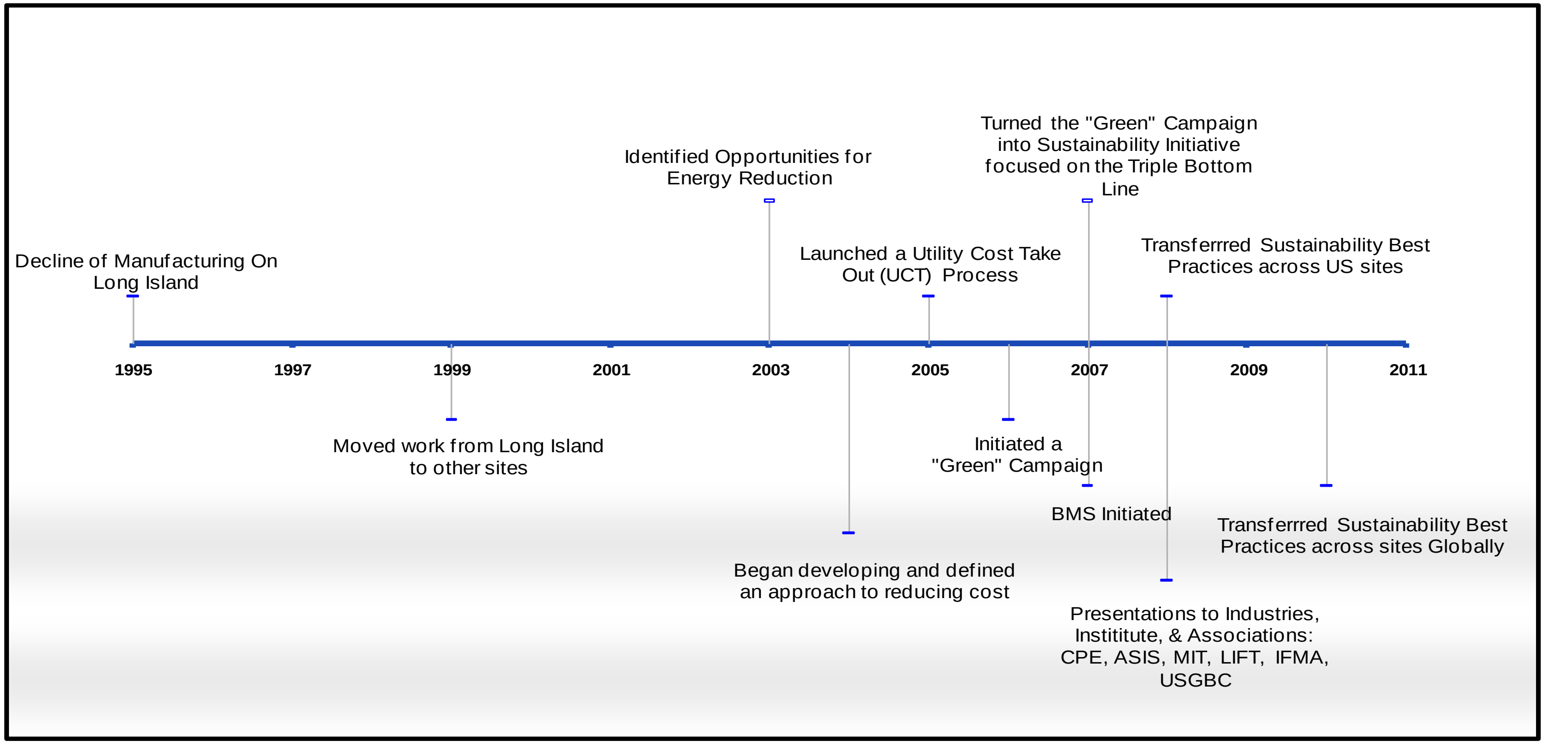
Sustainability/Utility Cost Take-Out Initiative at BAE Systems

Part 1: Morgan Rooney, Sustainability Communications Specialist , BAE Systems
Sean Delehanty, Sustainability Manager, BAE Systems

BAE Systems – Sustainability Journey



Audit Every Room For Energy Conservation Opportunities

Introduction to Utility Cost Takeout (UCT) Approach

UTILITY REDUCTION PERCENTAGE

100% ROOM BY ROOM APPROACH

STANDARD FACILITIES APPROACH

Utility cost take out combat	VFD's	Lighting CTRLS	HVAC CTRLS	Motors	PF correction

50%

Motion Detect
Upgrade Fixtures
Waste Heat Usage
Time clock
Waste Stream reduction
CFL's
Bathroom Exhausts
Roll Up Door Sensors
Fleet Fuel Conservation
Parking Lot Lighting
Building Exterior Lighting
Insulation / Gap Correction

50%

Variable Frequency Drives
Building Management System
Lighting CTRLS
HVAC CTRLS
Power Factor Correction
High Efficiency Motor Upgrade
Sustainable Design
Solar Water Heater
Photovoltaic
Geothermal
High Efficiency RTU's
Air Compressor Upgrades
Exhaust Systems

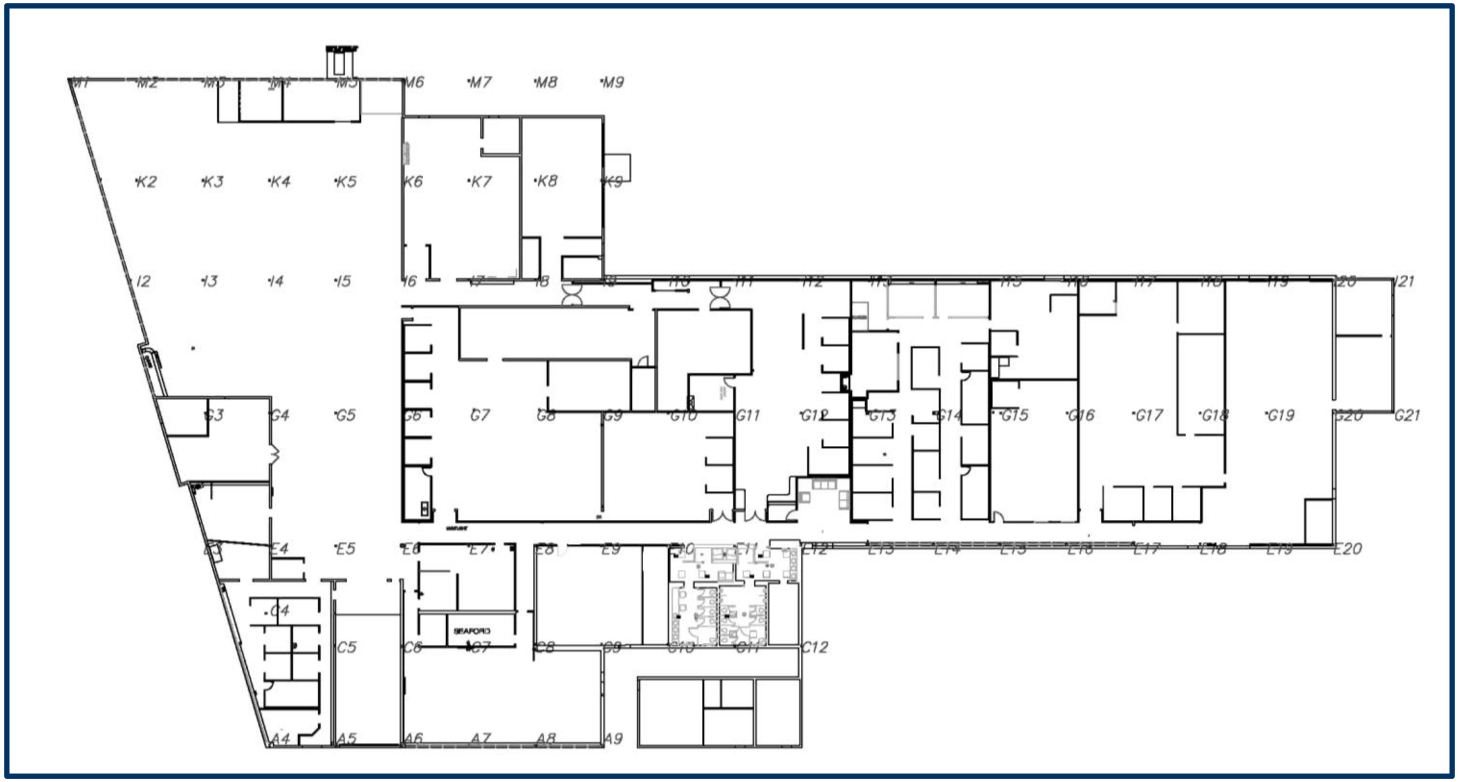
Introduction to Utility Cost Takeout (UCT) Approach

