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Covered Companies Mentioned:

American Tower Corporation (NYSE: AMT, \$62.42; Outperform, Above Average Risk)

AT&T Inc. (NYSE: T, \$30.33; Sector Perform, Above Average Risk)

Clearwire Corp. (NASDAQ: CLWR, \$1.86; Sector Perform, Speculative Risk)

CoreSite Realty Corp. (NYSE: COR, \$19.24; Outperform, Average Risk)

Crown Castle International Corp. (NYSE: CCI, \$45.84; Outperform, Above Average Risk)

Deutsche Telekom (FSE: DTE, €8.96; Sector Perform, Above Average Risk)

Digital Realty Trust (NYSE: DLR, \$24.13; Outperform, Average Risk)

DuPont Fabros Technology, Inc. (NYSE: DFT, \$67.32; Outperform, Average Risk)

Equinix, Inc. (NASDAQ: EQIX, \$112.95; Outperform, Above Average Risk)

Internap Network Services Corp. (NASDAQ: INAP, \$6.38; Outperform, Above Average Risk)

InterXion Holding N.V. (NASDAQ: INXN, \$14.06; Outperform, Above Average Risk)

Leap Wireless International Inc. (NASDAQ: LEAP, \$10.19; Outperform, Speculative Risk)

MetroPCS Communications Inc. (NASDAQ: PCS, \$8.68; Sector Perform, Above Average Risk)

Rackspace Hosting, Inc. (NASDAQ: RAX, \$43.28; Outperform, Speculative Risk)

SBA Communications Corp. (NASDAQ: SBAC, \$45.06; Outperform, Above Average Risk)

Sprint Nextel Corp. (NYSE: S, \$2.33; Sector Perform, Speculative Risk)

TelecityGroup PLC (LSE: TCY, 634GBp; Outperform, Above Average Risk)

Verizon Communications Inc. (NYSE: VZ, \$39.01; Outperform, Above Average Risk)

INDUSTRY | COMMENT

JANUARY 19, 2012

Data 2012**A Primer and Outlook on Telecom Services, Towers, and Datacenter/Hosting Infrastructure****Summary**

This report provides a primer on multiple sectors in our coverage universe whose growth is driven by data generation and consumption: wireless and wireline telecom and infrastructure plays such as towers, datacenters, and hosting.

- We expect the wireless sector to exhibit the most strategic and operating volatility in 2012 as the M&A landscape involving carriers and spectrum begins to crystallize. We believe VZ is best positioned within the telecom and postpaid wireless segments, with LEAP best positioned in the prepaid segment.
- Tower operators should feel a direct and positive impact from carrier 4G initiatives and the potential buildout of new spectrum, and represent an effective way to invest in wireless data growth given their diversification amongst all major operators and technologies. We prefer a basket of AMT, CCI, and SBAC, with a slight overweight toward CCI given its currently discounted trading multiple and the potential for S&P index inclusion.
- For the datacenter and hosting providers, we expect a strong growth year, especially for the retail colo and hosting players. Our preferred picks are INXN, EQIX, COR and RAX. The wholesale datacenter space, reliant on chunkier demand, may experience pricing pressure by market.

The chapters within this report discuss the basics of, and current operating trends driving, the telecom services, tower, and datacenter/hosting segments.

Priced as of prior trading day's market close, EST (unless otherwise noted).
All values in USD unless otherwise noted.

For Required Conflicts Disclosures, see Page 79.

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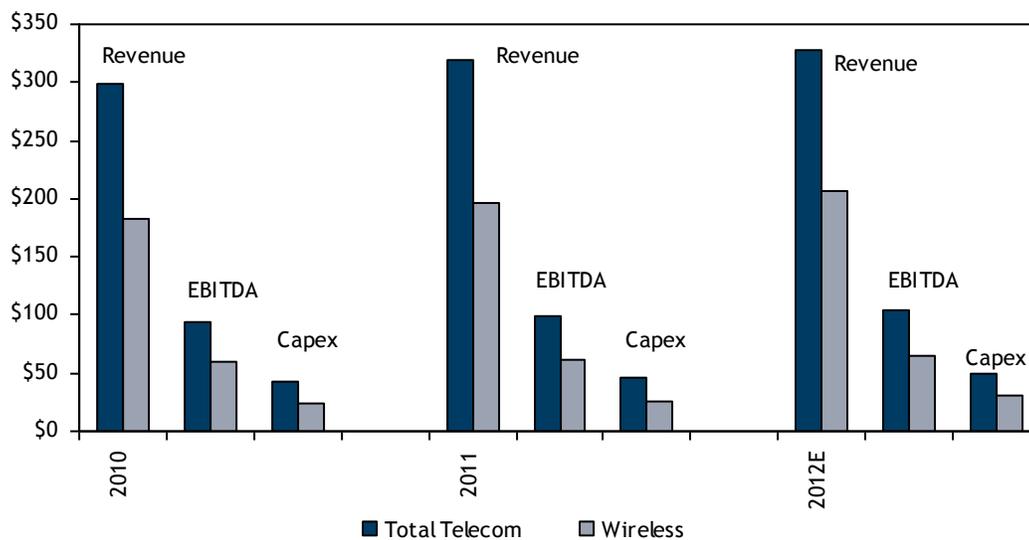
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Executive Summary and 2012 Themes

This report provides a primer on multiple sectors in our coverage universe whose growth is driven by data generation and consumption: wireless and wireline telecom, wireless services, and infrastructure plays such as towers, datacenters, and hosting.

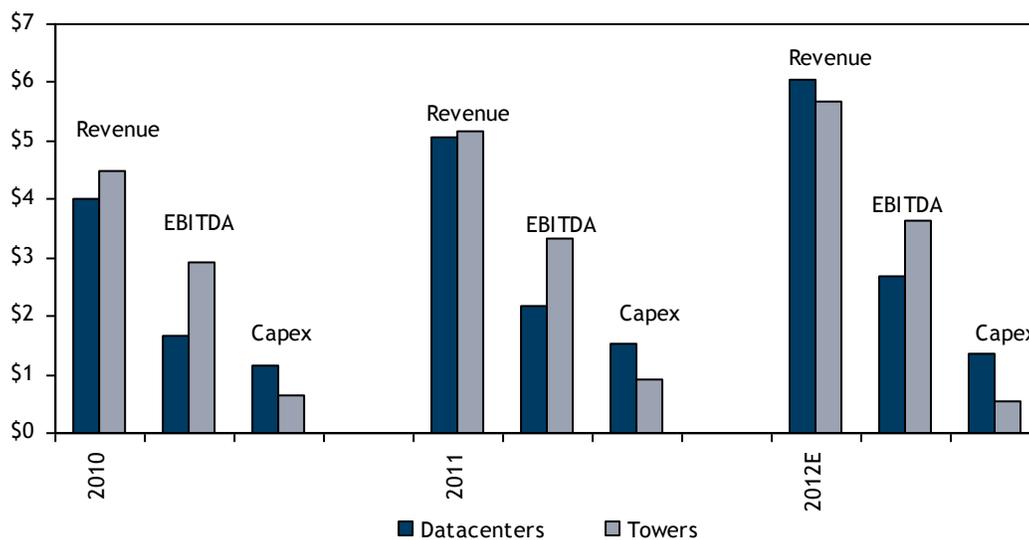
To give an idea of scale, the U.S. telecom carriers generate some \$328 billion in revenues and \$104 billion in EBITDA on capex of \$49 billion, based on our 2012 estimates. This compares to \$319 billion and \$300 billion in revenues during 2011 and 2010, \$99 billion and \$95 billion in EBITDA during 2011 and 2010, and \$46 billion and \$43 billion in capex during 2011 and 2010. Within the wireless segment, we expect \$207 billion in revenues and \$65 billion in EBITDA on capex of \$30.4 billion in 2012. This compares to \$196 billion and \$183 billion in revenues during 2011 and 2010, \$62 billion and \$60 billion in EBITDA during 2011 and 2010, and \$26 billion and \$24 billion in capex during 2011 and 2010. Of the more meaningful carrier and data-driven subsectors, the U.S. tower industry is expected to generate 2012E revenues and EBITDA of \$5 billion and \$3 billion (with \$500 million of capex, mostly discretionary) while the datacenter/hosting sector generates an estimated \$8 billion in revenues and \$3 billion in EBITDA (and just under \$2 billion of capex). Our datacenter/hosting totals are likely understated as they are based just on the pureplay providers, and do not include the significant yet difficult to quantify contribution of major telcos and software players.

Exhibit 1: Telecom Services Financial Snapshot (\$ billions)



Source: Company reports, RBC Capital Markets estimates

Exhibit 2: Telecom Services Financial Snapshot - Infrastructure Based Segments (\$ billions)

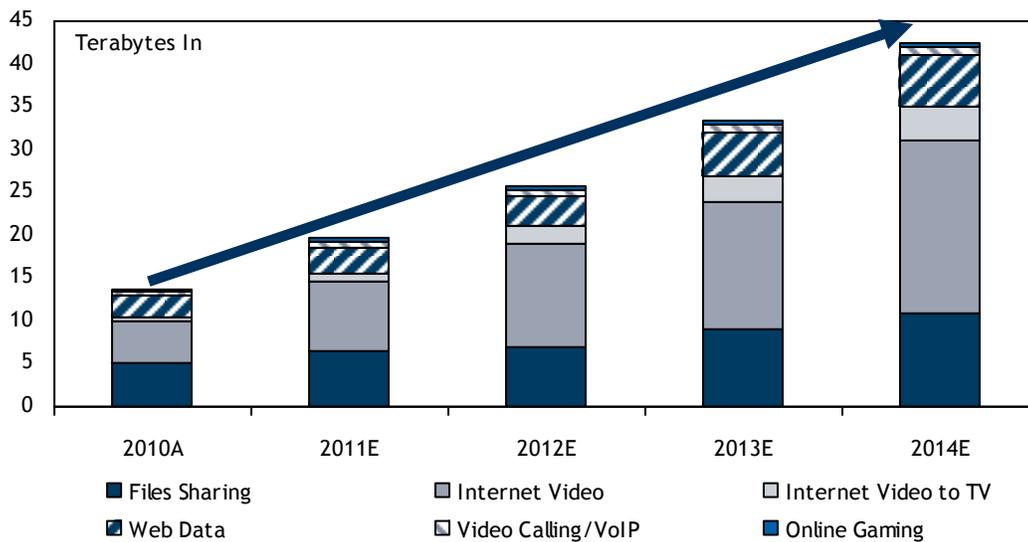


Source: Company reports, RBC Capital Markets estimates

Consumer and business data generation and data consumption continue to drive a plethora of content, storage, network, and outsourcing investments, new products and emerging business models, driving brisk growth in traffic. According to IDC and storage vendor EMC, global data requirements are growing 60% annually. Meanwhile, Cisco forecasts North American IP traffic to grow at a 35% compounded annual growth rate (CAGR) from 2010 to 2014, of which consumer and business IP traffic in North America are projected to grow at 43% and 27% CAGRs. Mobile traffic alone in the U.S. is expected to grow by over 50% over the next four years, driven by video.

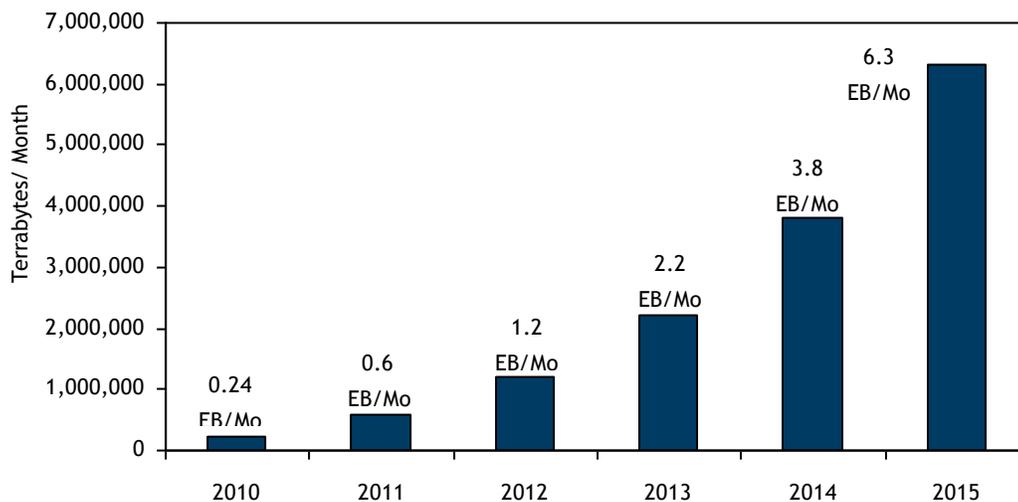
Consumer data growth is being driven by bandwidth-intensive applications such as file sharing, gaming and social networking, as well as streaming multimedia (video and audio). Among net-centric businesses, developing and supporting these consumer applications contribute to the data growth, by necessitating server colocation in company-owned and third-party data centers and related connectivity requirements. Among enterprises, storage, disaster recovery and IT (network and application) outsourcing growth through managed hosting and cloud computing have contributed to data center colocation and network connectivity demand. The extension of corporate LANs to branch offices and remote workers, combined with growth in new enterprise applications, such as Web/video conferencing and telepresence, are also driving bandwidth requirements.

Exhibit 3: Data Traffic Composition and Forecast



Source: Cisco

Exhibit 4: Global Mobile Data Traffic Growth



Source: Cisco

Telecom Services

Amongst our coverage sectors, we expect the greatest volatility, both strategically and operationally, to occur in the wireless services sector given the significant ongoing growth in mobile data traffic, capacity and spectrum constraints at many of the operators, and multiple strategic scenarios amongst carriers and other holders of spectrum. This follows an eventful 2011 featuring amongst other highlights 1) the announcement, then withdrawal of, the AT&T/T-Mobile transaction; 2) S-band consolidation; 3) L-band technical and other challenges; 4) Verizon/cable spectrum transactions; 5) Clearwire/Sprint stalemate, followed by year-end funding to support LTE; 6) broadening of Android and iPhone device selection and distribution, with diminished BlackBerry share. We anticipate few surprises on the wireline side, and are cautiously optimistic on top-line growth and modest margin expansion driven by favorable mix-shifts within the business segment and favorable incremental margins for growth areas in the consumer business (video, broadband) which should offset declines in the legacy voice business.

Key issues that may crystallize in 2012 include 1) the disposition of DISH Network's S-band spectrum (FCC transfer and waiver approval, potential sale or lease to AT&T or T-Mobile) or the company itself (e.g., potential sale to AT&T); 2) T-Mobile USA's 4G strategy, or whether it would potentially pursue an alternative suitor; 3) the buildout of Clearwire's 2.5 GHz spectrum licenses; and 4) Sprint's degree of success at implementing 4G and consolidating its network. We also believe MVNOs, which have occasionally served as a test bed for innovative products and marketing positioning, to continue to play a meaningful role, with all of the four national carriers potentially serving as a host. Areas where we believe MVNO forays are possible include: WiFi or femtocell offload; prepaid iPhones to compete with Android share; session-based pricing (e.g., for tablets), and speed-based price tiering for data. Finally, spectrum auctions (broadcast spectrum and AWS-2 and AWS-3 licenses) will remain a high-profile policy and strategic topic – at present, it appears auctions are unlikely to take place before late 2013.

At this time, we view Verizon as the best positioned operator and see stock-specific opportunities (currently Leap Wireless) amongst the remaining competitors.

Tower Operators

Tower operators should see benefits from the carriers' push for competitive 4G networks and the potential buildouts associated with new spectrum or network sharing. Towercos' retain their unique status as technology, vendor, and carrier neutral beneficiaries of wireless network deployment and is the only telecom-driven sector able to drive EBITDA and recurring FCF growth well into the teens. This is based on fixed-price economics, ample capacity with low redevelopment capex requirements, and a combination of pricing power and increasing same-store demand.

Operationally, we expect an accelerated lease-up pace in 2012 versus 2011 levels, driven domestically by Sprint Network Vision, continuing LTE buildouts at AT&T and Verizon, and a potential T-Mobile or S-band buildout. In international markets, the picture looks similar, if not more robust, as carriers in many regions where the U.S. based towercos operate embark on technology overlays and build out new spectrum licenses. As carriers seek to pinpoint capacity solutions and enhanced coverage in difficult-to-zone areas, we expect to them to continue, if not to increase, their utilization of small-cell architectures such as distributed antenna systems, which is a growing ancillary business for the tower sector. We favor a basket of all three public tower operators, with a slight overweight toward Crown Castle based on a combination of its current multiple versus its peers and a potential index-related catalyst (S&P 500).

Datcenters/Hosting

The datacenter sector (including hosting) should post the highest growth rates, driven by increasing organic demand, adoption by new customers of outsourced collocation and hosting, and supported by significant capital investment programs. We believe the majority of public datacenter operators will remain disciplined in their allocation of expansion capital, thereby supporting a continued robust pricing environment in most segments. New buildouts remain a potential source of concern in the wholesale segment, however. In managed hosting, we believe cloud adoption should continue at a rapid clip, and view Openstack as an exciting open-source alternative to both accelerate adoption and aid pureplay hosters in competing against large content and software plays such as Amazon, Microsoft, and Google.

Amongst the various subsectors, we favor the prospects for hosting and retail collocation over those of wholesale. We view hosting, driven by increasing cloud adoption and increasing capital efficiency, as having the most robust growth prospects, with Rackspace the most intuitive beneficiary, followed by Internap. Retail collocation providers should see strong growth driven by demand amongst multiple verticals (e.g., networking, cloud, content, and parts of enterprise) and stable (U.S.) to increasing (Europe, Asia) pricing trends. Based on a combination of current trading multiples, company positioning, and potential catalysts, we currently favor Equinix, CoreSite, and Interxion, followed by Telecity, amongst this group. The wholesale collocation providers, which we believe face varying degrees of competitiveness according to metro area, should see continued robust demand, albeit a bit choppy in certain markets, with sporadic pricing pressure in select markets.

Stock-Specific Considerations

AT&T: A key decision point for the company revolves around its spectrum position – will it attempt to acquire DISH Network’s S-band licenses (or the company) or wait for future spectrum auctions, the timing of which is highly uncertain? Operationally, the company remains more indexed to the iPhone than competitors; hence, we expect greater margin volatility around iPhone refreshes.

Leap Wireless: We believe the company has strong prospects for favorable year-over-year churn and subscriber trends via its Sprint network partnership and proprietary MUVE music offer. We expect MUVE to help drive ARPU expansion and create greater customer retention. We believe the Sprint partnership entails low roaming rates for Leap and provides for superior network quality for in-network capacity needs and out-of-region roaming vs. prior arrangements.

Sprint: In the core postpaid segment, Sprint’s position as the only unlimited player may pressure network quality; it will be interesting to see how Network Vision counteracts this or leads to overall improvement. We anticipate a continued push in the MVNO, prepaid, and lifeline channels as the company attempts to turn around its postpaid business. In light of near-term margin compression related to the iPhone and Network Vision and the uncertainty around the timing and magnitude of the margin trough, we remain cautious on Sprint shares.

Verizon: The company is well positioned operationally and strategically by virtue of its sector-leading postpaid growth, margins, network quality, and LTE footprint as well as enhanced spectrum position post the pending acquisition of cableco spectrum. We expect the company to balance iPhone sales with LTE-enabled smartphones, given the greater network capacity on the 4G network (we note that the company pays higher dealer commissions for LTE smartphones than for the iPhone). We expect the Vodafone relationship to come into greater focus as the company appears likely to make more frequent dividend payments to Vodafone as it upstreams cash from Verizon Wireless. With respect to the recently announced acquisition of SpectrumCo and Cox spectrum, we expect these deals (or at least the spectrum transfer element thereof) to be approved in late 2012, despite regulatory scrutiny on spectrum concentration in top markets and the commercial agreements on wireline services. We expect the VZ common dividend to grow at a similar pace to prior years.

T-Mobile USA: The company has an acute need for 4G spectrum should it remain independent. Possibilities for 2012 include 1) strategic sale, perhaps to a foreign buyer or Sprint (though financing and regulatory uncertainties are complicating factors); 2) acquisition or lease of spectrum (DISH or Clearwire are potential sources); 3) network sharing or wholesale arrangements (potentially with Sprint or AT&T). Operationally, we expect a focus on churn reduction and increasing competitiveness in the prepaid, MVNO, and lifeline segments. Should the company remain an independent U.S. subsidiary, we believe a sale of the company’s approximately 7,000 towers could fetch \$2.5 billion or more, acting as an effective financing tool along with the recently received \$3 billion cash break-up fee from AT&T.

CoreSite: COR’s efforts to push into more profitable retail colocation business are likely to continue throughout 2012, and we expect the stock to respond well to this transition. Internal business improvements during the past year including new sales personnel and a heightened customer review process were only partially reflected in earnings results during 2011, and we anticipate that its move away from the traditional wholesale side of the business will support added performance in the year to come. With new projects recently complete or set to commence in Santa Clara, Northern Virginia, Chicago and Los Angeles, COR appears well positioned to drive utilization in a subset of the business that continues to see stable to improving rates driven by incremental demand. We expect that success in the early part of 2012 should shift investors’ attention to the future development potential of the company that could serve to double the firm’s size (without adding property or land) over the next several years.

Digital Realty Trust: DLR enters 2012 as it has in years past with a substantial cost of capital advantage relative to its datacenter peers. Its aggressive pursuit of opportunities in Europe and Asia should alleviate some pressure from a more crowded U.S. wholesale market and allow for still solid returns. However, we expect a slower track for earnings growth in the near term, particularly domestically, as flat to lower market rental rates challenge rising commodity inputs for new builds. Additionally, DLR’s capital centric model for growth will require an increasing level of capex (and hence financing activity) during 2012 and into 2013. We continue to view DLR at the center of M&A activity in the data arena. While the management appears focused on wholesale investments, we also anticipate DLR’s growth will increasingly focus on retail-colo services.

DuPont Fabros: With the early 2012 completion of DFT’s second phase in Chicago, the Company will boast \$750 million of recently completed data center space--67MW of critical load--of which an estimated 73% remains unleased. While we believe that the opportunity for improving leasing and earnings performance is embedded in this current vacancy, we also note that the supply of additional power into each of the firm’s key markets--thanks largely to its own facilities--has and will likely continue to pressure returns for new investment. We expect the demand profile for DFT’s large-scale wholesale product to be choppy during the year stemming primarily from the Internet and secondarily from the hosting vertical but do anticipate progress on leasing with little need to raise additional capital. In addition, with limited tenant expirations during 2012 and the rollout of YHOO during 2Q12 already well digested by the market, the focus for DFT will be squarely on its lease-up pace in the early part of the year.

Equinix: We expect the company to continue its existing expansion path, predicated on organic builds coupled with modest tuck-in acquisitions. Ongoing catalysts include solid execution at or above expectations, and the recently announced share buyback program and plan for reaching positive FCF for full-year 2013, which we believe should widen the investor base. We also believe the company is exploring the sale of non-core Switch & Data assets in smaller markets. Our research suggests that the company continues to successfully position its products at premium pricing levels vs. competitors, which should help drive sales and EBITDA growth at or ahead of expected levels.

Rackspace: We anticipate continued sector-leading growth. Key drivers remain cloud and hybrid hosting alongside the core dedicated hosting offering. We expect momentum associated with enterprise initiatives, Openstack, and newer efforts such as Private Edition to fuel additional growth. We believe many of the company's initiatives, including cloud and Private Edition, could provide a more capital-efficient growth path vs. legacy services, thereby enhancing the FCF profile.

Interxion: We believe execution and growth prospects remain on par with its principal peers, Telecity and Equinix Europe. Given its below-peer trading multiple, we believe INXN could significantly outperform its peers if 1) operating and financial metrics remain robust relative to the peer group, thus highlighting its attractiveness on a trading multiple basis; 2) share liquidity is enhanced through a gradual unwind of the 45% Baker Capital stake; and/or 3) Euro-related volatility declines (obviously an entirely external factor).

Internap: We expect the company to migrate further toward managed services as it continues to differentiate on the basis of network connectivity and bundling additional products (colocation, content acceleration, hosting) as it digests the Voxel acquisition.

American Tower: We expect the company to benefit from strong domestic and international carrier activity, perhaps accelerating its organic growth rate in cash rental revenues. Continued outreach amongst REIT investors could gradually increase the company's investor base and trading multiple given its REIT sector-leading organic growth rate and capital efficiency. However, we do not expect inclusion in the MSCI or FTSE/NAREIT Equity indices.

Crown Castle: We expect the company to benefit from strong LTE buildout efforts (Sprint Network Vision, AT&T, Verizon, and a potential T-Mobile or S-band buildout) and close the multiple gap versus its peers. S&P 500 Index inclusion is a potential company-specific catalyst.

SBA Communications: Similar to its tower peers, we expect 2012 lease-up to be greater than 2011 levels driven by Sprint Network Vision, continuing LTE buildouts at AT&T and Verizon, and a potential T-Mobile or S-band buildout. As the smallest publicly traded tower operator, we believe consolidation by one of its larger peers remains a possibility.

The following chapters in this report provide detail on the basics of telecom services (wireless and wireline), towers, and datacenters/hosting, including historical context, technology, products and services, current macro drivers, and operating updates. As a historical background, we include summary tables in Appendices A and B that describes the evolution of the major U.S. telecom service providers through consolidation as well as recent financing highlights.

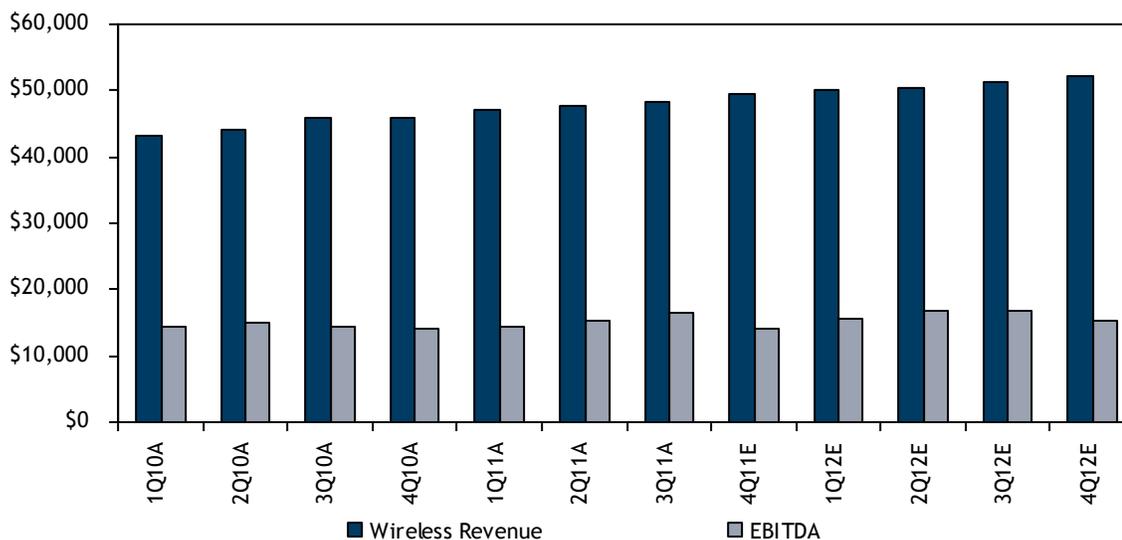
Wireless Services

Proliferation of wireless devices and applications continues unabated, driven by family plans, prepaid, connected devices, and other products. By our estimates, the number of active wireless devices in the US surpassed the population in mid-2011, driven by data—specifically by demand for smartphones and other text-friendly devices.

During 2012, we estimate the US wireless carriers will generate \$204 billion, up 6% versus \$192.5 billion in 2011 (and compared to \$179 billion in 2010). We project 2012 sector EBITDA of \$64.3 billion, a 6.7% change versus \$60.2 in 2011 (and compared to \$58 billion in 2010). These wireless totals represent approximately 63% of domestic telecom service revenues and EBITDA.

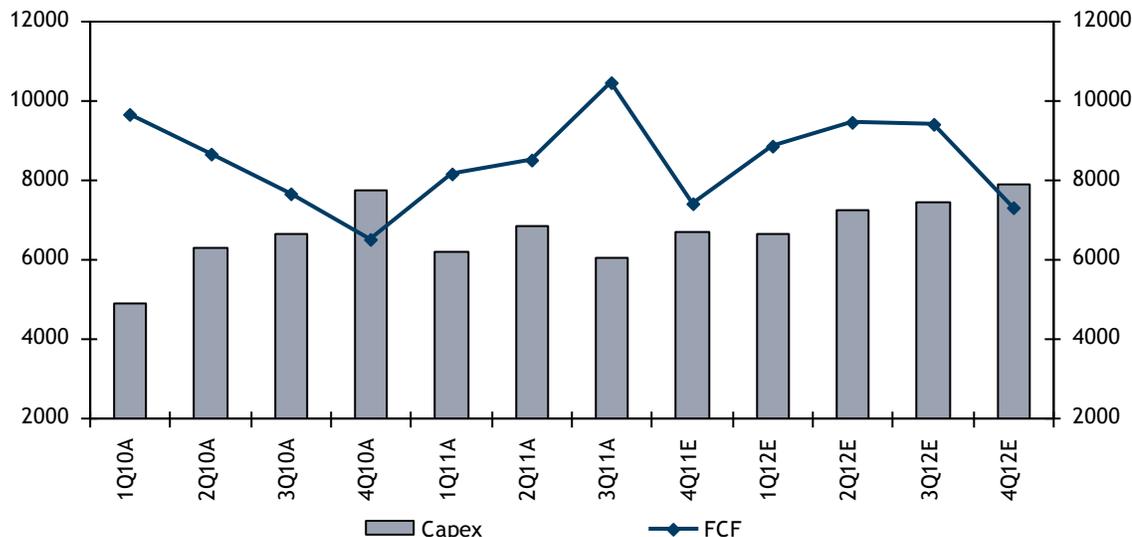
Factoring in capex, we project 2012 wireless operating free cash flow of \$35 billion versus \$34.4 billion in 2011 and \$32.4 billion in 2010. If we include spectrum purchases during 2011, operating free cash flow totals an estimated \$27.7 billion for 2012 versus \$31.7 billion and \$32.0 billion for 2011 and 2010, respectively.

Exhibit 5: Wireless Revenue and EBITDA (\$ millions)



Source: RBC Capital Markets estimates and company reports

Exhibit 6: Wireless CAPEX and Operating FCF (\$ millions)



Source: RBC Capital Markets estimates and company reports

We calculate that postpaid ARPU growth was the most significant top-line driver (38% of sector growth from ARPU accretion), followed closely by postpaid and prepaid subscriber growth, each of which contributed roughly 30% toward top-line growth.

Exhibit 7: Drivers of Revenue Growth (2011)

% from postpaid subscriber growth	31.1%
% from postpaid ARPU growth	37.7%
% from prepaid subscriber growth	30.0%
% from prepaid ARPU growth	1.1%

Source: RBC Capital Markets

The Players

The US wireless industry consists primarily of four national players, two of which (AT&T and Verizon) are telco incumbents whose wireless operations trace their beginnings to the first allocation of cellular licenses in the 1980s. The other two trace most of their current business to the personal communications services (PCS) license auctions in 1996 and ensuing buildouts and M&A.

Exhibit 8 summarizes the major wireless carriers.

Exhibit 8: Wireless Carrier Profile

(amounts in mils, except subs, metrics)	AT&T	Sprint	T-Mobile	Verizon	Leap	MetroPCS
3Q11 Operating Metrics						
Total subscribers	100,766	53,399	33,711	107,627	5,755	9,150
Postpaid subscribers	68,614	32,853	25,599	86,172	NA	NA
% of total subscribers	68.1%	61.5%	75.9%	80.1%	NA	NA
Prepaid subscribers	7,059	14,282	8,113	4,531	NA	NA
% of total subscribers	7.0%	26.7%	24.1%	4.2%	NA	NA
Total Net adds	2,123	1,276	126	1,335	10	303
Postpaid net adds	319	(44)	(186)	882	NA	NA
Prepaid net adds	293	485	312	86	10	303
Blended ARPU	\$47.70	\$29.55	\$45.00	\$53.21	\$41.25	\$40.80
Postpaid ARPU	\$63.69	\$58.00	\$53.00	\$54.89	NA	NA
Data ARPU	\$18.77	NA	\$13.95	\$21.59	NA	NA
Cost per gross add (CPGA)	\$525	\$977	\$260	\$667	\$238	\$194
Cash cost per user (CCPU)	\$19	\$39.44	\$23.00	\$26.06	\$23.09	\$19.52
Monthly churn, blended	1.3%	3.7%	3.5%	1.3%	3.8%	4.5%
Monthly churn, postpaid	1.2%	1.9%	2.4%	0.9%	NA	NA
Lifetime subscriber value	\$3,727	\$807	\$1,286	\$4,223	\$1,086	\$907
Monthly minutes of use	600	900	986	665	1,500	2,000
Financials						
3Q11A Service revenue	\$14,261	\$6,964	\$4,666	\$15,033	\$717	\$1,131
3Q11A EBITDA	\$6,239	\$1,586	\$1,445	\$7,189	\$154	\$327
3Q11A EBITDA margin	43.7%	17.6%	31.0%	47.8%	21.5%	28.9%
3Q11A Capex	\$2,520	\$647	\$741	\$1,784	\$103	\$248
2010A Service revenue	\$53,510	\$26,731	\$18,733	\$55,629	\$2,483	\$3,690
2011E Service revenue	\$56,892	\$27,421	\$18,512	\$59,169	\$2,838	\$4,445
2012E Service revenue	\$60,815	\$29,513	\$18,223	\$63,442	\$3,122	\$4,816
2010A Adjusted EBITDA	\$21,727	\$5,605	\$5,478	\$26,080	\$525	\$1,176
2011E Adjusted EBITDA	\$22,841	\$5,460	\$5,133	\$26,740	\$571	\$1,285
2012E Adjusted EBITDA	\$25,112	\$4,650	\$5,030	\$29,010	\$682	\$1,388
2010A Adjusted EBITDA margin	40.6%	17.5%	29.2%	46.9%	21.2%	31.9%
2011E Adjusted EBITDA margin	40.1%	15.1%	27.7%	45.2%	20.1%	28.9%
2012E Adjusted EBITDA margin	41.3%	10.5%	27.6%	45.7%	21.9%	28.8%
2010A Capital expenditure	\$9,171	\$1,444	\$2,819	\$8,438	\$399	\$790
2011E Capital expenditure	\$9,791	\$2,467	\$2,899	\$8,973	\$452	\$950
2012E Capital expenditure	\$10,699	\$4,250	\$2,652	\$10,034	\$593	\$700

Source: Company reports, RBC Capital Markets estimates

Wireless Service Revenues

Wireless service revenues accelerated in 2011 with a 6.7% year-over-year increase in 2011 versus a 5.9% year-over-year increase in 2010 and 2.1% in 2009, with challenges to voice and messaging revenues offset by growth in broadband revenues. An increase in smartphone subscribers, who tend to have 1.5 to 2.0x higher ARPU than non-smartphone subscribers, and data revenue contribution are the key drivers of service revenue growth. We expect the service revenue growth trend to continue in 2012 with the increase of long-term evolution (LTE) services at AT&T, emerging LTE services at Sprint, and continuing LTE momentum at Verizon.

