

Closing Plenary Session
Powering the Next Millennium:
CCT Answers the Challenge

COMPLETING THE CCT MISSION: THE CHALLENGE OF CHANGE

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I. INTRODUCTION

Thank you for the opportunity to provide some insight on the future of clean coal technology and how the CCT mission might be completed in a restructured electricity industry. A few years back, I spoke at this conference when it was held in Cleveland. At that time I was a regulator and before that a legislator. I hope to draw upon those prior experiences, add a perspective from my current role as an energy industry association executive, and suggest some ways in which we can all work together to meet the challenge of change consistent with the theme of this meeting.

First, I hope you will indulge me the opportunity to tell you a little about the Illinois Energy Association. Our organization is relatively new, having been formed in January 1994. We have eight member companies who are investor-owned energy utilities doing business in the State of Illinois: Central Illinois Light Company, Central Illinois Public Service Company, Commonwealth Edison Company, Illinois Power Company, Interstate Power Company, MidAmerican Energy Company, Mt. Carmel Public Utility Company and Union Electric Company. Our members run the gamut from a heavy concentration of nuclear generating capacity to exclusive use of coal for generation. Each year we use millions of tons of coal, both high-sulfur Illinois Basin and low-sulfur. The member companies of the Illinois Energy Association are not only interested in the future of clean coal technology, we have a huge stake in its viability.

My personal involvement in clean coal technology spans my changes in career. As an Indiana State Senator representing a coal belt district, I was deeply involved in pro-coal legislation and was an author of Indiana's 1989 statute promoting the use of clean coal technology. When I left the legislature and became Chairman of the Indiana Utility Regulatory Commission in May of 1989, one of my first tasks was to interpret and implement that very law which I had just authored. That case resulted in construction of the Pure Air on the Lake project at Northern Indiana Public Service Company's Bailly Generating Station. Later I was involved in approval of construction for PSI Energy's Wabash River Coal Gassification Repowering Project. Since leaving the Indiana Commission in 1993 for my present position, I have been involved in helping my member companies monitor clean coal technology

developments. I was born and raised in Sullivan County in Indiana's coal belt, and much of my public and private career has been devoted to promoting coal and clean coal technology.

Permit me also to say a word about coal and the State of Illinois. We are deeply involved in coal development for many reasons, but especially because of the fact that there is more energy in Illinois coal deposits than in the oil reserves of Saudi Arabia and Kuwait combined. From the earliest days of the state, coal has not only fueled the homes of Illinois residents and the state's economy, but it has been woven into its social fabric.

The State of Illinois and the state's coal mining industry have long acknowledged the problems inherent with mining and burning coal. But, more importantly, they are actively and vigorously seeking new technologies to ensure that coal plays an important role in Illinois' future.

Long before clean air and acid rain become important public issues, Illinois was leading the way toward the development of new technologies to burn coal more cleanly, more efficiently and less expensively. Illinois, in fact, is a leader in the development of clean coal technologies.

Coal is mined on an immense scale in our state. Altogether, some 54 million tons a year are recovered from beneath the rock and soil of Illinois. Both surface and underground mining are done on a scale that astonishes those who view it for the first time.

Unlocking the secrets of clean coal technologies is done on the other end of the scale. It begins with the molecular structure of coal. Researchers probe the basic organic nature of this fossil fuel to help other scientists — and later, utility and coal industry engineers — understand how to make coal a cleaner fuel for the 21st century.

The search for answers on how to burn Illinois coal, which is naturally high in sulfur, without releasing unacceptable levels of sulfur dioxide into the air has been going on for decades.

The effort is under way in the laboratories of major Illinois universities, in the demonstration projects managed by the state's utilities and large industries, by researchers working for the state's coal companies and through special programs operated around the state. This massive effort is coordinated by the Illinois Coal Development Board and the Illinois Department of Commerce and Community Affairs, which administers the state's research, development and demonstration programs. In 1984, the Illinois General Assembly established the Coal Technology Development Assistance Fund to speed the transfer of successful laboratory experiments into full-scale demonstration projects. To date, the Board has approved nearly \$42 million for laboratory research through the Illinois Clean Coal Institute.

Since 1975, the Illinois General Assembly has authorized \$183 million in Coal Development Bond funds for the Illinois Coal Demonstration Program, of which the Board has committed \$138 million on 18 clean coal technology projects. The state money has been matched with nearly \$662 million in public, private and federal funds for these projects.

Illinois believes that coal is a fuel for the 21st century, both by necessity and by technology. From the standpoint of necessity, coal is our most abundant natural resource, giving America literally hundreds of years of supply.

From the technological perspective, advances in research — fostered by the Illinois Coal Development Board, the Office of Coal Development and Marketing and the Illinois Clean Coal Institute — are proof of the reality that coal's bright past is but a prelude to coal's bright future.

II. CCT AND INDUSTRY RESTRUCTURING

The thrust of my remarks today is this: In order to "complete the clean coal technology mission" it will be necessary to determine CCT's role in the restructured electricity industry and develop a strategy to promote that role. First, we must understand where the industry is headed and how clean coal technology fits into that future. Then, we need to develop a strategy for getting from here to there, from where CCT is today to where it must be in five, ten or twenty years to be a viable option for decision-makers.

