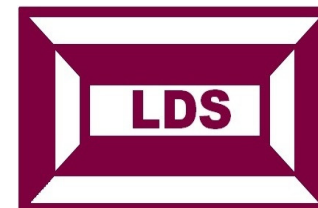
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# Consider funding sources

## Focus on energy

- Custom projects require Focus on Energy pre-approval
  - Get your Focus representative involved in the planning or it could cost you your incentive.
- Prescriptive projects are the easy but you must have the right lamps and ballasts
  - Most plant applications fall in here but check with your rep.
- Focus Loan Program
  - Officially ended except on a case by case basis

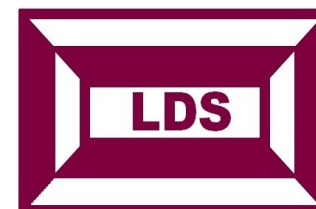


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# EPACT – what is it?

- Emergency Economic Stabilization Act extended the Energy Policy ACT of 2005
  - Allows a tax deduction of up to \$0.60 / ft<sup>2</sup> if certain requirements are met
  - Must be inspected after installation to meet the IESNA lighting recommendations
  - Must offer multiple level controls that qualify for the deduction
  - Must beat ASHREA by percentage based on occupancy
  - Must be certified by licensed designer and proper documents explaining the system must be provided to company claiming deduction.
  - Valid for projects installed prior to December 31, 2013
  - Must keep certified tax documents on file for IRS

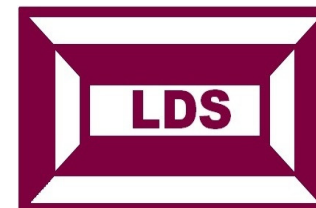


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# EPACT – what is it?

- You are not allowed to deduct
  - Any Focus on Energy incentive applied to the project
  - Any other grants used to offset project cost
  - Any project cost if project is expensed out
  - Any project cost if you are non taxable charity
- You are allowed to deduct
  - Any certified lighting project installed that calendar year, can not go back to previous projects
  - Any costs for any product used in the lighting upgrade
  - Any design or certification expense
  - Any external labor for installation
  - Your maximum out-of-pocket expense
  - Any project cost if project is capitalized



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# Summary – How it works

- Get the system analysis completed to find your best areas for energy reductions
- Get your Focus Representative involved on custom projects
- Complete a number of building area designs to compare areas with best alternatives
- Use building designs to narrow down project list
- Get funding sources in line – make sure project conforms to E pact & Focus
- Install and certify - there is no energy saved with out the project being installed
- Verify recent project and confirm performance
- Look into other areas of the facility for your next energy hog



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# Questions?



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