United States | H1 2020

Research

Data Center Outlook

Outperforming other sectors amid the pandemic

Executive summary

- According to Nareit, data center REITs outperformed other sectors amid the pandemic in total returns, due to immediate demand for e-commerce and virtual connectivity. While they have challenges with manned operations and increased demand, we project data center REITs will continue to outperform other sectors throughout the year.
- Operators with diverse tenancy have been largely unscathed from direct COVID-19 impacts. Other operators, such as QTS and CyrusOne, have set record revenue backlogs, which will feed growth throughout the year and heading into 2021.
- Public cloud services accelerated demand in the first half of 2020. Eight of the 14 markets in the United States recorded an increase in net absorption. Last year, select major domestic markets absorbed 171.2 MW in H1 2019, compared to 288.2 MW in H1 2020.
- Global expansions drove strong M&A activity to start the year, with Digital Realty's record-setting $8.4 billion deal with Interxion, representing just over half of all deal value in the first four months of the year. Operators will continue to track down larger returns in EMEA markets, notably Frankfurt, London, Amsterdam and Paris, where barriers to entry are high.

David Barnett,
Manager, Americas Research

Contents

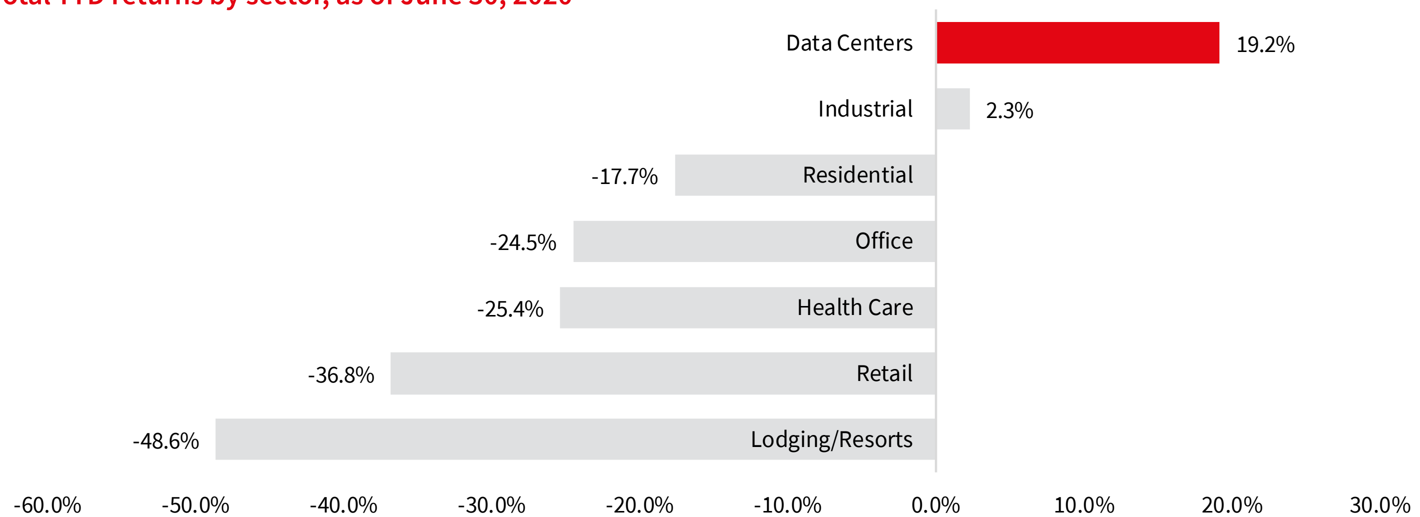
1.

Data center REITs show resilience amid COVID-19

COVID-19's impact on public safety and stay-home orders led to significant immediate demand for digital connectivity, e-commerce and consumer usage, including Microsoft Teams, Zoom, WebEx and more. In addition to increased adoption of videoconferencing and keeping employees connected, streaming services usage accelerated, keeping millions of people entertained inside the home. All this data activity relies on data centers with reliable infrastructure and redundancy.

While data centers' resiliency, reliability and manned operations have been tested during the pandemic, it is one of the few sectors that performed strongly in H1 2020. In fact, data center REITs recorded the highest YTD returns in the FTSE Nareit US Real Estate Index Series in the first half of 2020, ahead of office, industrial, retail, hospitality and healthcare. Three out of five data center REITs (CyrusOne, QTS, Digital Realty, Equinix, CoreSite) recorded at least 40 percent returns over the past year.

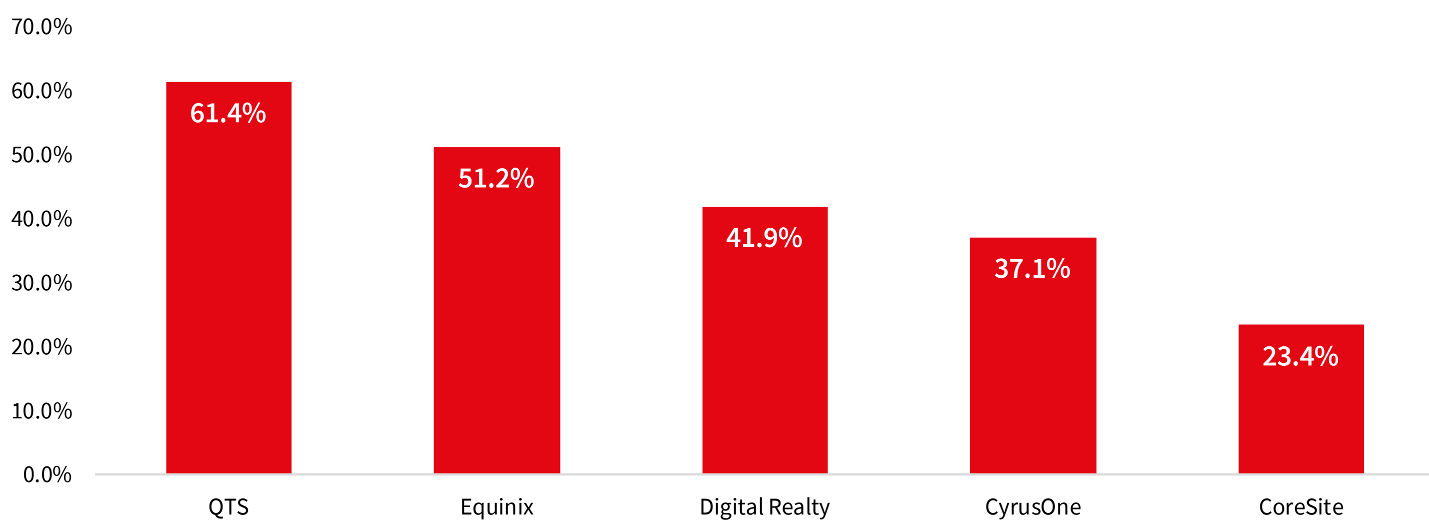
Total YTD returns by sector, as of June 30, 2020



Sources: JLL Research, Nareit, FTSE

*Nareit defines returns as a "stock's dividend income plus capital appreciation, before taxes and commissions."

One-year total return, as of August 3, 2020



2.

COVID-19 impact and outlook for operators and users

Operators' revenue backlogs will fuel growth toward year-end and early 2021

The pandemic prompted urgent demand for operators in the first half of 2020. Despite an immediate need for capacity, especially for cloud services, users and operators paused and delayed deals.

These delays created a robust backlog heading into year-end and early 2021. While tenants from retail, energy and hospitality requested extended payment terms in the wake of COVID-19, they represent only a fraction of revenue for operators who have a diverse tenant mix. The industry will continue to see significant competition among operators moving forward, accelerated by the pandemic, which will bolster user-friendly conditions.

The latest earnings and REIT performance underscore the spotlight the pandemic has shone on the industry. CyrusOne's revenue is up 2.0 percent year-over-year as of Q2, due to strong leasing activity across its U.S. and European markets. According to CyrusOne's latest earnings, the company recorded the largest backlog at quarter-end in its entire history at $97 million. This figure will ensure steady growth moving into 2021.

Like CyrusOne, QTS also set a record in its backlog. In Q2, its annualized booked-not-billed monthly recurring revenue ("MRR") balance reached $111.2 million, up from $100.9 million in Q1. Its leasing activity in the first half of 2020, primarily driven by federal and hybrid colocation demand induced by the pandemic, helped bring in $131.6 million in revenue. This is a 10.5 percent increase year-over-year. QTS has had little exposure to volatility in certain industries, such as retail, hospitality and energy, as those tenants accounted for just 5 percent of its revenue in Q1.

The pandemic and the surge in demand ushered in challenges for operators, related to manning onsite operations and ensuring reliability. Moving forward, operators will focus on scaling portfolios and mergers and acquisitions to get ahead on cost and attract large users in domestic and foreign markets.

