

# Energy Audit Report

for

Client Name

April 18, 2011

**Any questions regarding this energy report may be directed to  
The Daylight Savings Company at 1-800-337-2192.**

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An Independent Contractor to:



**New York State Energy Research and Development Authority**  
17 Columbia Circle • Albany, NY 12203-6399  
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[www.nyserda.org](http://www.nyserda.org)

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# 1 Executive Summary

This report presents the findings of an energy survey conducted on March 7, 2000 by James King for:

Sample Report  
59 Windham Hill Highway  
Newtown, NY 15553

Facility contact person: Dave Greenspan  
Central Hudson account number: 42-2525-2525-42

New York State Energy Research and Development Authority (NYSERDA) conducts energy surveys to promote NYSERDA's message of safeguarding the environment, reducing dependence on foreign oil and delaying the need to build costly new power plants. This can be achieved through the wiser and more efficient use of energy.

The annual energy costs at this facility are as follows:

|             |          |
|-------------|----------|
| Fuel Oil    | \$3,641  |
| Electricity | \$23,451 |
| Natural Gas | \$15,873 |
| Total       | \$42,964 |

The potential annual energy cost savings are shown below in Table 1-1.

**Table 1-1 Energy Cost Reduction Opportunities (ECRO's)**

| Description                          | Cost            | Savings         | Payback (years) | % of Annual Energy Cost |
|--------------------------------------|-----------------|-----------------|-----------------|-------------------------|
| Upgrade the Lighting                 | \$11,078        | \$2,004         | 5.5             | 4.7%                    |
| Install Lighting Controls            | \$12,600        | \$2,600         | 4.8             | 6.1%                    |
| Improve Temperature Control          | \$2,070         | \$6,113         | 0.3             | 14.2%                   |
| Improve the Building Envelope        | \$778           | \$870           | 1.1             | 2.0%                    |
| Upgrade the HVAC                     | \$21,950        | \$1,308         | 16.8            | 3.0%                    |
| Improve the Motors                   | \$7,731         | \$4,093         | 1.9             | 9.5                     |
| Modify the Domestic Hot Water System | \$136           | \$480           | 0.3             | 1.0%                    |
| Other Measures                       | \$200           | \$129           | 1.6             | 0.3%                    |
| <b>Totals</b>                        | <b>\$56,543</b> | <b>\$17,597</b> | <b>2.3</b>      | <b>41.0%</b>            |

# 1 Executive Summary

An estimated cashflow analysis is shown below in Table 1-2. This analysis is based on the information found in Table 1-1.

**Table 1-2**  
**Estimated Cashflow Analysis**

| Year           | Savings         | Payment           | Net             | Cumulative |
|----------------|-----------------|-------------------|-----------------|------------|
| 1              | \$17,597        | (\$12,770)        | \$4,827         | \$4,827    |
| 2              | \$17,861        | (\$12,770)        | \$5,091         | \$9,918    |
| 3              | \$18,129        | (\$12,770)        | \$5,359         | \$15,277   |
| 4              | \$18,401        | (\$12,770)        | \$5,631         | \$20,908   |
| 5              | \$18,677        | (\$12,770)        | \$5,907         | \$26,815   |
| <b>Totals:</b> | <b>\$90,664</b> | <b>(\$63,850)</b> | <b>\$26,815</b> |            |

Assumptions: loan term of 5.0 years, principal of \$56,543, average utility price increase of 1.5% annually, APR of 9.5% discounted 4.5% through NYSERDA's Loan Fund Program to 5.0%.

The estimated demand and energy savings are shown below in Table 1-3. The information in this table corresponds to the recommendations in Table 1-1.

**Table 1-3**  
**Estimated Energy Savings**  
*(energy savings for this sample report will not match the actual recommendations)*

| Recommendation                | Total kW Reduction | Total Annual kWh Reduction | Total Annual Therms Reduced | Total Annual Gallons of Oil Reduced |
|-------------------------------|--------------------|----------------------------|-----------------------------|-------------------------------------|
| Upgrade the Lighting          | 6.1                | 24,631                     |                             |                                     |
| Install Lighting Controls     |                    | 495                        |                             |                                     |
| Improve Temperature Control   |                    |                            | 8,225                       | 1,158                               |
| Improve the Building Envelope |                    |                            |                             | 96                                  |
| Upgrade the HVAC              |                    |                            | 2,121                       |                                     |
| Other Measures                |                    |                            | 210                         |                                     |
| <b>Totals</b>                 | <b>6.1</b>         | <b>25,126</b>              | <b>10,556</b>               | <b>1,254</b>                        |

# 1 *Executive Summary*

The remainder of the report is organized as follows: Section 2 explains the details of the Energy Cost Reduction Opportunities, Section 3 shows the historical energy usage and costs for this facility. Section 4 gives an equipment inventory and discusses the building characteristics (architectural, mechanical, electrical, etc.), and Section 5 is the methodology used to survey and analyze your facility.

## Auditor's Comments

**This report is entirely fictitious. The numbers will not match up throughout the report.**

This facility is open seven days per week. The management of the store is interested in exploring any viable energy-saving measures which will reduce the utility bills for this facility.

The main body of the store is a permanent structure which is heated by five hot-water boilers. These units are already slated for replacement. At the management's request we are including the boiler replacement in this report in order to illustrate the potential energy savings.

The attached greenhouse and patio areas are less-permanent structures with typical greenhouse-type walls and ceilings.

There are existing ceiling fans in the left-side greenhouse, but none in the larger right-side greenhouse. A ceiling fan recommendation for this area has been made here.

In discussing the temperature profiles with the customer, it was learned that there is no organized setback throughout the facility. The heat is controlled by a series of manual thermostats; replacement with digital thermostats and lock-boxes has been proposed in this report.

## Audit Disclaimer

This report was prepared pursuant to the **New York Energy Smart<sup>SM</sup>** Energy Audit Program (hereafter "Audit Program") administered by the New York State Energy Research and Development Authority (hereafter the "Energy Authority"). The opinions expressed in this report do not necessarily reflect those of the Energy Authority or the State of New York, and reference to any specific product, service, process, or method does not constitute an implied or expressed recommendation or endorsement of it. Further, the Energy Authority and the State of New York make no warranties or representations, expressed or implied, as to the fitness for particular purpose or merchantability of any product, apparatus, or service, or the usefulness, completeness, or accuracy of any processes, methods, energy savings, or other information contained, described, disclosed, or referred to in this report. The Energy Authority and the State of New York make no representation that the use of any product, apparatus, process, method, or other information will not infringe privately owned rights and will assume no responsibility for any loss, injury, or damage resulting from, or occurring in connection with, the use of information contained, described, disclosed, or referred to in this report.

# 1

## Executive Summary



### Energy Star Rating

The Environmental Protection Agency's Energy Star Portfolio Manager program rates buildings by their energy efficiency. This rating is adjusted for building use and location. This is a voluntary program established to help facility managers establish baselines for energy consumption and measure progress.

### How the Rating System Works

The national energy performance rating is a type of external benchmark that helps energy managers assess how efficiently their buildings use energy, relative to similar buildings nationwide. The rating system's 1–100 scale allows everyone to quickly understand how a building is performing — a rating of 50 indicates average energy performance, while a rating of 75 or better indicates top performance.

EPA, in conjunction with stakeholders, developed the energy rating as a screening tool; it does not by itself explain why a building performs a certain way, or how to change the building's performance. It does, however, help organizations assess performance and identify those buildings that offer the best opportunities for improvement and recognition.

Your building's actual source energy data is weather normalized; this enables EPA to assess your building's performance relative to the typical weather for your region, without bias for the specific weather patterns in the rating year.

Excerpted from Energy Star.gov

**Based upon your current building use and energy consumption the Environmental Protection Agency your facility rating is as follows:**

|                                |           |                                                                                                                                                                                                                                                           |
|--------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>Baseline Score</u>          | <b>1</b>  | Your current rating. This score represents your buildings relative energy efficiency on a 1-100 scale compared to similar buildings in your climate. This number can serve as a baseline to gauge improvements in energy efficiency.                      |
| <b>Industry Average</b>        | <b>50</b> | This number represents an average score for similar buildings in your climate.                                                                                                                                                                            |
| <b>Target</b>                  | <b>2</b>  | The target score is a customer-selected number. In this case the Target score was based on the energy reduction recommendations in this energy audit. In other words, this is where your score should be after implementation of the efficiency measures. |
| <b>Energy Star Designation</b> | <b>75</b> | Facilities with a Rating of 75 or above can receive an Energy Star designation by the EPA                                                                                                                                                                 |

Energy Star Portfolio Manager [http://www.energystar.gov/index.cfm?c=evaluate\\_performance.bus\\_portfoliomanager](http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager)

# 2

## Energy Cost Reduction Opportunities

### Upgrade the Lighting

#### Upgrade the Fluorescent Lighting

New fluorescent lamps and ballasts are available as direct replacements for your existing lamps and ballasts. A simple change from the old to the new can provide substantial savings. A typical drop-ceiling layin fixture with four, 4-foot lamps (34 Watt lamps) has a total wattage of about 164 Watts. By using the new lamps and ballasts the total wattage would be about 110 Watts, the light levels would increase by about 15%, and the light quality would increase by 35%!

The new lamps are called T8 lamps and they can fit right into the existing fixtures without any fixture modifications. The lamps are 1" in diameter instead of the 1.5" diameter of the existing T12 lamps. (The number after the "T" indicates the diameter in 8ths of an inch. Hence, T8=8/8 or 1", while T12=12/8 or 1.5".) The reduced surface area allows the use of more costly inside coatings (phosphors). The improved phosphors provide a greatly improved color rendering index (CRI). A T12 typically has a CRI of about 55. A typical T8 has a CRI of about 75.

The new ballasts are called "electronic ballasts" and they, too, can fit right into the existing fixtures without any fixture modifications. The existing ballasts add wattage to the lighting system due to its operating characteristics. An electronic ballast subtracts wattage from the lighting system due to its operating characteristics. In addition, a single electronic ballast can operate one, two, three, or four lamps in a fixture. The existing ballasts can only operate up to two lamps. The electronic ballasts could reduce the amount of ballasts in your facility by half! This can be taken advantage of with "tandem wiring" of ballasts. Instead of using one electronic ballast for every one fixture it is sometimes feasible to use one ballast for every two or more fixtures. The electrician wires a single ballast to operate the lamps in adjacent light fixtures which further reduces the amount of ballasts needed.

Although the T8 lamps and the electronic ballasts can fit into your existing fixtures, it is sometimes recommended to replace the fixtures. The reflective surfaces degrade over time and as they reach the end of their useful life it becomes more practical to install new fixtures, especially since modern fixture designs are much more efficient - meaning they are more effective at getting the light "out" of the fixture.

NOTE: fluorescent ballasts that are to be used in cold locations need to be specified as such. These "cold temperature" ballasts can be rated as low as zero degrees Fahrenheit.

