

Korea - 1H 2024

# Korea Data Centers



# Rising interest in Edge Data Centers amid challenges in large-scale data center development

## Summary

- Total capacity of data centers in the SMA is projected to surge to 3.2GW in 2027, marking an increase of 2.4 times compared to 2023.
- Financial investors are leading 90% of the 1.9GW supply planned for 2024 to 2027.
- More than half of the approved DC projects in the SMA face issues including civil complaints and construction delays, which are expected to persist due to government regulations, complicating future development.
- Amid challenges with large-scale DC supply, the rise of edge DCs is expected to redefine the market, driven by the growth of advanced industries.

## OVERVIEW

Before 2019, the Korean Data Center (“DC”) market was primarily controlled by Telecommunications carriers, IT Service providers, banks, financial institutions, and government agencies. However, significant market growth occurred after 2020, driven by increased involvement from financial investors and global colocation DC operators. Recently, a new market trend has emerged, with smaller-sized Edge DCs gaining popularity in response to evolving government regulations and the rapid advancement of industries such as AI and autonomous driving.

## SUPPLY

### TOTAL STOCK

Based on data surveyed by Savills Korea, the total power capacity of DCs within the Seoul Metropolitan Area (“SMA”) reached 1.3GW as of the end of 2023, with an additional 1.9GW projected to be supplied over the next four years. Consequently, by 2027, the total capacity of DCs in the SMA is expected to surge to 3.2GW, marking a 2.4-fold increase from the 2023 capacity.

### KEY PLAYERS

By the end of 2019, telecom operators (KT, LG U+, SKB) and IT service providers (Samsung SDS, LG CNS, Digital Realty) accounted for 87% of the

estimated DC stock in the SMA. The remaining 13% was attributed to public government agencies, and financial institutions. However, between 2020 and 2023, approximately 83% of the newly supplied 460MW came from telecommunications operators and IT services.

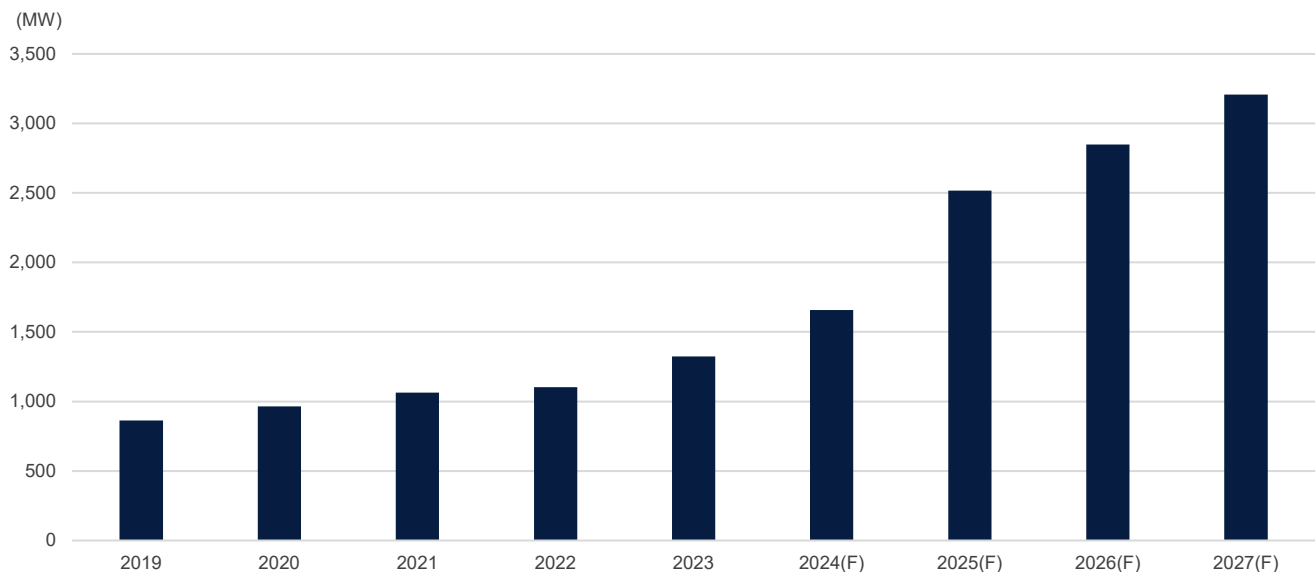
As DC development typically undergo a 3 to 4-year process for approval and construction, the projects initiated in 2020 are due for completion starting from 2024. Financial investors lead 90% of the planned DC supply in the SMA from 2024 to 2027 and by 2027, DC supply from financial investors is expected to surpass half (56%) of the total stock. Key projects include newly-completed Anyang Epoch Data Center by AC-TIS, and the upcoming Pacific Sunny Data Center by CPPIB, scheduled for Q2/2024.

