

Caribbean Hotel Energy Efficiency and Renewable Energy Programme

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CHENACT

- * Joint venture of the CHTA and CTO, funded by IDB, CDE, GIZ, UNEP
- * Caribbean Hotel Case study (144 detailed audits, 30 walkthroughs to date)
- * Hotel Clean Energy Policies – Barbados Jamaica and Bahamas
- * Energy Performance Contracting Study for Caribbean Hotel Sector
- * www.chenact.com with tools for members
- * Institutional strengthening and collaboration with regional programmes
- * Inclusion in the Government of Barbados NDC
<http://www4.unfccc.int/submissions/INDC/Published%20Documents/Barbados/1/Barbados%20INDC%20FINAL%20September%20%2028,%202015.pdf>

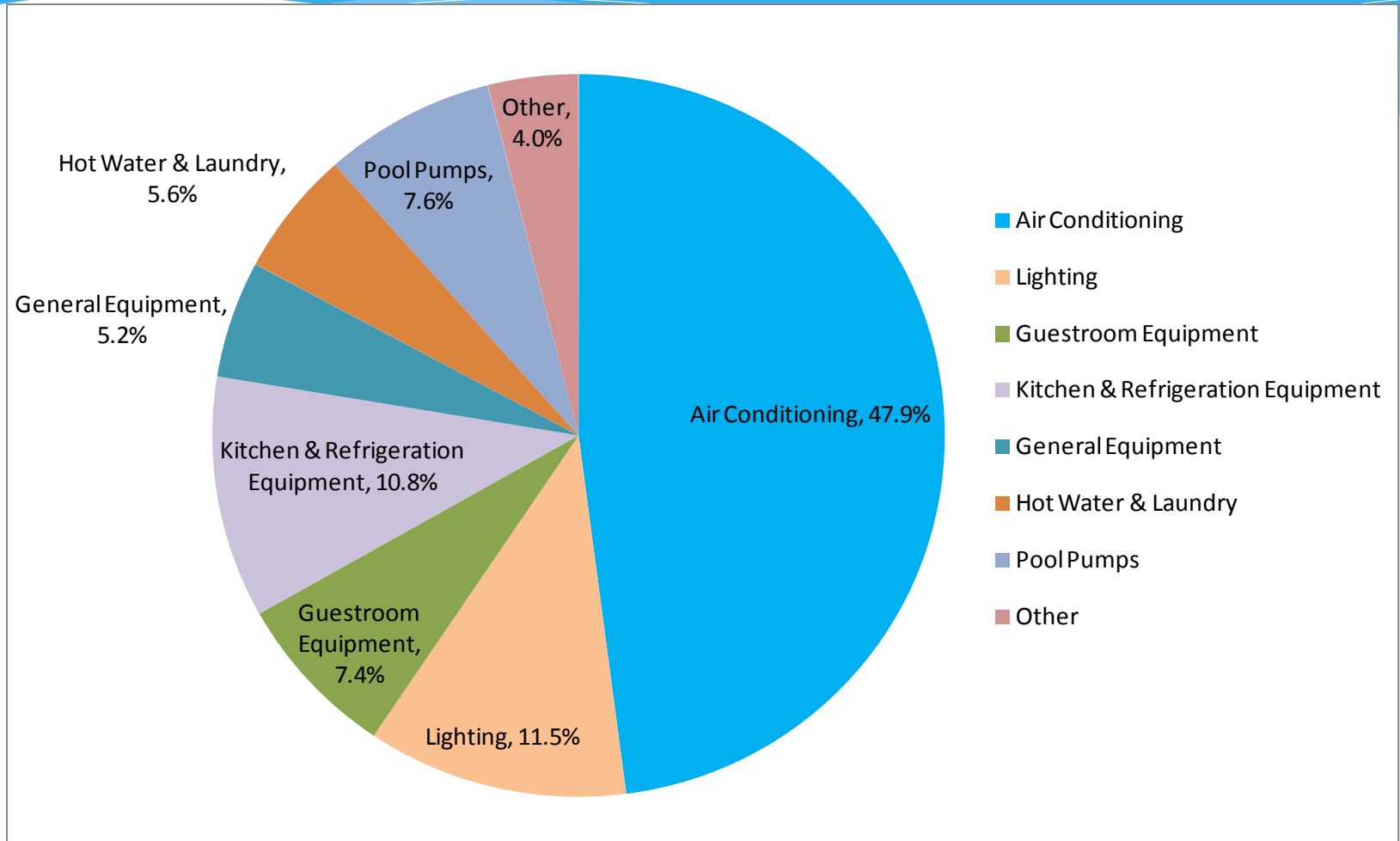
Objective of CHENACT

Caribbean Hotel Energy Efficiency and Renewable Energy Action

To improve the competitiveness of small and medium sized hotels (<400 rooms) in the Caribbean Region through improved use of energy with the emphasis on Energy Efficiency, Renewable Energy and Micro-Generation

The beneficiaries are CHTA member hotels

Electricity consumption in Caribbean Hotels by End use



Potential savings of 10-65% in Energy and up to 50% in water. Energy accounts for up to 60% of the operational costs in some hotels.

Energy Usage Profile

	JAMAICA	BAHAMAS	BARBADOS
RANGE	11-244 KW/GN	16-237 KW/GN	11.3- 103 KW/GN
AVERAGE	50.56	81.56	32.19
# HOTELS > 100KW/GN	3	5	1

Why the Differences?

Barbados/Eastern Caribbean

- * Clientele- UK/Europe /other Caribbean
- * Building Design-Open
- * Temperature – fairly constant
- * Use of SWH/Natural Gas
- * Water costs less
- * Barbados Hotels have implemented many of the recommendations

Bahamas/Jamaica/Northern Caribbean

- * Clientele - North American
- * Building design - Enclosed