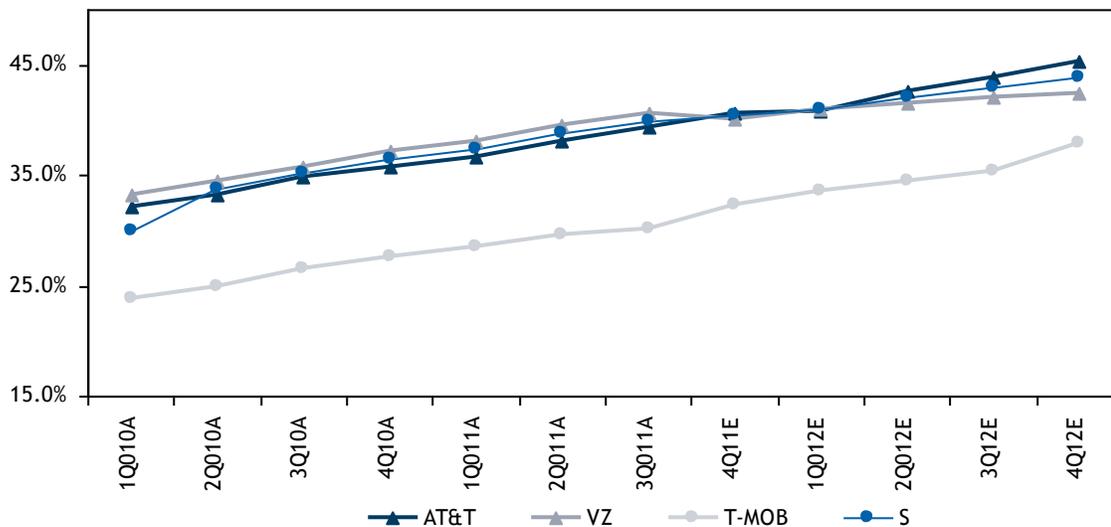
Exhibit 9: Service Revenues (\$ millions)

	2010A	1Q11A	2Q11A	3Q11A	4Q11E	2011E	1Q12E	2Q12E	3Q12E	4Q12E	2012E
AT&T	\$53,510	\$13,961	\$14,157	\$14,261	\$14,513	\$56,892	\$14,944	\$15,182	\$15,241	\$15,448	\$60,815
Clearwire	\$523	\$236	\$322	\$332	\$355	\$1,245	\$353	\$366	\$378	\$390	\$1,488
Leap Wireless	\$2,483	\$678	\$704	\$717	\$738	\$2,838	\$761	\$775	\$783	\$802	\$3,122
MetroPCS	\$3,690	\$1,050	\$1,113	\$1,131	\$1,150	\$4,445	\$1,173	\$1,195	\$1,216	\$1,232	\$4,816
Sprint Nextel	\$25,894	\$6,718	\$6,762	\$6,900	\$7,041	\$27,421	\$7,177	\$7,324	\$7,428	\$7,584	\$29,513
Tracfone	\$2,647	\$816	\$861	\$930	\$1,006	\$3,613	\$1,079	\$1,166	\$1,248	\$1,352	\$4,844
T-Mobile	\$18,733	\$4,630	\$4,620	\$4,666	\$4,596	\$18,512	\$4,540	\$4,577	\$4,582	\$4,524	\$18,223
US Cellular	\$3,913	\$985	\$1,002	\$1,037	\$1,042	\$4,065	\$1,034	\$1,052	\$1,088	\$1,094	\$4,269
Verizon	\$55,629	\$14,311	\$14,707	\$15,033	\$15,118	\$59,169	\$15,356	\$15,735	\$16,129	\$16,222	\$63,442
Total	\$167,021	\$43,386	\$44,249	\$45,007	\$45,560	\$178,201	\$46,418	\$47,371	\$48,094	\$48,648	\$190,532
Y/Y Change	5.9%	7.1%	6.8%	6.3%	6.6%	6.7%	7.0%	7.1%	6.9%	6.8%	6.9%

Source: Company reports, RBC Capital Markets estimates

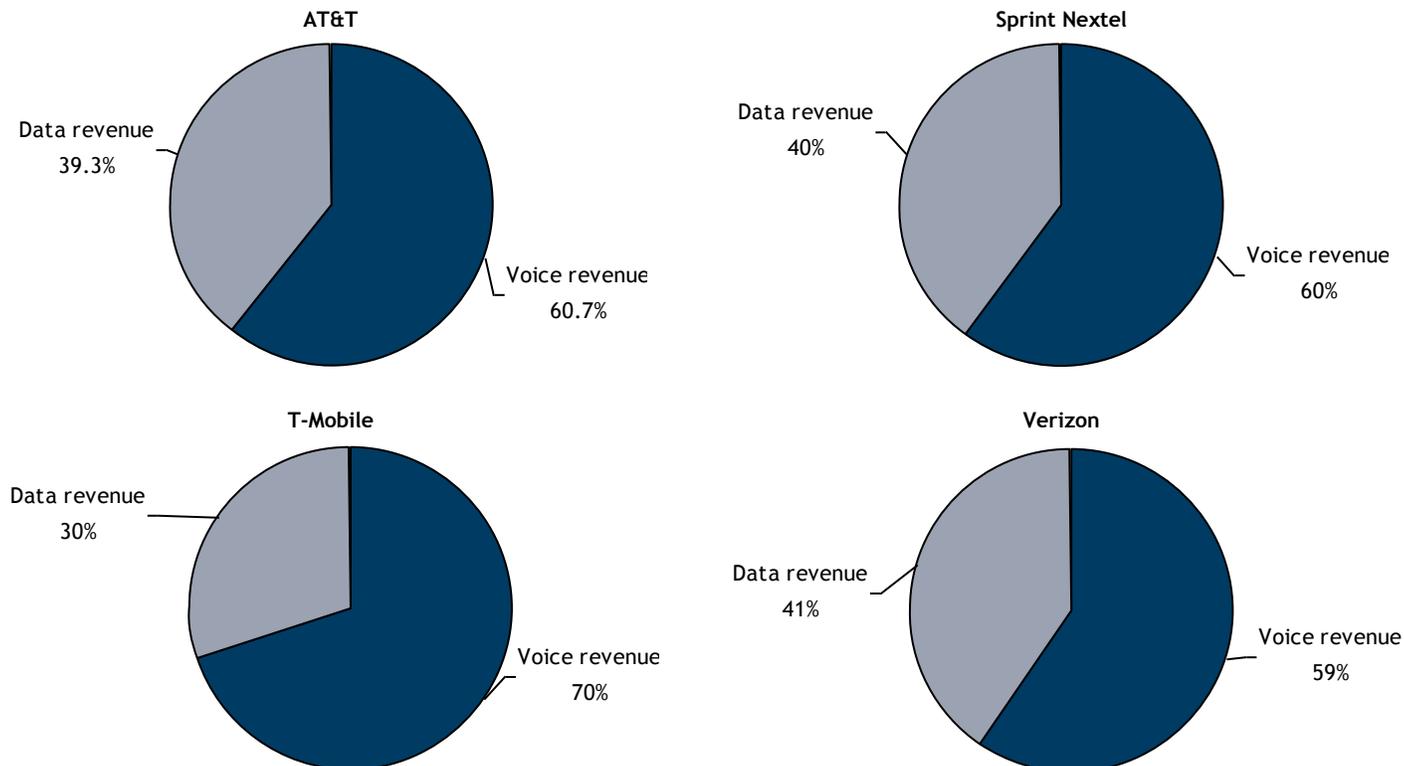
Data revenues account for 40.6% of Verizon’s service revenues; while at AT&T and T-Mobile, data revenues as a percentage of service revenues were 39.3% and 30.2%, respectively, at the end of the third quarter of 2011. We estimate Sprint Nextel data revenue to be approximately 40% of its service revenues. We estimate messaging revenue accounts for 30–40% of data revenues, but the primary driver of data revenue growth is web, email, and other non-messaging data applications. With smartphones representing 55–80% of postpaid handsets sold by the ‘Big Four’, we expect smartphone penetration to continue its momentum into 2012 and drive further increases in drive data revenues, especially with an expanded selection of LTE devices.

Exhibit 10: Data Revenue as Percentage of Service Revenues



Source: Company reports, RBC Capital Markets estimates

Exhibit 11: Wireless Voice vs. Data Revenue Mix (2011)



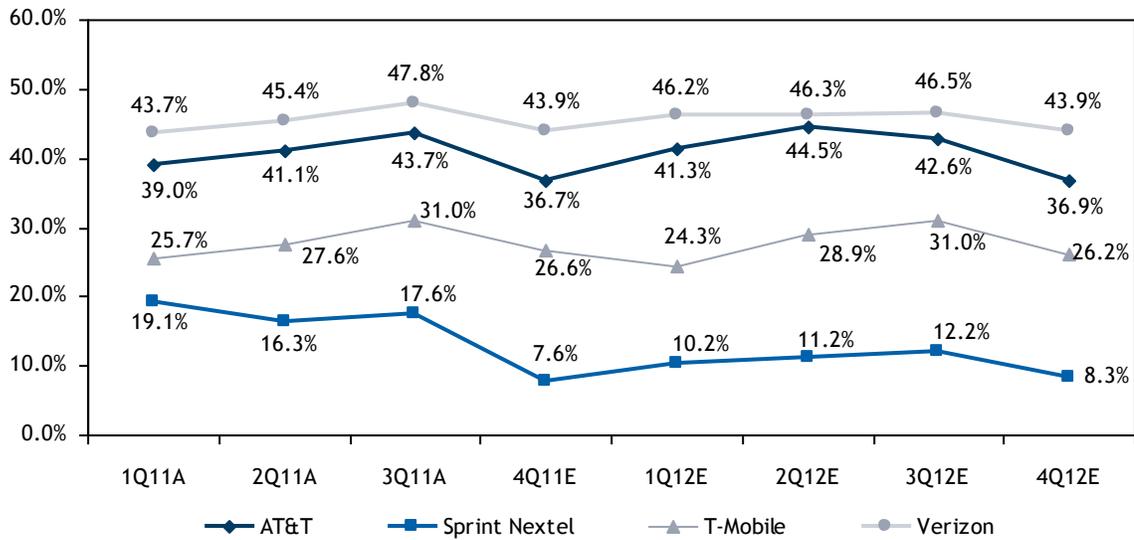
Source: RBC Capital Markets estimates and company reports

EBITDA Margins

Wireless EBITDA margin declined in 2011 versus 2010, as higher handset subsidies for smartphones coupled with accelerated smartphone penetration was dilutive to near-term margins. We estimate that smartphone subsidies ranged from \$300–500 versus sub-\$200 for feature phones. The heavy upfront subsidy for smartphones is most evident during the quarter of an iPhone refresh, which tends to be the low mark of the year for EBITDA margins. AT&T's third-quarter 2010 EBITDA margins declined 550 basis points (bp) quarter over quarter due to an iPhone 4 refresh, with record iPhone activations of 5.2 million, and we expect margins to decline by 700 bps quarter over quarter in the fourth quarter of 2011 driven by the iPhone 4S refresh coupled with seasonality. When Verizon launched the iPhone in February 2011, its first-quarter 2011 EBITDA margin was trimmed 380 bp quarter over quarter compared to increase of 1.0% in the first quarter of 2010.

Verizon Wireless' EBITDA margin has been consistently in the mid-40% range partly due to lower smartphone penetration (driven in part by later iPhone participation), thus lower handset subsidies. AT&T's wireless EBITDA margins have been trading in the 40% range with dips to the mid to high 30% during iPhone refresh quarters. We expect Sprint's EBITDA margin to decline to high-single digit to low-teens as the implementation of Network Vision and iPhone subsidies both pressure margins. T-Mobile USA's margins have been pressured over the last several years due to lack of scale, net losses of higher ARPU postpaid subscribers, and subsidies associated with smartphones.

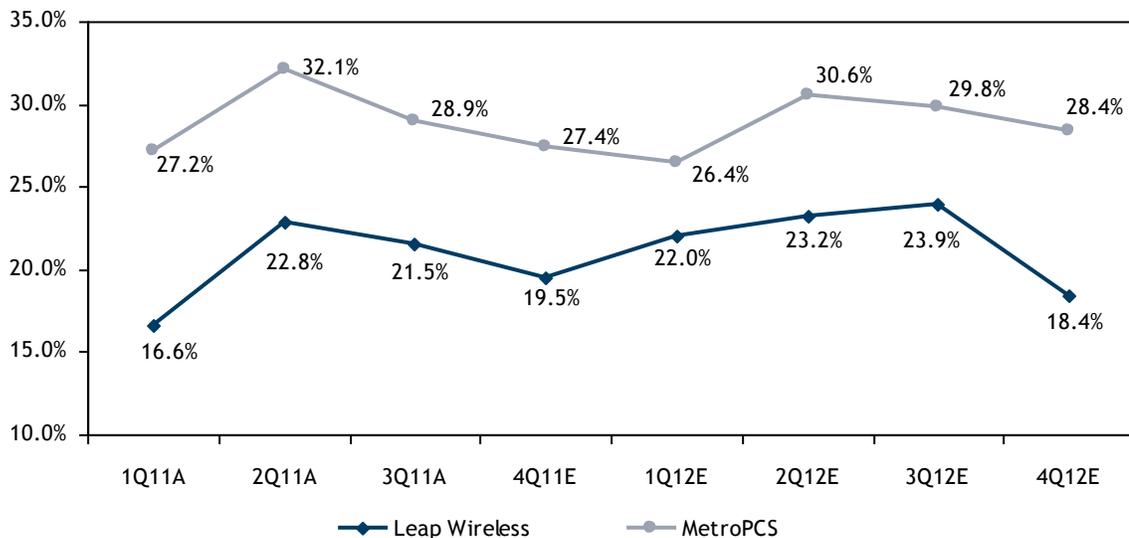
Exhibit 12: National Carrier EBITDA Margins



Source: RBC Capital Markets estimates and company reports

Prepaid margins were pressured following MetroPCS and Leap’s introduction of all-inclusive plans, which include taxes, regulatory fees, and increased handset subsidy, leading to higher CPGA. At the beginning of 2010, MetroPCS launched its all-inclusive calling plans and scrapped the first month of service free promotion, replacing it with a higher handset subsidy. In the initial quarter of the all-inclusive plans, MetroPCS margins declined 430 bps quarter over quarter compared to 180 bp quarter-over-quarter decline in the first quarter of 2009. When Leap followed MetroPCS with its all-inclusive calling plans and higher handset subsidy, its margins declined 150 bp year over year in the third quarter of 2010 to 20.5%. We expect Leap and MetroPCS 2011 EBITDA margins to decline 100 bp and 300 bp, respectively, as the mix of smartphone sales increases.

Exhibit 13: Prepaid EBITDA Margins



Source: RBC Capital Markets estimates and company reports

Subscriber Trends and Metrics

We estimate overall wireless subscriber growth of 7.4% in 2011 versus 7.2% in 2010 with wireless subscriber penetration of the US population having surpassed 100% in mid-2011. Verizon Wireless continues to hold the top spot with a 33.8% share of wireless subscribers, followed by AT&T at 31.7%, Sprint Nextel at 16.8%, and T-Mobile at 10.6%. AT&T and Verizon primarily focused on driving their postpaid business; whereas, Sprint Nextel and T-Mobile depended on their prepaid business to maintain positive total net additions. Overall wireless subscriber growth was mostly driven by increasingly attractive smartphone offers, including the prepaid segment, and an increase in the number of customers with multiple wireless devices. Gross additions for the major carriers increased



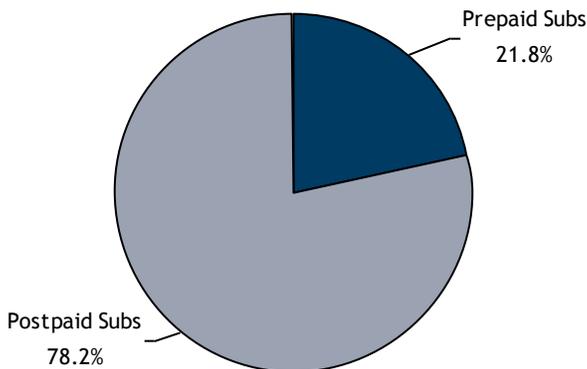
by 4.5% year over year in 2011 to 83.3 million, compared to a decline of 6.3% in 2010. Blended churn declined by 5 bp in 2011 with the biggest improvement coming from Leap on the back of introducing all-inclusive calling plans.

Exhibit 14: Wireless subscribers (thousands)

	2010A	1Q11A	2Q11A	3Q11A	4Q11E	2011E	1Q12E	2Q12E	3Q12E	4Q12E	2012E
AT&T	95,564	97,548	98,643	100,766	103,464	103,464	105,598	106,655	108,567	111,003	111,003
Clearwire	1,139	1,249	1,288	1,323	1,348	1,348	1,368	1,376	1,386	1,401	1,401
Leap Wireless	5,518	5,849	5,746	5,755	5,885	5,885	6,035	6,040	6,085	6,250	6,250
MetroPCS	8,156	8,882	9,081	9,150	9,299	9,299	9,480	9,610	9,672	9,806	9,806
Sprint Nextel	49,910	51,031	52,123	53,399	55,302	55,302	56,856	58,146	59,282	60,801	60,801
T-Mobile	33,734	33,635	33,585	33,711	33,736	33,736	33,642	33,594	33,714	33,738	33,738
US Cellular	6,072	6,033	5,968	5,932	5,967	5,967	6,002	6,037	6,072	6,107	6,107
Verizon	102,246	104,022	106,292	107,627	109,627	109,627	111,430	113,196	114,598	116,638	116,638
Total	302,339	308,249	312,725	317,663	324,629	324,629	330,411	334,654	339,376	345,744	345,744
Q/Q Change		2.0%	1.5%	1.6%	2.2%		1.8%	1.3%	1.4%	1.9%	
Y/Y Change	7.2%	7.6%	7.2%	7.1%	7.4%	7.4%	7.2%	7.0%	6.8%	6.5%	6.5%

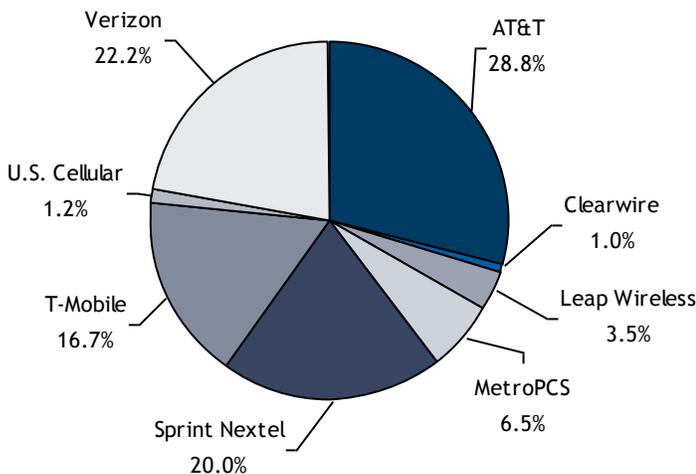
Source: Company reports, RBC Capital Markets estimates

Exhibit 15: 2011E Wireless Subscriber Mix



Source: Company reports, RBC Capital Markets estimates

Exhibit 16: 2011E Share of Gross Additions



Source: Company reports, RBC Capital Markets estimates

In line with improved gross additions, total net additions increased from 18.1 million in 2010 to 19.6 million in 2011 for 8.3% year-over-year growth. We attribute total net additions returning to positive growth to solid total net additions in postpaid, and connected

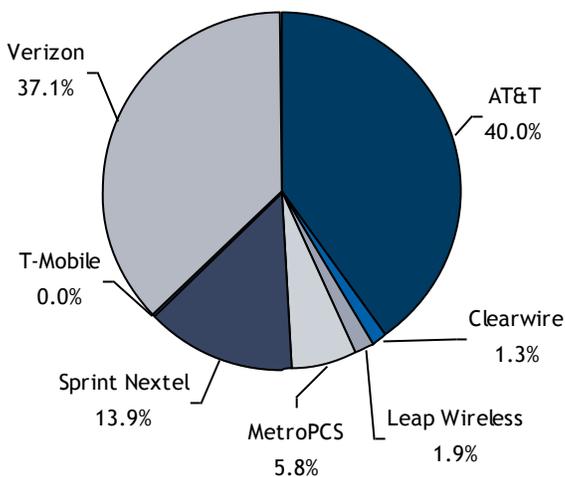
and Internet devices, and we estimate postpaid accounted for 22% of total net additions. We expect AT&T will exit 2011 with 40.3% of total net additions with Verizon and Sprint Nextel accounting for 37.3% and 14.0%, respectively, increasing from 30.5% and 8.5% in 2010 at the expense of AT&T. We believe that the iPhone launch by Verizon in February 2011 shifted the total net additional shares in favor of Verizon as was evident by Verizon's share increasing from 22.4% in the fourth quarter of 2010 to 31.8% and 55.5% in the first and second quarters of 2011, respectively, while AT&T's share declined from 55.1% in the fourth quarter of 2010 to 35.5% and 27.5% in the first and second quarters of 2011, respectively.

Exhibit 17: Total Net Additions (thousands)

	2010A	1Q11A	2Q11A	3Q11A	4Q11E	2011E	1Q12E	2Q12E	3Q12E	4Q12E	2012E
AT&T	8,853	1,984	1,095	2,123	2,698	7,900	2,133	1,057	1,912	2,436	7,539
Clearwire	575	172	127	150	126	254	155	39	35	25	53
Leap Wireless	242	331	(103)	10	130	367	150	5	45	165	365
MetroPCS	1,516	726	199	69	149	1,143	181	129	62	134	507
Sprint Nextel	1,533	732	573	441	1,003	2,749	1,054	790	636	1,019	3,499
T-Mobile	(57)	(99)	(50)	126	25	2	(94)	(48)	120	24	2
US Cellular	(69)	(39)	(70)	(36)	35	(110)	35	35	35	35	140
Verizon	5,534	1,776	2,208	1,335	2,000	7,319	1,803	1,766	1,402	2,040	7,011
Total	18,127	5,583	3,979	4,218	6,166	19,624	5,417	3,775	4,247	5,878	19,115
Q/Q Change		9.8%	(28.7%)	6.0%	46.2%		(12.2%)	(30.3%)	12.5%	38.4%	
Y/Y Change	(0.3%)	19.5%	11.9%	(4.3%)	21.2%	8.3%	(3.0%)	(5.1%)	0.7%	(4.7%)	(2.6%)

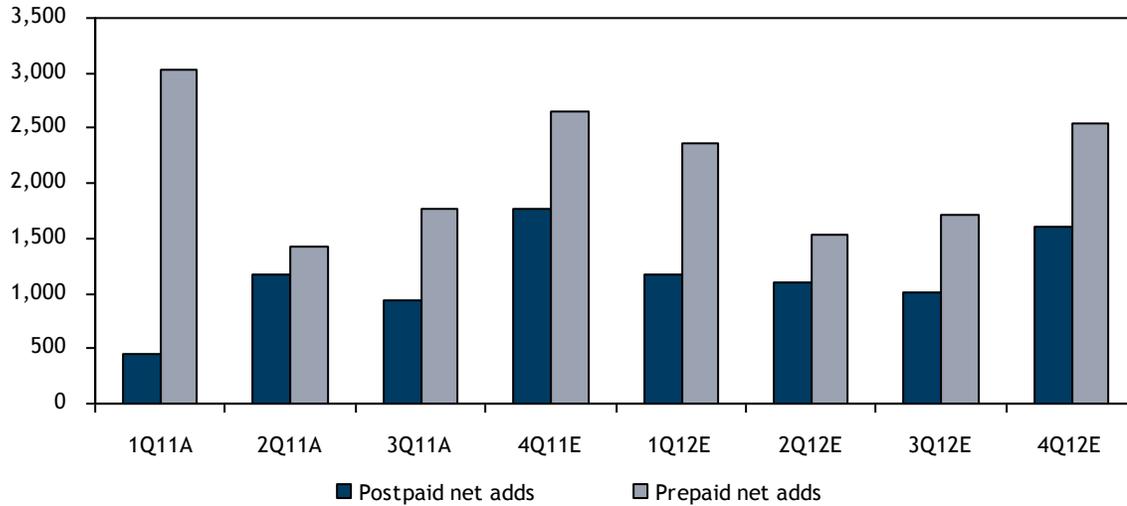
Source: Company reports, RBC Capital Markets estimates

Exhibit 18: 2011E Share of Net Additions



Source: Company reports, RBC Capital Markets estimates

Exhibit 19: Wireless Net Adds Mix (thousands)



Source: Company reports, RBC Capital Markets estimates

Postpaid Subscriber Trends

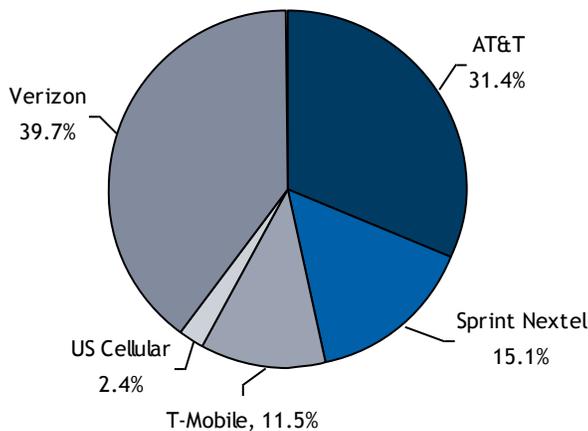
Postpaid subscribers represent approximately 69% of total wireless subscribers, were down from 71.5% at the end of 2010 as continued macroeconomic headwinds coupled with increased competition from prepaid providers drove greater share gains for the prepaid segment. The exhibit below provides a breakdown of postpaid subscriber trends by carrier.

Exhibit 20: Postpaid Subscribers (thousands)

	2010A	1Q11A	2Q11A	3Q11A	4Q11E	2011E	1Q12E	2Q12E	3Q12E	4Q12E	2012E
AT&T	68,041	68,062	68,353	68,614	69,114	69,114	69,339	69,539	69,739	70,089	70,089
Sprint Nextel	33,112	32,998	32,897	32,853	33,178	33,178	33,428	33,578	33,753	34,128	34,128
T-Mobile	26,448	26,066	25,785	25,599	25,274	25,274	24,911	24,644	24,467	24,159	24,159
US Cellular	5,416	5,394	5,353	5,319	5,294	5,294	5,270	5,225	5,187	5,160	5,160
Verizon	83,125	84,031	85,290	86,172	87,472	87,472	88,554	89,613	90,454	91,678	91,678
Total	216,142	216,551	217,678	218,557	220,332	220,332	221,501	222,599	223,601	225,214	225,214
Q/Q Change	0.0%	0.2%	0.5%	0.4%	0.8%	0.0%	0.5%	0.5%	0.5%	0.7%	0.0%
Y/Y Change	2.3%	2.4%	1.8%	1.6%	1.9%	1.9%	2.3%	2.3%	2.3%	2.2%	2.2%

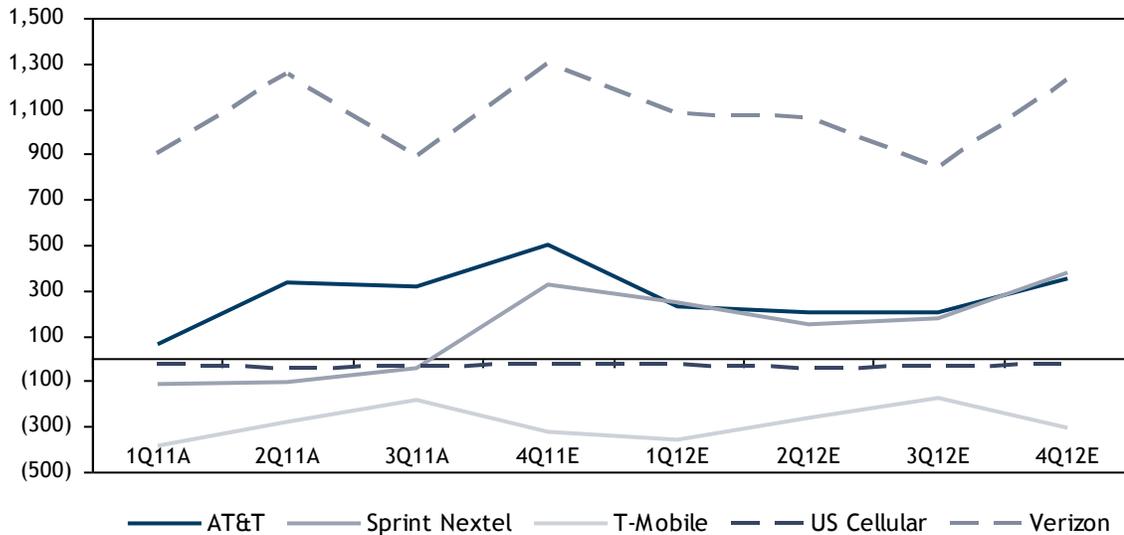
Source: Company reports, RBC Capital Markets estimates

Exhibit 21: 2011E Share of Postpaid Subscribers



Source: Company reports, RBC Capital Markets estimates

Exhibit 22: Postpaid Net Additions (thousands)

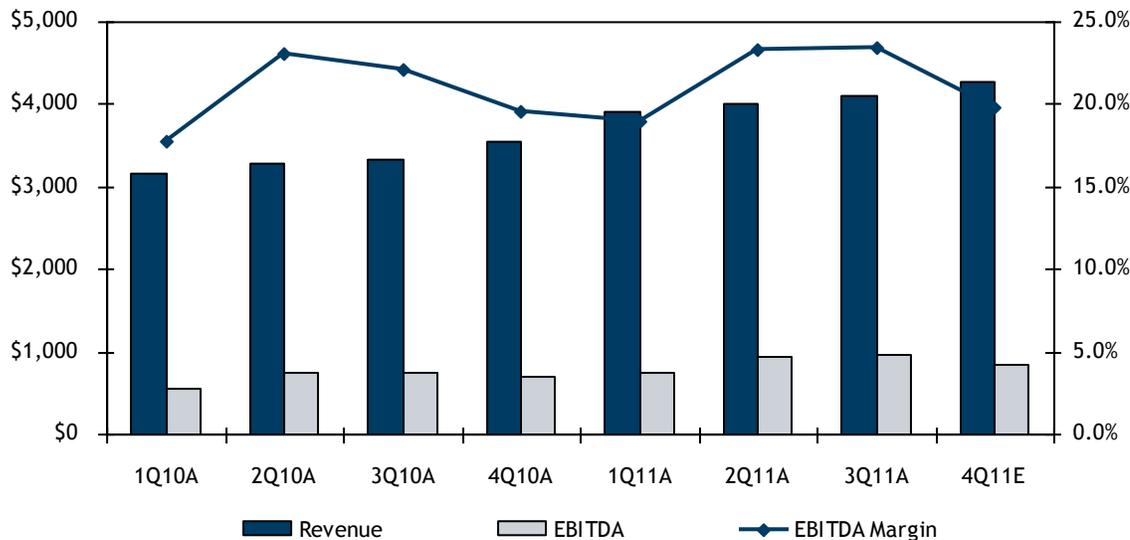


Source: Company reports, RBC Capital Markets estimates

Prepaid Subscriber Trends

The prepaid segment continues to dominate subscriber growth but still accounts for a minority 8% of sector level (services revenues). Drivers include the increasing mix of smartphones and popularity of unlimited data offers. Prepaid margins have fluctuated within the high teens to low 20% driven by seasonal factors and ARPU accretion from smartphone data plans, offset by increased device subsidies. Exhibit 23 summarizes sector trends for the prepaid/unlimited carriers.

Exhibit 23: Prepaid Revenues (\$ millions) and EBITDA Margins



Source: Company reports, RBC Capital Markets estimates

Prepaid outpaced postpaid growth in 2011 (as it has every year since mid-2009), aided by increasing saturation within higher-income subscriber segments, affordable unlimited no-contract plans, and increasingly competitive smartphone pricing. At the lower-income end of postpaid, we believe there has been some migration toward prepaid, which has affected T-Mobile's postpaid share and driven an increasing diversification into prepaid, most recently via its Simple Mobile mobile virtual network operator (MVNO).

Big Four initiatives (e.g., Verizon's recently launched unlimited offer on some of its lower-end feature phones, and T-Mobile Simple Mobile) are increasing the competitive intensity for the established prepaid carriers (Leap and PCS) and brands (Virgin, Boost, and Tracfone).

Exhibit 24 summarizes the major carrier-branded, MVNO, and lifeline players that, next to the carrier-owned and branded offers, represent a key element of the prepaid market:

Exhibit 24: Selected MVNOs and LifeLine Carriers

Brand	Network Affiliation	Subscribers
Assurance	Sprint	N/A
Tracfone	Multiple	18M
PagePlus	Verizon	>1.3M
Simple Mobile	T-Mobile USA	1.5M
Reachout		1M
Consumer Cellular		700K
Locus/H2O		400K

Source: RBC Capital Markets estimates

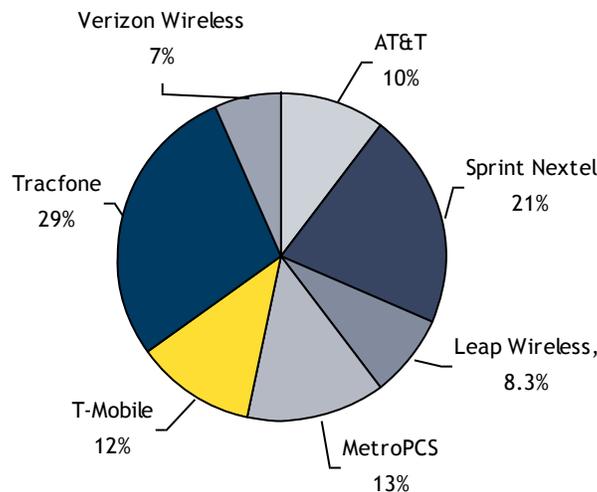
Prepaid has seen the most robust take-rate within younger and lower-income subscriber segments, subscribers with weak or sparse credit histories, and segments that transact more in cash rather than credit or do not have steady employment and thus are hesitant to enter into service contracts.

