

Data Center Outlook

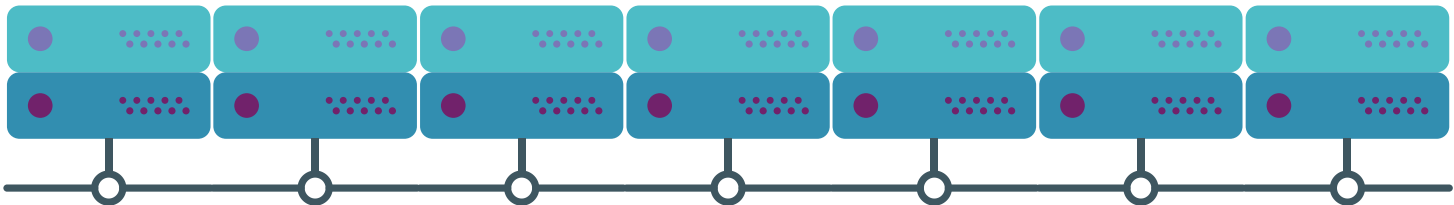
Strong Demand, Smart Growth

North America | 2016



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TOP 2016 DATA CENTER TRENDS

From cloud adoption to data sovereignty, the data center industry is experiencing a host of new change drivers, all while it continues to explode with vigorous growth. We're observing companies getting smarter about their data center and data usage strategies, thriving amidst these winds of change.

Cloud adoption acceleration will double the size of the data center industry over the next five years.

Cloud adoption is racing ahead at an accelerated clip, with the cloud-managed service market expected to double by 2021.

Data sovereignty laws are redrawing the global data center location map.

From Brazil to Russia, the industry's biggest players are expanding internationally faster than ever to meet growing demand and help users stay compliant with regulations designed to keep data inside a nation's borders.

Data center users are spreading out across locations, bringing data closer for greater reliability and speed, at the same time as demanding flexibility.

Data center providers and users alike are getting smarter about location planning, and pursuing shorter, more flexible lease structures.

Climate change is shaping data center legislation and technology.

The realities of global climate change have spurred increasingly effective energy efficiency solutions, from refrigerant-based cooling systems to the continuing rise of data center microgrids—all becoming more sophisticated with every year.



CLOSE-UP

ON NORTH AMERICA'S DATA CENTER MARKETS

Economic picture

Stratospheric momentum towards the cloud. A seismic global political shift toward data sovereignty. New regulations supporting a more sustainable future. Today's data center landscape is changing fast, as leading providers and users strive to stay competitive amidst rapid regulatory, technological, and environmental change.

WHERE IS THE RISING DEMAND ORIGINATING? CONSIDER THE FOLLOWING EMERGING GAME-CHANGERS:

- **Demand for cloud technology** is growing fast, and data center providers are working quickly to meet the need.
- **Rapidly evolving data sovereignty laws** are redrawing the map, creating and expanding new markets both in North America and overseas.
- The industry's **biggest players are upping their game**, as users and providers alike grow more sophisticated in server use and resource planning.

Across the board, revenue and growth is up—both in the U.S. and globally. Data center stocks surged in the first half of 2016, gaining an average of 19 percent in the first quarter, then an average of 50 percent in the second quarter.

Globally, the multi-tenant data center (MTDC) market is expected to rise at a compound annual growth rate (CAGR) of 12.1 percent between 2015 and 2018. As the most mature market, North America remains most competitive, representing approximately 44 percent of the global data center market. Here, each of the top 10 metro markets is home to more than 20 MTDC providers each.¹

By itself, the cloud managed services market size is predicted to grow at a CAGR of 16.6 percent from now through 2021, from \$35.54 billion in 2016 to \$76.73 billion.² Meanwhile, top cloud providers are expected to pull in a collective \$120 billion by 2020, representing a CAGR of 61.3 percent from the \$11.2 billion these seven mega-providers generated on Infrastructure-as-a-Service (IaaS) in 2015.³

Together, this spells continuing promise for large wholesale data center service providers that can keep up with the demand.

Industry insight

Of course, this new opportunity won't be satisfied by stale tactics. Today's data center users and operators are bringing creative approaches that support smarter strategies into the market. For example, large data center operators are offering large campuses to accommodate the intense demand for server space to support cloud and digital content-driven demand. Users are deploying sophisticated predictive analytics to understand their true need, and invest in the servers they need, without over-investing for extensive back-up as in years past. With so much rapid evolution, this means everyone in the market is taking a fresh look at location decisions, rising to the challenge of a changing climate and leveraging new technologies to better capture the market opportunity.

Another curveball the market is offering this year: Rapidly evolving data sovereignty laws. These laws, designed to require that data be housed within the same country from which it is accessed, are influencing data center location decisions, and acting as market-makers in certain countries. It's a smart move for these nations, which can achieve a double-benefit of helping protect data as well as essentially requiring new investment in their economies. However, it also makes conditions more complex for users of data center space. As a result of new and coming data sovereignty laws from France to Brazil to Russia, more data center development activity is taking place outside the U.S. and Canada than ever before.

Additionally complicating international data law is the potential impact of Brexit (the United Kingdom's decision to leave the European Union). Some analysis shows that more than three quarters of British IT leaders have said their data centers are housed elsewhere in Europe. The outcome is still unclear, but many speculate the impact could be profound on data residency issues within the island nation, and well beyond. However, the UK will continue to be held to GDPR (General Data Protection Regulation), a regulation by the European Commission on data handling for all EU citizens, which comes into effect in April 2018.

Meanwhile, **climate change is also becoming a clear influence on strategy**, as the data center industry increasingly looks to improve its triple bottom line (people, planet, and profit). The triple bottom line is an accounting framework used by many organizations to evaluate performance from a socially responsible, environmental, and financial perspective; new technologies and regulations now allow data center facilities to more fully participate in sustainability and corporate responsibility programs.

The U.S. data center industry has significantly improved its electricity savings in the last few years. Despite expectations that energy use would catapult as quickly as the demand for real-time data, energy use has actually remained stable since 2010. And although the total server installed base is expected to grow by 40 percent from 2010 to 2020, the industry is on pace to save energy use by another 10-40 percent in 2020.⁴

There are a few key reasons for this improved efficiency.

- **Cooling and powering strategies** have improved dramatically—especially meaningful in drought- and heat-stricken areas in the Western U.S. Advanced cooling strategies have emerged to make the cooling process less resource-intensive. California recently made headlines by relaxing state law on how refrigerants are used in cooling systems to pave the way for more use of refrigerant-based cooling systems over water cooling, which can save millions of gallons of replenishment of water per day.
- **"Power proportionality" methods** are enabling more data centers to scale back electricity use when they are not processing at full throttle. The resulting economic and environmental benefits of getting smarter about energy use extends to providers, as well as end users.
- The idea of **data center microgrids** is also catching on, from active development in some areas, to more earnest consideration in others. Consider for example Arizona's largest utility's 63-MW development now underway, or Colorado's massive 300-MW microgrid park development. Meanwhile in Manhattan, microgrids are becoming a topic of greater interest within data center leadership circles. The pairing of data centers and microgrids is a natural evolution, considering the industry's dependence on quality, reliable power that can endure even when the central grid is unavailable or simply congested.

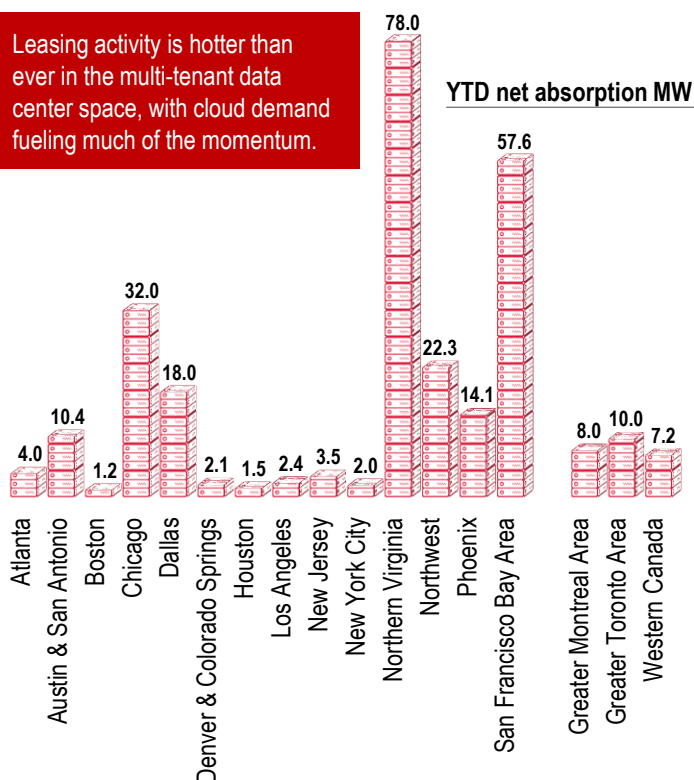
Demand drivers

Today's data center IT decision-makers are using increasingly sophisticated criteria when they shop for space and power. Overall, we are seeing a trend toward more informed usage. New supply is being added that is more in tune with demand than in the past. Thanks to predictive analytics, there is less guesswork.

- The **'Big Six' providers have continued on their development binge** domestically, which, amongst other outcomes, means more overall space is available. The industry's most prominent publicly traded data center REITs, which include Equinix, Digital Realty, DuPont Fabros Technology, CoreSite Realty, CyrusOne, and QTS have been making some surprising new investments. For example, Digital Realty recently acquired eight data centers in Europe from Equinix, which had committed to spinning off the assets for regulatory approval of its own acquisition of Telecity in 2015.

- Meanwhile, smaller multi-tenant data center players are also making some notable 2016 acquisitions, including Boulder-based Zayo's acquisition of Dallas-based Clearview and St. Louis-based TierPoint's acquisition of Cosentry.
- Big providers are becoming **more efficient in how they are building out space**, and that keeps data center costs in line. Gone are the days of overbuilding a facility that customers might consider nice-to-have—but not mission-critical. Now, they are creating more flexible space so that as new, more diverse users come in, they can offer the resiliency and capacity for what 80 percent of the customers need, as opposed to simply catering to the higher-end specifications of a 20 percent niche market. Design and build has become better geared toward return on investment, and supply chains are also becoming more efficient.
- Data center developers are **no longer building for massive redundancies** as they become more confident in their own forecasting of needs for space and power. And as more sophisticated analytics tools improve usage planning, data center users are becoming less likely to overinvest on more data server space than they need—affecting deals.

These new tactics are pushing demand for space through the roof in many North American markets, causing demand to spread out across primary as well as secondary markets.



Global expansion is another key trend influencing demand. The Big Six data center provider companies are expanding internationally more rapidly than in the past, to locations with needs driven by data sovereignty laws such as France and Brazil, as well as emerging markets. According to data from one of the Big Six, cross-border data center traffic was minimal 15 years ago, but has since grown 45 times, and is expected to grow another nine times in the next 15 years.⁵

In fact, the regions with the fastest expected multi-tenant data center market growth are in Latin America, where 451 Research forecasts CAGR of 19.7 percent from 2015 to 2018, and Asia-Pacific, with a forecasted CAGR of 16.3 percent over the same period.⁶ One recent example of this trend comes from Amazon Web Services, which recently announced it is building its next big data center farm in Mumbai, India.

