

Carbon Footprint of a Typical 19" Business Monitor From Dell

Total greenhouse gas emissions for the E1912H 19" monitor (233 kg CO₂eq) are comparable to those for 160 liters of orange juice.

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Dell recognizes that climate change is real and must be mitigated, and we support efforts to reduce global greenhouse gas (GHG) emissions to levels guided by evolving science. We are also committed to reducing GHG emissions beyond our own operations.

To do this, we have adopted a strategy that takes into account the GHG impacts of our products and our suppliers. We look at each stage of the product life cycle — from developing, designing and sourcing through manufacturing and operations, order fulfilment, customer use and product recovery.

By assessing the carbon footprint of a monitor, we are able to identify areas for improvement to reduce overall GHG emissions and also help customers do the same.

Calculating the carbon footprint of a monitor

In research conducted in 2012, Dell determined the carbon footprint of the E Series E1912H 19" monitor, a typical high-volume, mainstream business monitor that is representative of a range of similar monitor products. It is Energy Star® compliant and EPEAT Silver registered.



Figure 1: Dell E1912H 19" monitor.

The carbon footprint of the monitor was assessed for two regions: the US and Germany. This was done to compare the impacts caused by different transport patterns and energy mixes.

The GHG emissions were calculated according to ISO 14040 and ISO 14044, the two international standards governing the investigation and evaluation of the environmental impacts of a given product over its life cycle. We relied on the carbon footprinting expertise of Intertek RDC for these calculations.

The following processes were taken into account:

