



Potential Impact of a Data Center Incentive in Illinois

Prepared For: The Illinois Chamber of Commerce Foundation

Report

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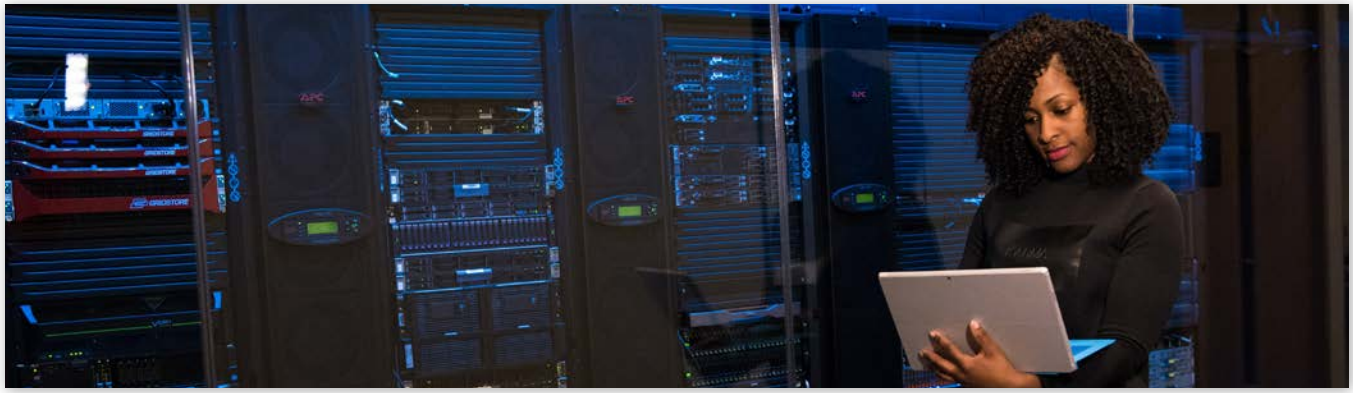
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Executive Summary

This report compares the disparity of data center capital investment growth and jobs created between Illinois and neighboring and competitive states and examines the state tax policies used to attract and grow the industry.

In an increasingly digitally-connected world, data centers are critical infrastructure facilities providing for the storage and transmission of data related to financial services, health care, retail, transportation, telecommunications, academia, entertainment, and almost every industry. Additionally, data centers are essential to the functioning of all networked, computer-centric devices, such as smart phones and tablets, and GPS systems. Data centers are part of the core infrastructure that supports the technology sector and constitute the backbone of the modern economy. Nearly every business operates a data center, either in-house or as a contracted service. Data centers are special real estate assets that require multimillion-dollar, up-front capital investments and on-going operating and maintenance costs, as the computer equipment is refreshed on a two- to three-year cycle. As the world's economy continues its reliance upon digital information, the need for facilities to store and transmit the ever-expanding universe of data will continue to grow.

The area around Chicago accounted for 93 percent of employment in Illinois' data center industry. According to CBRE, the Greater Chicago area is the third largest data center market in the United States, but the rest of the state of Illinois has very few data centers. While the Chicago market is large, it is 40 percent smaller than the size of the Northern Virginia market. And it is growing much more slowly than other major markets. According to CBRE, from June 2017 to June 2018, the Chicago data center market grew at a rate of 7 percent. At the same time, the Atlanta market grew 12 percent, the Northern Virginia market grew 16 percent, and the Phoenix market grew 26 percent.

The data center industry's total 2017 economic impact on Illinois was approximately 31,500 jobs, \$2.4 billion in labor income, and \$7.1 billion in economic output. Illinois data centers generated a total of approximately \$877.5 million in tax revenue in 2017, of which \$321.7 million was state and local tax revenue.¹ Construction expenditures for new data centers in Illinois were \$122.3 million in 2017, including \$54.1 million in labor income for 820 construction workers.

¹ It is important to realize that this \$321.7 million estimate of state and local taxes paid by the data center industry in 2017 is comprised of all state and local taxes paid by the industry. As such, it would include all government revenue from property taxes, sales taxes, corporate income taxes, electricity excise taxes, license fees, and all other applicable taxes at both the state and the local levels. Data to disaggregate this overall state and local tax estimate is not available.



Illinois showed significantly weaker growth in data center markets than any of the surrounding states that have data center incentives. The data center markets in the state of Illinois beyond the Chicago area have not been doing as well as the markets in surrounding states that have data center incentives.

The data center industry in Illinois under-performs the nationwide trends for the data center industry in terms of growth in employment and wages.

In addition to providing capital improvements that add to Illinois' tax base, this capital investment also fuels an on-going demand for data center construction which often uses union labor. This has particular relevance for Illinois, where employment growth in the state's construction sector has lagged behind the national norm in recent years.

Today, 30 states (from Washington to Florida, New York to Arizona) have incentives that are specifically targeted at attracting data centers as part of expanded economic development efforts. However, 24 of these states have enacted legislation since 2012 in an effort to capture a greater percentage of the growth. Illinois is surrounded by states that offer data center incentives.

If a large data center were to be located in Illinois like the one that Apple is building in Waukegan, Iowa, the potential total economic impact on the Illinois' statewide economy would be approximately 3,360 jobs, \$203.9 million in labor income, and \$521.7 million in economic output. That much economic activity would generate approximately \$66.7 million in tax revenue, of which \$20.2 million would be state and local tax revenue.

Hammond, Indiana was selected as the site for a new data center because of its proximity to Chicago and the "tax-friendliness" of Indiana. It could be a harbinger of more data center development on the significant amount of underutilized property in Hammond, East Chicago, and Gary, Indiana. Significant data center development in the Indiana suburbs of Chicago would likely slow growth in Illinois, especially in the Chicago suburbs.



Industry Trends

There are many ways to define data centers. For practical purposes, a data center is any building that contains networked computer equipment that stores, processes, or distributes large amounts of data. There are also many different business models in the data center industry. For simplicity we can divide them into enterprise data centers and colocation data centers.

Enterprise data centers are constructed, maintained, and operated by one enterprise for the data needs of only one company. They may be built and managed by the same company that houses its data there, or they may be built or managed by one firm to serve one other firm. (This latter type is often referred to as a wholesale or managed hosting data center.) Think of enterprise data centers as detached single-family homes for data centers. The enterprise data centers that receive the most attention store the data of the giant IT companies that are household names. However, other very large data centers serve lesser-known companies, like telecommunications, biotechnology, or insurance companies. Enterprise data centers serve companies who are in a line of business other than hosting data.

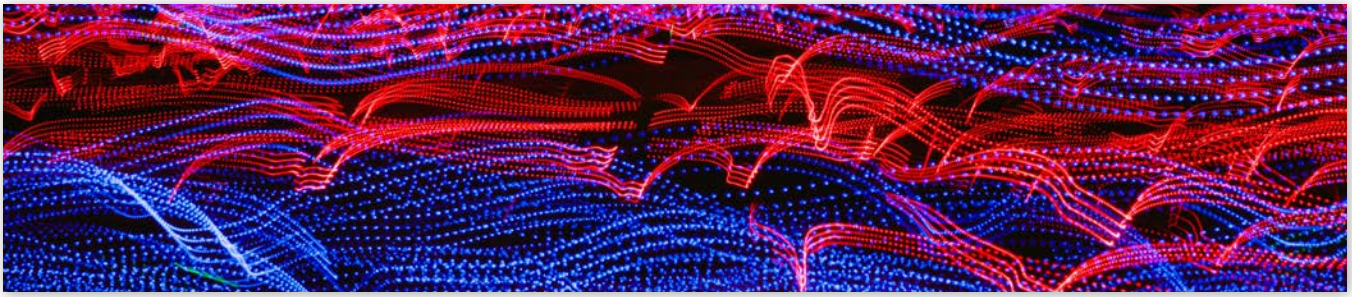
Colocation data centers are usually large buildings that serve multiple business tenants, including giant IT companies. Think of them like shopping malls for data centers. The colocation company rents out its data center space to multiple companies who co-locate their data inside sharing some common building components. Storing data is the primary line of business of colocation data center companies.

Additional information related to this section is provided in the Appendix.

DATA CENTERS AND THE MODERN ECONOMY

Ninety percent of the data stored today was created in the last two years.² That statistic is not a static estimate, but the result of an increasingly connected, electronic world. The trend is expected to continue and even increase as more and more connected devices roll out in the internet of things, autonomous vehicles, and as artificial intelligence is increasingly employed to get productive value out of the accumulated data.

² IBM, 10 Key Marketing Trends for 2017 and Ideas for Exceeding Customer Expectations.



Smart city technologies will depend on access to large amounts of real-time and historical data from connected devices of various types to learn behavioral patterns, adjust algorithms, and efficiently allocate municipal resources. The volume of data needed for this is startling. For example, just one of Google's self-driving automobile generates one gigabyte of data for every second of operation, totaling two petabytes per year per vehicle.³ That data along with data from manually controlled vehicles will not remain on the vehicle or only locally at small edge data centers. Instead, this data on vehicle route, speed, the wear on components, and road conditions will be stored by vehicle manufacturers in large data centers to analyze, adjust, and inform algorithms.

Pharmaceutical and biotechnology companies rely on computer modeling of chemical compounds in drug development based on stored clinical trial data. With telemedicine technologies, patients can transmit their health data to distant medical professionals and receive diagnoses and care in real time. All of this health-related data needs to be stored for analysis, archiving, insurance, and billing purposes.

To reduce the chance that data will be permanently lost, it is often stored redundantly in several diverse locations. Businesses of all types are increasingly moving data from on-premises storage to publicly-provided cloud services.⁴ The need for data centers is increasing at a much higher rate than the increase in the capacity of data storage devices. For the foreseeable future, the world will need an increasing number of data centers to maintain data in secure and accessible environments.

THE CHICAGO AND ILLINOIS MARKETS FOR DATA CENTERS

Chicago is one of the most important geographic locations in the internet age. It is the third largest city in the nation and the population of its metropolitan area is more than twice the size of the next nearest area in the Midwest, representing a large volume of consumers, participants, and producers in many online aspects and venues. The high-speed financial trading that occurs downtown with other financial exchanges around the globe provides a high and stable demand for high-end connectivity. When there were only a four network access points for the internet in the United States, one was in Chicago – the only one in the Midwest. Combined with relatively low costs of electricity and few environmental risks, these factors and more have made the City of Chicago and its suburbs a prime location for both giant enterprise and colocation data centers.⁵ Most of the major data center companies have multiple facilities in the city or just outside of it. According to CBRE, Chicago is the third largest data center market in the United States with

³ Dataflog, "Self-driving Cars Will Create 2 Petabytes Of Data, What Are The Big Data Opportunities For The Car Industry?"

⁴ PricewaterhouseCoopers, Enterprise data center buyer survey and interview insights, October 2017.

⁵ Data Center Frontier, *Special Report: Chicago Data Center Market*, 2016.



245 MW of electricity capacity.⁶ For comparison, ahead of Chicago are Northern Virginia (805.8 MW) and Dallas/Fort Worth (267.8 MW). And just trailing Chicago are the Silicon Valley (234.6 MW) and Phoenix (212.9 MW). However, the Chicago market is growing much more slowly than other major markets. According to CBRE, from June 2017 to June 2018, the Chicago data center market grew at a rate of 7 percent. At the same time, the Atlanta market grew 12 percent, the Northern Virginia market grew 16 percent, and the Phoenix market grew 26 percent.⁷

Outside of Chicago and the suburbs adjacent to O'Hare Airport, the rest of the state of Illinois has very few data centers. In the following sections of the report we will go into this stark contrast of the Chicago area with the rest of the state in more detail and explore what may stimulate growth throughout Illinois.

The same was once true of the data center market in the state of Virginia – until data center incentives were enacted. Prior to Virginia's passage of its data center incentive, data centers were heavily concentrated in Ashburn, Virginia. Ashburn is a small town in a distant suburb of Washington, DC that was another one of the four original network access points of the internet. Data centers were drawn there for many of the same reasons that they are drawn to Chicago – especially connectivity. However, there were no data centers to speak of elsewhere in the state. As we will explain later, shortly after the Virginia General Assembly enacted a data center tax incentive, Microsoft announced its intention to build its Boydton data center campus, the East Coast hub for Microsoft's online services, in Mecklenburg County – one of the most rural areas near the southern edge of the state. In 2010, the facility represented an investment of \$499 million in a county with less than 33,000 people. Since that time the campus has been expanded five times for a total investment of almost \$2 billion and employing 250 people.⁸

Since that time significant investments in data centers have also occurred

- in parts of Northern Virginia that are distant from the important internet infrastructure in Ashburn,
- on a brownfield location north of Richmond near the center of Virginia, and
- in the Virginia Beach area at the southeastern tip of the state.

All of those locations are places where there were no data centers before. Tax incentives were important parts of the package that local economic development officials used to attract the data center investments in each case.

