

DOE's Perspective on Natural Gas

Keynote Address

by
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Abstract

Secretary Federico Peña outlined four priorities in the U.S. Department of Energy's proposed FY1998 fossil fuel R&D budget: enhancing energy security, ensuring our nuclear weapons stockpile safety/reliability, cleaning up former weapons sites, and leveraging science and technology to advance fundamental knowledge. Energy is to be re-elevated as DOE's dominant mission, increasing domestic energy production through smarter regulations and technological advances that expand natural gas usage. This will reduce U.S. dependence on insecure oil supplies, maintain nuclear power reactor safety, and ensure a strategic petroleum reserve. The continuing oil import increase is unacceptable, so DOE is raising the public's energy awareness. DOE is communicating how its research benefits citizens directly, because DOE's R&D budget is in jeopardy. The Administration, as microcosm of the nation, has Defense as the largest electricity consumer and Agriculture as among the largest bondholders financing electric power.

The Energy Information Administration's 1997 annual energy outlook sees domestic gas consumption growing from 21.6 trillion cubic feet in 1995 to 28.4 Tcf (low-growth case) or even 32 Tcf (high-growth case) in 2015. For the first ten years all scenarios track similarly for consumption and production, but in later years a high-technology case accelerates gas opportunities. Some ask why government R&D is needed—industry is doing well on its own—but gas prices are sensitive to technological progress, so gas made cheaper through technology means greater consumer demand and benefit. U.S. citizens are the largest royalty owners: all gas produced from federal lands pays royalties, reducing both the need to tax and the budget deficit, and federal-land oil and gas royalties returned \$6 billion to state and federal treasuries in 1995. Public/private partnerships in fossil-energy R&D reduce production cost and environmental degradation. R&D is needed to reduce greenhouse gas emissions.

DOE and supercomputing companies are collaborating on a 1-teraflop machine (1 trillion calculations/second) that will be available for gas research, speeding 3-D seismic imaging, etc. A 100-teraflop machine is needed soon for the comprehensive nuclear test-ban treaty; it also could aid geologic exploration and climate analysis worldwide.

The Administration supports technological advancement (such as 3-D seismic, improved drilling systems, better fracturing technologies) because: domestic gas production increased 14 percent since 1985 (despite a 50-percent decline in wellhead prices); only 9,000 wells in 1994 produced what 14,250 wells did in 1985; oil reserve replacements went from 37 to 95 percent during 1992-1995 (over 100 percent may have occurred in 1996); and exploratory oil and gas

well success rates went from 29 percent ten years ago to 38 percent today, at lower cost. DOE's 1998 natural gas budget is lower than 1997's, but reduction is in end-use technologies, advanced gas turbines, and fuel cells, mainly because more money is needed for exploration and production.

1983-1993 private-sector energy R&D investment dropped a third, mostly from reduction by the 25 largest U.S. energy producers, which produce over 43 percent of all natural gas. R&D is becoming more efficient, with more teaming and computer simulation, but investment is down and is focused more on near-term technical problems than longer-term issues (such as developing technology for geologically complex deeper reservoirs and producing quantum-leap technology for Gulf of Mexico subsalt basins). Industry cannot assume government will fill the funding gap. Conference attendees need to translate industry technological progress into public benefits, jobs, economic growth, and cleaner environment, telling the public that gas R&D is not a corporate subsidy but an investment in future generations.

Introduction by Hugh D. Guthrie

(FETC Senior Management and Technical Advisor)

Dr. Joseph Strakey is a chemical engineer, and thereby a gentleman by definition. He is the Associate Director for the Office of Product Technology Management for Fuels and Specialty Markets. And since he is my boss, I have to carefully say that he is going to introduce Kyle Simpson. Joe?

Introduction by Joseph P. Strakey

Thank you, Hugh. I find myself at this conference being introduced as Hugh Guthrie's boss. But I don't think that is quite the right expression. I think in oil patch language, Hugh Guthrie probably is an "independent." I am pleased to have the opportunity to be his understudy!