Trying to determine the details of where the nation's electricity industry is headed is an especially difficult task at this point in time. In fact, it has developed into a real growth industry if the number of conference and seminar brochures which arrive daily at my office are any indication. But one need look no further than the halls of the state legislatures and the Congress to find guidance. For the first time in nearly a century, the fundamental order of the industry is being changed by those who set it in place originally, our elected representatives. In Illinois, as in California, Rhode Island and any number of Statehouses, the General Assembly is beginning to take up industry restructuring legislation as we speak. The Congress is also poised to take up the subject. The laws which are passed in Washington, Springfield and elsewhere will provide the statutory roadmap which leads eventually to a fully competitive electricity industry where every customer has the power to choose his or her or its electricity supplier. While important, the timing of this move is not nearly as critical as the fact that it absolutely, positively will occur.

One of the most critical parts of my job is to demonstrate to people at my member companies who have been in the industry for many, many years that this change is coming, it is positive and that it will fundamentally alter the way their companies operate. The phrase I often use in a shorthand way to try to describe this sea change is that we will soon become an industry where the bottom line is actually the bottom line. That concept has lots of implications for every stakeholder in the industry but it has particular implications for those of us interested in promoting clean coal technology. When I say that we need to determine how clean coal technology fits into the future of a restructured industry I mean above all how does it fit in terms of "cost." Because that little four-letter word "cost" will soon play the same role in our industry as it does in every other competitive industry, a role which it has really never before played for us. We can talk all day long about the abundance of coal and how using coal to

fuel the next generation of power plants would be in the common good, but believe me all the strong policy arguments won't amount to much if clean coal technology is not cost-competitive with other sources. When we say that CCT will be a superior technology at the time these decisions are made, we must include superiority from a cost-effectiveness standpoint in that definition.

Clearly, clean coal technology does not meet that standard today. How, then do we get from here to there? What is our strategy as promoters of clean coal technology as the power source of choice for the next generation? Who does our strategy target in terms of decision-makers? Perhaps, this final question is the place to begin because the answer on a long-term basis will be quite different than it has ever been for the industry. For the first time in its history, the electricity industry itself will be required to assume the risk and make such decisions. And all without any of the old, reliable safety net found in the regulatory model. In the coming market economy, electricity industry decision-makers will find that the market itself will set the parameters of their decisions and that those parameters, as in all competitive industries, will be largely based on costs. It is nearly impossible to underestimate the change in industry corporate culture needed to digest this shift in priorities.

Thus, the crux of any strategy for promoting clean coal technology as a viable choice for industry decision-makers must lie in making CCT cost-competitive with other potential power sources. Reaching such a goal will not be easy but it is not impossible. It can be accomplished by forging a collaborative effort on the part of the stakeholders who would benefit from use of clean coal technology: electricity consumers, federal and state governments, electricity suppliers of all stripes, CCT developers and vendors, and those directly involved in the production and sale of coal itself. And in this latter group I would certainly include those whose jobs either directly or indirectly depend on coal. One of the increasingly vocal stakeholder groups in the electricity industry restructuring debate is that representing the utility workers. Coal miner representatives must be a vital part of any clean coal technology collaborative effort.

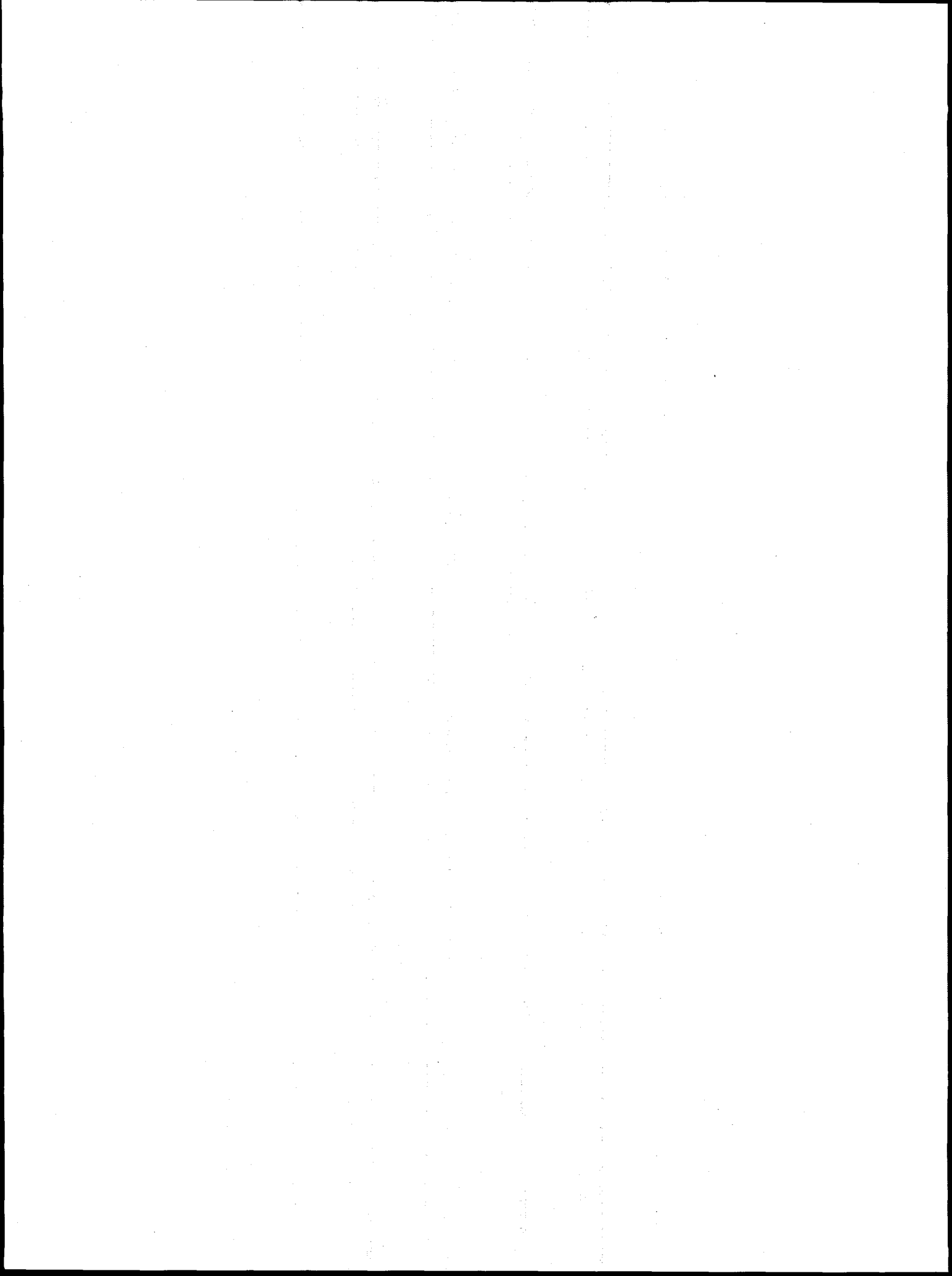
Together, these diverse groups have a great deal of political clout if they will only work in a coordinated fashion to use it for this purpose. Various types of incentives which would help to spur research and development of clean coal technology can be achieved at both federal and state levels if we all work together toward that goal. To be cost-competitive in the long run when decisions will be made regarding new sources of generation, clean coal technology must have already progressed through the testing stage and the application stage of development so that it is approaching maturity status as a market. Only then will it pass the kinds of cost-effectiveness tests which will be used by the market to make final choices. Clean coal technology must be ready when the time is right; it cannot afford to be late, because as my industry is about to learn, in a market economy as in politics, timing is everything.

