

Data Centers and the Global Shift to Cloud Computing

- The global market for cloud computing will increase from \$40 billion in 2011 to more than \$240 billion in 2020.
- A data center is a centralized repository for the storage, management, and dissemination of data and information for business or government.
- Many businesses and governments turn to data centers in order to outsource the security and maintenance requirements of maintaining their own data storage operations.
- Recent data centers, also called server farms, have been built in rural areas of many states.
- Data centers are a huge financial investment in property and infrastructure, costing from \$100 million to \$1 billion
- Illinois has long haul fiber, competitive energy rates, a strong technology sector and the workforce to be a major player in cloud computing's future
- However, competition from other states is leaving Illinois off the site list for many companies
- Sales tax breaks for construction and/or equipment were recently passed in 16 states
- Iowa, in particular, has passed exemptions for construction, equipment and energy.
- Data centers are a symbol of a changing economy, an investment in the future.

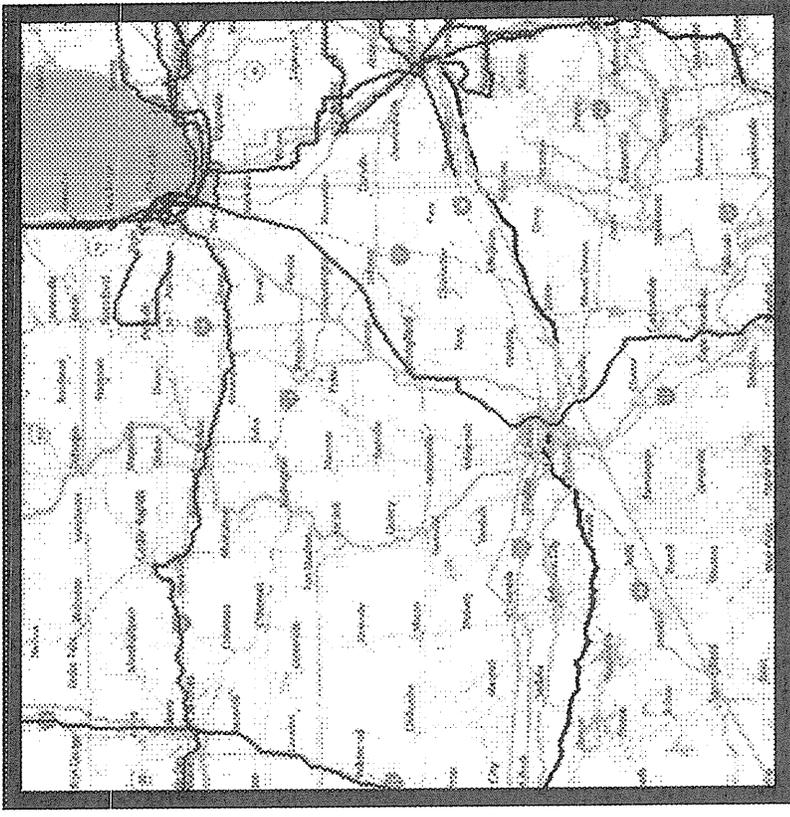
Global Shift To The Cloud...

Global market for cloud computing will leap from \$40.7 Billion in 2011 to more than \$241 Billion in 2020.