Our speaker to present the DOE perspective on natural gas is C. Kyle Simpson. Kyle is uniquely qualified to do so because he is in a key DOE position, working directly for the Secretary. He has a broad background in the natural gas industry. Kyle has been involved in energy policy issues and policy formulation for some time, and in politics, both at the state and federal level. In addition, he comes from Texas. Kyle is currently the senior policy advisor to Energy Secretary Peña. He is also the Vice Chairman of DOE's Energy Resources Business Line. In that capacity, he plans and coordinates activities within the Office of Fossil Energy, Energy Efficiency and Renewable Energy, Nuclear Energy, Energy Information Administration, and the Power Marketing Administration. Essentially, he is our pipeline into the Secretary's office.

Since 1993, Kyle served as Executive Assistant to Deputy Secretary of Energy Bill White, whom many of you know. In that capacity, Kyle had primary responsibility for dealing with industry and stakeholder groups for the Deputy Secretary of Energy. From 1991 to 1992, Kyle was the top energy advisor to the Clinton for President campaign, and he has been a member of the National Finance Committee. That was before we had the White House sleepovers and

coffees. He didn't invent those!

Kyle is a native of Wichita Falls, Texas. He has had a long history of leadership in business, civic, and political activities within the state. He has worked for both the Coastal Corporation and Brown and Root in the Government Affairs Department in the Houston area. He has served on a number of important committees and commissions. One of these was his appointment to the Interstate Oil and Gas Compact Commission by Texas Governor Ann Richards. From 1980 to 1983, Kyle also worked as the Government Affairs Representative for the American Gas Association. Please join me in welcoming Kyle Simpson.

Address by Kyle Simpson

Thank you. I can tell that I haven't revised my vita in a while. There are a couple of things I might want to scratch out, because they are not quite as popular as they were. The nicest thing that was just said, a thing that I hope to live up to in my new job, is that I am a pipeline into the Secretary's office, and hopefully a pipeline out of the office as well, and not a roadblock to getting things done! That is something that we really have to work on in the Department of Energy. It is a complicated agency, and we have a tendency not to act, as opposed to acting. I give all of you at this conference my commitment to work on that.

On behalf of our new Secretary of Energy, Federico Peña, I extend an official welcome from the Department of Energy to each of you at the Natural Gas Conference. This is one of the hallmarks of the Department's Fossil Energy Office—to hold meetings like this where those involved with our Federal Energy Technology Center's R&D programs can present their progress, and those in the natural gas business can tell us if progress is being made in the right direction—and equally important, whether it is an efficient and effective investment of taxpayers' dollars. We hope that, throughout this conference, you will not be reluctant to voice your opinion on either issue. This is particularly important in a time when the federal role in our country's energy future is increasingly debated, and where we daily confront issues of corporate welfare versus the public good. Your opinion on what we are doing, where we are heading, and what we are spending are more valuable than ever. Again, let me extend our welcome and appreciation for your attendance.

To have the opportunity to follow Dr. Lay and Chairman Matthews is really a privilege, but also a challenge. Each of these gentlemen occupies a particular perspective and position within and around the industry, which gives each a unique view. Each has proven himself, and each by his actions and words can affect the industry significantly, and does so regularly. It really is an honor to follow them, and to hear Chairman Matthews' perspective on R&D's role in the energy business.

Secretary Peña's Commitment to Energy

First, let us step back a bit to get a better perspective on our economic, energy, and environmental future. Then I want to home in on a couple of specific items that may be of particular interest to this audience.

Several events have occurred in the past few weeks and months that have drawn attention to energy's role in our economy and in national policy. Some of these events have been good, and some have been not-so-good. Let me start with one of the more positive events. After a bit of a wait, we now have a new Secretary. You might be thinking that there really is nothing new about having a new Energy Secretary—there have been, after all, eight in the nearly 20-year history of the Department. What is new and very positive about Federico Peña is not that he is on board, but what he said in his first public appearance on his first day on the job.

Less than 24 hours after he was sworn in, Secretary Peña was seated in a Congressional hearing room, facing the Senate Appropriations Committee, defending our proposed FY1998 fossil fuel R&D budget. At that hearing, as in his confirmation hearing, Secretary Peña outlined four key priorities for the Department. First is enhancing energy security, second is ensuring the safety and reliability of our nuclear weapons stockpile, third is cleaning up former weapons sites, and fourth is leveraging science and technology to advance fundamental knowledge. But what he said beyond that was most important. In his words, "all of these needs present unparalleled opportunities and dawning challenges that will greatly affect the future of our nation and indeed the world; however, first among them is *energy*."