Exhibit 25: Prepaid Subscribers (thousands)

	2010A	1Q11A	2Q11A	3Q11A	4Q11E	2011E	1Q12E	2Q12E	3Q12E	4Q12E	2012E
AT&T	6,524	6,613	6,750	7,059	7,381	7,381	7,573	7,847	8,147	8,477	8,477
Sprint Nextel	12,277	13,123	13,797	14,282	14,960	14,960	15,764	16,404	16,865	17,509	17,509
Leap Wireless	5,518	5,849	5,746	5,755	5,885	5,885	6,035	6,040	6,085	6,250	6,250
MetroPCS	8,156	8,882	9,081	9,150	9,299	9,299	9,480	9,610	9,672	9,806	9,806
T-Mobile	7,287	7,570	7,801	8,113	8,463	8,463	8,732	8,951	9,248	9,580	9,580
Tracfone	17,749	18,529	18,754	19,269	20,197	20,197	20,899	21,102	21,565	22,401	22,401
Verizon Wireless	4,410	4,383	4,445	4,531	4,631	4,631	4,706	4,770	4,860	4,965	4,965
Total	61,921	64,949	66,373	68,159	70,817	70,817	73,189	74,724	76,442	78,989	78,989
	4.1%	15.0%	15.6%	15.6%	14.4%	14.4%	12.7%	12.6%	12.2%	11.5%	11.5%

Source: Company reports, RBC Capital Markets estimates

Exhibit 26: 2011E Share of Prepaid Subscribers

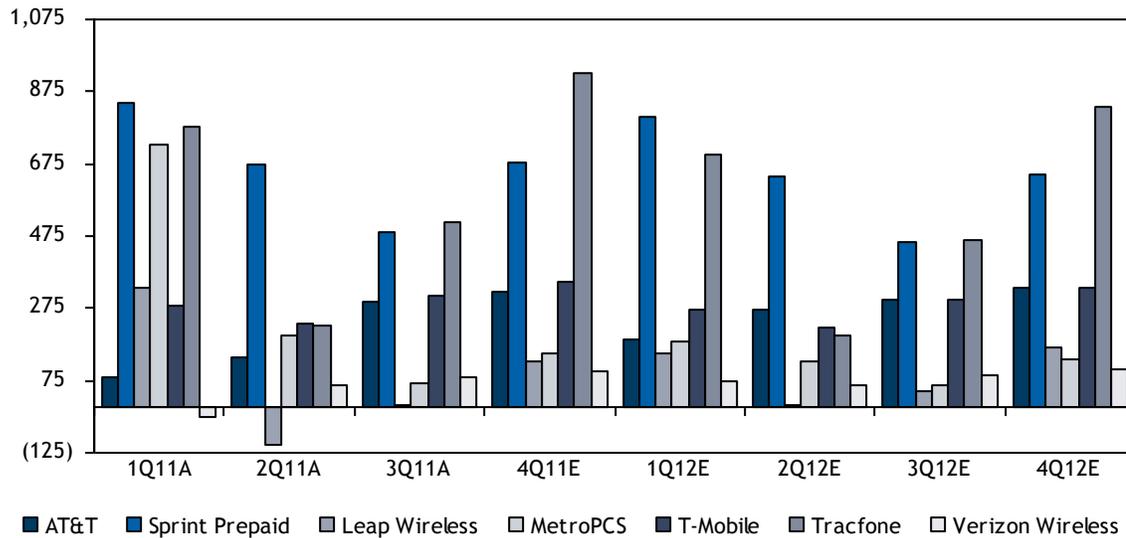


Source: RBC Capital Markets estimates

During 2011, we estimate Sprint Nextel and Tracfone will have 30.2% and 27.6% share, respectively, of prepaid additions. We attribute Sprint Nextel's strong prepaid net additions to Assurance Wireless, which is a government assistant wireless program for low-income individuals. We estimate Assurance accounts for approximately half of prepaid net additions and approximately 20% of Sprint Nextel's prepaid base. The increasing mix of Assurance subscribers has pressured prepaid ARPU in 2010 and 2011 as these

customers generate ARPU below \$10; however, Assurance subscribers tend to have lower churn and are EBITDA accretive with higher margins than traditional prepaid subscribers.

Exhibit 27: Prepaid Net Additions (thousands)



Source: Company reports, RBC Capital Markets estimates

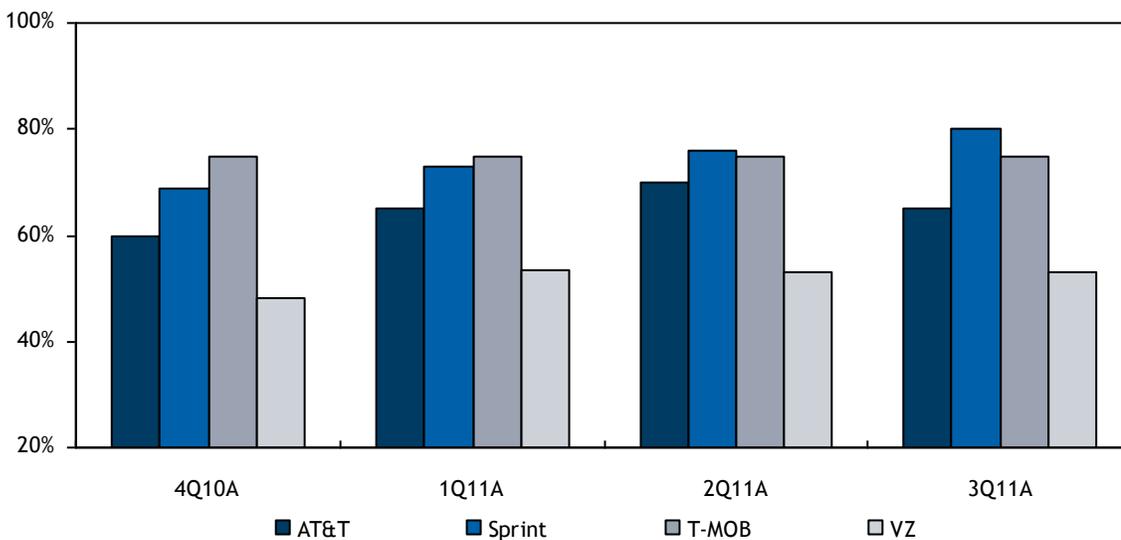
Device Trends

2011 was characterized by significant share gains of smart devices despite consumer economic pressures. Highlights included new iPhone launches at Sprint (in October) and Verizon (in February), new versions of the iPhone and iPad, and continual introductions and refreshes of Android devices at the major carriers.

A notable trend in 2011 was smartphone offerings by the prepaid operators, including the facilities-based carriers Leap Wireless, MetroPCS, MVNOs, and prepaid brands such as StraightTalk, Boost, and Virgin.

We expect this trend to continue in 2012, with device portfolios of carriers dominated by smartphones.

Exhibit 28: Smartphones as Percentage of Device Sales



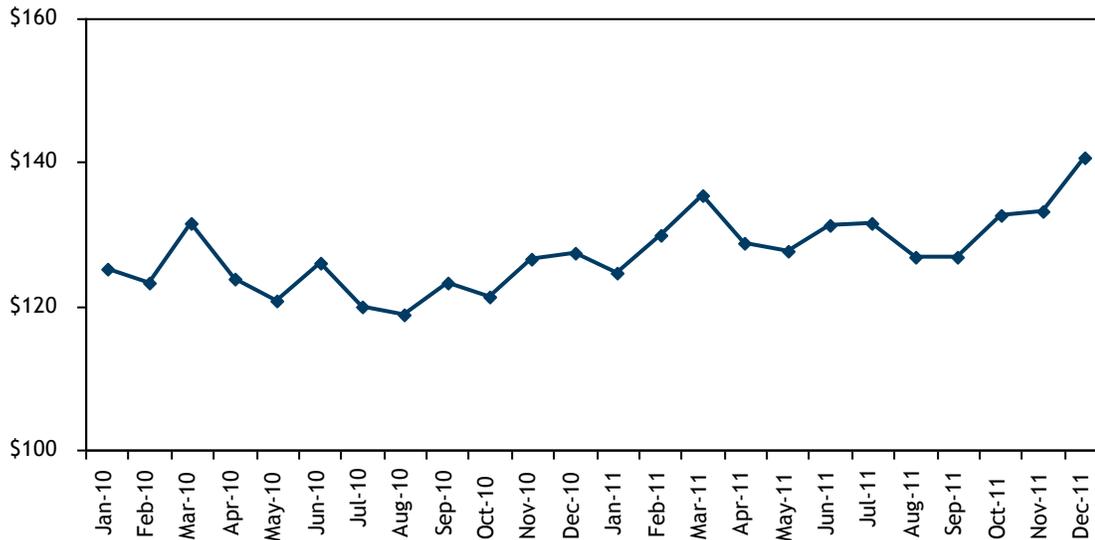
Source: RBC Capital Markets estimates, company reports

Device Subsidies

Exhibit 29 illustrates estimated device subsidies for the wireless sector since early 2010. Subsidies have been seasonal in nature, increasing during the fourth and first quarters, and then flattening. Subsidies are also affected by the launch timing of popular smartphones (e.g., iPhone at Sprint and Verizon) and price cuts for more mature devices (e.g., iPhone 3G and 4 promotions at AT&T).

In aggregate, we observe a slightly increasing trend, with average subsidies in 2011 up approximately 5.5% versus average subsidies in 2010.

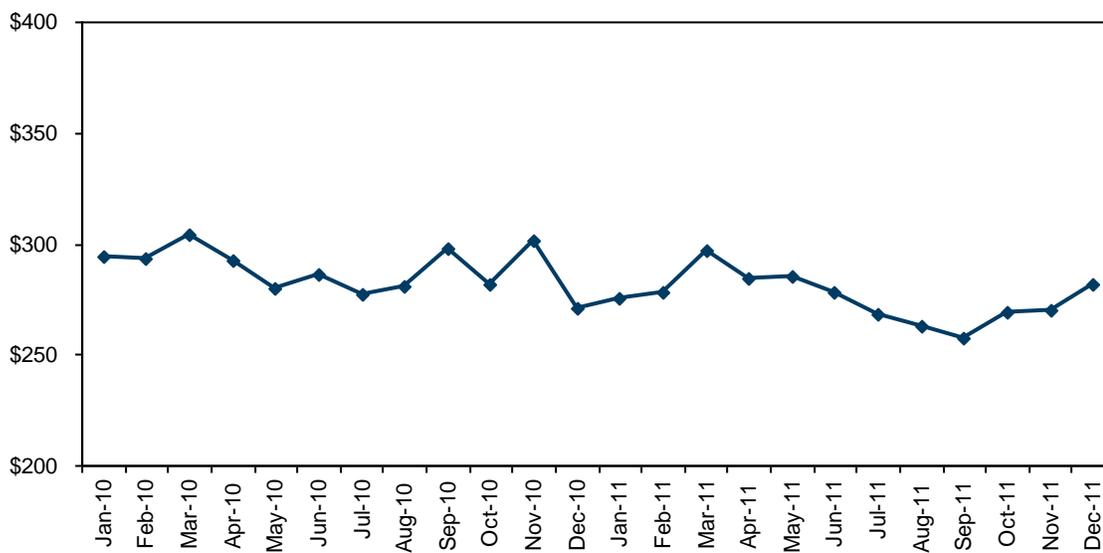
Exhibit 29: Handset Subsidies



Source: RBC Capital Markets estimates, based on retail and replacement pricing at U.S. carriers.

Drilling down further into the postpaid segment, smartphones represent nearly 60% of the overall device portfolio and constitute the lion’s share of subsidies on offer. Here, we see the same trend where subsidies tend to pick up heading into the holiday season and then again in March when many carriers sell through post-holiday inventory.

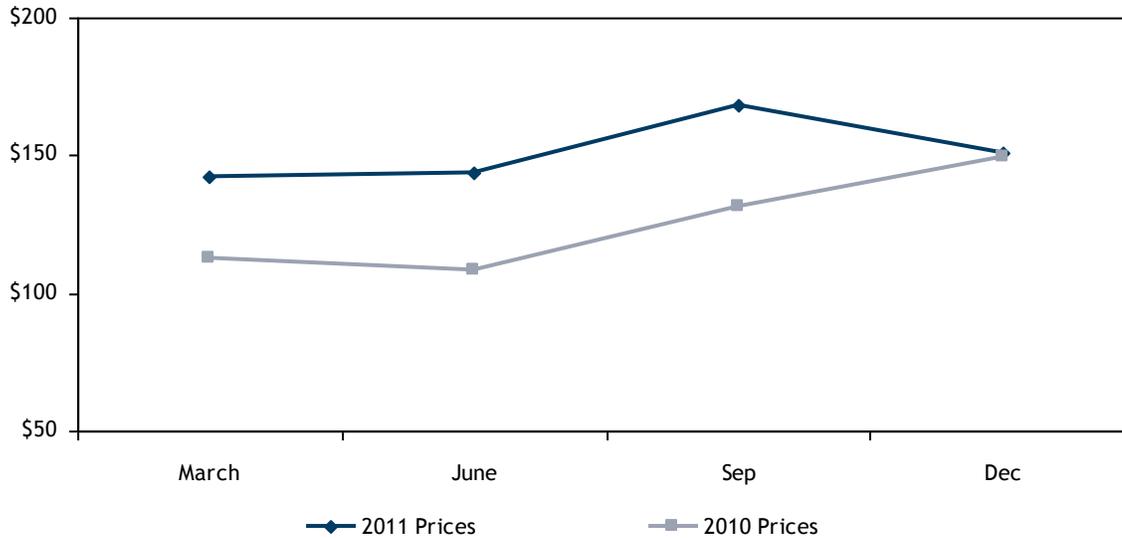
Exhibit 30: Postpaid Smartphone Subsidies



Source: RBC Capital Markets estimates, based on postpaid smartphone retail and replacement prices.

Across the entire smartphone portfolio, the postpaid-only segment does not appear to exhibit the same upward pressure in subsidies as the overall wireless segment. Surprisingly the average, Android price (net of rebate to the consumer) increased during 2011 to \$151 from \$126 during 2010, by our estimates.

Exhibit 31: Android Prices



Source: RBC Capital Markets estimates, based on carrier device pricing.

The iPhone continues to be the most popular smartphone, with AT&T activating 9.9 million in the first nine months of 2011 and Verizon activating 10.7 million during full-year 2011. Android is the most popular OS platform and represents a major source of activations at Sprint, the dominant share of activations at T-Mobile (which does not sell the iPhone), and a competitive source of activations at Verizon (which is less indexed toward iPhone activations than AT&T). With increasing network demands and no 4G network of its own, Sprint continues to heavily promote WiMax-capable Android smartphones. T-Mobile USA has no iPhone at present and is pushing Android devices on its various HSPA+ platforms. Meanwhile, Verizon is promoting its LTE coverage differentiation and features several Android devices (but no iPhones, which are not yet offered in an LTE capable version) operable on its 4G network.

Smartphone Penetration

Smartphone adoption (wider device selection and capabilities) was a meaningful factor driving postpaid net additions in 2011, with particularly notable increases at Verizon during the year, reflecting its first-to-market LTE offer and iPhone launch. Smartphones accounted for 80% of all CDMA postpaid handsets sold at Sprint Nextel in the third quarter of 2011 while AT&T and Verizon smartphone sales as percentage of postpaid equipment sales were 65% and 53%, respectively. The Big Four national carriers had approximately 95.1 million smartphone subscribers with AT&T and Verizon representing 38% and 33%, respectively. Verizon made the biggest gain in smartphone subscribers in 2011 with an average year-over-year growth of 68% in first three quarters of 2011, followed by T-Mobile at 55.3% and Sprint Nextel at 46%. The iPhone launch and Verizon’s lead in LTE network and smartphone deployment were the main factors for accelerated smartphone penetration at Verizon.

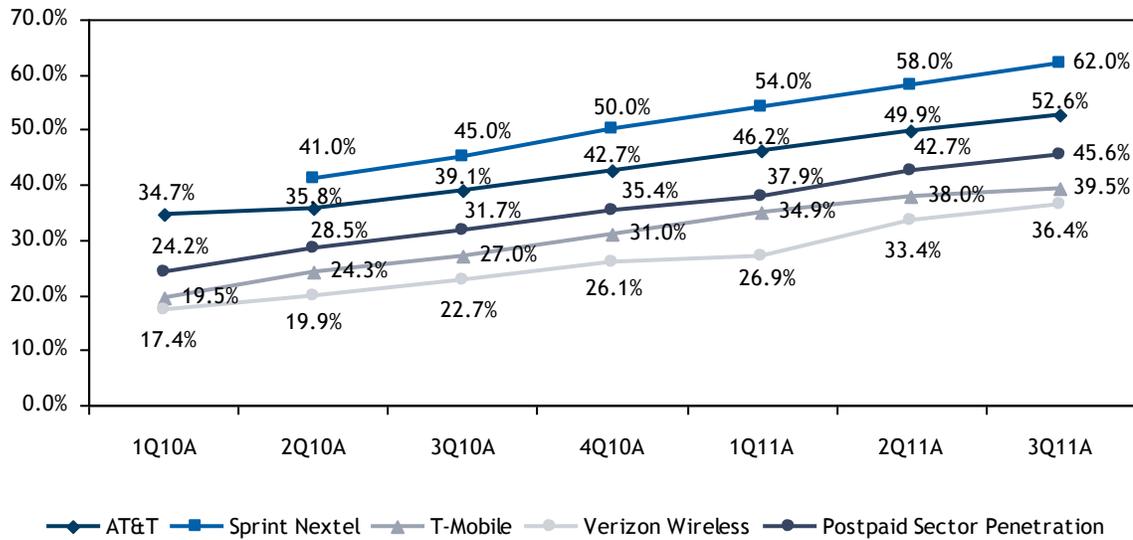
Exhibit 32: Smartphone Subscriber Trends (millions)

	1Q10A	2Q10A	3Q10A	4Q10A	1Q11A	2Q11A	3Q11A
AT&T	22.6	24.0	26.5	29.1	31.4	34.1	36.1
Sprint Nextel	NA	11.0	12.1	13.7	15.0	16.2	17.5
T-Mobile	5.2	6.5	7.2	8.2	9.1	9.8	10.1
Verizon Wireless	14.1	16.2	18.7	21.7	22.6	28.5	31.4
Postpaid Sector Total	41.9	57.7	64.5	72.7	78.1	88.6	95.1
Y/Y Change					86.5%	53.6%	47.4%

Source: RBC Capital Markets estimates, company reports

Penetration among the postpaid subscribers of the Big 4 increased 1,400 bp in the third quarter of 2011 to 45.6% from 31.7%. Sprint Nextel’s smartphone penetration of its CDMA-subscriber base increased 17% year over year through the first three quarters of 2011 with the remaining three national carriers increasing their penetration by low to mid-teen percentages. The simplified and lower-priced rate plans coupled with aggressive smartphone promotions and discounts by Sprint Nextel were the drivers of leading the increase in smartphone penetration.

Exhibit 33: Smartphone Penetration



* Penetration of postpaid subscribers; Sprint penetration based on CDMA subscribers.
 Source: Company reports, RBC Capital Markets

Churn

Blended churn improved by low-single digits in 2011 to 1.75% from 1.80% in 2010, with improvements in prepaid more pronounced than in postpaid.

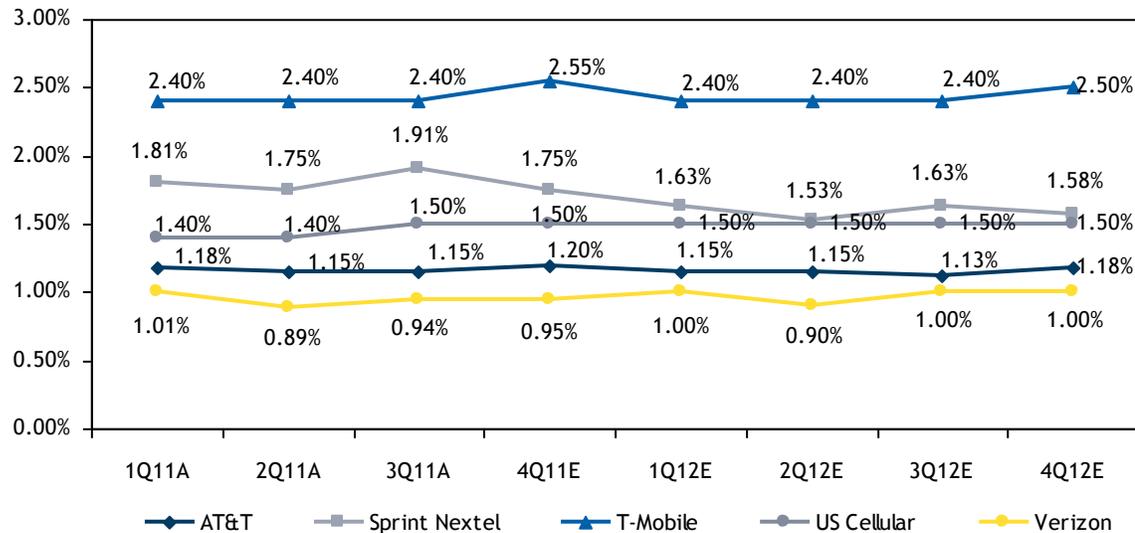
Exhibit 34: Blended Churn Trends

	2010A	1Q11A	2Q11A	3Q11A	4Q11E	2011E	1Q12E	2Q12E	3Q12E	4Q12E	2012E
AT&T	1.31%	1.36%	1.43%	1.28%	1.35%	1.36%	1.30%	1.30%	1.28%	1.33%	1.30%
Clearwire	3.38%	3.30%	3.90%	4.20%	3.70%	3.78%	3.45%	4.00%	4.15%	3.70%	3.83%
Leap Wireless	4.78%	3.10%	4.20%	3.80%	3.61%	3.68%	3.45%	3.71%	3.49%	3.35%	3.50%
MetroPCS	3.58%	3.10%	3.90%	4.50%	4.25%	3.94%	3.50%	3.80%	4.40%	4.15%	3.96%
Sprint Nextel	1.95%	1.81%	1.75%	1.91%	1.75%	1.81%	1.63%	1.53%	1.63%	1.58%	1.59%
T-Mobile	3.37%	3.40%	3.30%	3.50%	3.57%	3.44%	3.47%	3.50%	3.54%	3.64%	3.54%
US Cellular	1.96%	1.83%	1.82%	1.88%	1.76%	1.82%	1.63%	1.62%	1.68%	1.56%	1.62%
Verizon	1.34%	1.33%	1.22%	1.26%	1.27%	1.27%	1.32%	1.22%	1.32%	1.32%	1.30%
Weighted Average	1.80%	1.75%	1.75%	1.78%	1.76%	1.75%	1.70%	1.67%	1.72%	1.72%	1.70%
Y/Y Change	(10.0%)	(4.5%)	(0.3%)	(3.0%)	(1.9%)	(2.5%)	(2.6%)	(5.0%)	(3.0%)	(2.2%)	(3.2%)

Source: Company reports, RBC Capital Markets estimates

Postpaid churn benefited from increased smartphone penetration and related increases in retention and upgrade rates. Smartphones carry a higher upfront investment for the customer, and upgrades reset the early termination fee. Sprint Nextel raised its termination fee for smartphone subscribers to \$350 from \$200 in the third quarter of 2011, thereby bringing its termination fee in line with AT&T and Verizon. T-Mobile charges \$200. iPhone upgrades in 2011 accounted for 75–80% of all iPhone activations at AT&T and Verizon.

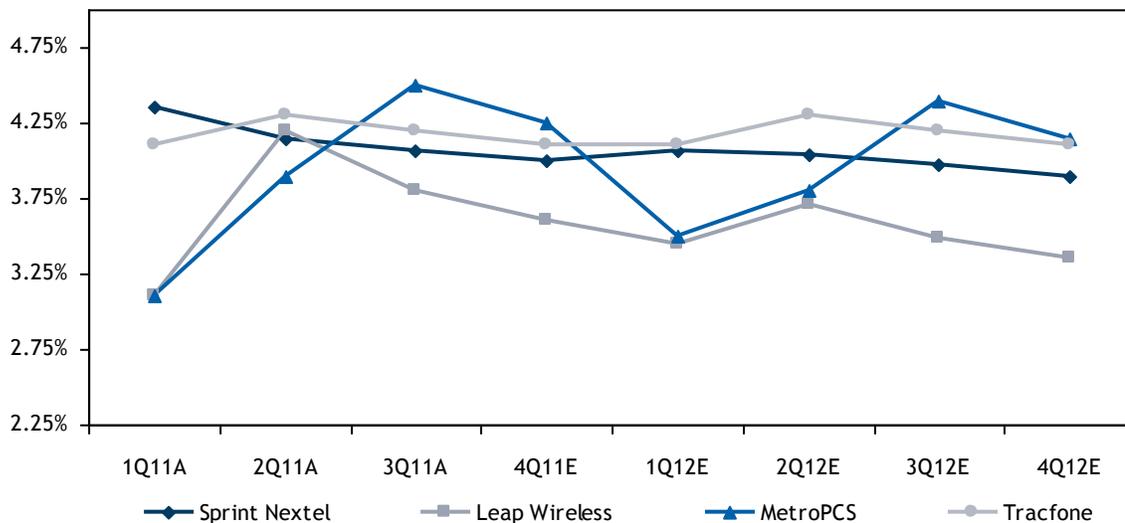
Exhibit 35: Postpaid Churn



Source: Company reports, RBC Capital Markets estimates

On the prepaid side, Leap benefited from its all-inclusive wireless plans (i.e., the monthly fee quoted to the customer is inclusive of taxes and fees), which were introduced in the third quarter of 2010 as did MetroPCS during the period following its introduction of all-inclusive plans in the first quarter of 2010. Increasing smartphone and MUVE music penetration of Leap voice subscribers are aiding churn as smartphone and MUVE subscribers are showing lower churn than traditional feature phone subscribers. Sprint Nextel has seen its prepaid churn improve as the base of Assurance subscribers ramps and Boost churn improves under its *Shrinkage* program that rewards customers with lower monthly fees following successive periods of on-time bill payments.

Exhibit 36: Prepaid Churn

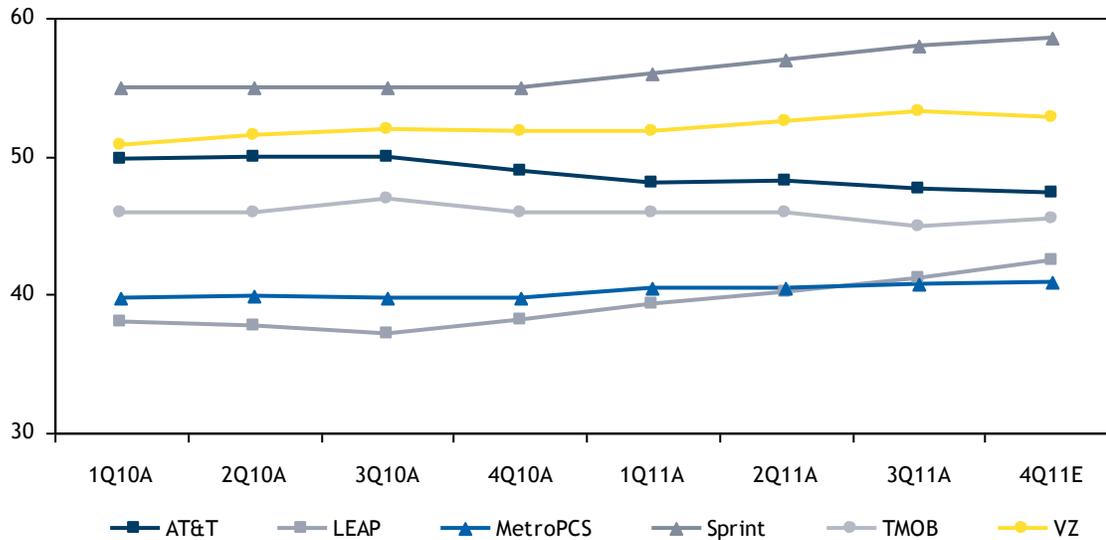


Source: Company reports, RBC Capital Markets estimates

Wireless ARPU

2011 saw a continued uptrend in wireless ARPU in both prepaid and postpaid, driven by increasing smartphone penetration and the addition of data buckets. In postpaid, Sprint added a \$10/month charge for 4G-capable devices in early February with little resulting change in subscriber momentum. Prepaid ARPU benefited from smartphone penetration (smartphone plans are priced slightly higher than feature-phone plans) as well as innovative plans. One example from 2011 is the MUVE music plans from Leap wireless. The MUVE music plans were launched at 2010 CES and provide customers with unlimited talk, text, web usage as well as music downloads. The plan starts at \$55/month and is well suited for lower-income consumers without access to an online music store, a secondary music device, and who desire music on the go.

Exhibit 37: Wireless ARPU



Source: Company reports, RBC Capital Markets estimates

Overall, postpaid ARPU growth accelerated to mid-2% from 1.5% in 2010 largely driven by the required data plans for most smartphones. Sprint Nextel postpaid ARPU grew 4.3% in 2011, benefiting from increasing smartphone adoptions and \$10/month add on fee for new and upgrading smartphone subscribers. We estimate the remaining three national carriers saw postpaid ARPU increases of approximately 2% year over year in 2011. For 2012, most managements continue to be bullish about continued ARPU growth driven by smartphone penetration. We expect Sprint Nextel and Verizon will see the biggest postpaid ARPU growth in the near future due to Sprint Nextel introducing the iPhone in the fourth quarter of 2011 and an increasing share of smartphone subscribers currently paying the \$10/month premium fee. As Verizon smartphone penetrations accelerate to reach par with its peers, postpaid ARPU should continue to increase, barring any unforeseen impacts of new pricing schemes (see discussion below on shared data pricing).

We expect that Leap and Tracfone generated the largest year-over-year gain in prepaid ARPU with 2011 year-over-year ARPU growth of 7.7% and 24.0%, respectively. Leap's ARPU tipping point was in the fourth quarter of 2011 when it sequentially increased 2.7% following six quarters of quarter-over-quarter declines. Since then, Leap has reported four straight quarters of sequential growth with an average quarterly improvement of 2.7% driven by smartphone and MUVE adoptions, which requires \$55 or \$65 calling plans. Tracfone has seen its ARPU accelerate since introducing its unlimited talk, text, and data plans under its StraightTalk brand. MetroPCS ARPU increased 2.1% year over year in 2011 while Sprint Nextel ARPU should decline 1.1% due to lower-ARPU Assurance Wireless subscribers.

Exhibit 38: Postpaid ARPU

	2010A	1Q11A	2Q11A	3Q11A	4Q11E	2011E	1Q12E	2Q12E	3Q12E	4Q12E	2012E
AT&T	\$62.56	\$63.39	\$63.87	\$63.69	\$64.14	\$63.77	\$64.66	\$65.15	\$64.96	\$65.42	\$65.05
Sprint Nextel	\$55.00	\$56.00	\$57.00	\$58.00	\$58.50	\$57.38	\$58.80	\$59.28	\$59.54	\$60.11	\$59.43
T-Mobile	\$51.63	\$52.00	\$53.00	\$53.00	\$52.50	\$52.63	\$52.25	\$53.25	\$53.25	\$52.75	\$52.88
Verizon	\$53.14	\$53.52	\$54.12	\$54.89	\$54.52	\$54.26	\$54.59	\$55.20	\$56.13	\$55.75	\$55.42
Weighted Average	\$56.28	\$56.90	\$57.57	\$57.97	\$57.99	\$57.61	\$58.20	\$58.79	\$59.15	\$59.17	\$58.83
Y/Y Change	1.5%	2.3%	2.5%	2.4%	2.3%	2.4%	2.3%	2.1%	2.0%	2.0%	2.1%

Source: Company reports, RBC Capital Markets estimates

Exhibit 39: Prepaid ARPU

	2010A	1Q11A	2Q11A	3Q11A	4Q11E	2011E	1Q12E	2Q12E	3Q12E	4Q12E	2012E
Sprint Prepaid	\$27.75	\$28.00	\$28.00	\$27.00	\$26.75	\$27.44	\$26.50	\$26.50	\$26.50	\$26.50	\$26.50
Leap Wireless	\$37.76	\$39.35	\$40.15	\$41.25	\$41.88	\$40.66	\$42.19	\$42.40	\$42.68	\$42.97	\$42.56
MetroPCS	\$39.79	\$40.42	\$40.49	\$40.80	\$40.84	\$40.64	\$40.93	\$41.00	\$41.31	\$41.46	\$41.17
T-Mobile	\$18.75	\$18.00	\$17.00	\$19.00	\$18.00	\$18.00	\$18.00	\$18.00	\$19.00	\$19.00	\$18.50
Tracfone	\$12.50	\$14.00	\$15.00	\$16.00	\$17.00	\$15.50	\$17.50	\$18.50	\$19.50	\$20.50	\$19.00
Weighted Average	\$24.16	\$25.06	\$25.35	\$25.79	\$25.88	\$25.39	\$25.99	\$26.35	\$26.84	\$27.16	\$26.49
Y/Y Change	1.1%	5.5%	5.0%	5.8%	4.3%	5.1%	3.7%	3.9%	4.1%	4.9%	4.3%

Source: Company reports, RBC Capital Markets estimates

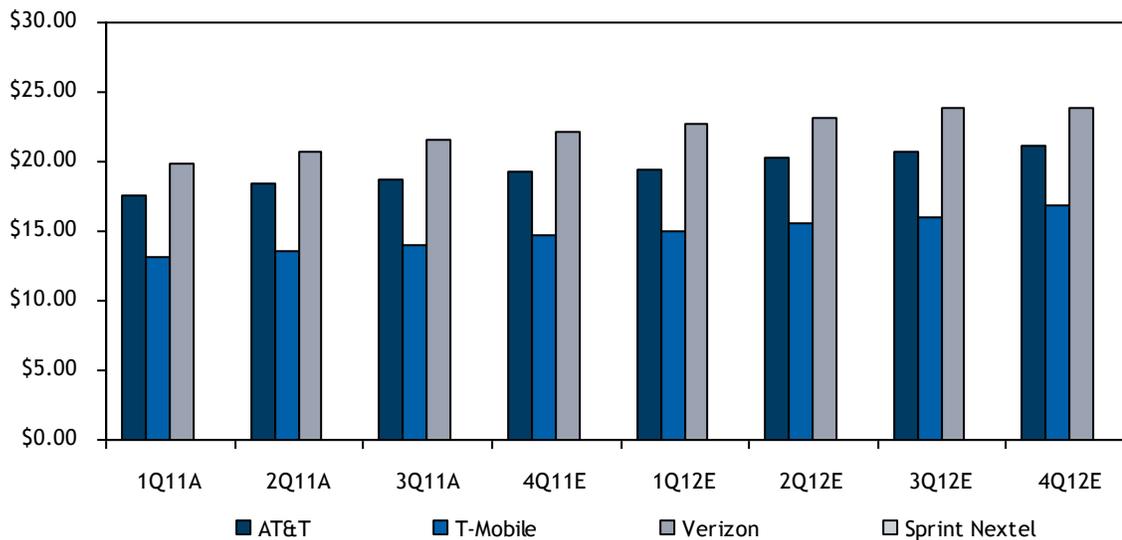


Data ARPU Trends

Wireless data ARPU has been increasing with smartphone usage. Verizon, with its enhanced portfolio of smartphones, LTE network, and lower smartphone penetration than its peers, saw more rapid growth than its peers during 2011. Verizon’s data ARPU has increased on average 19.2% year over year in each of the first three quarters of 2011, which is above a weighted average growth of 15.3%. T-Mobile is second with a 16.6% year-over-year average quarterly increase followed by AT&T at 9.7%. Sprint Nextel no longer discloses data ARPU given that majority of its customers are on bundled plans; however, we estimate approximately 40% of postpaid ARPU is generated from data ARPU and is the highest in absolute dollars among the Big Four.