Supply drivers

The industry is flourishing, and yet the pace of new development for colocation firms is actually slowing. Why the apparent disconnect? Capacity is not shrinking—it's simply taking new form as Big Six providers like Digital Realty and CyrusOne shift gears toward building out fewer but larger campuses in order to spread infrastructure and ultimately lower the cost of delivery.

The following new forces are already profoundly shaping new supply:

- **The cloud is driving demand**, as technology continues to advance, and demand accelerates. The hottest markets are those adopting cloud technology and/or absorbing cloud space at a strong clip. And unlike the market surge in 2013, the cloud is expected to bring more staying power to demand. For example, cloud spending is expected to reach \$204 billion globally in 2016, with 71 percent of enterprises adopting hybrid cloud services in some way.⁷ Indeed, many of the biggest data center providers are scouting for cloud-driven, multi-megawatt wholesale deals, and winning at an unprecedented rate.
- **Leases are expiring—and exposing new opportunities to evolve.** Another key game-changer is that the first wave of multi-tenant data center buildings are now seeing their 10-year leases rolling. Now, as more users begin to renegotiate their terms, an uptick in right-sizing server and resiliency is likely. At the same time, traditional 10-year leases are becoming less common. Today's average is more like 5-7 years, with new opportunity for flexibility and lower rent rates. How will this affect the larger economic outlook? Data center stocks remain up, but little consideration has been given yet to the blend-and-extend nature of current usage agreements. We anticipate some offset to all this absorption.
- **Brexit is stirring up a ripple effect of uncertainty.** How will Britain's decision to leave the EU affect the data center market? The long-term outlook is unclear, but immediate effects included a temporary dip in stock value for a few of the big players. Ultimately, the vote raises questions for international players that cannot yet be

answered. For example, what will the change mean for compliance—and related costs? What kinds of citizenship issues will emerge for EU employees in the UK, and vice versa? Will the island nation's prominence as a hub for global technology and financial services continue or falter? We will continue to closely monitor this developing situation.

It is important to recognize, too, the ways in which this vote could have direct impact on the U.S. market. Financial and currency market volatility across North America could have some negative consequences for consumer and business confidence, however, the potential impact for now is expected to be very minimal. At the same time, lower yields together with uncertainty could push interest in commercial real estate acquisitions, which could theoretically work out favorably for U.S. data centers.

Real estate insight

Hyper-connectivity, flexible capacity, and a solid supply of relatively inexpensive yet reliable power are helping keep the top markets ahead. While some of the hottest markets are not new to the winners' circle, they are keeping their place by staying relevant for companies in rapid cloud-adoption mode, and other current demand drivers. Smaller markets are also emerging as surprising areas of opportunity. Here are a few highlights from our in-depth local North American analyses that round out this report:

Market highlights

- **Northern Virginia retains its star power** with social media and cloud providers like Microsoft, AWS, Google, Facebook, LinkedIn and Oracle's recent feast of space, together signing up for about 55 MW of capacity in the second quarter; that is on top of third-party data center absorption of 78 MW in the first half of the year. New allure is also coming to this connectivity hub thanks to new subsea fiber cables that will link the market to Europe, Africa, and South America.
- **Data centers go north...to Canada:** Montréal's supply is soaring—and with it, growing demand from cloud providers. The Toronto area is also seeing significant potential for inventory growth, and growing hunger for wholesale space. And looking west, extremely limited supply coupled with swelling demand from content delivery networks is heating up the Vancouver market.
- **Chicago rapidly adds to supply:** Explosive cloud growth here will outpace supply, while providers compete for large cloud tenants. Several data center REITs have development projects underway in the Windy City, however, it will likely take a few years for all this new supply to be delivered.

- **The Northwest grows with the tech industry:** Growth is rampant here, thanks to the region's bustling tech and e-commerce industry, together with the emerging trend for Asian corporations to establish data and routing equipment in the area. Supply is growing, with several large expansions now underway, and large and midsize colocation operators alike are scouting the area, too.

Outlook

Rapidly evolving trends mean demand drivers also change quickly. Look for the following trends to increase in industry influence over the next year:

- **Cloud-driven data center usage is an increasingly important “food group.”** To some, it already is a key driver from Northern Virginia to Northern California to Chicago. How will the clamor for the cloud affect managed services firms (MSF), and what changes might they make to adapt? Some MSFs report they are being forced already to change their ways, while others say they see it as an opportunity to potentially generate interconnected revenue. We will continue to monitor this game-changing dynamic.

Cloud adoption has also spurred a massive takedown of multi-tenant data center space from the likes of Microsoft Azure, Oracle, AWS, and Google—a trend that we expect to continue in the coming months.

Meanwhile, the cloud-driven land grab in many markets is creating a lack of inventory for large-scale deployments, so we expect the pipeline of build-to-suits to expand, too.

- **American consumers have an insatiable thirst for digital content.** And that means so is the thirst for data center server usage. Content providers like Comcast, CNN, ESPN, and many others need more data center capacity, as demand for ubiquitous digital content skyrockets. Consider the following demand drivers:

- *Our culture has a love affair with binge-watching:* 70 percent of Americans say they will watch consecutive TV episodes in rapid succession now.
- *Demand for streaming media is exploding:* Close to half of U.S. consumers subscribe to streaming services, more than ever.
- *Many of us depend on social media:* Two-thirds of millennials say that social media interactions with friends are as valuable as in-person time.⁸

The digital content frenzy extends well beyond entertainment content, too. For example, a recent banking survey showed that 4 in 10 Americans hadn't visited a branch in the last six months, signaling more people are doing their banking online, on phones or ATMs than in previous years—and mandating that banks expand their digital capability to stay competitive. Banks are also exploring mobile technology for use in their own branches, such as video tellers for self-serve kiosks that would also drive their need for additional data center space.⁹

- **Data center REITs soared in the first half of 2016, but the future is uncertain.** Investor expectations were sky-high in the first half of 2016, with record leasing results spurring data center REITs up by 19 percent during the first quarter of 2016, and by another 50 percent through the second quarter. Looking ahead, however, uncertainty around Brexit and the upcoming U.S. presidential election could trigger a curtail in spending in the second half of the year. Stay alert for potential change in this space.

- ¹ 451 Research
- ² [Markets and Markets](#)
- ³ Structure Research
- ⁴ Lawrence [Berkeley National Lab report](#)
- ⁵ Equinix
- ⁶ 451 Research
- ⁷ Equinix
- ⁸ [Deloitte](#)
- ⁹ [US News](#)

DATA CENTER MARKETS



ATLANTA

Supply

Total inventory: 1.65 m.s.f. / 194 MW
Total commissioned vacant: 120,000 s.f. / 20 MW
Under construction: 90,000 s.f. / 14 MW
Planned: 100,000 s.f. / 13 MW

Demand

Net absorption: 4 MW YTD

Rental rates

< 250 kW: \$225 - \$325/kW (all in)
> 250 kW: \$130 - \$155/kW (+E)

Data center overview

Supply has been steady—but that is likely to change later this year and into 2017 as more space and power becomes positioned to come online. Three providers are scheduled to deliver planned expansion space, a newcomer to the market has recently delivered newly acquired space, and at least two other providers are also actively negotiating to secure new space to bring to the market. Meanwhile, Portman Holdings and Georgia Tech have also officially announced the kick-off of the prominent Coda Tech Square development, a mix of office, retail, and high performance computing space.

Demand is coming from a combination of enterprise server rooms that are migrating out of non-colocation facilities, and new operators from outside Atlanta that are now entering the market.

Market trends we are actively tracking include notable demand-driven expansion by existing colocation providers. We also see potential for new user and operator activity, with Southern Company (the fourth largest utility in the U.S.) actively enhancing the region's utility infrastructure and diversification with recently announced acquisitions and venture agreements with PowerSecure, AGL Resources, and Kinder Morgan.

Corporate headquarter relocation, such as NCR and WorldPay, and some regional office expansions, are also contributing to absorption of office and data center space.

Outlook

for Users

- Users are looking for the maximum flexibility with regards to the type of facility and services offered.
- Enterprise colocation requirements and the entertainment, media, and technology sectors continue to be the driving forces of the market.
- The cloud continues to act as a disrupter for decision-making.

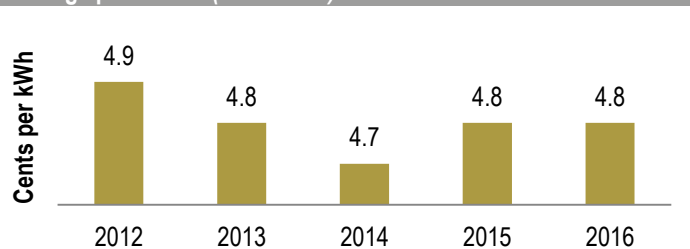
for Providers

- Providers are challenged with trying to solve for the optimum hybrid solution for their prospects and customers.
- Testing alternative types of pricing is on the rise for retail space.

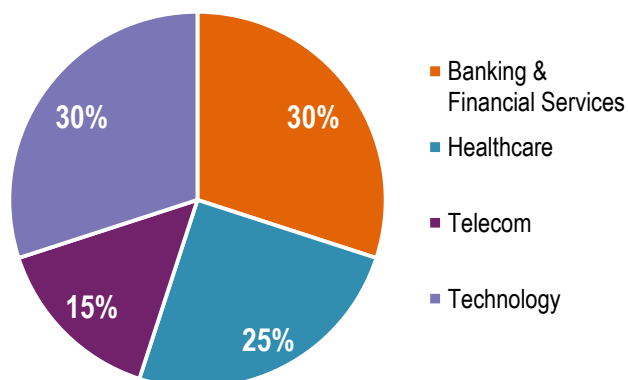
Q2 16 > Q3 16 > Q4 16 > Q1 17 > Q2 17

User favorable market
 Neutral market
 Provider favorable market

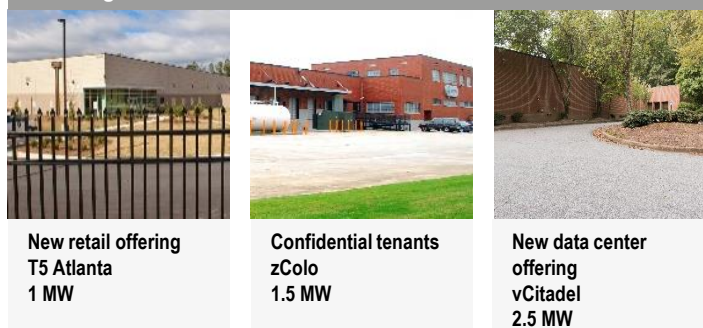
Average power rate (cents/kWh)



User demand by industry



2016 significant data center transactions



AUSTIN & SAN ANTONIO

Supply

Total inventory: 2.86 m.s.f. / 403 MW
Total commissioned vacant: 98,073 s.f. / 11.36 MW
Under construction: 43,834 s.f. / 9 MW
Planned: 121,000 s.f. / 26.1 MW

Demand

Net absorption: 10.4 MW YTD

Rental rates

< 250 kW: \$260 - \$360/kW (all in)
> 250 kW: \$140 - \$160/kW (+E)

Data center overview

Supply, we anticipate, will remain stable in the Austin market as CyrusOne, Digital Realty, and OnRamp all have healthy supply for this market based on current demand. In contrast, supply in San Antonio is tight now that CyrusOne—which until recently had an entire powered shell building available for build-out—has leased nearly 100 percent of this space to a technology tenant.

