

Impact Study

Japan Data Center

2024



Google's Data Center Impact in Japan

Google's data center in Japan is helping to rapidly grow the digital economy. It is 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 Japan drive local economic development through job creation, promote environmental stewardship through carbon-free energy production, and foster thriving communities.

Google has been part of Japan's digital infrastructure since 2022. This Impact Study provides a summary of key economic, environmental, and social metrics that Google's digital infrastructure investments have had on Japan.

Economic

Google's investments in digital infrastructure in Japan support jobs in construction, engineering, and the service industry.

Google's data center contribution to labor income in Japan is equal to supporting **~5,420 households in the country each year.**

JPY ~77,805M¹

Annual contribution to Japan's GDP² (2021-2023)

~7,165

Annual jobs supported (2021-2023)

Environmental

As part of Google's commitment to operate all of its data centers using carbon-free energy by 2030, in 2024 Google signed its **first two Power Purchase Agreements in Japan, bringing 60 MW of new solar capacity to the Japanese grid.**

23% (2023) | 24% (2022)

Percentage of electricity matched with carbon-free energy^{3,4} supply at every hour of every day at Google's data center in Japan

Social

Google's community investments include support to Minna no Code's STEM⁵ program which helped empower 230+ students, **generating a JPY ~49.10⁶ social benefit for every Google-invested dollar** and fostering a more digitally skilled future workforce in Japan.

JPY ~99M⁷

Invested in Japan communities surrounding Google's data center 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. Equivalent to ~USD 611 Million 2. GDP stands for gross domestic product. 3. 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. 4. 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. 5. STEM stands for science, technology, engineering, and mathematics. 6. Equivalent to ~USD 0.35. 7. Equivalent to ~USD 725K.

Economic Impact: 2021-2023^{1,2}



JPY ~77,805M³

Annual Contribution
to Local GDP

*Includes⁴ JPY ~ 31,682M direct,
JPY ~ 25,943M indirect, and JPY
~20,180M induced*



~7,165

Annual
Jobs Supported⁵

*Includes ~185 direct jobs, ~5,060
indirect, and ~1,920 induced*



JPY ~35,940M⁶

Annual
Labor Income

*Includes⁷ JPY ~2,318M direct, JPY
~26,192M indirect, and JPY
~7,429M induced*

Google aspires to increase its contribution to Japan's GDP by supporting the growth of the country's digital economy and digital infrastructure goals.

Google's data center contribution to direct, indirect, and induced labor income in Japan is equal to supporting ~5,420 households in the country each year.

Top GDP Contributions



Construction

(18% of Total GDP Contribution
from Google's investments in
Japan)



Real estate

(14%)



Other (various sectors such as
wholesale trade and
manufacturing)

(68%)

Spotlight: Fiber Optics Expansion

In 2022, Google announced its Japan Digitization Initiative, with Prime Minister Kishida, as a commitment to bring technology to more people in Japan. Google followed on its commitment with a JPY ~127B⁸ investment to deliver two new subsea cables – named Proa and Taihei – creating new fiber-optic routes between the US and Japan.

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. Numbers were converted into local currency using the average 2021-2023 exchange rate (IRS). 2. GDP and labor income rounded to the nearest one-million; Jobs and household numbers rounded to the nearest multiple of five. 3. Equivalent to USD ~611 Million. 4. Equivalent to USD ~249 Million direct, USD ~204 Million indirect, and USD ~159 Million induced. 5. Google's support to jobs includes construction, engineering, networking, renewable energy jobs, security, and services, among others. 6. Equivalent to USD ~282 Million. 7. Equivalent to USD ~18 Million direct, USD ~206 Million indirect, and USD ~58 Million induced. 8. Equivalent to USD ~1 Billion.

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

23% (2023) vs. 23% (2023 Regional Grid)

24% (2022) vs. 24% (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.

Spotlight: Carbon-Free Energy

To advance Google's 24/7 carbon-free energy CFE commitment, in 2024, Google signed its first two Power Purchase Agreements in Japan, bringing 60 MW of new solar capacity to the Japanese grid.

The first, with Clean Energy Connect, a partner of Itochu Corporation, will bring 40 MW of clean energy through the construction of 800 small-scale solar plants in grids across Japan. The second, with Shizen Energy, will develop a utility-scale solar project and bring 20 MW to the same power grid as Google's data Center in Inzai City.

Avg. Power Usage Effectiveness

Google's global data centers³ have an average power usage effectiveness (PUE) of 1.10, compared to the industry average of 1.58. This means that Google's global data centers are achieving an 83% reduction in overhead power usage. For every watt of power used to run servers and network equipment, only 0.10 watts are used to run supporting infrastructure like cooling and lighting.

"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

25.7M Liters (2023)

Water Consumption

Google strives to protect water quality and ecosystem health in the communities where it operates, including Japan.⁴

Sustainability Spotlight

Google is using AI-powered technologies to mitigate climate change impacts while enhancing safety: for instance, machine learning models are used to forecast floods or typhoons in Japan days in advance, and satellite imagery is used to identify areas most in need of help after a natural disaster.

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 country; CFE and PUE are averages across data centers. 3. This represents Google's global average PUE value for Google's owned data centers. 4. 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



JPY ~99M²

Given to communities
in 2022 and 2023

*Surrounding Google's data center
in Japan in addition to other
Google.Org programs³*



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Organizations supported
in 2022 and 2023

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



JPY ~49.10⁴

Social benefit per
Google-invested dollar⁵

*Based on STEM educational
program⁶*

Google invested JPY ~99M² in Japan communities, including:

Habitat Restoration

In 2023, Google provided over JPY ~34M⁷ to help Ramsar Network Japan and local farmers restore and enhance the Watarase Basin's wetland habitat. This habitat holds the Ramsar designation⁸ and is home to over 1,000 plant species and countless birds, including endangered storks, in the area.

- Google's investments helped create small ponds that provide year-round food sources to wildlife, which are threatened by local farming.

"Thanks to Google's support, the Watarase project has helped grow connections across the local community. Because we have the Watarase Retention Basin Project, the local farmers are working together with us on this, and that ensures that the storks have a future where they can thrive abundantly here."

- Naomi Goto, General Secretary, Ramsar Network Japan

STEM Programming

From 2022-2023, Google gave JPY ~26M⁹ to support Minna no Code Code for Everyone's computer science education programs in public elementary and junior high schools in Inzai City.

- In 2023, part of the funding enabled computer science training for 238 students and 26 teachers, generating the social benefit referenced above.
- As Yuta Tonegawa, CEO of Code for Everyone, put it, *"Google's funding has allowed Code for Everyone to create a computer science education program at Harayama Elementary School that is among the most advanced of its kind in the public elementary school system. The school's team was awarded 2nd place in the Robot Design Finalist category at the First Lego League Challenge World Championship in the US!"*

Notes: 1. Numbers were converted into local currency using the average 2022-2023 exchange rate and rounded to the nearest one-million. 2. Equivalent to USD ~725K. 3. The amounts listed are in addition to other Google programs, like Grow with Google, Google.Org's Impact Challenge, and other initiatives. 4. Equivalent to USD ~0.35. 5. This calculation is directional and represents Google's step toward understanding social value associated with its community investments. 6. Calculation based on Minna no Code's computer science education program. 7. Equivalent to USD ~250K. 8. Ramsar designation is given to a Wetland of International Importance according to UNESCO. 9. Equivalent to USD ~192K.

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 Japan.

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 Japan articulates Google's impact across these three domains. As Google considers its future strategy in Japan, 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 Japan. 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 Japan 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.