Our GNY BETA Site - What We Did:

- **Implemented energy efficient infrastructure**
  - Indoor and exterior lighting
  - Motion sensors
  - High efficiency motors and pumps
  - Campus wide installation of CFL's (Compact Fluorescent Lamps)
  - Established conservative runtime programs for HVAC and lighting systems (reduced for evenings, off-Friday and weekends)
  - Restrictions on personal appliances

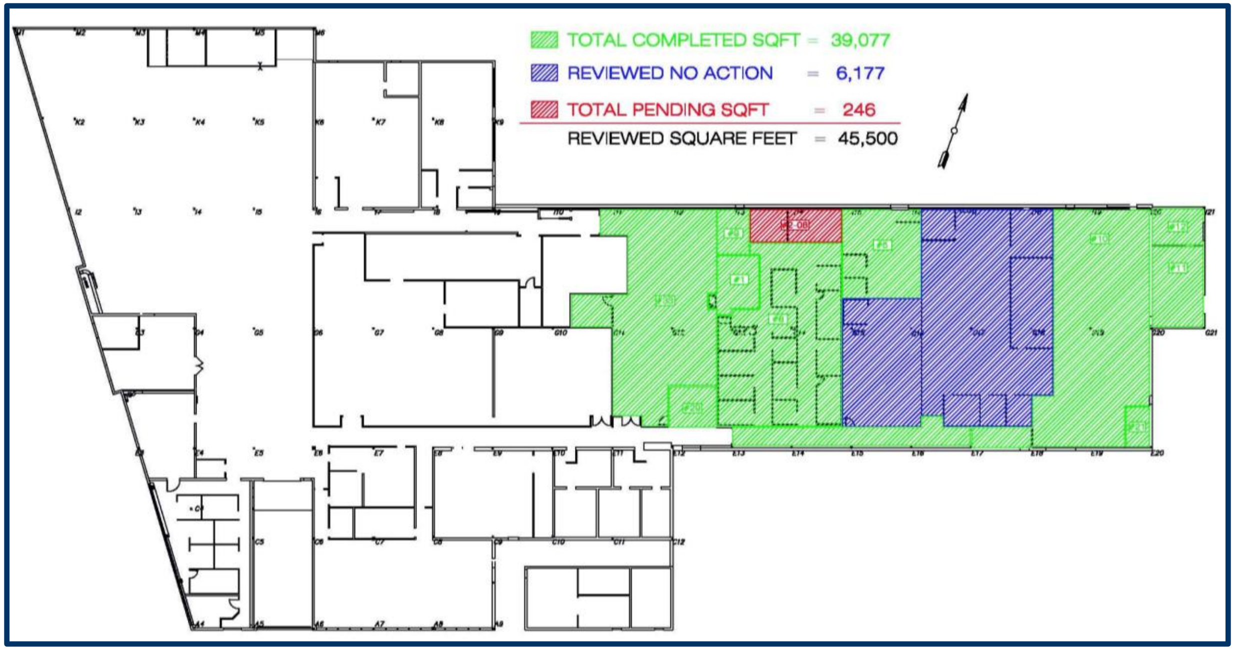
Room By Room Approach

- Start with a Blank Floor Plan



Room By Room Approach

- Begin to evaluate room by room



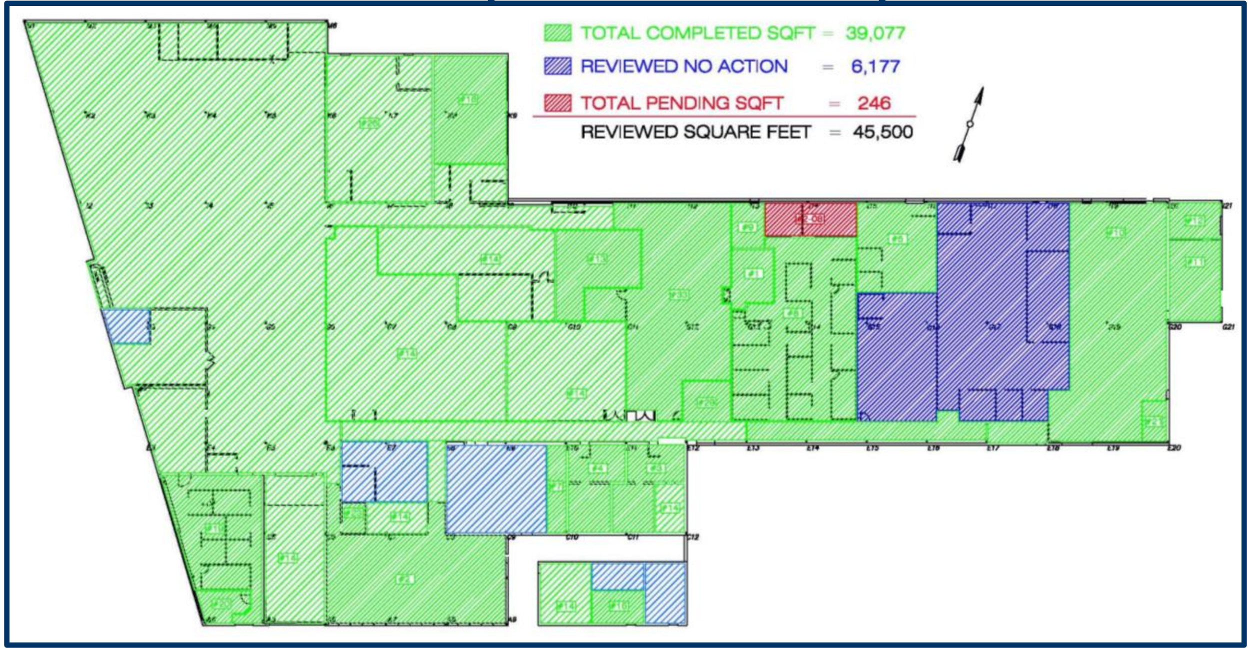
ROOMS OR AREAS THAT HAVE BEEN COMPLETED

ROOMS OR AREAS THAT HAVE BEEN REVIEWED AND NO ACTION IS REQUIRED

ROOMS OR AREAS THAT ARE UNDER REVIEW

Room By Room Approach

- End with a completed floor plan



ROOMS OR AREA THAT HAVE BEEN COMPLETED

ROOMS OR AREAS THAT HAVE BEEN REVIEWED AND NO ACTION IS REQUIRED

ROOMS OR AREAS THAT ARE UNDER REVIEW

Results From A BAE Systems Site

Total Utility Savings = 48%

- Electrical savings = 5,558,171 kilowatt-hours / year
- Fuel oil savings = ~20,000 gallons / year
- Natural Gas Savings = ~12,500 therms/year
- Water savings = ~7,000,000 gallons / year
- Green Efforts = ~225 tons / year of waste diverted from landfill via recycling
- Carbon reduction = 3,991metric tons/year

