

ASSESSING THE PREPAREDNESS OF A PUBLIC TERTIARY INSTITUTION FOR ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFICATION: THE CASE OF ACCRA POLYTECHNIC

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Abstract

This paper proposes and implements a sensitization program to improve upon Environmental Management System (EMS) in Educational Institutions. Selected key indicators including energy management, water resource use, solid waste management and air pollution have been considered for this study. The relevance of this sensitization program can be attributed to the global interest in reducing carbon emissions and its attendant problems. Issues of global warming, erratic rainfall patterns, depletion of the ozone layer will improve if there is a reduction in carbon footprint. The approach adopted consists of collecting data on the above mentioned key indicators for a tertiary institution, Accra Polytechnic for the year 2015 and also running the sensitization program during the same year. Subsequently, the same data is collected for the year 2016 and compared to the previous data using statistical tools. Results show significant reductions in electrical energy consumption, solid waste disposal, water use and their pre-disposal treatment, and air pollution after the evaluation, attesting to the relevance of the adopted sensitization making the institution globally acceptable.

It is hoped that, the pilot assessment will be replicated in other areas of the institution for the benefit of the broader society.

Keywords: Environmental Management System; ISO 14001; Environmental Performance; Pollution Control, Sustainability

1. Introduction

The 'Khan Review' and 'Toyne Report' (1993, 1996) embrace advancements in response to issues of environmental performance. Acknowledging that, whilst several universities have led the way in the development of effective systems, others were yet to commit to the improvement in their environmental performance.

Activities of commercial and industrial nature have been carried out in the past unregulated, leading to consequences such as acid rain, contaminated land, global warming, ozone layer depletion and polluted streams. Coincidentally, there has been a renewed demand from customers whose persistent requirements when imposed on organizations will bring about the much needed environmental performance.

The environmental policy of a tertiary institution may emphasize its 'operational' aspects only such as ; solid waste production, energy use, water consumption, but its role as an influencer and trainer of decision makers of the future cannot be ignored (von Oelreich,2002) also with the Sustainable Universities Initiative (Barnes and Jerman, 2002).

Hence, education for sustainability must be taken as an environmental aspect in an institutions Environmental Management System (EMS), in spite of its 'positive impact' together with known impacts of 'waste of resources' which are negative (Junker,2002).

The polytechnic produces innovative, disciplined and all- round professionals contributing to the human resource needs of industry therefore, will inculcate these habits in its graduates for subsequent implementation with the broader society.

The vision of the Polytechnic is to become a true center of excellence for practical training, research, learning and teaching with its mission to provide opportunities that are life- transforming and experiences through practical training, teaching, entrepreneurial development of skills and research in engineering, applied science and arts, business, and technology for society's benefit.

Accra Polytechnic has a population of 12,685 and it is thought that, successful implementation of an EMS will lead to massive reduction in demand for fuel, electricity, water which all point to saving financial resources to be channelled into research; its core mandate.

The aim of this paper is to emphasize further on the benefits educational tertiary institutions can obtain by adopting and implementing an EMS to improve their environmental performance.

This paper seeks to address the following objectives:

- a. Assess the current level of some selected EMS indicators at Accra Polytechnic,
- b. To establish the existing variance to fill in order to get Accra Polytechnic ready for certification,
- c. To recommend measures necessary for the attainment of EMS certification

The world's resources are dwindling which call for a collective approach towards the effective use of these seemingly 'infinite' natural endowments. The survey of energy resources (SER) report asset that, energy efficiency is a strategic 'energy resource' since a unit of energy saved is far less expensive than energy of same amount produced. It also notes that, the availability and use of energy have strong social, environmental and economic impacts.

World production of oil, petroleum experts believe will reach maximum (peak oil) soon and once reached, obtaining supplies for future will become difficult, leading to decline according to the Hubbert curve (Hackett, 2006)

Pimentel et.al, 1989 observed that, human's management of the environment and the protection of their essential resources were disappointing from over- exploiting it due to rapidly growing populations.

These are concerns that prompted the paper attempting to do the assessment and to highlight simple but effective ways of saving the environment. In addition, it costs money to operate tertiary institution hence savings made from the regulated use could be channeled to research and development.

Research focused on the current levels, assessing environmental aspects and the impact of environmental policy implementation but silent on theoretical procedures and processes for establishing the EMS.

The research was limited to a public tertiary institution while no attempt was made to measure the influence in private tertiary institutions.

The paper focused on only three aspects even though there could be several others leading to reduced environmental effects.