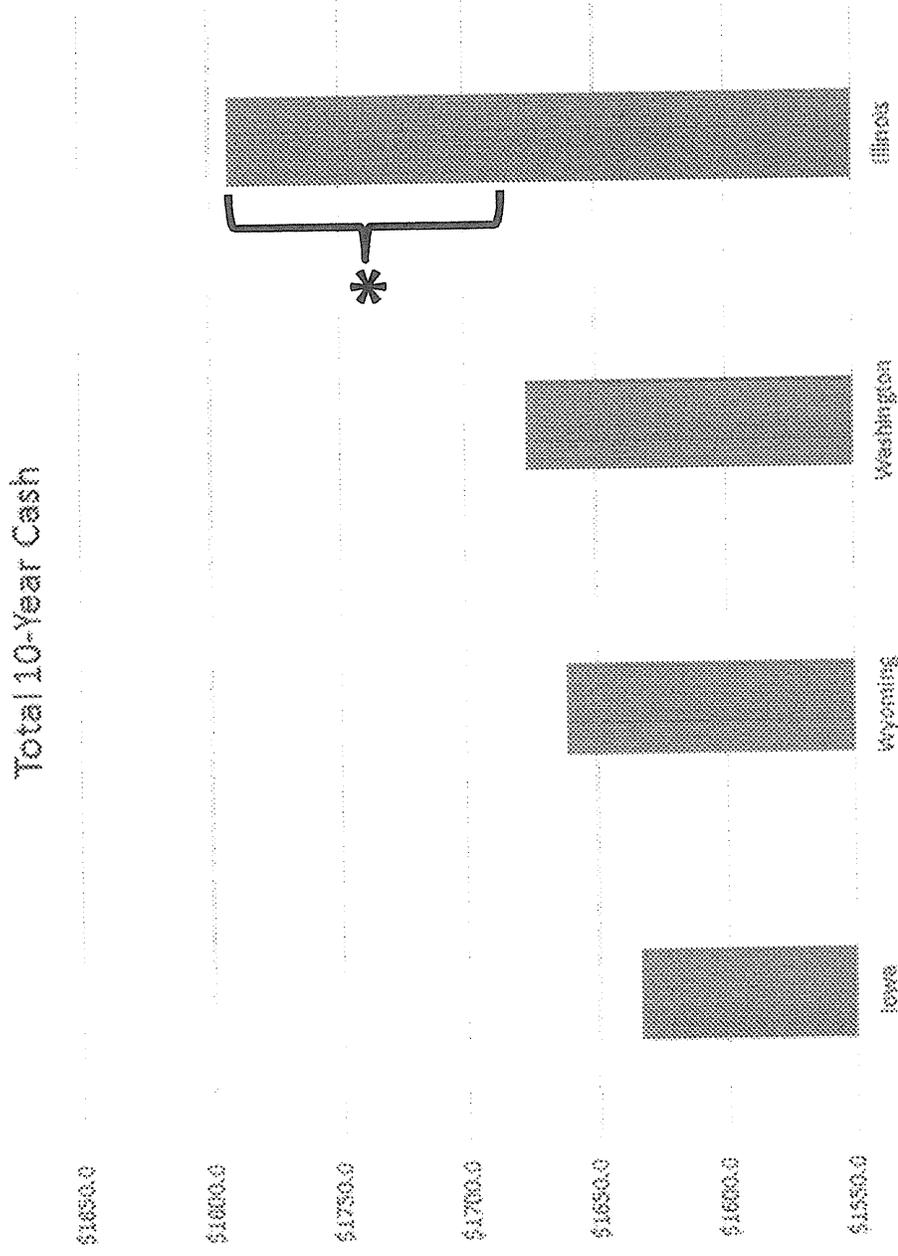
Sizing The Cloud. Forrester Research, Inc. 4/21/2011

Illinois Advantages

1. **Illinois is Pro-Business; No PPT**
2. **Illinois has access to long-haul fiber** (*shown in this map as green and blue lines*)
3. **Competitive energy rates**
4. **Access to major population centers** (Chicago, Aurora, Rockford, Joliet, Peoria, et al.)
5. **Technology sector**
6. **Solid workforce and educational system**