The pandemic nudges users toward the public cloud

While companies migrated to the public cloud before the pandemic, this trend accelerated in the first half of the year due to the just-in-time nature of the cloud. When companies house and manage their own data, these are considered private clouds. In-house services grant companies control over security and ongoing maintenance. Public clouds take over the management and maintenance components of data hosting and provide a flexible and scalable option for users. The pandemic also forced users to revisit cost-optimization strategies. Changing IT infrastructure presents an additional option for companies and users to lower capital costs, such as selling aging equipment. All these factors impact IT spend.

In January, Gartner projected that global IT spend would increase by 3.4 percent in 2020, but COVID-19's disruption changed this outlook. Gartner now projects a decline of 8 percent for the year. While we expect a drop in overall IT spend as companies weather the current economic conditions, pockets of growth exist. The pandemic spurred a strong shift to the public cloud, and Gartner projects a 19 percent increase in revenue for public cloud services in 2020. In Q2, the top public cloud providers continued to see strong revenue growth, albeit a bit slower than seen in 2019, due to some exposure to clients impacted by the pandemic. Remote work is the most significant demand driver in this projection. Amid the pandemic and stay-home policies, companies have little choice but to adopt videoconferencing, messaging and phone services.

A myriad of factors, including the recent surge in demand during the pandemic, increased operator competition, and rent stabilization created user-friendly market conditions in most U.S. markets. Expect users to renegotiate lease terms and renewals while vacancy and supply remain abundant throughout the year.

3.

Global expansions drive M&A activity

The confluence of rent compression and increased competition in the United States has pushed operators to expand in international markets to improve returns. Rents in 2018 and 2019 were stable, with only a few U.S. markets posting increases, as covered in our 2019 Year-End Data Center Outlook. This trend held up in the first half of 2020.

Global expansions drove robust M&A activity year-to-date. In fact, M&A activity hit 2019 levels in just four months in 2020, with 28 deals valued near $15 billion, according to Synergy Research Group. Operators will continue to expand services and increase capacity in Western Europe, South America and Asia. Digital Realty's merger with Interxion, valued at $8.4 billion, drove the significant increase in M&A activity. While this activity is a drastic change from 2019, delays and a wait-and-see approach on due diligence due to travel restrictions will slow deal completions by year-end.

Investment activity robust in EMEA, despite the pandemic

Operators are pursuing greater returns and locating where hyperscale and enterprise users are expanding, which is Western Europe. Vantage Data Centers announced in February that it would be investing $2 billion in five markets across Europe, including its acquisition of Etix Everywhere.

Citing energy consumption and density concerns, Amsterdam placed a ban on any new data center developments in 2019. That ban has now been lifted, which will attract investors and operators once more.

In May, Denmark's largest pension fund, PFA, purchased a 20 percent stake of Data4 from AXA Investment Managers for £176.5 million. Data4 currently operates 16 data centers with 204 MW of available power primarily located in Paris, Milan, Madrid and Luxembourg. AXA IM had taken full ownership of Data4 back in 2018. In 2017, PFA doubled its exposure to alternative investments, and, as of 2019, 20 percent of its overall portfolio was in alternative markets. May also saw the announcement of KKR's new fund of $1.0 billion to build data centers throughout Europe.

Activity brewing in APAC

Digital Realty opened its first location in South Korea in June and announced plans in July to deliver its second location in Hong Kong by midyear 2021. While the REIT has operated in other markets in the region, such as Sydney, Melbourne and Singapore, the Hong Kong market is rated number one on the Cloud Readiness Index provided by the Asia Cloud Computing Association (ACCA), which examines the regulatory environment, data privacy and security, IP protection and other variables.

In April of this year, Macquarie Infrastructure and Real Assets completed its acquisition of AirTrunk, which has data centers in Sydney, Melbourne and Singapore.

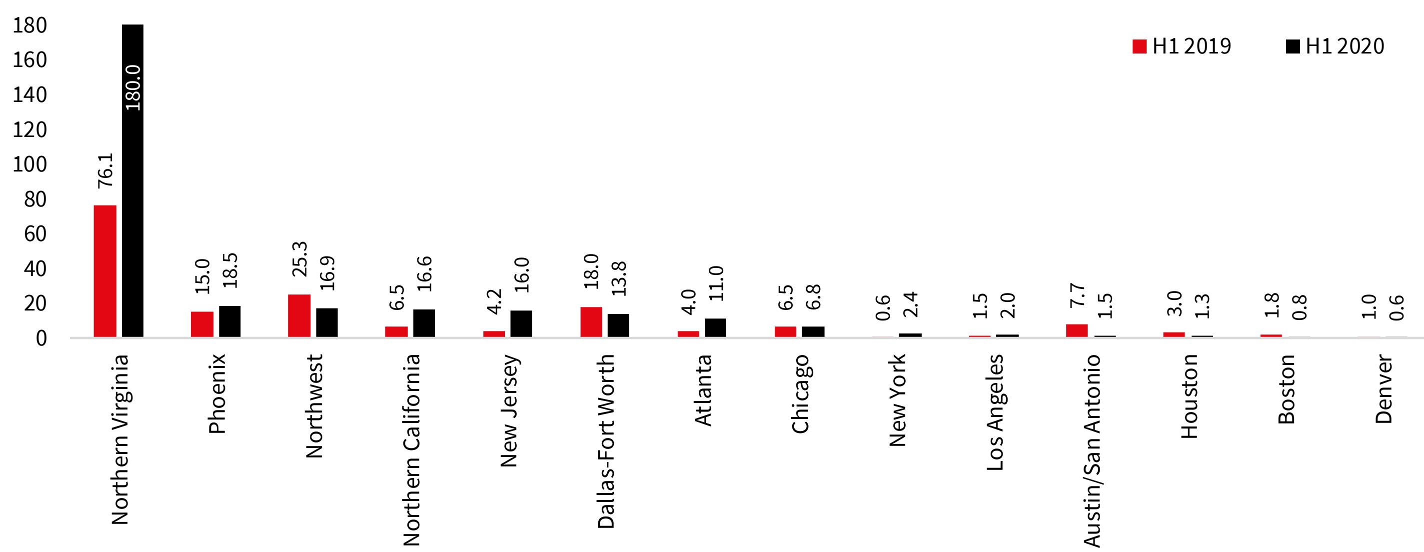
State of the industry

Domestic demand stays strong in H1 2020

Demand remains robust in the first half of 2020, with eight out of the 14 markets in the United States showing a year-over-year increase. Last year, these same domestic markets absorbed 171.2 MW, compared to 288.2 MW in H1 2020. Our coverage changed this half to include Salt Lake City and exclude Las Vegas/Reno. Total absorption reached 295.2 MW in the United States, including Salt Lake City's 7.0 MW figure.

Northern Virginia leads the way in demand, as absorption increased from 76.1 MW in H1 2019 to 180.0 MW in H1 2020. New Jersey and Northern California increased absorption by 11.8 MW and 10.2 MW, respectively, year-over-year.

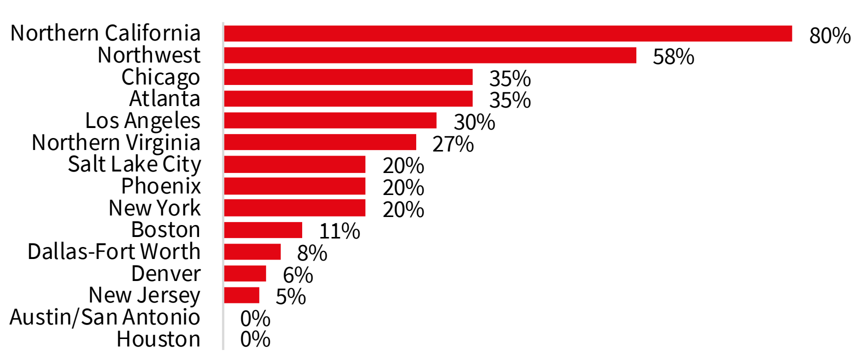
Absorption (MW) by market, year-over-year



Cloud still the key driver for demand

The cloud remains the primary demand driver in the top markets across the United States. Northern California remains the most consistent in its cloud share of demand, at 80 percent. The local market continues to see hyperscale cloud expansions and build-to-suit projects. West Coast–based technology companies account for the large share of cloud demand in the Northwest, with most speculative supply focused in Hillsboro, Oregon.