Sharing Best Practices

Merrimack, NH

Nashua (Canal Street), NH

Nashua (Headquarters), NH

Hudson, NH

Lexington, MA

Wayne, NJ

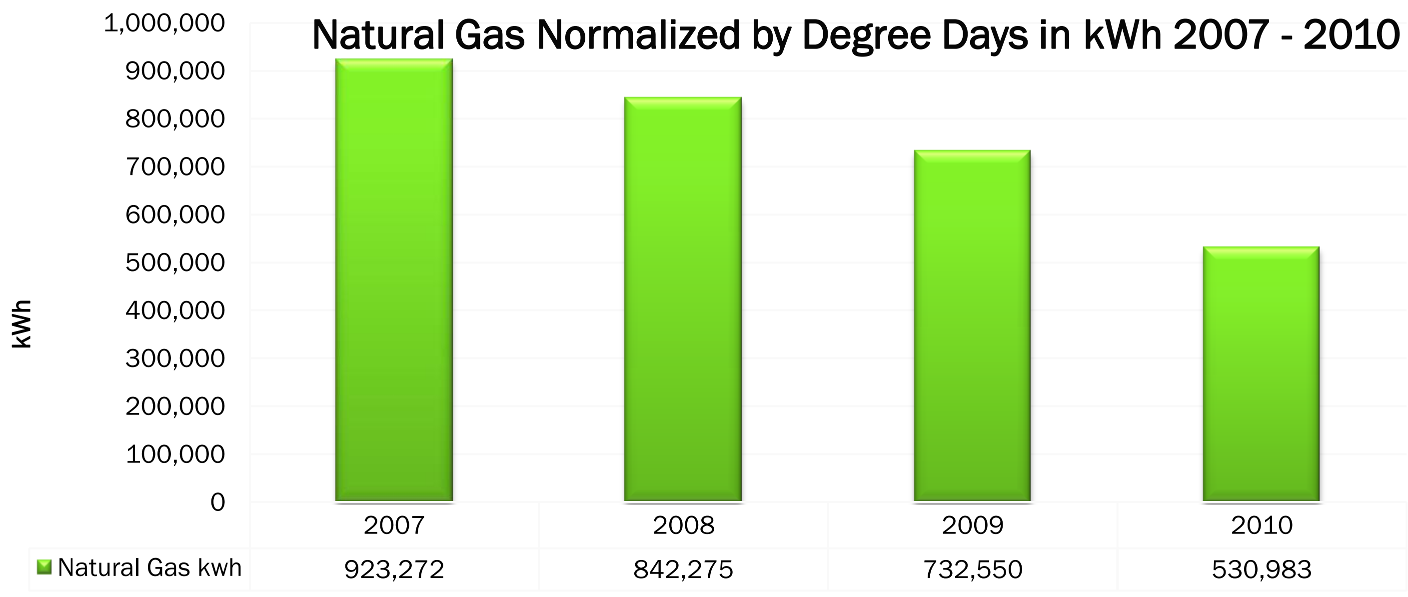
Austin, TX

Greenlawn, NY

Manassas, VA

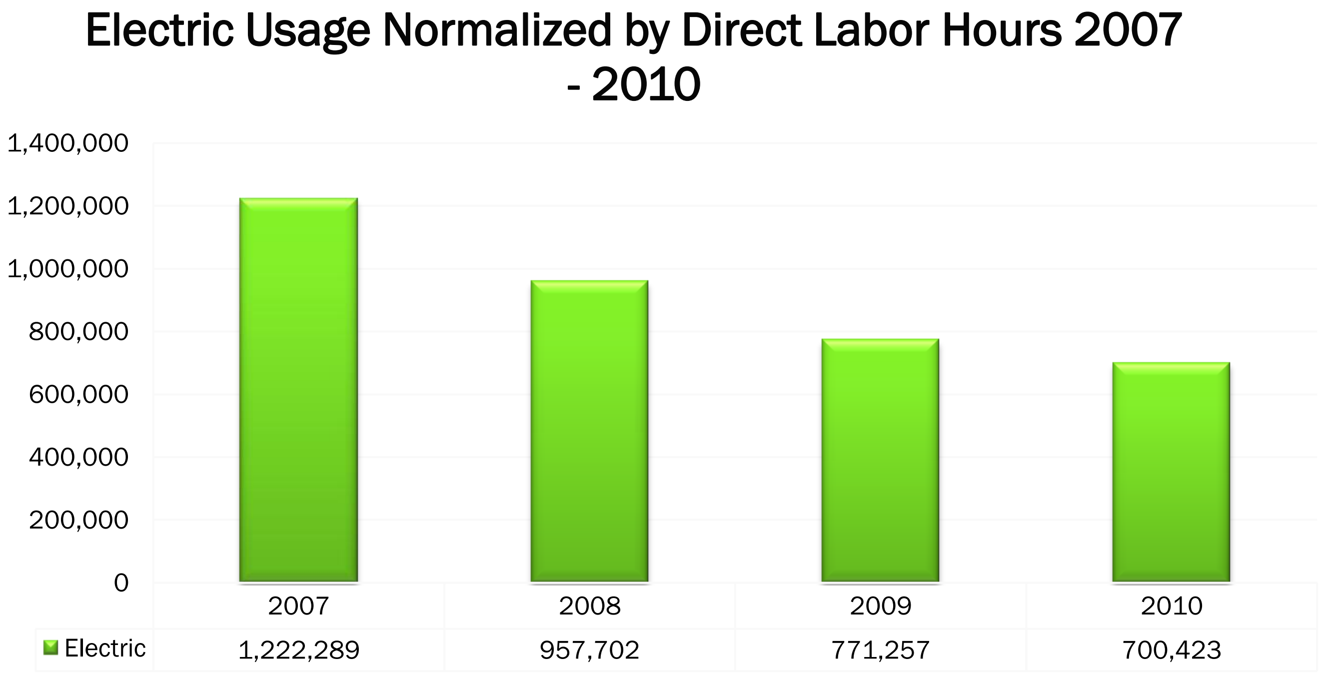
United Kingdom

Case Study ES Sector Site 2007 to Date



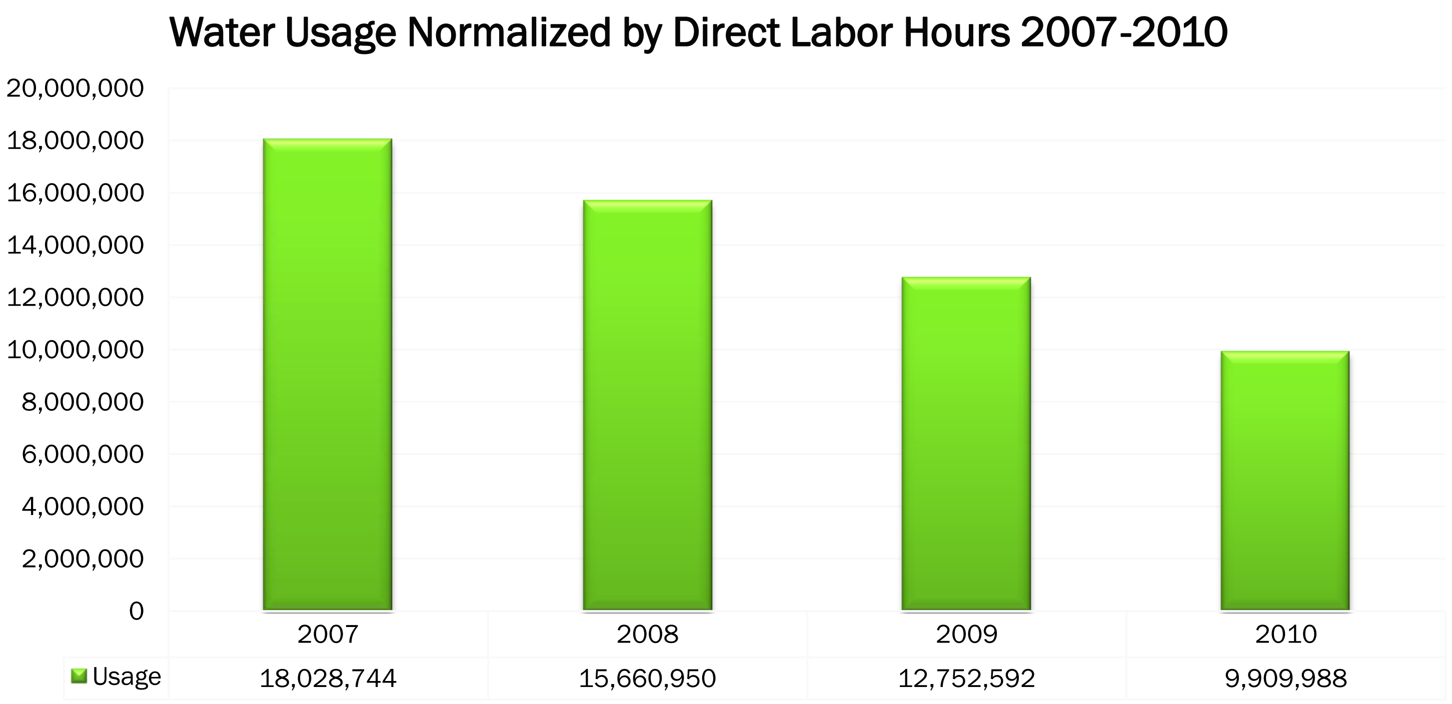
3 year reduction of 42 %

Case Study ES Sector Site 2007 to Date



3 year reduction of 43 %

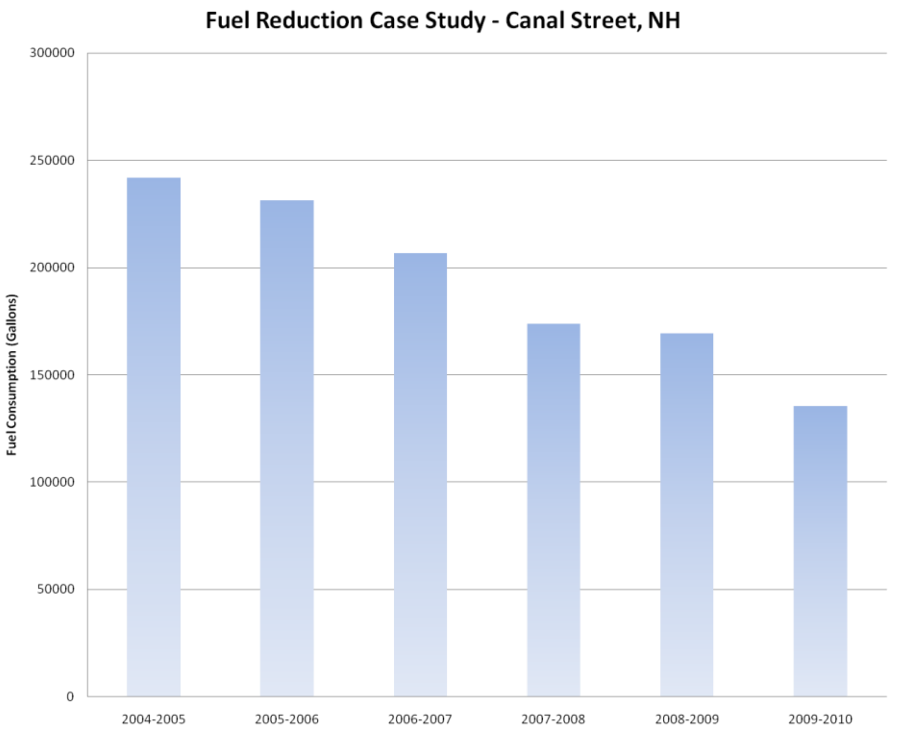
Case Study ES Sector Site 2007 to Date



3 year reduction of 55 %

Fuel Reduction – Case Study – Canal Street, NH

- BAE Systems energy efficiency improvements include a commitment in reducing the building energy fuel consumption.
- One of the larger facilities, Nashua Canal Street (NCA) has shown significant decrease in there fuel usage.
- The chart beside shows the impact of operational changes implemented, Including night temperature setback, off-hours scheduling, enhanced piping insulation program, boiler pressure reset and an aggressive steam trap survey program to achieve a fuel consumption reduction of 47 percent over the last 6 years.

