

Impact Study

Virginia, US Data Center

2024



Google's Data Center Impact in Virginia

Google's data centers in Virginia are helping to rapidly grow the digital economy. They are what you rely on to pull up a map to a new restaurant, attend online classes, or access your healthcare records.

Google's digital infrastructure investments in Virginia drive local economic development through job creation, promote environmental stewardship through carbon-free energy production, and foster thriving communities.

Since 2018, Google has invested more than [\\$4.2B in Virginia's digital infrastructure](#). This Impact Study provides a summary of key economic, environmental, and social metrics that Google's data centers have had on Virginia in recent years.

Economic

Google's investments in digital infrastructure in Virginia support jobs in construction, engineering, and the service industry. Google's data center contribution to labor income in Virginia is equal to supporting **~8,340 households in the Commonwealth each year**.

~\$1,066M

Annual contribution to Virginia's GDP¹ (2021-2023)

~10,385

Annual jobs supported (2021-2023)

Environmental

As part of Google's commitment to operate all of its data centers using carbon-free energy (CFE) by 2030, Google partnered with AES Corporation to **source 500 MW of local renewable energy and battery storage** that will help its data centers in Virginia be 90% CFE.

52% (2023) | 60% (2022)

Percentage of electricity matched with carbon-free energy^{2,3} supply at every hour of every day at Google's data centers in Virginia

Social

Google's community investments include support to the Loudoun Education Foundation's STEM⁴ program which helped empower underserved students, **generating a ~\$0.50 social benefit for every Google-invested dollar** and fostering a diverse future workforce and more equitable economic growth in Virginia.

~\$3.1M

Invested in Virginia communities surrounding Google's data centers in 2022 and 2023

This report provides a summary of Google's data center impact. The overall impact of all Google operations is significantly larger, encompassing contributions beyond data centers, including economic benefits from its platforms, products, and services used across various sectors.

Notes: 1. GDP stands for gross domestic product. 2. Google defines [carbon-free energy](#) (CFE) as any type of electricity generation that doesn't directly emit carbon dioxide, including (but not limited to) solar, wind, geothermal, hydropower, and nuclear. Sustainable biomass and carbon capture and storage (CCS) are special cases considered on a case-by-case basis, but are often also considered carbon free energy sources. 3. Google's CFE is influenced by various factors, such as overall electricity usage, purchases of carbon-free energy, technological advancements, and changes in the broader energy landscape. 4. STEM stands for science, technology, engineering, and mathematics.

Economic Impact: 2021-2023¹



~\$1,066M

Annual Contribution
to Local GDP

Includes ~\$598M direct, ~\$204M indirect, and ~\$264M induced



~10,385

Annual
Jobs Supported²

Includes ~305 direct jobs, ~7,730 indirect, and ~2,350 induced



~\$716M

Annual
Labor Income

Includes ~\$75M direct, ~\$508M indirect, and ~\$133M induced

Google's contribution to Virginia's GDP increased by ~14% between 2021 and 2023, compared to the Commonwealth's overall GDP growth of ~7% during the same period.

Google's data center contribution to direct, indirect, and induced labor income in Virginia is equal to supporting ~8,340 households in the Commonwealth each year.

Top GDP Contributions



Construction

(37% of Total GDP Contribution from Google's investments in Virginia)



Other (various sectors such as professional, scientific, and technical services³ and management)

(63%)

Spotlight: Carbon-Free Energy

Google's investments in clean energy in Virginia have created...



~\$4M

Annual
Contribution to
Local GDP



Jobs

Annually
Supported for
Construction &
Maintenance



~\$1M

Annual Labor
Income

Direct: includes Google employees and contractors (incl. their payroll and benefits) and annual spend on Google's suppliers

Indirect: includes Google's suppliers' employees and contractors, the suppliers' payroll and benefits due to Google orders, and suppliers spend

Induced: includes impact generated by the household spending of Google's employees and their suppliers in their local economies

Notes: 1. GDP and labor income rounded to the nearest one-million; Jobs and household numbers rounded to the nearest multiple of five. 2. Google's support to jobs includes construction, engineering, networking, renewable energy jobs, security, and services, among others. 3. Includes computer systems, data processing, software services, and other computer-related facility management support, etc.

Environmental Impact: 2022 & 2023^{1,2}

52% (2023) vs. 41% (2023 Regional Grid)

60% (2022) vs. 40% (2022 Regional Grid)

24/7 Carbon-Free Energy (CFE)

Google has matched 100% of its global annual electricity consumption with renewable energy purchases, and has further committed to operating at 24/7 CFE by 2030. This means matching electricity demand with CFE supply every hour of every day.

1.08 (2023)

1.09 (2022) vs. 1.58 (industry average)

Avg. Power Usage Effectiveness

Compared to the industry average, Google's Virginia data centers are achieving an 86% reduction in overhead power usage. For every watt of power used to run servers and network equipment, only 0.08 watts are used to run supporting infrastructure like cooling and lighting.

Spotlight: Carbon-Free Energy

To help advance Google's 24/7 CFE commitment, Google signed a ten-year supply contract with AES Corporation, sourcing 500 MW of energy from wind, solar, hydro, and battery storage resources. These sources will help Google's data centers in Virginia be 90% carbon-free when measured on an hourly basis.

In addition, the creation of the clean energy portfolio will require ~\$600M of investment and create 1,200 jobs for construction and operations within the local community.