⁶ CBRE, *Data Center Trends Report, H1 2018: Surging Demand from Large Cloud Users Driving Record Absorption*. The greatest restraint on data center capacity is the availability of electricity rather than the square footage of the building. Therefore, the best measure of data center capacity is the amount of available electrical power that the data center has in terms of megawatts (MW).

⁷ Calculations using data from CBRE, *Data Center Trends Report, H1 2018: Surging Demand from Large Cloud Users Driving Record Absorption* and CBRE, *Data Center Trends Report, H2 2017: Hybrid IT Solutions Continue to Bring Opportunity to the Data Center Industry*.

⁸ Richmond Times Dispatch, "Microsoft announces fifth expansion to data center in Mecklenburg County, creating 44 jobs," November 9, 2016.



ILLINOIS (BEYOND CHICAGO) AND SURROUNDING STATES

Before we consider the data center market in the state of Illinois in detail, it is worth comparing the data center markets in Illinois with those in the surrounding states. In doing so we will focus only on the markets in Illinois that are outside of the Chicago area. The data center market of Chicago is not comparable to that of Peoria, Illinois or even that of St. Louis, Missouri. But the data center markets of Peoria and St. Louis are comparable. That is what we do here.

The relative strength of the data center market in Chicago belies the general weakness of the data center market in the rest of Illinois. The easiest way to see the extent of the weakness is to look at how the metropolitan statistical areas in Illinois beyond the Chicago area compare to the metropolitan statistical areas in Missouri, Iowa, Wisconsin, and Indiana in terms of data centers added or lost over time. Figure A uses data on the number of data processing establishments⁹ in the standard metropolitan statistical areas in Illinois and surrounding states.¹⁰ We use the time period of 2004 to 2017 because that is the longest period of time for which a meaningful amount of data is reported for the industry.

Several things stand out from the map. Indiana shows only growth or at the very least stability. Over the time period, the data center markets in Indiana grew by up to 700 percent, and no markets showed a decline. The state with the next greatest strength is Iowa. The market in the Ames area grew by 700 percent over the period, and the Dubuque area market grew by 200 percent. A couple of Iowa markets showed declines, but none by more than 25 percent. In the Racine and Madison, Wisconsin markets there were increases of over 100 percent, while only one metropolitan area in the state declined during the period. Missouri shows mixed results, but the market in the Columbia area increased by 100 percent, while the largest decline for any area in Missouri was 33 percent. Like Missouri, Illinois (excluding Chicago) shows mixed results, but its strongest growing markets grew less than the strongest markets in any of the surrounding states and of the declining markets, they declined more than any of the markets in the surrounding states. In the Illinois markets where there were declines, they were deeper than markets in any of the surrounding states where there were declines. Also, all of the states surrounding Illinois had markets where there were increases greater than the markets that had increases in Illinois.

In sum, the Midwest state without data center incentives, Illinois, showed significantly weaker growth in data center markets than any of the other states that do have data center incentives. And it is important to consider that these are the results for the period of time when the world-

⁹ We explain this data in detail in sections that follow.

¹⁰ The data center markets in the metropolitan areas of Kentucky are so small that we do not study them here.

wide market for data centers was growing. So, while the data center market in the Chicago area may have been doing well, these data seem to indicate that the data center markets in the rest of the state of Illinois have not been doing nearly as well as the markets in surrounding states that have data center incentives.

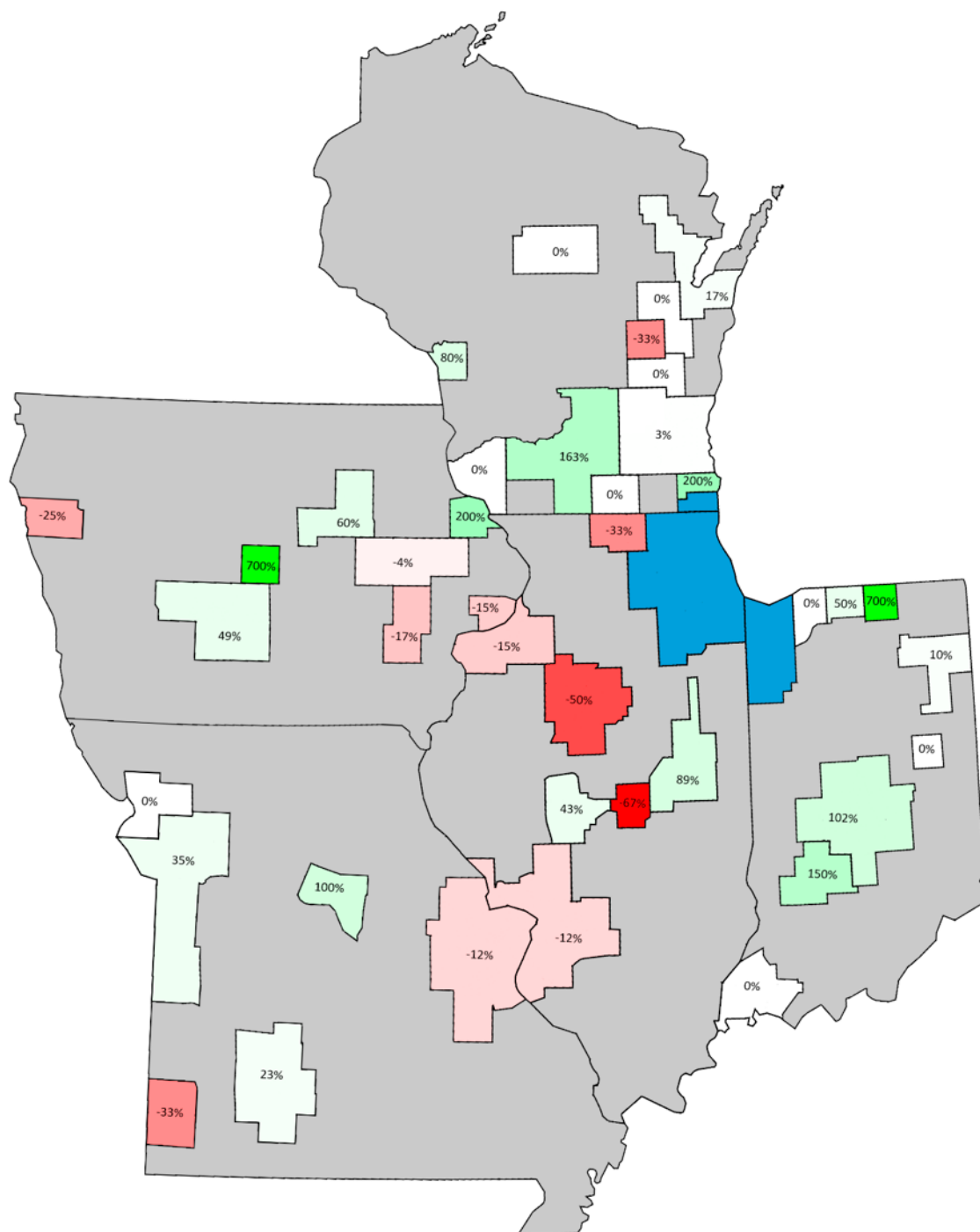


Figure A: Change in Number of Data Processing Establishments from 2004 to 2017 in Select Midwestern Metropolitan Statistical Areas¹¹ (shading indicates degree of change)

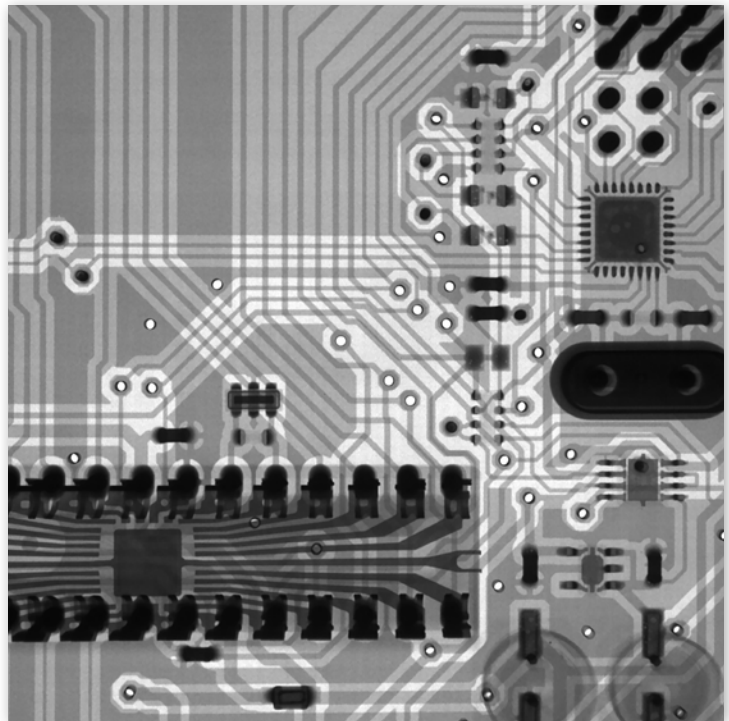
¹¹ Source: Bureau of Labor Statistics, NAICS 518210. Some metropolitan statistical areas did not have enough establishments during the period for BLS to release statistics. See the appendix for this section for identification of the MSAs.



ILLINOIS AND VIRGINIA

Illinois and Virginia are comparable on many points. Both have a very large metro area in the northern parts of the states (Greater Chicago and Northern Virginia/Washington, D.C.). Both have smaller state capitals. Both have some other urban areas. Both have very rural areas. Both have a core reason for data centers to be attracted to the very large metro area. Chicago and Ashburn, Virginia were both on the list of the 5 original major internet hubs. Chicago has the commodity and options trading financial markets and Ashburn has the legacy tech industry headquarters. In 2012, Northern Virginia had about 50 percent more square feet of data centers than the Greater Chicago Area. By 2016, Northern Virginia had almost 100 percent more square feet than the Greater Chicago Area. In 2012, Virginia updated its data center incentive. Illinois still does not have a specific data center incentive. From 2012 to 2016, Northern Virginia grew about 40 percent, while over the same period the Greater Chicago Area grew by about 20 percent.¹²

The contrast between the two states deepens when considering activity outside of the Greater Chicago Area and Northern Virginia. Soon after the Virginia incentive was enacted, Microsoft announced its data center project in Mecklenburg County. Since then Microsoft has invested \$2 billion in the county. QTS has undertaken a large expansion of its data center in Henrico County. Facebook has the potential to invest \$3 billion at its data center campus in Henrico County. NxtVn's data center at Virginia Beach could be expanded to \$2 billion. Several other data centers are being developed in Virginia Beach. In Illinois, outside of the Greater Chicago Area, there are no data centers of any size or significance contributing to economic development growth.





The Data Center Industry's Current Contribution to Illinois

In this section, we provide an analysis of the contribution that the data center industry currently makes to the state of Illinois. Additional information related to this section is provided in the Appendix.

REGIONAL DATA CENTER TRENDS

In this portion of the section we look at data center industry trends in Illinois at a regional level. To define those regions, we employ the ten Economic Development Regions used by the Illinois Department of Employment Security and the Illinois Department of Commerce and Economic Opportunity (DCEO).

The Bureau of Labor Statistics is not allowed to report employment and wages in those instances where public release of those data might enable third parties to identify employment and wages in an individual business. For that reason, of the 10,229 private sector data center industry jobs that the Bureau of Labor Statistics reported statewide in Illinois in 2017, sub-state data are only available for 8,536 of those jobs.



Figure B depicts the sub-state distribution of those 8,536 private sector data center jobs in 2017. As this chart shows, the Bureau of Labor Statistics reported data center employment in only four of Illinois' ten Economic Development Regions that year. The Northeast Economic Development Region (which encompasses the Chicago area) accounted for 93 percent, or by far the largest proportion, of that employment.¹³ While the East Central Economic Development Region¹⁴ (which encompasses the Champaign-Urbana area) accounted for five percent, and the Central Economic Development Region¹⁵ (which encompasses the Springfield area) and the North Central Economic Development Region¹⁶ (which encompasses the Bloomington-Peoria area) accounted for one percent each.

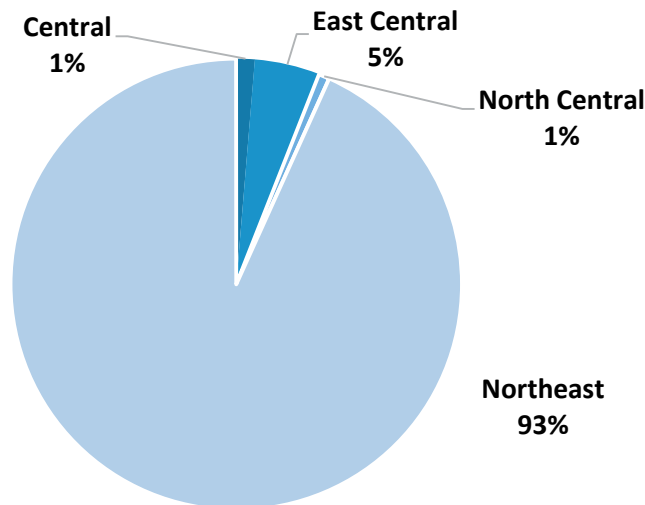


Figure B: Regional Distribution of Private Sector Employment in the Data Center Industry in Illinois in 2017¹⁷

We can look at trends in regional private sector employment in the data center industry over the ten-year period from 2008 through 2017. Data center employment in the Central Region remained essentially flat over the period, rising from 107 jobs in 2008 to 112 jobs in 2017 (a net gain of five jobs, or 4.7 percent of regional industry employment, over the period). Data center employment in the East Central Region rose from 214 jobs in 2008 to 448 jobs in 2015 and then slipped back to 398 jobs in 2017 (a net gain of 184 jobs, or 86 percent of regional industry employment, over the period). While data center employment in the North Central Region was not reported in four years of the period and came in at 66 jobs in 2017.

