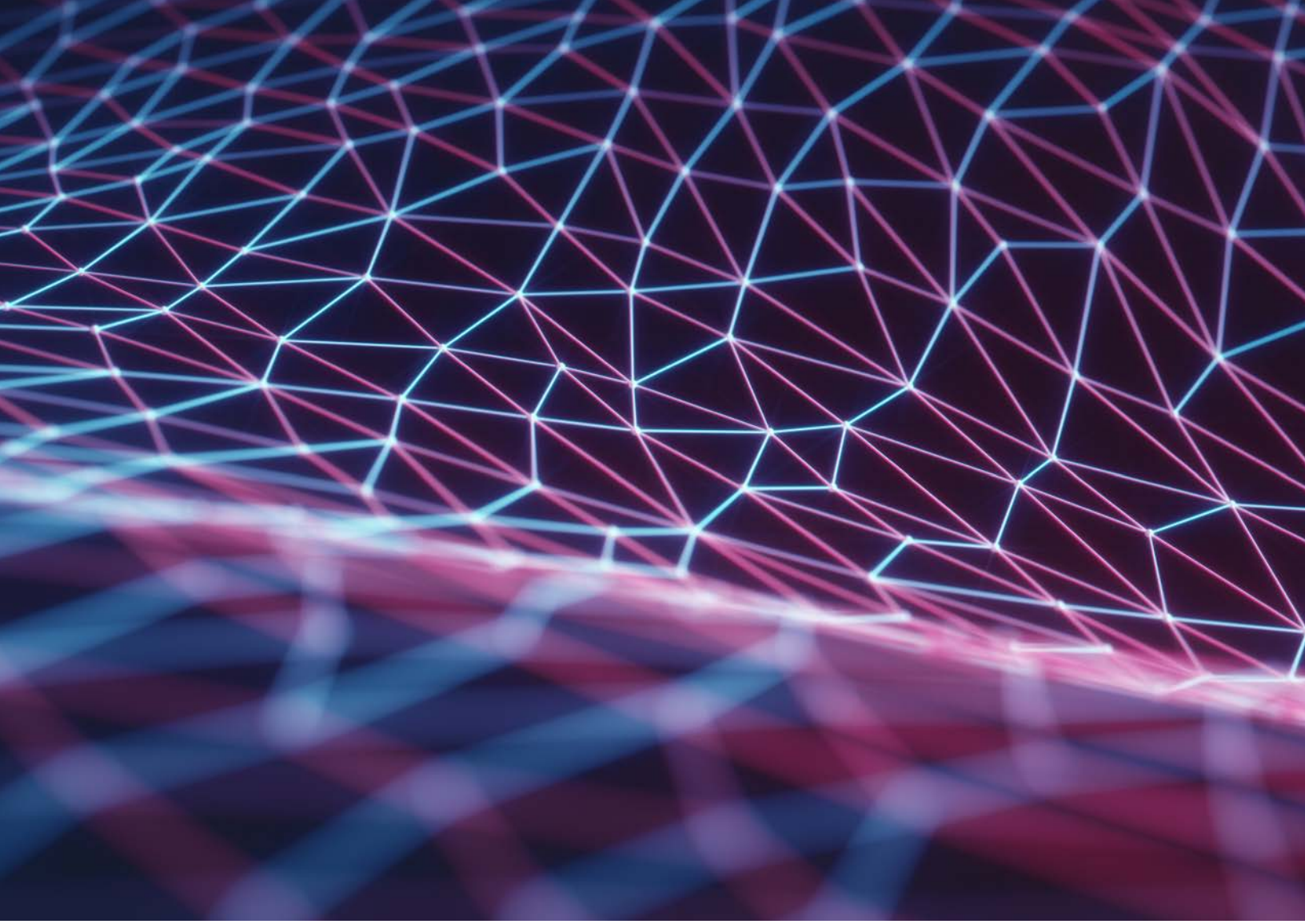
Newmark Knight Frank

GLOBAL KNOWLEDGE CENTER

U.S. DATA CENTER REPORT

H2 2019

FEBRUARY 6, 2020



Welcome

Coming off a record shattering 2018 year, data center leasing in 2019 was down but still very healthy with over 272 MW of absorption in the Top 10 US markets tracked by Newmark Knight Frank. Northern Virginia continues to be the record setting market, accounting for nearly 120 MW of new leasing. As expected, Northern California (40 MW) and Dallas/Ft. Worth (30 MW) also recorded strong leasing for the year. Atlanta and Phoenix both had noticeable changes in 2019 as well. Atlanta closed the year with over 19 MW leased in Q4, making it the fourth largest US market in 2019 with 24 MW of absorption compared to only 2 MW in 2018! Phoenix, however, did not get the anticipated pre-leasing at the larger development sites and went the opposite direction in 2019 with absorption totaling only 11.6 MW compared to 34.7 MW in 2018. Newmark Knight Frank is tracking several large requirements, as 2020 is projected to be another solid year of leasing led by many of the largest and second tier hyperscale players. We also expect "edge" requirements to dramatically increase demands in many major markets with the emergence of 5G, IoT, and AI technologies pushing content and data further and further towards the end users. For example, in 2019, Los Angeles was a noticeable winner of edge requirements with much of the 19.4 MW of new leasing falling into this niche edge category compared to only 3.2 MW of total absorption in 2018. With the proliferation of data and the expectations for near zero latency results, expect this trend to exponentially increase over the next few years.

Growth of Multi-Tenant Data Center (MTDC) Markets

In North America, Northern Virginia, Greater Phoenix, and Dallas Metro are the leading regions where planned data center space outpaces every other major metropolitan area. Nearly 15M SF space is planned in Northern Virginia, approximately 8M SF in Greater Phoenix, and over 4M SF in Dallas space has been planned.

Globally, the expected space under construction in APAC at 74M SF will continue to outpace North America that is expected to grow to 69M SF in operational space. However, total UPS power in North America at 9,600 MW will continue to be slightly greater than 9,100 MW in APAC.

Global MTDC space will exceed 200M SF in 2023 with the expected operational space to exceed 180M SF in 2020. Utilization rates will continue to climb to 75% in 2020 and expected to go on to 77% in 2023. North America utilization rates will continue to be higher than other regions around the world staying consistently above 80%. Although LATAM is expected to see higher percent growth than other regions, its utilization is expected to stay around 64%.

In terms of total operational square feet per company, Digital Realty will account for 8.6% of global space, Equinix 5.9%, and China Telecom 3.3%.

Source: 451 Research 2019

Absorption (in MW)	2018	2019	Growth y-o-y - 2019 vs 2018
Atlanta	2.09	24.35	91.4%
Chicago	14.40	15.44	6.7%
Dallas/Fort Worth	21.80	29.52	26.1%
Los Angeles	3.20	19.41	83.5%
New York	1.10	3.98	72.5%
Northern California	26.86	39.90	32.7%
Northern New Jersey	4.45	5.68	21.7%
Northern Virginia	293.26	125.42	-133.8%
Phoenix	33.39	11.60	-187.9%
Seattle	4.15	1.84	-126.0%

Source: Datacenter Hawk, Q4 2019

Atlanta

Several of the development projects which constitute the new supply executed pre-leases that positively impacted Atlanta's absorption throughout 2019. More than 19 MW of absorption was added towards the end of 2019, totaling Atlanta's absorption in 2019 at 24 MW - compared to 2018, it was an increase by 91.4%. This is significant news especially since many consider Atlanta in a good position to handle additional east coast data center growth, given the market's competitive colocation options, reasonable costs and aggressive tax incentives.

Energy/Connectivity

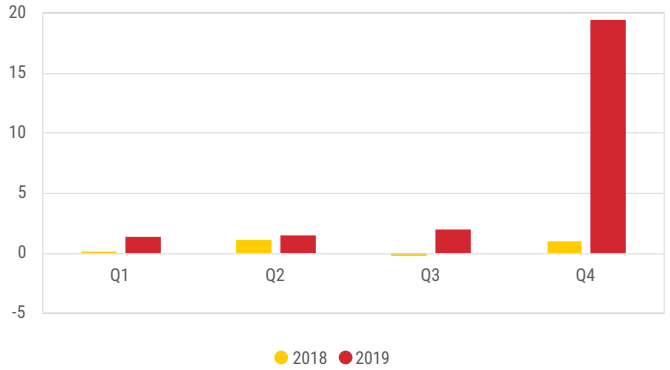
With Facebook's growing presence in the region, so grows its demand for clean energy. Walton Electric Membership Corporation and Silicon Ranch fund recently signed another contract with Facebook for their new solar project, totaling 125 MW. As part of the deal, Solar Ranch will fund and construct two solar farms, Appling Solar Farm (25 MW) due to complete towards the end of 2020 and Lumpkin Solar Farm (100 MW), expected to open in 2022. In total, Walton EMC administered six renewable energy contracts on Facebook's behalf (four with Silicon Ranch) to support their operations in Georgia with 435 MW of energy.

DataBank is exploring ways to benefit communities surrounding their latest downtown data center. Hot air generated by Company operations will be repurposed for use with the surrounding buildings' boilers. The concept is a standard in a number of European data centers located in densely developed urban areas, where distributing residual heat cuts down on energy needed to cool the data center while powering external businesses' heating systems.

Laws, Regulations, and Incentives

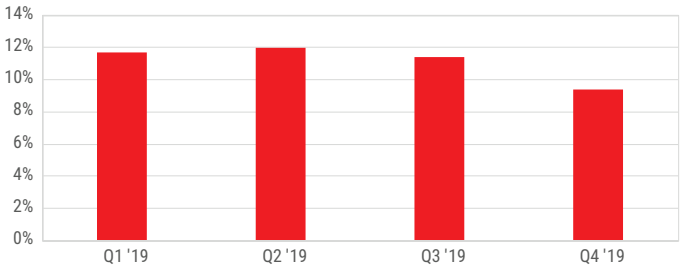
QTS Metro data center qualified for Georgia's Certified High-Technology Data Center tax exemption incentive. The data center is now exempt from sales and use tax on data center equipment which is likely to support extensive savings for users with large deployments. The decision is retroactive, which means that despite the incentive going into effect in 2019, QTS will receive tax credits paid back to July 2018 on a data center which as of now is the largest facility in Atlanta.

