

Keynote Address: A Utility Perspective on Coal-Based Energy Production

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Introduction

by Rita Bajura

I have the pleasure of introducing our keynote speaker, J. Gordon Hurst. He is Executive Vice-President and Chief Operating Officer of the Southern Indiana Gas & Electric Company (SIGECO). He graduated from the University of Evansville in electrical engineering. He joined SIGECO in 1966 and has served in various engineering/managerial positions, including Director of Engineering, Vice-President of Power Supply, and Vice-President of Operations. He is a graduate of the University of Michigan's Public Utility Executive Program and is a registered professional engineer.

Mr. Hurst is a strong supporter of education. He currently serves as a member of the University of Southern Indiana Technology Advisory Committee and a member of the University of Evansville Advisory Council for the School of Business Administration and the College of Engineering and Computer Science. He's a Director of the Evansville Public Education Foundation.

Mr. Hurst also serves as a Director of the Indiana Gas Association and the Indiana-Kentucky Electric Corporation. His community activities have included Portfolio Chairman for the United Way of southwestern Indiana, Director of the Friends of Mesker Park Zoo, and Chairman of the Indiana Gas Association.

Please join me in welcoming J. Gordon Hurst.

Keynote Address

Thank you, Rita, for that very kind introduction. I would like to take a moment to put my comments in perspective. I am going to change the focus considerably from Rita's international or global focus in talking about the full gamut of fossil energy. I am going to zero in on the subject of this conference: coal-based energy production, but from an industry perspective.

Southern Indiana Gas and Electric Company is a comparatively small investor-owned gas and electric utility compared to other utilities in our country. We have about 125,000 electric customers and 110,000 gas customers. We serve an area in southwestern Indiana. We have about 1,260 megawatts (MW) of installed electric generating capacity, and we operate an additional approximately 600 MW of capacity for a joint venture that we are involved in with the Aluminum Company of America.

As you know, southwestern Indiana sits literally on top of the Illinois Basin. So coal is very important to us as an energy source, and the ability for us to utilize that energy source into the future is very important to us as a company and to our local economy. In that context, I am really delighted to be invited here to speak at FETC — which I consider to be the center of the universe for clean coal technology.

Clean coal technology is also very important to us. As a small company, we are not in a position to pioneer. We are not in position to take on the risk of emerging technologies. We need the advanced technologies that are developed through the cooperative efforts of the Department of Energy (DOE) and industry under the programs that are administered here at FETC. We are very appreciative of these efforts, and we look forward to taking advantage of that progress as we move forward with our energy needs in southwestern Indiana.

It is my firm belief that the continued advancement of clean coal technology, closely coupled and coordinated with evolving environmental policy and regulations to provide an economically and environmentally balanced technology platform for the continued use of our abundant coal resources, are vital to our competitiveness in the global marketplace into the new millennium. That's quite a mouthful, but I think it really encapsulates my perspective as I look at the programs that you're going to be considering in this conference. Since SIGECO is a utility that uses coal for over 99 percent of our generating capacity, it is very encouraging for us to see the development of advanced coal-based power and environmental systems combined with the stimulus and the leadership of DOE and FETC.

These advancements will enable us to increase the utilization of coal needed to drive our energy-intensive economy. Although there are those who seem to have a mission to eliminate coal from our energy menu, a recent statement by Patricia Godley, DOE's Assistant Secretary for Fossil Energy, clearly established our national perspective — and it was very heart warming to us in southwestern Indiana. She said, and I quote:

The comprehensive national energy strategy reflects the same pragmatism as our 1999 budget, specifically, that fossil fuels including coal, power our economy. No credible energy strategy can realistically postulate that this Nation or the world is going to change its energy mix dramatically for well into the 21st century. Coal is a very important component of our energy future and because it is, it will be a very important part of our forthcoming energy strategy. And it is very much a part of our fiscal 99 budget. Coal is where our significant budget increase is.

I think that budget increase was for the Vision 21 program and for the carbon sequestration that Rita spoke to you about. I believe that you're going to hear more about it during the conference.

Ms. Godley also noted that DOE is “. . . not ready to write coal off,” that the DOE goal in the energy mix and the key to new and better technology is a sustained Federal commitment to research and development (R&D), focusing on coal. This is a really powerful statement regarding the importance of coal and our country's future energy needs. It is further illustrated in the Energy Information Administration's “Annual Energy Outlook.” This chart shows the projected growth in coal consumption in the U.S. You will note that almost all of the growth in coal demand is for electric energy production, with other demands for coal remaining fairly flat. Domestic coal demand is projected to rise about 300 million tons over the next 20 years because of growth in electric generation utilization. The average utilization rate of coal-fired power plants over that time period is expected to increase from the present 60 to 65 percent to over 80 percent. This chart shows how the increasing demand is forecast to be supplied by coal supply region: it's pretty easy to see that Eastern coal shows little growth, while Western coal is forecast to supply most of the additional demand. As coal-fired generation and the demand for coal grows and labor productivity improvements manifest themselves, Western low-sulfur coal seems to be the least-cost low-sulfur fuel in most regions.