#### Install Compact Fluorescent Lighting

Compact fluorescent lamps (CFL's) were created to be replacements for the standard incandescent lamps that are common to table lamps, spot lights, hi-hats, bathroom vanity lighting, etc. The light output of the CFL has been designed to look like the incandescent lamp. However, the color rendering index (CRI) of the CFL is much higher than the incandescent lamp and

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## Energy Cost Reduction Opportunities

therefore provides a much “truer” light. In some instances, this is not the desired ambiance, but in most cases the improvement is welcomed.

The CFL buyer should spend some time shopping around, since the CFL is available in a myriad of shapes and sizes depending on the specific application. But for almost any application, there is a lamp that fits the need. Typical replacements are: a 13-Watt CFL for a 60-Watt incandescent lamp, an 18-Watt CFL for a 75-Watt incandescent lamp, and a 28-Watt CFL for an 100-Watt incandescent lamp.

The CFL is also available for a number of “brightness colors” that is indicated by the Kelvin rating. A 2700K CFL is the “warmest” color available and is closest in color to the incandescent lamp. Then there is a 3000K, a 3500K, and a 4100K. The 4100K would be the “brightest” or “coolest” output. It would be wise to see an example of each before making a purchase, and even to see a sample of the lamp you are buying since Kelvin ratings vary between manufacturers.

A CFL can be chosen to screw right into your existing fixtures, or to be hardwired into your existing fixtures, or a new CFL fixture could be purchased.

NOTE: fluorescent ballasts that are to be used in cold locations need to be specified as such. These “cold temperature” ballasts can be rated as low as zero degrees Fahrenheit.

### Install New HID Lighting

HID stands for high-intensity discharge. HID fixtures typically use mercury vapor lamps, metal halide lamps, or high-pressure sodium lamps. The efficiency of the different lamps is rated in lumens per Watt (L/W), (i.e., the amount of light you get relative to the amount of power the lamp requires). Mercury vapor lamps provide white light and have the lowest L/W, but they have the longest life. Unfortunately they provide less and less light as they age while still drawing the same amount of electricity. Metal halide lamps are white and they are more efficient than the mercury vapor. They maintain more of their light output as they age. High-pressure sodium lamps have a light-orange tint. They are the most efficient, but they do not show colors as well as the “white” lamps.

HID fixtures come in many styles and should be researched carefully.

### Install LED Exit Retrofit Kits

LED stands for light-emitting-diode. LED’s are very small light sources that people most readily associate with electronic equipment. LED retrofit kits for exit signs have been made in a variety of shapes and sizes. Install a sample to confirm compatibility before making large quantity purchases due to the fact that there are so many different exit sign styles.

The following table lists the details of the lighting upgrade. Applicable areas and the recommended action are shown. The first column identifies the line number that corresponds to the detailed lighting inventory at the end of this report.

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## Energy Cost Reduction Opportunities

### Upgrade the Lighting - Details

| Line # - Area              | Action                                                                                                                                                                                                         | Costs and Savings                                                                 |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| 2 - Main Store             | For the existing 10 track lighting fixtures, each using 150-Watt, incandescent "flood" lamps, retrofit with PAR-Capsylite lamps, 90-Watt. (New qty: 10)                                                        | Mat'l Cost: \$38<br>Labor Cost: \$23<br>Total Cost: \$60<br>Savings: \$168        |
| 4 - Store Front Area       | For the existing 32 surface-mounted wrap 2X4 fixtures, each using 4, 4' energy-efficient lamps and standard ballasts, retrofit with T8 lamps and electronic ballasts.                                          | Mat'l Cost: \$1,070<br>Labor Cost: \$600<br>Total Cost: \$1,670<br>Savings: \$447 |
| 6 - Store Front Area       | For the existing 2 recessed lensed 1X1 fixtures, each using 75-Watt, incandescent lamps, retrofit with 18-Watt compact fluorescent screw-in lamps. (New qty: 2)                                                | Mat'l Cost: \$32<br>Labor Cost: \$8<br>Total Cost: \$39<br>Savings: \$30          |
| 7 - Store Front Area       | For the existing 9 surface-mounted wrap 1X4 fixtures, each using 2,4' energy-efficient lamps and ballasts, retrofit with T8 lamps and electronic ballasts.                                                     | Mat'l Cost: \$201<br>Labor Cost: \$169<br>Total Cost: \$370<br>Savings: \$30      |
| 8 - Store Front Area       | For the existing 3 surface-mounted strip 1X8 fixtures, each using 2, 8' energy-efficient lamps and standard ballasts, install new 1X8 strip fixtures with 4, 4'-T8 lamps and electronic ballasts. (New qty: 3) | Mat'l Cost: \$169<br>Labor Cost: \$146<br>Total Cost: \$315<br>Savings: \$23      |
| 9 - Store Front Area       | For the existing 1 track lighting fixture using 150-Watt, incandescent "flood" lamps, retrofit with PAR-Capsylite lamps, 90-Watt. (New qty: 1)                                                                 | Mat'l Cost: \$4<br>Labor Cost: \$2<br>Total Cost: \$6<br>Savings: \$17            |
| 14 - Right Side Greenhouse | For the existing 1 surface-mounted strip 1X8 fixture using 2, 8' energy-efficient lamps and standard ballasts, install new 1X8 strip fixtures with 4, 4'-T8 lamps and electronic ballasts. (New qty: 1)        | Mat'l Cost: \$56<br>Labor Cost: \$49<br>Total Cost: \$105<br>Savings: \$8         |
| 15 - Right Side Greenhouse | For the existing 8 track lighting fixtures, each using 150-Watt, incandescent "flood" lamps, retrofit with PAR-Capsylite lamps, 90-Watt. (New qty: 8)                                                          | Mat'l Cost: \$30<br>Labor Cost: \$18<br>Total Cost: \$48<br>Savings: \$134        |

## 2 Energy Cost Reduction Opportunities

| Line # - Area | Action                                                                                                                                                      | Costs and Savings                                                            |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 16 - Offices  | For the existing 10 surface-mounted wrap 1X4 fixtures, each using 2,4' energy-efficient lamps and ballasts, retrofit with T8 lamps and electronic ballasts. | Mat'l Cost: \$224<br>Labor Cost: \$188<br>Total Cost: \$411<br>Savings: \$34 |

*The remainder of this table was removed from this sample report.*

| Total Fixtures             |            |
|----------------------------|------------|
| Unaffected Qty:            | 457        |
| Affected Qty:              | 190        |
| <b>Total Existing Qty:</b> | <b>647</b> |

| Totals                |                   |
|-----------------------|-------------------|
| <b>Labor Cost:</b>    | \$4,736           |
| <b>Material Cost:</b> | \$6,349           |
| <b>Total:</b>         | <b>\$11,078</b>   |
| <b>Total Savings:</b> | <b>\$2,004</b>    |
| <b>Payback:</b>       | <b>5.5 years.</b> |

## 2 Energy Cost Reduction Opportunities

### Install Lighting Controls

#### Install Lighting Controls to Reduce the Lighting Use

In some areas the lighting is left on unnecessarily. Many times this is due to the idea that it is better to keep the lights on rather than to continuously switch them on and off. The on/off dilemma was studied and it was found that the best option is to turn the lights off whenever possible. Although this does reduce the lamp life, the energy savings far outweigh the lamp replacement costs. The cutoff for when to turn the lights off is around two minutes. If the lights can be off for only a two minute interval, then it pays to shut them off.

Lighting controls come in many forms. Sometimes an additional switch is all it would take. In some cases a wind-up timer is what is required. Another type is the timeclock which allows the user to set an on/off schedule. Timeclocks can be a dial clock with on/off indicators on it, or a timeclock can be a small box the size of a thermostat where the user programs the on/off schedule in a digital format like setting the alarm on a wristwatch. Occupancy sensors detect motion and will switch the lights on when the room is occupied. They can either be mounted in place of the current wall switch, or they can be mounted on the ceiling to cover large areas. Lastly, photocells are a lighting control that sense light levels and will turn the lights off when there is adequate daylight. These are mostly used outside, but they are becoming much more popular in energy-efficient office designs as well.

Details of the lighting controls recommendation are shown in the following table:

| Line #                            | Location      | Exist. Hrs. | New Hrs. | Type of Control to Install | Qty      | Mat'l Cost     | Labor Cost     | Total Cost      | Annual Savings |
|-----------------------------------|---------------|-------------|----------|----------------------------|----------|----------------|----------------|-----------------|----------------|
| 22                                | Back Hallways | 60          | 40       | Wall Occupancy Sensor      | 100      | \$4,500        | \$1,800        | \$6,300         | \$1,000        |
| 24                                | Lunchrooms    | 60          | 28       | Wall Occupancy Sensor      | 100      | \$4,500        | \$1,800        | \$6,300         | \$1,600        |
| <b>Totals:</b>                    |               |             |          |                            | <b>2</b> | <b>\$9,000</b> | <b>\$3,600</b> | <b>\$12,600</b> | <b>\$2,600</b> |
| <b><i>Payback: 4.8 years.</i></b> |               |             |          |                            |          |                |                |                 |                |

*The values in the table above were modified for the purposes of this sample report.*

## 2 Energy Cost Reduction Opportunities

### Improve Temperature Control

It is the intention of almost all facilities to keep the thermostat set at the most economical position while providing an appropriate climate for the residents. However, due to thermostat problems, too many people with access to the thermostat, or faulty setback equipment, many control systems fall short of the optimum energy cost savings.

#### Install Digital Thermostats

By installing digital thermostats you eliminate most of the impediments to significant energy cost savings. Digital thermostats can be purchased with password capability, or key capability, or other deterrent. And in addition to the savings found through consistent setpoints, they can be programmed to more extreme unoccupied temperatures with a warm-up schedule that prepares the building for occupancy before the first person is up and around.

#### Install Lock Boxes over the Thermostats

Excessive tampering of the thermostats causes inefficient cycling of the heating and cooling equipment, ineffective modulation of the occupied room temperature, and inconsistent setback/setforward settings. To avoid these problems lock boxes should be installed over the thermostats. Special lock boxes for thermostats have holes in them to allow room air to enter the box, but they limit control of the thermostat to those people with keys. This can result in a significant amount of energy cost savings at a very low initial cost.

