

R.P. DELIO



Energy Audit Report

THE EAGLE LEASING COMPANY

DECEMBER 29, 2011



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R.P. Delio & Company is a leader in full-service consultancy on engineering, procurement, construction, and operations in the new industrial age. As a project delivery firm with a global grasp, we believe the challenge is in the planning, not the executing.

Our activities span the full spectrum of facility, technology and process design; by applying technology and innovation optimally to these, our vision is of helping to build a better world.

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Energy Audit Report

THE EAGLE LEASING COMPANY

EXECUTIVE SUMMARY

Eagle Leasing & Old Dominion Truck Leasing have embarked upon a effort to reduce their energy consumption and costs and as a result making their products and services more cost competitive, the business more profitable, and as a result reduce their businesses carbon footprint. The 1 Irving Eagle Place, in Orange, CT was selected as the initial facility for R. P. Delio & Company to conduct an energy efficiency review. Any energy efficiency measures recommended in this report have been proven as commercially reliable based on the payback criteria specified: <5 years.

SITE INFORMATION

- a. Report title: Eagle Leasing Company ASHRAE Level 1 Energy Audit
- b. Name of client: Eagle Leasing / Old Dominion Truck Leasing
- c. Location of facility: 1 Irving Eagle Place, Orange, CT 06477-3204
- d. Date of report: 12/29/2011
- e. Energy Service Provider: R. P. Delio & Company
- f. KQP, R. P. Delio, #CEM 017620
- g. Signature of KQP: R. P. Delio, #CEM 017620

ABOUT R.P DELIO & CO.

R.P. Delio & Co. is a full service engineering firm providing engineering services in support of utility infrastructure projects and energy efficiency and distributed generation projects. Our professional engineers are dedicated to improving your business profitability, competitiveness and energy independence through the efficient and intelligent use of thermodynamics and ingenuity. As an added benefit, the solutions we recommend enable your business to preserve scarce local resources.

We have found this approach results in financially compelling and environmentally rewarding solutions. R.P Delio uses a complete set of tools, processes and strategies to provide the critical management information necessary to determine the optimum deployment of capital to achieve the largest impact for company objectives.

AUDIT RESULT SUMMARY:

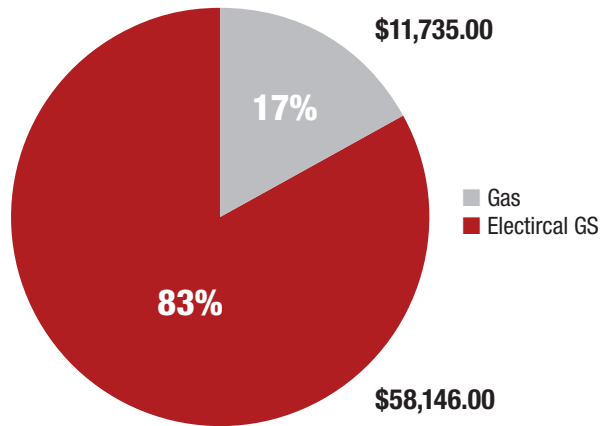
R. P. Delio & Company completed a site inspection on 12/22/2011, collected equipment and utility data, recorded operational information and conducted interviews with Eagle Leasing and Old Dominion Truck Leasing personnel during its audit of the 1 Irving Eagle Place, Orange, CT facility. The audit showed that the facility had many energy efficiency measures already installed.

No Energy Efficiency Measures (EEMs) were identified through this audit process that have a payback of less than 5 years. Each potential EEM was evaluated for its energy saving potential and its financial returns, using the projected energy savings and utility rebate incentives. The identified measures were converted into individual work scopes. Prime Solutions calculated the resulting energy savings and our project managers estimated the project costs using industry standards typical for an initial audit. The audit results summary in the below shows the results of this effort.

