

A New Kind of Farm

BY CHARLES GERENA

Western North Carolina once depended on tobacco and cotton production to make money. When agriculture gave way to the Industrial Revolution, communities turned to textile and furniture production to utilize their natural resources.

Now another kind of farm is drawing upon the region's comparative advantages. Massive data centers called "server farms" — large enough to hold several football fields — house room after room stacked with computers. They draw about 20 times the power of a mid-sized office building yet require only a few dozen workers to operate.

Economic development officials in western North Carolina have been promoting the region to companies looking to build data centers, offering generous tax breaks to compete with rural towns like Quincy, Wash., that also have ample land, power, and water. Officials have had a number of wins.

Google has operated a data center in Caldwell County since 2008 and is in the process of expanding it. Apple began operating a center in Catawba County last spring, while Facebook plans to complete its center in Rutherford County next year. In addition, a subsidiary of the Walt Disney Co. is eyeing Cleveland County, where Wipro Technologies, a provider of IT services and infrastructure, is already converting part of a boat manufacturing plant into a data center.

Would these recruitment efforts stand up to a formal cost-benefit analysis? It depends on how you define "benefits." Data centers don't generate enough employment to make up for the thousands of manufacturing jobs that have been eliminated through automation or relocated overseas.

But for western North Carolina, some new jobs are better than no jobs in the face of double-digit unemployment that has persisted for more than two years. Data centers also generate significant tax revenue without requiring a lot of additional services like roads and schools. Finally, they hold the promise of generating new economic activity in the future.

"We feel like we still have to recruit companies that make stuff," notes Kristin Fletcher, executive vice president of economic development for the Cleveland County Economic Development Partnership. "But data centers give our rural county a foothold in the technology world. We're looking for diversification and stability."

The Demand for Virtual Real Estate

Data centers have been around in various forms since at least the 1960s. Companies have created these centralized locations to house a variety of computer equipment, from servers hosting enterprise-level applications and websites to routers and other networking equipment to data

storage and backup facilities.

The demand for this virtual real estate has steadily increased over the years, driving the need for ever-larger data centers located far from the urban canyons of corporate America. For one thing, there are technical advantages and cost savings from consolidating smaller centers. "It's the economies of scale of having a certain amount of server capacity under one roof," explains John Lenio, an economist and managing director of the Economic Incentives Group at CB Richard Ellis, a real estate services firm.

Secondly, says Lenio, companies want their data centers located away from their headquarters in case of an emergency. Finally, taxes are higher in the big cities and mature suburbs where companies have usually been based. Technical factors are also driving the growth in the size and number of data centers. Like a river harnessed by dams and channels, torrents of data constantly flow through our economy that have to be manipulated and stored. Every picture posted on Facebook, every download of a song from iTunes adds to the torrent.

"The more people that have Internet access, the more people start using services" that require additional computing power, notes Peter Marin, president of T5 Partners, which has been developing data centers in western North Carolina since 2008. Then there's the emergence of cloud computing, where data processing and storage are taken out of PCs in people's homes and offices and placed in a more efficient environment. "All a data center does is provide power, space, and cooling on a larger scale."

Go West

To the east, the Research Triangle has been where data centers traditionally clustered in North Carolina. IBM, Fidelity Investments, and other companies have taken advantage of the region's nexus of IT professionals and telecommunications infrastructure.

What does the western part of the Tar Heel State offer for Google, Apple, and Facebook? Often, it is the same infrastructure that has supported manufacturers for more than a century.

At the top of the list is access to abundant, reliable, and relatively inexpensive electricity to run a large data center's computers and keep them cool. "The electrical power [sold by Duke Energy in western North Carolina] is 4.3 cents per kilowatt hour, which is one of the lowest rates in the country," says Marin. More than half of that power comes from nuclear plants, which are stable sources of electricity from a pricing perspective. Also, Duke has a history of serving the power needs of textile and furniture manufacturers. "Those industries have left the region and left significant capacity on Duke's system."

Server Farm Roundup

North Carolina lawmakers got the ball rolling when they approved the construction of a state-run data center in western North Carolina in 2008. Private industry quickly followed suit, taking advantage of the region's power, water, and telecommunications infrastructure.