- * Temperature – Variable – gets cold!!
- * All Electricity
- * Bahamas- Electricity surcharge!
- * Water in parts of Jamaica (Negril) and Bahamas is expensive and scarce

Energy Saving opportunities in a 25 room hotel

EMO	Energy Management Opportunity	Initial Cost (US\$)	Annual Cost Savings (US\$)	Payback (years)	Annual Electrical Energy Savings (kWh)	Annual CO ₂ Savings (Tons/year)
1	Turning off of mini fridges once the room is vacant (i.e. not checked in)	-	954	-	1,578	1
2	Halogen Floodlights Retrofit	112	276	0.41	456	0
3	Replace Conventional Air conditioning Units with Inverter Units	13,160	12,496	1.05	21,037	17
4	Compact Fluorescent Lights retrofit to LED Lamps	1,750	1,272	1.38	2,103	2
5	PV Installation	13,000	4,636	2.80	7,666	6
TOTAL		28,022	19,633	1.43	32,839	26

Potential Energy savings cost of 60%!

Energy Saving opportunities identified in a 247 room hotel

EMO	Energy Management Opportunity	Initial Cost (US\$)	Annual Cost Savings (US\$)	Payback (years)	Annual Electrical Energy Savings (kWh)	Annual CO ₂ Savings (Tons/year)
1	Too many refrigerators underutilized (empty minibars in operation)	-	2,149	0.00	10,077	8
2	Lighting turned on unnecessarily	54	1,005	0.05	4,713	4
3	T12 Fluorescent Lamp Replacement	3,924	5,404	0.73	21,606	17
4	T8 Fluorescent Lamp Retrofit to T8 LED	3,310	3,386	0.98	13,692	11
5	Inefficient air conditioning units (<1.25 kW/ ton)	52,940	35,136	1.51	120,635	96
6	Corporate Utility Management Program	30,000	26,000	1.18	6,800	5
7	Food simulator energy saver (refrigeration system)	3,600	1,743	2.07	8,173	7
8	Limit Ice machine operation	4,500	2,145	2.10	10,058	8
9	Combine Heat and Power	2,775,000	678,927	4.09	1,164,303	927
10	ECM Motors in Ceiling Fans	29,500	5,463	5.40	12,807	10
TOTAL		2,950,828	751,556	3.93	1,415,872	1,127

Potential energy savings cost of 65%!!

