GREENHOUSE GAS EMISSION REDUCTION IN ST. LUCIA

Report on:
Energy Audit Training Workshop and Training Audits
Summary Report

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Lewis Engineering Inc.

GOVERNMENT OF SAINT LUCIA

MARBEK
Resource Consultants Ltd.

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1.1 INTRODUCTION

On February 11, 12 and 13, 2004, a series of training workshops and audits in energy management for the Hospitality sector was conducted in the Castries and Rodney Bay areas in St. Lucia. This training was part of a project being undertaken by Lewis Engineering Inc., Marbek Resource Consultants Inc., and the St. Lucia Ministry of Physical Development, Environment, and Housing, to reduce greenhouse gas emissions through enhancing energy efficiency in the hospitality sector. This project has been made possible due to the support of the Climate Change Development Fund of the Canadian International Development Agency.

The program consisted of an initial one half day workshop session followed by five walk through training audits of hotel properties in the Castries - Rodney Bay area, over the next one and a half days. The program concluded with a half day session to discuss findings and analysis from the audits. Classroom sessions were hosted by Sir Arthur Lewis Community College. The program was well attended. A list of attendees is shown in Figure 1.

The primary intention of this training program was to increase awareness of energy management opportunities among members of the hospitality industry and key stakeholder groups such as government, colleges, utilities, and the local consulting community. By bringing together representatives from a cross section of key stakeholder groups with an interest in energy management, we hoped to also foster some sharing of ideas and experiences among the group and let all attendees know what resources are available locally to assist with their energy management needs. A longer term goal of this project is to develop continuity in the energy management training field by supporting the development of a training host in St. Lucia. Sir Arthur Lewis Community College has expressed interest in being this host. Some potential methods of delivering this training include inclusion of energy management units within the core curriculum of several of the technology programs offered by the college, development of full credit courses in energy management, and development of short courses in selected energy management topics of interest to people in business and industry.

Figure 1. Training Audit Attendees

NAME	ORGANIZATION	TEL#	EMAIL
Leroy F. Ochilion	Ministry of the Public Service	468-2236	
Raymond St. Catherine	Ministry of Communications, Works, Transport and Public Utilities	468-4364	rayste@hotmail.com
Ormond Reece	LUCELEC	457-4400	oreece@lucelec.com
Gabriel James	LUCELEC	452-2324	gjames@lucelec.com
Chad Daniel	Bay Gardens Hotel	719-4009	
A. C. Small	Caribbean Equipment Corp.	453-6002	rightangle@candw.lc
John Sylvester	Sir Arthur Lewis Community College	458-0276	
John Charlery	Empac Services Ltd.	453-6722	empac@candw.lc
Kade Theodule	Harmony Suites Hotel	452-8756	
Remon Leon	Harmony suites Hotel	452-8756	
Curtis Isaac	Energy & Advances Control Technologies	458 2446	Eact.energy@candw.lc
Terence Monrose	Sir Arthur Lewis Community College	459-0121	
Narpaul Heeralall	Sir Arthur Lewis Community College	452-5507	narpaul@excite.com
Cosmos Alexander	Sir Arthur Lewis Community College	452-5507	cossyy@hotmail.com
Judith Ephraim	Ministry of Physical Development, Environment and Housing	468-4460	jephraim@planning.gov.lc
Francelia Marksman	Rainbow Hotel	452-0148	francelia@rainbowstlucia.com
Frederick Cypal	Rainbow Hotel	452-0148	

Identifying and strengthening existing energy management service providers in St. Lucia is also an objective. Discussions were held with companies currently involved in energy performance contracting in other parts of the Caribbean and others involved with energy training and importation and distribution of energy efficient products. A lack of awareness and appreciation of the true cost of energy in operating a business at the upper management levels was cited as a major reason for the lack of energy management initiatives to date in St. Lucia.

1.2 SUMMARY

1.2.1 Workshops

The initial workshop session on February 11, identified some main items that should be considered during the course of a hotel energy audit. These items are presented in Figure 2. These were condensed from a larger more extensive checklist suitable for most building types. This larger checklist was provided with the course materials handed out to all participants.

The initial workshop session included some very useful discussion regarding previous experiences with energy management initiatives and with perceived and actual barriers to greater acceptance of energy management in the St. Lucian hotel industry. The high cost of energy efficient products, particularly lighting products, was mentioned by most workshop participants as a barrier. Within the hotel industry there is also a perception that energy efficiency and guest comfort cannot easily coexist. The orientation and layout of many hotels is to maximize a view or improve traffic flow rather than reduce solar heat gain to conditioned spaces or take advantage of prevailing winds to provide natural ventilation. Energy consumption is not usually a consideration of designers when designing new hotels for St. Lucia. Most hotels are designed outside the country and there may not be sufficient awareness of the high energy costs in St. Lucia and the impact inefficient design can have on hotel operating costs.

