Creating Resilience

Generative AI and Data Center Decentralization

2 Electrical supply issues in Greater Tokyo

REPORT

CBRE RESEARCH
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Contents

This report is the second in a three-part series analyzing the link between the proliferation of generative AI and the geographical diversification of data center locations throughout Japan (this issue is in bold in the table of contents).

Summary

– In addition to major metropolitan centers, an increasing number of AI data centers are being built in the Tohoku, Hokuriku, and Shikoku areas. The supply-demand balance for data centers in Greater Tokyo remains extremely tight, making it difficult for developers to secure both land for development and the necessary power supply. As a result, developers now have no choice but to consider regional areas as potential sites for future data center development.

– The government has launched the “Public-Private Advisory Council on Watt-Bit Collaboration” as a means of encouraging both decarbonization of regional power production and the decentralization of data centers in Japan. With renewable energy sources such as solar power and wind power seen as decarbonization initiatives with the potential to triple Japan’s current total domestic power production capacity, their importance is set to grow.

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AI Data Centers Increasing Nationwide

3.1. The Proliferation of AI Data Centers

Both new development plans for AI data centers and reconfigurations of existing data centers to house GPU servers are on the rise (Figure 3-1). However, existing facilities and those planned for completion within the next couple of years were designed before the recent explosive proliferation of generative AI. For this reason, most data center projects currently in development aim to modify their operational plans by partially implementing features necessary for running GPU servers, such as racks with higher heat tolerance and liquid cooling systems. As shown in Figure 3-1, even the smallest per rack power capacity for new domestic AI data centers is now 20 kVA, while the higher end of this scale is now reaching in excess of 100 kVA. This is significantly higher than the 5 to 10 kVA typical for conventional data centers.

More AI data centers are being built in the Tohoku, Hokuriku, and Shikoku areas, where such facilities were previously scarce (Figure 3-2). This is due to the higher level of latency tolerance of AI data centers. Other factors include the fact that it is much easier for developers to secure land and power at a reasonable cost in regional areas than in major cities, and the availability of central and local government aid programs to assist development.

Figure 3-1: Recently Completed and Planned AI Data Center Developments (Greater Tokyo and Greater Osaka)

Location	Operator	Facility name	Rack power capacity	IT power supply (MW)	Total floor area (sq. m.)	Opening date
Shiroi City, Chiba	NTT Data Group	Shiroi Data Center	100kW	50	-	Mar. 2027
Seika Town, Kyoto	NTT Data Group	Keihanna Data Center	100kW	30(6)*	-	Feb. 2026
Inzai City, Chiba	MC Digital Realty	NRT14 Data Center	70kW	31	22,800	Dec. 2025
Saitama City, Saitama	Princeton Digital Group	TY1 Campus	140kW	96	59,500	Apr. 2025
Minato-ku, Tokyo	Equinix Japan	TY15	-	-	-	Sep. 2024
Kanagawa	NEC	NEC Kanagawa Data Center: Phase 2 Building	20kW	8	-	May 2024
Kobe City, Hyogo	NEC	NEC Kobe Data Center: Phase 3 Building	20kW	11	-	May 2024
Minoh City, Osaka	MC Digital Realty	KIX13 Data Center	-	21	23,432	Feb. 2023
Kita-ku, Osaka	NTT West	Sonezaki Data Center	20kW+	10(6)*	-	Apr. 2022
Nishitokyo City, Tokyo	Canon IT Solutions	Nishi-Tokyo Data Center	100kW	-	33,703	Oct. 2020
Ibaraki City, Osaka	NTT Communications	Osaka 7 Data Center	-	-	-	Dec. 2019
Mitaka City, Tokyo	NTT Data	Mitaka Data Center EAST	20kVA	-	App. 38,000	Apr. 2018
Inzai City, Chiba	SCSK	netXDC Chiba Center No. 2 (SI2)	30kVA	-	15,586	2015
Yokohama City, Kanagawa	NTT Communications	Yokohama 1 Data Center	80kW	-	-	2009
Sanda City, Hyogo	SCSK	Sanda Campus (SH1)	30kVA	-	22,173	2008
Inzai City, Chiba	SCSK	netXDC Chiba Center (SI1)	30kVA	-	14,353	2002

*Figures in parentheses for IT power supply are at the opening of the establishment.
Source: Created by CBRE based on publicly available materials, June 2025.

