

LCAT from LCAanalytics for Environmental Impact Assessment of Computers

Case Study: Environmental Impact of Notebook LCD Screens

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 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: LCD Screen



Liquid Crystal Displays

Liquid Crystal Displays (LCD) contribute over 15% of the CO₂ emissions in the manufacturing of notebook computers. Additionally, the LCD screen has a high power consumption during use, and contains toxic materials.

LCD Component Estimates

Previous life cycle analysis studies have made several assumptions about the materials in LCD modules, including use of mass ratios to estimate notebook LCDs based on desktop LCD monitors. LCAT uses in-depth material analysis to accurately determine the environmental impact of an LCD assembly.

Significance of Resolution

Our research shows that the resolution, or number of pixels, is critical to estimating the carbon footprint. This is because the most significant components of an LCD screen are the row and column driver ICs. These control the LCD pixel transistors.

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 manufacture of the components. LCAT also considers post-consumer waste of components.

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