Several of the workshop participants were interested in the marketing potential of an energy management program to potential guests. Several facilities in St. Lucia have achieved or are in the process of achieving green globe certification, which is an internationally recognized standard of environmental management. Energy management is a key factor in achieving this certification.

A follow-up workshop was held on February 13, to discuss the results of the five hotel audits conducted on February 11 and 12, and to discuss strategies to ensure energy management plays a greater role in hotel operations in the future.

Figure 2. Main Audit Checklist Points

• Obtain and review energy records.
• Review operational practices.
• Check insulation levels, consider cost and practicality of addition.
• Clean evaporator and condenser coils.
• Air condensers shaded?
• Air conditioner type? EER? Age? Replacement due when?
• Consider best in class air conditioning when replacing equipment, incremental cost difference from standard.
• Use circulatory fans to minimize air conditioning requirements.
• Turn off pool circulating pumps overnight or consider speed controller.
• Repair water leaks.
• Consider solar DHW instead of electric or fuel.
• Verify water meter accuracy.
• Reduce DHW temperature.
• Reduce excessive light levels.
• Replace incandescent with CFL's.
• Use occupancy sensors to shut off unneeded lights.
• Upgrade fluorescents to T8 lamps and electronic ballasts.

1.2.2 Training Audits

The five facilities that were audited on February 11 and 12 are listed in the Training Audits Results Summary in Figure 3. The scoring system used for the twelve categories in the results summary is in Section 1.3. Audit reports for each individual hotel were prepared and sent to that hotel's representative. The reports described findings during each audit along with some recommendations for improving energy performance. Some recommendations common to most if not all the hotels audited were as follows:

- Replace incandescent lamps with compact fluorescent lamps in all light fixtures operating more than two (2) hours per day. This was determined to be an approach level at which energy savings will allow payback of the purchase price of the lamp within one (1) year. Compact fluorescent lamp distributors in St. Lucia must do a better job of informing customers of the full range of lamps available and about proper application for specific lamps to ensure maximum customer satisfaction.

- Ensure exterior condenser units for split system air conditioning systems are kept clean and corrosion free, shielded from direct sun, and that refrigerant suction lines are properly insulated.

- Ensure exterior condenser units for split system air conditioning systems are positioned to allow unobstructed airflow across the condenser coils and that regular maintenance checks include checking that refrigerant charge is maintained to manufacturers' specifications.

- Make solar energy the primary means of providing domestic hot water.

- Utilize water conservation measures in all guestrooms.

- Institute formal policies and work practices that will reduce energy consumption. Ensure all staff are aware of and trained in the practices.

- Monitor energy use on a regular basis and compare with occupancy rates. Analyse data for trends.

- Ensure attic spaces above conditioned rooms are insulated and naturally ventilated.

Figure 3. Training Audit Results Summary

	St. James Club (250 rooms)	Rainbow Hotel (76 rooms)	Bay Gardens Inn (32 rooms)	Harmony Suites (30 rooms)	Bay Gardens Hotel (71 rooms)
1. Energy Records	Excellent	Good	O.K.	Good	O.K.
2. Housekeeping Practices	Excellent	Good	O.K.	Good	Good
3. Water Measures	Excellent	Excellent	Poor	Good	Excellent
4. Natural Ventilation	O.K.	Excellent 1.0 hrs EER	Good	Poor	Poor
5. Air Conditioning and Condenser Units	EER 9.2 Equipment O.K. Installation Good Maintenance O.K.	1.5 ton EER 8.0 tons EER 10.0 Equipment O.K. Installation Good Maintenance Poor	EER 103 Equipment O.K. Cond. of roof Poor installation	EER 10.3 Equipment Good Maintenance Poor Installation O.K.	EER 9.8 Equipment Good Installation Poor
6. Pool	Good	Good	Good	Good	Good
7. Lighting	Good	Good	Poor	Good	Poor
8. Room Controls	Excellent	No	No	Considered it	No
9. DHW	Good	Poor	Excellent	Excellent	Excellent
10. Insulation	RI2 roof	None	None	None	None
11. Water Pressure	Good	Poor Needs bypass	Good	Good	Good
12. Environmental Practices	Excellent	Excellent	O.K.	O.K.	Good

1.3 SCORING SYSTEM FOR AUDIT RESULTS SUMMARY

1. Energy Records

Excellent	-	Comprehensive data collection and analysis that results in active energy savings measures.
Good	-	Extensive data collection, some analysis, few active measures.
O.K.	-	Some data collection, awareness of importance of collection and analysis, no active measures.
Poor	-	No collection, awareness, or measures.