2. Literature Review

Emilsson, 2002 considers an Environmental Management System (EMS) a tool used for the purposes of ensuring environmental pro-activeness and efficiency of organizations. However, WRAP 2016 sees an EMS as a systematic approach that is used by an organization for the management of its environmental impacts.

The ISO 14001 set of guidelines requires facilities (whole or part), to strengthen or establish their environmental policy, identify operations with environmental aspects in them, defining environmental targets and objectives, implementing programs to achieve environmental performance, measure and monitor

effectives, to correct problems and deficiencies that arise, to ensure continuous improvement through the review of the management systems (Weaver, 1996).

It is known that, regulations from government demand that establishments eliminate or reduce water and toxic pollution with technology that cleans or controls its "end of pipe" emissions (Rondinelli, 2001). Consequently, several multi- national concerns under the ISO 14001 have provided harmonized standards for managing their environmental impacts (Tibor and Feldman, 1996). Many other organizations are yet to comply with the directive.

Several studies have provided proof to the fact that, non- certified organizations have been out- performed by certified ones. (Heras, Dick & Casadesús, 2002; Corbett, Montes-Sancho & Kirsck, 2005; Sharma, 2005). For example, Ford Motors embraced the ISO 14001 series and later certified its plants worldwide while requesting its suppliers to certify and adopt an EMS which being a condition to continue to do business with Ford (Wilson, 2001). Later, Toyota and General Motors also requested their facilities around the globe to certify and adopt EMS and demand same from their suppliers (Sabatini, 2000).

As of the year 2000 in the U.S., more than a hundred organizations in the semi- conductor and electronics industries got EMS's certified by registrars of the ISO 14001 system (Sissel, 2000).

Clark (1999) assets that, several organizations are rolling out the EMS as a desire to satisfy pressures from customers while ensuring its suppliers operated in socially and environmentally responsible ways. Proponents of the ISO 14001 system claim such a system will integrate and harmonize programs of environmental protection into a framework that is coherent (Cascio, 1994).

The adaptation of ISO 14001/ EMS certification will ensure a reduction of environmental liabilities and incidents, employee awareness of environmental impacts, an image of strong social responsibility will be established (IISD, 1996).

The debate as whether the implementation of EMS produces results is still raging however, at the Ford Company, millions of dollars were saved and its environmental impact reduced substantially after adopting and certifying for plants worldwide (Wilson, 2001).

Similarly, ABB Automation adopted and certified ISO 14001 which helped the organization to manage the handling and disposal of hazardous waste and the reduction in energy cost. (O'Conner, 2000).

McManus and Sanders, 2001 assert that Honda of America adopted and certified their EMS which brought about marked improvements both in the short and long- term.

It is believed that, the cost of environmental improvement will make adopting organizations disadvantaged as against those who do not. As a result of the complexity, speed and range of the issues of the environment, firms desire to operationalize and internalize their programs and policies in other that their long term goals will be consistent. (Corbett and Wassenhove, 1993).

The ISO 14001 unlike regulation allows organizations to develop through voluntary approach that which are peculiar to its operations, location, levels of risk and characteristics (Rondinelli and Vastag, 1996)

3. Methodology

After the idea was conceived, a small committee was set up and the piloting area selected. The occupants of those spaces were notified through newsletter and short staff durbar. They were informed the program will run for the first six months after which a review would be conducted.

Action points:

1. Class rooms or lecture halls unoccupied for 30 minutes should have their lights turned off.
2. Lecturers who left their offices for more than two hours should turn off their lights and air conditioners.
3. Separate litter bins being provided and labeled for separate re-cycleable material, bio- degradable waste and poisonous substances such as used dry cells, lead-acid batteries and computer boards.

4. Extractor fan at the woodwork laboratory repaired so as to extract odor from freshly sawn timber.
5. Leaks along plumbing systems were reported technicians were notified instantly.

These five points were monitored for six months and the result obtained as are shown in tables 1, 2, and 3 comparing against the six months of last year.