Policy decisions which benefit the development of clean coal technology will not be made in a vacuum and they will not be made out of altruism. They will be made by down-to-earth policymakers engaged in a political process which is the lifeblood of our society. If we who

favor deployment of clean coal technology sit back and wait for policymakers to discover the wonder of our product by their own devices, it will be a very, very long wait. We must mobilize our considerable resources and actively promote our agenda if we have any hope of success for CCT.

III. CONCLUSION

Coal makes sense for the United States. It makes sense for several important reasons not the least of which is its abundance here — we are the Persian Gulf of coal. It also makes sense in terms of its economic impact on large areas of our nation. And if coal makes sense, especially economically, then clean coal technology makes even more sense because of its potential to capitalize on this abundant resource in an environmentally friendly manner. But I am here to testify that after nearly thirty years of involvement in the political world at all levels from Washington, D.C. to Washington, Indiana, I have learned the hard way that “common sense” does not always, or even often, carry the day in the policymaking process. I believe that the future of clean coal technology hinges on our ability in the next few months and years to mobilize all those who favor that technology to move forward in a cohesive and coordinated effort to affect the policymaking and political process and thereby promote and accelerate CCT development. If we can do so, then we are well on the way to completing the clean coal technology mission and meeting the challenge of change.



INTERNATIONAL MARKETS: SEIZING THE OPPORTUNITY

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Chairman, before I get started on my presentation I would like to congratulate the US Department of Energy for having the considerable foresight in establishing the clean coal demonstration programme when it did.

While many speakers over the past few days have highlighted the challenges of bringing forward the take-up of clean coal technologies, without the US Department of Energy Clean Coal Demonstration Programme the challenge would be near impossible to reach and the long term consequences on the environment substantial. In addition the guidance and inspiration it has given to more modest clean coal programmes overseas cannot be underestimated. I know from personal experience that the UK Department of Trade and Industry and UK industry has found our contacts with the programme invaluable.

To start off my analysis of the presentations, I would like to highlight some of the key facts and figures mentioned in a number of papers this week, together with a summary of the perceived market barriers.

Firstly, a number of presenters have referred to the expected continued rise in coal demand for power generation and other uses for the foreseeable future - certainly well into the 21 century. Forecasts by the International Energy Agency highlighted in John Ferriter's presentation on Wednesday indicate a substantial increase in world coal demand to 2010. Rising from around 3.5 billion tonnes at present to over 5.3 billion tonnes by 2010. As we heard from David Gallasby yesterday, most of this increase is in Asia, where coal demand in China alone is set to increase from 1 billion tonnes to over 2 billion tonnes and in India from 250 million tonnes to 500 million tonnes by 2010. These figures demonstrate the substantial economic growth expected in Asia over the next few years and perhaps indicates where much of our effort to promote clean coal technology should really be focused.

There is a clear consensus on what the barriers to bringing forward any significant amount of advanced clean coal technology at the present time. These are:

- uncertainty associated with a deregulated electricity industry and a highly competitive market place

- increased availability and competition from natural gas
- in many countries the electricity utilities have only just been privatised and are particularly risk adverse
- lack of commercially demonstrated performance and perceived cost competitiveness, particularly for IGCC and PFBC
- the public and political perception about coal
- the concern about even tighter environmental constraints
- the financial constraints and technology risk premiums

A number of presenters have touched on the issue of coal being perceived to be a "problem fuel" associated with global warming and local pollution acid rain and particulates. This is despite the wealth of publications and information about the benefits of clean coal technologies produced over the past few years by various public and private agencies in the US and overseas.