"Our long-standing data center efficiency efforts are important because our data centers represent the vast majority of our direct electricity use. Google's [global] data center consumption was more than 24 TWh in 2023 which translates to approximately 7-10% of global data center electricity consumption."

- 2023 & 2024 Google Environmental Reports

283.4M Gal. (2023)

229.3M Gal. (2022)

Water Consumption

Google strives to protect water quality and ecosystem health in the communities where it operates, including Virginia.³

Sustainability Spotlight

The Chesapeake Bay watershed is the nation's largest estuary system; however, it faces water quality challenges due to increased nutrients and sediments from runoff. In partnership with the Alliance for the Chesapeake Bay, Google is identifying opportunities to help and incentivize farmers with agricultural best management practices to improve local water quality.

Notes: 1. For more information on the environmental statistics, refer to the 2023 & 2024 Google Environmental Reports. 2. As applicable, the water consumption represents total water consumption across all data centers in the state; CFE and PUE are averages across data centers. 3. Google seeks to replenish 120% of the freshwater volume it consumes, on average, across its offices and data centers by 2030.

Social Impact: 2022 & 2023¹



~\$3.1M

Given to communities
in 2022 and 2023

*Surrounding Google's data
centers in Virginia in addition to
other Google.Org programs²*



41

Organizations supported
in 2022 and 2023

*Focused on education, workforce,
and community development,
among other areas*



~\$0.50

Social benefit per
Google-invested dollar³

*Based on STEM educational
program⁴*

Google invested ~\$3.1M in Virginia communities, including:

STEM Exploration

Since 2022, Google provided \$30K to support the Northern Virginia Science Center Foundation's STEM Chicas after school program to empower Latina girls to explore STEM careers.

- The nine-week program engaged 100 Latina girls from elementary schools in Prince William and Loudoun counties. They participated in hands-on learning modules including robotics and electric slime, encouraging them to discover STEM-related careers and opportunities.
- As Jenn Brunner, Director of Advancement, Northern Virginia Science Center Foundation, put it, *"With Google's support, and working in partnership with Title 1 schools with high Hispanic populations, the Science Center is able to open the eyes and minds of young Latinas and their families to careers and opportunities...within STEM."*

STEM Programming

Since 2020, Google has provided nearly \$360K to the Loudoun Education Foundation, which supported programs including Bridge to Enter Advanced Mathematics (BEAM):

- The 5-week summer program gave 108 students from underserved communities support to improve their confidence, problem-solving skills, and Northwest Evaluation Assessment (NWEA) assessment scores, generating the social benefit referenced above.

"I talked to a student who never thought she would come to a summer math camp.. they're learning that math is everywhere, and it informs every career path."

- Danielle Nadler, LEF Executive Director

Notes: 1. When applicable, numbers were rounded to the nearest thousand. 2. The amounts listed are in addition to other Google programs, like Grow with Google, Google.Org's Impact Challenge, and other initiatives. 3. This calculation is directional and represents Google's step toward understanding social value associated with its community investments. 4. Calculation based on the Loudoun Education Foundation's program.

The Google Differentiator

Google recognizes that its data center operations and value chain can be engines of economic, environmental, and social progress. Google aims for its investments to catalyze positive spillover effects within Virginia.

Google thinks about its investments holistically.

Google recognizes that it can catalyze greater impact when it looks at its economic, environmental, and social efforts collectively, which is why Google's 2024 Impact Study in Virginia articulates Google's impact across these three domains. As Google considers its future strategy in Virginia, it will continue to look for opportunities to keep digital infrastructure secure and sustainable while driving local economic development, fostering thriving communities, and spurring environmental stewardship.

Google seeks to harness AI to drive innovation and accelerate climate action.

Google continues to invest in state-of-the-art infrastructure to support its artificial intelligence (AI) efforts and rapidly grow the digital economy in Virginia. However, Google recognizes that these benefits also come with increased energy usage and emissions and might have unintended consequences if not properly managed. As part of its AI for Sustainability strategy, Google is taking steps to use AI to accelerate climate progress and through its AI Opportunity Agenda, Google is providing recommendations for governments to amplify the positive impacts of AI for the broadest possible range of people.

Google seeks to engage directly with community members to advance and measure impact.

Google continues to work closely with community members in Virginia to understand its impact and refine its strategy. This report represents a step toward measuring impact as Google moves from measuring inputs to measuring impact and value. This includes Google's approximation of a "social return on investment", intended to estimate the social value created per Google-invested dollar based on educational empowerment and future job opportunities. Google will continue to find ways to be more transparent and articulate its impact to local communities across all dimensions.

Thank you!

To the many community members and Googlers who strive to make Google's ambitious economic, environmental, and social goals a reality.

For additional information or any questions please reach out to:



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DISCLAIMER: This Impact Study was prepared by Deloitte Consulting LLP ("Deloitte") for Google LLC ("Google") during Fall 2024. The purpose of the study is to assess the economic, environmental, and social impacts of Google's data centers modeled from the years of 2021-2023. The modeling, analysis, and results shown as part of the impact are based on information provided directly by Google LLC, publicly available information, and third-party information. Any revisions to those data will affect the assessments shown as part of the study. To calculate economic impacts, this study used an input-output model developed by IMPLAN. In preparing this study, Deloitte has, without independent verification, relied on the accuracy of information made available by Google.