Atlanta: Absorption (in MW) - 2019 vs 2018



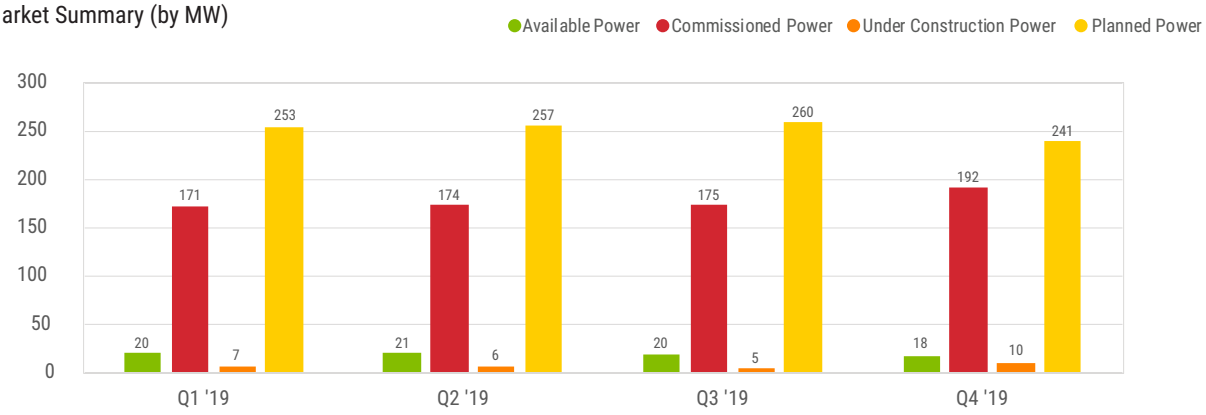
Source: Datacenter Hawk, Q4 2019

Atlanta: Market Vacancy (Available Power/Commissioned Power)



Source: Datacenter Hawk, Q4 2019

Atlanta: Market Summary (by MW)



Source: Datacenter Hawk, Q4 2019

Available Space (SF)
149,280

Planned Space (SF)
1,746,186

Commissioned Space (SF)
1,961,655

Under Construction Space (SF)
96,700

Source: Datacenter Hawk, Q4 2019

Development News

After selling a significant part of their business in 2018, T5 recapitalized and is planning to build its second Atlanta data center in 2020. The site will have approximately 66,000 SF of commissioned space and an estimated 10 MW of commissioned power when complete.

Stack Infrastructure, who bought T5's Atlanta data center property in 2018, is at capacity and plans to expand their Alpharetta property in 2020.

QTS expanded their Atlanta Metro campus, signing a pre-lease for additional 12 MW. Their next downtown data center is an expansion of an existing 4.5 MW site in Richmond. QTS' Atlanta Metro campus is the largest data center in Atlanta and Building 2 alone is expected to offer up to 72 MW of commissioned power when complete. First phase will be delivered mid-2020 and will add a total of 6 MW.

Following its recent entrance to Atlanta, Switch signed its first customers at its Atlanta campus which is due to open in early 2020. Switch announced plans for this 1 million SF data center back in 2017. Early pre-lease agreements indicate healthy absorption levels.

Transactions

West Carolina Tel recently signed a lease with Colo Atl for colocation and interconnection services to improve their network presence and redundancy. West Carolina's goal is to benefit from Colo Atl's downtown carrier hotel connection with additional fiber networks. This will allow a reduction in costs by eliminating monthly recurring cross-connect fees.

Outlook

Companies outside from the primary Atlanta market are driving the demand and absorption. A growing interest from companies headquartered outside of the market see Atlanta as a key location for their data center deployments. For example, the 12 MW of pre-leasing at QTS is believed to be from a large, West Coast cloud service provider.

Sources

Datacenter Hawk 2020, PV Tech, NKF Global Knowledge Center Research

Chicago

Several enterprise transactions completed in 4Q 2019 caused absorption in Chicago to increase by 6.7% year-on-year, from 14.4 MW to 15.4 MW. Data center development also increased towards the end of 2019, due to companies starting projects set to bring additional capability to the market, with Stack Infrastructure and Stream Data Centers being two notable examples with their Elk Grove Village developments. As an emerging US tech hub, Chicago is an attractive location for companies deploying edge solutions. Edge companies like VaporIO and SBA Communications are attracted to invest in Chicago's data center market due to the market's pivotal Internet exchange, dense interconnection, and the preliminary launch of 5G.

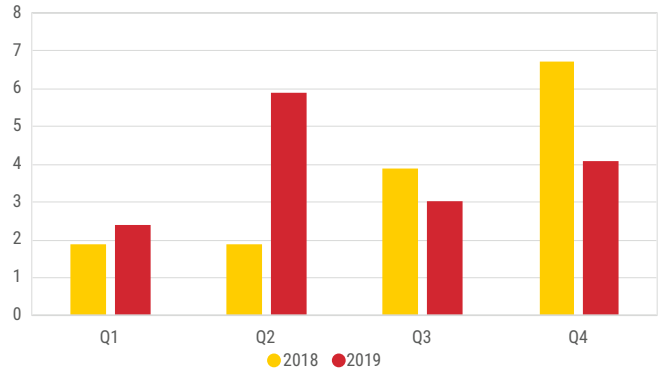
Energy/Connectivity

Chicago's main energy provider, Commonwealth Edison, announced that it started construction of a new substation to accommodate the forthcoming growth of data centers in Elk Grove in a move to increase operational capacity in the region. The site is on track to increase the scope of transmission and distribution systems. This expansion in capacity will be accompanied by better high voltage support. The first phase of the construction project is estimated to complete by summer 2021.

Laws, Regulations, and Incentives

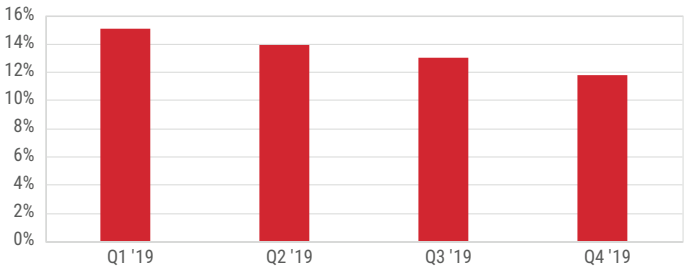
Recently introduced, new data center incentives are helping Chicago compete with nearby data center markets including Minneapolis, St. Louis and Indianapolis. Exemptions from state's high sales tax which stands at 10.25% are attractive to investors and are likely to create not only a more affordable but also a more efficient space for tech businesses. Despite a short period of time, many providers are already noticing an uptick in demand from inside Chicago as well as from companies headquartered outside of the market.

Chicago: Absorption (in MW) - 2019 vs 2018



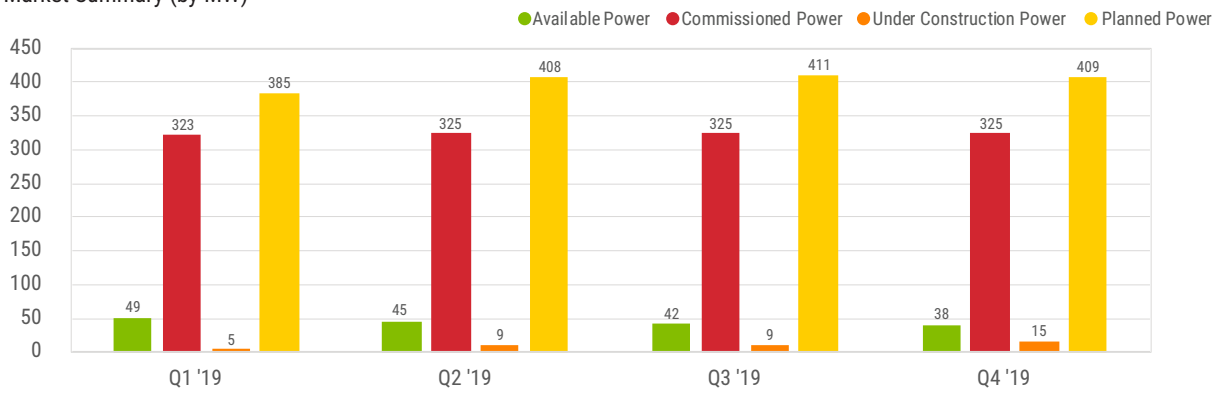
Source: Datacenter Hawk, Q4 2019

Chicago: Market Vacancy (Available Power/Commissioned Power)



Source: Datacenter Hawk, Q4 2019

Chicago: Market Summary (by MW)



Source: Datacenter Hawk, Q4 2019

Available Space (SF)	Planned Space (SF)	Commissioned Space (SF)	Under Construction Space (SF)
284,663	2,448,467	2,388,454	97,000

Source: Datacenter Hawk, Q4 2019

Development News

1547 Critical Systems Realty is developing additional capacity at both their Chicago data centers with 2.25 MW of turnkey space at their downtown data center and 10 MW of powered shell at their S. Chicago property in 2020.

Equinix grows their largest data center in Chicago (CH3), following completion of the Phase V expansion phase that added 2 MW of commissioned power and 13,500 SF of space. Last phase of the construction has already began and when complete, will total more than 21 MW of commissioned power. CH3 is located in Elk Grove Village and in close proximity to other data centers operated in the area by Digital Realty, Stream, Stack, EdgeConneX, and Element Critical. Data centers surrounding CH3 link to the facility in order to take advantage of its connectivity to the carrier hotel data center at 350 Cermak, which makes CH3 an important and valuable asset.

Stack is turning its effort towards a new facility which is expected to come online in 2020. The new site is in close proximity to their current Elk Grove Village data center and will offer up to 24 MW of commissioned power when complete.

CoreSite, a company providing colocation and peering services is reportedly on track to complete its 169,000 SF downtown data center facility CH2 in Q2 2020. First phase which is set to deliver 6.0 MW is currently underway. CH2 facility is designed to be connected to CH1 to guarantee optimal connectivity options for users.

Transactions

Macquarie Infrastructure Partners completed their purchase of Netrality Data Centers. Netrality owns and operates six interconnected carrier hotels in Chicago, Houston, Kansas City, Philadelphia, and St. Louis. This strategic acquisition will allow Netrality to leverage their interconnection solutions. Netrality's downtown Chicago data center facility spreads over 112,000 SF.

Outlook

Elk Grove Village's new 85-acre technology park will soon be home to several new data center projects in the coming year 2020. A number of end users and providers are already expressing interest in the park for future expansion, which promises 30 MW of power with a potential to add more in the future.

Chicago's data centers are likely to benefit from increased demand driven by tax incentives introduced in the second quarter of 2019. Recent developments in the Internet of Things as well as Artificial Intelligence (AI) force low-latency edge facilities to become more of a standard solution, which is likely to drive further demand from companies dealing with edge computing and AI.