Owner	Location	Size (sq. ft.)	Projected Capital Investment	Maximum Projected Employment	Past Use	Completion Date
NC Government	Forest City, Rutherford County	50,000	\$25 million	50	None (new construction)	2008
Google	Lenoir, Caldwell County	100,000	\$600 million	210*	Lumberyard operated by Burnhardt Furniture, single-family homes	2008
Apple	Maiden, Catawba County	500,000	\$1 billion	50	None (new construction)	2011
Facebook	Forest City, Rutherford County	390,000	\$450 million	45	Textile mill operated by Burlington Industries	2012**
Wipro Technologies	Kings Mountain, Cleveland County	215,000	\$75 million	17	Boat manufacturing facility operated by Chris-Craft	N/A

* Includes contract workers ** Estimated

SOURCES: News reports and information supplied by Google and Facebook

There is also lots of water that mills no longer use. At many data centers, the excess heat coming from computers is absorbed by water, which is taken to a tower where air quickly cools it off. Also, some of the water evaporates and some is drained to remove sediment before circulating back into the building. Both cause large losses of water. As a result, large data centers typically use between 500,000 and a million gallons of water a day, according to Lenio. To put that number in perspective, a knit-fabric textile plant operated by Hanesbrands in Forest City used 3 million gallons of water daily before it closed in 2008.

Finally, there is access to long-haul, high-speed communications lines. Some of them have been built by state and local government, while others are operated by telecom providers like AT&T and Verizon.

Western North Carolina has environmental factors in its favor as well. The region tends to have a mild climate and a low risk of natural disasters. It also has lots of land that's undeveloped or can be redeveloped.

On top of these factors, local economic development officials are aggressive recruiters. To assemble the 200-plus acres required for Google's data center, for example, the Caldwell County Economic Development Commission (EDC) acquired dozens of homesites in Lenoir that were next to a former lumberyard and an undeveloped parcel owned by Duke Energy.

John Howard, the EDC's former executive director, recalls how he dealt with a railroad that passed right through the site being developed for Google. "We had to negotiate with the owner of the railroad and the manager to stop the tracks prior to the site and create an off-load station." (Google did pay \$3 million to help fund the railroad's reconfiguration.)

Data center projects also benefit from a slew of tax incentives. For example, Caldwell County gave Google a break on 100 percent of its business property taxes and 80 percent of its real property taxes for 30 years. The city of Lenoir, where the center is located, offered a similar deal.

Furthermore, the state enacted a sales-tax exemption in 2006 for purchases of electricity and business property by

"Internet data centers." These are defined as facilities located in economically distressed counties and operated by software publishing and Internet services firms that have invested at least \$250 million over five years.

Such incentives are important — data centers are very capital-intensive, so companies care a lot about the tax bills they'll have to pay. There's the sales and use tax on all of the computers, electrical equipment, fire suppression systems, and cooling systems that a data center needs. Then, business property taxes are due on all of that equipment on an ongoing basis. Finally, there are the real property taxes paid on the land and buildings.

You've Got to Give to Get

Lenio hopes that communities don't give up all of their potential tax revenue to recruit a data center. But he can see why they might do so. "There will be some counties that may not see good economic development projects every day [and] might be willing to use the big data center as a loss leader to build a cluster," he notes. "For some policymakers, they'd rather have something than nothing."

What is that "something?" In the short term, the construction of a large data center can provide an economic boost, if the required expertise is available locally.

"It's very specialized construction," says Robert McFarlane, who designs data centers for New York-based Shen Milsom & Wilke. "The equipment that is used to power and cool these facilities have to be built the right way, and the majority of trades people are not used to building them." Further, "they might use a local architect, but probably not a local engineering firm. Only a few engineers in the country know how to do these designs."

As of October 2011, more than 1,500 people have helped build Facebook's data center in Rutherford County. "Most of them live here; they eat at the restaurants and buy food and clothes here," says Thomas Johnson, executive director of the county's Economic Development Commission. Once a month, a local restaurant caters lunch for the construction crew.

In the long term, however, the employment impact is

minimal. None of the companies with data centers will say exactly how many people they employ full time, but estimates range from 45 for Facebook and 50 for Apple to 210 for Google. The higher estimate for Google likely includes security personnel and service technicians who work on a contract basis.