However, the progressive tightening of our regulatory requirements regarding sulfur emissions and the engineering limits on the use of low-rank Western coal mean there must be a drive towards advanced technologies to enable us to use higher sulfur coals in order to meet our environmental goals. The environmental efficiency of these technologies will allow increased utilization of the Eastern mid- and high-sulfur coals. Nevertheless, these mines are projected to lose market share over the next 20 years. It is my hope that this trend can be impacted by the development and application of new technologies to provide power plants with options that are more efficient and environmentally friendly to using Eastern coals. This is of major importance to our company and to other power generation facilities that are located on or near the large Eastern coal reserves. This is not only important to our competitive position in the marketplace, but also, as I have mentioned, to the mining industry, which is a vital part of our local economy.

As a coal-based utility in southwestern Indiana, historically we've had a limited menu of technology choices for generating electricity and/or meeting our environmental responsibilities. The *pulverized coal boiler*, as you might expect, has historically been our most effective means for utilizing coal to produce electricity. In order to utilize our local low-cost, high-sulfur fuel, the *wet scrubber* has been the technology of choice for sulfur dioxide (SO₂) removal for the last 20 years, and we have over 80 percent of our base-load generation fitted with scrubbers for sulfur dioxide control. Of course, the *low nitrogen-oxides (NO_x) burner* has been the technology most attractive to us for NO_x control with over 95 percent of our generating capacity fitted with low-NO_x combustion technology.

However, as we look to the future, none of these options is particularly attractive because of the tightening of our environmental standards and because of the advanced technologies that are becoming available through the cooperative efforts of DOE and industry. This Federal investment and partnership with private industry is bringing on new technologies, such as gasification combined-cycle, fluidized-bed combustion, and fuel cells — and all these

technologies are in various stages of maturity and commercial viability. We now look to these technologies to fuel our future.

Power Magazine called the development of fluidized-bed coal combustors the commercial success story of the last decade in the power generation business. As a result of these efforts, my company is currently working on implementation of an atmospheric circulating fluidized-bed unit as our next generating capacity addition. Without the research, development, and demonstration sponsored by DOE and FETC, we would not have that opportunity to apply better technology to meet our future energy needs.

However, I am greatly concerned that we may not be able to configure our fluidized-bed project to meet our economic hurdles and still be able to meet the environmental requirements that are placed on us as we move through the permitting process. It appears that either the technology development curve is lagging, or we need better coordination with technology development and development of environmental standards and regulations. For instance, continuing to use the atmospheric fluidized-bed combustion (AFBC) example: that technology was largely developed prior to the Clean Air Act Amendments (CAAA) of 1990 when the New Source Performance Standards (NSPS) and best available control technology (BACT) for utility boilers were pretty much aligned. At that time, the air emission control requirements were: 0.03 pounds per million British thermal units (lb/MMBtu) for particulate matter, 90-percent sulfur dioxide (SO₂) removal, and 0.6 lb/MMBtu for NO_x.

What we have seen developing is that although the NSPS requirements are still the same today, the BACT requirements under a PSD for permitting a new facility are much more stringent today. This side-by-side comparison shows the targets that we're shooting at today in trying to permit this technology for construction. Particulate matter has gone down by 50 percent to 0.015. We are looking to achieve 95-percent SO₂ removal, and the NO_x requirements are moving down to the range of 0.1 lb/MMBtu.

In addition we are faced with several unknowns on the horizon regarding additional requirements for control of hazardous air pollutants (HAPs), volatile organic compounds (VOCs), fine particulates, mercury, and meeting the new 8-hour ozone standard. So in today's environment, the mature AFBC technology that we as a small company are comfortable with applying is becoming environmentally challenged by the more stringent requirements. It is entirely possible and likely that this technology may need ex situ helpers for further reduction of SO₂ and NO_x beyond what is feasible in the in situ environment of the fluidized-bed combustor.

This causes the fluidized-bed unit to look similar to the pulverized combustion (PC) units that we traditionally have used. And the fluidized-bed begins to lose its competitive advantage. Obviously, clean coal technology development is a double-edged sword: just as AFBC technology has matured and we have also begun to have the need for adding generation capacity to our system, the technology is becoming economically and environmentally challenged. The BACT are continuously driving us toward obsolescence. So it's a constant struggle to develop new and more advanced technologies that will enable us to continue to utilize our local coal resource.