Sources

Datacenter Hawk 2020, ComEd, Data Center Knowledge (2020), Economic Incentives Advisory (EIA) Incentives Insights by NKF Global Corporate Services, NKF Global Knowledge Center Research

Dallas/Fort Worth

4Q 2019 in DFW market proved to be another time period where data center operators focused on leasing available capacity and less on delivering new capacity. 2019 absorption totalled 29.5 MW which was an increase of 26.1% compared to previous year. The market currently includes a number of sites with multiple megawatts available. However, several larger enterprise users are evaluating the DFW market for infrastructure deployments. Enterprise users find the Dallas data center market attractive because of the competitive colocation market and extremely inexpensive power cost. With a healthy amount of turnkey space and power still available in the market, DFW is a buyer's market.

Energy/Connectivity

DFW is a deregulated electricity market which has allowed electricity pricing to reach the lowest level of any of the major US markets in our report. Multiple data center operators have negotiated pricing below $0.05/kWH with some even breaking the $0.040/kWH barrier.

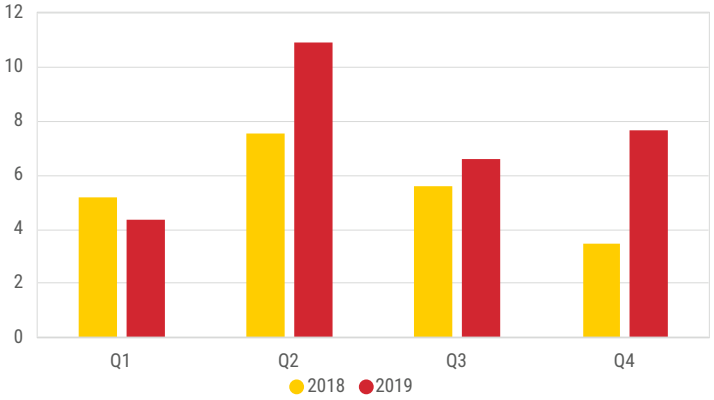
On the renewable energy front, Texas has a growing supply of wind energy, which accounted for 18% of the electricity generated in Texas during 2017, up from 10% in 2015. On top of this, as new data from Electric Reliability Council of Texas (ERCOT) showed, wind generated power nearly matched that from coal for the first time in 2019. Energy generated from coal is estimated to drop further in the future, with renewable sources likely to pick up the slack. The availability of renewable energy options is crucial to the DFW region's aspirations to emerge as a player in hyperscale deals.

Laws, Regulations, and Incentives

State lawmakers approved a plan to offer tax incentives to companies that open data centers throughout the state, as part of a move to attract more technology companies and capital investment to Texas. Texas has long been a preferred location for large data centers given its central location, economic climate, reliable electric grid, historically low occurrences of natural disasters, educated workforce and pro-business environment.

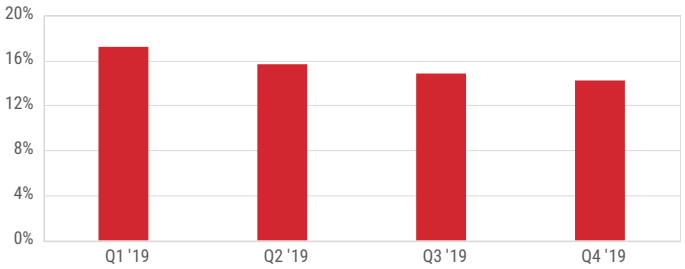
House Bill 1223 created the incentive and will eliminate much of the sales tax for new data centers that take up more than 100,000 square feet of space and have at least a $200 million investment. The law provides a sales tax exemption for electricity consumption and equipment purchases, such as servers, generators, storage devices, software and other systems necessary for data center operations. The incentives took effect September 1, 2013.

Dallas/Fort Worth: Absorption (in MW) - 2019 vs 2018



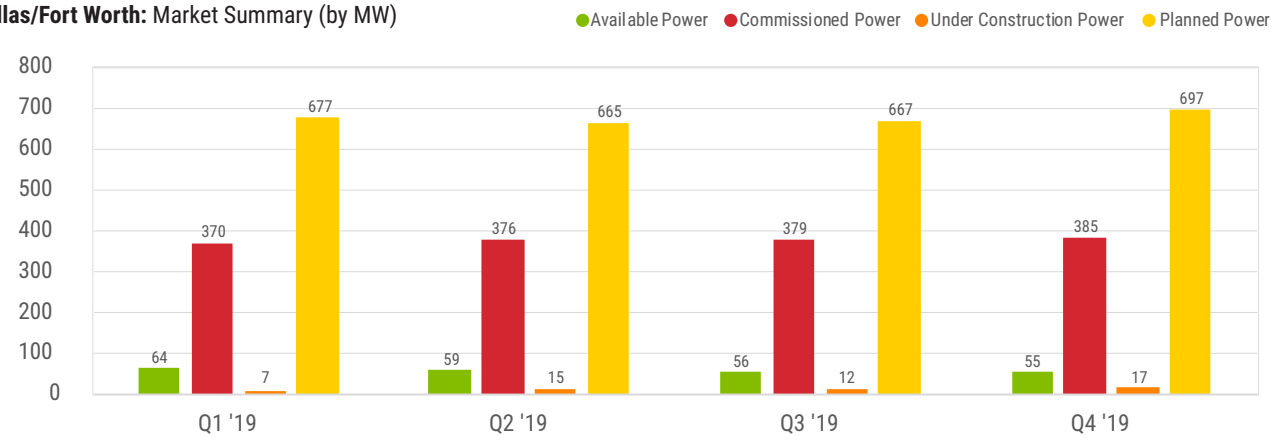
Source: Datacenter Hawk, Q4 2019

Dallas/Fort Worth: Market Vacancy (Available Power/ Commissioned Power)



Source: Datacenter Hawk, Q4 2019

Dallas/Fort Worth: Market Summary (by MW)



Source: Datacenter Hawk, Q4 2019

Available Space (SF)	Planned Space (SF)	Commissioned Space (SF)	Under Construction Space (SF)
452,695	4,046,443	3,376,607	123,600

Source: Datacenter Hawk, Q4 2019

Other incentives are at the local level and include real and business personal property tax abatements at the City and County level and Chapter 380 grants for employment or capital investment. Depending on the investment, there could be a possibility of tax exemptions of the independent school district tax portion but it is very restricted and hard to gain approval. These are reviewed on a case by case basis by the city that is being considered for the data center project.

Development News

Capacity at Stream's new Garland data center is now available. The company opened the first data hall with 3 MW of commissioned power, which is fully available. There is room for an additional 30 MW of planned power.

Aligned is scheduled to expand its DFW site in 2020. The new 8 MW expansion is in response to increasing demand for dense colocation solutions. Aligned's Plano data center offers densities of up to 50 kW per rack and utilizes a highly renewable energy source.

KDC recently put the finishing touches on their 130,000 SF powered shell in Richardson. The facility is fed by two, 12.5 MW feeds and is directly next to a substation and a data center owned and operated by State Farm. Powered shell solutions provide flexibility for users and data center providers wanting to customize their electrical and mechanical designs.

Compass Datacenters is currently working on site preparations for DFW III, its data center site in Red Oak (20 miles south of Dallas). The 155-acre site can accommodate up to 100 MW and will have a dedicated substation built to support the demand.

Transactions

A second hyperscale data center campus is coming to southern Dallas after Google received a tax abatement to build on a site in Red Oak. Google is currently in development of a campus in nearby Midlothian where they plan to invest up to $600 million in the project. Google will invest a similar amount in the 166-acre Red Oak site. Facebook, Dropbox, IBM, and LinkedIn all completed multi-megawatt transactions in DFW in the 2nd half of 2019.

Outlook

Given the current availability in the DFW market, it is expected that pricing will remain aggressive in 2020 for requirements 250 kW and higher. Enterprise users in DFW are highly sought after and will continue to be as data center operators work to fill their sites over the next year. The DFW market is poised for growth in 2020 from both enterprise users and cloud service providers evaluating the market. The competitive options, such as low-cost power, tax incentives and price compression from inventory volume make the DFW area a market to watch in 2020.

Sources

Data Center Hawk 2020, Houston Public Media (2020), Economic Incentives Advisory (EIA) Incentives Insights by NKF Global Corporate Services, NKF Global Knowledge Center Research

Los Angeles

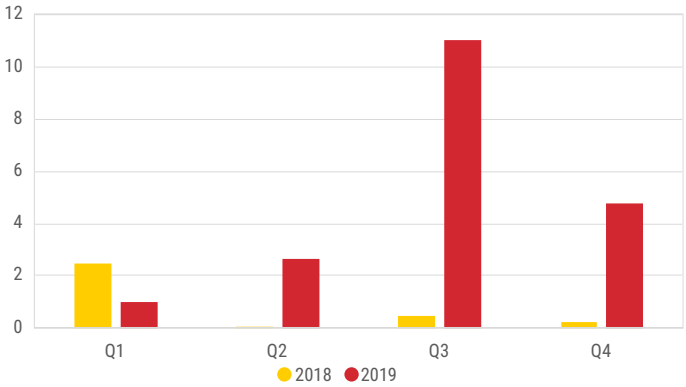
2019 was a successful year for the Los Angeles market, with absorption totaling just under 20 MW and a year-on-year reported growth of 83.5%. A lot of this growth was directly influenced by large deployments made by the cloud providers. A number of cloud providers declared they aim to become more mature in the markets generally considered more costly for deployments of this nature. An example of this trend is AWS announcement in Q4 that a local zone meant to place compute, storage, and other AWS services closer to the end user is already under way.

Energy/Connectivity

Strategic connectivity and subsea cable maturity continues to drive demand in Los Angeles market. Los Angeles is the anchor point for several subsea cables, including the new Curie cable connecting LA with Chile. Southern Cross also recently announced plans for a new cable they plan to develop between Australia and Los Angeles.