While the number of jobs is small, they include a few well-paying positions such as software engineers and operations managers. Again, the challenge is whether local workers, many of whom were laid off from their factory jobs years ago, have the requisite skills.

“If a person is a computer jockey at home, it’s very possible they could learn what they need to know on the job and fill many of the positions at a server farm,” says McFarlane. That’s because all the servers in a data center are identical. “When you learn to reload [the software on] one of them or replace it, you know what to do.” Still, “that doesn’t mean you can train a monkey to do it. You’ve got to have people who are very agile with computers because they are going to be expected to react quickly.”

Economic development officials in western North

Carolina are well aware that a data center isn’t a manufacturing plant and won’t single-handedly make up for the job losses in the region’s manufacturing sector. But they see other benefits for their communities in the long term besides job creation.

Despite the generous tax breaks provided to data centers, county governments stand to receive a significant inflow of tax revenue from property that had been sitting vacant. According to Johnson, Facebook will probably become the fifth- or sixth-largest taxpayer in Rutherford County, paying about \$109,000 annually for the next 10 years. Google was expected to yield \$130,000 to \$160,000 in tax revenues annually for Lenoir and Caldwell County.

For Kristen Fletcher in Cleveland County, and her competitors in neighboring counties, the huge amount of capital invested in data centers makes them worth the pursuit.

“It’s a positive contribution to our tax base, which is going to allow us to progress in so many other ways — building schools, stabilizing our local government financially,” says Fletcher. “It is a fairly easy target with a fairly large, immediate return on investment.” **RF**

UPFRONT *continued from page 5*

scrubbers and pollution controls over the past few years, and is likely to spend \$5 billion to \$6 billion more over the next decade, according to spokeswoman Erin Culbert of Duke, now the nation’s sixth-largest electricity provider. (If Duke merges with Raleigh, N.C.-based Progress Energy, as planned, the combined firm will be the nation’s biggest utility.)

“We are planning retirements of coal-fired plants between now and 2015 that will total around 3,200 megawatts,” Culbert says. That’s the amount of electricity required to power about 2.56 million homes. Affected plants are in the Midwest and the Carolinas. The plant closings are not only in response to Duke’s modernization of its 50-year-old coal fleet but also to future emissions cuts. “With anticipation of multiple environmental regulations, we do see an upward pressure on rates nationally.”

According to American Electric Power, based in Columbus, Ohio, costs will range from \$6 billion to \$8 billion through the end of this decade. The company plans to close three plants in West Virginia and one in Virginia, among others; 600 jobs overall may be lost.

The new rule limits market-based emissions trading. This ability to buy and sell pollution allowances gave power plants flexibility to meet emissions standards in the past. (Older, dirtier plants could buy allowances from newer, cleaner plants.) CSAPR allows no carryover of SO₂ or NO_x banked emissions from previous programs. EPA says the large number of old allowances would have made it more likely for states to exceed levels and for

power plants to incur penalties.

CSAPR establishes four new trading programs, two of which are for SO₂. One applies to states that require deep cuts and one to states needing fewer emissions cuts. Another program was set up for annual NO_x emissions, and still another for ozone-season (summer) NO_x. The new rule allows intrastate trading of pollution allowances, along with limited interstate transactions among certain groups of plants. A strict emissions cap in each state is designed to prevent pollution “hotspots.”

Environmental benefits may be hard to quantify. Existing cost-benefit studies of the rule and its predecessor rule find, however, that benefits outweigh costs, often by a wide margin, write Richard Schmalensee and Robert Stavins in a March 2011 paper analyzing the pollution transport rule. The authors are economists at the Massachusetts Institute of Technology and Harvard University, respectively. Estimates of benefits vary across studies, from a low of \$20 billion annually to a high of \$310 billion, with most of the variation coming from assumptions about the value of a statistical life, estimated by the EPA at about \$7.3 million in 2006 dollars. Annual costs to utilities are estimated at \$2.4 billion, including capital investments already in progress under the old rule.

The cross-state rule is one of several proposed that will affect the electric power sector. Others include regulations of greenhouse gas emissions, mercury and other hazardous air pollutants, cooling water intake structures, and fly-ash disposal at combustion sites.

— BETTY JOYCE NASH