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ENERGY MANAGEMENT IN SELECTED COMMERCIAL  
AND NON COMMERCIAL FOOD SERVICE OPERATIONS

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**Abstract**

Energy Management is the practice of controlling procedures, operations and equipment that contribute to the energy use, comprising electricity, gas, water and other natural resources. Educating the management and the employees of the food service operations about the energy crisis, the methods of energy conservation, adoption of energy efficient equipments, waste to energy and energy from waste techniques for the development of pollution free environment will enhance the energy management practices. Energy conservation practices in business practice will help to fight the energy crises and save the energy and environment for the future generation.

**KEY WORDS:** Energy management, Energy conservation, Energy efficiency

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## INTRODUCTION

Energy is among the fastest growing cost items for the hotel industry in India and is the single fastest growing operating expenses. Adoption of sound environmental and energy efficient technologies will help in conservation of resources across the globe. Efficient management of resources not only benefits community, but it is also good for business practice (Weiss, 2006)

Energy Management in food service operations is the practice of controlling procedures, operations and equipment that contribute to the energy use comprising electricity, gas, water and other natural resources. The common sources of energies are non-renewable, such as all fossil fuels (coal, petroleum and natural gas) are formed millions of years ago and cannot be reproduced and they emit carbon di oxide when burned. Renewable sources are those that are abundant in nature such as hydro, solar, biomass and wind energy that can be used as energy sources without affecting the environment. The world is in the verge of energy crisis, pollution and global warming as a result of the usage of non-renewable energy sources and the transition of energy occurs as people are realising the goodness to adopt renewable sources.

The sun was the first energy source and provided light and heat to the early nomadic man. Early examples for energy usage include wood heat in tents. According to the census of India, 2001, about 91 percent of rural and 31 percent of urban homes depends chiefly on traditional fuels such as fuel wood, animal and crop wastes and charcoal for cooking (Antonette and Narashima, 2001).

The sources of energy which have accumulated in nature over a very long time and cannot be quickly replaced when exhausted are termed as non-renewable source of energy. The renewable source of energy are the alternative form of energy which can save us from the energy crisis and become the major source of energy in the future (Prabhakar, 2001).

Waste to Energy (WtE) conversion is a approach to resolve two issues including waste management and sustainable energy. Waste represents an increasingly important fuel source. Using waste as fuel can have important environmental benefits. It can not only provide a safe and cost ineffective way of waste disposal but can also help reduce carbon-di-oxide emission (Bose, 2009).

People are becoming more and more eco sensitive and those, who can afford spend more when looking to book a vacation are interested to find the energy sources used in the hotel and the amount of carbon-di-oxide emission it radiates to the atmosphere (Petrakis, 2003).

There is a remarkable growth of food service industry which has led to twin energy challenges sustainability and energy security and this study explores the possible energy conservation methods in the selected food service operations and hence the study titled "Energy Management in Selected Commercial and Non Commercial Food Service Operations" was undertaken with the objective to study the different types of energy used in selected food service operations, asses, renewable and non renewable resources used in various sections of the food service operations, to develop the various energy conservation methods of food service operations.

## METHODOLOGY

A total of five food service operations with three commercial food service operations namely the Residency, the Velan Green Fields, the Velan FoodPark were selected and two non-commercial food service comprising the canteen of National Textile Corporation Limited and dietary department from PSG Hospitals at Coimbatore were selected on judgement sampling and the study was carried out in the mentioned phases. **PHASE-I Selection of area and designing the tool for collection of data from selected food service operations** and for this process questionnaire was used. The sample was selected using judgement sampling In judgement sampling, the judgement or opinion of some experts forms the basis of the sampling method. it is expected that these samples would be better as the experts are supposed to know the population (Bhattacharyya, 2009). **PHASE-II Observation of energy management at selected food service operations** was the energy audit programme carried out for three days to observe the efficiency of fuel utilisation and the steps followed for energy conservation using a checklist. One of the simplest methods for reducing energy use is creating an energy checklist. The schedules start-up and shut down times for lighting and equipment so they are tuned when needed and turned off when not needed. (Mathur, 2008) **PHASE-III was to Impart guidelines for efficient energy management.** Based on the results of the energy audit, the guidelines were

planned and Implemented for two days at each food service operation using flash cards, power point presentation and face to face to discussions. A total of forty employees with eight from each food service operations were deputed to participate in the programme. **PHASE-IV Evaluation on energy management in selected food service operations** the estimation of improvement was done with the help of checklist for post observation. The impact of the energy management programmes was statistically analysed to find the levels of significance using 't' test.