In 2011, tiered data pricing became ubiquitous for Verizon and AT&T amid concerns that tiered structures could mitigate data ARPU growth. However, these concerns did not materialize as the tiered structures incented more up rating (from new smartphone customers taking the entry-level data package) than down rating (customers tiering down to lower-usage cap plans). Approximately 95% of Verizon data users use less than 2 GB of data, which is \$30 for smartphone users and the same price as its previous unlimited plan. 50% of AT&T smartphone subscribers are on tier data plans with majority on the \$25/2 GB plan. AT&T offers \$15/200 MB data plan for smartphones, which appears to be an effective entry point for new smartphone subscribers.

Exhibit 40: Data ARPU



* Sprint Nextel data ARPU is calculated.
 Source: Company reports, RBC Capital Markets estimates

As we discuss later, new features that may be introduced during 2012 include shared data pricing and speed tiering.

Postpaid Calling Plans

Looking back in 2011, postpaid and prepaid calling plans in general have been stable with minimal disruptive calling plans that have pressured ARPU. In fact, prepaid carriers successfully launched higher tiered Android calling plans that have been well received as is evident by strong smartphone sales. AT&T, Sprint Nextel, and Verizon postpaid calling plans in 2011 remain relatively unchanged while T-Mobile eliminated its Even More and Even More Plus plans, replacing them with Classic and Value plans in mid-2011. T-Mobile’s subscribers on the Classic plan receive the post-rebate prices; whereas, Value subscribers pay full retail handset prices with options to spread the payment over 20 months. Value subscribers pay \$5 to \$15 less on their monthly calling plans versus Classic subscribers.

The most popular calling plans and bundles remain relatively unchanged with \$40 for 450 minute combined with unlimited text and 2 GB of data being the most popular bundle at AT&T and Verizon. Sprint Nextel’s most popular plan is the \$70 plus \$10 add-on fee for smartphones that comes with 450 landline minutes, unlimited text and data, unlimited anytime any mobile feature. AT&T offers similar unlimited anytime any mobile feature for individuals taking the \$20 unlimited text messaging and \$30 family unlimited text messaging plan. T-Mobile offers a value-based plan for unlimited talk, text, and data with 2 GB of HSPA+ speeds at \$80 per month.

Exhibit 41: National Carrier Rate Plan Snapshot

	Talk	Text	Data	Total
AT&T	\$40/450 min	\$20/unlimited	\$25/2 GB	\$85.00
Sprint Nextel (Everything Data Plan)	450 min	Unlimited	Unlimited	\$80.00
T-Mobile	Unlimited	Unlimited	Unlimited	\$80.00
Verizon Wireless	\$40/450 min	\$20/unlimited	\$30/2 GB	\$90.00

* Sprint's plan includes \$10/month smartphone premium fee and any mobile anytime feature.

* T-Mobile data plan is unlimited with 2 GB at HSPA+ speeds.

Source: Company collateral

Exhibit 42: National Carriers Unlimited Plans

	Talk	Text	Data	Total
AT&T	\$70.00	\$20.00	\$25.00	\$115.00
Sprint Nextel	Included	Included	Included	\$100.00
T-Mobile	Included	Included	Included	\$80.00
Verizon Wireless	\$70.00	\$20.00	\$30.00	\$120.00

* Data plan for AT&T and Verizon is 2 GB; T-Mobile plan is unlimited data with 2 GB at HSPA+ speeds.

Source: Company collateral

Similar to postpaid calling plans, unlimited prepaid calling plans were stable in 2011. The most significant new entrant to the unlimited prepaid space was Verizon with the introduction of a \$50 unlimited talk, text, web plan, which had been tested in select markets before launching nationwide. Fears of cannibalization of postpaid subscribers by the prepaid \$50 unlimited offer were muted in Verizon's test markets as only limited features and quick messaging devices are offered. MetroPCS and Leap have experienced an increasing number of customers tiering up to the higher-rate plans that are usually required for Android smartphones, although on a promotional basis, we believe that some carriers may sporadically reduce or eliminate this requirement. Leap is having success with its unlimited music download service, MUVE Music, which was launched in early 2011 and requires \$55 or \$65 service plans.

Exhibit 43: Unlimited Prepaid Plans**MetroPCS**

\$40	Unlimited local, Nationwide, voice mail, text, pic messaging, web
\$45	\$40 plan plus unlimited int. text, screenIT, pocket express, premium 411 asst, Metro ChatLINK
\$50	\$45 plan plus unlimited MetroNavigator, IM, GPS friend finder, email access
\$60	Blackberry Plan, corporate email \$5
\$40	4G LTE Service Plan/ Unlimited Talk, Text, and Web but no additional 4G data
\$50	4G LTE Service Plan/ Unlimited talk, Text, and Web / Only 1GB 4G Additional data access
\$60	4G LTE Unlimited Premium Plan/ Unlimited 4G & 4G VOD available

Leap Wireless

\$35	Unlimited nationwide talk, long distance, text
\$45	\$35 plan plus 3-way calling, call forwarding, unlimited 411, unlimited pic/video/int. text, 3G data
\$55	Android plan and same features as the \$45 plan plus email and app store access
\$55	Muve music plan and same feature as the \$45 plan plus unlimited song downloads, ringback tones, ringtones, mobile video
\$65	Muve music plan for Android; same features as \$55 plan plus email and app store access

Boost Unlimited

\$50	Unlimited talk, text, email, web, Walkie-Talkie, Voicemail, free incoming international text
\$55	Android unlimited talk, text, web, email
\$60	Blackberry unlimited talk, text, web, email

Virgin Mobile

\$55	Unlimited anytime minutes, text, email, data, web
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AT&T GoPhone

\$50	Unlimited talk, text, web
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Verizon Wireless

\$50	Unlimited talk, text, web
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Source: Company reports, RBC Capital Markets



Data and Broadband Calling Plans

While voice changes have been virtually unchanged in 2011, data plans have seen the most movements by the Big Four. AT&T and Verizon launched tiered data plans at the start of 2011 and eliminated their unlimited data plans. Sprint Nextel offers unlimited data plans for 3G and 4G, while T-Mobile's unlimited data plans have a usage cap on their HSPA+ network. AT&T offers \$15/200 MB and \$25/2 GB data plans for smartphones, while Verizon offers \$30/2 GB, \$50/5 GB, and \$80/\$8 GB smartphone data plans. In the second half of 2011, Verizon tested a \$20/300 MB smartphone data in the mid-Atlantic region. In the second quarter of 2011, AT&T discontinued its \$10/1,000 messaging plan for individual plans and only offers \$20 unlimited messaging plans.

Similar to its voice plans, T-Mobile launched Classic and Value broadband plans in 2011 with Value plans priced \$10 below the Classic plans and requiring subscribers to pay full retail prices for equipment. In the fourth quarter of 2011, Sprint Nextel revamped its data plans for USB, notebooks, tablets, and hotspots, which lowered the plan prices and/or raised the data allowances for the plans. In conjunction with the data plan changes, Sprint Nextel changed 4G usage from unlimited to data allowance of the plan for non-smartphone data plans.

Exhibit 44: Postpaid Data and Broadband Plans

<u>AT&T</u>			<u>Sprint Nextel - CDMA</u>		
	<u>Data</u>	<u>Overage</u>		<u>Data</u>	<u>Overage</u>
Text Messaging					
\$20 Individual text messaging plan	Unlimited	N/A	\$5	300	\$0.20/msg
\$30 Family text messaging plan	Unlimited	N/A	\$10	1000	\$0.20/msg
Non-Smartphones Data Plans					
\$10 Unlimited data plan (msg unlimited required)	Unlimited	N/A	\$20	Unlimited	N/A
\$15 Unlimited data plan	Unlimited	N/A	* per line; for talk and basic plans		
DATA Connect 3G Plans					
\$60	5 GB	\$0.05/mb	Mobile Broadband Connection Plan - 3G/4G*		
			\$50	4G connection in select cities	6 GB On-network \$0.05/MB
			\$80	4G connection in select cities	12 GB On-network \$0.05/MB
Smartphones, Blackberry Data Plans (3G & 4G)					
\$20 DataPlus 300 MB plan	300 MB	\$20/300 MB	\$60		5 GB On-network \$0.05/MB
\$30 DataPro 3 GB plan	3 GB	\$10/1 GB	3G/4G Hotspot Mobile Broadband Connection Plan		
\$50 DataPro 5 GB w/hotspot & tethering	5 GB	\$10/1 GB	\$35	4G connection in select cities	3 GB On-network \$0.05/MB
DataConnect 4G plans for Laptop, USB, Hotspot					
\$50	5 GB	\$10/1 GB	Tablet 3G/4G Mobile Broadband Connection Plan*		
			\$20		1 GB
			\$35		3 GB On-network \$0.05/MB
No-Commitment Tablet DataConnect Plans					
\$15	250 MB	\$15/250 MB	\$50		6 GB On-network \$0.05/MB
\$30	3 GB	\$10/1 GB	\$80		12 GB On-network \$0.05/MB
Service Commitment Tablet DataConnect Plans					
\$50	5 GB	\$10/1 GB	Verizon Wireless		
Text Messaging					
			\$0		0 \$0.20/msg
			\$10		1000 \$0.10/msg
			\$20		Unlimited NA
Mobile Broadband - Overage-Free Classic					
\$40	2 GB at HSPA+ speed	N/A	\$10	For basic phones only	75 MB \$10/75 MB
\$50	5 GB at HSPA+ speed	N/A	\$30		2 GB \$10/1 GB
\$80	10 GB at HSPA+ speed	N/A	\$50		5 GB \$10/1 GB
			\$80		10 GB \$10/1 GB
* T-Mobile voice customers receive \$10 discount per month					
* unlimited web access and hotspot					
Mobile Broadband - Overage-Free Value					
\$30	2 GB at HSPA+ speed	N/A	\$50		4 GB \$10/1 GB
\$40	5 GB at HSPA+ speed	N/A	\$70		7 GB \$10/1 GB
\$70	10 GB at HSPA+ speed	N/A	\$100		12 GB \$10/1 GB
* unlimited web access and hotspot					
Blackberry/Smartphone Plans					
\$50	Unlimited email/web, Voice \$0.45/min	N/A	\$30		2GB \$10/1 GB
			\$50	Includes hotspot	5GB \$10/1 GB
			\$50		5GB \$10/1 GB
			\$80	Includes hotspot	10GB \$10/1 GB
			\$80		10GB \$10/1 GB
* applies to USB, tablets, notebooks, MiFi hotspots					

Source: Company reports, RBC Capital Markets

A Spectrum Primer

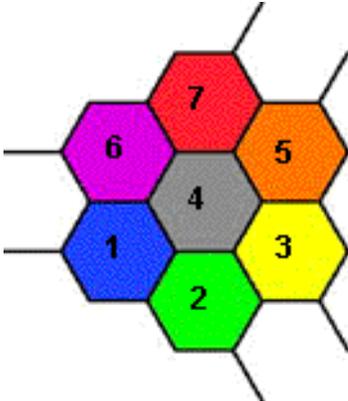
Spectrum forms the basis for wireless networks. The vast majority of commercial mobile wireless operations are based on spectrum licenses that are regulated by the Federal Communications Commission (FCC) according to spectrum depth (essentially channel width, usually expressed in Megahertz – MHz), the position that the spectrum occupies along the frequency scale (for most mobile systems, somewhere between 300 MHz and 3 GHz, and up to 40 GHz or more for stationary systems), and admissible transmission power. Power and other factors equal, radio signals at higher-frequency signals carry voice and data traffic over a shorter distance before dissipating, and penetrate the walls of buildings less effectively than radio signals that propagate at lower frequencies. Conversely, lower-frequency signals travel farther (and can cover more geographic territory) and penetrate buildings better than



higher-frequency signals. Thus, all else equal, constructing a mobile network at higher frequencies requires more cell sites (hence more capex than construction of a comparable network at higher frequencies due to coverage and building penetration requirements).

Because spectrum is a finite resource, mobile networks covering large geographic areas employ frequency reuse in a cellular fashion. Exhibit 45 illustrates this.

Exhibit 45: Mobile Cellular Architecture



Source: RBC Capital Markets

These seven cells, whose radio equipment (antenna and base station cabling) are usually mounted on a tower or rooftop or other elevated structure, are arranged adjacent to each other to cover a defined territory. The first cell on the top left uses a defined set of frequencies (say frequencies A-C). The cells adjacent to this use different frequencies (e.g., frequencies D-F for cell 4, and frequencies G-I for cell 6) so as to avoid interfering with the first cell. Subsequent cells that are sufficiently distant from the first cell (e.g., cell 7 and cell 3) can then use frequencies A-C without interference. In this fashion, a cellular network is configured that avoids the use of the same frequency in adjacent cells. Of note, CDMA based systems can in theory use all frequencies in all cells; by increasing capacity, they avoid adjacent-cell interference through code-division spread-spectrum techniques rather than time-division methods.

The most common license blocks in use fall in the categories of cellular, PCS, AWS, SMR, 700 MHz, and BRS/2.5 GHz. Each block has a distinct history, regulatory framework, and allocation framework.

- **Cellular Licenses:** In 1981, the FCC set aside mobile spectrum in the so called 850 MHz band (824–849 and 869–894 MHz) for cellular services. Under the licensing rules, one of the two 25-MHz cellular bands in each geographic area (B block) was awarded to the local wireline incumbent, and the A block was awarded by a non-incumbent, initially through a series of hearings and later by lottery. In most cases, cellular licenses correspond to Rand McNally definitions of Metropolitan Statistical Area (MSA) and Rural Service Area (RSA). AT&T and Verizon own the vast majority of cellular licenses.
- **PCS Licenses:** PCS licenses in the so called 1,900 MHz band (1,850–1,910 and 1,930–1,990 MHz) refer to a series of 30-MHz (A, B, and C) and 10-MHz (D, E, and F) licenses that were auctioned by the FCC during the mid-1990s (and later re-auctioned in some cases). PCS licenses are allocated by Major Trading Area (MTA) and Basic Trading Area (BTA). The PCS licenses formed the basis for Sprint's initial CDMA network buildout in the late 1990s. Other major winners of the PCS licenses were GSM start-ups operating in non-overlapping areas (VoiceStream, Omnipoint, Aerial, and Powertel) that were later consolidated by VoiceStream and later purchased by T-Mobile. After the PCS auctions, the 10-MHz G block became available for licensed commercial use and is now owned by Sprint Nextel.
- **AWS Licenses:** Advanced Wireless Services (AWS) spectrum resides at 1,710-1,755 and 2,110-2,155 MHz. The AWS auctions were held during 2006. T-Mobile was the major license winner in these auctions; it was a motivated bidder because its PCS spectrum holdings were insufficient to support robust 3G services. AT&T and Verizon were also significant winners.
- **SMR:** Specialized Mobile Radio licenses are located at 806-824 and 851-869 MHz and formed the basis of various dispatch systems. Many of these were consolidated by Nextel into a national network using a Motorola-developed digital technology known as iDEN. Nextel's spectrum was typically non-contiguous (i.e., split into discrete kHz-level chunks), and iDEN was and remains the principal digital technology capable of operating effectively across multiple non-contiguous licenses. Sprint now operates a nationwide iDEN network (following its acquisition of Nextel) that it plans to phase out in favor of CDMA (and later LTE) technology capable of dispatch operations.
- **700 MHz:** 700-MHz licenses (A block: 12 MHz bandwidth at 698–704 and 728–734 MHz, B block: 12 MHz bandwidth at 704–710 and 734–740 MHz, C block: 22 MHz bandwidth at 746–757 and 776–787 MHz, D block: 10 MHz bandwidth at 758–763 and 788–793 MHz, and E block: 6 MHz unpaired bandwidth at 722–728 MHz) were auctioned in early 2008 using spectrum previously used by analog television stations. AT&T and Verizon were the principal winners, with US Cellular, Qualcomm, and DISH

Network also winning significant licenses. This spectrum forms the basis of AT&T and Verizon's current 4G networks utilizing LTE technology. The D block did not meet minimum bid requirements because of public-safety related constraints and was not awarded to any carrier. It now appears possible that this block will be allocated directly toward public-safety use.

- **BRS/2.5 GHz:** Broadcast Radio Service (BRS) licenses form the basis for Clearwire's WiMax network (currently undergoing an overlay with LTE technology). These licenses because of their spectral position are comparatively challenged versus lower-band frequencies because of propagation and in-building penetration limitations.
- **S-Band:** In the US, the satellite S-band comprises two 20-MHz license at 2 GHz. DISH Network has acquired these licenses in conjunction with its acquisition of TerreStar and DBSD North America following the companies' bankruptcy filings. The FCC has not yet approved final transfer of these licenses to DISH. In addition, the rules associated with this are currently under review and would require an FCC waiver in order to enable the deployment of a terrestrial-only network.
- **WiFi – Unlicensed:** WiFi utilizes non-exclusive unlicensed frequencies in the 2.4 GHz range and is used for fixed applications such as connecting laptops, tables, game consoles, audio players, and other electronic devices to a centralized hub or hotspot that emits and receives WiFi signals. This hub is then typically connected to the Internet via a fixed broadband connection (fiber, DSL, T1, etc.). WiFi signals typically can provide up to 11–54 Mbps of throughput, but have a limited range (typically 20 yards) and can be prone to interference because they can be used simultaneously by multiple operators. Thus, this spectrum is suited for stationary or nomadic applications rather than mobile services over a large coverage area. WiFi allows the offloading of wireless traffic onto fixed-line infrastructure and thus alleviates traffic loading.

The entire range of FCC-regulated spectrum is illustrated in Exhibit 46.

Spectrum Transactions

Exhibit 47 provides an overview of spectrum transactions over the last several years, including auction purchases and private-market transactions.

Exhibit 47: Wireless Spectrum Transactions

Date	Acquirer	Seller	Frequency	Price (mils)	MHz	POPs (000s)	\$/MHz/POP
2001/01/26	Various bidders	FCC	1.9GHz	\$17,597	30	168,230	\$3.49
2001/11/14	Cingular Wireless	Leap Wireless	N/A	\$140	15	2,000	\$4.67
2001/11/30	Airgate PCS	iPCS	1.9GHz	\$806	10	7,400	\$10.89
2004/04/13	Cingular Wireless	Nextwave PCS	1.9GHz	\$1,400	10	83,000	\$1.69
2004/08/16	Leap Wireless	Alpine-Fresno C	1.9GHz	\$27	30	950	\$0.95
2004/08/16	Cingular Wireless	Leap Wireless	1.9GHz	\$2	15	N/A	N/A
2004/11/05	Verizon Wireless	Nextwave PCS	1.9GHz	\$3,000	14	73,000	\$2.85
2004/11/23	Verizon Wireless	NTELOS	1.9GHz	\$16	10	2,100	\$0.74
2004/11/29	Metro PCS	Cingular Wireless	1.9GHz	\$230	10	19,690	\$1.17
2005/02/15	various bidders	FCC	1.9GHz	\$2,043	10	206,607	\$0.95
2005/03/03	Verizon Wireless	Metro PCS	1.9GHz	\$230	10	7,237	\$3.18
2005/03/04	Verizon Wireless	Qwest Wireless	1.9GHz	\$418	10	30,800	\$1.36
2005/07/13	XM Satellite Radio	WCS Wireless	N/A	\$196	10	163,000	\$0.12
2005/07/14	Verizon Wireless	Urban-Comm North	1.9GHz	\$69	21	3,900	\$0.84
2005/08/03	Verizon Wireless	Leap Wireless	1.9GHz	\$103	11	8,000	\$1.17
2006/09/18	various bidders	FCC	1.7GHz/2.1GHz	\$13,700	90	300,000	\$0.51
2007/02/20	Clearwire	AT&T	2.5GHz	\$300	170	18,000	\$0.10
2007/07/24	Telecom Ventures	Crown Castle	1670MHz	\$143	5	300,000	\$0.10
2007/10/09	AT&T Mobility	Aloha Partners	700MHz	\$2,500	12	196,000	\$1.06
2008/03/18	various bidders	FCC	700MHz	\$19,120	52	285,174	\$1.29
2008/07/24		Nextwave PCS	AWS	\$150,100	N/A	N/A	\$0.25
2010/12/20	AT&T	Qualcomm	700 MHz	\$1,925	7.4	300,000	\$0.87
2011/03/15	DISH	DBSD	2 GHz MSS 'S' band	\$1,413	20.0	6,180,000	\$0.01
2011/06/20	DISH	Terrestar	2 GHz MSS 'S' band	\$1,380	20.0	6,860,000	\$0.01
2011/12/02	Verizon	SpectrumCo	1.7 GHz/2.1 GHz	\$3,600	20.0	259,000	\$0.69
2011/12/16	Verizon	Cox	1.7 GHz/2.1 GHz	\$315	20	28,000	\$0.56

Source: Company reports, RBC Capital Markets

Future Commercial Spectrum Availability and Auctions

On March 16, 2010, the FCC published the National Broadband Plan, which set goals designed to improve the quality and availability of Internet access across the United States. Its objectives included improving Internet service provided by wireless products such as cell phones, tablets, and data access devices in the context of sky rocketing demand for broadband capacity. At the same time, all branches of government are searching for ways to reduce national debt. One potential avenue to achieve both goals (an increase in available broadband capacity and reduction in the national debt) is to repurpose and reclaim spectrum from TV broadcasters through incentive auctions in which broadcast could potentially sell spectrum back to the US government, and then the government could sell this spectrum on the open market (taking a 'commission'). This proposal has set off a rather heated policy debate and has potential financial implications for broadcasters and their investors.

Spectrum targeted for potential commercial use includes:

- 20 MHz of spectrum in the 2.3 GHz WCS (wireless communications service) band,
- 10 MHz of spectrum in the 700 MHz band (D block); as mentioned, this spectrum may be allocated toward public-safety use,
- 60 MHz of spectrum in the AWS band that was not previously auctioned (so called AWS 2/3 band),
- 90 MHz of satellite spectrum – this includes the aforementioned S band licenses currently owned by DISH Network as well as L-band licenses in the mid-1 GHz band. The L band currently faces technical challenges to its implementation due to potential interference with GPS devices, and
- 120 MHz of broadcast television spectrum in the 500 and 600 MHz ranges.

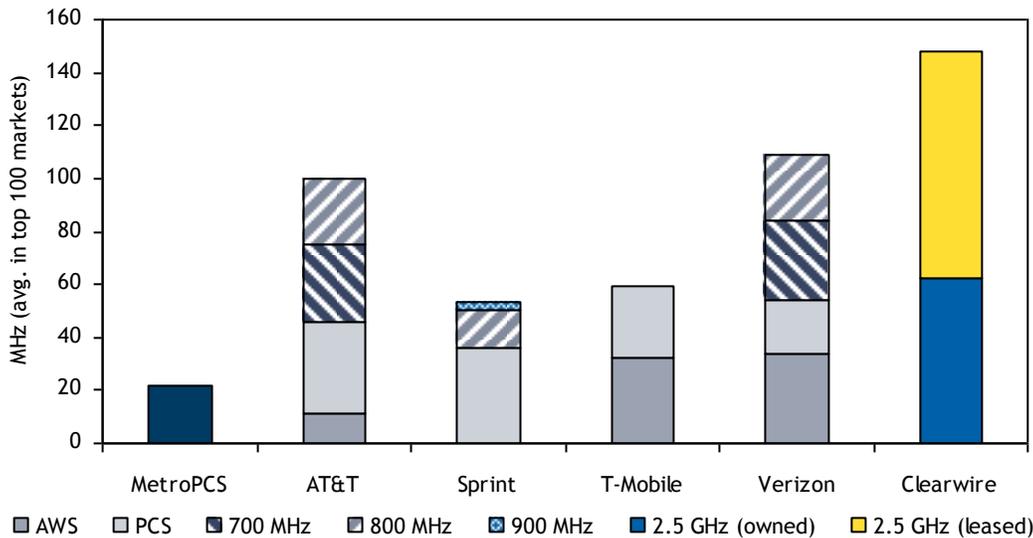


We believe that the latter three categories are most likely to see commercial use, with S-band licenses potentially being approved for purely terrestrial use during 2012, and AWS 2/3 and broadcast licenses potentially being auctioned in late 2013 or 2014.

Spectrum Position by Carrier

Exhibit 48 illustrates the average spectrum depth for each major, with bar shading denoting the major spectrum bands possessed by each.

Exhibit 48: Spectrum Position



Source: Company reports, RBC Capital Markets

4G Initiatives

LTE: offers the spectrum-rich carriers, particularly those more advanced in their buildout such as Verizon, the prospects for both superior throughputs and higher incremental margins (because of more efficient data throughputs over a comparatively less utilized network).

Verizon: Verizon Wireless was the first national carrier to launch LTE service in December 2010 with an initial covered population of 110 million in 38 markets and 60 commercial airports. Verizon finished 2011 with LTE coverage in 190 markets, covering more than 200 million people and is on track to complete its LTE rollout in 2013, which will cover approximately 300 million people. Verizon has heavily promoted LTE services and devices (smartphones, MiFi, and USB).

AT&T launched LTE initially in San Antonio, Atlanta, Chicago, Dallas, and Houston in August 2011, and it is currently expanding to 26 markets, covering 74 million POPs. AT&T is scheduled to be complete its LTE rollout by year-end 2013.

Clearwire/LTE: The company focused its initial 4G deployment on a pre-WiMAX standard, then overlaid WiMax in its original markets and launched newer markets with WiMax. It now plans to deploy LTE across 8,000 of its 16,000 cell sites during 2012–2013.

T-Mobile: The company lacks readily available 4G spectrum. Prior to the announcement of the ill fated AT&T deal, T-Mobile had been focusing its efforts on enhanced versions of HSPA technology and marketing this as 4G.

Leap: Leap launched LTE in Tucson in December 2011. It is targeting 25 million covered POPs by year-end 2012 with further expansions in 2013–2014.

MetroPCS: The company launched LTE initially in 3Q10, albeit with less spectrum capacity than the larger carriers. As a result, the throughput is more comparable to other carriers’ 3G offers.

U.S. Cellular: The company’s initial rollout of 4G LTE service is planned for select cities in Iowa, Wisconsin, Maine, North Carolina, Texas and Oklahoma. Its first device (a tablet) is scheduled for launch in late 1Q12.

Themes

Emerging or continuing themes include continued smartphone and tablet penetration, 4G network expansions, the need to keep up with capacity demands through other network investments such as backhaul and cell-splitting, increased device functionality through innovations such as near-field communications, and emerging machine-to-machine applications for various industry sectors. We have discussed many of in the analysis above and would highlight the following: small-cell architectures, performance tiering, shared data pricing; and session based data.

Traffic trends are not evenly distributed across subscribers. Data from Arieso suggest that 1% of wireless users generate half of overall traffic and the top 3% generate 70% of traffic. The device mix among these users is roughly two-thirds laptop and one-third smartphone, with a small portion coming from tablets (most tablet usage is from WiFi or sideloaded content and hence does not count significantly toward overall wireless traffic. This may change should the mix of tablets operable over 3G or 4G networks increase and/or pricing plans for such devices become more affordable.

What are the implications for carriers? New spectrum must continually be obtained, or capacity must be enhancement from densifying their networks via cell splitting or increased use of micro-architectures such as DAS, and WiFi offload.

Small Cells

As many carriers confront spectrum limitations, network densification is the primarily tool at their disposal for meeting growing capacity requirements. This entails conventional cell-splitting (deploying a new cell site in a capacity constrained to accommodate increased traffic), deployment of higher-speed backhaul links (often by deploying fiber to the cell site), and various small-cell approaches such as microcells, picocells, femtocells, and distributed antennas systems (DAS). These approaches are often more feasible from a zoning perspective due to their smaller form factor. Also, they are often more effective than conventional macro cell sites at addressing pinpoint capacity needs. Premises-based femtocells (e.g., in the residence or enterprise) offload traffic from wireless networks by leveraging existing DSL, cable, or fiber-based backhaul to the network. The cost for these devices is usually footed by the end user rather than the network operator.

Performance Tiering

At present, many carriers have a policy of throttling down the speed once a certain usage level is exceeded. Performance tiering, although not widely used, is an extension of this concept and an additional option that carriers have to manage finite network resources. Similar to the tiered broadband offers of many cable operators, users would pay a premium for accessing the network at top speeds, and could choose to pay a lower monthly fee for network access at a lower or medium speed. This concept could be further modified to regulate top speeds according to time of day, or location, thereby allowing the carrier to regulate loading at the most highly trafficked sites while allowing users in less-congested parts of the network to continue to achieve peak performance. If implemented, effects on ARPU would be highly dependent on how the various tiers are defined and priced, but we believe there is an opportunity for carriers to manage resources by segmenting different usage tiers.

Shared Data Pricing

The advent of family and add-a-line plans allowed the US wireless industry to achieve mature penetration rates through most of the last decade while still relying predominately on postpaid-centric growth. The per-subscriber economics remained compelling even for \$10/line nominal pricing because as many users tiered up to larger voice buckets, the resulting subscriber growth drove higher customer retention (switching costs for a family are higher than for an individual), and entailed lower subscriber acquisition costs. Today, large or unlimited voice and text buckets are commonly offered on a family basis, but data continue to be priced on a per-line basis. During the coming year, we believe many carriers may consider introducing shared data buckets. We have mixed views on this potential development. On the positive side, shared-data buckets may encourage more subscribers to adopt postpaid plans for tablets (versus relying on WiFi) and thereby drive incremental data revenues (but not necessarily data ARPU). On the negative side, we see some risk that increased data take rates under shared plans could cannibalize growth that may have occurred anyway under single-bucket plans. The ultimate effect is difficult to forecast as it would depend on the pricing and volume specifics, but we would not be surprised to see some carriers trial or introduce shared-data plans as a way of further spurring smartphone and tablet adoption.

Session-Based Data

Leap Wireless recently indicated plans to introduce session-based data pricing, allowing the user to purchase services on an on-demand basis. This approach has significant potential, in our view, since it will not deter users from entering into a monthly commitment, whether on a prepaid or postpaid basis. AT&T's DataConnect plans offer the flexibility of daily, weekly and monthly buckets but do not offer a purely on-demand option. As with shared data pricing, the ultimate outcome of session-based plans will depend on pricing and volume specifics, but we believe session-based data capability could be an effective means of increasing tablet penetration, with MVNOs perhaps emerging as an additional distribution channel.

Lifeline Programs

We believe that carriers (such as Sprint, T-Mobile USA, and Tracfone) will continue if not expand their prepaid lifeline offers via their own branded offers or MVNOs. As mentioned earlier these programs provide low-bucket plans at comparatively low, government-subsidized rates for qualifying low-income subscribers. We believe subscribers in such programs exhibit lower churn than is typical for prepaid, and because they are offered only in conjunction with basic handsets, also entail lower device subsidies. Lifeline carriers achieve operating leverage given their small minute buckets (e.g. 250 base level) coupled with usage-based overage fees for subscribers that exceed their monthly allowance.

Wireline Services

Wireline telecom in the United States will generate approximately \$128 billion in revenues and \$41 billion in EBITDA on capex of \$19.4 billion, based on our 2012 estimates. This compares to \$129 billion and \$117 billion in revenues during 2011 and 2010, \$41 billion and \$37 billion in EBITDA during 2011 and 2010, and \$21.1 billion and \$19.4 billion in capex during 2011 and 2010. Moreover, including voice and broadband revenues from the top five cable operators, 2012 telecom revenues would be \$157 billion compared to \$156 billion and \$143 billion for 2011 and 2010, respectively.

Wireline telecom growth lags that of wireless because of mix-shifts between legacy (voice and TDM circuits) and IP products, more modest growth rates in end-user broadband connections (fiber and DSL wireline vs. 3G and 4G wireless), and pricing structures for IP data that incorporate a significant fixed versus variable component, thereby making revenue growth for the sector less usage-sensitive than for wireless.

Much of the technology substitution that has muted wireline growth rates results from the displacement of TDM-based (time division multiplexing) protocols by Ethernet. Ethernet is an attractive data transport medium legacy, TDM-based solutions (i.e., Frame Relay, ATM, SONET). Traditional TDM was suitable for QoS latency-sensitive voice traffic due to committed channel capacity to each user; however, bandwidth is used inefficiently. Frame Relay, ATM (asynchronous transfer mode) and SONET (synchronous optical networks) were improvements upon TDM, as each utilizes bandwidth more efficiently to support data traffic bursts. Already widely deployed for LAN (local area network) connectivity, Ethernet offers advantages to customers and carriers due to ease of use, greater flexibility, scalability and cost efficiencies (lower bandwidth and port cost). Moreover, Ethernet solutions can be sold at less than port capacity, allowing customers to purchase bandwidth on a just-in-time basis. This dynamic allocation of port capacity makes Ethernet more cost efficient to the customer versus TDM-based data transport protocols, which require end users to purchase bandwidth at the same increment as the port speed. In addition, incremental bandwidth can be provisioned without additional Ethernet equipment, while the migration from low to high port capacity/bandwidth on TDM-based networks may require the purchase and provision of new technologies. Combined with economies of scale, as Ethernet is already widely deployed in many networking products, these factors make it an economical and scalable solution for network providers and their customers.