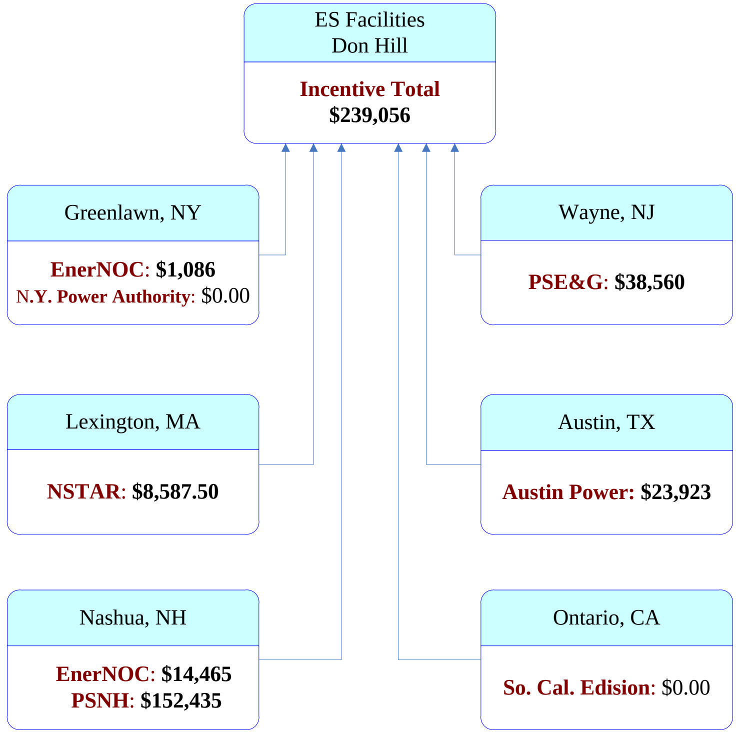


BAE SYSTEMS RESULTS

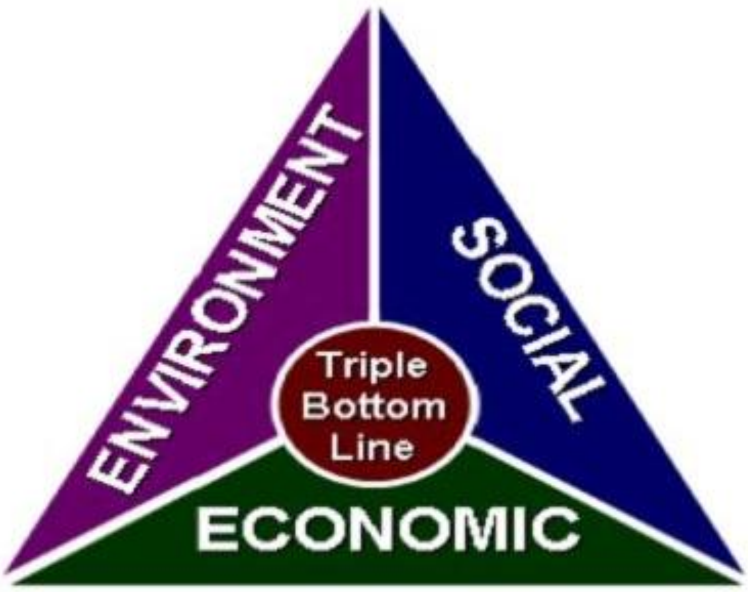
- Developed common definition and mission for Sustainability Program
- Aligned & Leveraged Strategic Energy Services across BAE Systems
- Realized 2010 energy cost savings across enterprise
  - (~$2M)
- Reduced carbon emissions by ~15% sector wide since 2007
- Sharing common measurement and performance indicators
- Improved global employee engagement
- Adopted organizational roles & responsibilities
- Developed common training & implementation strategies

BAE Systems Incentive Programs

ELECTRONIC SOLUTIONS INCENTIVE PROGRAM
2011



BAE SYSTEMS SUMMARY

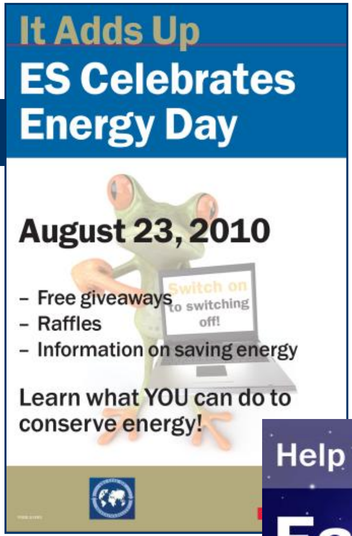


Employee Engagement Program

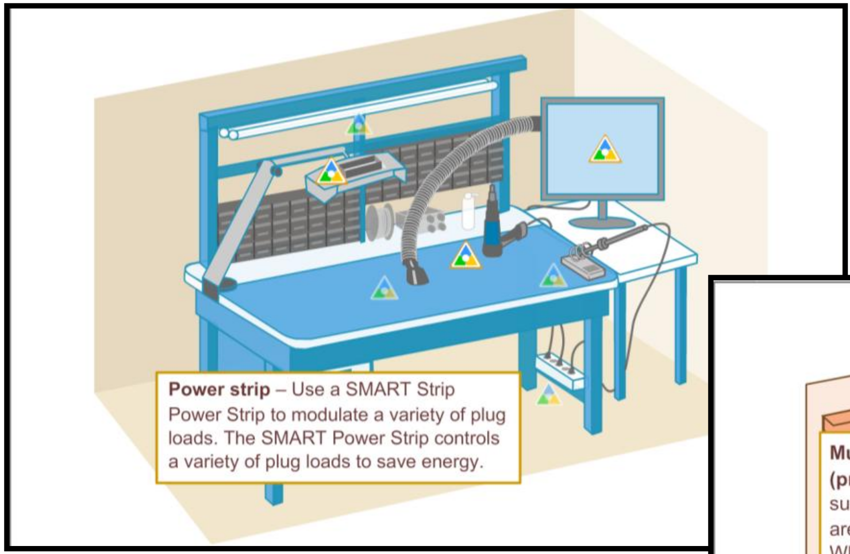
Energy Management & Sustainability Involves Everyone

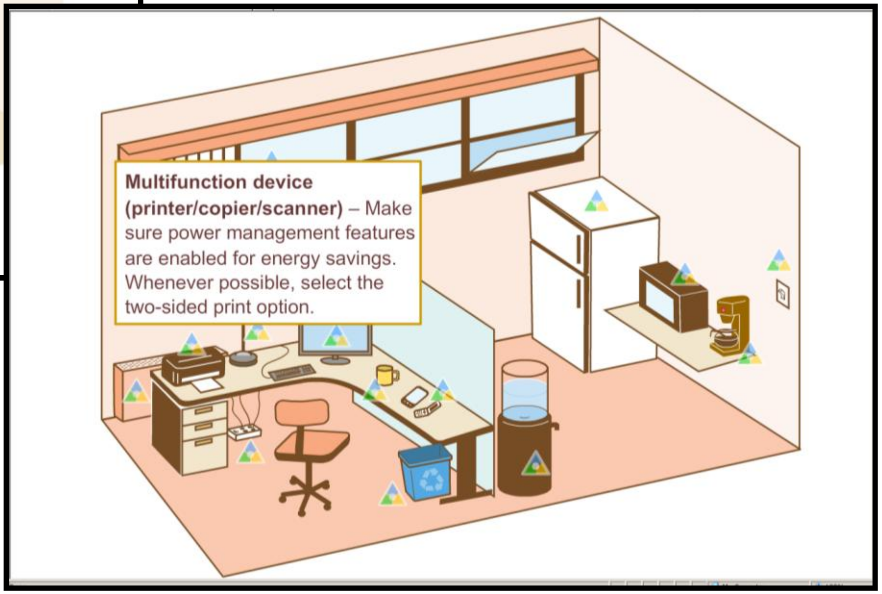
General Awareness Training

- Launched Global Sustainability website
- Sustainability Awareness Training
  - For all employees
  - Computer web-based
  - Company accredited
- Conduct sector wide Earth Day & Energy Day Events