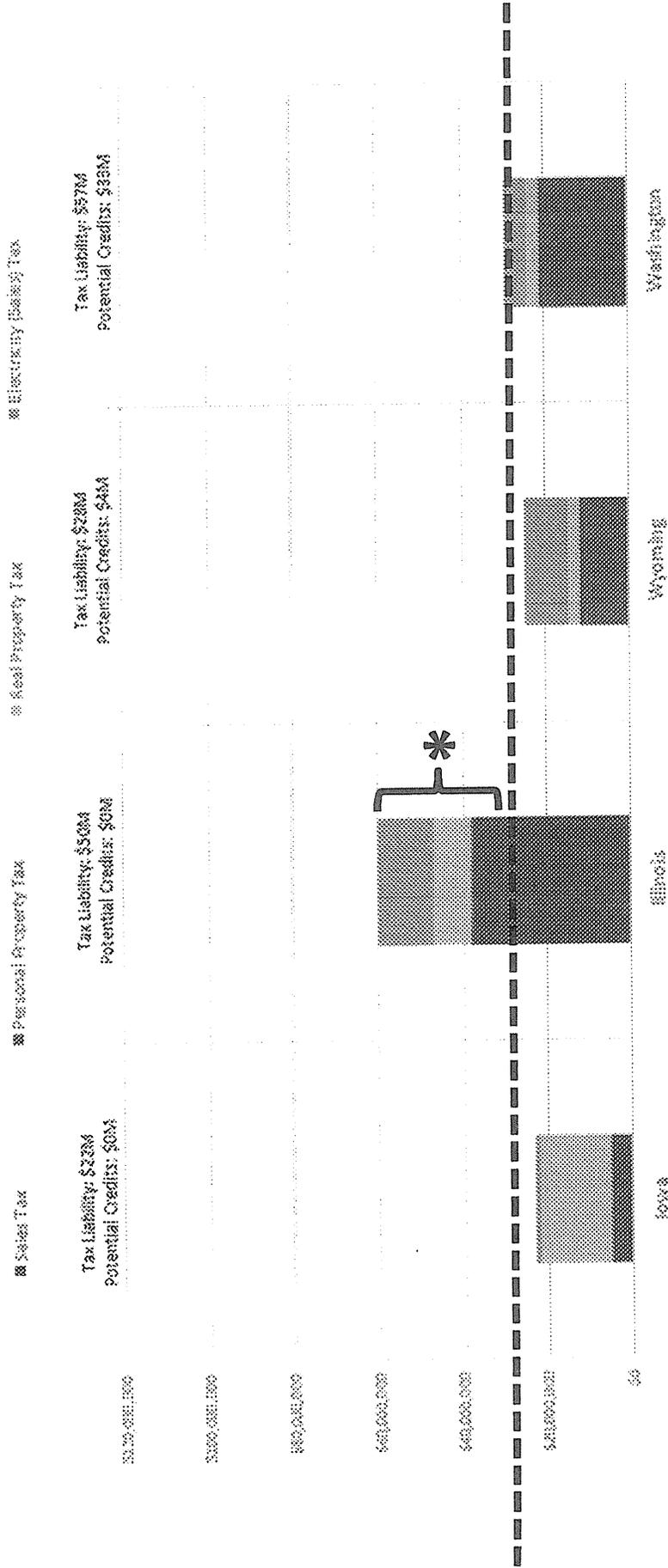
State Total Cost Comparison



* However, when measured in terms of the total cost of operations over a 10-year time period, Illinois is 7-10% higher than leading states

Tax Liability: State Comparison

Tax Liabilities and Potential Tax Credits for \$250M Data Center Investment



1. Approximately 85% of tax liability (~\$51M) is attributable to sales tax
2. Iowa is most competitive from a tax exposure perspective
3. Washington and Wyoming offer sales tax credits/abatements on server and equipment purchases

* A high sales tax rate causes Illinois to fall behind other top US locations

State Tax Comparison

Investment Incentives	Illinois	Iowa	Wyoming	Washington
Sales Tax Abatement on Servers	No	Yes, no sunset	Yes, no sunset	Yes, 10-years
Sales Tax Abatement on Major Equipment	No	Yes	Yes	Yes
Sales Tax Abatement on Fuel/Energy	No	Yes	No	No
Personal Property Tax	No PPT	No PPT	No PPT	Low
Corp Income Tax	Yes ⁴	Yes ¹	No CIT	No CIT
Tax-Increment Financing for Infrastructure	No	Yes ²	Yes; MOU Defined	No
Free Land	No	No	Yes; Initial Takedown	No
Annual Training Stipend	No	Yes	No	No
Sales Tax Rebate on select equipment	No	Yes ³	No	Yes

