Task 6: Energy Supply, Distribution and Conservation

Prepared for: **Broward County Aviation Department**

Fort Lauderdale, Florida

September 25, 2007

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Prepared for

Broward County Aviation Department
Ft. Lauderdale, Florida

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Final Report

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ARTICLE I. ACRONYMS

A/C - Air-conditioning

AHU - Air Handling Unit

BAS - Building Automation System

BCAD - Broward County Aviation Department

CAP - Clean Airport Partnership, Inc.

CCF - Hundred Cubic Feet

CFC - Chlorofluorocarbon

CHP - Combined Heat and Power

CO - Carbon Monoxide

CO2 - Carbon Dioxide

CUP - Central Utility Plant

DCWP - Distributed Chilled Water Plant

DOE - Department Of Energy

DX - Direct Expansion

ECM - Energy Conservation Measure

EFLH - Equivalent Full Load Hours

EMCS - Energy Management Control System

EPA - US Environmental Protection Agency

EU - European Union

FC - Fuel Cell

FLL - Ft. Lauderdale-Hollywood International Airport

FPL - Florida Power and Light

HCFC - Hydro chlorofluorocarbon

HID - High Intensity Discharge

HPS - High Pressure Sodium

HRHWG - Heat Recovery Hot Water Generator

HRSG - Heat Recovery Steam Generator

HVAC - Heating Ventilation and Air Conditioning

KW - Kilowatt

KWH - Kilowatt Hour

LEED - Leadership in Energy and Environmental Design

LEED CI - LEED for Commercial Interiors

LEED CS - LEED for Core and Shell

LEED EB - LEED for Existing Buildings

LEED NC - LEED for New Construction

MAC - Midwest CHP Application Center

MH - Metal Halide

MRI - Midwest Research Institute

MW - Mega Watt

NASA - National Aeronautics and Space Administration

NOx - Nitrogen Oxides

NRCan - Natural Resources Canada

NREL- National Renewable Energy Laboratory

OES - Broward County Office of Environmental Services

PSID - Pounds per Square Inch Differential

PV - Photovoltaic

RCC - Rental Car Center

SAM - Solar Advisor Model

SFWMD - South Florida Water Management District

SOx - Sulfur Oxides

SPB - Simple Payback

SPLV - System Part Load Value

T/E - Thermal-to-Electric

TES - Thermal Energy Storage

URS -

USA - United States of America

USCHPA - U.S. Combined Heat and Power Association

USGBC - U.S. Green Building Council

VAV - Variable Air Volume

VFD - Variable Frequency Drive

VSCCP - Variable Speed Centrifugal Chiller Plants

1. Executive Summary

1.1. Purpose

The purpose of this report is to evaluate energy supply, distribution and conservation at FLL. Recommendations are made considering practical, technical, economic and environmental factors associated with the various measures considered.

1.2. Scope

The analysis included those major facilities for which BCAD has maintenance and operational responsibility. Utilities that are consumed and billed directly to tenants are not included in this analysis.

Although the original scope was limited to the evaluation of the top two renewable and conservation opportunities, Johnson Controls expanded the scope to include the evaluation of a number of additional opportunities. In addition, renewable and conservation opportunities are both included in this single report. These scope modifications resulted in a more comprehensive and holistic evaluation. The level of effort provided for opportunities for conserving energy was significantly higher than for renewables. Johnson Controls decision to put more detail in the opportunities to conserve energy was based upon input from BCAD staff.

Regarding recommendations and the measures that should be pursued and implemented, it was felt that Johnson Controls role is more to provide economic and technical information. The economic criteria, such as acceptable payback, and the desirability of including some renewables, that may not have a short payback, but will help make the overall project more "green", is BCAD's decision.

1.3. Findings Summary

FLL energy consumption and costs are almost exclusively for electricity. Annual electric costs for period ending June 2005 were $6,315,000 and the associated electric energy consumption was 83,000,000 kilo-watt hours (KWH). The electric consumption was estimated to be approximately 40% lighting, 40% heating, ventilating and air-conditioning (HVAC) equipment and 20% other (escalators, conveyor belts, power to aircraft, business and computer equipment, etc.).

FLL BCAD staff have done a good job and implemented a number of upgrade projects for the facilities that were constructed in years past when today's energy efficient technologies were not available. However, they are aware of additional opportunities but have been very limited in available resources for energy focused projects. Based upon discussions with BCAD staff and the performance of comprehensive surveys of the facilities, a large number of energy conservation measure (ECM) opportunities were identified that will result in significant energy savings.

The estimated savings, cost and positive environmental impact associated with each major ECM category may be found on the following page. The lighting systems, many of which still use older technology and do not perform very well, were found to have a large opportunity for improved efficiency, energy savings and the potential to significantly improve quality of the building environment.

ECM Estimated Impact and Simple Payback Summary

ECM No.	Found in Report Section	ECM Category Description	Estimated Energy Cost Savings Range (% of Total)	Estimated Cost to Implement $ (4)	Estimated Simple Payback Range (Years)
1	7	Lighting (3)	8 to 11	3,000,000 (4)	5
2	5	Interconnect Chilled Water Plant(s)	2 to 4	1,200,000 (2, 4)	14 (2)
		Subtotal		4,200,000 (4)	
3	6	Supply Side	0 to 4(1)	1,000,000 (4)	8
4	8 & 10	Other HVAC Systems and Retro-Cx	1 to 5	1,250,000 (4)	5
5	9.1, 9.2, 9.3	Other (Excluding Renewables)	0 to 2	750,000 (4)	8
		Total All Categories	11 to 22	$7,200,000 (4)	7

(1) Supply side measures would generally not save energy but would reduce costs.

(2) Interconnecting chilled water plants would improve system efficiency and redundancy.

(3) Lighting estimate excludes runway and tenant/vendor space lighting.

(4) The cost estimate for ECM Numbers 1 and 2 were the result of detailed surveys and cost estimates based upon a firm proposed scope of work. However, the exact scope of work that would be implemented

for ECM Numbers 3, 4 and 5 was not as well defined and their associated cost estimates are based primarily upon the data available at the time and Johnson Control's experience in implementing similar ECMs on prior projects.

The top two energy conservation opportunities/recommendations, considering both economic benefit and intangible benefits such as improved chilled water system redundancy, were felt to be:

1. Retro-fitting lighting systems as described in Section 7. The scope of the proposed lighting project includes all 4 terminals, Cypress, Hibiscus, Palm, BCAD Building North and South, Facilities, URS and the West Maintenance facilities. Proposed lighting project details may be found in Section 7 and in Appendix B.1, Lighting Audit Data. The appendix data contains detailed information on the existing lighting fixtures in each space in each building along with the proposed upgrades. At an estimated project cost of $3,000,000 and annual savings of $600,000, a simple payback of 5 years would result. The $3,000,000 estimate does not include any runway or tenant vendor lighting retro-fits.
2. Interconnect existing chilled water plants into a new chilled water loop that might be installed within the elevated road structure that connects the terminals. This might be implemented as a separate project or perhaps as a part of a new construction project. This would result in a distributed chilled water plant system consisting of perhaps 2 or 3 plants with phasing out of the older, smaller and less efficient Terminal 4 plant. This would greatly improve system redundancy and would improve overall system efficiency (most efficient plants and chillers would be loaded first). This recommendation is detailed in Section 5.3 and is significantly more economical than a single new central chilled water plant. However, a new chilled water plant might be constructed as a part of a major new construction project. It is anticipated that any new chilled water plant would be interconnected as well and supplement existing plants that remain. A new interconnecting chilled water loop with an estimated project cost of $1,200,000 and annual savings of $86,600 would have a simple payback of 13.6 years.

Several renewables were evaluated and the top two renewable opportunities were felt to be:

1. Thin-Film Photovoltaic (PV) Technology integrated into re-roofing projects or new construction roofs as described in Section 9.4.1, Photovoltaic Power Generation, Option 2. Detailed economic data is provided in the referenced section for a proposed project that would utilize 500,000 square feet of roof and generate 1.5 MegaWatt of electric power.
2. Daylight harvesting is a renewable with a relatively large number of individual opportunities with a wide range in size and payback. Daylight harvesting is detailed in Section 9.4.2. In its simplest application, a photocell switch can be used to turn off unnecessary lights, particularly outdoors, during daylight hours. Simple photo-cell switch applications can have a payback of one year or less. When

applied indoors, controls may be installed that sense the amount of light in the space and automatically either turn some lights off or automatically dim lights so the light in the space remains relatively constant. The simple payback on these more sophisticated interior day lighting systems can vary from approximately 4 years when applied in new construction projects to 8 years or longer when applied to retro-fitting existing spaces. Some specific opportunities are noted in Section 9.4.2.

Bottom Line Economic Estimate:

Implementation of a comprehensive energy focused project for the existing facilities that included all ECM Categories in the prior Summary Table could generate electric savings of approximately 18% or $1,100,000 per year (15,000,000 KWH). The project is estimated to have a cost of about $7,200,000 for a simple payback of about 7 years.

However, it should be noted that smaller projects could be put together that would only include those items that have a relatively short payback. For example, it is anticipated that a scaled back project totaling approximately $2,000,000 and having a simple payback of 3 to 4 years could be implemented if desired.

Bottom Line Environmental Impact Estimate:

A summary of the existing and future environmental footprint of FLL from implementing a comprehensive energy focused project that saved 15,000,000 KWH (the large $7,200,000 project previously described) follows:

Pollutant	Emission Factor	Pollutant Equivalent	Existing 83.5 x 10^6 KWH	Future 68.5 x 10^6 KWH	Reduction 15 x 10^6 KWH
CO_2	.59	pounds of carbon dioxide	49,153,000	40,305,000	8,848,000
SO_2	.46	pounds of sulfur dioxide	177,000	145,000	32,000
NO_x	.96	pounds of nitrogen dioxide	460,000	377,000	83,000

(1) The positive environmental impact from reducing electric consumption at FLL is based upon the Florida Power and Light fuel mixture and details may be found in the Baseline Report.

Renewable energy sources, including solar and fuel cell technologies, were evaluated and were generally found to have relatively long paybacks. However, a possible exception is a newly developed application of thin-film photovoltaic technology in an integrated roofing system. When this approach is coupled with a developing financial market that allows the federal tax and depreciation incentives for solar technologies to be brought to the public sector, a large photovoltaic project might be included in FLL re-roofing projects for a very short payback.

1.4. Recommendations Summary

Recommendations include the following:

1. BCAD should select a Commissioning Agent as soon as possible that will be used on all future new and renovation construction projects. The Commissioning Agent should be a part of the team from the inception of a project. The same Commissioning Agent should be used to help ensure standardization and consistent goals even when the architect and engineer for specific projects are different.
2. Consider having all new FLL construction be designed in accordance with LEED New Construction to help ensure environmentally sound design and construction. As an example,

daylight harvesting, a measure advocated by LEED, should be incorporated into new design and construction.

3. Implement the proposed chilled water plant renovation project for Terminals 3 and 4 that already has design drawings prepared. However, certain efficiency upgrades, that can be supported by a life cycle cost analysis and are estimated to cost $660,000 with a 4.8 year simple payback, are recommended.

4. Interconnect existing chilled water plants into a new chilled water loop that might be installed within the elevated road structure that connects the terminals. This might be implemented as part of a new construction project or a separate retro-fit project as follows.

5. Consider implementing an energy and environmental focused retrofit project that would include comprehensive lighting upgrades as a stand alone project or as part of a new construction project. The exact scope would be dependent upon BCAD financial criteria and non-economic goals.

6. Consider implementing thin film photovoltaic technology in an integrated roofing system on future re-roofing projects and new construction projects at FLL.

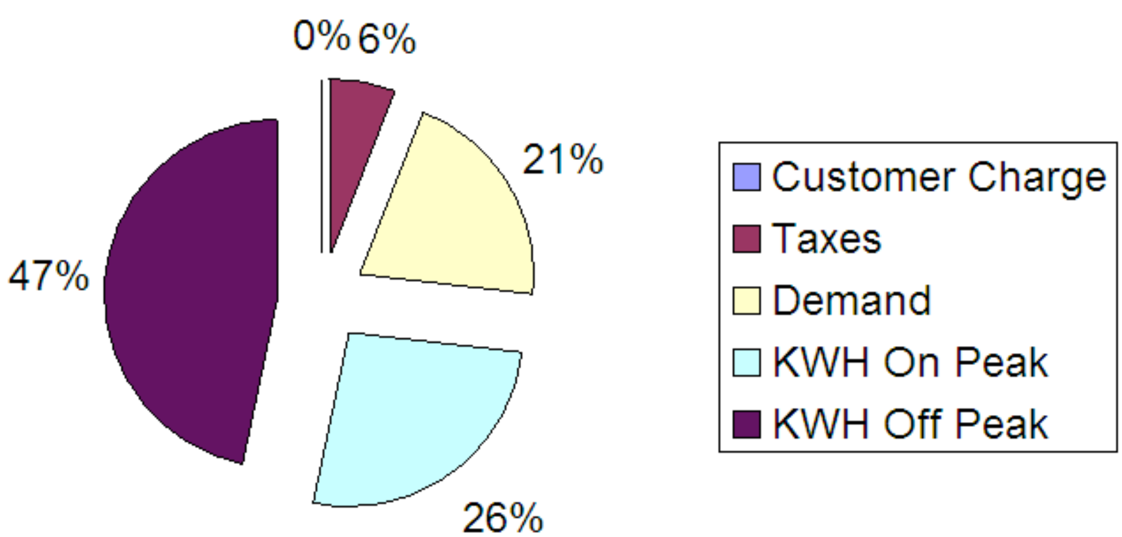
2. Review of Energy Bills and Consumption at FLL

2.1. Introduction

FLL BCAD and tenant facilities are provided electric and natural gas service. However, BCAD facilities are provided electric service only. Many tenant spaces such as Chili's restaurant are provided with separate electric and natural gas services and the tenants are billed directly by the utility companies.

2.2. Annual Electric Cost

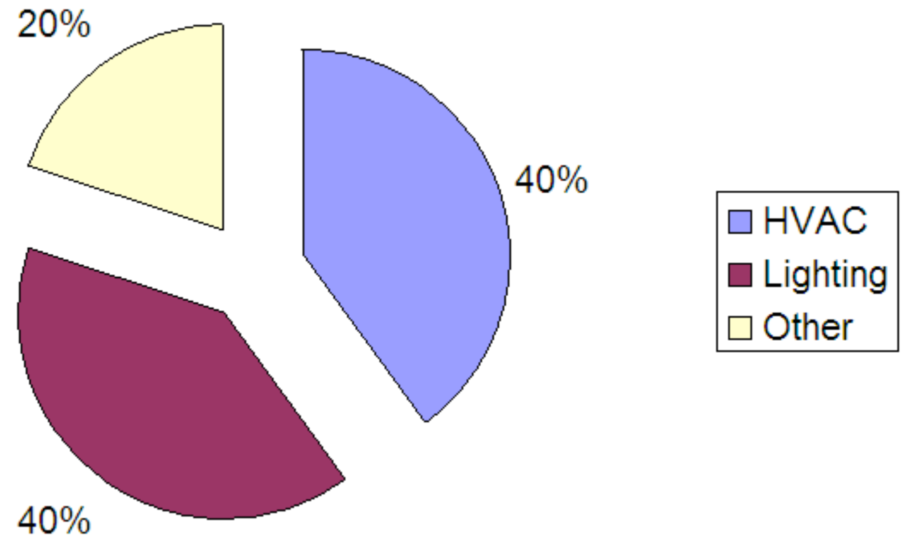
FLL BCAD facility electric cost is dealt with in detail in the prior Baseline Report that the reader may want to review for detail. However, a summary of the annual cost of FLL BCAD electric meters is as follows:



$6,315,000 per year electric bill total through

2.3. Annual Electric Consumption and Breakdown

FLL BCAD facility electric consumption is dealt with in detail in the prior Baseline Report that the reader may want to review for detail. However, a summary of the annual electric consumption breakdown of all significant FLL BCAD electric meters is as follows:



83,000,000 KWH per year in June

3. Past and Current Energy Related Projects at FLL

3.1. Introduction

BCAD has done a good job in upgrading their facilities that were constructed in years past when today's energy efficient technologies were not available. However, they are aware of additional opportunities but have been very limited in resources for energy focused projects. Projects that have been implemented in the past or are in the planning stage now include the following:

3.2. Lighting Retrofits

Most of the lighting in public areas has been retrofitted from the original T-12 lamps and magnetic ballasts to energy efficient T-8 lamps and electronic ballast technology.

There is a lighting retro-fit project in the planning stages now that will provide automatic control of ramp area lighting through the Building Automation system.

3.3. Rooftop Air Handling Unit (AHU) Replacement

A major AHU project was recently completed that replaced most all of the Rooftop AHUs in Terminals 2, 3 and 4. The project was an upgrade project that included energy efficient technologies such as variable frequency drives (VFDs), 100% outdoor air units for pre-conditioning and CO2 sensors for demand ventilation control.

3.4. Building Automation System Upgrade Project

A major Building Automation System (BAS) upgrade project is currently being implemented in Terminals 2, 3 and 4. This will result in the entire BAS that controls the HVAC systems and much of the lighting having the same modern technology in all terminals.

3.5. Chilled Water Plant Renovation Project

A major chilled water plant renovation project is planned that includes the plants in Terminals 1, 3 and 4. The construction plans were recently completed and were obtained and reviewed as a part of this evaluation.

4. LEED for New Construction and Existing Buildings at FLL

4.1. LEED Application at FLL

LEED, Leadership in Energy and Environmental Design, is an organized framework that has recently been developed for New Construction and Existing Buildings that may be applied to FLL. Application at FLL will provide a consistent focus on energy and environmental considerations even though the specific architects, engineers or assigned BCAD staff changes from project to project.

LEED includes recommendations for a Commissioning Agent that could be used on all future new and renovation construction projects. The same Commissioning Agent should be a part of the design team from the inception of a project to help ensure standardization and consistent goals even when the architect and engineer for specific projects are different. For example, the recent garage rental car facility used water cooled self contained A/C units with a cooling tower, an atypical system at FLL. A Commissioning Agent could have been a voice for the owner and advocated their preferred HVAC system, chilled water systems that could have easily been tied into a future central or distributed chilled water plant.

Newly constructed Terminal A at Logan International Airport is the first airport to receive LEED certification for new construction. FLL could become the first existing airport facility to achieve LEED EB (existing building) certification. FLL Terminal 1, the newest and most efficient terminal, could likely achieve certification with relatively minor retrofits and the least investment while the remaining terminals might receive certification in the future as part of major renovations.

4.2. LEED Background

In 1993, the USGBC was formed by a diverse group of industry leaders that included architects, developers, engineers, environmental groups and a few others. The top priority quickly became defining green. From those early discussions emerged the development of the LEED rating system with the mission of transforming the building industry. Thus was born the U.S. Green Building Council and the idea of a better way to build.

They spent five years developing, pilot testing and refining LEED through a consensus balloting process that engaged every member organization and company until it was launched in March 2000 in Washington D.C. As of June 2004, the USGBC had more than 4,500 member organizations, businesses, product manufacturers, government entities, building owners and operators, utilities and universities.

LEED was originally designed to be a comprehensive rating system that the USGBC employs to certify new buildings and recognize building project teams for their efforts to create a green building. LEED offers prerequisites and credits allowing buildings to gain points for meeting LEED criteria. Certification is awarded on certified, silver, gold and platinum levels. Beyond the prestigious recognition that LEED certification is becoming, LEED is evolving into the very blueprint for achieving high levels of economic, social and environmental returns on investment.

Based on strong market response to LEED 2.0 (the balloted version for new construction), new rating systems have been developed. LEED 2.1 for new construction (LEED NC) has been implemented to streamline the documentation process. LEED for existing buildings operation (LEED EB), LEED for commercial interiors projects (LEED CI) and LEED for core and shell projects (LEED CS) are all fully developed or are in pilot phase of development.

4.3. Building Green the Smart Thing to Do

Designing, constructing and operating facilities in an environmentally responsible way is an idea that's time has come for several reasons, not the least of which is that building green is not only good for the outdoor environment, but is also great for the indoor environment, for the people who live and work in these buildings. Plus, and this is a big plus because of ever-tightening budgets, green buildings are cost-neutral in upfront costs compared to traditional construction. They are hugely less costly to operate over the life of the building, and returns on investments come much sooner, which is especially important to managers of buildings like those found on this facility. Green buildings have several beneficial characteristics in common that include:

- Optimal environmental and economic performance
- Increased efficiencies saving energy and resources
- Satisfying, productive, quality indoor spaces
- Whole-building mindset from the start of design and over the building's entire life cycle
- Fully integrated approach to design, construction and operation for teams, processes, systems

It has been a long-held belief that the construction of an environmentally friendly, energy- and resource-efficient building brings with it a substantial price tag and extended timetables. That is simply not the case. Breakthroughs in building materials, operating systems and integrated building automation technologies have made building with an eye on our global future not only a timely, cost effective alternative, but the preferred method of construction among the nation's leading professionals. Furthermore, government planners understand as well as the business community that buildings are huge investments and, like any sound investment, investors expect a significant return. Today's building-industry leaders are enjoying increases in efficiency and productivity, and reductions in design, construction and operational costs, all of which helps to drastically improve bottom lines. How is this being done? Through a sustainable approach labeled integrated design.

4.4. Integration the Path to Green Returns

Integration brings together owners, design teams and construction teams at the earliest stage of the building project to integrate processes and building systems. Developing buildings on an integrated, whole-building framework ensures the efficient use of energy and resources, a healthy and productive indoor environment, the optimum performance of all systems, and a wealth of other benefits that directly impact the environment and the budget. Here are some recent statistics to consider:

- About 70 percent of a building's life-cycle costs are committed by the time the first one percent of the upfront costs has been spent.
- Over a building's first 40 years, construction costs amount to only 11 percent, whereas operation and alteration costs total as much as 75 percent.

- Poor indoor air quality in the U.S. has resulted in an annual loss of $15 billion in worker productivity and unhealthy air is found in 30 percent of today's buildings.
- With poor indoor air quality ranked by the U.S. Environmental Protection Agency as the fifth greatest health threat, the average legal settlement is $500,000.

Pondering these economic implications, it becomes clear that the benefits offered by integrating design and construction processes and technologies associated with any building project can be substantial. By assembling key decision makers of the design and construction team at the earliest stages of a project, government managers can maximize revenues, plan for all contingencies, and prevent building-cost overruns and timetable delays.

According to the Energy Information Administration of the U.S. Department of Energy, energy costs could be reduced by 30 percent if existing technologies were deployed in buildings. Also, maximizing use of integrated building automation systems – including fire alarm, security, lighting, mechanical, electrical, and HVAC – can cost 10 percent less to install and commission. Life cycle costs of buildings also can be reduced by 25 percent at the very least, using an integrated team approach compared to existing benchmarks. This integrated process provides dramatic relief to the world's already taxed natural environment, which is at the core of what it means to "build green." But how do our planners know what is really green?

Building green. Sustainability. Integrated design. High-performance buildings. These are catchphrases that are used widely but have needed clarification and solid definition. Several years ago, leaders in the building industry recognized the challenge of creating a common set of standards that would lay the groundwork for building project teams to design, construct and operate fully green buildings.

The premiere methodology emerging in the building industry for defining and measuring how to build sustainable facilities is the LEED Green Building Rating System™ from the U.S. Green Building Council (USGBC).

5. Central Energy Plant, Chilled Water Production and Distribution at FLL

5.1. Introduction

The four (4) airport terminals are supplied chilled water by three (3) independent plants, housed within the terminal buildings, in which terminal two (2) is supplied by the chilled water plant in the terminal three (3) building via under ground distribution piping.

5.2. Existing Chilled Water Plants

The Terminal one (1) chilled water plant is the newest, equipped with three (3) Carrier 650 ton centrifugal chillers. The chillers utilize an "Ozone friendly" HCFC base refrigerant and are relatively high efficient machines. The chillers are arranged in a standard primary secondary configuration with the secondary variable flow. The condenser water system is a standard parallel flow constant volume. The current building loads require two (2) chillers to operate during most load conditions, with one (1) chiller as the backup. The related auxiliary equipment is in good condition with many years of service life remaining. The chilled water distribution system is design for a twelve (12°) degree temperature rise (Delta T) for the chillers and on the associated air-handling units chilled water coils. The original chilled water distribution had complex tertiary pumping systems on each major air-handler with modulating pressure control valves, all to ensure high Delta T performance and to maintain the efficiency of the chilled water plant during all loads. After construction the aforementioned pumps were removed due to reported poor cooling coil performance.

Terminal two (2) is supplied chilled water by terminal three (3) chilled water plant via two (2) dedicated secondary pumps and under ground distribution piping. The secondary distribution pumps are variable speed and are located in the terminal three (3) building. The pumps and related auxiliary equipment are in fair condition with limited service life remaining.

The Terminal three (3) chilled water plant is mostly original construction. The plant is equipped with two (2) Mcquay 1000 ton centrifugal chillers. The chillers utilize a CFC base refrigerant and are low efficiency machines. The chillers are arranged in a constant flow series primary with a variable flow secondary. The condenser water system is a standard parallel flow constant volume. The current building loads require two (2) chillers to operate during most load conditions, with no backup chiller available. The chillers and related auxiliary equipment are in poor condition with limited service life remaining.

Existing McQuay Chiller in Terminal 3

The Terminal four (4) chilled water plant is equipped with two (2) Carrier 350 ton chillers from the original construction and one (1) York 275 ton chiller added during a 1992 renovation. The chillers utilize a CFC base refrigerant and are low efficiency machines. The chillers are arranged in a constant flow series primary with a variable flow secondary. The condenser water system is a standard parallel flow constant volume. The current building loads require two (2) chillers to operate during most load conditions, with one (1) chiller as the backup. The pumps and related auxiliary equipment are in fair condition with limited service life remaining.

Existing Carrier Chiller in Terminal 4

The major air-handlers in terminals two (2), three (3) and four (4) that represent approximately ninety percent (90%) of the building loads were designed and were selected for a ten (10°) degree temperature rise on the associated chilled water coils, while the chilled water plants were designed and selected for a twelve (12°) degree temperature rise. Cooling capacity of a specific air handler or chiller in tons is basically fixed and directly proportional to the water flow in GPM (gallons per minute) times the temperature difference (Delta T). With the chillers selected for a higher temperature difference than the air handlers, all of the air handlers will not be able to receive their design GPM water flow. This would cause cooling capacity deficiencies at the air handlers (water flow is below design conditions that the coils were selected for). It is our understanding that in an effort to achieve adequate cooling capacity at lower than design air handler water flows (higher Delta Ts at the air handlers), the chilled water supply temperature set point from the chillers is lowered. However, selecting air handlers to have a temperature difference equal to or larger (preferable) than that of the chillers will result in oversized air handler coils being provided. Getting oversized air handler coils is desirable as this will make it unnecessary to lower chilled water supply temperatures to get design capacity at the air handlers.

5.3. Recommendations

Chilled Water Plant Recommendations Summary

1. Implement the proposed chilled water plant renovation project for Terminals 3 and 4 that already has design drawings prepared. However, certain efficiency upgrades, that can be supported by a life cycle cost analysis and are estimated to cost $660,000 with a 4.8 year simple payback, are recommended.
2. Interconnect existing chilled water plants into a new chilled water loop that might be installed within the elevated road structure that connects the terminals. This might be implemented as a separate project or perhaps as a part of a new construction project. This would result in a distributed chilled water plant system consisting of perhaps 2 or 3 plants with phasing out of the older, smaller and less efficient Terminal 4 plant. This would greatly improve system redundancy and would improve overall system efficiency (most efficient plants and chillers would be loaded first). This recommendation is detailed in Section 5.3 and is significantly more economical than a single new central chilled water plant. However, a new chilled water plant might be constructed as a part of a major new construction project as a part of the Master Plan. It is anticipated that any new chilled water plant would be interconnected as well and supplement existing plants that remain. A new interconnecting chilled water loop with an estimated project cost of $1,200,000 and annual savings of $86,600 would have a simple payback of 13.6 years.

Chiller Plant Renovations

During the time that this report was being generated, the Broward County Aviation Department (BCAD) contracted for the engineering and drawings for chiller plant renovations of terminals three (3) and four (4). The contract documents proposed the replacement of the existing chillers with larger machines. The scope included the replacement of the associated primary chilled water pumps, condenser water pumps, and cooling towers to accommodate the larger chillers, and the required upgrades to the equipment room to comply with the current safety codes for mechanical refrigeration.

Our recommendation is to move forward with the proposed renovations with some modification to the scope. The new high efficiency chillers that are installed in the existing plants as a part of the renovation project may be cost effectively utilized in the future through two options (1) through a Distributed Chilled Water Plant (DCWP) strategy (explained later in this section) or (2) by relocating the new chillers to a new central plant in a few years.

However, the final chiller and system selection for the renovation project should be by life cycle cost analysis based upon (1) first cost, (2) operating (energy) cost and (3) maintenance cost. Experience has shown that when life cycle cost analysis is used to evaluate firm and competitive proposals from chiller manufacturers, much more efficient chillers, such as modern high efficiency variable speed centrifugal chillers, are economically justified as compared to less efficient "low bid" equipment.

In addition, consideration should be given to a modern high efficiency All-Variable Speed Centrifugal Chiller Plant (VSCCP) along with the following changes;

a) Evaluate existing air handler cooling capacities with proposed twelve degree (12°) Delta T and proposed water supply temperature from the chillers to ensure they will have adequate cooling capacity.

b) Select the chillers by life cycle cost analysis of competitive proposals (consider variable speed drives in addition to constant speed machines).

c) Select the chillers with chilled water flow velocities to allow for the conversion of the existing primary secondary configuration to variable primary pumping VSCCP strategies.

d) Select the primary chilled water and condenser pumps to accommodate the VSCCP configuration.

e) Provide any required variable speed drives, controls valves, controls sensors, and sequence of operation for the new primary pumping strategies.

f) Provide variable speed drives for the new cooling towers.

Savings Analysis

In our savings analysis we evaluated the proposed standard replacement of the chiller plants compared to the All-Variable Speed Centrifugal Chiller Plants. Our analysis revealed that the proposed standard chiller plant would consume 18,505,175 kWh or 22% of the FLL baseline. While the All-Variable Speed Centrifugal Chiller Plants would consume 16,495,712 kWh, a reduction of 2,009,463 kWh or a savings of 10.8%. The table that follows summarizes the chiller plants consumption and savings used in our analysis.

	Total Cost $	kWh	Ton Hours	EFLH (1)	SPLV(2) kW/ton
Current Chiller Plant Utility Summary					
Terminal #1	$ 353,214	5,045,919	6,351,150	4,885	0.794
Terminal #3	$ 812,119	9,577,817	12,932,502	5,409	0.741
Terminal #4	$ 327,290	3,881,439	4,885,448	4,885	0.794
Total:	$ 1,492,623	18,505,175	24,169,100	na	na
Proposed Chiller Plant Utility Summary					
Terminal #1	$ 353,214	5,045,919	6,351,150	4,885	0.794
Terminal #3	$ 714,912	8,107,936	12,932,502	5,409	0.627
Terminal #4	$ 289,457	3,341,856	4,885,448	4,885	0.684
Total:	$ 1,357,583	16,495,712	24,169,100	na	na
Proposed Chiller Plant Utility Savings					
Terminal #1	$ -	-	na	na	0.000
Terminal #3	$ 97,207	1,469,880	na	na	0.114
Terminal #4	$ 37,833	539,583	na	na	0.110
Total:	$ 135,040	2,009,463	na	na	na

(1) Equivalent Full Load hours

(2) Seasonal Part Load Value (average)

In our financial analysis we use a premium of $189 per installed ton (based upon prior project costs) or $660,000 for the additional cost of the recommended All-Variable Speed Centrifugal Chiller Plant as compared to the proposed design. With an estimated annual energy savings of 2,009,463 kWh or $135,040 the simple payback would be 4.8 years for the $660,000 cost premium and maintenance costs will not be impacted appreciably.

The energy savings projections for our analysis were supplied by a reliable Chiller Plant Energy Analysis Program. See the appendix for sample chiller plant analysis, including assumptions, summaries and savings projections.

Other reference materials include "All-Variable Speed Centrifugal Chiller Plants." ASHRAE Journal. Vol. 43, No. 9: p. 43-51, September 2001.

Enhanced Delta T Performance

The existing chilled water control and balancing valves are pressure dependent, meaning that the chilled water flow is subject to pressure changes of the system. This can lead to excessive chilled water flow at the closest circuits and low flow at the furthest circuits, and poor Delta T performance at the cooling coils. Low Delta T performance at the cooling coils leads to lost capacity, wasted energy, and added complexity for the chilled water plant.

Our recommendation is to provide enhanced Delta T performance with the following modification:

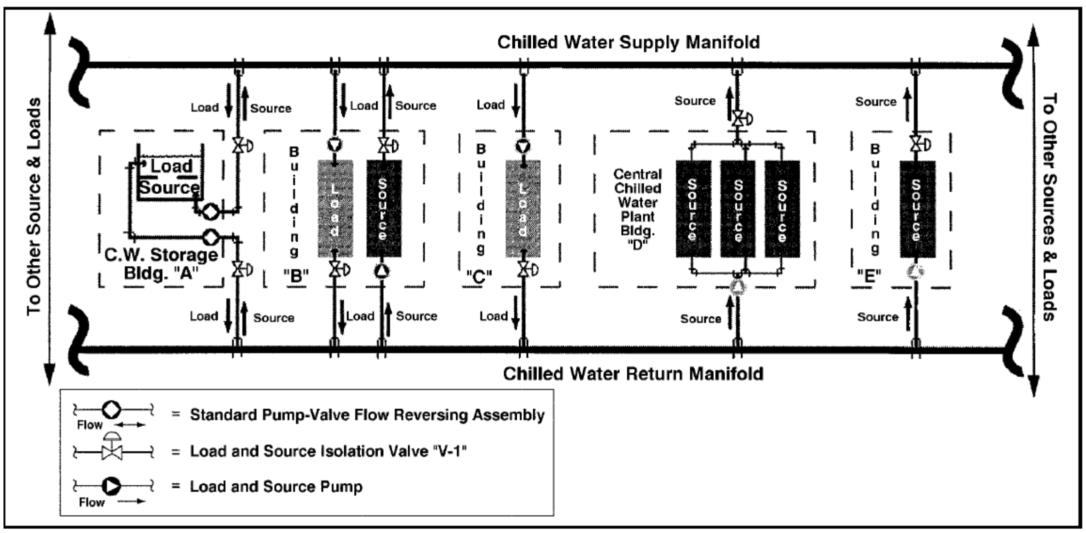
a) Remove any remaining 3-way valves and unnecessary bypasses in all variable flow distribution systems. However, it is believed that all 3-way valves have already been replaced or converted.
b) Where possible select coils at 12° to 14° degrees delta T condition to improve overall thermal efficiency.
c) Select coils at design conditions for a minimum of 4 fps tube velocity on varying load applications.
d) Ensure that heat transfer surfaces are clean, replace bad or damage coils. Currently, coils are cleaned on a regular basis and are in excellent condition.
e) The installation of pressure independent control valves at all major air-handling unit cooling coils.
f) On VAV air handlers, verify that the supply air temperature sensor is monitoring the cooling coil discharge in lieu of the discharge of the supply fan as applicable. The supply fan can add up to 3 degrees to the discharge temperature resulting in over cooling of the discharge air and low Delta T conditions.
g) Provide new pumping controls and sequence modifications to maintain the minimum required pressure of 5 psid across the most remote valve(s).
h) Monitor all major air-handling units cooling coil return water temperature and corresponding system Delta T. Provide automatic notification of low delta T conditions.
i) Provide continuous re-commissioning of the critical temperature control loops on all major air-handling units.

In our analysis we use a cost of $71 per ton or $286,000. With an estimated annual energy savings of 545,216 kWh or $38,165 the simple payback would be 7.5 years.

Possible Chilled Water Plant Consolidation and Inter-Connection Loop

The Fort Lauderdale-Hollywood International Airport (FLL) has three (3) major independent chilled water plants. Two (2) of these plant as discussed in this report will be renovated with new equipment, leaving many years of service life remaining, in most cases 20 to 25 years. In our analysis we evaluated the strategy of a single new Central Utility Plant (CUP) versus a Distributed Chilled Water Plant (DCWP). For FLL, a DCWP could include a piping loop installed under the elevated road structure that connects the terminals.

In a Distributed Chilled Water Plant the existing or new chilled water sources (chillers) are connected to the chilled water system through the supply and return manifold as illustrated below. Primary and secondary pumping systems would be required and if there are sufficient pumping head requirements in each terminal, tertiary pumping systems at each terminal may be warranted. In the illustration all sources pump out of the return manifold through the cooling source and into the supply manifold. All loads are pumped out of the supply manifold through the load and into the return manifold. Multiplexing all of the chilled water sources and loads in this manner has many advantages. Any source or combination of sources can serve any load or combination of loads any place on the manifold. Loads and sources can be matched to provide the most efficient operation. Manifold piping is smaller and less expensive than conventional central plant loop piping. Chilled water diversity is unleashed to provide for additional square footage without adding chiller capacity. Chiller redundancy is maximized. Thermal storage capacity and strategies can be implemented by simply adding the thermal storage plant to the manifold headers.



Typical Chilled Water System with Multiplexed Sources and Loads

Our analysis revealed that a single new CUP would cost approximately $1,787 per ton or $7,000,000 for a 4,000 ton plant. A DCWP with an inter-connecting loop would reuse all the existing assets and would cost a faction of a new Central Utility Plant.

In our analysis we use a cost of $175 per linear foot of distribution piping and $60 per ton for equipment or $1,200,000. With an estimated annual energy savings of 1,237,178 kWh or $86,602 the simple payback would be 13.6 years. Although we do anticipate capital savings to offset some of the project cost it couldn't be quantified at this time.

Our recommendation is to implement a DCWP with an inter-connecting loop rather than a single new chilled water central plant. It could be implemented as a separate project or during major terminal expansions to the airport. However, a new chilled water plant might be constructed as a part of a major new construction project. It is anticipated that any new chilled water plant would be interconnected as well and supplement existing plants that remain.

Thermal Energy Storage

The Fort Lauderdale-Hollywood International Airport (FLL) could benefit from the use of Thermal Energy Storage (TES). This proposed expansion could provide an additional peak capacity of 2,000 tons and would also provide demand side management tool for decreasing FLL expenditure for electricity. The TES, acting like a large thermal flywheel, will shift cooling load on the chillers to off-peak times by charging the water in the tank. The tank volume will be cooled at night by the chillers and warmed by cooling load during the day. It allows for the use of less-expensive off peak electricity rates, and reduces the need for additional chiller capacity. This project would not only be capable of shifting significant demand to off-peak hours; the total system efficiency could be increased by 10%. Most of this increase in efficiency would be attributable to increasing the annual production by more efficient chillers and also taking advantage of the more favorable condensing conditions at night.

In our analysis we use an 18,000 ton hour TES system with a budget cost of $172 per ton hour (budget cost from prior projects) or $3,100,000. With Florida Power & Light Company (FPL) incentives of $367,000 and an estimated annual energy savings of 590,800 kWh or $250,876 the simple payback would be 10.9 years.

Fixing the low delta T conditions could be a stand alone project or it could e be implemented in conjunction with the TES project and/or in parallel with the Distributed Chilled Water Plant and/or Central Chilled Water Plant so that the necessary airport wide chilled water distribution system would be in place to realize the maximum savings.

6. Energy Supply Measures at FLL

6.1. Consolidate Numerous Electric Meters

FLL BCAD facilities are currently provided most of their electric energy through 12 significant and separate electric services and meters as indicated below.

Concourse-B (T1)	Concourse-C (T1)	North Concourse-D (T2)	# Mech (T3)	NW Concourse -E (T3)	West Terminal (T3)	AA West Concourse-F (T3)	West Concourse-F (T3)	S. Terminal-H (T4)	Admin (T4)	Hibiscus Parking	Cypress Parking*
$413,444	$1,025,544	$340,027	$945,134	$80,860	$369,644	$32,637	$137,531	$610,883	$604,989	$534,849	$1,218,345

There would be some cost savings if these services were consolidated with a single monthly bill. This would be the case because the cost of electricity associated with the larger services and meters is slightly lower than the smaller services. There are two possible ways that consolidation of the electric meters might be accomplished. The first would be to perform extensive electrical distribution modifications in order that all of the incoming electric power is metered at one physical point. This would be very costly and would not be cost effective. The second would be to perform the consolidation electronically so that the total demand at any time is determined by the sum of the demand from each electronic meter at any time. Some electric utilities will allow this type of meter consolidation when requested and negotiated.

