

Sustainable Computing Initiatives – A TCSTM Operation Center Case Study

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Abstract—Green IT is basically a study of green computing as a corporate plan of any IT industry. It vastly includes the concept of Energy Efficiency and the use of Renewable Energy Resources to carry out operations dealing with IT and computing. The Green IT initiative carries an agenda of maximizing the energy efficiency, recycling of industry waste while reducing the adverse impact on environment effectively and efficiently. The paper highlights the green IT initiatives, in the form of a case study, taken by Tata Consultancy ServicesTM in their operation and offshore delivery center ‘Skyview Corporate Park’ Manesar, Gurgaon. The paper discusses the innovative initiatives like Eco Foot printing/Base lining, Energy Management through Star and BE Rating Compliance, Focus on Renewable Energy Sources, Water and Waste Management, Green IT / Data Centers and several others as a part of organization’s root plan. Green IT has helped the organization to carry out its environmental responsibility without compromising on the IT performance. Adhering to these initiatives, the corporation has been able to reduce its specific electricity consumption by 39% and carbon footprint has also been substantially minimized by as much as 34%, with future target up to 50% reduction by 2020. This could be accounted as a remarkable outcome of the Sustainable Growth Model.

1. INTRODUCTION

It is an undeniable truth that anything and everything that exist in this world has both good and bad points. Over the years information technology has evolved its way to be the most powerful tool without which we cannot even think of technological advancement, be it a country’s growth to be a developed nation from a developing, or an organization trying to touch the zenith competing with its counterparts, or human race to make world a better place for sustenance, or ordering your daily needs online. Information technology has always proved its point right from maintaining its importance in the field of science, education, research, entertainment etc. The strong tool could even be regarded as the cup-bearer for trimming down distance and facilitating dissemination of information almost free of cost creating a drastic change in the field of e-communication. A few other examples of information technology being used in various sectors are railway ticket reservation, maintaining the traffic signals in the field of transportation; application form facilitation, result

declaration, aid in the applied research all club up in the education sector; automation of electric appliances, advertising, e-marketing, online shopping. Revolutionizing the bank sector in India, IT has played its role in computerization and via ATM cards one could make transactions over internet, pay electricity bills, telephone bills, and income tax returns. Business process and outsourcing, India’s biggest sector for providing services has become lean only because of introduction of IT. Media and IT are almost synonyms these days. Due to various leniencies and amendments made in the IT laws, the common masses have been granted a very powerful tool i.e. IT (internet to be precise) to put forward their perspective on various social issues very efficiently and honestly in a legal manner. It has such huge importance that it is considered a necessity rather than a luxury for mankind.

But everything comes up with a cost, and so did the era of information technology. Today it is very difficult to tackle the uncertainty of whether the positive about being IT prone outweighs its negative aspects. The cogwheels of IT have got embedded so deep, that it has created a virtual space, which could be termed as techno-sphere raging a war against our own biosphere. The foremost being a bad quality life, by creating time scarcity while pacing up with the era. It has also proved to be a breach in the privacy. The invasion though would be long lasting and perhaps it will eventually become a cultural construct. Forget about the shredding of environment by the toxins released in producing these computers, and the resources that go into producing them. That’s trivial compared to the direct effect that computers, and the industrial system as a result, have on the atmosphere and climate, the pollution of air and water. Due to excessive usage of e-products and their variants, emission of greenhouse gases have already crossed their permissible limits, resulting in an alarming increase in the carbon foot print. As per a recent study, the National Capital has been declared as the most polluted city in the entire world, which is something we cannot be proud of. [1]

2. GREEN IT CONCEPT

Whenever we talk of ecofriendly usage of IT products by minimizing the usage of hazardous and non-biodegradable materials during manufacturing and designing, optimum utilization of resources during their operational life cycle and an environment friendly manner of their disposal, this is collaboratively termed as Green IT concept.

The concept of Green IT got introduced in 1992 by the introduction of Energy Star labeling by the US Environmental Protection Agency [2]. This aided organizations to identify and implement maximum resource utilization that in turn led to minimization of greenhouse gas emissions and monetary investments in projects. Green IT takes advantage of various IT based tools such as Green Computing, Virtualization, Cloud Computing and restructuring its Data Centers into Green Data Centers.