3.1. The Proliferation of AI Data Centers

Containerized data centers

One new type of data center which is gaining more attention with the rapid rise of generative AI is the containerized data center. This involves the installation of IT equipment such as servers, together with cooling facilities, in a modular container such as a shipping container, and using it as an on-site data center for a factory or other similar establishment. Incurring significantly lower development costs than traditional, building-based data centers, containerized data centers are also more amenable to the implementation of cutting-edge facilities, such as liquid cooling systems, allowing them to be constructed relatively quickly and cost-effectively. Furthermore, as shipping containers are not defined as buildings, no prior construction permits are necessary,*4 streamlining the often time-consuming and complex paperwork typically associated with data center development. On the negative side, the fact that they are not seen as buildings means they are not allowed to be stacked vertically. In cases where expansion to multiple containers is necessary, additional containers must be placed alongside one another, thereby utilizing valuable space. This is a particularly significant issue in urban locations. In contrast, in regional areas where broad areas of land can be relatively easily secured, the creation of large-scale data centers using multiple containerized modules is a realistic option.

*4 2011 revision to the Building Standards Act: "Structures that are installed independently (self-supporting) on land, which are unmanned during operation, and into which people do not enter except in cases such as the occurrence of major equipment failures" are defined as not constituting buildings. It should be noted, however, that specific criteria differ by local body authority.

Figure 3-2: Recently Completed and Planned AI Data Center Developments (regional cities)

Location	Operator	Facility name	Rack power capacity	IT power supply (MW)	Total floor area (m^2)	Opening date
Tochigi	NTT Data Group	Tochigi Data Center	100kW	100	-	FY 2028
Tomakomai City, Hokkaido	SoftBank, IDC Frontier	Core Brain	-	300(50)*	-	2026
Ayagawa Town, Kagawa	HIGHRESO		-	-	-	Aug. 2025
Ishikari City, Hokkaido	SAKURA Internet	Ishikari Data Center (Containerized Data Center)	-	App. 3.5(MVA)	-	May 2025
Okuma Town, Fukushima	RUTILEA	AI Fukushima Data Center 2	-	-	-	Feb. 2025
Takahama Town, Fukui	Quantum Mesh	Takahama Drip 1	-	-	-	Dec. 2024
Takamatsu City, Kagawa	HIGHRESO	Takamatsu City Data Center	-	-	687	Dec. 2024
Ishikari City, Hokkaido	KYOCERA Communication Systems	Zero-Emission Data Center Ishikari	-	2~3	App. 5,300	Oct. 2024
Okuma Town, Fukushima	RUTILEA	AI Fukushima Data Center 1	-	-	-	Oct. 2024
Yuzawa Town, Niigata	Getworks	Yuzawa GX Data Center (Containerized)	-	-	-	Oct. 2022
Shika Town, Ishikawa	HIGHRESO	Shika Town GPU Data Center 2	30kVA	-	1,107	Aug. 2022
Fukuoka City, Fukuoka	QTnet	QTnet Fukuoka Data Center 3	30kVA	-	App. 10,000	Sep. 2019
Shika Town, Ishikawa	HIGHRESO	Shika Town GPU Data Center 1	-	-	437	Aug. 2019
Ishikari City, Hokkaido	SAKURA Internet	Ishikari Data Center	-	-	-	Building 1, 2: 2011 Building 3: 2016