2. Housekeeping Practices

Excellent	-	Clear written policies and procedures for staff to follow to reduce energy consumption while minimizing guest inconvenience, regular updates, and training.
Good	-	Awareness among all staff of importance of energy conservation, some written policies, no regular updates or training.
O.K.	-	General staff awareness of energy conservation importance, no written policies or training.
Poor	-	No staff or management awareness.

3. Water Measures

Excellent	-	Water conservation measures employed in most guestrooms, kitchens, laundry, and other water using facilities. Ongoing efforts to improve water use efficiency.
Good	-	Water conservation measures employed in some areas and awareness and ongoing efforts to improve efficiency.
Poor	-	No visible measures, no awareness or efforts to improve water conservation efficiency.

4. Natural Ventilation

Excellent	-	A majority of spaces designed to take best advantage of prevailing winds and natural air movement to cool spaces without need of mechanical cooling.
Good	-	Some measures to provide for natural ventilation in conditioned spaces.
O.K.	-	Minimal passive natural ventilation in conditioned spaces, possible with greater staff intervention.
Poor	-	No natural ventilation capability in conditioned spaces without active guest intervention (i.e. blocking doors open).

5. A.C. and Condensing Units

Ranking based upon energy efficiency ratio (EER) which is a ratio of Btu/h of output cooling per watt of input power. Higher EER's indicate higher efficiency. Additional factors considered are age and condition of equipment - older equipment and poorly maintained equipment is less efficient, type of equipment - larger central systems are more efficient than individual units, and condenser location - external air cooled condensers are more efficient when located in a shaded area with good natural ventilation and accessibility for servicing.

6. Pool

Filtration system only needs to run when the pool is occupied. In-house procedures to manually shut off filter pumps when pool is unoccupied or an automatic shut off system such as timers will yield good energy savings without inconveniencing guests or compromising pool water quality.

7. Lighting

Excellent	-	High efficiency light fixtures throughout property, high degree of awareness of benefits of efficient lighting.
Good	-	Some high efficiency light fixtures in use, high degree of awareness, lighting upgrade program in place.
Poor	-	Few or no high efficiency light fixtures, no upgrade plan.

8. Room Controls

Excellent	-	A high number of conditioned guest suites have an automatic room energy control system in place to limit energy consumption in unoccupied rooms.
Good	-	Some control systems in place, awareness of their positive impact, plans to increase number of installations.
No	-	No control systems in place or plans to install any.

9. Domestic Hot Water Production (DHW)

Excellent	-	Primary DHW production is from a renewable energy source such as solar.
Good	-	Some renewable DHW production, plans to increase renewable percentage.
Poor	-	No renewable DHW production or plans to add any, inefficient DHW production system.

10. Building Envelope Insulation

Thermal and/or acoustic insulation used in envelope surrounding conditioned spaces. Primary importance is roof insulation where the majority of solar heat gain to a space is

generated. The best designs utilize thermal insulation in all exterior envelopes and acoustic insulation in internal partitions between individual conditioned spaces. Insulation levels are measured in R value, which indicates the resistance to heat flow. The high the R value, the greater the resistance. Higher R values are generally used in roofs or ceilings with lesser amounts in walls or floors. Insulation in internal partitions is usually only for soundproofing but can also provide sufficient thermal insulation to prevent condensation formation on the walls of an unconditioned room adjacent to a conditioned one.

11. Water Pressure

All properties receive potable water from WASCO. Due to uncertainty of supply and pressure from this system, all properties maintain on site reservoirs and booster pumps to guard against supply interruptions.

Most properties rely on their booster pumps and reservoirs only during supply interruptions (good), others use a fill and pump system that requires continuous operation of the booster pump (poor).

12. Environmental Practices

Excellent	-	Clear written policies, procedures, and systems and equipment to reduce environmental impact of the operation. Some examples of good environmental practices include solid waste diversion to recycling programs, linen exchange programs to reduce laundering.
Good	-	Good procedures but few written policies.
O.K.	-	Some awareness but few procedures.
Poor	-	No awareness or procedures.