Cloud as a percentage of demand, H1 2020

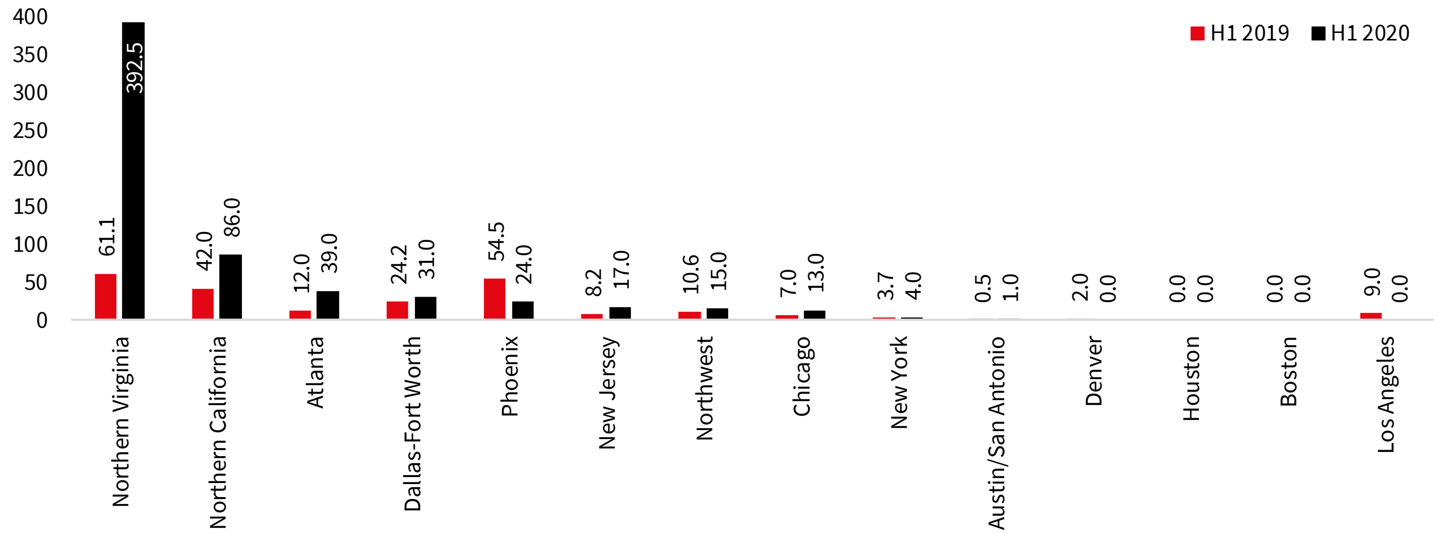


State of the industry

Northern Virginia drives record construction

The construction pipeline is one of the largest on record, totaling 622.5 MW, largely due to Northern Virginia's vast activity. This supply will feed the growing size and number of hyperscalers in the market. Northern California and Atlanta also added to their robust pipelines, increasing by 44.0 MW and 27.0 MW year-over-year, respectively. Vacancy remains in the mid-single digits in Northern California, creating ripe conditions for expansions and build-to-suit activity. Switch, QTS and others are driving new supply and expansions in the Atlanta market to meet technology and cloud user demand.

Under construction (MW) by market, year-over-year



Definitions:

Inventory of multitenant data center square footage and power that's either leased (absorption), shell space planned for future development (planned), turnkey/conditioned available today (vacant) or currently being developed into turnkey/conditioned (under construction) all under roof.

Planned rrepresents development that has been announced, in process of entitlements and design.

Total vacant space represents turnkey/fully conditioned data center space available for lease.

Under construction represents data center space that has broken ground and has entitlements.

Absorption (Net) represents the amount of new multitenant data center square footage and power leased less the total amount of square footage and power no longer occupied between the current and last measurement periods.

Hyperscale data centers represent data centers with the ability to scale out from hundreds to thousands of servers owned and operated by one entity.

Multitenant data centers comprise facilities where an owner sells space and power to multiple tenants.

Local markets

Atlanta

Increasing supply and demand elevates the Atlanta colocation market

Market overview

Supply

Colocation operators are bullish on the Atlanta market and continue with plans to deliver more product. Switch ramps up plans to build out next phase of its campus; QTS is on track to deliver Phase I of its mega-campus later this year; T5 graded its first site for a 13 MW build; and STACK announced plans for a 12 MW expansion.

Demand

The demand in the Atlanta market remains steady. New product deliveries have been especially attractive to corporate users. Hyperscalers and high-tech users continue to make commitments in the marketplace.

Market trends

The recent entry of new operators and major campus expansions continue to elevate the Atlanta colocation market with other major data center markets. Users have more colocation, cloud and connectivity options than ever before.

Outlook

*for **Users***

- Take advantage of new, enhanced redundant product
- Operators willing to negotiate for sizable kW deals
- Tech sector leveraging skilled labor pool

*for **Providers***

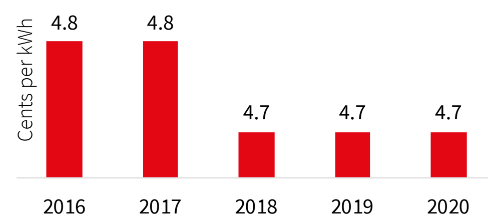
- Revised economic incentives have helped lure colocation operators
- Operators are being competitive to retain tenants
- Investing in connectivity strategies to fulfill client needs

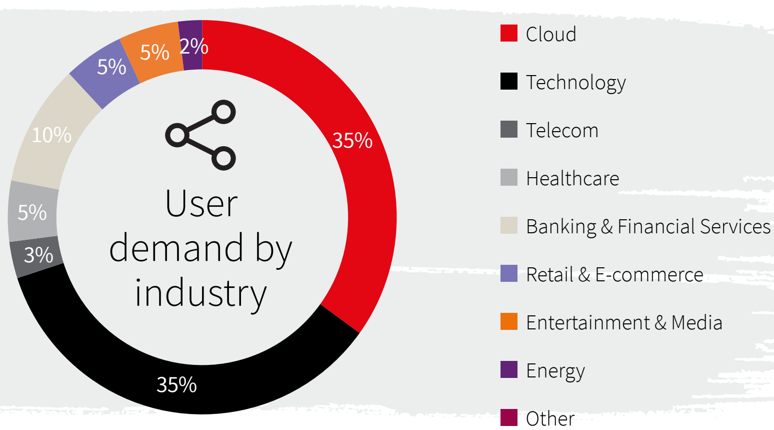
Supply	s.f.	MW
Total inventory:	2,067,225	246.0
Total vacant:	224,900	32.0
Under construction:	348,000	39.0
Planned:	953,000	150.0

Demand	MW
Net absorption:	11.0

Rental rates	Low	High
(All-in) sub-250 kW	$185	$300
250 kW-1 MW	$95	$150
1-5 MW	-	-
5 MW plus	-	-

Average power rate (cents/kWh)





Data Center leverage

H2 2018	H1 2019	H2 2019	H1 2020	H2 2020

User-favorable market
Neutral market
Provider-favorable market

Authored by: Mike Dolan | Ryan Fetz | Leigh Martin | Wendy McArthur

See page 24 of this document for contact information.

Austin & San Antonio

Large anchor tenants drive new supply

Market overview

Supply

Supply in both Austin and San Antonio remains tight as providers have held off constructing new supply. Several providers have very little capacity available, as large requirements over the last 18 months have absorbed much of the available supply in 2019. Power concerns for some providers in the Austin market have hindered some providers from adding to inventory.

Demand

A balance of technology companies and enterprise users drove demand in the first half of 2020. Activity from large cloud providers and other hyperscale users has slowed, although several have included these markets as possible targets for future requirements.

Market trends

Providers have not stepped up construction to increase supply, so the market has limited options on the supply side. Demand has decreased in the first half of 2020 as the cloud providers, who contributed the majority of absorption in 2019, have sat on the sidelines so far in 2020. Pricing has remained steady due to lack of options and new construction.