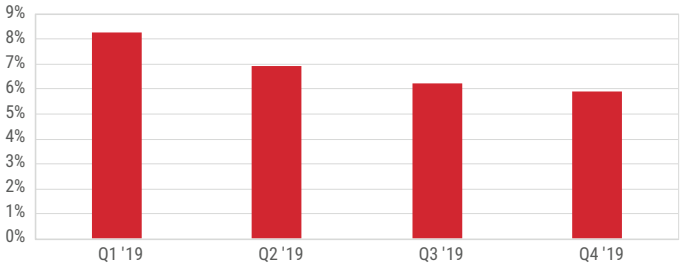
The Los Angeles Department of Water and Power (LADWP) Board of Commission recently voted to approve power purchase agreements for the largest solar and battery storage system in the United States. This will enable Los Angeles to reach 100% renewable energy by 2045. The Eland Solar and Storage Center is planned to capture up to 400 MW of solar energy and store 1,200 MWh of energy, all of which can be distributed to accommodate changes in demand. According to the purchase agreements, the project must begin commercial operation by 31st December 2023. Early in 2019, LADWP announced it will also begin to phase out natural gas operations across three power plants in California.

Los Angeles: Absorption (in MW) - 2019 vs 2018



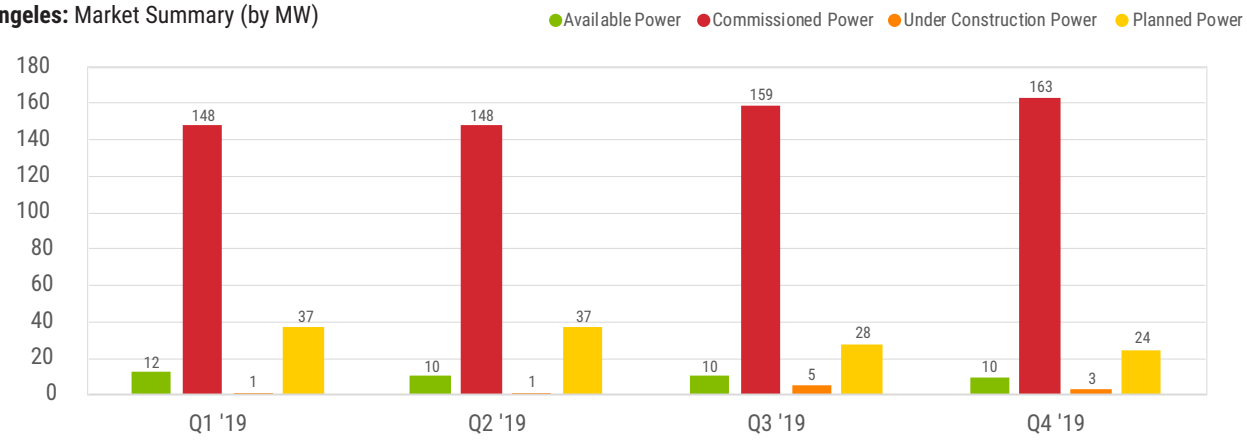
Source: Datacenter Hawk, Q4 2019

Los Angeles: Market Vacancy (Available Power/ Commissioned Power)



Source: Datacenter Hawk, Q4 2019

Los Angeles: Market Summary (by MW)



Source: Datacenter Hawk, Q4 2019

Available Space (SF)	Planned Space (SF)	Commissioned Space (SF)	Under Construction Space (SF)
63,206	166,000	1,679,934	16,500

Source: Datacenter Hawk, Q4 2019

Laws, Regulations, and Incentives

At the moment, California does not offer data center tax incentive legislation. City of Los Angeles does offer some tax reduction strategies that data centers can leverage. Data centers built in designated "Enterprise Zones", such as areas with high unemployment rates, can qualify for tax credits of up to 100% on sales/use taxes paid for equipment purchases.

Development News

Leading global colocation provider Equinix is under construction with a Phase III at their LA4 data center in a move to add an estimated 1.5 MW of commissioned power, with an option to add further 5 MW in the future. The project is set to complete in Q1 2020. LA4 is a well connected building seen as an anchor point to the Curie subsea cable between the US and Chile.

CoreSite recently signed a pre-lease for nearly 75% of Phase I of its LA3 data center which is designed to accommodate up to 15 MW and 100,000 SF of commissioned power and space when completed.

Transactions

AWS and Google both took large chunks of turnkey data center capacity in the LA market during the second half of 2020. We believe these are serving as "edge" data centers, which we expect to be a continued trend in 2020.

INAP and DediPath continue to strengthen their relationship with DediPath's signing of a lease for colocation services in INAP's El Segundo data center. DediPath has been an anchor tenant in INAP's Redondo Beach data center since 2018 and will utilize their new space in El Segundo as a redundant disaster recovery location.

Outlook

The presence of cloud providers is growing in the region, which is directly responsible for the increase in absorption. Demand for LA data centers will continue to increase throughout 2020, mainly due to its strategic location and connectivity to international markets.

Sources

Datacenter Hawk 2020, Data Center Dynamics, Techwire, NKF Global Knowledge Center Research

New York

In 2019, absorption in the NY market increased to 4.0 MW from 1.1 MW in 2018, for a year-on-year increase of 72.5%. New York is home to an extensive base of data center facilities. Their location in proximity to businesses and a massive population drives their use and also ensures sector retention. That said, the cost of electricity and taxes have dramatically slowed New York's transactions in recent years. A primary focus of data center providers in New York will be to adopt energy efficiency technologies to attract potential new users who view electricity pricing as a barrier to entry.

Energy/Connectivity

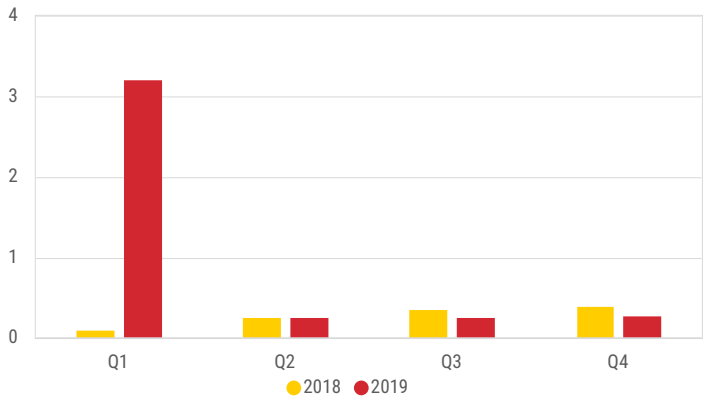
Empire State Data Hub initiative had put forward a plan to turn two coal-burning power plants in Somerset and Cayuga, New York into dual hyperscale data centers. The plant in Somerset, New York could become a 250 MW data center, while a similar smaller plant in Cayuga, New York could be turned into a 100 MW facility. The initiative is a $650 million private capital investment plan to close the last two remaining coal burning power plants in the state of New York.

Laws, Regulations, and Incentives

New York provides a sales tax exemption for equipment used by Internet data centers.

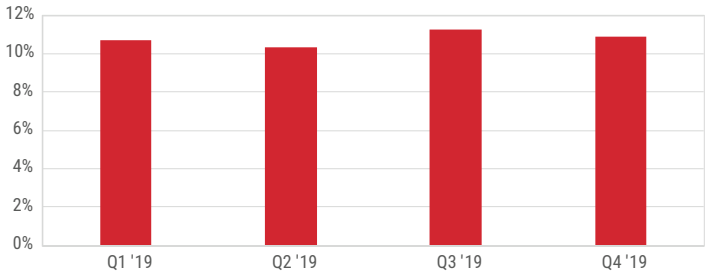
The potential for Rockland County to attract a growing number of data centers has increased with the creation of the Orange and Rockland Utilities' electric substation. The possibility of data center tax incentives will help attract customers dramatically.

New York: Absorption (in MW) - 2019 vs 2018



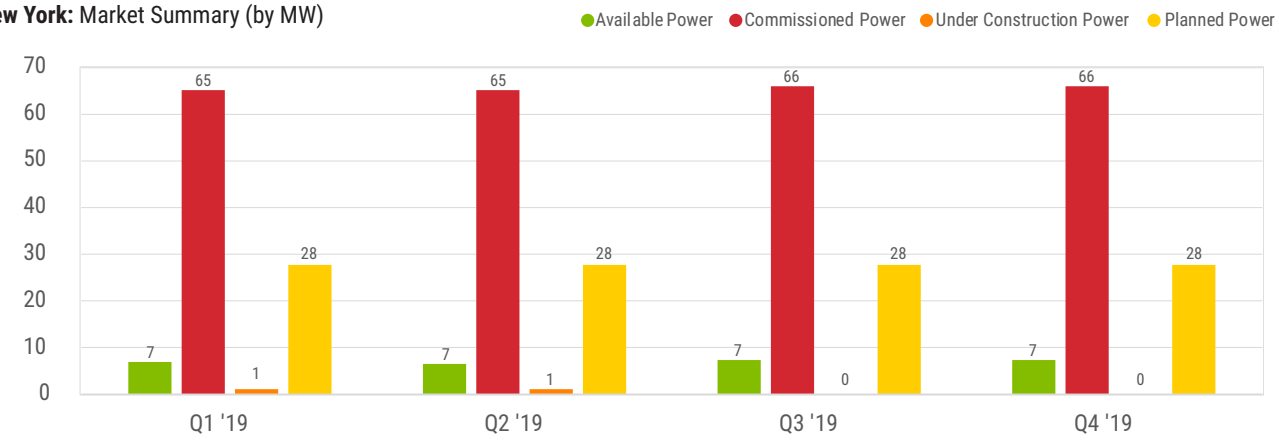
Source: Datacenter Hawk, Q4 2019

New York: Market Vacancy (Available Power/ Commissioned Power)



Source: Datacenter Hawk, Q4 2019

New York: Market Summary (by MW)



Source: Datacenter Hawk, Q4 2019

Available Space (SF)	Planned Space (SF)	Commissioned Space (SF)	Under Construction Space (SF)
78,008	174,500	653,557	0

Source: Datacenter Hawk, Q4 2019

Development News

DataGryd has completed the first phase of MegaSuite project 6 at 60 Hudson Street. The project will add up to 5 MW of new capacity on the sixth floor of 60 Hudson Street, the iconic carrier hotel that is a linchpin of Manhattan's global connectivity. The 72,000 square foot floor plate is being built out in 1 MW rooms, with the ability to customize suites starting at 100 kW and up.

Transactions

Eataly, a provider of Italian culinary experiences (goods, restaurants and classes) recently selected enterprise colocation solution provider ColoGuard as their provider of private cloud infrastructure. The cloud infrastructure is hosted from ColoGuard's Brooklyn location and will provide processing and analysis for Eataly's operations in the US.