Energy Saving opportunities in a 40 room hotel

ESO	Energy Management Opportunity	Initial Cost (US\$)	Annual Cost Savings (US\$)	Payback (years)	Annual Electrical Energy Savings (kWh)	Annual CO ₂ Savings (Tons/year)
1	Water Heater running unnecessarily	-	24,609	-	76,352	61
2	Underutilized Refrigerator	-	10,873	-	33,736	27
3	Pumps running unnecessarily	-	7,306	-	22,669	18
4	Lights turned on unnecessarily	-	3,582	-	11,114	9
5	Separating light switches in mini mart	2	1,800	-	5,585	4
6	Metal Halide retrofit with CFL	75	4,180	0.02	11,827	9
7	Heat Recovery from Refrigeration	6,475	54,074	0.12	167,770	134
8	Halogen Floodlights retrofit to CFL's	1,204	5,669	0.21	16,018	13
9	T12 replacement with LED tubes	505	2,296	0.22	6,787	5
10	Tungsten filament lamps retrofit to CFL's	658	2,812	0.23	7,959	6
TOTAL		8,919	117,202	0.08	359,816	286

If it's a "No Brainer" - Why have some hotels not implemented the recommendations?

3 biggest problems in Hotels

Maintenance

Monitoring

Money

Maintenance

- Maintenance contracts not taken out until something goes wrong
- Hotel staff/Management unaware of what is working and what is not
- Lack of training of hotel staff
- Some maintenance outsourced – staff never learn!
- Staff tend to fire-fight rather do preventative maintenance
- Some A/Cs still using R22 , cheaper and gas is stockpiled
- Mini fridges still using R12!!

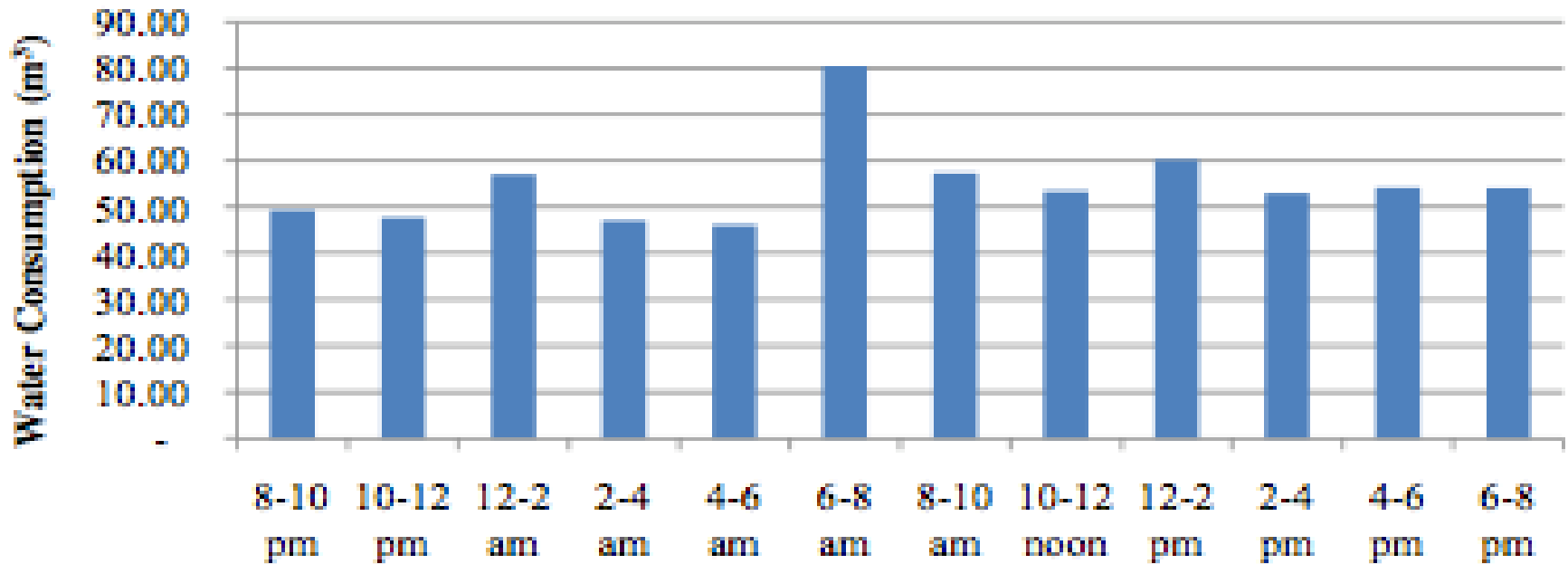
The switches were left on for the entire duration of the audit.



