DATA CENTRE UPDATE

AMSTERDAM

WINTER 2020-2021

CUSHMAN & WAKEFIELD

Key Indicators

Under Construction
23 MW

Vacancy
12%

MORE INFORMATION

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GLOBAL DATA CENTER ADVISORY GROUP

Cushman & Wakefield's Data Center Advisory Group is a global team of elite professionals delivering specialized real estate solutions for mission critical users, owners, and environments. With scalability, reliability, and security as a driving force, our highly knowledgeable and responsive professionals guide clients to make effective financial decisions. Our expertise ranges includes colocation facilities, control centers, greenfields, powered shell, and trading floors. We lend additional value through our understanding of global dynamics and their impact on local markets.

Market Overview

The cities of Amsterdam and Haarlemmermeer spent the summer reviewing strategic proposals for future data centre development, ultimately coming to no imminent decision on further builds and likely pursuing a final choice in 2021. Recent press reports indicate that a new data centre community could spring up nearby in Almere, though this would require certain changes in zoning and overall public acceptance, along with the agreement of local power utilities and industry personnel. The situation in greater Amsterdam is the first and currently most intense of what will likely be a greater global decision process, of how best to manage the positive business creation aspects of data centres whilst balancing power loads and land requirements.

This decision will be crucial as data centres continue to be in extreme demand. The local AMS-IX internet exchange set a new local record in early November, with throughput reaching 9 terabits per second as more internet capacity is utilized than ever before thanks to the continued effects worldwide from COVID-19. Certain pre-approved new builds are continuing, with Global Switch in particular moving ahead with their new Amsterdam East facility. A variety of cloud services continue to deploy new products in Amsterdam as one of their primary initial hubs, adding greater value to the local market and providing corporate clients with greater choice as they develop their own hybrid IT strategies. Exploration of using waste heat to warm local homes continues alongside similar developments across Scandinavia, and the city remains key for data centre green initiatives. Cautious optimism then for further multi-layered growth in 2021!

Ecosystem Developments

- **3W Infra** has relocated their main operational data centre and headquarters to maincubes Amsterdam, attracted by the flexibility on offer and the independent ownership structure. 3W provides hosting and other Infrastructure-as-a-Service options for their clients.

- In further **maincubes** news, the AMS01 data centre has become the first in continental Europe to receive the OCP ready classification, able to deliver the density and cooling required for resource-heavy applications.

- In their bid to become a zero-waste company, **Microsoft** has piloted their Circular Centre program locally in Amsterdam with the company using machine learning to determine if servers require recycling or repurposing. The successful program will see expansion throughout the world in coming years, as Microsoft plans to be carbon-negative by 2030.

- **CyrusOne** is exploring their own renewable initiative around waste heat, working with the municipality of Haarlem and the PolanenPark business park to warm local homes. If successful, the project could serve 15,000 dwellings and assist the city in their pursuit away from natural gas.

- Cloud hosting provider **Vexxhost** recently launched their new data centre in Amsterdam, their first in Europe and third worldwide. The Montreal-based company offers a variety of compute and storage options.

CUSHMAN & WAKEFIELD

Ecosystem Developments

- Similar to the CyrusOne project discussed elsewhere in this report, **Caransa Groep**, Westpoort Warmte, and the Port of Amsterdam are working together on their own residual heat/home heat framework. Plans on the proposed facility would allow for the residual heat to be available to the utility from original construction rather then retrofitting the data centre in later years.

- **Cloudflare** recently released their Cloudflare Network Interconnect product, allowing users to directly connect to Cloudflare services rather than utilizing the public cloud. The company is partnering with several global providers to offer this platform, and Amsterdam is joining 22 other major metros to have this service at launch.

- **Equinix** launched their new Equinix Metal bare metal service in autumn, with the new option fully integrational with Equinix Fabric for companies pursuing a hybrid IT plan. Amsterdam is the initial market for Equinix Metal in Europe, launching alongside three US cities. euNetworks also signed an agreement with the global REIT, offering their services on ECX Fabric in Amsterdam and four other European markets. Equinix is also underway on a local expansion at AM7.

- **Greenhouse Datacenters** has signed a new agreement with i4 Networks, with i4 now providing a nationwide fibre network directly connected to the Greenhouse campus in Naaldwijk. The new i4 point-of-presence (PoP) allows for full access to further carriers and several internet exchanges.

