

The Future of Wireless Infrastructure in the United States

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Wall Street would love you to believe that small cells will dominate the construction environment for the next five years. But at the end of the day, it may be more macros than micros.

December 2014 - AGL Magazine - Speaking at a meeting of the Maryland-DC Wireless Association, Marc Ganzi, the chief executive officer of Digital Bridge, said investors and owners have as much reason to be optimistic about the tower industry as ever. Ganzi is the founder and former CEO of Global Tower Partners."

The reasons are simple," Ganzi said. "For one thing, investors, in general, love barriers to entry. Towers have that because you're fighting zoning battles every day. This is probably the number one reason why the tower business attracts capital. If you obtain the right location, you really don't need a great sales force to lease it."

Ganzi said the next reason is visibility. Equity investors like visibility, and debt investors like it even more, he explained. It's the reason behind steps that Crown Castle International, American Tower and SBA Communications take with the long-term, 30-year commercial mortgage-backed securities they issue and why they amend their master leasing agreements to add seven and 10 years. "It provides visibility for revenue," Ganzi said. "What debt investors want to know is that you have a stabilized cash flow growing at 3 percent a year, and that customers can't terminate for the next 10 years. Those are the key buzz metrics."

The third thing that Ganzi said investors love is growth. "Tower owners can grow their businesses in a number of ways," he said. "We can build, buy and lease towers. Then we have a choice whether to lease the towers by signing amendments or leasing for new, de novo collocations, or for microwave backhaul, or it could be for 4.5G technology or 700-MHz systems. The 700-MHz systems could represent another amendment that's coming and that keeps on giving. The embedded notion of growth and why this is a great asset class underpins our investing thesis for the next five years."

The fourth reason Ganzi cited is operating leverage, which he said means that from a fixed-cost-base of operations, a tower owner can add revenue without adding expense.

"The way we did it in our business was we tried to keep our site-level operating cost fixed," he said. "We had great partners for site maintenance. We had David Saul doing our insurance, who kept that expense down. Making sure there wasn't a lot of unpredictable activity related to site-level operating expenses helped to improve cash flow margins at the sites. Another tactic is to buy out your ground lease."

To control sales, general and administrative expenses, Ganzi said he created silos of people to execute different functions, and he used a back office system, a database, to tie those functions together. "The right back-office system allows employees to consistently and constantly communicate with each other about every tower, whether it was a new build, an amendment or collocation, without having a hundred emails circulating among six people about one topic," he said.

Explosive Growth

Ganzi said investors are excited about the way tower companies grow their asset base.

"For the next several years, growth will result from the explosion in the use of mobile data," he said. "A smart-phone takes up to 49 times more capacity than a feature phone. Laptop computers are the network killers. It would take 227 feature phones to replicate the data consumption of a laptop. Next-generation devices, particularly tablets, take 2.4 times more capacity than an average smartphone. For tower owners, all of our demand right now, whether it's negotiating a ground lease, upgrading a tower, building a new tower or handling a collocation application, is being driven by mobile data. AT&T calls the growth the 'data tsunami.'"

Trends to Think About

Ganzi said machine-to-machine communications will drive the mobile networks in the coming years. M2M communications include wearables and video. It also includes smart cars, houses and refrigerators.

"An example of a wearable would be a fitness band," Ganzi said. "With M2M communications, individuals no longer are involved in the transaction. It's one device talking to another device. Original equipment manufacturers are consuming themselves with how to invent devices that don't involve us making a purchasing decision. That's scary, but this is a growing part of their game."

Wearables are in their infancy, Ganzi explained, saying, "Today, there are 22 million distinct users in the wearables market. That will rise to 177 million by 2018, and you will not be involved in that conversation. That will be one of your machines talking to somebody else's machine. It's a whole new category of wireless products in which America will be the leader, because America is totally responsible for useless technology. As consumers, we love it, so we will far and away be the global leader. M2M communications will not be driving European, Latin American, African or Asian towers anytime soon."

The second trend, video, is a big consumer of traffic on the network, Ganzi said. "With video, carriers have a problem. Network engineers will tell you that if they don't migrate and separate data, voice and video traffic into different frequencies and different bands, the

networks will become choked," he said. "Already, today, we have 60 percent of video consumption as mobile video. Carrying all of that video is going to be a big problem for the network operators."

Ganzi said that mobile audio, mobile M2M, mobile file sharing and mobile Web all are growing fast and are consuming exabytes, not terabytes, of data per month.