The following tables show the existing setpoints for each area of the facility and also the recommended or "proposed" setpoints (shown in the shaded rows). It should be noted that the temperature setpoints in the facility may have varied greatly over the past twelve months. The information shown below for the "existing conditions" are based on data collected at the site and then are adjusted up or down depending upon the amount of energy used over the past twelve months for heating and cooling.

| Zone 1        | Occupied Periods        |                         | Days/<br>Week | Heating  |       | Cooling  |       |
|---------------|-------------------------|-------------------------|---------------|----------|-------|----------|-------|
|               | From                    | To                      |               | Occupied | Unocc | Occupied | Unocc |
| Main Building | <i>existing</i> 9:00 AM | <i>existing</i> 5:00 PM | 7             | 68       | 68    |          |       |
|               | <i>proposed</i> 9:00 AM | <i>proposed</i> 5:00 PM | 7             | 68       | 55    |          |       |

| <b>Zone 1 Summary - Main Store Building</b> |           |
|---------------------------------------------|-----------|
| <b>Annual Heating Cost Savings (gas):</b>   | \$2,396   |
| <b>Number of Thermostats Required:</b>      | 4         |
| <b>Number of Lock Boxes Required:</b>       | 4         |
| <b>Total Materials:</b>                     | \$540     |
| <b>Total Labor:</b>                         | \$380     |
| <b>Total Installation Cost:</b>             | \$920     |
| <b>Payback:</b>                             | 0.4 years |

*The remainder of this recommendation was removed from this sample report.*

# 2

## Energy Cost Reduction Opportunities

### Improve the Building Envelope

The word “envelope” refers to the “shell” of the building: walls, roof, windows, and doors. To improve the envelope would mean upgrading or adding materials to enhance the insulation or to reduce the amount of unconditioned outside air that enters the building. The design goal is to provide maximum insulation and minimal loss of conditioned air while keeping construction costs at a minimum.

#### Install Ceiling Fans

Using ceiling fans during the heating months reduces the cost to heat the building. Without fans, the building’s heat rises and eventually leaves through the roof. With the heat rising away from the thermostat, the thermostat reads a low temperature and the heating system kicks on. By using the ceiling fans, the hot air is blown back down to the thermostat and the heating system comes on less frequently. For this reason, ceiling fans should operate both night and day during the winter to maintain an even distribution of the heated air and to prevent unnecessary operation of the heating system.

Without some sort of fan-induced mixing of the room air, the air “stratifies”. For every one-foot off of the floor there is roughly a one-degree rise in temperature. So a twenty-foot ceiling would have a temperature difference of about 20F. Heat crosses a surface (the roof) at a rate that is directly proportional to the temperature difference between the inside and the outside. So if the inside air at the ceiling is 90F, then the heat is going to leave the building at a faster rate than if the inside air at the ceiling were only 70F. Ceiling fans keep the inside air distributed more evenly to prevent this “stratification”. For this reason, ceiling fans can also be called “destratification fans”.

Do not use ceiling fans in the summer or the hot air that has risen to the ceiling will be redistributed back down to floor level. Use floor fans to provide air flow. Human comfort is determined by humidity, temperature, and air flow across the skin. The use of floor fans in the summer provides air flow and allows the heat to rise away.

| <i>Ceiling Fans:</i> |                       |
|----------------------|-----------------------|
| Area:                | Right Side Greenhouse |
| Sq Ft:               | 2,700                 |
| Ceiling Ht (ft):     | 12                    |
| # Fans Needed:       | 2                     |
| Material Cost:       | \$411                 |
| Labor Cost:          | \$367                 |
| Total Cost:          | \$778                 |
| Savings:             | \$870                 |
| Payback (years):     | 1.1                   |

*The values in the table above were modified for the purposes of this sample report.*

## 2

# Energy Cost Reduction Opportunities

### Upgrade the HVAC

HVAC stands for heating, ventilation, and air conditioning. All of this equipment requires periodic maintenance that includes equipment adjustments and part replacements. By replacing parts it is possible to keep most HVAC equipment operating well beyond its economic life. At some point, however, the efficiency of the old equipment must be compared to newer models that incorporate the latest designs and state-of-the-art technologies. Based on energy savings alone, an investment in new equipment is often cost effective. But the analysis must go further to include maintenance savings, as well. This report is an “energy” report and considers only the portion of savings due to energy-efficiency. The recommendations that follow are suggestions to improve the efficiency of the HVAC systems.

#### Install a New Heating System

Older heating systems fall prey to the idea that if you maintain it, it will last forever. New technologies and more energy-efficient designs allow the efficiency of newer models to greatly surpass what was available over a decade ago. Investigate the possibility of installing new heating equipment as prescribed in the table below.

| Heating Equipment Description                | Proposed Action                                                                        | Material Cost   | Labor Cost     | Total Cost      | Cost Savings   |
|----------------------------------------------|----------------------------------------------------------------------------------------|-----------------|----------------|-----------------|----------------|
| Hot-Water Boilers: 5 unit(s) @ 236 MBH each. | Replace the existing old hot-water boilers with new units having an efficiency of 84%. | \$16,300        | \$5,650        | \$21,950        | \$1,308        |
| <b>Totals:</b>                               |                                                                                        | <b>\$16,300</b> | <b>\$5,650</b> | <b>\$21,950</b> | <b>\$1,308</b> |

## 2

# Energy Cost Reduction Opportunities

## Modify the Domestic Hot Water System

### Install Timeclocks on the Domestic Hot Water Heaters

The cost of electricity during the “nighttime” period is much cheaper than during the daytime. Cost savings could be realized if the domestic hot water (DHW) heaters were programmed to operate only during the low-cost nighttime period. Even though the electric elements in the tanks would be shut off, the hot water in the tank would last throughout the day under most circumstances. On certain occasions the timeclock would have to be overridden, but for the most part a great deal of savings can be achieved.

Energy savings can be realized simply due to the fact that a hot water tank that is not going to be used for a while loses heat to the surrounding space. These are called “standby losses”. A properly programmed timeclock could shut the tank off during periods of low use, thus resulting in a partial recovery of the “standby losses”.

The ECRO details are shown below:

| Install DHW Timeclocks |           |
|------------------------|-----------|
| Energy Cost Savings:   | \$480     |
| # Timeclocks Needed:   | 2         |
| Material Cost:         | \$56      |
| Labor Cost:            | \$80      |
| Total Cost:            | \$136     |
| Payback:               | 2.8 years |

*The values in the table above were modified for the purposes of this sample report.*

## 2 Energy Cost Reduction Opportunities

### Improve the Motors

#### Install High Efficiency Motors:

New, high efficiency motors now available as replacements for the standard types produce significant energy cost savings.

It always pays to replace burned out standard efficiency motors with high efficiency motors. The additional cost for buying a high efficiency motor instead of a new standard motor will be paid back in a relatively short amount of time (see the table below).

When a new high efficiency motor is bought instead of having a standard motor rewound, the savings are not so dramatic because the difference in initial costs is narrower. The difference in the price of the rewind motor and the high efficiency motor will be paid back in electricity savings in four to nine years. It probably makes sense to buy high efficiency motors instead of rewind motors for motors of less than 50 HP. Of course, if the motor cannot be rewound, then replacement with a high efficiency unit is warranted upon burnout for even the larger sizes.

Most of the larger motors used in business and industry are three-phase motors from one HP to 200 HP. Standard three-phase motors are relatively efficient at converting electrical energy to mechanical work, but new motors have been developed which are even more efficient. These new high efficiency motors reduce power losses, losses which in older motors will cause excessive heating of the motor windings and therefore a decrease in motor life. New high efficiency motors have the following characteristics:

- A steel core with thinner laminations to reduce eddy current losses, but with more steel to reduce operating flux density,
- Windings with larger wire diameters to reduce electrical resistance,
- Improved bearing lubrication systems and smaller internal fans since efficient motors are easier to keep cool.
- Tighter manufacturing tolerances and other improvements to increase efficiency and overall quality.

#### Install Adjustable Speed Drives:

Motors typically do not operate at their full capacity. There are times when it is needed, but the majority of the time it is partially loaded. Due to electrical dynamics, a motor operating in a partial load wastes energy and therefore money. An adjustable speed drive greatly reduces these losses by properly matching the motor speed to the required load. The drive mounts very near the motor and uses controls to measure the required load. It changes the motor speed according to the measured load.

For assistance, contact your local motor sales representative. High efficiency motors generally have special names. Most sales representatives can confirm your savings and estimate exact costs for your application.

## 2 Energy Cost Reduction Opportunities

| Motor Description                                             | Annual Savings | Material Cost  | Burnout Mat'l Cost | Labor Cost     | Total Cost     | Payback    | Burnout Payback |
|---------------------------------------------------------------|----------------|----------------|--------------------|----------------|----------------|------------|-----------------|
| Spray Booth Exhaust<br>(Qty: 1, HP: 2.5)                      | \$37           | \$384          | \$151              | \$125          | \$509          | 13.8       | 7.5             |
| Grinder<br>(Qty: 1, HP: 5)                                    | \$77           | \$542          | \$225              | \$175          | \$717          | 9.3        | 5.2             |
| Buffers<br>(Qty: 2, HP: 5)                                    | \$155          | \$1,084        | \$450              | \$350          | \$1434         | 9.3        | 5.2             |
| Large Buffer<br>(Qty: 1, HP: 7.5)                             | \$130          | \$614          | \$206              | \$175          | \$789          | 6.1        | 2.9             |
| Cutter<br>(Qty: 1, HP: 10)                                    | \$118          | \$650          | \$134              | \$175          | \$825          | 7.0        | 2.6             |
| <b>Totals:</b>                                                | <b>\$517</b>   | <b>\$3,274</b> | <b>\$1,166</b>     | <b>\$1,000</b> | <b>\$4,274</b> | <b>8.3</b> | <b>4.2</b>      |
| <b>Total Material and Labor Costs to Install Now: \$4,274</b> |                |                |                    |                |                |            |                 |

| Adjustable Speed Drive Description | Qty | HP  | Annual Savings  | Material Cost   | Labor Cost     | Total Cost      | Payback    |
|------------------------------------|-----|-----|-----------------|-----------------|----------------|-----------------|------------|
| ACU #17 Supply                     | 1   | 15  | \$3,666         | \$3,566         | \$604          | \$4,170         | 1.1        |
| ACU #16 Supply                     | 1   | 15  | \$3,666         | \$3,566         | \$604          | \$4,170         | 1.1        |
| ACU #15 Supply                     | 1   | 15  | \$3,666         | \$3,566         | \$604          | \$4,170         | 1.1        |
| ACU #14 Supply                     | 1   | 25  | \$6,110         | \$5,233         | \$805          | \$6,038         | 1.0        |
| ACU #4 Supply                      | 1   | 15  | \$917           | \$3,566         | \$604          | \$4,170         | 4.5        |
| ACU #3 Supply                      | 1   | 7.5 | \$1,833         | \$2,990         | \$403          | \$3,393         | 1.9        |
| ACU #2 Supply                      | 1   | 7.5 | \$917           | \$2,990         | \$403          | \$3,393         | 3.7        |
| <b>Totals:</b>                     |     |     | <b>\$32,232</b> | <b>\$41,579</b> | <b>\$6,444</b> | <b>\$48,023</b> | <b>1.5</b> |

*Part of the above table was removed from this sample report.*

| Totals for "Improve the Motors" |          |
|---------------------------------|----------|
| <b>Materials:</b>               | \$65,217 |
| <b>Labor:</b>                   | \$12,094 |
| <b>Total cost:</b>              | \$77,311 |
| <b>Total savings:</b>           | \$40,930 |
| <b>Payback (yrs):</b>           | 1.9      |

*For the purposes of this sample report the values in the table above were modified in the Executive Summary.*

## 2

# Energy Cost Reduction Opportunities

### Other Measures

#### Install Electronic Ignition Devices in Place of the Pilot Lights

Pilot lights consume a significant amount of gas. Sometimes they are manually extinguished in the summer, but in this complex an examination of the energy bills showed that most stayed in operation. Even in the wintertime the constant pilot light is a source of unnecessary expense. The installation of electronic ignition devices in place of the pilot lights will eliminate the unnecessary energy use and its associated costs. This recommendation will require about \$150 in materials and \$50 in labor. Annual savings are estimated to be \$129. This yields a payback of 1.5 years.