Employee Energy Impact



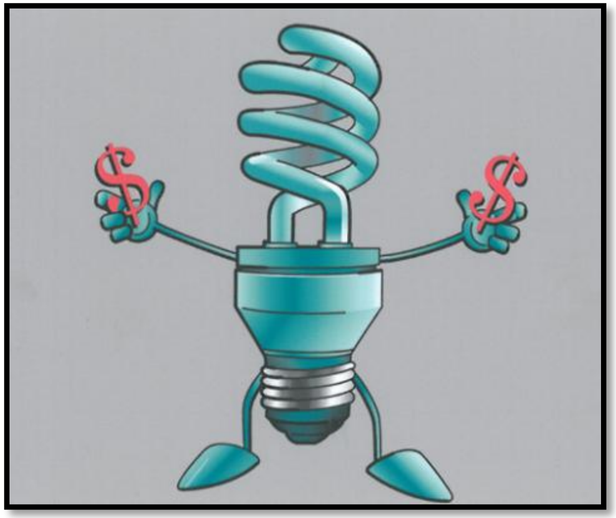


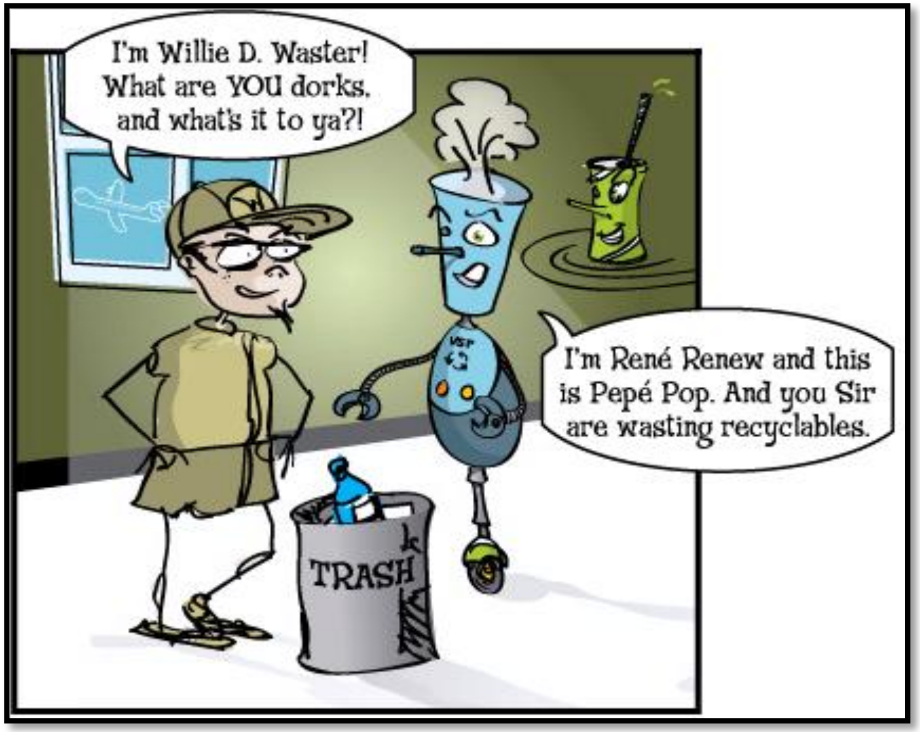
Manufacturing Employee Awareness

Encourage & Motivate

- Innovative Education

" Recycle, Recycle, it's not hard to do, you can reduce the pollution and help the world too"





**Cartoon courtesy of Vision Services Plan (VSP)*

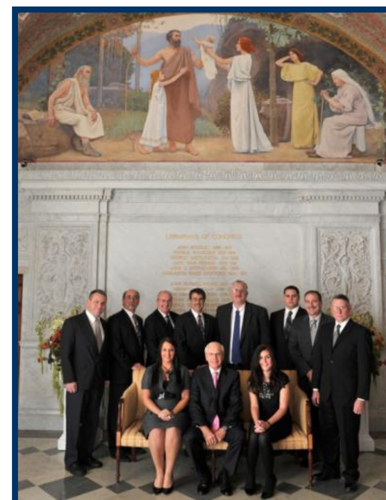
ENERGY STAR Success

Before Program = 57

After Program = 89

2010 Awards and Recognition

- Seal of Sustainability – Awarded by Sustainable Business Institute at US Capitol on April 19, 2010 for overall corporate sustainability achievements
- MVP2 Award – Awarded by National Pollution Prevention Roundtable for Carbon Reduction
- Chairman's Awards
  - Bronze & Silver Winner, Gold Nomination - Utility Cost Take Out Process
  - Bronze Winner – Building Energy Management System
  - Bronze Winner – Carbon Reduction Program
  - Bronze Winner – EPAct Federal Tax Reductions



2010 Successes

What Can You Do?

- Educate All
- Share Your Successes
- Awards & Recognition
- Champions
- Task Forces
- Employee Challenges

Energy Tax Savers' EPAct and Tax Incentives Presentation

Part 2: Charles Goulding, President & Founder of Energy Tax Savers, Inc.

Energy Tax Savers

Save Energy, Save Taxes

Energy Tax Savers, Inc.
Charles Goulding
charles.goulding@energytaxsavers.com

Energy Policy Act of 2005 (EPAct)

- Extended through 12/31/13
- Benefits available from 1/1/06 thru 12/31/13
- Incentivized areas:
  - Lighting
  - HVAC
  - Building envelope
- Available for New Construction and Existing Buildings
- Also available for tenant owned lease-hold improvements
- Benefit available for Primary Designers on Government Projects

Important IRS Notice Rev. Proc. 2011-14

- Taxpayers can now use 3115 process to catch up on all missed EPAct deductions
  - Great for 2006/2007 new construction and retrofits
  - Excellent for investor groups to avoid amended individual returns
- Many property owners are combining prior and current projects for the $1.80