Outlook

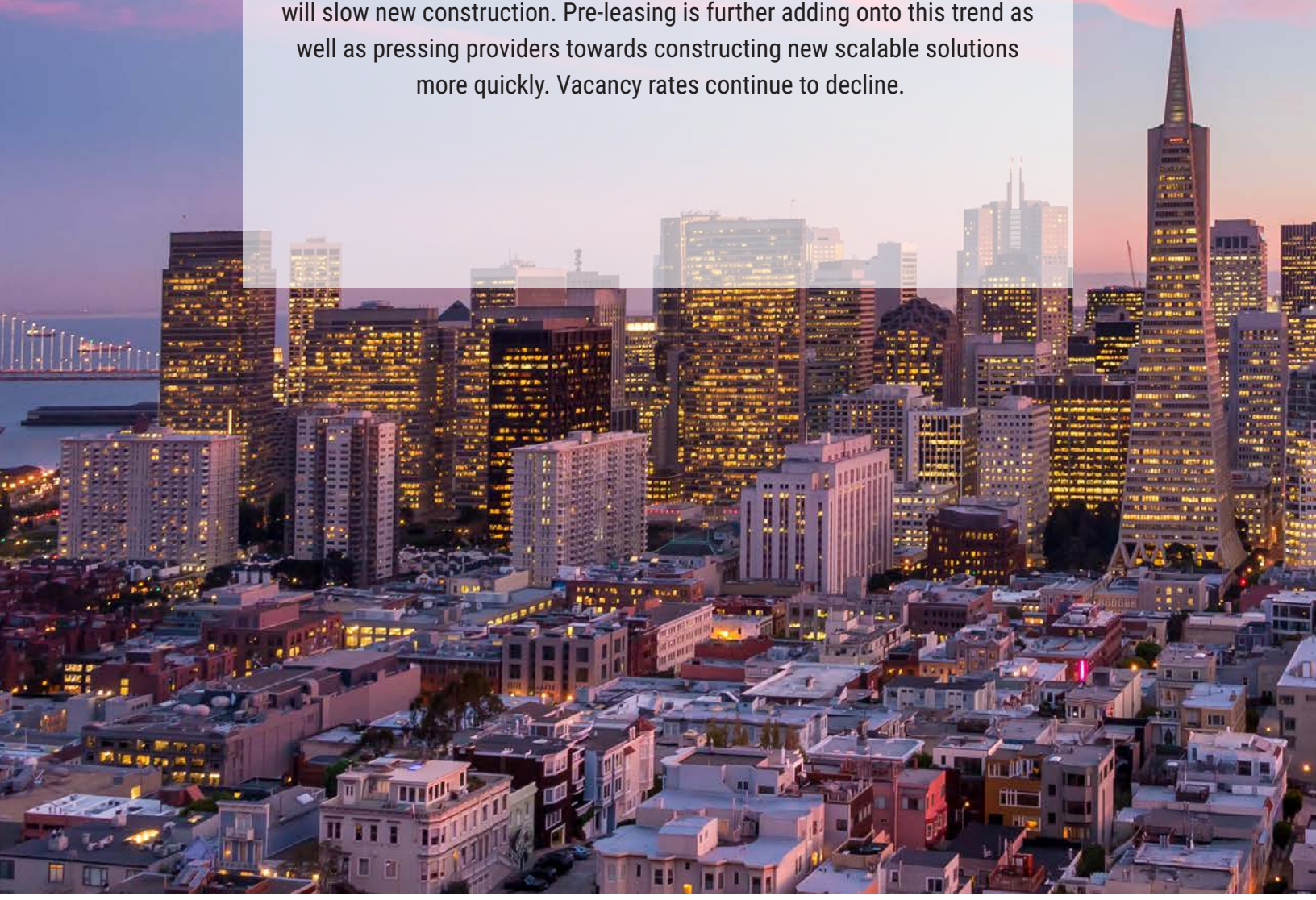
New York State's Green New Deal climate and green energy initiative puts the state on route to becoming carbon neutral in all sectors of the economy. This may have an effect on data centers, forcing data centers to adopt designs and methods to drive energy and cooling efficiency systems to meet zero emissions regulations.

Sources

Datacenter Hawk 2020, Data Center Frontier, Data Center Dynamics, New York State Energy Research and Development Authority, NKF Global Knowledge Center Research

Northern California

A sizeable portion of the 39 MW in absorption in 2019 is linked to the expansion of cloud service providers. They helped to achieve growth of 32.7% in 2019 on a yearly basis. New development projects usually take longer in Northern California than in other markets due to permitting and environmental aspect challenges. Despite the fact that data center development continues to be the focus, it is likely that these challenges will slow new construction. Pre-leasing is further adding onto this trend as well as pressing providers towards constructing new scalable solutions more quickly. Vacancy rates continue to decline.



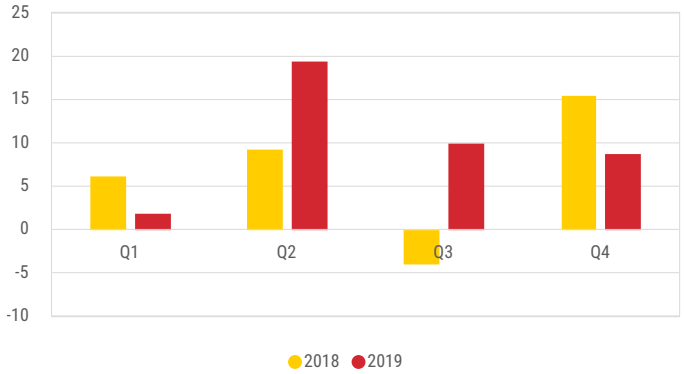
Energy/Connectivity

QTS which has 26 data center facilities located throughout the United States, added an Internet exchange node from the San Francisco Metropolitan Internet Exchange (SFMIX) in its Santa Clara data center. As data center users are becoming more mature and connectivity is becoming a higher priority on their colocation checklist, direct access to an Internet exchange is increasingly valuable. California energy prices continue to be some of the highest in the country, which has limited growth in NoCAL to those users absolutely needing capacity in that market.

Law, Regulations, and Incentives

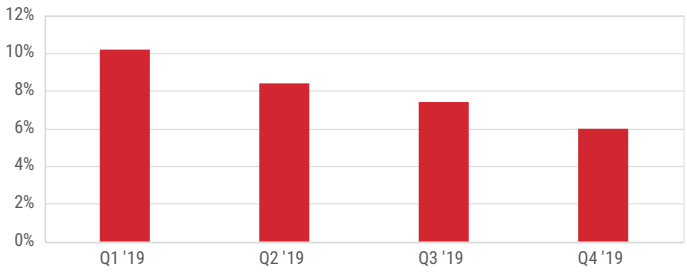
The State of California does not currently offer any specific incentives or tax credits. Certain markets in Northern California offer some local tax abatement opportunities, like the City of Santa Clara having no city user tax which is worth a noticeable portion of tax savings.

Northern California: Absorption (in MW) - 2019 vs 2018



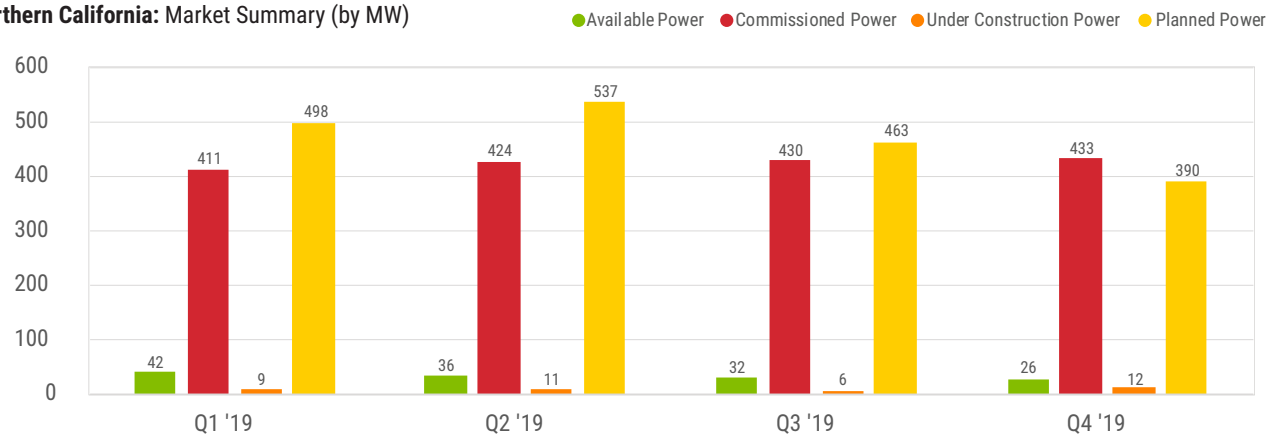
Source: Datacenter Hawk, Q4 2019

Northern California: Market Vacancy (Available Power/ Commissioned Power)



Source: Datacenter Hawk, Q4 2019

Northern California: Market Summary (by MW)



Source: Datacenter Hawk, Q4 2019

Available Space (SF)	Planned Space (SF)	Commissioned Space (SF)	Under Construction Space (SF)
193,385	1,850,966	3,008,123	51,333

Source: Datacenter Hawk, Q4 2019

Development News

1547 Critical Systems Realty broke ground in late 2019 on the first purpose built data center development in the City of San Francisco in over a decade. Scheduled for completion October 2020, 1547 will deliver a 187K SF, two story, 24 MW powered shell.

Vantage is currently under construction with the shell of their second data center on its Santa Clara site, which will hold 24 MW when fully delivered.

A real estate investment trust CyrusOne is preparing for their first entrance into Silicon Valley with a 14.9 acre site near to the San Jose airport. When the four-story building comes online, it is estimated that it will hold up to 72 MW of commissioned power across eleven data halls. The company is planning to deliver their first data hall on the site towards the end of 2020.

RagingWire is preparing to construct its earthquake resistant facility in Santa Clara by clearing its SV1 data center site. The facility will deliver 16 MW of commissioned power when complete. The data center, which is RagingWire's first location in the Silicon Valley, is scheduled to be delivered in Q1 2021 at the latest. The company also has a large data center presence in Sacramento, just over 100 miles away.

LVP Martin Avenue Associates, LLC is planning to demolish the 31,500 SF building at 2175 Martin Avenue to build a three story, 80,000 SF data center. The building will accommodate up to 13.5 MW of commissioned power when delivered. Lightstone purchased the site in 2019. First phase is estimated to be delivered in 2021.