### 3 Historical Energy Usage and Costs

Table 3-2 and Figure 3-1 represents the electrical energy usage for the surveyed building from Feb-99 to Jan-00. Central Hudson provides electricity to the facility under Rate 200. This electric rate has a component for consumption that is measured in kilowatt-hours (kWh). It is measured by multiplying the wattage of the equipment times the hours that it operates. For example, a 1,000-Watt lamp operating for 5 hours would measure 5,000 Watt-hours. Since one kilowatt is equal to 1,000 Watts, the measured consumption would be 5 kWh. This rate has another component for Peak Demand that is measured in kilowatts (kW). Following the example above, if your facility had nothing else in it except for the 1,000-Watt lamp, then your monthly Peak Demand would be 1.0 kW. Your meter averages your demand constantly over 15 or 30-minute intervals (depending upon the utility and the specific rate). At the end of the month you are charged for the highest "average" and this is called your Peak Demand. Based on these definitions of consumption and Peak Demand it can be shown that keeping equipment off whenever it is not in use will reduce your consumption, while not operating equipment simultaneously will reduce your Peak Demand. The latter is much more difficult, especially when business is good and the equipment needs to operate to be profitable. However, demand reduction can sometimes be attained through the installation of a device that sounds an alarm when a preset demand threshold is reached. This gives plant personnel the ability to make operational changes to reduce the Peak Demand.

Rates used in this report reflect the most current rate structure available. Table 3-1 shows the annualized rate structure:

**Table 3-1**  
**Rate Structure for Rate 200**

| Description   | Summer       | Winter       | Average      |
|---------------|--------------|--------------|--------------|
| Demand Charge | \$9.66/kW    | \$9.58/kW    | \$9.61/kW    |
| Energy Charge | \$0.0529/kWh | \$0.0524/kWh | \$0.0526/kWh |

Figure 3-2 is a pie chart reflecting the electrical end-uses and their contribution to the total electricity usage. Table 3-3 is the electrical end-use in data format.

Table 3-4 and Figure 3-3 on the following pages show the natural gas energy usage for the surveyed building from Feb-99 to Jan-00. Gas is supplied by Central Hudson. The cost per CCF over the time period shown was \$0.6166. Natural gas is used exclusively for heat

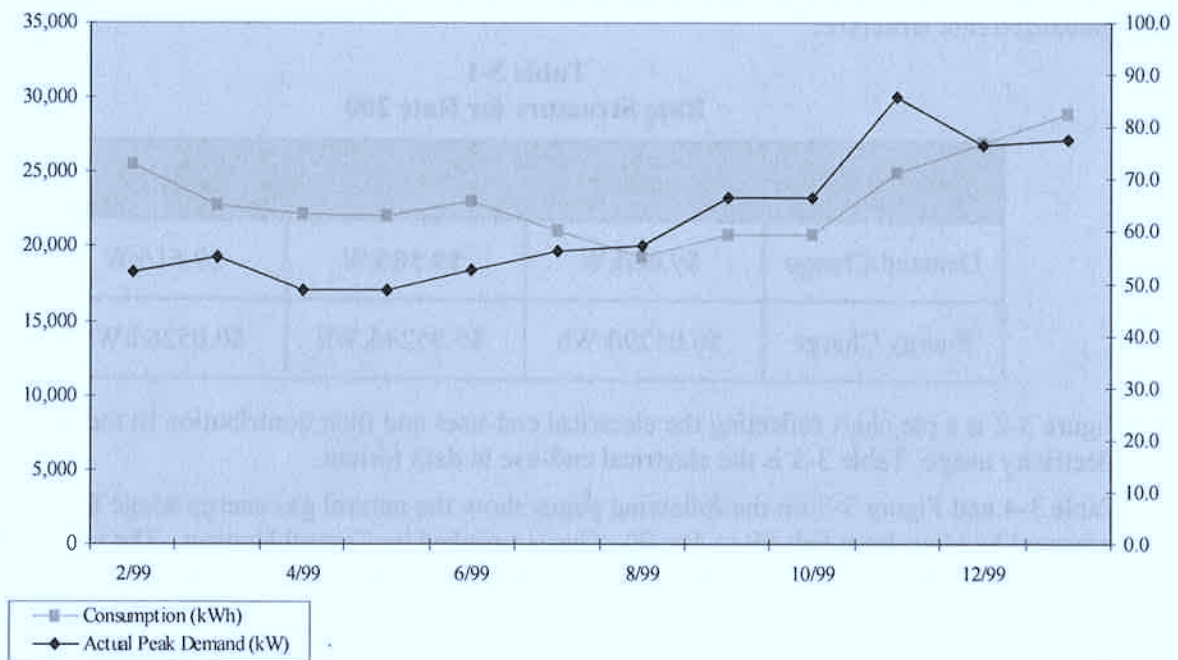
Annual oil usage is estimated to be 4,046 gallons at an annual cost of \$3,641. Average cost per gallon is \$0.90.

# 3 Historical Energy Usage and Costs

**Table 3-2**  
**Electricity Billing Data**

| Date          | Days per Month | Consumption (kWh) | Peak Demand (kW) |        | Total Bill      |
|---------------|----------------|-------------------|------------------|--------|-----------------|
|               |                |                   | Actual           | Billed |                 |
| 2/99          | 31             | 25,484            | 52.2             | 52.2   | \$1,993         |
| 3/99          | 29             | 22,844            | 55.2             | 55.2   | \$1,864         |
| 4/99          | 30             | 22,163            | 48.6             | 48.6   | \$1,745         |
| 5/99          | 30             | 21,984            | 48.6             | 48.6   | \$1,753         |
| 6/99          | 32             | 23,034            | 52.8             | 52.8   | \$1,849         |
| 7/99          | 30             | 21,054            | 56.1             | 56.1   | \$1,877         |
| 8/99          | 29             | 19,280            | 57.2             | 57.2   | \$1,729         |
| 9/99          | 29             | 20,796            | 66.4             | 66.4   | \$1,855         |
| 10/99         | 28             | 20,797            | 66.4             | 66.4   | \$1,826         |
| 11/99         | 32             | 24,901            | 85.9             | 85.9   | \$2,161         |
| 12/99         | 30             | 26,886            | 76.6             | 77.0   | \$2,318         |
| 1/00          | 35             | 28,872            | 77.5             | 77.5   | \$2,480         |
| <b>Totals</b> | <b>365</b>     | <b>278,095</b>    |                  |        | <b>\$23,451</b> |

**Figure 3-1**  
**Electricity Usage Profile**

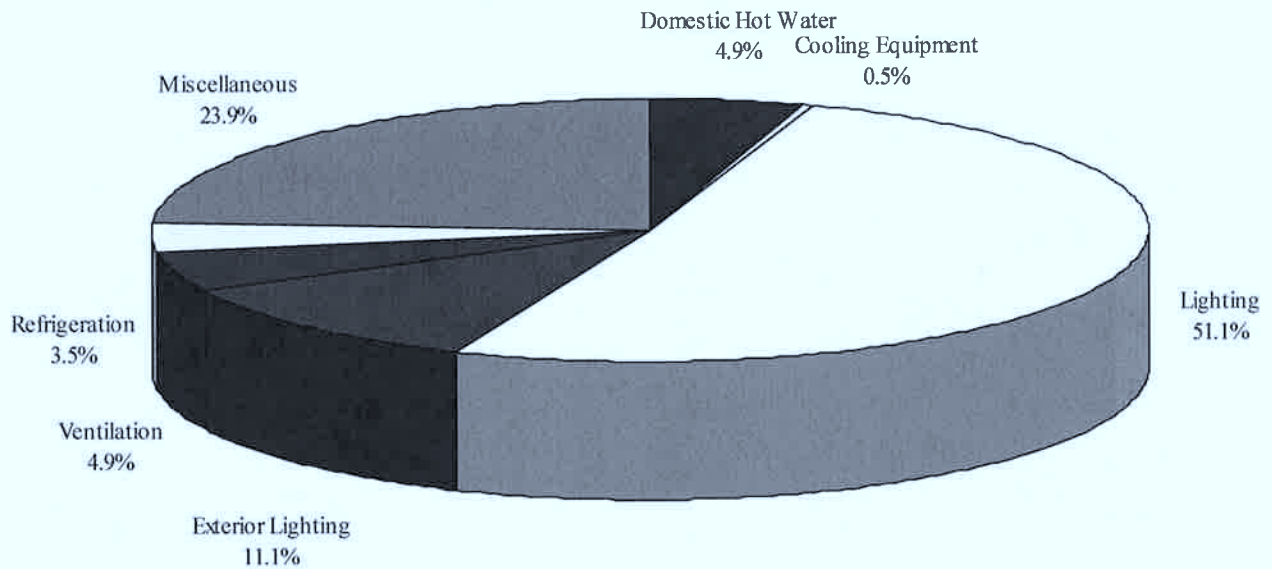


# 3 Historical Energy Usage and Costs

**Table 3-3**  
**Electricity End Use**

| End Use            | Percent of Total |
|--------------------|------------------|
| Domestic Hot Water | 4.9%             |
| Cooling Equipment  | 0.5%             |
| Lighting           | 51.1%            |
| Exterior Lighting  | 11.1%            |
| Ventilation        | 4.9%             |
| Refrigeration      | 3.5%             |
| Miscellaneous      | 23.9%            |
| TOTAL              | 100.0%           |