This is a Secretary who knows that he is taking the reigns of an agency under fire. Just a couple of days ago, a congressman from Kansas announced that, once again, he would submit legislation to abolish the Department of Energy as part of the FY1998 budget resolution. As a department, we have been criticized for downplaying energy in the face of mounting pressure from other priorities. Indeed, the Energy Task Force commissioned by Secretary O'Leary a couple of years ago called energy "the disappearing E in DOE." Secretary Peña has been unequivocal in saying that we must re-elevate energy as our dominant mission and priority in the Department. He has stated clearly that a credible energy strategy is among his priorities, at the head of his priorities, and that at a minimum it must include the federal government's commitment to increasing domestic energy production. We are to do so through smarter regulations and technological advances to expand the use of natural gas. This will (1) reduce U.S. dependence on its insecure supplies of oil, in part by diversifying globally supplied resources; (2) maintain the safety of nuclear power reactors; and (3) ensure that our strategic petroleum reserve remains fully capable of meeting domestic and international commitments.

Our new Secretary has been blunt in saying that our current level of oil imports and the alarming trend toward rapidly increasing imports in the coming years is clearly unacceptable. Consequently, he is committed to raising energy awareness, both inside the Administration and among the public. We should not have to rely on sharp spikes in gasoline prices, like we had a year ago, or a pair of short-lived electric power outages, such as occurred in the West last summer. And we should not have to rely on concerns about the supply and price of winter heating fuels, or the dangerous antics of Saddam Hussein, to make the public conscious of the

everyday role that energy plays in our lives. If more people, including many members of Congress, understood the lockstep relationship of energy to future economic growth and to our national security, then I suspect we would have a more positive debate in Washington about the federal investment in energy.

I think it is a very positive sign that Secretary Peña has already begun to turn the debate in that direction. But let me tell you, he can't turn it around by himself. If those who are on the front line of energy research, like those of you in this audience, are not talking about the importance of what you do, if your arguments revolve only around "why government support is important to my company" or even to "my industry," then we can't work together to build support for investing tax dollars in future energy technologies.

Surviving the FY1998 Budget

The American people need to know how your work benefits them directly. If we can't find a way to make that point, we will likely lose the corporate-welfare debate. It is important to understand that the programs we are talking about at this conference are in the cross hairs of the budget-cutters. The list of federal programs that Congressman Kesick, Chairman of the House Budget Committee, singles out for immediate termination are fossil fuel research—coal, oil, and natural gas R&D programs. No other major energy programs slated for FY98 funding are on his list. *This* program is the target, and we must be blunt and ask ourselves, "is it because fossil energy programming is considered to be the least defensible, or is it the one with perhaps the least vocal constituency?" Secretary Peña wants to change the debate, but he needs your help.

Let me talk about some specifics that probably will keep energy in the Congressional eye. First, as you may know, the Administration is presently developing a legislative proposal on restructuring. Ken Lay shared his opinion on restructuring of the natural gas industry, and I must say that we hold a lot of that same opinion. But the details of what we are trying to do still have to be worked out through the Administration.

Just as an aside, it is very interesting that the Administration in all its many facets—from the Department of Defense, to the Department of Agriculture, to the Department of Treasury—is a microcosm of the nation on this issue, with Defense being the largest consumer of electricity in the country and Agriculture being one of the largest bondholders for financing the electric power sector. As we work through this debate within the Administration, I think we are going to learn a great deal about where things might come out in the end through the congressional process. We are committed to changing the federal regulatory structure and the policy framework for the electric industry in ways that increase competition. I don't think there is any doubt that changes are needed. The laws that form the basis for today's electric power sector were written in the 1930s. They neither recognize, nor can they accommodate, the advancement of technology and the evolved role and relationships of the states and federal regulatory apparatus. In this new and changing world of energy regulation, restructuring, and increasing competition, natural gas is—and will continue to be—a top priority of the Department of Energy and the Administration.