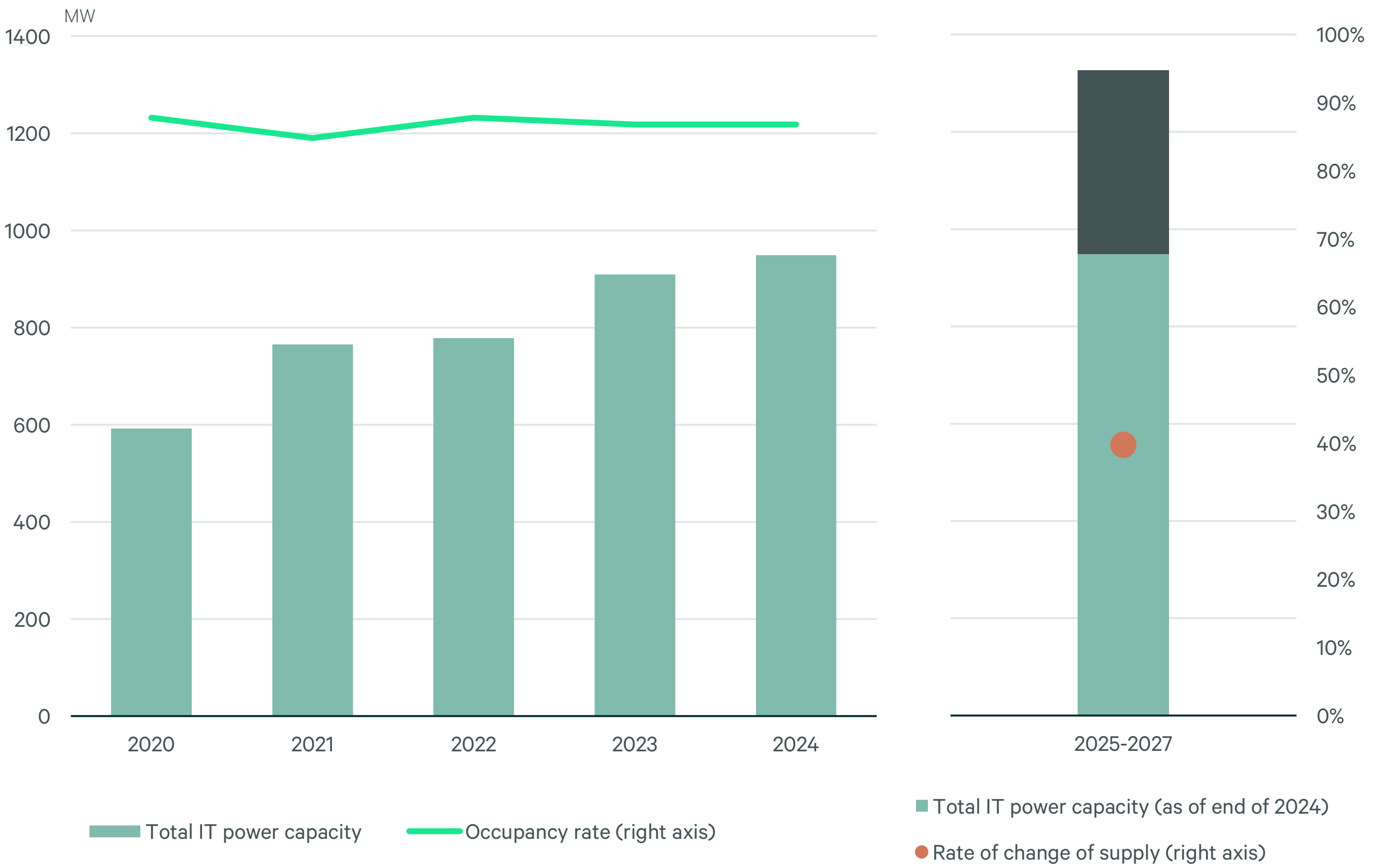
*Figures in parentheses for IT power supply are at the opening of the establishment.
Source: Created by CBRE based on publicly available materials, June 2025.

