



Renowned energy expert and Pulitzer Prize winner Daniel Yergin shares his thoughts about what the natural gas utility business may look like in 2020 and beyond.

In May 2008, at the direction of the AGA Strategic Planning Committee, AGA launched the Vision 2020 Strategic Planning Initiative. Its purpose was to identify the natural gas utility industry's long-term strategic challenges and opportunities, their implications for the future of AGA's members, and the role AGA should play in helping members prepare for that future. Vision 2020 included brainstorming discussions of key energy issues among industry executive and outside experts, as well as roundtable discussions among the strategic thinkers and top executives at AGA's member companies.

Vision 2020 also included interviews with a number of the world's most respected and renowned energy experts. The intent was to complement the local utility industry perspective with a higher-level look at national and global energy, economic and environmental

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issues—and what effect they may have on the day-to-day operations of the local energy utility.

To this end, *American Gas* recently spoke with Pulitzer Prize winner and U.S. Energy Award honoree for “lifelong achievements in energy and the promotion of international understanding” Daniel Yergin, PhD, about his views of American energy in the coming decades.

Yergin is co-founder and chairman of Cambridge Energy Research Associates (CERA), a leading energy consulting and research firm, and executive vice president of IHS, CERA’s parent company. His book *The Prize: The Epic Quest for Oil, Money and Power* won the Pulitzer Prize and became a No. 1 bestseller and the basis of an eight-hour PBS/BBC series seen by 20 million people in the United States. The book has been translated into 17 languages and has just been released

come obstacles to developing such new technologies worldwide?

YERGIN: Technology is essential to the energy business. In fact, in many ways the business is all about technological innovation. We’re seeing that right now in terms of unconventional gas in the United States. As a country we have underinvested in research and development, but we have to be consistent—not up and down swings in investment—and there has to be a partnership between government and the private industry, along with universities and research institutes.

One thing that is new is a new set of players—venture capitalists—who look at energy the way they have traditionally looked at information technology, computers, bio-tech and the like. They’re the new kids on the block in the energy business, and it’s probably going to be about four to six years before we see their impact, es-

intense national seminar on cap-and-trade and carbon regimes although the timing and outcome of that debate will be affected by the recession. Obviously, cap-and-trade will create a vast new market. Some people feel absolutely that’s the way to go; others think a carbon tax would be more straightforward and simpler to administer. The debate will be over which one gives the right incentives. It will also be over the vast revenues that will result, and what is to be done with that money.

Keep in mind that it’s a very different playing field than it was even a few years ago. On the one hand, the consensus on climate change is much broader. On the other, you have all of the turmoil and upheaval in the financial markets now and the resulting loss of confidence. How will cap-and-trade fit into that? That would not have been an issue for cap-and-trade in 2007. I would think that there will be much more focus on the regulation of a cap-and-trade system today.

AMERICAN GAS: *On natural gas going into electricity generation, AGA’s position is that we need more diversity in power generation—more different fuels in the generation mix—because regardless of what people say about renewables and nuclear being able to meet a significant portion of power generation soon, we don’t see that happening soon at all, which means more gas—which AGA thinks is best used directly in homes and business—goes into power generation. What is your view?*

YERGIN: I agree. Natural gas is the default fuel for generation. When we get into debates about offshore drilling, people think about oil, but it’s also about gas. It’s about the continuing importance of gas in electricity generation and what will likely be the growing role for gas in that market.

Your gas company members worry about gas going into electricity generation because of its effect on supply and price for their customers. But most people don’t understand the

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in a new, updated edition.

Yergin also has chaired the U.S. Department of Energy’s Task Force on Strategic Energy Research and Development. He is the only foreign member of the Russian Academy of Oil and Gas, and serves as one of the “Wise Men” of the International Gas Union.

AMERICAN GAS: *To begin with the issue on everyone’s mind, climate change, some energy experts believe the only solution to the greenhouse gas emissions problem is to invest massive sums of money into developing radically advanced low-carbon technologies—a Manhattan-like project, if you will. Is that feasible? Is it worthwhile? What needs to be done to over-*

pecially given all the variables— scale, time frame, capital intensity, the regulatory framework, the requirements for reliability and so on.

What will be highly significant now is the big step-up in government support for energy R&D that the Obama administration has committed to. The more participants in the research enterprise, the better. Technology really does drive efficiency, which is critically important to meeting the greenhouse gas emissions challenge.