Cell Site Growth Prospects

Ganzi said the wireless infrastructure industry ended 2012 with 294,000 macrosites in the United States. He said that absent new spectrum, without increased spectral efficiency in the radios and the handsets and without the use of small cells, network operators would need 4.3 million macrosites by 2021.

"Even though the tower companies are not going to build 4.3 million macros because there will be new spectrum and increased spectral efficiency, everyone will need to keep building macrosites as fast as they can and keep providing services to the wireless industry with infrastructure construction. In this ecosystem, we need everything to happen. There really is no single bullet that solves the problem."

Spectrum Increase

Ganzi said he believes there will be a 40 percent increase in spectrum released between now and 2021. "During my 20 years in this business, 24 months after the FCC announces selling the spectrum, the spectrum clears and falls into the carriers' hands, my phone rings. We either have to upgrade the radios on the tower, install new lines, install new antennas or build new sites. The networks need coverage or capacity. That's not going to change."

New spectrum that may come to wireless networks include frequency bands owned by Dish Network, frequencies in Advanced Wireless Service spectrum, digital TV (DTV) channel refarming and spectrum under federal control. "We're sitting on a ton of spectrum that's unallocated," Ganzi said. "There is plenty of spectrum to build out this next data tsunami. AT&T shouldn't be worried."

Spectrum Efficiency

Ganzi said the leap in spectrum efficiency from HSPA to LTE was significant for handsets and, more importantly, the radios. He said the coming spectrum efficiency of 5G cellular technology will be needed to meet the expected 10 times demand spike in data usage and a 32 times spike in video usage.

"When we think about where we're going in the next seven years, networks are going to be changed radically," he said. "They're going to have 4G radios, 4.5G radios and 5G radios. 2.5G and 3G will be gone — deconstructed. There will be a fight over what devices use these frequency bands. We'll have wearables. We'll have autos — smart cars — a large and

growing segment of network use. We'll have dongles, feature phones and smartphones. And just think, in 2021, we'll only have 138 million users on 5G. The predominance of use will be in 4.5G. So, in seven years, 4.5G use will be what 3G use was in 2011. We'll have two iterations of technology improvement."

Ganzi said that despite U.S. innovation, the United States lags in network and spectrum efficiency compared with South Korea and Japan. "In South Korea, carriers have already launched 4.5G, and they're trial-testing 5G. In Latin America, carriers are still running on 3G. So, the ecosystem hierarchy puts South Korea and Japan first. North America follows, Western Europe goes next, then Latin America, and the last is Africa. That's the original equipment manufacturer ecosystem, where they sell which devices."

DAS and Small Cells

The site construction, site maintenance and site development business could be affected by the use of technologies other than macrosites. On this subject, Ganzi reiterated that operators cannot solve their growing network capacity requirements with any single technology.

"Wall Street analysts tell you it's all about small cells," he said. "Small cell. Small cell. It is, to a certain degree. But keep in mind that distributed antenna system (DAS) networks are not the low-cost solution that so many believe they are. Carriers tell us, 'Yeah, we'd love to have small cell, but it's not priced correctly,' because you still have this last-mile problem, which is the landlord. Landlords are not going to give away real estate cheaply. The tower companies aren't giving it away. Municipalities aren't giving it away. Private real estate owners are not going to give it away."

Ganzi said that on a one-for-one basis, DAS nodes cost less than macrocells. "It will cost anywhere from \$15,000 to \$20,000 to deploy a small cell," he said "It can cost \$150,000 to \$300,000 to deploy a macrocell. The problem is that the estimates of how many DAS nodes equal one macrosite range from eight to 12. If it costs \$20,000 per DAS node and 10 nodes one macrosite, you're already at \$200,000 to \$250,000 capex, and you haven't even dealt with the rent factor with the landlords. We're just talking capex. In the capex model, it is always cheaper to overlay a macrosite on an existing facility such as an existing tower or an existing rooftop site. That remains the cheaper solution."

Focusing on the rent factor, Ganzi said that cheap DAS nodes are \$175 a month, and expensive, well-located DAS nodes on Long Island or in Newport Beach, California, can rent for as much as \$400 a month.

"Take 10 DAS nodes at \$400 a month, and that's the equivalent of \$4,000 in macro rent," he said. "What would a carrier prefer? Pay \$4,000 for 10 nodes? Or go to tower company Z and pay \$1,700 a month for a collocation? That's a big difference in opex. So there's a capex consideration, and there's an opex consideration."

