SectorStance™

The SectorStance Monthly

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Mega-Ships: A Mini-Boon to Cruise Lines

Conclusion

Based on announced ship construction plans, the cruise line industry appears to be undergoing a more measured pace of ship capacity growth than that observed historically. After sustaining a 7.5% compound annual growth rate (CAGR) in passenger berth capacity since the early 1980's, the North American cruise industry is expected to have sustained a 4% CAGR in ship capacity between 2008 and 2013, according to the Cruise Line International Association (CLIA). Of course, these estimates disregard the dilutive effect that unforeseen ship retirements would have on industry capacity growth, but also overlook the potential for future ship construction plans to elevate supply growth.

Against the backdrop of this potentially more moderate pace of capacity growth, the cruise lines' new mega-ships are positioned to account for an increasing percentage of industry-wide North American capacity. While the financial implications for legacy vessels of these new ship introductions remain unclear, it does appear that their new features and amenities have continued to elevate the level of ticket fares achievable by major cruise line companies.

Viewpoint

Cruise lines have once again outdone themselves by introducing a new wave of mega-ships. In terms of their size and passenger capacity, these ships eclipse the dimensions of earlier vessel classes operated by the same companies.

The *Oasis of the Seas* – the flagship of Royal Caribbean's new Oasis class – is approximately 1,200-feet long, displaces 225,000 tons of water and sports 5,400 passenger berths (see Exhibit 1). Those specifications outshine the 1,020-foot-length, 138,000-ton displacement and 3,114-berth capacity of the five ships belonging to the earlier-generation Voyager class, which entered service between 1999 and 2003. They also eclipse the dimensions of the 1,112-foot, 160,000-ton, 3,634-berth Freedom class, three deliveries of which have occurred since 2006.

For its part, the Carnival *Dream,* with its 3,642 passenger berths, is about 20% larger than the next-largest ships operated by Carnival Corporation's Carnival Cruise Lines, Princess, Costa and P&O Cruises brands. Moreover, with 4,200 lower berths, the Norwegian *Epic* will be 75% larger in passenger capacity than Norwegian Cruise Lines' next largest ship when it enters service this summer.

Inasmuch as 90% of all cruises are sold by travel agents (according to CLIA), it is instructive to canvass the opinions of agents in order to gauge the industry impact of these ship introductions. To that end, we recently conducted a survey that elicited responses from twenty-five US travel agents who completed an Internet-based questionnaire.

While the results yielded by such a survey are anecdotal and subjective in nature, they nevertheless point to three potentially interesting conclusions:

1. While these new ships are perceived by agents to be having a mixed effect on industry booking volumes, they appear to be at least moderately advancing industry-wide pricing for 2010 Caribbean sailings.
2. Notwithstanding the salutary effect of new ships on overall Caribbean ticket fares, agents are split in their opinion as to whether these ships enable older ships to operate more profitably. Recent comments by cruise company executives do little to clarify the extent to which umbrella pricing benefits older vessels in the Caribbean cruise market.

3. Travel agents are divided in their opinion as to whether the revenue benefit of the new ships' pricing premiums will be sufficient to offset any negative effect on their own bookings resulting from the popularity of the newest ships.

Key Issues

The initial corporate feedback regarding the financial performance of these new cruise ships has generally been favorable. In particular, we note the following observations:

1. During the company's January 28, 2010 earnings conference call, Royal Caribbean Cruises Ltd.'s management observed that the *Oasis of the Seas*, which entered service during the 2009 fourth quarter, has been garnering "considerable" ticket fare premiums and observing onboard spending levels "handily above" those of other ships in the company's fleet. These favorable revenue trends have occurred against the backdrop of an early-2010 bookings "wave season" characterized by strong volumes and improving pricing. The port-based and shipboard logistics of managing large volumes of passengers have not appeared to present any major operational issues for Royal Caribbean.