It should be noted that consolidating electric meters would only save electric costs (average unit cost of electricity would be slightly lower) but there would be no energy savings or positive environmental impact even if it were implemented.

6.2. Peak Shaving Using Existing Emergency Generators

Electric cost reductions can be achieved through demand control strategies. These strategies, which include thermal storage of chilled water, reduce the peak electric demand, but produce little to no energy savings. One possible demand strategy would use the emergency electric generators to generate electricity during peak demand periods so as to reduce the electric demand charges. The FPL electric utility has a special electric rate, CILC, whereby the utility contracts with a customer for the customer to reduce their demand by a predetermined KW when requested by the utility. However, FPL was contacted and they are not currently granting any more CILC rates at this time.

It should be noted that peak shaving using existing emergency generators is not an energy saving measure since it basically results in reduced demand charges and possibly a more favorable CILC electric rate. In addition, this measure can result in a small negative environmental impact since the pollution released by the internal combustion engines is more than that released by the utility company to produce an equivalent amount of electrical energy.

6.3. Conversion to Natural Gas

Natural gas is provided to tenant spaces that have their own service and meters. In addition, it was learned that a major natural gas pipeline will be installed on FLL property that will bring in gas from a liquefied natural gas port in the Bahamas.

The natural gas might be used to displace some of the existing electrical energy or as a cogeneration fuel source. One specific possible application would be existing electric hot water boilers in Terminal 1 that are used to heat water for HVAC heating and/or reheat applications. However, using “free” reclaimed heat from the chilled water plant is a more efficient option that is believed to be viable for Terminal 1. Installation of a small heat recovery chiller is one way to generate “free” reclaimed heat.

7. Lighting at FLL

7.1. Lighting Audit Scope

A comprehensive lighting audit was performed that included a physical inspection of the following buildings at the airport:

- BCAD Administration Buildings (North and South)
- Cypress RCC – The new garage and rental car center
- Facilities Building
- Hibiscus Garage
- Palm Garage
- Terminals 1 through 4
- The URS Building (adjacent to the BCAD Administration Buildings)
- West Maintenance Facility
- Terminal Enplane and Deplane Areas
- Roadways between Terminals 1 and 4

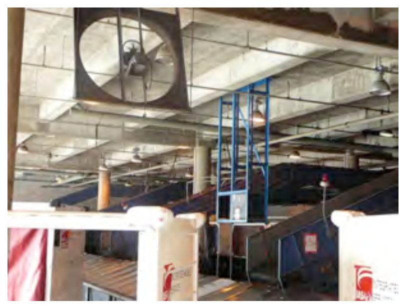
The lighting audit scope was relatively detailed and included audit staff physically surveying nearly every space in each of the referenced buildings to evaluate the lighting serving the space. Evaluation included the number of fixtures, number, type and wattage of lamps in each fixture, an assessment of the fixture's ability to meet the lighting needs of the space in an efficient manner, lighting (foot candle) measurements, applicability of daylight harvesting, etc. Lighting audit detailed findings may be found in the appendix.

7.2. Lighting Audit Findings and Recommendations

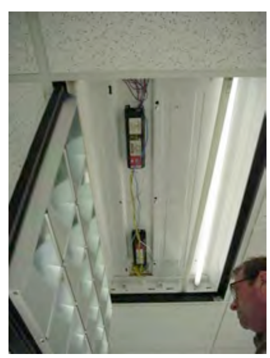
Approximately 35,000 lighting fixtures exist at the airport. There are many types of lighting equipment ranging from compact fluorescent fixtures and lamps, to linear fluorescent fixtures and many high-intensity discharge fixtures (HID). HID lighting included high pressure sodium (HPS) fixtures (lamps have a yellowish glow) and metal halide (MH) lamps (clear white light). Our goal was to identify all of the lighting equipment in the airport, including those types of equipment that should not be modified as they represent the highest and best technology available for the purpose. Examples of appropriate lighting are miniature MR16 lamps in many of the vendor areas for merchandise display, compact fluorescent biax fixtures in the vendor areas and elsewhere and exterior high pressure sodium security lighting where this lighting is at appropriate light levels for security and other specific tasks and purposes.

The following recommendations apply to approximately 27,000 light fixtures (75%) in the above-listed buildings and include the following:

1. Replacement of many HID luminaires with linear fluorescent fixtures (generally T-8 but T-5 may be considered for high ceiling areas). This recommendation has potential application to not only the older high pressure sodium HID fixtures in the baggage handling areas below the concourses and behind the terminal buildings but also in the three garage facilities and in high ceiling areas with metal halide lighting fixtures (areas in Terminal 1 and it's concourses for example).

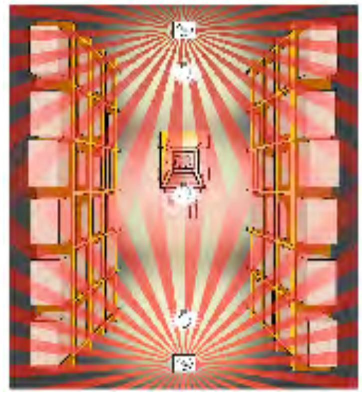

2. Retrofit existing luminaries containing T12 fluorescent lamps and magnetic ballasts with new 28-watt T8 lamps and electronic ballasts. In many cases, there is the ability to reduce lamp quantities from 3 or 4/fixture to 2 lamps/fixtures using specular reflectors.



3. Re-lamp all existing 32-watt T8 lamps with new 28-watt T8 lamps. This will result in energy savings and also will create the opportunity for the airport to maintain an inventory of 4' T8 lamps with consistent color temperature and lumen output. Presently the airport has or utilizes lamps with different color temperatures adversely affecting the aesthetics of the lighting.

4. Install lighting controls. This is done through (1) three types of motion sensors (sensors may utilize ultrasound, passive infrared or dual technology) – line voltage sensors attached directly to a single

fixture; ceiling mounted sensors (typically low voltage) and combination wall switch sensors.



7.3. Lighting Operating Hours and Logger Data

In order to calculate the benefits that will result from the installation of occupancy sensors, it was necessary to identify those areas of the airport in which occupancy sensors are recommended. Our physical inspection, including interviews with personnel, indicates that lights in most areas are left on regardless of the need. A good opportunity for potentially large savings is the application of occupancy sensors to the gate areas. Loggers were randomly installed in a total of 16 gates in the Terminals. Results are as follows (details are in the Appendix):

Terminal	Average Logged Hours Per Gate		% Time Unoccupied	Occupancy Sensors Savings
	Occupied	Unoccupied		
1	21.9	4.2	16.1	Small
2, 3 and 4	21.3	19.1	47.7	Large

In the Gates, occupancy sensors could be installed so that bi-level lighting occurs with minimal light levels (perhaps equal to minimum light levels for corridors as recommended by the Illumination Engineering Society) when unoccupied and the higher light levels when occupied. This would be very cost effective when incorporated into the original design and construction or renovation of gates and not as cost effective if installed on a retro-fit basis (significant re-wiring of fixtures may be required).

Our analysis includes estimates that some areas would reduce energy consumed by as much as 40% if occupancy sensors were installed and other areas by 15%. Areas of the terminal buildings are rarely occupied between 1:30 AM and 4 AM. Areas behind and below the concourses, and the garages would benefit by the installation of motion sensor devices installed directly on fixtures. Our assumption in these areas was the use of such sensors on approximately one-third of the luminaires.

7.4. Potential Lighting Project Savings

Implementation of all lighting recommendations that are practical, technically sound and economically viable will result in the following estimated electrical savings:

Demand Reduction	883 kW (.883 mW)
Consumption Reduction – Lighting Modifications	7,500,000 kWh
Consumption Reduction – Occupancy Sensors	1,600,000 kWh

Additional Savings from Reduced Air Conditioning Load will result as well. We calculated that of the total kWh reduction at the airport from lighting load reduction, approximately 20% is located in air-conditioned space. A little over 80% of the lighting equipment to be modified is in non-air-conditioned spaces. Assuming an additional benefit of 25%, consumption will be further reduced by a little over 375,000 kWh.

By far the largest percentage of demand reduction (42%) assumes the replacement of HID lighting with new gasketed "vaportight" linear fluorescent luminaires. These will be either 4' fixtures containing two T8 lamps or 8' fixtures containing four T8 lamps. About 50% of the projected capital cost is associated with these changes.

The HID lighting to be replaced is primarily located in the Hibiscus, Palm and Cypress garages and in the areas behind baggage claim and below all of the concourses.

Additional benefits that will result from replacement of HID fixtures with linear fluorescent luminaires include:

- Instant-on after restoration of power after an outage.
- Ability to automatically control through the use of occupancy sensors.

- Lower maintenance cost. Rated life of these new lamps are as much as 36,000 hours (warranted for 36 months), depending on the lamp/ballast combination chosen. The best HID lamp life that can be expected is 24,000 hours.
- Higher lumen/watt ratio
- Better color rendering, i.e. a CRI of 45-75 with HID lighting and a CRI about 85 using fluorescent T8 technology.
- Much slower lumen and color depreciation with time resulting in much more uniform light levels and color rendition over the life of the lamp.

Using fluorescent luminaires would allow the airport to control each fixture in two ways. Combination motion/photosensors could be mounted on each luminaire adjacent to an area with sufficient sunlight to shut lights (or dim them – assuming the use of dimming electronic ballasts) during daylight hours and shut down during evening hours when no motion is detected.

Technology is available that combines automatic occupancy sensing controls and day lighting control. One example is the CMRB-10 Series sensor and controller that is manufactured by SensorSwitch Inc.

The CMRB-10 Series sensor mounts directly to the end of a fixture. It will sense motion and has both an On/Off Photocell option and an Automatic Dimming Control Photocell option.

Areas beneath the terminal buildings use high pressure sodium fixtures as the primary light source. Replacing these HPS fixtures with new linear fluorescent luminaires would produce whiter and more uniform lighting and have a positive effect on the work environment (enhance productivity and improve employee perception of their environment (the yellowish light is perceived negatively (depressing)).

Additional benefits include more uniform lighting and longer-lasting lamps and ballasts resulting in much lower lighting maintenance costs. There are many linear fluorescent fixtures in these areas already. They will be retrofitted with new T8 lamps and electronic ballasts. Replacing the HID lighting will enable BCAD to increase light levels and spread light more uniformly. Almost all of the present equipment is near or at its "end of life", significantly degraded and needs to be replaced.

BCAD has "retrofitted" much of the lighting in the terminals, however, all of the lighting that is not in the public eye has remained T12/Magnetic. We anticipate retrofit of over 4,000 of these luminaires.

Occupancy sensors might be considered on approximately 1/3rd of the luminaires in the garages to reduce energy consumption when motor vehicles or pedestrians are not present. Adequate light levels will still exist. However, occupancy sensors will allow us to control a portion of the luminaires when the areas are not occupied. When motion is detected near a fixture it will turn on automatically. If motion is not detected again, the fixture will turn off in 10 minutes (or longer, if desired). This measure might be installed on a small area on a trial basis and closely monitored and logged.

We are also recommending room occupancy sensors in many offices, conference rooms, break rooms, file rooms and other areas.

7.5. Garage Light Levels and Potential Liability Issues

Based on our discussions with FLL personnel, it is evident that a great deal of concern exists regarding efforts to use lighting controls, particularly as related to the three garages. Our recommendations include mounting occupancy sensors directly onto a percentage of the new luminaires to be installed. These will sense motion and turn, for example, every other luminaire off during periods when no pedestrian or motor traffic is sensed.

Based on the IES Lighting Handbook, a Covered Parking Facility requires an average light level of 5 foot-candles. Light measurements were taken when, several years ago, Johnson Controls, Inc., through its lighting subcontractor, installed 4' and 8' luminaires as a test in the Hibiscus Garage.

At that time a report was submitted that included the following:

> "Predominant fixtures in the Hibiscus Garage are 150-watt high pressure sodium ("HPS") and 200-watt metal halide ("MH") Gardco GP1 Luminaires. Predominant fixtures in the Palm Garage are 200-watt high pressure sodium Gardco fixtures and some 250-watt metal halide fixtures added since the original construction.
>
> JCI requested that we conduct two field tests for inspection by airport executives: We performed the following test installations:
>
> 1. Removing and replacing six (6) of the 150-watt HPS luminaires with six (6) 1'x4' 2-lamp vapor-tight fixtures at section 3C, each

containing two Sylvania FO32T8/741/ECO (Octron "700" Ecologic) lamps and an Osram-Sylvania Quicktronic 2-lamp QT2X32/277LP Instant-Start Electronic Ballast.

2. Removing and replacing six (6) of the 200-watt MH luminaires with six (6) 1'x8' 4-lamp vapor-tight fixtures at Section 2C, each containing four Sylvania FO32T8/741/ECO (Octron "700" Ecologic) lamps and an Osram-Sylvania Quicktronic 4-lamp QT4X32/277LP Instant-Start Electronic Ballast.

Replacement luminaires were surface-mounted in accordance with industry standards and in compliance with all applicable codes, utilizing existing junction boxes in existing locations.

Light Level Comparisons were made utilizing a calibrated Greenlee Illuminometer (Certificate of Conformity attached). Readings were taken after dark at floor level.

Gardco 150-watt HPS luminaires provided an average of 14.75 foot-candles directly under a fixture and 17.3 foot-candles between fixtures. The 2-lamp 4' vapor-tight luminaire installed provided an average of 14.30 foot-candles directly under a fixture and 10.4 foot-candles between fixtures.

Gardco 200-watt MH luminaires provided an average of 16.75 foot-candles directly under a fixture and 22.5 foot-candles between fixtures. The 4-lamp 8' vapor-tight luminaire installed provided an average of 17.80 foot-candles directly under a fixture and 19.0 foot-candles between fixtures."

Photometric analyses, as well as another test installation, will determine whether the use of occupancy sensors on a percentage of the new luminaires will provide sufficient light for safety purposes. Questions regarding the reliability of the sensors chosen must be answered. In the event of sensor failure, it must be determined whether the sensor will fail with the lighting circuit closed, so that the light remains on if there is a failure, rather than off which is the industry standard.

We believe that maintaining or exceeding IES lighting levels would eliminate any liability issues. It is important to note that the existing HID lamps have significant lamp lumen depreciation over the life of the lamp whereas the proposed fluorescent lamps have minimal. Therefore, it may be possible to turn off some of the fluorescent lamps in an area and still exceed minimum IES standards while this would not be true for HID lamps, particularly towards the end of their useful life.

(Reference "Lighting Illumination Levels" by Tzveta Panayotova, Univ. of Florida, Facilities Planning and Construction).

Also note Florida Building Code Section 13-415.1.ABC.1 Controls, subsection 2, requiring that interior lighting in buildings larger than 5,000 sq. ft. contain occupancy sensors "…that shall turn lighting off within 30 minutes of an occupant leaving…".

7.6. High Efficiency LED Runway Lighting

LED (light emitting diode) lights are available for application to the runway landing lights. According to the report "LED Runway Landing Lights", Lighting Design Lab publication that can be found at www.lightingdesignlab.com/articles/led/ledfaa2.htm, a 116 watt light source can be replaced by a 13 watt LED with equivalent lighting effectiveness. The audit conducted by JCI did not include a detailed analysis of the runway lighting but there appears to be a significant opportunity to reduce energy and maintenance costs with a LED lighting retrofit. The cost to implement a runway lighting retro-fit is not included in the $3,000,000 lighting estimate.

7.7. Tenant Vendor Spaces and Metering

Tenant vendor spaces were also included in our study but are not included in the economic data reported which is for BCAD facility space only. Some changes are recommended such as replacement of incandescent/halogen track lighting with compact fluorescent technology. The cost to implement any tenant vendor spaces is not included in the $3,000,000 lighting estimate.

Most Tenants (other than airline tenants) have their own electric meters for power and lighting. However, air-conditioning cooling (chilled water) is supplied by BCAD. Reducing heat from incandescent/halogen track lighting, for example, will improve employee comfort and also reduce the A/C load. BCAD can make certain requests on Tenants to improve energy profiles, subject, of course to the needs of tenants for company-wide uniformity of lighting design.

8. Other HVAC Systems at FLL

8.1. Eliminate Inefficient Electric Boilers in Terminal 1

Terminal 1 was found to have two electric boilers that heat hot water for HVAC applications. One of the boilers depicted below, that is rated 100 KW, was found to be operating at 100% capacity (all 5 heating elements were operating) on a hot summer day.

Most all of the hot water is believed to be used for reheating pre-conditioned outdoor air at the 100% outdoor air AHUs. There are several advanced energy options including:

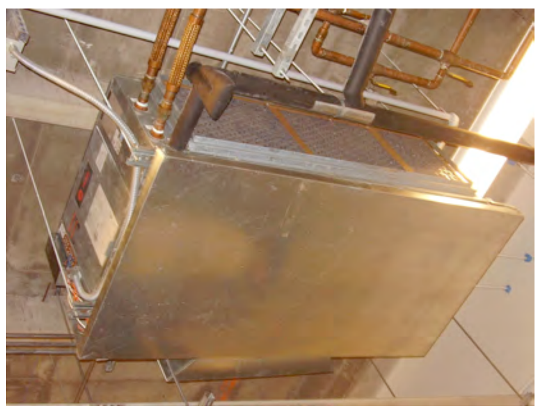
1. Utilize heat pipe heat exchangers or run around water loops so as to provide free pre-cooling and free re-heat.

2. Use waste/free heat from the chillers to provide free hot water for re-heat. Installation of a small heat recovery chiller is one way to generate free reclaimed heat.
3. Replace the existing inefficient electric resistance boilers with new boilers that utilize natural gas.

The options are listed in order from the most efficient with the least operating cost. Therefore, from an energy and environmental perspective, option 1. would be the most desirable and option 3. the least.

8.2. Convert Hibiscus Garage to Variable Volume Pumping

The hibiscus Garage's air conditioned spaces are served by numerous relatively small self contained DX (Direct Expansion refrigeration) water source heat pump units as depicted below.

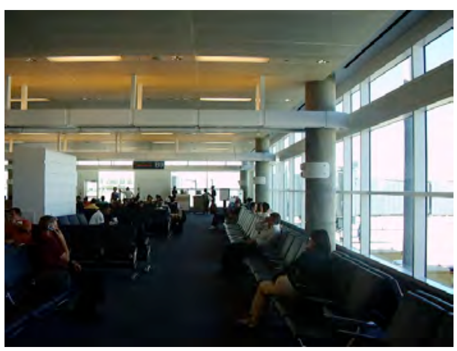


Currently, cooling water is pumped continuously to each unit regardless of whether its compressor is operating. The water is circulated from central pumps and cooling towers. An energy saving measure would have each unit equipped with an automatic valve that would close when the unit's compressor is not operating. Variable frequency drives (VFDs) would be retrofitted along with new controls so as to convert from constant to a variable volume cooling/condenser water system.

8.3. Turn Off Additional HVAC Equipment at Night

Most of the HVAC equipment operates on a continuous basis. Much of this equipment could be turned off in the middle of the night when passenger traffic is nonexistent or very light. For this to be successful, it is important that exhaust systems do not continue to operate causing negative building pressurization (infiltration of humid outdoor air), high relative humidities and mold growth.

8.4. Expand Demand Ventilation Control Using CO2 Sensors



During the recent AHU replacement project, demand based ventilation controls using CO2 sensors that automatically adjust outdoor ventilation rates to match building occupancy levels were installed. However, there are still some AHU systems that could use this advanced energy saving technology that are not so equipped.

8.5. Pump Impeller Trimming

During the survey of chilled water and condenser water pumping systems, it was observed that a number of balancing valves were partially closed like the one depicted below that was nearly closed.

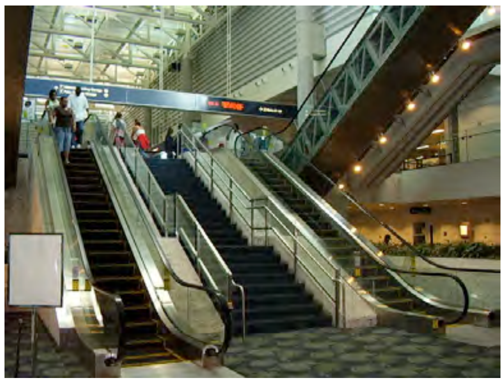
When chilled water and condenser water systems are designed, pressure losses are either estimated or rules of thumb are used. Since the system can be throttled down if the pump is oversized, large safety factors are typically applied (engineers are never sued for over sizing a pump but have been sued for under sizing pumps). The result is a pumping system that "works" but is very inefficient with balancing valves throttling water flow with large pressure drops occurring in the balancing valves.

An efficient solution is to perform test and balance procedures and engineering calculations to determine the pump head that would be required to achieve design flow if the balancing valve was 100% open. Then using the pump performance curves, the impeller diameter that would be required to generate this head is determined. Finally, the pump should be disassembled and the pump impeller trimmed to the required diameter. When re-installed, the design flow will be achieved with the balancing valve 100% open with no inefficient throttling and with the pump requiring much less power than before.

9. Renewable Energy and Other Technologies at FLL

9.1. Automatic Shutdown of Escalators and Moving Walkways

Escalators and moving walkways as depicted below are generally operated on a continuous basis.



The moving walkways may be automatically shut down by a schedule through the BAS and/or by detectors that sense passengers approaching the moving walkway. The use of passenger detector technology has been applied successfully at other airports and is recommended.

However, shutting down escalators is a more complex issue. If the escalators are off, there is a safety and potential liability issue since they are not designed to meet code requirements for stairs. In addition, having the escalators turn on and off could create a jolt that could cause users to fall. If they are turned off between the hours of perhaps 1 AM and 5 AM, they would need to be cordoned off to prevent any use as stairs. A more detailed evaluation is required to determine if the energy savings would more than offset the additional labor cost of someone who cordons off an escalator and then turns it off and then reverses the sequence in the morning.

Another new technology option is the use of the proprietary Kone "Ecostart" energy performance control for escalators and elevators. When there is little to no passenger traffic, Ecostart reduces voltage and current supplied to the escalator or elevator motor generator. When demand increases, Ecostart instantly delivers the required power. The soft start feature of Ecostart reduces in-rush current by up to 75%. An adjustable timed ramp circuit gradually increases power until the motor reaches its operating RPM. Kone's literature claims that the technology can reduce escalator and elevator energy usage by 40% and have a payback of around 3 years but the energy savings claims in the literature that was made available by Kone for this evaluation did not have good documentation. This appears to have promise but a more detailed evaluation is recommended prior to an implementation decision.

9.2. Domestic Water Booster Systems

Domestic water systems at FLL are equipped with booster pumps such as those depicted below and they may be retro-fitted with variable frequency drives (VFDs) and new automatic controls to match pump output to domestic water demand for energy savings.

9.3. Common Use Systems

There has been a trend in commercial airports to utilize what are referred to in the industry as common use systems.

Benefits of common use systems include:

1. Maximize space utilization. Increase efficiency of ticket counters, curb side check in locations and gate operations.

2. Coordination between terminal activities and back of house systems to provide seamless automated control of utilities for the passenger experience. For example, gate area lighting may be reduced significantly automatically when not in use and automatically raised to design levels based upon airline arrival and departing flight schedules.
3. Coordinate activities with in-line baggage handling, safety and security operations to efficiently move passengers through the terminal.

Application of common use systems is recommended at FLL and this will result in improved energy efficiency and a positive environmental impact.

9.4. Renewable Energy Sources

9.4.1. Photovoltaic Power Generation

Photovoltaics (PV) are an important energy technology for many reasons. As a solar energy technology, it has numerous environmental benefits. As a domestic source of electricity, it contributes to the nation's energy security. Photovoltaics is a growing high-tech industry, it helps to create jobs and strengthen the economy. The cost associated with producing and using photovoltaics is steadily declining and it is becoming more available. Few power-generation technologies have as little impact on the environment as photovoltaics. As it quietly generates electricity from light, PV produces no air pollution or hazardous waste. It doesn't require liquid or gaseous fuels to be transported or combusted. And because its energy source - sunlight - is free and abundant, PV systems can guarantee access to electric power. Because of these benefits, PV can play an important role in mitigating environmental problems.

Renewable Energy Technologies Grants Program

The Florida Renewable Energy Technologies Grants Program was established in June 2006 (SB 888) to provide renewable energy matching grants for demonstration, commercialization, research, and development projects relating to renewable energy technologies. Eligible recipients include municipalities and county governments; businesses; universities and colleges;

utilities; not-for-profit organizations; and other qualified entities as determined by the Department of Environmental Protection.

The grant applies to photovoltaic systems for solar-generated electricity (Calculated at $4.00 per rated Watt). Rebates will be allowed at a maximum of $20,000 for residential installations, while systems on commercial property may qualify for up to $100,000 rebate.

Option 1: Separate Photovoltaic Panels

One option is to take full advantage of Florida's Renewable Energy Technologies Grants Program (SB 888) by applying for the maximum rebate of $100,000 and this would in effect apply matching funds up to 25,000 watts of installed photovoltaic panels.

In our analysis we evaluated the feasibility and potential economics of installing 200 (125 watt) photovoltaic panels in a parking lot canopy configuration. The photovoltaic panels will be connected to the parking lot power system through a utility grid inverter. The PV panels will provide electrical power to the parking lot lighting systems and other miscellaneous loads.

In the financial analysis we used a budget cost of $9.12 per watt installed or $228,000. With Florida's incentives of $4 per watt and an estimated annual energy savings of 43,617 kWh or $4,012 (based upon a blended rate of .092 per KWH). This would result in a simple payback of 57 years. However, after application of the $100,000 Florida grant, the simple payback would be reduced to 32 years on a $128,000 investment. A PV project might be implemented in parallel with larger projects that have excess savings to provide an overall financial and environmental solution.

Budgets for Option 1 were supplied by the Solar Advisor Model ("SAM") and is provided by the National Renewable Energy Laboratory ("NREL"), which is operated by the Midwest Research Institute ("MRI") for the Department Of Energy ("DOE"). The RETScreen® International "Clean Energy Project Analysis Software for Photovoltaic" is provided by the Natural Resources Canada (NRCan).

Potential hurricane wind damage to solar panels is a risk that can be essentially eliminated by the use of an alternative technology described in Option 2.

Option 2: Integrate Thin-Film Photovoltaic Technology into the Roof

Another approach worth consideration is a newly developed application of thin-film photovoltaic technology. While the technology has been around for more than 20 years, the last 12 years has seen a vast improvement. A leader in this technology is Uni Solar, based in Michigan. The thin film PV technology has actually proven to be more productive than the typical crystalline panel, producing 20% to 30% more kWh from a comparably sized glass panel system. Products are well developed that may be applied to large scale roofing projects in a building integrated PV (BIPV) approach.

As a BIPV application this product is part of the facility roof and is best applied during a re-roofing activity. By combining the two applications it is possible to match the life expectancy of both the roof and the PV, getting at least 20 years of service from each.

This approach might be coupled with a developing financial market that allows the federal tax and depreciation incentives for solar technologies to be brought to the public sector. In the case of a BIPV solution the financier can take a 30% tax credit on the PV and the portions of the roof connected to the PV (considered supporting structure) as well as an accelerated depreciation (5 year) on the same amount. These benefits are delivered to the public entity in the form of a lower acquisition cost for the BIPV asset.

As a relatively specific example, lets assume 500,000 square feet of existing roof space could incorporate the BIPV product. Assuming coverage of 70% of this space approximately 1.5 MW of PV could be placed. Using similar assumptions, expected annual generation would be 2,304,000 kWh (from PV Watts Ver 1, using defaults, Miami location), representing an annual savings of $207,000 at 9 cents per kWh.

Lets also assume that the 500,000 square feet of roof was in need of roof replacement and replacement is budgeted as a $10M project, and the PV addition, at 1.5MW and $7.50 per watt, comes to $11.25M for a total of $21.25M. The tax credit for the BIPV solution is 30% of the PV and 30% of the portion of the roof covered by the PV (assume 70%) for a total tax credit of $5.475M. The same amount is depreciated over the next 5 years, without reduction for the tax credit, so essentially another $5.475M (30% tax bracket) is recovered in the first 5 years. The tax credits and roof budget total almost $21M – essentially the cost of the project – no property or sales taxes on PV in Florida. The private investor is looking for a 10% IRR, so any additional funds are recovered through a small charge on the kWh delivered. During the 20 year performance period, FLL/BCAD would be relieved of any responsibility for the roof, and would only pay for power delivered. Utilizing a third party approach to apply the product would require a payment of most or the entire roofing budget, $10M in the example, and then the power would be purchased at a discounted rate. Annual electric savings of approximately $42,000 would result with the power being purchased at a discount of 20% below current kWh rates. Essentially, the project could be structured to cost BCAD nothing up front so the payback would be immediate.

Typically a roofing and electrical services contract is arranged which places responsibility for both the roof and PV in the hands of the contractor for the 20 year length of such agreements. As long as the base load of the facility is greater than the peak output of the array the ability to connect is not limited by the serving utility. Each utility jurisdiction has varying rules related to the interconnection of PV systems, so further analysis and discussions with the serving utility (FP&L) would be required.

Solar Integrated is currently the only FSEC approved applicator of the Unisolar product. Information on the Solar Integrated product is provided in the appendices of this report.

The BIPV system is perhaps uniquely suited for hurricane prone areas such as FLL. A BIPV installation by Solar Integrated was recently completed for a military base on Okinawa just before a Category 4 (150 to 180 mph winds) hurricane hit the island. The roofing system and BIPV related attachments can be engineered for any wind load conditions. The roof at Okinawa was a 185 mph engineered design. The pictures that follow are of the Okinawa BIPV installation after the hurricane showing no damage to the PV roof but significant damage near the building.



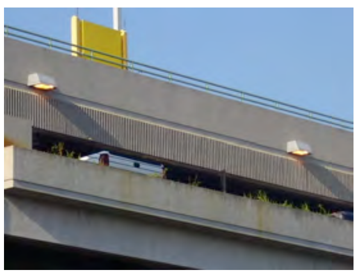
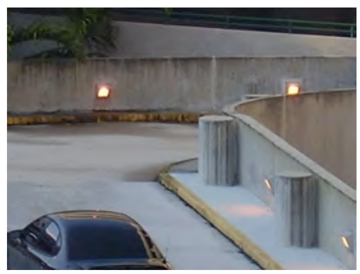

Regarding approval by Miami-Dade code officials, the manufacturer of the roof, Snarafil, is already fully approved there with many existing installations. However, it is recognized that approval of the specific Sarnafil roof with the integrated PVs may require some time for approval but there is no question that it can receive approval.

9.4.2. Daylight Harvesting

The use of natural sun light in place of or to supplement electric light fixtures, commonly referred to as daylight harvesting, is the most basic renewable application. Sunlight is an efficient lighting source, particularly when the glass has been specially treated to allow the transmission of visible light and the removal of the invisible (shorter wavelength untra-violet and infrared spectrum) that only adds heat and increases air conditioning costs. In addition to energy savings, the use of natural daylight in buildings has been proven to have a positive psychological impact causing sales to increase in retail stores and scores to improve in schools. When applied at FLL, daylight harvesting is a renewable with a relatively large number of small individual opportunities with a wide range in size and payback.

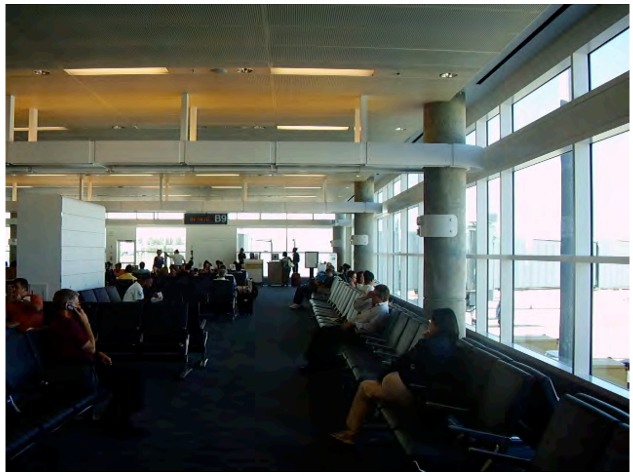
In its simplest application, a photocell switch can be used to turn off unnecessary lights, particularly outdoors, during daylight hours. Simple photo-cell switch applications can have a payback of one year or less. When applied indoors, controls may be installed that sense the amount of light in the space and automatically either turn some lights off or automatically dim lights (efficient dimmable fluorescent lighting is readily available) so that the total light in the space remains relatively constant. The simple payback on these more sophisticated interior day lighting control systems can vary from approximately 4 years when applied in new construction projects to 8 years or longer when applied to retro-fitting existing spaces.

There are relatively limited opportunities for daylight harvesting in terminal buildings 2, 3 and 4. However, extensive daylighting opportunities exist in Terminal 1.


The 3 pictures above are of exterior lighting fixtures that could be automatically controlled by simple photo-cell switches to prevent operation during daylight hours. In these types of applications, the simple payback on the cost of the modification will be short and vary between about 1 and 4 years.

The 2 pictures above are the ticketing and baggage claim areas in Terminal 1. A "Lutron Graphic Eye" lighting control system is currently in place that was designed to shut down HID lighting in the ticketing area. Lighting measurements indicated that additional light fixtures could be turned off when daylight is available and the resulting light levels would still be above IES (Illumination Engineering Society) recommended levels. The original design also controlled areas in which the system has been overridden on. However, some of the HID indirect lighting fixtures (400w metal halide) are being controlled. The second picture is of recessed HID light fixtures in the baggage claim area. Where day lighting is to be applied, it is better to have fluorescent fixtures than HID fixtures since (1) fluorescent fixtures can be easily cycled on and off whereas HID lamps require a warm-up period before full illumination and (2) dimmable fluorescent lighting systems are readily available and are efficient whereas HID lamps cannot be efficiently dimmed. These two applications show the importance of integrating day lighting design into the original construction to ensure the most cost effective utilization of day lighting. Having to change out HID fixtures to dimmable fluorescent systems in a retro-fit application will cause the payback to be much longer than if it had been incorporated into the original design.



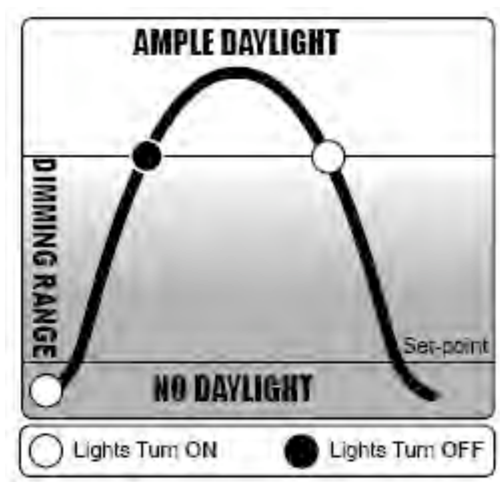
The picture above is the gate seating in Terminal 1. As can be seen, there is a significant day lighting opportunity. However, it is important to note that the continuous fluorescent lighting fixtures are installed perpendicular to the windows rather than parallel to the windows. This is important since only those fixtures that are close to the window may be turned off or dimmed. Typically, all of the fixtures in a row are on the same lighting circuit such that the existing installation does not lend itself to a retro-fit day lighting control project without relatively expensive re-wiring of the existing fixtures. Again, the importance of integrating day lighting design into the original construction to ensure the most cost effective utilization of day lighting is obvious. If the lighting fixtures had been installed in a continuous manner parallel to the windows, an automatic day light control system could have been installed to result in a short payback, approximately 3 years or less. However, if light fixtures must be re-wired in a retro-fit project, the payback could easily exceed 10 years.

Day lighting sensors and controls, such as the CM-PC and CM-PC-ADC Series, manufactured by SensorSwitch Inc., can be used in conjunction with power packs installed to local branch circuits to control groups of fixtures when sufficient ambient light is available and for automatic dimming control with electronic dimmable ballasts. SensorSwitch describes these controllers as follows:

> The CM-PC and CM-PC-ADC series of On/Off and Automatic Dimming Control Photocell sensors provide the industry's most intelligent control of lighting for daylight harvesting applications. Ideal for public spaces

with windows like vestibules, corridors, or bathrooms; the sensors work by monitoring daylight conditions in a room, then controlling the lighting so as to insure that adequate lighting levels are maintained. The CM-PC is used for On/Off lighting control; turning off the lights when sufficient natural light is present and turning them on when additional lighting is necessary. Additionally with the Dual Zone (-DZ) option, a second set of customized control outputs is provided. All CM-PC sensors can be used alone or as part of an occupancy sensor system. The sensors are powered with 12 to 24 VAC/VDC and typically operate with a PP-20 or MP-20 Power Pack; enabling complete 20 Amp circuits to be controlled. To add dimming control to the On/Off switching provided by the CM-PC, the CM-PC-ADC sensor may be used with electronic dimmable ballasts.

A good example of the potential use of the CM-PC-ADC automatic dimming controller would a number of the areas with daylight harvesting opportunity in Terminal 1. In the large open ticketing area in Terminal 1, the existing metal halide fixtures could be replaced with new fluorescent fixtures with electronic dimmable ballasts to obtain (1) lighting power reduction due to more efficient lighting sources (fluorescent lighting is more efficient than HID light sources) and (2) fluorescent lighting is more appropriate for day lighting applications as previously discussed. As pointed out in this application, concurrently implementing day lighting with a lighting fixture retro-fit project can result in synergies for enhanced savings and cost effectiveness (lower paybacks).



The reader is directed to “Field Commissioning of a Daylight-Dimming Lighting System” written by David B. Floyd, Danny S. Parker of the Florida Solar Energy Center (FSEC – PF -283).

9.4.3. Fuel Cell Power Generation

A Fuel Cell (FC) is an electrochemical device that combines hydrogen fuel nd oxygen from the air to produce electricity, heat and water. Fuel cells operate without combustion, so they are virtually pollution free. Since the fuel is converted directly to electricity, a fuel cell can operate at much higher efficiencies than internal combustion engines, extracting more electricity from the same amount of fuel. The fuel cell itself has no moving parts - making it a quiet and reliable source of power. Fuel cell technology has been found suitable for a growing number of applications. The National Aeronautics and Space Administration (NASA) has used fuel cells for many years as the primary power source for space missions and currently uses fuel cells in the Space Shuttle program.

In our analysis we evaluated the feasibility and potential economics of installing a 200 kW Fuel Cell power generating systems at FLL with a budget cost of $1,874 per kW installed or $374,670. With an estimated annual energy production of 1,664,400 kWh and a consumption of 170,601 CCF of natural gas, the annual savings would be $7,757 yielding a simple payback of 48 years. It is our recommendation that the Fuel Cell project should not be implemented due to the extended payback, but is a candidate for further consideration with government-provided funds or grants applied.

Budget projection for our analysis were supplied by the Department Of Energy ("DOE") Energy Efficiency and Renewable Energy and the Hydrogen, Fuel Cells & Infrastructure Technologies Program.

9.5. Combined Heat and Power

Intent

The intent is to evaluate the economic feasibility of a Combined Heat and Power (CHP) at Fort Lauderdale-Hollywood International Airport (FLL).

Introduction

The basic concepts behind cogeneration have been utilized by industry and utilities for many decades. Many early industrial facilities utilized on site steam systems, which powered manufacturing and foundry equipment, to also generate electricity. In 1882, Thomas Edison's Pearl Street Station functioned on the basic concepts of cogeneration to provide localized power facilities that distributed electrical and thermal energy short distances to nearby facilities.

The present model of electrical generation and distribution was established in 1896 when a method to transmit electricity effectively over long distances was invented using alternating current. This allowed electricity to be produced at one location and utilized at another location. While electricity can be transmitted economically over long distances, thermal energy cannot. Sprawling economic development patterns coupled with increasing economics of scale in power generation led to today's energy system. Inexpensive and apparently abundant fuel sources coupled with the above pattern of development directed power generation and thermal energy applications down separate and less efficient paths.