Outlook

*for **Users***

- Lack of turnkey space requires longer-term capacity planning
- Rental rates have remained steady but could see an increase
- Growth in Austin and San Antonio will deliver increased demand

*for **Providers***

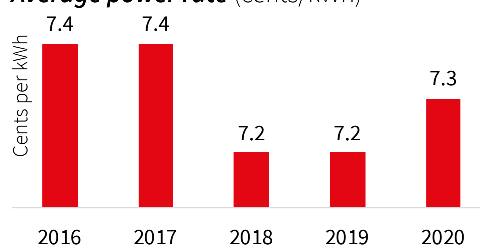
- Lack of turnkey space would suggest an opportunity for a provider to build on spec
- Upfront utility planning is key to timely delivery of new supply
- Scalable space is critical to meeting current and future hyperscale demand

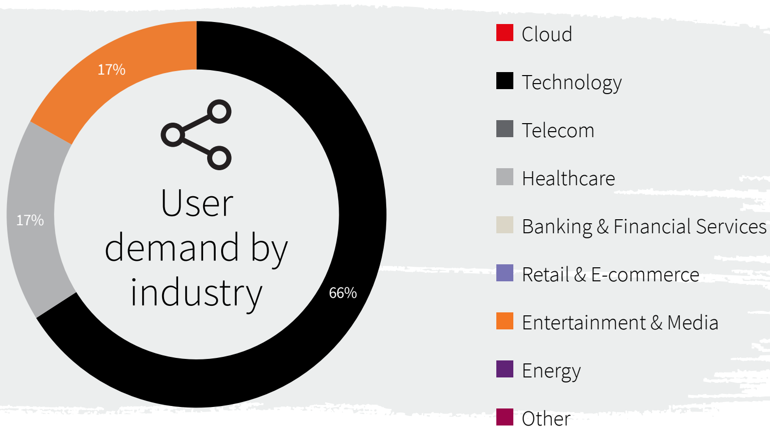
Supply	s.f.	MW
Total inventory:	775,883	142.2
Total vacant:	42,765	5.1
Under construction:	8,000	1.0
Planned:	117,146	15.0

Demand	MW
Net absorption:	1.5

Rental rates	Low	High
(All-in) sub-250 kW	$220	$290
250 kW-1 MW	$85	$120
1-5 MW	$85	$105
5 MW plus	-	-

Average power rate (cents/kWh)





Data Center leverage

H2 2018	H1 2019	H2 2019	H1 2020	H2 2020

User-favorable market
Neutral market
Provider-favorable market

Authored by: Curt Holcomb

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Boston

Anemic growth as Equinix and Tierpoint continue to downsize

Market overview

Supply

Market supply remains healthy, with next-generation vacancy at 70 Innerbelt Road (CoreSite), One Summer (Markley), Digital Realty in Needham, Cyxtera in Waltham, and Tierpoint in Marlboro.

Demand

Demand has slowed markedly since last year, when much of the demand was driven by the turn-down of TierPoint in Charlestown and Equinix in Waltham, which are now virtually complete.

Market trends

Growth has been slow across tech, energy and even pharmaceutical firms, mainly due to reduced financing and working to extend existing capacity and equipment.

Outlook

for ***Users***

- Prices are reaching a bottom point
- Next generation product offers better energy efficiency and lower cost
- There continues to be attractive out-of-market options

for ***Providers***

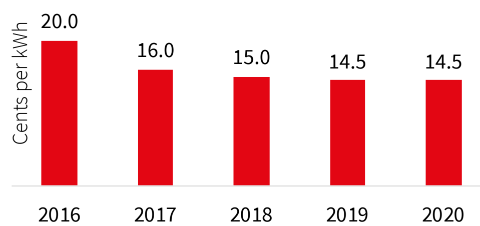
- Prices will stabilize
- Next-generation space will be more attractive to customers
- Need to renew efforts to reduce electricity cost and taxes

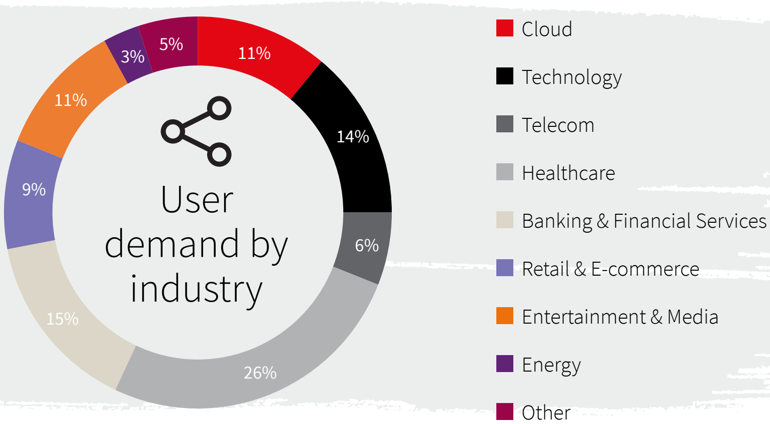
Supply	s.f.	MW
Total inventory:	1,200,000	160.0
Total vacant:	255,000	30.0
Under construction:	0.0	0.0
Planned:	60,000	10.0

Demand	MW
Net absorption:	0.8

Rental rates	Low	High
($/kW+E) sub-250 kW	$115	$170
250 kW-1 MW	$110	$145
1-5 MW	$95	$130
5 MW plus	$85	$115

Average power rate (cents/kWh)





Data Center leverage

H2 2018	H1 2019	H2 2019	H1 2020	H2 2020

User-favorable market
Neutral market
Provider-favorable market

Authored by: Gabe Cole

See page 24 of this document for contact information.

Chicago

The calm before the storm, demand expected to pick up in the second half of 2020

Market overview

Supply

Available supply decreased in the first half of 2020. However, new capacity was added by CoreSite (4 MW). There are also several expansion projects and new developments that will deliver in the second half, including RagingWire (4 MW), Stack Infrastructure (3 MW), Stream Data Centers (3 MW) and Digital Crossroads (3 MW).

Demand

Chicago saw a large increase in demand from cloud companies. One large cloud provider purchased 90 AC across two sites for large greenfield developments and a 38 MW-powered shell lease. A social media platform purchased 500 AC in Dekalb for a new development. Colocation demand remained relatively modest, with several requirements being delayed due to COVID-19 adjustments.

Market trends

Absorption kicked off the year slowly and was capped off with a few large colocation requirements. However, the second half of 2020 is anticipated to be much better as COVID-19 delays start to alleviate. Certain providers will become limited on capacity in the next 12 months as major leases get done.

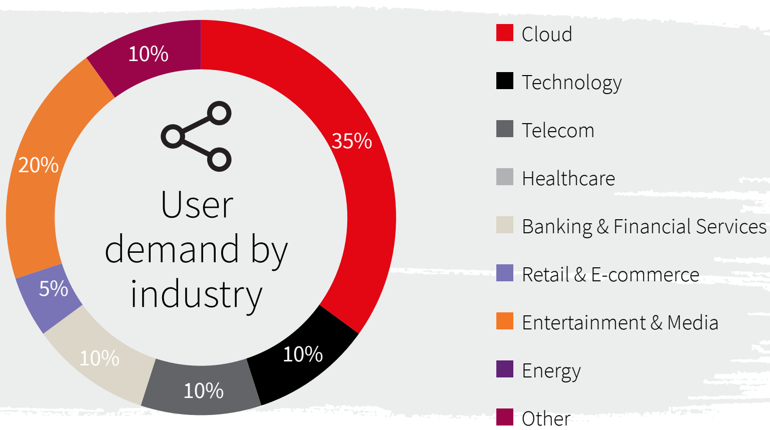
Outlook

for ***Users***

- Price stabilization in colocation rates
- Capacity may become limited with key providers over the next 12 months
- Tax incentives make Chicago one of the cheapest markets in the U.S.

for ***Providers***

- Extremely limited land acquisition opportunities in key submarkets
- Price stabilization in colocation rates
- Some providers will be limited in capacity over the next 12 months

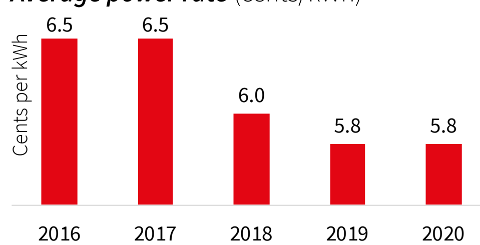


Supply	s.f.	MW
Total inventory:	4,699,000	563.0
Total vacant:	268,000	34.3
Under construction:	350,000	13.0
Planned:	580,000	27.5

Demand	MW
Net absorption:	6.8

Rental rates	Low	High
($/kW+E) sub-250 kW	$115	$150
250 kW-1 MW	$110	$120
1-5 MW	$95	$110
5 MW plus	$75	$95

Average power rate (cents/kWh)



Data Center leverage

H2 2018	***H1 2019***	***H2 2019***	***H1 2020***	***H2 2020***

User-favorable market
Neutral market
Provider-favorable market

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See page 24 of this document for contact information.

Dallas/Fort Worth

Steady demand as users take advantage of lower pricing

Market overview

Supply

Supply in Dallas/Fort Worth ("DFW") continues to increase, but at a much slower pace than in recent years. Providers completing construction on new builds in Q1–Q2 include Stream in Garland and Equinix, which delivered Phase I (140,000 s.f. and 18 MWs) of a new, four-story 42 MW build at INFOMART.

Demand

DFW demand has always been dominated by enterprise users, and the first half of the year was not different than prior years. Several technology companies completed transactions. However, the DFW market has not seen the large hyperscale deals that dominate demand in other markets.

Market trends

Pricing in DFW continues to drop, as several operators have lowered their asking rents significantly in the last year. Ample supply and lower pricing will attract more enterprise users to evaluate the DFW market. Lower growth in supply may help stabilize rates at existing levels.