2. During the company's December 18, 2009 earnings conference call, Carnival Corporation and PLC's management observed that Royal Caribbean's *Oasis of the Seas* had benefited the cruise industry by attracting greater consumer attention. Moreover, the ship's entry into service had not appeared to affect materially the tenor of pricing or occupancies for Carnival's own cruise ships.

The results of our travel agent survey, which was conducted during the first week of February 2010, suggest that the Carnival *Dream*, Norwegian *Epic* and Royal Caribbean *Oasis of the Seas* have had a more pronounced effect on current-year industry pricing than they have had on booking volumes.

In particular, 58% of our survey's respondents had observed at least a moderate favorable effect of the new ship introductions on industry-wide Caribbean pricing levels (see Exhibit 2). One-third of the responding agents had observed no discernible effect on pricing from the new ships. In contrast, nearly two-thirds of respondents characterized the new ship introductions as having little or no effect on aggregate industry booking volumes for the Caribbean market.

Notwithstanding the preponderance of respondents characterizing the industry-wide pricing effect of the *Dream*, *Epic* and *Oasis of the Seas* as favorable, travel agents responding to our questionnaire were split evenly in their opinion as to whether the pricing premiums generated by the new mega-ships have created a pricing umbrella under which older ships are able to operate more profitably. One respondent cautioned against the temptation to ascribe "savior status" to the impact of the three new mega-ships outlined in Exhibit 1 of this report.

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Exhibit 1 Cruise Ship Vessel Class Introductions: 2009-2010

Company	Carnival Corporation & PLC	NCL Corporation Ltd.	Royal Caribbean Cruises, Ltd.
Cruise Line	Carnival Cruise Lines	Norwegian Cruise Lines	Royal Caribbean International
Shipbuilder	Fincantieri	STX France SA	STX Finland Oy
Ship Class	Dream	F3	Oasis
Ship Name	Dream	Epic	Oasis of the Seas
Delivery Date	9/19/2009	June 2010	10/28/2009
Lower Berths	3,642	4,200	5,400
Tons	130,000	153,000	225,282
Length (feet)	1,004	1,080	1,187
CAPX (millions)	$740	$1,300	$1,400
CAPX per Berth	$203,185	$309,524	$259,259
Winter Homeport	Port Canaveral, FL	Miami, FL	Port Everglades, FL
Winter Itinerary	Eastern/Western Caribbean	Eastern/Western Caribbean	Eastern/Western Caribbean

Sources: Carnival Corporation & PLC, NCL Corporation Ltd., Royal Caribbean Cruises, Ltd., *Miami Herald*, cruisecritic.com.

Exhibit 2 Travel Agent Survey Results: Impact of New Ships on Caribbean Bookings

(Based on percentage of respondents characterizing impact of *Dream*, *Oasis of the Seas* and *Epic*, as indicated)

		Booking Volumes	Booked Prices
Significantly	Increased	0%	21%
Moderately		33%	38%
	No Effect	63%	33%
Moderately		0%	4%
Significantly	Reduced	4%	4%

Source: 25 travel agent responses to questionnaire, complied using surveymonkey.com.

P2P: Coming to an Enterprise WAN Near You

Conclusion

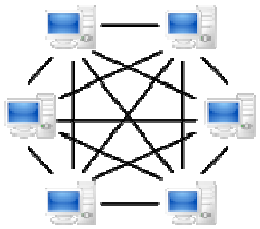
Until recently, P2P (peer-to-peer) technology has been synonymous with digital piracy, which has overshadowed the merits of the technology. However, P2P is experiencing something of a renaissance; it is an enabling technology for many forms of legitimate content distribution, communications and telephony, collaboration, and distributed processing.

We think P2P will prove to be as disruptive to enterprise networking as P2P telephony solutions like Skype have been to consumer telephony. In fact the cloud computing architectures that many enterprises are contemplating are reminiscent of P2P networks in the way distributed resources are coordinated and applied to computing tasks. Admittedly, this is a long-term enterprise opportunity. In the near-term, the impact of P2P will be made in redefining the scale, performance, and cost paradigms of enterprise messaging and remote application/file delivery.