Natural Gas a Top DOE Priority

Secretary Peña singled out gas as a way to meet our energy security goals, as well as a key element of our commitment to be responsible environmental stewards. In the Energy Information Administration's new 1997 annual energy outlook, domestic natural gas consumption grows, in every scenario, from 21.6 trillion cubic feet in 1995 to 28.4 trillion cubic feet in 2015. And this is the low-growth case. It could grow as much as 32 trillion cubic feet in the high-growth case. Ken Lay's charts illustrated this quite dramatically.

It is important to note that there is an interesting role for technology in EIA's estimates. They point out that, for the first ten years—say from 1995 to 2005—all cases track relatively the same for growth in natural gas consumption and production. But in the later years, there is a high-technology case that really accelerates the opportunities for natural gas to much, much greater levels. This will be very important as we continue the restructuring debate in Washington, and we see across the country what the different states do, because this will open new opportunities for natural gas. The lower the price for gas, the more opportunity there will be. Some people are concerned that the price of gas is too low, although if it remains low and competitive, a great deal more will be sold.

Why Is Government R&D Needed?

These facts sometimes cause people to criticize our programs and to ask why government investment is needed. It looks like the industry is doing pretty well on its own, so why invest more tax dollars in R&D, for example? Again, I point out that natural gas prices have a dramatic sensitivity to assumptions about technological progress. So, the less expensive that gas is through technology, the greater will be the demand, and the more we will reap domestic and environmental benefits from this resource.

Ken did a great job with all his charts, and I don't want to be repetitive, so I am trying to skip over some of this, yet still bring up points that need to be raised.

Another important and often overlooked reason for federal R&D investment has to do with profit for the taxpayer and responsible stewardship of our nation's natural resources. This argument often gets lost in the debate. U.S. citizens are the single largest royalty owners in the nation. All natural gas produced from federal lands returns a royalty to the federal treasury, and it reduces the need to tax individuals and corporations, and it helps reduce the federal budget deficit. In 1995, royalties from natural gas and oil produced from federal lands returned \$6 billion to state and federal treasuries. It is in the interest of all taxpayers that we reap the greatest benefit possible from our natural resource assets, while minimizing the environmental impact of their exploitation. Public/private partnerships in fossil energy technology R&D provide important technological advances that lower production cost and limit environmental degradation. They help us fulfill our duties as responsible stewards of the natural resource assets of the American people.

A third reason for continuing investment in R&D is another one that Dr. Lay mentioned, and that is the question of greenhouse gas emissions. The United Nations panel of scientists did, in fact, conclude that human activity has a discernable impact on climate. A very loud and difficult debate is going on over what to do about it, if anything. If we are going to do something, one thing is clear: it probably will be very expensive, unless we can do it through technological advancement. That is something we are pressing for as an administration—that, while we reap R&D benefits through lower general energy cost, we also complete our own domestic resources more efficiently, so we can attack the price volatility that results from rising petroleum imports—volatility as a result of unstable, unpredictable foreign suppliers of oil.

Let us also look down the road to what impact R&D might have on reducing carbon emissions, for therein lies the culprit in greenhouse gas emissions. I submit that this is a computational technology the Commission Chairman was talking about. It is an expanding area of manifold opportunities over the next few years.

Teraflop Supercomputers for Natural Gas R&D

At the Department—some of you may know this and I risk being repetitive—we have created with some of the supercomputing companies a 1-teraflop machine, which can do 1 trillion calculations a second. Some portion of that machine will become available to the natural gas research community. When that happens, the ability to advance the review of 3-D seismic imaging, subsalt plays, etc., becomes much, much quicker, as you know. By the end of this next year [1998], we will have a 3-teraflop machine, attaining 3 trillion calculations per second. To meet the requirements that we believe we will need to carry out the comprehensive nuclear test-ban treaty, we will need a 100-teraflop machine within this decade. The ability that could be given to the industry to explore the geology of the nation, and indeed the world, is phenomenal, when you think about that kind of computing capacity. The other thing it brings to light is that we can use this computational horsepower to chart the climate as well, and to predict and analyze what is happening up there much more effectively and closer to real-time.

How Technology Is Advancing Oil and Gas Production

These are a few reasons why this conference and your participation here are important. And these are the reasons why your voice and support of government/industry partnerships for future technology will be critical to your business and to our nation as a whole. You know better than anyone the impact and benefit of technology. You know that because of 3-D seismic, improved drilling systems, and better fracturing technologies, our nation has seen a 14 percent increase in domestic gas production since 1985, despite a 50-percent decline in wellhead prices. It took only 9,000 wells in 1994 to produce what 14,250 wells did in 1985.