3.2. The Tightening Data Center Market in Greater Tokyo

The supply-demand balance in the Greater Tokyo data center market remains tight. As of the end of 2024, the total IT power capacity (essentially equivalent to data center market scale) occupancy rate stood at approximately 87%, just below the 90% threshold at which new users are no longer actively sought. While some comparatively large data centers opened in 2024 in central Tokyo and Inzai City, Chiba Prefecture, several entered operation with many users already confirmed, helping to maintain the high market-wide occupancy rate. With several new development plans already in the works, the overall market is forecast to expand by 40% over the three-year period between now and 2027. Despite this expansion, occupancy rates are expected to remain high (Figure 3-3).

In Greater Tokyo, it is becoming increasingly challenging to secure the super-high voltage power supply required for the development of new data centers. While five years was previously considered the standard period of time required to secure the necessary power and lay cables, CBRE is aware of several cases in which 10 years must be allotted. Additionally, labor shortages in the construction industry and delays in the delivery of parts have resulted in lengthening schedules for many data center projects. This is likely to result in delays in the completion of developments, or even cancellations. If this occurs, the supply-demand balance would tighten even further.

Figure 3-3: Data Center* Supply-Demand Balance in Greater Tokyo and Projected Future Supply

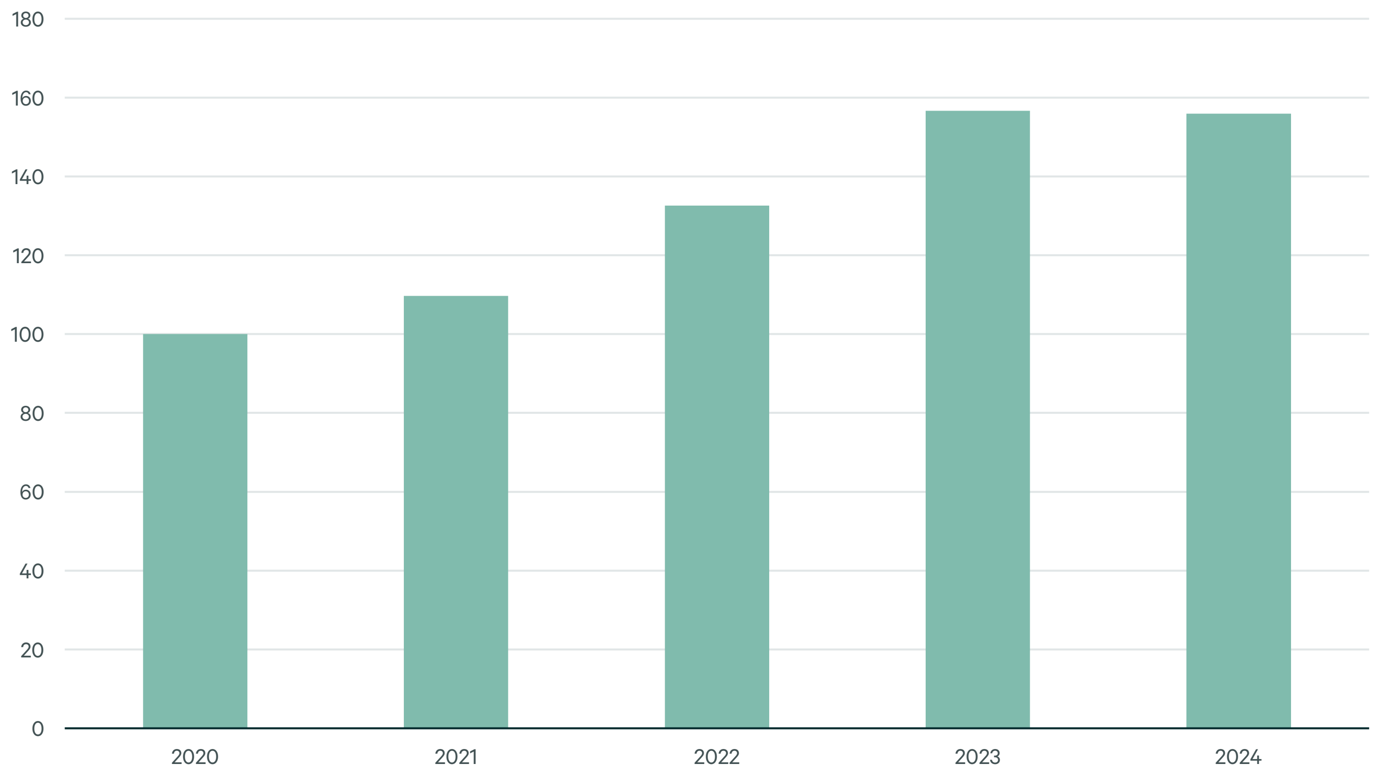


*Carrier-neutral data centers, excluding private data centers. Some values have been adjusted, based on an analysis of past performance.
Source: CBRE, May 2025.

3.3. Changes in Data Center Rack Prices

Despite the aforementioned market tightness, data center rack prices have remained largely unchanged, dropping by 1% over the course of 2024. It must be recognized, however, that this still represents a 56% increase over 2020 levels, underscoring the fact that costs remain relatively high (Figure 3-4). As 2024 saw the opening of several data centers that