AMERICAN GAS: *What is your opinion of cap-and-trade legislation? Do you think it can be effective?*

YERGIN: I think we’re headed into an

interconnectivity, how one market affects another, how supply and technology are interrelated. So that's why these issues of integration and change have to be seen in this larger picture.

AMERICAN GAS: *Could you explain that a bit more?*

YERGIN: I am just bringing out a new edition of *The Prize*—I updated it and continued the story. And one of the themes of *The Prize* that you see repeatedly is that people don't look at the bigger picture and see how things fit together. People say we've reached the end point, it's over, it's finished, it's the end of oil, it's the end of history, it's the end of technology.

In *The Prize* I mention how many times the world was convinced we were running out of oil. The first time it was in the 1880s; the last time before this time was 1970.

It's not just oil; it's also natural gas. Three years ago few would have fully foreseen the role that unconventional gas would play in meeting our energy needs. Back then, the general expectation was for dramatic increases in LNG [liquefied natural gas] in North America. But last year domestic gas production was up more than 7 percent in the United States, thanks to unconventional gas, which is made possible because of the application and integration of new technologies. And suddenly there is less need for LNG in the United States, which will have significant reverberations for the global natural gas market.

AMERICAN GAS: *Well, the price of LNG is higher than domestic gas.*

YERGIN: Yes, and there are at least two reasons for this. You may remember that we were all going to become more integrated globally, and then we found out that the global market was not as flexible when you have the Asians and Europeans willing to pay much higher prices. So LNG is more


expensive than domestic gas because of the demand in Asia and Europe.

But, in addition, the unconventional gas revolution here in the United States has dramatically lowered the cost of domestic gas. We are just completing our study of unconventional gas supply and cost—we call it *Rising to the Challenge*—which projects that dry gas productive capacity in the Lower 48 will increase from 53.5 Bcf [billion cubic feet] per day this year to 60.6 Bcf per day by 2018, with another 4 Bcf per day of increase in Canadian productive capacity. And the

the outlook and expectations change substantially! And sometimes more quickly than that.


AMERICAN GAS: *In many of your writings you make the point that energy independence is the wrong goal. Energy security is the right goal and that will actually necessitate interdependence among a variety of energy sellers and buyers. In today's world, how do we do a better job of ensuring that interdependence and therefore energy security?*

YERGIN: Since the 1970s we have actually built up a pretty good interna-



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—DANIEL YERGIN, CERA



costs have come down dramatically. So if it wasn't for unconventional gas, members of the AGA would be looking at a tighter market with their customers and their regulators.

This is another example of how technology solves problems and its effect on resources. We aren't running out of resources after all. Technological innovation has changed the outlook to the point that our current studies of our energy future give us different answers than studies done just three or four years ago.

AMERICAN GAS: *No question about it.*

YERGIN: That's why one of my other rules from *The Prize*, and from all the work we do at CERA, is that while the energy business is inherently a long-term business—it has one of the longest time lines of any business in the world—every three or four years

tional energy security system around the International Energy Agency. I see two specific things that need to be addressed.

One, from a global perspective, China and India have to be brought into the system. The original international energy agency system came about because the Americans and Europeans were so worried about access to supplies that they were at each other's throats over energy. Everyone needed to get back into alignment. We don't want to be in that situation with the Chinese. I've just become a member of a U.S. government advisory committee aimed at helping to create a framework for China and the United States to discuss energy and environmental issues. So that's one part of the energy security picture.

The second one is the security of the whole energy infrastructure—

who pays for it, what do you need to do, how coordinated are we from the wellhead to consumer? I always go back to Winston Churchill and the energy security theme that I describe in *The Prize*. On the eve of World War I, Churchill shifted the Royal Navy from coal to oil to gain speed against the German navy. But this created a security of supply problem. His answer was diversification. Safety, he said, lay in variety and variety alone.

The point is that we and the other major consumers need to think about what we can do to try to ensure greater diversification. We need to make sure we have strong dialogues with the producers and that our messages are consistent. To say, on the one hand, that we want the producers to invest more in increased supply and then, on the other hand, to say we want energy independence—that's a confusing message for energy-producing nations. And that is especially true now when, during this deep recession, countries are trying to decide how much to invest in developing new supplies.

This whole question of energy independence goes back to President Nixon. Every president since has been in favor of it, partly because I don't think we ever really adjusted to being part of a global energy market the way we have in other global markets. And, of course, if you look at overall energy, actually we're not heavily dependent. Aside from natural gas imports from Canada, it's mainly just in the area of oil.