In today's world with rising fuel/energy costs, aging infrastructure, concerns over pollution, air quality, energy usage, and power quality and reliability the concepts and efficiencies of cogeneration present a viable method of total energy production.

In response to this need in 1998, the U.S. Department of Energy and the U.S. Environmental Protection Agency initiated the "CHP Challenge". The newly formed U.S. Combined Heat and Power Association (USCHPA) accepted the challenge and instituted the preparation of the National CHP Roadmap. This Roadmap charts a course for doubling the amount of CHP capacity in the United States by 2010.

Definitions of Cogeneration

Cogeneration is defined as the simultaneous production of electricity, heating and/or cooling in a single process and with an overall efficiency normally exceeding 70%, "thermal recycling". Cogeneration accounts for approximately 7% of total global power production and more than 40% in some European countries. Both the United States (USA) and the European Union (EU) have targets to double the share of cogeneration by 2010.

Cogeneration Plant

A typical Cogeneration power plant consists a combustion turbine (Brayton cycle) powered by almost any liquid or gas fossil fuel that creates shaft energy, which is usually converted to electricity via an electric generator. A heat recovery steam generator (HRSG) or hot water generator (HRHWG) that extracts heat from the approximately 1000º F turbine exhaust gases can satisfy the thermal loads of a facility.

Typical Cogeneration Power Plant Schematic

Similar to the combustion turbine/HRSG is its reciprocating engine driven counterpart. The two systems are very similar, but the prime mover of a reciprocating engine system is usually either a diesel engine or a natural gas spark ignition engine. Reciprocating systems are generally less costly to install initially than turbine-driven systems but require additional on-going maintenance. Steam turbine systems are powered by high-pressure steam generated in traditional fossil-fired boilers. The steam expands through the turbine creating shaft energy (usually driving an electric generator). In the back-pressure turbine configuration, low pressure steam exhausted from the turbine is distributed throughout the facility to meet thermal load requirements. A common variation of the back-pressure system is the extracting/condensing turbine. This turbine design provides the flexibility to either extract low-pressure steam for thermal load use or condense the steam for additional power generation similar to a traditional utility generation process.

Selection Guidelines

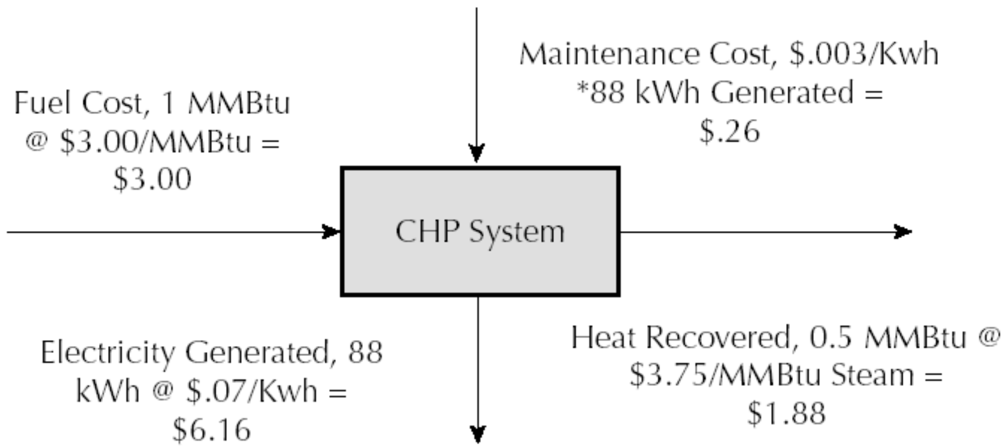
Many factors influence the system design selection process. However, perhaps the most important consideration is the thermal-to-electric (T/E) load ratio. Each system type presents slightly different thermodynamic considerations, which in turn affects how economically the system can meet a given thermal/electric load.

General System Costs

Generalizing potential system installation costs can be difficult due to the many design and site conditions that tend to be unique to each installation. However, some general pricing guidelines can be used for comparison. In general, system size is the biggest pricing issue. For example, a 1-MW gas turbine generator/HRSG system could be installed for $1900 per kilowatt (kW) where a larger system of 5 megawatts (MW) could cost as little as $750 per kW. These figures reflect relatively simple installation conditions and costs for system engineering and design. Providing a building to house the CHP system, routing electrical conductors a large distance from the new generator to the existing utility point of entry, and upsizing on-site gas distribution piping to accommodate increased gas consumption needs all increase complexity and system cost.

System Economic Feasibility

A major factor behind the economics of the ideal system is the assumption that 100% of the thermal energy recovered could be utilized to serve the facility load. Lower recovery rates produce different economics. For instance, if only 50% steam utilization were possible, then an excellent simple pay back (SPB) would increase to an insufficient SPB. Similarly, the facility load factor also plays a significant role in the system economics. In many cases, when a poor "natural" thermal/electric load match exists (usually due to low steam loads during summer months in northern climates), an "artificial" steam load can be created by installing absorption chillers, steam turbine drives for centrifugal chillers, or electric motors. In addition to improving the thermal/electrical load (and the system thermal efficiency), the electric summer peak load can be reduced as well as the associated installed power capacity requirement and initial cost.



The heat balance diagram above simply illustrates the cost of operation versus the energy savings while reflecting the ideal thermal balance for a CHP system.

Combined Heat and Power Plant Analysis at FLL

In our analysis we evaluated three (3) combinations of gas turbine generators and steam driven absorption chillers. In all cases the waste heat from the turbine was routed through a Heat Recovery Steam Generator (HRSG) and 100% of the steam was used to produce chilled water by the means of a double effect absorption chiller. See the appendix for the cogeneration plant analysis, including assumption, summaries and savings projects.

The table that follows illustrates the various scenarios analyzed with the 3rd scenario the most favorable for implementation.

Scenario	Turbine Generator	Chiller Capacity	Cooling delivered to load	Electricity delivered to load	Plant Efficiency	Plant Annual Savings	Simple Payback
#1	1,200	850	7,446,000	10,394	69.7%	-76,754	na
#2	4,600	2,500	19,763,053	36,364	67.2%	-94,185	na
#3	7,520	3,733	21,676,569	47,910	73.5%	492,300	24.4

Notes; (1) Turbine Generator listed in "kW" (2) Chiller capacity is in "Tons". (3) Cooling delivered to load in "Ton Hours" (4) Electricity delivered to load is in "MWh"

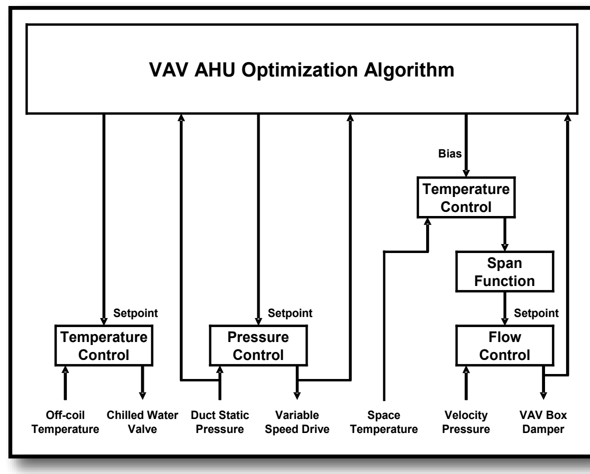
It is our recommendation that the Combined Heat & Power project should not be implemented due to the extended payback, but is a candidate for further consideration with government-provided funds or grants applied.

Budget and savings projection for our analysis where supplied by the RETScreen® International Combined Heat & Power (CHP) Project Model and is provided by the Natural Resources Canada (NRCan) and The Midwest CHP Application Center (MAC), operated for the Department Of Energy ("DOE").

10. Control System Utilization and Optimization at FLL

10.1. VAV AHU Optimization

This strategy saves fan energy by minimizing the motor speed at all times. The challenges in optimizing the control of variable air volume air handling units include:



- Too low of a set point will cause comfort problems
- Too high of a set point will waste energy
- Too high of a set point will make control of the VAV box difficult
- Too high of a set point will cause acoustic noise in the VAV box
- At peak load, the system may not have sufficient capacity
- At very low load, the motor speed cannot be reduced below 40%
- Difficulty in knowing where to place the duct static pressure sensor(s)

Under normal load conditions, the VAV AHU optimization algorithm resets the duct static pressure setpoint to maximise energy savings. This resetting is done based on the damper positions of the VAV boxes. At peak load, if the system capacity is insufficient, an offset is added to the setpoint of the temperature control loops at the VAV boxes. VAV zones are prioritized so that lower priority areas have the highest amount of offset applied. This is sometimes called a "share the pain" approach.

A simple database application, called a "VAV Box Report", can be implemented that uses Point History files maintained by the Building Management System installed at FLL. The Valve Report application analyzes the historical damper positions for all boxes and prepares a report indicating the valve that is most frequently the most open (i.e. the box that determines POSMAX). The management at FLL can review this report quarterly looking for a consistent pattern. If the VAV Box Report identifies that a damper is frequently the most open, energy can be saved by adjusting air balancing, increasing the size of the VAV box to allow greater reset of the fan speed.

Observations

The Building Management System installed at FLL has all of the necessary inputs and outputs to implement this energy conservation measure.

Assessment

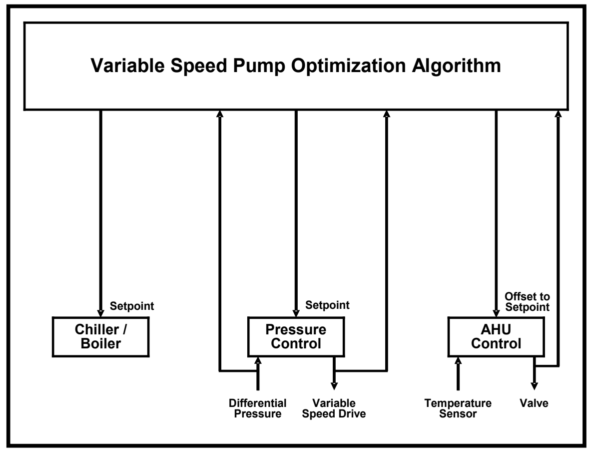
Additional energy can be saved at FLL by implementing the variable speed pump optimization strategy as described.

Recommendations

FLL can implement a VAV AHU optimization program. A VAV Box Report application may be used to proactively explore the opportunity for increased energy savings through increased resetting of pressure setpoint.

10.2. Variable Speed Pump Optimization

This strategy saves pumping energy by minimizing the motor speed at all times. The challenges in optimizing the control of variable speed pumps are the same as the challenges in optimizing variable air volume air handling units:



- Too low of a set point will cause comfort problems
- Too high of a set point will waste energy
- Too high of a set point will make control of the end device difficult
- Too high of a set point will cause problems with the end device (cavitation in the case of AHU valve, acoustic noise in the case of VAV box)
- At peak load, the system may not have sufficient capacity
- At very low load, the motor speed cannot be reduced below 40%
- Difficulty in knowing where to place the pressure sensor (differential water pressure in the case of the pump, duct static pressure in the case of the AHU)

Under normal load conditions, the variable speed pump optimization algorithm resets the differential pressure set point to maximize energy savings. This resetting is done based on the valve positions of the air handling units. Air handling units are prioritized so that lower priority loads have the highest amount of offset applied. This is sometimes called a "share the pain" approach.

For most facilities, the delay between resetting the differential pressure set point should be at least 20 minutes. This gives the valves time to stabilize at their new positions.

A simple database application, called a "Valve Report", can be implemented that uses Point History files maintained by the Building Management System installed at FLL. The Valve Report application analyzes the historical valve positions for all valves and prepares a report indicating the valve that is most frequently the most open (i.e. the valve that determines POSMAX). The management at FLL can review this report quarterly looking for a consistent pattern. If the Valve Report identifies that a valve is frequently the most open, energy can be saved by repairing this condition (increasing the size of the valve or port) to allow greater reset of the variable speed pump.

Observations

The Building Management System installed at FLL has all of the necessary inputs and outputs to implement this energy conservation measure.

Assessment

Additional energy can be saved at FLL by implementing the variable speed pump optimization strategy as described.

Recommendations

FLL can implement a variable speed pump optimization program. A valve history report application may be used to proactively explore the opportunity for increased energy savings through increased resetting of differential pressure setpoint.

10.3. Retro-Commissioning

HVAC system operations often degrade over the life of a building, resulting in system performance well below original design. In addition to the loss of energy efficiency, system performance issues and changes in space use contribute to inadequate comfort control and ventilation. Retro-commissioning building systems based on current building use characteristics is a cost-effective way of identifying specific system problems and addressing the problems.

The proven approach for retro-commissioning buildings follows the guidelines set forth in "A Practical Guide for Commissioning Existing Buildings" prepared by Oak Ridge National Laboratory and Portland Energy Commission, Inc. This approach to retro-commissioning goes beyond quick fix solutions to systematically optimize building systems so that they operate efficiently and effectively. This ECM will result in decreased energy consumption, improved occupant comfort and will set the stage for improvements in future maintenance of HVAC systems.

Existing Conditions

Many of the buildings at FLL were designed as state-of-the-art facilities with complex mechanical and energy management control systems. However, as is true with most facilities, actual operating conditions differ from design conditions and HVAC system operation has degraded over time. It is likely that some sensors and control components have fallen out of calibration, EMCS programming has been altered, and in some cases, building use and occupancy patterns have changed.

Terminals 1, 2, 3 and 4 were identified during analysis as being viable candidates for retro-commissioning. An example of a specific HVAC and EMCS issue identified during the Preliminary Audit is the heat recovery system serving terminal 1. The air-handling systems serving the building utilize significant amounts of outdoor air.

Recommendations

The project will provide labor and materials to inspect, test, and adjust the mechanical and EMCS systems to ensure the building HVAC systems are performing as near to optimal conditions, design conditions modified to meet the needs of current building operating characteristics. This project will bring inoperative dampers and valves back into service, calibrate or replace sensors and controllers and optimize EMCS control sequences. Balancing of air distribution, and chilled water distribution systems within the facilities is included. Major repair or replacement of equipment such as, but not limited to motors, fans, coils, or piping systems is not part of this ECM.

A detailed Commissioning Report should be provided explaining the retro-commissioning process, problems encountered, solutions implemented, repairs required and suggestions for future system operation.

Energy Savings Calculations

Given the large savings opportunity available through the retro-commissioning of the four (4) terminals we are estimating a 10% savings of the estimated HVAC system utilities or about 4% of the total utilities (HVAC estimated at 40% of the total). We anticipate the simple payback to be approximately 2 to 3 years.

Appendix A – HVAC Data

A.1. Central Plant Analysis Data

Refer to the folder provided on the enclosed CD titled Central Plant Analysis Data that includes four PDF files.

Chiller Plant Summary.pdf

1.2 MKW cogen and chw plant.pdf

4.6 MKW cogen and chw plant.pdf

7.5 Mkw cogen and chw plant.pdf

A.2. HVAC Log Data

Refer to the folder provided on the enclosed CD titled HVAC Log Data that includes a number of sub folders that contain Excel spreadsheets of many HVAC data trends.

Appendix B – Lighting Data

B.1. Lighting Audit Data

Refer to the enclosed CD for the files:

Lighting Audit Data 1.pdf

Lighting Audit Data 2.pdf

Lighting Audit Data 3.pdf

B.2. Lighting System Log Data

Refer to the enclosed CD for the file: Lighting System Log Data.xls

Appendix C – Photovoltaic Data

C.1. Photovoltaic Project Data Option 1

Refer to the enclosed CD for the file: Photovoltaic.pdf

C.2. Photovoltaic Project Data Option 2

Refer to the enclosed CD for two SI Brochure 1.pdf and SI Brochure 2.pdf

A.1.

Central Plant Analysis Data

Plant Summary

York International Cost of Operation

Project	Location
Fort Lauderdale-Hollywood International Airport	**Broward County, Florida**

	Jan $	Feb $	Mar $	Apr $	May $	Jun $	Jul $	Aug $	Sep $	Oct $	Nov $	Dec $
Multiple Chiller Plant (Alternate 1)												
Chiller System #1	31500	30006	32683	33421	35792	36601	39200	39273	37460	35384	32156	31554
Chiller System #2	22700	22238	28103	33674	37528	38831	41597	41674	39746	36910	30138	23950
Multiple Chiller Plant (Alternate 2)												
Chiller System #1	25382	24837	27203	28899	31713	33292	36350	36424	34450	31230	27106	25583
Chiller System #2	18663	18908	23771	29370	33485	35528	38776	38854	36755	32824	25718	19791

	Total Cost $	Ton Hours	Equiv.Full Load Hours	SPLV
Multiple Chiller Plant (Alternate 1)				
Chiller System #1	415030	6651816	5794	0.744 kW/ton
Chiller System #2	397089	6280686	5053	0.737 kW/ton
Total:	812119	12932502	5409	0.741 kW/ton
Multiple Chiller Plant (Alternate 2)				
Chiller System #1	362470	6651816	5794	0.625 kW/ton
Chiller System #2	352443	6280686	5053	0.629 kW/ton
Total:	714912	12932502	5409	0.627 kW/ton

Chiller Summary

York International Cost of Operation

Project	Location
Fort Lauderdale-Hollywood International Airport	**Broward County, Florida**

	Jan $	Feb $	Mar $	Apr $	May $	Jun $	Jul $	Aug $	Sep $	Oct $	Nov $	Dec $
Multiple Chiller System (Alternate 1)												
CH-2 Centrif	20071	19254	20989	21720	23499	24267	26178	26228	24936	23216	20731	20139
CH-1 Centrif	14696	14548	18413	22347	25149	26269	28341	28395	26994	24720	19835	15553
Multiple Chiller System (Alternate 2)												
CH-2 Centrif	16823	16536	18155	19519	21675	22952	25196	25243	23821	21384	18191	16992
CH-1 Centrif	12628	12889	16244	20271	23338	24954	27381	27433	25893	22924	17663	13437

	Total Cost $	Ton Hours	Equiv.Full Load Hours	SPLV
Multiple Chiller System (Alternate 1)				
CH-2 Centrif	271228	6651816	5794	0.484 kW/ton
CH-1 Centrif	265259	6280686	5053	0.490 kW/ton
Total:	536487	12932502	5409	0.487 kW/ton
Multiple Chiller System (Alternate 2)				
CH-2 Centrif	246486	6651816	5794	0.425 kW/ton
CH-1 Centrif	245054	6280686	5053	0.438 kW/ton
Total:	491540	12932502	5409	0.431 kW/ton

Chiller Cost Details

York International Cost of Operation

Project	Location
Fort Lauderdale-Hollywood International Airport	**Broward County, Florida**

System	Chiller	Type
Multiple Alt #1	**CH-2**	**Centrifugal**

Chiller Information		**Demand Cost**						
		Month	**High Bin**	**Peak kW**	**Ratchet**	**$/kW**	**Diversity**	**Dmd Cost ($)**
Energy Source:	Electric	Jan	80=>84	458	n/a	8.00	0.85	3111
Utility Type:	Electric	Feb	85=>89	523	n/a	8.00	0.85	3556
Full Load (tons):	1148	Mar	85=>89	523	n/a	8.00	0.85	3556
Full Load (kW):	638	Apr	90=>94	598	n/a	8.00	0.85	4063
Design ECWT (°F):	85.0	May	90=>94	598	n/a	8.00	0.85	4063
Minimum ECWT (°F):	65.0	Jun	90=>94	598	n/a	8.00	0.85	4063
Minimum RTD (°F):	18.0	Jul	90=>94	598	n/a	8.00	0.85	4063
Average Cost/kWh:	$0.084	Aug	90=>94	598	n/a	8.00	0.85	4063
Total kWh:	3234319	Sep	90=>94	598	n/a	8.00	0.85	4063
Total Cost:	$271228	Oct	85=>89	523	n/a	8.00	0.85	3556
SPLV (kW/ton):	0.484	Nov	85=>89	523	n/a	8.00	0.85	3556
Total Hours:	8762	Dec	80=>84	458	n/a	8.00	0.85	3111
Average Cost/Hour:	$25.84							
Drive Speed:	Constant	**Total**						44826

Energy Usage Cost

Temp Bin (°F)	Avg.WB (°F)	Tower Appr (°F)	ECWT (°F)	Load (tons)	(kW/ton)	Draw (kW)	Hours	Energy Usage (kWh)	Cost of Operation ($)	Cost/Hour ($)
95=>99	80.0	6.5	*86.5	1127	0.566	638	0	0	0	0.00
90=>94	78.0	6.4	84.4	1033	0.539	557	48	26736	1872	38.99
85=>89	77.0	6.1	83.1	939	0.521	489	811	396579	27761	34.23
80=>84	75.0	5.9	80.9	844	0.505	426	1788	761688	53318	29.82
75=>79	72.0	5.8	77.8	749	0.491	368	2456	903808	63267	25.76
70=>74	67.0	5.9	72.9	655	0.473	310	1716	531960	37237	21.70
65=>69	63.0	5.8	68.8	560	0.464	260	921	239460	16762	18.20
60=>64	58.0	10.0	68.0	970	0.445	432	489	211248	14787	30.24
55=>59	53.0	12.0	65.0	773	0.429	332	281	93292	6530	23.24
50=>54	48.0	17.0	65.0	655	0.434	284	156	44304	3101	19.88
45=>49	43.0	22.0	65.0	614	0.438	269	65	17485	1224	18.83
40=>44	38.0	27.0	65.0	573	0.442	253	25	6325	443	17.71
35=>39	35.0	30.0	65.0	532	0.449	239	6	1434	100	16.73
30=>34	32.0	33.0	65.0	491	0.456	224	0	0	0	0.00
25=>29	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
20=>24	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
15=>19	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
10=>14	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
5=>9	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
0=>4	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
Total/Avg:	69.0		75.7		0.484		8762	3234319	226402	25.84

* ECWT => ECWT exceeds Design ECWT

Chiller Cost Details

York International Cost of Operation

Project	Location
Fort Lauderdale-Hollywood International Airport	Broward County, Florida

System	Chiller	Type
Multiple Alt #1	CH-1	Centrifugal

Chiller Information		Demand Cost						
		Month	High Bin	Peak kW	Ratchet	$/kW	Diversity	Dmd Cost ($)
Energy Source:	Electric	Jan	80=>84	496	n/a	8.00	0.85	3369
Utility Type:	Electric	Feb	85=>89	567	n/a	8.00	0.85	3852
Full Load (tons):	1243	Mar	85=>89	567	n/a	8.00	0.85	3852
Full Load (kW):	691	Apr	90=>94	647	n/a	8.00	0.85	4400
Design ECWT (°F):	85.0	May	90=>94	647	n/a	8.00	0.85	4400
Minimum ECWT (°F):	65.0	Jun	90=>94	647	n/a	8.00	0.85	4400
Minimum RTD (°F):	18.0	Jul	90=>94	647	n/a	8.00	0.85	4400
Average Cost/kWh:	$0.086	Aug	90=>94	647	n/a	8.00	0.85	4400
Total kWh:	3095907	Sep	90=>94	647	n/a	8.00	0.85	4400
Total Cost:	$265259	Oct	85=>89	567	n/a	8.00	0.85	3852
SPLV (kW/ton):	0.490	Nov	85=>89	567	n/a	8.00	0.85	3852
Total Hours:	7740	Dec	80=>84	496	n/a	8.00	0.85	3369
Average Cost/Hour:	$28.00							
Drive Speed:	Constant	Total						48545

Energy Usage Cost

Temp Bin (°F)	Avg.WB (°F)	Tower Appr (°F)	ECWT (°F)	Load (tons)	(kW/ton)	Draw (kW)	Hours	Energy Usage (kWh)	Cost of Operation ($)	Cost/Hour ($)
95=>99	80.0	6.5	*86.5	1221	0.566	691	0	0	0	0.00
90=>94	78.0	6.4	84.4	1119	0.539	603	48	28944	2026	42.21
85=>89	77.0	6.1	83.1	1016	0.521	530	811	429830	30088	37.10
80=>84	75.0	5.9	80.9	914	0.504	461	1788	824268	57699	32.27
75=>79	72.0	5.8	77.8	812	0.490	398	2456	977488	68424	27.86
70=>74	67.0	5.9	72.9	709	0.474	336	1716	576576	40360	23.52
65=>69	63.0	5.8	68.8	607	0.463	281	921	258801	18116	19.67
60=>64	58.0	0.0	0.0	0	0.000	0	0	0	0	0.00
55=>59	53.0	0.0	0.0	0	0.000	0	0	0	0	0.00
50=>54	48.0	0.0	0.0	0	0.000	0	0	0	0	0.00
45=>49	43.0	0.0	0.0	0	0.000	0	0	0	0	0.00
40=>44	38.0	0.0	0.0	0	0.000	0	0	0	0	0.00
35=>39	35.0	0.0	0.0	0	0.000	0	0	0	0	0.00
30=>34	32.0	0.0	0.0	0	0.000	0	0	0	0	0.00
25=>29	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
20=>24	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
15=>19	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
10=>14	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
5=>9	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
0=>4	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
Total/Avg:	71.1		77.0		0.490		7740	3095907	216713	28.00

* ECWT => ECWT exceeds Design ECWT

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Chiller Cost Details

York International Cost of Operation

Project	Location
Fort Lauderdale-Hollywood International Airport	**Broward County, Florida**

System	Chiller	Type
Multiple Alt #2	**CH-2**	**Centrifugal**

Chiller Information		Demand Cost						
Energy Source:	Electric	**Month**	**High Bin**	**Peak kW**	**Ratchet**	**$/kW**	**Diversity**	**Dmd Cost ($)**
Utility Type:	Electric	Jan	80=>84	447	n/a	8.00	0.85	3036
Full Load (tons):	1148	Feb	85=>89	526	n/a	8.00	0.85	3577
Full Load (kW):	638	Mar	85=>89	526	n/a	8.00	0.85	3577
Design ECWT (°F):	85.0	Apr	90=>94	612	n/a	8.00	0.85	4162
Minimum ECWT (°F):	65.0	May	90=>94	612	n/a	8.00	0.85	4162
Minimum RTD (°F):	18.0	Jun	90=>94	612	n/a	8.00	0.85	4162
Average Cost/kWh:	$0.086	Jul	90=>94	612	n/a	8.00	0.85	4162
Total kWh:	2873376	Aug	90=>94	612	n/a	8.00	0.85	4162
Total Cost:	$246486	Sep	90=>94	612	n/a	8.00	0.85	4162
SPLV (kW/ton):	0.425	Oct	85=>89	526	n/a	8.00	0.85	3577
Total Hours:	8762	Nov	85=>89	526	n/a	8.00	0.85	3577
Average Cost/Hour:	$22.96	Dec	80=>84	447	n/a	8.00	0.85	3036
Drive Speed:	Variable	**Total**						45349

Energy Usage Cost

Temp Bin (°F)	Avg.WB (°F)	Tower Appr (°F)	ECWT (°F)	Load (tons)	(kW/ton)	Draw (kW)	Hours	Energy Usage (kWh)	Cost of Operation ($)	Cost/Hour ($)
95=>99	80.0	6.4	*86.4	1127	0.584	658	0	0	0	0.00
90=>94	78.0	6.1	84.1	1033	0.548	566	48	27168	1902	39.62
85=>89	77.0	5.5	82.5	939	0.518	486	811	394146	27590	34.02
80=>84	75.0	5.0	80.0	844	0.482	407	1788	727716	50940	28.49
75=>79	72.0	4.6	76.6	749	0.440	330	2456	810480	56734	23.10
70=>74	67.0	4.4	71.4	655	0.386	253	1716	434148	30390	17.71
65=>69	63.0	4.0	67.0	560	0.341	191	921	175911	12314	13.37
60=>64	58.0	9.3	67.3	970	0.377	366	489	178974	12528	25.62
55=>59	53.0	12.0	65.0	773	0.335	259	281	72779	5095	18.13
50=>54	48.0	17.0	65.0	655	0.327	214	156	33384	2337	14.98
45=>49	43.0	22.0	65.0	614	0.326	200	65	13000	910	14.00
40=>44	38.0	27.0	65.0	573	0.325	186	25	4650	326	13.02
35=>39	35.0	30.0	65.0	532	0.320	170	6	1020	71	11.90
30=>34	32.0	33.0	65.0	491	0.316	155	0	0	0	0.00
25=>29	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
20=>24	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
15=>19	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
10=>14	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
5=>9	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
0=>4	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
Total/Avg:	69.0		74.6		0.425		8762	2873376	201136	22.96

* ECWT => ECWT exceeds Design ECWT

Chiller Cost Details

York International Cost of Operation

Project	Location
Fort Lauderdale-Hollywood International Airport	**Broward County, Florida**

System	Chiller	Type
Multiple Alt #2	**CH-1**	**Centrifugal**

Chiller Information		Demand Cost						
		Month	**High Bin**	**Peak kW**	**Ratchet**	**$/kW**	**Diversity**	**Dmd Cost ($)**
Energy Source:	Electric							
Utility Type:	Electric	Jan	80=>84	485	n/a	8.00	0.85	3298
Full Load (tons):	1243	Feb	85=>89	571	n/a	8.00	0.85	3883
Full Load (kW):	691	Mar	85=>89	571	n/a	8.00	0.85	3883
Design ECWT (°F):	85.0	Apr	90=>94	663	n/a	8.00	0.85	4508
Minimum ECWT (°F):	65.0	May	90=>94	663	n/a	8.00	0.85	4508
Minimum RTD (°F):	18.0	Jun	90=>94	663	n/a	8.00	0.85	4508
Average Cost/kWh:	$0.088	Jul	90=>94	663	n/a	8.00	0.85	4508
Total kWh:	2798241	Aug	90=>94	663	n/a	8.00	0.85	4508
Total Cost:	$245054	Sep	90=>94	663	n/a	8.00	0.85	4508
SPLV (kW/ton):	0.438	Oct	85=>89	571	n/a	8.00	0.85	3883
Total Hours:	7740	Nov	85=>89	571	n/a	8.00	0.85	3883
Average Cost/Hour:	$25.31	Dec	80=>84	485	n/a	8.00	0.85	3298
Drive Speed:	Variable	**Total**						49178

Energy Usage Cost

Temp Bin (°F)	Avg.WB (°F)	Tower Appr (°F)	ECWT (°F)	Load (tons)	(kW/ton)	Draw (kW)	Hours	Energy Usage (kWh)	Cost of Operation ($)	Cost/Hour ($)
95=>99	80.0	6.5	*86.5	1221	0.583	712	0	0	0	0.00
90=>94	78.0	6.1	84.1	1119	0.549	614	48	29472	2063	42.98
85=>89	77.0	5.5	82.5	1016	0.520	528	811	428208	29975	36.96
80=>84	75.0	5.0	80.0	914	0.484	442	1788	790296	55321	30.94
75=>79	72.0	4.6	76.6	812	0.444	360	2456	884160	61891	25.20
70=>74	67.0	4.4	71.4	709	0.389	276	1716	473616	33153	19.32
65=>69	63.0	4.0	67.0	607	0.344	209	921	192489	13474	14.63
60=>64	58.0	0.0	0.0	0	0.000	0	0	0	0	0.00
55=>59	53.0	0.0	0.0	0	0.000	0	0	0	0	0.00
50=>54	48.0	0.0	0.0	0	0.000	0	0	0	0	0.00
45=>49	43.0	0.0	0.0	0	0.000	0	0	0	0	0.00
40=>44	38.0	0.0	0.0	0	0.000	0	0	0	0	0.00
35=>39	35.0	0.0	0.0	0	0.000	0	0	0	0	0.00
30=>34	32.0	0.0	0.0	0	0.000	0	0	0	0	0.00
25=>29	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
20=>24	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
15=>19	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
10=>14	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
5=>9	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
0=>4	0.0	0.0	0.0	0	0.000	0	0	0	0	0.00
Total/Avg:	71.1		75.8		0.438		7740	2798241	195877	25.31

* ECWT => ECWT exceeds Design ECWT

Chiller Input Data

York International Cost of Operation

Project	Location
Fort Lauderdale-Hollywood International Airport	**Broward County, Florida**

System	Chiller	Type
Multiple Alt #1	**CH-2**	**Centrifugal**

Design Conditions Data

Energy Source:	Electric	Part Load Energy Mode:		Computer
Utility Type:	Electric	Tower Approach (°F):		7.0
Drive Speed:	Constant			
Condenser Cooling:	Water		**--- Evap ---**	**--- Cond ---**
ECWT Source:	Varies w/ WB (Tower)	Entering Temp (°F):	49.7	85.0
Full Load (tons):	1148	Leaving Temp (°F):	44.0	93.9
Full Load (kW/ton):	0.556	Press.Drop (ft.H2O):	9.0	22.0
Full Load (kW):	638	Tube Approach (°F):	4.0	4.0

Building Load Data

Building Load Mode:	Computer
Design OADB (°F):	95.0
Design OAWB (°F):	78.0
Load @ Design OADB (tons):	2250
Weather Bal.Temperature (°F):	55.0
Drop @ Wthr.Bal.Temp (tons):	0
Min DB Operating Temp (°F):	30.0
----- Load Line Parameters -----	
Load Line Type:	Light Load
%Design @ Wthr.Bal.Temp:	30
%Design @ Min Temp.Bin:	10

Local Controls Data

LCHWT Ctl.Type:	Constant
Control Type:	Min ECWT
Minimum ECWT (°F):	65.0
Minimum RTD (°F):	18.0

Utility Rate Data

Month	$/kWh	Ratchet	$/kW	Diversity
Jan	0.07000	n/a	8.00	0.85
Feb	0.07000	n/a	8.00	0.85
Mar	0.07000	n/a	8.00	0.85
Apr	0.07000	n/a	8.00	0.85
May	0.07000	n/a	8.00	0.85
Jun	0.07000	n/a	8.00	0.85
Jul	0.07000	n/a	8.00	0.85
Aug	0.07000	n/a	8.00	0.85
Sep	0.07000	n/a	8.00	0.85
Oct	0.07000	n/a	8.00	0.85
Nov	0.07000	n/a	8.00	0.85
Dec	0.07000	n/a	8.00	0.85
Avg	0.07000	n/a	8.00	0.85

Temperature Bin Data

Temp Bin (°F)	Average WB (°F)	Tower Appr (°F)	ECWT (°F)	Building Load (tons)	Load (tons)	Part Load (kW)
95=>99	80.0	6.5	*86.5	2348	1127	638
90=>94	78.0	6.4	84.4	2152	1033	557
85=>89	77.0	6.1	83.1	1955	939	489
80=>84	75.0	5.9	80.9	1758	844	426
75=>79	72.0	5.8	77.8	1561	749	368
70=>74	67.0	5.9	72.9	1364	655	310
65=>69	63.0	5.8	68.8	1167	560	260
60=>64	58.0	10.0	68.0	970	970	432
55=>59	53.0	12.0	65.0	773	773	332
50=>54	48.0	17.0	65.0	655	655	284
45=>49	43.0	22.0	65.0	614	614	269
40=>44	38.0	27.0	65.0	573	573	253
35=>39	35.0	30.0	65.0	532	532	239
30=>34	32.0	33.0	65.0	491	491	224
25=>29	0.0	0.0	0.0	0	0	0
20=>24	0.0	0.0	0.0	0	0	0
15=>19	0.0	0.0	0.0	0	0	0
10=>14	0.0	0.0	0.0	0	0	0
5=>9	0.0	0.0	0.0	0	0	0
0=>4	0.0	0.0	0.0	0	0	0

* ECWT => ECWT exceeds Design ECWT

Chiller Input Data

York International Cost of Operation

Project	Location
Fort Lauderdale-Hollywood International Airport	**Broward County, Florida**

System	Chiller	Type
Multiple Alt #1	**CH-1**	**Centrifugal**

Design Conditions Data

Energy Source:	Electric	Part Load Energy Mode:	Computer	
Utility Type:	Electric	Tower Approach (°F):	7.0	
Drive Speed:	Constant			
Condenser Cooling:	Water		**--- Evap ---**	**--- Cond ---**
ECWT Source:	Varies w/ WB (Tower)	Entering Temp (°F):	56.0	85.0
Full Load (tons):	1243	Leaving Temp (°F):	49.8	94.6
Full Load (kW/ton):	0.556	Press.Drop (ft.H2O):	9.0	22.0
Full Load (kW):	691	Tube Approach (°F):	4.0	4.0

Building Load Data

Building Load Mode:	Computer
Design OADB (°F):	95.0
Design OAWB (°F):	78.0
Load @ Design OADB (tons):	2250
Weather Bal.Temperature (°F):	55.0
Drop @ Wthr.Bal.Temp (tons):	0
Min DB Operating Temp (°F):	30.0
----- Load Line Parameters -----	
Load Line Type:	Light Load
%Design @ Wthr.Bal.Temp:	30
%Design @ Min Temp.Bin:	10

Local Controls Data

LCHWT Ctl.Type:	Constant
Control Type:	Min ECWT
Minimum ECWT (°F):	65.0
Minimum RTD (°F):	18.0

Utility Rate Data

Month	$/kWh	Ratchet	$/kW	Diversity
Jan	0.07000	n/a	8.00	0.85
Feb	0.07000	n/a	8.00	0.85
Mar	0.07000	n/a	8.00	0.85
Apr	0.07000	n/a	8.00	0.85
May	0.07000	n/a	8.00	0.85
Jun	0.07000	n/a	8.00	0.85
Jul	0.07000	n/a	8.00	0.85
Aug	0.07000	n/a	8.00	0.85
Sep	0.07000	n/a	8.00	0.85
Oct	0.07000	n/a	8.00	0.85
Nov	0.07000	n/a	8.00	0.85
Dec	0.07000	n/a	8.00	0.85
Avg	0.07000	n/a	8.00	0.85

Temperature Bin Data

Temp Bin (°F)	Average WB (°F)	Tower Appr (°F)	ECWT (°F)	Building Load (tons)	Load (tons)	Part Load (kW)
95=>99	80.0	6.5	*86.5	2348	1221	691
90=>94	78.0	6.4	84.4	2152	1119	603
85=>89	77.0	6.1	83.1	1955	1016	530
80=>84	75.0	5.9	80.9	1758	914	461
75=>79	72.0	5.8	77.8	1561	812	398
70=>74	67.0	5.9	72.9	1364	709	336
65=>69	63.0	5.8	68.8	1167	607	281
60=>64	58.0	0.0	0.0	970	0	0
55=>59	53.0	0.0	0.0	773	0	0
50=>54	48.0	0.0	0.0	655	0	0
45=>49	43.0	0.0	0.0	614	0	0
40=>44	38.0	0.0	0.0	573	0	0
35=>39	35.0	0.0	0.0	532	0	0
30=>34	32.0	0.0	0.0	491	0	0
25=>29	0.0	0.0	0.0	0	0	0
20=>24	0.0	0.0	0.0	0	0	0
15=>19	0.0	0.0	0.0	0	0	0
10=>14	0.0	0.0	0.0	0	0	0
5=>9	0.0	0.0	0.0	0	0	0
0=>4	0.0	0.0	0.0	0	0	0

* ECWT => ECWT exceeds Design ECWT

Chiller Input Data

York International Cost of Operation

Project	Location
Fort Lauderdale-Hollywood International Airport	**Broward County, Florida**

System	Chiller	Type
Multiple Alt #2	**CH-2**	**Centrifugal**

Design Conditions Data

Energy Source:	Electric	VSD Efficiency (%):	97.0	Part Load Energy Mode:	Computer	
Utility Type:	Electric			Tower Approach (°F):	7.0	
Drive Speed:	Variable					
Condenser Cooling:	Water				**--- Evap ---**	**--- Cond ---**
ECWT Source:	Varies w/ WB (Tower)			Entering Temp (°F):	49.7	85.0
Full Load (tons):	1148			Leaving Temp (°F):	44.0	93.9
Full Load (kW/ton):	0.556			Press.Drop (ft.H2O):	9.0	22.0
Full Load (kW):	638			Tube Approach (°F):	4.0	4.0

Building Load Data

Building Load Mode:	Computer
Design OADB (°F):	95.0
Design OAWB (°F):	78.0
Load @ Design OADB (tons):	2250
Weather Bal.Temperature (°F):	55.0
Drop @ Wthr.Bal.Temp (tons):	0
Min DB Operating Temp (°F):	30.0
----- Load Line Parameters -----	
Load Line Type:	Light Load
%Design @ Wthr.Bal.Temp:	30
%Design @ Min Temp.Bin:	10