ENERGY AUDIT REPORT

The current energy usage based on current utility bills for the past 12 months is broken down in the pie chart below:

Eagle Leasing Energy Usage



Based on a review of the current utility bills provided by Eagle Leasing, the energy distribution was able to be summarized, and the need to focus on electrical reductions apparent with it comprising 83% of the overall energy budget.

Given the reliance on lighting and electrically compressed air this is not a surprise. Natural gas is used for hot water space heating, air conditioning in the office space. Given the 5-year no incentive payback there were no projects that made economic sense. In the future attention should be given to upgrading the 8-10 year old Caravan hot water boilers that are at their best 83% efficient with a new condensing high efficiency water boiler. The reason this is not recommended as part of the current audit is that the total energy demand for space heating when the savings of 16% amounts to only \$9,388.00 over 5 years and no rebate (\$11,735 x 16% x 5 years savings). The low demand of natural gas is because of the facilities creative use of waste oil space heating averaging 10,000 gallons of waste oil for space heat.

The focus of this energy report was to look at ways to reduce or to couple systems so as to reduce the overall electrical energy usage of the facility, with special attention paid to air compression, ventilation, and lighting control. With proper energy use monitoring is estimated that the facility can reduce a small portion of their overall electrical bill.

OBJECTIVES OF AUDIT

- a. Identify EEMs in the hot water space heat, exhaust, compressed air, comfort cooling and heating, building envelope and lighting systems.
- b. Key systems and equipment analyzed
 - i. Building:
 1. Weather-stripping around doors, man ways and windows.
 - ii. Compressor Air
 1. Monitor the existing compressed air system to better understand the possibility of adding a receiver and variable speed drive.
 - iii. Motors
 1. Monitor the electrical usage of fans to better understand if soft start / stop or VFDs are warranted.
 - iv. Domestic Hot Water
 1. The use of domestic hot water is minimal for hand washing in lavatories.

v. Comfort Heating and Cooling

1. The current system is comprised of 8 Caravan hot water boilers

vi. Building Exhaust

1. The paint bay has large exhaust fans used to remove paint fumes from the bay and provide fresh air to the occupants.

vii. BMS

1. The building operates on manual controls and set points of the heating system.

viii. Equipment Waste Oil

1. The Eagle Leasing space uses approximately 10,000 gallons of waste truck oil in a forced air furnace in order to offset the use of natural gas for space heating.

ix. Renewable Energy – Solar

1. The buildings are an ideal location for renewable energy given the lack of shading obstructions on the property.

x. Bathrooms

1. Install occupancy sensors on the lighting and exhaust fan systems.
2. Replace the fixtures with water saving low flow / low flush systems.

xi. Lighting

1. Most of the facility is using T8 or T5 lamps.
2. Occupancy sensors were installed in some locations but not throughout the facility.
3. No photo sensors were installed on outdoor lighting.

Due to the recent energy efficiency measures implemented the auditor did not find any recommended energy conservation measures, annual energy savings and cost savings using the table format below:

DETAILED ENERGY AUDIT REPORT

Table of Contents

- a. Introduction
- b. Methodology and instrumentation
- c. Data analysis and findings including graphs and plots
- d. Identified saving measures
- e. Summary of recommendations and the associated costs and savings
- f. Conclusion
- g. Appendices

ENERGY AUDIT REPORT

INTRODUCTION

The objectives of the audit is to study the energy consumption of the facility with a view to identifying energy conservation measures for implementation that meet the client's financial criteria (less than 5 year payback) and take into consideration facility/building technical and operational limitations.

The ASHRAE level 1 energy audit was conducted and EEMs were identified with paybacks of less than 5 years with no incentives.

The facility consists of 2 buildings and a truck and cargo box storage yard. Dominion Truck Leasing building audited comprises an unheated truck loading bay and attached office space and bathroom space. The Eagle Leasing building consists of several high bay truck maintenance bays and a painting area as well as storage and mechanical space.