Viewpoint

P2P technology was first widely deployed and popularized by file-sharing applications, such as Napster and KaZaA. Today, P2P-based file sharing accounts for nearly 75% of Internet traffic, according to TeleGeography. However, it is believed that the majority of this traffic is being generated by the unlawful distribution of music, videos, and software. Consequently, P2P has become synonymous with digital piracy. Until recently, this perception has overshadowed legitimate applications of the technology in the areas of content distribution, communications and telephony, collaboration, and distributed processing.

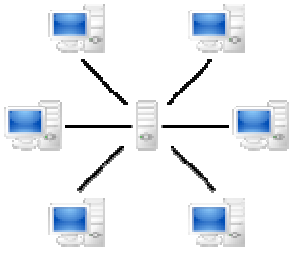
Exhibit 1 P2P Computing Topology



Source: Wikimedia Commons.

A pure P2P system utilizes a distributed network architecture composed of participants (i.e., nodes or clients) that make a portion of their resources (i.e., disk storage, processing power, or bandwidth) directly available to other network participants, without the need for central coordination by servers or hosts. In this fashion, participants both serve resources to, and receive resources from, other participants in the network.

Exhibit 2 Client-Server Computing Topology



Source: Wikimedia Commons.

In contrast, in a traditional client-server computing model, a server acts as a host and

shares its resources with clients in the network. Unlike P2P systems, clients do not share any of their resources directly with other clients. Rather, clients initiate sessions with servers to request content or services from the server.

Decentralized P2P networks have several advantages over traditional client-server networks:

1. **Scalability and Performance.** P2P networks scale indefinitely, without the need for costly centralized servers. Each new participant adds potential processing power and bandwidth to the network.
2. **Reliability.** The distributed nature of P2P networks results in no single point of network failure, which is a potential weakness of client-server systems. Centralized servers tend to serve as a system bottleneck in time of high network utilization.
3. **Low Cost.** By decentralizing resources and utilizing unused capacity in relatively inexpensive computing devices (e.g., versus data center network and server hardware), P2P networks have virtually been able to eliminate the costs associated with a large centralized infrastructure.

Notwithstanding the advantages of P2P systems relative to centralized architectures, they have historically had some notable drawbacks, hindering their adoption. These drawbacks include the following:

1. **Reputation.** P2P networking is still associated with digital piracy. We believe this reputational hurdle remains a significant impediment to commercial adoption of P2P-based technologies.
2. **Security.** Security is one of the most important problems to be solved for any P2P system because of potentially untrustworthy peers. In a P2P environment, there are no centralized servers with security databases or the capability of providing authentication and authorization services.
3. **ISP Bottleneck.** Internet service providers (ISP's) have been known to throttle P2P traffic due to bandwidth usage. P2P file-sharing is characterized by heavy bandwidth usage for long-lived file transfers. Also, peer serving is hindered by asymmetrical network capacity; downstream capacity can be up to ten times greater than upstream capacity in consumer Internet links.

A renewed interest in P2P technology has coincided with rising broadband adoption rates. Ubiquitous broadband connectivity has helped pave the way for mainstream audiences to embrace Internet video, which is extremely expensive to deliver at scale using client-server approaches. It is unlikely that a client-server approach alone could scale reliably to large audiences without being augmented by a distributed architecture of some type (e.g., CDN, P2P, or IP multicast).

In some ways, the application and file delivery challenges that enterprises face today are analogous to the content delivery challenges facing media firms. That is, the timely delivery of digital assets to a large, distributed user base is a mounting networking challenge. Enterprises are increasingly consolidating applications and storage in centralized data centers. Meanwhile, employees and other users of these applications and data are increasingly geographically distributed.