In the Northeast Region over the same period, employment slipped from a high of 8,771 jobs in 2007 to a low of 6,577 jobs in 2012, and then rebounded to 7,960 jobs in 2017 (a net loss of 811 jobs, or 9.2 percent of regional industry employment, over the period).

¹³ The Northeast Region is comprised of the counties of Cook, DeKalb, DuPage, Grundy, Kane, Kankakee, Kendall, Lake, McHenry, and Will.

¹⁴ The East Central Region is comprised of the counties of Champaign, Douglas, Ford, Iroquois, Piatt, and Vermillion.

¹⁵ The Central Region is comprised of the counties of the counties of Cass, Christian, Greene, Logan, Macon, Macoupin, Menard, Montgomery, Morgan, Sangamon, Scott, and Shelby.

¹⁶ The North Central Region is comprised of the counties of DeWitt, Fulton, Livingston, McLean, Marshall, Mason, Peoria, Stark, Tazewell, and Woodford.

¹⁷ Source: U.S. Bureau of Labor Statistics.



Figure C depicts the number of private sector data center establishments in the Northeast Region from 2008 through 2017. As these data indicate, the number of establishments rose from 430 in 2008 to 516 in 2014, and then slipped 378 in 2017 (a net loss 52, or minus 12.1 percent). It is worth noting that the growth in the number of data center establishments in the region reverses direction and becomes a decline shortly after many states implemented data center incentives in 2012.

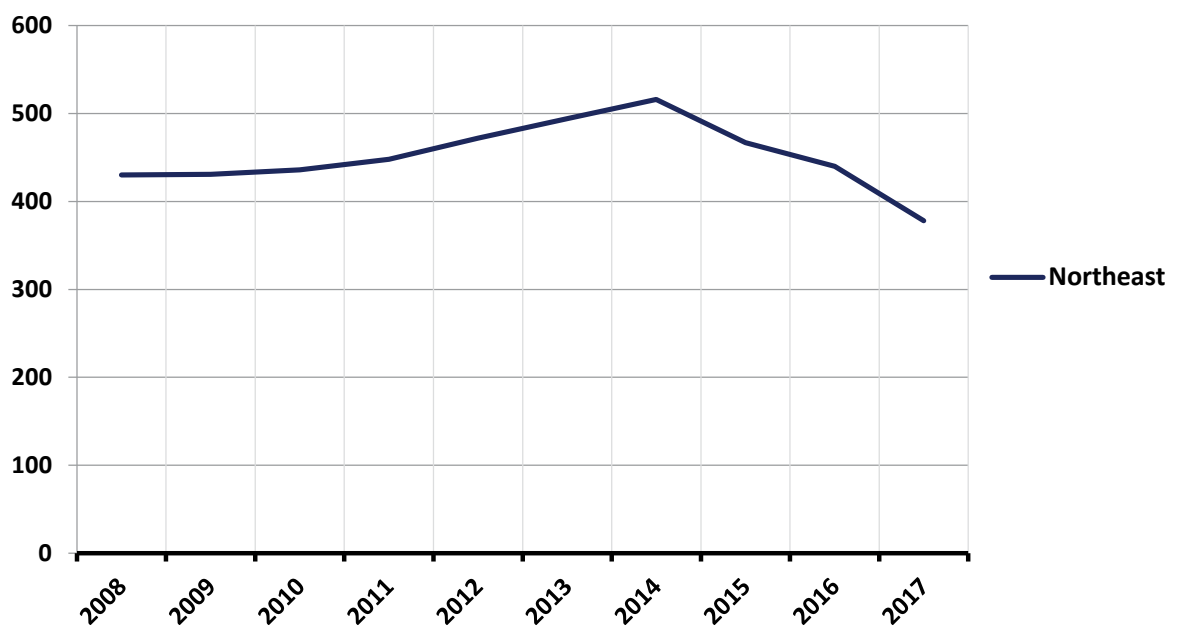


Figure C: Regional Private Sector Data Center Industry Establishments – 2008 to 2017¹⁸

¹⁸ Source: U.S. Bureau of Labor Statistics.



Figure D depicts average annual private sector wages in the data center industry in the Northeast Region show the regional change in average annual private sector wages in the data center industry over the ten-year period from 2008 through 2017. As these data indicate, average annual industry wages in the region rose from \$96,781 in 2007 to \$123,398 in 2017 (a nominal increase of \$26,616 or 27.5 percent).

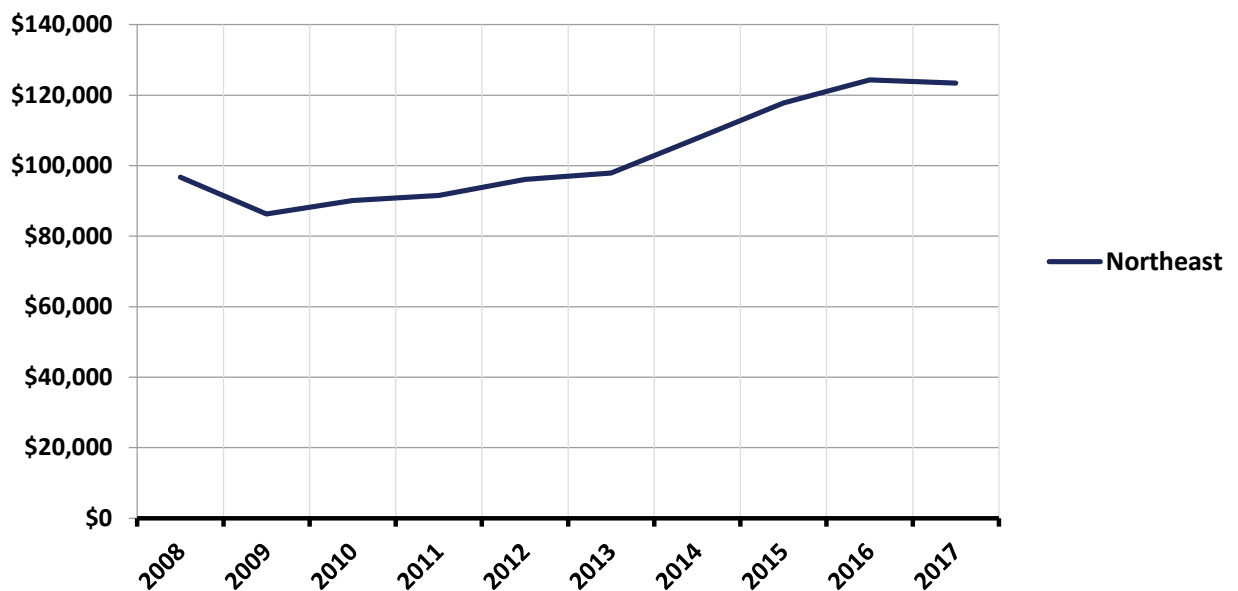


Figure D: Regional Private Sector Employment in the Data Center Industry – 2008 to 2017¹⁹

DATA CENTER EMPLOYMENT AND WAGE PERFORMANCE

It is important to realize that the data center industry is a high-performance industry in terms of both employment and wage growth. Figure E presents the most recent one-year (2016 to 2017) and five-year (2012 to 2017) statewide growth rates for private sector employment in this industry and compares them to the growth rates for total private employment across all industry sectors in Illinois. As these data show, with respect to one-year growth, statewide employment in Illinois' data center industry increased by 2.9 percent as compared to 0.8 percent across all industries. While in terms of five-year growth, statewide employment in the data center industry increased by 20.6 percent as compared to 7.1 percent across all industries.

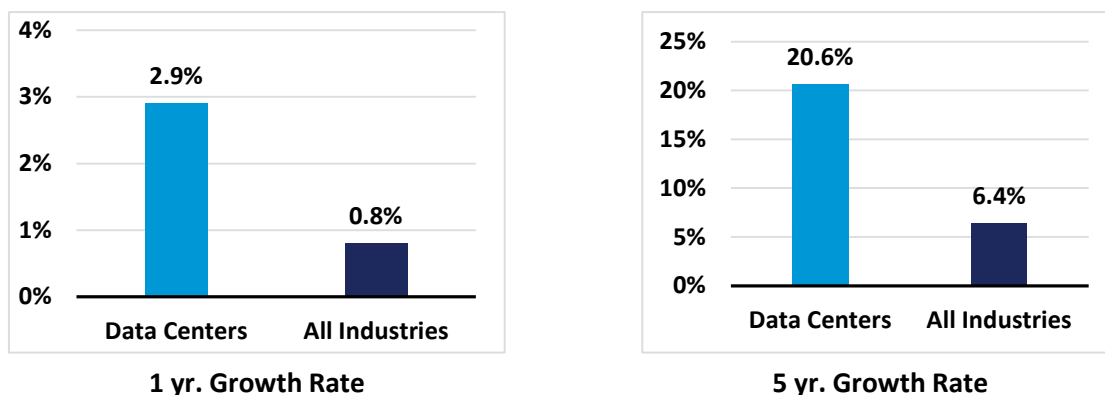


Figure E: Illinois Private Sector Employment Growth in the Data Center Industry vs. All Industries²⁰

Figure F provides a similar comparison for one-year and five-year growth rates for private sector wages. With respect to one-year growth, average wages in Illinois' data center industry increased by 0.5 percent as compared to 2.7 percent across all industries. While in terms of five-year growth, average statewide wages in the data center industry increased by 26.1 percent as compared to 11.6 percent across all industries.

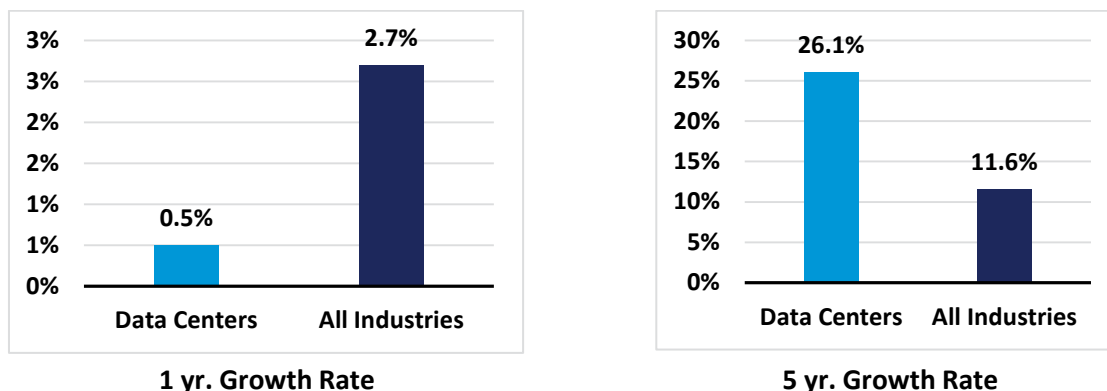


Figure F: Illinois Private Sector Wage Growth in the Data Center Industry vs. All Industries²¹

²⁰ Source: U.S. Bureau of Labor Statistics.

²¹ Source: U.S. Bureau of Labor Statistics.

However, it is equally important to realize that even though Illinois' data center industry is a high-performer relative to other industry sectors in Illinois, it currently under-performs the nationwide trends for the data center industry. Figure G contrasts the most recent one-year (2016 to 2017) and five-year (2012 to 2017) growth rates for private sector data center employment in Illinois to comparable data for the nation as a whole. As these data show, where the most recent one-year employment growth in Illinois' data center industry was 2.9 percent, at the national level the comparable figure was 4.3 percent. Similarly, where the most recent five-year employment growth in Illinois' data center industry was 20.6 percent, at the national level the comparable figure was 23.8 percent.