### REGIONAL DISTRIBUTION

Most of the DC supply scheduled for completion post-2024 is concentrated within a specific radius extending from the existing DC clusters, covering Anyang of Gyeonggi Province, to Sangam-dong, Mok-dong and Gasan-dong of Seoul, where major telecommunications and IT service providers have established large facilities. In terms of future supply ranking by region, Incheon leads with 470MW, followed by Ansan (290MW), Seoul (264MW), Goyang (260MW), Yongin (220MW), Gimpo (160MW) and Bucheon (140MW).

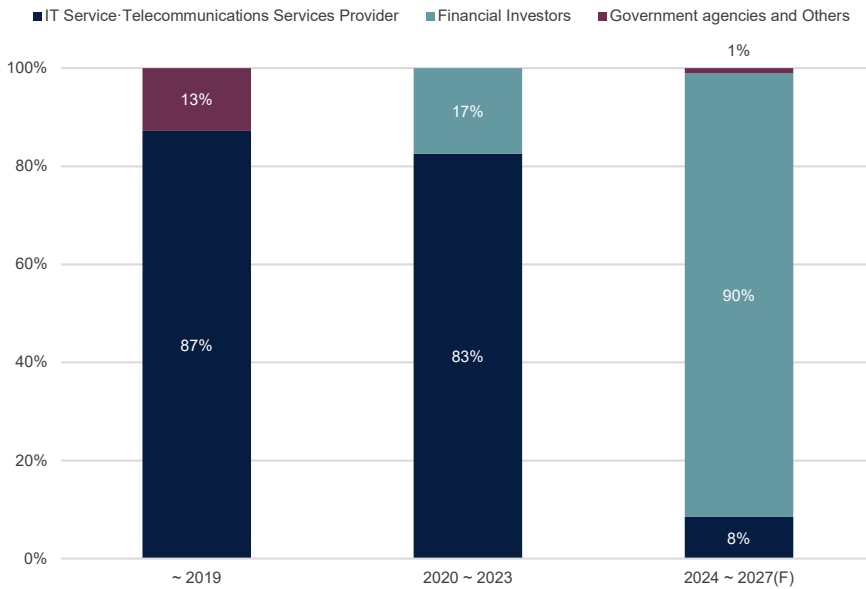
These clusters are anticipated to draw interest from operators due to their proximity to existing

GRAPH 1 : SMA Data Center Stock by Power Capacity, 2019 – 2027(F)



\* Forecasted based on contracted power as of April 2024.

Source Savills Korea

**GRAPH 2: SMA Data Center Stock Ratio by Supplier Type, 2019 - 2027(F)**

Source Savills Korea

projects, enabling expansion. Moreover, they are situated within industrial complexes or designated industrial use areas, which typically face fewer constraints regarding land size and civil complaints, making new development easier.

### DEVELOPMENT PIPELINE

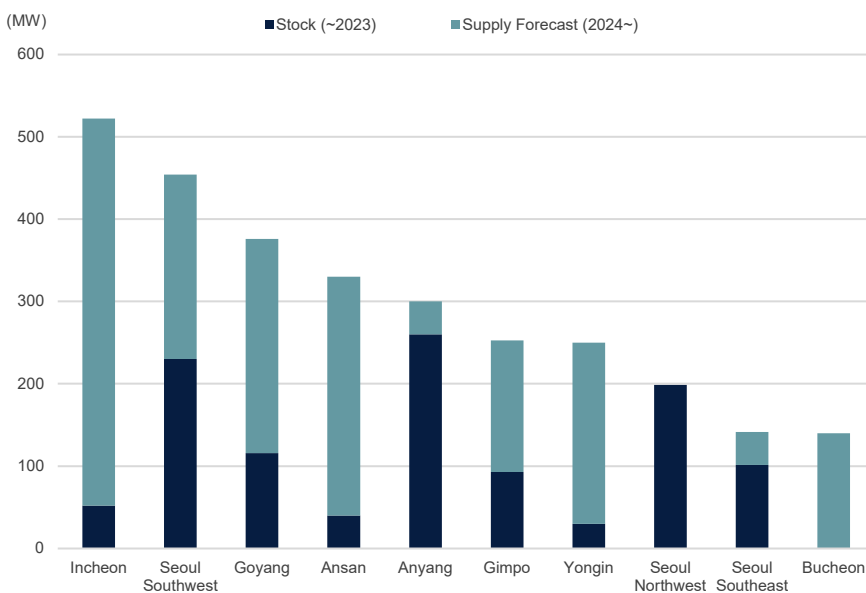
More than half of the 33 approved projects for DC development in the SMA are facing challenges or delays. Key issues include difficulty in locking in DC operators, delays in approval due to resident complaints, and construction setbacks. Securing tenants in advance is crucial for project financing, but the tenant pool is largely limited to a few global Cloud Service Providers (“CSPs”), complicating tenant attraction for new projects.