had attracted significant industry attention, many data center operators appear to be reluctant to raise prices, fearing they will lose market share to their competitors. Another factor in the recent flattening of rack prices is that electricity costs for super-high voltage power, included in the per rack cost, have remained unchanged, preventing operators from needing to pass additional costs on to customers. It is possible that costs will begin to diverge in the coming years depending on whether or not specific data centers implement the high-heat-tolerance racks necessary for the operation of GPU servers.

Figure 3-4: Monthly Data Center Estimated Cost Index (per rack)* in Greater Tokyo (2020 figures set at 100; electricity costs included)



Estimated cost refers to the monthly cost of operating a single 5kVA rack, and includes electricity usage costs.
Source: CBRE, May 2025.

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Tight power supply and demand in Greater Tokyo and the “Watt-Bit Collaboration”.

4.1. Electrical Supply Issues in Greater Tokyo in Comparison to Regional Areas

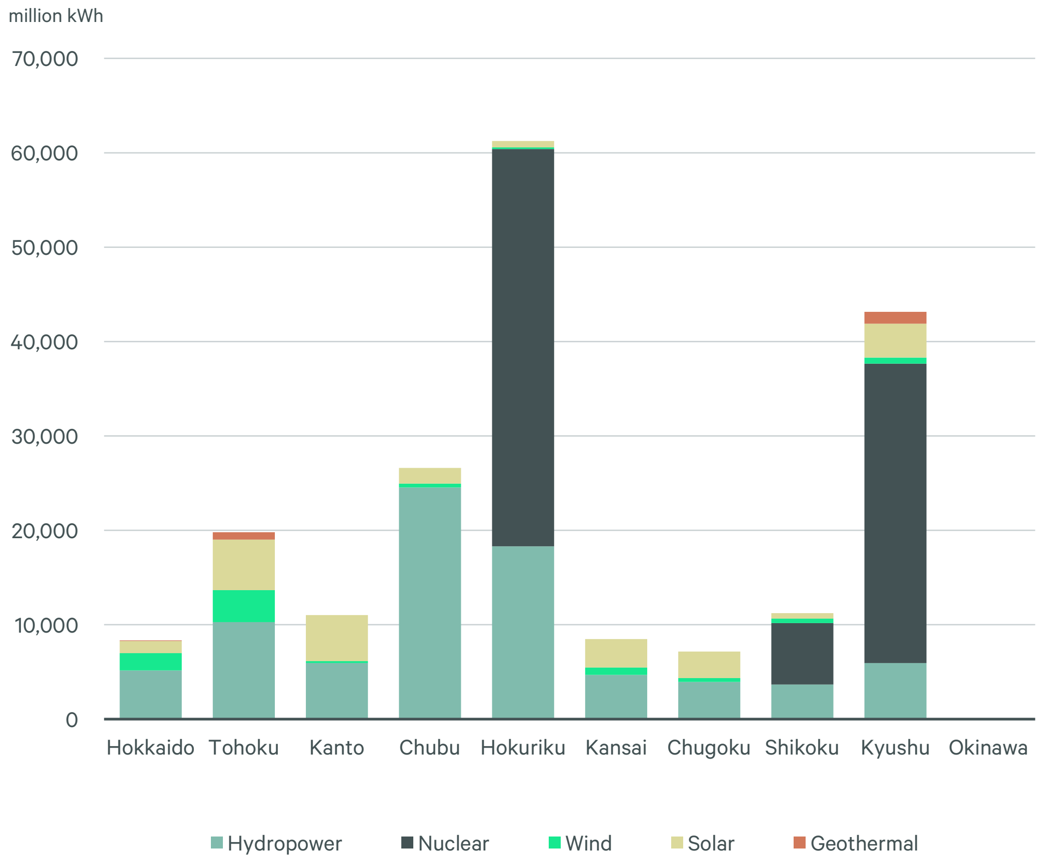
While major metropolitan areas will continue to hold advantages as locations for data centers, the increasing difficulty of securing both land and power supply in Greater Tokyo means that developers now have no choice but to consider regional areas as potential sites for future data center development. The Tokyo power grid is under significantly more pressure than other areas, with the city already relying on surrounding prefectures and regions to supplement its electricity supply. Any future efforts to strengthen Tokyo's power grid will require significant investments of cost and time to not only increase generation facilities in the surrounding prefectures, but also to improve the power delivery network. Further exacerbating the issue is the fact that the thermal power plants providing the majority of Greater Tokyo's power are aging badly and will probably need to be retired at a pace that will exceed the establishment of new facilities.*5 This is likely to make securing electrical power in Greater Tokyo increasingly difficult.