Outlook

*for **Users***

- Renegotiations and renewals will provide increased value to users
- Users locking in lower rates and more flexible terms
- Extremely competitive rates for new, credit-worthy logos

*for **Providers***

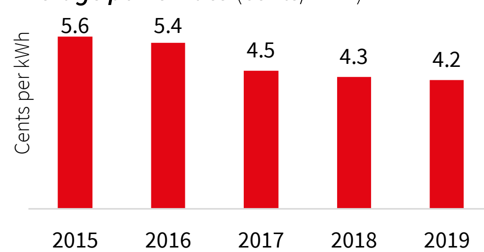
- Organic growth from existing customers feeling expansion
- Users are valuing higher-density infrastructure
- Cloud access and services are key differentiators

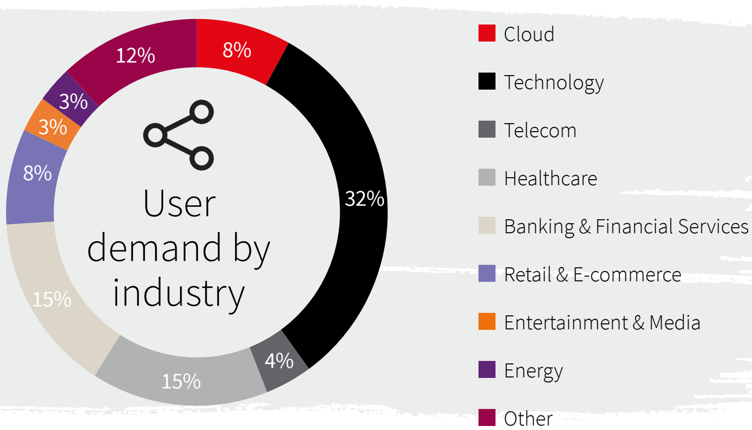
Supply	s.f.	MW
Total inventory:	3,919,650	580.5
Total vacant:	640,621	82.9
Under construction:	156,200	31.0
Planned:	1,354,030	230.0

Demand	MW
Net absorption:	13.8

Rental rates	Low	High
(All-in) sub-250 kW	$170	$250
250 kW-1 MW	$80	$110
1-5 MW	$75	$95
5 MW plus	-	-

Average power rate (cents/kWh)





Data Center leverage

H2 2018	H1 2019	H2 2019	H1 2020	H2 2020

User-favorable market
Neutral market
Provider-favorable market

Authored by: Curt Holcomb

See page 24 of this document for contact information.

Denver

Denver maintains steady growth through retail colocation requirements

Market overview

Supply

Supply in Denver has been consistent over the years. H5 Data Centers continues to have growth capabilities, with as little as 1 MW readily available and up to 10 MW with further expansion. Other companies, such as Flexential, Iron Mountain and Cyxtera, have a few MW of available space as well.

Demand

Smaller retail colocation still remains the main source of demand and absorption for Denver. Although many deals have recently been put on hold due to the pandemic, there are still conversations taking place with Fortune 500 companies to acquire space within the market. Denver shows great promise for continued growth by tech and finance institutions.

Market trends

Although activity has slowed down due to the pandemic, the market still seems to be trending in a positive direction for both retail colocation and disastery recovery for Fortune 500 companies. As Denver continues to invest more into its renewable energy resources and finds ways to reduce TCO, it'll be a valuable market for all types of colocation requirements.

Outlook

*for **Users***

- Continue cloud strategy pressures from the C-suite
- Flexibility going forward will be of even higher importance

*for **Providers***

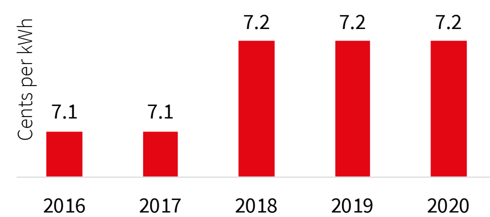
- Be able to deliver contiguous space to end users
- Continue to emphasize pandemic protocols within the facilities
- Compliance still of high importance for end users

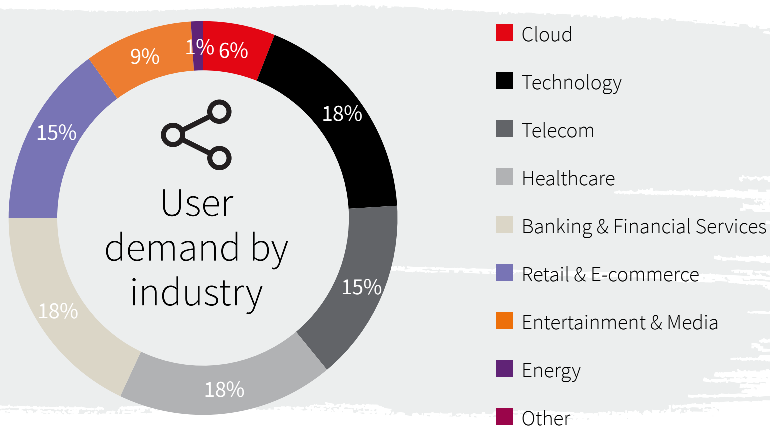
Supply	s.f.	MW
Total inventory:	902,180	101.6
Total vacant:	274,804	22.6
Under construction:	0.0	0.0
Planned:	176,301	32.8

Demand	MW
Net absorption:	0.6

Rental rates	Low	High
(All-in) sub-250 kW	$200	$300
250 kW-1 MW	$105	$125
1-5 MW	-	-
5 MW plus	-	-

Average power rate (cents/kWh)





Data Center leverage

H2 2018	H1 2019	H2 2019	H1 2020	H2 2020

User-favorable market
Neutral market
Provider-favorable market

Authored by: Mark Bauer | Kevin Bauer

See page 24 of this document for contact information.

Houston

Lack of demand keeps supply stagnant

Market overview

Supply

Supply modestly increased as providers have stayed on the sideline with no new supply on the horizon. Providers are hesitant to start new construction until vacancy is reduced and demand dictates an increase in supply. Several providers have the ability to construct new supply on existing campuses but have declined to build speculatively so far in 2020.

Demand

Demand is tepid at best as the region has experienced the oil bust and COVID-19 simultaneously. The energy industry historically has driven data center demand in Houston and that has not changed. Once the energy industry comes out of its current slump, the forecast for the Houston market will improve. Demand will likely improve but modestly through 2020.

Market trends

Supply is not the issue in Houston. Lack of demand is currently driving the market as providers have lowered pricing in an attempt to compete for the users. Providers with the ability to quickly add to supply may benefit as the market recovers.

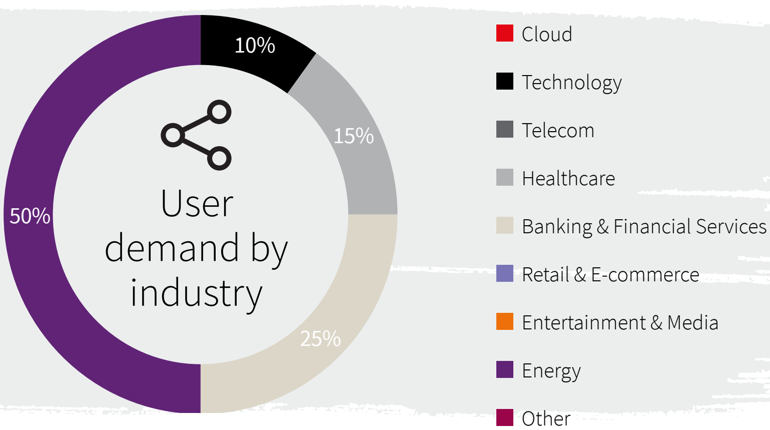
Outlook

for ***Users***

- Lack of new supply will soften price compression
- Quality space available at competitive pricing
- Users leveraging market to renegotiate terms

for ***Providers***

- Providers connecting Houston facilities with their other markets
- Access to cloud providers and services key
- Providers focusing on retaining tenants

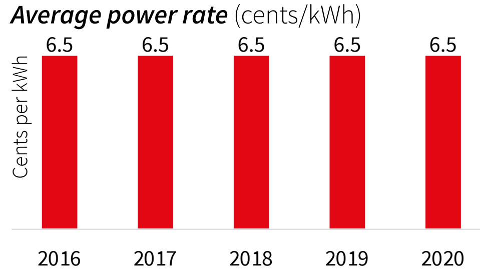


Supply	s.f.	MW
Total inventory:	1,125,411	140.2
Total vacant:	201,789	19.8
Under construction:	0.0	0.0
Planned:	582,413	87.2

Demand	MW
Net absorption:	1.3

Rental rates	Low	High
(All-in) sub-250 kW	$170	$250
250 kW-1 MW	$80	$110
1-5 MW	$75	$95
5 MW plus	-	-

Average power rate (cents/kWh)



Data Center leverage

H2 2018	***H1 2019***	***H2 2019***	***H1 2020***	***H2 2020***

User-favorable market
Neutral market
Provider-favorable market

Authored by: Curt Holcomb

See page 24 of this document for contact information.