Monitoring

- * Very little monitoring done
- * Bills are accepted and paid
- * Meters read and logged – no analysis
- * Staff are not empowered to question
- * Some small hotels simply do not have the information to do proper analysis

Water Audit Findings in a 200 room hotel



Between 2.00am and 6.00am the water usage was almost 50 cubic meters per hour. That 11,000 gallons of water per hour or 264,000 per day due to leaks. An Olympic size pool holds 660,430 gallons !!!

Money

- * Hotels are in the business of selling beds food and drinks
- * Many owners/BoDs still do not see the importance of investment in EE
- * Focussed on marketing before efficiency
- * Many of the larger hotels have obtained finance for capital expansion. Revenue V Cost saving!
- Smaller hotels are unable to find finance from traditional sources i.e. commercial banks,
- Banks don't understand EE and its importance

Energy Audits in CHENACT AP

- * Re-audits show an increase in guest nights in all hotels
- * Few hotels implemented **all** the recommendations yet, mainly due to lack of funding
- * Those that have implemented even some of the recommendations have seen savings in energy costs of between 10%-62%
- * Most hotels did repair the water leaks – however leaks come back – Monitoring!

Solutions : Energy Service Companies (ESCOs)

Four different contract types are used with ESCOs:

- **Shared savings contract** - ESCO guarantees the cost of energy saved; the cost savings are split for a pre-determined length of time in accordance with a pre-arranged percentage. ESCO assumes the credit and performance risk.
- **Guaranteed savings contract** - ESCO guarantees a certain level of energy savings; the performance guarantee is the level of energy saved. The client assumes the credit risk, while the ESCO assumes the risk for the savings.
- **Power Purchase Agreement** – a contract between the power/energy producer and the consumer, and single cost for customer based on an easy to meter output, e.g., kilowatt hour or kWh. PPA provider would secure funding for the project, maintain and monitor the energy production.
- **Lease (or lease-purchase) agreement** - the consumer agrees to make a fixed payment to the ESCO for a fixed term. In addition to designing, operating, and maintaining the improvements, the ESCO guarantees that energy and maintenance savings from the project will exceed the payments to the ESCO. The net effect is similar to that under a shared savings agreement.

Good News!!

- * There are many success stories.....
- * 5 demonstration projects in Jamaica and Bahamas currently underway
- * Identified several new funding sources
- * Opportunities for ESCOs!!!!



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GETTING STARTED RESOURCES

The CHENACT AP Program recommends each member begin with this step-by-step guide to effect a continuous improvement of energy performance which requires establishing effective energy management practices and processes to guide each member's own energy program.

Any organization, regardless of size, function, or mission can develop an effective energy program if they are willing to make the commitment. We have created this website with the support resources to assist you in these endeavors.

This website includes; Reports, References (both Worldwide and Regional specific), Tools and Tool Kits, Case Studies, and related materials to support you as you advance thru each step.

[View the Step-By-Step Guide](#)





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