Local Controls Data

LCHWT Ctl.Type:	Constant
Control Type:	Min ECWT
Minimum ECWT (°F):	65.0
Minimum RTD (°F):	18.0

Utility Rate Data

Month	$/kWh	Ratchet	$/kW	Diversity
Jan	0.07000	n/a	8.00	0.85
Feb	0.07000	n/a	8.00	0.85
Mar	0.07000	n/a	8.00	0.85
Apr	0.07000	n/a	8.00	0.85
May	0.07000	n/a	8.00	0.85
Jun	0.07000	n/a	8.00	0.85
Jul	0.07000	n/a	8.00	0.85
Aug	0.07000	n/a	8.00	0.85
Sep	0.07000	n/a	8.00	0.85
Oct	0.07000	n/a	8.00	0.85
Nov	0.07000	n/a	8.00	0.85
Dec	0.07000	n/a	8.00	0.85
Avg	0.07000	n/a	8.00	0.85

Temperature Bin Data

Temp Bin (°F)	Average WB (°F)	Tower Appr (°F)	ECWT (°F)	Building Load (tons)	Load (tons)	Part Load (kW)
95=>99	80.0	6.4	*86.4	2348	1127	658
90=>94	78.0	6.1	84.1	2152	1033	566
85=>89	77.0	5.5	82.5	1955	939	486
80=>84	75.0	5.0	80.0	1758	844	407
75=>79	72.0	4.6	76.6	1561	749	330
70=>74	67.0	4.4	71.4	1364	655	253
65=>69	63.0	4.0	67.0	1167	560	191
60=>64	58.0	9.3	67.3	970	970	366
55=>59	53.0	12.0	65.0	773	773	259
50=>54	48.0	17.0	65.0	655	655	214
45=>49	43.0	22.0	65.0	614	614	200
40=>44	38.0	27.0	65.0	573	573	186
35=>39	35.0	30.0	65.0	532	532	170
30=>34	32.0	33.0	65.0	491	491	155
25=>29	0.0	0.0	0.0	0	0	0
20=>24	0.0	0.0	0.0	0	0	0
15=>19	0.0	0.0	0.0	0	0	0
10=>14	0.0	0.0	0.0	0	0	0
5=>9	0.0	0.0	0.0	0	0	0
0=>4	0.0	0.0	0.0	0	0	0

* ECWT => ECWT exceeds Design ECWT

Chiller Input Data

York International Cost of Operation

Project	Location
Fort Lauderdale-Hollywood International Airport	**Broward County, Florida**

System	Chiller	Type
Multiple Alt #2	**CH-1**	**Centrifugal**

Design Conditions Data

Energy Source:	Electric	VSD Efficiency (%):	97.0	Part Load Energy Mode:	Computer	
Utility Type:	Electric			Tower Approach (°F):	7.0	
Drive Speed:	Variable					
Condenser Cooling:	Water				**--- Evap ---**	**--- Cond ---**
ECWT Source:	Varies w/ WB (Tower)			Entering Temp (°F):	56.0	85.0
Full Load (tons):	1243			Leaving Temp (°F):	49.8	94.6
Full Load (kW/ton):	0.556			Press.Drop (ft.H2O):	9.0	22.0
Full Load (kW):	691			Tube Approach (°F):	4.0	4.0

Building Load Data

Building Load Mode:	Computer
Design OADB (°F):	95.0
Design OAWB (°F):	78.0
Load @ Design OADB (tons):	2250
Weather Bal.Temperature (°F):	55.0
Drop @ Wthr.Bal.Temp (tons):	0
Min DB Operating Temp (°F):	30.0
----- Load Line Parameters -----	
Load Line Type:	Light Load
%Design @ Wthr.Bal.Temp:	30
%Design @ Min Temp.Bin:	10

Local Controls Data

LCHWT Ctl.Type:	Constant
Control Type:	Min ECWT
Minimum ECWT (°F):	65.0
Minimum RTD (°F):	18.0

Utility Rate Data

Month	$/kWh	Ratchet	$/kW	Diversity
Jan	0.07000	n/a	8.00	0.85
Feb	0.07000	n/a	8.00	0.85
Mar	0.07000	n/a	8.00	0.85
Apr	0.07000	n/a	8.00	0.85
May	0.07000	n/a	8.00	0.85
Jun	0.07000	n/a	8.00	0.85
Jul	0.07000	n/a	8.00	0.85
Aug	0.07000	n/a	8.00	0.85
Sep	0.07000	n/a	8.00	0.85
Oct	0.07000	n/a	8.00	0.85
Nov	0.07000	n/a	8.00	0.85
Dec	0.07000	n/a	8.00	0.85
Avg	0.07000	n/a	8.00	0.85

Temperature Bin Data

Temp Bin (°F)	Average WB (°F)	Tower Appr (°F)	ECWT (°F)	Building Load (tons)	Load (tons)	Part Load (kW)
95=>99	80.0	6.5	*86.5	2348	1221	712
90=>94	78.0	6.1	84.1	2152	1119	614
85=>89	77.0	5.5	82.5	1955	1016	528
80=>84	75.0	5.0	80.0	1758	914	442
75=>79	72.0	4.6	76.6	1561	812	360
70=>74	67.0	4.4	71.4	1364	709	276
65=>69	63.0	4.0	67.0	1167	607	209
60=>64	58.0	0.0	0.0	970	0	0
55=>59	53.0	0.0	0.0	773	0	0
50=>54	48.0	0.0	0.0	655	0	0
45=>49	43.0	0.0	0.0	614	0	0
40=>44	38.0	0.0	0.0	573	0	0
35=>39	35.0	0.0	0.0	532	0	0
30=>34	32.0	0.0	0.0	491	0	0
25=>29	0.0	0.0	0.0	0	0	0
20=>24	0.0	0.0	0.0	0	0	0
15=>19	0.0	0.0	0.0	0	0	0
10=>14	0.0	0.0	0.0	0	0	0
5=>9	0.0	0.0	0.0	0	0	0
0=>4	0.0	0.0	0.0	0	0	0

* ECWT => ECWT exceeds Design ECWT

RETScreen Energy Model - Combined cooling, heating & power project

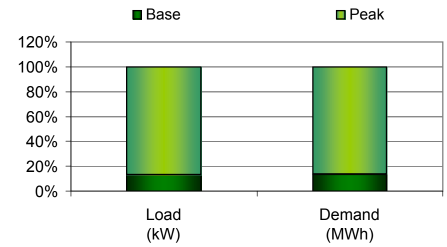
See Online Manual

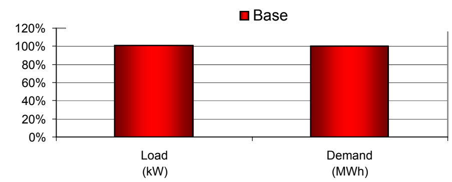
Settings			
Language - Langue	English - Anglais	Online manual - English	
Currency	$	☐ Metric units	☒ Imperial units
Project name	Fort Lauderdale-Hollywood International Airport	☒ Higher heating value (HHV)	☐ Lower heating value (LHV)
Project location	Broward County, Florida		
Proposed project	Combined cooling, heating & power		

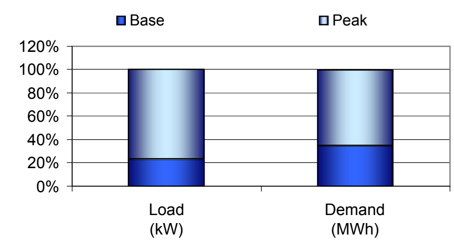
Complete Load & Network sheet

Proposed case system characteristics	Unit	Estimate	%
Power			
Base load power system			
Type		Gas turbine	
Operating strategy		Heating load following	
Capacity	kW	1,200	12.7%
Electricity delivered to load	MWh	10,394	13.5%
Electricity exported to grid	MWh	0	
Peak load power system			
Type		Grid electricity	
Suggested capacity	kW	8,249	
Capacity	kW	8,249	87.3%
Electricity delivered to load	MWh	66,646	86.5%
Back-up power system (optional)			
Type			
Capacity	kW	0	
Heating			
Base load heating system			
Type		Gas turbine	
Capacity	million Btu/h	7.6	101.1%
Heating delivered	million Btu	66,187	100.0%
Intermediate load heating system			
Type		Not required	
Peak load heating system			
Type		Not required	
Back-up heating system (optional)			
Type			
Capacity	kW	0.0	
Cooling			
Base load cooling system			
Type		Absorption	
Fuel source		Heating system	
Capacity	RT	850.0	22.8%
Cooling delivered	RTh	7,446,000	34.4%
Peak load cooling system			
Type		Compressor	
Fuel source		Power system	
Capacity	RT	2,884.0	77.3%
Cooling delivered	RTh	14,230,569	65.6%
Back-up cooling system (optional)			
Type			
Capacity	kW	0	

System design graph







Proposed case system summary	Fuel type	Fuel consumption - unit	Fuel consumption	Capacity (kW)	Energy delivered (MWh)	Clean Energy production credit?
Power						
Base load	Natural gas	mmBtu	145,777	1,200	10,394	☐
Peak load	Electricity	MWh	66,646	8,249	66,646	☐
			Total	9,449	77,040	
Heating						
Base load	Recovered heat			2,239	19,397	☐
			Total	2,239	19,397	
Cooling						
Base load	Heating system			2,989	26,186	☐
Peak load	Power system			10,143	50,047	☐
			Total	13,132	76,233	

Complete Cost Analysis sheet

RETScreen Load & Network Design - Combined cooling, heating & power project

Heating project	Unit	Estimate		Notes/Range
Site conditions		**Estimate**		**Notes/Range**
Nearest location for weather data		Fort Lauderdale Hollywood		*See Weather Database*
Heating design temperature	°C	10.6	51.1 °F	-40 to 15 °C
Annual heating degree-days below 18°C	°C-d	0	0 °F-d	*Complete Monthly inputs*
Domestic hot water heating base demand	%	10%		0% to 25%
Equivalent degree-days for DHW heating	°C-d/d	0.0		0 to 10 °C-d/d
Equivalent full load hours	h	143		

Monthly inputs

Month	°C-d <18°C	°F-d <65°F	Month	°C-d <18°C	°F-d <65°F	Month	°C-d <18°C	°F-d <65°F
January	0	0	May	0	0	September	0	0
February	0	0	June	0	0	October	0	0
March	0	0	July	0	0	November	0	0
April	0	0	August	0	0	December	0	0

See Weather Database

Base case heating system		Single building - space heating
Heated floor area for building	ft²	1,280,000
Fuel type		Electricity
Seasonal efficiency	%	100%
Heating load calculation		
Heating load for building	Btu/ft²	0.0
Total heating demand	million Btu	**0**
Total peak heating load	million Btu/h	**0.0**
Fuel consumption - annual	MWh	0
Fuel rate	$/kWh	0.000
Fuel cost		$ -
Proposed case energy efficiency measures		
End-use energy efficiency measures	%	0%
Net peak heating load	million Btu/h	0.0
Net heating demand	million Btu	0

RETScreen Load & Network Design - Combined cooling, heating & power project

Cooling project	Unit			
Site conditions		**Estimate**		**Notes/Range**
Nearest location for weather data		Fort Lauderdale Hollywood		*See Weather Database*
Cooling design temperature	°C	32.7	90.9 °F	10 to 47 °C
Annual cooling degree-days above 10°C	°C-d	5,445	9,802 °F-d	*Complete Monthly inputs*
Non-weather dependant cooling	%	0%		5% to 30%
Equivalent full load hours	h	5,806		

Monthly inputs

Month	°C-d >10°C	°F-d >50°F	Month	°C-d >10°C	°F-d >50°F	Month	°C-d >10°C	°F-d >50°F	
January	313	564	May	508	915	September	540	972	*See Weather Database*
February	314	564	June	534	961	October	505	910	
March	381	686	July	580	1,043	November	417	751	
April	423	761	August	577	1,038	December	353	636	

Base case cooling system	Single building - space cooling	
Cooled floor area for building	ft²	1,280,000
Fuel type		Electricity
Seasonal efficiency	%	412%
Cooling load calculation		
Cooling load for building	Btu/ft²	35.0
Total cooling demand	RTh	**21,676,569**
Total peak cooling load	RT	**3,733.3**
Fuel consumption - annual	MWh	18,505
Fuel rate	$/kWh	0.070
Fuel cost		$ 1,295,383
Proposed case energy efficiency measures		
End-use energy efficiency measures	%	0%
Net peak cooling load	RT	3,733.3
Net cooling demand	RTh	21,676,569

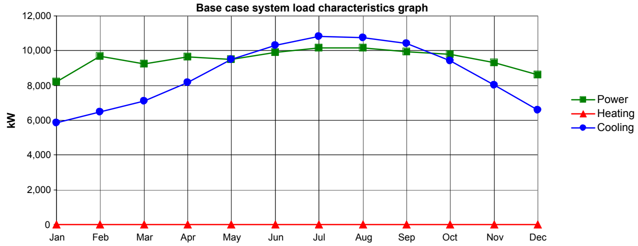
RETScreen Load & Network Design - Combined cooling, heating & power project

Power project	Unit	
Base case power system		
Grid type		Central-grid

Base case load characteristics

Month		Power gross average load kW	Power net average load kW	Cooling average load kW	Heating average load kW
January		8,198	6,780	5,842	0
February		9,677	8,104	6,478	0
March		9,226	7,499	7,114	0
April		9,658	7,678	8,155	0
May		9,509	7,207	9,486	0
June		9,895	7,396	10,295	0
July		10,174	7,549	10,816	0
August		10,151	7,539	10,758	0
September		9,928	7,400	10,411	0
October		9,784	7,495	9,428	0
November		9,323	7,372	8,040	0
December		8,630	7,030	6,594	0
System peak electricity load over max monthly average		0.0%			
Peak load - annual		10,174	8,104	13,130	0
Electricity demand	MWh	83,396	64,891		
Electricity rate - base case	$/kWh	0.070	0.070		
Total electricity cost		$ 5,837,752	$ 4,542,368		

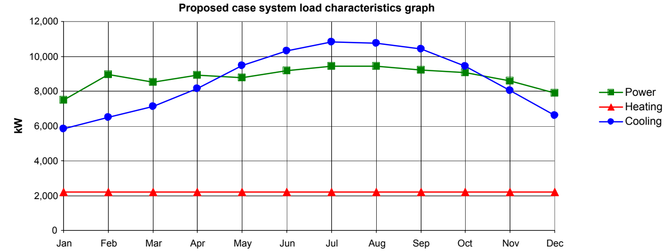
Base case system load characteristics graph



Proposed case load characteristics

Month	Power net average load kW	Power for cooling kW	Power system load kW	Cooling system load kW	Heating net average load kW	Heat for cooling kW	Heating system load kW
January	6,780	692	7,472	5,842	0	2,214	2,214
February	8,104	847	8,951	6,478	0	2,214	2,214
March	7,499	1,001	8,500	7,114	0	2,214	2,214
April	7,678	1,254	8,932	8,155	0	2,214	2,214
May	7,207	1,577	8,784	9,486	0	2,214	2,214
June	7,396	1,774	9,170	10,295	0	2,214	2,214
July	7,549	1,900	9,449	10,816	0	2,214	2,214
August	7,539	1,886	9,425	10,758	0	2,214	2,214
September	7,400	1,802	9,202	10,411	0	2,214	2,214
October	7,495	1,563	9,058	9,428	0	2,214	2,214
November	7,372	1,226	8,598	8,040	0	2,214	2,214
December	7,030	875	7,905	6,594	0	2,214	2,214
Peak load - annual	8,104	2,462	**9,449**	**13,130**	0	2,214	**2,214**

Proposed case system load characteristics graph



Proposed case energy efficiency measures

End-use energy efficiency measures	%	0%
Net peak electricity load	kW	8,104
Net electricity demand	MWh	64,891

Proposed case load and demand

		Power		Heating		Cooling
System peak load	kW	9,449	million Btu/h	7.6	RT	3,733.3
System energy demand	MWh	77,040	million Btu	66,187	RTh	21,676,569

Complete Equipment Selection sheet

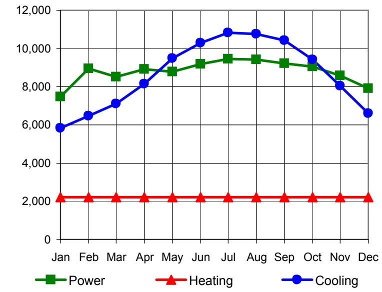
Complete Equipment Selection sheet

RETScreen Equipment Selection - Combined cooling, heating & power project

☑ Show alternative units

Proposed case cooling system						
Base load cooling system					kW	
Type		Absorption				
Fuel source		Heating system				
Capacity	RT	850.0	22.8%	*See product database*		
Seasonal efficiency	%	135%				
Manufacturer		Mitsubishi Electric				
Model		MDUE-2500H		1 unit(s)		
Cooling delivered	RTh	7,446,000	34.4%	MWh	26,186	
Peak load cooling system						
Type		Compressor				
Fuel source		Power system				
Suggested capacity	RT	2,883.3		kW	10,140	
Capacity	RT	2,884.0	77.3%	*See product database*		
Seasonal efficiency	%	412%				
Manufacturer		Trane				
Model		CVHE-1250		1 unit(s)		
Cooling delivered	RTh	14,230,569	65.6%	MWh	50,047	

Proposed case system load characteristics graph



Proposed case power system					
System selection		Base load system			
Base load power system					
Type		Gas turbine			
Availability	%		100.0%	8,760 h	
Fuel selection method		Single fuel			
Fuel type		Natural gas - mmBtu			
Fuel rate	$/mmBtu	8.570			
Gas turbine					
Power capacity	kW	1,200	12.7%	*See product database*	
Minimum capacity	%	40%			
Electricity delivered to load	MWh	10,394	13.5%		
Electricity exported to grid	MWh	0			
Manufacturer		Solar Turbines			
Model		Saturn 20		1 unit(s)	
Heat rate	Btu/kWh	14,025			
Heat recovery efficiency	%	60%			
Fuel required	million Btu/h	16.8		GJ/h	17.8
Heating capacity	million Btu/h	7.6	101.1%	kW	2,239.4

Operating strategy - base load power system				
Fuel rate - base case heating system	$/MWh	0.00	$/kWh	0.000
Electricity rate - base case	$/MWh	70.00	$/kWh	0.070
Fuel rate - proposed case power system	$/MWh	29.24	$/kWh	0.029
Electricity export rate	$/MWh	70.00	$/kWh	0.070
Electricity rate - proposed case	$/MWh	70.00	$/kWh	0.070

Operating strategy	Electricity delivered to load MWh	Electricity exported to grid MWh	Remaining electricity required MWh	Heat recovered million Btu	Remaining heat required million Btu	Power system fuel million Btu	Operating profit (loss) $	Efficiency %
Full power capacity output	10,512	0	66,528	66,187	0	147,431	-527,642	69.2%
Power load following	10,512	0	66,528	66,187	0	147,431	-527,642	69.2%
Heating load following	**10,394**	**0**	**66,646**	**66,187**	**0**	**145,777**	**-521,724**	**69.7%**

Select operating strategy: Heating load following

Return to Energy Model sheet

RETScreen Cost Analysis - Combined cooling, heating & power project

Settings - Fort Lauderdale-Hollywood International Airport - Broward County, Florida

☒ Pre-feasibility analysis	☒ Cost reference	Cost reference: None
☐ Feasibility analysis	☐ Second currency	

Initial costs (credits)	Unit	Quantity	Unit cost	Amount	Relative costs
Feasibility study					
Feasibility study	cost	1	$ 7,500	$ 7,500	
Sub-total:				**$ 7,500**	0.2%
Development					
Development	cost	1	$ 35,000	$ 35,000	
Sub-total:				**$ 35,000**	1.1%
Engineering					
Engineering	cost	1	$ 175,000	$ 175,000	
Sub-total:				**$ 175,000**	5.4%
Power system					
Base load - Gas turbine	kW	1,200	$ 625	$ 750,000	
Peak load - Grid electricity	kW	8,249		$ -	
Road construction	km			$ -	
Transmission line	km			$ -	
Substation	project			$ -	
Energy efficiency measures	project			$ -	
Custom	credit			$ -	
				$ -	
Sub-total:				**$ 750,000**	23.2%
Heating system					
Base load - Gas turbine	kW	2,239.4		$ -	
Energy efficiency measures	project			$ -	
HRSG	cost	1	$ 304,000	$ 304,000	
				$ -	
Sub-total:				**$ 304,000**	9.4%
Cooling system					
Base load - Absorption	RT	850.0	$ 1,000	$ 850,000	
Peak load - Compressor	RT	2,884.0		$ -	
Energy efficiency measures	project			$ -	
	cost	1		$ -	
				$ -	
Sub-total:				**$ 850,000**	26.3%
Balance of system & miscellaneous					
Balance of system & miscellaneous	cost	1	$ 756,900	$ 756,900	
Contingencies	%	10.0%	$ 2,878,400	$ 287,840	
Interest during construction	8.00%	6 month(s)	$ 3,166,240	$ 63,325	
Sub-total:				**$ 1,108,065**	34.3%
Total initial costs				**$ 3,229,565**	100.0%

Annual costs (credits)	Unit	Quantity	Unit cost	Amount	Relative costs
O&M					
Parts & labour	project	1	$ 35,000	$ 35,000	
O&M	cost	1	$ 15,591	$ 15,591	
Contingencies	%	5.0%	$ 50,591	$ 2,530	
Sub-total:				**$ 53,121**	0.9%
Fuel					
Natural gas	mmBtu	145,777	$ 8.570	$ 1,249,311	
Electricity	MWh	66,646	$ 70.000	$ 4,665,195	
Sub-total:				**$ 5,914,506**	99.1%
Total annual costs				**$ 5,967,626**	100.0%

Periodic costs (credits)	Unit	Year	Unit cost	Amount
Overhaul	cost	7	$ 120,000	**$ 120,000**
				$ -
				$ -
End of project life				**$ -**

Go to GHG Analysis sheet

RETScreen Greenhouse Gas (GHG) Emission Reduction Analysis - Combined cooling, heating & power project

Settings - Fort Lauderdale-Hollywood International Airport - Broward County, Florida

- [x] GHG Analysis
- [ ] Potential CDM project

- (•) Simplified analysis
- ( ) Standard analysis
- ( ) Custom analysis

Base case electricity system (Baseline)

Country - region	Fuel type	GHG emission factor (excl. T&D) tCO2/MWh	T&D losses %	GHG emission factor tCO2/MWh
United States of America (USA)	All types	0.579	5.0%	0.609

- [ ] Baseline changes during project life

Base case system GHG summary (Baseline)

Fuel type	Fuel mix %	Fuel consumption MWh	GHG emission factor tCO2/MWh	GHG emission tCO2
Electricity	100.0%	83,396	0.609	50,828
Total	100.0%	83,396	0.609	50,828

Proposed case system GHG summary (Combined cooling, heating & power project)

Fuel type	Fuel mix %	Fuel consumption MWh	GHG emission factor tCO2/MWh	GHG emission tCO2
Natural gas	39.1%	42,723	0.179	7,647
Electricity	60.9%	66,646	0.609	40,619
Total	100.0%	109,369	0.441	48,265

GHG emission reduction summary

Combined cooling, heating & power project	Base case GHG emission tCO2	Proposed case GHG emission tCO2	Gross annual GHG emission reduction tCO2	GHG credits transaction fee %	Net annual GHG emission reduction tCO2
	50,828	48,265	2,563	0%	**2,563**

Net annual GHG emission reduction 2,563 tCO2 is equivalent to 521 Cars & light trucks not used

Complete Financial Summary sheet

RETScreen Financial Summary - Combined cooling, heating & power project

Annual fuel cost summary - Fort Lauderdale-Hollywood International Airport - Broward County, Florida

Base case system	Peak load kW	Energy demand MWh	End-use energy rate $/MWh	Fuel cost $
Power	10,174	64,891	70.00	4,542,368
Heating	0	0	0.00	0
Cooling	13,130	76,233	16.99	1,295,383
Fuel cost - base case				**5,837,752**

Proposed case system	Capacity kW	Energy delivered MWh	End-use energy rate $/MWh	Fuel cost $
Power	9,449	77,040	76.77	5,914,506
Heating	2,239	19,397	0.00	0
Cooling	13,132	76,233	0.00	0
Fuel cost - proposed case				**5,914,506**

Yearly cash flows

Year #	Pre-tax $	After-tax $	Cumulative $
0	(968,869)	(968,869)	(968,869)
1	(350,273)	(350,273)	(1,319,142)
2	(352,922)	(352,922)	(1,672,064)
3	(355,624)	(355,624)	(2,027,689)
4	(358,381)	(358,381)	(2,386,070)
5	(361,193)	(361,193)	(2,747,262)
6	(364,060)	(364,060)	(3,111,323)
7	(504,828)	(504,828)	(3,616,151)
8	(369,969)	(369,969)	(3,986,120)
9	(373,013)	(373,013)	(4,359,133)
10	(376,117)	(376,117)	(4,735,250)
11	(379,283)	(379,283)	(5,114,533)
12	(382,513)	(382,513)	(5,497,046)
13	(385,807)	(385,807)	(5,882,853)
14	(547,505)	(547,505)	(6,430,358)
15	(392,595)	(392,595)	(6,822,952)
16	(178,290)	(178,290)	(7,001,242)
17	(181,856)	(181,856)	(7,183,098)
18	(185,493)	(185,493)	(7,368,591)
19	(189,203)	(189,203)	(7,557,794)
20	(192,987)	(192,987)	(7,750,780)
21	(378,726)	(378,726)	(8,129,507)
22	(200,783)	(200,783)	(8,330,290)
23	(204,799)	(204,799)	(8,535,089)
24	(208,895)	(208,895)	(8,743,985)
25	(213,073)	(213,073)	(8,957,058)

Financial parameters

General		
Fuel cost escalation rate	%	2.0%
Inflation rate	%	2.0%
Discount rate	%	10.0%
Project life	yr	25
Finance		
Incentives and grants	$	
Debt ratio	%	70.0%
Debt	$	2,260,695
Equity	$	968,869
Debt interest rate	%	5.00%
Debt term	yr	15
Debt payments	$/yr	**217,801**
Income tax analysis		☐

Project costs and savings/income summary

Initial costs			
Feasibility study	0.2%	$	7,500
Development	1.1%	$	35,000
Engineering	5.4%	$	175,000
Power system	23.2%	$	750,000
Heating system	9.4%	$	304,000
Cooling system	26.3%	$	850,000
Balance of system & misc.	34.3%	$	1,108,065
Total initial costs	100.0%	**$**	**3,229,565**
Annual costs and debt payments			
O&M		$	53,121
Fuel cost - proposed case		$	5,914,506
Debt payments - 15 yrs		$	217,801
Total annual costs		**$**	**6,185,427**
Periodic costs (credits)			
Overhaul - 7 yrs		$	120,000
Annual savings and income			
Fuel cost - base case		$	5,837,752
Total annual savings and income		**$**	**5,837,752**

Annual income

Customer premium income (rebate) ☐

Electricity export income

Clean Energy (CE) production income ☐

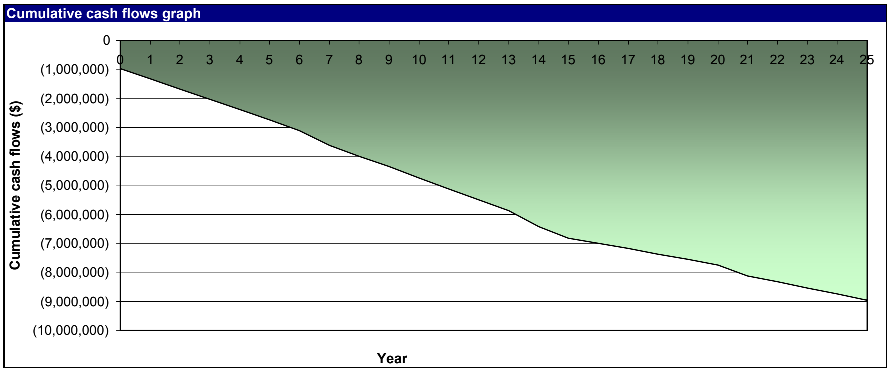
GHG reduction income ☐

Net GHG reduction	tCO2/yr	2,563
Net GHG reduction - 25 yrs	tCO2	64,063

Financial viability

Pre-tax IRR - equity	%	negative
Pre-tax IRR - assets	%	negative
After-tax IRR - equity	%	negative
After-tax IRR - assets	%	negative
Simple payback	yr	(24.9)
Equity payback	yr	> project
Net Present Value (NPV)	$	(4,167,648)
Annual life cycle savings	$/yr	(459,142)
Benefit-Cost (B-C) ratio	-	(3.30)
Debt service coverage	-	(1.51)
GHG reduction cost	$/tCO2	179

Cumulative cash flows graph



RETScreen Sensitivity and Risk Analysis - Combined cooling, heating & power project

Sensitivity analysis for After-tax IRR - equity

Perform analysis on	After-tax IRR - equity	
Sensitivity range	20%	
Threshold	12	%

		Initial costs				$
Fuel cost - base case		2,583,652	2,906,608	**3,229,565**	3,552,521	3,875,478
$		-20%	-10%	0%	10%	20%
4,670,201	-20%	negative	negative	negative	negative	negative
5,253,977	-10%	negative	negative	negative	negative	negative
5,837,752	0%	negative	negative	**negative**	negative	negative
6,421,527	10%	39.8%	33.4%	28.4%	24.5%	21.2%
7,005,302	20%	116.4%	101.2%	89.1%	79.2%	71.0%

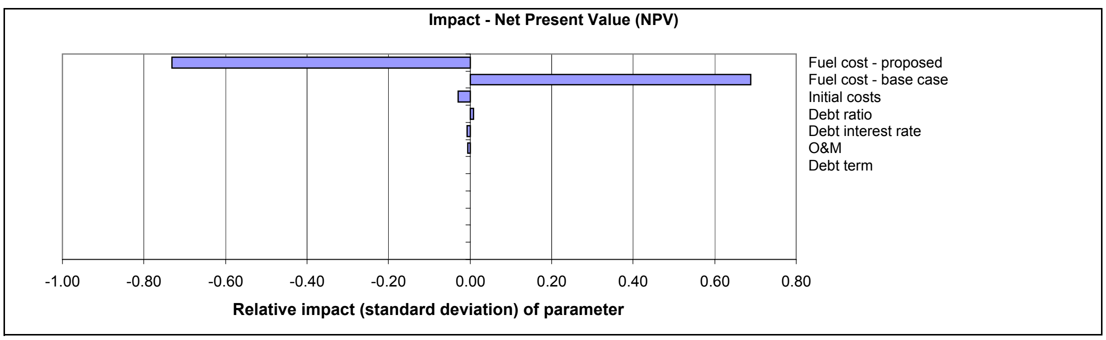
		Initial costs				$
Fuel cost - proposed case		2,583,652	2,906,608	**3,229,565**	3,552,521	3,875,478
$		-20%	-10%	0%	10%	20%
4,731,605	-20%	118.4%	103.0%	90.7%	80.7%	72.3%
5,323,055	-10%	40.8%	34.3%	29.2%	25.1%	21.8%
5,914,506	0%	negative	negative	**negative**	negative	negative
6,505,956	10%	negative	negative	negative	negative	negative
7,097,407	20%	negative	negative	negative	negative	negative

		Initial costs				$
Debt interest rate		2,583,652	2,906,608	**3,229,565**	3,552,521	3,875,478
%		-20%	-10%	0%	10%	20%
4.00%	-20%	negative	negative	negative	negative	negative
4.50%	-10%	negative	negative	negative	negative	negative
5.00%	0%	negative	negative	**negative**	negative	negative
5.50%	10%	negative	negative	negative	negative	negative
6.00%	20%	negative	negative	negative	negative	negative

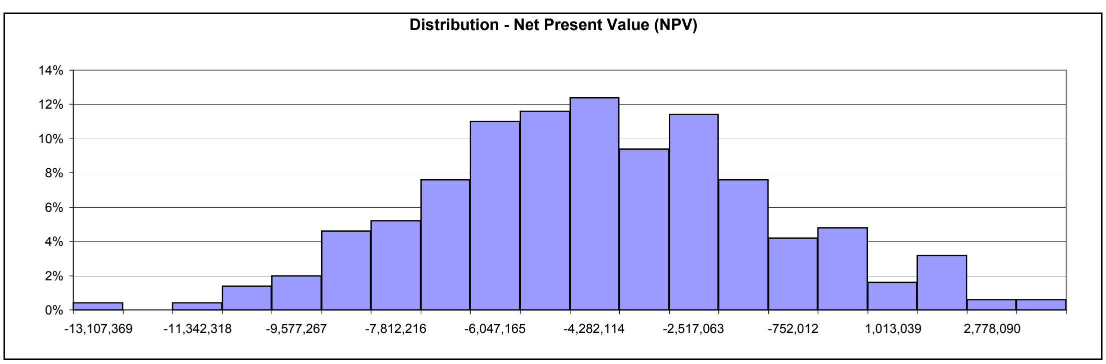
Risk analysis for Net Present Value (NPV)

Perform analysis on: Net Present Value (NPV)

Parameter	**Unit**	**Value**	**Range (+/-)**	**Minimum**	**Maximum**
Initial costs	$	3,229,565	10%	2,906,608	3,552,521
O&M	$	53,121	10%	47,808	58,433
Fuel cost - proposed case	$	5,914,506	10%	5,323,055	6,505,956
Fuel cost - base case	$	5,837,752	10%	5,253,977	6,421,527
Debt ratio	%	70%	10%	63%	77%
Debt interest rate	%	5.00%	10%	4.50%	5.50%
Debt term	yr	15	10%	14	17



Median	$	-4,376,760
Level of risk	%	20%
Minimum within level of confidence	$	-7,900,542
Maximum within level of confidence	$	-184,896



	Minimum	**Median**	**Maximum**	
10.0%	Level of confidence = 80%			10.0%
	$ (7,900,542)	**$ (4,376,760)**	**$ (184,896)**	

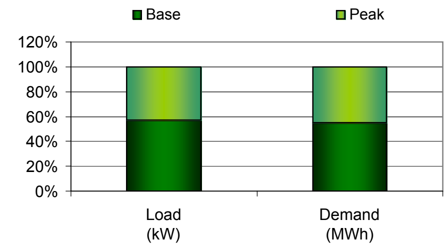
RETScreen Energy Model - Combined cooling, heating & power project

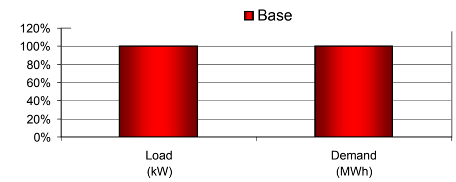
See Online Manual

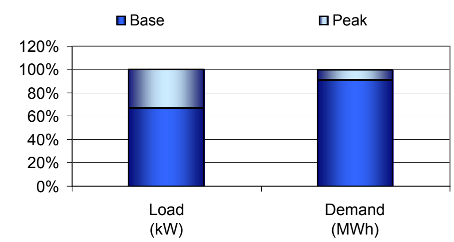
Settings		
Language - Langue	English - Anglais	Online manual - English
Currency	$	Metric units
		Imperial units
Project name	Fort Lauderdale-Hollywood International Airport	
Project location	Broward County, Florida	Higher heating value (HHV)
Proposed project	Combined cooling, heating & power	Lower heating value (LHV)
	Complete Load & Network sheet	

Proposed case system characteristics	Unit	Estimate	%
Power			
Base load power system			
Type		Gas turbine	
Operating strategy		Heating load following	
Capacity	kW	4,600	56.8%
Electricity delivered to load	MWh	36,364	54.7%
Electricity exported to grid	MWh	0	
Peak load power system			
Type		Grid electricity	
Suggested capacity	kW	3,504	
Capacity	kW	3,504	43.2%
Electricity delivered to load	MWh	30,161	45.3%
Back-up power system (optional)			
Type			
Capacity	kW	0	
Heating			
Base load heating system			
Type		Gas turbine	
Capacity	million Btu/h	22.2	100.0%
Heating delivered	million Btu	175,672	100.0%
Intermediate load heating system			
Type		Not required	
Peak load heating system			
Type		Not required	
Back-up heating system (optional)			
Type			
Capacity	kW	0.0	
Cooling			
Base load cooling system			
Type		Absorption	
Fuel source		Heating system	
Capacity	RT	2,499.7	67.0%
Cooling delivered	RTh	19,763,053	91.2%
Peak load cooling system			
Type		Compressor	
Fuel source		Power system	
Capacity	RT	1,248.8	33.5%
Cooling delivered	RTh	1,913,516	8.8%
Back-up cooling system (optional)			
Type			
Capacity	kW	0	

System design graph







Proposed case system summary	Fuel type	Fuel consumption - unit	Fuel consumption	Capacity (kW)	Energy delivered (MWh)	Clean Energy production credit?
Power						
Base load	Natural gas	mmBtu	445,822	4,600	36,364	☐
Peak load	Electricity	MWh	30,161	3,504	30,161	☐
			Total	**8,104**	**66,525**	
Heating						
Base load	Recovered heat			6,513	51,484	☐
			Total	**6,513**	**51,484**	
Cooling						
Base load	Heating system			8,791	69,504	☐
Peak load	Power system			4,392	6,730	☐
			Total	**13,183**	**76,233**	

Complete Cost Analysis sheet

RETScreen Load & Network Design - Combined cooling, heating & power project

Heating project	Unit	Estimate		Notes/Range
Site conditions		**Estimate**		**Notes/Range**
Nearest location for weather data		Fort Lauderdale Hollywood		*See Weather Database*
Heating design temperature	°C	10.6	51.1 °F	-40 to 15 °C
Annual heating degree-days below 18°C	°C-d	0	0 °F-d	*Complete Monthly inputs*
Domestic hot water heating base demand	%	10%		0% to 25%
Equivalent degree-days for DHW heating	°C-d/d	0.0		0 to 10 °C-d/d
Equivalent full load hours	h	143		

Monthly inputs

Month	°C-d <18°C	°F-d <65°F	Month	°C-d <18°C	°F-d <65°F	Month	°C-d <18°C	°F-d <65°F
January	0	0	May	0	0	September	0	0
February	0	0	June	0	0	October	0	0
March	0	0	July	0	0	November	0	0
April	0	0	August	0	0	December	0	0

See Weather Database

Base case heating system		Single building - space heating
Heated floor area for building	ft²	1,280,000
Fuel type		Electricity
Seasonal efficiency	%	100%
Heating load calculation		
Heating load for building	Btu/ft²	0.0
Total heating demand	million Btu	**0**
Total peak heating load	million Btu/h	**0.0**
Fuel consumption - annual	MWh	0
Fuel rate	$/kWh	0.000
Fuel cost		$ -
Proposed case energy efficiency measures		
End-use energy efficiency measures	%	0%
Net peak heating load	million Btu/h	0.0
Net heating demand	million Btu	0

RETScreen Load & Network Design - Combined cooling, heating & power project

Cooling project	Unit			
Site conditions		**Estimate**		**Notes/Range**
Nearest location for weather data		Fort Lauderdale Hollywood		*See Weather Database*
Cooling design temperature	°C	32.7	90.9 °F	10 to 47 °C
Annual cooling degree-days above 10°C	°C-d	5,445	9,802 °F-d	*Complete Monthly inputs*
Non-weather dependant cooling	%	0%		5% to 30%
Equivalent full load hours	h	5,806		

Monthly inputs

Month	°C-d >10°C	°F-d >50°F	Month	°C-d >10°C	°F-d >50°F	Month	°C-d >10°C	°F-d >50°F	
January	313	564	May	508	915	September	540	972	*See Weather Database*
February	314	564	June	534	961	October	505	910	
March	381	686	July	580	1,043	November	417	751	
April	423	761	August	577	1,038	December	353	636	

Base case cooling system	Single building - space cooling	
Cooled floor area for building	ft²	1,280,000
Fuel type		Electricity
Seasonal efficiency	%	412%
Cooling load calculation		
Cooling load for building	Btu/ft²	35.0
Total cooling demand	RTh	**21,676,569**
Total peak cooling load	RT	**3,733.3**
Fuel consumption - annual	MWh	18,505
Fuel rate	$/kWh	0.070
Fuel cost		$ 1,295,383
Proposed case energy efficiency measures		
End-use energy efficiency measures	%	0%
Net peak cooling load	RT	3,733.3
Net cooling demand	RTh	21,676,569