Transactions

Towards the end of the year, IPI Partners purchased a data center site from 2305 Mission College in Santa Clara for $101.4 million. IPI Partners leased the site to Amazon for 15 years which plans to demolish the existing 358,000 SF building and construct two three-story data centers which will add up to 490,000 SF. The site which benefits from a proximity to a number of data centers in Silicon Valley is expected to begin construction in 2020.

Nvidia also completed a larger wholesale lease in Q419 in the market.

Outlook

It is estimated that vacancy rates are going to remain stable or even slow down over the next year. This is caused by lengthy development timelines as well as growing pre-leasing activity.

Sources

Datacenter Hawk 2020, The Silicon Valley Voice, NKF Global Knowledge Center Research

Northern New Jersey

There are a few projects under construction on the New Jersey market which will cause noticeable growth in the not so distant future. However, absorption in New Jersey is low which means the market is likely to experience an increase in vacancy. The Northern New Jersey data center market generally grows up to 6 MW of commissioned power annually and absorbs capacity at a similar rate - in 2019 the annual growth rate was equal to 21.7%.

Energy/Connectivity

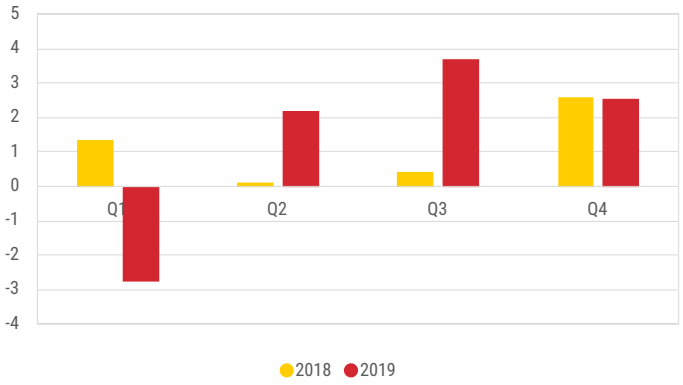
NJFX a New Jersey data center operator is a popular landing station for subsea cables as well as a termination port for the Havfrue cable connecting the US to the Nordics. It introduced Bulk Infrastructure's Nordic Gateway as an on-ramp to Havfrue in the NJFX data center. The goal is to provide US customers with easier access to Nordic markets in the hopes of attracting those companies to build the area.

Cyxtera is another provider introducing Nvidia DGX AI programs into its data centers. By supplementing its colocation offering with Nvidia processors, Cyxtera is catering to demand created by users implementing AI workloads in data centers. This service is also utilized in Cyxtera locations in Dallas, New Jersey, Los Angeles, Phoenix, Seattle, Toronto and some international markets.

Laws, Regulations, and Incentives

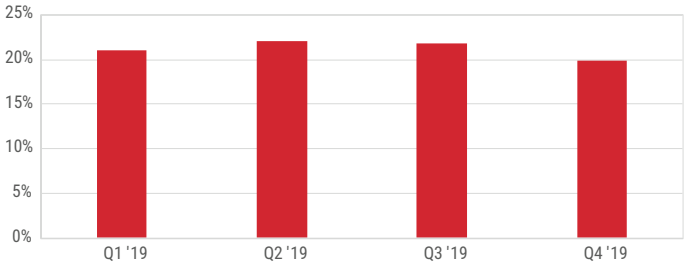
New Jersey's incentive laws are currently under review and the state is not issuing any new tax credit incentives until a new program is launched and approved.

Northern New Jersey: Absorption (in MW) - 2019 vs 2018



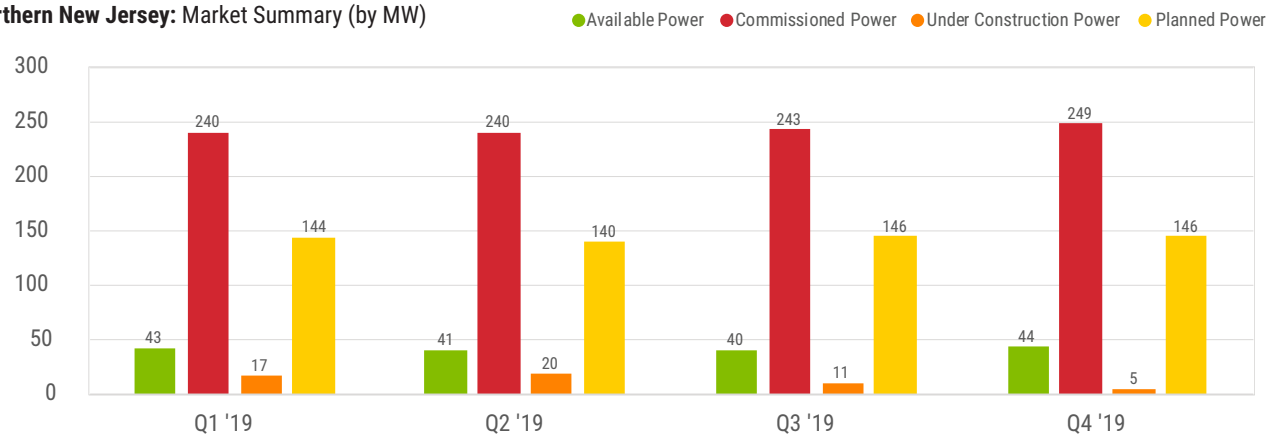
Source: Datacenter Hawk, Q4 2019

Northern New Jersey: Market Vacancy (Available Power/ Commissioned Power)



Source: Datacenter Hawk, Q4 2019

Northern New Jersey: Market Summary (by MW)



Source: Datacenter Hawk, Q4 2019

Available Space (SF)	Planned Space (SF)	Commissioned Space (SF)	Under Construction Space (SF)
337,960	1,203,741	2,226,675	49,000

Source: Datacenter Hawk, Q4 2019

Development News

Iron Mountain, a global provider with more than 3.5 million SF gross in their portfolio, is constructing a rooftop solar array at its 830,000 SF Edison facility, a New Jersey data center capable of generating a total of 7.2 MW. Iron Mountain is one of the companies leading the data center industry in adopting renewable energy. The solar array currently under development is its next step in reducing use of non-renewable energy.

Transactions

In Q3 2019, 365 Data Centers purchased its first data center in the area. The data center is a 25,000 SF facility in Bridgewater with 2.3 MW of commissioned power. The acquisition will ensure good connectivity between 365 Data Centers' operations in New York and Philadelphia. The entrance of a new provider in New Jersey market is good news for stagnant competition.

Outlook

We expect pricing to remain very buyer friendly in the New Jersey market with supply and inventory outpacing new tenant growth. We also anticipate that New Jersey and New York will start to attract more "edge" requirements, similar to the growth seen in the Los Angeles market in 2019.

Sources

Datacenter Hawk 2020, Data Center Frontier, Economic Incentives Advisory (EIA) Incentives Insights by NKF Global Corporate Services, NKF Global Knowledge Center Research

Northern Virginia

The Northern Virginia data center market posted over 125 MW in absorption in 2019. The lighter demand in 2019 (when compared to the 293 MW record breaking year in absorption for Northern Virginia set in 2018) is reflective of the current "digestion" period by cloud service providers in the area.

Companies with international data center demand continue to view Northern Virginia as a suitable home for their infrastructure projects. The region provides robust connectivity, reasonable economic costs, and competitive options to chose from.

Energy/Connectivity

Dominion Virginia Power has been one of the most effective utilities in providing power capacity to support the growth of the data center industry, but features an energy mix with a low percentage of wind and solar power. Dominion is working to address the issue, recently announcing plans for solar farms and a large offshore wind power project to address future demand for renewables. The power purchase agreement (PPA) in Virginia is important because cloud customers are focused on the availability of renewable energy in the region.

Laws, Regulations, and Incentives

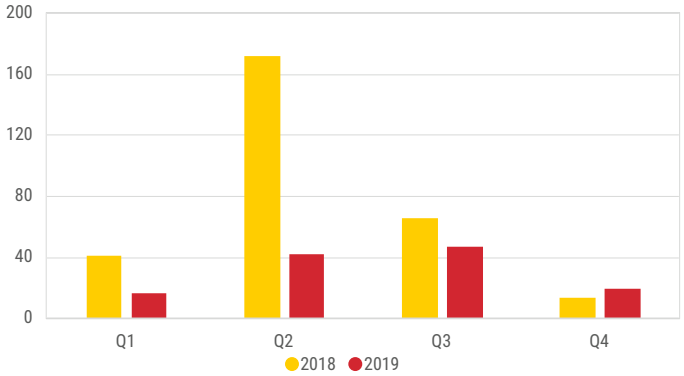
Projects that invest $150 million in new capital and create 50 permanent jobs that are paid at least 150% of the average local wage will be qualified for Data Center Retail Sales & Use Tax (DCRSUT) Exemption managed by the Virginia Economic Development Partnership and the Department of Taxation. For projects located in enterprise zones, this job requirement is halved to 25, creating a strong motivation for projects to locate in disadvantaged communities.

Development News

Aligned recently delivered the first two data halls at their Ashburn campus. Both of the completed data halls hold 6 MW of commissioned power, and the rest of the 369,000 SF facility is capable of supporting an additional 48 MW. Aligned also has additional room for a 120 MW data center on the site as well.

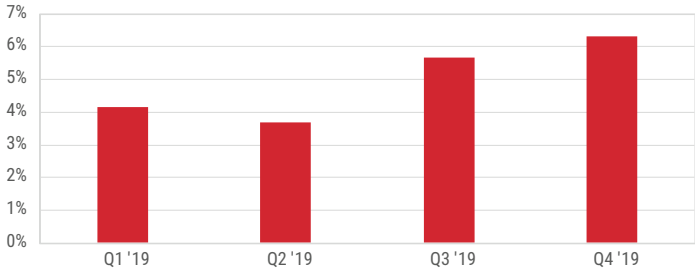
Sentinel Data Centers is rezoning a site on Loudoun County Parkway in efforts to develop a 600,000 SF data center campus. The zoning efforts are focused on a 20+ acre part of a greater 280 acre site, all owned by Sentinel. The company recently completed a 30 MW build to suit project in proximity for a cloud services company. Look for this development to begin in 2020.