Demand continues to come primarily from the government and technology sectors, with a significant uptick from West Coast technology firms. Overall, with the exception of one very large transaction, the two markets remain stable and demand remains similar to previous years.

Market trends are being driven by managed services and cloud growth, which will continue to be key in this market as large cloud providers become tenants in massive colocation facilities, and/or continue to increase their owned footprint in these markets. Providers should continue to market these new service options broadly.

Meanwhile, utility rates in Austin continue to rise as subsidies have dropped off, with rates now hovering around \$.07/kWh.

Outlook

for Users

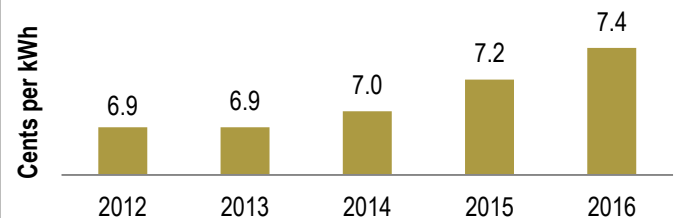
- Utility pricing continues to increase as government subsidies burn off.
- While there are few providers in the marketplace, quality Tier III product is available in the market from best-in-class providers.
- These providers' facilities are demonstrating an increase in managed services and cloud-provider options.

for Providers

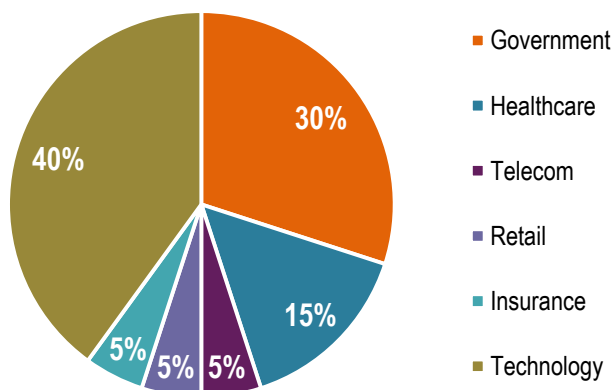
- Cloud and technology companies are showing continued interest.
- Promotion of additional services is key to attracting new customers.
- A focus on efficiency is meaningful here, as utility costs outpace other Texas markets that may also appeal to technology firms.



Average power rate (cents/kWh)



User demand by industry



2016 significant data center transactions



Technology firm
CyrusOne
San Antonio, TX
9 MW



Fortune 100 technology
Stream
San Antonio, TX
200 kW



Energy firm
CyrusOne
Austin, TX
200 kW

BOSTON

Supply

Total inventory: 1.4 m.s.f. / 135 MW
Total commissioned vacant: 165,000 s.f. / 20 MW
Under construction: 10,000 s.f. / 1.5 MW
Planned: 65,000 s.f. / 8 MW

Demand

Net absorption: 1.2 MW YTD

Rental rates

< 250 kW: \$300 - \$850/kW (all in)
> 250 kW: \$115 - \$200/kW (+E)

Data center overview

Supply remains fairly static in Boston, with new construction limited to the TierPoint expansion in Marlborough, and the second Markley facility soon to enter the market in Lowell.

Demand is largely coming from local companies and institutions, particularly those focused on life sciences, universities, technology, or financial services.

Market trends are being influenced by a range of new and continuing factors. For one, although we have seen some decline, Boston's utility rates generally remain amongst the highest in the country—a trend that should continue considering the undersupply of generating resources, and more facilities now scheduled to close. Even the most favorable power purchasing contracts today result in all-in rates of \$.15-\$.20 per kWh. Overall, we are seeing these high rates inspiring strong emphasis on energy conservation for new projects and retrofits.

At the same time, employment growth, GE's relocation to Boston, and continued strength in tech and life sciences are all boosting the economy, and ultimately benefiting data center space providers.

We expect users to maintain leverage in the market for the foreseeable future, with the possible exception of the most highly connected buildings in the market, including One Summer, 230 Congress, and the Bent Street area in Cambridge.

Outlook

for Users

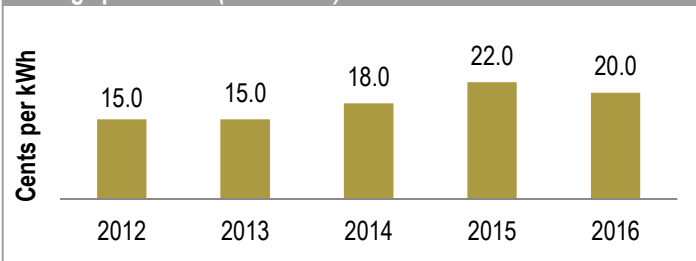
- There is significant availability in both retail and wholesale segments.
- Aggressive pricing has eased and rate declines have subsided for most providers.
- Many providers in the market offer customers the option to convert from colocation to managed services in the future.

for Providers

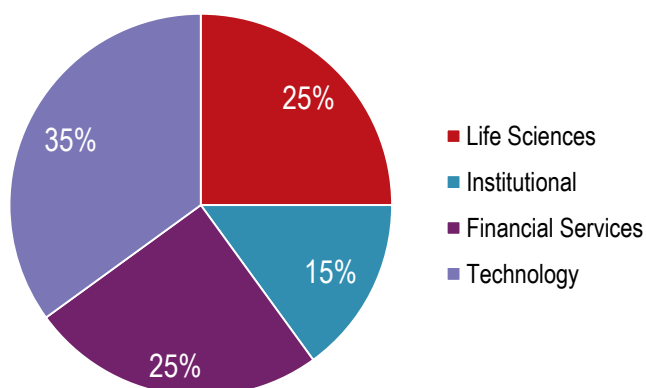
- The data center investment climate remains strong and assets should continue to trade hands at attractive cap rates of 7.5% or less.
- New entrants and existing providers have active expansion plans across the market.



Average power rate (cents/kWh)



User demand by industry



2016 significant data center transactions



CHICAGO

Supply

Total inventory: 3.9 m.s.f. / 502 MW
Total commissioned vacant: 266,947 s.f. / 25 MW
Under construction: 255 s.f. / 27 MW
Planned: 503,000 s.f. / 49 MW

Demand

Net absorption: 32 MW YTD

Rental rates

< 250 kW: \$210 - \$325/kW (all in)
> 250 kW: \$145 - \$165/kW (+E)

Data center overview

Supply of wholesale data center space in the Chicagoland area has become scarce due to significant leasing by cloud users and power constraints in key submarkets. All major providers are in the process of next-phase speculative builds due to “just-in-time” cloud requirements.

Demand for the most part continues to come from cloud providers and edge/content expansions into the market. Banking and financial services interest has also grown moderately, due to market fluctuation. Meanwhile, enterprise leasing has slowed with rampant adoption of cloud strategies.

Market trends of note include Chicago’s utility rates, which remain very attractive and have been in the \$.059 - \$.064 per kWh range. The forecast calls for stable, competitive rates in the future, too, in part owing to ComEd’s active work to expand several critical substations in order to meet growing demand from data centers. This should be key, considering Elk Grove and Franklin Park substations are at capacity.

Looking ahead, we expect cloud demand to continue to outpace supply. There will be limited product until the first quarter of 2017, but by late 2017, new vacancy should give end users the leverage to negotiate lower rates.

Outlook

for Users

- Users are focused on “just-in-time” compute to accommodate explosive cloud growth.
- Cloud, edge, and financials lead the way as driving forces for the market.

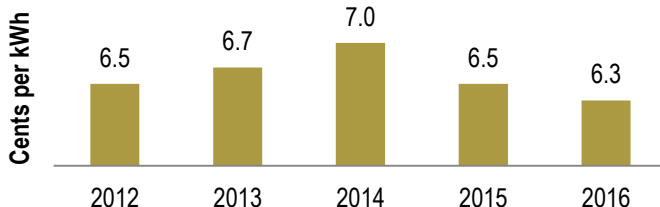
for Providers

- Providers continue to compete for large cloud tenants.
- Aggressive pricing structures still exist for credit tenants.
- Many new providers are looking hard at the market—however, they have limited site options to consider.

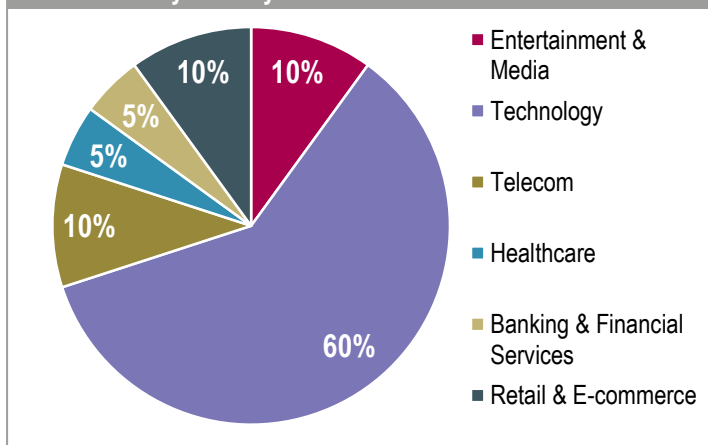
Q2 16 > Q3 16 > Q4 16 > Q1 17 > Q2 17

■ User favorable market
 ■ Neutral market
 ■ Provider favorable market

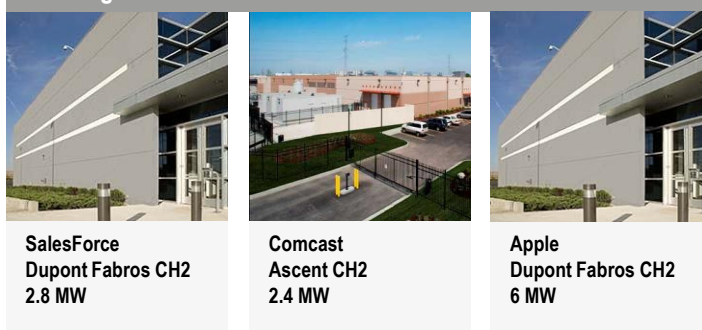
Average power rate (cents/kWh)



User demand by industry



2016 significant data center transactions



DALLAS

Supply

Total inventory: 2.912 m.s.f. / 403 MW
Total commissioned vacant: 228,864 s.f. / 35.33 MW
Under construction: 182,000 s.f. / 17 MW
Planned: 681,875 s.f. / 91 MW

Demand

Net absorption: 18 MW YTD

Rental rates

< 250 kW: \$250 - \$350/kW (all in)
> 250 kW: \$125 - \$140/kW (+E)

Data center overview

Supply is currently constrained, with only a handful of wholesale providers offering blocks of available supply. However, some key transactions are underway that could soon help turn the tide: RagingWire, Digital Realty, and ViaWest all have buildings under construction now in the Dallas-Forth Worth area, and will be delivering between the third quarter of 2016 and first quarter of 2017. Additionally, Skybox and Stream are in the midst of delivering powered shell product in the Plano market, a new offering in the area.

Demand continues to come most robustly from financial services, insurance, healthcare, and, increasingly technology—in addition to other sectors in this diversified market. Continued headquarter relocations and regional expansions are also driving demand.

Market trends include ongoing interest in DFW's low utility rates, which remain attractive in the \$.045 - \$.053 per kWh range. Oncor continues to invest in adding power, while interest in wind energy is spurring increased wind farm development. Other local utilities are also rapidly increasing their infrastructure deployment in the area.

