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 Wifi over its full life cycle, from design and manufacturing through usage and recycling.

Product highlights

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

- PVC-free
- 49% post consumer recycled content across its plastic mechanical parts
- 94% 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 Google Wifi

Total GHG emissions assuming four years of use: 90 kg CO₂ e

<table>
<thead>
<tr>
<th>Production</th>
<th>Transportation</th>
<th>Customer use</th>
<th>Recycling</th>
</tr>
</thead>
<tbody>
<tr>
<td>24%</td>
<td>1%</td>
<td>74%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Energy efficiency

Google Wifi uses an energy efficient DOE Level VI power adapter.

<table>
<thead>
<tr>
<th>Mode</th>
<th>115 V, 60 Hz</th>
<th>230 V, 50 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power adapter average efficiency</td>
<td>84.7% at 5 V output</td>
<td>85.0% at 5 V output</td>
</tr>
<tr>
<td>Idle power</td>
<td>3.47 W</td>
<td>3.49 W</td>
</tr>
<tr>
<td>Active mode power</td>
<td>4.30 W</td>
<td>4.46 W</td>
</tr>
<tr>
<td>Annual energy use estimate</td>
<td>31 kWh</td>
<td>31 kWh</td>
</tr>
<tr>
<td>Annual cost of energy estimate</td>
<td>US$4.03⁵</td>
<td>€6.82⁷</td>
</tr>
</tbody>
</table>
Material use

Google Wifi is designed to be small. Minimizing the size and weight of Google Wifi 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 Google Wifi

Total materials: 340 g

- Plastic: 150 g
- Electronics: 33 g
- Steel: 14 g
- Aluminum: 125 g
- Other: 18 g

Recycled materials

- 49% post consumer recycled content across its plastic mechanical parts

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 Google Wifi to meet global regulations that restrict harmful substances, including the following:

- European RoHS Directive restrictions on lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), polybrominated diphenyl ethers (PBDE), and four different phthalates (DEHP, BBP, DBP, DIBP)

- European Packaging Directive restrictions on lead, mercury, cadmium, and hexavalent chromium in packaging
Voluntary substance restrictions

Google Wifi also meets the following voluntary substance restrictions:

☑ PVC-free

Packaging

Packaging for Google Wifi uses 94% paper and fiber-based materials. We have designed Google Wifi 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 Google Wifi (U.S. configuration retail packaging)

<table>
<thead>
<tr>
<th>Material</th>
<th>Mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper / fiber-based</td>
<td>160 g</td>
</tr>
<tr>
<td>Plastic</td>
<td>10 g</td>
</tr>
</tbody>
</table>

Total packaging 170 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 2019 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 Sustainability website and our 2019 Environmental Report.

Learn how to recycle your used device in the Google Store Help section of our website.

Endnotes

1. Google defines its restrictions on harmful substances, including definitions for what Google considers to be “free of,” in the Google Restricted Substances Specification.

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. Average efficiency of power adapter when input and output power is measured at 25%, 50%, 75%, and 100% of rated output current and averaged. Tested in accordance with the U.S. Department of Energy Uniform Test Method for Measuring the Energy Consumption of External Power Supplies.

5. Estimated energy use is based on 5 devices continuously and simultaneously connected, with 175GB data transferred weekly.

6. The average residential cost of energy for U.S. households is $0.13 per kWh (source: U.S. Energy Information Agency June 2020 report).

7. The average household cost of energy for consumers in the EU-28 was €0.22 per kWh in the first half of 2019 (source: Eurostat Statistics Explained).

8. Product material masses are for Google Wifi only. For the U.S. configuration, an additional 114 g of electronics accessories can be included in-box.