According to Frost & Sullivan, next-generation services are expected to grow at a 17% compounded annual growth rate (CAGR) through 2014, with Ethernet growing by 27% per year, MPLS by 14% per year, and Wavelengths by 11%. This growth should be partially offset by a cumulative 4% CAGR decline in legacy transport service through 2014. Growth in next-generation services reflects customer demand for high bandwidth, bandwidth scalability, low latency, and cost efficiency. As shown in the following exhibit, Ethernet, MPLS and Wavelengths accounted for 36% of the US data transport market in 2009; however, they are expected to account for 59% of the same market in 2014.

That said, data and Internet traffic volumes continue to grow rapidly, and based on industry forecasts, growth is expected to remain brisk over the intermediate to long term. According to IDC and storage vendor EMC, global data requirements are growing 60% annually. Meanwhile, Cisco forecasts North America IP traffic to grow at a 39% compounded annual growth rate (CAGR) from 2009 to 2013, of which consumer and business IP traffic in North America are projected to grow at 43% and 27% CAGRs. Data and Internet traffic, initially comprised of email and simple file transfers, has evolved to include more complex and bandwidth-intensive applications.

Although not mutually exclusive, growth in consumer and business data traffic is being driven by varying factors. Specifically, consumer data growth is being driven by bandwidth-intensive applications such as file sharing, gaming and social networking, and especially streaming multimedia (video and audio). Among net-centric businesses, developing and supporting these consumer applications contribute to the data growth, by necessitating server collocation in company-owned and third party data centers and related connectivity requirements. Among enterprises, storage, disaster recovery and IT (network and application) outsourcing growth through managed hosting and cloud computing have contributed to data center collocation and network connectivity demand. In addition, the extension of corporate LANs to branch offices and remote workers, combined with growth in new enterprise applications, such as Web/video conferencing and telepresence, are also driving bandwidth requirements.

In the consumer business, since the major telco fiber-to-the-home (Verizon FiOS) and fiber-to-the-node (AT&T U-Verse) buildouts are nearly complete, we expect wireline capex-to-revenue levels to moderate versus recent levels of 16.4% and incremental margins to improve as well. On the business side, the shift away from less profitable legacy services and (in the case of Verizon) wholesale traffic) should help drive margin improvement as well.

Consumer Video and Enhanced Broadband

Verizon and AT&T announced their initial fiber and IPTV buildout plans in 2003 and launched their video services, FiOS and U-verse in 2005 and 2006. Both buildouts are now near completion, with both FiOS and U-Verse posting consistent penetration gains. The two operators have contrasting approaches Verizon has built fiber to the home (FTTH); the advantage of this architecture is that it offers almost unlimited bandwidth potential. AT&T has built fiber to the node (FTTN), which extends fiber closer to the home but relies on

enhanced DSL technology to provide video and high-speed data services over the existing copper that extends into the home. Although this is a less expensive approach, copper, even enhanced with advanced DSL technology, does have capacity limitations vs. FiOS and vs. cable architectures that have upgraded their plan to DOCSIS 3.0 in most urban areas.

Video Market Share

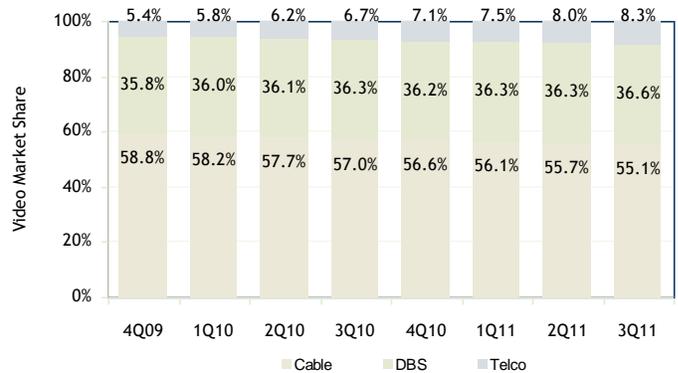
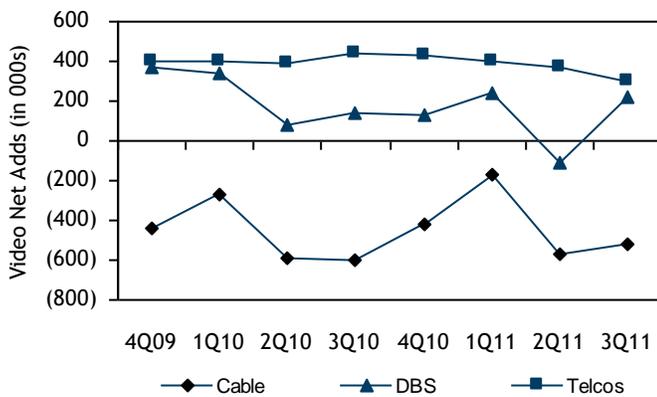
In the video market, telcos have gradually gained share vs. cable, with the contribution satellite video services relatively stable.

Exhibit 49: Video Market Share (thousands)

Ending Video Subs	4Q09	1Q10	2Q10	3Q10	4Q10	1Q11	2Q11	3Q11
Cable	53,667	53,396	52,805	52,204	52,105	51,931	51,365	50,840
DBS	32,660	32,997	33,078	33,223	33,356	33,598	33,489	33,705
Telco	4,925	5,323	5,707	6,149	6,581	6,981	7,354	7,651
Total Reported Subs	91,252	91,716	91,590	91,576	92,042	92,510	92,208	92,196
Total Based on kagan	37,585	38,320	38,785	39,372	39,937	40,579	40,843	
% share								
Cable	58.8%	58.2%	57.7%	57.0%	56.6%	56.1%	55.7%	55.1%
DBS	35.8%	36.0%	36.1%	36.3%	36.2%	36.3%	36.3%	36.6%
Telco	5.4%	5.8%	6.2%	6.7%	7.1%	7.5%	8.0%	8.3%

Source: RBC Capital Markets, company data

Exhibit 50: Trailing Eight Quarters Video Net Adds (Losses)



Source: RBC Capital Markets, company data

Voice

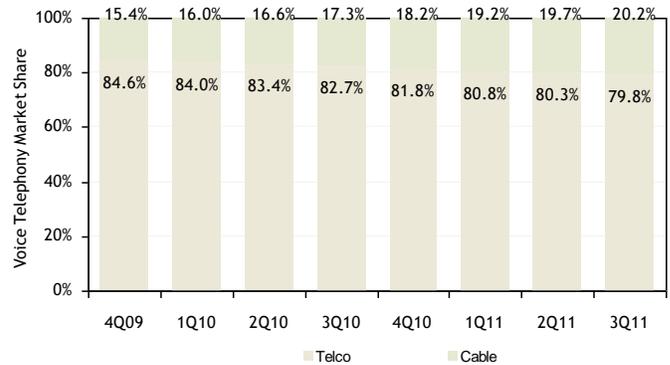
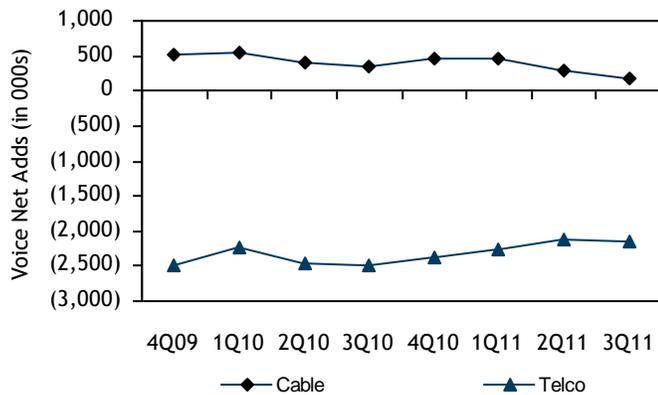
The incumbent telcos have a naturally dominant position in voice, but one that is seeing steady erosion from technology substitution (principally wireless and broadband VoIP) and competitive cable VoIP services.

Exhibit 51: Voice Market Share (thousands)

Ending Voice Subs	4Q09	1Q10	2Q10	3Q10	4Q10	1Q11	2Q11	3Q11
Cable	19,505	20,049	20,450	20,787	21,956	22,430	22,718	22,902
Telcos Access Lines	107,230	104,878	102,462	99,708	98,376	94,311	92,521	90,384
Total Reported Subs	126,735	124,927	122,912	120,494	120,332	116,741	115,240	113,286
% share								
Cable	15.4%	16.0%	16.6%	17.3%	18.2%	19.2%	19.7%	20.2%
Telco	84.6%	84.0%	83.4%	82.7%	81.8%	80.8%	80.3%	79.8%

Source: RBC Capital Markets, company data

Exhibit 52: Trailing Eight Quarters Voice Net Adds (Losses)



Source: RBC Capital Markets, company data

Broadband

In the broadband market, the cable segment has dominant position vs. the telcos. Plant upgrades throughout the last decade have allowed the cable operators offer higher speeds than telco DSL-based services.

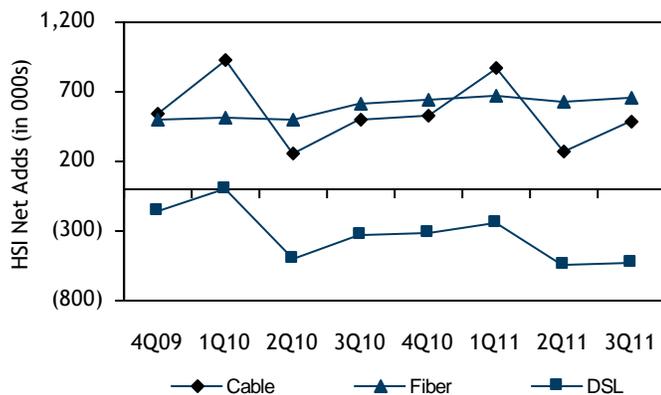
Exhibit 53: Data Market Share (000)

Ending Data Subs	4Q09	1Q10	2Q10	3Q10	4Q10	1Q11	2Q11	3Q11
Cable	38,071	38,998	39,256	39,756	40,517	41,389	41,662	42,147
DSL	27,050	27,048	26,547	26,227	25,910	25,673	25,156	24,622
Fiber	5,921	6,433	6,936	7,547	8,189	8,858	9,493	10,145
Total High Speed Data Subs	71,042	72,479	72,739	73,530	74,616	75,920	76,310	76,914
Total Based on kagan	32,971	33,481	33,483	33,774	34,099	34,531	34,648	

% share	4Q09	1Q10	2Q10	3Q10	4Q10	1Q11	2Q11	3Q11
Cable	53.6%	53.8%	54.0%	54.1%	54.3%	54.5%	54.6%	54.8%
DSL	38.1%	37.3%	36.5%	35.7%	34.7%	33.8%	33.0%	32.0%
Fiber	8.3%	8.9%	9.5%	10.3%	11.0%	11.7%	12.4%	13.2%

Source: RBC Capital Markets, company data

Exhibit 54: Trailing Eight Quarters Data Net Adds (Losses)



Source: Company data

The exhibit below provides a snapshot of broadband and bundled pricing at the major providers. At present, AT&T, followed by Comcast, appears to offer the most discounts vs. these list prices, typically \$20-30/month off for a period of six to twelve months, depending on the package.

Exhibit 55: Standalone Broadband Prices

Operator	Plan	Download	Upload	Price
Comcast	Economy	1.5 mbps	384 kbps	\$28.95
	Economy Plus	3 mbps	768 kbps	\$39.95
	Performance Starter	6 mbps	1 mbps	\$49.95
	Performance	20 mbps	4 mbps	\$46.95
	Blast!	30 mbps	6 mbps	\$56.95
	Extreme	50 mbps	15 mbps	\$99.95
	Extreme 105	105 mbps	20 mbps	\$199.95

Time Warner Cable	Basic	1.5 mbps	256 kbps	\$33.95
	Standard	10 mbps	512 kbps	\$49.95
	Turbo	15 mbps	768 kbps	\$59.90
	Wideband Internet	30 mbps	5 mbps	\$49.99
	Wideband Internet	50 mbps	5 mbps	\$99.95

Verizon DSL	High speed internet	0.5 - 1 mbps	384 kbps	\$24.99
	High speed internet enhanced	1.1 - 3 mbps	768 kbps	\$39.99
	High speed internet enhanced	3.1 - 7 mbps	768 kbps	\$39.99
	High speed internet enhanced	7.1 - 15 mbps	1 mbps	\$39.99
Verizon FiOS	Good	15 mbps	5 mbps	\$54.99
	Better	25 mbps	25 mbps	\$74.99
	Best	50 mbps	20 mbps	\$144.99

AT&T DSL	Basic	768 kbps	384 kbps	\$14.95
	Express	1.5 mbps	384 kbps	\$14.95
	Pro	3.0 mbps	512 kbps	\$14.95
	Elite	6.0 mbps	768 kbps	\$19.95
AT&T U-Verse	Pro	3 mbps	1 mbps	\$38.00
	Elite	6 mbps	1 mbps	\$43.00
	Max	12 mbps	1.5 mbps	\$48.00
	Max Plus	18 mbps	1.5 mbps	\$53.00
	Max Turbo	24 mbps	3.0 mbps	\$63.00

Source: RBC Capital Markets, company data

Exhibit 56: Bundle Price Comparison

Operator	Plan	Video	Download	Upload	Voice	Monthly Price	Contract Price*
Comcast	Starter XF Triple Play	80 channels	15 mbps	N/A	Unlimited	\$139.95	\$99.00
	HD Preferred XF Triple Play	160 channels, Starz	15 mbps	N/A	Unlimited	\$159.95	\$119.99
	HD Preferred Plus XF Triple Play	170 channels, Starz, HBO	25 mbps	N/A	Unlimited	\$179.95	\$139.99
	HD Premier XF Triple Play	200 ch, Starz, HBO, Cinemax, Showtime, sports/entertainment pkg	25 mbps	N/A	Unlimited	\$209.95	\$159.99
	HD Complete XF Triple Play	Same as HD Premier plus themoviechannel	25 mbps	N/A	Unlimited	\$239.95	\$199.99

* requires two year contract, new customers

Time Warner Cable	Triple play starter pak	Digital starter pak(130 channels)	1.5 mbps	256 kbps	Unlimited	\$136.45	N/A
	Time Warner Cable triple play	DTValue (350 channels)	10 mbps	512 kbps	Unlimited	\$156.25	N/A
	Signature Home triple play	DTValue (350 channels), whole house DVR, 2 HD-DVR boxes	50 mbps	5 mbps	Unlimited	\$199.99	N/A
	Digital starter pak& HSD	Digital starter pak(130 channels)	1.5 mbps	256 kbps	N/A	\$99.90	N/A
	DTValue & HSD	DTValue (350 channels)	10 mbps	512 kbps	N/A	\$124.75	N/A
	Digital starter pak& digital phone	Digital starter pak(130 channels)	N/A	N/A	Unlimited	\$104.90	N/A
	DTValue & digitla phone	DTValue (350 channels)	N/A	N/A	Unlimited	\$117.75	N/A
	HSD & digital phone	N/A	1.5 mbps	256 kbps	Unlimited	\$73.90	N/A
	HSD & digital phone	N/A	10 mbps	512 kbps	Unlimited	\$89.90	N/A
	Triple play with DVR	Digital TV	10 mbps	512 kbps	Unlimited	N/A	\$89.99
	TV & Internet	Digital TV with over 150 channels	10 mbps	512 kbps	N/A	N/A	\$79.00
TV & digital phone	Digital TV with over 150 channels	N/A	N/A	Unlimited	N/A	\$112.75	

* requires one year contract

Verizon FiOS	Double play bundle	N/A	25 mbps	25 mbps	Unlimited	N/A	\$69.99
	Triple play bundle	270 channels with FiOS TV Prime HD including 70 HD	25 mbps	25 mbps	Unlimited	N/A	\$89.99

* requires two year contract

AT&T U-Verse	Double play bundle *	U-family, 130 channels, \$10/mth for HD	3 mbps	1 mbps	N/A	N/A	\$92.00
	Double play bundle *	U2000, 270 channels, \$10/mth for HD	6 mbps	1 mbps	N/A	N/A	\$112.00
	Double play bundle **	U300, 360 channels, \$10/mth for HD, movie package	6 mbps	1 mbps	N/A	N/A	\$127.00
	Triple play bundle ***	U-family, 130 channels, \$10/mth for HD	3 mbps	1 mbps	250 mins	N/A	\$117.00
	Triple play bundle ***	U450, 430 channels, HD HBO, Cinemax, sports/movie package	12 mbps	1.5 mbps	Unlimited	N/A	\$200.00

Promotion: * \$43 off for 6 mths, ** \$53 off for 6 mths, *** \$28 off for 12 mths, **** \$38 off for 12 mths

* Comcast and AT&T pricing from California; Time Warner Cable and Verizon pricing from New York
Source: RBC Capital markets, company data

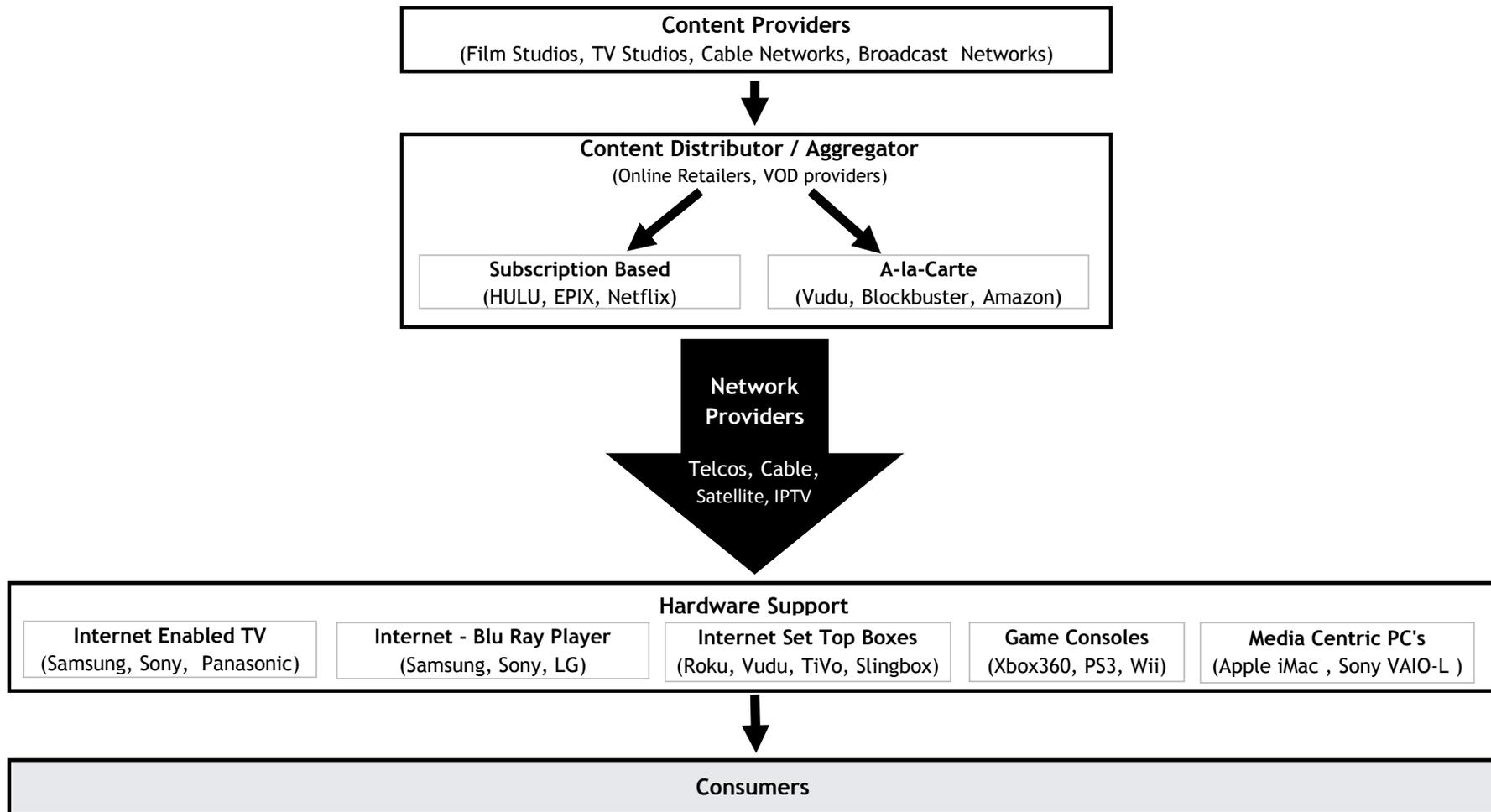


Over-the-Top (OTT)

OTT regularly receives headline attention, but it does not appear to be materially affecting video subscriber trends. While some portion of lower-income customers appear willing to give up Pay TV in favor of offerings such as Netflix, Hulu, and Vudu, it is not causing a material disruption to the Pay TV business.

The following tables depict the OTT value chain and a snapshot of the major players.

Exhibit 57: OTT Value Chain



Source: RBC Capital Markets

Exhibit 58: OTT Content Providers

	Provider	Content Partners	Hardware Partners	Retail Partners	Price	Number of Titles (Movies and TV)
Subscription	Hulu	Fox, ABC, NBC (with deals reportedly in the works with CBS, Viacom, and Time Warner)	Apple, Samsung, Sony PS3 / Xbox 360 (2010-11), Sony / Vizio (2010-11)	N/A	Unlimited Hulu Plus streaming plans @ \$9.99/ month	Thousands, Hulu streamed videos 1 billion times in December 2009
	Epix	Paramount, MGM, Lionsgate	N/A	N/A	Offered for free with \$9.99/month Verizon FiOS, Cox, Mediacom, Dish cable subscriptions. Also offered on Netflix.	1150 Standard and HD
	Netflix	Starz (Disney, Sony, Warner Bros.), EPIX (Paramount, MGM, Lionsgate)	TiVo, Vizio, Sony and Sony PS3, Xbox 360, Nintendo Wii, Roku, Samsung, LG, Apple iPad, Philips	N/A	Unlimited streaming plans start at \$9/ month	17,000 standard 1,300 HD
	HBO Go	Warner Brothers, New Line, DreamWorks Animation, Twentieth Century Fox, Universal Studios, Rogue Pictures, Focus Features	N/A	N/A	Offered for free with Verizon FiOS cable subscription	190 + Movie Titles
A La Carte	Walmart: Vudu	All major studios	Mitsubishi, Samsung, Sanyo, Sharp, LG, Toshiba, Vizio	Owned by Walmart	\$3 - \$6 per title	20,000 standard 3,000 HD
	Amazon	All major studios	Samsung, Sony, TIVO, Roku, Panasonic	Amazon	\$0.99+ rentals per title	50,000 standard 3,000 HD
	Blockbuster	All major studios	Philips, Toshiba, Samsung, Sony, TiVo, MediaPoint, T-Mobile, Motorola, Archos, Xbox360	Blockbuster	\$2 - \$4 per title	10,000 standard zero HD
	Best Buy: Roxio CinemaNow	All major studios	TiVo, LG, Xbox 360, Prodea, Slingbox, HP media smart server, Quartics STB	Best Buy	\$3.99 per title	14000+ standard
	Sears	All major studios	Several Blu-ray disc /TV set / Console and other Internet Set top box manufacturers	Sears Holdings Corp. (Owners of Kmart Stores)	N/A	N/A
	iTunes	All major studios	Apple TV	iTunes	\$0.99+ rentals per title	1500 + standard 100+ HD

Source: Webbmedia Group, Company reports

So far, OTT has had a relatively benign impact on the telco and cable video business. One reason is that OTT HD quality is inferior to that of Pay TV. Also, it is difficult to gain access to same content via OTT as Pay TV. Finally, content providers do not necessarily want to bill for content consumption, since cable MSOs and DBSs are doing this for them. If they were to bill customers directly, they would then have to invest in back office systems and customer support. The Pay TV ecosystem remains intact. Although OTT may not be disruptive to Pay TV model in the near-term, demographic factors may present a pressure on the Pay TV business over time as younger viewers are more comfortable accessing alternative content via OTT.

Small/Medium Business and Enterprise

Another focus area in the Wireline space would be the growing contribution of SMB and enterprise to Wireline revenues. Market opportunity: carriers we have spoken to estimate the small/medium enterprise opportunity at approximately \$75 billion, based on the demands of businesses up to 250 employees.

For the last few quarters, we have seen an increasing trend in higher revenue contribution from SMBs, they seemed to have taken to the value pricing that the MSOs and the telcos are currently offering. This is a trend we believe that is going to continue, a tiered pricing that offers value for money.

The MSOs expect to take a portion of the business services market share from the Telcos, who have predominantly controlled this segment. The exhibits below reflect how business services have fared as a percentage of revenues for Telcos and MSOs.

Exhibit 59: MSO Business Services as Percentage of Total Revenue

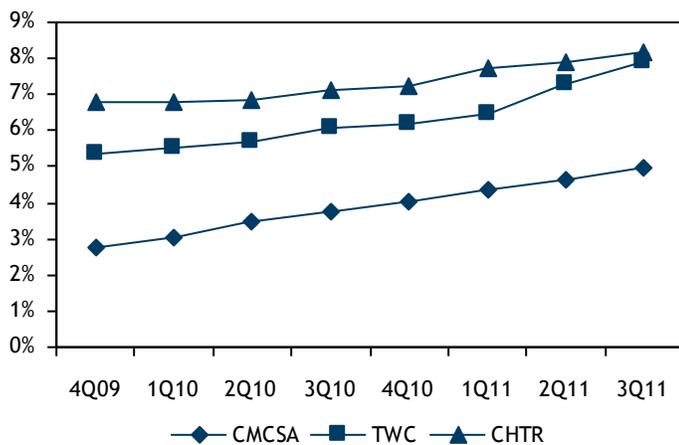
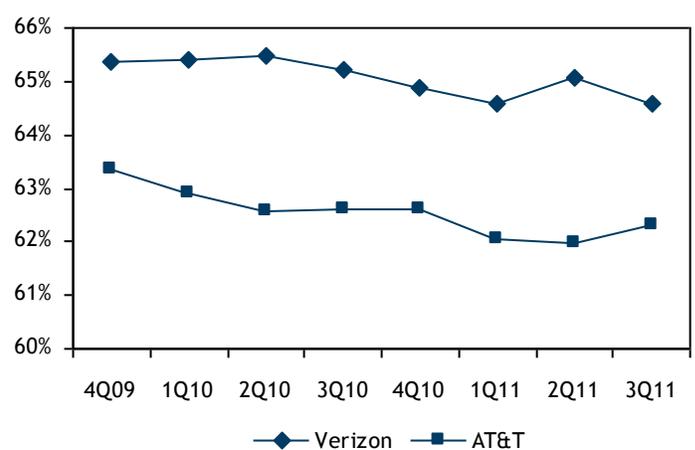


Exhibit 60: Telco Business Services as Percentage of Wireline Revenues



Source: RBC Capital Markets, company data

Tower Operators

Although the pace, unit metrics, and profitability of incremental wireless subscriber growth can be debated (given uncertainties around pricing, promotions, capex, churn and other variables) we have little doubt that substantial data-driven traffic growth will continue unabated for the foreseeable future. The tower sector represents a carrier-, technology-, device- and vendor-agnostic way to benefit from the strong demand for data from mobile devices. Keeping pace with demand will necessitate continued capital investment by the carriers, much of which will benefit towers, be it the buildout of additional spectrum or capacity, the densification of current networks, or the overlay of new technologies. While the pace of network investment varies by carrier, aggregate levels of new buildouts, capacity improvements, and maintenance spending have driven and should continue to drive annual US wireless capex in the low \$20-billion range (see prior Exhibits 1 and 6 for details). Recognizing this fundamental strength, and the high scarcity value of tower assets due to the difficulty of receiving zoning approval for new sites, tower operators rarely compete against each other on price, and have in fact been able to steadily increase the rent they charge their carrier tenants. In turn, by virtue of its fixed-cost model, the sector drives incremental margins of 75% or higher.

Landscape

The five largest independent US tower operators are American Tower, Crown Castle International, SBA Communications, Global Tower Partners, and TowerCo; the first three are the largest by asset and revenue base and are publicly traded. Exhibit 61 provides a snapshot.

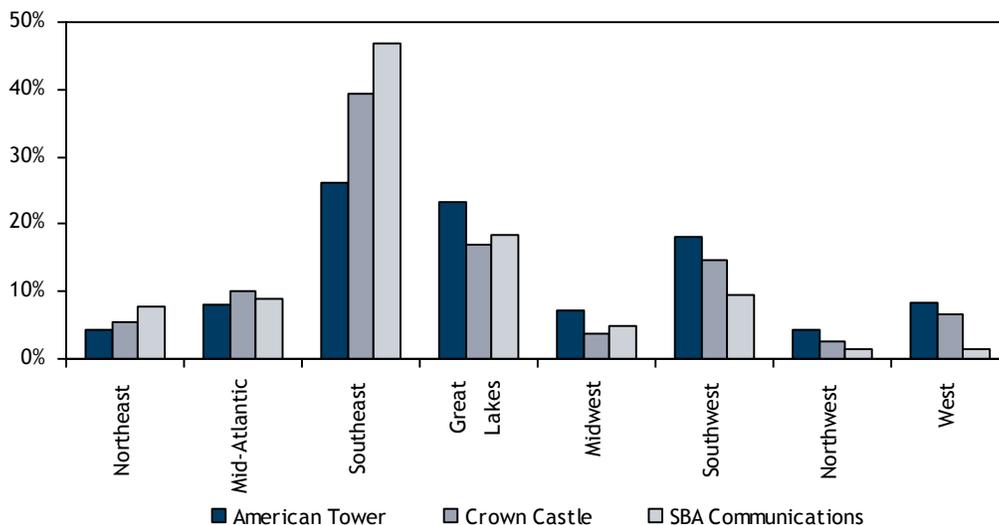
Exhibit 61: Tower Company Profiles

Company	Headquarters	Markets	Number of Towers	# of Rooftops
American Tower	Boston, MA	USA, Brazil, Chile, Colombia, Ghana, India, Mexico, Peru, South Africa, Uganda	USA-21,000, Asia-8,000, Mexico-2,800, Brazil-1,600, Chile-403, Colombia-1,600, Peru-500, South Africa-1,200, Ghana-2,000	USA-2,300
SBA Communications	Boca Raton, FL	USA, Costa Rica, Panama, Canada	USA - 9,400, International 400	3,800
Crown Castle	Houston, TX	USA, Australia, Canada	USA-22,200, Australia-1,600, Canada 100	<300
Global Tower Partners	Boca Raton, FL	USA, Canada, Mexico, Costa Rica	5,700	8,000
TowerCo	Cary, NC	USA	3,300	

Source: Company reports, RBC Capital Markets

The three publicly traded tower operators have fairly comparable geographic distribution, as depicted in the following exhibit, with SBA Communications and Crown Castle showing a slightly greater weighting toward the Southeast region.

Exhibit 62: Tower Geographic Distribution



Source: RBC Capital Markets, based on company data.

Much of the tower operators' growth has resulted from industry consolidation and the purchase of carrier-constructed towers under sale/leaseback transactions. American Tower and Crown Castle have each acquired, either through direct carrier transactions or acquisitions of other tower operators with carrier-centric portfolios, a substantial base of towers that were originally constructed by carriers. Exhibit 63 lists several of the major transactions that have shaped the current third party tower operators.