Los Angeles

Los Angeles market activity slowed as other markets attract attention

Market overview

Supply

The large transactions that occurred at the end of 2019 did not continue the momentum into 2020. However, several large transactions are rumored to gain traction in late 2020.

Demand

The majority of transactions in the broader data center market have followed the same trend for Los Angeles, which are sub-50 kW deployments.

Market trends

The reliance on more, faster and reliable content and connectivity will spur demand from large providers to increase their presence. The work-from-home model will not dwindle and the market will have to react to the increased demand user.

Outlook

*for **Users***

- New inventory hitting market in Q3
- Continued rate compression and consolidation among colocation providers
- More options in the market to further reduce rates

*for **Providers***

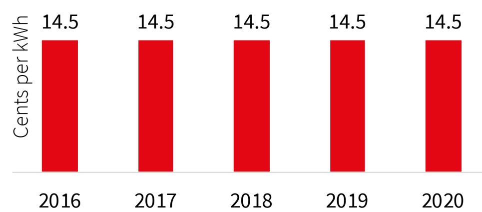
- Providers need to upgrade infrastructure
- Expect more-efficient environments to combat high energy rates
- Higher return from investments in critical infrastructure from higher-level clients

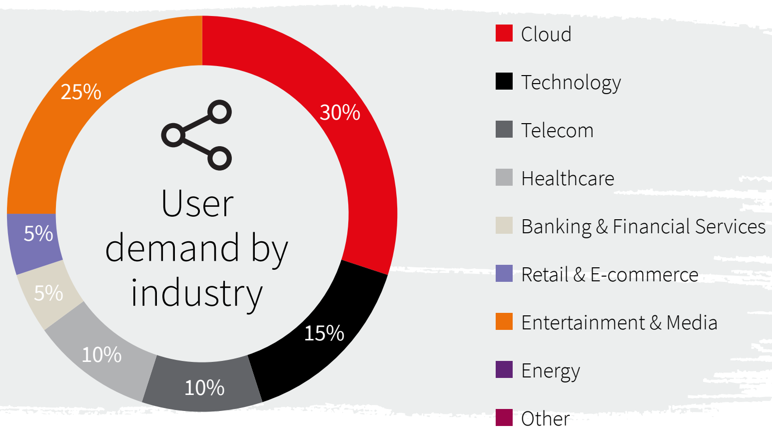
Supply	s.f.	MW
Total inventory:	2,300,000	210.0
Total vacant:	320,000	12.0
Under construction:	160,000	9.0
Planned:	0.0	0.0

Demand	MW
Net absorption:	2.0

Rental rates	Low	High
($/kW+E) sub-250 kW	$125	$135
250 kW-1 MW	$115	$125
1-5 MW	$105	$120
5 MW plus	$90	$110

Average power rate (cents/kWh)





Data Center leverage

H2 2018	H1 2019	H2 2019	H1 2020	H2 2020

User-favorable market
Neutral market
Provider-favorable market

Authored by: Darren Eades

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New Jersey

The New Jersey market continues to attract financial services tenants with over 16 MW in H1 2020

Market overview

Supply

Digital Realty started construction on its first data center on the Totowa campus with an 8 MW committment with a financial services client. CyrusOne also landed a 5 MW committment from a financial services client with plans to build out 10 MW. Coresite added 4 MW in Q1.

Demand

Financial services continue to migrate from owned assets to colocations as transactions from 500 kW-5 to MW are still surfacing in this market.

Market trends

New build-to-suit greenfield opportunities are emerging in Northern NJ as developers continue to repurpose industrial properties. Data center monetization opportunities continue to surface as tenants want to capitalize on assets and build a long-term IT hybrid cloud strategy.

Outlook

for ***Users***

- Competitive market that will offer flexible terms to expand and contract
- Operators are investing in virtual tours and deployment planning
- Improved utilization and portal capabilities for improved service and reporting

for ***Providers***

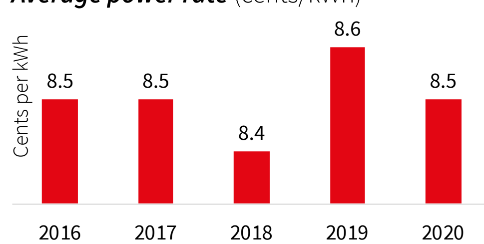
- New inventory is slated for Q1 2021 to support demand
- New greenfield developments in Northern NJ are emerging
- Sale lease-backs and subleases emerging in older facilities

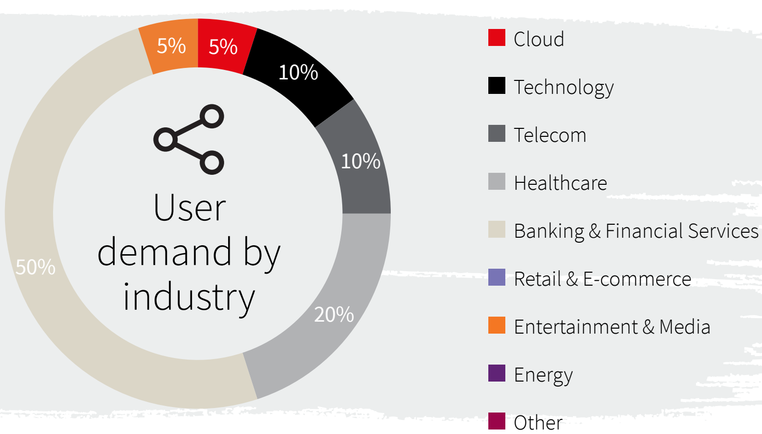
Supply	s.f.	MW
Total inventory:	3,850,000	410.0
Total vacant:	210,000	35.0
Under construction:	95,000	17.0
Planned:	550,000	65.0

Demand	MW
Net absorption:	16

Rental rates	Low	High
($/kW+E) sub-250 kW	$120	$180
250 kW-1 MW	$105	$115
1-5 MW	$95	$105
5 MW plus	$85	$95

Average power rate (cents/kWh)





Data Center leverage

H2 2018	*H1 2019*	*H2 2019*	*H1 2020*	*H2 2020*

User-favorable market
Neutral market
Provider-favorable market

Authored by: Jason Bell | Thomas Reilly

See page 24 of this document for contact information.

New York

NYC and suburbs continue to see 2+ MW, incremental edge growth demand

Market overview

Supply

Sabey is adding supply in H2 as anchor tenant expands. Digital Realty is also adding capacity as overflow from its 111 Eighth Ave, consolidation. 1547 and Datagryd continue to lead shell conversion to wholesale option. WebAir and NYI continue to position small retail space from the SMB needs for managed services.

Demand

NYC continues to see small edge deployments ranging from 50MW to 200 kW supporting carrier hotel capacity, content providers, wireless radio networks and local NY government applications. Coresite and Digital Realty are positioning hybrid clouds at 32 Avenue of Americas.

Market trends

Service and location portability, power expansion and reduction on demand are being offered to attract users to stay locally. More managed services are entering the NJ market to support hybrid cloud workloads. Carrier edge deployments are surfacing in Northern NJ to support carriers' 5G network deployments.

Outlook

for ***Users***

- Network access to cloud on-ramps are vital to designing multi-cloud strategies
- Convertible, powered shell readily available in both NYC and suburbs
- Multi-market tenants can receive promotions for network edge and cloud access

for ***Providers***

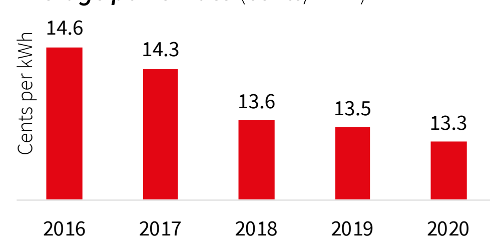
- Virtual tours with space models and new operation standards are a must with COIVD
- Shell, flex and office space will come to market as enterprises downsize office space
- Managed services are growing as enterprises are capital- and resource-constrained

Supply	s.f.	MW
Total inventory:	1,020,000	152.0
Total vacant:	85,000	15.0
Under construction:	25,000	4.0
Planned:	140,000	20.0

Demand	MW
Net absorption:	2.4

Rental rates	Low	High
(All-in) sub-250 kW	$300	$350
250 kW-1 MW	$250	$300
1-5 MW	$150	$250
5 MW plus	$130	$150

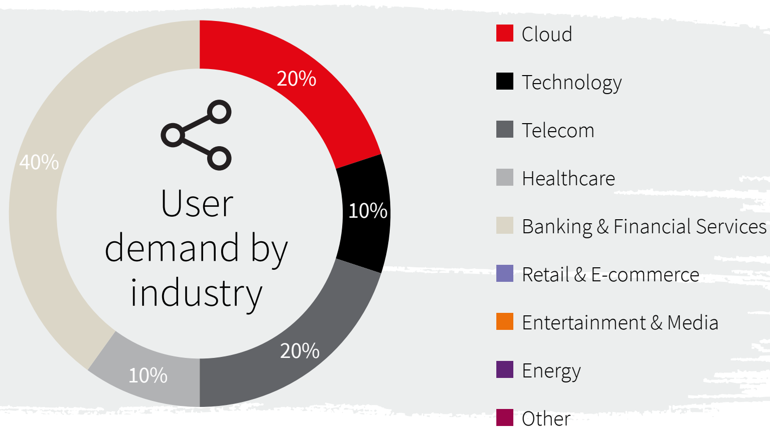
Average power rate (cents/kWh)



Data Center leverage

H2 2018	***H1 2019***	***H2 2019***	***H1 2020***	***H2 2020***

User-favorable market
Neutral market
Provider-favorable market



Authored by: Jason Bell | James Quinn | Gary Youm

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Northern California

COVID-19 has not interrupted momentum in the market. Fundamentals are still the strongest in the U.S.

