

EIA 2008 Energy Conference: 30 years of Energy Information and Analysis
April 7 – 8th, 2008
April 7, Plenary Session
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I have to say, feel a little intimidated standing up here to talk about energy after Secretary Schlesinger talked about a forecast called, "The Next Million Years." I think that's taking a very long-term view of things.

It is a great honor and very meaningful to be here: sixteen hundred people, forty five countries. I think that, in itself, tells us a great deal about the significance of the questions we're dealing with today. It's certainly an honor to share this platform with two distinguished Americans: Secretary Bodman and Secretary Schlesinger. They've made great contributions as public servants to the energy arena and to many other arenas. They bring great understanding to the issues. I join everybody here in my great respect for both of them, and I have to say personally I've learned much from both of them.

Guy Caruso, the Administrator of EIA, brings the knowledge and deep understanding to the energy questions. In fact, Guy, I'm hard pressed to think of anybody else in public service who's been so consistently focused on these issues, so constructively, for so long. Guy brings a judgment and balance that many, many people depend upon. In recent years he's also worked to strengthen international relations in this data and understanding field, and he's certainly brought outstanding leadership at an essential institution.

I have to say that was a great film. To the filmmakers, I think it did capture the spirit of EIA, and I have the happy responsibility, along with the other keynoters, to congratulate, really on behalf of everybody here, sixteen hundred people and the nation, congratulate EIA and the EIA people, those both who are here and those who are back at the office, on this 30th anniversary for what EIA has accomplished and its very significant contribution to the U.S. and the world community. Guy mentioned so many friends and colleagues here. I share that, a sense looking out on this audience, and I share the strong sense of community that brings everybody here this morning.

I called EIA an essential institution; indeed, it was so essential that it had to be invented, and that occurred when energy moved from the business page to the front pages, which was another way of saying, as Secretary Schlesinger put it, that energy could no longer be taken for granted. When we as a nation explicitly recognize the fundamental importance of energy to our well being, to the successful functioning of our economy, the global economy, and America's

position in the world, this established the mandate for EIA to provide the data and analysis that is required for sound policy-making, for effective functioning of markets, and for public understanding. Certainly, meeting the energy requirements of our \$14 trillion economy is very challenging job. The data, the analysis, the information, the authoritative forecasts provided by EIA help make that economy work, and that high quality and objective information is essential.

Also, as we've already heard, EIA is about trust, about confidence, and those elements went into the very legislative bricks and mortars which define this organization. And I think that story of its founding helps that Secretary Schlesinger addressed helps us understand the present. For it was, as he pointed out, established at a time of great suspicion and confusion, acrimony and bitterness reigned. There were tumultuous Congressional hearings, there were the gas lines, and in fact I think that I'm convinced that even people who weren't born at the time remember the gas lines, so indelibly are they implanted in people's minds. Litigation, political battles, price controls verses markets... you know you go back and read as I did over the last week the legislative history of EIA and its striking to see why EIA was needed.

Actually before the embargo, there was already a building energy crisis, and six months before that embargo, a good friend of Secretary Schlesinger's, Senator Scoop Jackson, warned that critical energy decisions have been based on incomplete and inaccurate information. He said there was a need for new approach to energy information in the federal government. After the embargo, Senator Jackson was a little more explicit: he said the public is about to revolt. People are not going to continue to sacrifice until they get straight-forward answers.

Tomorrow morning, we are going to hear from Senator Pete Domenici, and again, in the legislative history I find in 1974, a few months after the embargo, Senator Domenici came back from New Mexico and he told his colleagues that people are confused about the extent, perhaps even the reality, of the Nations's worsening situation with regard to energy resources. What the people lack is information, and that information first of all defines the true parameters of our problem, and secondly motivates them to act for the good of us all. And then he said it's sad to admit that neither the executive nor the legislative branches have the information that they require.

We'll also hear from Congressman Dingell tomorrow, who is really central to the foundation of EIA, and at the time in 1974, he talked about the need for this kind of work and organization, so that he said that policy-making based upon

fundamental analysis, reliable energy data and he talked about the absence of reliable and fundamental data throughout the federal government.

So here were, indeed, the foundation of EIA, in terms of information, data, trust and confidence, and it's interesting, as I prepared for these remarks, I found myself reflecting on the same thing that Jim Schlesinger just talked about and that goes back to that wonderful phrase, "energy Independence." And he described the fortune that the United States had in terms of its resources. And it's true, the U.S. really was energy independent. He mentioned Suez, and during the Second World War, out of seven billion barrels of oil the allies used, six billion was produced in the United States. But then, as he described, we reached a point where we were no longer self-sufficient, a time of growing global demand, and tight capacity. Sounds familiar, doesn't it, actually? Americans couldn't believe, and I think that's a point he was making, that we had become so integrated into a global market. It was hard to believe that price controls and allocations were a cause of gas lines, rather than a solution.