We anticipate that users will have significant leverage towards the end of 2016, when new supply nears completion and providers more actively seek anchor tenants for their new projects.

Outlook

for Users

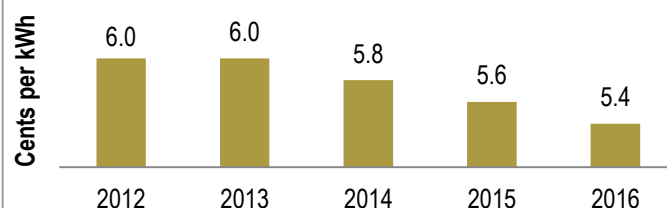
- There will be a small supply deficit window between Q3 and Q4,
- Aggressive pricing and ramp structures will be available for Q1 2017 go-live projects.
- New options for powered shell facilities are coming to the market early next year.

for Providers

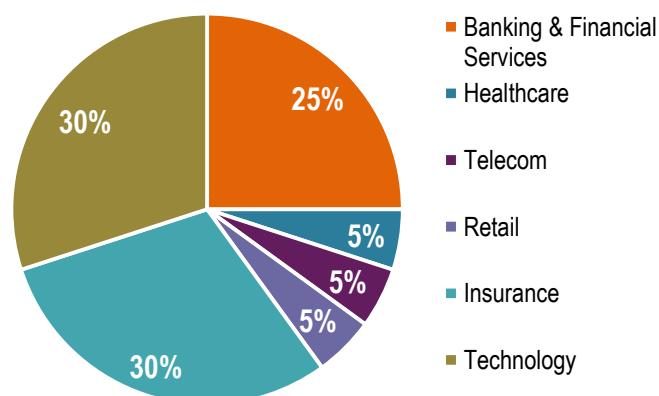
- A race is underway to get inventory to market Q1 2017 and beyond.
- Users will expect aggressive anchor tenant deals for new 2017 projects.
- Pricing will remain stable through Q3, and then potentially compress by 3-5 percent as new supply comes online.



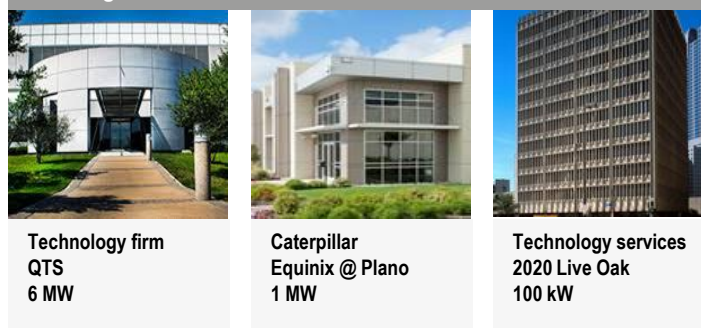
Average power rate (cents/kWh)



User demand by industry



2016 significant data center transactions



DENVER & COLORADO SPRINGS

Supply

Total inventory: 660,778 s.f. / 113.8 MW
Total commissioned vacant: 195,755 s.f. / 22 MW
Under construction: 0 s.f. / 0 MW
Planned: 205,000 s.f. / 24 MW

Demand

Net absorption: 2.1 MW YTD

Rental rates

< 250 kW: \$255 - \$325/kW (all in)
> 250 kW: \$130 - \$160/kW (+E)

Data center overview

Demand is driven predominately by end users with retail colocation requirements and those looking to meet disaster recovery needs. Companies are attracted to the Denver market for workforce technical talent and because of its central U.S. location which supports low-latency specifications and interconnectivity to communications networks serving Chicago and San Francisco metropolitan areas.

Supply is being driven by significant activity from providers, including ViaWest, which is currently in the design and implementation phase of building out the remaining capacity at its Compark facility in Southeast Denver. Construction is scheduled for fourth quarter of this year, and consists of 90,000 square feet delivered in powered shell condition and configured in 1.5 MW blocks. At full build-out, the Compark facility will consist of 140,000 square feet and 18 MW of critical IT load. Meanwhile in Colorado Springs, T5 executed a purchase agreement with a multi-national software company as the first occupant of the T5@Colorado Campus.

Market trends show Colorado Springs remains among the popular enterprise data center markets, having gained a large multi-national software company that purchased approximately 9 acres within the T5@Colorado campus. This enterprise data center is scheduled to break ground in 2017.

Outlook

for Users

- As providers compete, users benefit from low and stable pricing, expansion flexibility, and a wide array of managed service options.
- The Greater Denver area continues to be an in-demand market thanks to its connectivity for enterprises on both East and West Coasts.

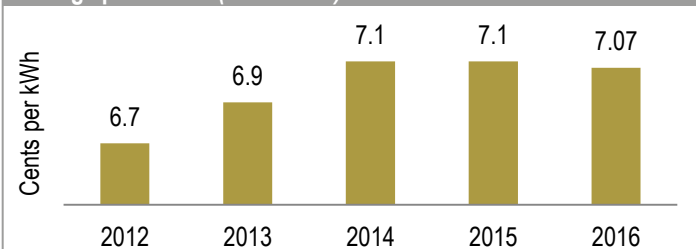
for Providers

- Managed service requirements and retail colocation consistently represent the demand.
- Hybrid cloud deployments sought by large enterprises will continue to motivate market growth.

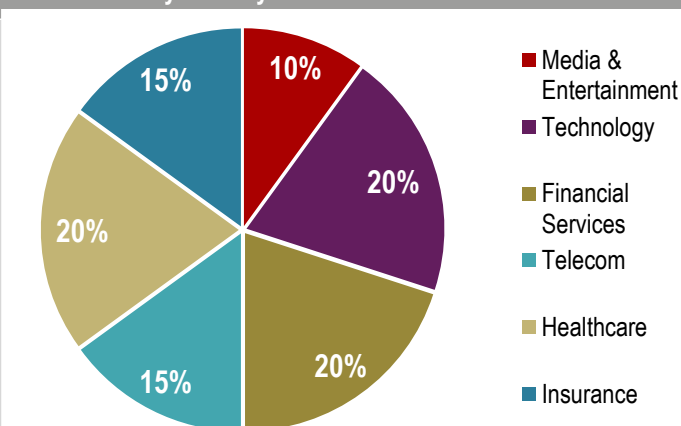
Q2 16 > Q3 16 > Q4 16 > Q1 17 > Q2 17

User favorable market
 Neutral market
 Provider favorable market

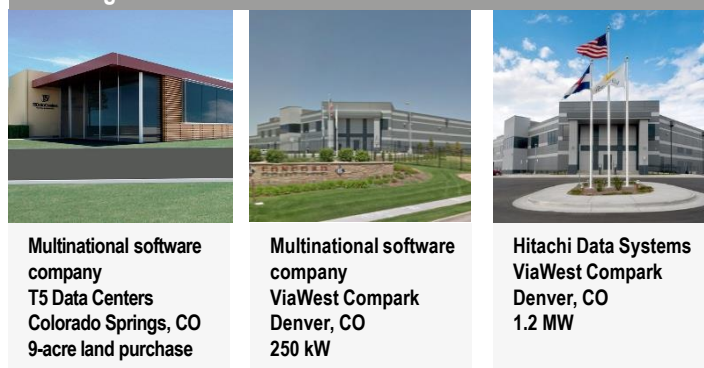
Average power rate (cents/kWh)



User demand by industry



2016 significant data center transactions



HOUSTON

Supply

Total inventory: 762,300 s.f. / 119 MW
Total commissioned vacant: 97,000 s.f. / 12.712 MW
Under construction: 10,000 s.f. / 1 MW
Planned: 393,984 s.f. / 68.2 MW

Demand

Net absorption: 1.45 MW YTD

Rental rates

< 250 kW: \$260 - \$360/kW (all in)
> 250 kW: \$140 - \$160/kW (+E)

Data center overview

Supply has been absorbed at a slower rate in the first half of 2016, which is not a surprise, given the drop in the price of oil and its cascading effect on the energy sector over the last 12 months. Recent new supply has been added by a few key players, including Skybox, which delivered its second data center to the market and has additional shell space for a third. CyrusOne also delivered additional space to keep up with demand, and has more options to deliver capacity as needed. Other new supply has come from DataFoundry's 250,000-square-foot building, which saw early leasing success, and Digital Realty's 1.7 MW now available at its Greenspoint campus.

Demand is primarily still coming out of the energy sector, even under current economic conditions, as technology and data-intensive applications support drilling and exploration efforts dramatically. Interest is also growing in the healthcare sector. We have also observed that much of the year-to-date activity is sparked by renewals that consider moving to another provider, but ultimately renew.

Market trends here are deeply connected to the struggling oil and gas sector. Job growth that previously grew at 3-5 percent annually has dropped to .5 percent. As a result, we are seeing some delays in technology spending. Still, overall, the data compute power required for the large companies to drill more efficiently is helping keep the data center market stable.

Outlook

for Users

- Users are looking more at powered shell opportunities as quality built-out options are minimal.
- Despite reduced overall spending, the energy sector is still driving the market, while healthcare is a growing presence.

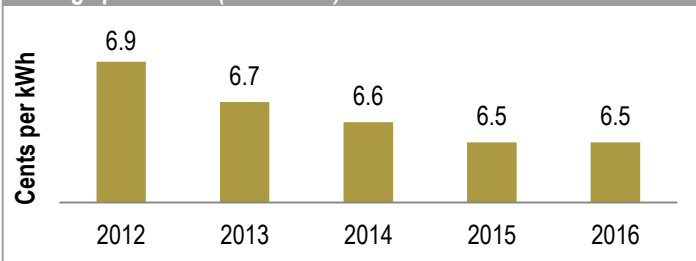
for Providers

- Providers are continuing to compete for tenants.
- Aggressive pricing structures still exist for credit tenants.

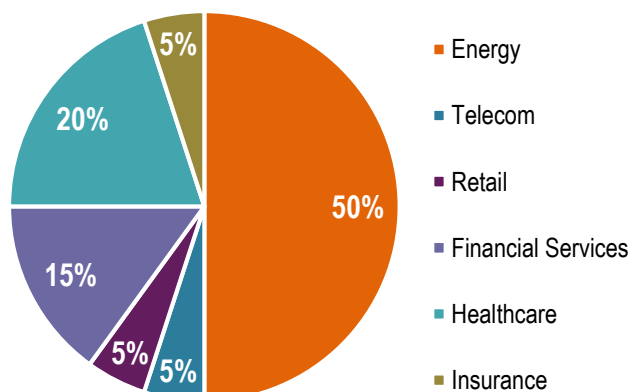
Q2 16 > Q3 16 > Q4 16 > Q1 17 > Q2 17

■ User favorable market
 ■ Neutral market
 ■ Provider favorable market

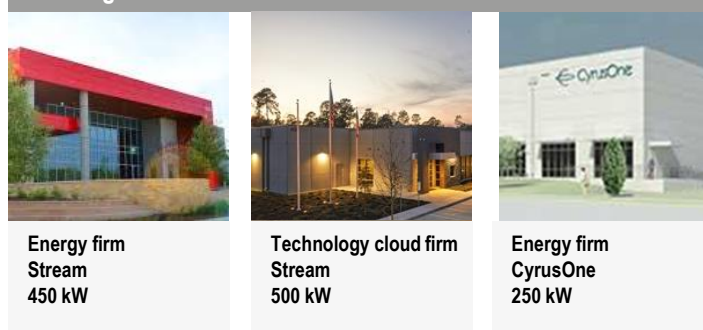
Average power rate (cents/kWh)



User demand by industry



2016 significant data center transactions



LOS ANGELES

Supply

Total inventory: 2.3 m.s.f. / 210 MW
Total commissioned vacant: 190,000 s.f. / 18 MW
Under construction: 20,000 s.f. / 3 MW
Planned: 30,000 s.f. / 3 MW

Demand

Net absorption: 2.4 MW

Rental rates

< 250 kW: \$250 - \$300/kW (all in)
> 250 kW: \$125 - \$250/kW (+E)

Data center overview

Supply is being driven by a few key companies—primarily CoreSite, Digital Realty, and Equinix. CoreSite has been the most active in the market at its 900 N. Alameda location, and One Wilshire also remains well leased. G1 Partners, owners at One Wilshire, have added cooling and power in order to lease directly to other users, who can then connect to the Meet-me room without needing to use CoreSite as the primary operator. Additional supply changes in the market include Telecom Center at 530 W. 6th, which came off the market to upgrade infrastructure, and Garland Center, which closed in June to Rising Realty and is being repositioned as a more core market offering with upgrades to power and cooling infrastructure planned for late 2016 to early 2017.