*5 "Electricity Supply and Demand Measures for Summer 2025", Agency for Natural Resources and Energy, May 2025.

4.2. "Watt-Bit Collaboration" and Data Center Decentralization

Amid this environment, the government's new "watt-bit collaboration" policy is seen as key to both relieving power supply issues and promoting data center decentralization. This policy involves integrated improvements to and collaborations between electricity (watt) and telecommunications (bit) infrastructure. By encouraging the development of data centers in regional areas where power is more reliant on renewable energy sources, the policy aims to promote local production and local consumption of both electricity and data, which will in turn lower transmission network costs. A wide range of secondary effects are also anticipated, including improved resilience and business continuity in the event of major disasters, and the revitalization of regional economies. As noted earlier, approximately 90% of data centers in Japan are concentrated in the Greater Tokyo and Greater Osaka areas. Conversely, around 90% of Japan's decarbonized energy is generated in areas other than Kanto (Greater Tokyo and surrounds) and Kansai (Greater Osaka and surrounds) (Figure 4-1). The purpose of this policy is to enable data generated by local economic activity to be processed in the same area using locally-generated electricity, thereby helping to resolve the current geographical disparities in the electrical power and information communication infrastructural networks.

Figure 4-1: Total Decarbonized Power Generation (FY 2023 data)