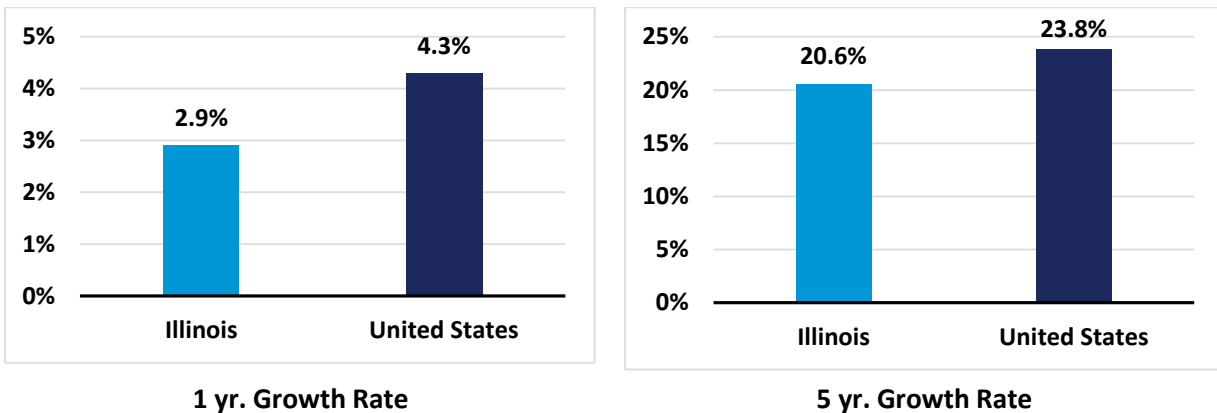


Figure G: Illinois vs. United States Private Sector Employment Growth in the Data Center Industry²²

Figure H provides a similar contrast between the most recent one-year (2016 to 2017) and five-year (2012 to 2017) growth rates for private sector data center wages. As these data show, where average wages in Illinois' data center industry grew by 0.5 percent in the most recent one-year period, at the national level the comparable figure was 7.1 percent. Similarly, where average wages in Illinois' data center industry grew by 26.1 percent in the most recent five-year period, at the national level the comparable figure was 33.6 percent.

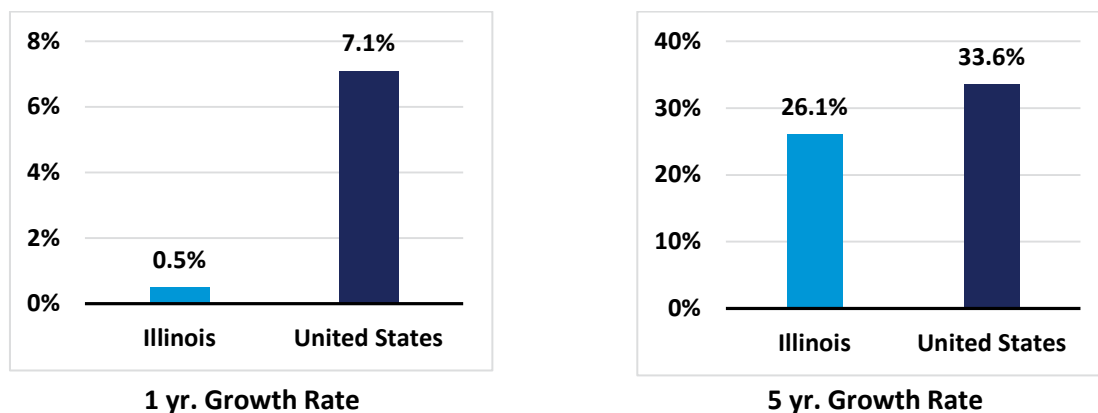


Figure H: Illinois vs. United States Private Sector Wage Growth in the Data Center Industry²³

In short, while Illinois' data center industry is a fast-growing sector that pays high wages and is exhibiting growth rates that generally exceed the norm for Illinois' economy, it is still lagging behind the growth rates that this industry is exhibiting nationally.

Economic and Fiscal Impact Contribution

In this portion of the section, we quantify the economic and fiscal contribution that the data center industry makes to the state of Illinois as a whole, and to the four Illinois Economic Development Regions for which the Bureau of Labor Statistics reported data center employment in 2017.²⁴ Details underlying the estimates reported here are included in the Appendix.

ILLINOIS

In conducting our analysis of the annual economic and fiscal impact that the data center industry had on the state of Illinois as a whole in 2017, we employ the following assumptions:

- Statewide employment in the data center industry was 10,229 in 2017.²⁵
- Construction expenditures for new data centers were \$121.2 million in 2017.²⁶

By feeding these assumptions into the IMPLAN model, we obtain the estimates of annual economic and fiscal impact. As these data indicate, in 2017 the data center industry directly provided approximately:

- 10,229 jobs,
- \$1.2 billion in associated wages and salaries, and
- \$3.1 billion in statewide economic output to Illinois' economy.

In addition, the data center industry was responsible for generating the following approximate second round indirect and induced economic activity within Illinois:

- 21,269 additional full-time-equivalent jobs (including construction jobs),
- \$1.2 billion in additional associated labor income (including construction worker pay), and
- \$4.1 billion in additional economic output.

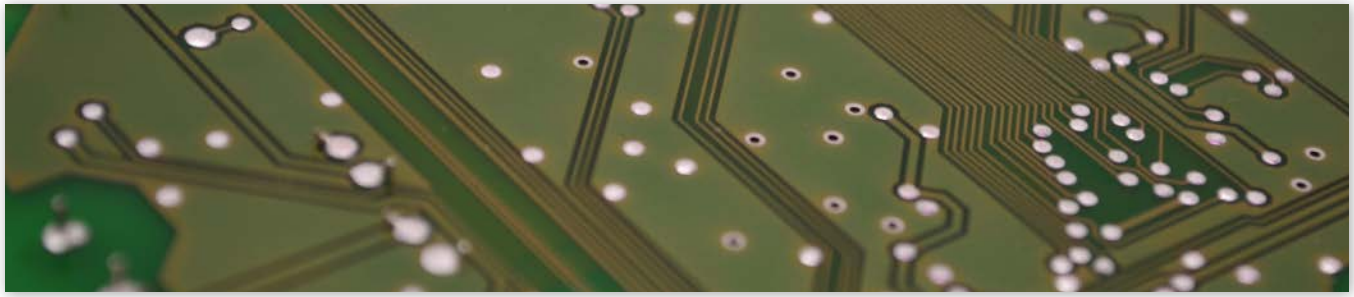
In combination, this means that the data center industry's total 2017 economic impact on Illinois was approximately:

- 31,498 jobs,
- \$2.4 billion in labor income, and
- \$7.1 billion in economic output.

²⁴ As in the Data Center Industry Profile in Illinois section, the data used in this section to estimate data center employment are taken from the U.S. Bureau of Labor Statistics and reflect private employment in the Data Processing, Hosting, and Related Services industry. Data Processing, Hosting, and Related Services (NAICS code 518210) is an industry classification within the NAICS code taxonomy that the Bureau of Labor Statistics uses to categorize industry data. It is the most narrowly defined classification within the NAICS code taxonomy that encompasses data centers.

²⁵ Source: U.S. Bureau of Labor Statistics.

²⁶ Source: Derived from data center announcements provided by ComEd for the Chicago area only Assumes 20 percent of announced data center capital investment is comprised of construction expenditures and 80 percent is comprised of equipment purchases. Our analysis is based on construction expenditures only. For ease of explication, all construction expenditures are assumed to take place in a single representative year.



Finally, this economic activity was also responsible for generating a total of approximately \$877.5 million in tax revenue in 2017, of which \$321.7 million was state and local tax revenue.²⁷

CENTRAL ECONOMIC DEVELOPMENT REGION²⁸

In conducting our analysis of the annual economic and fiscal impact that the data center industry had on the Central Economic Development Region in 2017, we employ the following assumption: The Central Economic Development Region employment in the data center industry was 112 in 2017.²⁹ By feeding this assumption into the IMPLAN model, we obtain the estimates of annual economic and fiscal impact.

As these data indicate, in 2017 the data center industry directly provided approximately:

- 112 jobs,
- \$5.1 million in associated wages and salaries, and
- \$25.6 million in economic output to the Central Economic Development Region's economy.

In addition, the data center industry was responsible for generating the following approximate second round indirect and induced economic activity within the Central Region:

- 120 additional full-time-equivalent jobs (including construction jobs),
- \$5.4 million in additional associated labor income (including construction worker pay), and
- \$21.6 million in additional economic output.

In combination, this means that the data center industry's total 2017 economic impact on the Central Region was approximately:

- 232 jobs,
- \$10.4 million in labor income, and
- \$47.2 million in economic output.

Finally, this economic activity was also responsible for generating a total of approximately \$4.5 million in tax revenue in 2017, of which \$2.1 million was state and local tax revenue.

²⁷ It is important to realize that this \$321.7 million estimate of state and local taxes paid by the data center industry in 2017 is comprised of all state and local taxes paid by the industry. As such, it would include all government revenue from property taxes, sales taxes, corporate income taxes, electricity excise taxes, license fees, and all other applicable taxes at both the state and the local levels. Data to disaggregate this overall state and local tax estimate is not available.

²⁸ The Central Region is comprised of the counties of the counties of Cass, Christian, Greene, Logan, Macon, Macoupin, Menard, Montgomery, Morgan, Sangamon, Scott, and Shelby.

²⁹ Source: U.S. Bureau of Labor Statistics.



EAST CENTRAL ECONOMIC DEVELOPMENT REGION³⁰

In conducting our analysis of the annual economic and fiscal impact that the data center industry had on the East Central Economic Development Region in 2017, we employ the following assumption: The East Central Economic Development Region employment in the data center industry was 398 in 2017.³¹

By feeding this assumption into the IMPLAN model, we obtain the estimates of annual economic and fiscal impact. As these data indicate, in 2017 the data center industry directly provided approximately:

- 398 jobs,
- \$25.5 million in associated wages and salaries, and
- \$98.9 million in economic output to the East Central Economic Development Region's economy.

In addition, the data center industry was responsible for generating the following approximate second round indirect and induced economic activity within the East Central Region:

- 430 additional full-time-equivalent jobs (including construction jobs),
- \$20.1 million in additional associated labor income (including construction worker pay), and
- \$76.3 million in additional economic output.

In combination, this means that the data center industry's total 2017 economic impact on the East Central Region was approximately:

- 828 jobs,
- \$45.5 million in labor income, and
- \$175.2 million in economic output.

Finally, this economic activity was also responsible for generating a total of approximately \$16.9 million in tax revenue in 2017, of which \$6.7 million was state and local tax revenue.

³⁰ The East Central Region is comprised of the counties of Champaign, Douglas, Ford, Iroquois, Piatt, and Vermillion.

³¹ Source: U.S. Bureau of Labor Statistics.



NORTH CENTRAL ECONOMIC DEVELOPMENT REGION³²

In conducting our analysis of the annual economic and fiscal impact that the data center industry had on the North Central Economic Development Region in 2017, we employ the following assumption: The North Central Economic Development Region employment in the data center industry was 66 in 2017.³³

By feeding this assumption into the IMPLAN model, we obtain the estimates of annual economic and fiscal impact. As these data indicate, in 2017 the data center industry directly provided approximately:

- 66 jobs,
- \$4.2 million in associated wages and salaries, and
- \$16.4 million in economic output to the North Central Economic Development Region's economy.

In addition, the data center industry was responsible for generating the following approximate second round indirect and induced economic activity within the North Central Region:

- 86 additional full-time-equivalent jobs (including construction jobs),
- \$4.1 million in additional associated labor income (including construction worker pay), and
- \$15.2 million in additional economic output.

In combination, this means that the data center industry's total 2017 economic impact on the North Central Economic Development Region was approximately:

- 152 jobs,
- \$8.3 million in labor income, and
- \$31.6 million in economic output.

Finally, this economic activity was also responsible for generating a total of approximately \$3.3 million in tax revenue in 2017, of which \$1.4 million was state and local tax revenue.



NORTHEAST ECONOMIC DEVELOPMENT ³⁴

In conducting our analysis of the annual economic and fiscal impact that the data center industry had on the Northeast Economic Development Region in 2017, we employ the following assumptions:

- Northeast Economic Development Region employment in the data center industry was 7,960 in 2017.³⁵
- Construction expenditures for new data centers were \$121.2 million in 2017.³⁶

By feeding these assumptions into the IMPLAN model, we obtain the estimates of annual economic and fiscal impact. As these data indicate, in 2017 the data center industry directly provided approximately:

- 7,960 jobs,
- \$961.1 million in associated wages and salaries, and
- \$2.4 billion in economic output to the Northeast Economic Development Region's economy.

In addition, the data center industry was responsible for generating the following approximate second round indirect and induced economic activity within the Northeast Region:

- 16,887 additional full-time-equivalent jobs (including construction jobs),
- \$1.0 billion in additional associated labor income (including construction worker pay), and
- \$3.2 billion in additional economic output.