Key Issues

Most enterprises have been loath to allow P2P applications and streaming media to be accessed from their business networks. This reluctance is based on past security vulnerabilities and the potential for recreational Internet traffic to degrade the performance of critical business applications. However, in the case of the latter, network policy management tools are available to restrict recreational Internet use.

In our view, the potential productivity and cost savings inherent to deploying P2P-based solutions for content distribution (application and file delivery), communications (server-less

instant messaging), collaboration (workspace sharing), and distributed processing (division and distribution of computing) within an enterprise are becoming too significant for companies to ignore.

In this vein, Microsoft now provides peer-to-peer protocols, an application platform, and user experiences (e.g., Windows Meeting Space for desktop file and program sharing) in its current version of Windows. The intention is to enable Windows users to build scalable, high-performance, large-scale messaging solutions for use in collaboration and content distribution. Of course, enterprises could simply use a solution like Skype – a secure, commercial P2P-based telephony and messaging platform that already boasts hundreds of millions of users – rather than build their own applications.

We believe P2P technology can be as disruptive to enterprise networking as it has been to consumer telephony (Skype). In fact, from the way messages are passed between nodes to the process whereby distributed resources are coordinated and applied to computing tasks, the cloud computing architectures being contemplated by many enterprises are reminiscent of P2P architectures. It would not be an overstatement to assert that cloud computing will revolutionize computing and networking.

We think P2P could have a more immediate impact disrupting the multi-billion dollar remote application and file delivery sectors. Today, enterprises use WAN (Wide Area Network) optimization controllers to reduce bandwidth usage, lower data center networking costs, and improve end user performance. These devices utilize compression and distributed network caches to accelerate application performance and data backup and minimize bandwidth consumption. Caches operate by storing frequently accessed data objects (e.g., files and web pages) at remote locations and periodically synchronizing that data with central servers.

We believe that P2P could deliver a comparable value proposition to WAN optimization controllers; or, at the very least, complement these solutions in enterprise deployments. We think P2P technology is superior on two critical dimensions:

1. **Scalability.** Many WAN optimization controllers utilize a hub-and-spoke architecture (loosely akin to a client-server architecture), whereby a central controller manages the optimization to each of the remote controllers individually, with limited peering between remote controllers. This places a significant computational burden on the central controller(s) and limits system scalability.

2. **UDP (User Datagram Protocol) Optimization.** Most WAN optimization controllers are TCP (Transmission Communication Protocol) optimization devices only and cannot guarantee the service level of real-time, latency-sensitive UDP network traffic, like VoIP, Citrix and RDP. Enterprises will increasingly require this assurance, as VoIP is more widely deployed and enterprise applications and workspaces are increasingly being centralized and remotely delivered (e.g., desktop virtualization).

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Patrick Rau, CFA
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Energy/Natural Gas
Volume: 10-02

Rising US Natural Gas Supply Picture Creates Price Risk

Conclusion

On February 3, 2010, the 12-month NYMEX natural gas futures strip closed at $5.85 per MMbtu (million British Thermal Units). We believe the outlook implied by that price level, as well as the current 2010 Wall Street consensus estimate for natural gas prices of $5.75 per MMbtu, are too aggressive, based on a growing net supply picture in the US.

Viewpoint

There is nothing like a sustained blast of Arctic temperatures to drain natural gas storage levels. That is precisely what has happened this winter in the US. The country entered the heating season with 414 Bcf (billion cubic feet) more in natural gas storage than the previous five-year average. However, as of January 29, 2010, that storage level stood at a more manageable 146 Bcf. The reduction in storage levels has helped elevate natural gas spot market prices from below $4.00 per MMbtu in early November 2009 to the mid-$5.00 range today.

The sensitivity analysis summarized in Exhibit 1 portrays a highly conservative "best-case" scenario in which natural gas supply would decline by only 62 Bcf during 2010. Yet, on February 3, 2010, the 12-month NYMEX natural gas strip closed at $5.85, well above the $4-average US natural gas price for all of 2009. We recognize that speculation and technical trading considerations play a role in determining commodity prices. That said, based purely on fundamental considerations, it seems difficult to justify a 46% premium in the 12-month strip over 2009 based on a reduction in the net supply balance equivalent to just one day of overall consumption. This is particularly true, considering that we believe the actual supply balance is much more likely to *rise* in 2010, after factoring in probable increases in private company production and LNG (liquefied natural gas) imports.