RETScreen Load & Network Design - Combined cooling, heating & power project

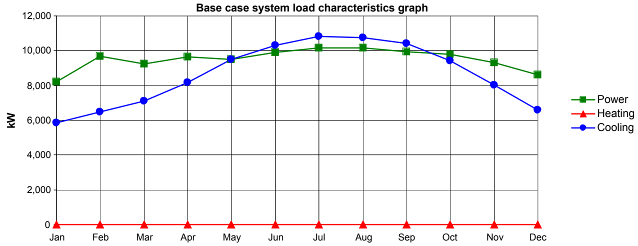
Power project	Unit	
Base case power system		
Grid type		Central-grid

Base case load characteristics

Month	Power gross average load kW	Power net average load kW	Cooling average load kW	Heating average load kW
January	8,198	6,780	5,842	0
February	9,677	8,104	6,478	0
March	9,226	7,499	7,114	0
April	9,658	7,678	8,155	0
May	9,509	7,207	9,486	0
June	9,895	7,396	10,295	0
July	10,174	7,549	10,816	0
August	10,151	7,539	10,758	0
September	9,928	7,400	10,411	0
October	9,784	7,495	9,428	0
November	9,323	7,372	8,040	0
December	8,630	7,030	6,594	0
System peak electricity load over max monthly average	0.0%			
Peak load - annual	10,174	8,104	13,130	0

	Unit		
Electricity demand	MWh	83,396	64,891
Electricity rate - base case	$/kWh	0.070	0.070
Total electricity cost		$ 5,837,752	$ 4,542,368

Base case system load characteristics graph



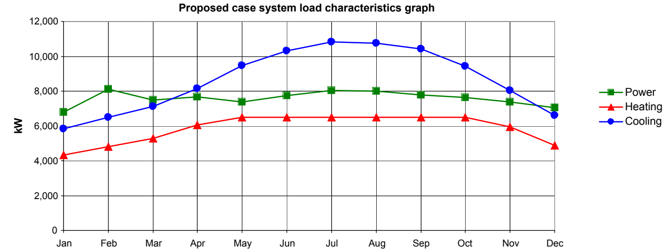
Proposed case energy efficiency measures

	Unit	
End-use energy efficiency measures	%	0%
Net peak electricity load	kW	8,104
Net electricity demand	MWh	64,891

Proposed case load characteristics

Month	Power net average load kW	Power for cooling kW	Power system load kW	Cooling system load kW	Heating net average load kW	Heat for cooling kW	Heating system load kW
January	6,780	0	6,780	5,842	0	4,327	4,327
February	8,104	0	8,104	6,478	0	4,799	4,799
March	7,499	0	7,499	7,114	0	5,270	5,270
April	7,678	0	7,678	8,155	0	6,041	6,041
May	7,207	169	7,375	9,486	0	6,512	6,512
June	7,396	365	7,761	10,295	0	6,512	6,512
July	7,549	492	8,040	10,816	0	6,512	6,512
August	7,539	478	8,017	10,758	0	6,512	6,512
September	7,400	393	7,794	10,411	0	6,512	6,512
October	7,495	155	7,650	9,428	0	6,512	6,512
November	7,372	0	7,372	8,040	0	5,955	5,955
December	7,030	0	7,030	6,594	0	4,884	4,884
Peak load - annual	8,104	1,053	**8,104**	**13,130**	0	6,512	**6,512**

Proposed case system load characteristics graph



Proposed case load and demand		Power		Heating		Cooling
System peak load	kW	8,104	million Btu/h	22.2	RT	3,733.3
System energy demand	MWh	66,525	million Btu	175,672	RTh	21,676,569

Complete Equipment Selection sheet

Complete Equipment Selection sheet

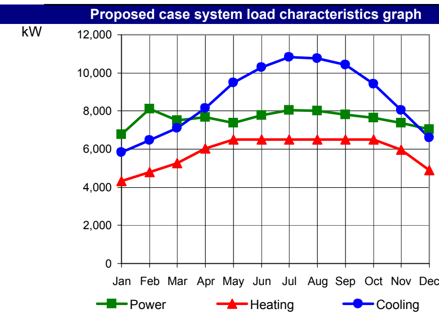
RETScreen Equipment Selection - Combined cooling, heating & power project

☐ Show alternative units

Proposed case cooling system

Base load cooling system				
Type		Absorption		
Fuel source		Heating system		
Capacity	RT	2,499.7	67.0%	See product database
Seasonal efficiency	%	135%		
Manufacturer		Mitsubishi Electric		
Model		MDUE-2500H		1 unit(s)
Cooling delivered	RTh	19,763,053	91.2%	
Peak load cooling system				
Type		Compressor		
Fuel source		Power system		
Suggested capacity	RT	1,233.7		
Capacity	RT	1,248.8	33.5%	See product database
Seasonal efficiency	%	412%		
Manufacturer		Trane		
Model		CVHE-1250		1 unit(s)
Cooling delivered	RTh	1,913,516	8.8%	

Proposed case system load characteristics graph



Proposed case power system

System selection		Base load system		
Base load power system				
Type		Gas turbine		
Availability	%		100.0%	8,760 h
Fuel selection method		Single fuel		
Fuel type		Natural gas - mmBtu		
Fuel rate	$/mmBtu	8.570		
Gas turbine				
Power capacity	kW	4,600	56.8%	See product database
Minimum capacity	%	40%		
Electricity delivered to load	MWh	36,364	54.7%	
Electricity exported to grid	MWh	0		
Manufacturer		Solar Turbines		
Model		Centaur 50		1 unit(s)
Heat rate	Btu/kWh	12,260		
Heat recovery efficiency	%	55%		
Fuel required	million Btu/h	56.4		
Heating capacity	million Btu/h	22.2	100.0%	

Operating strategy - base load power system

Fuel rate - base case heating system	$/MWh	0.00
Electricity rate - base case	$/MWh	70.00
Fuel rate - proposed case power system	$/MWh	29.24
Electricity export rate	$/MWh	70.00
Electricity rate - proposed case	$/MWh	70.00

Operating strategy	Electricity delivered to load MWh	Electricity exported to grid MWh	Remaining electricity required MWh	Heat recovered million Btu	Remaining heat required million Btu	Power system fuel million Btu	Operating profit (loss) $	Efficiency %
Full power capacity output	40,296	0	26,229	175,672	0	494,029	-1,413,108	63.4%
Power load following	40,296	0	26,229	175,672	0	494,029	-1,413,108	63.4%
Heating load following	**36,364**	**0**	**30,161**	**175,672**	**0**	**445,822**	**-1,275,217**	**67.2%**

Select operating strategy: Heating load following

Return to Energy Model sheet

RETScreen Cost Analysis - Combined cooling, heating & power project

Settings - Fort Lauderdale-Hollywood International Airport - Broward County, Florida			
◉ Pre-feasibility analysis	◉ Cost reference	Cost reference	None
○ Feasibility analysis	○ Second currency		

Initial costs (credits)	Unit	Quantity	Unit cost	Amount	Relative costs
Feasibility study					
Feasibility study	cost	1	$ 13,000	$ 13,000	
Sub-total:				**$ 13,000**	0.1%
Development					
Development	cost	1	$ 65,000	$ 65,000	
Sub-total:				**$ 65,000**	0.7%
Engineering					
Engineering	cost	1	$ 425,000	$ 425,000	
Sub-total:				**$ 425,000**	4.7%
Power system					
Base load - Gas turbine	kW	4,600	$ 500	$ 2,300,000	
Peak load - Grid electricity	kW	3,504		$ -	
Road construction	km			$ -	
Transmission line	km			$ -	
Substation	project			$ -	
Energy efficiency measures	project			$ -	
Custom	credit			$ -	
				$ -	
Sub-total:				**$ 2,300,000**	25.3%
Heating system					
Base load - Gas turbine	kW	6,512.7		$ -	
Energy efficiency measures	project			$ -	
HRSG	cost	1	$ 475,000	$ 475,000	
				$ -	
Sub-total:				**$ 475,000**	5.2%
Cooling system					
Base load - Absorption	RT	2,499.7	$ 1,150	$ 2,874,630	
Peak load - Compressor	RT	1,248.8		$ -	
Energy efficiency measures	project			$ -	
	cost	1		$ -	
				$ -	
Sub-total:				**$ 2,874,630**	31.6%
Balance of system & miscellaneous					
Balance of system & miscellaneous	cost	1	$ 1,956,900	$ 1,956,900	
Contingencies	%	10.0%	$ 8,109,530	$ 810,953	
Interest during construction	8.00%	6 month(s)	$ 8,920,483	$ 178,410	
Sub-total:				**$ 2,946,263**	32.4%
Total initial costs				**$ 9,098,892**	100.0%

Annual costs (credits)	Unit	Quantity	Unit cost	Amount	Relative costs
O&M					
Parts & labour	project	1	$ 35,000	$ 35,000	
O&M	cost	1	$ 54,546	$ 54,546	
Contingencies	%	5.0%	$ 89,546	$ 4,477	
Sub-total:				**$ 94,023**	1.6%
Fuel					
Natural gas	mmBtu	445,822	$ 8.570	$ 3,820,692	
Electricity	MWh	30,161	$ 70.000	$ 2,111,245	
Sub-total:				**$ 5,931,937**	98.4%
Total annual costs				**$ 6,025,960**	100.0%

Periodic costs (credits)	Unit	Year	Unit cost	Amount
Overhaul	cost	7	$ 460,000	**$ 460,000**
				$ -
				$ -
End of project life				**$ -**

Go to GHG Analysis sheet

RETScreen Greenhouse Gas (GHG) Emission Reduction Analysis - Combined cooling, heating & power project

Settings - Fort Lauderdale-Hollywood International Airport - Broward County, Florida

- [x] GHG Analysis
- [ ] Potential CDM project

- (●) Simplified analysis
- ( ) Standard analysis
- ( ) Custom analysis

Base case electricity system (Baseline)

Country - region	Fuel type	GHG emission factor (excl. T&D) tCO2/MWh	T&D losses %	GHG emission factor tCO2/MWh
United States of America (USA)	All types	0.579	5.0%	0.609

- [ ] Baseline changes during project life

Base case system GHG summary (Baseline)

Fuel type	Fuel mix %	Fuel consumption MWh	GHG emission factor tCO2/MWh	GHG emission tCO2
Electricity	100.0%	83,396	0.609	50,828
Total	100.0%	83,396	0.609	50,828

Proposed case system GHG summary (Combined cooling, heating & power project)

Fuel type	Fuel mix %	Fuel consumption MWh	GHG emission factor tCO2/MWh	GHG emission tCO2
Natural gas	81.2%	130,657	0.179	23,385
Electricity	18.8%	30,161	0.609	18,382
Total	100.0%	160,818	0.260	41,767

GHG emission reduction summary

	Base case GHG emission tCO2	Proposed case GHG emission tCO2	Gross annual GHG emission reduction tCO2	GHG credits transaction fee %	Net annual GHG emission reduction tCO2
Combined cooling, heating & power project	50,828	41,767	9,061	0%	**9,061**

Net annual GHG emission reduction 9,061 tCO2 is equivalent to 1,842 Cars & light trucks not used

Complete Financial Summary sheet

RETScreen Financial Summary - Combined cooling, heating & power project

Annual fuel cost summary - Fort Lauderdale-Hollywood International Airport - Broward County, Florida

Base case system	Peak load kW	Energy demand MWh	End-use energy rate $/MWh	Fuel cost $
Power	10,174	64,891	70.00	4,542,368
Heating	0	0	0.00	0
Cooling	13,130	76,233	16.99	1,295,383
Fuel cost - base case				**5,837,752**

Proposed case system	Capacity kW	Energy delivered MWh	End-use energy rate $/MWh	Fuel cost $
Power	8,104	66,525	89.17	5,931,937
Heating	6,513	51,484	0.00	0
Cooling	13,183	76,233	0.00	0
Fuel cost - proposed case				**5,931,937**

Financial parameters

General		
Fuel cost escalation rate	%	2.0%
Inflation rate	%	2.0%
Discount rate	%	10.0%
Project life	yr	25
Finance		
Incentives and grants	$	
Debt ratio	%	70.0%
Debt	$	6,369,225
Equity	$	2,729,668
Debt interest rate	%	5.00%
Debt term	yr	15
Debt payments	$/yr	**613,626**

Income tax analysis

Annual income

Customer premium income (rebate)

Electricity export income

Clean Energy (CE) production income

GHG reduction income

Net GHG reduction	tCO2/yr	9,061
Net GHG reduction - 25 yrs	tCO2	226,514

Project costs and savings/income summary

Initial costs			
Feasibility study	0.1%	$	13,000
Development	0.7%	$	65,000
Engineering	4.7%	$	425,000
Power system	25.3%	$	2,300,000
Heating system	5.2%	$	475,000
Cooling system	31.6%	$	2,874,630
Balance of system & misc.	32.4%	$	2,946,263
Total initial costs	100.0%	**$**	**9,098,892**
Annual costs and debt payments			
O&M		$	94,023
Fuel cost - proposed case		$	5,931,937
Debt payments - 15 yrs		$	613,626
Total annual costs		**$**	**6,639,586**
Periodic costs (credits)			
Overhaul - 7 yrs		$	460,000
Annual savings and income			
Fuel cost - base case		$	5,837,752
Total annual savings and income		**$**	**5,837,752**

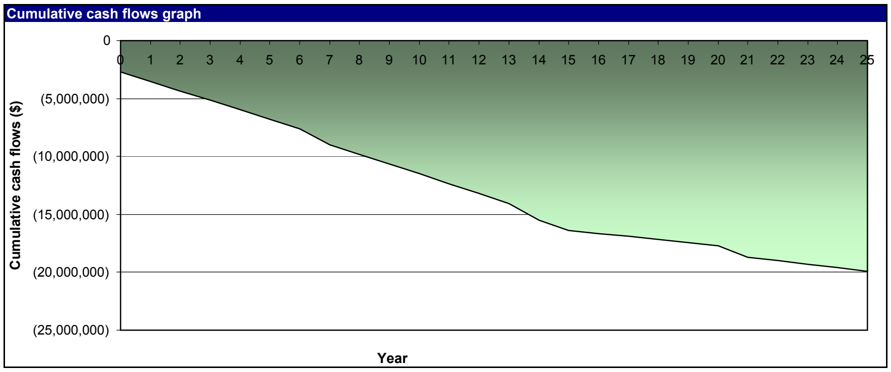
Financial viability

Pre-tax IRR - equity	%	negative
Pre-tax IRR - assets	%	negative
After-tax IRR - equity	%	negative
After-tax IRR - assets	%	negative
Simple payback	yr	(48.3)
Equity payback	yr	> project
Net Present Value (NPV)	$	(9,958,446)
Annual life cycle savings	$/yr	(1,097,103)
Benefit-Cost (B-C) ratio	-	(2.65)
Debt service coverage	-	(1.39)
GHG reduction cost	$/tCO2	121

Yearly cash flows

Year #	Pre-tax $	After-tax $	Cumulative $
0	(2,729,668)	(2,729,668)	(2,729,668)
1	(805,598)	(805,598)	(3,535,266)
2	(809,438)	(809,438)	(4,344,703)
3	(813,354)	(813,354)	(5,158,057)
4	(817,348)	(817,348)	(5,975,406)
5	(821,423)	(821,423)	(6,796,829)
6	(825,579)	(825,579)	(7,622,407)
7	(1,358,213)	(1,358,213)	(8,980,621)
8	(834,142)	(834,142)	(9,814,762)
9	(838,552)	(838,552)	(10,653,314)
10	(843,051)	(843,051)	(11,496,365)
11	(847,639)	(847,639)	(12,344,004)
12	(852,319)	(852,319)	(13,196,323)
13	(857,093)	(857,093)	(14,053,416)
14	(1,468,923)	(1,468,923)	(15,522,339)
15	(866,929)	(866,929)	(16,389,268)
16	(258,370)	(258,370)	(16,647,638)
17	(263,537)	(263,537)	(16,911,175)
18	(268,808)	(268,808)	(17,179,983)
19	(274,184)	(274,184)	(17,454,167)
20	(279,668)	(279,668)	(17,733,834)
21	(982,467)	(982,467)	(18,716,302)
22	(290,966)	(290,966)	(19,007,268)
23	(296,786)	(296,786)	(19,304,054)
24	(302,721)	(302,721)	(19,606,775)
25	(308,776)	(308,776)	(19,915,550)

Cumulative cash flows graph



RETScreen Sensitivity and Risk Analysis - Combined cooling, heating & power project

Sensitivity analysis for After-tax IRR - equity

Perform analysis on	After-tax IRR - equity	
Sensitivity range	20%	
Threshold	12	%

		Initial costs				$
Fuel cost - base case		7,279,114	8,189,003	**9,098,892**	10,008,782	10,918,671
$		-20%	-10%	0%	10%	20%
4,670,201	-20%	negative	negative	negative	negative	negative
5,253,977	-10%	negative	negative	negative	negative	negative
5,837,752	0%	negative	negative	**negative**	negative	negative
6,421,527	10%	2.0%	0.4%	-0.9%	-2.1%	-3.1%
7,005,302	20%	25.9%	21.4%	17.9%	15.1%	12.9%

		Initial costs				$
Fuel cost - proposed case		7,279,114	8,189,003	**9,098,892**	10,008,782	10,918,671
$		-20%	-10%	0%	10%	20%
4,745,549	-20%	26.8%	22.1%	18.5%	15.7%	13.4%
5,338,743	-10%	2.4%	0.8%	-0.6%	-1.7%	-2.8%
5,931,937	0%	negative	negative	**negative**	negative	negative
6,525,130	10%	negative	negative	negative	negative	negative
7,118,324	20%	negative	negative	negative	negative	negative

		Initial costs				$
Debt interest rate		7,279,114	8,189,003	**9,098,892**	10,008,782	10,918,671
%		-20%	-10%	0%	10%	20%
4.00%	-20%	negative	negative	negative	negative	negative
4.50%	-10%	negative	negative	negative	negative	negative
5.00%	0%	negative	negative	**negative**	negative	negative
5.50%	10%	negative	negative	negative	negative	negative
6.00%	20%	negative	negative	negative	negative	negative

RETScreen Energy Model - Combined cooling, heating & power project

See Online Manual

Settings

Language - Langue	English - Anglais
Currency	$
Project name	Fort Lauderdale-Hollywood International Airport
Project location	Broward County, Florida
Proposed project	Combined cooling, heating & power

Complete Load & Network sheet

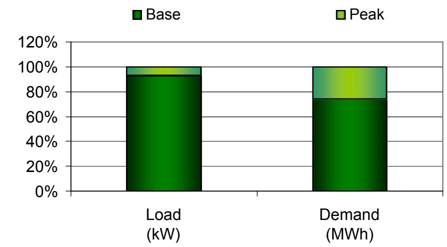
Online manual - English

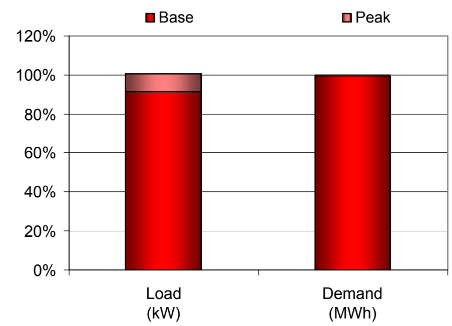
- Metric units
- Imperial units (selected)
- Higher heating value (HHV) (selected)
- Lower heating value (LHV)

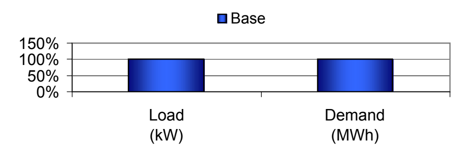
Proposed case system characteristics

Proposed case system characteristics	Unit	Estimate	%
Power			
Base load power system			
Type		Gas turbine	
Operating strategy		Heating load following	
Capacity	kW	7,520	92.8%
Electricity delivered to load	MWh	47,834	73.7%
Electricity exported to grid	MWh	76	
Peak load power system			
Type		Grid electricity	
Suggested capacity	kW	584	
Capacity	kW	584	7.2%
Electricity delivered to load	MWh	17,057	26.3%
Back-up power system (optional)			
Type			
Capacity	kW	0	
Heating			
Base load heating system			
Type		Gas turbine	
Capacity	million Btu/h	30.2	90.9%
Heating delivered	million Btu	192,250	99.8%
Intermediate load heating system			
Type		Not required	
Peak load heating system			
Type		Boiler	
Fuel type		Natural gas - mmBtu	
Fuel rate	$/mmBtu	8.570	
Suggested capacity	million Btu/h	3.0	
Capacity	million Btu/h	3.2	9.6%
Heating delivered	million Btu	430	0.2%
Manufacturer			*See PDB*
Model			
Seasonal efficiency	%	82%	
Back-up heating system (optional)			
Type			
Capacity	kW	0.0	
Cooling			
Base load cooling system			
Type		Absorption	
Fuel source		Heating system	
Capacity	RT	3,733.4	100.0%
Cooling delivered	RTh	21,676,569	100.0%
Back-up cooling system (optional)			
Type			
Capacity	kW	0	

System design graph







Proposed case system summary

Proposed case system summary	Fuel type	Fuel consumption - unit	Fuel consumption	Capacity (kW)	Energy delivered (MWh)	Clean Energy production credit?
Power						
Base load	Natural gas	mmBtu	483,894	7,520	47,834	☐
Peak load	Electricity	MWh	17,057	584	17,057	☐
Electricity exported to grid					76	☐
			Total	**8,104**	**64,967**	
Heating						
Base load	Recovered heat			8,844	56,343	☐
Peak load	Natural gas	mmBtu	525	938	126	☐
			Total	**9,781**	**56,469**	
Cooling						
Base load	Heating system			13,130	76,233	☐
			Total	**13,130**	**76,233**	

Complete Cost Analysis sheet

RETScreen Load & Network Design - Combined cooling, heating & power project

Heating project	Unit	Estimate		Notes/Range
Site conditions		**Estimate**		**Notes/Range**
Nearest location for weather data		Fort Lauderdale Hollywood		*See Weather Database*
Heating design temperature	°C	10.6	51.1 °F	-40 to 15 °C
Annual heating degree-days below 18°C	°C-d	0	0 °F-d	*Complete Monthly inputs*
Domestic hot water heating base demand	%	10%		0% to 25%
Equivalent degree-days for DHW heating	°C-d/d	0.0		0 to 10 °C-d/d
Equivalent full load hours	h	143		

Monthly inputs

Month	°C-d <18°C	°F-d <65°F	Month	°C-d <18°C	°F-d <65°F	Month	°C-d <18°C	°F-d <65°F
January	0	0	May	0	0	September	0	0
February	0	0	June	0	0	October	0	0
March	0	0	July	0	0	November	0	0
April	0	0	August	0	0	December	0	0

See Weather Database

Base case heating system	Single building - space heating	
Heated floor area for building	ft²	1,280,000
Fuel type		Electricity
Seasonal efficiency	%	100%
Heating load calculation		
Heating load for building	Btu/ft²	0.0
Total heating demand	million Btu	**0**
Total peak heating load	million Btu/h	**0.0**
Fuel consumption - annual	MWh	0
Fuel rate	$/kWh	0.000
Fuel cost		$ -
Proposed case energy efficiency measures		
End-use energy efficiency measures	%	0%
Net peak heating load	million Btu/h	0.0
Net heating demand	million Btu	0

RETScreen Load & Network Design - Combined cooling, heating & power project

Cooling project	Unit			
Site conditions		**Estimate**		**Notes/Range**
Nearest location for weather data		Fort Lauderdale Hollywood		*See Weather Database*
Cooling design temperature	°C	32.7	90.9 °F	10 to 47 °C
Annual cooling degree-days above 10°C	°C-d	5,445	9,802 °F-d	*Complete Monthly inputs*
Non-weather dependant cooling	%	0%		5% to 30%
Equivalent full load hours	h	5,806		

Monthly inputs

Month	°C-d >10°C	°F-d >50°F	Month	°C-d >10°C	°F-d >50°F	Month	°C-d >10°C	°F-d >50°F	
January	313	564	May	508	915	September	540	972	*See Weather Database*
February	314	564	June	534	961	October	505	910	
March	381	686	July	580	1,043	November	417	751	
April	423	761	August	577	1,038	December	353	636	

Base case cooling system	Single building - space cooling	
Cooled floor area for building	ft²	1,280,000
Fuel type		Electricity
Seasonal efficiency	%	412%
Cooling load calculation		
Cooling load for building	Btu/ft²	35.0
Total cooling demand	RTh	**21,676,569**
Total peak cooling load	RT	**3,733.3**
Fuel consumption - annual	MWh	18,505
Fuel rate	$/kWh	0.070
Fuel cost		$ 1,295,383
Proposed case energy efficiency measures		
End-use energy efficiency measures	%	0%
Net peak cooling load	RT	3,733.3
Net cooling demand	RTh	21,676,569

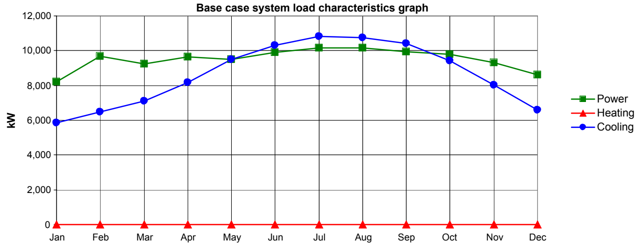
RETScreen Load & Network Design - Combined cooling, heating & power project

Power project	Unit	
Base case power system		
Grid type		Central-grid

Base case load characteristics

Month		Power gross average load kW	Power net average load kW	Cooling average load kW	Heating average load kW
January		8,198	6,780	5,842	0
February		9,677	8,104	6,478	0
March		9,226	7,499	7,114	0
April		9,658	7,678	8,155	0
May		9,509	7,207	9,486	0
June		9,895	7,396	10,295	0
July		10,174	7,549	10,816	0
August		10,151	7,539	10,758	0
September		9,928	7,400	10,411	0
October		9,784	7,495	9,428	0
November		9,323	7,372	8,040	0
December		8,630	7,030	6,594	0
System peak electricity load over max monthly average		0.0%			
Peak load - annual		10,174	8,104	13,130	0
Electricity demand	MWh	83,396	64,891		
Electricity rate - base case	$/kWh	0.070	0.070		
Total electricity cost		$ 5,837,752	$ 4,542,368		

Base case system load characteristics graph



Proposed case energy efficiency measures

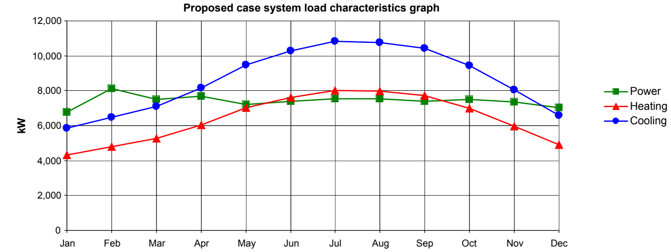
End-use energy efficiency measures	%	0%
Net peak electricity load	kW	8,104
Net electricity demand	MWh	64,891

Complete Equipment Selection sheet

Proposed case load characteristics

Month	Power net average load kW	Power for cooling kW	Power system load kW	Cooling system load kW	Heating net average load kW	Heat for cooling kW	Heating system load kW
January	6,780	0	6,780	5,842	0	4,327	4,327
February	8,104	0	8,104	6,478	0	4,799	4,799
March	7,499	0	7,499	7,114	0	5,270	5,270
April	7,678	0	7,678	8,155	0	6,041	6,041
May	7,207	0	7,207	9,486	0	7,026	7,026
June	7,396	0	7,396	10,295	0	7,626	7,626
July	7,549	0	7,549	10,816	0	8,012	8,012
August	7,539	0	7,539	10,758	0	7,969	7,969
September	7,400	0	7,400	10,411	0	7,712	7,712
October	7,495	0	7,495	9,428	0	6,984	6,984
November	7,372	0	7,372	8,040	0	5,955	5,955
December	7,030	0	7,030	6,594	0	4,884	4,884
Peak load - annual	8,104	0	**8,104**	**13,130**	0	9,726	**9,726**

Proposed case system load characteristics graph



Proposed case load and demand		Power		Heating		Cooling
System peak load	kW	8,104	million Btu/h	33.2	RT	3,733.3
System energy demand	MWh	64,891	million Btu	192,681	RTh	21,676,569

Complete Equipment Selection sheet

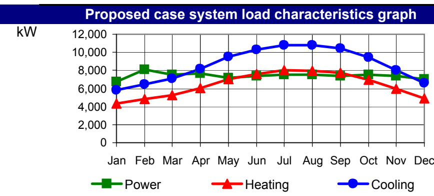
RETScreen Equipment Selection - Combined cooling, heating & power project

Show alternative units

Proposed case cooling system

Base load cooling system				
Type		Absorption		
Fuel source		Heating system		
Capacity	RT	3,733.4	100.0%	See product database
Seasonal efficiency	%	135%		
Manufacturer		Mitsubishi Electric		
Model		MDUE-2500H		1 unit(s)
Cooling delivered	RTh	21,676,569	100.0%	
Peak load cooling system				
Type		Not required		

Proposed case system load characteristics graph



Proposed case power system

System selection		Base load system		
Base load power system				
Type		Gas turbine		
Availability	%		100.0%	8,760 h
Fuel selection method		Single fuel		
Fuel type		Natural gas - mmBtu		
Fuel rate	$/mmBtu	8.570		
Gas turbine				
Power capacity	kW	7,520	92.8%	See product database
Minimum capacity	%	40%		
Electricity delivered to load	MWh	47,834	73.7%	
Electricity exported to grid	MWh	76		
Manufacturer		Solar Turbines		
Model		Taurus 70		1 unit(s)
Heat rate	Btu/kWh	10,100		
Heat recovery efficiency	%	60%		
Fuel required	million Btu/h	76.0		
Heating capacity	million Btu/h	30.2	90.9%	

Operating strategy - base load power system

Fuel rate - base case heating system	$/MWh	0.00
Electricity rate - base case	$/MWh	70.00
Fuel rate - proposed case power system	$/MWh	29.24
Electricity export rate	$/MWh	70.00
Electricity rate - proposed case	$/MWh	70.00

Operating strategy	Electricity delivered to load MWh	Electricity exported to grid MWh	Remaining electricity required MWh	Heat recovered million Btu	Remaining heat required million Btu	Power system fuel million Btu	Operating profit (loss) $	Efficiency %
Full power capacity output	64,358	1,518	533	192,250	430	665,340	-1,090,696	62.7%
Power load following	64,358	0	533	191,944	736	650,012	-1,065,568	63.3%
Heating load following	**47,834**	**76**	**17,057**	**192,250**	**430**	**483,894**	**-793,250**	**73.5%**

Select operating strategy: Heating load following

Return to Energy Model sheet

RETScreen Cost Analysis - Combined cooling, heating & power project

Settings - Fort Lauderdale-Hollywood International Airport - Broward County, Florida

- [x] Pre-feasibility analysis
- [ ] Feasibility analysis
- [x] Cost reference
- [ ] Second currency

Cost reference: None

Initial costs (credits)	Unit	Quantity	Unit cost	Amount	Relative costs
Feasibility study					
Feasibility study	cost	1	$ 13,000	$ 13,000	
Sub-total:				**$ 13,000**	0.1%
Development					
Development	cost	1	$ 65,000	$ 65,000	
Sub-total:				**$ 65,000**	0.5%
Engineering					
Engineering	cost	1	$ 425,000	$ 425,000	
Sub-total:				**$ 425,000**	3.5%
Power system					
Base load - Gas turbine	kW	7,520	$ 425	$ 3,196,000	
Peak load - Grid electricity	kW	584		$ -	
Road construction	km			$ -	
Transmission line	km			$ -	
Substation	project			$ -	
Energy efficiency measures	project			$ -	
Custom	credit			$ -	
				$ -	
Sub-total:				**$ 3,196,000**	26.6%
Heating system					
Base load - Gas turbine	kW	8,843.6		$ -	
Peak load - Boiler	million Btu/h	3.2		$ -	
Energy efficiency measures	project			$ -	
HRSG	cost	1	$ 525,000	$ 525,000	
Duct Burner	cost	1	$ 242,000	$ 242,000	
Sub-total:				**$ 767,000**	6.4%
Cooling system					
Base load - Absorption	RT	3,733.4	$ 1,150	$ 4,293,410	
Energy efficiency measures	project			$ -	
	cost	1		$ -	
				$ -	
Sub-total:				**$ 4,293,410**	35.7%
Balance of system & miscellaneous					
Balance of system & miscellaneous	cost	1	$ 1,956,900	$ 1,956,900	
Contingencies	%	10.0%	$ 10,716,310	$ 1,071,631	
Interest during construction	8.00%	6 month(s)	$ 11,787,941	$ 235,759	
Sub-total:				**$ 3,264,290**	27.1%
Total initial costs				**$ 12,023,700**	100.0%

Annual costs (credits)	Unit	Quantity	Unit cost	Amount	Relative costs
O&M					
Parts & labour	project	1	$ 70,000	$ 70,000	
O&M	cost	1	$ 98,812	$ 98,812	
Contingencies	%	5.0%	$ 168,812	$ 8,441	
Sub-total:				**$ 177,253**	3.2%
Fuel					
Natural gas	mmBtu	484,419	$ 8.570	$ 4,151,467	
Electricity	MWh	17,057	$ 70.000	$ 1,193,985	
Sub-total:				**$ 5,345,452**	96.8%
Total annual costs				**$ 5,522,704**	100.0%

Periodic costs (credits)	Unit	Year	Unit cost	Amount
Overhaul	cost	7	$ 752,000	**$ 752,000**
				$ -
				$ -
End of project life				**$ -**

Go to GHG Analysis sheet

RETScreen Greenhouse Gas (GHG) Emission Reduction Analysis - Combined cooling, heating & power project

Settings - Fort Lauderdale-Hollywood International Airport - Broward County, Florida

- [x] GHG Analysis
- [ ] Potential CDM project

- (•) Simplified analysis
- ( ) Standard analysis
- ( ) Custom analysis

Base case electricity system (Baseline)

Country - region	Fuel type	GHG emission factor (excl. T&D) tCO2/MWh	T&D losses %	GHG emission factor tCO2/MWh
United States of America (USA)	All types	0.579	5.0%	0.609

- [ ] Baseline changes during project life

Base case system GHG summary (Baseline)

Fuel type	Fuel mix %	Fuel consumption MWh	GHG emission factor tCO2/MWh	GHG emission tCO2
Electricity	100.0%	83,473	0.609	50,874
Total	100.0%	83,473	0.609	50,874

Proposed case system GHG summary (Combined cooling, heating & power project)

Fuel type	Fuel mix %				Fuel consumption MWh	GHG emission factor tCO2/MWh	GHG emission tCO2
Natural gas	89.3%				141,969	0.179	25,410
Electricity	10.7%				17,057	0.609	10,396
Total	100.0%				159,026	0.225	35,806
Electricity exported to grid	MWh	76	T&D losses	1.0%	1	0.609	0
						Total	35,806

GHG emission reduction summary

	Base case GHG emission tCO2	Proposed case GHG emission tCO2	Gross annual GHG emission reduction tCO2	GHG credits transaction fee %	Net annual GHG emission reduction tCO2
Combined cooling, heating & power project	50,874	35,806	15,068	0%	**15,068**

Net annual GHG emission reduction 15,068 tCO2 is equivalent to 3,063 Cars & light trucks not used

Complete Financial Summary sheet

RETScreen Financial Summary - Combined cooling, heating & power project

Annual fuel cost summary - Fort Lauderdale-Hollywood International Airport - Broward County, Florida

Base case system	Peak load kW	Energy demand MWh	End-use energy rate $/MWh	Fuel cost $
Power	10,174	64,891	70.00	4,542,368
Heating	0	0	0.00	0
Cooling	13,130	76,233	16.99	1,295,383
Fuel cost - base case				**5,837,752**

Proposed case system	Capacity kW	Energy delivered MWh	End-use energy rate $/MWh	Fuel cost $
Power	8,104	64,967	82.21	5,340,954
Heating	9,781	56,469	0.08	4,498
Cooling	13,130	76,233	0.00	0
Fuel cost - proposed case				**5,345,452**

Yearly cash flows

Year #	Pre-tax $	After-tax $	Cumulative $
0	(3,607,110)	(3,607,110)	(3,607,110)
1	(484,083)	(484,083)	(4,091,193)
2	(477,548)	(477,548)	(4,568,741)
3	(470,881)	(470,881)	(5,039,622)
4	(464,081)	(464,081)	(5,503,703)
5	(457,145)	(457,145)	(5,960,849)
6	(450,071)	(450,071)	(6,410,919)
7	(1,306,666)	(1,306,666)	(7,717,586)
8	(435,494)	(435,494)	(8,153,080)
9	(427,987)	(427,987)	(8,581,067)
10	(420,329)	(420,329)	(9,001,396)
11	(412,518)	(412,518)	(9,413,914)
12	(404,551)	(404,551)	(9,818,465)
13	(396,425)	(396,425)	(10,214,890)
14	(1,380,384)	(1,380,384)	(11,595,274)
15	(379,681)	(379,681)	(11,974,954)
16	439,816	439,816	(11,535,138)
17	448,613	448,613	(11,086,525)
18	457,585	457,585	(10,628,940)
19	466,737	466,737	(10,162,203)
20	476,072	476,072	(9,686,132)
21	(654,188)	(654,188)	(10,340,320)
22	495,305	495,305	(9,845,015)
23	505,211	505,211	(9,339,804)
24	515,315	515,315	(8,824,489)
25	525,621	525,621	(8,298,868)

Financial parameters

General		
Fuel cost escalation rate	%	2.0%
Inflation rate	%	2.0%
Discount rate	%	10.0%
Project life	yr	25
Finance		
Incentives and grants	$	
Debt ratio	%	70.0%
Debt	$	8,416,590
Equity	$	3,607,110
Debt interest rate	%	5.00%
Debt term	yr	15
Debt payments	$/yr	**810,874**
Income tax analysis		☐

Annual income

Customer premium income (rebate)		☐
Electricity export income		
Electricity exported to grid	MWh	76
Electricity export rate	$/MWh	70.00
Electricity export income	$	**5,335**
Electricity export escalation rate	%	2.0%
Clean Energy (CE) production income		☐
GHG reduction income		☐
Net GHG reduction	tCO2/yr	15,068
Net GHG reduction - 25 yrs	tCO2	376,708

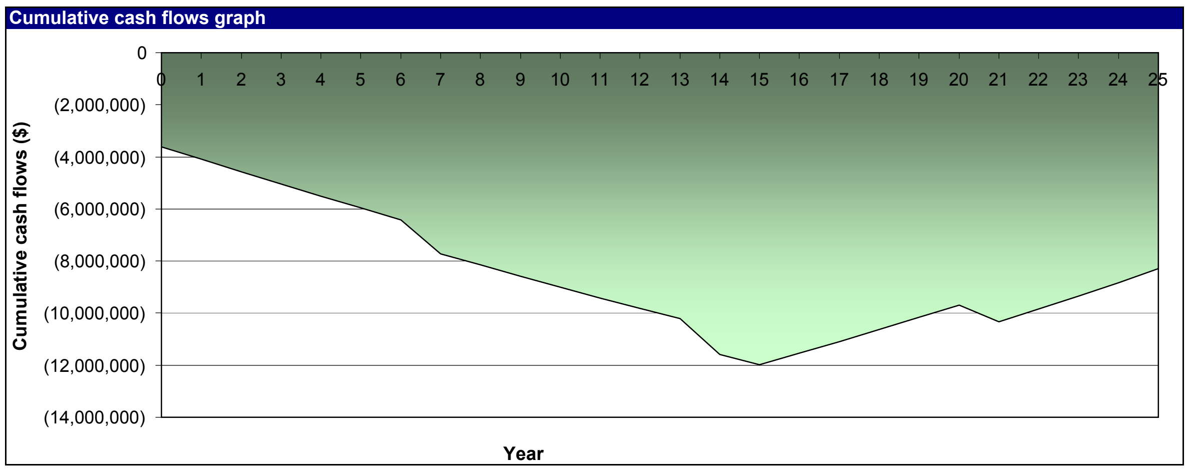
Project costs and savings/income summary

Initial costs			
Feasibility study	0.1%	$	13,000
Development	0.5%	$	65,000
Engineering	3.5%	$	425,000
Power system	26.6%	$	3,196,000
Heating system	6.4%	$	767,000
Cooling system	35.7%	$	4,293,410
Balance of system & misc.	27.1%	$	3,264,290
Total initial costs	100.0%	**$**	**12,023,700**
Annual costs and debt payments			
O&M		$	177,253
Fuel cost - proposed case		$	5,345,452
Debt payments - 15 yrs		$	810,874
Total annual costs		**$**	**6,333,578**
Periodic costs (credits)			
Overhaul - 7 yrs		$	752,000
Annual savings and income			
Fuel cost - base case		$	5,837,752
Electricity export income		$	5,335
Total annual savings and income		**$**	**5,843,087**

Financial viability

Pre-tax IRR - equity	%	-8.1%
Pre-tax IRR - assets	%	-10.1%
After-tax IRR - equity	%	-8.1%
After-tax IRR - assets	%	-10.1%
Simple payback	yr	37.5
Equity payback	yr	> project
Net Present Value (NPV)	$	(7,166,921)
Annual life cycle savings	$/yr	(789,566)
Benefit-Cost (B-C) ratio	-	(0.99)
Debt service coverage	-	(0.70)
GHG reduction cost	$/tCO2	52

Cumulative cash flows graph



RETScreen Sensitivity and Risk Analysis - Combined cooling, heating & power project

Sensitivity analysis for After-tax IRR - equity

Perform analysis on	After-tax IRR - equity	
Sensitivity range	20%	
Threshold	12	%

				Initial costs		$
Fuel cost - base case		9,618,960	10,821,330	**12,023,700**	13,226,070	14,428,440
$		-20%	-10%	0%	10%	20%
4,670,201	-20%	negative	negative	negative	negative	negative
5,253,977	-10%	negative	negative	negative	negative	negative
5,837,752	0%	-6.0%	-7.1%	**-8.1%**	-9.0%	-9.8%
6,421,527	10%	13.1%	10.3%	8.1%	6.4%	4.9%
7,005,302	20%	32.2%	26.8%	22.5%	19.2%	16.5%

				Initial costs		$
Fuel cost - proposed case		9,618,960	10,821,330	**12,023,700**	13,226,070	14,428,440
$		-20%	-10%	0%	10%	20%
4,276,361	-20%	28.8%	23.8%	20.0%	17.0%	14.5%
4,810,907	-10%	11.6%	9.0%	7.0%	5.3%	3.9%
5,345,452	0%	-6.0%	-7.1%	**-8.1%**	-9.0%	-9.8%
5,879,997	10%	negative	negative	negative	negative	negative
6,414,542	20%	negative	negative	negative	negative	negative

				Initial costs		$
Debt interest rate		9,618,960	10,821,330	**12,023,700**	13,226,070	14,428,440
%		-20%	-10%	0%	10%	20%
4.00%	-20%	-5.4%	-6.5%	-7.5%	-8.4%	-9.2%
4.50%	-10%	-5.7%	-6.8%	-7.8%	-8.7%	-9.5%
5.00%	0%	-6.0%	-7.1%	**-8.1%**	-9.0%	-9.8%
5.50%	10%	-6.2%	-7.4%	-8.4%	-9.3%	-10.0%
6.00%	20%	-6.5%	-7.7%	-8.7%	-9.5%	-10.3%

A.2.