BAE SYSTEMS

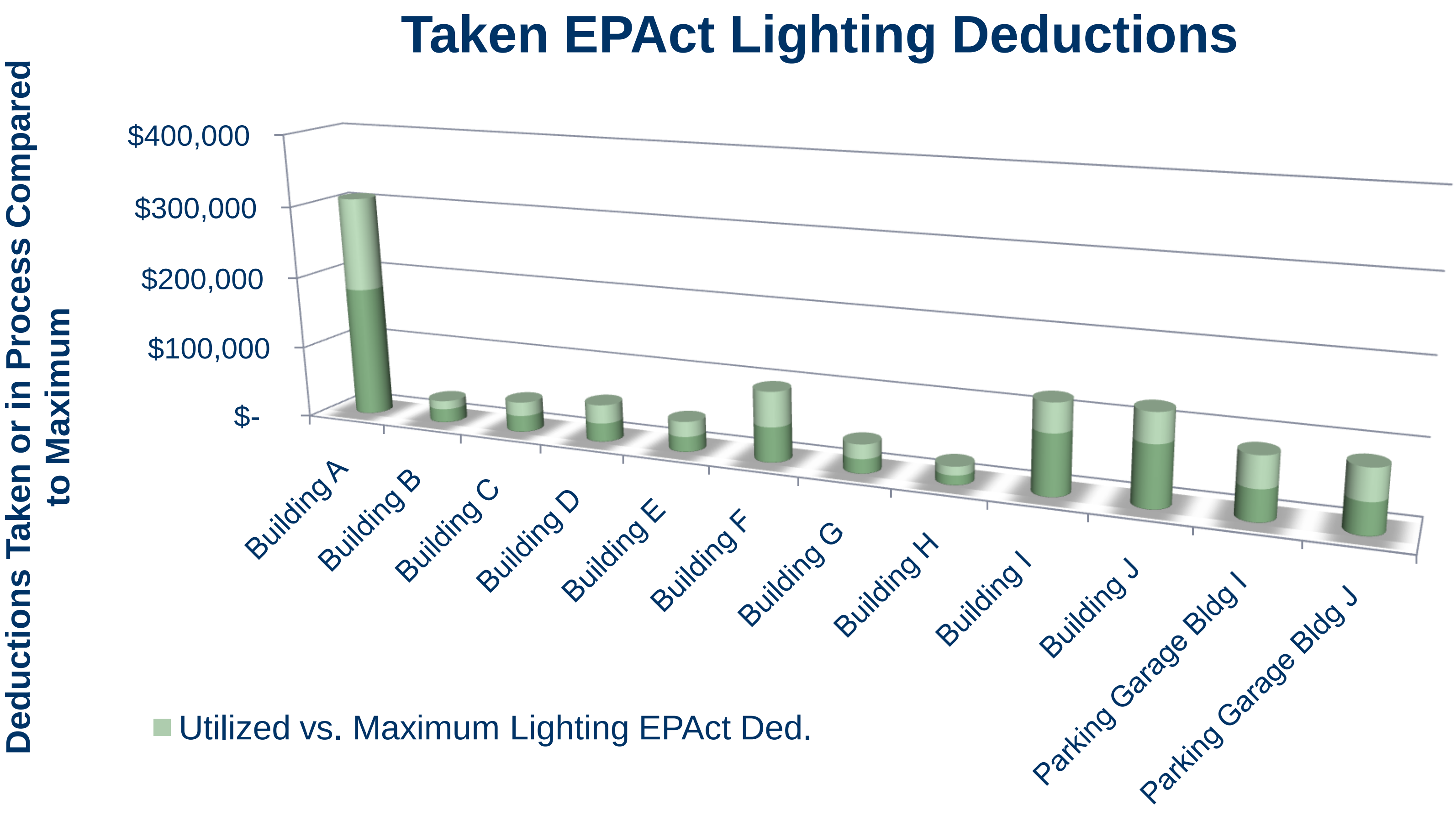
EPAct Tax Deduction Planning

Lighting Projects

	Building	Area	Maximum Deduction	Deduction Taken or in Process	Remaining Balance
EPAct	Building A	300,000	$ 180,000	$ 128,948	$ 51,052
Q-Suite	Building B	31,643	$ 18,986	$ 11,675	$ 7,311
	Building C	37,857	$ 22,714	$ 19,202	$ 3,512
	Building D	42,832	$ 25,699	$ 25,699	$ -
	Building E	34,762	$ 20,857	$ 20,857	$ -
	Building F	80,265	$ 48,159	$ 48,159	$ -
	Building G	32,838	$ 19,703	$ 19,703	$ -
	Building H	21,474	$ 12,884	$ 11,639	$ 1,245
	Building I	137,377	$ 82,426	$ 39,474	$ 42,952
	Building J	138,540	$ 83,124	$ 40,350	$ 42,774
	Parking Garage Bldg I	69,984	$ 41,990	$ 41,990	$ -
	Parking Garage Bldg J	69,984	$ 41,990	$ 41,990	$ -
	K	N/R	$ 900,000	$ 900,000	$ -
	L	N/R	$ 267,695	$ 267,695	$ -
	M	N/R	$ 263,000	$ 263,000	$ -
	Totals	**447,093**	**$ 2,029,228**	**$ 1,880,381**	**$ 148,847**

charles.goulding@energytaxsavers.com

Taken EPAct Tax Deductions



Interim Lighting Rules

- Meet W/ft^2 targets
- Add'l Requirements
  - Bilevel Switching
  - Meet ASHRAE 90.1 Requirements
  - Meet IESNA minimum light levels

	2001 Standard LPD, W/ft^2	25% Improvement	40% Improvement
Office	1.3	0.975	0.78
Manufacturing	2.2	1.65	1.32
School/Library	1.5	1.125	0.90
Retail	1.9	1.425	1.14
Warehouse	1.2	50% required, 0.60	

% Improvement	25%	26%	27%	28%	29%	30%	31%	32%	33%	34%	35%	36%	37%	38%	39%	40%
Tax Deduction $/sq.ft.	0.30	0.32	0.34	0.36	0.38	0.40	0.42	0.44	0.46	0.48	0.50	0.52	0.54	0.56	0.58	0.60

LPD (Light Power Density)

charles.goulding@energytaxsavers.com

Benefiting from ASHRAE 2004 & 2003 IECC

	2001 Std. (W/ft2)	25% Over 2001	40% Over 2001	2004 Std. (W/ft2)	2004 % over 2001	
Automotive Facility	1.5	1.125	0.9	0.9	40%	X
Convention Center	1.4	1.05	0.84	1.2	14%	
Court House	1.4	1.05	0.84	1.2	14%	
Bar Lounge/Leisure	1.5	1.125	0.9	1.3	13%	
Cafeteria/Fast Food	1.8	1.35	1.08	1.4	22%	
Family Dining	1.9	1.425	1.14	1.6	16%	
Exercise Center	1.4	1.05	0.84	1	29%	X
Gymnasium	1.7	1.275	1.02	1.1	35%	X
Health Care Clinic	1.6	1.2	0.96	1	38%	X
Hospital	1.6	1.2	0.96	1.2	25%	X
Hotel	1.7	1.275	1.02	1	41%	X
Library	1.5	1.125	0.9	1.3	13%	
Manufacturing	2.2	1.65	1.32	1.3	41%	X
Motel	2	1.5	1.2	1	50%	X

	2001 Std. (W/ft2)	25% Over 2001	40% Over 2001	2004 Std. (W/ft2)	2004 % over 2001	
Movie Theater	1.6	1.2	0.96	1.2	25%	X
Museum	1.6	1.2	0.96	1.1	31%	X
Office	1.3	0.975	0.78	1	23%	
Parking Garage	0.3	0.225	0.18	0.3	0%	
Theater	1.5	1.125	0.9	1.6	-7%	
Police/Fire Station	1.3	0.975	0.78	1	23%	
Post Office	1.6	1.2	0.96	1.1	31%	X
Retail	1.9	1.425	1.14	1.5	21%	
School/University	1.5	1.125	0.9	1.2	20%	
Sports Arena	1.5	1.125	0.9	1.1	27%	X
Town Hall	1.4	1.05	0.84	1.1	21%	
Transportation	1.2	0.9	0.72	1	17%	
Warehouse	1.2			0.8		
Workshop	1.7	1.275	1.02	1.4	18%	

Major Lighting Bans

Lighting Type	Date Effective	
Most Probe Start Metal Halides	January 1, 2009	Manufacturing banned
T-12s[1]	July 1, 2010	Manufacturing banned Distribution now limited to ten per pack
Incandescents[2]	Beginning 2012-2014	Ban on current efficiency levels beginning 2012

[1] Residential is excluded from the ban, provided power factor is less than 0.90.

[2] Permissible replacements for incandescents include:

1) High efficiency incandescents
2) CFLs
3) LEDs

What Tends to Qualify on the HVAC side?

1. Geothermal (Ground Source Heat Pumps)
2. Thermal Storage
3. High Efficiency VRF units in Rental Apartments/Dorms/Hotels
4. Centralized HVAC in Rental Apartments/Dorms/Hotels
5. Energy Recovery Ventilation
6. Demand Control Ventilation
7. Chillers in buildings < 150,000 sq ft
8. Direct fired heaters in no AC Industrial Spaces
9. VAV (variable air volume devices) in buildings <75,000 sq ft
10. Chilled Beam
11. Magnetic Bearing Chillers
12. Gas fired chillers combined with electric chillers to peak shave

American Recovery and Reinvestment Act of 2009

Tax Credits & Grants in Lieu of Tax Credits

Specified Energy Property	Credit Termination Date	Applicable Percentage of Eligible Cost Basis
Large Wind	Jan 1, 2013	30%
Closed-Loop Biomass Facility	Jan 1, 2014	30%
Open-loop Biomass Facility	Jan 1, 2014	30%
Geothermal under IRC sec. 45	Jan 1, 2014	30%
Landfill Gas Facility	Jan 1, 2014	30%
Trash Facility	Jan 1, 2014	30%
Qualified Hydropower Facility	Jan 1, 2014	30%
Marine & Hydrokinetic	Jan 1, 2014	30%
Solar	Jan 1, 2017	30%
Geothermal under IRC sec. 48	Jan 1, 2017	10%*
Fuel Cells	Jan 1, 2017	30%**
Microturbines	Jan 1, 2017	10%***
Combined Heat & Power	Jan 1, 2017	10%
Small Wind	Jan 1, 2017	30%
Geothermal Heat Pumps	Jan 1, 2017	10%

*For the first time in U.S. Tax History 100% of the cost of an alternative energy project can be expensed for tax purposes for projects completed after September 8, 2010 and before December 31, 2011.