M.G. O'Neill (2010) [3] mentions in his book that, there are various tactical and strategic initiatives which could help one to be more efficient when it comes to Green IT. Some of the initiatives highlighted by him are:

- Restructuring the corporate and cultural construct of the organization such that Green IT is of high priority when it comes to organization's social responsibility and corporate policies.
- To implement employee programs so that each and every individual is encouraged to actively and innovatively practice the Green IT strategies.
- Seamlessly infuse the practices harnessed by the Green IT concept into the organization's IT workflows.
- Adhering to various reputed energy standards such as EPEAT, BE ratings and energy star labeling while procuring the elements of the IT infrastructure that ensures optimum and sustainable energy consumption and lowers the toxic emissions.
- To emphasize on Power Utilization Efficiency (PUE) that enhances the efficiency of any data center in terms of energy consumed.
- To highly recommend usage of software services such as cloud computing and virtualization to help achieve Greener IT based solutions.
- To embolden basic tactics that could help in the long run such as duplex printing, turning off the systems at the end of the day, scheduled system hibernations etc.

These are only a few postulates stated by O'Niell. The scope and solutions provided by Green IT are limitless. IT depends on how efficiently the organization is able to embrace the improvised workflow and routines suggested by the Green IT concept.

Today's IT industry has many hurdles that need to be addressed in order to have an eco-friendly and energy efficient work environment. The foremost issue that any IT

organization is worried about is the humongous energy required for its daily operations. Energy is required for every single computing machine that is in running state, for ambient lighting of the work places, for proper air conditioning of the delivery centers and data centers and many other unnoticed tasks. To provide basic amenities to each and every resource (in terms of man power), while consuming minimum monetary and natural resources is the next problematic issue. Apart from infrastructural hassles, the motivation and encouragement of the workforce is also at stake because of the nature of work and work culture being followed by the IT organizations.

The possible solution to all these problems and many others could be addressed via the usage of Green IT. This is not merely a theoretical concept, but implementation is also equally vital in addressing the aforementioned issues. The subsequent Case Study of 'SkyView Corporate Park' – A TCS offshore delivery center situated near Manesar, Gurgaon is a living example of how this concept can be molded into practice.

3. CASE STUDY – TCS OFFSHORE DELIVERY CENTER

SkyView Corporate Park, TCS Offshore Delivery Center is situated at outskirts of Gurgaon city. The center is the most recent TCS excellence state of the art delivery center. The delivery center is smart enough to handle the problems and issues mentioned earlier in the paper, in an eco-friendly and efficient manner. This case study highlights the various innovative programs and policies that are a part and parcel of the TCS work culture and its outcomes pertaining to the year 2013-14.

The concern of overuse power resources for the satisfactory operation of computing machines was very effectively resolved by the organization by introducing the GO GREEN INITIATIVE. Under this initiative, a desktop application has been developed by TCS and has been deployed to every single workstation within the organization so that the systems are automatically turned off when not required. The application pops up every single time a machine is turned on, and the user is mandated to schedule the hibernation of the system as per one's nature of work. Once, the suitable option is selected, at the stipulated time, the machine is put under hibernation so that the user's work is saved and the system is put in a deep sleep. Apart from this the machines that are being used by the organization are compliant to Energy Star and BE ratings so that the power consumption is minimized as much as possible. While designing the building it was ensured that the orientation of the building is such that the ambient lighting is facilitated by the daylight itself and there is minimum amount of artificial lighting required. The tinted glass cladding facilitates the sunlight while maintaining comfortable indoor temperatures. It has helped reducing the Electricity

consumption from an expected of 800,000 MWh to 400,000 MWh [4].

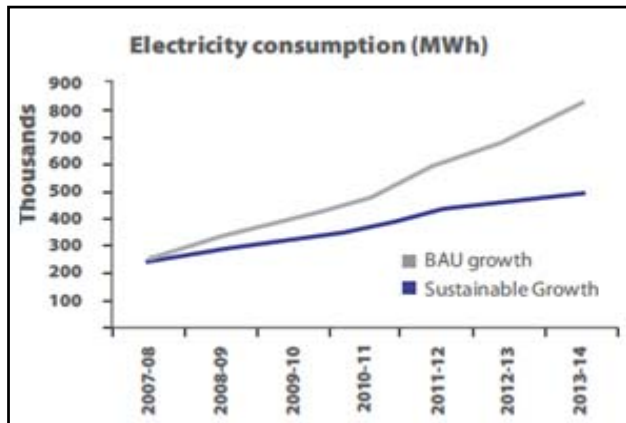


Fig. 1: Reduction in electricity consumption [Adopted from TCS sustainability report (2014)] [4]

The next point of concern is providing ample amount of basic amenities to the manpower making use of minimum money and natural resources has been addressed by various measures. One could never have imagined that the water utilized in the urinals could be alternatively made available from the water harvested during the rains rather than wholly relying on the regular water supply. This really brings down the gross water consumption by the organization from a projected consumption of 3 million KL of water to 2.5 Million KL^[4], especially during monsoons. When it comes to actual working, paper is something that is required in abundance for all those reports and inked paper works. This is analogous to the food that a human requires for living. This problem was taken care of by strict implementation of duplex printing, which means that both sides of the paper have to be utilized while printing. Also, there is a culture of using waste paper for test reporting, which otherwise could not have been used for fair drafting. TCS also encourages the concept of working remotely as and when feasible, from around the globe to cut down on the commuting costs while providing a lucrative perk to the workforce.