**Figure 3-2**  
**Electricity End Use**

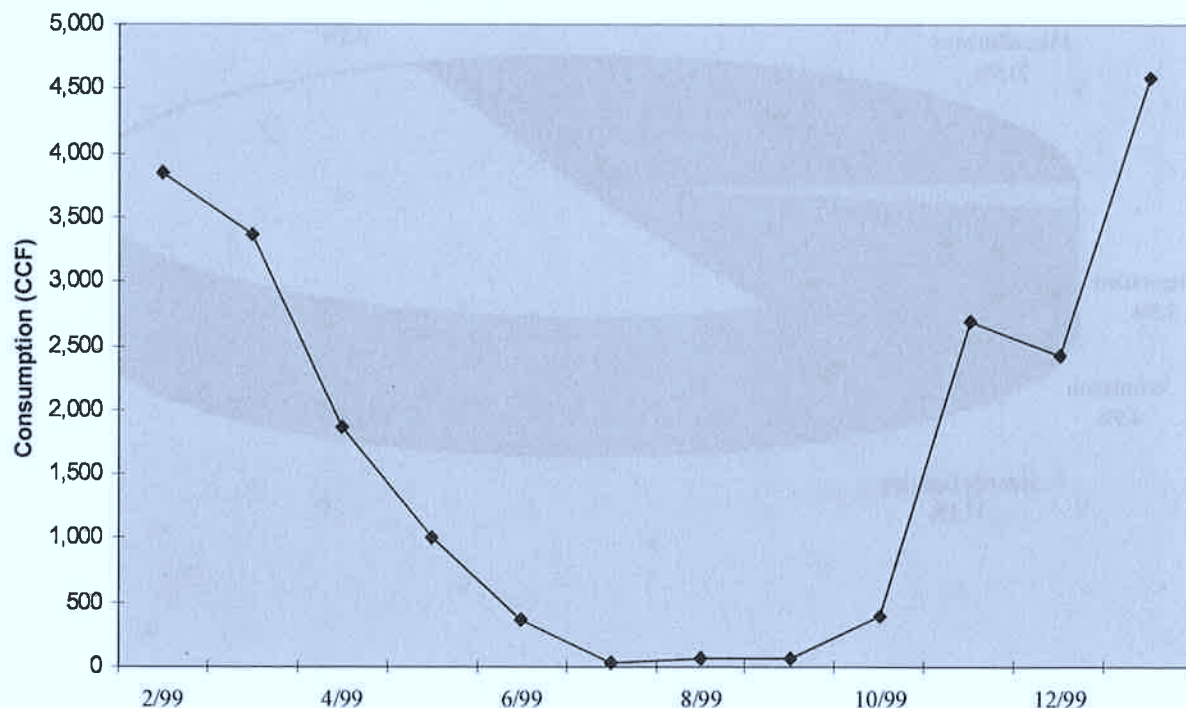


# 3 Historical Energy Usage and Costs

**Table 3-4**  
**Natural Gas Billing Data**

| Date          | Days per Month | Consumption (CCF) | Total Bill      |
|---------------|----------------|-------------------|-----------------|
| 2/99          | 31             | 3,848             | \$2,968         |
| 3/99          | 29             | 3,370             | \$2,601         |
| 4/99          | 30             | 1,864             | \$1,399         |
| 5/99          | 30             | 999               | \$756           |
| 6/99          | 32             | 360               | \$289           |
| 7/99          | 30             | 40                | \$41            |
| 8/99          | 29             | 59                | \$57            |
| 9/99          | 29             | 72                | \$69            |
| 10/99         | 28             | 391               | \$317           |
| 11/99         | 32             | 2,693             | \$2,080         |
| 12/99         | 30             | 2,419             | \$1,869         |
| 1/00          | 35             | 4,586             | \$3,426         |
| <b>Totals</b> | <b>365</b>     | <b>20,701</b>     | <b>\$15,873</b> |

**Figure 3-3**  
**Natural Gas Usage Profile**



# 4

## Equipment Inventory

### Building Characteristics

|                              |                  |
|------------------------------|------------------|
| <b>Facility Name:</b>        | Sample Report    |
| <b>Total Square Footage:</b> | 31,400           |
| <b>Building Type:</b>        | Light Industrial |

| Building Construction |           |                |                 |           |                 |             |
|-----------------------|-----------|----------------|-----------------|-----------|-----------------|-------------|
| Description           | Age (yrs) | Wall Type      | Wall Insulation | Roof Type | Roof Insulation | Window Type |
| Store                 | 20        | Concrete Block | Adequate        | Framed    | Adequate        | Double-Pane |

The main body of this facility is a permanent structure with concrete block walls and a framed roof. In the main store area there is a lay-in tile ceiling with 6 inches of insulation installed above the tiles. The areas attached to this building are greenhouse-type structures with stretched poly over metal frames, and various plexiglass and corrugated plastic panels for walls.

### Equipment Inventory

Equipment denoted by an asterisk indicates an estimate of the equipment ratings due to equipment inaccessibility, worn nameplates, or a lack of nameplates. The Miscellaneous Equipment table ends with a column that shows that line's contribution to the total respective fuel bill (electricity, gas, oil, etc.)

| Heating Equipment      |     |          |      |           |
|------------------------|-----|----------|------|-----------|
| Description            | Qty | Capacity | Fuel | Age (yrs) |
| Hot-Water Boilers      | 5   | 236 MBH  | gas  | 20        |
| Oil-Fired Space Heater | 1   | 300 MBH  | oil  | 1         |
| Oil-Fired Space Heater | 1   | 400 MBH  | oil  | 6         |
| Oil-Fired Space Heater | 1   | 300 MBH  | oil  | 6         |

| Cooling Equipment |     |          |             |
|-------------------|-----|----------|-------------|
| Description       | Qty | Capacity | Age (years) |
| Wall Unit*        | 1   | 1 Tons   | 10          |

# 4

## Equipment Inventory

| Ventilation Equipment |     |          |               |               |
|-----------------------|-----|----------|---------------|---------------|
| Description           | Qty | Capacity | Hrs/Wk Winter | Hrs/Wk Summer |
| Exhaust Fans*         | 4   | 0.1 HP   | 168           | 168           |
| Exhaust Fans          | 7   | 0.75 HP  | 28            | 80            |

| Domestic Hot Water Systems |      |          |      |
|----------------------------|------|----------|------|
| Description                | Qty. | Capacity | Fuel |
| Self-contained             | 2    | 4.5 kW   | elec |

| Motor Inventory     |     |     |          |      |               |               |                       |
|---------------------|-----|-----|----------|------|---------------|---------------|-----------------------|
| Equipment           | Qty | HP  | ODP/TEFC | RPM  | Usage hrs/day | Usage days/wk | Estimated Load Factor |
| Spray Booth Exhaust | 1   | 2.5 | ODP      | 1750 | 7             | 5             | 0.8                   |
| Grinder             | 1   | 5   | ODP      | 1750 | 7             | 5             | 0.8                   |
| Buffers             | 2   | 5   | ODP      | 1750 | 7             | 5             | 0.8                   |
| Large Buffer        | 1   | 7.5 | ODP      | 1750 | 7             | 5             | 0.8                   |
| Cutter              | 1   | 10  | ODP      | 1750 | 6             | 5             | 0.8                   |

| Miscellaneous Equipment |     |          |      |              |              |               |
|-------------------------|-----|----------|------|--------------|--------------|---------------|
| Description             | Qty | Capacity | Fuel | Hrs/Wk Usage | % Fuel Usage | End-Use       |
| Misc. Load              | 1   | 2 kW     | elec | 50           | 2.1%         | Miscellaneous |
| Quincy Air Compressor   | 1   | 15 HP    | elec | 40           | 9.4%         | Miscellaneous |
| Grinder                 | 2   | 5 HP     | elec | 34           | 5.2%         | Process       |
| Buffers                 | 1   | 5 HP     | elec | 34           | 2.6%         | Process       |
| Large Buffer            | 1   | 7.5 HP   | elec | 34           | 3.9%         | Process       |
| Cutter                  | 1   | 10 HP    | elec | 27           | 4.2%         | Process       |
| Baler                   | 1   | 3 HP     | elec | 15           | 0.7%         | Baler         |
| Spot Welder             | 1   | 11.5 kW  | elec | 3            | 0.8%         | Process       |
| Arc Welder              | 1   | 21.8 kW  | elec | 10           | 4.6%         | Process       |
| Chicago Press           | 1   | 1 HP     | elec | 13           | 0.2%         | Process       |
| Bridgeport Drill Press  | 1   | 2 HP     | elec | 13           | 0.4%         | Process       |
| Bridgeport Drill Press  | 1   | 1 HP     | elec | 10           | 0.2%         | Process       |

# 4

## Equipment Inventory

| Miscellaneous Equipment |     |          |      |              |              |                   |
|-------------------------|-----|----------|------|--------------|--------------|-------------------|
| Description             | Qty | Capacity | Fuel | Hrs/Wk Usage | % Fuel Usage | End-Use           |
| Sander                  | 1   | 1 kW     | elec | 7            | 0.1%         | Process           |
| Speedy Packer           | 1   | 5.3 kW   | elec | 7            | 0.7%         | Process           |
| Dust Collector          | 1   | 3 HP     | elec | 34           | 1.6%         | Process           |
| PC's                    | 25  | 0.25 kW  | elec | 44           | 5.8%         | Office Equipment  |
| Copier                  | 1   | 1 kW     | elec | 16           | 0.3%         | Office Equipment  |
| Coffee Maker            | 1   | 2.5 kW   | elec | 25           | 1.3%         | Kitchen Equipment |
| Coffee Vending Machine  | 1   | 3 kW     | elec | 20           | 1.3%         | Kitchen Equipment |
| Drink Vending Machine   | 1   | 1 kW     | elec | 60           | 1.3%         | Kitchen Equipment |
| Employee Refrigerators  | 2   | 0.4 kW   | elec | 60           | 1.0%         | Kitchen Equipment |

The second to the last column of the Miscellaneous Equipment Table shows the percentage of the total fuel usage (electricity, natural gas, or fuel oil) which corresponds with the pie charts on the previous pages. The "Hrs/Wk Usage" column values include the equipment load factor and duty cycling (i.e. an air compressor running at 80% capacity and cycling on 30% of the time during a 60 hour week would have an "Hrs/Wk Usage" value of  $60 \times 0.08 \times 0.30 = 14$  Hrs/Wk).

| Lighting Equipment |            |                                                                                      |              |
|--------------------|------------|--------------------------------------------------------------------------------------|--------------|
| Line #             | Area       | Description                                                                          | Hrs/Wk Usage |
| 1                  | Main Store | 154 recessed lensed 2X4 fixtures, each using 4, 4' T8 lamps and electronic ballasts. | 60           |
| 2                  | Main Store | 10 track lighting fixtures, each using 150-Watt, incandescent "flood" lamps.         | 60           |
| 3                  | Main Store | 8 track lighting fixtures, each using 90-Watt, PAR-capsylite halogen lamps.          | 60           |

*The remainder of this table was removed from this sample report.*

# 5

## Methodology

The first step in the energy analysis is the site survey. The auditor walks your entire site to inventory the building envelope (roof, windows, etc.), the heating, ventilation, and air conditioning equipment (HVAC), the lighting equipment, other facility-specific equipment, and to gain an understanding of how each facility is used.

