



## Google Pixelbook Product environmental report

Model COA, introduced October 4, 2017

## Environmental Sustainability at Google

At Google, operating in an environmentally sustainable way has been a core value from the beginning. As our business has evolved to include the manufacturing of electronic products, we've continually expanded our efforts to improve each product's environmental performance and minimize Google's impact on the world around us. This report details the environmental performance of Google Pixelbook over its full life cycle, from design and manufacturing through usage and recycling.

### Product highlights

Pixelbook is designed with the following key features to help reduce its environmental impact:



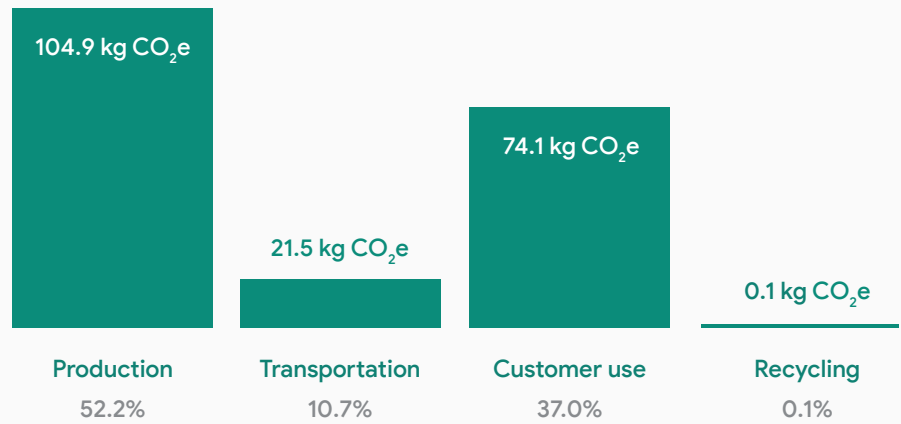
- ✓ Mercury-free LED-backlit display
- ✓ Arsenic-free glass
- ✓ PVC-free
- ✓ Brominated flame retardant-free
- ↻ 98% paper and fiber-based packaging
- ⚡ Power adapter with Level VI efficiency rating

## Greenhouse gas (GHG) emissions

The production, transportation, use, and recycling of electronic products generate GHG emissions that can contribute to rising global temperatures. Google conducts a life cycle assessment on products to identify materials and processes that contribute to GHG emissions, with the goal of minimizing these emissions.

### Estimated GHG Emissions for Pixelbook<sup>2</sup>

Total GHG emissions over four-year life cycle: 200.6 kg CO<sub>2</sub>e



## Energy efficiency

Pixelbook uses a power adapter with a Level VI efficiency rating<sup>3</sup> and incorporates power-management software to maximize battery-charging efficiency and extend battery life during use.

### Energy efficiency of Pixelbook

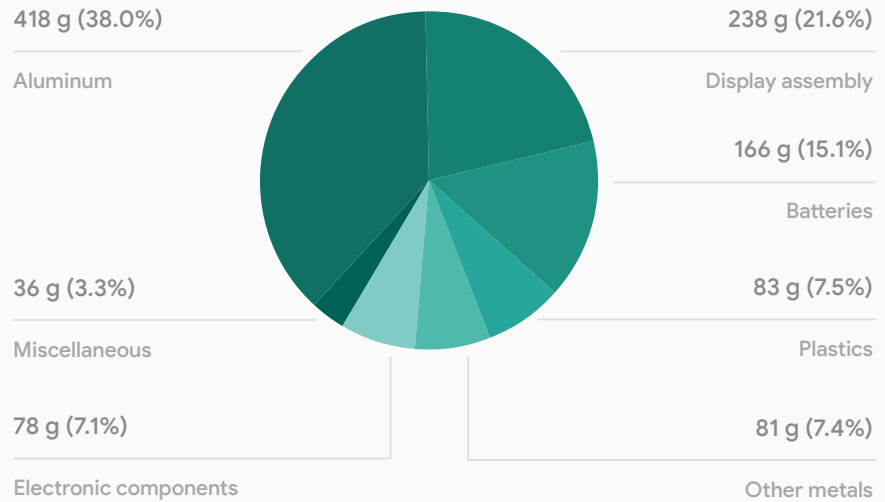
| Mode  | 115 V, 60 Hz                                | 230 V, 50 Hz                                |
|---|---|---|
| Power adapter average efficiency <sup>4</sup> | 83.7% at 5 V output<br>89.6% at 20 V output | 82.5% at 5 V output<br>90.0% at 20 V output |
| Power adapter no-load power <sup>5</sup>      | 0.030 W                                     | 0.027 W                                     |
| Off mode power                                | 0.50 W                                      | 0.54 W                                      |
| Sleep mode power                              | 1.08 W                                      | 1.15 W                                      |
| Long idle mode power (display off)            | 2.64 W                                      | 2.77 W                                      |
| Long idle mode power (display on)             | 9.50 W                                      | 9.62 W                                      |
| Annual energy use estimate <sup>6</sup>       | 31.7 kWh                                    | 32.4 kWh                                    |
| Annual cost of energy estimate                | US\$4.12 <sup>7</sup>                       | €6.84 <sup>8</sup>                          |