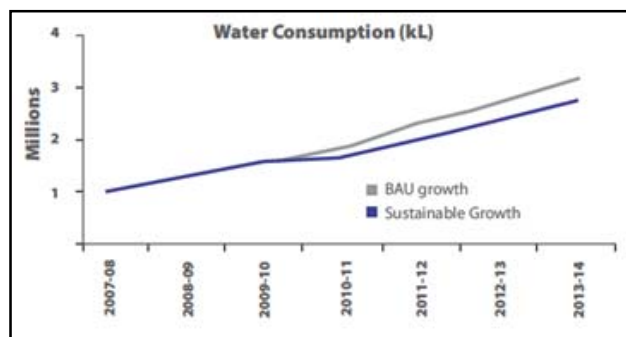


Fig. 2: Reduction in water consumption [Adopted from TCS sustainability report (2014)] [4]

Remote Conferencing is utilized most of the times, to save the employees from physically travelling to the venue, rather, his presence as a tele-participant is totally encouraged. Trainings and induction programs are also carried out remotely via virtual bridges so that the participants are comfortable in their own place of work while the instructor carries out the trainings from his/her workplace.

Last but not the least, in fact the most important asset of an organization is its employees. One most prominent occupational hazard in the IT industry is that one often loses one's motivation and will power after a certain point of time. To tackle such situations, TCS hosts various employee concern programs such as FIT4LIFE, PURPOSE4LIFE etc. These schemes encourage the individuals to pursue a hobby of their choice such that they are enhancing their personal skills while proving to be an asset to the society. Under Fit4Life initiative, the employees are eligible to form a fitness team and log their daily fitness activities such as brisk walking, cycling, swimming, outdoor playing etc. on a global portal where they compete against other teams for top rankings. For every hour that the teams log, TCS donates a specified amount in charity for uplifting the society. So, people are actually encouraged to pursue fitness activities in their daily routine that makes them feel good about themselves as they are doing their part of the social responsibility. Additionally, it aids in bringing down their mental stress which allows them to work more efficiently. Similarly Purpose4Life encourages the employees to donate a little amount of time from their weekly schedule towards any social cause be it education classes for the under privileged, or cleaning up the society, or be a part of any campaign of their choice.

As a part of organization's own social responsibility towards a cleaner India, TCS uses the maximum amount of biodegradable materials, wherever feasible. A perfect example of this would be the usage of ceramic cups instead of plastic or paper cups in the Coffee areas. One is supposed to use these ceramic cups for their coffees and then rinse them off so that they can be reused. Also, TCS uses LED lightings instead of conventional CFL equipment in order to save the environment from around 200,000 tons of CFCs. [4]

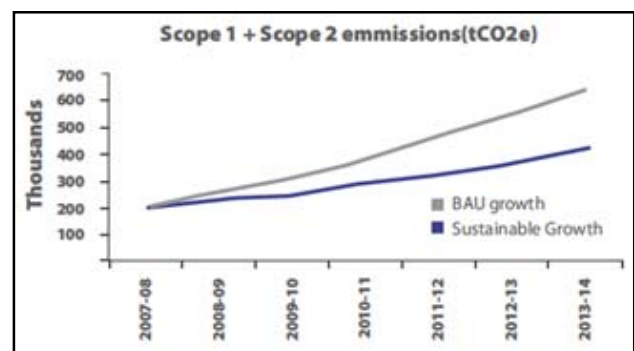


Fig. 3: Reduction in carbon emission [Adopted from TCS sustainability report (2014)] [4]

4. CONCLUSION

The paper concludes that the Green IT initiative has really helped TCS to cut down its operating costs to a large extent. The even bigger picture is that it has helped the organization to reduce its direct and indirect carbon emissions, as is evident by the facts stated in the paper. By implementing the described concept into practice TCS has set an example for other IT organizations to think seriously about the environment while at the same time enjoy the monetary benefits and resource efficiency. Motivated by the by credits earned due to the initiative, TCS aims to reduce its carbon footprint by as much as 50% by year 2020.

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