

# LCAT from LCAAnalytics for Environmental Impact Assessment of Computers

## Case Study: Environmental Impact of Expansion Cards

### LCAnalytics

The growing use of computers and electronics is a significant environmental concern. Manufacturers and consumers are increasingly conscious of their impact on the environment; however, no tool exists to accurately model the environmental impact of personal computers and components. LCAAnalytics is a company that provides accurate and easy-to-use tools to fill this need.

### LCAT

LCAAnalytics Tool, LCAT, provides:

- Accurate assessment of a computer's impact on global warming, human health, and nature.
- High precision estimates based on component-level analysis.
- Estimates based on more accurate assumptions than existing models, which only use industry-wide averages.

The development of LCAT was based on:

- Professional disassembly, material and process analysis of computers and components.
- Review of recent literature and documentation.
- Correlation of product manufacturer specifications with environmental impact.
- Industry-standard LCA software, including the Ecoinvent database.
- ISO 14000 series requirements



### Team

The team at LCAAnalytics consists of experts from academia and industry with a passion for the environment:

Shiva Nanda of Newport Computers, Professor Venky Venkatachalam of the University of New Hampshire, and Dr. Samudra Vijay of Sam Analytic Solutions, they are assisted by Mike Ernsting, majoring in environmental engineering at Tufts University, and Christopher Schwab, majoring in business administration at the University of New Hampshire.

### Case Study: Expansion Cards



#### Prevalence of Computer Expansion Cards

There are several advantages of add-on hardware. It can improve functionality of a computer, and standards like PCI and PCI-Express make upgrading hardware like graphics, audio, and networking capability extremely easy. Nearly all new desktops and laptops have PCI, PCIe, mini PCI, or mini PCIe slots on the main board for easy installation and removal of additional hardware. In fact, many necessary components are peripheral cards that are not permanently attached, making replacement easier and more cost-effective. The use of expansion cards allows smaller form factors by allowing cards with separate functions to stack on top of the system board to make better use of the space.

In contrast to other life cycle studies on expansion cards, LCAT uses industry standards for network, graphics, and wireless cards to accurately estimate the environmental impact for these components. This allows streamlined calculations of environmental impact and the ability to customize for variations in system configurations.

#### Electricity Mix

Previous life cycle analysis studies used data from an entirely European electricity mix, which is not an accurate representation of the energy mix used to create these computer components, as most of these are manufactured in Asia. LCAT uses a geographic-region specific electricity mix based on the location of component manufacturing. LCAT also considers post-consumer waste of components.

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