Key Issues

Exhibit 1 illustrates some extremely conservative, "best-case" assumptions for the US natural gas supply and demand picture in 2010 that could affect overall net supply. Please note our objective is *not* to predict 2010 US supply-demand, but rather to provide a simple sensitivity analysis that corroborates our conviction that US natural gas supply will likely fall by very little, if at all, during 2010. Starting with the current 146-Bcf storage surplus, we proceeded with our analysis by adding expected 2010 production. Given the dramatic increase in drilling efficiency and well completion techniques over the last five years, it is difficult to estimate overall production growth based on a simple increase in rig count. Rather, we think a far more effective approach in today's environment would be to frame an industry supply curve by aggregating expected production levels for each firm in the industry.

During 2009, publicly-traded energy companies accounted for roughly two-thirds of US natural gas production. Based on disclosed 2010 production targets and recent trend-line growth profiles for 89 representative publicly-traded firms, we expect those companies to increase their gas production by 6.3% in 2010, versus a 4.8% gain in 2009. That increase would add 880 Bcf of incremental gas to market supply.

While these companies could significantly reduce their 2010 natural gas production in the face of lower gas prices, we do not expect that to happen. In particular, we estimate 45%-50% of planned production growth is directly hedged with financial instruments. Moreover, perhaps

another 15%-20% is indirectly hedged, inasmuch as it will be used in other parts of the energy supply chain, such as natural gas liquids fractionation or oil refining. In addition, a large proportion of rig activity in 2010 will be in unconventional areas, such as the Haynesville and Woodford Shale plays, where companies are drilling to hold acreage.

Our industry supply curve approach does not work as well for privately-held companies, for which it is much more difficult to obtain production data. Based on public company reports and industry production data, we extrapolate that production by private companies declined 19% in 2009, primarily because of lower natural gas prices and the collapse of the credit market. However, credit is once again flowing in the energy patch. Moreover, given the current 12-month NYMEX natural gas strip, we would be surprised if privately held producers lowered their gas output again in 2010. For the purpose of this exercise, we conservatively assumed zero production growth for private companies.

Imports, which comprise the other half of the gas supply picture, are a mixed bag. Net pipeline imports have declined during the last two years because of rising shale production in the US and oil sands production in Canada. Those net imports fell 213 Bcf in 2008 and by an estimated 341 additional Bcf in 2009. While we expect another 341 Bcf decline in 2010, that forecast could prove conservative, especially if increased Horn River and Montney production pushes more Canadian gas south of the border.

LNG is the potential wildcard. Those imports increased by an estimated 93 Bcf in 2009, in no small part because of the rise in world liquification capacity during the prior year. The US is slated to add two more import facilities in 2010. Qatar is also commissioning two more liquification trains, so there will be even more LNG production infrastructure in place.

More importantly, as shown in Exhibit 2, the differences among prices at the National Balancing Point (NBP) in the United Kingdom and the Henry Hub and Dracut, MA in the US indicate that the US may be emerging as a more favorable destination for spot LNG cargoes. For the purpose of this exercise, we conservatively assumed that US LNG imports will remain flat.

Turning to demand conditions, we note that major fluctuations in residential and commercial (R&C) natural gas usage tend to be driven by extreme weather conditions, which are difficult to forecast. We have used 47 Bcf, the median annual combined change in R&C consumption over the last decade, as an estimate for 2010.

