September 8, 2011

Google Details, and Defends, Its Use of Electricity

By **JAMES GLANZ**

Google disclosed Thursday that it continuously uses enough electricity to power 200,000 homes, but it says that in doing so, it also makes the planet greener.

Every time a person runs a Google search, watches a YouTube video or sends a message through Gmail, the company's data centers full of computers use electricity. Those data centers around the world continuously draw almost 260 million watts — about a quarter of the output of a nuclear power plant.

Up to now, the company has kept statistics about its energy use secret. Industry analysts speculate it was because the information was embarrassing and would also give competitors a clue to how Google runs its operations.

While the electricity figures may seem large, the company asserts that the world is a greener place because people use less energy as a result of the billions of operations carried out in Google data centers. Google says people should consider things like the amount of gasoline saved when someone conducts a Google search rather than, say, drives to the library. "They look big in the small context," Urs Hoelzle, Google's senior vice president for technical infrastructure, said in an interview.

Google says that people conduct over a billion searches a day and numerous other downloads and queries. But when it calculates that average energy consumption on the level of a typical user the amount is small, about 180 watt-hours a month, or the equivalent of running a 60-watt light bulb for three hours. The overall electricity figure includes all Google operations worldwide, like the energy required to run its campuses and office parks, Mr. Hoelzle added. Data centers, however, account for most of it.

For years, Google maintained a wall of silence worthy of a government security agency on how much electricity the company used — a silence that experts speculated was used to cloak how quickly it was outstripping the competition in the scale and efficiency of its data centers.

The electricity figures are no longer seen as a key to decoding the company's operations, Mr. Hoelzle said.

Unlike many data-driven companies, Google designs and builds most of its data centers from scratch, down to the servers using energy-saving chips and software.

Noah Horowitz, senior scientist at the Natural Resources Defense Council in San Francisco, applauded Google for releasing the figures but cautioned that despite the advent of increasingly powerful and energy-efficient computing tools, electricity use at data centers was still rising because every major corporation now relied on them. He said the figures did not include the electricity drawn by the personal computers, tablets and iPhones that use information from Google.

"When we hit the Google search button," Mr. Horowitz said, "it's not for free."

Google also estimated that its total carbon emissions for 2010 were just under 1.5 million metric tons, with most of that attributable to carbon fuels that provide electricity for the data centers. In part because of special arrangements the company has made to buy electricity from wind farms, Google says that 25 percent of its energy was supplied by renewable fuels in 2010, and estimates that figure will reach 30 percent in 2011.

Google also released an estimate that an average search uses 0.3 watt-hours of electricity, a figure that may be difficult to understand intuitively. But when multiplied by Google's estimate of more than a billion searches a day, the figure yields a somewhat surprising result: about 12.5 million watts of Google's 260-million-watt total can be accounted for by searches, the company's bread-and-butter service.

The rest is used by Google's other services, including YouTube, whose power consumption the company also depicted as very small.

The announcement is likely to spur further competition in an industry where every company is already striving to appear "greener" than the next, said Dennis Symanski, a senior data center project manager at the Electric Power Research Institute, a nonprofit organization. At professional conferences on the topic, Mr. Symanski said, "they're all clamoring to get on the podium to claim that they have the most efficient data center."

Whether you accept Google's power use data and its efforts to reduce the environmental impact or not, there is one clear concept to remember when it comes to energy use of any kind: inefficiency increases cost. Even if your data center is one 10-year old PC running Windows XP, you want to use power in the most efficient way you can. Doing so will not only help reduce your impact on the environment; it will also reduce your cost of operations. With that in mind, I am curious how your organization approaches power use reduction. Also read: Google Details, and Defends, Its Use of Electricity (New York Times). Google reveals energy use to show search is green (Associated Press). Google discloses carbon footprint for the first time (The Guardian - UK). Editor's Picks. Flywheels use electricity to spin up a weighted disc, and then that angular momentum (rotational inertia) is used to drive a generator to generate electricity later. Thermal energy storage uses heat sinks like molten salts to store heat energy, then uses that energy to either generate electricity or provide heating later. Alternatively, electricity can be used to freeze water into ice, and then the ice can be used to provide air conditioning later. (This is a way of time-shifting electricity consumption moreso than "storing" it.) Various other schemes exist, such as driving large electric trains uphill and then using regenerative braking as they roll back down. Google is feeling the heat over its decision to build its new Hangouts IM and audio/video chat product with proprietary technology that doesn't support server federation via the XMPP industry standard, but the company is defending its move. Specifically, Google maintains that XMPP (Extensible Messaging and Presence Protocol) industry support is weak, which dilutes its purpose as a common protocol, and that its technology hasn't kept up with the times. Integration urged. This week, the Electronic Frontier Foundation took Google to task over this issue, saying that the move is bad for users from the standpoints of interoperability and privacy. Read the article Google Details, and Defends, Its Use of Electricity. Conduct your own research. What do you think? Do the benefits of internet search engines outweigh the costs? In discussing this issue, address the following points:? Do internet searches increase or decrease our the contribution to GHG? ? Should we increase or decrease our use of technology in View complete question ». Where electricity is generated by the burning of fuels (coal, natural gas, oil, trash incineration), we can say we are adding to greenhouse gases (GHG) every time we switch on a light. Even doing a search on internet produces GHG. Read the article Google Details, and Defends, Its Use of Electricity. Conduct your own research. What do you think?