

Stranded Gas Hearings (0409011430 Minutes)

Estimates of Future Gas Prices

Edward M. Kelly, Vice President, North American Gas & Power, Wood Mackenzie, September 1, 2004.

EDWARD M. KELLY, Vice President, North American Natural Gas and Power, Wood Mackenzie, relayed that Wood Mackenzie would be considered consultant number two or three in the previous presentation [provided by Mr. Palmer]. Mr. Kelly mentioned that his presentation offers greater detail on some of the supply and demand factors previously spoken to by other presenters. Gas prices, now, are responding very directly to oil, and this is both a psychological and a fundamental reality with regard to the way markets are working now, he remarked, adding that Wood Mackenzie expects that linkage to continue, fairly consistently, due to that fact that there is approximately a trillion cubic feet of market that can switch from gas to oil products at various pricing levels.

MR. KELLY said that on the low price side, that's gas to residual fuel oil, and on the high price side, that's gas to distillate fuel oil. So either way, if gas moves into those alternative fuel prices - moves in one direction to compete against those alternative fuels - it tends to lose approximately a trillion cubic feet in annual market, and that's a strong force keeping gas bound in close relationship with oil. In addition, they're both traded on the NYMEX [New York Mercantile Exchange], and that creates a strong psychological linkage factor - excitement in one pit tends to lead to excitement in other pits. Also, noncommercial interests are trading both sets of products at once, so there are psychological correlations there as well. He said that from a fundamental standpoint, for the next decade or more, Wood Mackenzie doesn't see that changing a great deal - "there's not so much gas sloshing around that gas can price consistently below the level of oil products." With regard to outlook, as goes oil in the next 10, 15, or more years, so goes gas, he predicted.

MR. KELLY then referred to page 3 of his presentation, and said it focuses on the Organization of Petroleum Exporting Countries (OPEC) spare production capacity, which is set to grow. He pointed out that in the third quarter of this year, spare capacity for "OPEC-10" was approximately 800,000 barrels per day, which is not a lot in the context of a 29-million- to 30-million-barrels-per-day OPEC production capability. Still referring to page 3, he pointed out that spare capacity for "OPEC-10" in the fourth quarter was approximately 2.2 million barrels per day, and suggested that one could expect spare capacity to expand a great deal. Geopolitical uncertainty being what it is, he remarked, oil prices can sustain at high levels due to psychological factors and the reality of geopolitical uncertainty; nonetheless, spare productive capacity is set to increase substantially in the fourth quarter of this year.

MR. KELLY referred to page 4 of his presentation, and said that as a result of [this increase], the oil price outlook does tend to decline significantly, beginning in the early part of 2005. Price outlooks for natural gas, he remarked, assume a long-term, real, oil price outlook of about \$22.75, in 2004 dollars, per barrel - that's for Wood Mackenzie's West Texas Intermediate (WTI). At that price level, he noted, the gas price range is very consistent with that which has been presented by previous speakers - a gas price of between \$3.50-\$5.00. This is based on competing oil products in the end-use market in much of the U.S. In addition, one must also consider what is on the margin for supply. He relayed that Alaska gas would not be competing with LNG so much as with the cost associated with sustaining U.S. and Canadian production.

MR. KELLY said he concurs with some of the figures provide by prior speakers with regard to declines in North American production, adding that the cost associated with replacing 16 bcf per day of North American production essentially sets the floor price for natural gas. Therefore, if the cost associated with replacing that amount of production is \$3.00, for example, then a price above \$3.00 will encourage the drilling necessary to get that 16 bcf a day produced. Evidence in the marketplace now suggests that as prices decline below \$4.00, a lot of activity "came off," which implies very strongly that at that point, in 2002, the cost associated with drilling many of the marginal wells in North America was between \$3.50 and \$4.00 per million Btu [British thermal unit]. This sets a pretty strict long-term floor price for gas, he

remarked, under current drilling costs regimes, under current technology, and once the price declines below the cost of drilling marginal wells, native supply will decline pretty fast.

MR. KELLY, on the issue of risk that Alaska and producers might face, indicated that residual fuel oil can also be a factor in setting the floor price - currently that is \$3.00 to \$3.50 in a \$23 oil environment. Also, the cost of replacing production can be a factor, as can the type of technology being used. As technology improves and producers are able to extract more product, the floor price could decline as a result. He remarked that Wood Mackenzie is of the view that North American productive capability can be sustained as long as gas prices remain high enough to encourage marginal drilling, but that will require \$3.75 to \$4.00 gas under current conditions. He noted that various entities predict a range of Lower 48 production declines, and Wood Mackenzie is about in the middle of those predictions.

MR. KELLY detailed some aspects of Wood Mackenzie and the work that it does. He mentioned that the nature of production and the location of production will change over time. Also, changes in location will affect changes in the nature of production. For example, production could shift from historically defined conventional reservoirs with better porosity, better permeability, to unconventional reservoirs, which are historically defined as relatively tight reservoirs, coal bed methane (CBM), and shale. These unconventional reservoirs will make up over 40 percent of U.S. production by the year 2010, he predicted, whereas current production of these unconventional reservoirs ranges in the upper 20 percent.