## RESULTS

### I. Total built in area of the food service operations.

Table 1 gives the total built in area of the different sections of the selected food service operations in square feet.

**Table 1 Total built in area of the food service operations.**

	Commercial			Non - Commercial	
	Hotel I	Hotel II	Restaurant	Industrial canteen	Dietary kitchen
Area of the building	1,26,000 ft <sup>2</sup>	75,358.8 ft <sup>2</sup>	8710 ft <sup>2</sup>	-	-
<b>Front office</b>					
Lobby	900 ft <sup>2</sup>	1300 ft <sup>2</sup>	-	-	-
<b>Food and beverage department</b>					
Kitchen	3500 ft <sup>2</sup>	6532.5 Chinese kitchen – 4355 ft <sup>2</sup>	1200 ft <sup>2</sup>	800 ft <sup>2</sup>	4500 ft <sup>2</sup>
Storage area	2500 ft <sup>2</sup>	4500 ft <sup>2</sup>	1800 ft <sup>2</sup>	300 ft <sup>2</sup>	2500 ft <sup>2</sup>
Receiving area	400 sft	600 sft	200 sft	-	-
Service area	Window –	Chin chin –	Café n cake	1900 ft <sup>2</sup>	-

	1840 ft <sup>2</sup> Bhavani – 1200 ft <sup>2</sup> La pastry – 110 ft <sup>2</sup> Barbeque – 840 ft <sup>2</sup> Rainbow – 1840 ft <sup>2</sup>	6535 ft <sup>2</sup> Afghanis grill- 4355 ft <sup>2</sup> House of loads- 5226 ft <sup>2</sup> Pavilion – 8710 ft <sup>2</sup> Bike and Barrel - 4355 ft <sup>2</sup>	- 1400 ft <sup>2</sup> Rich dine – 2200 ft <sup>2</sup> Private dining hall – 1800 ft <sup>2</sup> Flavours – 2100 ft <sup>2</sup>		
<b>House keeping department</b>					
House keeping desk	220 ft <sup>2</sup>	100 ft <sup>2</sup>	-	-	-
Laundry	900 ft <sup>2</sup>	625 ft <sup>2</sup>	-	-	-
Rooms	Standard ( 40 ) – 275 ft <sup>2</sup> Executive (22) Suite – 275 ft <sup>2</sup> Velan (8) Suite -475 ft <sup>2</sup>	Standard (93) – 375 ft <sup>2</sup> Deluxe suite (4) – 875 ft <sup>2</sup> Club room (22) – 475 ft <sup>2</sup> Vice presidential (1) – 1500 ft <sup>2</sup> Presidential(1) – 1635 ft <sup>2</sup>	-	-	-
Corridors	18000 ft <sup>2</sup>	18000 ft <sup>2</sup>	-	-	-

Public area	Pool – 10000 ft <sup>2</sup>	Business center – 2000 ft <sup>2</sup>	-	-	-
	Business center – 220 ft <sup>2</sup>	Pool – 1000 ft <sup>2</sup>			
	Conference hall – 1227 ft <sup>2</sup>	Lounge – 2300 ft <sup>2</sup>			
		Senator I – 2200 ft <sup>2</sup>			
		Senator II – 2200 ft <sup>2</sup>			
		Legend – 2500 ft <sup>2</sup>			
		Council – 2300 ft <sup>2</sup>			
		Ball room – 2400 ft <sup>2</sup>			
Maintenance and engineering	21818 ft <sup>2</sup>	23168 ft <sup>2</sup>	3000 ft <sup>2</sup>	200 ft <sup>2</sup>	-

As energy consumed is directly proportional to the area of the operation. Larger the area higher is the energy consumption and it calls for more number of equipment especially for lighting and ventilation. the table also projects that hotels consume more energy when compared with other non commercial food service operations.

