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How Practical Green Meeting Can Reduced Carbon Footprint and Contributed Green University? †

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Abstract: The major activity produced waste in university was generated by meetings in various types of food packaging for break and lunch box, especially in the context of Suan Sunandha Rajabhat University, Thailand. Therefore, this research aimed to (1) identify waste characteristics from packaging of coffee brake and lunch box in the general meeting, (2) studied carbon footprint emission from general meeting and green meeting and (3) estimated Greenhouse Gases (GHGs) reduction from green meeting in the university at the Faculty of Science and Technology, Suan Sunandha Rajabhat University, Thailand**.** The data was conducted for 3 months and arranged 3 times for green meetings and general meetings. The results of waste characteristics from packaging showed that in one set box of coffee brake contained kraft paper (paper box), plastics bag, stencil paper, aluminium sheet, tissue paper, and plastic bottle (PET). In general meeting, GHGs emission equal 1.6 KgeCO_2/person/meeting whereas for green meeting GHGs emission was only 0.94 KgeCO_2. Overall of GHGs reduction from green meeting calculated from arrangement of meeting once a week, and in 1 year GHGs can be reduced 34.32 KgeCO_2 per person.

Keywords: green university; green meeting; carbon footprint; Suan Sunandha Rajabhat University

1. Introduction

In order to enhance green university concept, waste characterization study is a critical first step in successful waste management planning and sustainability mitigation [1]. The most important factors that contribute towards achieving green university's goal and developed factors into 7 categories, i.e., management systems, environmental sustainability, sustainable curricula, research and development, staff development and rewards, student opportunities, and social responsibility. Therefore, the educational sector particularly the higher education sector must play increasingly active roles to help society to achieve the strategic sustainable development goal. Especially, in China the educational sector is the largest public sector energy consumer. Approximately 40% of the energy consumption of the public sector and the energy consumption per students is four times that other Chinese residents [2].

Green meetings was purposed by businesses to sustainable development (Thailand Business Council for Sustainable Development: TBCSD) with the Thailand Environment Institute in order to foster resource efficiency and reduce environmental impact. Therefore, green meeting is the theme of seminar training with regard to the use of resources to maximize and minimize environmental impact and will concern in the various stages of the meeting.

Faculty of Science and technology, Suan Sunandha Rajabhat University (SciSSRU) awares the importance of reducing greenhouse gas emissions within the organization. SciSSRU has joined as a part of the green office of the Department of Environmental Quality and certified the Green Meeting

(silver award) since 2014. Apiratikul [3] studied electricity and water supply consumption of the Dean's Office of SciSSRU and noted that electrical consumption had decreased significantly in 2015 compared to the year 2014 and this resulted in the decreasing of total GHGs in 2015.

In addition, SciSSRU has participated as one of the organizations leading the green meeting to reduce greenhouse gases, reduce the use of electricity, paper, etc., which are an important part in reducing greenhouse gas emissions. Consequently, this study was focused on (1) identify waste characteristics from packaging of coffee brake and lunch box in the general meeting, (2) studied carbon footprint emission from general meeting and green meeting, and (3) estimated Greenhouse Gases (GHGs) reduction from green meeting in the university.

2. Methodology

Data Collection

(1) Determine the primary area for arrange the meeting of SciSSRU, which has two meeting rooms. The first one is room 26101 represents for the faculty's committee meeting approximately 40 persons. The second room is room 26108 represents the faculty's board meeting approximately 10 persons.

(2) Conduct data of resources consumption between two meeting rooms which are composed of similar activity. Data collection were divided into five criteria of activity which are: invitation documents, preparation of documents for the meeting, preparation of location and device, preparation of food and beverages, and preparation other relate issues

(3) Compare and calculate GHGs emission between green meeting and normal meeting rooms.

3. Results

The results of this study were classified five activities criteria of the meetings. According to the format of the green meeting of Thailand Business Council for Sustainable Development (TBCS). Comparison of regular and green meeting's carbon footprint also presented in Tables 1 and 2.

Table 1. Comparison of regular and green meeting's carbon footprint of room 26101.