Demand in the LA market remains flat due to high power costs—and yet, we continue to see activity from small users and organic growth. Moreover, Chinese telecommunications companies and cloud users are beginning to enter the market in search of space.

Market trends are fairly consistent with the general California market, where blue-chip companies and proximity plays will continue to drive demand—as will cloud companies looking to solve local market latency and connectivity needs. Large users with high MW needs will continue to source in markets with cheaper power and lower taxes.

Outlook

for Users

- Several new blocks of direct and sublease space have opened up options for users.
- Entertainment, media, and technology continue to be the driving forces in the market.
- Some providers have offered 2016 promotions to drive new business.

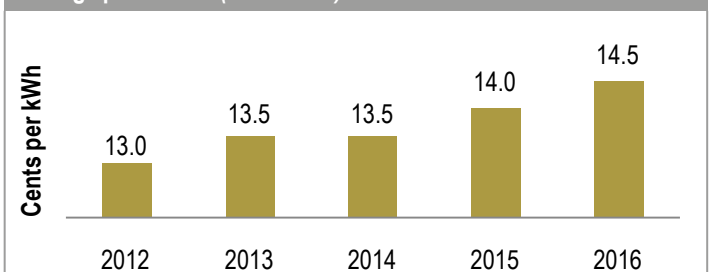
for Providers

- Providers are continuing to aggressively compete for tenants.
- Extremely aggressive pricing structures still exist for credit tenants.

Q2 16 > Q3 16 > Q4 16 > Q1 17 > Q2 17

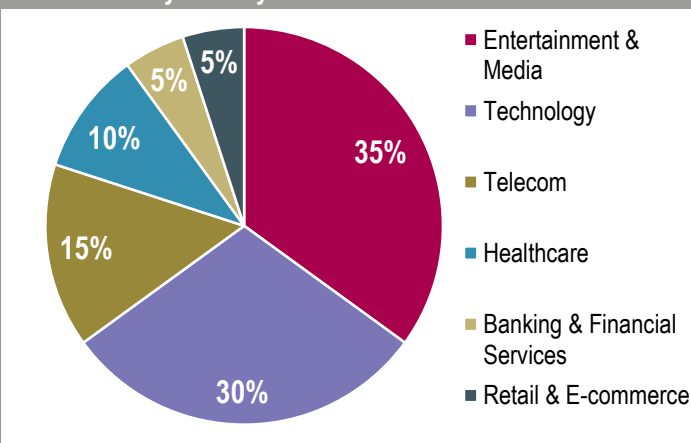
User favorable market
 Neutral market
 Provider favorable market

Average power rate (cents/kWh)

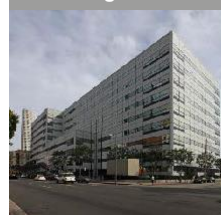


* Burbank and SoCal Edison are approximately 9.5 cents

User demand by industry



2016 significant data center transactions



Alchemy
 1200 W. 7th St.
 500kW



Quantil
 CoreSite
 400 kW



Confidential tech firm
 CoreSite
 1.5 MW

NEW JERSEY

Supply

Total inventory: 3.1 m.s.f. / 327 MW
Total commissioned vacant: 260,000 s.f. / 33 MW
Under construction: 0 s.f. / 0 MW
Planned: 796,000 s.f. / 115 MW

Demand

Net absorption: 3.5 MW YTD

Rental rates

< 250 kW: \$175 - \$350/kW (all in)
> 250 kW: \$125 - \$170/kW (+E)

Data center overview

Supply is somewhat ahead of demand; as a result, we have observed that supply is being added very judiciously. In fact, in most facilities around New Jersey, it is rare to see a Performance Optimized Data Center being built unless the majority of those built out previously have tenant commitments.

Demand within the tristate area continues to be dominated by the financial services industry. However, we have tracked social media, healthcare, and technology as becoming part of a healthier, more diversified tenant base.

Market trends include a short-term dip in utility rates. Operators that did not lock in stable long-term rates (typically averaging \$.09 - \$.10 per kWh) have recently been able to secure shorter term rates at \$.065 - \$.08 for a year or two—still leaving the future in question.

We anticipate that users will maintain significant leverage until existing supply is absorbed, or there is increased absorption. Pressure on rates will remain in place, and providers with superior connectivity locally and via long haul seem to have the upper hand. The QTS purchase of DuPont Fabros' facility for \$125 million was an impactful event for this market.

Outlook

for Users

- Users in the New Jersey market are still driven by latency.
- Deployments in this market seem to be smaller than other major markets in the U.S.

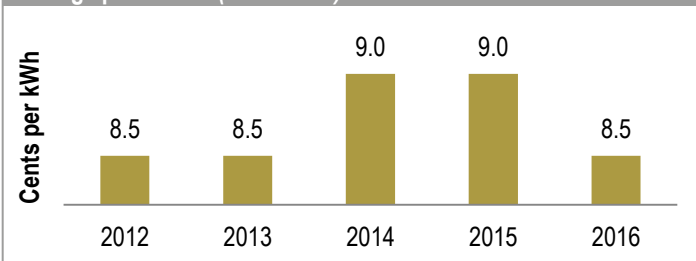
for Providers

- Providers continue to compete for tenants.
- Aggressive pricing structures still exist for credit tenants.

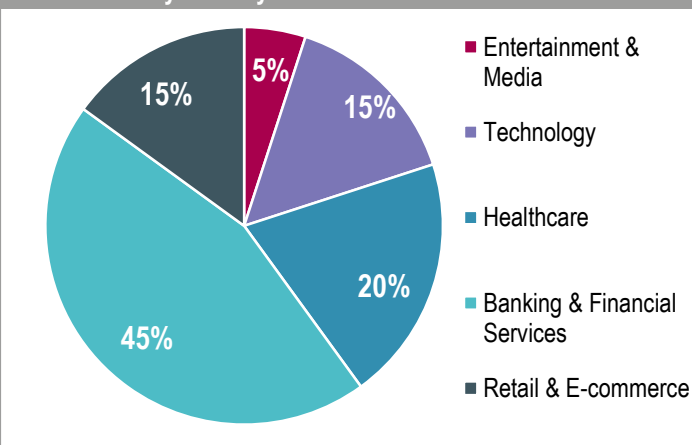
Q2 16 > Q3 16 > Q4 16 > Q1 17 > Q2 17

User favorable market
 Neutral market
 Provider favorable market

Average power rate (cents/kWh)



User demand by industry



2016 significant data center transactions



NEW YORK CITY

Supply

Total inventory: 1.21 m.s.f. / 166 MW
Total commissioned vacant: 156,000 s.f. / 21 MW
Under construction: 45,000 s.f. / 4.8 MW
Planned: 307,000 s.f. / 40 MW

Demand

Net absorption: 2 MW YTD

Rental rates

< 250 kW: \$300 - \$700/kW (all in)
> 250 kW: \$250 - \$500/kW (+E)

Data center overview

Supply in New York state and the New York City metropolitan area has stabilized, and no new providers have entered the market in the last 24 months. In both places, we have observed that third-party colocation providers are taking a “just-in-time” approach to wholesale market demand by increasing supply with a committed lease in hand rather than as forecasted supply. Wholesale market supply generally comes in the form of shell space easily convertible into turnkey space on a six-month average. In the city, Digital Realty, Sabey, and DataGryd are the only competitors, while 1547 in Orangeburg is the only wholesale option outside Manhattan. Overall, retail colocation providers continue to see good absorption and price stabilization, as there is a limited supply of quality space.

Demand has recently been flat. One notable factor is significant vacancy at Sabey’s 375 Pearl, which has been pushing down starting rates throughout the market.

Market trends are being driven by factors like commercial utility rates, which in the state of New York are \$.134/kWh. This may be down \$.026/kWh year-over-year, but it is also 24.2 percent higher than the national average of \$.1015/kWh. Additionally, overall employment growth has been up 2.9 percent year-over-year, a sign of economic vitality that is in turn of value to data center providers.

Outlook

for Users

- Supply has leveled out and retail rental rates have stabilized.
- Wholesale rates are trending down slightly with open vacancies.
- Wholesale users can leverage these trends to negotiate favorable ramp terms and flexible expansion options.
- Cloud Interconnect and managed infrastructure solutions are readily available.

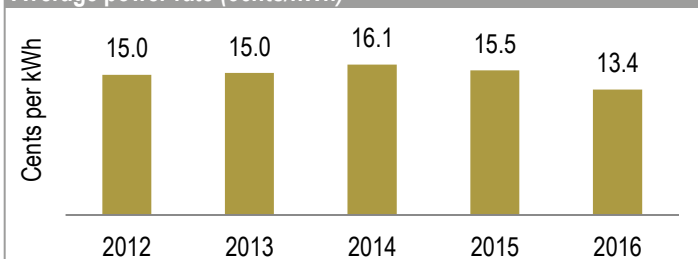
for Providers

- User demand is below the three-year average, with users preferring more favorable conditions in Northern Virginia and healthy supply in New Jersey.
- Supply will no longer be added speculatively.
- Pay as you go models will increase in usage.