In combination, this means that the data center industry's total 2017 economic impact on the Northeast Economic Development Region was approximately:

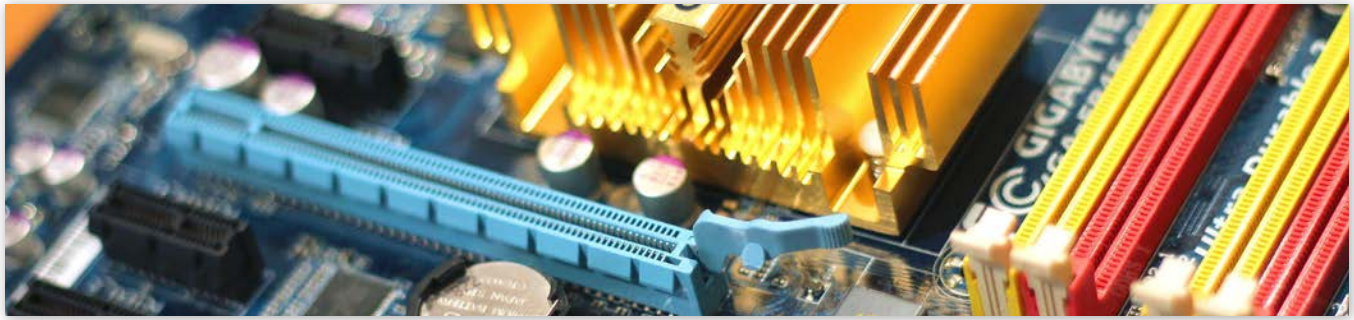
- 24,847 jobs,
- \$2.0 billion in labor income, and
- \$5.7 billion in economic output.

Finally, this economic activity was also responsible for generating a total of approximately \$702.3 million in tax revenue in 2017, of which \$246.4 million was state and local tax revenue.

³⁴ The Northeast Region is comprised of the counties of Cook, DeKalb, DuPage, Grundy, Kane, Kankakee, Kendall, Lake, McHenry, and Will.

³⁵ Source: U.S. Bureau of Labor Statistics.

³⁶ Derived from data center announcements provided by ComEd for the Chicago area only. Assumes 20 percent of announced data center capital investment is comprised of construction expenditures and 80 percent is comprised of equipment purchases. Our analysis is based on construction expenditures only. For ease of explication, all construction expenditures are assumed to take place in a single representative year.



Other Contributions

In this portion of the section, we focus on some of the potentially less obvious characteristics of the data center industry that also make an important contribution to Illinois' economy. Additional information related to this section is provided in the Appendix.

CAPITAL INVESTMENT AND CONSTRUCTION ACTIVITY

The data center industry is very capital-intensive. According to data from the U.S. Chamber of Commerce, the typical data center of 165,000 ft² requires an initial investment of \$45 million in building construction and \$157 million in servers and other computer equipment.³⁷ Figure I depicts new investment announcements in the data center industry in the Northeast Economic Development Region for the period from 2012 through the first half of 2018 (recall that the Northeast Region accounts for the bulk of data center employment in the state of Illinois). As these data demonstrate, since 2016 those new investment announcements have averaged at least \$657 million per year (includes only partial data for 2018).

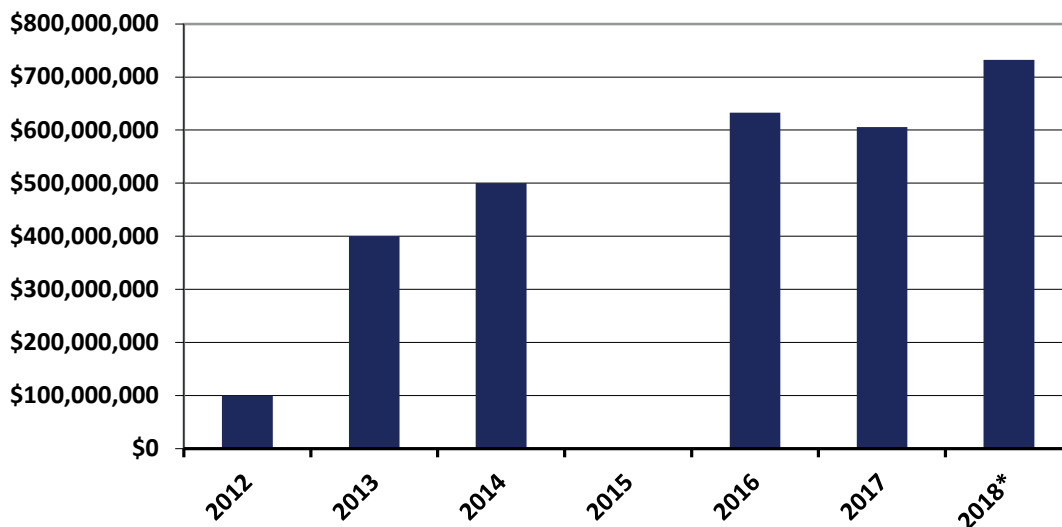


Figure I: Data Center Investment Announcements in the Northeast Economic Development Region – 2012 through 2018 (*includes only partial data for 2018)³⁸

³⁷ U.S. Chamber of Commerce, "Data Centers: Jobs and Opportunities in Communities Nationwide," June 2017. It is worth noting that many data centers are much larger than the 165,000/\$45 million building that the U.S. Chamber of Commerce report describes.

³⁸ Source: ComEd.

In addition to providing capital improvements that add to Illinois' tax base, this capital investment also fuels an on-going demand for data center construction. Moreover, in areas such as the Northeast Region it is often the case that demand leads to the formation of stable and significant industry clusters that support the very specialized construction needs of the data center industry. In addition, in the Northeast Region, most of the data centers were constructed using union labor. This characteristic of the data center industry has particular relevance for Illinois, where employment growth in the state's Construction sector has lagged behind the national norm in recent years.

Once again using the IMPLAN model, Table 1 provides an estimate of the direct impact on the Northeast Economic Development Region's Construction sector from the new data center investments detailed in Figure I.³⁹ As these data show, the direct employment impact on the Region's Construction sector is estimated to rise from 144 jobs in 2012 to 981 jobs in 2018, while the direct labor income impact is estimated to rise from \$9.5 million in 2012 to \$64.7 million in 2018, and the direct output impact is estimated to rise from \$21.4 million in 2012 to \$146.4 million in 2018. In addition, the state and local tax revenue generated by this direct economic activity is estimated to rise from \$0.5 million in 2012 to \$3.7 million in 2018.

Year	Employment	Labor Income	Output	State and Local Tax Revenue
2012	144	\$9,474,724	\$21,424,443	\$537,614
2013	567	\$37,430,487	\$84,638,594	\$2,123,875
2014	699	\$46,164,609	\$104,388,371	\$2,619,464
2016	864	\$57,060,802	\$129,027,069	\$3,237,734
2017	820	\$54,110,709	\$122,356,257	\$3,070,341
2018*	981	\$64,743,793	\$146,400,007	\$3,673,682

* Includes only partial data for 2018.

Table 1: Direct Economic Impact on the Construction Industry from Data Center Construction in the Northeast Economic Development Region (2018 dollars)

³⁹ Derived from data center announcements provided by ComEd for the Chicago area only. Assumes 20 percent of announced data center capital investment is comprised of construction expenditures and 80 percent is comprised of equipment purchases. Our analysis is based on construction expenditures only. For ease of explication, all construction expenditures are assumed to take place in a single representative year.



Policy Considerations

Additional information related to this section is provided in the Appendix.

INCENTIVES VARY AMONG STATES

In 2009, only seven states had data center tax incentives. Today, 30 states have incentives that are specifically targeted at attracting data centers. Illinois is surrounded by states that offer data center incentives. Figure J provides a map of the contiguous U.S. in which these states are shaded in blue. The availability of state tax incentives for data centers is often an initial screening criterion used to narrow a locational decision.

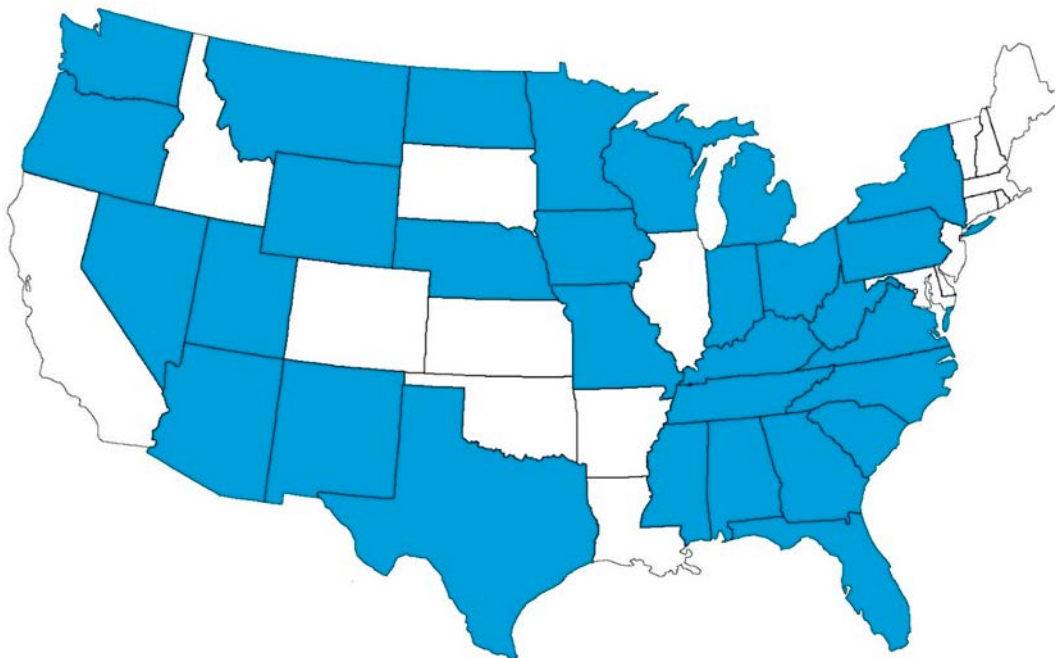
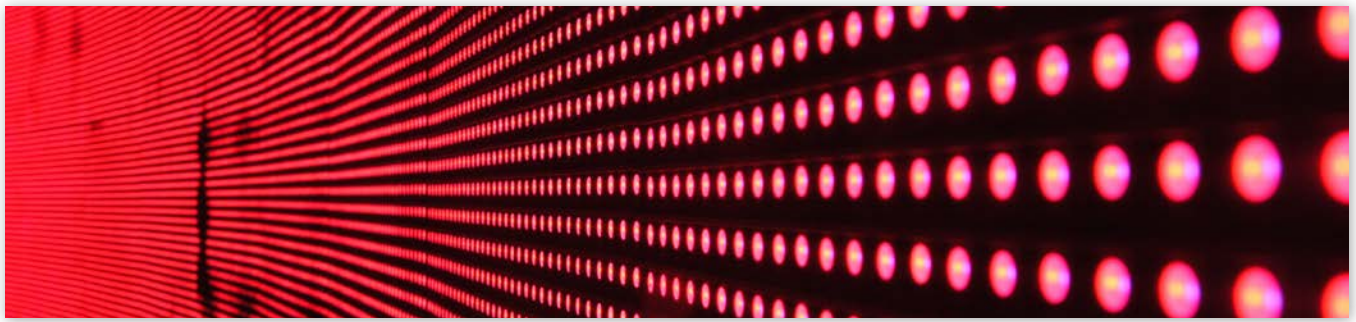


Figure J: States Offering Data Center Incentives in September 2018

In the 25-year history of data center tax incentives, only two states, Louisiana and Washington, have ever terminated data center incentive policies. Louisiana (not a major data center market) had an incentive, enacted in 2012, that allowed for a single sales factor on corporate income



for up to 40 years for approved data centers with more than 50 percent of sales outside of the state. Louisiana stopped approving data centers for the program in 2017.⁴⁰ Washington enacted its current data center incentive for rural areas only in 2015. Later we will discuss the difficulties that Washington is experiencing with this version of the state's incentives.

In 2015 and 2016, Virginia, Tennessee, North Carolina, and Utah revised their data center tax incentives. The Virginia incentive was extended without changing the qualifications or expanding the incentives. The revisions in North Carolina, Tennessee, and Utah all made it easier for data centers to qualify for the incentives to more aggressively compete for data center developments. In 2017, Florida and Montana enacted data center tax incentives for the first time. The Florida tax incentive is especially noteworthy as it was enacted while Jacksonville is working to attract data centers to the international undersea cable landing that was recently constructed there. In 2018, Virginia made it easier for property tax purposes for local governments to value the computer equipment in data centers based on their rapid depreciation.

DATA CENTERS FOLLOW INCENTIVES

In 2009, Apple decided to build a \$1 billion data center in Maiden, NC instead of Virginia.⁴¹ Both states had vied for the facility.⁴² After Apple indicated that it was leaning toward a Virginia location⁴³, the North Carolina legislature enacted tax incentives to secure the Apple facility.⁴⁴ In response to that loss, the Virginia General Assembly voted unanimously to make data center facilities eligible for a sales and use tax exemption on computer equipment. Shortly after that incentive became effective, Microsoft announced its intention to build its Boydton data center campus, the east coast hub for Microsoft's online services, in Mecklenburg County.

Tax incentives have become a critical component of the competition between states for data centers. Moreover, as Microsoft's Boydton campus illustrates, incentives can be particularly helpful in luring data centers to less developed rural communities. In Wyoming, the least populated state in the union, Randy Bruns, director of Cheyenne LEADS, has stated that without the state's data center incentives it would be at a 4 percent to 6 percent tax disadvantage relative to Colorado, Nebraska or Utah.⁴⁵ The Wyoming incentive was instrumental in securing a \$250 million expansion of Microsoft's Cheyenne data center campus in February of 2015, bringing the company's total investment in the facility to \$750 million.