Exhibit 63: Major Tower and Related Transactions

Date	Seller	Buyer	Amount (\$)	Towers	Comments
January-12	Wireless Capital Partners	Crown Castle	\$500,000,000	2,300 locations	2,300 ground release related assets.
December-11	NextG Networks	Crown Castle	\$1,000,000,000	7,000 DAS nodes	Expected closing 2Q12; financing primarily through debt.
December-11	Telefonica Mexico	American Tower	\$500,000,000	2,500	
September-11	GS Cell Site Holding	Global Tower Partners		1,600 locations	1,600 ground lease and related interests.
September-11	Unison	American Tower	\$500,000,000	1,800 locations	1,800 ground lease related assets.
July-11	Millicom Colombia	American Towers	\$182,000,000	2,126	
June-11	Convergys/Cincinnati SMSA Towers	AT&T	\$320,000,000		
May-11	Leap Wireless	Global Tower Partners		130	Urban tower assets w/large presence in California, Arizona and Colorado.
April-11	Central States Tower	American Tower		170	28x TCF
September-10	CitySwitch, LLC	Global Tower Partners		450	
August-10	Telefonica Peru	American Tower		468	
July-10	New Path Networks	Crown Castle	\$115,000,000		Distributed antenna systems
June-10	Telefonica Chile	American Tower		287	
June-10	Reliance Towers	GTL Infrastructure	\$11,000,000,000	50,000	
June-10	Sierra Nevada Property Management	InSite Towers, LLC		40	
June-10	Roberts Towers	American Tower	\$88,500,000	164	
February-10	Essar Telecom Infrastructure	American Tower	\$433,600,000	4,450	
January-10	Millicom International Cellular	Helios Towers Ghana	\$50,000,000	750	
January-10	Aircell Towers	GTL Infrastructure	\$1,783,600,000	30,000	
December-09	DukeNet Communications	Global Tower Partners		141	19.0x TCF; located in eight states, including Ohio and the Carolinas; acquired at 68% of replacement cost.
December-09	Cincinnati Bell	American Tower	\$100,000,000	196	18.6x TCF; average 2.1 tenants/tower.
September-09	First Telecom	Diamond Communications	\$70,000,000	368	
	Towers of Texas	Global Tower Partners		137	
January-09	AT&T	Global Tower Partners	\$16,450,000	235	Nevada locations, mostly decommissioned AT&T sites.
October-08	Light Tower Wireless	SBA Communications	\$224,000,000	340	18.0x TCF multiple; towers located in 23 states with an average of 2.2 tenants/site and five DAS networks.
September-08	Sprint	Tower Co.	\$670,000,000	3,080	22.5x TCF multiple; 1.4 tenants w/capacity of three tenants. Mostly Sprint affiliate and Nextel sites.
September-08	OptaSite	SBA Communications	\$429,000,000	593	18.6x TCF multiple; towers located in 31 states, Puerto Rico and US Virgin Islands with an average of 2.4 tenants/tower.
August-07	Light Tower Holding	M/C Venture	\$290,000,000	345	
July-07	Southeast Towers	Diamond Communications		180	
July-07	Reliance Towers	Consortium	\$9,000,000,000	13,849	25.2x EBITDA
July-07	Global Tower Partners	Macquarie	\$1,427,000,000	2,500	24.4x EBITDA
May-07	National Grid US	M/C Venture and Wachovia Capital	\$290,000,000	350	
May-07	SunCom Wireless	Global Signal		169	
April-07	ANI Site Development	Global Tower Partners		241	18.8x multiple
April-07	National Grid Wireless UK	Macquarie	\$4,947,000,000	5,500	

Exhibit 63: Major Tower and Related Transactions (con't)

Date	Seller	Buyer	Amount	Towers	Comments
January-07	Global Signal	Crown Castle	\$5,730,000,000	10,659	22x multiple.
November-06	SunCom Wireless	SBA Communications	\$18,000,000	69	20x TCF multiple; 1.3 tenants on the towers with capacity of four tenants. Towers are located primarily in Carolinas.
October-06	Global Signal	Crown Castle	\$5,800,000,000	10,960	1.61 CCI shares or \$55.95 for each GSL share; RBC 2006 and 2007 site leasing revenue estimates: \$493 million and \$518.3 million; tower cash flow: \$272.3 million and \$290.3 million; EBITDA: \$238.6 million and \$258.9 million. Implies 2007 TCF and EBITDA multiples of 22.4x and 19.8x.
October-06	Clearshot	National Grid Transco		235	
May-06	Mountain Union	Crown Castle	315,000,000	500	468 towers and 79 towers under development; 4.6 years average age with high concentration in LA, Denver, Las Vegas and Phoenix. 468 completed sites should generate ~\$26 million of annualized site rental revenue and ~\$18.2 million of annualized tower cash flow (TCF).
April-06	AAT Communications	SBA Communications	1,002,000,000	1,855	1,855 tower sites have capacity of 4.5 telephony tenants, and as of 02/28/06 had actual use of 1.8 telephony tenants and 2.4 total tenants/tower. At 12/31/05, the telephony tenants represented approximately 91% of revenue on AAT's owned towers.
January-06	TCP Communications	Global Tower Partners		234	Includes 24 sites under development.
January-06	Towers of Texas	Global Tower Partners		137	
November-05	Mesa Communications	Global Tower Partners		222	78 of 222 towers located in Maine; 117 developmental sites.
October-05	SpectraSite	American Tower	3,100,000,000	7,800	All-stock transaction valued at 20x EV/EBITDA; 15x EV/TCF; and 26x EV/opFCF
October-05	TRM	Global Tower Partners		3676	13.8 avg.
August-05	TrinTel	Crown Castle	145,000,000	467	16x TCF
July-05	Leap Wireless	Mountain Union		143	
June-05	Triton PCS	Global Signal	55,100,000	169	Located primarily in Charlotte, Raleigh, and Greensboro, NC with additional sites located throughout North and South Carolina and Puerto Rico.
June-05	Dobson Cellular	Global Triad	77,000,000	507	Sold through two subsidiaries - American Cellular (204 towers - \$35.1 million in Kentucky, Michigan, Minnesota, New York, Ohio, Oklahoma, Pennsylvania, West Virginia and Wisconsin) and Dobson Cellular (359 towers - \$52.4 million in Alaska, Kansas, Maryland, Minnesota, Missouri, New York, Ohio, Oklahoma, Pennsylvania and Texas).
June-05	Various	American Tower	43,900,000	182	
June-05	Various	American Tower	14,600,000	84	
June-05	AAT Communications	SBA Communications	644,000,000	1,850	
June-05	Various	SBA Communications	75,300,000	339	
June-05	Mesa Communications	Global Tower Partners		227	
May-05	Sprint	Global Signal	1,202,000,000	6,397	14.1x TCF.

Exhibit 63: Major Tower and Related Transactions (con't)

Date	Seller	Buyer	Amount (\$)	Towers	Comments
May-05	SprintSites	Global Signal	1,200,000,000	6,600	32-year lease with terminal-year buyback provision for \$2.3B.
April-05	Foresite	Global Signal	30,000,000	172	Alabama, Georgia, Mississippi and Louisiana and other Southeast regions. 11.7x TCF.
April-05	Blackstone Group	Global Tower Partners		642	
April-05	Foresite	Global Signal	33,000,000	172	
March-05	Cricket	Mountain Union	18,000,000	142	Lease back space at \$1,500/month for 10 years.
February-05	Triton	Global Tower Partners		169	
September-04	Golden State Towers	Global Signal	63,000,000	207	Located primarily in California, Oregon, Idaho, Washington, Nevada and Arizona.
July-04	Lattice Communications	Global Signal	115,000,000	235	The majority of the towers are located in Indiana, Ohio, Alabama, Kansas and Georgia.
July-04	NTLI	unannounced	1,860,000,000	2,000	Proposed sale of TV and wireless towers.
June-04	Crown Castle	National Grid Transco	2,035,000,000	3,500	2.9 tenants/site; \$134 million of revenue in 2003, and 11x EBITDA multiple sale price.
April-04	Titan Towers	Global Tower Partners		260	
March-04	Signal One	AAT Communications	91,000,000	226	Located in four states - Tennessee, Alabama, Mississippi & Georgia (including 226 owned and 199 managed sites).
May-04	US Unwired	AAT Communications	11,000,000	87	Located in six states - Arkansas, Alabama, Mississippi, Florida, Louisiana & Texas.
October-03	SBA Communications	AAT Communications	193,000,000	801	Located in western US, Michigan and Wisconsin.
June-03	Ubiquitel PCS (VIA Wireless)	Golden State Towers	11,500,000	100	Located in central valley California.
June-03	Centennial Communications	AAT Communications	27,500,000	158	Located in six states - Indiana, Michigan, Louisiana, Texas, Mississippi & Ohio.
January-02	NTELOS	American Tower	23,800,000	70	Located in Virginia.
March-01	TeleCorp PCS	SBA Communications	66,500,000	203	Located in Midwest & Southeast.
February-01	Vodafone	SpectraSite	108,700,000	302	Located in California.
January-01	US Unwired	SBA Communications	40,000,000	127	
December-00	Alltel	American Tower	675,000,000	2,193	
August-00	SBC	SpectraSite	1,562,000,000	3,900	
February-00	AirTouch	SpectraSite	155,000,000	430	
November-99	GTE	Crown Castle	906,000,000	2,300	
September-99	AT&T Microwave	American Tower	260,000,000	1,942	
August-99	AirTouch	American Tower	800,000,000	2,100	
July-99	BellSouth	Crown Castle	317,000,000	773	
March-99	Powertel	Crown Castle	275,000,000	650	
March-99	Bell South	Crown Castle	610,000,000	1,850	
February-99	Nextel	SpectraSite	630,000,000	2,000	
December-98	Bell Atlantic	Crown Castle	447,000,000	1,427	

Source: Company reports, RBC Capital Markets

With respect to M&A transactions in the tower space, the most meaningful synergies are overhead (the vast majority of SG&A of the acquired tower operator can be consolidated) and financing (the acquired assets can be refinanced using the acquirer's often lower cost of capital). There are virtually no site-level synergies. As a result, most tower transactions are negotiated in terms of tower cash flow (TCF), which is essentially site leasing gross margin. As seen in the above exhibit, the range of private market TCF multiples typically varies between the mid-teen and low 20x range.

Despite the wireless carriers' migration since the mid-1990s to relying on third-party rather than owned communications sites, there are a significant number of carrier-owned towers, which could, especially in the case of T-Mobile USA, provide M&A fodder for the independent tower operators. This chart summarizes the major carrier owned tower portfolios.

Exhibit 64: Carrier-Owned Towers

AT&T	11,000
Sprint	negligible
T-Mobile USA	7,000
Verizon	10,000- 11,000

Source: Company reports, RBC Capital Markets

The following exhibit provides a breakdown of US towers by type of ownership.

Exhibit 65: Commercial Towers

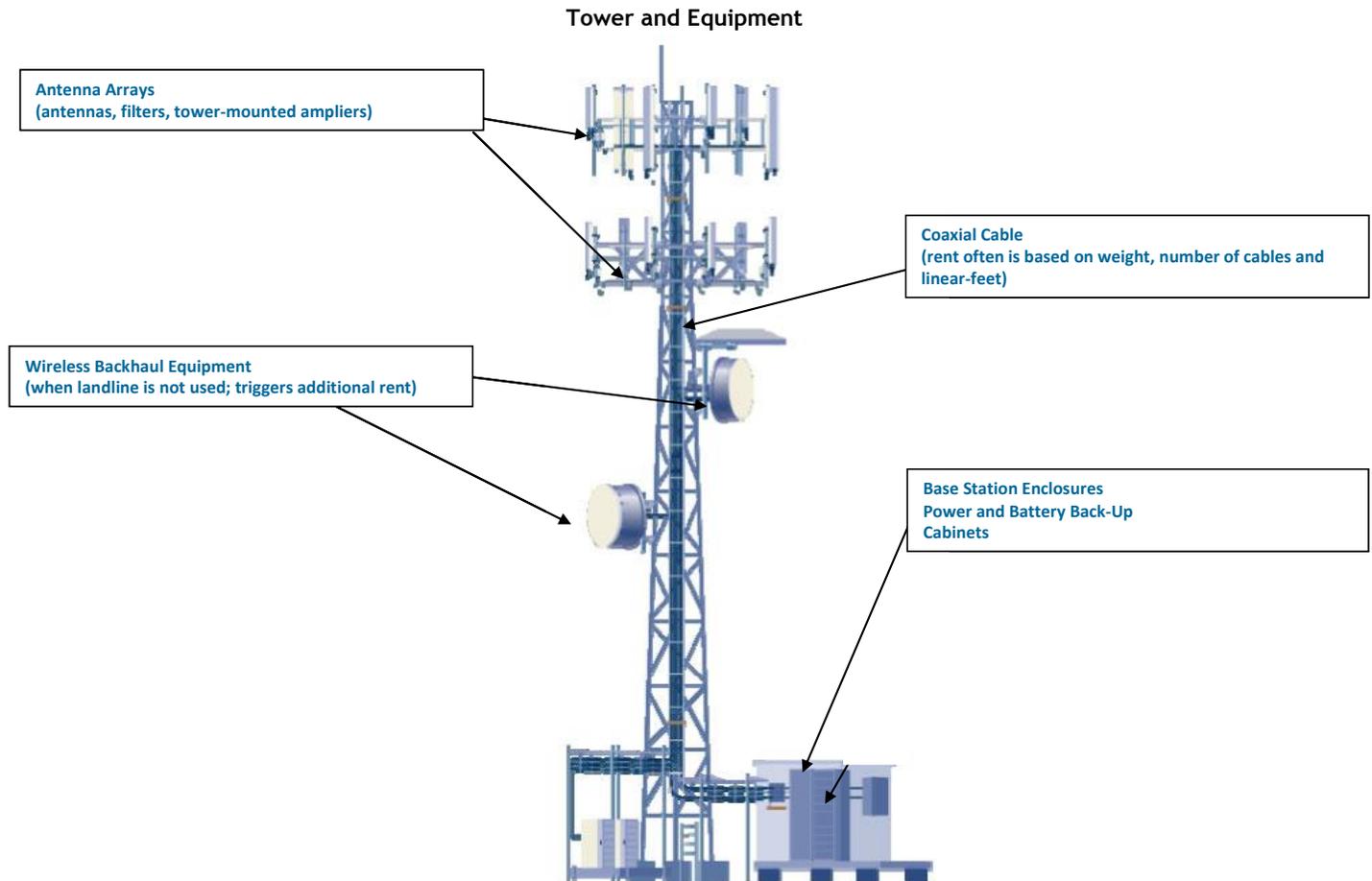
	Category size	Number of Companies	Number of Towers	Percentage of Market	Average Inventory
Major	2,500>	6	60,965	54.3	10,161
Mid-Tier 1	2,499-100	45	7,345	6.5	163
Mid-Tier 2	99-10	508	21,652	19.2	43
Mom & Pop	10<	6,480	22,543	20.0	3
Total		7,039	112,505	100.0	

Source: Biby Publishing

Tower Basics

The tower model is highly scalable, with long term customer contracts with built-in escalators, a predominately high-credit customer base, and overwhelmingly fixed site-level and overhead costs that result in 90%+ incremental margins. Moreover, towers provide a mission-critical service to their carrier customers, which results in timely receipt of rent, even from customers that are experiencing business difficulties. Carriers experiencing financial challenges realize that their monthly cash flows depend on running a live network, whose essential elements are situated on towers. For this reason, contract terminations are typically 1% or lower per year.

Exhibit 66: Representative Tower



Source: RBC Capital Markets

A representative US tower entails the following illustrative unit economics:

- Initial capex: \$250,000 to \$300,000, depending on location height, type of tower, and other factors.
- Revenues: ~\$20,000 per year per tenant, but this can vary significantly depending on lease specifics and local market conditions. A typical lease provides the carrier the right to place an antenna array at a specific height on the tower, a base station on the ground at the base of the tower, and vertical cabling along the tower to connect the radio with the antenna. Most leases are specific with regard to the number of antenna panels, the amount of allowable ground space to be occupied, the number of lines, and other matters. Occasionally, the anchor tenant pays a slight premium vs. subsequent tenant rents. The initial lease terms are five to ten years, with several five-year auto-renewal cycles. The rent escalates at 3.5% per year (though higher under some of the recent MLA amendments). The tenant must pay an early-termination fee in the (unlikely) event of churn equal to the cash value of the remaining term.
- Expenses: ~\$14,000 per year, though this can vary by market and location. Roughly two-thirds of this amount is the ground lease (what the tower owner pays the ground owner); the remainder consists of items such as taxes, insurance, and maintenance. Ground leases usually escalate at ~3% per year. In cases when the tower company owns the underlying land (roughly 25% to 30% of public company towers, and increasing gradually each year as tower operators deploy their free cash toward ground purchases), ~\$10,000 of opex is removed from the cost structure, significantly enhancing margins.
- Ongoing capex: This is roughly \$1,000 per year, or less. It consists of routine inspections and repairs around the perimeter area and ground plot. On most steel towers constructed for collocation, it is rare for actual maintenance of the structure to be necessary.
- Augmentation capex: Occasionally, to accommodate a new tenant, a tower requires augmentation. Capex varies greatly, but it is not uncommon for this to range from \$20,000 to 50,000. Importantly, this cost is often borne in part or in full by the additional tenant as this is cost and time beneficial from a carrier perspective versus constructing an entirely new site.

The following table illustrates the returns for a “plain vanilla” US tower.

Exhibit 67: Illustrative Per-Tower Economics (US)

<u>New Build</u>		<u>Number of Tenants</u>			
			1	2	3
Capex	\$250,000				
Rent/tenant	\$20,000	Revenues	\$26,000	\$46,000	\$66,000
Ground lease	\$10,000	Ground lease	\$10,000	\$10,000	\$10,000
Other Opex	\$4,000	Other opex	\$4,000	\$4,000	\$4,000
Maintenance capex	\$750		\$750	\$750	\$750
Operating margin(leased land)			46%	70%	79%
Operating margin (owned land)			85%	91%	94%
Recurring FCF margin			43%	68%	78%
ROIC			5%	13%	21%
<u>Augmentation</u>		<u>Carrier Contribution</u>			
Capex	\$45,000		0%	50%	100%
Incremental rent	\$20,000	ROIC	44%	89%	highest

Source: RBC Capital Markets estimates

A single-tenant tower may generate mid single digit returns, but this increases significantly once tenancy levels reach two or higher given the substantial operating leverage in the business. At international sites, the cost structure and typical tenant leases differ from the above illustration. In several Latin American markets, for instance, ground-lease expenses are passed through to tenants.

Non-Core Revenues

Non-core revenue streams for tower operators include rooftop and other site management, and various types of services such as site development, structural engineering, and construction. The rooftop business typically entails a revenue share with the building owner and provides comparatively low margins. The services businesses are non-recurring in nature and typically provide substantially lower margins than site rental. Neither of these lines of business is typically a meaningful valuation driver for towers compared to the site-rental business, but they do provide an opportunity for the operators to forge closer relationships with their carrier customers.

Tenant Composition

Independent tower operators receive the majority of their revenues from the major carriers as well as select regional operators, government agencies, and local operators. The following chart provides an overview of the major tenants of the publicly listed tower operators.

Exhibit 68: Tenant Revenue Distribution

<u>American Tower</u>		<u>Crown Castle</u>		<u>SBA Communications</u>	
Domestic wireless	81%	Domestic	96%	Domestic	96%
AT&T Mobility	20%	Sprint Nextel	20%	AT&T Mobility	22%
Sprint Nextel	13%	AT&T Mobility	23%	Sprint Nextel	22%
Verizon Wireless	12%	Verizon Wireless	20%	Verizon Wireless	16%
T-Mobile	7%	T-Mobile	11%	T-Mobile	11%
Domestic (other commercial wireless)	11%				
Domestic broadcast	4%				
Domestic other	4%				
International	29%				
(incl. 7% each Mexico, Brazil, India)					

Note: Sprint leasing exposure is more iDEN-centric for American Tower (because of its SpectraSite acquisition) and CDMA-centric for Crown Castle and SBA Communications. Apart from the commercial mobile providers, tower tenants include federal, state and local government agencies, and businesses such as utility, construction, courier, taxicab and private transportation companies. Source: Company reports, RBC Capital Markets

Barriers to Entry

Zoning, environmental permitting, and factors differ by state and municipality, but they often represent a significant limitation on new site construction and can represent multiple quarters, even years, of effort. This, in turn, enhances the value of existing communications sites. As a result, before committing capital, a tower owner typically requires a commitment from one or more customers in order to justify the time and investment required to receive zoning approval and construct a site.

Demand Drivers and Leasing Outlook

Site-leasing demand differs according to carrier need: emerging businesses usually require rapid coverage, while mature businesses will choose to deploy sites to address fill-in capacity or augment existing sites in order to utilize newly acquired spectrum licenses. Finally, technology overlays (e.g. the migration from 3G to 4G technology) present a rich source of revenues from amendments to existing leases.

We believe the closest comps to the tower sector are real estate (the sector has supported two REITs: Global Signal and its predecessor company Pinnacle, and newly converted American Tower) and outdoor advertising. However, we believe the tower sector enjoys fundamentally greater stability and organic growth due to long-term contracts, low churn, negligible customer-acquisition expense, and steady to increasing unit rent.

Investor Concerns

Increasing Carrier Use of Non-Tower Infrastructure

Towers are a primary but by no means all-encompassing tool for addressing carrier network coverage and capacity needs. Operators have routinely used alternative infrastructure such as rooftops water tanks, utility poles, microcells, DAS, and other infrastructure over the past decade. To an extent, the tower companies have positioned themselves to participate in this growth through their ongoing rooftop operations and DAS subsidiaries or investments.

Smaller RF architectures (femtocells, microcells, DAS) are an increasing trend in wireless infrastructure. Of the micro architectures used by carriers, femtocells are potentially more meaningful than other methods since they can be deployed by the end-user subscriber to provide better signal. In the consumer market, customer-deployed femtocells, in principal, could drive a greater weighting of mobile traffic toward wireline networks, but the consumer market for femtocells is the slowest-growing segment within that market, and price points are a significant barrier to broad scale customer adoption. Femtocell appears more likely to be deployed in enterprise settings, augmenting or competing with in-building systems.

WiFi Offload

Investor concerns have also arisen with respect to the impact of WiFi, which alleviates capacity on cellular networks and provides fast data rates as long as the WiFi access point is connected to a high-speed link to the Internet. However, there are distance limitations (roughly 30 to 40 meters, depending on the WiFi frequency used), WiFi utilizes unlicensed spectrum (raising interference and quality concerns), and carriers usually do not maintain the WiFi infrastructure, making it an unreliable offload option. Cisco data suggest that offload to WiFi or femtocells in the U.S. may reach 30% of mobile traffic by 2015, up from 23% at present. This comparatively modest increase in the portion of traffic offloaded should be more than offset by the increasing number of devices and overall traffic volumes.

Carrier Consolidation

One relative disadvantage of tower companies relative to other sectors is tenant concentration. As we illustrate in Exhibit 68, the established national carriers represent the lion's share of incremental and existing site-leasing revenues. This raises the commonly asked question of the impact to towers from carrier consolidation. The two mergers involving national carriers, Cingular's acquisition of AT&T Wireless in 2004 and Sprint's acquisition of Nextel in 2005, provide a strong indication that the impact on the existing tower revenue base is negligible. The most intuitive reason for this is that mature wireless networks typically are operated at capacity and close to full utilization of their existing spectrum and deployed infrastructure. Thus, when two carriers merge (as was the case in these two examples) there was minimal opportunity to consolidate cell sites and terminate leases. This was double the case for Sprint Nextel due to the disparate and incompatible technologies used by the two companies (CDMA and iDEN). The most significant fundamental impact of carrier consolidation is that it reduces the future opportunity for technology overlays as one integrated deployment (post merger) would displace the (pre-merger) opportunity for two duplicative deployments.

Once the carrier deploys radio and other equipment (base station, antenna, cabling, backhaul, and utility) at a cell site, this becomes an integral part of the network (see Exhibit 45). Thus, it is highly unlikely to displace this equipment to a nearby site (if one even exists) due to a combination of factors: risk of network disruption; early-termination fees; and cost of moving the gear. This explains carriers' interest in signing long-term leases (they do not want to be displaced at the tower site by a potentially higher-paying customer) and low churn rates.

Ground-Lease Aggregators

There is a risk that a ground owner may raise the rate paid to tower owners upon renewal of the ground lease. However, this risk has proven to be modest given the extreme fragmentation of ground leases and the long-term nature of such leases. Well over 90% of US tower ground leases are owned by separate entities, and attempts to consolidate them under single ownership have demonstrated little impact given the highly time-consuming process of contacting individual land owners and agreeing to terms. Moreover, each tower company has its own program for contacting ground owners and is a competing buyer of these assets (or can offer to extend ground leases on favorable terms).

Recently, three tower operators have purchased the interest of major land aggregators. In January 2012, Crown Castle announced the purchase of 2,300 ground lease-related assets from Wireless Capital Partners for \$180 million in cash and the assumption of \$320 million of debt. The portfolio reportedly includes approximately 2,300 ground lease-related assets, including more than 150 related to Crown Castle towers, and generates annual cash flow of approximately \$42 million, with 80% from the four national carriers. The acquisition is expected to close in the first quarter of 2012. In September, American Tower announced the purchase of ~1,800 ground leases for \$500 million. The majority of these leases are at locations under carrier-owned towers, with the remainder spread across a range of tower-company assets. As well, Global Tower Partners announced the acquisition of GS Cell Site Holding, representing ~1,600 ground leases and rooftop and land leaseholdings. The other major remaining company (yet to be acquired) that is active in ground-lease aggregation is TriStar Investors.

While the majority of assets the tower companies purchased in these transactions were under non-owned towers, they represent a solid source of real estate income and a potential tool in the future for trading (e.g. leases under non-owned towers for leases under owned towers).

Related Revenue Opportunities

Over the past 15 years, tower operators have explored to varying degrees additional revenue opportunities such as wireless backhaul, shared power infrastructure, various technical services, DAS (discussed in the following section), and even the purchase of spectrum for a one-way video network (Crown Castle's Modeo project). The principal ancillary revenue stream is installation-related services, in which the tower operator deploys the cell-site equipment on behalf of the carrier.

Distributed Antenna Systems

Distributed antenna systems (DAS) represent a focused way of enhancing network coverage. They consist of individual antennas placed, usually a low elevation relative to the wireless subscriber, within a venue (stadium, hospital, mall, casino, or other structure, in the case of indoor DAS) or along a city block or travel corridor (often mounted on utility or light poles, in the case of outdoor DAS). A key difference between DAS and microcells is that the base-station radio is a single unit connected via fiber to the DAS antennas, and can be located at a remote site because of the minimal signal loss over fiber. Microcells, in contrast, require radios to be collocated near each antenna.

Carriers consider distributed antenna systems (DAS) an effective capacity-offload option as well as a solution for indoor coverage and coverage in difficult to zone outdoor areas. Compared to towers, DAS deployments are usually more expensive and complex to deploy.

DAS installations have been deployed widely since the late 1990s for indoor applications, and since the early 2000s for outdoor applications, and are an increasing part of the carrier toolkit for addressing network coverage and capacity requirements, particularly in difficult-to-zone areas where a macro tower is not feasible.

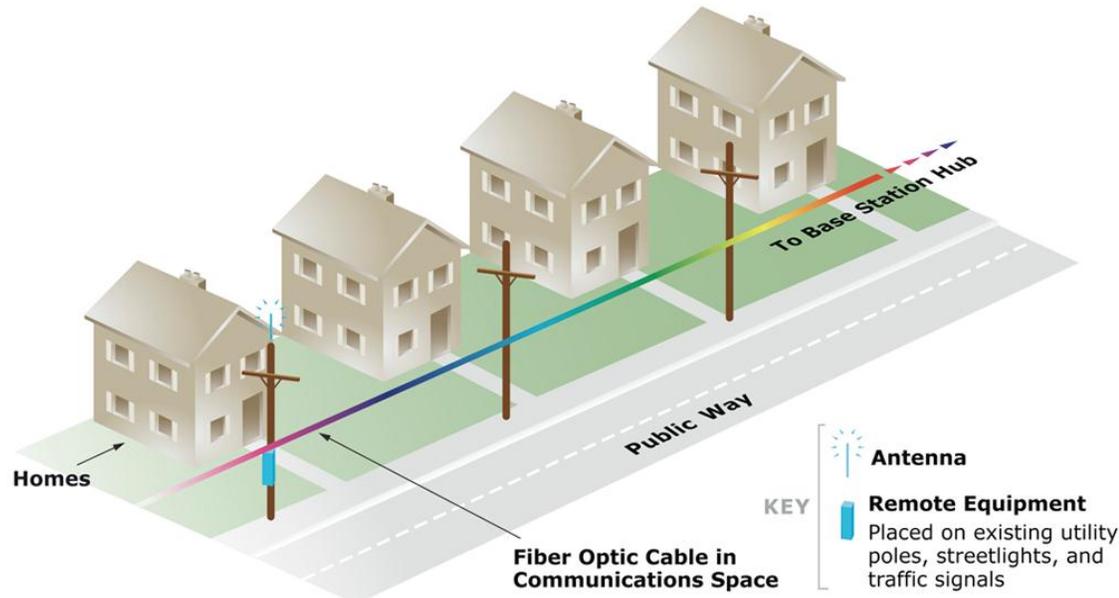
In contrast with other micro architectures, such as microcells, DAS provides the benefit of base-station hubbing, reducing the recurring expense associated with operating, powering, and maintaining multiple individual micro (or macro) cells.

DAS can help carriers speed their time to deployment and provide a more easily upgradeable RF infrastructure because of the centralized base station. They can also provide transport efficiencies through consolidated fiber backhaul (many outdoor DAS operators use fiber and are registered as CLECs). Finally, they can support faster and easier network extension as adding an access point is generally faster and less costly than cell-splitting.

With a fiber fed distribution infrastructure, technologies such as LTE, WiFi and others can be deployed more quickly over existing DAS installations, in contrast to the more costly and time-consuming fork-lift or replacement of equipment at multiple individual tower sites.

The benefit of a base-station hotel means that carriers can deploy newer technologies rapidly via plug-and-play upgrades.

Exhibit 69: Distributed Antenna System



Source: NextG Networks

Indoor DAS

American Tower, by virtue of its acquisition of SpectraSite, has a larger presence in the indoor DAS segment than its tower peers. The company has significant deployments in casinos, shopping malls, and other buildings. In some of the legacy SpectraSite installations, we believe tenancy levels have reached four carriers. As there are generally few options for providing competitive in-building coverage, we believe indoor DAS tenancy levels range between two at the low end to four or higher on the high end. Other areas where indoor DAS has seen significant adoption include convention centers, sports venues, airports, and tunnels. Because each building floor or corridor segment generally houses a node, power output is low, thereby preventing interference and proving greater spectral efficiency.

Exhibit 70: Indoor DAS Installation



Source: Powerwave (hotel ceiling) and Connectivity Wireless (nodes in closet).

Outdoor DAS

Outdoor DAS installations have been deployed in a variety of settings, including downtown areas, historical districts, and difficult-to-zone neighborhoods and travel corridors with pinpoint coverage needs or where obtaining zoning approval for a conventional tower is prohibitive. Because the DAS antenna elements are positioned as individual nodes on low-elevation structures rather than as highly

visible arrays (as on towers), zoning authorities that are resistant to towers are often more amenable to DAS because of their aesthetic advantages.

Outdoor DAS operators are typically registered as CLECs in order to enhance options for providing fiber backhaul from the access points to the base-station hotel.

In some metro areas, it is easier to obtain construction approval for DAS installations than for other solutions. As a rough comparison, a macro tower site in an urban area would require three to seven DAS nodes to provide additional coverage.

Pricing for DAS installations varies widely depending on the capital contribution by the carrier. We have seen monthly pricing that equates to roughly \$500 to 1,000/node per month, depending on the capital contribution. Unlike towers, DAS deployment costs differ significantly from installation to installation depending on location and complexity. Factors that contribute to premium pricing for DAS installations include: 1) backhaul efficiencies; 2) avoidance of cell-site maintenance at multiple locations; and 3) more cost effective future expansion (node addition instead of cell splitting).

Cost elements for a DAS deployment include base-station equipment, network backhaul, and power, which are a similar scale as for towers. DAS cost items that differ significantly versus conventional towers include fiber deployment costs, which vary considerably depending on whether the fiber is aerial or buried; pole-attachment costs (roughly \$30 to \$80 per month per node); maintenance costs (more relevant for outdoor than indoor installations), and power and installation costs for each node.

Crown Castle is the US leader in the outdoor DAS segment, with roughly 8,000 DAS nodes, by our estimation, including the NextG acquisition. The company has consistently led its tower peers in outdoor DAS capabilities, but enhanced its scale considerably with the acquisition of Newpath Networks in 2010, followed by the acquisition of NextG Networks in December 2011.

Exhibit 71: Urban Outdoor DAS Deployment



Source: NextG Networks

Shared Power Infrastructure

Shared power solutions, such as back-up generators, have been offered to varying degrees since the inception of the tower industry. This set of services has not grown meaningfully, but American Tower recently has made a push in this direction, with AT&T agreeing

to act as the anchor tenant on many of the shared generators that American Tower is deploying. Generator use (often carrier deployed) has become more common during the last decade as carriers seek to “harden” their cell sites and ensure service continuity during outages. We believe typical monthly rent levels are in the mid \$400 range.

Site-Leasing Trends

We project an increase in 2012 site-leasing demand to 19,400 lease equivalents industrywide, up from an estimated 18,500 in 2011. 2012 site leasing demand drivers remain AT&T and Verizon, with a significant ramp by Sprint and some incrementally higher contributions from T-Mobile and Clearwire. While the higher 2012 leasing contribution should benefit all tower operators, SBAC, followed by CCI, should experience a more significant benefit to reported site-leasing revenues from increased US activity in 2012. AT&T leasing contributions are already contemplated in American Tower and Crown Castle revenue escalators from the 2010 master lease agreements (MLAs). Sprint Network Vision leasing contributions at its current frequencies are reflected in American Tower MLA escalators and partially reflected in minimum commitments to SBA Communications under its MLA. Tower revenue contributions from all other carriers (as well as SBA contributions from AT&T, and Sprint contributions from Crown Castle) should be more usage based, reflecting actual activity levels rather than recent escalator or straight-line adjustments.