- Locally-based hosting firm **Leaseweb** shifted offices in November, with the company now based at Hessenbergweg 95. The Leaseweb portfolio now tallies 15 data centres across the globe, with locations in the Americas, EMEA, and APAC.

Options Regionally

As Amsterdam and the greater Randstad serve as the economic and popular hub of the Netherlands other data centres throughout the country are often overlooked, despite the major operators and capacity present. The recent moratorium on new builds in Amsterdam have caused the spotlight to shift regionally, where 40 MW of capacity are available across the eastern half of the country. American REIT QTS has been a big proponent of this strategy, with two data centres in the cities of Eemshaven (close to the COBRA Cable) and Groningen giving them the largest capacity of any colocation operator in smaller markets. Equinix has smaller facilities in Enschede and Zwolle, and more locally focused operators BIT, Dataplace, NorthC, and Serverius also offering capacity. As the edge continues to drive compute closer to the end user, these options may continue to grow going forward.

> *Moratorium or not, phased development continues for those already permitted and the local ecosystem continues to be among the global leaders for the green data centre movement.*

Construction Update

OPERATOR	LOCATION	SIZE (SQM)	POWER (MW)	STAGE / EST. DELIVERY
Digital Realty	Amsterdam	12,359	9.2	Under Construction / Q4 2020
Iron Mountain	AMS-1 Phase 3	1,254	1.1	Under Construction / Q1 2021
	AMS-1 Phase 4	6,271	5	Under Construction / Q4 2021
Equinix	AM7 Phase 3	2,000 (est)	1.5	Under Construction / Q1 2021
Global Switch	Amsterdam East	32,000	6	Under Construction / Q4 2021

DATA CENTRE UPDATE
DUBLIN
WINTER 2020-2021

CUSHMAN & WAKEFIELD

Key Indicators

Under Construction
153 MW

Vacancy
4%

MORE INFORMATION

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Market Overview

Long considered a market for hyperscale self-builds rather than colocation, Dublin has tightened to 4% vacancy as several companies have chosen the local area for their single EU deployment, disaster recovery location, or as a bulwark against Brexit. Several large-scale projects are still under construction, including a major expansion by Facebook, more capacity for Amazon, and the large Echelon project at Clondalkin that is now expecting completion in 2021. COVID-19 did strike certain data centre projects locally in recent months, with the Facebook project requiring a pause as an outbreak occurred among employees on site. Despite these delays, all projects underway in 2020 remain in progress over coming months. The competitive corporate tax regime for Ireland works for data centres as well, and international companies will likely continue to lease capacity in greater Dublin providing power remains available for phased construction. Outlook for Dublin thus remains positive, with a strong ecosystem around the major cloud service providers and several large-scale projects in serious planning.

Ecosystem Developments

- **Interxion** announced a major new tenant in Dublin, with Hewlett Packard Enterprise (HPE) signing on to base their GreenLake Cloud services locally. GreenLake helps clients manage their distributed colocation and cloud architecture, and is a solid win for the recently merged Digital Realty-Interxion partnership.

- **ServiceNow** added a new data centre in Dublin to maintain EU data sovereignty, adding to their original EU location in Amsterdam. The Dublin announcement was followed by another location in Newport to maintain UK data sovereignty post-Brexit.

- Specifics have yet to be determined, but **TikTok** is planning to invest €420 million on a new local data centre campus, with operations beginning in 2022. TikTok plans for all EU-generated data to be maintained in Ireland to meet sovereignty requirements.

Construction Update

OPERATOR	LOCATION	SIZE (SQM)	POWER (MW)	STAGE / EST. DELIVERY
CyrusOne	South Dublin	18,116	6	Under Construction / Q1 2021
Amazon	Mulhuddart	20,717	35	Under Construction / Q2 2021
	Tallaght	23,283	30 (est)	In Planning
Echelon	Clondalkin	20,000	40	Under Construction / Q3 2021
	Arklow	45,000	100	In Planning / Q4 2021
Facebook	Clonee	64,000	72 (est)	Under Construction
Equinix	DB5	9,000	10.77	In Planning
K2 Data Centres	Ballycoolin	58,000	75 (est)	In Planning
EngineNode	Bracetown	92,200	100 (est)	In Planning
UCB Properties	Grange Castle	80,200	100 (est)	In Planning