⁴⁰ Louisiana State Legislature, Corporate Tax Apportionment Program.

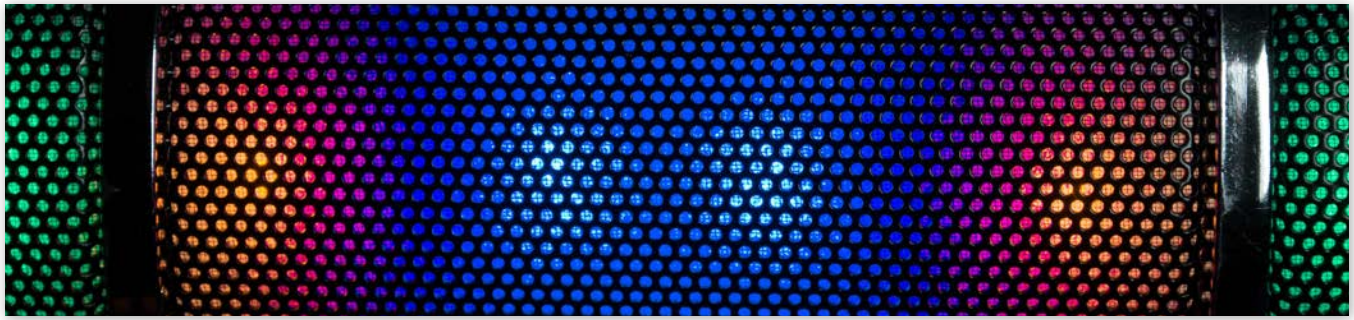
⁴¹ <http://www.datacenterknowledge.com/archives/2009/07/06/apple-confirms-maiden-site-for-idatacenter/>

⁴² <http://www.datacenterknowledge.com/archives/2010/02/05/virginia-nc-battling-for-microsoft-data-center/>

⁴³ <http://www.datacenterknowledge.com/archives/2009/07/07/how-apple-played-the-incentive-game/>

⁴⁴ <http://www.datacenterknowledge.com/archives/2010/02/05/virginia-nc-battling-for-microsoft-data-center/>

⁴⁵ http://trib.com/news/local/putting-cheyenne-on-the-data-center-map/article_856c306f-9050-58a6-ad35-5cafb3b32e17.html



South Carolina lawmakers have also attempted to position their state to more aggressively compete in the data center market. After losing a \$450 million Facebook data center to North Carolina, South Carolina revised their data center incentive in May 2015 to lower the required amount of investment and to exempt data centers from taxes on electricity as well as sales taxes on equipment. State Representative Phyllis Henderson (R-Greenville) stated,

*The main piece of this legislation is because of North Carolina. We were just losing projects right and left to them.*⁴⁶

In addition, the competition between Virginia and North Carolina did not end with North Carolina beating out Virginia for the Apple facility in 2009,⁴⁷ and Virginia beating out North Carolina for the Microsoft facility in 2010. In September 2015, North Carolina lowered its investment criteria for its data center incentive and provided a tax exemption for data center purchases of electricity to better compete with Virginia, and to better target multi-tenant co-location facilities that typically provide a larger number of total jobs.⁴⁸

A similar scenario played out over a \$1.8 billion Facebook data center in 2016. Facebook intended to locate in Utah, but local officials balked at a proposed package of local incentives. After Facebook announced that it would build the facility in New Mexico, where state-wide incentives were already in place, Utah state legislators voted to enact statewide data center incentives.⁴⁹ Early in 2018, the first project to take advantage of those Utah incentives was announced – a 1 million square foot Facebook data center in Eagle Mountain.⁵⁰ The first phase alone of the project will generate \$837,000 in property taxes on land that currently generates only \$66 in property tax revenue.⁵¹

In 2013, Arizona provided owners and users of data centers with a sales abatement on qualifying equipment purchases. Since the law was enacted, there has been significant increased data center investment in the Phoenix market. Some notable examples are Apple's \$2 billion data center hub,⁵² CyrusOne's 100MW data center campus,⁵³ and the 277-acre Microsoft development for a data center to support its Azure Cloud platform.⁵⁴

⁴⁶ <http://www.thestate.com/news/politics-government/article14403305.html>

⁴⁷ <http://www.datacenterknowledge.com/archives/2009/06/03/its-official-apple-to-north-carolina>

⁴⁸ <http://www.datacenterknowledge.com/archives/2015/10/01/north-carolina-makes-data-center-tax-breaks-easier-to-get>

⁴⁹ <https://www.theguardian.com/technology/2016/sep/14/facebook-data-center-new-mexico-utah>

⁵⁰ <https://www.sltrib.com/news/politics/2018/06/05/facebooks-data-center-deal-with-eagle-mountain-includes-a-5-million-sweetener-from-the-state/>

⁵¹ <https://www.sltrib.com/news/politics/2018/05/30/facebook-to-bring-data-center-to-eagle-mountain/>

⁵² <https://www.bizjournals.com/phoenix/news/2018/08/15/see-inside-apples-2-billion-data-center-in-mesa.html>

⁵³ <https://www.datacenterknowledge.com/archives/2015/06/29/cyrusone-kicks-off-third-massive-phoenix-data-center>

⁵⁴ <https://www.forbes.com/sites/ellenbarber/2018/09/10/microsoft-just-bought-277-acres-in-arizona/#6c1b94156002>

The state of Michigan enacted data center incentives 2015. Those incentives enabled Michigan to beat out New York in a competition for a new \$5 billion Switch data center in Grand Rapids. The Switch facility is expected to provide 1,000 jobs and will be the largest data center in the eastern half of the U.S.⁵⁵ After Pennsylvania enacted data center tax incentives in 2016, the colocation provider Iron Mountain announced plans to upgrade and expand its underground data center campus.⁵⁶

Most recently, days after the governor of Georgia signed a bill in May 2018 to extend its data center tax incentive to colocation data centers, the colocation provider Switch announced plans to begin construction on a 1 million square foot data center campus in Atlanta.⁵⁷ Georgians are hoping that with this new version of their incentive the Atlanta area can overtake the New York Tri-state Area in terms of data center capacity.⁵⁸

The Washington Experience with Data Center Incentives

Washington state's experience with data center incentives is also illustrative, but in a different way. Washington is home to Microsoft's corporate headquarters in Redmond. In December 2007, Washington's Attorney General ruled the state's data center incentives invalid. Microsoft and Yahoo immediately halted construction on data center facilities in rural Quincy, Washington, and Microsoft subsequently chose to move its Windows Azure cloud computing service to another state.⁵⁹ Facebook and Amazon also cited state and local taxes as an important consideration in their decisions to construct new data center facilities in neighboring Oregon.⁶⁰

Washington's data center incentives were legislatively re-enacted in April 2010, sparking a construction boom and up to \$2 billion in new private investment in the state.⁶¹ But, in June 2011 the incentives were allowed to lapse, which once again halted data center growth in Washington and drove a \$1 billion investment boom in nearby Oregon as Adobe, Apple,⁶² Fortune Data Centers,⁶³ and NetApp⁶⁴ all announced that they would be building data centers there rather than in Washington. In May 2012, Washington again re-enacted their data center incentives,⁶⁵ only to fail to reauthorize them during the 2014 legislative session.⁶⁶ Microsoft subsequently cited that lack of reauthorization as a motivating factor in its decision to build a new \$1.1 billion data center in West Des Moines, Iowa rather than Washington.⁶⁷ Washington then re-enacted a data center incentive yet again in July 2015.⁶⁸

⁵⁵ <http://www.freep.com/story/money/business/michigan/2015/11/16/data-center-switch-steelcase-grand-rapids-pyramid/75896236/>

⁵⁶ <http://www.ironmountain.com/about-us/news-events/news-categories/press-releases/2016/october/iron-mountain-upgrades-expands-western-pennsylvania-data-center-campus>

⁵⁷ <https://www.switch.com/georgia-governor-nathan-deal-signs-switch-bill-data-center-tax-exemption-legislation/>

⁵⁸ <http://www.developdouglas.com/news/new-tax-incentive-expected-generate-jolt-data-center-investment-georgia>

⁵⁹ <http://www.datacenterknowledge.com/archives/2010/02/01/group-pushes-for-change-in-washington-state>

⁶⁰ <http://www.greenbiz.com/news/2010/05/05/states-use-tax-incentives-lure-data-centers/>

⁶¹ <https://washingtonstatewire.com/data-center-fumble-costs-jobs-in-washington-state-and-maybe-big-money/>

⁶² <http://www.datacenterknowledge.com/archives/2012/02/21/apple-confirms-plans-for-oregon-data-center>

⁶³ <http://www.datacenterknowledge.com/archives/2011/10/21/fortune-expands-to-portland-oregon>

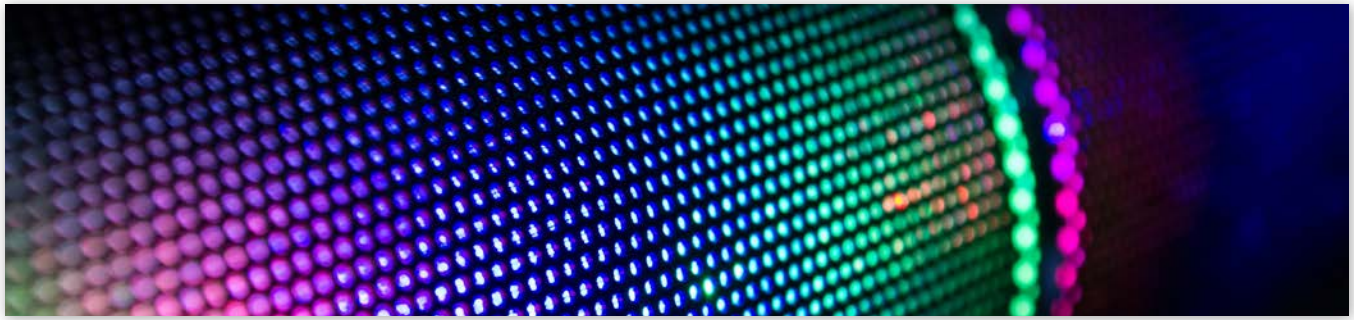
⁶⁴ <http://www.datacenterknowledge.com/archives/2011/10/17/digital-realty-to-build-netapp-facility-in-oregon>

⁶⁵ <https://washingtonstatewire.com/data-center-fumble-costs-jobs-in-washington-state-and-maybe-big-money/>

⁶⁶ <http://blogs.seattletimes.com/opinionnw/2014/04/28/new-microsoft-data-center-in-iowa-offers-a-billion-dollar-lesson/>

⁶⁷ <http://blogs.seattletimes.com/opinionnw/2014/04/28/new-microsoft-data-center-in-iowa-offers-a-billion-dollar-lesson/>

⁶⁸ <https://wiredre.com/data-center-tax-incentives-extended-in-washington-state/>



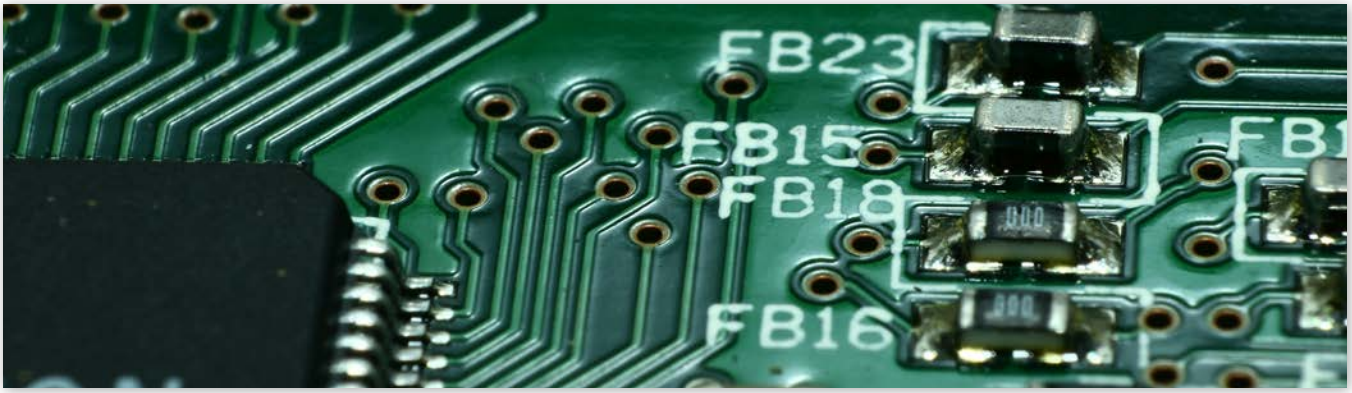
Presently, Washington State is considering revising its current data center incentive. The 2015 incentive is only available for facilities in rural counties. As the Washington State Department of Commerce has documented, the effect of the incentive has been to drive many colocation data centers a few miles over the border with Oregon to the town of Hillsboro.⁶⁹ Colocation data centers are best suited to more urban, rather than rural, locations. This experience provides a warning to states attempting to design narrowly-targeted incentives. Because the majority of states now offer data center incentives and many locations around the country are good substitutes for each other, businesses can pick and choose the most advantageous location for the type of facility that they are constructing.