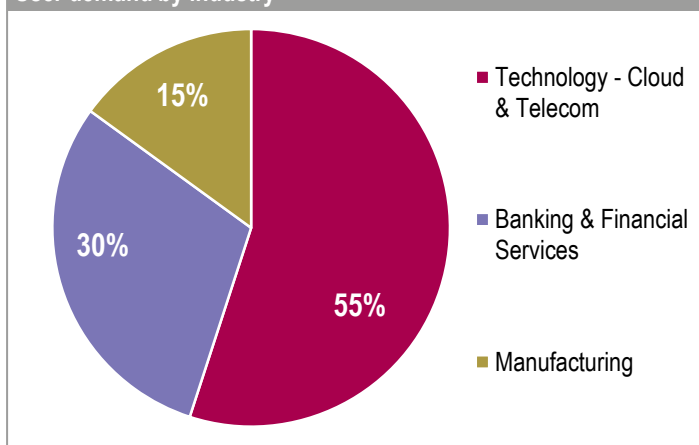
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■ User favorable market
 ■ Neutral market
 ■ Provider favorable market

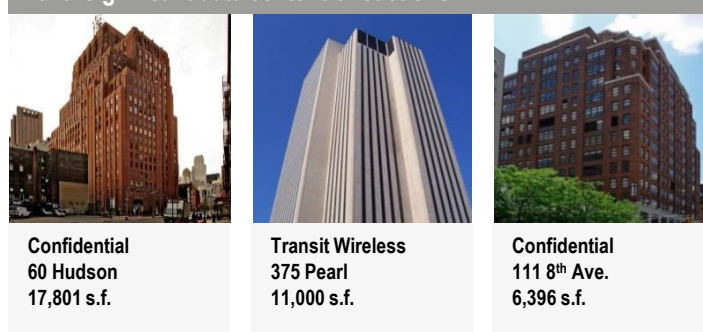
Average power rate (cents/kWh)



User demand by industry



2016 significant data center transactions



NORTHERN VIRGINIA

Supply

Total inventory: 11.2 m.s.f. / 77.6 MW
Total commissioned vacant: 258,615 s.f. / 41.0 MW
Under construction: 1.13 m.s.f. / 103.1 MW
Planned: 2.67 m.s.f. / 290.8 MW

Demand

Net absorption: 78 MW YTD

Rental rates

< 250 kW: \$225 - \$350/kW (all in)
> 250 kW: \$120 - \$130/kW (+E)

Data center overview

Supply in Northern Virginia (NOVA) is experiencing historic annual market demand, making this one of the most active and vibrant data center markets globally. With more than 103 MW of new supply under construction, an abundance of annual demand ensures the new space will be filled rapidly upon completion.

Demand is being driven by a confluence of salient factors making NOVA a dominant expansion market for both new and existing third-party data center providers, as well as cloud providers with their own facilities, thanks to historic absorption and quality enterprise users.

Market trends show providers and enterprise users alike are drawn to NOVA's rich fiber optic networks, low latency, and access to all cloud providers. Three new major TransAtlantic subsea cables (MAREA, BRUSA, and SAEs) will deliver direct connections to Europe, Brazil, and South Africa, significantly reducing dependency on New Jersey or New York—while also providing greater connectivity. Cloud computing, Dot-com 2.0, and new SaaS users also continue to dominate market growth, AWS Direct Connect and Microsoft Azure ExpressRoute are also experiencing rapid growth in NOVA. Absorption is further enhanced by enterprise users and cloud providers that are turning to third-party providers because they can't build their own facilities fast enough to keep up with internal demand. Additionally, NOVA offers an abundance of available power at competitive rates (\$.052/kWh), and proximity to federal government facilities and their burgeoning data center optimization initiatives.

Outlook

for Users

- Historic rent and concessions will continue into 2018.
- Retail colocation pricing will compete aggressively with wholesale.
- Power costs are at record lows and will be predictable for many years.
- Managed services and cloud offering are a significant consideration.

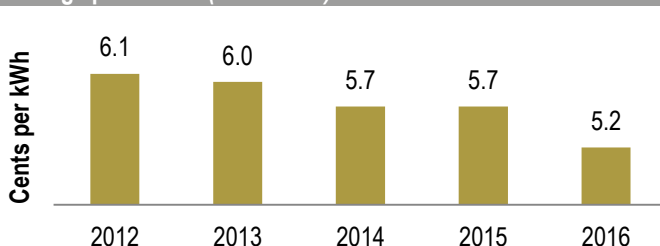
for Providers

- Rent compression will continue into 2018 as providers aggressively compete for users, market share, and participation in market velocity.
- The breadth of competition continues to expand as new providers enter NOVA and attempt to differentiate their service offerings.

Q2 16 > Q3 16 > Q4 16 > Q1 17 > Q2 17

User favorable market
 Neutral market
 Provider favorable market

Average power rate (cents/kWh)



2016 significant data center transactions



Microsoft
CyrusOne
35 MW

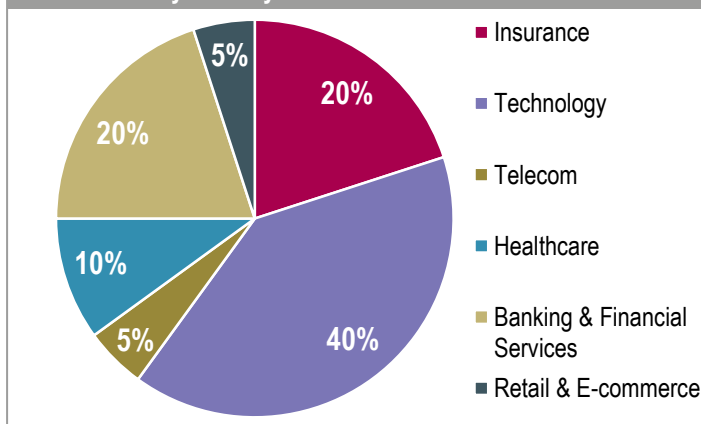


Apple
DuPont Fabros-ACC7
8 MW



New spec project
Sabey
70+ MW

User demand by industry



NORTHWEST

Greater Seattle Area / Central Washington / Hillsboro, Oregon

Supply

Total inventory: 3.725 m.s.f. / 343 MW
Total commissioned vacant: 485,500 s.f. / 53.15 MW
Under construction: 185,000 s.f. / 19 MW
Planned: 431,073 s.f. / 45 MW

Demand

Net absorption: 22.25 MW YTD

Rental rates

< 250 kW: \$250 - \$350/kW (all in)
> 250 kW: \$130 - \$140/kW (+E)

Data center overview

Supply is increasing in the Pacific Northwest due to large expansions by Sabey in Central and Eastern Washington as well as INFOMART in Hillsboro, Oregon. We have also documented interest from multiple large and mid-scale colocation operators looking to break into the Northwest.

Demand is still dominated by the technology industry. While 2015 experienced a few massive MW transactions, 2016 is more in line with standard demand metrics, with many transactions in the 200 kW-2 MW range. We are seeing a new influx of Asian corporations (primarily content delivery networks, e-commerce, and Internet service providers) beginning to establish data centers and routing equipment in the Northwest, while at the same time, aggressive data center expansions by colocation operators and managed hosting providers continues.

Market trends show the region is benefiting from sustainable power, with 80 percent of power estimated to be derived from hydropower. Inexpensive power and tax abatements help total cost of ownership here remain considerably lower than the national average.

Connectivity also plays a major role, with major telecommunications grids being enhanced to service Seattle's robust e-commerce platforms, and resulting in increased demand. New cables are continuing to land, with AWS, Microsoft, and Google all having vested interests in Pacific Submarine cables in Oregon.

Outlook

for Users

- Users can expect new options to be offered for consideration in the next 24 months in Hillsboro, Oregon, and Central Washington.
- Rental rates will remain competitive as the fight for establishment in Hillsboro continues.
- Seattle and Hillsboro are becoming major telecommunications routing hubs; expect more telco transactions.

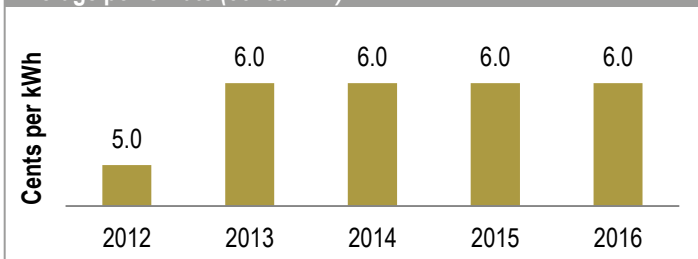
for Providers

- New competitors are expected to enter the market.
- Nearly every existing operator is expanding in the Northwest, which indicates that while supply and competition are increasing, so is demand.

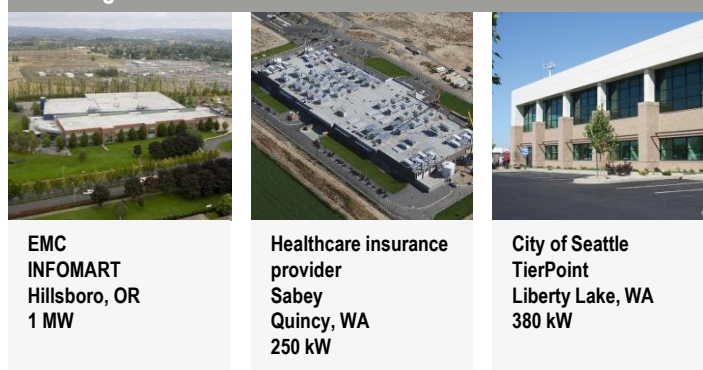
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User favorable market
 Neutral market
 Provider favorable market

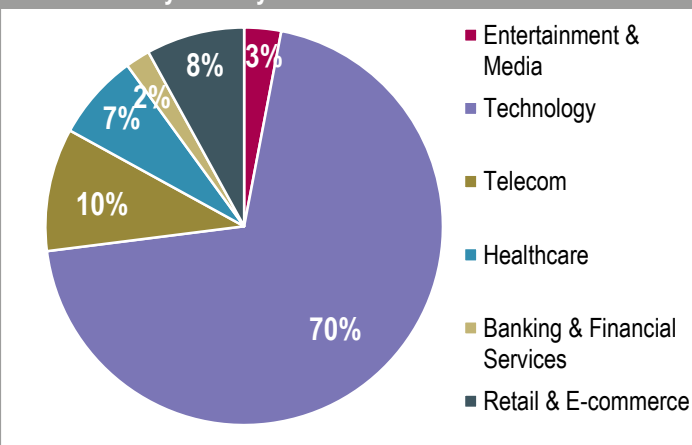
Average power rate (cents/kWh)



2016 significant data center transactions



User demand by industry



PHOENIX

Supply

Total inventory: 1.1 m.s.f. / 143 MW
Total commissioned vacant: 45,200 s.f. / 11 MW
Under construction: 60,500 s.f. / 13 MW
Planned: 386,300 s.f. / 66 MW

Demand

Net absorption: 14.1 MW YTD

Rental rates

< 250 kW: \$250 - \$325/kW (all in)
> 250 kW: \$120 - \$160/kW (+E)

Data center overview

Supply continues to increase due to advances by CyrusOne, currently in production to deliver its fourth building at its Chandler campus, and Aligned Data Centers, which is delivering the first phase of its 550,000 square-foot data center later this year. Local provider PhoenixNAP recently brought online additional turnkey space and power. From an enterprise data center perspective, Apple is in the midst of a \$2 billion transformation of the partially solar-powered global command center.

Demand is predominately driven by West Coast-based companies attracted by the healthy amount of wholesale product available in the greater market. These companies view Phoenix as viable consideration for data center requirements because of the short latency to California while decreasing power and tax costs. With providers racing to deliver new space, demand from end users with regional requirements is expected.

Market trends demonstrate an increased absorption by cloud and Software-as-a-Service (SaaS) companies. This trend has been a result of the migration by enterprises away from traditional data center build-outs as they transition their infrastructure and software needs toward a public or private cloud environment.

Outlook

for Users

- Phoenix is a user-favorable market and provides competitive pricing and flexibility as new supply is delivered.
- New contiguous space will be available when Aligned Data Centers delivers a new product in the fourth quarter.