Market overview

Supply

Only well-capitalized landlords with established campuses are building: Digital, CoreSite, Equinix and RagingWire. Vacancy remains in mid-single digits as landlords bring additional supply online on responsible timelines.

Demand

COVID-19 has not impacted demand. H1 net absorption was 16.6 MW. The new work-from-home (WFH) model has accelerated users' need for additional computing and bandwidth. Hyperscale cloud operators continue to drive this market via expansion in new product and build-to-suit projects near existing core deployments.

Market trends

Hyperscale cloud providers remain aggressive and have proven willing to lease from multiple providers or expand via build-to-suit opportunities. Robust demand and low vacancy have compelled major providers to remain aggressive. Strong performance in comparison to other asset classes has driven interest in investment. Cap rates have not moved during the pandemic.

Outlook

for ***Users***

- WFH model and associated technology will increase need for bandwidth and computing
- Near-term supply will remain incredibly tight
- Expect pricing to remain stable in the short term

for ***Providers***

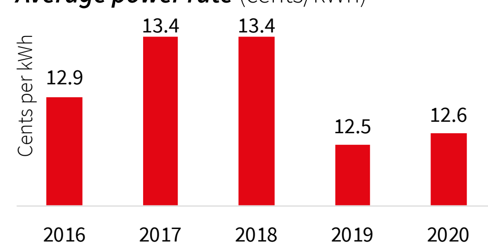
- Need to be mindful of competitive supply coming online
- Need to determine how much supply to bring online and why
- Need to be realistic about development costs and timelines

Supply	s.f.	MW
Total inventory:	6,099,488	468.0
Total vacant:	383,626	48.0
Under construction:	1,403,861	77.0
Planned:	3,328,928	505.0

Demand	MW
Net absorption:	16.6

Rental rates	Low	High
(All-in) sub-250 kW	$200	$300
250 kW-1 MW	$95	$110
1-5 MW	$85	$95
5 MW plus	$75	$85

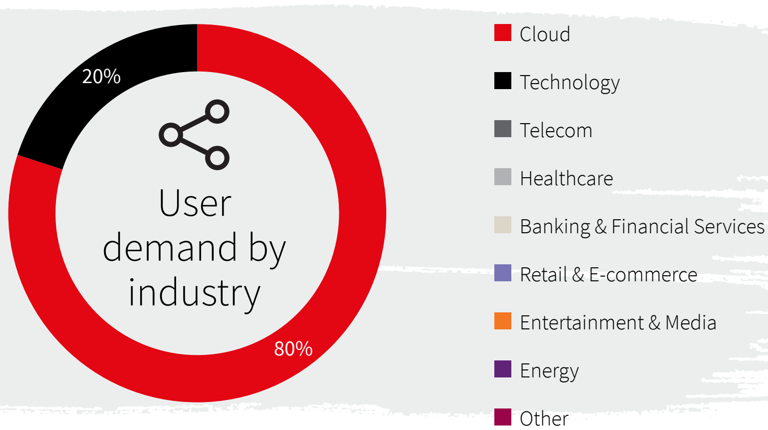
Average power rate (cents/kWh)



Data Center leverage

H2 2018	***H1 2019***	***H2 2019***	***H1 2020***	***H2 2020***

User-favorable market
Neutral market
Provider-favorable market



Authored by: Raul Saavedra | Patrick Murdock

See page 24 of this document for contact information.

** A notable deal was signed in Q2 2020 between Hines and a hyperscale cloud- based operator. Please note this signing has not been included in H1 2020 market statistics.*

Northern Virginia

Northern Virginia is on track for a historic year, with over 180 MW of absorption in the first two quarters of 2020

Market overview

Supply

There has been 120 MW added to supply in the first half of 2020. With a historic amount of product under construction, Northern Virginia will widen the gap between smaller markets around the globe.

Demand

There has been 180 MW of absorption so far in 2020, 114 of those were in Q2 alone. As the demand for data between tech, social media and cloud service providers continues to soar, so will the NoVa data center market.

Market trends

Demand is being driven by continually larger deployments for hyperscale occupiers, while price compression is a result of aggressive competition with lower investment return thresholds plus the advent of second-generation inventory. We anticipate the user-friendly environment to continue for some time.

Outlook

for ***Users***

- Historically low rates and additional concessions
- Many high-quality options to consider
- Competition will stay strong for the foreseeable future

for ***Providers***

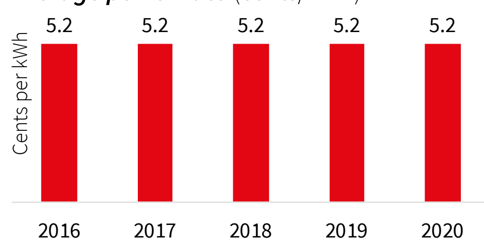
- Margins decreasing for providers due to aggressive new competitors
- Large hyperscale deployments are at historic highs
- Must be more flexible, offer more services and highlight "on-ramps"

Supply	s.f.	MW
Total inventory:	13,820,196	1,719.0
Total vacant:	1,210,000	121.0
Under construction:	3,925,000	392.5
Planned:	7,290,000	729.0

Demand	MW
Net absorption:	180

Rental rates	Low	High
($/kW+E) sub-250 kW	$125	$180
250 kW-1 MW	$80	$120
1-5 MW	$75	$100
5 MW plus	$65	$85

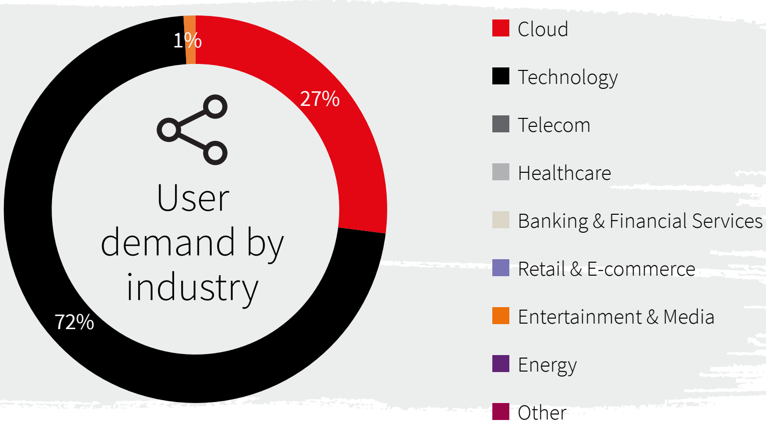
Average power rate (cents/kWh)



Data Center leverage

H2 2018	H1 2019	H2 2019	H1 2020	H2 2020

User-favorable market
Neutral market
Provider-favorable market



Authored by: Jeff Groh | Kelly Katz

See page 24 of this document for contact information.

Northwest

Northwest on track for another major year, led by West Coast technology companies

Market overview

Supply

Some preleased expansions occurred in central Washington. The new supply is all being developed largely on speculation in Hillsboro.

Demand

Demand is driven by tenants of all sizes. Nearly every significant end user is a U.S. West Coast–headquartered technology company. Seattle is continuing to expand with latency-sensitive requirements.

Market trends

New construction has increased demand. Rental rates are still stabilizing downward to align with lower costs in Midwest and East Coast markets. Asia traffic is continuing to fuel demand. Gaming demand is growing at a fast rate. Analysis suggests absorption may match or exceed the banner year 2018.