Table 1: Electrical Energy Consumption Table

S/N	Period (Month)	Quantity (kWh)	
		Before (2015)	After (2016)
1	January	105,051	93000
2	February	67,527	55000
3	March	87,265	74936
4	April	102,526	63281
5	May	97,744	81845
6	June	71,353	47118
7	July	64,924	-
8	August	72,238	-
9	September	57,755	-
10	October	50,263	-
11	November	63,469	-
12	December	95,929	-

Table 2: Solid Waste Collected

S/N	Period (Month)	Quantity Lifted (m ³)	
		Before (2015)	After (2016)
1	January	109	95
2	February	107	57
3	March	119	93
4	April	133	78
5	May	127	43
6	June	100	66
7	July	88	-
8	August	56	-
9	September	23	-
10	October	69	-
11	November	110	-
12	December	134	-

Table 3: Water Consumption Table

S/N	Period (Month)	Quantity (litres)	
		Before (2015)	After (2016)
1	January	458640	331984
2	February	460700	255880
3	March	470015	421339
4	April	325988	269354
5	May	387060	253001
6	June	461010	358034
7	July	444111	-
8	August	390224	-
9	September	422008	-
10	October	443646	-
11	November	223891	-
12	December	325952	-

4. Results and Findings

It will be seen from figure 1 below that, though the consumption followed the same pattern, the quantity in real term attained has reduced significantly. It can also be predicted that, if the same things are done reductions could continue further down from July to the December.

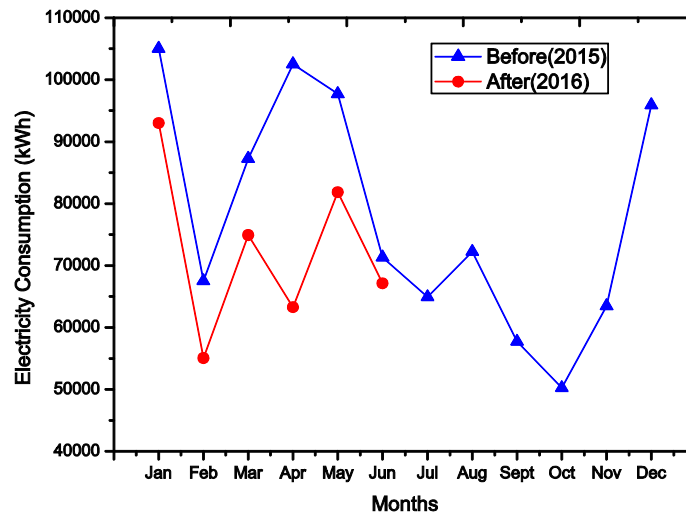


Figure 1: electricity usage plot

Solid waste disposal by burning or landfill are both destructive to the environment; as such the most effective method will be to separate waste and get a greater percentage for recycling. Only bio- degradable waste will be sent to landfill. It is therefore no surprise to see a sharp fall in the volumes of garbage lifted after launching the programme as shown in figure 2 below.

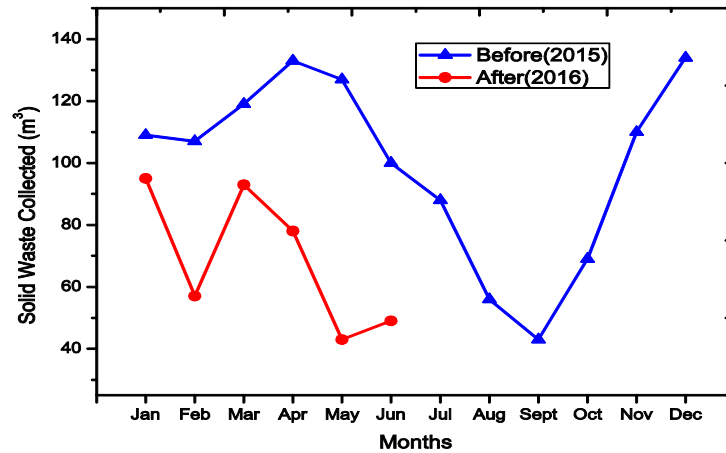


Figure 2: plot for solid waste collection

The use of water which was mainly obtained from municipal sources has reduced partly because; waste occurring as a result of leaks is now being attended to with urgency. Future drilling of borehole and mechanizing it with a solar plant will bring further reduction. These reductions however do not compromise on the health needs of both staff and students.