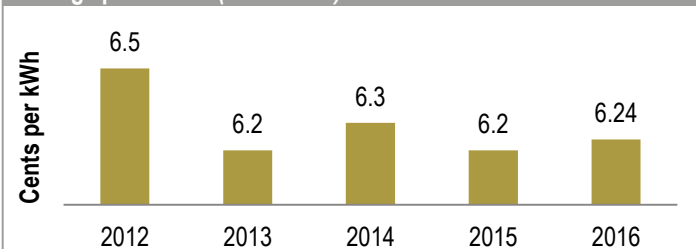
for Providers

- Providers will continue to compete for tenants, as long as turnkey space is available.
- Tenants are beginning to prioritize flexibility for expansion or reduction in square footage and power density.

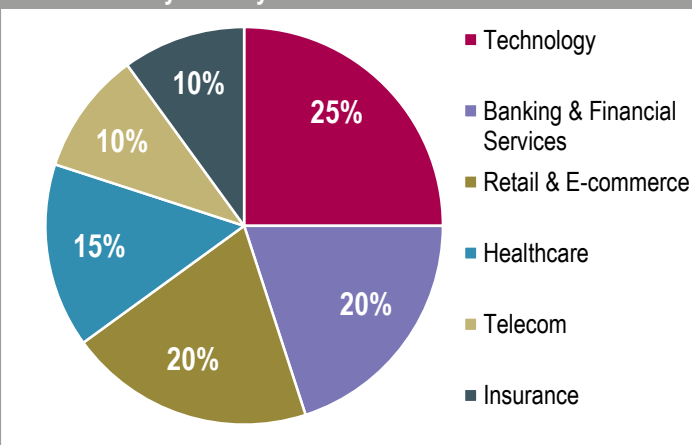
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User favorable market
 Neutral market
 Provider favorable market

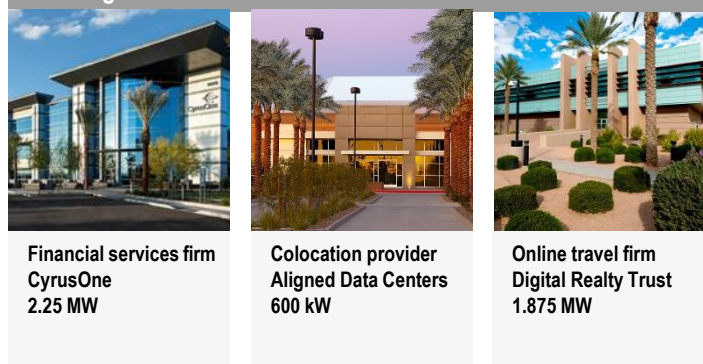
Average power rate (cents/kWh)



User demand by industry



2016 significant data center transactions



SAN FRANCISCO BAY AREA

Supply

Total inventory: 4.6 m.s.f. / 424 MW
Total commissioned vacant: 105,000 s.f. / 17 MW
Under construction: 200,000 s.f. / 18 MW (leased)
Planned: 380,000 s.f. / 43 MW

Demand

Net absorption: 57.6 MW YTD

Rental rates

< 250 kW: \$300 - \$425/kW (all in)
> 250 kW: \$145 - \$175/kW (+E)

Data center overview

Supply remains at historically low levels for turnkey product in the Bay Area, and although several projects are planned, most planned inventory has been leased prior to construction. Absorption in the first and second quarters of 2016 was above the prior year's average, with multiple MW deals signed by cloud providers and software companies. We are also seeing a slight increase in rates and a turn towards a more landlord-driven market, with continued demand for new product—and scarce potential development space. In downtown San Francisco, the market is mostly made up of three buildings: 365 Main Street (mostly retail space with no available capacity), 200 Paul Street (60,000 square feet availability but only 4 MW power), and 400 Paul (200,000 square feet coming online in the first quarter of 2017).

Demand has been robust in 2016, with increased activity over 2015. Low inventory levels and a lack of construction suggest pricing will climb on wholesale and colocation leasing rates. Meanwhile, local technology companies, mobile apps, and cloud requirements also continue to drive growth.

Market trends show power rates are a driving factor in the area, with Santa Clara garnering interest for having some of the lowest power rates in California.

Outlook

for Users

- Expect supply to remain constrained and inventory to become very tight.
- Pricing will remain stable in the short term, then trend upward later in the year.
- Available contiguous space will be priced at a premium.

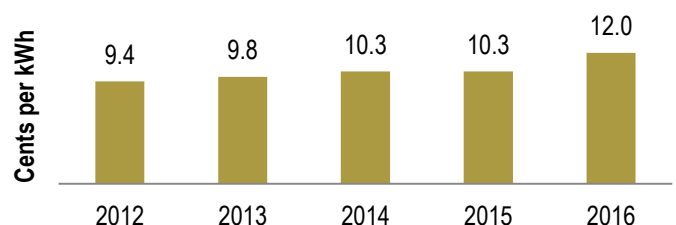
for Providers

- CoreSite, Vantage, DuPont, and Digital Realty will need to find new locations to build new product.
- Users will be looking for flexibility of N and N+1 redundancy.
- Inventory will be key to ensuring the continued organic growth of users.

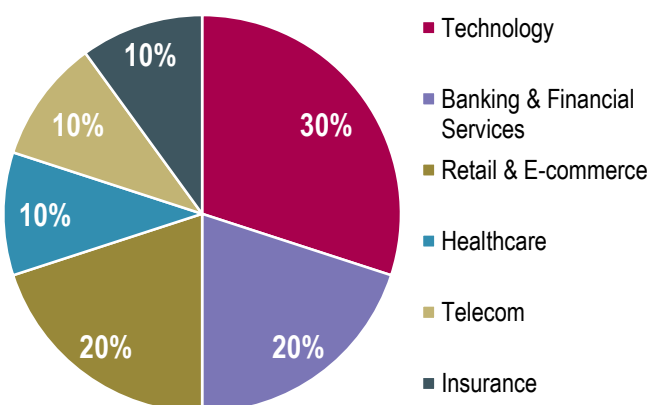
Q2 16 > Q3 16 > Q4 16 > Q1 17 > Q2 17

■ User favorable market
 ■ Neutral market
 ■ Provider favorable market

Average power rate (cents/kWh)



User demand by industry



2016 significant data center transactions



**SoftLayer
InfoMart**
San Jose, CA
2.6 MW



**AWS
CoreSite**
Santa Clara, CA
20 MW



**Microsoft
Vantage**
Santa Clara, CA
9 MW

GREATER MONTRÉAL AREA

Supply

Total inventory: 344,000 s.f. / 114 MW
Total commissioned vacant: 82,700 s.f. / 12 MW
Under construction: 324,000 s.f. / 80 MW
Planned: 393,000 s.f. / 115 MW

Demand

Net absorption: 8 MW YTD

Rental rates

< 250 kW: \$280 - \$460/kW (all in)
> 250 kW: \$160 - \$220/kW (+E)

Data centre overview

Supply has been increasing dramatically across Montréal—a trend that we anticipate continuing. New data center facilities completed include locations from COLO-D, Hypertec, Metro Optic, ROOT, Urbacon, and Videotron; CogecoPEER1 also recently launched its newest facility. We expect users to maintain significant leverage until existing supply and new construction is absorbed, most likely by mid-to-late 2017. By late 2017, lower vacancy should give providers the leverage to raise rates and scale back on incentives.

Demand is predominantly coming from cloud providers and technology firms, with additional activity from the gaming, insurance, financial, technology, hospitality, and healthcare sectors. New data sovereignty laws and the low cost of electricity are two of the main drivers of this diverse demand.

Market trends show cloud-based demand has risen dramatically in the Montréal market, with significant transactions now complete with AWS and Microsoft absorbing large amounts of capacity.

Utility rates here remain the lowest in Canada, at approximately CAD\$.052 per kWh, and are expected to remain stable, thanks in part to the area's ample hydroelectric supply. Our expectation is that the market will become stronger in the near future, despite slow growth over previous years.

Outlook

for Users

- Users are increasingly looking more at powered shell wholesale colocation opportunities, since high quality built out options are minimal.
- Pricing should become more competitive as more supply comes to market.
- Tax incentives are available for users tapping more than 5 MW.

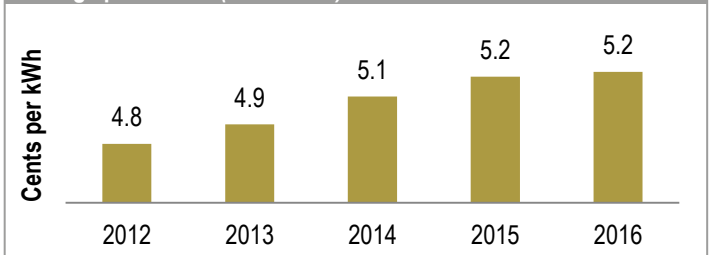
for Providers

- The significant amount of planned developments may have an impact on future pricing (downward pricing).
- Demand seems to be shifting from retail to cloud, and wholesale colocation with future cloud growth expected.

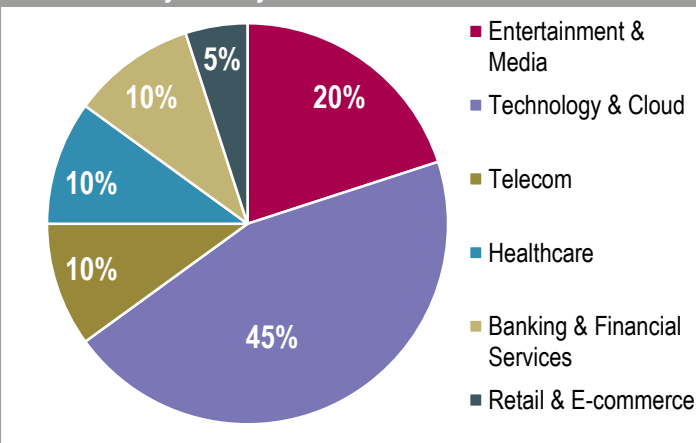
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User favorable market
 Neutral market
 Provider favorable market

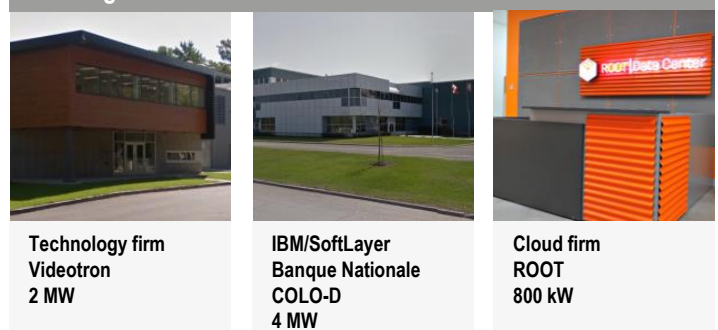
Average power rate (cents/kWh)



User demand by industry



2016 significant data centre transactions



GREATER TORONTO AREA

Including Barrie & Kitchener/Waterloo Region

Supply

Total inventory: 1.14 m.s.f. / 174 MW
Total commissioned vacant: 229,000 s.f. / 46 MW
Under construction: 155,000 s.f. / 21 MW
Planned: 224,000 s.f. / 42 MW

Demand

Net absorption: 10 MW YTD

Rental rates

< 250 kW: \$225 - \$700/kW (all in)
> 250 kW: \$150 - \$190/kW (+E)

Data center overview

Supply is stable at the moment—but we see the potential for a market shift when two significant developments planned by DuPont Fabros and SuperNap come online. While both developments have been rumored for months, definitive plans have yet to be released. ICE Datacenters' purchase of the former HP enterprise data center will also add roughly 4 MW of new supply to the market in 2017. Interest in data center space continues to grow amongst both wholesale providers and enterprise users outside the financial core, and the rarity of second-generation facilities is translating into additional lag time for new supply to enter the market.