Northern Virginia: Absorption (in MW) - 2019 vs 2018



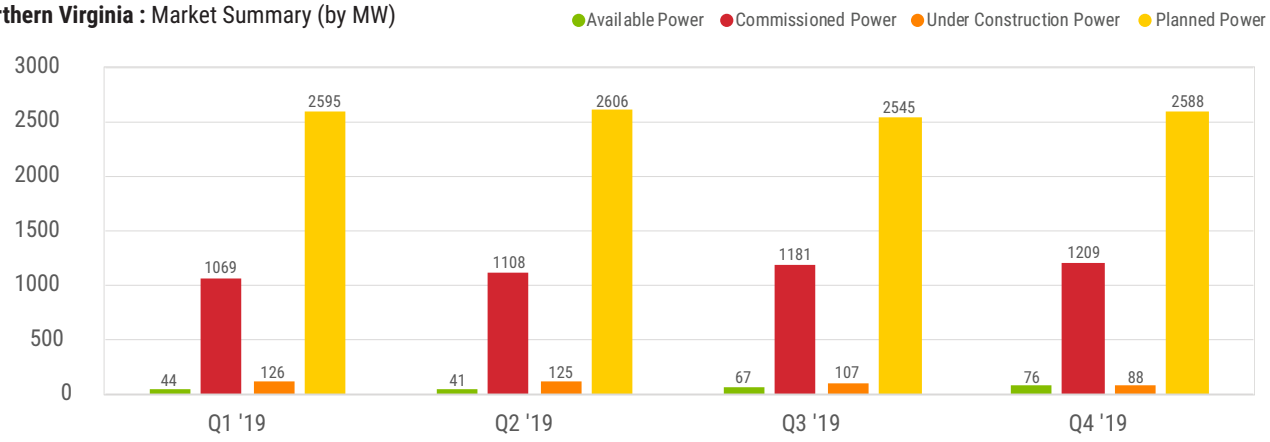
Source: Datacenter Hawk, Q4 2019

Northern Virginia: Market Vacancy (Available Power/ Commissioned Power)



Source: Datacenter Hawk, Q4 2019

Northern Virginia : Market Summary (by MW)



Source: Datacenter Hawk, Q4 2019

Available Space (SF)	Planned Space (SF)	Commissioned Space (SF)	Under Construction Space (SF)
348,670	15,991,000	8,106,008	631,000

Source: Datacenter Hawk, Q4 2019

Digital Realty recently expanded their renewable energy footprint after executing a solar power purchase agreement for their Northern Virginia data center operations. As part of the agreement, ENGIE North America will construct a solar array which will provide Digital Realty with 50 MW of solar energy. The project is anticipated for delivery in late 2020.

CyrusOne is underway with their next Northern Virginia data center campus, Sterling IX. The site will hold up to 90 MW of commissioned power and over 400,000 SF of commissioned space.

Microsoft is now moving forward with development on a 332-acre site in Leesburg they purchased in late 2018. The first building will be a 250,000 SF data center, with other data centers planned for future development. It is not uncommon to see cloud service providers executing a strategy involving both owning their own facilities, while also leasing smaller (1 - 4 MW requirements) and larger (20 MW + requirements) footprints from data center providers.

Amazon is responsible for a substantial portion of all data center development in Northern Virginia. The company has approximately 50 data centers in the region alone and recently moved forward with an additional development on a 90-acre site in Arcola.

Transactions

An international social media company highlighted the absorption in the 2nd half of 2019 by signing leases for totaling 14 MW of turnkey data center capacity with Digital Realty.

Amazon purchased a large office building and land site from Perspecta in Herndon in 4Q 2019. Of the site's total 57 acres, approximately 35 acres is unused and will support data center development immediately.

Outlook

The larger demand in Northern Virginia is expected by the middle of 2020, which leads most to believe 2020 will be equal to or stronger than 2019 for Northern Virginia. Several large government cloud contracts currently in the market will drive demand over the next few years. These contracts are large in scope and the infrastructure to support them will be large as well.
The scalability and connectivity offered by data center operators there allow international companies to grow efficiently as they set up their first US deployments. Look for this trend to continue in 2020. Pricing for large deployments in the Northern Virginia data center market is aggressive and will continue to be, as sophisticated users look for facilities to house their large deployments. It is also important to realize many of these larger deployments have efficient electrical and mechanical designs that allow for the pricing to be less when compared to different builds several years ago. It is expected that the pricing in Northern Virginia will remain aggressive in 2020, but will rebound once several of the larger facilities are leased.

Sources

Datacenter Hawk 2020, Data Center Frontier,
NKF Global Knowledge Center Research

Phoenix

The Phoenix market is clearly on the radar for cloud service providers looking to increase their footprint in a low cost Western US market. Because of the growth possibilities in Phoenix, 179.6 MW were added to Phoenix's planned power category in 2019. However, data center operators have approached adding additional capacity here in a reasonable manner and most preferred to wait for additional demand signals before breaking ground on planned facilities. Total absorption in 2019 was equal to 11.6 MW, a decrease of two-thirds (-187.9%) compared to 2018. Both Compass and Stream Data Centers are actively developing projects in Goodyear, approximately 20 miles to the West of downtown Phoenix. Microsoft purchased three sites in Goodyear in 2019 and is currently under construction with several buildings aimed at accommodating future growth. Goodyear is attractive because of the larger land parcels (which promotes campus growth over single building growth), lower land cost, and APS is the power provider. Overall Arizona has been more flexible in providing incentive packages for data center equipment purchases compared to other states, which has been one of the drivers for continued investment in this market.

Energy /Connectivity

Salt River Project (SRP) announced in November that they will build the biggest battery on the power grid in Arizona as part of its pledge last year to add 1,000 megawatts of solar to its supply by 2025. The big battery project is planned for the Little Rainbow Valley, south of Buckeye, and the battery system there will be many times larger than anything in Arizona today. SRP plans to reduce carbon emissions by more than 60% by 2035 and 90% by 2050, and moving toward more solar and batteries is a large part of how the company plans to accomplish that.

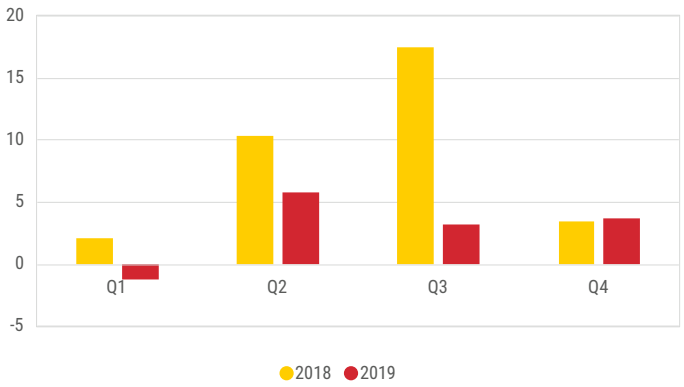
Laws, Regulation, and Incentives

Arizona is unique due to its flexible approach and less stringent qualifications compared to some of the other states. The capital investment requirements for a data center project to qualify for benefits range from $25 million and $50 million over five years. If this is met, an exemption on transaction privilege tax and use tax can be offered at the state, county and local levels for equipment purchases.

Development News

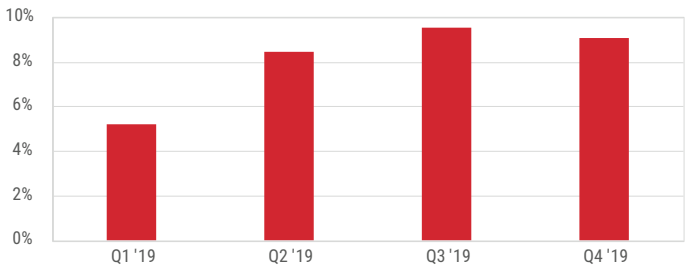
One of Phoenix's largest data centers, Iron Mountain's AZP-2, is now open. Iron Mountain held the grand opening for the first phase in August 2019 offering 4 MW of commissioned power available day-one. There is also room for another 46 MW of capacity for future development. The company intends to power the data center with renewable energy from multiple wind farms and other sources.

Phoenix: Absorption (in MW) - 2019 vs 2018



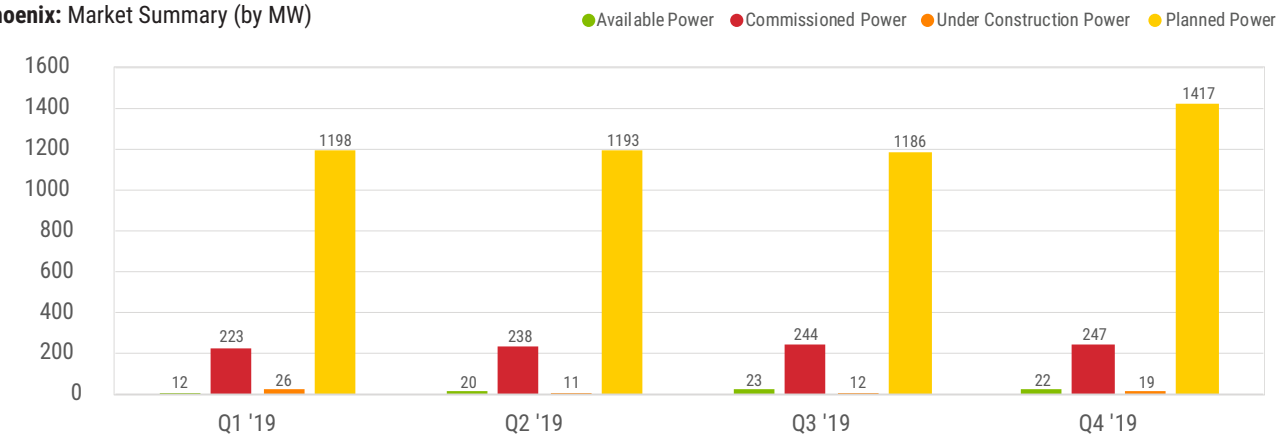
Source: Datacenter Hawk, Q4 2019

Phoenix: Market Vacancy (Available Power/ Commissioned Power)



Source: Datacenter Hawk, Q4 2019

Phoenix: Market Summary (by MW)



Source: Datacenter Hawk, Q4 2019

Available Space (SF)	Planned Space (SF)	Commissioned Space (SF)	Under Construction Space (SF)
107,300	7,715,500	1,727,983	140,000

Source: Datacenter Hawk, Q4 2019

Compass is currently underway with a large data center campus in Goodyear and the walls for the first building are now up. Compass plans to deliver over 90 MW on the 225-acre campus over the life of the project.

Stream Data Centers is now under construction on their 418,200 SF industrial building it purchased in 1Q 2019. The company is building out the first data hall with 4.5 MW of commissioned power with plans to deliver in 2Q 2020 (the building is set to hold 40.5 MW when fully delivered). The Goodyear site is powered by APS and sits on 157-acres that can accommodate future growth of over 200 MW and 25,000 SF when completed, more than tripling the data center's current footprint. H5 intends to deliver the Phase I later this year.