The next generation in fluidized-bed technology, the pressurized fluidized-bed combustion (PFBC) system, is now approaching commercial readiness — once again, through the leadership of DOE and FETC. This advanced system uses both gas and steam turbines to boost the amount of electricity that can be generated from coal, thereby increasing the efficiency. The results are lower cost power with substantial reductions in carbon dioxide (CO₂), the greenhouse gas that Rita spoke to you about earlier that we are becoming more concerned about. The PFBC is a great improvement over the traditional power plants that we currently have in service. It is my hope that this effort gets us all the way there and that we will break that cycle of what I call *BACT obsolescence*. My hope is that all the effort and funding toward PFBC will be a longer term answer than the interim term answer that AFBC has become.

I'm so impressed with the aggressive roles that have been set for that program that I would like to show you a chart that Don Bonk sent us summarizing the goals of the PFBC system. What I would really like to focus on is the emissions goals: emissions goals of 1/5 of the NSPS, or 1/10th of the NSPS for the advanced system. It really puts in perspective the very aggressive emissions reductions that are the goal of this project. In working today on our current atmospheric project and the environmental goals that we have for that project, I really wish I had this as a mature technology available today.

Although I have dwelled extensively on air issues, equally important in my opinion are by-product and solid waste issues. I must say that I am gratified to see that there is an entire section of this conference devoted to by-product utilization. To me, that is an extremely important facet of our utilization of coal for electricity production. Not only must we reduce air emissions, but we must also find applications for the by-products. We can no longer have waste products from coal combustion. That is a goal of my company and I think that must be a goal of our industry. In that realm, we also need good predictive models as we are developing and applying this technology — so we can predict the characteristics and chemical analysis of those by-products. Then we could establish markets for those products prior to coming on line with power generation. We have been able to do that with FGD systems. We have developed markets for synthetic gypsum and entered into sales contracts before the power plant comes on line.

We need that same predictability for the by-products that we will expect to get from these new technologies — so that we don't have to invest in some backup last-resort means of disposal in the event we are not able to establish a commercial market for the by-products.

To ensure that the efforts and the costs to develop these next commercial technologies are not wasted because the systems cannot meet environmental requirements that are in force at the time the technology matures, there needs to be a strong coordinated approach with environmental agencies, DOE, and industry (1) in order to realistically set our goals, and (2) in order to meet these goals in an environmentally and economically efficient manner. This teamwork approach will ensure that the R&D funds are spent on technologies that meet our Nation's needs for energy and that they are transferrable into the global market in an economically and environmentally efficient manner. We have the knowhow to achieve these goals, and the key I think, is working in concert in order to achieve those in the best possible way.

FETC's advanced coal-based power and environmental systems program is I think, really the world's leader in development of this technology. I applaud your efforts. Those efforts, I'll say once again, are very important to small companies such as ours that are not able to take on the risk of development of these technologies. So through this program and others like it, our country's hope for meeting the challenge of clean, efficient energy from coal can be achieved. And once again, the challenge is to the DOE, the EPA, the boiler manufacturers, and others in the generation business to develop these technologies for tomorrow in order to make all of our Nation's coal resources viable (and please include our southwestern Indiana high-sulfur coal). We really need to use this coal in an efficient and environmentally effective manner. That will help us maintain our competitive position in the global marketplace.

Thank you for the opportunity to share my thoughts with you this morning. Have an excellent conference: it looks like a very aggressive program. I'm personally looking forward to partaking of the knowledge that is going to be shared throughout the next two and a half days. Thank you.

Mr. Hurst will accept some questions.

Question, Meyer Steinberg, Brookhaven National Laboratory: Based on the excellent review that we had on greenhouse gas mitigation technologies that we heard today, does your thinking in clean coal technology include CO₂ mitigation and what is your view on this without standards?

Answer: Let me qualify my response to that by reminding you that I am not a researcher. I am an industrialist and an electricity manufacturer. I think the CO₂ mitigation and sequestration approaches like Rita described are very important and they really make a lot of sense to us. This research could well enable us to continue, could really be the tie breaker or make the difference in our ability to continue to utilize our fossil resources. I think that effort is very important.

Question, Meyer Steinberg: Then, do you think the utilities recognize the problem?

Answer: Yes.

Question, James Cobb, University of Pittsburgh: This may not be a politically correct question. . . You commented on the good work at FETC and discussed your concern that small utilities are not able to support this research. What are your observations about larger utilities supporting this research through a joint research effort? What's the prognosis for the future about the utility sector doing its own research or helping with its own research activity?