Demand is moving from a moderately balanced appetite between retail and wholesale from previous years, toward a heavier focus on the wholesale market. Several wholesale deals are now pending that should significantly absorb existing vacant space—and in turn reinforce decisions for new wholesale developments in the area.

Market trends show growing momentum for the cloud, with many cloud-based providers rapidly expanding within the market—seemingly undeterred by the fact that utility rates are still rising.

Outlook

for Users

- Rents have not changed dramatically over the past 24 months, however, we expect marginal price softening in 2017.
- We recommend a full review of the market when considering a renewal or new deployment, as some providers are willing to stretch below the perceived market floor on pricing.

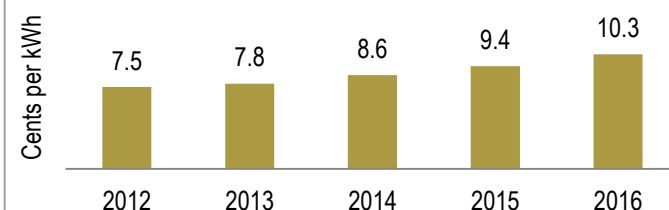
for Providers

- Retail demand seems to be softening, with a shift to a growing wholesale market.
- Planned new developments may have future pricing impact for existing providers with available space.

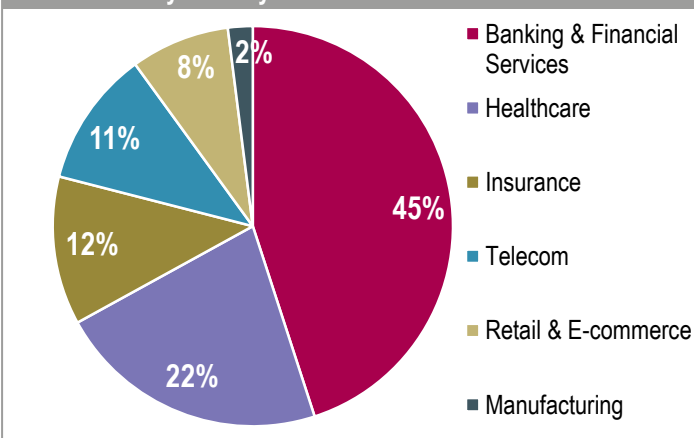
Q2 16 > Q3 16 > Q4 16 > Q1 17 > Q2 17

User favorable market
 Neutral market
 Provider favorable market

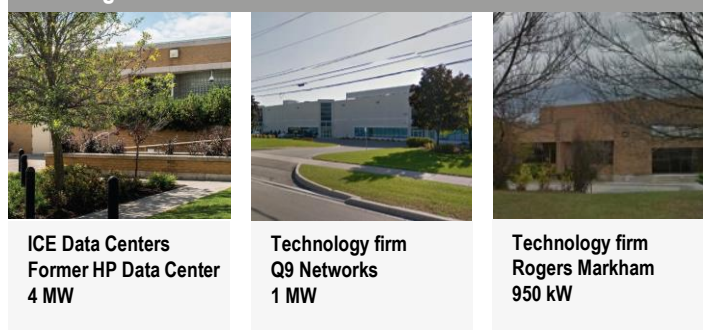
Average power rate (cents/kWh)



User demand by industry



2016 significant data center transactions



WESTERN CANADA

Vancouver BC / Calgary AB

Supply

Total inventory: 900,000 s.f. / 174 MW
Total commissioned vacant: 132,000 s.f. / 46 MW
Under construction: 20,000 s.f. / 2 MW
Planned: 112,000 s.f. / 10 MW

Demand

Net absorption: 7.2 MW YTD

Rental rates

< 250 kW: \$300 - \$400/kW (all in)
> 250 kW: \$200 - \$250/kW (+E)

Data center overview

Supply in Calgary is holding steady, owing to the fact that there have been no significant builds since expansions by Shaw and Rogers. Some developments that had been planned for the area have since been postponed due to oil market volatility.

In Vancouver, supply is extremely limited, which is putting upward pressure on pricing. As a result, a few established operators such as Cologix are evaluating expansion opportunities in the area.

Demand is continuing in Calgary, despite low oil prices, due to its strategic telecommunications grid and low risk environment. Demand in Vancouver is also on the rise, with content delivery networks and e-commerce entities establishing data centers locally to tap into the affluent community and sufficiently robust telecommunications grid.

Smaller markets, including Edmonton and Kamloops/Kelowna offer extremely limited options, and are not likely to grow this cycle.

Outlook

for Users

- The Calgary area has a limited amount of options to consider, unless the geographic search parameters are widened.
- Vancouver is expected to receive additional supply in the next 18 months, which may stabilize pricing.

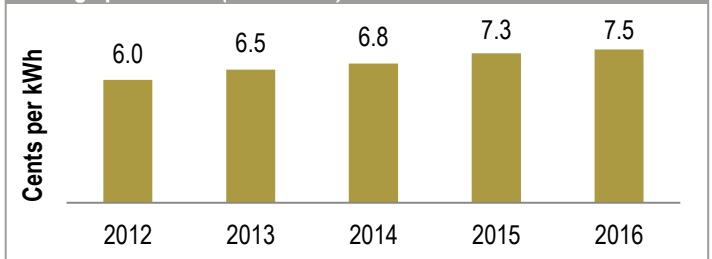
for Providers

- Calgary is expected to continue solid growth as it better connects with the data center community in Toronto.
- Vancouver has limited options suitable for data center conversion, so providers would do well to look for off-market opportunities only.

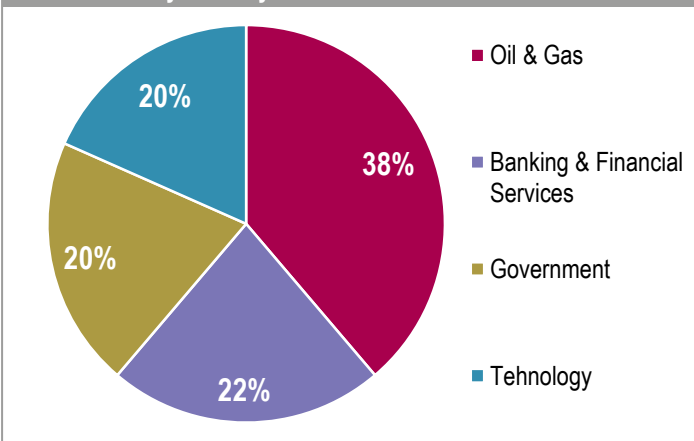
Q2 16 > Q3 16 > Q4 16 > Q1 17 > Q2 17

User favorable market
 Neutral market
 Provider favorable market

Average power rate (cents/kWh)



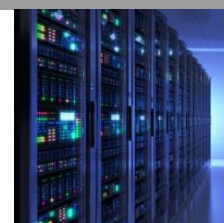
User demand by industry



2016 significant data center transactions



Centrilogic
 Confidential location
 Vancouver, BC
 250 kW

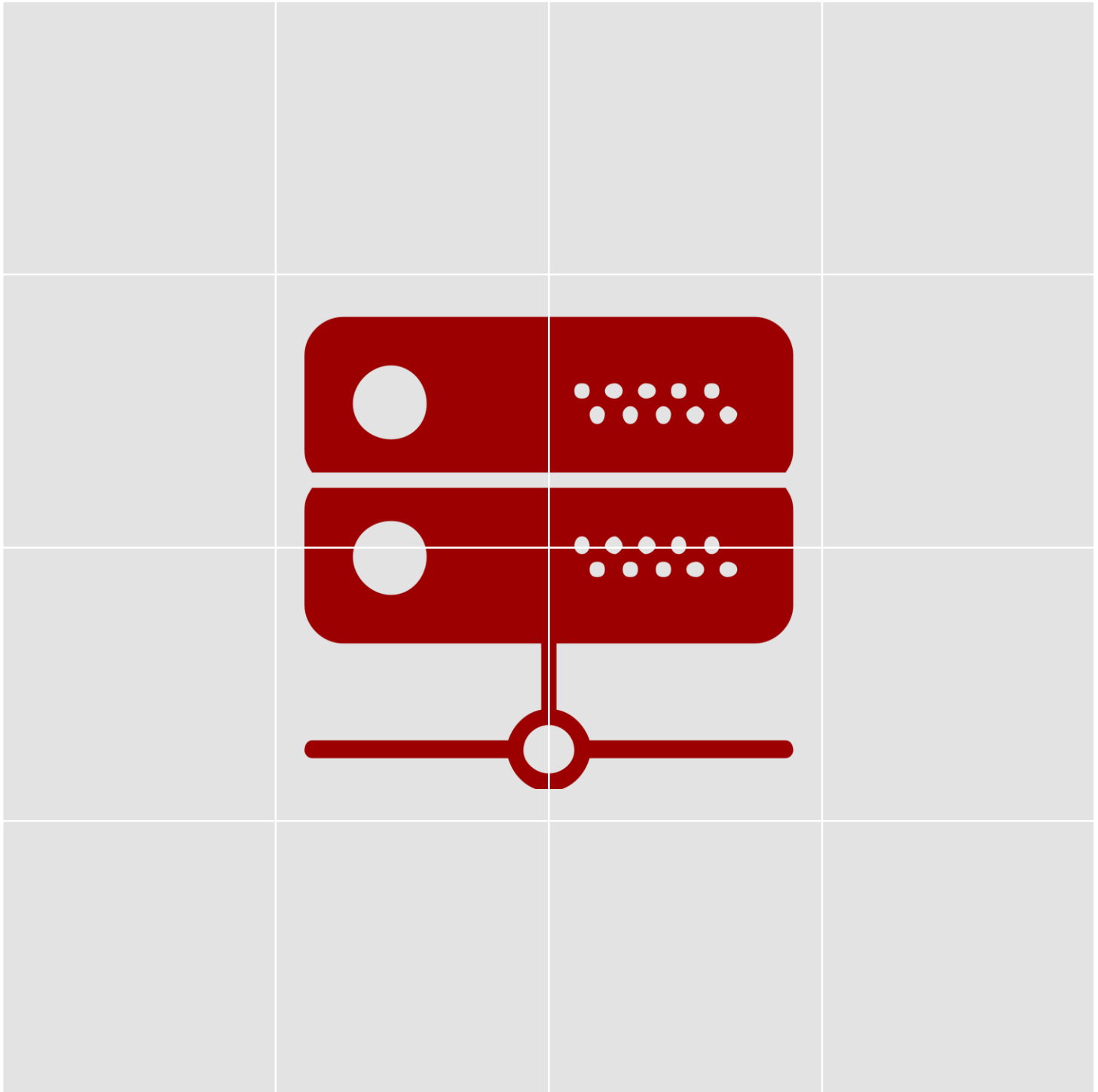


Oil/gas firm
 Rogers
 Calgary, AB
 250 kW



Tech firm
 Q9
 Calgary, AB
 ~300 kW

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