Toward Achieving Environmental Sustainability in the Computer Industry

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ABSTRACT

The computer industry has come under increasing scrutiny in terms of energy consumption, the carbon emissions and e-waste. Shipment of e-waste to developing countries where it is often disposed of in unsafe ways is another major issue. Organizations and individuals have a tendency to throw away or store their aging computer technology assets which is not environmentally sustainable and or cost effective. Implementation of an end-to-end computer and related products’ sustainability management strategy by incorporating the reuse of existing technology can make a major impact on the environment. Computer industry sustainability management includes design and development of energy efficient computer products, refurbishing of computer assets, purchasing of green or refurbished components and providing sustainability metrics procedures. By implementing sustainability programs, organizations can contribute in reducing the amount of energy spent to develop new computer technology products, help in reducing carbon emission, keep e-waste out of landfills and recycle them. This paper discusses different aspects of sustainable computer industry program and proposes that computer makers take ownership of disposing of e-waste by following safety standards. The paper also proposes adopting reverse supply chain process for possible reuse, recycle or disposal of computers.

KEYWORDS

Desktop Computer, e-Waste, Laptop, Personal Computer, Reverse Supply Chain, Sustainability

1. INTRODUCTION

The information technology (IT) industry accounts for approximately 2 percent of global carbon dioxide (CO₂) emissions (Gartner, Inc. 2007). About 75% of the ecological footprint comes from IT products usage and 25% constitute embodied carbon in IT products (The Climate Group, 2008). IT products include data centers, servers, personal computers (PCs), telecoms networks and devices, and printers. This paper limits the scope of this research to Personal Computers (PCs).
Research firm, Gartner, Inc. (2015) reported that worldwide combined shipments of devices (PCs, tablets, ultra-mobiles and mobile phones) for 2015 are estimated to reach 2.5 billion units, an increase of 3.9 percent over 2014. This projected number of computer device sold indicates how much energy would be consumed worldwide. This also references materials used to build these computer products. Energy consumption, carbon emissions, natural resources consumption and landfill of computers (after end of life) are the key concerns. Given the intensity of natural resources and energy consumption by computer products indicates the need for the computer industry to be environmentally sustainable.

The term sustainability has been defined in many different ways by different people, institutions and organizations. One widely accepted definition is from the Brundlandt Report, “sustainable development is the development that meets the needs of present without compromising the ability of future generations to meet their own needs” (World Commission on the Environment and Development, 1987). Sustainability is “a characteristic of a process or state that can be maintained at a certain level indefinitely” (Jabareen, 2008). The major driving force for sustainability is the public concern about the environmental impact of the present fossil fuel based energy system (Rahman and Akhter, 2010). We need to satisfy our needs by judiciously using renewable resources, recycling wastes, and reversing environmental degradation (Duan et al. 2009).

Sustainability starts from a sustainable design. Sustainability can and should be a central focus of interaction design (Blevis, 2007). A sustainable approach to design and engineering involves evaluating where a product or system has the greatest environmental impact and then prioritizing strategies which reduce that impact (Gaughran et al. 2007). Intelligent manufacturers must take into account all the indicators of energy demands and supply in planning their chain supply, and processing strategies. All these apply to computer products. Reduction of waste including energy waste shows not just corporate responsibility, but is also seen to make sound economic sense (Gaughran et al. 2007).

Nidumolu et al. (2009) assert that sustainability should be taken as one of the main drivers of innovation. Instituting sustainability starting from design (sustainable products and services) helps a company to be compliant with regulations enforced by countries in different regions. In fact forward looking companies take compliance as an opportunity to make their products follow regulations set by countries globally. They add sustainability to value chains – supply, operations, and returns (reuse returned products).

Our research was based upon a few questions. Can the computer industry improve environmental sustainability to help contribute to a greener planet? Where do computers go after end of use? Are they recycled or hoarded or go to landfill? To answer to these questions, we did an extensive review of existing literature. We went through research and industry papers written by researchers, practitioners, and environmental sustainability advocacy group. Based on insights drawn from academy and industry papers we propose measures that needs to be adopted to achieve sustainability in terms of environmental, energy and material consumption.
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