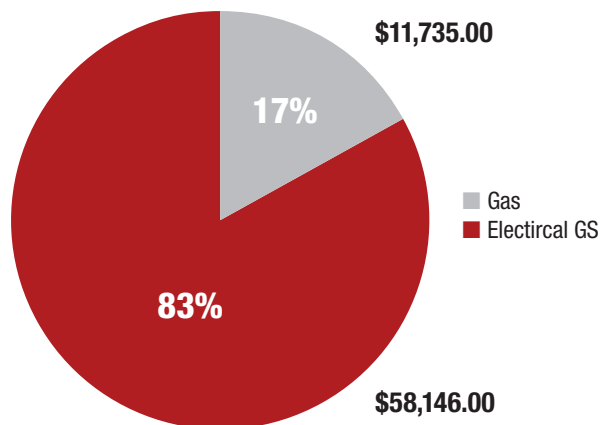
The tenants of the buildings are paying their own water, electrical and natural gas bills.

The past 12 months energy consumption and costs, including tariff rates were used for financial calculations.

Breakdown of energy (electricity and fuel) consumption in pie-chart form:

The scope of the ASHRAE level 1 audit was to survey the Eagle leasing boiler room, air compressor room, second floor office space with a small AC unit, the truck bays, maintenance parts area and paint room, the exterior of the building and the storage yard. In the Old Dominion area the survey consisted of the loading area, the office space, entry and bathrooms.

Eagle Leasing Energy Usage



METHODOLOGY AND INSTRUMENTATION

No instrumentation was used on this audit, the auditor performed a level 1 energy audit per AHSRAE recommendations.

A more detailed instrument installation and measurement procedure is recommended for the air compression systems but given the requirements of a 5 year payback and the size of utility bills, the auditor does not believe that there are substantial enough savings to meet payback criteria.

If additional measurements were performed, the photo below shows the locations of installed power consumption, pressure and flow instruments and sensors on the compressed air system as well as the intake air temperature and humidity.

DATA ANALYSIS AND FINDINGS

- a. Date of audit: 12/22/2011
- b. Only name plate information and operating conditions were collected during the audit for major equipment.
- c. Baseline energy consumption was determined by a review of the utility bills and a cross checks of the consumption identified in the bills and the equipment nameplate information observed.
- d. The energy efficiency index (EEI – kWh/m²/year) of buildings, defined as the amount of energy consumed annually per Gross Floor Area (GFA) of the building. The auditor was unable to find an EEI for this type of facility.
- e. Below is a description of systems or equipment audited, their capacities and ratings, design and operating conditions, equipment schedules, etc., including information such as the type of systems, controls, type and number of auxiliary equipment, etc.
 - i. Boilers:



- ii. Lighting: T8 and T5 lamps:



- iii. 800 Amp 208Y/120 GE Switchboard:



ENERGY AUDIT REPORT

iv. Air Compression:



v. Exhaust Fans:



There were no refrigeration systems in the building of note. A single small office had one small air conditioner that rejected heat into the truck bay area of the Eagle Leasing facility.

As no air conditioning is provided to the remainder of the space, there is no reason to make any modifications to this system.

> A heat and mass balance were not applicable for this system.

f. Findings and observations

i. Power Measurement

1. The UI Meter ending # 303 was found in the air compressor room of the Eagle Leasing building.
2. The building does not have power management capability, all heating, cooling and lighting are manually operated.

ii. Compressed air systems

1. Details of the type, number, capacity and rating of air compressors

Description	Qty	Rated kW / Capacity
Air Compressor (Reciprocating Type)	2	55kw (25HP)

2. Performance of air compressors

Description	Measured Total Compressor Load (kW)	Air Pressure at Receiver Tank (bar)	Air Pressure at furthest End User (bar)	Pressure Drop (bar)
2 reciprocating compressors – one in operation one in reserve	Unk	8.27	Unk	Unk

3. The system gauges at the air compressor showed 120psi discharge pressure and a dew point of 22deg F or -5.5deg C or 16 grains per Lb compressed air. A pressure regulator in the paint shop could not be identified to determine the pressure drop of the system.