Additionally, about 35% of approved projects have been inactive for over a year, and around 30% of ongoing projects took more than a year to commence construction post-approval. This marks a significant delay compared to DCs developed by major telecom carriers and IT service providers over the past four years, which typically began construction within an average of four to five months after approval.

### REGULATION & POLICY

Developing large-scale DCs in the SMA is expected to face more challenges ahead. Despite a surge in land transactions since 2020, there was a notable decrease in 2023 to one-third of the previous year’s level. This decline is attributed to Korea Electric Power Corp. (KEPCO) recently taking significantly longer, about 12 months compared to 2-3 months, to confirm power supply, coupled with the announcement of a new policy restricting additional power supply in the SMA.

In January 2023, Korea’s Ministry of Trade, Industry and Energy (MOTIE) announced a plan to ease the concentration of DCs in the SMA, which comprises 60% of total number of DCs and 70% of total power consumption from DCs as of September 2022, with each figure expected to rise to 80% by 2029. The Enforcement Decree of the Electric Utility Act was partially amended in March 2023 to include a provision that allows KEPCO to refuse power supply for applications with over 5MW. Additionally, starting June 14, 2024, the Special Act on Distributed Energy Activation will determine authorization for projects using 10MW or more through a power system impact assessment.

**GRAPH 3: SMA Total Data Center Stock & Forecast by Region, Pre-2023 vs. Post-2024**

\* Seoul Southwest : Yeongdeungpo-gu, Mok-dong of Yangcheon-gu, Gasan-dong of Geumcheon-gu, Guro-gu  
 Seoul Northwest : Sangam-dong, Mapo-gu  
 Seoul Southeast : Seocho-gu, Gangnam-gu

Source Savills Korea

Along with restrictions on power supply within the SMA, MOTIE and KEPCO introduced incentives in June 2023 for DCs operating in provincial regions outside the SMA, including discounts on infrastructure construction costs and exemption from reserve power charges.

## EDGE DATA CENTERS

Edge DCs are gaining prominence as traditional large-scale DCs encounter challenges outlined earlier.

Edge DCs are smaller facilities strategically located in urban areas where both end users and creators of data are concentrated. They are mostly used by entities in industries such as AR/VR, autonomous driving, IoT, and OTT where reduced latency through edge caching and edge computing is crucial.

Even though conventional edge DCs typically operated with a power capacity of 500kW or less, the recent surge in data generation across related industries has led to the emergence of 2 to 5MW facilities. Their small size facilitates more efficient deployment of new centers, offering enhanced scalability and flexibility to respond swiftly to imminent demands compared to larger DCs.

The global edge DC market is projected to grow at an average annual rate of 23% after 2024, with the Asia-Pacific region anticipated to show more rapid growth at 25% per year. By 2028, the Asia-Pacific market is forecasted to represent approximately 24% of the global edge DC market.