But "energy independence" is a very popular term and so it gets repeated, even if we are not likely to achieve it any time soon. That hurts our message of consistency and confuses the global producing community. Of course, some say that "energy independence" is really a more popular shorthand for "energy security."

AMERICAN GAS: *How about energy efficiency, which is certainly an energy*

security issue? What strategies do we deploy to successfully promote energy efficiency and conservation nationwide and worldwide?

YERGIN: That is a subject that we're doing a lot of research on at CERA, along with the impact on demand and business strategy. The Obama administration has put it at the top of the agenda more so than any other administration. There are several different ways to promote greater efficiency. One is just the normal process of ongoing technological innovation and being more efficient. Second is price. Price is a very important, if sometimes unpopular, messenger. Obviously, building regulations—codes and standards—are important. Our automobile fleet turns over about 8 percent a year, but our housing stock turns over nowhere near that fast, so long term the codes and standards for buildings are a key requirement. And consistent communication is another element. So it's all of those kinds of things because there isn't a single miracle breakthrough.

AMERICAN GAS: *Let's go back to supply for a minute. You spoke earlier of the role of global LNG and its growing significance. Do you see a worldwide LNG market that reaches the scale of the worldwide oil market—and will that lead to an LNG cartel similar to OPEC?*

YERGIN: Clearly the LNG business is going to grow; CERA sees a very substantial increase in capacity over the next few years. We will soon have about 14 Bcf per day of North American regasification capacity, so that means we'll certainly see a marketing push toward an LNG market. But you still have to ask, what is the role of unconventional gas going forward? And as I've already mentioned, our research indicates its role will be very substantial here in North America.

As to your question about will there be a gas OPEC—GOPEC—we are already seeing efforts toward what might be called 'greater coordi-

nation' on the part of the major gas exporters. But of course, one of their problems in trying to create a GOPEC is that LNG is more difficult and expensive to transport than oil, and you don't have the same flexibility that you do in an oil market.

And the global competition is different. In Europe, the chief energy security concern is not oil, it's natural gas, as we have seen recently in the recent standoffs over gas supply between Russia and Ukraine and other of the Eastern European nations. The nature of the gas market is different; the degree of interdependence is different. At this point, we don't think

CERA Releases Study on Natural Gas Supply to 2018

Cambridge Energy Research Associates (CERA) has just completed a new multi-client study, *Rising to the Challenge*, about the future of natural gas supply in North America.

The study, subtitled *Turning North America's Unconventional Gas Supply Potential Into Reality*, sees dry gas productive capacity growing by more than 13 percent in the United States (Lower 48) during the 10-year period of the study, while full-cycle unit-weighted average costs increase by about 60 percent by 2018. Average decline rates fall, and increased drilling activity is not needed to maintain production, the study reports.

The study includes both conventional and unconventional gas. The findings are detailed down to the unit costs and play levels, using CERA's broader natural gas market outlook and modeling effort, combined with insights from CERA's Capital Costs Analysis Forum and the IHS Well and Production Database.

For more information, go to www2.cera.com/rising or contact Ken Downey at kdowney@cera.com.

a GOPEC will be as well-coordinated as OPEC because there won't be the same unanimity in outlook and because the relationship between exporters and importers is different. The fact that Iran, along with Qatar and Russia and Algeria, would be the Big Four complicates matters further.

AMERICAN GAS: *Looking long-term future for a moment, describe what energy, or energies, will be powering our economy in the next 20 to 30 years, including what they might cost, how reliable they will be, and what will be their effect on our environment and our way of life?*

YERGIN: Truthfully, the only way to answer a question like that is through scenarios, and we have done several of them, looking out long term and making suppositions that in some cases we thought were highly unlikely, even a little ridiculous, yet they turned out to be very relevant. Three years ago, we did a "Global Fissures" scenario, in which we imagined a housing crisis in the United States triggering a deep recession here and then around the world, followed by a new wave of protectionism. At that time, people probably put a nearly zero probability on it.

Yet the signposts from scenarios alert you and enable you to see the risks or changes sooner. Renewables, excluding hydropower, which today are only about 1 percent, are bound to grow significantly in the electricity generation market. But we also looked at the population growth and climate change, and the momentum for all change. I've never seen so much emphasis when it comes to innovation across the energy sectors.