The auditor recommends that flow and pressure monitoring be installed on this system to better determine the size of the air receiver as well as the piping to ensure that there is sufficient pressure delivered to the most remote user. Additionally the air intake for the compressor should be ducted so as to prevent outside air infiltration into the building.

iii. Lighting systems

1. The lighting system for the entire Eagle Leasing and Old Dominion Truck Leasing facility had been upgraded to T5 and T8 lighting recently and as such the auditor did not see any economic payback in making the upgrade to LED given the 5-year payback hurdle.
2. The auditor does recommend a more detailed monitoring of lighting levels and the long term paybacks of occupancy sensors and level controls but the paybacks are estimated to be longer than 5 years.

g. Identified Energy Saving Measures

- i. The auditor was unable to identify any recommended energy saving measures substantiated with detailed and clear calculations of the predicted annual energy and cost savings, investment cost and payback period for each measure given the requirement for 5-year payback.

CONCLUSIONS

SUMMARY OF RECOMMENDATIONS AND THE ASSOCIATED COSTS AND SAVINGS

- i. No Energy Efficiency Measures (EEMs) were identified through this audit process that have a payback of less than 5 years. Each potential EEM was evaluated for its energy saving potential and its financial returns, using the projected energy savings and utility rebate incentives. The identified measures were converted into individual work scopes. Prime Solutions calculated the resulting energy savings and our project managers estimated the project costs using industry standards typical for an initial audit. The audit results summary in the below shows the results of this effort.
- ii. It is recommended that the facility continue to audit the energy demand by sub metering the major energy consuming systems (ex Lighting and Air Compression) using temporary electrical current and voltage data loggers and also the installation of temporary flow and pressure measuring devices and electrical demand monitoring equipment the air compression system and a more detailed study of the lighting uses. These projects represent the next round of energy efficiency measures for the facility.
- iii. Exterior lighting should be considered candidates for photo sensors to allow for automated operation, again, given the total energy bill, it is not the auditors opinion that there is a 5 year or shorter payback on these systems.
- iv. While not strictly energy related the auditor did identify a water savings measure that is less than a 5-year payback without incentives. The facility consumes approximately 871,000 gallons of water per year and the use of low flow faucets, low flush toilets and low flush urinals would make a significant different in water consumption. The estimate is that by upgrading both bathrooms with low flow/flush fixtures the facility could save 25% of its water consumption. This translates into 217,855 gallons of water saved, or 291 CCF of water (1 CCF = 748 Gal). The facility pays approximately \$3 per CCF so this measure would total \$837 per year in water savings.
- v. Finally, while not a 5-year payback project, the facility should consider the replacement of exterior door weather-stripping. Most exterior doors show degradation or total loss of weather-stripping in the Eagle Leasing building.

ENERGY AUDIT REPORT

APPENDICES

a. Documentation of discussions with the facility personnel;

For DOMINION:

1. How is the Dominion space heat generated? [Joe Reagan] No heat in warehouse bays. Gas heat in office space.
2. For the heating system, what are the set points? [Joe Reagan] Office space is 70 degrees. Thermostats set manually, so set back to 65 at night and 70 during working hours 6-5
3. How many zones are on the office thermostat? [Joe Reagan] 1
4. Is there a timer or automated scheduler for heating prior to start time? [Joe Reagan] no
5. What are the heating / cooling system turn on and turn off for weekdays, weekends and holidays? [Joe Reagan] see above. Holidays it is set back to 65
6. How is the building heated when someone is working after hours? [Joe Reagan] same – thermostat set back by last out the door.
7. Is the Dominion loading dock space ever heated or cooled? [Joe Reagan] no
8. Is the Dominion loading dock space ever ventilated with fans?[Joe Reagan] no – doors are always open, so lots of airflow.
9. How is the hot water generated for the bathrooms in the Dominion bathrooms?[Joe Reagan] domestic water heater –small.
10. Does the Dominion office space have AC?[Joe Reagan] yes- RTU
11. Please explain how this system works. [Joe Reagan] standard- manual thermostat, same as for heat.

