

Natural Gas Technology – Investments in a Healthy U.S. Energy Future

Concurrent Panel Discussion Session

Panel A: Delivering 30 Tcf - Will we be Ready?

Questions and Answers

Q (by Rhone Resch – Moderator and directed to James Kendell of EIA)

In your presentation, you projected a natural gas price of \$5.56/Mcf in year 2020. If this projection is true, how realistic is a 30 Tcf market?

A (James Kendell – EIA)

The \$5.56/Mcf projection is nominal dollars. The 2020 price projection in 2000 dollars is actually \$3.26/Mcf, which will have no adverse effect, I think, on the 30 Tcf market projection.

Q (by Rhone Resch – Moderator and directed to Raoul Leblanc of Anadarko)

In your presentation, you indicated that a sustained 2% annual growth will require tremendous supply availability and drilling activity which will translate to high gas prices. With this in mind, what impact will that scenario have on 30 Tcf Market?

A (Raoul Leblanc - Anadarko)

Frankly, I personally do not believe we will have a 30 Tcf market in 2020 under a high gas price scenario. High gas prices usually translate to lower consumer demand in all sectors. My point is that may reduce demand growth and postpone the date that we arrive at a 30 Tcf market.

A (Tom O'Connor – Duke Energy)

High prices usually translate to a reduction in throughput. Higher prices have translated to lower throughput on Duke Energy's systems. During the last price hike, 7 and 10 percent reductions in throughput were experienced on the Algonquin and Texas Eastern transmission systems, respectively.

Q (by Rhone Resch – Moderator and directed to all panelists)

In your opinion, what is the role of government in technology development in meeting a 30 Tcf market?

A (Lee Stewart – SOCAL)

Government does have a role. Since end users are the ultimate beneficiaries of the dividends of technology investment, ratepayers in some form, should invest in technology research and development, either through a rate structure, as is the case in California, or through tax dollars. The DOE approach is a good one.

A (Robert Bryngelson – EL Paso Global LNG)

The role of government should go beyond the traditional technology research and development. I would like to see government streamline the process so that new technology can reach the market much faster to meet market needs as they arise.

A (Raoul Leblanc - Anadarko)

In my personal view, I believe government has a limited role. The industry will always innovate. Government should not be too much involved in direct research and development.

A (Al Shroeder of Energy Value from the audience)

Investment in technology R&D in the major oil gas companies is on the decline. Only one of the top 50 energy companies is currently investing top dollars in energy technology R&D. The role of government, I believe, is providing a common platform, leveling the playing field and providing the basic building blocks for technology research and development to thrive.

A (Hugh Guthrie of DOE-NETL from the audience)

I believe government should be involved in technology research and development. An analysis of a 30-year history of investment in research and development by the 32 largest oil and gas companies show that they barely meet the minimum return on capital requirement. Since the

U.S. government, is the largest owner of oil and gas assets, if some level of R&D is needed in the industry, then government has a right and an obligation to get involved in technology R&D.

Q (Stan Borys – GTI and directed to Robert Bryngelson of El Paso)

In the early 80's there was a very safe technology for LNG transportation and transmission developed by Westinghouse. Are you aware of this technology or have you seen what they did?

A (Robert Bryngelson – El Paso)

No. I'm not personally familiar with the technology you are referring to. The LNG technology issue is more "time to market" than anything else. Right now, the industry is struggling with who regulates infrastructure for these new LNG delivery alternatives.

Q (Stan Borys – GTI and directed to Robert Bryngelson of El Paso)

A lot of people talk about LNG expansion vis-a-vis the shipping capacity of LNG tankers, number of shipyards, the capacity to build tankers and the capacity for optimum utilization of tankers. Has your company looked at these issues and, in your opinion, is the market able to build ships as fast as needed?

A (Robert Bryngelson – El Paso)

We think the industry will be able to build the ship capacity needed. In the last two years, there has been a significant increase in orders placed, but there should be sufficient shipyard capacity to handle most of the load.