MR. KELLY detailed aspects of the "Rocky Mountains," mentioned that the obstacles to increasing production are becoming more meaningful as the opposition to drilling activity becomes more organized and efficient, recounted some of the efforts put forth by those in opposition to drilling, and noted that the risk associated with attempts at increasing production is sometimes dependant on the pace at which drilling can actually occur. He also mentioned that almost all of the increase in the "Rocky Mountains" will be from unconventional sources.

MR. KELLY indicated that with regard to Canada and Mexico, there is similar outlook through 2010 and beyond. Currently, the U.S. is exporting about 1 bcf per day into Mexico, even at \$5.00 to \$6.00 prices, but that should decrease due to Mexico importing LNG. He relayed that Wood Mackenzie expects the flow between the U.S. and Mexico to reverse by the year 2010, though this reversal won't be the result of an increase in native Mexican production. He mentioned that Mexico's upstream industry is the most closed in the world; at this point, it is virtually impossible in Mexico to get effective private investment in drilling. Mexico's potential to increase beyond 2010 depends on structural change in the Mexican upstream; if such a change occurs, Wood Mackenzie's production outlook for Mexico could be substantially exceeded, and this could provide a critical increment of supply into the North American marketplace, though it won't solve the gap.

MR. KELLY referred to page 11 of his presentation, and said that Wood Mackenzie's view on LNG and Arctic projects is that they are highly unlikely to fully address the supply/demand gap. Although the number of proposals has exploded in recent years, there are a couple of limiting factors that intersect, the first being the availability of liquefaction capacity on the upstream end, the second being re-gas permitting capability. Each re-gas project that's permitted has to have a supply source, but suppliers aren't necessarily rushing to do business with a re-gas project just because it's permitted, especially since some permitted re-gas facilities are expensive. "You've got to have both to make an LNG value chain work," he concluded. He mentioned that Wood Mackenzie anticipates that by 2010, there will be 6 bcf per day of LNG, total, in the U.S. main grid.

MR. KELLY remarked, "Our assumption on Alaskan gas, in our models, is 2015; that's a modeling artifice ... based on feasibility." One reason that many are rushing to build LNG facilities is that the cost basis for delivering LNG into a re-gas facility on the East Coast varies between \$1.00 and \$3.00, so there is a lot of money in the remainder of the value chain. This [cost basis] already assigns, to the producers, a 12 percent rate of return towards the upstream activity necessary to get the LNG into the ship. Although doing something similar on the West Coast is somewhat more risky, it has attracted a lot of LNG development interest. He mentioned that LNG will continue to be a seasonal fuel for a long time to come

because Asian and other markets have no storage; since LNG [delivery] in those regions has to ramp up in the winter and ramp down in the summer, this leaves a lot of cargoes available for summer delivery to other places such as the U.S.

MR. KELLY said that the supply/demand gap in the U.S. is large enough that it won't be satisfied only by either Alaskan gas or LNG, particularly given that the speed at which an LNG value chain can be built is somewhat limiting. Also, the U.S. gas market is limited by the number of molecules available to it; it would be much larger today if there were more molecules available to it. That limitation won't be overcome in the future, he predicted; instead, the gap will only get wider. He also predicted that although there is currently an overbuild of gas-based power generation facilities, more such facilities will have to be built beginning in 2010 in order to meet increased regional demand; he characterized natural gas as the default source for the majority of those yet-to-be-built power generation facilities.

MR. KELLY said that this is an organic growth in gas demand that is dependant on the growth of the economy, though the U.S. is consuming electricity much more efficiently and is not devoting energy to industrial usage as much as it had been in the past. He predicted that economic growth to energy usage will drop to 3:1.6, though regardless of this drop in increasing power consumption, demand will continue to increase depending on regional differences and seasonal changes. He went on to detail some of the uses for gas consumption, for example, in the making of steel, fertilizer, and paper. Broadly speaking, he remarked, this year is a strong year for industrial gas consumption, though it may be the last strong year for a long time to come. Referring to page 22 of his presentation, he relayed that the average "Henry Hub Spot Price Outlook" for 2005 is listed as \$5.36 per mmBtu [million British thermal units], though that depends very strongly on a "\$35 oil price."

MR. KELLY said that through 2010, it will be difficult to sustain gas above \$4.00. He spoke of residual fuel oil and distillate fuel oil, and mentioned that gas gets priced between those two and that roughly a trillion cubic feet (tcf) of demand would go away if gas "went below [residual] or above distillate." Referring to his presentation, he stated:

Longer term. Flat picture for supply. With Alaska, again, by assumption, coming in at 2015. This requires, again, that \$3.75 to \$4.00 minimum kind of price to sustain a heavy pace of drilling to replace that 16 billion cubic feet a day each year; that heavy pace of drilling has to continue to sustain U.S. Lower 48 and Western Canadian supplies, and that's the floor price setter for much of our gas price outlook - [it] is the price required to sustain that level of drilling.