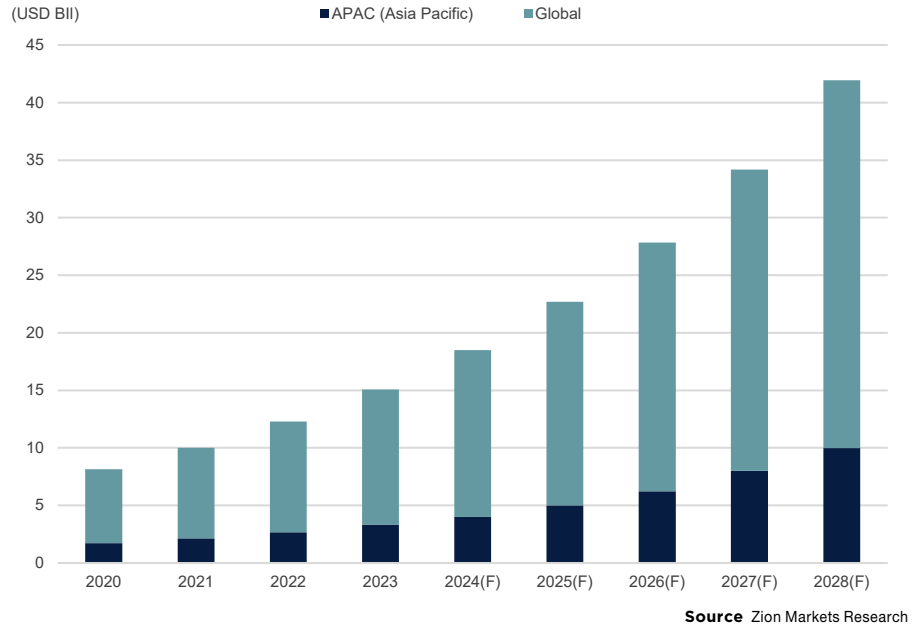
## DEMAND

Large-scale DCs currently in development are optimized in processing and storing large volumes of data, leveraging both their size and advanced equipment. However, these centers are mostly located outside of the SMA, resulting in longer latency compared to urban DCs. This latency issue underscores the necessity for a dense network within Seoul, consequently driving the anticipated rise in demand for edge DCs.

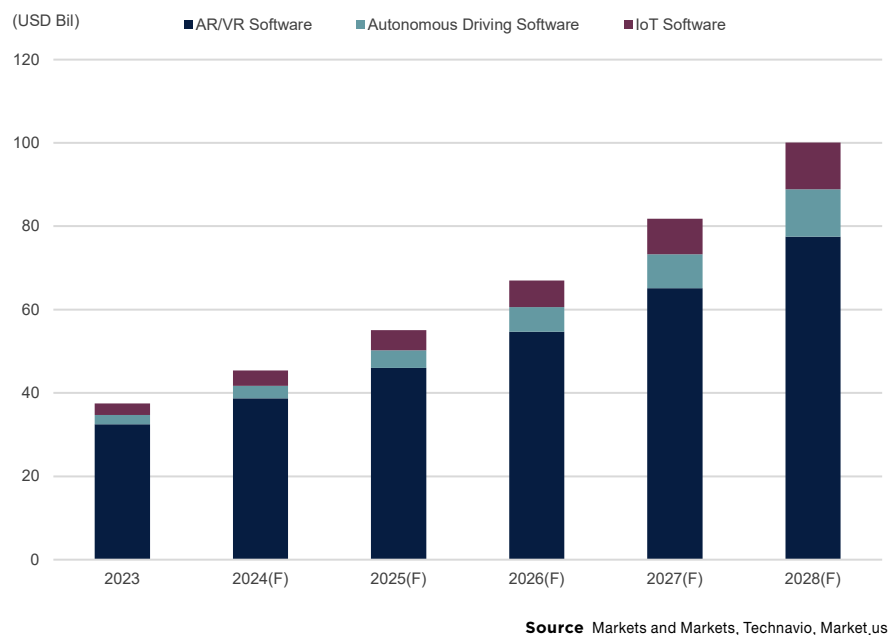
The primary users of edge DCs are IT companies specializing in AR/VR, autonomous driving, and IoT, commonly requiring low latency and edge computing capabilities. Additionally, global CSP operators, which are significant consumers of recently developed large-scale centers, are also strategically incorporating edge DCs in accordance with their business strategies.

Forecasts indicate significant growth in various software markets over the next five years. The

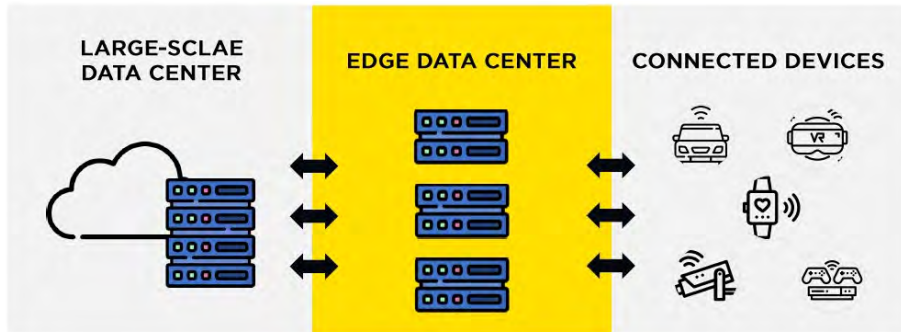
**GRAPH 4: Edge Data Center Market Size, 2020 - 2028(F)**



**GRAPH 5: Global Market Size by Service, 2023-2028(F)**





**FIGURE 1: Edge Data Center Network**

Source Savills Korea

AR/VR software market is projected to expand at an annual average rate of 19% from 2023 to 2028, while the self-driving software market is expected to experience even faster growth, with an annual average rate of 39% over the same period, reaching approximately KRW15 trillion by 2028. Moreover, the IoT software market is expected to see a 32% annual average growth rate during the same period.