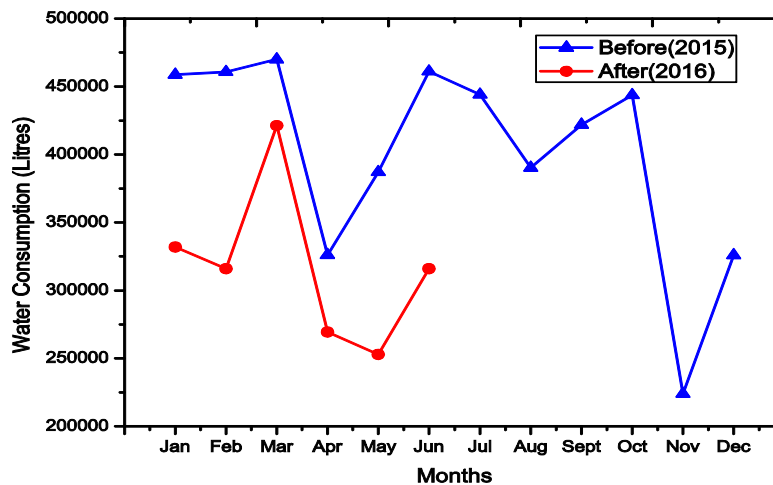


Figure 3: water use plot

Figure 4 below compares the consumption of water for first six months of 2015 to the first six months of 2016. It is obvious that the gains made confirm water consumption has reduced similar to the fuel energy

required to treat municipal water from the source (river), transport it through pipes then finally distribute it to consumers. Less volume required means less carbon produced to consume the product with less impact on the environment.

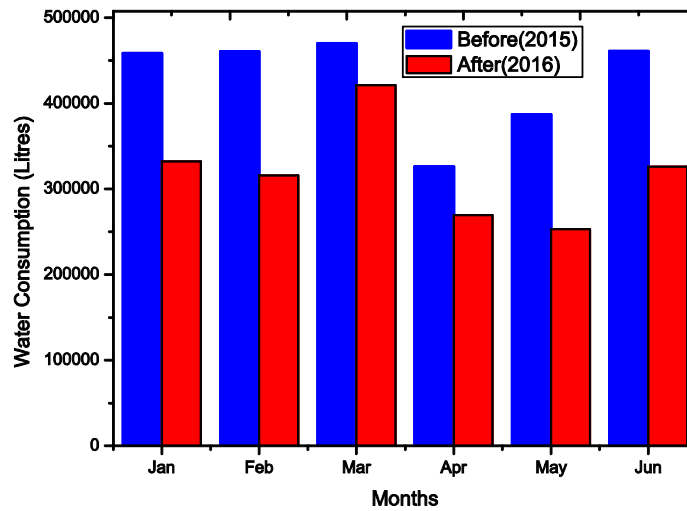


Figure 4: comparison of plot for water consumption during six months of the programme

The figure below shows a comparison between six months of 2015 and the first six months in 2016 of solid waste lifted by waste disposal contractor as in figure 5 below. Recycle-able waste has played a significant role in volumes reduced. If further uses are found for 'good' waste, the end result will be no waste at all leaving a clean environment.

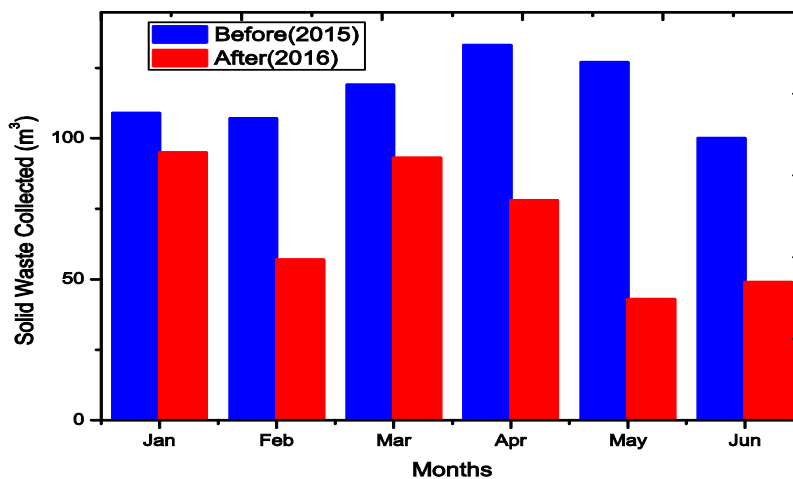


Figure 5: comparison of solid waste lifted by contractor during period

4. Conclusion

The ISO 14001 just like the ISO 9001 has certain conditions to be met to guarantee the claimant for certification truly complaint. It is in this vain that Accra Polytechnic is seeking certification thereby suggesting to the world as having been responsible for the environment in which it operates.

The assessments of the aforementioned aspects show a need to address them as they contributed to the production of carbon through the burning of fossil fuel.

The evaluation of the previous and current levels of use of the four interest areas show, a lot has been achieved through the unnecessary use of natural resources.

It is recommended that, more stringent rules for the use of these resources be sustained for a long lasting behavioral change. Also, other aspects like emergency preparedness, pollution control and the building and operation of wastewater treatment plant to be brought on board for total implementation learning from the successes of the piloting exercise.

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