The increase in coal use should not be seen only as an environmental problem to solve, but a major market opportunity for exporters of technology, components and know-how - in both the United States and internationally. A recent study by the IEA Working Party on Fossil Fuels has shown that the potential market for clean coal technologies exceeds \$800 billion over the next few years to 2010. 90% of which is related to power generation. This \$800 billion forecast is close to the trillion dollar figure quoted by Mrs Patricia Godley on Wednesday.

Seizing this huge market opportunity is the real challenge. If we are successful (I say we for this market is large enough for everyone to have a share), it would make a substantial difference to the environment of the certain increase in coal use over the next few decades.

It is also important here to understand that clean coal technologies can also mean "state of the art" conventional plant. Such plants offer substantial improvements in both efficiency and environmental performance when compared to many existing plants in both the United States and the rest of the world.

We should not necessarily be too pessimistic about not being able to speed up the deployment of advanced clean coal technologies as fast as some speakers this week would like. In my view the worst possible outcome for advanced clean coal technologies such as IGCC is if a technology is sold to a utility or IPP on the basis of certain performance criteria and it fails to deliver. While this is obviously a major problem both financially and technically for the technology supplier, it is also immensely damaging to other clean coal technologies approaching commercialisation. As Larry Papay of Bectel mentioned during his luncheon address on Wednesday, some technologies will inevitably fall by the wayside; what we must not do is make some of them fall off the road because we pushed them to quickly.

The Coal Industry Advisory Board study which John Wootten outlined on Thursday provides an invaluable status report on where we are with deploying clean coal technologies. In particular, it set out the policies and measures that might be deployed to overcome some of the barriers.

The presentations from John Wootten and David Gallasby, did indicate to me a considerable interest by utilities to take up more advanced clean coal technologies if manufacturers could deliver on price, availability, and reliability etc. As Ian Torrens presentation highlighted, the fact we have 350 supercritical units operating or planned throughout the world now, and that some utilities are prepared to take the risk and become involved in first of a kind plant both here in the United States and in Europe, Japan etc., albeit with some public funding in one form or the other, is very encouraging. Clearly it would be immensely beneficial both to the environment and to industry if the more advanced technologies could be taken up commercially at a faster pace both at home and overseas.

Having listened to, and read the papers presented on Thursday, I believe there are a number of positive things we can do to smooth the path of encouraging the deployment of clean coal technologies over the next few years. It will require careful planning, and a willingness of all those with an interest in seeing clean coal technologies adopted as the energy technologies of choice in the 21st century, to work together much more closely than at present. Many of the activities could turn out to involve little if any additional work and may even lead overall to less effort if there is a commitment to work together.

Firstly, we need to be much more focused and concentrate effort in a few key growth areas such as China and India. The UK for example is focusing its export activities on clean coal technology on India and just one or two provinces in China.

Secondly, there is growing evidence that a number of countries have been confused by the conflicting information and advice they have received about clean coal technologies. This confusion and lack of knowledge also persists in those countries leading technology development. I have met for example a number of senior energy company executives in the United States who were unaware of the breadth of the US Clean Coal Demonstration Programme. Mrs Patricia Godley has quite rightly emphasised the importance of educating key players in the United States together with the general public.

There is always a danger we produce information only for ourselves, It is vital we remember key decision makers at home and abroad and the public have their own, often very specific information requirements. The importance of preparing appropriate information and disseminating it effectively was emphasised by John Wootten in setting out the CIAB's recommendations on policies and measures to overcome barriers.

These CIAB recommendations' emphasises the importance of the private sector and government working together to disseminate technical and economic information about clean coal technologies including supercritical and ultra supercritical technology.

I would strongly endorse this but recommend this is done under the auspices of the International Energy Agency as part of the World Bank clean coal initiative. I would also recommend we make particular use of the IEA Clean coal Centre (formerly known as IEA Coal Research) for this work.

Thirdly, there is a need for a consensus on what are the main barriers to technology deployment within individual countries and prepare a strategy to overcome them collectively. Again, this could form part of an international collaborative activity under the auspices of the IEA. It cannot be effective and efficient to try and open up new markets to deployment and reduce tariff charges etc., in a random way as currently undertaken.

Three final points. There are clearly no easy solutions to overcome some of the perceived impacts of deregulation, privatisation and competition to the take up of clean coal technologies. As David Gallasby reminded us on Thursday, what is most important is market pull, assisted to some extent by improved information dissemination on benefits of clean coal technologies.

The US Department of Energy may wish to consider for its next conference to have a specific session devoted to reporting progress on overseas demonstration projects. This would allow within the scope of one conference for us to see the "state of the art of world development of clean coal technologies., and further demonstrate the commitment of the United States, Europe and Japan etc., to work together to enhance information dissemination.

Finally, accepting market pull is essential to the future deployment of clean coal technologies, the US Department of Energy should consider inviting representatives from the key market areas - decision makers, technical and financial advisers etc. to tell us what information they require with respect to clean coal technologies. Such action should greatly assist the US Department of Energy in focusing its future activities more effectively.