The collected data is then processed with a software package from The Daylight Savings Company in Goshen, NY (1-800-337-2192) that calculates the anticipated energy usage. The actual energy usage is entered directly from your utility bills. The anticipated energy usage is compared to the actual usage. If necessary, corrections are made to the site-collected data until the anticipated energy usage matches the actual usage. This process develops an end-use baseline for all of the fuels used at the facility. The baseline is used to calculate the energy savings for the measures that are recommended in this report.

The savings in this report are not duplicative. The savings for each recommendation may actually be higher if the individual recommendations were installed instead of the entire project. For example, the lighting module calculates the change in wattage and multiplies it by the new operating hours instead of the existing operating hours (if there was a change in the hours at all). The lighting controls module calculates the change in hours and multiplies it by the new system wattage instead of the existing wattage. Therefore, if you chose to install the recommended lighting system but not the lighting controls, the savings achieved with the new lighting system would actually be higher because there would have been no reduction in the hours of use.

The same principal follows for heating, cooling, and temperature recommendations - even with fuel switching. If there are recommendations to change the temperature settings to reduce fuel use, then the savings for the heating/cooling equipment recommendations are reduced, as well.

Our thermal module calculates the savings for temperature reductions using ASHRAE's modified bin method. The savings are calculated in "output" values –meaning energy, not fuel savings. To show fuel savings we multiply the energy values times the fuel conversion factor (these factors are different for electricity, natural gas, fuel oil, etc.) and also take into account the heating/cooling equipment efficiency. The temperature recommendation savings are lower when the heating/cooling equipment is more efficient or is using a cheaper fuel. Also, you may see natural gas savings in this report even if you do not currently have natural gas. This happens when fuel switching was recommended for your heating/cooling equipment and you have temperature reduction recommendations, as well.

Thermal recommendations (insulation, windows, pipe insulation etc.) are evaluated by taking the difference in the thermal load due to reduced heat transfer. Again, the "thermal load" is the thermal load after the other recommendations have been accounted for.

Lastly, installation costs are then applied to each recommendation and simple paybacks are calculated. Costs are derived from Means Cost Data, other industry publications, and local contractors and suppliers.

## **NYSERDA FLEXTech ENERGY AUDIT PROGRAM**

For 2011 and 2012, NYSERDA is offering “free” (i.e. fully funded) energy audits to small businesses and not-for-profits.

The Daylight Savings Company is NYSERDA’s contractor for Region 3 which includes Orange County, Rockland County, Westchester County, Bronx County, Nassau County and Suffolk County.

### **FAQ:**

#### **What does NYSERDA stand for?**

New York State Energy Research and Development Authority

<http://nysERDA.ny.gov/Page-Sections/Commercial-and-Industrial/Programs/FlexTech-Program.aspx>

#### **What makes me eligible for a free NYSERDA energy audit?**

If you are a small business or not-for-profit that uses less than 100 kW demand in a year.

#### **Who is not eligible?**

Facilities that are municipalities or facilities that use over 100 kW or more demand in a year.

#### **How much will the NYSERDA audit cost me?**

The audit and the resulting audit report are free. They are completely funded by NYSERDA.

#### **Why do you need our number of employees?**

The number of employees decides which funding source will fund the audit.

If a facility employs 10 or less people, the audit is funded by Green Jobs Green New York (GJGNY).

If a facility employs 11 or more people, the audit is funded by the American Recovery and Reinvestment Act (ARRA).

#### **Why do you need the company’s Federal ID #?**

The New York State Application for a NYSERDA energy audit requires the Federal ID #.

#### **Why do you need our utility company and account numbers?**

Because a baseline of the facility’s energy usage is needed to compare to possible savings.

#### **How long after completing the in-take form will I be contacted to schedule the NYSERDA audit?**

Approximately 2 to 3 weeks.



The Daylight Savings Company  
25 Main Street  
Goshen, NY 10940  
845-291-1275/Fax: 845-291-1276





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**Greening  
The Bottom Line**

# **Commercial Energy Audits**

**February, 2012**

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## **Agenda**

- Why An Energy Audit
- NYSERDA's Energy Audit Program
- NYSERDA's Incentives
- Con Edison's Small Business Direct Install Program (SBDI)
- Sample Result
- Q & A



**The Daylight  
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# The Daylight Savings Company

- Energy efficiency consulting and engineering firm - since 1991
- Independent contractor for many of NYSEERDA's Programs
- Exclusive NYSEERDA Contractor for Energy Audit Program
- A Partner in NYSEERDA's Multifamily Performance Program (MPP)
- A selected NYSEERDA FlexTech Contractor for Benchmarking Program
- Over 10,000 energy projects completed
- Our staff is CEM, BPI, MFBA, EBCP certified along with PE and LEED-AP

(800) 337-2192    [www.daylightsavings.us](http://www.daylightsavings.us)



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## Why Energy Efficiency?

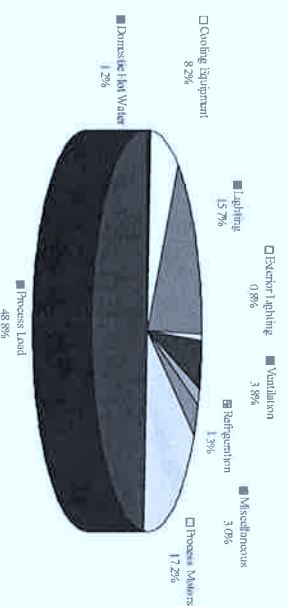
- Save energy-the old perception
  - Turn off your lights!
- Energy efficiency -reality
  - the same (or better) products and services for less energy
- Benefits
  - saves consumers and businesses millions of dollars in energy costs
  - helps protect the environment
  - reduces the need for additional capacity
- Energy efficient solutions can reduce your energy bill by 20%- 30%
- ROI usually exceeds 30%



## The Daylight Savings Company

### Why An Energy Audit?

- Better understanding of current energy usage
- Identify improvements- existing or new equipment
- Provides costs and payback data to make informed decisions
- Quick analysis of alternative energy sources
  - Solar PV and/or solar hot water
  - Combined Heat & Power (CHP) – Cogen
- Roadmap for incentive programs (e.g. NYSEERDA, Utilities)

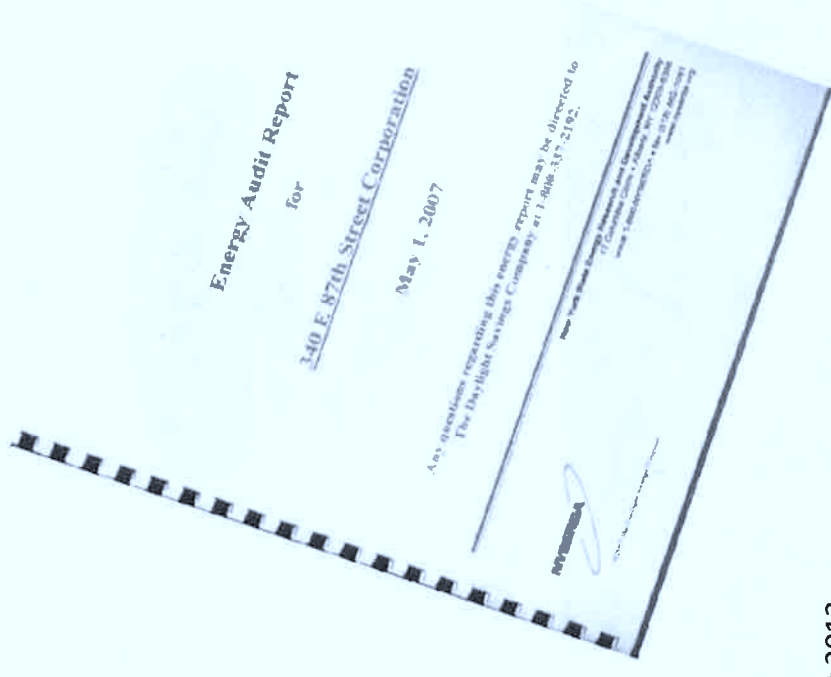




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Savings Company**

## Why An Energy Audit?

- An Energy Audit is only the first step
- Audits help you and your community to:
  - Save Energy
  - Be environmentally responsible
  - Reduce your energy bills
  - Provide local jobs and
  - Save money!!





**The Daylight  
Savings Company**

## **Who is NYSERDA**

- New York State Energy Research & Development Authority
- Headquartered in Albany- offices in NYC & Buffalo
- Promotes Energy Awareness, Efficiency and Alternative Energy
- Provides incentives, rebates and funding
- Funded through the Systems Benefit Charge (tax) on utility bill

• [WWW.NYSERDA.NY.ORG](http://WWW.NYSERDA.NY.ORG)





**The Daylight  
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## **NYSERDA Programs**



- Audit Program
- New Construction
- Retro-Commissioning
- Existing Facilities Program
- Green Jobs Green NY Loan Fund
- FlexTech
- Green Building
- Commercial Lighting
- Renewable Energy
- Combined Heat And Power
- Peak Load Reduction
- Commercial Kitchens
- Multifamily Performance Program
- Residential



**The Daylight  
Savings Company**

## **NYSERDA Energy Audit Program-Commercial**

- **FREE ENERGY AUDIT !**
- **Who Is Eligible?**
  - Small Businesses using less than 100kW avg. / month
  - Non-profits
- Daylight Savings is the exclusive contractor for:
  - Bronx, Westchester, Rockland, Orange, Nassau and Suffolk

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## **Energy Audit Report**

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**New York State Energy Research and Development Authority**  
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[www.nyszerda.ny.org](http://www.nyszerda.ny.org)

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## Study Results

- Building and equipment inventory
- Analysis of historical energy usage and costs
- Energy Cost Reduction Opportunities (ECROs)
  - Anticipated savings
  - Implementation costs
  - Maintenance considerations
  - Government and other potential incentives
  - Financial analysis (payback, life cycle, NPV)



# The Daylight Savings Company

## EPA PORTFOLIO MANAGER

OMB No. 2060-0347



### STATEMENT OF ENERGY PERFORMANCE Eb Franklin

Building ID: 2324221  
For 12-month Period Ending: March 31, 2010  
Date SEP becomes ineligible: N/A

Date SEP Generated: August 03, 2010

Facility  
Eb Franklin  
401 Franklin Ave  
Garden City, NY 11530

Facility Owner  
N/A

Primary Contact for this Facility  
N/A

Year Built: 1940  
Gross Floor Area (ft<sup>2</sup>): 125,000

Energy Performance Rating<sup>2</sup> (1-100) 76

Site Energy Use Summary<sup>3</sup>  
Electricity - Grid Purchase (kBtu)  
Natural Gas (kBtu)<sup>4</sup>  
Total Energy (kBtu)

6,280,810  
2,150,505  
8,431,315

Energy Intensity<sup>5</sup>  
Site (kBtu/ft<sup>2</sup>/yr)  
Source (kBtu/ft<sup>2</sup>/yr)

67  
186

Emissions (based on site energy use)  
Greenhouse Gas Emissions (MCO<sub>2</sub>e/year)

1,404

Electric Distribution Utility  
National Grid - Long Island Power Authority

National Average Comparison  
National Average Site EUI  
National Average Source EUI  
% Difference from National Average Source EUI  
Building Type

93  
255  
-27%  
Office

\*equivalent of either removing 3 cars from the road or  
planting 918 trees

#### Reduced Emissions (in Pounds)

| Source        | SO <sub>2</sub> | NO <sub>x</sub> | CO <sub>2</sub> |
|---------------|-----------------|-----------------|-----------------|
| Coal:         | 128             | 49              | 15,881          |
| Petroleum:    | 37              | 9               | 5,331           |
| Gas:          | 0               | 22              | 7,523           |
| <b>Total:</b> | <b>165</b>      | <b>79</b>       | <b>28,734</b>   |

Stamp of Certifying Professional  
Based on the conditions observed at the time of my visit to this building, I certify that the information contained within this statement is accurate.

