TNC Transactions on Networks and Communications
SOCIETY FOR SCIENCE AND EDUCATION UNITED KINGDOM
VOLUME 2, ISSUE 3
ISSN: 2054 - 7420

'Green Wall Rating': A Methodology to Evaluate Sustainable Development by Implementing Green Wall Model

Ankit Kumar Srivastava, Neeraj Kumar Tiwari
Department of Computer Science and Engineering, Shri Ramswaroop Memorial University, Lucknow-Deva Road, Hadauri, Tindola, Uttar Pradesh-225003, India
Assistant Professor Under faculty of Computer Science and Engineering, Shri RamSwaroop Memorial University, Lucknow-Deva Road, Hadauri, Tindola,Uttar Pradesh-225003, India
Ankit.suraj786@gmail.com, neeraj.cs@srmu.ac.in

ABSTRACT

The modern technology has changed the life of human being. Rapidly changing technology develops many kind of development approaches and products which makes the life easier and comfortable but they have also a negative impact on human beings as well as on the environment, In this paper a green wall rating methodology is being introduced. The protocols used in this rating methodology, a developer can rate any product or process well in terms of sustainability. Further green wall rating (GWR) can be measured with the help of sustainable development qualities. About the essential qualities for sustainable development has been discussed in our earlier publication (Srivastava, et. al., 2014). On the basis of conceptual hypothesis the practical value of GWR has to be set between 2.00 to 4.00 units. For being a sustainable process or product it must contains at least 2.00 green wall rating.

Keywords: Sustainable development, GHG, EPA (environmental protection agency).

1. INTRODUCTION

In our recent study we have proposed a Green Wall Model, a model for sustainable development. By this model we can address both the qualities of sustainable software and profiling energy consumption. In that model we have introduced four basic qualities of sustainable development: Entourage effect, curtailment, social impact, performance [1]. If any development process contains these qualities then we can say that it is a sustainable development and now with the help of that model we are introducing a new technique and terminology which is called as green wall rating. It is a grading methodology or rating technique of any development process and this methodology also enlighten about the process compatibility regarding with the environment. This methodology comes under the area of green computing and it ensures about sustainable development. The reasons behind this study

DOI: 10.14738/tnc.23.254
Publication Date: 12th June 2014
URL: http://dx.doi.org/10.14738/tnc. 23.254

are firstly the world of supercomputing and fast growing technology there are rapidly changing of product and various demands call for manufacturing products so for that various methods and approaches are adapted and developed [2] so there is no technique has present that ensures the new adapted technology is compatible to human being and also for environment. Secondly if any one considered the environment, only discuss about greenhouse gas emissions or wastages no one relates to the effect on human being e.g. IT industry is responsible for 2–2.5% of global greenhouse (GHS) gas emissions [3]. This paper contributes about the rating system for various life cycle models or development process by which we can decide that how much it is sustainable.

2. BACKGROUND

Until now, there are many publications available discussing about the sustainable development and energy saving methodology. Shaofei jiang [4] has describes the innovative design of a new laptop by which we can overcome the energy related problems of traditional laptops. Anh Hoang describes the life cycle of a laptop from materials acquisition to manufacturing, use, and end-of-life disposition in terms of contribution to greenhouse gas (GHG) emission [5]. EPA (Environmental Protection Agency) described the life cycle of a cell phone [6]. In this study the requirements for mobile phone manufacturing and as well as various stages of mobile phones have been discussed. Lewis produces its artifacts for the environmentally sustainable infrastructure design [7]. It is a comprehensive understanding of environmental sustainability that needs for IT infrastructure system design.

3. MATERIALS AND METHODS

This paper is based on the qualities of sustainable development that we are discussed in our previous study [1]. According to that qualities of sustainable development can be divided into four major qualities those are: Entourage effect, Curtailment, Social impact and Performance and by the help of these qualities we can calculate the Green wall rating of any development process or any product. Green wall rating is a terminology used for explaining about any product that how much that product is effective regarding with the human being or environment. We can calculate it by following way as mentioned in Table 1.

Table 1: Sustainable Development Qualities

S. No.	Major Qualities	Sub Qualities
1	Entourage effect	Bionomics impact, Pernicious effect, Low vitiation, Extravagance, Use renewable energy.
2	Curtailment	Low elementary cost, Less raw material cost, Low ontogeny, Low breakdown cost.
3	Social impact	Inclinated, Use provincial material, Less use of energy, Safe and secure, Externalize energy.