Transactions

Lincoln Rackhouse first came to the Phoenix market in 2Q 2018 after purchasing three data centers from Bank of America in Phoenix, Dallas, and Kansas City. The company sold the Phoenix asset in 3Q 2019 for nearly double their $39 million investment. Much of this value increase is the result of Lincoln Rackhouse fully leasing the facility to INAP with INAP being responsible for all data center operations.

INAP secured a long-term contract extension to an anchor tenant. Bank of America previously owned the facility and executed a sale-leaseback in 2Q 2018. INAP now provides the data center operations of the building and signed a lease with Bank of America through mid-2028. Bank of America will occupy at least 2 MW of capacity but has options to expand if needed.

RagingWire is moving forward with plans to construct their first campus in Phoenix. The company recently purchased a 102-acre site in Mesa where they plan to construct a seven-building, 1.5 million SF campus. The site is in proximity to sites owned by Digital Realty, CyrusOne, EdgeConneX, and EdgeCore.

Outlook

It is clear that large cloud service providers believe the Phoenix market is and will be a location for data center growth. Not only the multi-tenant data center absorption was observed from these users over the past several years in Phoenix, but also the hyperscalers recently buying land and building infrastructure to own and operate for themselves. As an example, Microsoft is underway with its first of three sites in the Goodyear area of Phoenix. Google is in a position to deliver a 750,000 SF data center campus in Mesa, AZ, and other large users are looking to as well. As a direct result of this, the data center operator community is buying land in close proximity to these sites in an effort to accommodate additional and future demand in these areas.

Sources

Datacenter Hawk 2020, AZ Commerce, AZ Central, NKF Global Knowledge Center Research

Seattle

Renowned for trade and financial services in the Northwest, Seattle is home to a growing data center market with as much as 455,000 SF planned. The market posted only 1.8 MW of absorption in 2019, decreasing from 4.1 MW in 2018. Seattle works towards adding supply to better compete with nearby Portland and Quincy markets and win back some of the user demand - wholesale and retail. Numerous cloud infrastructure investments from the likes of Microsoft and Amazon, together with high-performance connectivity options, relatively low power costs, and months of cool weather which can be used as free cooling, make Seattle an attractive location for data center operations.

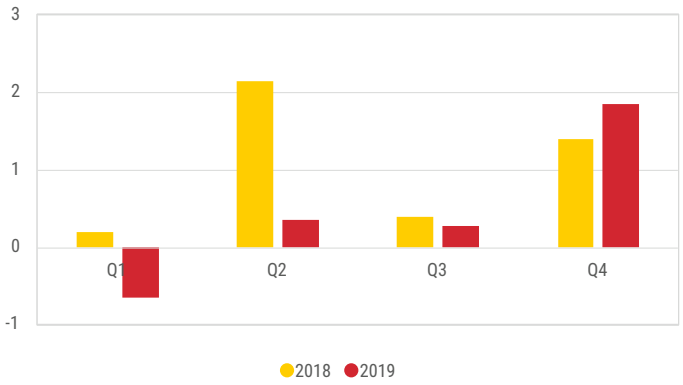
Energy /Connectivity

For customers planning a data center around green IT initiatives, Seattle City Light markets their electricity as "green," generated primarily from hydroelectric and other "renewable" sources such as wind and (inexplicably) solar. In Seattle's suburbs, investor-owned Puget Sound Energy (PSE) is the provider with rates similar to Seattle's. Typical rates paid for electricity serving industrial buildings in Seattle are between two to three times less than in the Northern California market.

Law, Regulations, and Incentives

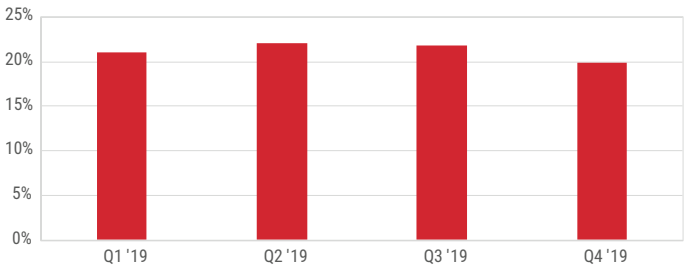
Washington State's incentives are only available for data centers built in rural counties with low population densities. To qualify, a data center would have to be built a minimum of 60 miles away from the Seattle market.

Seattle: Absorption (in MW) - 2019 vs 2018



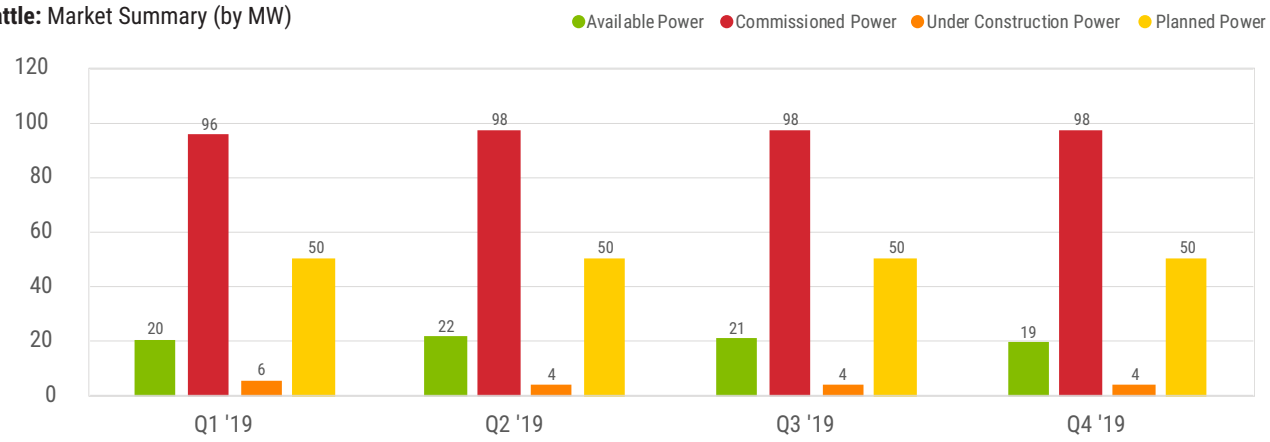
Source: Datacenter Hawk, Q4 2019

Seattle: Market Vacancy (Available Power/ Commissioned Power)



Source: Datacenter Hawk, Q4 2019

Seattle: Market Summary (by MW)



Source: Datacenter Hawk, Q4 2019

Available Space (SF)	Planned Space (SF)	Commissioned Space (SF)	Under Construction Space (SF)
151,380	455,000	953,652	30,000

Source: Datacenter Hawk, Q4 2019

Development News

Direct access from the Seattle Internet Exchange (SIX) is now available in H5's Seattle data center. Internet exchange nodes are becoming increasingly valuable in the current data center industry. As data center users are becoming more mature and connectivity is a high priority on their colocation checklist, direct access to an internet exchange is increasingly valuable.

Transactions

After their 2Q 2019 purchase of ByteGrid's data centers, Lincoln Rackhouse has now leased the Seattle data facility to Digital Fortress. Lincoln Rackhouse will own the facility but Digital Fortress will manage data center operations. Acquiring Digital Fortress as an anchor tenant immediately adds value to the asset and provides a consistent revenue stream. The Seattle data center is a 47,000 SF facility with 5.4 MW and 16,000 SF of commissioned power and space. It also connects to the Westin Exchange, one of the most dense carrier hotels on the west coast.

Outlook

Although Seattle is the largest data center market in the Pacific Northwest, much of the recent demand in the area is going to other cities like Portland and Quincy. Recent activity by providers in Seattle could change that however. Existing providers like Sabey and Colocation Northwest, along with new providers like H5, Lincoln Rackhouse, and ScaleMatrix, are adding large portions of capacity able to capture both wholesale and retail demand.

Sources

Datacenter Hawk 2020, Data Center Frontier,
NKF Global Knowledge Center Research

What to Expect in 2020

Going into 2020 there are many new trends that will affect data center growth across the United States. Surging data volume or tonnage, environmental challenges, and new technology are some of the factors that will have a deep impact on the industry.

All indications point to an unprecedented growth in data generation in 2020. It is expected that in the next 2-3 years 70 percent of data will be generated outside the cloud or the data center environments compared to 40 percent today. That would mean that as the size of datasets increases and Machine to Machine (M2M) data transfers increase exponentially, new ways will be needed to concentrate and distribute this data. This will increase the need for distributed computing and storage, leading to growth in data center business. We may also see enterprise applications move closer to the data sources rather than transporting resources to central locations. Artificial Intelligence and machine learning for custom solutions will become a strategic requirement in 2020. This can explain why hyperscale companies are deploying their own fiber and subsea cables, and SDN-powered cloud connectivity is increasingly attractive. More of the same in 2020.

As cloud customers are becoming increasingly focused on clean and green renewable energy, satisfying the increasing demand for cloud becomes tougher. Therefore, accommodation and cooperation may be the only way for colocation providers as observed in markets like New York. Similarly to New York, in 2020 Dallas/Fort Worth is likely to experience growing interest from enterprise users and cloud service providers already evaluating this market. Chicago seems to be a stand out market in the area of 5G with its preliminary launch. When successfully commercialized, it is likely to affect all parts of the network including the data centers. An increase in the size of data transmissions due to self-driving cars, smart buildings and increase in IoT connected devices may lead to larger data centers in the near future.

Raging fires in California prompted the power company PG&E to apply blackouts. The losses and law suits that followed led to PG&E filing for bankruptcy. Forest fires, torrential rains, floods, and high winds resulting from climate change have made transporting electricity through cables a risky business. Onsite generation of power could become a popular solution to tide over extreme events to avoid disruption. Demand for renewable energy sources is likely to reach all-time highs in 2020. Data center districts with clusters or corridors of data centers may justify local production of electricity.

Demand-driving reliance on cloud resources from large companies is going to impact absorption figures in 2020 as compared to 2019 which might have seemed worse off as compared to a record breaking 2018. With a variety of options, we are likely to see higher absorption, especially in second-tier markets. In 2020 we are also likely to observe growth of off-premises data centers. The above trends would lead to a decline in installed capacity and utilized racks across the enterprise while cloud based solutions and service providers will expand their footprint by double digit percent growth.

Source:
451 Research 2020
Data Center Frontier
NKF Global Knowledge Center

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