Certifying Professional  
N/A

Meets Industry Standards for Indoor Environmental Conditions:  
Ventilation for Acceptable Indoor Air Quality  
Acceptable Thermal Environmental Conditions  
Adequate Illumination

N/A  
N/A  
N/A



# The Daylight Savings Company

## Energy Audit Results- Summary

| Description                          | Cost(*)         | Annual Savings  | Payback (years) | % of Annual Energy Cost |
|--------------------------------------|-----------------|-----------------|-----------------|-------------------------|
| Upgrade the Lighting                 | \$14,253        | \$4,751         | 3.0             | 3.6%                    |
| Improve the Building Envelope        | \$6,300         | \$942           | 6.7             | 1.8%                    |
| Upgrade the HVAC                     | \$62,000        | \$5,736         | 10.8            | 10.8%                   |
| Improve the Motors                   | \$2,174         | \$432           | 5.0             | 0.8%                    |
| Modify the Domestic Hot Water System | \$29            | \$39            | 0.7             | 0.1%                    |
| Other Measures                       | \$1,000         | \$294           | 3.4             | 0.6%                    |
| <b>Totals</b>                        | <b>\$85,756</b> | <b>\$12,194</b> | <b>7.03</b>     | <b>17.5%</b>            |

(\*) Costs are before any potential Rebates



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Savings Company**

## Energy Audit Results- After Implementation

| Description                          | Cost            | Rebate          | Net Cost        | Annual Savings  | Payback (years) |
|--------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Upgrade the Lighting                 | \$14,253        | \$9,900         | \$4,353         | \$4,751         | 0.9             |
| Upgrade the HVAC                     | \$62,000        | \$6,500         | \$55,500        | \$5,736         | 9.7             |
| Improve the Motors                   | \$2,174         | \$150           | \$2,024         | \$432           | 4.7             |
| Modify the Domestic Hot Water System | \$29            |                 | \$29            | \$39            | 0.7             |
| Other Measures                       | \$1,000         |                 | \$1,000         | \$294           | 3.4             |
| <b>Totals</b>                        | <b>\$79,456</b> | <b>\$16,550</b> | <b>\$62,906</b> | <b>\$11,252</b> | <b>6.7</b>      |

|                                    |    |       |
|------------------------------------|----|-------|
| Lighting Upgrade -Con Ed SBDI      | \$ | 9,900 |
| 2.ea. High Eff. Gas Boiler-NYSERDA | \$ | 5,000 |
| 2 ea. A/C Units-NYSERDA            | \$ | 1,500 |
| Motors                             | \$ | 150   |



## The Daylight Savings Company

### NYSERDA's Existing Facilities Program

- Small, Simple Equipment - Up to \$30,000
- Pre-Qualified Path
  - smaller-scale lighting, HVAC
  - commercial refrigeration, commercial kitchen,
  - gas equipment and other categories
- Maximum incentives of \$30,000 for electric improvements
- No minimum incentive
- Submit your application for eligible equipment incentives up to 90 days after project completion





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## Existing Facilities Program- Sample Incentive

### Pre-Qualified HVAC



| Air-to-Air Heat Pump Systems Efficiency Levels and Incentive Amounts |                        |                        |                                 |           |  |
|----------------------------------------------------------------------|------------------------|------------------------|---------------------------------|-----------|--|
| Measure Code                                                         | Unitary Equipment Size |                        | Minimum Efficiency              | Incentive |  |
|                                                                      | Tons                   | Btu/h                  |                                 |           |  |
| ASHP-1                                                               | Split System ≤ 5.4     | ≤ 65,000               | 14.0 SEER / 12 EER / 8.5 HSPF   | \$125/btu |  |
| ASHP-2                                                               | Single Package ≤ 5.4   | ≤ 65,000               | 14.0 SEER / 11.6 EER / 8.0 HSPF | \$125/btu |  |
| ASHP-3                                                               | > 5.4 to ≤ 11.25       | > 65,000 to ≤ 135,000  | 11.5 EER                        | \$80/ton  |  |
| ASHP-4                                                               | > 11.25 to ≤ 20        | > 135,000 to ≤ 240,000 | 11.5 EER                        | \$80/ton  |  |
| ASHP-5                                                               | > 20 to ≤ 63           | > 240,000 to ≤ 760,000 | 10.5 EER                        | \$50/ton  |  |

| Air-to-Air Heat Pump Systems Incentive Calculation                       |                 |                                  |                     |                                       |                                     |               |                                     |
|--------------------------------------------------------------------------|-----------------|----------------------------------|---------------------|---------------------------------------|-------------------------------------|---------------|-------------------------------------|
| Reason:<br>N = New<br>R = Replacement<br>F = Field                       | Measure<br>Code | Manufacturer and<br>Model Number | Unit Size<br>(Tons) | Unit Efficiency<br>(EER or SEER/HSPF) | C<br>Incentive<br>\$/ton<br>(Table) | D<br>Quantity | E<br>Total Incentive<br>(D x E x N) |
| Example: N                                                               | ASH-P-3         | ABC123                           | 6                   | 12.0 EER                              | \$80                                | 1             | \$480                               |
| 1.                                                                       |                 |                                  |                     |                                       |                                     |               |                                     |
| 2.                                                                       |                 |                                  |                     |                                       |                                     |               |                                     |
| 3.                                                                       |                 |                                  |                     |                                       |                                     |               |                                     |
| (enter on page 1) Total Air-to-Air Heat Pump Systems Incentive Requested |                 |                                  |                     |                                       |                                     |               | \$                                  |

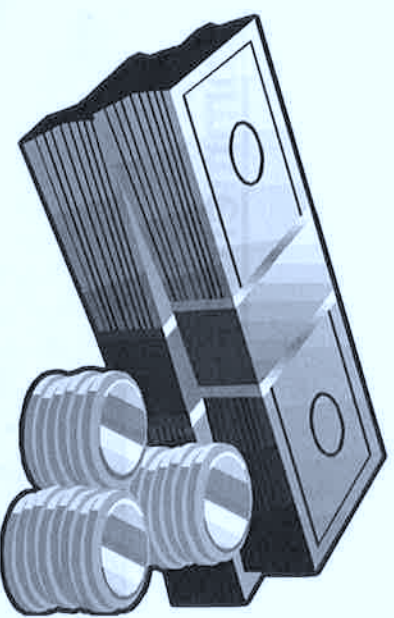


**The Daylight  
Savings Company**

## **NYSERDA's Green Jobs Green NY Financing**

### **Program**

- NYSERDA provides 50% of a loan, up to \$50,000, at 0% interest
- Lender provides the rest of the loan at market rate.





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## Con Edison's SBDI Program-Commercial

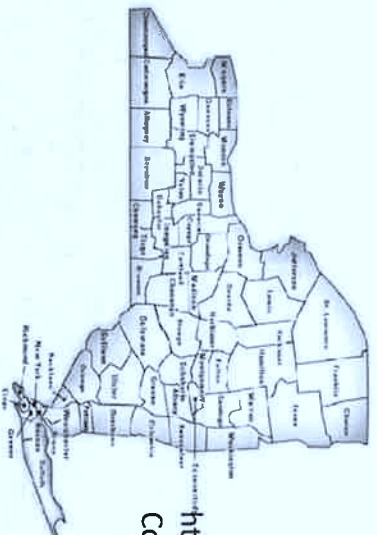
- Commercial Small Business and Not for Profit
  - **SBDI Program** pays for 70% of recommended energy-efficient upgrades, while you pay the remaining 30%. Eligible customer uses less than 100kW/mo
- **Commercial and Industrial (C & I) Program** - Rebate program for larger customers



## The Daylight Savings Company

### Home Performance with ENERGY STAR-Residential

- Home Energy Audit, Existing
- 1-4 unit residential units
- Free, if household annual income is below \$213,000 (Westchester)
- Conducted by an approved contractor that is BPI certified



<http://www.nyserda.ny.gov/Contractors/Find-a-Contractor/Residential-Contractor.aspx>

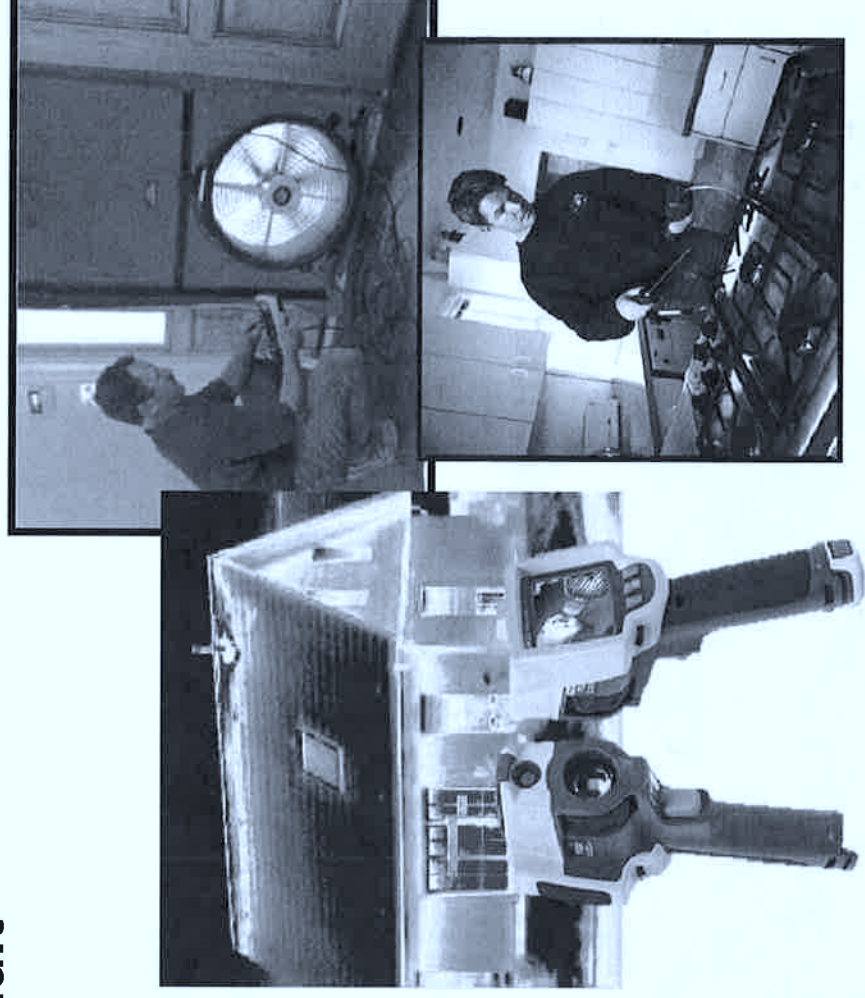


**The Daylight  
Savings Company**

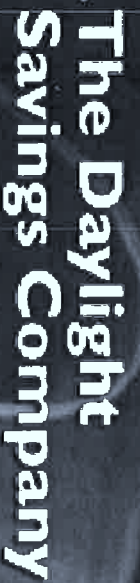
## **Home Energy Audit**

**•Evaluates :**

- Building Envelope
- Major HVAC Systems & Controls
- Appliances
- Lighting and Controls
- Testing