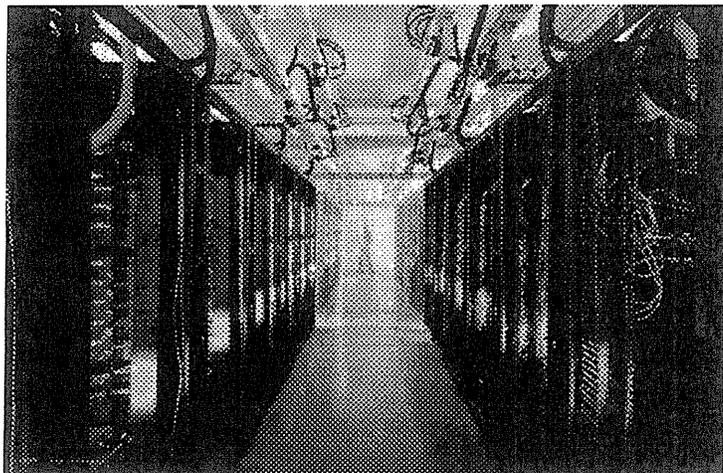
¹ Iowa levies Corp Income Tax, but also provides a rolling Tax Credit of up to \$10M for each major data center phase

² Iowa uses Tax Increment financing to provide roads, water, sewer, and fiber

³ In addition to abatement of sales tax on major equipment (HVAC, Electrical, Generators, etc.), Iowa provides Tax Credit (on construction) based on headcount and Capital Investment

⁴ Corporate income tax apportionment is based on single sales factor so additional capital investment does not increase ~~Microsoft's~~ corporate income tax.

This content was printed from **Data Center Knowledge**



Rows of networking equipment inside a Google data center in Council Bluffs, Iowa. The state may soon land another large data center project. (Photo for Google by Connie Zhou)

IOWA

Iowa Data Center Boom Continues with \$255 Million Project Alluvion

BY JOHN BATH ON MARCH 24, 2014

Another mystery data center project may land in Iowa, with the city of West Des Moines set to review an application for **Project Alluvion** — a \$255 million data center project from an unnamed company.

The Des Moines Register reports that city documents indicate the mystery company plans an investment that would add at least \$255 million to the city tax base, and create 84 jobs. Once given the green light by the city council, the application goes to the Iowa Economic Development Authority asking for state assistance for the proposed development.

With the term Alluvion referring to an increase in the area of land over time, the data center will be built in four phases, with the city throwing in \$18 million in tax increment financing to help pay for infrastructure improvements and development costs. Project Alluvion would carry a minimum taxable valuation of \$255 million, which does not indicate the final costs for the project.

By comparison, Microsoft's data center in West Des Moines was given a 2013 taxable valuation just under \$146 million.

"If the project comes to fruition and if we're able to get it done, I think we're very excited about it," City Councilman John Mickelson said Friday. "It will add to our property tax

base in West Des Moines and it will add some new jobs and it will open up infrastructure in a new part of town."

Microsoft announced plans last summer under the code name Project Mountain for a \$679.1 million expansion of its West Des Moines data center, bringing its total Iowa investment to \$864 million.

That expansion was part of over \$1.4 billion in data center projects for Iowa, which witnessed another expansion of the Google data center in Council Bluffs and a \$300 million project for Facebook in Altoona (project Catapult). Later in 2013 another code-named project, project Oasis turned out to be Travelers Insurance, which landed in a suburb of Omaha.

About the Author



John Rath (1505 Posts)

John Rath is a veteran IT professional and regular contributor at Data Center Knowledge. He has served many roles in the data center, including support, system administration, web development and facility management.

RESOURCE LINKS:

Inside DCK

- [About Us](#)
- [Advertise](#)
- [Staff](#)
- [Contact Us](#)
- [Submit News](#)
- [Submit Guest Column](#)
- [Site Map](#)

Hot Topics

- [Data Center Infrastructure Management](#)
- [Downtime](#)
- [HPC / Supercomputing](#)
- [Facebook](#)
- [Apple](#)
- [Microsoft](#)
- [Google](#)
- [Northern Virginia](#)
- [New York](#)
- [Silicon Valley](#)
- [North Carolina](#)

News Channels

- [White Papers](#)
- [Events Calendar](#)
- [Virtualization](#)
- [Consolidation](#)
- [Open Compute](#)
- [Internet of Things](#)
- [Storage](#)
- [Convergence](#)
- [Disaster Recovery](#)
- [Managed Hosting](#)
- [Content Delivery](#)
- [Selection](#)
- [iting](#)

Stay Connected

- [Daily Email Newsletter](#)
- [RSS](#)
- [Twitter](#)
- [Facebook](#)
- [LinkedIn](#)
- [Data Center Videos](#)
- [Humor](#)
- [Webinars](#)