HVAC Log Data

Refer to the CD titled HVAC Log Data that includes a number of sub folders that contain Excel spreadsheets of many HVAC data trends. This data is meaningful only in electronic format that allows manipulation of the large amount of data.

B.1.

Lighting Audit Data

RET.	BUILDING	FLR	ROOM DESCRIPTION	EXIST.	PROP.	ExistCode	PropCode	A/C	Hours/Yr	ExistDescription	PropDescription	ExistkWh	PropkWh
1	BCAD BLDG NORTH	1	COPY RM	1	1	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.100	0.050
2	BCAD BLDG NORTH	1	COPY RM	1	1	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.100	0.050
3	BCAD BLDG NORTH	1	POSADAS	1	1	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.086	0.050
4	BCAD BLDG NORTH	1	POSADAS	1	1	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.059	0.050
5	BCAD BLDG NORTH	1	LAGERSTEDT	3	3	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.177	0.150
6	BCAD BLDG NORTH	1	DOUGE	1	1	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.100	0.050
7	BCAD BLDG NORTH	1	DOUGE	1	1	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.059	0.050
8	BCAD BLDG NORTH	1	GAMBRILL	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
9	BCAD BLDG NORTH	1	HALL	4	4	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.400	0.200
10	BCAD BLDG NORTH	1	HALL	3	3	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.258	0.150
11	BCAD BLDG NORTH	1	PACITTO	2	2	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.200	0.100
12	BCAD BLDG NORTH	1	RESTROOMS	4	4	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.400	0.200
13	BCAD BLDG NORTH	1	PLAN STORAGE	3	3	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.300	0.150
14	BCAD BLDG NORTH	1	CLOSET	1	1	2X22T8U6	NR	Y	6,750	2-FO32T8U - ELECTRONIC	NO RETROFIT	0.059	0.000
15	BCAD BLDG NORTH	1	STORAGE	1	1	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.100	0.050
16	BCAD BLDG NORTH	1	AUDITORIUM	18	18	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	1.062	0.900
17	BCAD BLDG NORTH	1	AUDITORIUM	6	6	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.600	0.300
18	BCAD BLDG NORTH	1	GENERAL AREA	1	1	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.100	0.050
19	BCAD BLDG NORTH	1	GENERAL AREA	12	12	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.708	0.600
20	BCAD BLDG NORTH	1	WELCH	2	2	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.200	0.100
21	BCAD BLDG NORTH	1	STORAGE	4	4	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.400	0.200
22	BCAD BLDG NORTH	1	FILE RM	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
23	BCAD BLDG NORTH	1	FIRE PANEL	1	1	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.100	0.050
24	BCAD BLDG NORTH	1	HALL	1	1	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.100	0.050
25	BCAD BLDG NORTH	1	IDF	1	1	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.100	0.050
26	BCAD BLDG NORTH	1	BREAK RM	3	3	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.300	0.150
27	BCAD BLDG NORTH	1	OPEN AREA	6	6	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.354	0.300
28	BCAD BLDG NORTH	1	OFFICE	3	3	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.300	0.150
29	BCAD BLDG NORTH	1	GREGORY	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
30	BCAD BLDG NORTH	1	OPEN AREA	13	13	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.767	0.650
31	BCAD BLDG NORTH	1	CONFERENCE #9	4	4	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.400	0.200
32	BCAD BLDG NORTH	1	OPEN AREA	16	16	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.944	0.800
33	BCAD BLDG NORTH	1	OPEN AREA	1	1	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.100	0.050
34	BCAD BLDG NORTH	1	BOWMAN	1	1	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.059	0.050
35	BCAD BLDG NORTH	1	BOWMAN	1	1	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.086	0.050
36	BCAD BLDG NORTH	1	OFFICE	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
37	BCAD BLDG SOUTH	1	HALL	14	14	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.826	0.700
38	BCAD BLDG SOUTH	1	OFFICE	1	1	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.059	0.050
39	BCAD BLDG SOUTH	1	SAME	3	3	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.300	0.150
40	BCAD BLDG SOUTH	1	WEBSTER	2	2	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.200	0.100
41	BCAD BLDG SOUTH	1	KITCHEN	3	3	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.258	0.150
42	BCAD BLDG SOUTH	1	KITCHEN	1	1	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.100	0.050
43	BCAD BLDG SOUTH	1	HERNANDEZ	2	2	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.200	0.100
44	BCAD BLDG SOUTH	1	NEXT OFFICE	1	1	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.100	0.050
45	BCAD BLDG SOUTH	1	CONFERENCE	2	2	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.200	0.100
46	BCAD BLDG SOUTH	1	CONFERENCE	4	4	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.236	0.200
47	BCAD BLDG SOUTH	1	PAULSON	3	3	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.177	0.150
48	BCAD BLDG SOUTH	1	KREIN	1	1	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.059	0.050

RET.	BUILDING	FLR	ROOM DESCRIPTION	EXIST.	PROP.	ExistCode	PropCode	A/C	Hours/Yr	ExistDescription	PropDescription	ExistkWh	PropkWh
49	BCAD BLDG SOUTH	1	GILLOCK	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
50	BCAD BLDG SOUTH	1	SOLINGER	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
51	BCAD BLDG SOUTH	1	GENERAL AREA	4	4	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.236	0.200
52	BCAD BLDG SOUTH	1	WORK AREA	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
53	BCAD BLDG SOUTH	1	CONFERENCE #3	2	2	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.200	0.100
54	BCAD BLDG SOUTH	1	CONFERENCE #3	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
55	BCAD BLDG SOUTH	1	HALL	27	27	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	1.593	1.350
56	BCAD BLDG SOUTH	1	GENERAL AREA	6	6	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.354	0.300
57	BCAD BLDG SOUTH	1	IDF	1	1	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.059	0.050
58	BCAD BLDG SOUTH	1	ERBAN	1	1	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.059	0.050
59	BCAD BLDG SOUTH	1	O'HARA	2	2	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.172	0.100
60	BCAD BLDG SOUTH	1	NONNEMACHER	3	3	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.258	0.150
61	BCAD BLDG SOUTH	1	GENERAL AREA	4	4	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.236	0.200
62	BCAD BLDG SOUTH	1	DOS SANTOS	2	2	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.172	0.100
63	BCAD BLDG SOUTH	1	POKRYEKE	2	2	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.172	0.100
64	BCAD BLDG SOUTH	1	GENERAL AREA	7	7	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.413	0.350
65	BCAD BLDG SOUTH	1	BREAK RM	1	1	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.100	0.050
66	BCAD BLDG SOUTH	1	BREAK RM	1	1	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.086	0.050
67	BCAD BLDG SOUTH	1	CONFERENCE #4	2	2	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.200	0.100
68	BCAD BLDG SOUTH	1	CONFERENCE #4	2	2	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.172	0.100
69	BCAD BLDG SOUTH	1	CONFERENCE #4	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
70	BCAD BLDG SOUTH	1	RESTROOMS	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
71	BCAD BLDG SOUTH	1	RESTROOMS	2	2	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.200	0.100
72	BCAD BLDG SOUTH	1	OPEN AREA	4	4	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.236	0.200
73	BCAD BLDG SOUTH	1	HALL	4	4	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.236	0.200
74	BCAD BLDG SOUTH	1	JANITOR	1	1	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.059	0.050
75	BCAD BLDG SOUTH	1	STORAGE	1	1	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.059	0.050
76	BCAD BLDG SOUTH	1	HALL	3	3	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.177	0.150
77	BCAD BLDG SOUTH	1	WALSH	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
78	BCAD BLDG SOUTH	1	GOVIN	3	3	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.177	0.150
79	BCAD BLDG SOUTH	1	LEE	3	3	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.177	0.150
80	BCAD BLDG SOUTH	1	CONFERENCE #5	4	4	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.236	0.200
81	BCAD BLDG SOUTH	1	CONFERENCE #5	4	4	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.400	0.200
82	BCAD BLDG SOUTH	1	RECEPTION	5	5	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.295	0.250
83	BCAD BLDG SOUTH	1	MAILROOM	1	1	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.059	0.050
84	BCAD BLDG SOUTH	1	RESTROOMS	4	4	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.236	0.200
85	BCAD BLDG SOUTH	1	HALL	15	15	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.885	0.750
86	BCAD BLDG SOUTH	1	TRAINING RM	2	2	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.200	0.100
87	BCAD BLDG SOUTH	1	TRAINING RM	3	3	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.258	0.150
88	BCAD BLDG SOUTH	1	TRAINING RM	4	4	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.236	0.200
89	BCAD BLDG SOUTH	1	BREAK RM	1	1	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.100	0.050
90	BCAD BLDG SOUTH	1	BREAK RM	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
91	BCAD BLDG SOUTH	1	CLOSET	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
92	BCAD BLDG SOUTH	1	LIBRARY	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
93	BCAD BLDG SOUTH	1	FILE ROOM	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
94	BCAD BLDG SOUTH	1	STORAGE	1	1	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.059	0.050
95	BCAD BLDG SOUTH	1	OFFICE	3	3	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.177	0.150
96	BCAD BLDG SOUTH	1	PIMERO	3	3	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.177	0.150

RET.	BUILDING	FLR	ROOM DESCRIPTION	EXIST.	PROP.	ExistCode	PropCode	A/C	Hours/Yr	ExistDescription	PropDescription	ExistkWh	PropkWh
97	BCAD BLDG SOUTH	1	PANEL RM	1	1	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.100	0.050
98	BCAD BLDG SOUTH	1	ELEC RM	3	3	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.300	0.150
99	BCAD BLDG SOUTH	1	MDF	2	2	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.200	0.100
100	BCAD BLDG SOUTH	1	LAB	1	1	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.086	0.050
101	BCAD BLDG SOUTH	1	LAB	1	1	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.059	0.050
102	BCAD BLDG SOUTH	1	CONFRENCE #6	2	2	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.200	0.100
103	BCAD BLDG SOUTH	1	CONFRENCE #6	2	2	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.172	0.100
104	BCAD BLDG SOUTH	1	CONFRENCE #6	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
105	BCAD BLDG SOUTH	1	CLOSET	1	1	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.059	0.050
106	BCAD BLDG SOUTH	1	GENERAL AREA	3	3	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.258	0.150
107	BCAD BLDG SOUTH	1	GENERAL AREA	12	12	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.708	0.600
108	BCAD BLDG SOUTH	1	GREENBERG	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
109	BCAD BLDG SOUTH	1	HALL	11	11	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.649	0.550
110	BCAD BLDG SOUTH	1	ODESS	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
111	BCAD BLDG SOUTH	1	HOWLETT	3	3	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.258	0.150
112	BCAD BLDG SOUTH	1	SMITH	2	2	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.172	0.100
113	BCAD BLDG SOUTH	1	EQUIP RM	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
114	BCAD BLDG SOUTH	1	NETWORK	2	2	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.172	0.100
115	BCAD BLDG SOUTH	1	GENERAL AREA	12	12	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.708	0.600
116	BCAD BLDG SOUTH	1	SUPPLY RM	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
117	BCAD BLDG SOUTH	1	AUDIT FILE RM	1	1	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.059	0.050
118	BCAD BLDG SOUTH	1	BURNS	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
119	BCAD BLDG SOUTH	1	PENCE	3	3	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.258	0.150
120	BCAD BLDG SOUTH	1	PENCE	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
121	BCAD BLDG SOUTH	1	COMPUTER RM	2	2	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.200	0.100
122	BCAD BLDG SOUTH	1	COMPUTER RM	3	3	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.258	0.150
123	BCAD BLDG SOUTH	1	COMPUTER RM	5	5	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.295	0.250
124	BCAD BLDG SOUTH	1	FILE RM	2	2	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.172	0.100
125	BCAD BLDG SOUTH	1	CONFERENCE #8	2	2	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.200	0.100
126	BCAD BLDG SOUTH	1	CONFERENCE #8	4	4	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.344	0.200
127	BCAD BLDG SOUTH	1	LIBRARY	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
128	BCAD BLDG SOUTH	1	LIBRARY	3	3	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.258	0.150
129	BCAD BLDG SOUTH	1	IDF	1	1	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.059	0.050
130	BCAD BLDG SOUTH	1	GEN'L FILING	3	3	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.177	0.150
131	BCAD BLDG SOUTH	1	CLOSET	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
132	BCAD BLDG SOUTH	1	OPEN AREA	22	22	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	1.298	1.100
133	BCAD BLDG SOUTH	1	ENRIQUEZ	2	2	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.172	0.100
134	BCAD BLDG SOUTH	1	SCHUSTER	2	2	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.172	0.100
135	BCAD BLDG SOUTH	1	LEE	3	3	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.258	0.150
136	BCAD BLDG SOUTH	1	MALINOWSKI	2	2	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.172	0.100
137	BCAD BLDG SOUTH	1	STORAGE	1	1	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.059	0.050
138	BCAD BLDG SOUTH	1	RESTROOMS	2	2	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.200	0.100
139	BCAD BLDG SOUTH	1	RESTROOMS	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
140	BCAD BLDG SOUTH	1	SAMAR	2	2	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.172	0.100
141	BCAD BLDG SOUTH	1	DAVIDSON	2	2	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.172	0.100
142	BCAD BLDG SOUTH	1	OTTO	2	2	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.172	0.100
143	BCAD BLDG SOUTH	1	OPEN AREA	33	33	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	1.947	1.650
144	BCAD BLDG SOUTH	1	STORAGE	1	1	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.059	0.050

RET.	BUILDING	FLR	ROOM DESCRIPTION	EXIST.	PROP.	ExistCode	PropCode	A/C	Hours/Yr	ExistDescription	PropDescription	ExistkWh	PropkWh
145	BCAD BLDG SOUTH	1	SPENNACCHIO	2	2	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.172	0.100
146	BCAD BLDG SOUTH	1	MASCARELL	2	2	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.172	0.100
147	BCAD BLDG SOUTH	1	NELSON	3	3	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.258	0.150
148	BCAD BLDG SOUTH	1	CONFERENCE #7	4	4	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.344	0.200
149	BCAD BLDG SOUTH	1	CONFERENCE #7	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
150	BCAD BLDG SOUTH	1	OPEN AREA	8	8	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.472	0.400
151	BCAD BLDG SOUTH	1	LAX	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
152	BCAD BLDG SOUTH	1	STORAGE	1	1	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.086	0.050
153	BCAD BLDG SOUTH	1	STACHURSKI	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
154	BCAD BLDG SOUTH	1	RESTROOMS	2	2	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.200	0.100
155	BCAD BLDG SOUTH	1	RESTROOMS	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
156	BCAD BLDG SOUTH	1	OPEN AREA	15	15	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.885	0.750
157	BCAD BLDG SOUTH	1	STORAGE	2	2	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.118	0.100
158	BCAD BLDG SOUTH	1	MEYER	3	3	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.258	0.150
159	BCAD BLDG SOUTH	1	CLOSET	1	1	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.059	0.050
160	BCAD BLDG SOUTH	1	IDF	1	1	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.100	0.050
161	BCAD BLDG SOUTH	1	FILE RM	2	2	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.200	0.100
162	BCAD BLDG SOUTH	1	PERSONNEL	1	1	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.086	0.050
163	BCAD BLDG SOUTH	1	CONFERENCE EXEC	2	2	2X44T8	2X42T28R	Y	6,750	4 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.200	0.100
164	BCAD BLDG SOUTH	1	CONFERENCE EXEC	4	4	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.344	0.200
165	BCAD BLDG SOUTH	1	HOUGHTON	3	3	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.258	0.150
166	BCAD BLDG SOUTH	1	BIELEK	4	4	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.344	0.200
167	BCAD BLDG SOUTH	1	JARGIELLO	4	4	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.344	0.200
168	BCAD BLDG SOUTH	1	OPEN AREA	14	14	2X42T8	2X42T28	Y	6,750	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.826	0.700
169	BCAD BLDG SOUTH	1	EXTERIOR	42	42	MH-100	42CFN	N	4,380	100 WATT METAL HALIDE/BALLAST	42WATT COMPACT FLUORESCENT NEW FIXTURE	5.670	1.890
170	CYRESS RCC	ALL	PARKING AREAS FIXT A	621	621	MH-400	NV-1X84T28	N	8,760	400 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	285.660	54.027
171	CYRESS RCC	ALL	PARKING AREAS FIXT B	4574	4574	MH-150	NV-1X42T28	N	8,760	150 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	891.930	228.700
172	CYRESS RCC	ALL	WALL-MOUNT FIXT V	12	12	MH-400	NR	N	8,760	400 WATT METAL HALIDE/BALLAST	NO RETROFIT	5.520	0.000
173	CYRESS RCC	ALL	WALL-MOUNT FIXT U	22	22	MH-150	NR	N	8,760	150 WATT METAL HALIDE/BALLAST	NO RETROFIT	4.290	0.000
174	CYRESS RCC	ALL	STAIRWELLS FIXT H	212	212	1X42T8	1X42T28	N	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	12.508	10.600
175	CYRESS RCC	9	POLE LIGHTS	180	180	MH-250	NR	N	4,380	250 WATT METAL HALIDE/BALLAST	NO RETROFIT	54.000	0.000
176	CYRESS RCC	ALL	MECHANICAL RMS	115	115	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	6.785	5.750
177	CYRESS RCC	ALL	MECHANICAL RMS	12	12	2X43T8	2X43T28	Y	8,760	3 -F032T8-ELECTRONIC	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	1.032	0.888
178	FACILITIES BLDG	1	OFFICES ETC	100	100	2X43T8	2X43T28	Y	6,750	3 -F032T8-ELECTRONIC	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	8.600	7.400
179	FACILITIES BLDG	1	OFFICES ETC	57	57	MH-400	NV-1X84T28	Y	6,750	400 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	26.220	4.959
180	HIBISCUS GARAGE	1A	A1 - K2	20	20	HPS-400	NV-1X84T28	N	8,760	400 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	9.300	1.740
181	HIBISCUS GARAGE	1A	A1 - K2	72	72	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	14.400	6.264
182	HIBISCUS GARAGE	1A	A2 - K3	64	64	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	12.800	5.568
183	HIBISCUS GARAGE	1A	G2 - H3	16	16	2X43T8	2X43T28	N	8,760	3 -F032T8-ELECTRONIC	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	1.376	1.184
184	HIBISCUS GARAGE	1A	A3 - K4	44	44	1X42T8	1X42T28	N	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.596	2.200
185	HIBISCUS GARAGE	1A	A3 - K4	16	16	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	3.200	1.392
186	HIBISCUS GARAGE	1A	A4 -K5	72	72	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	14.400	6.264
187	HIBISCUS GARAGE	1A	A5 - K6	72	72	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	14.400	6.264
188	HIBISCUS GARAGE	1A	A6 - K7	70	70	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	14.000	6.090
189	HIBISCUS GARAGE	1A	A7 - K8	70	70	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	14.000	6.090
190	HIBISCUS GARAGE	1A	A3 - K4	32	32	MH-250	MH-100PS	N	4,380	250 WATT METAL HALIDE/BALLAST	100 WATT PULSE START METAL HALIDE LAMP AND BALLAST	9.600	4.128
191	HIBISCUS GARAGE	1B	A8 - A9	70	70	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	14.000	6.090
192	HIBISCUS GARAGE	1B	A9 - K10	70	70	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	14.000	6.090

RET.	BUILDING	FLR	ROOM DESCRIPTION	EXIST.	PROP.	ExistCode	PropCode	A/C	Hours/Yr	ExistDescription	PropDescription	ExistkWh	PropkWh
193	HIBISCUS GARAGE	1B	A10 - K11	68	68	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	13.600	5.916
194	HIBISCUS GARAGE	1B	A10 - B12	12	12	HPS-400	NV-1X84T28	N	8,760	400 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	5.580	1.044
195	HIBISCUS GARAGE	1B	A10 - B12	20	20	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	4.000	1.740
196	HIBISCUS GARAGE	1B	A11 - K12	68	68	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	13.600	5.916
197	HIBISCUS GARAGE	1B	A12 - K13	24	24	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	4.800	2.088
198	HIBISCUS GARAGE	1B	A12 - K13	44	44	1X42T8	1X42T28	N	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.596	2.200
199	HIBISCUS GARAGE	1B	A12 - K13	32	32	MH-250	MH-100PS	N	4,380	250 WATT METAL HALIDE/BALLAST	100 WATT PULSE START METAL HALIDE LAMP AND BALLAST	9.600	4.128
200	HIBISCUS GARAGE	1B	A13 - K14	58	58	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	11.600	5.046
201	HIBISCUS GARAGE	1B	A13 - K14	16	16	HPS-400	NV-1X84T28	N	8,760	400 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	7.440	1.392
202	HIBISCUS GARAGE	1B	A13 - K14	12	12	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.400	0.600
203	HIBISCUS GARAGE	1B	A14 - K15	24	24	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	4.800	2.088
204	HIBISCUS GARAGE	1B	A14 - K15	12	12	HPS-400	NV-1X84T28	N	8,760	400 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	5.580	1.044
205	HIBISCUS GARAGE	1B	A14 - K15	12	12	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.400	0.600
206	HIBISCUS GARAGE	1B	A14 - K15	6	6	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	1.200	0.522
207	HIBISCUS GARAGE	2A	A1 - K2	50	50	MH-200	NV-1X84T28	N	8,760	200 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	13.500	4.350
208	HIBISCUS GARAGE	2A	A1 - K2	8	8	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	1.600	0.696
209	HIBISCUS GARAGE	2A	A1 - K2	6	6	MH-200	NV-1X84T28	N	8,760	200 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	1.620	0.522
210	HIBISCUS GARAGE	2A	A2 - K3	54	54	MH-200	NV-1X84T28	N	8,760	200 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	14.580	4.698
211	HIBISCUS GARAGE	2A	A3 - K4	44	44	1X42T8	1X42T28	N	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.596	2.200
212	HIBISCUS GARAGE	2A	A3 - K4	22	22	MH-200	NV-1X84T28	N	8,760	200 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	5.940	1.914
213	HIBISCUS GARAGE	2A	A4 - K5	54	54	MH-200	NV-1X84T28	N	8,760	200 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	14.580	4.698
214	HIBISCUS GARAGE	2A	A5 - K6	54	54	MH-200	NV-1X84T28	N	8,760	200 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	14.580	4.698
215	HIBISCUS GARAGE	2A	A6 - K7	52	52	MH-200	NV-1X84T28	N	8,760	200 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	14.040	4.524
216	HIBISCUS GARAGE	2A	A7 - K8	52	52	MH-200	NV-1X84T28	N	8,760	200 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	14.040	4.524
217	HIBISCUS GARAGE	2A	ALL FLOORS	20	20	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	4.000	1.740
218	HIBISCUS GARAGE	2A	A8 - K9	52	52	MH-200	NV-1X84T28	N	8,760	200 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	14.040	4.524
219	HIBISCUS GARAGE	2B	A8 - K9	52	52	MH-200	NV-1X84T28	N	8,760	200 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	14.040	4.524
220	HIBISCUS GARAGE	2B	ALL FLOORS	20	20	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	4.000	1.740
221	HIBISCUS GARAGE	2B	A9 - K10	52	52	MH-200	NV-1X84T28	N	8,760	200 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	14.040	4.524
222	HIBISCUS GARAGE	2B	A11 - K11	54	54	MH-200	NV-1X84T28	N	8,760	200 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	14.580	4.698
223	HIBISCUS GARAGE	2B	A11 - K12	54	54	MH-200	NV-1X84T28	N	8,760	200 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	14.580	4.698
224	HIBISCUS GARAGE	2B	A12 - K13	44	44	1X42T8	1X42T28	N	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.596	2.200
225	HIBISCUS GARAGE	2B	A12 - K13	22	22	MH-200	NV-1X84T28	N	8,760	200 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	5.940	1.914
226	HIBISCUS GARAGE	2B	A13 - K14	30	30	MH-200	NV-1X84T28	N	8,760	200 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	8.100	2.610
227	HIBISCUS GARAGE	2B	A13 - K14	16	16	MH-200	NV-1X84T28	N	8,760	200 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	4.320	1.392
228	HIBISCUS GARAGE	2B	A13 - K14	8	8	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	1.600	0.696
229	HIBISCUS GARAGE	2B	A13 - K14	12	12	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.400	0.600
230	HIBISCUS GARAGE	2B	A14 - K15	6	6	MH-200	NV-1X84T28	N	8,760	200 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	1.620	0.522
231	HIBISCUS GARAGE	2B	A14 - K15	17	17	HPS-100	NR	N	4,380	100 HIGH PRESSURE SODIUM/BALLAST	NO RETROFIT	2.295	2.295
232	HIBISCUS GARAGE	2B	A14 - K15	12	12	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.400	0.600
233	HIBISCUS GARAGE	2B	A14 - K15	8	8	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	1.600	0.400
234	HIBISCUS GARAGE	3A	A1 - K2	8	8	HPS-400	NV-1X84T28	N	8,760	400 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	3.720	0.696
235	HIBISCUS GARAGE	3A	A1 - K12	51	51	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	10.200	2.550
236	HIBISCUS GARAGE	3A	A2 - K3	58	58	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	11.600	2.900
237	HIBISCUS GARAGE	3A	A1 - K2	4	4	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	0.800	0.348
238	HIBISCUS GARAGE	3A	A3 - K4	16	16	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	3.200	0.800
239	HIBISCUS GARAGE	3A	A4 - K4	44	44	1X42T8	1X42T28	N	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.596	2.200
240	HIBISCUS GARAGE	3A	A4 - K5	58	58	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	11.600	2.900

RET.	BUILDING	FLR	ROOM DESCRIPTION	EXIST.	PROP.	ExistCode	PropCode	A/C	Hours/Yr	ExistDescription	PropDescription	ExistkWh	PropkWh
241	HIBISCUS GARAGE	3A	A5 - K6	59	59	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	11.800	2.950
242	HIBISCUS GARAGE	3A	A6 - K7	57	57	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	11.400	2.850
243	HIBISCUS GARAGE	3A	A7 - K8	58	58	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	11.600	2.900
244	HIBISCUS GARAGE	3B	A8 - K9	57	57	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	11.400	2.850
245	HIBISCUS GARAGE	3B	A9 - K10	57	57	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	11.400	2.850
246	HIBISCUS GARAGE	3B	A10 - K11	59	59	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	11.800	2.950
247	HIBISCUS GARAGE	3B	A11 - K12	59	59	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	11.800	2.950
248	HIBISCUS GARAGE	3B	A12 - K13	16	16	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	3.200	0.800
249	HIBISCUS GARAGE	3B	A12 - K13	44	44	1X42T8	1X42T28	N	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.596	2.200
250	HIBISCUS GARAGE	3B	A13 - K14	49	49	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	9.800	2.450
251	HIBISCUS GARAGE	3B	A13 - K14	12	12	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.400	0.600
252	HIBISCUS GARAGE	3B	A14 - K15	16	16	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	3.200	0.800
253	HIBISCUS GARAGE	3B	A14 - K15	12	12	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.400	0.600
254	HIBISCUS GARAGE	4,5A	A1 - A2	120	120	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	24.000	6.000
255	HIBISCUS GARAGE	4,5A	A2 - A3	116	116	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	23.200	5.800
256	HIBISCUS GARAGE	4,5A	A3 -A4	16	16	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	3.200	0.800
257	HIBISCUS GARAGE	4,5A	A3 -A4	44	44	1X42T8	1X42T28	N	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.596	2.200
258	HIBISCUS GARAGE	4,5A	A4 -A5	118	118	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	23.600	5.900
259	HIBISCUS GARAGE	4,5A	A5 -A6	118	118	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	23.600	5.900
260	HIBISCUS GARAGE	4,5A	A6 -A7	114	114	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	22.800	5.700
261	HIBISCUS GARAGE	4,5A	A7 -A8	114	114	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	22.800	5.700
262	HIBISCUS GARAGE	4,5B	A8 - A9	114	114	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	22.800	5.700
263	HIBISCUS GARAGE	4,5B	A9 - A10	114	114	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	22.800	5.700
264	HIBISCUS GARAGE	4,5B	A10 - A11	118	118	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	23.600	5.900
265	HIBISCUS GARAGE	4,5B	A11 - A12	118	118	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	23.600	5.900
266	HIBISCUS GARAGE	4,5B	A12 - A13	16	16	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	3.200	0.800
267	HIBISCUS GARAGE	4,5B	A12 - A13	44	44	1X42T8	1X42T28	N	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.596	2.200
268	HIBISCUS GARAGE	4,5B	A13 - A14	98	98	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	19.600	4.900
269	HIBISCUS GARAGE	4,5B	A13 - A14	24	24	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	4.800	1.200
270	HIBISCUS GARAGE	4,5B	A14 - A15	32	32	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	6.400	1.600
271	HIBISCUS GARAGE	4,5B	A14 - A15	24	24	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	4.800	1.200
272	HIBISCUS GARAGE	6A	A1 - K8	24	24	HPS-250	NR	N	4,380	250 HIGH PRESSURE SODIUM/BALLAST	NO RETROFIT	7.440	7.440
273	HIBISCUS GARAGE	6A	A1 - K2	54	54	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	10.800	2.700
274	HIBISCUS GARAGE	6A	A2 - K3	54	54	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	10.800	2.700
275	HIBISCUS GARAGE	6A	A3 - K4	8	8	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	1.600	0.400
276	HIBISCUS GARAGE	6A	A4 - K5	54	54	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	10.800	2.700
277	HIBISCUS GARAGE	6A	A5 - K6	54	54	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	10.800	2.700
278	HIBISCUS GARAGE	6A	A6 - K7	52	52	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	10.400	2.600
279	HIBISCUS GARAGE	6A	A7 - K8	52	52	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	10.400	2.600
280	HIBISCUS GARAGE	6B	A8 - K15	22	22	HPS-250	NR	N	4,380	250 HIGH PRESSURE SODIUM/BALLAST	NO RETROFIT	6.820	6.820
281	HIBISCUS GARAGE	6B	A8 - K9	52	52	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	10.400	2.600
282	HIBISCUS GARAGE	6B	A9 - K10	52	52	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	10.400	2.600
283	HIBISCUS GARAGE	6B	A10 - K11	54	54	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	10.800	2.700
284	HIBISCUS GARAGE	6B	A11 - K12	54	54	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	10.800	2.700
285	HIBISCUS GARAGE	6B	A12 - K13	16	16	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	3.200	0.800
286	HIBISCUS GARAGE	6B	A12 - K13	44	44	1X42T8	1X42T28	N	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.596	2.200
287	HIBISCUS GARAGE	6B	A13 - K14	44	44	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	8.800	2.200
288	HIBISCUS GARAGE	6B	A13 - K14	12	12	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.400	0.600

RET.	BUILDING	FLR	ROOM DESCRIPTION	EXIST.	PROP.	ExistCode	PropCode	A/C	Hours/Yr	ExistDescription	PropDescription	ExistkWh	PropkWh
289	HIBISCUS GARAGE	6B	A14 - K15	12	12	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.400	0.600
290	HIBISCUS GARAGE	6B	A14 - K15	14	14	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.800	0.700
291	HIBISCUS GARAGE	ALL	STAIRWELLS	142	142	1X42T8	1X42T28	N	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	8.378	7.100
292	HIBISCUS GARAGE	ALL	EXIT SIGNS	252	252	ELED	NR	N	8,760	LED EXIT SIGN	NO RETROFIT	1.008	0.000
293	PALM GARAGE	1N	THROUGHOUT	141	141	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	28.200	12.267
294	PALM GARAGE	1S	THROUGHOUT	146	146	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	29.200	12.702
295	PALM GARAGE	1N	THROUGHOUT	22	22	MH-250	NV-1X84T28	N	8,760	250 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	6.600	1.914
296	PALM GARAGE	1S	THROUGHOUT	20	20	MH-250	NV-1X84T28	N	8,760	250 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	6.000	1.740
297	PALM GARAGE	2N	THROUGHOUT	135	135	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	27.000	11.745
298	PALM GARAGE	2S	THROUGHOUT	136	136	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	27.200	11.832
299	PALM GARAGE	3N	THROUGHOUT	123	123	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	24.600	10.701
300	PALM GARAGE	3S	THROUGHOUT	124	124	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	24.800	10.788
301	PALM GARAGE	ALL	THROUGHOUT	16	16	E2.20	NF-ELED	N	8,760	EXIT -(2) 20 WATT INCANDESCENT SCREW IN	EXIT - (2) 2 WATT LED HARDWIRE - NEW FIXTURE	0.640	0.064
302	TERMINAL 1	2	CONCOURSES	368	368	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	21.712	18.400
303	TERMINAL 1	2	CONCOURSES	70	70	2X43T8	2X43T28	Y	8,760	3 -F032T8-ELECTRONIC	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	6.020	5.180
304	TERMINAL 1	2	CONCOURSES	64	64	MH-175	NV-1X84T28	Y	8,760	175 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	13.440	5.568
305	TERMINAL 1	2	CONCOURSES	275	275	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	16.225	13.750
306	TERMINAL 1	2	CONCOURSES	21	21	MH-400	MH-300PS	Y	8,760	400 WATT METAL HALIDE/BALLAST	300 WATT PULSE START METAL HALIDE LAMP AND BALLAST	9.660	6.825
307	TERMINAL 1	1	AREA F	100	100	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	5.900	5.000
308	TERMINAL 1	1	AREA H	100	100	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	5.900	5.000
309	TERMINAL 1	2	AREA A	142	142	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	8.378	7.100
310	TERMINAL 1	2	AREA B	95	95	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	5.605	4.750
311	TERMINAL 1	2	AREA C	35	35	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.065	1.750
312	TERMINAL 1	1	AREA J	14	14	MH-175	NV-1X84T28	Y	8,760	175 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	2.940	1.218
313	TERMINAL 1	1	AREA K	9	9	MH-175	NV-1X84T28	Y	8,760	175 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	1.890	0.783
314	TERMINAL 1	2	AREA B	3	3	MH-175	NV-1X84T28	Y	8,760	175 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	0.630	0.261
315	TERMINAL 1	2	AREA C	2	2	MH-175	NV-1X84T28	Y	8,760	175 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	0.420	0.174
316	TERMINAL 1	1	AREA J	55	55	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	3.245	2.750
317	TERMINAL 1	2	AREA B	18	18	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	1.062	0.900
318	TERMINAL 1	2	AREA C	16	16	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.944	0.800
319	TERMINAL 1	2	AREA F	45	45	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.655	2.250
320	TERMINAL 1	2	AREA H	45	45	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.655	2.250
321	TERMINAL 1	2	AREA J	21	21	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	1.239	1.050
322	TERMINAL 1	2-2.5	AREA D&K	21	21	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	1.239	1.050
323	TERMINAL 1	3	AREA C	13	13	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.767	0.650
324	TERMINAL 1	3	AREA F	15	15	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.885	0.750
325	TERMINAL 1	3	AREA H	15	15	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.885	0.750
326	TERMINAL 1	3	AREA J	12	12	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.708	0.600
327	TERMINAL 1	2	AREAS E,G,F,H,J	106	106	MH-400	MH-300PS	Y	8,760	400 WATT METAL HALIDE/BALLAST	300 WATT PULSE START METAL HALIDE LAMP AND BALLAST	48.760	34.450
328	TERMINAL 1	2	AREAS F,H	4	4	MH-175	NV-1X84T28	Y	8,760	175 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	0.840	0.348
329	TERMINAL 1	2	AREAS F,H	46	46	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.714	2.300
330	TERMINAL 1	2	AREAS F,H	100	100	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	5.900	5.000
331	TERMINAL 1	2	AREA J	4	4	2X43T8	2X43T28	Y	8,760	3 -F032T8-ELECTRONIC	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	0.344	0.296
332	TERMINAL 1	3	AREA C	8	8	2X43T8	2X43T28	Y	8,760	3 -F032T8-ELECTRONIC	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	0.688	0.592
333	TERMINAL 1	3	AREA J	9	9	2X43T8	2X43T28	Y	8,760	3 -F032T8-ELECTRONIC	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	0.774	0.666
334	TERMINAL 1	3	AREAS A,B,C,J	69	69	MH-400	MH-300PS	Y	8,760	400 WATT METAL HALIDE/BALLAST	300 WATT PULSE START METAL HALIDE LAMP AND BALLAST	31.740	22.425
335	TERMINAL 1	4	AREAS C,F,H,J	99	99	MH-400	MH-300PS	Y	8,760	400 WATT METAL HALIDE/BALLAST	300 WATT PULSE START METAL HALIDE LAMP AND BALLAST	45.540	32.175
336	TERMINAL 1 ENPLANE	2	UNDER CANOPY	132	66	MH-100	NV-1X84T28	N	8,760	100 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	17.820	5.742