GAINS AND LOSSES

There are some obvious lessons to be learned from the experiences of Wyoming, Nebraska, Colorado, Utah, South Carolina, Virginia, North Carolina, Michigan, New York, New Mexico, Washington, Oregon, Illinois, and Iowa.

First, as the experience of Chicago and Illinois illustrate, some colocation data centers will be located in every major metropolitan area in order to serve the needs of businesses that must have data located nearby. However, without incentives, the only data centers that will be built in areas without incentives are those that cannot serve the needs of clients if they are built in other areas with incentives. In general, giant, rural data centers will only be located in places offering tax incentives because those facilities are very sensitive to cost and not very sensitive to proximity to business locations or large populations of users.

Secondly, no state has a natural lock on attracting data centers. Only a few years ago, New York was the world's largest market for data centers. In 2015, Virginia took over that spot because the state and localities within it worked aggressively to attract data centers. The state of Washington would seem to be the obvious, natural choice for Microsoft's data centers because the company is headquartered in Washington. However, when Washington legislators decided that they didn't need data center incentives to attract data centers to the state, Microsoft and other firms located their data centers in other states that provided lower total costs of operating. And the current incentive in the State of Washington has created a colocation data center boom in Hillsboro, Oregon (near the border with Washington) where data centers can serve clients in both Oregon and Washington while taking advantage of the lower tax environment in Oregon.



Finally, debates over tax incentives are often characterized in terms of “gains” and “losses.” Such terminology confuses the purpose of legislation with a zero-sum game. As with any legislation, the best terminology for evaluation is whether the enacted incentives are effective policies at serving the public interest. In the case of data centers, are states better off with more data centers located within their borders than would locate there without the incentives? Thirty states offer incentives to attract data centers to locate within their borders. There will always be some data centers that must be located in one place or another because of the customers that they serve. But there are many data centers that can perform their duties just as effectively in several locations. The data centers in that latter category will take advantage of incentives that a state offers. Large enterprise data centers that can locate in rural areas often fall into that category. People often recognize that the large data centers located in Iowa, southern Virginia, and rural North Carolina and Washington are there because the costs – including taxes – of those locations were so attractive. In those cases, it is easy to see the effectiveness of the incentive policies at attracting data centers to a state. However, incentives, or lack thereof, also have important effects in urban areas that will always have some amount of data center activity. This is clearly seen in the ability of data centers that need an urban environment to find one with incentives in Oregon when one without incentives is not available in Washington.

Business Climate And Taxes

According to Forbes, “Illinois is home to [the headquarters of] 68 of the 1,000 biggest companies in the U.S. by revenue—fourth most among states. They include Boeing, Abbott Labs, Caterpillar and Kraft Foods. However, the net migration rate out of Illinois over the last five years is the worst in the U.S.”⁷⁰ Why do these companies leave the state? CNBC’s America’s Top States for Business 2018 and Forbes’ Best State for Business 2018 rankings shed some light on Illinois’ weaknesses. Both rank Illinois in the bottom half of all states in the U.S, with an overall rank of 28 by CNBC and a rank of #37 by Forbes. According to CNBC, Illinois fares especially poorly, with a grade of F (rank 47), in the “Business Friendliness” category, which is linked to the state’s “onerous regulations”, which are also criticized by Forbes (rank 40 for regulatory environment).⁷¹

⁷⁰ Forbes 2018 Best State for Business. Illinois Profile.

⁷¹ CNBC: America’s Top States for Business 2018 - A scorecard on state economic climate.



Table 2 shows competitor states Indiana, Wisconsin, Iowa and Missouri outranking Illinois not only in the overall rankings but especially in the subcategories “Cost of Doing Business / Business Costs” and “Business Friendliness / Regulatory Environment”, in which Indiana scores especially well with ranks in the top five for three of the four subcategories.

	Indiana	Wisconsin	Iowa	Missouri	Illinois	Illinois Grade
Overall	16	17	18	23	28	-
Workforce	40	22	39	41	25	B-
Infrastructure	2	23	24	11	22	C+
Cost of Doing Business	5	21	6	8	29	C+
Economy	20	19	34	25	42	D+
Quality of Life	46	24	7	45	30	D+
Technology & Innovation	28	20	26	22	12	B+
Education	35	14	13	18	17	B
Business Friendliness	4	24	15	27	47	F
Access to Capital	24	25	36	22	4	A
Cost of Living	10	24	12	6	25	C

Table 2: CNBC: America’s Top States for Business 2018 -
A scorecard on state economic climate⁷²

The State of Illinois’ greatest strengths are in the “Access to Capital” and “Technology & Innovation” categories, in which they outrank the above-mentioned competitors.

A separate ranking prepared by Chief Executive Magazine, the “2018 Best & Worst States for Business”, ranks Illinois 48th overall and 46th for its “Taxes and Regulations”.⁷³ Similarly, the

⁷² CNBC: America’s Top States for Business 2018 - A scorecard on state economic climate.

⁷³ Chief Executive Magazine 2018 Best & Worst States for Business.

⁷⁴ Tax Foundation. 2018 State Business Tax Climate Index.

Tax Foundation's "2018 State Business Tax Climate Index" places Illinois 29th, which is a lower rank than in 2017 because of recent tax increases in the state, including an increase of "the state's corporate income tax rate from 7.75 to 9.5 percent."⁷⁴ Indiana and Missouri's business taxes are considered more favorable, ranking them 9th and 16th respectively, while Wisconsin and Iowa rank 38th and 40th overall (see Table 3).

State	Business Tax Climate Index Ranking	Corporate Tax Rank	Individual Income Tax Rank	Sales Tax Rank	Property Tax Rank	Unemployment Insurance Tax Rank
Indiana	9	23	10	9	4	10
Missouri	16	5	28	24	7	7
Illinois	29	36	16	35	45	42
Wisconsin	38	29	43	7	26	40
Iowa	40	48	33	19	39	34

Table 3: Tax Foundation. 2018 State Business Tax Climate Index.⁷⁵

Given the importance of taxes to businesses as they make location decisions, we will briefly discuss the corporate income tax, sales tax, property tax and unemployment insurance tax in Illinois and compare it to its competitor states.

CORPORATE INCOME TAX

The Illinois corporate income tax rate imposed on corporations is 9.5 percent, consisting of a corporate income tax rate of 7 percent and a Personal Property Replacement Tax (PPRT) of 2.5 percent, ranking it 36th of all states by the Tax Foundation in 2018. Indiana's 5.75 percent rate is the lowest rate of the five states (see Table 4) compared and currently ranks Indiana 23rd, which is certain to improve as its rate is scheduled to decrease to 4.9 percent by 2022. Iowa's system of four tax brackets with rates ranging from 6-12 percent translates into a low ranking of 48th. Missouri and Wisconsin also have lower corporate income tax rates than Illinois.

	Illinois	Indiana	Iowa	Missouri	Wisconsin
State Corporate Income Tax	9.5% ⁷⁷	5.75% ⁷⁸	6.0-12.0% ⁷⁹	6.25%	7.90%

Table 4: Corporate Income Tax Rates (2018)⁷⁶

⁷⁵ Tax Foundation. 2018 State Business Tax Climate Index.

⁷⁶ Federation of Tax Administrators. Corporate Income Tax Rates 2018.

⁷⁷ The Illinois rate of 9.5% is the sum of a corporate income tax rate of 7.0% plus a personal property replacement tax of 2.5%, which is passed through to local governments.

⁷⁸ The Indiana Corporate tax rate was reduced to 5.75% on 7/1/18, and Indiana's rate is scheduled to decrease to 4.9% by 2022.

⁷⁹ Iowa's four tax brackets range from \$25,000-\$250,001.



SALES TAX

The Illinois state sales tax rate of 6.25 percent is not the highest of the comparison states, as Indiana's rate is 7 percent, but Indiana does not impose a local sales tax, which can range from 0.25-4.75 percent in Illinois, increasing the total sales tax levy in Illinois to 10 to 11 percent in some localities. Missouri has a comparably wide range of local sales tax rates due to a large number of taxing entities. Iowa's local option sales tax doesn't vary as much, but it has about the same number of different municipal taxing entities (1,275) as Illinois (1,229) and Missouri (1,034).⁸⁰ Illinois' higher rates and large number of taxing entities translates into a rank of 35 by the Tax Foundation. Indiana's and Wisconsin's more favorable sales tax structure places them into higher ranks (#9 and #7 respectively).

State	State Sales Tax Rate	Local Sales Tax Rate Range	Number of Municipal Tax Rates/Entities ⁸²
Illinois	6.25%	0.25%-4.75%	1,229
Indiana	7.0%	n/a	-
Iowa	6.0%	1.0%	1,275
Missouri	4.225%	0.5%-5.388%	1,034
Wisconsin	5.0%	0.1%-0.6%	65

Table 5: Sales Tax Rates⁸¹

PROPERTY TAX

Property taxes are the reason for Illinois' overall lowest rank – 46 – of the Tax Foundation's subcategory rankings. In Illinois, property taxes are only levied at the local level, not the state. But, in 2016, the state had more than 6,000 separate taxing districts (including counties, townships, road districts, cities, villages, incorporated towns, and school districts), which is a driving factor in the state's overall high property tax rates. Consequently, the average property tax collection per capita of \$2,007 in Illinois is not surprising and significantly above the average in Missouri (\$960/rank 7) and Indiana (\$970/rank 4).

⁸⁰ Tax Policy Center. Urban Institute & Brookings Institution. Local Sales Tax Rates. Rates as of April 1, 2018.

⁸¹ Tax Policy Center. Urban Institute & Brookings Institution. Local Sales Tax Rates. Rates as of April 1, 2018.

⁸² Includes each town, city, and county that the state lists as having a general sales tax rate, even if multiple jurisdictions use the same percentage. Does not include special jurisdictions.

UNEMPLOYMENT INSURANCE TAX RATES AND WORKERS' COMPENSATION INSURANCE

Illinois received a low rank of #42 for unemployment insurance tax rates by the Tax Foundation. This is especially apparent when compared to Indiana (#10) and Missouri (#7).⁸³ Illinois' ranking is negatively impacted by several factors: first, its minimum tax rate of 0.55 percent compared to 0 percent (none) in other states, including Iowa, Missouri and Wisconsin; second, its maximum rate of 7.35 percent, which is below all four competitor states but above the 5.4 percent rate seen in several other states in the U.S. (i.e. FL and OR); third, its taxable wage base of \$12,960 – which is below that in Iowa (\$29,300) and comparable to Missouri and Wisconsin, but higher than in Indiana (\$9,500) and above the federal taxable wage base of \$7,000. Fourth, Illinois' experience formula is based on a benefits ratio, which is “based solely on the business's experience and [is] therefore nonneutral by design”⁸⁴ in comparison to states (including IN, MO, and WI) relying on state experience. In addition, a company in Illinois can only qualify for the experience rating after three years, which is the case in fourteen other states but above the one to two-year period in 32 other states.

State	Rank	Min. Rate	Max. Rate	Taxable Wage Base
Illinois	42	0.55%	7.35%	\$12,960
Indiana	10	0.5%	7.4%	\$9,500
Iowa	34	0.0%	8.0%	\$29,300
Missouri	7	0.0%	9.75%	\$13,000
Wisconsin	40	0.0%	12.0%	\$14,000

Table 6: Unemployment Insurance Tax Rates⁸⁵

Illinois' Workers Compensation Employer Insurance costs per \$100 of payroll (\$1.25 per \$100 of payroll) are about the U.S. average rate, ranking the state 25th lowest and just above Missouri (\$1.15 per \$100 of payroll). Indiana stands out with a low rate of \$0.85 (Rank 6) and Iowa and Wisconsin have the highest rates and thus lowest rankings (#38 and #46 respectively).

State	Workers' Compensation Employer Insurance Costs Per \$100 of Payroll (2015)	Rank*
Illinois	\$1.23	25
Indiana	\$0.85	6
Iowa	\$1.57	38
Missouri	\$1.15	23
Wisconsin	\$1.74	46

*Ranking from lowest to highest rate

Table 7: Workers' Compensation Insurance Rates⁸⁶

⁸³ According to the Tax Foundation, states with higher ranks “have rate structures with lower minimum and maximum rates and a wage base at the federal level. In addition, they have simpler experience formulas and charging methods, and they have not complicated their systems with benefit add-ons and surtaxes.”

⁸⁴ Tax Foundation. 2018 State Business Tax Climate Index.

⁸⁵ Tax Foundation. 2018 State Business Tax Climate Index.

⁸⁶ National Academy of Social Insurance. Workers' Compensation Benefits, Coverage, and Costs – 2015 Data.