*Also cash grants equivalent to the 30% and 10% credit amounts are available through December 31, 2011

Energy Tax Savers Inc.

Federal Tax Incentives

Warehouse Heater & Efficient Lighting

Location	Sq.Ft.	W/sq.ft.	Heaters	$/sq.ft.	Tax Deduction
Jacksonville, FL	642,219	0.69	3(1,850 MBH ea)	$1.20/sq.ft.	$770,663
Irving, TX	701,250	0.40	20(400 MBH ea)	$1.80/sq.ft.	$1,262,250
S. Brunswick, NJ	200,000	0.75	4(1,200 MBH ea)	$1.20/sq.ft.	$240,000
Franklin, NJ	140,000	0.45	1(1,850 MBH) & 1(1,600 MBH)	$1.80/sq.ft.	$252,000
Middleton, PA	61,067	0.61	2(1,200 MBH ea)	$1.20/sq.ft.	$73,280
Bristol, PA	273,080	0.37	2(2,200 MBH) & 4(1,600 MBH) 1(800 MBH)	$1.80/sq.ft.	$491,544
Bristol, PA	60,000	0.76	1(1,600 MBH) & 1(1,200 MBH)	$1.20/sq.ft.	$72,000
Edison, NJ	43,192	0.54	1(950 MBH)	$1.20/sq.ft	$51,830
Oxford, MA	68,800	0.76	1(950 MBH) 1(800 MBH)	$1.20/sq.ft.	$82,560
Hauppauge, NY	80,324	0.63	1(3,200 MBH)	$1.20/sq.ft	$96,389
Memphis, TN	231,345	0.39	4(1,600 MBH ea)	$1.80/sq.ft.	$416,421
Houston, TX	895,000	0.45	1(1,200 MBH)	$1.80/sq.ft.	$1,611,000
St. Tammany Parish, LA	852,000	0.44	5(200 MBH ea) & 2(100 MBH) 1(400 MBH)	$1.80/sq.ft.	$1,533,600
Edison, NJ	95,654	0.28	15(2 MBH ea)	$1.80/sq.ft.	$172,177
Atlanta, GA	600,814	0.44	11 (200 MBH ea)	$1.80/sq.ft.	$1,081,465
Edison, NJ	105,403	0.33	1(1,600 MBH)	$1.80/sq.ft.	$189,725
Eagan, MN	570,567	0.44	2(600 MBH) & 2(400 MBH)	$1.80/sq.ft.	$1,027,020
Whippany, NJ	292,458	0.39	Special System	$1.80/sq.ft.	$526,424
Joplin, MO	146,901	0.31	1 (1,000 MBH)	$1.80/sq.ft.	$264,422
Totals	**6,060,074**				**$10,214,770**

Largest Warehouses & Distribution Centers in Reno and Sparks, Nevada

Potential Tax Deductions Available for Energy Efficient Building Improvements

Property	Total Square Footage	Lighting Minimum Deduction	Lighting Maximum Deduction	HVAC Maximum Deduction	Building Envelope Maximum Deduction	Total
Barnes & Noble	641,506	$ 192,452	$ 384,904	$ 384,904	$ 384,904	$ 1,154,711
The Bender Group - Reno	600,000	$ 180,000	$ 360,000	$ 360,000	$ 360,000	$ 1,080,000
SanMar - Reno	490,000	$ 147,000	$ 294,000	$ 294,000	$ 294,000	$ 882,000
State Farm	340,000	$ 102,000	$ 204,000	$ 204,000	$ 204,000	$ 612,000
Griffin Transport & Logistics Services	300,000	$ 90,000	$ 180,000	$ 180,000	$ 180,000	$ 540,000
Toys 'R' Us - Reno	300,000	$ 90,000	$ 180,000	$ 180,000	$ 180,000	$ 540,000
ITS Logistics - Sparks	280,000	$ 84,000	$ 168,000	$ 168,000	$ 168,000	$ 504,000
K2 Distribution Center, Reno, NV	200,000	$ 60,000	$ 120,000	$ 120,000	$ 120,000	$ 360,000
Hopkins Distribution Co - Reno	200,000	$ 60,000	$ 120,000	$ 120,000	$ 120,000	$ 360,000
Bently Nevada Corporation	195,000	$ 58,500	$ 117,000	$ 117,000	$ 117,000	$ 351,000
*Patagonia's Reno Service Center	171,000	$ 51,300	$ 102,600	$ 102,600	$ 102,600	$ 307,800
Pfizer Western Logistics Facility	159,500	$ 47,850	$ 95,700	$ 95,700	$ 95,700	$ 287,100
Kuehne + Nagel - Reno	153,000	$ 45,900	$ 91,800	$ 91,800	$ 91,800	$ 275,400
Summit Racing - Sparks, NV	146,000	$ 43,800	$ 87,600	$ 87,600	$ 87,600	$ 262,800
Volvo-Mack - Reno	125,000	$ 37,500	$ 75,000	$ 75,000	$ 75,000	$ 225,000
Landmark Homes Corporate Offices	51,900	$ 15,570	$ 31,140	$ 31,140	$ 31,140	$ 93,420
Logistics & Distribution Services Corporation - Reno	40,000	$ 12,000	$ 24,000	$ 24,000	$ 24,000	$ 72,000
All Other Reno & Sparks Industrial Buildings	67,607,094	$ 20,282,128	$ 40,564,256	$ 40,564,256	$ 40,564,256	$ 121,692,769
Reno Sparks Convention Building	565,000	$ 169,500	$ 339,000	$ 339,000	$ 339,000	$ 1,017,000
Totals:	72,565,000	$ 711,452	$ 1,422,904	$ 1,422,904	$ 1,422,904	$ 4,268,711

Energy Tax Savers, Inc. The Nation's Leading EPAct Tax Firm.

*Denotes LEED designed building. LEED designs increase the chances of obtaining an EPAct deduction

Prepared By:
Energy Tax Savers, Inc.
144A Jackson Ave
Syosset, NY, 11791
516-364-2630
www.EnergyTaxSavers.com
Charles.Goulding@EnergyTaxSavers.com

What does Energy Tax Savers Deliver?

- Pre-project EPAct Marketing Material
- Complimentary Design Analysis
- Complimentary Tax Benefit Assessment
- Comprehensive EPAct Tax Package

  -Energy Reduction Plan
  (ETSI Software)
  -Building Energy Model
  (ETSI Reviewed)
  -Tax Deduction Calculation
  (ETSI Software)

  -Owners Manual, highlighting energy savings
  -Design Certification
  (ETSI Document Creation and Review)
  -Post-Implementation Inspection
  (ETSI Document Creation and Review)
  -Audit Assistance

- Alternative Energy Cash Grant Processing

charles.goulding@energytaxsavers.com

Energy Tax Savers Inc.

http://www.energytaxsavers.com/

Energy Tax Savers
144A Jackson Avenue
Syosset, NY 11791
Phone: 516.364.2630
Fax: 631.240.5165

Email: Charles.Goulding@EnergyTaxSavers.com