In the years since, we've seen how EIA has played such an important role in bringing transparency, information and knowledge to bare. We saw that great film by people who are highly dedicated to the specifics of their work and to the larger issues at the same time. Their benchmarks are accuracy, comprehensiveness, excellence and relevance. And, that is again, as we heard in the film, recognized around the world. No other nation has an organization like EIA.

Today and tomorrow, we have this tremendous agenda, we have an opportunity to reflect on the energy challenges ahead, the continuities and the changes, we are all going to learn a lot, and we'll leave here tomorrow afternoon knowing more than we know today. But I'd like to talk about some of the continuities and changes, to kind of put a perspective around it. I think in terms of continuities, suspicion and doubts about energy and about markets, is a continuity over the years.

We're in another period, of course, of tight capacity and we'll have a lot of discussion about that today and tomorrow. It's a continuity even in terms of price. At CERA, we've, recalculated, because of the recent bout of inflation, the highest prices ever before, the highest prices that we have now and it's eerily close. The highest price then was in April of 1980, in today's dollars, \$103.59. This morning at least, oil was around a \$106. It was a time of U.S.-Iranian tensions, gold commodities were going through the roof, very striking continuity. Another was the striving for alternatives, and those who've been in the field may feel on alternatives and renewables, like picking up a story from

twenty five years ago. Certainly, continuity is the continuing quest for energy independence. Energy security is a preoccupation, many things have changed over all these years. The one thing that has not changed is that the Strait of Hormuz has not moved.

But let us consider the changes and what they tell us about the future. First, let's do it under the category of markets. When the EIA was established, we were coming off a period of price controls, and it was not easy to come off a period of price controls. Among one of my favorite quotes from that time, from Secretary Schlesinger, is after sitting through many, many sessions of Senate-House conferences on natural gas de-regulation, he said, "I understand now what hell is; hell is endless and eternal sessions of the Natural Gas Conference." And I think that captured the spirit of the times.

It was a time of a potato crises, "The Great Maine Potato Crisis." It turned out that, at that time, Maine potatoes, were pardon the pun, the mainstay of an exchange in New York whose original name was the Butter, Cheese and Egg Exchange. But unbeknownst to most of the country, the Maine potato trade was caught up in a great scandal, and it turned out that Maine potatoes failed to pass inspection in the early 1980s in New York City and could not be admitted. Well, that exchange, at that point, found something else to trade, and that, of course was crude oil, and the Butter, Cheese and Egg Exchange, as originally was, became the New York Mercantile Exchange, the NYMEX. And on March 30th, 1983, the first crude oil contract was traded.

Big change, we went from de-control and began trading oil. Today, of course, oil is one of the most visibly, perhaps, I guess we'd really say the most visibly traded commodity, along with other commodities like natural gas and electricity. We've had restructuring of the natural gas markets, restructuring of electricity markets, and the last couple of years in particular, oil along with other commodities, has emerged as a distinctive asset class for financial investors, separated from the commercial realities. One way or the other, of what oil is used for, it's a financial class. Just a few weeks ago, the largest pension fund in the country, Calpers, announced that it was making a sixteen-fold increase in its commitment to commodities, oil and other commodities, as an asset class.

So what we've had particularly visible in the last couple of years is the integration of the energy markets and the financial markets, and that certainty is one of the most note-worthy features of the current era. You could almost think of oil as the new gold, except this is gold that you put into your auto engine.

For half a decade, as we heard from our keynoters, a strong world economy has driven world oil prices more than anything else, so although there have been

disruptions, there's been dislocations. But now it seems, in a very strange way, oil prices are being driven by a weak U.S. economy. Rate cuts, the expectation of further rate cuts, the extraordinary weakness of the dollar, the expectation of further weakness of the dollar: this is mirrored in a rising oil price. Instead of the kind of traditional flight to the dollar during times of instability, as in years past, we now have a flight to oil and other commodities during this time of currency instability and rising inflation. In this kind of market and financial interest in oil, we've seen a remarkable demonstration of the new role of the EIA. It occurs on Wednesday mornings at 10:30am and Thursday mornings at 10:30am, when the oil inventory and natural gas storage comes out. Critical to the functioning of markets, and of course, the reliance on that data reinforces the emphasis on accuracy and timeliness.

Second area of change, the one that Secretary Bodman so strongly emphasized is technology. Now think how technology has changed. The deepwater frontier, when EIA was founded, was about 600 feet. Today it's 12,000-13,000 feet. We see, as the Secretary Bodman described, the intensity of activity and a great bubbling all along the technology spectrum: conventional, renewables, alternatives. Harnessing technology to solve new problems. We've seen the entrance in a significant way, as Secretary Bodman described it, of venture capital into energy, bringing its distinctive discipline. How those disciplines interact with the challenges, capital intensity and lead times of energy will tell us much actually about the future.