ROLE OF CCTs IN THE EVOLVING DOMESTIC ELECTRICITY MARKET

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I. KEY POINTS AND ISSUES

- (1) Panel considered the effects of deregulation of electricity markets on CCTs, with CCTs defined as greenfield and repowering technologies, in the medium to long term
- (2) Full fledged consumer choice likely won't occur for at least five years, perhaps more, but there are at least two important impacts today for CCTs:
 - (A) Uncertainty: don't know what costs can be recovered in long run, so even more incentive (e.g., in addition to present overcapacity) to minimize new construction
 - (B) Huge incentive to cut costs everywhere: *any missed opportunity to reduce costs in new, deregulated environment automatically translates to lost profit (or losses instead of profit)*. Main impact of deregulation on CCTs is probably pressure to reduce construction costs
- (3) Impediments to CCTs being cheapest option:
 - (A) Natural gas prices are low and projected to increase only slowly (EIA projects about 1% annual increase in excess of inflation through 2015);
 - (B) Capital costs for CCTs (and coal generally) are too high; and
 - (C) CCTs are still perceived as riskier than more commercial technologies, and thus may bear a risk premium
- (4) Uncertainties that could affect demand for CCTs
 - (A) Natural gas prices can be quite variable, and uncertainty; may be mostly on the high side: despite EIA projections (and those of others) that gas wellhead prices will still be about \$2.50/MMbtu in 2015, Frank Burke graphics in Panel 4 showed late December price spike at Henry Hub in Louisiana, and futures prices for natural gas in similar time frames, at about \$4.75

- (B) Capital costs may well be lower in deregulated environment: according to Bob Edmonds of Duke Power, Duke recently built a new coal unit for just over \$1,000/KW in South Carolina (the Cope unit), several hundred \$/KW less than present expectations; Edmonds cited cost-cutting lessons learned in Duke's recent experiences abroad
- (C) Higher demand growth could spur need for new units, everything else equal: Mary Hutzler of EIA stated that an increase in demand growth from 1.5% to 2.0% from 1995 to 2015 would trigger a need for about 100 GW of new units, about half of them coal
- (D) Lower prices due to deregulation could spur new electricity demand: Bob Edmonds stated that Duke projects internally that prices could drop between 5% to 30%, depending on treatment of stranded costs

II. SUGGESTED SOLUTIONS TO BRINGING PRECOMMERCIAL CCTs TO MARKETPLACE

A wide range of potential solutions was offered, some involving some government role or incentive, some involving only industry

- (1) Solutions involving Government roles
 - (A) States currently undergoing, or looking at, the transition to deregulation are examining new ways to continue supporting "favored" technologies. These could include:
 - (I) a nonbypassable "wires" charge (such as implemented by California) to collect \$ to be used to fund renewables, conservation, and R&D
 - (ii) a "portfolio standard" which would require that sellers obtain a certain percentage of their power from favored technologies
 - (iii) regulatory requirements favorable to certain technologies, such as a requirement that nuclear units must be allowed to run anytime they are available
 - (B) Financial incentives, such as proposed by Dwain Spencer
 - (C) Incentives for overseas deployments of CCTs, in order to demonstrate them adequately by the time they are needed domestically

- (D) Work with state regulators to develop some types of incentives
- (E) Recognize in some way the fuel diversity benefits of coal

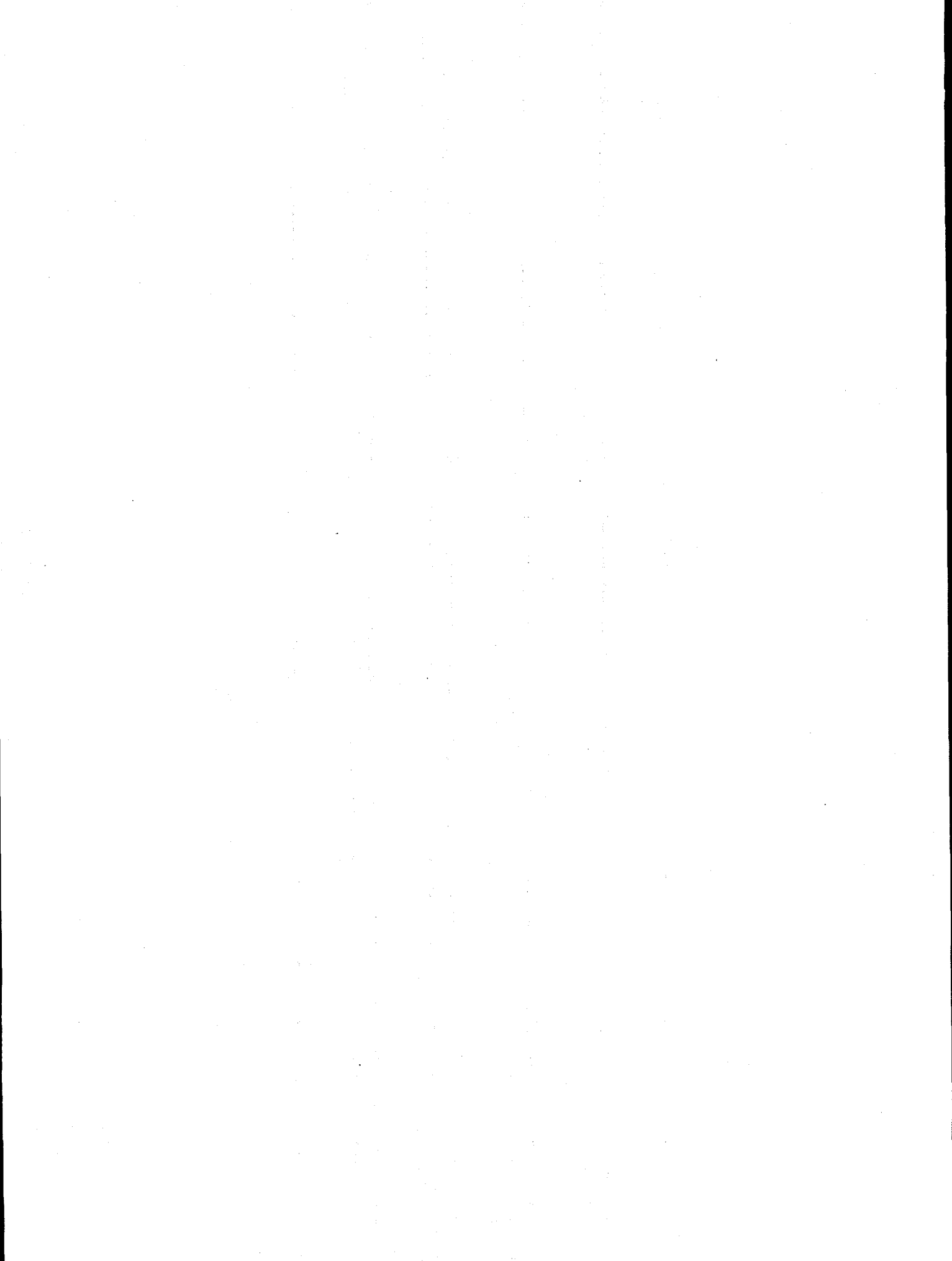
For any of these incentives, coal industry involvement above and beyond that of today was urged, because other entities might have other priorities than developing CCTs.