Answer: That is really a very perceptive question and a hot topic, if you will, with the deregulation of our industry. There have already been examples of set-asides in states where deregulation has taken place, where major utilities have greatly curtailed their R&D funding. I've noticed, for instance, that in California, essentially all of the R&D funding emanating from the major utilities has disappeared during the course of the deregulation process. So there is a scramble, if you will, among electric utilities to get lean and mean and to cut costs everywhere they can to prepare themselves for the competitive marketplace.

Unfortunately I think R&D funds is one of the areas they're looking to curtail. I'm in hopes that that's a short-term anomaly, because I think that in the long term, our industry cannot ignore the need for development of new technologies and must participate in that process.

Question, David Gray, Mitretek Systems: In your future scenarios, what do you think your capacity requirements would be in southern Indiana, and would you consider integrated gasification combined-cycle (IGCC) as a potential candidate technology?

Answer: In our region, we are enjoying growth that is probably about double what the average utility company is seeing across our Nation. Our growth and demand is averaging about 3 percent per year, and we expect that to continue for the short term for the next 2 or 3 years and then to taper off to probably about half that to about 1.5 percent per year. We are, as I mentioned, looking toward a capacity addition to be in service in early 2001. Beyond that, our needs are probably going to be for peaking energy rather than base-load energy.

In southwestern Indiana, it isn't nice and cool like it was here this morning. It's about 95 or 96°F, and the humidity is about the same. We have a very strong needle peak in the summertime. Much of our growth in demand is in peak demand, and we shave those peaks by using natural gas combustion turbines. Our need for another base-load type technology will be out probably beyond 2005. To say that IGCC might be a candidate to fulfill that capacity need, at this point, is hard to say. I hope there'll be an even better technology by then that we can utilize. Maybe through Vision 21, we can build our first zero-emissions power plant by then.

Question, Rita Bajura, FETC: Would you be willing to share with us some comments on deregulation: where the states in your service territory are, where your company is, and what you think the impact will be on rates?

Answer: Indiana has a very conservative regulatory environment. In Indiana, deregulation has been under a lot of scrutiny, a lot of discussion. Our regulatory commission has been undergoing a lot of fact finding and consideration of the subject. In the past 2 years (1997 and also in 1998), we had bills before our legislature in Indiana to deregulate the electric utility industry. In neither of these cases, did the bills actually make it out of committee onto the legislative floor. There are divided camps as you might expect relative to the need for deregulation.

We are a very low-cost energy state. When we look at our electric rates among all the electric utilities in the Nation, our company rates are 25th to 18th lowest cost of all the utilities in the country. So how much lower can you go is the question. Most all of the utilities in Indiana are low cost.

So there's great concern in Indiana that there will be a price leveling effect with deregulation and that the only thing that could happen in Indiana is that our prices really increase rather than decrease. So you have one faction saying that we don't need deregulation. We're doing fine now. Let's preserve the good work that we're doing now. There are others that say no, prices will go down with deregulation. We need deregulation and we need to move forward with it.

Right now, we are working on development of legislation that would be presented to the legislature in January 1999. And it will once again be considered. I would give it right now maybe a 50/50 chance of passing. Next door in Illinois, they deregulated the electric business this year, but when you look at the provisions of the deregulation process, it really won't take affect until about 2006 or 2008. There were protections built in: exit fees that customers have to pay if they exercise choice. In order to leave, they cause any competitor to be noncompetitive when you add that exit fee onto their competitive price. So although there's a lot of hype and a lot of verbiage about deregulation and customer choice, typically it really isn't happening — even in states where they moved toward deregulation — because of stranded cost recovery issues and other issues that are really not allowing an efficient marketplace to work. So school is still out.

There was a lot of discussion in the last week of June when there was a shortage of power throughout the East and the Midwest, and wholesale power prices went through the roof. The wholesale market is a deregulated market today, and energy that normally sold for \$30 per megawatt hour (MWh) was selling for \$3,000/MWh or as much as \$6,000 and \$7,000/MWh. When the marketplace has that much volatility, it causes people to be concerned. Some of the people who had access to the marketplace through interruptible rates were interrupted during that period of time. Now they're claiming that they were financially harmed, and they are looking for some kind of controls to be put back on that market.

So I don't know if we'll ever get to a true competitive market, but I think the move towards deregulation is inevitable. I think it's a matter of time. In Indiana, we're trying to be responsible and very diligent in the way that we embark on deregulation so that we do it in a fair and equitable manner that provides value for all classes of customers: for the residential customer, for the commercial customer, and for the industrial customer. There's a risk that only the large industrial customers will be the ones who benefit and others may not benefit or may have a dis-benefit. We're committed in Indiana to see that deregulation doesn't happen in that way and that there's something brought to the table for all of our stakeholders.

Long answer, Rita. I hope I answered your question.