DATA CENTRE UPDATE

FRANKFURT

CUSHMAN & WAKEFIELD

Key Indicators

Under Construction
148 MW

Vacancy
9%

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Market Overview

The second half of 2020 continued much as the first, with Frankfurt continuing its impressive performance despite the global pandemic and associated economic issues. Leasing remained strong, with two major operators announcing pre-leases of 52 MW months in advance of first phase completion and overall market vacancy dropping to the single digits. As the market tightened, several new phases have been announced by major operators, with the new NDC-Garbe partnership launching their initial project locally. Together these projects total 148 MW coming online over the next year and a half, among the top ten of all markets globally. Frankfurt remains a key location for cloud services large and small, with Google, Alibaba, and IBM all announcing further platform expansions in recent months. Prospects for Frankfurt remain extremely positive, with the area serving as the main national hub even as regional markets Berlin, Hamburg, and Munich continue to grow on their own.

Ecosystem Developments

- **Iron Mountain** announced a 27 MW pre-lease with an unnamed Fortune 100 client on their upcoming Frankfurt data centre at mid-year, with plans to complete the 9 MW first phase due in 2021 and the remainder following the next year. The global storage company followed this announcement by signing a joint venture agreement with AGC Equity Partners on the €300 million facility, as AGC will be taking an 80% interest.
- **Hurricane Electric** has deployed their latest Frankfurt point-of-presence (PoP), their sixth in-market and twelfth in-country. The PoP is located in the ITENOS data centre and provides further network options for local companies.
- **Sysdig** opened a new Frankfurt location, allowing the company to provide further software development and IT operations solutions. The Frankfurt location joins another new location in Oregon and the company's existing facility in Northern Virginia.
- **Google Cloud** announced that their Bare Metal Solution is now available in several new regions, with Frankfurt joining Los Angeles, Northern Virginia, London, and Sydney. Google is intending for this service to assist enterprises who would otherwise not utilize their normal cloud product suite.
- **Equinix** announced the availability of Alibaba Cloud to their clients in the summer, with Frankfurt and 16 other major markets providing this service at launch. Alibaba Cloud now offers full integration with Platform Equinix and the Equinix Cloud Exchange (ECX) Fabric. euNetworks also signed an agreement with the global REIT, offering their services on ECX Fabric in Frankfurt and four other European markets.
- **Cloudflare** recently released their Cloudflare Network Interconnect product, allowing users to directly connect to Cloudflare services rather than utilizing the public cloud. The company is partnering locally with several global providers to offer this platform, and Frankfurt is joining 22 other major metros to have this service at launch.
- In other **PCCW** news, the PCCW ConsoleConnect platform now offers direct on-ramps to IBM Cloud, with Frankfurt an initial market for this connectivity. The partnership enables access to the entire IBM portfolio including compute and storage infrastructure options.

Ecosystem Developments

- **Colt Data Centres** announced that their upcoming Frankfurt West campus is now fully pre-leased, with all 25.2 MW spoken for. Planned for completion in the fourth quarter of 2021, Frankfurt West is the second location in-market for the international operator. Colt PrizmNet had their own local announcement, with upgraded routes now connecting the local Equinix FR2 data centre to Equinix LD4, Interxion London, and the London Stock Exchange.

- Following a year of continued record breaking, internet exchange **DE-CIX** broke its own throughput record in early November, hitting 10 terabits per second and increasing year-on-year traffic by 40%. To provide perspective of this traffic, the company equates this to 2.2 million high definition videos streaming at once. The busy exchange also announced 1,000 networks connected locally in Frankfurt, a new PoP at the NTT Frankfurt 1 facility, and a new partnership with Seaborn for transport connectivity.

Construction Update

OPERATOR	LOCATION	SIZE (SQM)	POWER (MW)	STAGE / EST. DELIVERY
Equinix	FR5 Phase IV	618	2 (est)	Under Construction / Q4 2020
	FR9x Phase I	3,216	10	Under Construction / Q2 2021
	FR8 Phase I	4,066	12 (est)	Under Construction / Q3 2021
	FR11x Phase I	5,000 (est)	14	Under Construction / Q2 2022
CyrusOne	Frankfurt III Phase I	15,794	31	Under Construction / Q4 2020
	Frankfurt III Phase II-IV	8,175	13	Under Construction / Q2 2021
	Frankfurt IV	4,800	17	In Planning
Digital Realty	Frankfurt	11,163	9	Under Construction / Q4 2020
	Hattersheim	5,918	7	Under Construction / Q2 2021
	Sossenheim	8,082	6	Under Construction / Q1 2022
Iron Mountain	Frankfurt	40,000	9	Under Construction / Q2 2021
Colt Data Centres	Frankfurt West	8,000	25.2	Under Construction / Q4 2021
NDC-Garbe	Hanau	10,000	10 (est)	Under Construction / Q4 2021
maincubes	FRA02	7,500	12 (est)	In Planning

Frankfurt continues to grow across several projects by the largest global operators and is a highly attractive market for the major cloud services.