(2) Industry solutions

- (A) Co-production (including tri-generation of electricity, heat, and chemicals) will bring price of electricity down
- (B) Co-firing with "distressed fuels"
- (C) Develop standardized plant, modular production, use cookie cutter approach to lower capital costs
- (D) Coal sector should work together to produce an integrated project, just as the gas industry abroad has developed new gas fields in conjunction with identified power plant projects (parallel to mine-mouth units domestically?) To gain synergies

III. OUTLOOK FOR POSSIBLE ACTIONS

- (1) Given the difficulty of obtaining financing from federal or state sources (due in part from rising budgets for social costs such as health care, according to Terri Moreland), it may be up to the private sector, possibly in conjunction with non-financial incentives such as portfolio standards and line charges, to bring CCTs to commercial fruition
- (2) If there is to be government involvement, need to get private industry and different levels of government together to decide on a course of action. Right now, there appear to be many ideas, but little leadership.
- (3) If there is to be government involvement, the lone remaining major opportunity is likely to be the legislation that will likely go forward in states the U.S. Congress to put electricity deregulation into practice



SUMMARY OF PANEL SESSION 3 ENVIRONMENTAL ISSUES AFFECTING CCT DEPLOYMENT

BY KARL HAUSKER

The panelists discussed a variety of environmental issues that affect CCT deployment, and more broadly speaking, power development in general. The issues were both international and domestic in nature. I summarize below the issues discussed and possible solutions.

ISSUES

International Issues

James Newman of Golder Associates described the environmental guidelines and requirements facing developers of power plants abroad. The guidelines and requirements can come from the financing entity, the host country, or the internal policy of an independent power producer (IPP). The financing entity may be a multi-national, regional, or national development bank and/or a private bank, finance company, or trading company. The guidelines or requirements may be procedural in nature (concerning environmental impact assessments, management, monitoring, public participation in planning) or operational in nature (limits on emissions or impacts on natural resources). Adherence to ISO 14000 may become an important procedural requirement.

These guidelines and requirements may pose a confusing web for a developer. However, many finance entities defer to World Bank guidelines. This can simplify the situation, but those guidelines are, themselves, in a long process of revision, creating considerable uncertainty.

Domestic Issues

Considerable uncertainty exists with respect to domestic environmental requirements as well. Brian McLean of the U.S. Environmental Protection Agency discussed current and proposed EPA regulations that affect power plants. The 1990 Clean Air Act Amendments are still being implemented in stages as directed by the legislation. For example, Phase I of the NO_x and SO₂ programs are underway, with Phase II coming in 2000. Other programs in the pipeline include the utility air toxics MACT and regional ozone programs. In addition, in November 1996, EPA made proposed revisions to the National Ambient Air Quality Standards for ozone and particulate matter. These standards could result in significant additional requirements for emission reductions from power plants.

Climate Change

The issue of climate change spans the domestic and international agendas. Linda Silverman of the Department of Energy discussed the latest developments in the Framework Convention on Climate Change (FCCC). The signatories to the FCCC are in the process of negotiating a binding agreement on quantified emissions limitations and reductions for the post-

2000 period. This would be a major step beyond the current non-binding agreement on limiting greenhouse emissions in the year 2000 to 1990 levels (which most countries will not achieve). The U.S. position is to support an agreement that contains verifiable, medium-term emission targets that are realistic, achievable, and allow maximum flexibility. If an agreement goes into force, it would undoubtedly require limitations or reductions in fossil fuel combustion. Mark Mills of Mills, McCarthy, & Associates presented an analysis of electro-technologies that I discuss below under "SOLUTIONS".

Uncertainties Loom Large

There is little doubt that international and domestic policies will demand improved environmental performance by the electric power sector in the future. The presentations of these speakers and two Congressional staff also indicated the large uncertainties that exist over just what these future environmental requirements will be for CCT and other fossil fuel generation. Uncertainties flow from the internal decision processes of institutions such as the World Bank and EPA, the outcome of international negotiations on climate, and the impact of Congress on Administration policy proposals.

SOLUTIONS

My summary will highlight ideas from the panelists that could be characterized as solutions to the demand for improved environmental performance and the surrounding uncertainties. I will also offer some personal comments and observations

International Issues

Mr. Newman urged project developers to work hard to identify all the entities that might affect the environmental aspects of a power project, and determine their guidelines or requirements. Stay in close and frequent communication with these entities. Define the project early with close attention to site selection, baseline data and monitoring requirements, and public participation. I would add that, in addition, his presentation suggests that developers should press the World Bank to finalize its guidelines in order to eliminate that source of uncertainty.