Q (by Rhone Resch – Moderator and directed to all panelists)

What can the industry do to educate the public about the safety of LNG to increase public acceptance so that terminals can be built faster?

A (Robert Bryngelson – El Paso)

Intensified education aimed at changing public perception will be key. Operational videos that highlight the safety of LNG and LNG terminal technology will be helpful. Another approach will be comparing the energy content and volatility of LNG to that of other fuels currently

transported in urban areas (such as gasoline), and using it as an educational tool. The challenge to the industry is accomplishing the education process quickly enough.

A (Tom O'Connor – Duke Energy)

A significant amount of planning and capital is required before a major pipeline is built. There is also up to a 5-year lag before the pipeline becomes operational.

Q (from the audience)

What, in your opinion, is responsible for the declining curves in production that we see today? Are resources being targeted to match financial objectives of the production companies?

A (James Kendell – EIA)

Three factors, I think, are responsible: 1) better technology, 2) movement to smaller fields that produce faster than bigger fields and 3) movement to just-in-time investment philosophy by the industry. A lot of shallow wells are being drilled, but EIA is not concerned about the production-to-reserve ratio dropping catastrophically.

A (Raoul Leblanc - Anadarko)

Tight gas wells with fast decline rates are now being drilled. Coalbed methane will change the dynamics in the West because of their production profile, but in general, across the Lower 48, more and more marginal wells are being drilled as we continue to work in mature basins.

Q (Rita Bajura – NETL)

What will be the instantaneous impact of a 400 MW plant on the gas infrastructure?

A (Tom O'Connor – Duke Energy)

The impact will be 60 MMcf/day at 2,500 Btu/hr. Storage service is the answer for managing the electric demand swing.

A (Lee Stewart – SOCAL)

I think line packs will make a perfect solution for a single plant, but the concern I have is of the long line pipelines' ability to balance the system when multiple facilities come on simultaneously.

Q (Rita Bajura – NETL)

Does any of you individually or corporate, drive a natural gas-fueled vehicle?

A (Lee Stewart – SOCAL)

Driving or not driving a natural gas vehicle is a function of convenience. As far as I'm concerned, it is not convenient, so I don't drive one. I will drive one if and when it is convenient.

A (James Kendell – EIA)

A limiting factor for a CNG vehicle is how far you can go with a full tank and your ability to re-fuel. I think more people will embrace the technology if there are more conveniently located fueling stations.

A (from the audience)

The economics of CNG are not favorable for small and private cars. It's good for fleet.

Q (from the audience and addressed to the panelists)

Are there any transmission constraint issues in regard to supplying natural gas to new power plants?

A (Tom O'Connor – Duke Energy)

Most pipelines operate at pressures high enough to meet the demands of power plants. It is mostly a tariff or contractual issue between the power plant and the pipelines or LDCs.

Q (Rita Bajura – NETL)

Is the gas industry experiencing a shortage of professional manpower?

A (Tom O'Connor – Duke Energy)

The industry can certainly do with more graduates with technical and financial backgrounds.

A (Raoul Leblanc - Anadarko)

The industry as a whole has laid off a large part of its work force in the exploration sector. Anadarko is an exception to this, and has never had a general layoff, but have continued to build its technical staff. In addition, however, we are also turning to candidates that combine technical and business skills.

A (Robert Bryngelson – El Paso)

El Paso has outsourced many functions from its technical/engineering department, retaining a core operations and implementation team to direct the process. The company is interested in graduates with both technical and financial backgrounds, among others.

A (James Kendell – EIA)

At EIA, we mainly hire economists, operations research analysts, and statisticians. About 20% of EIA's workforce are eligible for retirement. In 3 years, 40% will be eligible to retire and 76% of managers will be eligible for retirement. There is, therefore, the need to quickly move people to management positions. The industry still has an image problem. Young graduates don't like to work in the energy industry, probably because of the environmental controversies surrounding the industry.

Q (Rita Bajura – NETL)

If you were President of a University, what department(s) would you set up that will eventually provide a good and professional work force for the gas industry?