Recent Site Sales

PROPERTY	SIZE (Hectares)	SALE DATE	SALE PRICE	BUYER	SELLER
Hanauer Landstraße 360, Frankfurt	10.7	Jul-20	€170,000,000	Interxion	Sinpas

Recent Property Sales

PROPERTY	SIZE (SQM)	SALE DATE	SALE PRICE	BUYER	SELLER
Borsigallee 1, Frankfurt	26,013	Oct-20 (in contract)	€300,000,000 (total value, 80% interest)	AGC Equity Partners	Iron Mountain

Key Indicators

Under Construction
172 MW

Vacancy
13%

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Market Overview

London continues to be the primary hub and largest data centre market in Europe, mirroring global powerhouses Northern Virginia or Singapore with their constant demand despite ever-increasing site costs and considerable competition. The city serves as a crucial primary deployment point for cloud services both major and minor, with Google, IBM, and Alibaba adding new options in-market throughout 2020 and operators adding further onramps and connectivity to assist. Interconnection in several locations both in Slough and the Docklands submarkets remains key for many clients, with the largest financial institutions and other corporations interested in local compute and backhaul connectivity to the continent.

While several construction phases have completed throughout recent months, international operators Equinix, NTT, and Telehouse are all working on newly-announced expansion projects, alongside new builds from locally-based Virtus. Two mega-projects have also been mooted by non-traditional data centre operators, with the Columbia Threadneedle mixed-used campus in Langley and the proposed Stratus Cromwell site likely growing to market leadership sizing at full buildout. With power availability not currently as constrained as in other European cities and sizable take-up continuing, the future remains bright for London heading into 2021.

Ecosystem Developments

- **Interxion** announced the successful deployment of EkkoSense monitoring tools at their West Drayton data centre in the summer, with an immediate reduction in cooling energy by 20 percent. Further sites throughout the greater Digital Realty/Interxion portfolio will now use the program in the future to derive efficiencies. Digital Realty also announced a further collaboration with Nvidia and Core Scientific at their Docklands location, with the companies now offering an artificial intelligence platform for local financial tenants.

- **Equinix** announced the availability of Alibaba Cloud to their clients in the summer, with London and 16 other major markets providing this service at launch. Alibaba Cloud now offers full integration with Platform Equinix and the Equinix Cloud Exchange (ECX) Fabric. euNetworks also signed an agreement with the global REIT, offering their services on ECX Fabric in London and four other European markets. The US REIT remains committed to London, with four expansion projects underway locally.

- **Google Cloud** announced that their Bare Metal Solution is now available in several new regions, with London joining Los Angeles, Northern Virginia, Frankfurt, and Sydney. Google is intending for this service to assist enterprises who would otherwise not utilize their usual cloud product suite.

- Global hosting provider **Leaseweb** opened their third UK data centre inside the Iron Mountain facility in Slough, with plans to offer a variety of colocation and disaster recovery options to clients. The 200 kW data centre is the 20th location for Leaseweb, with the company also operating in Frankfurt and Amsterdam on the continent.

- **Crosslake Fibre** is underway on the new CrossChannel Fibre network, with the 550-kilometre route to connect London and Paris. Due for completion by the end of 2021, the system will be the first new cable to cross the English Channel in the past two decades.

Ecosystem Developments

- **Cyxtera** has launched a new partnership with Unitas Global for their London data centres, providing Cyxtera customers with a variety of new connectivity options. The access will allow clients to simplify their multi-cloud architecture. The operator later announced its own partnership with Nvidia, providing artificial intelligence and machine learning options for users in London and two US markets.

- **Iron Mountain** established a new agreement with the London Internet Exchange (LINX) to become a ConneXions reseller, providing a new array of peering services at their local data centre. The global storage company is in progress on three expansions at two different sites, adding 13 MW to their local portfolio.