Additionally, edge DCs act as Disaster Recovery Centers, aiding in service restoration during main DC outages. The escalating frequency of digital disasters like fires and network disruptions underscores the need for resilient disaster recovery systems, likely driving heightened demand for edge DCs going forward.

### OUTLOOK

In comparison to large-scale DCs, Edge DCs are typically constructed with a power capacity of less than 5MW. They are characterized by location, power supply application procedures, duration for development, and costs.

**TABLE 1: Comparison of Large-scale & Edge Data Center Development Projects**

TYPE	Large-scale Data Center	Edge Data Center
Size	<ul style="list-style-type: none"> <li>Land Area approx. 2,000 ~ 3,000 py (6,500 ~ 10,000 sq m)</li> <li>GFA approx. 10,000 py (33,000 sq m)</li> </ul>	<ul style="list-style-type: none"> <li>3 ~ 4 Floors of existing building</li> <li>GFA approx. 300 py (1,000 sq m)</li> </ul>
Development Period	Average 24 ~ 30 months	Average 3 ~ 6 months
Power Capacity	40MW	2 ~ 5MW
Electric Power Supply Application	<ol style="list-style-type: none"> <li>1. "Power Use Intention Notice" Submission</li> <li>2. Preliminary Review from KEPCO</li> <li>3. "Power Use Application" Submission</li> <li>4. Supply Plan Review from KEPCO</li> <li>5. Power Use Agreement</li> </ol>	<ol style="list-style-type: none"> <li>1 &amp; 2 Not required</li> <li>3. "Power Use Application" Submission</li> <li>4. Supply Plan Review from KEPCO</li> <li>5. Power Use Agreement</li> </ol>
Characteristics	High risk of civil complaints related to noise and health damage from electromagnetic waves	Low risk of civil complaints
Key Tenants	CSP (Google Cloud, AWS, MS Azure)	<ul style="list-style-type: none"> <li>CSP (Google Cloud, AWS, MS Azure)</li> <li>IT companies in AI, OTT, AR/VR</li> </ul>

Source Savills Korea

Due to their relatively small size, edge DCs are typically built on small plots within urban areas. If the physical conditions such as floor height or load are met, existing buildings can be remodeled into DCs as well. Utilizing existing buildings can leverage their power lead-in infrastructure and potentially be exempt from certain permits such as traffic and environmental impact assessments, significantly reducing both the construction time and costs.

Furthermore, for edge DCs using less than 5MW, there are no requirements to submit a “Power Use Intention Notice” one year in advance (applicable for >5MW), nor are they subject to “Power System Impact Assessment” mandated

for larger facilities (>10MW) under the Distributed Energy Activation Act, effective June 2024. This will reduce the uncertainty in securing power, which has recently become the main barrier to new DC construction.

With the rapid advancement of AI technology, the demand for edge DCs from AR/VR, autonomous driving, and IoT operators is projected to increase. Considering this trend, along with the current challenges faced by state of domestic DC development and government policies, edge DCs are likely to emerge as a new pillar in the domestic market landscape.

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### ※ KEY TERMINOLOGY

- 1) **Telecommunications Services Provider** : a company that offers services for transmitting and receiving voice, data, images, etc. by installing or using telecommunications line equipment.
- 2) **IT Services Provider** : a business that delivers a variety of IT-related services and solutions such as system integration, cloud service, etc.
- 3) **Edge Caching**: the method of storing data closer to the user within a network, which enhances data retrieval efficiency and reduces latency, so that users can access data more quickly compared to central data storage locations.
- 4) **Edge Computing**: a distributed computing paradigm that processes data at or near the source of data generation with the aim to reduce latency and bandwidth use by bringing computation and data storage closer to the user.
- 5) **Latency**: the time delay between a request for data and the moment the data is received, and represents the period it takes for a data packet to travel across a network from one point to another.

※ All power capacities within the report are estimated based on contracted power with KEPCO (Korea Electric Power Corporation).

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