Ganzi said that although small cell technology is a part of the ecosystem, expect to see a blend of macrocells and small cells because both types of sites will continue to be deployed during the next five years. He said part of the reason is because coverage from macrosites and small cells alike never measures up to the theoretical, perfect-world coverage. One technology helps to fill in coverage gaps of the other, and they both have them.

"A fill-in strategy using small cells deals with gaps of coverage between macrosites that result from 4G conversions," Ganzi said. "With 4G radios at the macrosites, their coverage areas become slightly smaller, opening some coverage holes. Small cells are a perfect solution for filling coverage holes. That is the real world. This is what's happening right now with network engineers.

Prospects for Macrosites

Ganzi said that there is no one single technology that could replace the use of macrosites. "Wall Street would love you to believe that small cells will dominate the construction environment for the next five years. Not true," he said.

He offered some metrics about the wireless infrastructure industry sector as of the end of 2013. "We ended 315,000 macrosites," Ganzi said. "We ended the year with 23,000 small cells. So, wireless infrastructure was skewed heavily toward macro. The question is, what's going to happen over the next five years?"

Ganzi said that by 2018, the United States would have 405,000 macrosites. "That's 90,000 macros to be added during the next five years," he said. Those are new builds and collocations. It's a lot of work for everybody in the wireless infrastructure industry. Meanwhile, in 2018, we get to 36,000 small cells, and we ended 2013 with 24,000 small cells."

Thus, Ganzi observed, the use of small cells will grow, but not at the same velocity as the use of macro sites. "There's a public misconception that the growth of small cells will outpace macrocells," he said. "But talk with network engineers. Find out where the search rings are being issued for densification and where networks are being fortified. They're not being fortified with microcells. They're being fortified with macrocells. This is a big trend, and this is what gets us very excited — 90,000 macros to build between 2013 and 2018."

The public tower companies will get their fair share of the new macros, but Ganzi said the entrepreneurs, the small business owners and small tower developers are the ones that will benefit the most from the data tsunami effect.

The Future for Carriers

In Ganzi's view, these are early days for 4G deployment. "The United States market is nowhere in 4.5G, and no U.S. carrier has begun a trial-test of 5G in this country," he said. "There remains a lot of demand pull in the sector today. AT&T has stated publicly that it plans to deploy 40,000 small cells and unofficially more than that. But AT&T's Project Velocity IP

(VIP) to expand its potential in key platforms doesn't seem to be going particularly well, at least, not on the small-cell side. The feedback we're getting is that venues want too much money for what they're willing to deploy. Typically, the carriers want to pay as low as \$75 a month for a microcell or small cell."

Then, there's the matter of differentiating between macrosites and microsites. "We've seen a hybrid configuration of two panels, six feedlines and one BTU cabinet," Ganzi said. "Is that a macro or is that a microsite?" He said if the hybrid configuration is mounted on the side of a building, on a rooftop or on a tower, it might be more macro than micro.

"At the end of the day, it'll be more macros than micros," Ganzi said, referring to cell site deployment during the next five years. "It's really a function of the ecosystem of what carriers are willing to pay in opex. Opex kills their EBITDA more than capex does. The opex is what they report to the street. Carriers are focused on trying to keep infrastructure rents down."

Ganzi said AT&T's statement of its intention to deploy 40,000 microsites has been well publicized. "When you try to back them into a corner and ask, 'How many have you deployed?' they don't give you a number. So, we'll see," he said.

"With Sprint, we're looking at a budget between 5,000 to 6,000 macros," Ganzi said. "From now to 2018, we think Sprint is somewhere between 15,000 to 22,000 macrosites on the demand side. That's low, from our perspective. It really depends on how much its owner in Japan continues to fund the business."

Ganzi said Verizon Wireless adds 3,500 to 4,000 macrosites per year, thus, for the next five years, the company might be expected to add 15,000 to 20,000 macrosites.

"AT&T is talking about 8,000 macros this year," Ganzi said. "They're talking about another 6,000 to 8,000 next year. And if you ramp them out another 5,000 each, you get 26,000 macros from AT&T. If you start doing the math, you see 26,000 from AT&T, 20,000 from Sprint, 20,000 from Verizon, and then T-Mobile USA is the big unknown. At some point, T-Mobile is going to have to start reinvesting in the network because the current environment in Washington is not likely to approve a Sprint and T-Mobile merger in the next 18 months."