- **Colt PrizmNet** announced new fibre options in summertime, with an upgraded route now connecting the local Equinix LD4 data centre to Equinix FR2 in Frankfurt, Interxion London, and the London Stock Exchange, and a second upgraded route among Interxion London, Equinix FR2, Equinix ZH4 in Zurich, and the BME stock exchange in Madrid.

- **Cloudflare** recently released their Cloudflare Network Interconnect product, allowing users to directly connect to Cloudflare services rather than utilizing the public cloud. The company is partnering with several global providers to offer this platform, and London is joining 22 other major metros to have this service at launch.

- **Pulsant** announced Megaport connectivity across their portfolio, with the South London location joining Milton Keynes and Edinburgh data centres offering the service. Megaport and Pulsant Cloud Connect together provide direct access between Pulsant and the Megaport network.

- **SSE Enterprise** announced a plethora of newly enabled sites across the United Kingdom, alongside updated services at four existing locations including three in London. This includes Global Switch 2, Interxion at Hanbury Street, and Equinix LD5 in Slough. SSE operates a telecoms network and offers a variety of connectivity options in dozens of national data centres.

- The global acquisition of **Zayo** data centres by DataBank has a local component, with their 3.2 MW Feltham outpost to become a DataBank site once the deal closes. This will be the inaugural data centre in the UK for DataBank, who has until this time focused on secondary and tertiary markets across the United States.

- **RETN** has upgraded its fibre network across London, now offering dual-ring architecture connecting leading international operators such as Digital Realty, Equinix, Global Switch, Telehouse, and Equinix. The company also offers long-haul connectivity throughout Europe and Central Asia, with additional leased fibre in southern Europe and the Balkans.

- The **PCCW** ConsoleConnect platform now offers direct on-ramps to IBM Cloud, with London an initial market for this connectivity. The partnership enables access to the entire IBM portfolio including compute and storage infrastructure options.

FLAP-D Construction Update

As reviewed periodically in our FLAP-D reports, construction continues across all five markets, the smallest of which will still be approaching 300 MW after all current phases are complete. London remains far and away the largest, with plans to surpass 800 MW by mid-2022. Frankfurt has quickly surpassed Amsterdam thanks to the continued development moratorium, although certain phased projects have been able to continue. Although Paris has regained some recent interest, the rapid build-out of Dublin could have it edge ahead over the next couple of years.

Legend: ■ Size (MW) ■ Under Construction (MW)
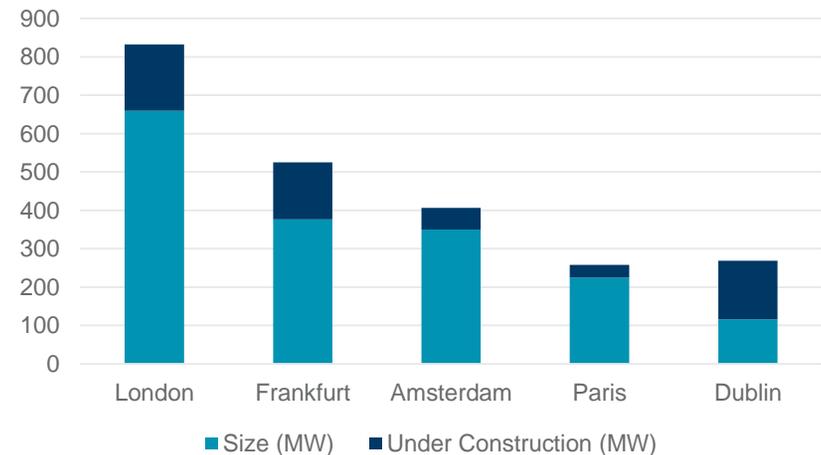
Construction Update