PUBLISHED BY 7X24 EXCHANGE INTERNATIONAL



Carly Fiorina
2013 FALL CONFERENCE
KEYNOTE SPEAKER

THE END-TO-END RELIABILITY FORUM

IBM'S LEADERSHIP DATA CENTERS

Designed for efficiency and business innovation

IBM Boulder Command Center



HOW DATA CENTERS Benefit Communities

by Tracey Hyatt Bosman

"Every day, we create 2.5 quintillion bytes of data – so much that 90% of the data in the world today has been created in the last two years alone," according to IBM.¹ Despite a slow growing economy, the world's seemingly insatiable demand for data is, in turn, driving demand for data center capacity. Over 80% of data center owners/operators have built a new data center or upgraded an existing facility within the past five years reports the Uptime Institute in a 2012 Data Center Industry Survey. Over half of those same respondents indicated their future data center budgets will be greater due to increased computing demands and the rising costs and investments required to keep data centers reliable, secure, and up to date.²

Data centers have become an integral component of the IT infrastructures for most large companies and, at a macroeconomic level, integral to a vibrant economy, in some regions one of the most active sectors in an otherwise weak economy. At the same time, data centers offer tangible benefits to the communities in which they locate, leading the way in redefining the digital economy while providing concrete economic benefits, including a steady flow of increased tax revenues, job creation and the opportunity for enhanced infrastructure, enabling even greater development opportunities.

Economic Stimulus

Data centers are far more complex than traditional office operations. They require enormous investment in highly sophisticated design and engineering to maximize the space for the servers and computer equipment. To ensure reliability of operations, the data centers require state-of-the-art mechanical systems for HVAC, air conditioning and power

generators to reduce down-time or damage to the equipment. According to Data Center Knowledge, Google invested \$600 million in its Council Bluffs, IA facility, and Facebook invested \$210 million to build the first phase of its new data center in Oregon.³ Investments like these have significant positive impacts on real property taxes for a community.

However, real estate taxes are just the beginning of a longer list of revenue streams generated by data centers. They also make large investments initially and ongoing in communications and computer equipment, servers, and security equipment. Based on BLS & Co's experience and interviews and discussions with data center operators and industry experts, investing \$200 million in computing equipment is common, with many investments far exceeding this number. Although the exact amount of investment depends on the size and layout of the facility, this typically equates to \$5,000 per square foot or more.

The extent to which purchases of equipment and construction materials occur within the host community will vary according to which products are available locally. Fiscal impact models can project the full range of estimated tax revenues, and broader economic impact models can be used to estimate the portion of the investment that will be spent in the local area and resulting regional stimulus. (See the case study at the end of this article for an illustration.)

Attracting a data center is comparable to a community investing in an annuity, delivering a recurring stream of payments to the investor. This is because data center operators "refresh" computing

equipment frequently (typically a minimum of every three years) due to the need to expand capacity, advances in computer equipment, software and security upgrades. As a result, the host community receives not only the initial investment needed to construct and equip the data center, but continuous large re-investments throughout the life of the data center. Additionally, data centers contribute to the host economy with on-going operational expenditures, such as routine maintenance and vendor/service contracts. Collectively, ongoing capital and operational expenditures generate a steady stream of tax revenues and economic stimulus.

Employment

Community and even business leaders have a tendency to underestimate the employment impact of data centers, failing to consider:

- 1) The impact of indirect and induced employment creation;
- 2) The impact of the related construction jobs; and
- 3) The growing tendency of companies to collocate IT staff, sales staff and other employees at the data center.

The Green Data Center blog⁴ explored the employment counts in mega data centers of major technology companies. Google reportedly hired 200 employees for its data center in Altoona, Iowa. In Quincy, WA, Ask.com, Intuit and Microsoft hired a combined total of 180 workers – Ask.com has 30 employees and the others each have 50. Data centers operated by a third party also have staff to support the tenants. (For example, a facility in the 175,000-250,000 SF range may have 20-25 employees.) Such facilities require a manager, engineers, and

network administrators to troubleshoot issues that surface during daily operations. These positions, for the most part, require advanced level degrees and are high-paying, with average wages typically exceeding \$60,000. Non-IT related staff typically includes a security team, janitorial staff to maintain the common areas, and a marketing staff to assure full occupancy.