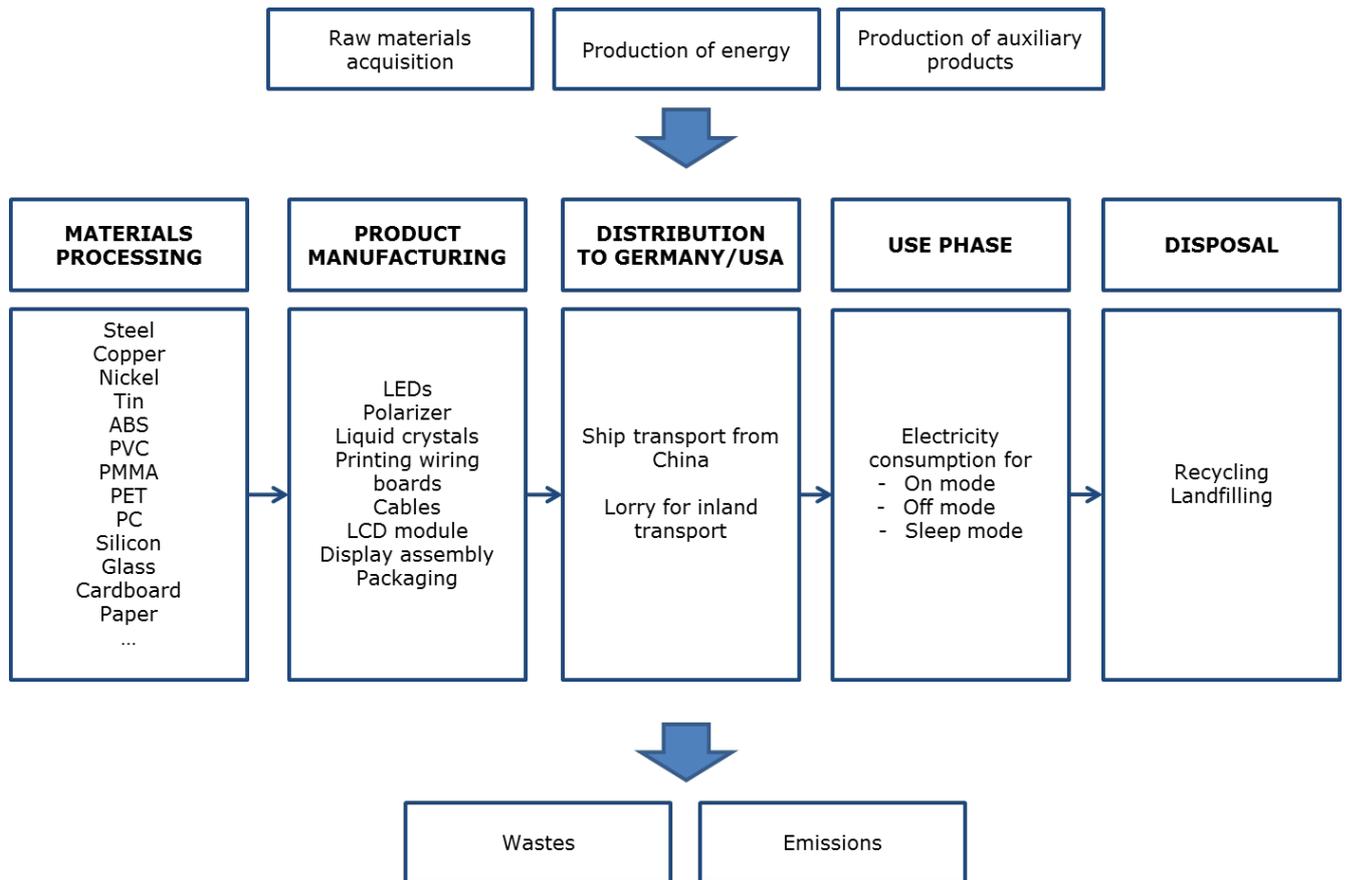


Figure 2: Process map for the E1912H monitor life cycle.

These processes can be grouped into four major steps:

Manufacturing: Includes the extraction, production and transport of raw materials, the manufacturing of components and subassemblies (including LCD module and product packaging), and the final assembly of the monitor in China. The transport of the subassemblies was taken into account as well. Energy consumption for final assembly was included.

Transport: Includes air, ocean and land transportation of the monitor and its packaging from the final assembly site in China to the end customer. Major means of transport was ship (from China to Europe and the US, resp.) and then truck transport to the final customer.

Use: Lifetime of the monitor was estimated at 4 years. This is consistent with general business customer use models. To determine the energy consumption in use, the US Environmental Protection Agency's Energy Star® Typical Energy Consumption (TEC) method was used. This method focuses on the typical electricity consumed while in normal operation during a representative period of time and can be used to compare the energy performance of monitors. The use phase was considered in each of the two regions (US and Europe). The respective grid mixes were considered for each region.

Recycling: For this study it was assumed that the monitor was sent for recycling after four years. Per European recycling legislation (the Waste Electronic and Electrical Equipment Directive, or WEEE) and similar US electronics recycling requirements, we assumed 75 percent of the monitor is recycled, while the rest is incinerated to recover the energy contained. Transport to recycling as well as energy used in mechanical separation and shredding were taken into account.

Carbon footprint of the Dell E1912H 19" Monitor

The total carbon footprint of a Dell E1912H 19" Monitor is approximately 233 kg CO₂eq when used in the US and 213 kg CO₂eq when used in Europe. The main reason for the difference between the two scenarios is the amount of emissions associated with the differing power generation modes in the two regions and (to a lesser extent) the difference in the distribution chain.