OPERATOR	LOCATION	SIZE (SQM)	POWER (MW)	STAGE / EST. DELIVERY
Ark Data Centres	Meridian Park	35,200	16	Under Construction / Q4 2020
	Longcross Park	35,768	16 (est)	Under Construction / Q4 2021
	Union Park	56,000	25 (est)	In Planning / 2021
Iron Mountain	LON-1 Phase 2	887	2	Under Construction / Q4 2020
	LON-1 Phase 3	887	2	Under Construction / Q1 2021
	LON-2	8,000 (est)	9	Under Construction / Q2 2022
CyrusOne	London III	1,765	6	Under Construction / Q1 2021
Echelon Data Centres	LCY 10	12,000	20	Under Construction / Q1 2021
Equinix	LD7 Phase 1B	1,545	2 (est)	Under Construction / Q1 2021
	LD11x Phase I	10,000 (est)	10	Under Construction / Q2 2021
	LD8 Phase 4	971	1 (est)	Under Construction / Q2 2021
	LD7 Phase 2	4,017	5 (est)	Under Construction / Q2 2022
Virtus	London 8	7,000	16	Under Construction / Q4 2021
	London 11	5,500	13	Under Construction / Q4 2022
NTT	Hemel Hempstead 4	9,600	24	Under Construction / Q4 2021
Telehouse	Docklands	31,000	30	Under Construction / Q1 2022
Columbia Threadneedle	Langley	93,000	100 (est)	In Planning
Stratus Cromwell	London	90,000 (est)	100	In Planning

The volatile pandemic economy has not harmed the London data centre market, with several new phases announced in recent months and another 200 MW in serious planning.

Recent Property Sales

PROPERTY	SIZE (SQM)	SALE DATE	SALE PRICE	BUYER	SELLER
Stanhope Rd, Camberley	13,500	Nov-20	£35,000,000 (est)	Lincoln Rackhouse, Sprott	Bank of America

Recent Site Sales

PROPERTY	SIZE (Hectares)	SALE DATE	SALE PRICE	BUYER	SELLER
Park Royal	2.2	Sep-20	£39,000,000	Ark Data Centres	Renault

DATA CENTRE UPDATE

PARIS

WINTER 2020-2021

CUSHMAN & WAKEFIELD

Key Indicators

Under Construction
33 MW

Vacancy
8%

MORE INFORMATION

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Market Overview

Interest in Paris has swung from the theoretical to the actual, with vacancy tightening to single digits and further phases of local campuses underway from global REITs and local operators alike. Leasing throughout the market has been led by a mix of large- and mid-scale cloud services companies, suggesting further progression in the move to the cloud by local companies, initiated prior to and then hastened by the pandemic. Of particular note is the confirmation of market entry by Google Cloud, providing Paris with full availability zones for all three major cloud service providers. The ever-larger campuses by operators such as Digital Realty and Equinix provide excellent homes for these services, and the expectation is a move to further hyperscale development in the foreseeable future. New development, new services, and even a new cable providing connectivity to London suggest a continued slow and steady move toward growth in Paris.

Ecosystem Developments

- **Interxion** added their Metro Connect- Managed Wave service at their North East Paris campus in summer, providing further interconnect options for local clients. The recently-merged Digital Realty-Interxion goliath is under construction on two projects across Paris, with completion expected in 2021.

- **Crosslake Fibre** is underway on the new CrossChannel Fibre network, with the 550-kilometre route to connect London and Paris. Due for completion by the end of 2021, the system will be the first new cable to cross the English Channel in the past two decades.

- The global acquisition of **Zayo** data centres by DataBank has a local component, with three data centres in Velizy-Villacoublay, Paris, and Saint-Denis all becoming DataBank locations once the deal closes. These along with two regional locations will be the entry for DataBank to France, who has until this time focused on secondary and tertiary markets across the United States.

- **euNetworks** signed an agreement with Equinix in autumn, offering their services on ECX Fabric in Paris and four other European markets. Equinix is also underway on three expansions locally, including their 10 MW PA9x hyperscale facility.

- **Google Cloud** has confirmed future entry to Paris, though a specific data centre campus has yet to be secured. Milan, Warsaw, and Madrid are other European markets coming soon, bringing the total number of zones across the continent to ten.

Construction Update

OPERATOR	LOCATION	SIZE (SQM)	POWER (MW)	STAGE / EST. DELIVERY
Equinix	PA2 Phase 4	441	.5 (est)	Under Construction / Q4 2020
	PA9x Phase 1	9,000 (est)	10	Under Construction / Q1 2021
	PA10 Phase 1	3,969	5 (est)	Under Construction / Q2 2022
Atos	Yvelines	3,900	4 (est)	Under Construction / Q4 2020
Digital Realty	Ferriers-en-Brie	8,956	6	Under Construction / Q1 2021
	PAR8	3,200	6.33	Under Construction / Q4 2021
Thesee	Aubergenville	1,000	1 (est)	Under Construction / Q1 2021