A (Tom O'Connor – Duke Energy)

A department that emphasizes biological studies would be my priority.

Q (by Rhone Resch – Moderator and directed to all panelists)

How has your businesses changed since September 11? How has it changed some of your priorities, including some of your projects in the context of national security?

A (Lee Stewart – SOCAL)

Things have gone back to equilibrium. At SOCAL, people are now more aware of the vulnerabilities and the criticality of their business. SOCAL has beefed up security, but the system is so large it is almost impossible to cover all bases. The DOE has been very responsive by soliciting input and analyzing options.

A (Tom O’Connor – Duke Energy)

After 911, Duke went on heightened alert making adjustments and improvements where necessary. The company now monitors critical facilities in the pipeline system. Duke is also analyzing and evaluating the Canadian understanding of how they, as a country, can be a solution for the lower 48 states.

A (Raoul Leblanc - Anadarko)

Anadarko is currently reevaluating international risks. The company is also reappraising where they want to do business through a thorough risk assessment process with plans on how to manage the risks.

A (Robert Bryngelson – El Paso)

El Paso is revising its security positions throughout all of our operations and all employees are involved in this effort. The company is also very careful about what it shows in public presentations. El Paso is also currently evaluating the new level of risk posed to our infrastructure system as a result of September 11, and taking appropriate steps to minimize any potential threats.

A (James Kendell – EIA)

In response to 911, EIA has removed some information from its web site. Aerial photographs of all sensitive sites have been removed. At the DOE headquarters, a new PA system has been

installed in the building for better communication in case of emergency or power failure. There is a plan being developed on how to reconstitute the agency in case of building destruction as a result of terrorism.

Q (Rita Bajura – NETL)

If you are to give a 30 second sound bite to government policy makers on a pending energy bill, what will your message be?

A (Robert Bryngelson – El Paso)

I will enjoin them to let the market work and also encourage real discussions on actions and consequences. The country has some tough choices to make and everyone needs to be aware of all the pros and cons.

A (Lee Stewart – SOCAL)

I will encourage them to define their priorities and stick with it.

A (Raoul Leblanc - Anadarko)

I will enjoin them to let the market work and also encourage real discussions on actions and consequences. The country has some tough choices to make and everyone needs to be aware of all the pros and cons.

Q (Leonard Graham – NETL)

Can we meet the 30 Tcf market? How do you overcome the psychological perceptions of the public regarding a 30 Tcf market?

A (Tom O'Connor – Duke Energy)

Developing clear policies that all segments of the market can understand so that competing interests in this country will not continue to complicate issues. Figure out what is important to the industry and stick with it. Policies should be clear and should enhance market growth in the right increments.

A (James Kendell – EIA)

Most people don't care about a 30 Tcf market. All they care about is the price of natural gas at the burner tip. Provided prices rise slowly and steadily, as opposed to sudden spikes of recent years, people will not care.

Q (by Rhone Resch – Moderator and directed to all panelists)

Will we have a 30 Tcf market and, if we do, will we be ready?

A (Lee Stewart – SOCAL)

I don't know if we will reach a 30 Tcf market or not. I can't answer the question. I know however, that the infrastructure will be ready at the right price and the right policy.

A (Tom O'Connor – Duke Energy)

I believe we will be ready. The excitement is in the amount of capital needed, but I think the capital will be accessible.

A (Raoul Leblanc - Anadarko)

I believe 30 Tcf will happen if all the drivers are aligned, but reaching a 30Tcf market is not something that we make happen. This is a market, and companies strive to offer the best energy source for the cheapest price possible, while consumers choose the best product at the lowest cost. Whatever the interaction of the two drivers get us, the important thing is the benefits created.

A (Robert Bryngelson – El Paso)

I think that we are ready for a 30 Tcf market, and since LNG has become increasingly competitive, it will be the source of much of the incremental supply. It may not be the only solution, but I see LNG playing a huge role in meeting a 30 Tcf demand market.