But that's only part of the technology picture, because of the considerable and continuing importance of the Department of Energy itself, of energy companies, national laboratories, and universities in research and development. Guy mentioned that study that I chaired with the Department of Energy about a decade ago, and as he said, we worked on it for two years and brought it out and actually, there wasn't much interest because no one was interested very much in the subject. I think, today, one recognizes that kind of study and the type of interest it would engender, which tells you how the times have changed.

Obviously, as we've heard, there's a focus on biofuels and a focus on how the automobile will change. And technology also poses critical questions for electric power, as it faces the needs of making investment decisions for the next generation of capacity, and that's one of the topics on our agenda for today and tomorrow.

Finally, there's the transformative affect of the information technology and communication technology in parts of the energy industry, including, and slightly sad to say, in terms of one of my truly favorite publications, as Guy

knows: the Monthly Energy Review, which is now only available on-line. It continues to be a great publication, but we get it differently now.

Another big change is in terms of the participants. You know, there's that old phrase, "you can't tell the players without a program?" Well, in the global energy business, you need a much bigger program today. In the days when EIA was founded, there was a thing called WOCA, how many of you remember WOCA? World Outside Communist Area. That was a basic element of energy analysis. Today, it's truly a global market, and most notably, those communist areas are now inside the tent, in the role of the Former Soviet Union and China. And it's striking to see that for several years, those two countries were running neck and neck. Russia increasing production, China increasing demand. What we've seen very recently is that this flattening out of Russian growth, but nothing has flattened out in Chinese demand.

So, growth is one of the really big themes around the world. That was one of the hardest truths in the NPC study. In the report to Secretary Bodman, the National Petroleum Council's hard truths, and the data he cited from the EIA, the essential point is that, based upon what we know today, our 2030 world energy demand will be fifty percent higher than it is today.

Now, we see a change in terms of companies, consolidation of familiar names. Eight years ago, we would have been talking probably a lot about the super majors, today we talk about the NOCs, the National Oil Companies, although there's very wide divergence among them. But the relations of the IOCs, the International Oil Companies, is one of the biggest themes. We heard from Secretary Schlesinger about Big Oil, and Big Oil is a favorite term in the headlines. Secretary Bodman told us something very important: that 90 percent of conventional reserves are in the hands of state oil companies. That is the real Big Oil, or the Big Big Oil, today, and that question of access is a central theme and it will be part of this agenda.

We've talked about how the U.S., over the years, has become more integrated, not less integrated, into the world market. Supply Response: it's interesting to compare the two eras. In the 70's, when EIA was founded, there was, I think we could say, abject pessimism about the future of supply, a sense that a permanent shortage was ahead. But the changes were pretty fast: fuel switching in the electric utilities sector, pushing of technology, the invention of non-OPEC. Today, we know we're in the middle of a very big debate about a permanent shortage or delayed supply response. We'll hear much about in the next couple of days; the one thing that is different now than then is very strong growth, it's been built into the system.

On the other hand, we have these delays and these postponements. What brings it home to me is we created an index, the IHS/CERA Upstream Capital Cost Index. When you look at the cost of developing a new oil field today, it's literally twice what it would have been to start that same oil field three years ago. So, delays and postponements are part of the picture.

We're in a new era of resource nationalism. A lot of focus in energy is a question of the scale, timing and location of investment, and that's far from certain.

Energy security: many of the basic principles were laid down in the 1970's and early 1980's. Secretary Schlesinger was right at the heart of that effort.

I think there are two big areas of development today; one is to bring China and India into the system, the international energy security system: just as the Western allies were in such a fractious situation the 1970's and interests were aligned, we need to do that again. We need to have, and they need to have, confidence in the system. The other thing that need to be addressed, and those pictures of Hurricane Katrina drove it home, is the security and reliability of the entire supply chain and the infrastructure. Remember, Secretary Bodman, when you were dealing with those questions, when we, as a country, faced the largest energy shock we've actually ever had, the most integrated energy shock. Oil was down, gas was down, power was down. And who would've thought when the sharing system of the International Energy Agency was established in the 1970's, that it would release oil to deal with the disruption in the United States. That wasn't in the original plans. It's hard to address the questions of infrastructure and supply chains, because governments and private sector: where does responsibility end? But it's something we have to look at.

Obviously, in terms of environment and climate change, what a change. In the late 1960's, the United States actually started to import more oil into New York City to reduce pollution in electric generation. We're now, obviously, either going to move towards a cap and trade or carbon tax. I think the next couple of years are going to be a national seminar on the subject, and I guess we're going to have the national seminar begin tomorrow morning in the discussion in this conference. But it will change the economics of the energy market place, and will affect every player and raises very big questions for electric power.