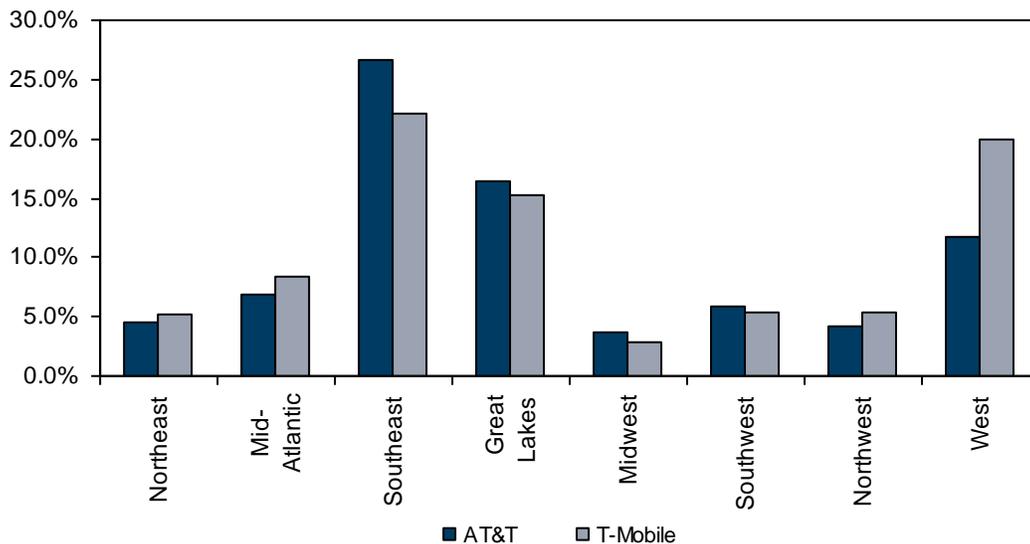
Exhibit 72: Wireless Cell Site Addition Estimates

Carrier	2004 adds	2005 adds	2006 adds	2007 adds	2008 adds	2009 adds	2010 adds	2011 adds	2012 adds	Comments
AT&T new sites	2,950	3,900	2,900	930	1,454	1,889	1,822	2,450	1,500-1,800	AT&T has selected vendors for next stage of turfing project, and remains active on 4G/LTE and 3G overlays. In 2012, LTE overlays should contribute ~80% of aggregate overlays, followed by UMTS first-carrier deployments.
AT&T lease equivalents added from overlays	860	2,200	6,500	1,875	2,500	1,400	2,200	6,200-7,600	4,100-5,700	
T-Mobile new sites	2,095	3,500	3,299	2,500	3,359	3,062	2,236	1,000	1,100	Roaming overbuild site leasing is gradually ramping. 2012 priorities, should T-Mobile remain independent, include roaming overbuild, capacity enhancement, and LTE preparations. Our projections may prove optimistic should T-Mobile be acquired or not make
T-Mobile lease equivalents added from overlays				2,000	2,000	2,792	1,381	750	1,400	
Verizon Wireless new sites	1,500	2,647	2,642	2,418	2,426	1,600	327	1,100	1,050	Focus remains LTE, with increased overlay ratio to keep up with capacity demands.
Verizon Wireless lease equiv. added from overlays	2,500	2,500			200	1,750	2,400	2,500	2,500	
Sprint Nextel new sites	5,875	4,900	3,400	1,450	920	175	230	400	300-600	Preliminary network modernization work in under way in select markets. Network Vision project could drive ~15K amendments in 2012. Repurposing of iDEN sites to CDMA is a growing emphasis in 2012. Markets slated for completion in late 2012/early 2013 incl
Sprint Nextel lease equivalents from overlays				1,338	420	-	125	500	3,250-5,100	
Alltel	550	500	600	300	500	-	-	100		Early stages of an LTE network build at former Alltel properties acquired by Atlantic Tele-Network, but work not yet released.
Cox						200	150	-		
US Cellular	672	572	500	420	400	402	366	500	300	Includes customary ~300 site additions plus LTE overlay impacts on leased towers
Clearwire new sites	200	400	783	1,045	1,000	4,175	9,500	1,500		Company plans to overlay LTE at 8,000 of its 16,700 sites. LTE overlays may trigger amendment revenues at a portion of Clearwire's sites. Antenna/cabling implications of the LTE overlay vary by market and equipment vendor.
Clearwire lease-equivalents from overlays						130	150	300	1,300	
Leap Wireless	100	2,800	3,600	700	2,700	2,200	150	100	100	Incremental site additions and capacity enhancement. Initial testing of LTE at AWS frequencies in Arizona.
Metro PCS	460	315	500	1,100	1,850	1,100	150	300	200	2012 projects include 3G capacity enhancement (unlikely to trigger amendment revenues) and backhaul enhancement.
MetroPCS lease equivalents from overlays							150	150	200-400	
LightSquared										Company has shut down its trial markets and not commenced leases. Meaningful deployment via Sprint 4G network sharing appears doubtful pending additional investment.
TOTAL	17.8K	24.2K	24.7K	16.1K	19.7K	20.9K	21.3K	17.9K-19.3K	17.3K-21.6K	2012 site leasing demand drivers remain AT&T and Verizon, with a significant ramp by Sprint and some incrementally higher contributions from T-Mobile and Clearwire overlays. Carrier MLAs with the major towercos may affect the reported growth rate in site

Note: Lease equivalents from overlays are based on assumptions that UMTS and LTE overlays trigger partial leases based on additional or replacement antennas and additional cabling. Source: Company reports, RBC Capital Markets estimates

AT&T: We expect >1,500 new site additions and >16,000 LTE deployments during 2012. AT&T has selected vendors for the next stage of its turfing project, and remains active on 4G/LTE and 3G overlays. In 2012, LTE overlays should contribute ~80% of aggregate overlays, with a significant balance (~20%) consisting of UMTS first-carrier deployments. Additional carrier deployments generally do not entail additional equipment at the tower that would trigger rent amendments. Our forecast does not contemplate the potential use of S-band spectrum (e.g., if AT&T were to acquire spectrum from, or purchase, DISH), which may trigger extra revenues not foreseen by the carriers' existing lease agreements because of additional equipment and/or propagation at a hitherto unused frequency. Below, we provide a geographic distribution of comparison of AT&T and T-Mobile's cell sites.

Exhibit 73: Cell Site Distribution by Geography (AT&T and T-Mobile)



Source: RBC Capital Markets estimates

T-Mobile: After a significant slowdown in network activity following the announcement of the AT&T transaction in early 2010, we have noticed a resumption of increased roaming overbuild activity (primarily in suburban/rural areas and travel corridors in the central and Western states). Should T-Mobile remain independent, we believe there is a significant possibility it would utilize its \$3B cash receipt as part of the negotiated break-up, as well as potentially additional cash (\$2.5-\$3B) from the proceeds of a tower sale, toward network enhancement, including LTE deployment. It is also possible the carrier could pursue partnership opportunities (e.g. LTE network sharing with Sprint, which would trigger additional leasing revenues for the towercos) or other strategic options.

Verizon: Verizon's focus for 2012 remains LTE, with an increased overlay ratio of 700-MHz LTE equipment on 850/1900 MHz EV-DO/CDMA sites to keep up with capacity demands. We continue to see steady levels of activity consistent with prior periods.

Sprint: Network modernization work has commenced in several markets. Thus far we are aware of no significant delays vs. plan. The Network Vision project could drive ~15K amendments in 2012. Repurposing of iDEN sites to CDMA is a growing emphasis in 2012. Markets slated for completion in late 2012/early 2013 include Kansas City, Houston, San Antonio, San Francisco, Chicago, Dallas, and Atlanta. Backhaul availability will be an important determinant of the project timeline. Of note, Sprint plans to deploy the full scope of Network Vision activities (CDMA capacity enhancement, and LTE overlay) in markets where Clearwire embarks on its LTE overlay. The table below provides a summary of Sprint's planned completion of major markets for LTE.

Exhibit 74: Sprint Network Vision - Market Timeline

City	Estimated Completion date
San Antonio	early 3Q12
Dallas/Fort-Worth	late 3Q12
Atlanta	early 3Q13
Baltimore	late 1Q14
Houston	late 1Q13
Kansas	early 4Q12
Washington DC	late 4Q14
Los Angeles	late 4Q14
Boston	late 3Q14
New York	late 4Q14
Chicago	early 2Q13
San Francisco	early 3Q13

Source: RBC Capital Markets estimates

Clearwire: The company plans to overlay LTE technology on 8,000 of its 16,700 sites during 2012-2013. These may trigger amendment revenues at a portion, perhaps two thirds, of the affected sites, requiring antenna, cabling, and/or radio swaps to accommodate the new technology. In prior quarters, Clearwire swapped equipment at roughly one third of its sites, mostly older locations, that allow it to accommodate LTE at such locations without amendment triggers.

Leap Wireless: In some markets, we are seeing lease terminations at corridor sites, which are being offset by new infill sites within the same core market. We believe LTE deployments and a slight increase in new site leases could drive more activity during 2012, but on a modest scale (hundreds of sites) relative to the national carriers.

MetroPCS: 2012 projects include infill sites, 3G capacity enhancement (unlikely to trigger significant amendment revenues), and backhaul enhancement.

The following exhibit summarizes the 4G deployment timelines of various carriers.

Exhibit 75: Carrier 4G Deployments

	2010	2011	2012	2013
Verizon	LTE networks launched covering 110 million POPs.	LTE network expanded to 200M POPs	Nationwide LTE coverage complete.	
AT&T	Initial LTE trials	LTE market launches covering 75M POPs		Nationwide LTE buildout by YE13
T-Mobile	HSPA+ 21 covered 200 million Pops	HSPA+42 to begin in 2011 upgrade to cover 140million Pops by YE11	HSPA+84 upgrade is being considered for a potential 2012 deployment	
Clearwire	WiMax coverage to 118M POPs	WiMAX coverage expanded from 118M to 130M POPs	Overlay of 8,000 cell sites with LTE over two-year period 2012-2013	
Sprint	Resell of Clearwire WiMAX capacity.	Network Vision: announced in Dec 2010, plans to spend \$5 billion strategy in 2011, anticipate completion by 2016		
Metro PCS	LTE network deployed in Las Vegas, Dallas/FW, Detroit, LA, Philadelphia in 2H10	LTE launched in all major metro markets.	Introduction of voice-over-LTE handsets.	
Leap Wireless		LTE launched in Tucson.		2/3 LTE footprint coverage planned.
US Cellular		Initial market completed in 4Q11.	Initial 4G LTE device to launch 1Q12.	

Source: RBC Capital Markets, company data

Highlights of Tower Company MLAs

Following are the highlights our research has uncovered of some of the recent master lease agreements (MLAs) that have been entered into by tower operators with the national carriers.

AT&T

AT&T's MLAs with AMT and CCI, signed in 2010, are similar in nature in that they reset the leases to 2011 and boosted the annual escalator from >3% to >6% in exchange for providing AT&T the right to deploy at existing RAD centers and enter into ~900 leases at new sites with zero rent through 2016. AT&T also agreed to utilize AMT's emerging shared-generator infrastructure at a minimum number of sites. AT&T did not sign an MLA with SBAC.

As a result of the straightlining impact of the MLAs, the pace of AT&T's network activity should have a more direct effect on SBAC's reported site-leasing revenue, whereas the pace of activity should have minimal effect on site-leasing revenues at AMT and CCI, whose revenues in 2011-2016 reflect straightlining of the increased escalator. Cash rent impacts at all three tower operators, however, should scale more closely with AT&T's activity levels.

Sprint

The MLAs signed with AMT, CCI, and SBAC each differ due to varying exposure to iDEN and CDMA. The MLA with AMT is similar in nature to one signed between AT&T and AMT in that it triggers a higher escalator, whose impact is straightlined. While this may slow AMT's reported revenue growth from Sprint, it also insulates the company from the impact of iDEN terminations (to which AMT has greater exposure than peers due to the acquired SpectraSite assets – SpectraSite had 28% exposure to iDEN leases). The MLA with CCI is more usage based and does not entail a straightlined increase in the escalator or minimum commitment (as with its

MLA with AT&T). The MLA with SBA entails a minimum commitment whose impact is straightlined. Thus, the pace of Sprint's network activity should have the most direct impact on CCI's reported site leasing revenue growth, a less direct impact on SBAC's reported site leasing revenue growth, and the least impact on AMT's reported site leasing revenue growth. We note also that any future network-sharing arrangements whereby Sprint's Network Vision architecture acts as the host of other carrier equipment (e.g. T-Mobile) would trigger additional revenue not included in the current MLA economics.

Index Inclusion Catalysts

In light of American Tower's recent conversion to REIT status, and Crown Castle's eligibility for admission to the S&P 500 Index, many investors are interested in index inclusion as a potential catalyst for the tower stocks. Our view is that index inclusion (AMT RMZ and CCI S&P 500) would potentially drive 20 million to 30 million shares of passive buying interest in the respective stocks, but that CCI S&P inclusion is somewhat more likely.

With respect to the REIT indices, American Tower has been treated in line with our expectations, receiving admission to the FTSE/NAREIT All Equity Index (FNER) and the Dow Jones REIT Index, but not being included in the more heavily weighted FTSE/NAREIT Equity Index (FNRE). The All Equity REIT Index includes all tax-qualified REITs listed on the NYSE, AMEX, or NASDAQ, while the Equity REITs index excludes those REITs that are commonly viewed as "non-core," such as timber REITs. We believe the FNER index is tracked significantly less by the passive-investment community than the FNRE index and thus view the share impact of AMT inclusion in FNER as minimal. Key factors as to why AMT was initially excluded from the FNRE are, in our view: 1) its large market cap (it is the second-largest REIT), necessitating 2) significant rebalancing among passive indexers, coupled with 3) lack of consensus among REIT investors as to whether AMT constitutes "core" real estate. AMT's relative lack of ground ownership, coupled with its lack of direct comparisons versus other well established real estate classes, present an impediment to many NAREIT stakeholders with regard to core index inclusion, in our view. But we believe this resistance could be overcome over time as AMT delivers stable operating performance and the investor base becomes more familiar with the business model and drivers.

A decision on potential American Tower inclusion in the MSCI US REIT Index (RMZ) is expected later this year, but we do not believe it will receive admission. According to our understanding, mortgage REITs and REITs classified as specialized REITs, such as timber REITs, which do not generate the majority of their revenues and income from traditional real estate rental and leasing operations, are not eligible for RMZ inclusion. We believe towers may be classified as a specialty REIT that is ineligible for the RMZ index. As an example, tower REIT Global Signal (formerly ticker GSL), which traded from mid-2004 to late 2006 prior to its acquisition by Crown Castle, was classified as a specialty REIT, but did not generate the majority of its revenues and income from real estate activities per MSCI's definition at the time. Based on this precedent, we believe it would be challenging for American Tower to receive different treatment.

With respect to Crown Castle and the S&P 500, CCI is current eligible. Additions are usually made on an as-needed basis as a result of M&A activity involving current constituents. We believe the next decision regarding S&P composition will occur toward the end of the first quarter of 2012; CCI would be eligible for inclusion at that time, as well as during future indexing decisions. We estimate the resulting passive-buying interest, if CCI were to be included, at roughly 30 million shares.

Datacenters and Hosting

Industry Background

During the 1990s and early 2000s, growth in the datacenter market mirrored the emerging trend of Internet-based businesses and broadband-capacity expansion. Aggressive datacenter investment construction ensued to accommodate the growth expectations in many Internet-based segments. However, significant overcapacity arose in the early 2000s as the technology sector and broader economy experienced a downturn, and many customers had committed to space they did not need or experienced business failures. During that downturn, many datacenter assets were decommissioned or consolidated. New construction essentially shut down starting in 2002. According to BroadGroup data, occupancy (square meters utilized) in the European datacenter segment declined in absolute terms by 14% during the 2001–2003 timeframe.

Spurred by macro-economic improvement, increasing penetration of broadband, and greater maturity of Internet-based business models and tools, datacenter demand started to improve in 2004, and, given the lack of new construction in the preceding years, utilization rates increased from the mid-30% range toward 60% or higher, depending on the market. During the economic downturn and credit crunch that began in 2008, datacenter expansions continued in key markets, sponsored by publicly traded operators and some well financed private operators. Driven by high demand, utilization rates at third-party datacenters continued to increase as corporate-sponsored projects were cancelled or delayed, and other datacenter customers continued to expand their IT and networking capacity. At present, utilization rates for retail colocation space in key markets are often in excess of 80%.

Datacenters have provided not only the basis for third-party provision of space, power, cooling, and security of servers, but also have spurred the growth of interconnection services among Internet operators, carriers, enterprises, and various other types of business. The IP interconnection market in Europe makes wide use of public peering facilitated by non-profit entities and has thus evolved in a different manner than in the United States. In the early days of the Internet, peering (traffic exchange) between Internet service providers (ISPs) took place in public peering points operated by government and non-profit entities on both sides of the Atlantic. In the US market, private carriers such as Ameritech, AT&T, Pacific Bell, Sprint, and MFS established peering points to handle the rapid growth in Internet traffic, and these were soon supplemented by peering points established at private exchanges that today are operated by such firms as Equinix, Switch & Data Facilities, and CoreSite. In Europe, the dominant peering points are coordinated with non-profit entities such as the Amsterdam Internet Exchange (AMS-IX), the London Internet Exchange (LINX), and the Deutscher Commercial Internet Exchange (DE-CIX). These entities provide settlement-free exchange of Internet traffic among their members, and make significant investments in research and development to remain at the forefront of IP switching capabilities.

Demand Drivers

Drivers of the colocation market are similar to those that drive overall Internet bandwidth and IT outsourcing demand, such as increasing broadband penetration, e-commerce, video delivery, gaming, social networking, voice-over-IP, cloud computing, and a host of Web applications that make the Internet and data networking a key enabler of business. We anticipate that growth rates for IP traffic, e-commerce transactions and revenues, and datacenter services will remain firmly in the double digits for the next several years as businesses seek out security and reliability for their servers and networking equipment, in many cases at third-party datacenters.

Leading sectors of demand include digital media and distribution, enterprises, financial services, managed services providers, and network providers. With 100% Web-site uptime and network connectivity increasing requirements for many businesses, and various compliance authorities mandating practices that leverage the strength of datacenters (business continuity, disaster recovery, data archiving and storage, and other practices depending on the vertical), we see little probability that demand for datacenter services will taper off during the next several years.

The datacenter industry has showed strength and resilience in 2011, and there has been no major effect from economic headwinds. We have seen continued bookings by enterprises, carriers, and managed services providers, including cloud. We expect this trend to continue and cloud services revenue contribution to increase in 2012.

Barriers to Entry

The datacenter segment has significant barriers to entry, including 1) access to power in desirable locations, 2) relationships with and concentration of network providers, 3) know-how in designing and building centers, and 4) access to capital, given the considerable cost required to construct new or redevelop existing facilities. Interconnect-centric providers such as Equinix, Telecity, Interxion, Telehouse, Global Switch, and CoreSite, in many of their respective markets, constitute a subset of the operators to whose datacenters carriers and ISPs will routinely build routes in order to exchange traffic, thereby enhancing the attractiveness of their sites as hubs for traffic exchange and colocation. Since lead times for datacenter construction can amount to 18–24 months or greater, it is difficult for new or existing players to add capacity fast enough to outstrip current demand.

Products

Colocation: These services include racks, full or half cabinets, or customer cage configurations, along with required power and cooling. Customer power is backed-up by on-site batteries and generators. Interxion’s datacenters are staffed 24x7 and feature multiple levels of physical security for building entry and access to customer cages.

Interconnection: Some providers offer interconnection services to provide for traffic exchange between customers. Interconnection can be on a one-to-one basis using direct cross connects within the company’s facilities, or one-to-one or one-to-many using a distributed peering switch at an on-site exchange.

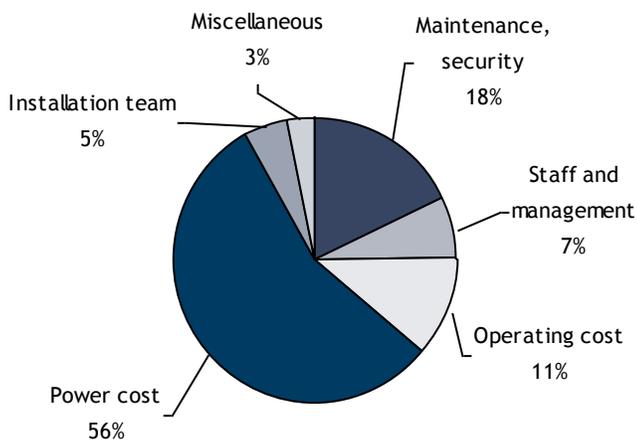
Managed hosting: Managed hosting services typically encompass one or more of: Web hosting, E-commerce, Email hosting, Storage, database servers and applications, security and monitoring, server clustering and load balancing, and other enterprise or consumer applications

We discuss pricing later in this chapter.

Expense Drivers

Major cash cost elements are rent payments for datacenters (when leased), utility costs, staff salary and benefits, and other SG&A. The majority of operating expenses are fixed. There is some influx of new personnel when an operator opens capacity at a new location but comparatively less of an effect when a company expands an existing campus. Variable costs consist mostly of utilities expenses, which are often passed on to customers (except in the US retail segment). To protect against increases and fluctuation in power costs, operators often enter into one or two-year fixed-priced contracts with a local utility companies and have the ability to pass through utility increases customers.

Exhibit 76: Estimated Datacenter Operating Costs



Source: BroadGroup

Power Considerations

For wholesale and many retail requirements, pricing is based not on datacenter space or cabinet metrics, but on the allocation of power resources to support peak load for the customer’s IT equipment. PUE (alternately referred to as power usage efficiency or power utilization effectiveness) is a power metric that indicates the total power supplied to the IT equipment, plus cooling requirements, divided by IT power. Since datacenters typically operate far below the customer’s estimate of full IT load requirement, and occupancy levels vary, PUE varies as well. Modern datacenters are usually designed to achieve PUE levels around 1.3. PUE metrics matter to customers since they directly affect their power usage costs. The customer cost incurred at a high-PUE (i.e., less energy efficient) site could be offset by lower power rates, and vice versa.

Below are illustrative power utility rates in various markets.

Exhibit 77: Datacenter Power Utility Rates

<u>City/ Area</u>	<u>Average Rate</u>	<u>Comments</u>
London	6-15p	increased roughly 10% during the past year, related to carbon reduction program
Frankfurt	10-13 cts.	potential environmentally driven increases during 2012
Paris	6-7 cts.	predominately nuclear sourced; potential increase during 2012
Amsterdam	6-13 cts.	
San Francisco Bay Area	9-16 cents	
Phoenix	7-8 cents	
Dallas range	5-7 cents	
Chicago	7-11 cents	
New Jersey	10-13 cents	
New York	20-31 cents	
Los Angeles	>20 cents	
Virginia	5-7 cents	
Tokyo	20-26 cents	
Hong Kong	12-15 cents	
Singapore	17-25 cents	Pricing can be volatile
Sydney	19-20 cents	

Source: RBC Capital Markets estimate based on government schedules and discussions with customers and operators.

Hosting and Cloud Overview

Hosting and cloud providers see demand from 1) growing Internet and data usage, 2) increasing acceptance of outsourced IT services and infrastructure, and 3) increasing computing needs requiring bandwidth, servers, technical space, power, and cooling in dedicated facilities. These companies do not have a uniform approach toward offering collocation and bandwidth services, with some, such as Rackspace focused exclusively on managed hosting, and others providing services that overlap with the collocation providers.

Major hosting product categories include the following:

- **Hardware and software:** Hosting providers often provide their customers with IT equipment such as servers, networking equipment, firewalls, load balancers, local storage, and related equipment. Customers often have the option to purchase software licenses to run on their IT devices, including operating systems, virtualization, database, anti-virus and anti-spam, and security.
- **Storage, backup, and security:** Hosting providers offer their customers a variety of storage services as well as backup to protect customer data in the event of a system failure. They also manage firewalls and intrusion detection systems and perform security scans to identify security vulnerabilities.
- **Professional services:** These include IT system design and capacity planning services that enable customers to enhance performance and plan for growth.
- **Monitoring and response:** This includes monitoring, trending, and reporting services to maximize uptime and performance of customers' IT systems.
- **Hosted applications:** The most common example of this is E-mail hosting.

Cloud Offerings

Cloud technologies leverage advances in virtualization and server technology to allow computing resources to be pooled and utilized by multiple customers and access on demand. Cloud-enabled products typically include storage, hosting, and computing. Cloud computing provides a number of advantages:

- **On-demand elastic provisioning:** Operators and users can leverage automation tools to provision servers and other features, or scale down their requirements, based on need, and with little to no manual intervention.
- **Access:** Computing capabilities can be made available through standard protocols from any Internet connection.
- **Multi-tenant:** Cloud implementations can serve multiple customers or user group.
- **Usage-based pricing:** Similar to utilities, cloud services can be provided and billed for in increments such as storage, processing resources, or time used, depending on the application.

Openstack

OpenStack is an open-source platform for cloud administration, management and operations. It is gaining traction as an alternative to larger, proprietary platforms such as Amazon. Advantages include portability, facilitating the transfer of applications and data between sites and even to different service providers. There is a growing base of hosting providers, including Rackspace, Internap that offer certain cloud services (e.g. computing, storage) based on Openstack. Currently, most implementations have been private cloud deployments by selected organizations. We expect multiple other hosting providers, including major telcos, to introduce Openstack-based products during the coming quarters.

Hosting Costs and Margins

Principal expense drivers include datacenter leases, salaries, utility costs, network costs, sales and marketing, software licenses, and various maintenance and overhead items. The principal expense item that hosting providers, in contrast to collocation providers, commonly incur is IT support personnel to support existing implementations and incremental growth.

Hosting Differences vs. Colocation

Despite their use of similar physical assets (datacenters) the hosting business model differs in key respects from collocation. Compared to collocation-focused operators, hosting providers provide a significantly broader array of value-added services, such as security, monitoring, back-up, storage, and various IT-related functions. This provides them with greater flexibility for increasing same-customer revenues by up-selling additional services, but also entails greater costs to provide IT support.

Datacenter and Hosting Players

The exhibit below depicts several of the major publicly traded and multi-location private operators.

Exhibit 78: Datacenter and Hosting Company Profiles

Company	Headquarter	Founded	# of Datacenters	Datacenter Locations	Services Offered
Amazon (Amazon Web Services & Elastic Compute Cloud)	Seattle, WA	1994	Global footprint	Partner and company owned sites in 190 countries	application hosting, backup and storage, cloud computing, content delivery, Web hosting, databases, payments & billing
Carpathia Hosting	Ashburn, VA	2003	12	Ashburn, Dulles, Harrisonburg, Phoenix, Los Angeles, Toronto, Amsterdam	Managed services, cloud, colocation services
CoreSite	Denver, CO	2010	12	Boston, Chicago, Los Angeles, Miami, New York, Reston, Milpitas, San Jose, Santa Clara, Washington DC	Wholesale and retail collocation; interconnection and peering
Datapipe	Jersey City, NJ	1998	6	Office locations in the U.S., U.K., and China	application management, cloud computing, hosting and security services.
Digital Realty Trust	San Francisco, CA	2004	99		Colocation
DuPont Fabros	Washington DC	2007	10	Ashburn, Reston, VA, Bristow, VA, Chicago, Piscataway, NJ, Santa Clara	Wholesale datacenter provider
GoDaddy	Scottsdale, AZ	1997		Major locations: Arizona, Iowa, Colorado, Washington D.C., Singapore, Netherlands.	Domain name registration, Web hosting, Web design, storage management
Global Switch	London, UK	1998	7 campuses	Amsterdam, Frankfurt, London, Madrid, Paris, Singapore, Sydney	Primarily wholesale
I/O Datacenters	Phoenix, AZ	2007	3 primary markets	Phoenix, Scottsdale, New Jersey	Colocation, some cloud and managed services
Equinix	Redwood, CA	1998	Campuses and sites across 38 markets and 13 countries	38 markets, 13 countries in the Americas, Europe, Asia, and Australia	Colocation, interconnectivity
Fortune Data Centers	San Jose, CA	2006	2	San Jose, CA; Hillsboro, OR (under construction)	Wholesale colocation
Internap	Atlanta, GA	1996	National footprint	Major sites include Atlanta, Boston, Dallas, Houston, New York, Seattle, and Santa Clara	Colocation, CDN, managed hosting, cloud, enterprise IP
InterXion	Amsterdam	1998	Campuses across multiple European markets	Amsterdam, Belgium, Copenhagen, Dublin, Paris, Frankfurt, Berlin, Dusseldorf, Munich, London, Slough, Paris, Madrid, Stockholm, Geneva, Zurich	Colocation, interconnectivity
Latisys	Ashburn, VA	2007	4	Ashburn, Chicago, Denver, Irvine	Colocation, managed hosting, managed services, private cloud
Layered Technologies	Plano, TX	2004	12	Kansas City, Dallas, Chicago, Santa Clara, Los Angeles, Reston, VA, Amsterdam, Tokyo, London, Berlin, Calgary, Toronto	Managed dedicated hosting, on-demand virtualization/cloud computing IT infrastructure, web services

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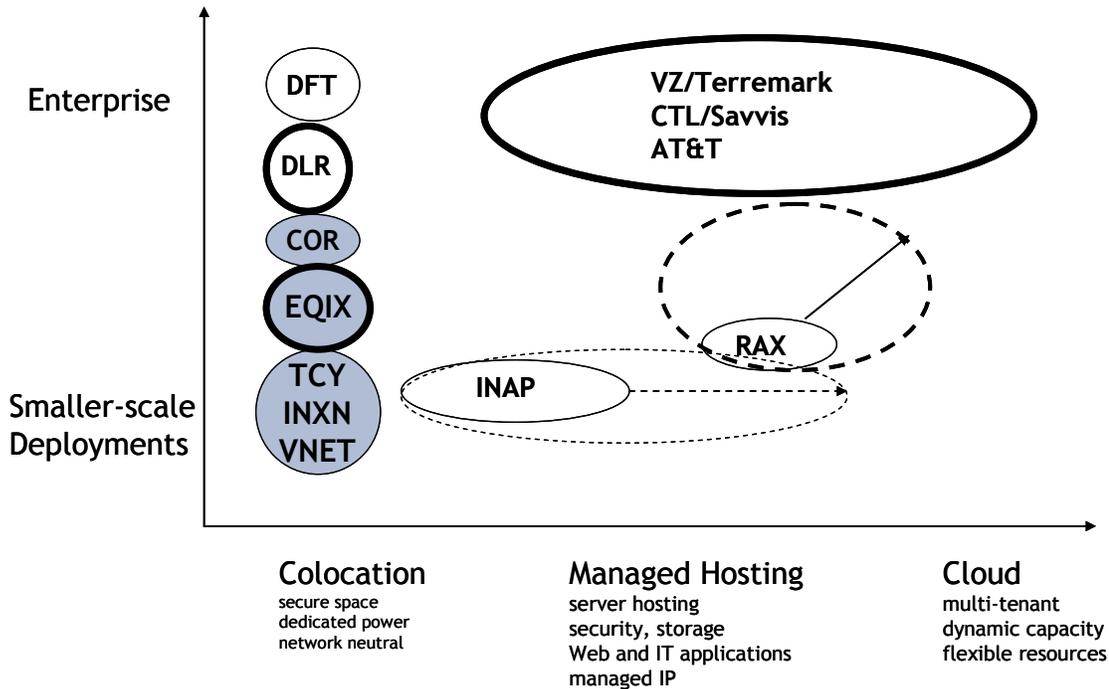
Exhibit 78: Datacenter and Hosting Company Profiles (con't)

Microsoft (Azure)	Seattle, WA	1975	Global footprint	Global	Cloud computing, storage, and servers, applications hosting.
Peak10	Charlotte, NC	2000	22	Atlanta, Charlotte, Cincinnati, Jacksonville, Louisville, Nashville, Raleigh, Richmond, Ft. Lauderdale, Tampa	Colocation, managed services, cloud
Q9 Networks	Toronto, Canada	1995	11	Toronto, Calgary, Brampton, Kamloops	Colocation, computing infrastructure, network services
Rackspace	San Antonio, TX	1998	9	San Antonio, Dallas, Ashburn, Herndon, Chicago, London, Slough, Hong Kong	Managed services, cloud, hybrid hosting
Sabey	Seattle, WA	1975	6 campuses	Seattle, Wenatchee, WA, Quincy, WA, Manhattan, Ashburn	Wholesale provider, design and construct datacenters
Softlayer	Dallas, TX	2005	13	Dallas, Houston, San Jose, Seattle, Washington D.C. Amsterdam, Singapore	Dedicated hosting, cloud hosting, managed services
21Vianet	Beijing, China	1998	33 cities throughout China	Multiple partner and company-owned sites across 33 markets throughout China	Primarily colocation, connectivity, content acceleration, and some hosting.
TeleCity Group	London, UK	1998	Campuses across multiple European markets	London, Manchester, Dublin, Paris, Amsterdam, Frankfurt, Milan, Stockholm	Colocation, interconnections/peering
TelX	New York, NY	2000	National footprint	Major markets include New York, New Jersey, Dallas, Santa Clara, San Francisco, Los Angeles, Atlanta, Miami, Phoenix, Charlotte.	Colocation, interconnection/peering.
Vantage	Santa Clara, CA	2010	4	Santa Clara, Quincy, WA (under construction)	Wholesale datacenter provider
ViaWest	Denver, CO	1999	22	Denver, Dallas, Salt Lake City, Portland, Las Vegas, Austin	Colocation, cloud, managed services

Source: Company reports, RBC Capital Markets

From a positioning perspective, the different operators have different approaches toward market segmentation, geographic focus, and product mix.

Exhibit 79: Datacenters and Hosting - Positioning



Bold outline: Significant multi-continent diversification
 Arrow and dotted line: broadening of product mix and target market.
 Shading: Significant interconnect-centric offer to customers.

Source: RBC Capital Markets

Exhibit 80: Major Datacenter M&A Transactions

Close	Acquirer	Target	Target Type	Price (in \$Ms)	EBITDA Multiples
Sep-07	Equinix	IX Europe	Colocation	\$481M	20.0x
May-10	Equinix	Switch & Data	Colocation	\$833.8	10.5x
June-10	Cincinnati Bell	CyrusOne	Colocation	\$525.0	12.8x
April-11	Time Warner Cable	NaviSite	Managed Services	\$264.5	10.5x
April-11	Verizon	Terremark	Managed Services	\$1,779.1	13.4x
July-11	CenturyLink	Savvis	Managed Services	\$3,200.0	10.9x

Source: Company reports and RBC Capital Markets estimates.

The segment continues to see significant interest among private investors, as illustrated below.

Exhibit 81: Selected Private Equity Datacenter Investments in 2011

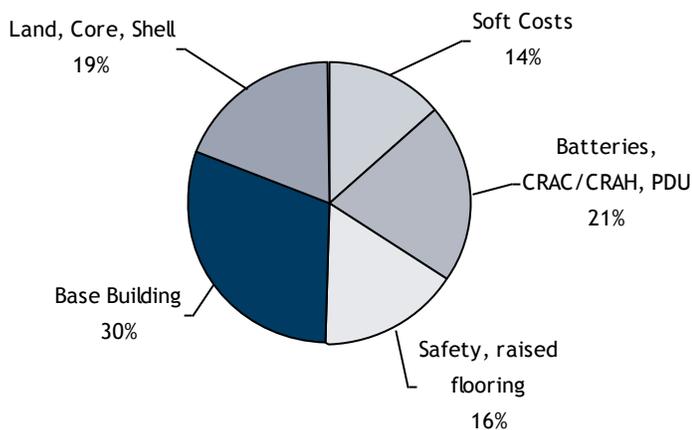
	Private Equity Partner	Datacenter	Comments
Feb-11	Kelso & Company	Sentinel	Sentinel Datacenters received an equity investment from Kelso & Company, a New York investment firm. Investment of \$300 million equity capital.
May- 11	ABRY Partners	Datapipe	Datapipe received a ‘significant equity investment’ from ABRY Partners, and also secured a new Senior Secured Credit Facility from a syndicate of lenders led by TD Securities and including Brown Brothers Harriman, CapitalSource, Caterpillar Financial, CIT Group, GE Capital, ING, and Raymond James Financial, for a total \$176 million in combined equity & debt.
June- 11	Avista Capital Partners	Data Bank	Avista Capital Partners Acquires DataBank Holdings. Financial terms of the transaction were not disclosed.
Aug-11	Darwin Private Equity	Attenda	Darwin completed the management buyout of Attenda Ltd, a leading provider of business critical managed hosting services to UK enterprises, for £50 million.
Aug-11	Abry and Berkshire Partners	Telx	ABRY Partners and Berkshire Partners bought Telx Group from GI Partners.
Oct-11	Abry Partners	Xand Corp	ABRY Partners Acquires Xand Data Centre.
Oct-11	TA Associates	CoSentry	TA partnered with CoSentry management to acquire the company from two Omaha-based investment firms, McCarthy Capital and WaittCorp Investments. Terms of the deal were not disclosed.
Dec-11	Abry Partners	e-Shelter	e-shelter secured an undisclosed investment from Boston-based private equity company ABRY Partners LLC.