There is another interesting trend on the oil side. Over the past four years, from 1992 through 1995, reserve replacements in oil have gone from 37 percent to 95 percent, and I would

be willing to bet a dinner that we will have over 100 percent reserve replacement in 1996. These are excellent trends, and it is R&D that is causing much of it to happen.

Ten years ago, the success rate of an exploratory oil and gas well was 29 percent. Today it is 38 percent, and cost has dropped substantially. This is why the Administration continues to place such emphasis on technological development. Some of you may be shaking your heads and saying, “Come on now! You tell me this, and yet the Department’s natural gas budget is lower for 1998 than it was in 1997!” The answer is, look at the details above the bottom line. The reduction is almost totally in end-use technologies, advanced gas turbines, and fuel cells, and that is partly because of market conditions and partly because some of the programs are coming to an end. But primarily it is because we need to put more money, we believe, into the exploration and production side. Let me tell you that any budget that goes up in this environment in Washington is a likely target for reduction.

Whither Tomorrow’s Energy R&D?

I tend to be an optimist about the future. But I will be honest with you: I have concerns about where technological innovation will rank in tomorrow’s priorities. We are under intense pressure, and rightly so, to cut the Department’s dollars. At the same time, industry is reducing its own R&D investment. Between 1983 and 1993, real private-sector investment in energy R&D dropped by a third. Most of this drop was due to decreased R&D spending by the 25 largest U.S. energy producers, which together represent more than 43 percent of all natural gas production. I know some will say that reduced private-sector R&D can be misinterpreted, and in fact it can, particularly in this oil-and-gas sector, because the R&D is becoming more efficient. There is more teaming and more computer simulation rather than expensive field testing, meaning a greater leveraging of dollars.

But no one can argue, I believe, that R&D investments have declined, and perhaps equally important, that R&D today is focused much more on near-term technical problems than on longer-term issues. I am concerned about the longer term. Who is developing the technology for the more geologically complex deeper reservoirs? Who is producing the quantum-leap technological advancements needed to tap the full potential of the subsalt basins in the Gulf of Mexico? I don’t think the industry can assume that the federal government can fill the funding gap—certainly not without a more positive and enlightening debate about the benefits of technology than we have had so far.

So let me challenge you at this conference to take your discussions outside of these meeting rooms, take what you hear these next few days about technological progress in the gas industry, and translate it into public benefits, jobs, economic growth, cleaner environment—things that make a difference to people, to their health, and to their standard of living. Then, make sure that the public hears about those benefits. Make sure they understand that an investment in tomorrow’s gas technology is not a corporate subsidy, but an investment in their future and the future of tomorrow’s generations. Thank you very much.

Questions and Answers

Question. You mentioned that Congress has an axe to grind with the fossil-energy budget, questioning its relevance, and at the same time you mentioned that the EIA [Energy Information Administration] has some outyear projections of a high-technology case. What relationship, if any, exists between what is currently programmed in fossil energy's R&D and the accomplishments of those high-technology impacts?

Response by Kyle Simpson. From the Department's viewpoint, we are trying to support technology efforts needed to get into that high-technology case. In fact, I testified at the Federal Energy Regulatory Commission on GRI's funding on Friday and emphasized the need to support this R&D. As most people here know, over the past few years we have had a very difficult time in Congress maintaining our fossil R&D budgets. We have kept the gas numbers up fairly high. I think we turned a corner last year with Congress, because a programmed continued cut of, I think, 10 percent ended up being only a 5-percent cut. As we continue to see price volatility at the margins of winter heating fuels and gasoline and such, I think we will be able to drive home the point that you must have the R&D partnerships between industry and government to drive the changes needed to move our economy out of a vulnerable position. Also, we all worry about national security. I argue that the Department's FY1998 budget submission takes into account the EIA's forecast, tries to take advantage of it, build on it, and live up to it, and that we need to make that argument to appropriators and to Congress as a whole.

Closing by Hugh Guthrie

I want to thank Kyle for being with us and let you know that this has not been the easiest thing in the world because we did not know who our DOE speaker would be. Kyle, thank you very much for being with us. We really appreciate it.