RET.	BUILDING	FLR	ROOM DESCRIPTION	EXIST.	PROP.	ExistCode	PropCode	A/C	Hours/Yr	ExistDescription	PropDescription	ExistkWh	PropkWh
337	TERMINAL 1 ENPLANE	2	UNDER CANOPY	66	66	MH-250	2.42CFH	N	8,760	250 WATT METAL HALIDE/BALLAST	2X42WATT COMPACT FLUORESCENT HARDWIRE RETROFIT KIT	19.800	6.864
338	TERMINAL 2	1	ENTRANCE FOYER	24	24	1X13T8U3	NR	Y	8,760	1X1 3-16W U-TUBE	NO RETROFIT	1.152	1.152
339	TERMINAL 2	1	ENTRANCE FOYER	8	8	2X22T8U6	NR	Y	8,760	2-FO32T8U - ELECTRONIC	NO RETROFIT	0.472	0.472
340	TERMINAL 2	1	FRONT WALL	16	16	1X13T8U3	NR	Y	8,760	1X1 3-16W U-TUBE	NO RETROFIT	0.768	0.768
341	TERMINAL 2	1	ENTRANCES	128	128	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	7.552	6.400
342	TERMINAL 2	1	BAGGAGE CLAIM	209	209	2X43T8	2X43T28	Y	8,760	3 -F032T8-ELECTRONIC	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	17.974	15.466
343	TERMINAL 2	1	ABOVE CAROUSELS	72	72	2X22T8U6	NR	Y	8,760	2-FO32T8U - ELECTRONIC	NO RETROFIT	4.248	4.248
344	TERMINAL 2	1	BATHROOMS	40	40	1X13T8U3	NR	Y	8,760	1X1 3-16W U-TUBE	NO RETROFIT	1.920	1.920
345	TERMINAL 2	1	BATHROOMS	20	20	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	1.180	1.000
346	TERMINAL 2	2	BATHROOMS	40	40	1X13T8U3	NR	Y	8,760	1X1 3-16W U-TUBE	NO RETROFIT	1.920	1.920
347	TERMINAL 2	2	BATHROOMS	20	20	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	1.180	1.000
348	TERMINAL 2	2	ABOVE ESCALATORS	36	36	2X22T8U6	NR	Y	8,760	2-FO32T8U - ELECTRONIC	NO RETROFIT	2.124	2.124
349	TERMINAL 2	2	ENTRANCE FOYER	24	24	1X13T8U3	NR	Y	8,760	1X1 3-16W U-TUBE	NO RETROFIT	1.152	1.152
350	TERMINAL 2	2	ENTRANCE FOYER	8	8	2X22T8U6	NR	Y	8,760	2-FO32T8U - ELECTRONIC	NO RETROFIT	0.472	0.472
351	TERMINAL 2	2	GENERAL AREA	178	178	2X43T8	2X43T28	Y	8,760	3 -F032T8-ELECTRONIC	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	15.308	13.172
352	TERMINAL 2	2	SECURITY ENTRANCE	18	18	1X13T8U3	NR	Y	8,760	1X1 3-16W U-TUBE	NO RETROFIT	0.864	0.864
353	TERMINAL 2	2	ABOVE TICKET COUNTERS	39	39	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.301	1.950
354	TERMINAL 2	2	BEHIND TICKET COUNTERS	37	37	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.183	1.850
355	TERMINAL 2	3	GARAGE ENTRANCES	6	6	MV-100	2.22CFN	N	8,760	100 WATT MERCURY VAPOR/BALLAST	(2) 22 WATT COMPACT FLUORESCENT NEW FIXTURE	0.762	0.312
356	TERMINAL 2	3	ELEVATORS	3	3	1X42SS	1X42T28	Y	8,760	2 -F40T12 STD LAMP-STD BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.273	0.150
357	TERMINAL 2	3	ELEVATORS	6	6	1X22SS	1X22T8L	Y	8,760	2 -F20T12-STD LAMP-STD BALLAST	2 -F017T8-ELECTRONIC LOW POWER	0.288	0.150
358	TERMINAL 2	3	EXITS	2	2	E2.20	NF-ELED	Y	8,760	EXIT -(2) 20 WATT INCANDESCENT SCREW IN	EXIT - (2) 2 WATT LED HARDWIRE - NEW FIXTURE	0.080	0.008
359	TERMINAL 2	3	STAIRS	4	4	1X42EE	1X42T28	Y	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.276	0.200
360	TERMINAL 2	1	ABOVE SIDEWALK	11	11	HPS-200	NV-1X84T28	N	8,760	200 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	2.695	0.957
361	TERMINAL 2	1	DELTA BAGGAGE	14	14	2X43EE	2X42T8R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2 -F032 T8-ELECTRONIC-2x4 REFLECTOR	1.442	0.826
362	TERMINAL 2	1	DELTA OFFICE	2	2	2X43EE	2X42T8R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2 -F032 T8-ELECTRONIC-2x4 REFLECTOR	0.206	0.118
363	TERMINAL 2	1	REAR DELTA	3	3	2X43EE	2X42T8R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2 -F032 T8-ELECTRONIC-2x4 REFLECTOR	0.309	0.177
364	TERMINAL 2	1	BREAK RM	3	3	2X43EE	2X42T8R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2 -F032 T8-ELECTRONIC-2x4 REFLECTOR	0.309	0.177
365	TERMINAL 2	1	TV RM	2	2	2X43EE	2X42T8R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2 -F032 T8-ELECTRONIC-2x4 REFLECTOR	0.206	0.118
366	TERMINAL 2	2	TORTOGA	11	11	2X22UEE	2X22T8U6	Y	6,750	2 -F40T12 U TUBE-ES LAMP-ES BALLAST	2 - F32T8 -6" U- TUBE - ELECTRONIC	0.792	0.649
367	TERMINAL 2	2	TORTOGA	9	9	75R30	15CFR	Y	6,750	INCANDESCENT PAR - 75 WATT R30	15 WATT COMPACT FLUORESCENT NEW FIXTURE	0.675	0.135
368	TERMINAL 2	2	TORTOGA	3	3	2X44EE	2X42T28R	Y	6,750	4 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.414	0.150
369	TERMINAL 2	2	GIFT & NEWS NO.	10	10	1X42EE	1X42T28	Y	6,750	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.690	0.500
370	TERMINAL 2	2	GIFT & NEWS NO.	3	3	1X32SS	1X32T8L	Y	6,750	2 -F30-T12-STD LAMP-STD BALLAST	2 -F025T8- LOW POWER	0.213	0.111
371	TERMINAL 2	2	GIFT & NEWS NO.	2	2	1X22SS	1X22T8L	Y	6,750	2 -F20T12-STD LAMP-STD BALLAST	2 -F017T8-ELECTRONIC LOW POWER	0.096	0.050
372	TERMINAL 2	2	ICE CREAM SHOP	18	18	1X42EE	1X42T28	Y	6,750	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	1.242	0.900
373	TERMINAL 2	2	ICE CREAM SHOP	2	2	2X44EE	2X42T28R	Y	6,750	4 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.276	0.100
374	TERMINAL 2	2	COFFEE SHOP	9	9	2X22UEE	2X22T8U6	Y	6,750	2 -F40T12 U TUBE-ES LAMP-ES BALLAST	2 - F32T8 -6" U- TUBE - ELECTRONIC	0.648	0.531
375	TERMINAL 2	2	COFFEE SHOP	2	2	2X44EE	2X42T28R	Y	6,750	4 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.276	0.100
376	TERMINAL 2	2	GIFT & NEWS SO.	3	3	1X42EE	1X42T28	Y	6,750	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.207	0.150
377	TERMINAL 2	2	GIFT & NEWS SO.	13	13	1X32SS	1X32T8L	Y	6,750	2 -F30-T12-STD LAMP-STD BALLAST	2 -F025T8- LOW POWER	0.923	0.481
378	TERMINAL 2	2	GIFT & NEWS SO.	3	3	1X22SS	1X22T8L	Y	6,750	2 -F20T12-STD LAMP-STD BALLAST	2 -F017T8-ELECTRONIC LOW POWER	0.144	0.075
379	TERMINAL 2	2	BEHIND TICKET HALL	3	3	2X22UEE	2X22T8U6	Y	8,760	2 -F40T12 U TUBE-ES LAMP-ES BALLAST	2 - F32T8 -6" U- TUBE - ELECTRONIC	0.216	0.177
380	TERMINAL 2	2	STORAGE	4	4	2X44EE	2X42T28R	Y	6,750	4 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.552	0.200
381	TERMINAL 2	2	FILE ROOM	3	3	1X42EE	1X42T28	Y	6,750	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.207	0.150
382	TERMINAL 2	2	STAIRS	2	2	1X42EE	1X42T28	Y	6,750	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.138	0.100
383	TERMINAL 2	2	LOCKER RM	4	4	1X42EE	1X42T28	Y	6,750	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.276	0.200
384	TERMINAL 2	2	HALL	5	5	2X43EE	2X42T28R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.515	0.250

RET.	BUILDING	FLR	ROOM DESCRIPTION	EXIST.	PROP.	ExistCode	PropCode	A/C	Hours/Yr	ExistDescription	PropDescription	ExistkWh	PropkWh
385	TERMINAL 2	2	LEAD AGENT OFFICE	2	2	2X43EE	2X42T28R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.206	0.100
386	TERMINAL 2	2	COUNTER CONTROL	3	3	2X43EE	2X42T28R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.309	0.150
387	TERMINAL 2	2	CASHIER	4	4	2X43EE	2X42T28R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.412	0.200
388	TERMINAL 2	2	LEAD AGENT OFFICE	2	2	2X43EE	2X42T28R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.206	0.100
389	TERMINAL 2	2	TELCO COMM	2	2	2X43EE	2X42T28R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.206	0.100
390	TERMINAL 2	2	ELEC RM	1	1	1X42EE	1X42T28	Y	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.069	0.050
391	TERMINAL 2	2	JANITOR RM	1	1	1X42EE	1X42T28	Y	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.069	0.050
392	TERMINAL 2	2	BREAK RM	4	4	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.412	0.200
393	TERMINAL 2	2	RESTROOMS	6	6	1X42EE	1X42T28	Y	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.414	0.300
394	TERMINAL 2	2	HALL	3	3	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.309	0.150
395	TERMINAL 2	2	ATA OFFICE	2	2	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.206	0.100
396	TERMINAL 2	2	MAIN OFFICE	7	7	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.721	0.350
397	TERMINAL 2	2	US VISIT	2	2	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.206	0.100
398	TERMINAL 2	2	HALL	3	3	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.309	0.150
399	TERMINAL 2	2	LA CUCINA	4	4	2X22UEE	2X22T8U6	Y	6,750	2 -F40T12 U TUBE-ES LAMP-ES BALLAST	2 - F32T8 -6" U- TUBE - ELECTRONIC	0.288	0.236
400	TERMINAL 2	2	LA CUCINA	18	18	75R30	15CFS	Y	6,750	INCANDESCENT PAR - 75 WATT R30	15 WATT COMPACT FLUOR. SCREW IN- PHILLIPS SLS	1.350	0.342
401	TERMINAL 2	2	LA CUCINA KITCHEN	4	4	2X22UEE	2X22T8U6	Y	6,750	2 -F40T12 U TUBE-ES LAMP-ES BALLAST	2 - F32T8 -6" U- TUBE - ELECTRONIC	0.288	0.236
402	TERMINAL 2	2	LA CUCINA SERVICE	2	2	2X44EE	2X42T28R	Y	6,750	4 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.276	0.100
403	TERMINAL 2	2	LA CUCINA BAR	10	10	75A	15CFD	Y	6,750	INCANDESCENT "A" LAMPS - 75 WATT	15 WATT COMPACT FLUOR. DIMMABLE	0.750	0.190
404	TERMINAL 2	2	PGA TOUR	9	9	1X32T8	NR	Y	6,750	2X25WATT 3' T8 ELECTRONIC	NO RETROFIT	0.369	0.369
405	TERMINAL 2	2	NEWS STAND	14	14	1X32T8	NR	Y	6,750	2X25WATT 3' T8 ELECTRONIC	NO RETROFIT	0.574	0.574
406	TERMINAL 2	2	MIAMI SUBS	2	2	2X43T8	2X43T28	Y	6,750	3 -F032T8-ELECTRONIC	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	0.172	0.148
407	TERMINAL 2	2	KITCHEN ABOVE	19	19	2X43EE	2X42T28R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	1.957	0.950
408	TERMINAL 2	2	REAR HALL	5	5	MV-100	2.22CFN	Y	6,750	100 WATT MERCURY VAPOR/BALLAST	(2) 22 WATT COMPACT FLUORESCENT NEW FIXTURE	0.635	0.260
409	TERMINAL 2	2	OFFICE MIAMI SUBS	3	3	2X43EE	2X42T28R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.309	0.150
410	TERMINAL 2	2	BREAK RM	3	3	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.309	0.150
411	TERMINAL 2	2	ELEC RM	1	1	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.103	0.050
412	TERMINAL 2	2	KITCHEN ABOVE	4	4	2X22UEE	2X22T8U6	Y	8,760	2 -F40T12 U TUBE-ES LAMP-ES BALLAST	2 - F32T8 -6" U- TUBE - ELECTRONIC	0.288	0.236
413	TERMINAL 2	2	CONCOURSE D	292	292	2X43T8	2X43T28	Y	8,760	3 -F032T8-ELECTRONIC	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	25.112	21.608
414	TERMINAL 2	2	CONCOURSE D	100	100	2X22T8U6	NR	Y	8,760	2-FO32T8U - ELECTRONIC	NO RETROFIT	5.900	5.900
415	TERMINAL 2	2	ABOVE SECURITY	10	10	2X43T8	2X43T28	Y	8,760	3 -F032T8-ELECTRONIC	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	0.860	0.740
416	TERMINAL 2	2	ABOVE SECURITY	12	12	2X22T8U6	NR	Y	8,760	2-FO32T8U - ELECTRONIC	NO RETROFIT	0.708	0.708
417	TERMINAL 2	1	BAGS TO GO OFFICE	4	4	1X42EE	1X42T28	Y	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.276	0.200
418	TERMINAL 2	1	UNDER CONCOURSE D	148	148	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	15.244	7.400
419	TERMINAL 2	1	UNDER CONCOURSE D	225	225	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	23.175	11.250
420	TERMINAL 2	1	UNDER CONCOURSE D	640	640	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	65.920	32.000
421	TERMINAL 2	1	UNDER CONCOURSE D	30	30	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	3.090	1.500
422	TERMINAL 2	1	UNDER CONCOURSE D	60	60	1X82SS	1X824T28RKIT	N	8,760	2 -F96T12-STD LAMP-STD BALLAST	1X8 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFL KIT	9.840	2.640
423	TERMINAL 2	1	UNDER CONCOURSE D	40	40	1X81SS	1X81T8	N	8,760	1 -F96T12-STD LAMP-STD BALLAST	1-F96T8-ELECTRONIC-8'-T8 LAMP	3.560	1.960
424	TERMINAL 2	1	UNDER CONCOURSE D	86	86	1X42EE	1X42T28	Y	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	5.934	4.300
425	TERMINAL 2	1	UNDER CONCOURSE D	94	94	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	18.800	8.178
426	TERMINAL 2	1	STAIRWELLS TERM 2	24	24	1X42EE	1X42T28	Y	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	1.656	1.200
427	TERMINAL 3	2	TICKET AREA	219	219	2X43T8	2X43T28	Y	8,760	3 -F032T8-ELECTRONIC	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	18.834	16.206
428	TERMINAL 3	1-2	TICKET/BAGGAGE CLAIM	320	320	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	18.880	16.000
429	TERMINAL 3	2	TICKET COUNTERS-TROFFER	90	90	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	5.310	4.500
430	TERMINAL 3	2	TICKET COUNTERS-PENDANT	124	124	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	7.316	6.200
431	TERMINAL 3	2	CENTER AREAS	40	40	2X22T8U6	NR	Y	8,760	2-FO32T8U - ELECTRONIC	NO RETROFIT	2.360	2.400
432	TERMINAL 3	2	CENTER AREAS	55	55	2X43T8	2X43T28	Y	8,760	3 -F032T8-ELECTRONIC	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	4.730	4.070

RET.	BUILDING	FLR	ROOM DESCRIPTION	EXIST.	PROP.	ExistCode	PropCode	A/C	Hours/Yr	ExistDescription	PropDescription	ExistkWh	PropkWh
433	TERMINAL 3	2	SITTING AREAS	25	25	MV-100	2.22CFN	Y	8,760	100 WATT MERCURY VAPOR/BALLAST	(2) 22 WATT COMPACT FLUORESCENT NEW FIXTURE	3.175	1.300
434	TERMINAL 3	2	REAR CORRIDOR	165	165	MV-100	2.22CFN	Y	8,760	100 WATT MERCURY VAPOR/BALLAST	(2) 22 WATT COMPACT FLUORESCENT NEW FIXTURE	20.955	8.580
435	TERMINAL 3	1-2	ENTRANCE LOBBIES	60	60	1X13T8U3	NR	Y	8,760	1X1 3-16W U-TUBE	NO RETROFIT	2.880	2.880
436	TERMINAL 3	1-2	ENTRANCE LOBBIES	20	20	2X22T8U6	NR	Y	8,760	2-FO32T8U - ELECTRONIC	NO RETROFIT	1.180	1.180
437	TERMINAL 3	2	WALL FACING WINDOWS	45	45	1X2BIAX40	NR	Y	8,760	40-WATT CFL BIAX	NO RETROFIT	1.800	1.800
438	TERMINAL 3	2	DISPLAY CASES	36	36	1X42EE	1X42T28L	Y	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP LP ELECTRONIC BALLAST	2.484	1.584
439	TERMINAL 3	2	RESTROOMS	20	20	1X13T8U3	NR	Y	8,760	1X1 3-16W U-TUBE	NO RETROFIT	0.960	0.960
440	TERMINAL 3	2	RESTROOMS	16	16	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.944	0.800
441	TERMINAL 3	2	EXIT SIGNS	4	4	E2.20	NF-ELED	Y	8,760	EXIT -(2) 20 WATT INCANDESCENT SCREW IN	EXIT - (2) 2 WATT LED HARDWIRE - NEW FIXTURE	0.160	0.016
442	TERMINAL 3	2	DECORATIVE GLOBES	18	18	13CFL	NR	Y	8,760	13-WATT COMPACT FLUORESCENT	NO RETROFIT	0.306	0.000
443	TERMINAL 3	1-2	ELEVATORS	4	4	1X22SS	1X22T8L	Y	8,760	2 -F20T12-STD LAMP-STD BALLAST	2 -F017T8-ELECTRONIC LOW POWER	0.192	0.100
444	TERMINAL 3	1-2	ELEVATORS	2	2	1X42SS	1X42T28L	Y	8,760	2 -F40T12 STD LAMP-STD BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP LP ELECTRONIC BALLAST	0.182	0.088
445	TERMINAL 3	1-2	ELEVATOR LOBBIES	8	8	MV-100	2.22CFN	Y	8,760	100 WATT MERCURY VAPOR/BALLAST	(2) 22 WATT COMPACT FLUORESCENT NEW FIXTURE	1.016	0.416
446	TERMINAL 3	1	BAGGAGE CLAIM	363	363	2X43T8	2X43T28	Y	8,760	3 -F032T8-ELECTRONIC	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	31.218	26.862
447	TERMINAL 3	1	BAGGAGE CLAIM	96	96	2X22T8U6	NR	Y	8,760	2-FO32T8U - ELECTRONIC	NO RETROFIT	5.664	5.664
448	TERMINAL 3	1	RESTROOMS	16	16	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.944	0.800
449	TERMINAL 3	1	RESTROOMS	28	28	1X13T8U3	NR	Y	8,760	1X1 3-16W U-TUBE	NO RETROFIT	1.344	1.344
450	TERMINAL 3	1	ABOVE WINDOWS	31	31	1X13T8U3	NR	Y	8,760	1X1 3-16W U-TUBE	NO RETROFIT	1.488	1.488
451	TERMINAL 3	1	REAR OF TICKET CTRS SO	220	220	2X44EE	2X42T28R	Y	8,760	4 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	30.360	11.000
452	TERMINAL 3	2	REAR OF TICKET CTRS NO	220	220	2X44EE	2X42T28R	Y	8,760	4 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	30.360	11.000
453	TERMINAL 3	2	FLLIGHT DECK	100	100	75A	15CFS	Y	8,760	INCANDESCENT "A" LAMPS - 75 WATT	15 WATT COMPACT FLUOR. SCREW IN- PHILLIPS SLS	7.500	1.900
454	TERMINAL 3	2	NEWS STAND	20	20	70HA20	18CFR	Y	6,750	70 WATT HALOGEN PAR 20 LAMP	18 WATT COMPACT FLUORESCENT FLOOD REFLECTOR	1.400	0.440
455	TERMINAL 3	2	NEWS STAND	19	19	1X32SS	1X32T8L	Y	6,750	2 -F30-T12-STD LAMP-STD BALLAST	2 -F025T8- LOW POWER	1.349	0.703
456	TERMINAL 3	2	TROPICAL TREATS	15	15	2X22UEE	2X22T8U6	Y	6,750	2 -F40T12 U TUBE-ES LAMP-ES BALLAST	2 - F32T8 -6" U- TUBE - ELECTRONIC	1.080	0.885
457	TERMINAL 3	2	TROPICAL TREATS	6	6	1X42EE	1X42T28	Y	6,750	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.414	0.300
458	TERMINAL 3	2	TROPICAL TREATS	3	3	1X32SS	1X32T8L	Y	6,750	2 -F30-T12-STD LAMP-STD BALLAST	2 -F025T8- LOW POWER	0.213	0.111
459	TERMINAL 3	2	CHILI'S	225	225	75R30	18CFR	Y	6,750	INCANDESCENT PAR - 75 WATT R30	18 WATT COMPACT FLUORESCENT FLOOD REFLECTOR	16.875	4.950
460	TERMINAL 3	2	CHILI'S KITCHEN	50	50	2X43EE	2X43T28	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	5.150	3.700
461	TERMINAL 3	2	TSA LOUNGE	34	34	2X43T8	2X43T28	Y	6,750	3 -F032T8-ELECTRONIC	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	2.924	2.516
462	TERMINAL 3	2	EDY'S	11	11	MV-100	2.22CFN	Y	6,750	100 WATT MERCURY VAPOR/BALLAST	(2) 22 WATT COMPACT FLUORESCENT NEW FIXTURE	1.397	0.572
463	TERMINAL 3	2	EDY'S	10	10	1X42EE	1X42T28	Y	6,750	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.690	0.500
464	TERMINAL 3	2	EDY'S REAR	2	2	2X44EE	2X42T28R	Y	6,750	4 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.276	0.100
465	TERMINAL 3	2	EDY'S	5	5	75A	15CFS	Y	6,750	INCANDESCENT "A" LAMPS - 75 WATT	15 WATT COMPACT FLUOR. SCREW IN- PHILLIPS SLS	0.375	0.095
466	TERMINAL 3	2	SIDA CONFERENCE AREA	24	24	2X43EE	2X42T28R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	2.472	1.200
467	TERMINAL 3	2	PGA SHOP	7	7	1X42T8	1X42T28	Y	6,750	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.413	0.350
468	TERMINAL 3	2	SECURITY AREA TO F	84	84	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	4.956	4.200
469	TERMINAL 3	2	HALL TO F	96	96	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	5.664	4.800
470	TERMINAL 3	2	GATE AREA F1-F10	30	30	1X41T8	1X41T28	Y	8,760	1X4 1-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.900	0.780
471	TERMINAL 3	2	GATE AREA F1-F10	270	270	2X43T8	2X42T28R	Y	8,760	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	23.220	13.500
472	TERMINAL 3	2	GATE AREA F1-F10	199	199	1X32T8	NR	Y	8,760	2X25WATT 3' T8 ELECTRONIC	NO RETROFIT	8.159	8.159
473	TERMINAL 3	2	OFFICE 2022	3	3	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.258	0.150
474	TERMINAL 3	2	OFFICE 2021	3	3	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.258	0.150
475	TERMINAL 3	2	OUTER OFFICE	5	5	2X43T8	2X42T28R	Y	6,750	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.430	0.250
476	TERMINAL 3	2	OFFICE 2018	1	1	1X42EE	1X42T28	Y	6,750	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.069	0.050
477	TERMINAL 3	2	HALL	1	1	2X42EE	2X42T28	Y	6,750	2 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.069	0.050
478	TERMINAL 3	2	MAIN OFFICE	6	6	2X43EE	2X42T28R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.618	0.300
479	TERMINAL 3	2	OFFICE	1	1	2X43EE	2X42T28R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.103	0.050
480	TERMINAL 3	2	OFFICE 2010	2	2	2X43EE	2X42T28R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.206	0.100

RET.	BUILDING	FLR	ROOM DESCRIPTION	EXIST.	PROP.	ExistCode	PropCode	A/C	Hours/Yr	ExistDescription	PropDescription	ExistkWh	PropkWh
481	TERMINAL 3	2	OFFICE 2009	2	2	2X43EE	2X42T28R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.206	0.100
482	TERMINAL 3	2	ADDN'L OFFICES	12	12	2X43EE	2X42T28R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	1.236	0.600
483	TERMINAL 3	2	RESTROOMS	2	2	1X42EE	1X42T28	Y	6,750	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.138	0.100
484	TERMINAL 3	2	STAIRS	4	4	1X42EE	1X42T28	Y	6,750	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.276	0.200
485	TERMINAL 3	1	HALL	2	2	2X42EE	2X42T28	Y	6,750	2 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.138	0.100
486	TERMINAL 3	1	OFFICE	6	6	2X43EE	2X42T28R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.618	0.300
487	TERMINAL 3	1	TOOL ROOM	12	12	1X42EE	1X42T28	Y	6,750	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.828	0.600
488	TERMINAL 3	1	BREAK RM	3	3	1X42EE	1X42T28	Y	6,750	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.207	0.150
489	TERMINAL 3	1	RESTROOMS	9	9	1X42EE	1X42T28	Y	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.621	0.450
490	TERMINAL 3	1	MAINTENANCE AREA	9	9	1X42EE	1X42T28	Y	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.621	0.450
491	TERMINAL 3	1	MECHANICAL RMS	15	15	1X42EE	1X42T28	Y	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	1.035	0.750
492	TERMINAL 3	1	MECHANICAL RMS	24	24	HPS-150	NV-1X42T28	Y	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	4.800	1.200
493	TERMINAL 3	1	UNDER CONCOURSE F	70	70	HPS-150	NV-1X42T28	Y	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	14.000	3.500
494	TERMINAL 3	1	TRAINING RM 1124	8	8	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.824	0.400
495	TERMINAL 3	1	HALL	5	5	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.515	0.250
496	TERMINAL 3	1	RESTROOMS	4	4	1X42EE	1X42T28	Y	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.276	0.200
497	TERMINAL 3	1	BREAK RM 1121	3	3	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.309	0.150
498	TERMINAL 3	1	RM 1117 & 1118	7	7	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.721	0.350
499	TERMINAL 3	1	ACROSS FROM 1118	3	3	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.309	0.150
500	TERMINAL 3	1	RM 1110	4	4	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.412	0.200
501	TERMINAL 3	1	HALL	2	2	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.206	0.100
502	TERMINAL 3	1	RM 1112	4	4	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.412	0.200
503	TERMINAL 3	1	TOOL ROOM	50	50	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.950	2.500
504	TERMINAL 3	1	GATE AREA E1-E10	30	30	1X41T8	1X41T28	Y	8,760	1X4 1-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.900	0.780
505	TERMINAL 3	1	GATE AREA E1-E10	270	270	2X43T8	2X42T28R	Y	8,760	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	23.220	13.500
506	TERMINAL 3	1	GATE AREA E1-E10	199	199	1X32T8	NR	Y	8,760	2X25WATT 3' T8 ELECTRONIC	NO RETROFIT	8.159	8.159
507	TERMINAL 3	1	UNDER CONCOURSE E	160	160	HPS-150	NV-1X42T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	32.000	8.000
508	TERMINAL 3	1	UNDER CONCOURSE E	76	76	HPS-150	NV-1X42T28	N	4,380	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	15.200	3.800
509	TERMINAL 3	1	UNDER CONCOURSE E	211	211	1X42EE	1X42T28	N	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	14.559	10.550
510	TERMINAL 3	1	AIRTRAN BELOW CONC. E	260	260	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	26.780	13.000
511	TERMINAL 3	1	USAIR BELOW CONC. E	200	200	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	20.600	10.000
512	TERMINAL 3	1	ELEC/MECH RM BELOW E	300	300	1X42EE	1X42T28	N	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	20.700	15.000
513	TERMINAL 3	1	STORAGE FOOD	65	65	2X42EE	2X42T28	Y	8,760	2 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	4.485	3.250
514	TERMINAL 3	2	CONCOURSE E TSA SCREEN	33	33	2X43T8	2X43T28	Y	8,760	3 -F032T8-ELECTRONIC	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	2.838	2.442
515	TERMINAL 3	2	HALL TO CONCOURSE	28	28	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	1.652	1.400
516	TERMINAL 3	2	HALL TO CONCOURSE	16	16	1X32T8	NR	Y	8,760	2X25WATT 3' T8 ELECTRONIC	NO RETROFIT	0.656	0.656
517	TERMINAL 3	2	AMERICO'S	12	12	70HA20	18CFR	Y	8,760	70 WATT HALOGEN PAR 20 LAMP	18 WATT COMPACT FLUORESCENT FLOOD REFLECTOR	0.840	0.264
518	TERMINAL 3	2	AMERICO'S	7	7	75A	15CFS	Y	8,760	INCANDESCENT "A" LAMPS - 75 WATT	15 WATT COMPACT FLUOR. SCREW IN- PHILLIPS SLS	0.525	0.133
519	TERMINAL 3	2	KEY WEST	10	10	75A	15CFS	Y	8,760	INCANDESCENT "A" LAMPS - 75 WATT	15 WATT COMPACT FLUOR. SCREW IN- PHILLIPS SLS	0.750	0.190
520	TERMINAL 3	2	JETWAYS CONC. E	150	150	1X41EE	1X41T28	Y	8,760	1 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	5.400	3.900
521	TERMINAL 4	1	BAGGAGE CLAIM	98	98	2X42T8	2X42T28	Y	8,760	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	5.782	4.900
522	TERMINAL 4	1	BAGGAGE CLAIM	183	183	2.32CFL	NR	Y	8,760	2X32-WATT COMPACT FLUORESCENT	NO RETROFIT	11.712	11.712
523	TERMINAL 4	1	BAGGAGE CLAIM	56	56	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	3.304	2.800
524	TERMINAL 4	1	ENTRANCE LOBBIES	12	12	2.32CFL	NR	Y	8,760	2X32-WATT COMPACT FLUORESCENT	NO RETROFIT	0.768	0.768
525	TERMINAL 4	1	ENTRANCE LOBBIES	3	3	1X1234T8	1X1234T28	Y	8,760	1X12 3-LAMP T8 ELEC BALLAST	12' FIXTURE 3 - 28 WATT T8 3-LAMP ELECTRONIC BALLAST	0.258	0.222
526	TERMINAL 4	1	AT WINDOWS	32	32	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	1.888	1.600
527	TERMINAL 4	1	INT'L ARRIVALS	65	65	1X42EE	1X42T28	Y	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	4.485	3.250
528	TERMINAL 4	1	INT'L ARRIVALS	25	25	2X43T8	2X43T28	Y	8,760	3 -F032T8-ELECTRONIC	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	2.150	1.850

RET.	BUILDING	FLR	ROOM DESCRIPTION	EXIST.	PROP.	ExistCode	PropCode	A/C	Hours/Yr	ExistDescription	PropDescription	ExistkWh	PropkWh
529	TERMINAL 4	1	INT'L ARRIVALS	12	12	1X41T8	1X41T28	Y	8,760	1X4 1-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.360	0.312
530	TERMINAL 4	1	EXIT SIGNS	6	6	E2.20	NF-ELED	Y	8,760	EXIT -(2) 20 WATT INCANDESCENT SCREW IN	EXIT - (2) 2 WATT LED HARDWIRE - NEW FIXTURE	0.240	0.024
531	TERMINAL 4	1	HPS SCONCES	4	4	HPS-250	NR	Y	8,760	250 HIGH PRESSURE SODIUM/BALLAST	NO RETROFIT	1.240	0.000
532	TERMINAL 4	1	ELEVATORS	4	4	1X22SS	1X22T8L	Y	8,760	2 -F20T12-STD LAMP-STD BALLAST	2 -F017T8-ELECTRONIC LOW POWER	0.192	0.100
533	TERMINAL 4	1	ELEVATORS	4	4	1X42SS	1X42T28L	Y	8,760	2 -F40T12 STD LAMP-STD BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP LP ELECTRONIC BALLAST	0.364	0.176
534	TERMINAL 4	2	ABOVE ESCALATORS	92	92	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	5.428	4.600
535	TERMINAL 4	2	ABOVE TICKET COUNTERS	58	58	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	3.422	2.900
536	TERMINAL 4	2	GENERAL AREA	175	175	2.32CFL	NR	Y	8,760	2X32-WATT COMPACT FLUORESCENT	NO RETROFIT	11.200	11.200
537	TERMINAL 4	2	VENDOR AREA	56	56	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	3.304	2.800
538	TERMINAL 4	2	RESTROOMS	6	6	1X42T8	1X42T28	Y	8,760	1X4 2-LAMP T8	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.354	0.300
539	TERMINAL 4	2-4	OFFICE BLDG ADMIN	450	450	2X43T8	2X43T28	Y	8,760	3 -F032T8-ELECTRONIC	2X4 3-LAMP 28 WATT T8 3-LAMP ELECTRONIC BALLAST	38.700	33.300
540	TERMINAL 4	1	FIS	17	17	2X43T8	2X42T28R	Y	8,760	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	1.462	0.850
541	TERMINAL 4	1	TSA	2	2	2X43T8	2X42T28R	Y	8,760	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.172	0.100
542	TERMINAL 4	1	TSA	2	2	2X43T8	2X42T28R	Y	8,760	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.172	0.100
543	TERMINAL 4	1	TSA ATO	1	1	2X43T8	2X42T28R	Y	8,760	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.086	0.050
544	TERMINAL 4	1	TICKET OFFICES	12	12	2X43T8	2X42T28R	Y	8,760	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	1.032	0.600
545	TERMINAL 4	1	CUSTOMS	111	111	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	11.433	5.550
546	TERMINAL 4	1	COMPUTER RM	2	2	2X44EE	2X42T28R	Y	8,760	4 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.276	0.100
547	TERMINAL 4	1	COMPUTER RM	2	2	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.206	0.100
548	TERMINAL 4	1	CART AREA	12	12	2X22UEE	2X22T8U6	Y	8,760	2 -F40T12 U TUBE-ES LAMP-ES BALLAST	2 - F32T8 -6" U- TUBE - ELECTRONIC	0.864	0.708
549	TERMINAL 4	1	RESTROOMS	5	5	1X42EE	1X42T28	Y	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.345	0.250
550	TERMINAL 4	1	COMP. OFFICE	2	2	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.206	0.100
551	TERMINAL 4	1	CANINE	2	2	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.206	0.100
552	TERMINAL 4	1	ISOLATION	10	10	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	1.030	0.500
553	TERMINAL 4	1	CHIEF'S OFFICE	2	2	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.206	0.100
554	TERMINAL 4	1	ESCALATOR LOBBY	6	6	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.618	0.300
555	TERMINAL 4	2	CUSTOMS	52	52	2X43T8	2X42T28R	Y	8,760	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	4.472	2.600
556	TERMINAL 4	2	CUSTOMS	2	2	2X22UEE	2X22T8U6	Y	8,760	2 -F40T12 U TUBE-ES LAMP-ES BALLAST	2 - F32T8 -6" U- TUBE - ELECTRONIC	0.144	0.118
557	TERMINAL 4	2	ELEVATOR	1	1	1X22SS	1X22T8L	Y	8,760	2 -F20T12-STD LAMP-STD BALLAST	2 -F017T8-ELECTRONIC LOW POWER	0.048	0.025
558	TERMINAL 4	2	ELEVATOR	2	2	1X42EE	1X42T28	Y	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.138	0.100
559	TERMINAL 4	2	CUSTOMS	15	15	MV-100	2.13CFN	Y	8,760	100 WATT MERCURY VAPOR/BALLAST	(2) 13 WATT COMPACT FLUORECSCENT NEW FIXTURE	1.905	0.510
560	TERMINAL 4	2	CUSTOMS	22	22	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	2.266	1.100
561	TERMINAL 4	2	CUSTOMS	63	63	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	6.489	3.150
562	TERMINAL 4	2	CUSTOMS	3	3	2X22UEE	2X22T8U6	Y	8,760	2 -F40T12 U TUBE-ES LAMP-ES BALLAST	2 - F32T8 -6" U- TUBE - ELECTRONIC	0.216	0.177
563	TERMINAL 4	2	RESTROOMS	6	6	1X42EE	1X42T28	Y	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.414	0.300
564	TERMINAL 4	2	DOWNRAMP	17	17	2X43T8	2X42T28R	Y	8,760	3 -F032T8-ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	1.462	0.850
565	TERMINAL 4	2	WALKWAY TO GATES	46	46	2.32CFL	NR	Y	8,760	2X32-WATT COMPACT FLUORESCENT	NO RETROFIT	2.944	2.944
566	TERMINAL 4	1	JETWAYS	80	80	2X43T8	2X42T8R	Y	8,760	3 -F032T8-ELECTRONIC	2 -F032 T8-ELECTRONIC-2x4 REFLECTOR	6.880	4.720
567	TERMINAL 4	1	RESTROOMS	4	4	1X42EE	1X42T28	Y	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.276	0.200
568	TERMINAL 4	1	RMS 107-109	18	18	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	1.854	0.900
569	TERMINAL 4	1	RMS 107-109	7	7	2X22UEE	2X22T8U6	Y	8,760	2 -F40T12 U TUBE-ES LAMP-ES BALLAST	2 - F32T8 -6" U- TUBE - ELECTRONIC	0.504	0.413
570	TERMINAL 4	1	HALL	2	2	2X22UEE	2X22T8U6	Y	8,760	2 -F40T12 U TUBE-ES LAMP-ES BALLAST	2 - F32T8 -6" U- TUBE - ELECTRONIC	0.144	0.118
571	TERMINAL 4	1	BAGGAGE OFFICES	6	6	2X43EE	2X42T28R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.618	0.300
572	TERMINAL 4	1	BAGGAGE OFFICES	4	4	1X42EE	1X42T28	Y	6,750	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.276	0.200
573	TERMINAL 4	1	AIR CANADA	4	4	2X44EE	2X42T28R	Y	6,750	4 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.552	0.200
574	TERMINAL 4	1	PUBLIC BAGGAGE	4	4	2X44EE	2X42T28R	Y	6,750	4 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.552	0.200
575	TERMINAL 4	1	DISPLAY SIGNS	36	36	1X32SS	1X32T8L	Y	6,750	2 -F30-T12-STD LAMP-STD BALLAST	2 -F025T8- LOW POWER	2.556	1.332
576	TERMINAL 4	1	UNDER CONCOURSE	81	81	HPS-400	NV-1X84T28	N	6,750	400 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	37.665	7.047

RET.	BUILDING	FLR	ROOM DESCRIPTION	EXIST.	PROP.	ExistCode	PropCode	A/C	Hours/Yr	ExistDescription	PropDescription	ExistkWh	PropkWh
577	TERMINAL 4	1	REAR OFFICES/MISC.	600	600	2X43EE	2X42T28R	Y	6,750	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	61.800	30.000
578	TERMINAL 4	1	BAGGAGE HANDLING	130	130	HPS-400	NV-1X84T28	N	6,750	400 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	60.450	11.310
579	TERMINAL 4	1	MISC ROOM	18	18	1X42EE	1X42T28	Y	6,750	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	1.242	0.900
580	TERMINAL 4	1	MECHANICAL RMS	40	40	1X42EE	1X42T28	N	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	2.760	2.000
581	TERMINALS ROADWAY	1	ABOVE ROAD	184	184	HPS-150	NV-1X84T28	N	8,760	150 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	36.800	16.008
582	URS BLDG	1	GENERAL AREA	17	17	1X42EE	1X42T28	Y	4,380	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	1.173	0.850
583	URS BLDG	1	GENERAL AREA	3	3	1X42EE	1X42T28	Y	4,380	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	0.207	0.150
584	URS BLDG	1	GENERAL AREA	24	24	2X42T8	2X42T28	Y	4,380	2-FO32T8 ELECTRONIC	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	1.416	1.200
585	URS BLDG	1	EXTERIOR	8	8	MH-250	NV-1X84T28	N	4,380	250 WATT METAL HALIDE/BALLAST	NEW VAPORTIGHT - 1X8 4-28 WATT T8 - 4-LAMP ELECTRONIC BALLAST	2.400	0.696
586	URS BLDG	1	EXTERIOR	2	2	MH-400	NR	N	4,380	400 WATT METAL HALIDE/BALLAST	NO RETROFIT	0.920	0.000
587	URS BLDG	1	EXTERIOR	4	4	75A	13CFN	N	4,380	INCANDESCENT "A" LAMPS - 75 WATT	13 WATT COMPACT FLUORESCENT NEW FIXTURE	0.300	0.068
588	WEST MAINTENANCE	1	OFFICES ETC	8	8	2X43EE	2X42T28R	Y	8,760	3 -F40T12-ES LAMP-ES BALLAST	2X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST REFLECTOR	0.824	0.400
589	WEST MAINTENANCE	1	GENERAL AREA	154	154	1X42EE	1X42T28	Y	8,760	2 -F40T12-ES LAMP-ES BALLAST	1X4 2-LAMP 28 WATT T8 2-LAMP ELECTRONIC BALLAST	10.626	7.700
590	WEST MAINTENANCE	1	EXTERIOR	43	43	HPS-100	NV-1X42T28	N	8,760	100 HIGH PRESSURE SODIUM/BALLAST	NEW VAPORTIGHT - 1X4 2-28 WATT T8 2-LAMP ELECTRONIC BALLAST	5.805	2.150
			TOTALS	26,959	26,893								

Sum of EXIST.	BUILDING														
ExistCode	BCAD BLDG NORTH	BCAD BLDG SOUTH	CYRESS RCC	FACILITIES BLDG	HIBISCUS GARAGE	PALM GARAGE	TERMINAL 1	TERMINAL 1 ENPLANE	TERMINAL 2	TERMINAL 3	TERMINAL 4	TERMINAL 4	TERMINALS ROADWA	URS BLDG	WEST MAINTENANCE	Grand Total
13CFL										18						18
1X1234T8											3					3
1X13T8U3									162	139						301
1X22SS									11	4	4	1				20
1X2BIAX40										45						45
1X32SS									16	22		36				74
1X32T8									23	414						437
1X41EE										150						150
1X41T8										60	12					72
1X42EE									166	622	65	79		20	154	1106
1X42SS									3	2	4					9
1X42T8			327		538		1537		244	831	300					3777
1X81SS									40							40
1X82SS									60							60
2.32CFL											370	46				416
2X22T8U6	1								236	156						393
2X22UEE									35	15		26				76
2X42EE										68						68
2X42T8	79	326									98			24		527
2X43EE									1132	599		844			8	2583
2X43T8	5	92	12	100	16		91		691	1255	475	183				2920
2X44EE									13	442		10				465
2X44T8	44	46														90
70HA20										32						32
75A									10	122				4		136
75R30									27	225						252
E2.20						16			2	4	6					28
ELED					252											252
HPS-100					17										43	60
HPS-150					3666	805			94	330			184			5079
HPS-200									11							11
HPS-250					46						4					50
HPS-400					68							211				279
MH-100		42						132								174
MH-150			4596													4596
MH-175							96									96
MH-200					682											682
MH-250			180		64	42		66						8		360
MH-400			633	57			295							2		987
MV-100									11	209		15				235
Grand Total	129	506	5748	157	5349	863	2019	198	2987	5764	1341	1451	184	58	205	26959

Sum of PROP.			
PropCode	Total	UNIT PRICE	TOTAL
13CFN	4	50.00	200.00
15CFD	10	55.00	550.00
15CFR	9	65.00	585.00
15CFS	140	15.00	2,100.00
18CFR	257	65.00	16,705.00
1X1234T28	3	16.00	48.00
1X22T8L	20	65.00	1,300.00
1X32T8L	74	65.00	4,810.00
1X41T28	222	12.00	2,664.00
1X42T28	4850	14.00	67,900.00
1X42T28L	42	65.00	2,730.00
1X81T8	40	85.00	3,400.00
1X824T28RKIT	60	100.00	6,000.00
2.13CFN	15	75.00	1,125.00
2.22CFN	220	95.00	380.00
2.42CFH	66	105.00	6,930.00
2X22T8U6	76	85.00	6,930.00
2X42T28	595	14.00	8,330.00
2X42T28R	3815	85.00	8,330.00
2X42T8R	104	85.00	324,275.00
2X43T28	2139	16.00	34,224.00
42CFN	42	150.00	6,300.00
MH-100PS	64	200.00	12,800.00
MH-300PS	295	200.00	59,000.00
NF-ELED	28	50.00	1,400.00
NR	2145	0.00	0.00
NV-1X42T28	7709	200.00	1,541,800.00
NV-1X84T28	3849	300.00	1,154,700.00
Total	**26893**		**$3,275,516**
Less Rebate			**$215,071**
Net Project Cost (includes labor)			**$3,059,545**

B.2.