Domestic Issues

Mr. McLean described the "Clean Power Initiative" under development at EPA: an effort to rationalize the current complex web of requirements and timelines, and to develop an integrated strategy for achieving the goals of the Clean Air Act with respect to the power industry. Such a strategy would employ more cap-and-trade approaches, more flexibility, and more banking. It could reduce the cost of compliance and provide more continuity to help business planning. I think there is great potential in such a strategy: it would build on the success of the SO₂ trading program and is very much in the spirit of other regulatory reinvention activities underway at EPA. I would add that the more sources that EPA can include in cap and trade programs (not just utilities and IPPs), the greater the cost savings. EPA may also want to consider regional or airshed-based boundaries for trading systems if that is appropriate to the

nature of the pollution problem. Finally, using an electric utility analogy, the Agency should explore "peak-shaving" approaches to some problems such as ozone. Temporary measures to address temporary peaks in pollution are under-utilized in the current system, and, in combination with permanent measures, can be cost-effective.

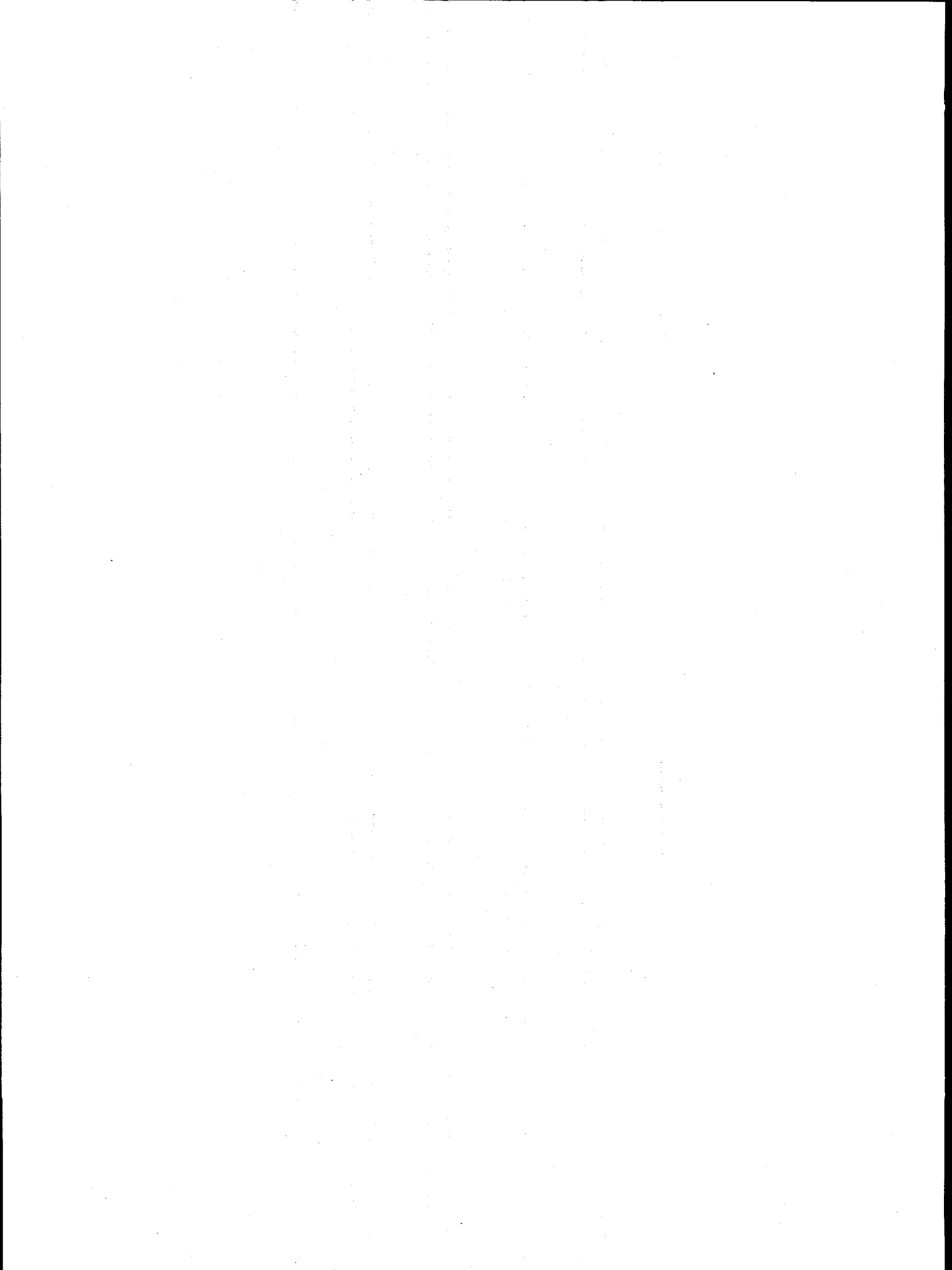
Climate Change

Ms. Silverman described some of the Administration's positions aimed at addressing the climate change problem in a cost-effective way. Policies should address comprehensively all greenhouse gases. Emission targets should be multi-year, rather than single-year, thus allowing nations more flexibility. Any agreement should involve a time horizon long enough to allow normal, rather than premature, turnover of capitol stock. Any agreement should allow emission trading and joint implementation. She also stressed that the U.S. opposes harmonized policies and measures because these could lead nation's away from least-cost solutions.