Outlook

for ***Users***

- Expect additional supply to come online in Hillsboro
- Quincy and Hillsboro continuing to become more apples and oranges
- High operator competition

for ***Providers***

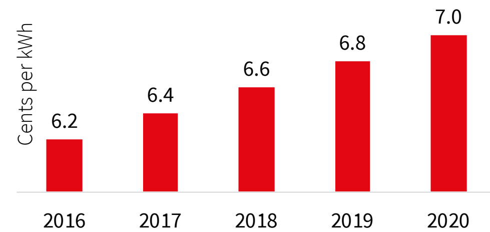
- Consider having product type of all size ranges above 100 kW available
- Hillsboro/Quincy/Seattle/Portland all competing nationally with western U.S.
- Markets are land- and power-constrained, limiting new entrants

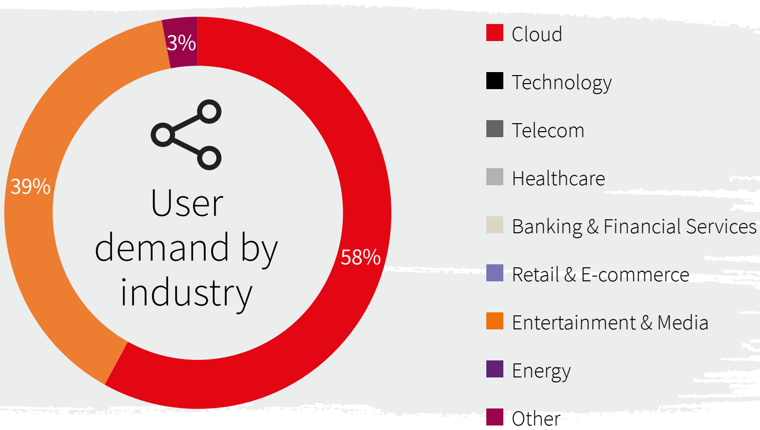
Supply	s.f.	MW
Total inventory:	2,140,043	338.0
Total vacant:	127,667	19.2
Under construction:	99,800	15.0
Planned:	567,000	85.1

Demand	MW
Net absorption:	16.85

Rental rates	Low	High
($/kW+E) sub-250 kW	$160	$200
250 kW-1 MW	$90	$110
1-5 MW	$85	$100
5 MW plus	$80	$95

Average power rate (cents/kWh)





Data Center leverage

H2 2018	***H1 2019***	***H2 2019***	***H1 2020***	***H2 2020***

User-favorable market
Neutral market
Provider-favorable market

Authored by: Conan Lee

See page 24 of this document for contact information.

Phoenix

Compass, Stream and more bring their first phase of developments to their campuses

Market overview

Supply

Compass and Stream are primed to have commissioned space available for end users by October in Goodyear. Due to existing client demand, Aligned continues to build out its existing building and has started construction on the West Wing. NTT, which owns land in Mesa, is underway with its substation, showing promise to their commitment to build out space in the future.

Demand

Early demand by retail customers has been either put on hold or pushed out to a later date due to the pandemic. Most of the demand was through multi-megawatt deals for a couple large end users expanding their existing footprint in the valley.

Market trends

Many end users have started looking at right-sizing their existing contracts and consolidating their existing footprints. New entrants into the market include Landmark Dividend, through the purchase of an enterprise data center facility, and STACK Infrastructure, who announced in June its commitment to build out its land in Avondale.

Outlook

for ***Users***

- Negotiating for pandemic clauses in future contracts
- Flexibility going forward will be of even higher importance
- Continue cloud strategy pressures from the C-suite

for ***Providers***

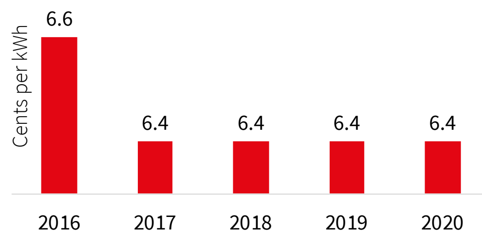
- Be able to deliver contiguous space to end users
- Continue to emphasize pandemic protocols within the facilities
- Compliance still of high importance for end users

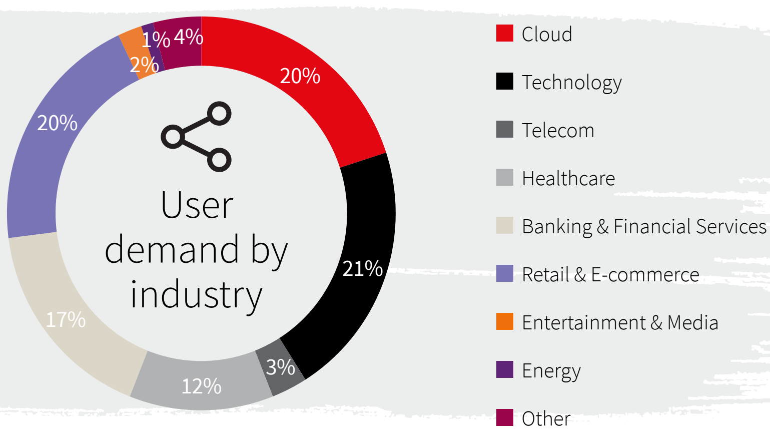
Supply	s.f.	MW
Total inventory:	2,096,741	302.7
Total vacant:	458,871	63.6
Under construction:	87,335	24.0
Planned:	959,897	250.0

Demand	MW
Net absorption:	18.5

Rental rates	Low	High
(All-in) sub-250 kW	$200	$300
250 kW-1 MW	$95	$110
1-5 MW	$85	$95
5 MW plus	$75	$85

Average power rate (cents/kWh)





Data Center leverage

H2 2018	***H1 2019***	***H2 2019***	***H1 2020***	***H2 2020***

User-favorable market
Neutral market
Provider-favorable market

Authored by: Mark Bauer | Kevin Bauer

See page 24 of this document for contact information.

Salt Lake City

SLC lands another data center provider in the mix; market is becoming a true competitor in the Western region

Market overview

Supply

Supply continues to be added in SLC. Aligned is continuing the build-out of its campus with a new second building, consisting of 48 MW of critical power. Newly announced Novva Data Centers started construction on its first of five buildings, which will support 24 MW. DataBank recently finished construction on SLC5, which added 13 MW to its campus.

Demand

SLC's diverse fiber routes across the Pacific Northwest, the Southwest and Midwest, as well as its new data center tax exemption program, has made SLC a very attractive market for many technology and financial institutions. With low power rates, numerous renewable energy options and a supportive tech sector, SLC has slowly started to grow into a desirable market.

Market trends

Utah recently passed legislation that allows sales-tax-free equipment purchases for data center clients, which became effective July 1, 2020. Utah has made leaps and bounds in becoming one of the most competitively priced data center markets in the country, which has been proven with the constant expansion of new space coming to the market.

Outlook

for ***Users***

- Continue cloud strategy pressures from the C-Suite
- Utilize new sales tax exemption for reduced TCO
- Flexibility going forward will be of even higher importance

for ***Providers***

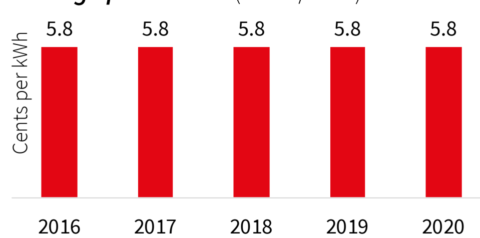
- Stay competitive as more providers look to SLC
- Compliance still of high importance for end users
- Continue to emphasize pandemic protocols within the facilities

Supply	s.f.	MW
Total inventory:	482,000	68.0
Total vacant:	83,100	12.2
Under construction:	500,000	72.0
Planned:	1,490,000	148.0

Demand	MW
Net absorption:	7.0

Rental rates	Low	High
(All-in) sub-250 kW	$225	$275
250 kW-1 MW	$95	$110
1-5 MW	$85	$95
5 MW plus	$78	$85

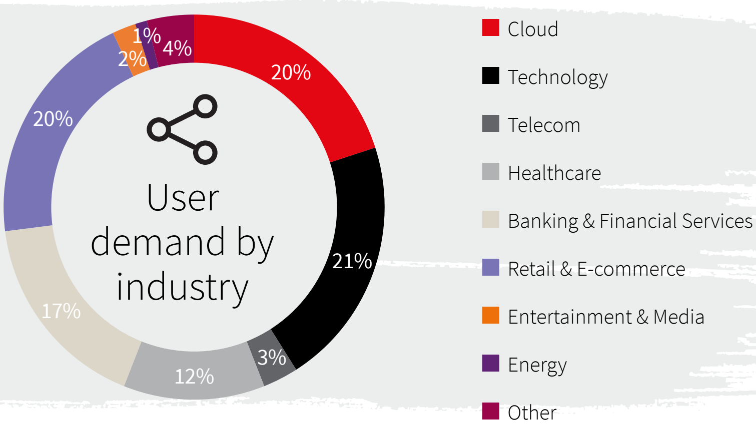
Average power rate (cents/kWh)



Data Center leverage

H2 2018	H1 2019	H2 2019	H1 2020	H2 2020

User-favorable market
Neutral market
Provider-favorable market



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