b. For EAGLE:

1. When were the Caravan boilers installed?[Joe Reagan] 8-10 years ago
2. Do you know the cfm of the exhaust fan system in the paint shop?[Joe Reagan] no
3. When do the ceiling exhaust fans operate in the non paint truck bays?[Brazo] manually controlled – occasional use based on conditions in the bay
4. What controls the ceiling overhead circulating fans?[Joe Reagan] manual
5. Please describe the operating procedure for opening and closing the overhead doors?[Joe Reagan] button controlled – on demand, manual
6. How much waste oil is burned per year (in gallons)?[Brazo] Guestimate = 10k gallons per year
7. What is use of the second air compressor?[Joe Reagan] They alternate the use of the 2 compressors each week to ensure they spread out the wear and tear and have an operational backup always available.
8. What is the size of the compressed air receiver and where is it located? [Joe Reagan] Unit is self-storing (underneath) no info on tank -- @ 75 gal capacity
9. Is there a truck wash or any reason for hot water usage? [Joe Reagan] They use pressure washers that heat the water – input is cold water. Washers used occasionally
10. Explain the hours of occupation for each bay
11. Number People[Joe Reagan] 2 staff members per pay per day (X 8 bays) + few extra guys=average # 20 total
12. Hours of operations[Joe Reagan] 6am-6pm weekdays, Sat 6am-12pm, closed Sundays.
13. Breaks and shut down[Joe Reagan] work breaks for 15 mins each at 8/10/2. Lunch 12-12:30pm weekdays.
14. Expected temperature for the building[Joe Reagan] warehouse area= 60 degrees; office =@70 degrees
15. What size motors are on the paint room exhaust fans? [Joe Reagan] unsure...but guess is 10Hp
16. What is the frequency of times the truck bay doors open[Joe Reagan] varies, but on average 4 X per day each.
17. Who controls the parking lot lighting?[Joe Reagan] Utility controls parking lot lights (UI) but they are on a timer.
18. Who controls the exterior building lighting? [Joe Reagan] Eagle – manual and timers
19. Do you know the CFM rating of the exhaust system for the paint area?[Joe Reagan] Unknown

[END OF REPORT]

Business success is not measured by the executive team's ability to imagine a winning corporate strategy, but by their ability to implement that strategy through innovative cross functional initiatives, employing projects to realize these new business capabilities. By partnering with **R.P. Delio & Company** companies benefit from the focus and **attention** that can only come from a small privately held consultancy, committed to **Engineering Program Success**. We understand the challenges organizations face when implementing **transformational** change. Our client's success is achieved through our ability to deliver stakeholders alignment on strategy, initiatives, and scope across the entire portfolio. We bring an unwavering commitment to analytical quality control, crisp communication, the integration of risk management and our strength in construction estimating.

Our focus is on the development and delivery of a programmatic approach to project delivery at the intersection of **renewable energy, public policy, and electrical utility**. We are highly selective in the markets we enter, and leverage being one of the only privately held firms that can bring a global reach and a **local understanding**. We believe the challenge for executives is in the planning, not the executing. Our activities span the full spectrum of facility, technology, process and design. By understanding **relationships** and applying **entrepreneurship**, our vision is helping to build a **cleaner, leaner, greener, brighter better world**.

Here is where we add significant value. We help leading companies drive business transformation by providing **industry leading utility integration renewable energy program management and project development consulting services, methods, financing and tools**. We've been engaged in some of the largest, highest profile and most effective renewable energy business transformation programs in US history. You can rely on us to help you develop a well-crafted strategy and drive a well-executed plan.

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