Source: Company press releases

Unit Economics

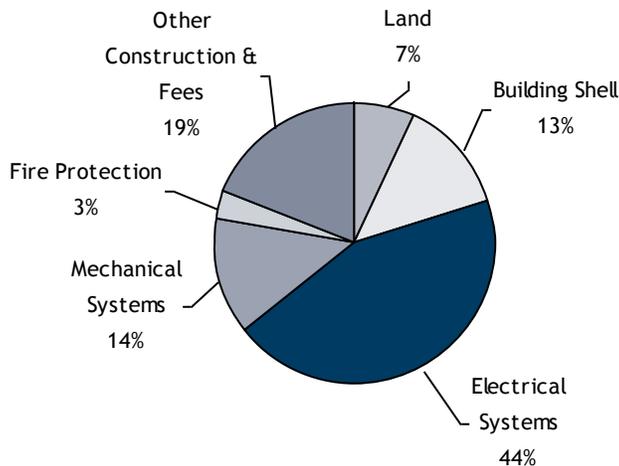
Exhibits 82 and 83 illustrate the buildout costs for a new datacenter, and retrofit costs converting an existing structure into a datacenter. On a capacity unit basis, we estimate a newly built datacenter costs roughly \$4,500-\$6,000 per kW, depending on the power density and scale, while retrofits of existing buildings cost roughly \$4,000-\$5,000 per kW, depending on scale and complexity. Smaller-scale sites (i.e., 3 MW or less) may cost toward the high end of these ranges, if not more.

Exhibit 82: Datacenter Development Costs



Source: Coresite

Exhibit 83: Datacenter Redevelopment Costs



Source: Digital Realty Trust

Exhibit 84: Illustrative Datacenter Unit Economics

Assumptions:

monthly colocation rate	\$1,400
monthly interconnect rate	\$200
cross connects/cabinet	3
operating lease rate	4.50%
power per cabinet (kW)	4
per kWh rate	\$0.12
employees/facility	20
per employee cost	\$100,000

	Investment	Square feet	Cabinets	Investment per cabinet
Chicago	\$175,000,000	250,000	2,500	\$70,000
Washington DC	\$70,000,000	85,000	1,650	\$42,424
New York	\$95,000,000	340,000	1,700	\$55,882
	Colocation Revenue	Interconnect Revenue	Aggregate Revenue	
Chicago	\$42,000,000	\$18,000,000	\$60,000,000	
Washington DC	\$27,720,000	\$11,880,000	\$39,600,000	
New York	\$28,560,000	\$12,240,000	\$40,800,000	
	Operating Lease Expense	Power costs	Employee cost	Aggregate Op Ex
Chicago	\$0	\$10,512,000	\$2,000,000	\$12,512,000
Washington DC	\$0	\$6,937,920	\$2,000,000	\$8,937,920
New York	\$4,275,000	\$7,148,160	\$2,000,000	\$13,423,160
	Data Center Cash Flow	Per cabinet cash flow	payback (months)	ROI
Chicago	\$47,488,000	\$18,995.20	44.2	27.14%
Washington DC	\$30,662,080	\$18,583.08	27.4	43.80%
New York	\$27,376,840	\$16,104.02	41.6	28.82%

Source: RBC Capital Markets estimates, based on Equinix public filings.

Pricing

Contract prices are priced differently by operator, with some charging according to a menu of rack capacity and/or space, power, and interconnections, and others charging according to a more simplified scheme, often correlated to critical power provided. Power costs are often included in contracts at the US retail providers, and are usually more usage-based in international markets and in the wholesale segment. For managed services, pricing can vary significantly depending on the type of service offered (storage, computing resources, email, Web hosting, etc.).

Exhibit 85 provides illustrative pricing for retail-scale colocation in selected US, Asia, and European markets.

Exhibit 85: Retail Colocation: Illustrative Pricing

<u>Global Comparison</u>	<u>Monthly Recurring Rate</u>
United Kingdom	\$530-750
Japan	\$470-660
Switzerland	\$430-600
Australia	\$430-600
Germany	\$380-540
Hong Kong	\$360-510
Netherlands	\$350-500
France	\$330-460
United States	\$330-600
Singapore	\$320-450
Average	
<u>Europe</u>	
Switzerland	€430-600
United Kingdom	€530-750
Germany	€380-540
Netherlands	€350-500
France	\$330-460
<u>Asia</u>	
Japan	\$470-660
Australia	\$430-596
Hong Kong	\$360-510
Singapore	\$320-450

Source: RBC Capital Markets estimates, based on vendor and customer discussions.

For multiple-cabinet deals, we expect negotiated pricing would skew toward the low end of this range, or even lower, depending on the provider and location within a metro. Conversely, for high-demand locations with scarce supply, pricing may skew toward the high end of these ranges, if not more. For instance, London Docklands commands significantly higher unit pricing than London Slough; Chicago Cermak commands higher pricing than other Chicago-area locations; and so forth, given the premiums attached to high-connectivity sites. .

On the wholesale side, typical pricing ranges are as follows:

Exhibit 86: RBC Capital Markets Datacenters - Illustrative Pricing

Area	Monthly rate (per kW)	
	Wholesale	
San Francisco Bay Area	\$110-150	high end has declined from high \$100 range, reflecting increased supply. Many recent deals signed at ~\$130-145/kW
Los Angeles	\$110-150	
Northern Virginia	\$140-180	
Chicago (suburbs)	low to mid \$100	
New Jersey	mid to high \$100	relatively disciplined pricing despite increased supply
Dallas	mid \$100	slight decline since 2010
Atlanta	low to mid \$100	
Los Angeles	\$110-135	
London (Slough)	£130-160	
Frankfurt	€130-170	
Amsterdam	\$145-170	
Paris	€150-180	
Singapore	\$225-250	

Note: Pricing excludes power usage

Source: RBC Capital Markets estimates

Exhibit 87 summarizes some of the major wholesale expansions announced during 2011.

Exhibit 87: Major Wholesale Expansions Announced During 2011 (U.S.)

Datacenter	Capacity	Location
CyrusOne	TBD (110 MW)	Phoenix, AZ
Sabey	40 MW	Manhattan, NY
i/o (PBB)	831,000 sf (30 MW)	Edison, NJ
Telx	215,000 sf (28 MW)	Clifton, NJ
T5	206,000 sf (16.65MW)	El Segundo, CA
RagingWire	70,000 sf (14.4 MW)	Ashburn, VA
Latisys	82,000 sf (14 MW)	Englewood, CO
Data Gryd	120,000 sf (12.5 MW)	Manhattan, NY
T5	150,000 sf (10.5 MW)	Dallas, TX
Equinix (PBB)	125,000 sf (10 MW)	Ashburn, VA
Fortune	240,000 sf (7.8 MW)	Hillsboro, OR
Savvis	70,000 sf (6 MW)	Piscataway, NJ
XO Comm. (PBB)	49,000 sf (3 MW)	Manhattan, NY
CyrusOne	45,000 sf	Dallas, TX
Terremark	30,000 sf	Santa Clara, CA
Sabey	TBD	Ashburn, VA

Source: Company reports, Grubb & Ellis, RBC Capital Markets

Exhibit 88: Selected recent wholesale leases (U.S.)

Datacenter	Capacity	Location
Zynga	9MW	Santa Clara, CA
Twitter	8MW	Atlanta, GA
RackSpace	7.9MW	Elk Grove Village, IL
Telx	6MW	Santa Clara, CA
Savvis	4.5MW	Santa Clara, CA
Softlayer	3.4MW	Santa Clara, CA
Server Central	3 MW	Elk Grove Village, IL
Salesforce	2.6 MW	Elk Grove Village, IL
Salesforce	2.275 MW	Ashburn, VA
Apple	2.28 MW	Santa Clara, CA
Groupon	1 MW	Santa Clara, CA
Mozilla	1 MW	Santa Clara, CA
Broadcom	1 MW	Santa Clara, CA

Source: Company reports, Grubb & Ellis, RBC Capital Markets

Exhibit 89: Largest Build-to-Suits and Power-Based Building Contracts

Datacenter	Capacity	Location
Facebook, Phs II	300,000 sf	Forest City, NC
Time Warner	178,000 sf	Charlotte, NC
Chevron	150,000 sf	San Antonio, TX
Boeing	133,000 sf	Quincy, WA
Amazon	120,000 sf	Boardman, OR
Disney	100,000 sf	Kings Mountain, NC
Adobe	100,000 sf	Hillsboro, OR
Equinix	77,000 sf	Ashburn, VA
NetApp	55,000 sf	Hillsboro, OR
Umpqua Bank	41,800 sf	Hillsboro, OR
Walgreens (PBB)	4 MW	Northlake, IL

Source: Company reports, Grubb & Ellis, RBC Capital Markets

Exhibit 90: Expansion: Largest Blocks of Wholesale Space Available for Immediate Occupancy

CyrusOne	25,000 sf (22 MW)	Dallas, TX
CyrusOne	60,000 sf (20 MW)	Houston, TX
CyrusOne	41,000 sf (20 MW)	Austin, TX
DuPont Fabros	44,000 sf (14.1 MW)	Santa Clara, CA
DuPont Fabros	60,000 sf (12 MW)	Piscataway, NJ
DuPont Fabros	12 MW	Ashburn, VA
Powerloft	50,000 sf (9 MW)	Manassas, VA
CoreSite	45,715 sf (8.5 MW)	Santa Clara, CA
Benaroya	50,000 sf (7.5 MW)	Puyallup, WA
DuPont Fabros	31,900 sf (5.3 MW)	Elk Grove Village, IL
T5	54,319 sf (6 MW)	Atlanta, GA
Quality Technology	50,000 sf (5 MW)	Atlanta, GA
Digital Realty Trust	28,254 sf (3.8 MW)	Chandler, AZ
Sentinel	20,000 sf (3.5 MW)	Somerset, NJ

Source: Company reports, Grubb & Ellis, RBC Capital Markets

Current Colocation Trends by Region

The following discussion provides a current view of regional and country-level trends that we have observed in the datacenter and collocation market.

On balance, industry fundamentals remain solid, but are generally stronger in Asia and Europe than in the US. In international markets, we find greater barriers to entry for new operators (or existing operators wishing to expand to new countries and/or markets) due to less access to capital for private start-ups and more varied jurisdictional complexities associated with permitting and construction. The pace of customer outsourcing requirements appears robust for both wholesale and retail requirements in the US and Europe, with few signs that customers are delaying decisions, even in markets that are slated for capacity expansions. We find demand to be broad based among multiple industry verticals and sizes of requirement, with some sectors showing signs of acceleration in both the US and Europe. Sectors where we find continuing growth across most regions include software, content, connectivity, and government. Sectors where we find accelerating or potentially emerging demand include mobility, healthcare, and (for wholesale) first-time enterprise outsourcing among businesses that determine it is more cost effective to rent wholesale space than build their own datacenters.

Supply growth remains active in both wholesale and retail. Despite a temporary risk of stranded incremental capacity in some markets (e.g., Santa Clara, New Jersey, Northern Virginia, and London) in the wholesale segment, we find this is moderated by rapid absorption. In both the US and Europe, we see an increased willingness by some traditionally retail-focused operators (e.g., Equinix) to address larger customer requirements and a willingness by traditionally wholesale-focused operators to address smaller requirements. This hybrid 'wholo' segment has its own pricing dynamic that can be accretive for the wholesale providers but dilutive for the retail providers.

Unit pricing continues to track in reverse relation to the size and duration of customers' requirements, with sporadic discounting for strategic deals. On balance, Asian and European spot pricing are stable to increasing, albeit with more modest increases than in prior years. US spot pricing trends appear mixed, with some markets showing essentially flat trends and others seeing some sporadic pressure. US wholesale pricing shows slightly less regional fluctuation than in Europe or Asia as requirements tend to be shopped around across markets less often overseas than in the US. Not infrequently, we find discordant trends in wholesale versus retail pricing



within the same market. Also, operators' rates are as dependent on the tier of datacenter and location within a specific market as on the market itself. Examples include Chicago, New York, and London, where pricing at the core downtown hubs significantly exceeds that of other downtown or suburban locations.

However, disciplined expansions mitigate pricing pressure. In most markets, we find that supply is being added in discrete-enough increments that pricing strength generally remains intact (although there have been some recent deal-specific exceptions in markets such as Santa Clara and Atlanta). One factor in winning customer decisions is the ability to grow capacity in response to customer needs. Several of the wholesale and retail colocation providers in our coverage list have demonstrated this ability and turned it into a competitive advantage for larger or rapidly growing customer requirements.

UNITED STATES

Chicago

The 350 Cermak site owned by DLR and occupied by numerous carriers, and colocation providers continue to attract high levels of customer demand and significantly higher than average pricing, reflecting the lack of significant incremental capacity downtown and strong demand from trading firms. We are aware of several potential projects that could alleviate strained capacity downtown, but thus far we see no significant shift in the supply/demand imbalance. Demand in suburban Chicago has seen a shift toward lower-priced retail colocation with steady demand for wholesale requirements. It remains to be seen whether the CME site in Aurora will dilute downtown demand; thus far, we have seen few disruptions as we believe customers are diversifying their deployments. Recent customer wins include law firms, enterprises, managed services providers, content delivery, and state government.

Northern Virginia

In Northern Virginia, there was a modest constraint on immediately available wholesale supply in prior years, but 2012 is shaping to be a more capacity rich year as several new entrants (Sabey and Raging Wire) expand into this market alongside established players such as Dupont Fabros, Digital Realty Trust, Latisys, Powerloft, and CoreSite. We believe the most interconnected sites in the market are Equinix in Ashburn and CoreSite in downtown Washington D.C., while the most power-diverse site is CoreSite in Reston. Virginia is one of the early markets where Equinix is marketing its Business Suites offering, which is priced on per kilo Watt wholesale term rather than its conventional pricing structure (rack, power, and interconnect). Consistent with other markets, DLR appears to be commanding higher unit pricing than DFT (e.g., mid-\$100/kW versus low to mid-\$100 range), with COR somewhere in between. We still expect Internet, content, system integrator, and enterprise demand to dominate this market.

New Jersey and New York

The major drivers in New Jersey include enterprise and financial requirements (e.g., banks with large wholesale footprints, market-data firms, and trading firms with smaller more connectivity-focused requirements). In New Jersey, we have noticed a modest lowering of spot prices in the wholesale segment in reaction to the increase in capacity or expansions, but we believe this market is among the higher-priced wholesale markets in the country (mid to high \$100/kW). The recently opened NYSE site in New Jersey may over time present incremental pressure on growth in trading requirements at other third-party colocation providers, but we have not seen evidence of this thus far as financial trading firms still find the core trading hubs at Savvis, Equinix, and TelX to be essential to their trading strategies.

In New York City, the major drivers continue to be carrier, content, and connectivity-centric with the 111 Eighth Avenue and 60 Hudson carrier-hub locations still commanding among the higher rates in the country (more than \$600/kW for some retail requirements, but significantly lower in non-core Manhattan sites). We have not seen a major effect on the market thus far from Google's acquisition of 111 Eighth Avenue. Sabey's wholesale entry (redevelopment of a former Verizon building on Pearl St.) will provide an interesting gauge of Manhattan-based demand in this segment.

Dallas

Wholesale demand appears steady but demand appears set to increase vs. prior years, with ongoing or potential developments to compete against Digital Realty Trust. These include projects by Stream Realty, Lincoln Rackhouse, and CyrusOne. Retail supply remains highly fragmented among multiple national and local players. Overall, we believe that average wholesale pricing is in the mid \$100/kW range, with retail pricing more than \$300/kW at highly connected sites. The most interconnected buildings include the Infomart (where multiple operators are based) and Bryan St. (operated by TelX).

Santa Clara

Nearly 40 MW of new capacity came on line during 2011, including DLR, DFT, COR, Vantage, and Quality Technology Systems. Wholesale absorption rates have remained healthy, but absorption on some campuses (CoreSite) and pricing at other campuses have taken a commensurate hit, with some wholesale deals being struck in the low \$100/kW range. We expect scarcity to return to the market during 2012, along with a potential lift in wholesale rates. On the retail side, we have seen consistent trends, with some

discounting by private operators but no reason to expect broader-based pricing pressure in this market. Equinix' SV5 site is seeing solid demand from the cloud, software, and other customer segments. The most interconnected sites in the market are PAIX (formerly Switch & Data, now owned by EQIX), Equinix in San Jose, and 200 Paul in San Francisco (owned by DLR, with connectivity facilitated by TelX).

EUROPE OBSERVATIONS

Sales and demand: In aggregate, the sector appears to be seeing sustained demand and growth. Much of the sector is indexed toward growth areas such as cloud, mobility, digital media, and various types of IT outsourcing, which reduces its exposure to slower customer decision cycles. Recent growth drivers for the market in multiple countries include Microsoft and Apple, among many others.

Pricing: Pricing is generally disciplined among the major players in Europe. On the continent, Telecity, Equinix, and Interxion tend to price at similar levels for similar requirements. In London, we believe there are greater variances given disparities between Docklands and central London (Telecity and Interxion) and Slough (Equinix).

Expansion: Most of the operators continue to focus their capital investment on the key Internet hub markets of Amsterdam, Frankfurt, and Paris, with comparatively modest expansions planned in smaller markets.

Paris

Demand in this market is diverse but relatively more indexed toward enterprises and systems integrators than other major European cities. Among the carrier-neutral colocation providers, we believe Equinix and Interxion have secured sufficient access to incremental space, power, and connectivity to meet their expansion requirements over the next several years as new power stations will not be erected until 2016 or later; Global Switch has recently opened new capacity, and we believe Telecity is pursuing the same in its existing Condorcet campus and elsewhere in Paris. The French corporate sector, in particular financials, has shown a mixed trend with respect to the pace and approval of IT investments, but we believe the market remains generally healthy with robust pricing due to disciplined competitive behavior and phased and incremental capacity expansion.

We believe the most carrier-dense independent operators are Interxion and Telehouse. In recent quarters, the peering environment has evolved toward a greater dominance by the France IX Exchange, which plays to Interxion's strength in this market. Recent requirements in the market include major players from the insurance sector, oil and gas, and cloud (which manifest themselves primarily through systems integrators).

London

Similar to several US markets, the amount of available turnkey wholesale supply has increased steadily in the market. Sentrum has captured much of the wholesale business this year, including from many US-based companies, supplemented by a more moderate update rate at Digital Realty Trust. The Docklands area (where Telecity, Telehouse, and Global Switch operate sites) hosts this market's key connectivity hubs, representing the vast majority of UK Internet traffic. The strongest players in terms of carrier density appear to be Telecity and Telehouse, each with newly available incremental capacity but with pricing levels that remain above that of other areas of London as well as other European markets. Other areas of strong retail demand include central London (Interxion), Powergate (Telecity), and Slough (Equinix), each catering to specific latency, power, and space needs that limit the degree of direct competition among operators.

Amsterdam

Overall demand from Internet, content, and media customers has been consistently strong, with corporate and system-integrator demand supplemented by growing content and cloud requirements by leading media and software companies. Among retail providers, Telecity commands a leading share of connectivity-centric traffic off the Amsterdam peering exchange, but Interxion remains well positioned, and Equinix has steadily increased its presence. Because of its lower pricing versus London, strong connectivity options, and smaller domestic market, Amsterdam is more indexed than other European markets toward multinational requirements. Incremental supply of retail collocation space has kept pricing, in aggregate, stable, for smaller-footprint requirements, but we have observed sporadic discounting for larger-reference deals.

Frankfurt

Datacenter demand in this market varies by operator, with Equinix driving many finance-centric deals, and other requirements (pharmaceutical, content, e-commerce, and social networking enterprise) spread among Equinix, Interxion, Telecity; and among larger requirements, E-Shelter and Global Switch. The key connectivity hubs of the DE-CIX exchange are located at the facilities of Interxion and Telecity, each of which we believe generally commands a premium pricing versus Equinix except for trading-centric deals.

An emerging player in the market, GreenCampus, plans to add 150,000 square feet of capacity over three phases, although the project is still in a relatively early phase.

ASIA-PACIFIC OBSERVATIONS

Demand appears strong throughout the region. Both wholesale and retail pricing are higher than in Europe and the US, with rates stable to increasing, in our view. For an initial Asian presence by an out-of-region customer, Singapore and Hong Kong usually attract the most attention because they are viewed as connectivity gateways. Meanwhile, Japan typically commands attention because of its domestic market and ecosystems; should Equinix enter the Korean market, we believe it would reflect similar considerations as those that underlie its Japan operations. Between the two connectivity gateways, Singapore generally is a quicker market for most players to enter, but both markets are in high demand. As with its US peers, Digital Realty Trust and Savvis, Equinix sees much demand for its Asian capacity from US-based customers, but we get the sense that among these three operators, Equinix and Savvis have established enough market presence to attract demand from local users as well.

Following are individual country observations:

Singapore

Compared to other markets, Singapore has a relatively cooperative regulatory framework and incentives for inward foreign investment. While access to development and/or redevelopment opportunities and power are challenging, our sense is that procedures in Singapore are a bit more streamlined compared to other urbanized markets. A new datacenter park has received approval that is attracting attention from several players. Singapore features strong connectivity, especially to India, Indonesia, and Southeast Asia. Datacenter demand is diverse, but indexed slightly more toward cloud and IT services, and less toward financials, than Hong Kong. There is significant content demand driven by Chinese and US companies. Demand for managed services from the public sector should increase as part of a government-sponsored cloud initiative, with potential ancillary benefits for colocation providers. The (government-owned) landlord is generally cooperative, with few variations expected in lease rates. In contrast to other markets, last-mile and middle-mile connectivity and power are more expensive (with power rates viewed as more subject to fluctuation). Last mile connectivity prices may drop over time as the government introduces additional capacity as part of its Next-Generation National Broadband Network. Among the carrier-neutral operators, the most connected sites are viewed as Equinix and Global Switch. The government is encouraging the development of a public Internet exchange that may be hosted outside of Equinix, thereby potentially enhancing the competitiveness of rival operators.

China

Mainland China is a less developed datacenter market, with much of the capacity consisting of individual floors within multi-purpose buildings and operated by the major carriers (China Telecom, China Unicom, and China Mobile). Demand is diverse across multiple cities (Beijing, Shanghai, Shenzhen, and others) and industry verticals (finance, Internet, telecom, and public sector), but it is indexed more toward Internet gaming, video, and e-commerce than other Asian countries. Power provisioning is not as significant a constraint as in other markets, but high-quality connectivity is a greater challenge. Licenses are a significant barrier to entry for providing connectivity, peering, or value-added services. New datacenter construction has been relatively flat by the carriers, but it is growing by the carrier-neutral players such as 21Vianet. We estimate Equinix operates about 150 racks in Shanghai with its local partner and does not provide interconnect as it does in other markets. We suspect most of the company's customers in Shanghai have followed Equinix from other markets, and that Shanghai is not currently a source of new business relationships. Other foreign companies active in the market as users, providers, or resellers include AT&T, NTT, KDDI, SingTel, BT, Unisys, major banks, and with multiple US content players evaluating market entry or expansion.

Hong Kong

Hong Kong has a vibrant financial services, carrier, and networking sector, and it is viewed as a connectivity gateway to mainland China and other Asian markets. Content demand is growing as well, driven by Chinese and US requirements. Hong Kong features competitive local connectivity options, and relatively lower and more stable pricing for transit and power than other Asian markets. Although there is some new datacenter development at a campus (TKO) and elsewhere, Hong Kong is generally a more challenging market to enter than Singapore due to fewer attractive greenfield options, and various business and legal complexities. Ongoing datacenter construction or expansions include NTT, Mega-I, Hong Kong Exchange, and Clearing, New World, Equinix, SingTel, Google, HK Colo, KDDI, and China Mobile.

Japan

On balance, Japan datacenter demand tends to be indexed more toward large domestic requirements. The market features competitive connectivity options. However, while power rates appear relatively stable, these can be more expensive compared to other markets given the relative scarcity of power and land. This contributes to a strong pricing environment for the colocation providers but significant challenges for market entry and expansion. Major colocation players include NTT, KDDI, SingTel, KVH, Softbank, Bit-

isle, and others. Among the carrier-independent players, Equinix and @Tokyo are generally viewed as having the best-connected sites. Eli's customer base in this market is mostly international. Cogent's recent entry into the Tokyo market, with direct connectivity to Equinix, could represent a source of additional cross-connect revenues.

Australia

As with other markets, Australian demand drivers are diverse, but we believe they are indexed slightly more toward systems integrators, financials, and state and federal government requirements. Among the carrier-neutral players, Equinix and Global Switch are generally viewed as having the most connectivity options. NextDC is an emerging local competitor in multiple markets that we expect to attract growing share, particularly among domestic users. Sydney is the core connectivity hub and houses more capacity than other markets, but Melbourne is attracting increasing investment, and other cities (e.g., Brisbane) are significant regional hubs. Robust datacenter competitors in the market include the datacenter operations of numerous Asian telcos, systems integrators, and, among carrier-neutral players, Global Switch, Equinix, and NextDC.

Modular Datacenters

Modular datacenters, often in form factors compatible with shipping containers, are marketed as an energy efficient and rapidly deployable solution for certain requirements. Some newer modular designs now incorporate ambient cooling (using air-side economizers) to reduce the need for cooling equipment.

Modular datacenters most recently gained momentum in 2007, with the debut of a Sun-developed modular product, and are now offered by many suppliers. Modular datacenters are currently deployed at certain sites of Microsoft, Google, IBM, and several other installations. Suppliers of these solutions include HP, I/O Data Centers, SGI, Oracle (former Sun), Liebert, NxGen Modular, and many others.

Exhibit 91: Modular Datacenter



Source: Enterprise Control Systems

Modular units are marketed to datacenter operators as a means of quickly adding capacity at lower costs compared to development of traditional 'brick and mortar' datacenters. Vendors also tout their energy-efficiency (since only the containers need to be cooled, not the surrounding area outside of the container).

We believe modular units can effectively address near-term requirements that cannot wait for longer-term conventional approaches that may require more extensive building fit-out or retrofits. Another potential advantage for the customer is that it provides 'one throat to choke' in case maintenance or repairs are required; conventional maintenance and repair procedures often entail a complex chain of specialized experts for the various datacenter elements. We view demand for modular solutions as complementary to, rather than directly competitive with, conventional datacenter solutions.

Companies Mentioned

American Tower Corporation (NYSE: AMT; \$62.42, Outperform, Above Average Risk)
AT&T Inc. (NYSE: T; \$30.33, Sector Perform, Above Average Risk)
Clearwire Corp. (NASDAQ: CLWR; \$1.86, Sector Perform, Speculative Risk)
CoreSite Realty Corporation (NYSE: COR; \$19.24, Outperform, Average Risk)
Crown Castle International Corp. (NYSE: CCI; \$45.84, Outperform Above Average Risk)
Deutsche Telekom (FSE: DTE; €8.96, Sector Perform, Above Average Risk)
Digital Realty Trust (NYSE: DLR; \$67.32, Outperform, Average Risk)
DuPont Fabros Technology, Inc. (NYSE: DFT; \$34.13, Outperform, Average Risk)
Equinix, Inc. (NASDAQ: EQIX; \$112.95 Outperform, Above Average Risk)
Internap Network Services Corporation (NASDAQ: INAP; \$6.38, Outperform, Above Average Risk)
InterXion Holding N.V. (NYSE: INXN; \$14.06, Outperform, Above Average Risk)
Leap Wireless International Inc. (NASDAQ: LEAP; \$10.19, Outperform, Speculative Risk)
MetroPCS Communications Inc. (NYSE: PCS; \$8.68, Sector Perform, Above Average Risk)
Rackspace Hosting, Inc. (NYSE: RAX; \$43.28, Outperform, Speculative Risk)
SBA Communications Corporation (NASDAQ: SBAC; \$45.06, Outperform, Above Average Risk)
Sprint Nextel Corporation (NYSE: S; \$2.33, Sector Perform, Speculative Risk)
TelecityGroup PLC (LSE: TCY; £6.34, Outperform, Above Average Risk)
Verizon Communications Inc. (VZ; \$39.01, Outperform, Above Average Risk)

APPENDIX A: The U.S. Telecom Landscape Shaped by M&A

Date	Acquiror	Target	Comments
Apr-96	Bell Atlantic Corp	Nynex Corp	RBOC/RBOC merger. Deal value- \$23B
Apr-97	SBC	Pacific Telesis	RBOC/RBOC merger. Deal value-\$16.7B
Nov-97	MCI	Worldcom	Long distance merger. Deal value- \$37B
May-98	SBC	Ameritech	RBOC/RBOC merger. Deal value- \$62B
Jul-98	Bell Atlantic	GTE	Stock swap deal- \$53B
Jun-99	VoiceStream	Omnipoint	Regional wireless consolidation amongst PCS startups. Deal value - \$3B.
Sep. 1999	VoiceStream	Aerial	Regional wireless consolidation amongst PCS startups. Deal value- \$3.5B
Mar-00	Telecorp	Tritel	AT&T Wireless' two largest affiliates merged in all-stock transaction. Deal value \$5.3B.
June. 2000	Qwest	US West	Long distance/RBOC merger. Deal Value- \$43.5B
July. 2000	Deutsche Telekom	VoiceStream	Beginnings of T-Mobile USA. Deal value -\$46B
Aug-00	VoiceStream	Powertel	\$5.8B acquisition completes most of T-Mobile USA's national footprint (except California/Nevada and Carolinas).
Feb-04	Cingular	AT&T	Deal value- \$41B in cash
Jan-05	Alltel	Western Wireless	Regional consolidation. Stock-and-cash deal valued at \$6.2B
Jan-05	SBC Communications INC	AT&T	RBOC/long distance merger. Deal value \$16B.
Feb-05	Verizon	MCI	RBOC/long distance merger. Deal value- \$6.75B
Jul-05	Sprint	US Unwired	Consolidation of regional affiliate. Deal value- \$1.3B
Aug. 2005	Sprint	Nextel	The second national/national wireless merger. Deal value- \$36B
Nov-05	Sprint	Alamosa Holdings	Consolidation of regional affiliate. Deal value \$3.4B.
Dec-05	Sprint	Airgate	Consolidation of regional affiliate. Deal value -\$4.3B
Mar-06	AT&T	BellSouth	RBOC/RBOC merger. Deal value- \$67B
Apr-06	Sprint	UbiquiTel	Consolidation of regional affiliate. Deal value \$1.3B (cash).
Sep-07	T-Mobile	Suncom Wireless	Consolidation of regional GSM carrier. Deal value- \$2.4B cash and debt
Nov-07	AT&T	Dobson Communications	Consolidation of regional carrier. Deal value- \$2.8B in cash
Jul-07	Verizon	Rural Cellular Corporation	Consolidation of regional carrier. Deal value- \$2.67B in cash and debt
Jun-08	Verizon	Alltel	Consolidation of largest regional carrier. Deal value- \$28.1B
Oct-08	CenturyTel	Embarq Corp.	RLEC/RLEC consolidation. Deal value- \$11.6B
Nov-09	Sprint Nextel	Virgin Mobile	Consolidation of MVNO.
Dec-09	Sprint Nextel	iPCS Inc	Consolidation of regional affiliate. Deal value- \$832M
Apr-11	CenturyLink	Qwest	RLEC/RBOC consolidation. Deal value \$22.3B (stock plus assumption of debt).

Source: RBC Capital Markets and company reports

APPENDIX B: 2011 Financings by Sector and Company

Financing Deals- 2011 Sector Carriers	Date	Type of Transaction	Amount	Purpose
Sprint	9-Nov-11	Credit Facility	\$3B notes Due 2018 + \$1B notes due 2021	Net proceeds of the Notes to be used for general corporate purposes, which may include, redemptions or service requirements of outstanding debt, network expansion
MetroPCS	2-May-11	Incremental Term Loan Financing	\$0.6B incremental Term Loan to existing \$2.1B senior secured credit facilities	Proceeds to repay all of its existing outstanding Tranche B-1 term loans due 2013 under the senior secured credit facilities remainder of the proceeds for general corporate purposes, including opportunistic spectrum acquisitions.
	3-Mar-11	Restatement and expansion of credit facility	Restatement & expansion of current \$1.6B senior secured credit facility included a new \$1.5B term loan	Proceeds to be used for repayment of the \$0.5B term loan maturing in 2013 acquisitions and general corporate purposes including opportunistic spectrum
LEAP	18-May-11	Credit Facility	\$400M Senior notes due 2020	The proceeds to be used for working capital and other general corporate purposes, which may include accelerated deployment of next-generation LTE network technology and/or opportunistic acquisitions
Clearwire	13-Dec-11	Public offering + Sprint investment	Total \$734M / Public Equity Offering \$402.5M & additional \$331.4M in from Sprint Exercise of Preemptive Right	Funding for 4G LTE network
Datacenters/Hosting				
Equinix	6-Oct-11 7-Jul-11	Credit Facility Credit Facility	\$150M due Sep.2016 \$750M due July.2021	The net proceeds to be used for general corporate purposes, which may include capital expenditures, repayment of 2.50% convertible subordinated notes due 2012 upon maturity, working capital and potential acquisitions
Digital Realty Trust	7-Nov-11 15-Sep-11	Credit Facility Redeemable Preferred Stock	\$1.5B- Nov.2015 \$287.5B gross proceeds	The net proceeds received used to temporarily repay borrowings under credit facility, purpose of the new credit facility is to provide funds for acquisitions, development, redevelopment repayment of debt, working capital and general corporate purposes in the Asia Pacific region.
	22-Aug-11	Credit Facility	\$100M due Aug.2012	
	10-Mar-11	Credit Facility	\$400M due March.2021	
Dupont Fabros	14-Mar-11	Redeemable Preferred Stock	\$97.7M	The company intends to use all of the net proceeds together with borrowings under its currently undrawn \$100M credit facility to develop the second phase of its CH1 data center in Elk Grove Village, Illinois
Tower Operators				
American Tower	4-Oct-11	Credit Facility	\$500M due Nov. 2021	Net proceeds to be used for finance acquisitions and repay \$100M of its outstanding indebtedness under its \$1.25B revolving credit facility
SBA Communications	30-Jun-11	Credit Facility	\$500M - 7 year	Refinancing of existing debt.

Source: Company reports

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