Management	Regular Meetings			Green Meetings		
	Resource	**Amount**	**CF (kg-CO_2eq) [4]**	**Resource**	**Amount**	**CF (kg-CO_2eq)**
Invitation	paper	0.1800 kg	0.2655	paper	0.0600 kg	0.0885
Documents	paper			paper		
Venue/equipment	Electricity	14.6582 kWh	8.9312	Electricity	15.0429 kWh	9.1656
Food and beverage	Plastic bag	0.4185 kg	0.5700	Plastic bag	-	-
	Paper box	2.2500 kg	4.2691	Paper box	-	-
	Stencil paper	0.1290 kg	0.2683	Stencil paper	-	-
	Milk box	1.6080 kg	4.5345	Milk box	-	-
	Tissue paper	0.0510 kg	0.0261	Tissue paper	-	-
	Plastic spoon	0.1485 kg	0.3332	Plastic spoon	-	-
	Food waste	-	-	Food waste	0.8190 kg	2.0720
		Total	19.1979		Total	11.3261
		Total/person	1.6		Total/person	0.94

From Table 1, the results showed that, comparison of GHGs emission of the meeting room 26101 between regular and Green Meeting by calculation of greenhouse gas emissions. In general meeting, one person is generated 1.6 kg of carbon dioxide emissions per tonne of carbon dioxide and total of

GHGs emission was 19.1979 per meeting. While, the greenhouse gas emissions from green meeting Green Meeting per person was 0.94 kg of carbon dioxide emissions per tonne of carbon dioxide and total of GHGs emissions was 11.3261 per meeting.

Table 2. Comparison of regular and green meeting's carbon footprint for room 26108.

Management	Regular Meetings			Green Meetings		
	Resource	**Amount**	**CF (kg-CO_2eq) [4]**	**Resource**	**Amount**	**CF (kg-CO_2eq)**
Invitation	Paper	2592	19.1224	Paper	1471	10.8523
Documents	Paper			Paper		
Venue/equipment	Electricity	38.2189 kWh	23.2867	Electricity	35.3563 kWh	21.5425
Food and beverage	Plastic Bottle	6.2997 kg	18.1771	Plastic Bottle	4.3907 kg	12.6689
	Plastic box	11.1090 kg	15.1315	Plastic box	5.5380 kg	7.5433
	Plastic box	5.2500 kg	9.9613	Plastic box	4.5000 kg	8.5383
	Plastic container	-	-	Plastic container	5.9760 kg	8.1399
	Paper (small pieces)	0.2520 kg	0.8122	Paper (small pieces)	-	-
	Plastic bag	-	-	Plastic bag	1.2090 kg	1.6467
	Straw	0.1914 kg	0.2607	Straw	-	-
	Milk box	3.7520 kg	10.5806	Milk box	-	-
	Tissue paper	-	-	Tissue paper	0.1680 kg	0.0860
	Plastic spoon	-	-	Plastic spoon	1.2090 kg	1.6467
	Water (waste)	1.8 litre	-	Water (waste)	3.2 litre	-
		Total	97.3325		Total	72.6646
		Total/person	3.2444		Total/person	3.1593

The results from Table 2 revealed that, comparison of GHGs emission of the meeting room 26108 between regular meeting and green meeting by calculation of greenhouse gas emissions. In general meeting, one person generated 3.2444 kg of carbon dioxide emissions per tonne of carbon dioxide and total of GHGs emission was 97.3325 per meeting.

While, the greenhouse gas emissions from green meeting Green Meeting per person was 3.1593 kg of carbon dioxide emissions per tonne of carbon dioxide and total of GHGs emissions was 72.6646 per meeting.

4. Conclusions

For regular meeting of room 26101, all 12 people spent 200 min meeting and generated greenhouse gases 19.1979 kilograms of carbon dioxide per meeting or 1.6 kg of carbon dioxide emissions per person. While, green meeting of room 26101 rooms spent 208 min meeting with the release of greenhouse gases 11.3261 kilograms of carbon dioxide per meeting or 0.94 kg of carbon dioxide emissions per person.

In comparison, the green meeting can reduce the carbon footprint by up to 7.8718 kg of carbon dioxide per meeting within three hours and 20 min of the two meetings. The difference activities among two type of meeting was green meeting changed the way to cut off packaging of food and beverages from plastic bottle to a glass of water and serving dish lunch instead of cardboard and plastic boxes. Snacks are also served on a plate. The leftover food waste of a Green Meeting was less than regular meeting and this could be a majority source of greenhouse gases reduction, as well.

The most reasonable activity that reduced GHGs emission is due to paper usage and consumption in the green meeting was lower than the general meeting. Reducing redundant

packaging by practical green meeting is the key to reduced waste and carbon footprint emission in the university.

5. Suggestions

(1) Reduce over packaging is an appropriate way to reduce paper, plastic, cardboard and to reduce resource consumption.

(2) Prepare the meeting venue and should be completed before the conference began, about 10 min to prepare. It can help reduce electricity consumption in each meeting.

(3) Spend less time for meeting will also reduce GHGs emission from electricity consumed.

(4) Should arrange training to educate staff and stakeholders to realize greenhouse gas reductions that took place in the meeting room and mitigation to develop green meeting in routine meeting.

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