Within the environment of third party-hosted data centers, the tenants also have employees on site to interact with the equipment, host meetings with clients or showcase their technological capabilities to win new clients. In fact, a recent trend in co-location facilities has been to increase the footprint of dedicated space for employees and tenants. According to Data Center Knowledge there has been renewed attention on the data center as a facility for IT professionals who need to be more productive and even unwind during long hours. "The nondescript concrete bunker of the past is giving way to campuses optimized for humans, complete with comfortable offices, conference rooms, theaters and gaming areas."⁵ Kevin Knight, Sales Director for Digital Realty, confirmed this trend noting, "We find ourselves planning for larger office areas in our data centers because our customers are demanding it. They want to have a place for their staff to work while on-site, in many cases temporarily but, increasingly, on a permanent basis."

Fiscal Impacts

As noted, the economic stimulus and employment created by the data center generates fiscal (tax) benefits to the host community, but a more specific understanding of the scale of fiscal impacts is warranted. The largest revenue opportunity occurs from property taxes. Whether development of a data center represents redevelopment of a previous use, or first-time development of a "greenfield" site, it virtually always means a significant increase in the assessed value of the property and a resulting increase in property tax revenues.

The Washington Research Council, which assessed the impact of data center development in three counties in the state, reported in the city of Quincy, WA where Yahoo and Microsoft located their data centers that "regular property tax values in the city grew nearly three-fold between 2006 and 2009, from about \$260 million to \$764 million... property tax collections in the city grew by more than \$1.4 million over the period — a 178% increase."⁶ Increased collections of utility taxes, employment taxes, corporate and personal income taxes, permit fees, and utility connection fees are also potential fiscal benefits, varying according to state and local tax structures, as well as the nature of the data center operation itself.

In addition, these fiscal benefits can be achieved with minimal cost. While data centers entail more direct employment than is generally assumed, they are nonetheless much less employee and traffic intensive than office buildings, equating to an increased ratable tax base without the burdens on municipal services, such as schools public works, public safety, etc. (See the case study at the end of this article for another example of "net" fiscal impacts.) In some situations in which a community is competing with other locations in an attempt to attract a new data center, it may choose to forego a portion of its fiscal benefits, in the form of economic incentives, in order to gain the remaining fiscal or employment benefits.

Additional Benefits to Utilities

Data centers consume large amounts of power, so it's no surprise utility companies view them as extremely attractive revenue generators. However, data centers also offer desirable "load characteristics." Data centers operate 24/7 with a very steady, consistent "load," — i.e., a predictable level of usage. This predictability makes it easier for utilities to balance the data center's usage with that of other customers on the system. Furthermore, as Mark James, Vice President Economic and Business Development with

American Electric Power notes, "In some cases, the addition of a large, steady requirement to a utility's customer base enables the utility to justify and finance upgrades and expansions to its systems, which can improve reliability and availability to all of the system's customers."

Urban and rural appeal

From a planning and development perspective, data centers offer opportunities for both urban and rural communities. Data centers near metropolitan areas typically utilize adaptive re-use of land or buildings. Two of the more well-known examples of data center-driven urban redevelopment are Chicago's 350 E. Cermak Avenue, which was once home to the printing press for the Yellow Book and Sears Catalog until the early 1990's; and New York's 60 Hudson Avenue, the former Western Union building. Both buildings are now sought-after data centers housing an array of telecom, internet, and financial tenants.

Rural areas have also benefited from the data center boom. Since 2007 Microsoft, Yahoo, Google, and Intuit, just to name a few, have invested billions of dollars into mega data centers in rural communities of Washington, Oregon and Iowa. These locations offer abundant land, electricity, cooler weather (facilitating "free cooling" of the data center by using outside air rather than artificially cooled air), and are not as disaster prone as some coastal locations. Just like their urban counter-parts, these facilities are redefining the landscape and bringing economic opportunities for rural communities in ways not conceivable just a few years ago.