4	Performance	Ease to build, Long life, Use green energy sources, Less chance to decay, Time saving, Money saving, High performance

Each major quality has value=1 means,

- Value of Entourage effect=1.
- Value of Curtailment =1.
- Value Social impact =1.
- Value of Performance =1.

So from the above values we can calculate the values of sub qualities so,

3.1 For Entourage effect

Total number of sub qualities=5 and value of entourage effect=1, thus

Value of each sub quality = 1/5

=.20

So that we can say that,

- value of Bionomics impact=.20
- Value of Pernicious effect=.20
- Value of Low vitiation=.20
- Value of Extravagance=.20
- Value of Use renewable energy=.20

3.2 3.2 For Curtailment

Total number of sub qualities=4 and value of Curtailment =1, thus

Value of each sub quality = 1/4

=.25

So that we can say that,

- Value of Low elementary cost=.25
- Value of Less raw material cost=.25
- Value of Low ontogeny=.25
- Value of Low breakdown cost=.25

3.3 For Social Impact

Total number of sub qualities=5 and value of Social impact =1, thus

Value of each sub quality = 1/5.

=.20

So that we can say that,

- value of Inclinated =.20
- Value of Use provincial material =.20
- Value of Less use of energy =.20
- Value of Safe and secure =.20
- Value of Externalize energy=.20

3.4 For Performance

Total number of sub qualities=7 and value of Performance=1, thus

Value of each sub quality=1/7

=.14

So that we can say that,

- Value of Ease to build=.14
- Value of Long life=.14
- Value of Use green energy sources=.14
- Value of Less chance to decay=.14
- Value of Time saving=.14
- Value of Money saving=.14
- Value of High performance=.14

If any development process contains all the sustainable qualities then we can say that development will be the sustainable development [1]. So the maximum value of green wall rating will be = 4 and the minimum value of green wall rating = .14, if it contains only one quality.

So the green wall rating that is necessary for the sustainable development = mean of (maximum value of green wall rating, minimum value of green wall rating)

Minimum green wall rating = (4+.14)/2

=2.07

Thus we can say that if any development process has green wall rating = 2 or more than, then that will be called as sustainable development.

Green wall rating evaluation or for organizational implementation

We can calculate the green wall rating of the after construction of the product, if product's development process satisfy any one of the qualities then we will take the value of that quality for e.g. if any development process has low elementary cost then we will consider its value=.20 such as the other are also considered so,

Green wall rating = addition of total values of qualities that are containing by development process.

Representation of green wall rating

The representation of green wall rating in product is can be done by GWR= (the value of green wall rating). Means if value of green wall rating for any product=3.00, then we can show its green wall rating by GWR=3.00

4. CONCLUSION

The initial studies presented in this paper have shown the qualities of sustainable development and these qualities are Entourage effect, Curtailment, Social impact and performance. By visualizing these qualities we evaluated green wall rating (GWR). The calculation of GWR will depends on the number of qualities contained by development process. The maximum value of GWR will be 4.00 units if development process satisfies all the qualities of sustainable development and minimum value of green wall rating for sustainable development is 2.00. If development process has 2.00 or more than 2.00 GWR then we can say that is a sustainable development process. The sustainability of the product depends on green wall rating (GWR). The higher value of GWR (between 3.00 to 4.00) means the product or process is more sustainable as compare to those products which contains the less green wall rating (2.00 to 3.00).

REFERENCES

[1]. Srivastava, A. and N. K. Tiwari, Green *Wall: A Methodology for Sustainable Development using Green Computing*, International Journal of Scientific and Innovative Research, 2014. 2(1).

[2]. Lindskoga, E., Berglunda, J., Vallhagenb, J. and B. Johanssona, *Visualization support for virtual redesign of manufacturing systems*, 2013. 7: p. 419-424.

[3]. Kharchenko, V. and A. Gorbenko, *Green Computing and Communications in Critical Application Domains: Challenges and Solutions*, 2013. p. 191-197.

[4]. Jiang, S., Lianga, W., Lia, J. and Congda. Lua, *Innovative Design of a New Laptop*, International Workshop on Information and Electronics Engineering (IWIEE), 2012. pp. 2932-2937.

[5]. Hoang, A., Tseng, W., Viswanathan, S. and H. Evans, *Life Cycle Assessment of a Laptop Computer and its Contribution to Greenhouse Gas Emissions*. National university, (San Diego), 2009. pp. 130.

[6]. The life cycle of a cell phone by EPA (environmental protection agency), 2004.

[7]. Curtis L*., Environmentally Sustainable Infrastructure Design*, the Architecture Journal #18, 2009.