You know, a dozen years or so ago there wasn't a Google. Is there a Google of energy out there, or is

there a You Tube of energy? Is there something else that's going to really change the picture from the way it looks today?

Certainly, based on what we know, in 20 or 30 years the energy outlook doesn't really look too much different than it does now except that we will have become even more energy efficient. Natural gas will become an increasingly important fuel. Nuclear



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may or may not become more significant depending upon the resolution of the questions surrounding it.

At the end of day, the renewables are just another set of technologies—and depend on technological progress. Wind today is generally more expensive, but a much more competitive source of electricity generation than it was in the 1980s. It has already seen a lot of technological progress. But the cost must continue to come down to reach greater scale. Transmission is another constraint, but one that is the focus of a great deal of attention. Intermittency is a real issue for sources like wind. Among other things, they require additional generation that is fueled by natural gas. I think ethanol will be competitive, but we're kind of maxed out on conventional ethanol. So there will have to be a new breakthrough in the labs in the form of cellulosic ethanol.

I think the other thing is that in 20 or 30 years we could be twice as

energy efficient as we are today. Of course, if a much higher degree of spending is maintained on energy R&D, we could see some major surprises in 10 or 15 years.

AMERICAN GAS: *In terms of our lifestyle, will we be building our houses different? Will our social arrangements be different? Will our cities be different?*

YERGIN: Our buildings will be greener and more efficient. But what you're asking is not just a question of energy. Education will have a determining effect on energy. We'll drive cars, but what kind of cars? We're probably at a kind of cusp point on that. We just did a paper about plug-in hybrids—if you really had everybody driving hybrids you'd have a very different energy configuration than

you have today. But even if we really got going on hybrids, by 2020 they'd still be a small part of the overall fleet.

Another question is: How smart will the grid be? The smart grid and its effect on efficiency and customer empowerment could have a significant effect on the energy mix and on our future lifestyle. Plug-in hybrids also take you back to the question of electricity generation—and the role of natural gas in generating power.

AMERICAN GAS: *Last question. What advice about the economic, environmental and global future would you give to the CEO of a regulated natural gas utility whose core business function is to safely and reliably deliver natural gas to residential and commercial customers? For that matter, do you think there will even be a natural gas utility industry in the future, or—as was the case with whale oil at the turn of the 20th century—will the industry be replaced by something else entirely?*

YERGIN: First of all, yours isn't a whale oil situation because in the middle of the 19th century whales were getting scarce, so innovation responded to necessity. Natural gas remains a very attractive and abundant fuel whose share of market on a global basis will continue to grow. But here in North America we will see more emphasis on efficiency. How does that affect the gas business? That is one question your CEOs should be thinking about.

I think the second thing is to assess what the pace of renewables is going to be, first on a distributed basis, and how will that change the markets. It's not just a question of breakthroughs but how breakthroughs are translated into commercialization and move into the marketplace.

Also the pendulum is going to swing—it's already swinging—toward the government getting more involved in your business. Overall, we have not seen government take such direct control over the economy since the price controls of the 1970s, or even World

War II and the New Deal. The government is always involved in the energy business, but it looks like it's going to be even more involved, so your CEOs should be considering what that means and how that plays out.

AMERICAN GAS: *It sounds like you're saying our business is not going to be all that much different from what it is now other than we're going to be a lot more efficient.*

YERGIN: Your customers will be a lot more efficient. How does that affect your business model? That certainly is one question to ask. How do you get on the right side of greater efficiency so you're a winner and not a loser?

You have to anticipate—whether it's an energy services business or something else. If I were a CEO, I would do some scenario work—it sounds like that is what you are doing with your Vision 2020 strategic planning process—and I would start with the proposition, 'If our business is seriously impaired in 20 years and

becoming obsolete, how did we get there? How did it happen?' Try to travel the road that got you there to understand what the risks are. I have seen again and again how powerful it can be for management to suspend disbelief, to suspend conventional wisdom, suspend prestige, suspend tradition, and ask different and difficult questions. Suddenly you begin to see things you didn't see before—both opportunities and risks.

There is a tendency in the energy business—and it's true in other businesses as well—that you get a consensus in which everybody is reinforcing everybody else, and so you don't see the real change that is occurring.

But I would say this—that natural gas has distinctive and attractive attributes that ensure it will be around for a long time. No question that energy is going to be more competitive, and its use more efficient, but gas has characteristics and inherent competitive advantages in the new era ahead that give it long-term staying power. ♣



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