Anchoring a New Economy

Data center developments also afford communities an opportunity to transition towards the digital economy. Improving the "tech" image of a community can enhance the location's competitive advantage for a wide range of investment projects. Data centers serve as an advertisement for the area's overall

(Continue to Page 18)

Low Data Centers Benefit Communities

IMPACT ANALYSIS CASE STUDY:

Proposed Data Center Development

Building Specifications	
Building Size:	230,000 SF
Interior Portion of Building to Be Renovated in Phase I:	58,800 SF
Rack Space (raised floor computing area available to tenants):	30,980 SF
Network Operations Center (NOC):	3,700 SF
Mechanicals and Supporting Infrastructure:	6,300 SF
Office:	6,800 SF
Miscellaneous (restrooms, etc.):	11,020 SF
Total Estimated Construction Expenditures	\$54,319,795

Employment Projections		
Job Title	Employees	Average Wage*
Security	8	\$25,220
Salesperson	2	\$77,740
Engineers (Hardware and Software)	2	\$90,080
Building Cleaning Worker	1	\$28,460
Data Center Manager	1	\$115,240
Data Center Technicians & Network Admin.	8	\$77,150
TOTAL Jobs/Weighted Average Wage	22	\$59,014

*Based on U.S. Bureau of Labor and Statistics, May 2011 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates, Chicago-Joliet-Naperville, IL Metropolitan Division.

Estimated Economic Impacts (Direct, Induced and Indirect) Over Ten Years				
Impacts to COOK COUNTY, IL	Job Creation			Earnings Added to Local Economy*
	Direct	Indirect and Induced	Total	
Construction Phase	NA	642	642	\$30,103,111
Ongoing Operations	22	143	165	\$72,022,310
Potential Implications Over Ten-Years	22	78 <i>(temp + permanent)</i>	807 <i>(temp + permanent)</i>	\$102,125,451

* "Earnings" refers to total earnings added to the local economy, not the specific revenues of the data center itself.

Estimated Net Tax Revenues	
Taxing District	Net New Tax Revenues Over 10 Years
Chicago Board of Education	\$2,810,080
City of Chicago	\$850,020
Cook County	\$451,700
Forest Preserve District of Cook County	\$56,700
Metropolitan Water Rec. Dist.	\$312,850
City of Chicago Library Fund	\$108,500
City of Chicago School Building & Improvement Fund	\$116,350
Community College District #508	\$161,300
Chicago Park District	\$338,830
Total	\$5,206,700

This case study presents the findings of an impact analysis performed for a proposed Tier III co-location center in Chicago. The proposed project is an adaptive re-use of a vacant 230,000 square foot food processing plant. The analysis considered both the potential economic and fiscal benefits of the project.

Economic Impact

The economic impact model employed utilized the Regional Input Output Modeling System (RIMS II) developed by the U.S. Bureau of Economic Affairs. The RIMS II system provides estimates of the inputs needed for a given economic output, (i.e., a stimulus such as the proposed project). In the context of this analysis, we utilized RIMS II multipliers to estimate the increased demand for the labor, construction materials, and computing equipment that would be required to establish and operate the proposed data center. The economic impact of the proposed project was broken down into two phases:

- Construction jobs and earnings impacts, and
- Permanent jobs and earnings impacts from the on-going operation of the data center. This includes the impacts of both on-going maintenance and service to the data center, as well as the technology refresh investments.

Fiscal Impact:

When functioning as a food processing facility, the operation may have employed as many as 500 persons over its almost 100-year history. While the facility was operational, the City of Chicago provided it with a range of municipal services, including police, fire, streets and sanitation, public health, transportation, emergency management, etc. With the cessation of operations and the vacancy of the property, the valuation (assessment) and, simultaneously, the tax revenues generated by the property have decreased substantially.

The analysis concluded that the proposed redevelopment of the property will not only restore the assessment (and accompanying tax revenues) to the taxing jurisdictions, but will yield even greater tax revenues while creating less burden on governmental services than the previous use. Meanwhile, all taxing bodies, including the City, would recognize increased tax revenues, with the school district realizing the greatest gain.

It should be noted that the case study and its results should not be interpreted as a guarantee of the outcomes or success of a project. It is intended to serve as a tool to help understand the potential impacts of the proposed project. It should also be noted that this analysis is unique to the proposed location. Potential impacts will vary by project, location and that location's tax structure.