Daylight Savings Company Copyright 2012



# Energy Audit Report

[illegible]

# YOUR HOME ASSESSMENT

**Home Performance with ENERGY STAR®**



**New York & Energy Smart**  
Public Service NYSEG

Abou Home Performance with ENERGY STAR®

New Yorkers are spending more money than ever on heat and cool their homes. Many homeowners are not getting the comfort they are paying for. Many homes suffer from cold spots, rooms that are too hot or too cold, etc. Thus, efficient heating, cool, and multi and multi-providers. They may all be common signs that the house is not properly insulated or that the heating system is improperly balanced, or that most at all, the house is not being effectively controlled. Many homes are simply wasting the outdoors.

Now, here's something you can do about it: The Three Percent Energy and Environmental Sustainability (SEESPEER), as part of the New York Program on Sustainable Development (NYS-SPD), is sponsoring the New York Green Screen (NYGS) Program. Collaborating with participating firms, this initiative has successfully completed a competitive skills evaluation in three performance categories. Each participating contractor has earned certification through the Building Performance Institute (BPI), a nationally recognized organization for building science technology that sets the standards for assessing and improving the energy performance of buildings.

## About Your Home's Assessment

Your Home Assessment is customized to identify the particular needs of your home based on your answers. The information that your Contractor gathered has been entered into a computer software package that helps your Contractor determine the most cost-effective measures you can take to make your house more efficient and comfortable. This report outlines the analysis, prioritizes recommended home repairs and helps you determine the best improvements for your home.

|                                                                                                                                                                                                  |                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                               | <p><b>PREPARED FOR</b></p> <p>Name: Bob Jones</p> <p>Phone: 585-1234</p> <p>Title:</p> <p>Date: 12/6/2007</p>                                                                                                  |
| <p><b>BUILDING INFORMATION</b></p> <p>Address: 1234 Buckner Drive<br/>Pittsburg, PA 84104</p> <p>Total Floor Area: 3,400 Sq Ft</p> <p>Heated Floor Area: 1,200 Sq Ft</p> <p>Year built: 1955</p> | <p><b>PREPARED BY</b></p> <p>Name: Curt Crow</p> <p>Address: 1234 Bradley St, Shiner TX<br/>Hocks, TX 78850</p> <p>Phone: (801-217-654)</p> <p>FAX: (807-277-9624)</p> <p>E-mail: ccrow@psdcconsulting.com</p> |



**The Daylight  
Savings Company**

## **Home Performance with ENERGY STAR**

### **•Residential Low-Interest Loan Features:**

- Low-interest loans made available through the Green Jobs – Green New York\* Act of 2009
- Finance up to \$13,000 per household, up to \$25,000 if the payback period is 15 years or less
- Loan buy-down of 4%pts. to min. of 3%
- Select a loan repayment period of 5, 10, or 15 years

### **•On-Bill Recovery Loan Program**

- Convenient – no separate bill to pay
- Repay from the money you save on energy
- Low 2.99% interest rate
- Interest may be tax deductible
- Transferrable if you sell your property
- No payments until June 2012
- Now Available





**The Daylight  
Savings Company**

**The Daylight Savings Company is the exclusive service provider for  
NYSERDA's Energy Audit Program**

**We have:**

- Over 20 years experience
- Qualified energy auditors – PE, CEM, BPI, LEED, etc.
- The ability to assist you in obtaining valuable incentives and rebates
- Contact us at **1-800-337-2192** or you may contact me directly at

**Brian Nieves**

(347) 719-0735 or [bnieves@daylightsavings.us](mailto:bnieves@daylightsavings.us)

More information at [www.daylightsavings.us](http://www.daylightsavings.us)



# NYSERDA FLEXTech ENERGY AUDIT IN-TAKE FORM

**For Daylight Savings Co. Office Use Only**

|                            |                     |
|----------------------------|---------------------|
| Salesperson:               | Date:               |
| Date CFA Submitted Online: | CFA E-mail Address: |
| CFA Token:                 | CFA Application #:  |

**Please complete one form per building.**

## General Information

|                                   |           |
|-----------------------------------|-----------|
| Legal Name of Facility:           |           |
| If DBA, What is DBA Name?         |           |
| Contact Name:                     |           |
| Title:                            |           |
| Address:                          |           |
| City:                             |           |
| Zip:                              |           |
| County:                           |           |
| Phone/Fax/Other:                  |           |
| E-Mail:                           |           |
| Not-for-Profit or Small Business? |           |
| Number of Employees:              |           |
| Square Footage of Facility:       | Fed ID #: |

### Type of Applicant

|                                               |                                                   |                                               |
|-----------------------------------------------|---------------------------------------------------|-----------------------------------------------|
| <input type="checkbox"/> District Corporation | <input type="checkbox"/> Sole Proprietorship HDFC | <input type="checkbox"/> Not-For-Profit       |
| <input type="checkbox"/> Public Authority     | <input type="checkbox"/> Business Corporation     | <input type="checkbox"/> Public Benefit Corp. |
| <input type="checkbox"/> Individual           | <input type="checkbox"/> LLC                      | <input type="checkbox"/> BID                  |
| <input type="checkbox"/> IDA                  | <input type="checkbox"/> LLP                      |                                               |
| <input type="checkbox"/> LDC                  | <input type="checkbox"/> LP                       |                                               |

### Facility / Building Use

|                                                 |                                                     |                                              |
|-------------------------------------------------|-----------------------------------------------------|----------------------------------------------|
| <input type="checkbox"/> Agriculture            | <input type="checkbox"/> Hospitality                | <input type="checkbox"/> Office              |
| <input type="checkbox"/> College / University   | <input type="checkbox"/> Industrial / Manufacturing | <input type="checkbox"/> Retail              |
| <input type="checkbox"/> Commercial Real Estate | <input type="checkbox"/> K-12 School                | <input type="checkbox"/> State Government    |
| <input type="checkbox"/> Data Center            | <input type="checkbox"/> Local Government           | <input type="checkbox"/> Water / Waste Water |
| <input type="checkbox"/> Healthcare             | <input type="checkbox"/> Not-For-Profit             |                                              |

**Please complete the back side of this form for mandatory energy usage information.**

The Daylight Savings Company  
25 Main Street, Goshen, NY 10924  
Phone: 845-291-1275 / Fax: 845-291-1276

**If you are a LIPA customer, please attach one (1) complete utility bill.**

---

**Energy Utility Information**

---

**Electric Provider:**

**Electric Account #:**

(If you are a NYSEG customer – Please include POD ID #)

**ESCO? If yes, please attach copy of ESCO bill**

---

**Gas Provider:**

**Gas Account #:**

(If you are a NYSEG customer – Please include POD ID #)

**ESCO? If yes, please attach copy of ESCO bill**

---

**Oil Provider:**

*Please attach copy of oil bill.*

---

**Propane Provider:**

*Please attach copy of propane bill.*

---

**Other Fuel Provider:**

*Please attach copy of bill for any other fuel.*

---

| <b>For Daylight Savings Co. Office Use Only</b> |  |
|-------------------------------------------------|--|
| <b>Annual Energy Usage Information</b>          |  |
| <b>TOTAL Annual Utility \$</b>                  |  |
| <b>Electric (kWh)</b>                           |  |
| <b>Electric \$</b>                              |  |
| <b>Electric kW</b>                              |  |
| <b>Gas (therms)</b>                             |  |
| <b>Gas \$</b>                                   |  |
| <b>Oil (gallons)</b>                            |  |
| <b>Oil \$</b>                                   |  |
| <b>Propane Units</b>                            |  |
| <b>Propane \$</b>                               |  |
| <b>Other Fuel Units</b>                         |  |
| <b>Other Fuel \$</b>                            |  |

**Please Note:**

**The Daylight Savings Company personnel will be contacting you for further information and to schedule your audit.**

The Daylight Savings Company  
25 Main Street, Goshen, NY 10924  
Phone: 845-291-1275 / Fax: 845-291-1276



## 100 % Funded Energy Audit

You are eligible for a **100% FUNDED ENERGY AUDIT** through **NYSERDA**<sup>†</sup> that could mean huge savings on your energy costs. Find out more from The Daylight Savings Company, the exclusive **NYSERDA** provider.

### Why is the government providing funding for these energy audits?

The government stimulus funds are allocated for small businesses and not-for-profits to receive a free, no obligation, onsite energy audit to analyze your energy usage and recommend cost effective improvements. The intent of the funding is to help you and your community:

- Save energy and reduce dependency on foreign oil
- Be environmentally responsible
- Reduce your energy bills
- Provide local jobs

### Your 100% Funded Energy Audit:

- Provides a no obligation evaluation and report (this is NOT a sales tool for lighting or any other products)
- Helps you understand your energy usage
- Let's you see the impact of cost effective measures related to all aspects of your facility (energy efficiency measures typically have an average 20%-30% Return on Investment (ROI))

<sup>†</sup> NYSERDA is the New York State Energy Research and Development Authority

Federal stimulus funding is provided from the American Recovery and Reinvestment Act of 2009 (ARRA).

New York stimulus funding is provided from the Green Jobs/Green New York Act of 2009 (GIGNY).



**The Daylight Savings Company** is the exclusive service provider for **NYSERDA's Energy Audit Program**. (NYSERDA is the New York State Energy Research and Development Authority)

We have:

- Over 20 years of experience
- Qualified energy auditors – PE, CEM, BPI, LEED, etc.
- The ability to assist you in obtaining valuable incentives and rebates

Contact us at **1-800-337-2192 x 300** and mention 100% funded energy audits. More information at [www.daylightsavings.us](http://www.daylightsavings.us)