Illustrations of the Development Potential of Data Centers

In this section we illustrate the economic and fiscal impact potential if just one new large data center were to locate in Illinois. We describe one large data center that was recently announced for construction in Iowa. We then illustrate the impact of constructing and operating a data center like that in three counties in Illinois, Bond, Kane, and McLean. We use the IMPLAN model to estimate the impacts, and, for ease of explication, we assume that all construction expenditures take place in the first year. The impact of constructing and operating the same facility in different counties varies because different counties are home to different industries that will feed off of the new development. The more populated and more economically diverse a local economy is, the more of the economic impact the county can absorb. When new development occurs in a less populated and less economically diverse county, then more of the economic development impact spills over into the surrounding counties. Details underlying the estimates reported here are included in the Appendix.

THE ILLUSTRATIVE DATA CENTER PROJECT

In the summer of 2017 Apple announced that it would build a 400,000 square foot data center on a 2,000-acre parcel of land in Waukee, Iowa.⁸⁷ The cost of construction was announced at \$1.375 billion, with 550 people being involved in the construction and beginning operation of the facility. On an ongoing basis, Apple committed to employ 50 full-time workers. In the scenarios that follow, we consider the impact on some select localities and the State of Illinois if a data center like that were to be constructed in rural and suburban locations in Illinois. In each scenario we employ the following assumption: the potential new data center will cost \$1.375 billion to build in 2018 and employ 50 full-time workers on an ongoing basis.⁸⁸

THE ECONOMIC AND FISCAL IMPACT IN BOND COUNTY

Bond County is a distant suburb of St. Louis. Connectivity, accessibility, and power would be sufficient to support a large data center in the county. A significant number of workers would come from other area counties. In 2018, such a data center would potentially provide approximately:

- 2,530 construction jobs and 50 operational jobs,
- \$116.5 million in associated construction wages plus \$2.3 million in associated operational wages and salaries, and
- \$274.8 million in economic output from construction and \$11.5 million in economic output from operations to the Bond County economy.

After accounting for all of the additional indirect effects that the new data center would induce as the new investment ripples through the local economy, a new large data center constructed in 2018 would have a potential total economic impact on the Bond County economy of approximately:

- 3,270 jobs,
- \$138.7 million in labor income, and
- \$368.8 million in economic output.

Finally, this economic activity in Bond County would also be responsible for generating a total of approximately \$38.9 million in tax revenue in 2018, of which \$13.4 million would be state and local tax revenue.

THE ECONOMIC AND FISCAL IMPACT IN KANE COUNTY

Kane County is a distant suburb of Chicago. Connectivity, accessibility, power, and workforce would be sufficient to support a large data center in the county. In 2018, such a data center would potentially provide approximately:

- 1,798 construction jobs and 50 operational jobs,
- \$120 million in associated construction wages plus \$3.5 million in associated operational wages and salaries, and
- \$274.9 million in economic output from construction and \$12.7 million in economic output from operations to the Kane County economy.

After accounting for all of the additional indirect effects that the new data center would induce as the new investment ripples through the local economy, a new large data center constructed in 2018 would have a potential total economic impact on the Kane County economy of approximately:

- 2,744 jobs,
- \$165.6 million in labor income, and
- \$420.2 million in economic output.

Finally, this economic activity in Kane County would also be responsible for generating a total of approximately \$53.8 million in tax revenue in 2018, of which \$15.7 million would be state and local tax revenue.

THE ECONOMIC AND FISCAL IMPACT IN MCLEAN COUNTY

McLean County is a largely rural county; however, the population of the Bloomington-Normal twin cities exceeds 100,000. Three interstate highways intersect in the county, and a significant amount of fiber already exists in the county. Connectivity, accessibility, power, and workforce would be sufficient to support a large data center in the county. In 2018, such a data center would potentially provide approximately:

- 2,088 construction jobs and 50 operational jobs,
- \$118.4 million in associated construction wages plus \$3.5 million in associated operational wages and salaries, and
- \$273.8 million in economic output from construction and \$12.7 million in economic output from operations to the McLean County economy.

After accounting for all of the additional indirect effects that the new data center would induce as the new investment ripples through the local economy, a new large data center constructed in 2018 would have a potential total economic impact on the McLean County economy of approximately:

- 3,132 jobs,
- \$165.2 million in labor income, and
- \$417.5 million in economic output.

Finally, this economic activity in McLean County would also be responsible for generating a total of approximately \$49.3 million in tax revenue in 2018, of which \$15 million would be state and local tax revenue.

THE STATEWIDE ECONOMIC AND FISCAL IMPACT IN ILLINOIS

The potential county impacts described above of a potential large new data center locating in Illinois represent only the portion of the total impact on the economy that would occur in that county. However, in reality, such a facility would have effects beyond the boundaries of the county where the data center would be located. Here we report the statewide impact of attracting a large new data center to Illinois. These estimates include the impact on the local county, so that the estimates for the state of Illinois should not be added to the county estimates previously reported.

By feeding the construction size assumption into the IMPLAN model, we obtain the estimates of annual economic and fiscal impact.⁸⁹ A new large data center constructed in 2018 would have a potential total economic impact on the Illinois economy of approximately:

- 3,360 jobs,
- \$203.9 million in labor income, and
- \$521.7 million in economic output.

Finally, this economic activity would also be responsible for generating a total of approximately \$66.7 million in tax revenue in 2018, of which \$20.2 million would be state and local tax revenue.



Potential Impact of Indiana's New Development on the Chicago Area

In the previous sections, we discussed the special nature of the city of Chicago and the Chicago area for the data center market in Illinois. Recent developments in northwest Indiana make it important to consider the degree to which the Illinois data center market in the Chicago area may soon change.

Recently, workers broke ground on a \$40 million data center in Hammond, Indiana.⁹⁰ The site totals 77 acres allowing for expansion of the project to a total of \$200 million of data center. According to the Chicago Tribune, the site was selected for the data center project for a number of reasons: The large data center market in the city of Chicago is just yards away, the lake-front property provides for easy cooling of the computer equipment, the site already has fiber connectivity to Chicago, the project benefitted from tax incentives, and the property is in more "tax-friendly" Indiana.⁹¹ So the Indiana data center will benefit from the connection to Chicago, while taking advantage of the tax environment in Indiana. However, it could be a harbinger of more data center development on underdeveloped property in Hammond and Gary, Indiana. Data centers there could provide businesses with many of the advantages of the Chicago data center market at a somewhat lower cost if only because of the lower taxes in Indiana. Just as we saw the sizable increase in economic development impact of a single large data center locating in a distant Chicago suburb, there could also be sizable decreases in economic activity in Chicago if new data centers locate just over the border with Indiana.

This possibility should not be discounted, because it is almost exactly what has happened in Washington and Oregon. Washington's data center incentive which is only available in rural counties, has created an environment where data centers are located in urban areas just across the border in Oregon.⁹²

⁹⁰ Tanwen Dawn-Hiscox, "Developers Break Ground on Chicago State Line Data Center," DatacenterDynamics, August 16, 2018.

⁹¹ Karen Caffarini, "Data Center Hopes to Rise from Ashes of Defunct Hammond Power Plant," Chicago Tribune, June 25, 2018.

⁹² Washington State Department of Commerce, State of the Data Center Industry: An Analysis of Washington's Competitiveness In This Fast-Growing High-Tech Field, January 2018.



Conclusion

The need for data centers is increasing at a much higher rate than the increase in the capacity of data storage devices. For the foreseeable future, the world will need an increasing number of data centers to maintain data in secure and accessible environments. Currently, Chicago is the third largest data center market in the United States. However, it is growing much more slowly than other major markets. From June 2017 to June 2018, the Chicago data center market grew at a rate of 7 percent. At the same time, the Atlanta market grew 12 percent, the Northern Virginia market grew 16 percent, and the Phoenix market grew 26 percent. And for all of the success of the Chicago area at attracting data centers, the rest of the state of Illinois has very few data centers. This is typical of states that have places with special catalysts for data center location, but that do not have state-wide data center incentives.

In comparison to its neighboring states, Illinois, the state without data center incentives, showed significantly weaker growth in data center markets than any of the other states that do have data center incentives. And it is important to consider that these are the results for the period of time when the world-wide market for data centers was growing. So, while the data center market in the Chicago area may have been doing well, these data indicate that the data center markets in the rest of the state of Illinois have not been doing nearly as well as the markets in surrounding states that have data center incentives.

The Northeast Economic Development Region, which encompasses the Chicago area, accounted for 93 percent, or by far the largest proportion, of employment in the data center industry. In terms of five-year growth, statewide employment in the data center industry increased by 20.6 percent as compared to 7.1 percent across all industries. However, it is important to realize that even though Illinois' data center industry is a high-performer in terms of job growth relative to other industry sectors in Illinois, it currently under-performs the nationwide trends for the data center industry. Similarly, where average wages in Illinois' data center industry grew by 26.1 percent in the most recent five-year period, at the national level the comparable figure was 33.6 percent.

In 2017 the data center industry's total 2017 economic impact on Illinois was approximately 31,500 jobs, \$2.4 billion in labor income, and \$7.1 billion in economic output. This economic activity was also responsible for generating a total of approximately \$877.5 million in tax revenue in 2017, of which \$321.7 million was state and local tax revenue.⁹³

⁹³ It is important to realize that this \$321.7 million estimate of state and local taxes paid by the data center industry in 2017 is comprised of all state and local taxes paid by the industry. As such, it would include all government revenue from property taxes, sales taxes, corporate income taxes, electricity excise taxes, license fees, and all other applicable taxes at both the state and the local levels. We do not have data to disaggregate this overall state and local tax estimate.



In addition to providing capital improvements that add to Illinois' tax base, this capital investment also fuels an on-going demand for data center construction. Moreover, in areas such as the Northeast Region it is often the case that that demand leads to the formation of stable and significant industry clusters that support the very specialized construction needs of the data center industry. This characteristic of the data center industry has particular relevance for Illinois, where employment growth in the state's construction sector has lagged behind the national norm in recent years.

Today, 30 states have incentives that are specifically targeted at attracting data centers. Illinois is surrounded by states that offer data center incentives. Data centers follow incentives and will avoid locating in states without incentives. There are lessons to be learned from the years of experience that numerous states have had with data center incentives.

First, as the experience of Chicago and Illinois illustrates, some colocation data centers will be located in every major metropolitan area in order to serve the needs of businesses that must have data located nearby. However, without incentives, the only data centers that will be built in areas without incentives are those that cannot serve the needs of clients if they are built in other areas with incentives. In general, giant, rural data centers will only be located where there are tax incentives because those facilities are very sensitive to cost and not very sensitive to proximity to business locations or large populations of users.

Secondly, no state has a natural lock on attracting data centers. The experience of New York, Virginia, and Washington prove that. For example, the state of Washington would seem to be the obvious, natural choice for Microsoft's data centers because the company is headquartered in the state. However, when Washington legislators decided that they didn't need data center incentives to attract data centers to the state, Microsoft and other firms located their data centers in other states. And the current incentive in the State of Washington has created a colocation data center boom in Hillsboro, Oregon (near the border with Washington) where data centers can serve clients in both Oregon and Washington while taking advantage of the lower tax environment in Oregon.

Finally, it is a mistake to think that giving tax incentives to data centers that locate in a state represent a "loss" for the state. If that were true, then the states where the data centers didn't locate would "gain." What has Illinois "gained" by not having a data center incentive, while 30 other states have enacted incentives. The only thing that the "losing" states "gain" in these situations is a smaller industrial base and a reputation for not being business-friendly.

According to Forbes, “Illinois is home to 68 of the 1,000 biggest companies in the U.S. by revenue—fourth most among states. They include Boeing, Abbott Labs, Caterpillar and Kraft Foods. However, the net migration rate out of Illinois over the last five years is the worst in the U.S.” Illinois fares especially poorly, with a grade of F (rank 47), in the “Business Friendliness” category. According to the popular business climate rankings Indiana, Wisconsin, Iowa and Missouri outrank Illinois not only in the overall rankings but especially in the subcategories “Cost of Doing Business / Business Costs” and “Business Friendliness / Regulatory Environment”, in which Indiana scores especially well.

It is not a coincidence that workers recently broke ground for a data center in Hammond, Indiana. There are plans to expand the project to a total of \$200 million of data center space. According to the Chicago Tribune, the site was selected for the data center project because of its proximity to Chicago and the “tax-friendliness” of Indiana. Though the project is not that large, it could be a harbinger of more data center development on the significant amount of underutilized property in Hammond, East Chicago, and Gary, Indiana. Significant data center development in the Indiana suburbs of Chicago would likely slow growth in the Illinois suburbs of Indiana.

Last summer Apple announced that it would build a 400,000 square foot data center on a 2,000-acre parcel of land in Waukee, Iowa. The cost of construction was announced at \$1.375 billion, and Apple committed to employ 50 full-time workers. If incentives attracted a data center like that to rural or suburban Illinois, the statewide impact would be 3,360 additional jobs, \$203.9 million in additional labor income, and \$521.7 million in new economic output. Such economic activity would also be responsible for generating a total of approximately \$66.7 million in tax revenue in 2018, of which \$20.2 million would be state and local tax revenue.