## Material use



Pixelbook is designed to be light and compact. Minimizing its size and weight allows materials to be used more efficiently, thereby reducing the energy consumed during production and shipping as well as minimizing the amount of packaging.

### Materials used in Pixelbook

Total materials: 1100 g<sup>9</sup>






### Pixelbook battery

-  Lithium-ion polymer
-  Free of cadmium, lead, and mercury

### Restricted substances

Historically, many electronic devices contained materials such as lead, mercury, cadmium, and brominated flame retardants that pose environmental and health risks. We designed Pixelbook to meet global regulations that restrict harmful substances, including the following:

-  European RoHS Directive restrictions on lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE)
-  European Battery Directive restrictions on lead, mercury, and cadmium in batteries
-  European Packaging Directive restrictions on lead, mercury, cadmium, and hexavalent chromium in packaging

## Voluntary substance restrictions

Pixelbook also meets the following Google voluntary substance restrictions:

- ✓ Mercury-free LED-backlit display
- ✓ Arsenic-free display glass
- ✓ PVC-free
- ✓ Brominated flame retardant-free

## Packaging

Packaging for Pixelbook uses 98% paper and fiber-based materials. The chipboard material that forms the underlying structural layer of the box base and lid is made of 100% recycled content. We have designed the Pixelbook packaging to minimize its weight and volume, which helps conserve natural resources and allows more devices to be transported in a single shipping container.

## Packaging materials for Pixelbook

(U.S. configuration retail packaging)

| Material        | Weight |
|-----------------|--------|
| Paper           | 1041 g |
| Plastics        | 11 g   |
| Total packaging | 1052 g |

## Ethical sourcing

Google and its subsidiaries are committed to ensuring that working conditions in our operations and in our supply chains are safe, that all workers are treated with respect and dignity, and that business operations are environmentally responsible and ethically conducted. Learn more about our expectations for manufacturing partners in the [Google Supplier Code of Conduct](#), our [2016 Creating a Responsible Supply Chain report](#), and our [Conflict Minerals Policy](#).

## Learn more

For more information about our environmental sustainability initiatives—including case studies, white papers, and blogs—please see our [Environment website](#) and our [Environmental Report: 2017 Progress Update](#).

Learn how to recycle your used device in the [Google Store Help](#) section of our website.

## Endnotes

1. ENERGY STAR and the ENERGY STAR mark are registered trademarks owned by the U.S. Environmental Protection Agency.
2. GHG emissions estimates are calculated in accordance with ISO 14040 and ISO 14044 requirements and guidelines for conducting life cycle assessments and include the production, transportation, use, and recycling of the product, accessories, and packaging.
3. Level VI is the highest available efficiency rating for power adapters as defined in the [International Efficiency Marking Protocol for External Power Supplies Version 3.0](#).
4. This is the average efficiency of the power adapter when input and output power is measured at 25%, 50%, 75%, and 100% of rated output current and averaged as part of testing in accordance with the [U.S. Department of Energy Uniform Test Method for Measuring the Energy Consumption of External Power Supplies](#).
5. Power is measured when the power adapter is plugged into an AC power source without being connected to the product. Testing is done in accordance with the [U.S. Department of Energy Uniform Test Method for Measuring the Energy Consumption of External Power Supplies](#).
6. Estimated energy use is based on the calculated Typical Energy Consumption method described in [ENERGY STAR Program Requirements for Computers, Version 6.1](#).
7. The average residential cost of energy for U.S. households is \$0.13 per kWh (source: [U.S. Energy Information Agency May 2017 report](#)).
8. The average household cost of energy for consumers in the European Union was €0.211 per kWh in the second half of 2015 (source: [Eurostat Statistics Explained](#)).
9. Product material weights are for Google Pixelbook only. For the U.S. configuration, an additional 186 g of electronic accessories can be included in-box.