We have also assumed a 163-Bcf increase in natural gas demand for power generators, based on the 2.4% annual trend-line consumption growth in that sector since 2006. This assumption runs counter to the Energy Information Administration's (EIA's) forecast that natural gas usage by power producers will *decline* in 2010, owing to the emergence of other generation sources. In addition, with the current 12-month natural gas strip at $5.85, we expect there to be some substitution away from natural gas among power generators in 2010. Therefore, we believe our expectation of *any* increase in electricity-related demand – much less a 163-Bcf increase – could prove aggressive.

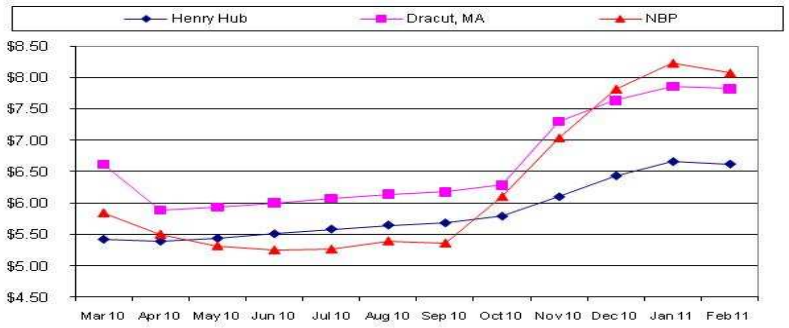
The foregoing assumptions point to a 475-Bcf increase in natural gas supply during 2010. That leaves the industrial sector as the last supply chain participant available to absorb the surplus. Higher real natural gas prices in the US have reduced industrial demand over the past decade (see Exhibit 3). With near-10% unemployment, it may be difficult for the US economy to improve enough this year in order for industrial demand to return to the average annual 6,588-Bcf level of consumption it experienced between 2005 and 2008. Even if industrial gas demand were to increase by this magnitude, it would add only 537 Bcf of industrial usage in 2010, scarcely enough to absorb extra supply.

Exhibit 1 US Natural Gas Net Supply "Best Case" Sensitivity Analysis (Amounts in Bcf)

Storage Balance In Excess of 5-Yr Average	146
Plus: Increase in Publicly Traded Company Production	880
Plus: Increase in Private Company Production	0
Plus: LNG Imports	0
Less: Decrease in Pipeline Imports	341
Less: Increase in Residential & Commercial	47
Less: Increase in Power Generation Demand	163
Subtotal Before Industrial Demand	475
Less: Increase in Industrial Demand	537
NET POTENTIAL CHANGE IN SUPPLY	-62

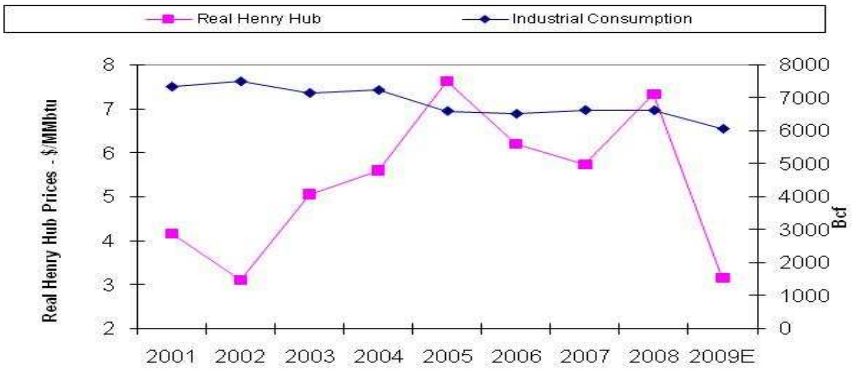
Sources: EIA, company filings.

Exhibit 2 12-Month NYMEX & ICE Futures and Estimated 12-Month Dracut, MA Forward Prices as of 2/3/10



Sources: NYMEX, InterContinental Exchange (ICE), *Natural Gas Intelligence*.

Exhibit 3 Real Henry Hub Prices (2000 Base) Vs. Industrial Consumption (2001-2009E)



Sources: EIA, *Natural Gas Intelligence*.

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