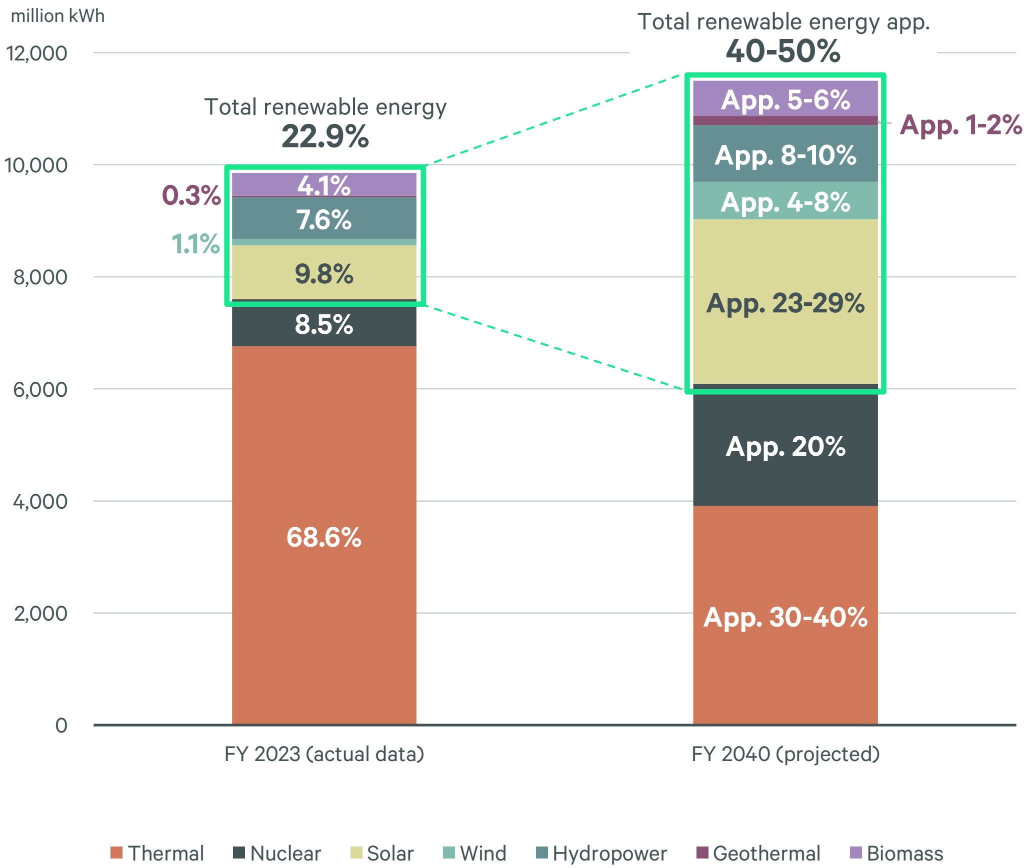


Source: Created by CBRE based on the Agency for Natural Resources and Energy's power generation data by prefecture for 2023, June 2025.

4.2. "Watt-Bit Collaboration" and Data Center Decentralization

Renewable energy sources, in particular solar power and wind power, are seen as key decarbonization initiatives with the potential to triple Japan's total domestic power production capacity.*6 As they are easily affected by weather conditions, however, their output can often be inconsistent. For this reason, facilities that require reliable power supply, such as data centers, must combine the use of renewable energy with the use of battery storage systems and baseload power sources such as nuclear and thermal power. However, the restarting of many of Japan's nuclear power plants remains uncertain, while thermal energy is expected to make up a decreasing percentage of the nation's power supply as the government proceeds with its decarbonization initiatives. The government's official targets for 2040 indicate that thermal energy is expected to decline from just under 70% as of 2023 to between 30 and 40%, while renewable energy sources are projected to rise from 22.9% to between 40 and 50% over the same time frame (Figure 4-2). While renewable energy must be used together with baseload power sources and storage batteries, the importance of renewable energy sources should continue to rise in relative terms as demand for electricity surges and decarbonization initiatives are implemented.

Figure 4-2: Projected Energy Structure in FY 2040



Source: Created by CBRE in June 2025 based on the "Basic Energy Plan Overview", Agency for Natural Resources and Energy, February 2025.

*6 "Report on the Bill for Partial Amendment of the Act on Promotion of Global Warming Countermeasures and the Survey on Renewable Energy Potential", Ministry of the Environment, March 2021.

Report Contacts

Research Analysts

Yuji Iwama
Senior Director
Office Team Leader/ Data Center
yuji.iwama@cbre.com

Chinatsu Hani
Senior Director
Head of Research
chinatsu.hani@cbre.com

Contributors

Data Center Solutions

Hirokazu Ono
Associate Director
Head of Data Center Solutions Japan
hirokazu.ono@cbre.com

Takashi Kishida
Associate Director
Data Center Solutions Japan
takashi.kishida@cbre.com

Valuation Advisory & Consulting Services

Yukihiro Okada
Consultant
Consulting Services
yukihiko.okada@cbre.com