Renewables: we've already heard Secretary Bodman describe the market for clean energy. I think the way we can put it is that we really are crossing a divide from these renewables being an alternative, being a fringe, to being a significant part of the energy mix. And that, then, raises a very interesting question because, how do they get integrated into this very large scale energy system that we have?

I think as they grow in their importance, actually that question of their integration will grow more.

Energy efficiency is, I think, more on the agenda than I've ever seen it before, even in the 1970's. I have a deep conviction that we will achieve a lot. After all, in the country today, we are twice as energy efficient as we were in the 1970's, but it will involve major investment questions, and I think it's important to understand the cost, and I think the national dialogue is just beginning on that.

Well, we do have a strong sense that we are at another point of major change in the energy world, and the relationship to the larger world. What will it look like? We can be pretty sure we'll be surprised. It seems to me, every few years we're surprised, every three or four years the consensus on energy changes. The EIA does what are certainly among the most authoritative forecasts in the world. They try to deal with the surprises by building in variances people don't often necessarily see, different assumptions about the economy, technology and alternatives.

I wanted to just take a moment to share a little, maybe offer some glimpse of the future. Not out a million years, but maybe out to 2030. But not to do it in terms of a forecast, but do it the only way I know how to do it, which is with scenarios. And to offer just the sort of top line of our three scenarios that kind of put a structure around some of the basic questions that we're all concerned with.

One scenario we call Asian Phoenix. You know that Asia's already overtaken North America as the number one consumer of oil in the world. That tells us something. In this scenario, Asia becomes the largest part of the global economy, over fifty percent by 2030. It's a world of strong energy demand. It means also, though, that there are the economic resources to invest in development and carbon mitigation. In a way, it's the most benign scenario.

The second is called "Break Point," and that asks the question: can we actually imagine oil losing its monopoly position, its traction in transportation, perhaps as early as 2015? What would make it possible? Would it be price? Would it be disruption? Would it be security concerns? Would it be climate change policy? One way or another, you start to work that out, and you start to see among other things, the growing role of electricity in transportation. Although, that, in turn, accentuates the question of capacity and fuel choice for electric utilities in the future.

The third scenario, is one that would not have seemed very likely year and a half ago, we call "Global Fissure." It's one of slower economic growth. It's one of backlash against globalization. It's one of higher protectionism. It affects demand more negatively: reduced investment in energy carbon mitigation, lower prices.

As I said, it didn't seem very likely a year and a half ago. That was when the boom was going to go on forever. Now, the "R" word for recession is pretty well accepted in the United States. And one of the big questions that we're living through right now, is whether the rest of the world is de-coupled or not from the U.S. economy. I think I would argue that we are seeing a de-coupling from the de-coupling theory going on right now, in the sense the U.S. is too big for the rest of the world not to be affected.

And yet it comes at a very strange time, because much of the rest of the world right now is not preoccupied with downturn. It's preoccupied with inflation, especially food, which goes with political and social stability. So, a more complicated time, but in Global Fissure, less pressure in energy markets, but less capacity to deal with climate issues.

What I think we all learn with scenarios is there's not a single one. They're not a forecast. The actual future is some mixture of the elements come together. But, there are three characteristics that will continue to be defining: One is, when we look at energy, so often I think that people forget that the scale in the public debate about it; second is complexity; and the third is the lead time. There's a fourth element, too, I think, which is confusion, which is a recurrent characteristic.

And that in turn brings us back to the EIA, which will provide the framework and the insight to understand the evolving energy future and the critical questions that are thrown up. We can see, as the energy picture changes, the expanding scope that will be there for EIA. And we can see it in terms of what it's already taken on: in terms of the underpinnings of these global energy markets, in terms of taking on responsibilities of natural gas production and natural gas storage, the impact that Katrina and the critical role that EIA played.

Now with biofuels, as I've discussed with some at EIA, is a question of how all these traditional categories are breaking down across the energy fields. The success of the Clean Air Act, as we saw in the film, added responsibilities to EIA, and we know that CO2 and carbon and climate change will add further to the responsibilities. And we'll see its increasingly important role as energy markets and financial markets become more and more integrated. So, ahead of it is very challenging work for understanding. And also, I should say, another thing that's very striking is that EIA will have a bigger, more complex role, and it's difficult to do understand what's happening in the demand side and consumption.

So, as we understand, it took significant resources to get EIA going. As it's responsibilities expand, it will need resources so that it will continue to deliver the work on which all depend for that credible, high quality information, data,

the analysis, and the forecasts that energy markets require to function properly and public policy requires for sound decision-making. And it's those markets, of course, on which our economy and our society depend. So I think that underscores that kind of agenda, underscores the importance of the very substantial agenda here that brings us all here together on this 30th anniversary of EIA. These two days are about the lessons of the past, the issues of the present, but most importantly, I think, they're about trying to understand the future. Thank you.