**II. The number of guest rooms**

Table II gives a description of the number of hotel rooms in each hotel

**Table II. The number of guest rooms.**

Number of hotel rooms	Commercial	
	Hotel I	Hotel II
	70	135

The commercial food service operations including hotels that provide lodging and boarding, was observed to have 70 and 135 guestrooms in hotel I and II respectively with full occupancy of 75 per cent on all the days

**III. Kinds of cuisines served in the food service operations**

Table 3 depicts the kinds of cuisines served in the food service operations

**Table 3 Kinds of cuisines served in the food service operations.**

	Commercial			Non - Commercial	
	Hotel I	Hotel II	Restaurant	Industrial canteen	Dietary kitchen
Types of cuisines	South Indian	South Indian North Indian	South Indian	South Indian	South Indian
	North Indian	Continental	North Indian		North Indian
	Chinese	Chinese	Chinese		

The fuel consumption and the cooking time of each cuisine different. South Indian cuisine needs more time followed by north Indian in par with the time for Chinese cuisine.

**IV. Type of energy used and consumption per day in food service operation**

Type of energy used and consumption per day in food service operation is given in Table IV

**Table IV Type of energy used and consumption per day in food service operation.**

Type of fuels	Consumption per day				
	Commercial			Non – Commercial	
	Hotel I	Hotel II	Restaurant	Industrial canteen	Dietary kitchen
Electricity	2000 units / day	4000 units / day	135 units / day	100 Kw (1/10 <sup>th</sup> unit)	90 units / day
LPG	4 cylinders	10 cylinders	1 cylinder	1 cylinder	119 kg
Diesel	400 lit	1200 lit	100 lit	-	-
Fire wood	5 tons / day	-	-	3 kg	-
Charcoal	2 bags (60 kg)	120 kg	½ bag	-	-
Gel fuel	30 tins	4 tins	¼ tins	-	-

The type of energy used states that there was an increased energy consumption in commercial when compared to non commercial food service operations

**V. Transition of fuels**

Table 5 presents the details of transition of fuels

**Table 5. The details of transition of fuels**

Food service operation	Fuels earlier used		Fuels currently used	
	Kind of	Equipment used	Kind of	Equipment

	fuel		fuel	used
Hotel I	Diesel	Boiler	Fire wood	Boiler
Hotel II	Gel fuel	Chef dish (Buffet )	Gas	Chef dish ( Buffet )

There was a transition of fuels seen in hotels because of Increase in cost, easiness to use the energy sources were the reasons reported for the transition of fuels by the selected food service operation.

There was more usage of non renewable than renewable resources. The renewable sources used mostly consisted of biomass which also releases carbon-di-oxide. So clean energy options were given such as solar, wind and hydro power.

#### VI. Number of employers in the food service operations

The number of employers in the food service operations is given in table

**Table 6. Number of employers in the food service operations.**

	Commercial			Non - Commercial	
	Hotel I	Hotel II	Restaurant	Industrial canteen	Dietary kitchen
Number of employees	80	350	60	150	120

Energy conservation is the responsibility of each and every employee and mainly for the employees working in industries. The larger the number of employees, there are more chances of overlooking. Food service industry is a fast growing industry and now it needs to watch out on its

fuel consumption. To check and to control any situation, man power is the major resource, therefore employees play a major role in controlling energy wastage.

The energy management programmes planned and implemented to the selected Commercial Food Service Operations and Non Commercial Food Service Operations when interpreted with statistical 't' test a significant improvement at five percent levels both at the selected Commercial Food Service Operations and Non Commercial Food Service Operations

## CONCLUSION

Energy Management practices adopted by the food service operation showed that the awareness existed among the management and the employees of the selected Commercial Food Service Operations and the Non Commercial Food Service Operations in the use of energy saving equipments such as vegetable cutter, mixer grinder, potato peeler and lacunae was noticed in the Utilisation of energy in different section of Food Service Operation. Hence more number of training programmes has to be planned and implemented at regular intervals for adoption of eco-friendly and energy management practices. The energy conservation practices in business practice will help to fight the energy crises and save the energy and environment for the future generation.

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