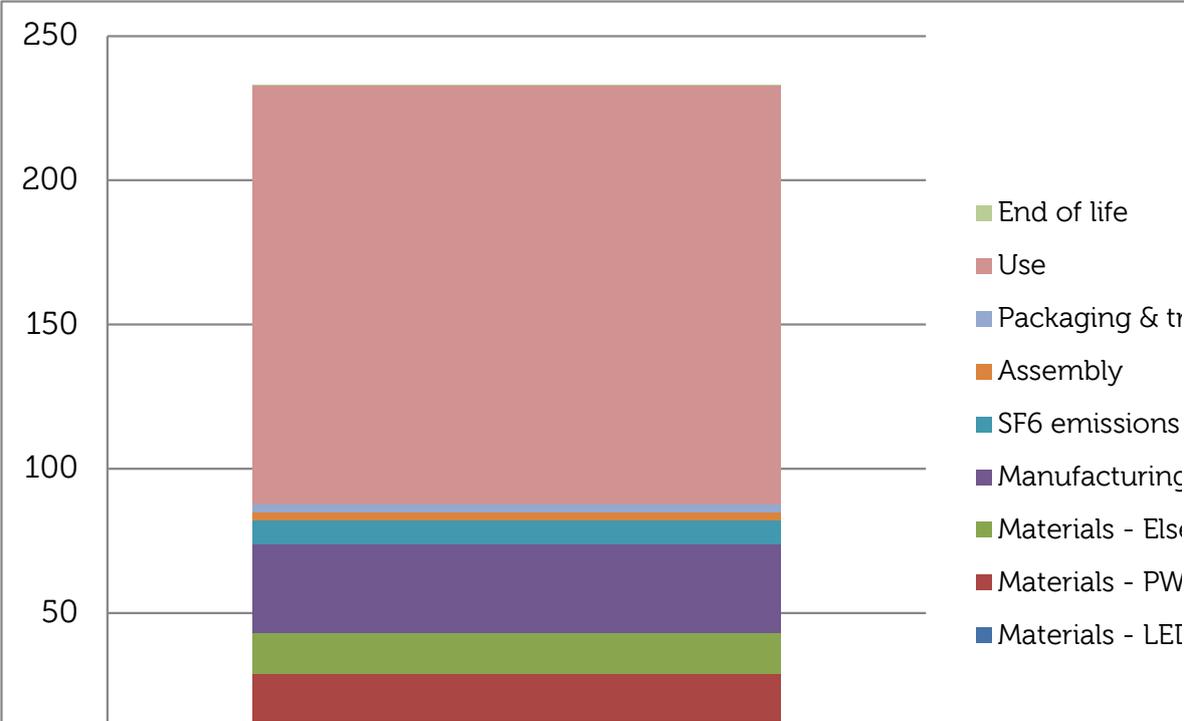


Figure 3: Total Carbon Footprint [kg CO₂eq] for the 1912H 19" monitor.

The GHG emissions from electricity consumption during the use phase (light red) account for approximately 60 percent of the total impact. This dominance of the use phase can also be observed in other electronic equipment, like in desktops.

The emissions from manufacturing of the LCD module also have a high impact (approximately 13%, violet). This is due to the fact that production of the LCD module is very energy intensive.

Manufacturing of other electronic components and subassemblies, such as the printed wiring board (PWB, dark red), the light emitting diodes (LED, dark blue) used as backlight and other components (dark green) together represent approximately 18% of the total impact.

The four items mentioned above account for over 90% of the GHG emissions when using the monitor over four years. Items such as transport or end of life have a very low impact.

The total product carbon footprint of the E1912H monitor is comparable to driving 800 km in a Porsche Cayenne (assuming a CO₂ emission of 296g/km¹). It is also comparable to drinking 160 liters of orange juice (assuming 360g CO₂eq/250ml²). This is equivalent to each member of a family of four drinking 250 ml of orange juice every day for half a year. These comparisons demonstrate that the GHG emissions over a four-year lifespan of the monitor are relatively modest.

Comparison of the carbon footprint of other Dell products

Dell has already published carbon footprint studies of a typical business laptop (the Latitude E6400³) and of a typical business desktop (the OptiPlex 780 MT⁴). In most cases a monitor is used when working on a laptop or a desktop. This study therefore complements these two earlier studies and allows determining the product carbon footprint of a workplace more accurately.

What Dell is doing to lower the carbon footprints

By optimizing consumption of energy, we can reduce costs, shrink our carbon footprint *and* develop expertise that allows us to help our customers do the same.

Manufacturing: Dell continues to be committed to using electricity that is produced from renewable sources. In FY12, we purchased and generated approximately 129 million kWh of green energy — accounting for roughly one-fifth of our total electricity purchases. In FY12, seven Dell facilities purchased 100 percent renewable electricity. Our headquarters in Round Rock, Texas, has purchased 100 percent renewable electricity since 2007.

Use: All Latitude, Precision and OptiPlex systems can be configured for Energy Star® compliance and are among the most energy-efficient in the industry. In fiscal year 2010, we had more than 135 products registered for Electronic Product Environmental Assessment Tool (EPEAT).

Recycling: Dell is committed to the environmentally responsible reuse and recycling of our products when our customers are finished with them. We are the first manufacturer to offer free computer recycling to consumers worldwide, and we have been providing responsible recycling services for more than a decade. We were also the first major computer manufacturer to ban the export of e-waste to developing nations.

Acknowledgments

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