MR. KELLY mentioned that a heavy effort will be required to sustain Western Canadian production, though there will be a slight increase in Eastern Canadian production through 2011-2012 due to "Arctic Canada" coming in. He predicted that Mexican production can increase, though that will depend very much on the structure of the business. Referring to Mexico, he mentioned "privatized upstream structure," "multiple service contract structure," and that Mexico suspects the U.S. of draining some reservoirs that are co-terminus with Mexico's portion of the deep water Gulf of Mexico. He concluded that Mexico has strong incentive to either allow a private structure or gain the expertise to access its own reservoirs, and predicted that it will be "a leftist" [government] that will allow such structural change.

MR. KELLY said that something to be aware of is that politically, "we" don't like to drill, and yet any of the anticipated increases that he's mentioned are based on the premise that drilling will continue. From a geological standpoint, uncertainty exists in "the deep water," though from a financial standpoint, "the financial stars have aligned for producers" and this has resulted in the kind of [drilling] activity currently taking place. Currently, long-term capital is plentiful, cheap, and available; this is because, relative to other sectors of the economy, producing energy is "somewhat hot" and the investor community is a very trendy and fickle community. "Right now, it's the best of all possible worlds for getting capital into the North American upstream, [but] that can change," he remarked.

MR. KELLY, referring to "our" LNG outlook, said that an impending reality of an Alaskan gas pipeline would make other markets more attractive to LNG producers and would cause a slowdown in the increase in LNG deliveries directly into the North American continent. By the year 2020, the power sector will reign, he predicted, unless and until an alternative means of producing electricity is found or until

there is a revolutionary shift in patterns of energy consumption. "We need the stuff for power generation, and power generation becomes by far the largest consuming sector by 2020," he remarked. He mentioned that Canadian demand is similar though Canada has a strong industrial demand as well.

SENATOR THERRIAULT asked what the effect will be of "purchasers" going to longer-term contracts and whether this has been factored into possible price stability.

MR. KELLY said it is difficult to foresee that there will be longer-term fixed price contracts for the natural gas commodity. He pointed out that when the Enron Corporation fell, the ability and willingness to take that kind of long-term price risk fell with it. The ability to "hedge forward" is a real service that requires a great deal of credit behind it. He predicted that utilities will hedge a portion of their gas price portfolio in order to limit [price fluctuations], and mentioned that he'd received a hedged deal from his competitive service provider in Texas that he'd taken advantage of. He suggested that [the state] will have more choice than it will know what to do with in the sense that some will provide a high fixed price and others will provide a floating price; the latter is already occurring at the "small customer" level. He opined that the ability and willingness to sign long term fixed price deals will not emerge as a major aspect of the supply business, though it may be a part of a portfolio strategy for producers and consumers.

MR. KELLY, referring to page 37 of his presentation, said that a strong catalyst to demand is the fact that a lot of the coal infrastructure is "old stuff," as are a lot of the oil and gas steam units. So by the time an Alaskan [pipeline] came on line, "you're" going to be retiring fairly significant amounts of coal units, which must be replaced "one for one." Additionally, the likelihood that there will be a coal shortage east of the Mississippi River and Illinois/Indiana border is real, so even if new coal-burning plants are developed, there may not be enough coal to supply them. Referring to page 39 of his presentation, he said:

The middle two bars are gas fired, so you've got another 150,000-plus megawatts of new gas-fired generation by the year 2020, assuming that somehow we build 80,000 megawatts of coal-generation. And it will be very clean-burning coal relative to what coal is today, but that's a lot of coal, that's a lot of time, [and] a lot of permitting efforts required.

MR. KELLY remarked that "we're stuck on fossil fuels," so any risk the state might face by taking ownership of a pipeline and taking royalty in-kind (RIK), or taking a contract position on a pipeline, would be based on whether "we're" still dependant on fossil fuel consumption. Currently, he remarked, "we need more gas, ... and we need more ... than even LNG and Alaska are likely to provide." He predicted that in real 2004 dollars, the price will hang above \$4.00 until an Alaskan pipeline is brought online, at which time the price will drop by about a \$1 over two years due to annual declines not being replaced. He concluded that with regard to the state taking a contract on a pipeline, or having ownership of a pipeline, it's difficult to see the state's cash risk as being anything more than minimal unless there is some significant, fundamental transformation in the way North America consumes or produces energy.

REPRESENTATIVE GARA asked whether bringing Alaska gas to market will have a long-term impact on Lower 48 gas prices.

MR. KELLY predicted that after the first four to five years after Alaska gas comes to market, the price will begin an upward trend that will continue. In response to another question, he said, "I wouldn't characterize it as a race between Alaskan gas and LNG, because it's just difficult to see LNG accumulating fast enough to drive gas prices down below competing products, to result in a North American supply that's great enough for gas to recapture oil-based markets."

REPRESENTATIVE ETHAN BERKOWITZ, Alaska State Legislature, asked whether any consideration has been given to the role that gas-to-liquids (GTL) might play in terms of filling markets.

MR. KELLY said that Wood Mackenzie has addressed GTL as a monetization option for stranded methane pools worldwide. He mentioned that because the western world is relatively energy short, there is every incentive to invest in whatever means can monetize distressed methane pools worldwide, and so GTL will be used.