Lighting System Log Data

JOHNSON CONTROLS, INC. - FORT LAUDERDALE - HOLLYWOOD INTERNATIONAL AIRPORT									
LOGGER DATA ANALYSIS			DATA COLLECTED FROM 9/19/06 TO 9/25/06 IN TERMINALS 1-4						
					START		END		
TERM	OCCUPIED	VACANT	LOGGER	GATE	DATE	TIME	DATE	TIME	TOTAL HRS
1	24.40	1.73	1	B-1	9/19/06	11:10 AM	9/20/06	1:28 PM	26.13
1	22.28	3.78	2	B-2	9/19/06	11:20 AM	9/20/06	1:30 PM	26.06
1	21.56	4.47	4	B-4	9/19/06	11:25 AM	9/20/06	1:32 PM	26.03
1	19.30	6.76	3	B-7	9/19/06	11:30 AM	9/20/06	1:33 PM	26.06
2	9.88	11.47	1	D-1	9/20/06	2:05 PM	9/21/06	2:00 PM	21.35
2	13.50	10.37	2	D-3	9/20/06	2:06 PM	9/21/06	2:03 PM	23.87
2	13.94	9.98	4	D-6	9/20/06	2:15 PM	9/21/06	2:05 PM	23.92
2	13.59	10.22	3	D-9	9/20/06	2:18 PM	9/21/06	2:07 PM	23.81
3	11.03	13.26	1	E-1	9/21/06	2:25 PM	9/22/06	2:51 PM	24.29
3	7.82	16.44	2	E-6	9/21/06	2:28 PM	9/22/06	2:53 PM	24.26
3	7.42	16.99	3	E-7	9/21/06	2:30 PM	9/22/06	2:55 PM	24.41
3	8.38	16.02	4	E-8	9/21/06	2:31 PM	9/22/06	2:57 PM	24.40
4	40.13	33.49	1	H-1	9/22/06	3:26 PM	9/25/06	5:35 PM	73.62
4	49.20	24.48	2	H-5	9/22/06	3:28 PM	9/25/06	5:38 PM	73.68
4	43.47	29.20	3	H-8	9/22/06	3:30 PM	9/25/06	5:40 PM	72.67
4	37.15	36.95	4	H-9	9/22/06	3:32 PM	9/25/06	5:42 PM	74.10
TERMS. 2-4	21.29	19.07	47.68%	UNOCCUPIED - MOTION SENSORS HIGHLY RECOMMENDED					
TERM. 1	21.89	4.19	16.10%	UNOCCUPIED - MOTION SENSORS NOT RECOMMENDED					

C.1.

Photovoltaic Project Data Option 1

RETScreen® Energy Model - Photovoltaic Project

Training & Support

Site Conditions		Estimate	Notes/Range
Project name		Fort Lauderdale-Hollywood International Airport	See Online Manual
Project location		Broward County, Florida	
Nearest location for weather data	-	Miami, FL	Complete SR&SL sheet
Latitude of project location	°N	25.8	-90.0 to 90.0
Annual solar radiation (tilted surface)	MWh/m²	2.21	
Annual average temperature	°C	24.2	-20.0 to 30.0

System Characteristics		Estimate	Notes/Range
Application type	-	**On-grid**	
Grid type	-	Central-grid	
PV energy absorption rate	%	100.0%	
PV Array			
PV module type	-	mono-Si	
PV module manufacturer / model #		Canadian Solar/ CS6C-125M	See Product Database
Nominal PV module efficiency	%	15.4%	4.0% to 15.0%
NOCT	°C	45	40 to 55
PV temperature coefficient	% / °C	0.40%	0.10% to 0.50%
Miscellaneous PV array losses	%	5.0%	0.0% to 20.0%
Nominal PV array power	kWp	**25.00**	
PV array area	m²	162.3	
Power Conditioning			
Average inverter efficiency	%	90%	80% to 95%
Suggested inverter (DC to AC) capacity	kW (AC)	22.5	
Inverter capacity	kW (AC)	30.0	
Miscellaneous power conditioning losses	%	0%	0% to 10%

Annual Energy Production (12.00 months analysed)		Estimate	Notes/Range
Specific yield	kWh/m²	268.7	
Overall PV system efficiency	%	12.1%	
PV system capacity factor	%	19.9%	
Renewable energy collected	MWh	48.463	
Renewable energy delivered	MWh	**43.617**	
	kWh	43,617	
Excess RE available	MWh	**0.000**	
			Complete Cost Analysis sheet

Version 3.2

NRCan/CETC - Varennes

RETScreen® Solar Resource and System Load Calculation - Photovoltaic Project

Site Latitude and PV Array Orientation		Estimate	Notes/Range
Nearest location for weather data		Miami, FL	See Weather Database
Latitude of project location	°N	25.8	-90.0 to 90.0
PV array tracking mode	-	Azimuth	
Slope of PV array	°	30.0	0.0 to 90.0

Monthly Inputs

Month	Fraction of month used (0 - 1)	Monthly average daily radiation on horizontal surface (kWh/m²/d)	Monthly average temperature (°C)	Monthly average daily radiation in plane of PV array (kWh/m²/d)	Monthly solar fraction (%)
January	1.00	3.54	19.6	5.11	-
February	1.00	4.24	20.1	5.77	-
March	1.00	5.15	22.0	6.53	-
April	1.00	5.93	23.9	7.08	-
May	1.00	5.93	25.7	6.96	-
June	1.00	5.57	27.0	6.38	-
July	1.00	5.83	28.0	6.78	-
August	1.00	5.59	28.0	6.46	-
September	1.00	4.88	27.4	5.89	-
October	1.00	4.35	25.5	5.73	-
November	1.00	3.66	22.9	5.15	-
December	1.00	3.31	20.6	4.88	-

		Annual	Season of use
Solar radiation (horizontal)	MWh/m²	1.76	1.76
Solar radiation (tilted surface)	MWh/m²	2.21	2.21
Average temperature	°C	24.2	24.2

Load Characteristics		Estimate
Application type	-	On-grid

Return to Energy Model sheet

Version 3.2 NRCan/CETC - Varennes

RETScreen® Cost Analysis - Photovoltaic Project

Type of analysis: Pre-feasibility | Currency: $ | Cost references: None

Initial Costs (Credits)	Unit	Quantity	Unit Cost	Amount	Relative Costs	Quantity Range	Unit Cost Range
Feasibility Study							
Other - Feasibility study	Cost	1	$ 1,250	$ 1,250		-	-
Sub-total :				**$ 1,250**	0.5%		
Development							
Other - Development	Cost	1	$ 2,500	$ 2,500		-	-
Sub-total :				**$ 2,500**	1.1%		
Engineering							
Other - Engineering	Cost	1	$ 25,000	$ 25,000		-	-
Sub-total :				**$ 25,000**	11.0%		
Energy Equipment							
PV module(s)	kWp	25.00	$ 4,000	$ 100,000		-	-
Transportation	project	0	$ -	$ -		-	-
Other - Energy equipment	Cost	0	$ -	$ -		-	-
Credit - Energy equipment	Credit	0	$ -	$ -		-	-
Sub-total :				**$ 100,000**	43.9%		
Balance of Equipment							
Module support structure	m^2	162.3	$ -	$ -		-	-
Inverter	kW AC	30.0	$ -	$ -		-	-
Other electrical equipment	kWp	25.00	$ -	$ -		-	-
System installation	kWp	25.00	$ 3,500	$ 87,500		-	-
Transportation	project	0	$ -	$ -		-	-
Other - Balance of equipment	Cost	0	$ -	$ -		-	-
Credit - Balance of equipment	Credit	0	$ -	$ -		-	-
Sub-total :				**$ 87,500**	38.4%		
Miscellaneous							
Training	p-h	8	$ 65	$ 520		-	-
Contingencies	%	5%	$ 216,770	$ 10,839		-	-
Sub-total :				**$ 11,359**	5.0%		
Initial Costs - Total				**$ 227,609**	100.0%		

Annual Costs (Credits)	Unit	Quantity	Unit Cost	Amount	Relative Costs	Quantity Range	Unit Cost Range
O&M							
Property taxes/Insurance	project	0	$ -	$ -		-	-
O&M labour	p-h	0	$ -	$ -		-	-
Other - O&M	Cost	8	$ 55	$ 440		-	-
Credit - O&M	Credit	0	$ -	$ -		-	-
Contingencies	%	0%	$ 440	$ -		-	-
Sub-total :				**$ 440**	100.0%		
Annual Costs - Total				$ 440	100.0%		

Periodic Costs (Credits)		Period	Unit Cost	Amount		Interval Range	Unit Cost Range
Inverter Repair/Replacement	Cost	12 yr	$ 5,000	**$ 5,000**		-	-
			$ -	**$ -**		-	-
			$ -	**$ -**		-	-
End of project life		-	$ -	**$ -**			

Go to GHG Analysis sheet

RETScreen® Greenhouse Gas (GHG) Emission Reduction Analysis - Photovoltaic Project

Use GHG analysis sheet? Yes | Type of analysis: Standard

Background Information

Project Information

Project name	Fort Lauderdale-Hollywood International Airport
Project location	Broward County, Florida

Global Warming Potential of GHG

1 tonne CH_4 =	21	tonnes CO_2	(IPCC 1996)
1 tonne N_2O =	310	tonnes CO_2	(IPCC 1996)

Base Case Electricity System (Baseline)

Fuel type	Fuel mix (%)	CO_2 emission factor (kg/GJ)	CH_4 emission factor (kg/GJ)	N_2O emission factor (kg/GJ)	Fuel conversion efficiency (%)	T & D losses (%)	GHG emission factor (t_{CO2}/MWh)
Natural gas	50.0%	56.1	0.0030	0.0010	45.0%	8.0%	0.491
Coal	50.0%	94.6	0.0020	0.0030	35.0%		0.983
Electricity mix	100.0%	202.9	0.0065	0.0055		4.0%	0.737

Proposed Case Electricity System (Photovoltaic Project)

Fuel type	Fuel mix (%)	CO_2 emission factor (kg/GJ)	CH_4 emission factor (kg/GJ)	N_2O emission factor (kg/GJ)	Fuel conversion efficiency (%)	T & D losses (%)	GHG emission factor (t_{CO2}/MWh)
Electricity system							
Solar	100.0%	0.0	0.0000	0.0000	100.0%	4.0%	0.000

GHG Emission Reduction Summary

	Base case GHG emission factor (t_{CO2}/MWh)	Proposed case GHG emission factor (t_{CO2}/MWh)	End-use annual energy delivered (MWh)		Annual GHG emission reduction (t_{CO2})
Electricity system	0.737	0.000	41.872		30.86
			Net GHG emission reduction	t_{CO2}/yr	**30.86**

Complete Financial Summary sheet

RETScreen® Financial Summary - Photovoltaic Project

Annual Energy Balance

Project name	Fort Lauderdale-Hollywood International Airport				
Project location		Broward County, Florida	Nominal PV array power	kWp	25.00
Renewable energy delivered	MWh	43.617	Net GHG reduction	t_{CO2}/yr	30.86
Firm RE capacity	kW	-	Net GHG emission reduction - 25 yrs	t_{CO2}	771.55
Application type		On-grid			

Financial Parameters

Avoided cost of energy	$/kWh	0.070	Debt ratio	%	60.0%
RE production credit	$/kWh	-	Debt interest rate	%	4.5%
			Debt term	yr	15
GHG emission reduction credit	$/$t_{CO2}$	-	Income tax analysis?	yes/no	No
Energy cost escalation rate	%	2.5%			
Inflation	%	2.5%			
Discount rate	%	9.0%			
Project life	yr	25			

Project Costs and Savings

Initial Costs				**Annual Costs and Debt**		
Feasibility study	0.5%	$	1,250	O&M	$	440
Development	1.1%	$	2,500	Fuel	$	-
Engineering	11.0%	$	25,000	Debt payments - 15 yrs	$	12,716
Energy equipment	43.9%	$	100,000	**Annual Costs and Debt - Total**	**$**	**13,156**
Balance of equipment	38.4%	$	87,500			
Miscellaneous	5.0%	$	11,359	**Annual Savings or Income**		
Initial Costs - Total	**100.0%**	**$**	**227,609**	Energy savings/income	$	3,053
Incentives/Grants		$	100,000			
				Annual Savings - Total	**$**	**3,053**
Periodic Costs (Credits)						
Inverter Repair/Replacement		$	5,000	Schedule yr # 12,24		
		$	-			
		$	-			
End of project life -		$	-			

Financial Feasibility

			Calculate energy production cost?	yes/no	Yes
Pre-tax IRR and ROI	%	-12.2%	Energy production cost	$/kWh	0.19
After-tax IRR and ROI	%	-12.2%	Calculate GHG reduction cost?	yes/no	Yes
Simple Payback	yr	48.8	GHG emission reduction cost	$/$t_{CO2}$	214
Year-to-positive cash flow	yr	immediate	Project equity	$	91,043

Yearly Cash Flows

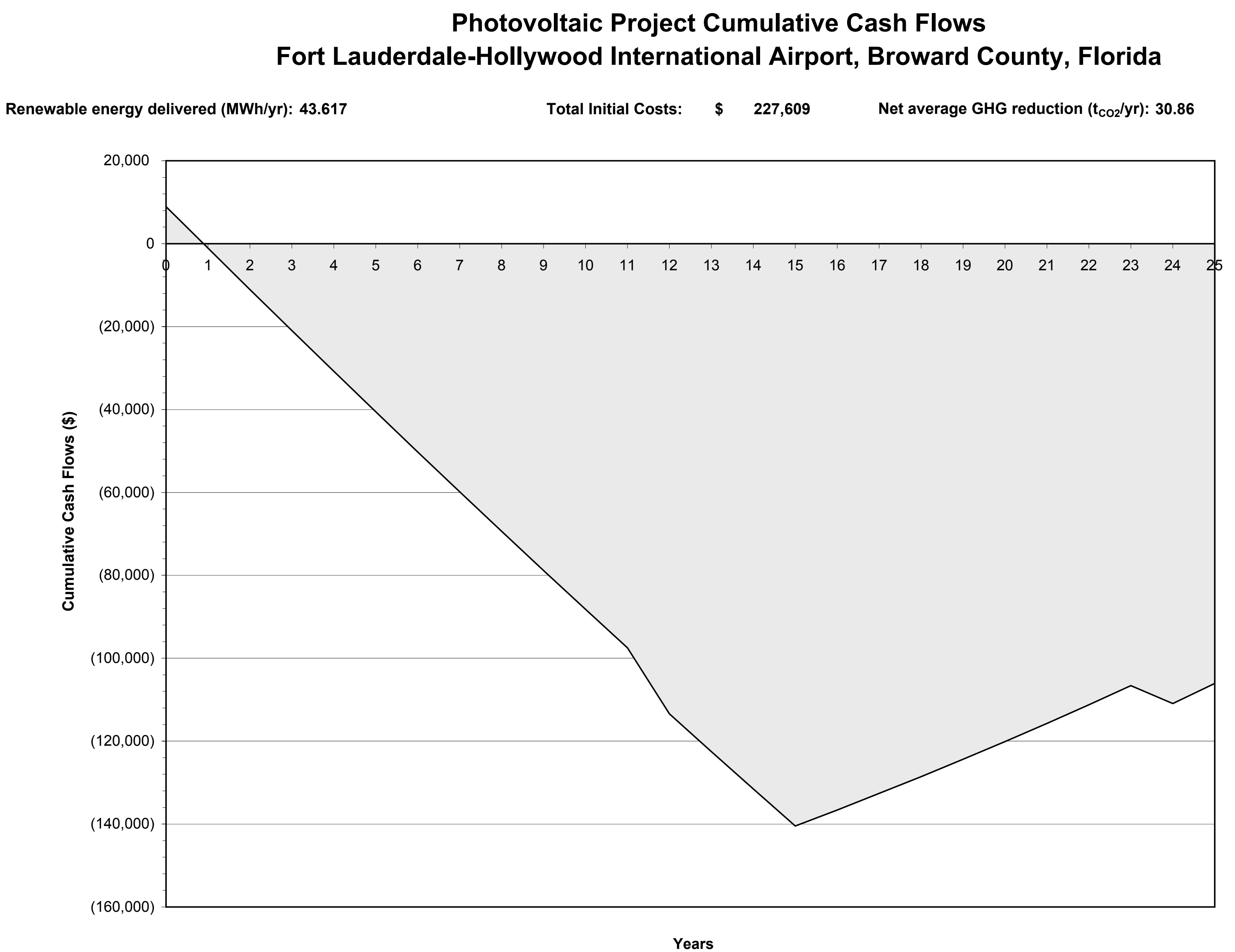
Year #	Pre-tax $	After-tax $	Cumulative $
0	8,957	8,957	8,957
1	(10,038)	(10,038)	(1,081)
2	(9,971)	(9,971)	(11,052)
3	(9,902)	(9,902)	(20,954)
4	(9,832)	(9,832)	(30,785)
5	(9,760)	(9,760)	(40,545)
6	(9,686)	(9,686)	(50,230)
7	(9,610)	(9,610)	(59,840)
8	(9,532)	(9,532)	(69,372)
9	(9,453)	(9,453)	(78,825)
10	(9,371)	(9,371)	(88,196)
11	(9,287)	(9,287)	(97,483)
12	(15,926)	(15,926)	(113,409)
13	(9,114)	(9,114)	(122,523)
14	(9,024)	(9,024)	(131,547)
15	(8,931)	(8,931)	(140,478)
16	3,879	3,879	(136,599)
17	3,976	3,976	(132,623)
18	4,076	4,076	(128,547)
19	4,178	4,178	(124,369)
20	4,282	4,282	(120,087)
21	4,389	4,389	(115,698)
22	4,499	4,499	(111,199)
23	4,611	4,611	(106,588)
24	(4,317)	(4,317)	(110,905)
25	4,845	4,845	(106,061)

RETScreen® Financial Summary - Photovoltaic Project

Net Present Value - NPV	$	(64,729)	Project debt	$	136,565
Annual Life Cycle Savings	$	(6,590)	Debt payments	$/yr	12,716
Benefit-Cost (B-C) ratio	-	0.29	Debt service coverage	-	(0.25)

RETScreen® Financial Summary - Photovoltaic Project

Cumulative Cash Flows Graph



RETScreen® Financial Summary - Photovoltaic Project

Year-to-positive cash flow: immediate **Net Present Value: $ -64,729**

RETScreen® Sensitivity and Risk Analysis - Photovoltaic Project

Use sensitivity analysis sheet?	Yes	Perform analysis on	After-tax IRR and ROI
Perform risk analysis too?	No	Sensitivity range	20%
Project name	Fort Lauderdale-Hollywood International Airport	Threshold	15.0 %
Project location	Broward County, Florida		

Sensitivity Analysis for After-tax IRR and ROI

RE delivered (MWh)		Avoided cost of energy ($/kWh) 0.0560 -20%	0.0630 -10%	**0.0700** 0%	0.0770 10%	0.0840 20%
34.894	-20%	-22.7%	-19.0%	-16.5%	-14.6%	-13.0%
39.255	-10%	-19.0%	-16.3%	-14.2%	-12.4%	-10.9%
43.617	0%	-16.5%	-14.2%	**-12.2%**	-10.6%	-9.1%
47.979	10%	-14.6%	-12.4%	-10.6%	-9.0%	-7.5%
52.340	20%	-13.0%	-10.9%	-9.1%	-7.5%	-6.1%

Initial costs ($)		Avoided cost of energy ($/kWh) 0.0560 -20%	0.0630 -10%	**0.0700** 0%	0.0770 10%	0.0840 20%
182,087	-20%	-13.8%	-11.2%	-9.0%	-7.0%	-5.1%
204,848	-10%	-15.3%	-12.8%	-10.8%	-9.1%	-7.5%
227,609	0%	-16.5%	-14.2%	**-12.2%**	-10.6%	-9.1%
250,369	10%	-17.6%	-15.3%	-13.4%	-11.8%	-10.4%
273,130	20%	-18.5%	-16.2%	-14.4%	-12.8%	-11.5%

Annual costs ($)		Avoided cost of energy ($/kWh) 0.0560 -20%	0.0630 -10%	**0.0700** 0%	0.0770 10%	0.0840 20%
352	-20%	-15.8%	-13.6%	-11.7%	-10.2%	-8.7%
396	-10%	-16.2%	-13.9%	-12.0%	-10.4%	-8.9%
440	0%	-16.5%	-14.2%	**-12.2%**	-10.6%	-9.1%
484	10%	-16.9%	-14.5%	-12.5%	-10.8%	-9.3%
528	20%	-17.3%	-14.8%	-12.8%	-11.1%	-9.5%

Debt interest rate (%)		Debt ratio (%) 48.0% -20%	54.0% -10%	**60.0%** 0%	66.0% 10%	72.0% 20%
3.6%	-20%	-9.8%	-10.7%	-11.5%	-12.4%	-13.2%
4.1%	-10%	-10.1%	-11.0%	-11.9%	-12.7%	-13.5%
4.5%	0%	-10.4%	-11.4%	**-12.2%**	-13.1%	-13.9%
5.0%	10%	-10.7%	-11.7%	-12.6%	-13.4%	-14.2%
5.4%	20%	-11.1%	-12.0%	-12.9%	-13.8%	-14.6%

Debt interest rate (%)		Debt term (yr) 12.0 -20%	13.5 -10%	**15.0** 0%	16.5 10%	18.0 20%
3.6%	-20%	-8.9%	-9.4%	-11.5%	-12.4%	-16.0%
4.1%	-10%	-9.2%	-9.7%	-11.9%	-12.9%	-16.5%
4.5%	0%	-9.4%	-10.0%	**-12.2%**	-13.3%	-17.0%
5.0%	10%	-9.7%	-10.3%	-12.6%	-13.7%	-17.5%
5.4%	20%	-9.9%	-10.5%	-12.9%	-14.0%	-18.0%

C.2.

Photovoltaic Project Data Option 2

SolarIntegrated

Thinking Integrated. Building Integrated.

Sustainable Roofing Solutions Made Easy Today

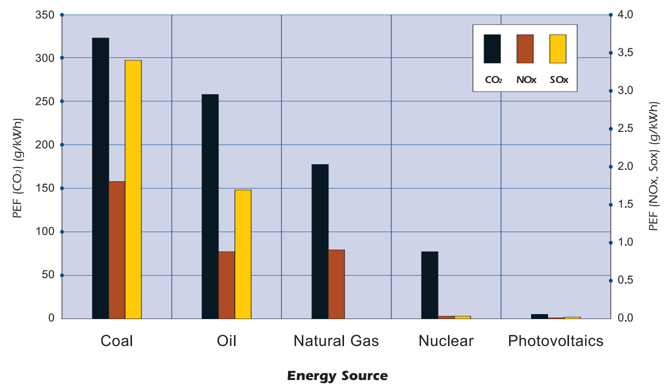
Businesses today face the challenge of cutting costs and improving efficiencies while making a profit in a sustainable manner. Solar Integrated's low slope photovoltaic roofing products are designed to address this challenge. The product integrates a durable, low maintenance, waterproof membrane with lightweight, thin-film photovoltaic cells. The result is a roofing system that produces clean power while protecting the building's interior, improving the building's efficiency and reducing utility and maintenance bills. Not only can customers save money by offsetting the most expensive peak power, but often times can get credit for feeding excess solar power into the local electrical grid.

In addition to providing a superior product, Solar Integrated delivers a total solution making it easy to get a hassle-free sustainable roofing system. Based on an initial audit of your facility, our qualified sales people will make customized roofing recommendations, as well as advise you on financing options, utility rebates and tax incentive programs. With a certified ISO 9001 quality management system in place, our engineers will custom design, manufacture and install a system that meets your exact needs. And with a commitment to our customers that is second to none, we back up every system with a 20-year warranty and extensive maintenance package that enhances and extends the life of any new or existing roof. From routine inspections and optional 24/7 emergency response care; to real-time internet-based system monitoring—Solar Integrated will take care of you and your roofing investment over the long run.

If you are looking to replace or build a new roof or planning a LEED certified green building, consider a photovoltaic roofing system and save money.

Pollutant Emission Factors for Electrical Generation

(The Total Fuel Cycle)



Photovoltaics are the cleanest form of electricity generation when all factors are considered from fuel extraction to equipment manufacturing to generation.

Audit/Feasibility Study
▼
Rebates & Incentives
▼
Qualification
▼
Financing
▼
System Engineering
▼
Manufacturing
▼
Installation
▼
Maintenance
▼
Warranty
▼
Savings

Case Study: Coca-Cola

Coca-Cola turned to Solar Integrated to transform its roofing needs into an opportunity to embrace green energy and significantly offset utility costs in the process. Solar Integrated installed a 329 kW photovoltaic roofing system that significantly decreases Coca-Cola's peak electricity expenditure while reducing on-going roof maintenance costs. This initial project led to multiple solar roofing installations on other Coca-Cola facilities in the Los Angeles area.

Case Study: ProLogis

Solar Integrated is working with ProLogis, a leading global provider of distribution facilities and services, to install one of the largest solar projects in France. ProLogis has pledged to make its 2.7 million square-foot distribution center near Paris in Moissy-Cramayel, France, one of the most environmentally-friendly distribution centers in the world. Solar Integrated installed a 446 kW photovoltaic roofing system on one of the center's warehouses.

The project was completed in less than three months and the customer is very pleased with the finished product and quality of workmanship.

Easy to Install & Maintain

Lightweight

Rugged & Durable

Weather-tight

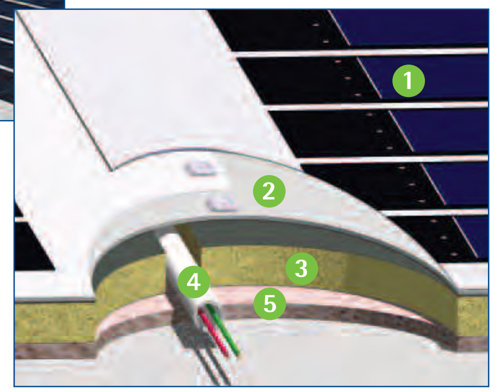
Tailored Solution

20-Year Warranty

Rugged Roofing Designed and Built to Last

Environmentally friendly, durable roofing products are an important part of sustainable construction. Solar Integrated has combined a single-ply roofing membrane under the EPA's ENERGY STAR® program with the most advanced amorphous silicon photovoltaic cells. The result is an integrated, efficient, flexible photovoltaic roofing panel that rolls onto low slope surfaces.

Solar Integrated starts with the existing roof top surface and adds rigid insulation and gypsum board that provides resistance against punctures and a Class-A fire rating. The roof is also topped with a durable white membrane. These three components provide customers with an energy efficient, weather-tight roof that significantly improves the thermal performance of the roof and reduces energy consumption by lowering the rooftop temperatures. This is accomplished by reflecting solar radiance rather than absorbing it, a feature that actually improves the productivity of the photovoltaic cells once they are added. Solar Integrated can offer pre-wired roofing solutions allowing for an easy-to-install solar retrofit when it best suits your needs and budget.



1. *Flexible Photovoltaic Roofing Panel*
2. *Gypsum Board Fire Barrier*
3. *Rigid Foam Insulation*
4. *Electrical Wiring Conduit*
5. *Existing Roof Deck*

Case Study: San Diego Schools

Challenger Middle School Bethune Elementary Eugene Brucker Education Center Jackson Elementary Juarez Elementary Lewis Junior High Mason Elementary Sequoia Elementary Serra Hig

At Solar Integrated, we are working with the San Diego City Schools (SDCS) to achieve their green campus goals by installing several megawatts of solar power on dozens of campuses. These systems generate clean electricity, reduce operating costs, and enable SDCS managers to predict future utility bills. Solar Integrated is also working with SDCS teachers to turn their roofs into educational tools. Using the interactive Renewable Energy Management tool, students can gather real-time solar production data from their school rooftops and translate this information into easy to understand facts and figures.

Generating Electricity for the Long Run

Until the introduction of Solar Integrated's photovoltaic roofing product, the installation of solar panels on large area low slope roofs was limited due to the heavy weight of traditional rigid crystalline panels and the related racks and roof penetrations required to secure these panels. The Solar Integrated photovoltaic roofing system addresses this problem in the following ways:

Lightweight

The Solar Integrated photovoltaic panel is the lightest in the industry, weighing only 12 ounces per square foot, allowing for installation on existing facilities without exceeding roof loading limits. Typical installations range from 50 kW to 1 MW.

More Powerful

The amorphous silicon panels enable maximum kilowatt-hour output, producing electricity using a wider spectrum of light than traditional crystalline technology. This feature enables optimum electricity production, even when it is cloudy.

Easy to Install

The attractive flexible photovoltaic roof literally rolls right on. Solar Integrated employs highly skilled professionals who consistently receive customer commendations for quality workmanship.

Rugged and Durable

Durability, to cope with challenging weather conditions, and stability, to handle changing light and shade conditions, have been built into all photovoltaic roofing products.

The Renewable Energy Management (REM) System.

Manage and Predict Power Costs

By using an internet-based proprietary Renewable Energy Management (REM) system customers can access enterprise-wide, real-time energy data from rooftops and transform it into valuable, useable knowledge, offset peak electricity and stabilize utility bills.

Attractive Appearance

Our unique electrical engineering integrates the solar array within the roofing assembly providing a neat and uncluttered roof surface.

Thin, lightweight PV technology combined with a flexible single-ply roofing membrane makes our roofing system extremely durable and easy-to-install.

Flexible Solar Panels

High Power Output

Predictable Power Costs

Energy Security

Renewable Green Power

Real-time Energy Data

Leveraging 80 years of roofing experience, we've got you covered

Solar Integrated has its roots in the commercial roofing industry. Over the past 80 years, the Company has evolved from a traditional industrial roofing supplier into the leading provider of Building Integrated Photovoltaic (BIPV) roofing systems. Solar Integrated's unique approach to the renewable energy market enables it to stand out from the competition by supplying a product that produces clean renewable energy, while offering a durable industrial-grade roof. Solar Integrated has developed a proprietary process to combine lightweight, thin-film photovoltaic (PV) cells and heavy-duty industrial fabrics. The result is an integrated solar panel that can be installed on virtually any flat or low slope surface. In addition to roofing products, the company also develops portable and mobile solar applications.

Solar Integrated is headquartered in California with offices in New Jersey, Nevada, Arizona, Washington, Canada and Germany, with BIPV manufacturing in Los Angeles.

Solar Roofing Solutions

Portable Solar Solutions

SolarIntegrated

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SolarIntegrated

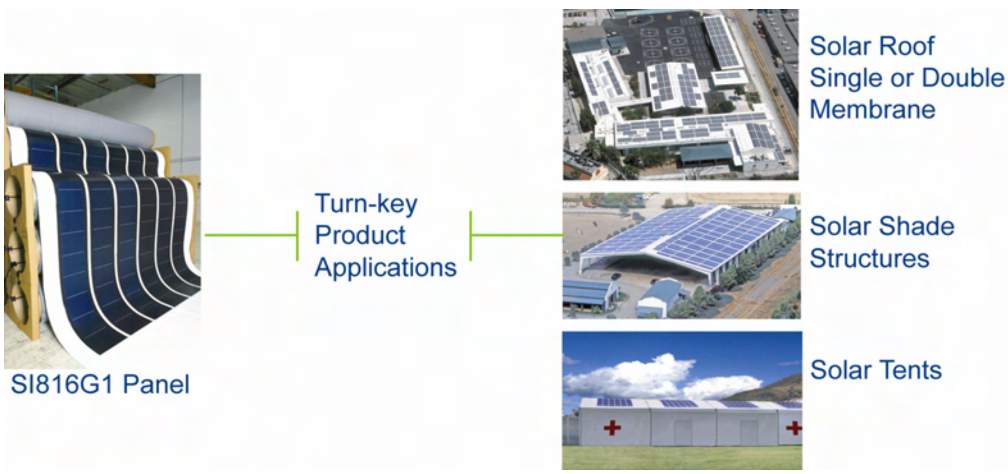
SI816G1Product Information

Solar Panels: Built to Last and Generate Reliable Power

Overview

Ideal for new construction or rooftop replacements, shade structures and solar tents, Solar Integrated's building integrated photovoltaic (BIPV) solar panel is a unique product designed for multiple solar applications. The SI816G1, engineered as a weather-tight solar panel, combines low maintenance industrial fabrics with UNI-SOLAR lightweight, amorphous PV cells. The result is a flexible durable solar panel that can be installed on virtually any low slope surface.

Until the introduction of Solar Integrated's BIPV products, the installation of solar panels on industrial rooftops, shade structures or tents was limited due to the heavy weight of rigid crystalline panels. The lightweight Solar Integrated products eliminate this issue and allow virtually any structure to generate electricity.



Key Product Features

- **Lightweight -** The solar panel is the lightest in the industry, weighing only 12 ounces per square foot.
- **Rugged and durable** - Durability to cope with challenging weather conditions and stability to handle changing light and shade conditions are built into our BIPV products. In addition, unlike crystalline panels, our systems incorporate bypass technology enabling power production even when damaged.
- **Powerful** – Amorphous silicon panels enable maximum kilowatt-hour output, producing electricity using a wider spectrum of light than traditional crystalline technology. This feature enables optimum electricity production, even when it is cloudy.
- **Reduced Silicon** - While 94% of all solar panels require silicon as a raw ingredient, amorphous silicon uses silane gas and not purified silicon. Therefore, the technology is not effected by the raw silicon shortages.

SI816G1 Electrical Specifications

Power (Pmax) (Watts)	816.0
PTC Power (Pmax PTC) (Watts) [1]	772.4
Operating Voltage (Vmax) (Volts)	198.0
Operating Current (Imax) (Amp)	4.13
Open Circuit Voltage (Voc) (Volts)	277.2
Short Circuit Current (Isc) (Amp)	5.1
Maximum System Voltage (Volts)	600.0
Voc (-10C CellT @ 1.25 sun) (Volts)	316.2
Isc (75C CellT @ 1.25 sun) (Amp)	6.7
Series Fuse Rating (Amp)	8.0
Blocking Diode Rating (Amp)	8.0

SI816G1 Physical Specifications

Length (ft)	20.0
Length (mm)	6096.0
Width (ft)	10.0
Width (mm)	3050.0
Thickness (in)	0.12
Thickness (mm)	3.05
Weight (lb)	147.73
Weight (kg)	67.0

[1] Also available in double panels (1632 watts). Multiple single and double panels are configurable to virtually any output requirements.

Electrical and Safety Certifications and Listings

The Solar Integrated SI816G1 solar panel is certified to the following standards:

- Certified to UL 1703 standard
- IECEE CB-FCS
- Class A Fire Rating

Endurance Tested

Solar Integrated's BIPV products have passed UL, IEC and TUV tests for accelerated aging, electrical safety, weather resistance, thermal shock, hail impact and humidity and freeze cycling.

Leveraging Over 80 Years of Roofing Experience, We've Got You Covered!

Solar Integrated is a leading provider of BIPV products for multiple applications. Contact us for a free layout design of a solar rooftop or shade structure or get a quote for a solar tent. Our team will design a customized system using multiple panels, configured for maximum coverage and electricity output. Go to our website at www.solarintegrated.com and fill in our Is Solar Right for You? on-line questionnaire.

SolarIntegrated

Thinking Integrated. Building Integrated.

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