THERE ARE THREE PRIMARY TYPES OF DATA CENTERS:

- 1) Co-location centers are typically owned and operated by a third party company that has server space they lease to companies while sharing common infrastructure and facility management. In some instances the owner/operator is leasing space in the facility and the tenant furnishes their own electronic and computer equipment, and other facilities where the tenant will rent space on the servers and utilize paid staff of the co-location center.
- 2) Enterprise data centers are data centers that house the IT infrastructure of an individual company that require reliable power, security and control.
- 3) Mega data centers are facilities supporting large cloud and data infrastructure for companies like Amazon, Google, and Wal-Mart. Almost all large companies and most mid-sized businesses have some level of need for data center operations.

DATA CENTERS CONTRIBUTE TO LOCAL EMPLOYMENT IN THREE FORMS:

- 1) Direct jobs - employees of the data center.
- 2) Indirect jobs - jobs created within the data center's supplier network to service the new facility.
- 3) Induced jobs - increased employment in the consumer sector as a result of the spending of wages in the local economy to pay for groceries, clothes, entertainment, haircuts, etc.

attractiveness — e.g., utility costs, availability and reliability; the quality and quantity of fiber infrastructure; its access to IT talent; and available land and buildings — enabling communities to attract a broader array of information technology companies and a deeper professional services cluster.

The benefits of this dynamic are most immediately felt when an "anchor" data center project that enters a new market inspires other data centers to follow. As Rich Miller points out in *Data Center Knowledge*, Microsoft's decision to locate in San Antonio was followed by companies siting their data centers nearby, including HP, Lowes and Citigroup³; North Carolina is now home to Apple, Google, American Express, and IBM. New Albany, Ohio (near Columbus) is enjoying data center stardom, having most recently announced that Discover Financial Services and Compass Data Centers will be constructing new facilities. Chicago has seen a flurry of planned activity in the South Loop area of the city⁴, where 350 East Cermak, reputedly the world's largest data center⁵, is located.

To truly "anchor" a community's transition to a new economy, data centers must be reliable, long-term

investments. And they are just that. Companies don't invest hundreds of millions of dollars and many months (if not years) in designing and equipping a data center only to close shop overnight and move to another location. Rather, a data center is a long-term commitment to a location.

Conclusion

As former Microsoft CFO Mike Brown said in a Seattle Times commentary, "They [data centers] create jobs to build, operate and service, they pay property taxes that provide economic stability to the counties and schools where they are located, and they attract suppliers and support infrastructure firms that are drawn to locate nearby."⁶ Data centers are reshaping the economic landscape and in doing so they represent an opportunity to expand the economic base of a community while generating a return on that investment. Even when competition for such projects requires states and/or localities to offer incentives to be competitive, the enormous tax and other fiscal benefits of such projects create opportunities for public/private partnerships that offer extremely attractive and long-term benefits for the communities that are successful in attracting data center projects.

Tracy Hyatt Bosman is Managing Director at Biggins Lacy Shapiro & Co.

He can be reached at tbosman@blsstrategies.com

References

- 1) IBM, "What is Big Data?" <http://www-01.ibm.com/software/data/bigdata/>
- 2) Uptime Institute, 2012 Data Center Industry Survey, Matt Stansberry & Julian Kudrinski
- 3) Miller, Rich, "The Billion Dollar Data Centers" 4/29/2013, *Data Center Knowledge*.
- 4) Green Data Center: <http://www.greenu3.com/2008/01/of-data-center.html>
- 5) *Data Center Knowledge*, Rich Miller, *The Rise of the Worker-Friendly Data Center*
- 6) Washington Research Council, "The Economic Contributions of Data Centers in North Central Washington", January 2010.
- 7) Miller, Rich, "The Data Center Clustering Effect," 05/01/2007, *DataCenterKnowledge.com*
- 8) Ryan Ori, "\$550 million in data centers slated for Near South Side," 2/13/2013, *ChicagoRealEstateDaily.com*
- 9) Miller, Rich, "World's Largest Data Center: 350 E. Cermak," 4/13/2010, *DataCenterKnowledge.com*
- 10) Mike Brown, "Washington must update business approach to compete for jobs", 12/11/2009, *Seattle Times*