Mr. Mills presented analysis indicating that a multitude of technologies are emerging that substitute electricity for direct fossil fuel combustion (e.g., microwave drying for heat drying), or for another factor of production (e.g., ultrasound cleaning or chemical cleaning). In many cases, the net impact of this substitution is to decrease CO2 emissions, even if the electricity is generated by coal. I believe this phenomenon reinforces an important lesson for any effort to limit greenhouse gases: least-cost policies must recognize the complexity of the economy, and the many trade-offs that can be made. For example, a cap on electric utility emissions alone would not be as cost-effective as a cap on all emissions. The former might prevent cost-effective net reduction in emissions resulting from a increase in utility emissions coupled with a large decrease in industrial emissions made possible through electro-technologies. Similarly, a cost-effective climate policy might result in an increase in kWh production coupled with decreases in direct fossil fuel use by industry.

The Role of Education

Maura Reidy and Barbara Wainman, staff to members of the House Interior Appropriations Committee, stated that Congress is paying a lot of attention to the issues raised here. They also stressed that Congressional members need plenty of education, especially given recent turnover and the influx of relatively young members. This is consistent with the comments from many attending the conference on the importance of education in general.



CCT DEPLOYMENT: FROM TODAY INTO THE NEXT MILLENNIUM

ISSUE 4 RAPPORTEUR REPORT

ALL SECTORS REPRESENTED: Utility, Industrial, Fuel Supplier,
Technology Supplier, State Government.

ALL EXPRESSED CCT FACES MANY UNCERTAINTIES: Barriers,
Hurdles, Problems

1. Electric Deregulation - Postpone Capacity Additions (49.6%CF)
Soft Market (load growth in US lower)
Need for Smaller Generation
2. Capital Expense- Higher
Seen as Demonstration vs. Standardization
3. Competition- Gas Price Low
Natural Gas Generation Technology
Advancing (Eff. 50-60%)
Known Natural Gas Supplies Increasing
(30% in last Decade)
Global Competition for Industry
4. Environmental- Can go to far (CCT not enough)

Can Discourage Retrofitting (Updating may Trigger NSPS)

Uncertainty of Regs. Even 2 & 3 Years From Now (NOx 60% today 80% tomorrow)

5. Government Dollars- Fewer Federal & State (30% Reduction of state funds in 2 years)

6. CCT Energy Awareness- Stigma of Coal in General

Public attitudes toward coal remind me of a resent political survey that ask Americans on the Street, "What is the bigger threat to our Democracy - Ignorance or Apathy?" The overwhelming response was, "I don't know and I don't care!"

First, for CCT to be excepted (like natural gas) it must be KNOWN!

Second, We must not be APATHETIC about the promotion of our product! The positive societal changes CCT can bring to the world are dramatic.

FOR EACH PROBLEM THERE IS A SOLUTION!

1. Electric Deregulation- Legislation may Include Environmental Requirements that promote Retrofit Tech.

Legislation may carry provision to encourage use of domestic resources and reliability provisions

2. Capital Expense- CCT no longer Demonstration (TEXACO) Commercialization/Standardization Facilities

Financial Commitment is there!

(IGCC Texaco, CFBC Phillips Coal Miss.)
JOINT VENTURE PARTNERS
RISK MANAGEMENT

3. Competition-

Increased generation efficiencies

Standardizing the fuel - coal blending

Natural gas prices are unstable

O & M expense cut with "smart" operating systems

Dual-Fuel generating capacity

Economies of Scale (multiple products & multiple feedstocks)

Integration with other processes.

4. Environmental-

Retrofit may grow if standards not too sever

Foreign Opportunities

5. Government Dollars-

Expedited Permitting

Tax Incentives Local

Targeted Export Assistance

State-Federal Coordination

6. CCT Energy Awareness-

SSEB (regional groups)

1998 25th Anniversary of Oil Embargo

We can as Robert Bessette quoted from Jesse Jackson "like a honey bee have the sense to repollinate the flower". With a 7.5 Billion dollar investment I

don't believe we will let this flower die!

ACTIONS

1. Develop comprehensive document listing State & Local incentives. (Taxes, Land, Permitting, etc.)
2. International conference on IGCC (explore integration with other processes, products, and feedstocks)
3. Fund groups like SSEB to promote CCT awareness
4. Start a program to tour key federal and state regulators through CCT sites
5. Lobby Congress for increased domestic resource use and dual-fuel standard for electric system reliability.

I will leave you with one final quote. It has to do with Capital. We have discussed capital expense , capital cost, capital outlays.

THOMAS EDISON SAYS :

“TIME IS REALLY THE ONLY CAPITAL THAT ANY HUMAN BEING HAS AND THE ONLY THING HE CAN'T AFFORD TO LOSE.”

I believe our time spent at this conference was not capital lost but capital well invested. We must go foreword now and change the stumbling blocks into stepping stones.

**The Honorable Ralph Regula
Chairman
Subcommittee on Appropriations
U.S. House of Representatives
Washington, DC**

Thank you.

I like to be out with the audience and I want to interact with you because we are teammates. You're not going to get another brilliant technology speech. But I think you've set the stage for what we need to do, and that is education. You're going to forget 99% of what I say, but I have a couple of things that I hope you remember.

First of all, I want to say you're my heros, because I think Clean Coal Technology is the future. We are sitting in this country, and many other countries, on tens of decades of supply. We fought a war over oil. You can talk about Desert Storm anyway you want to, but we were there because of oil and if there were no oil, we would not have been there, but neither would Saddam Hussein. So that's what it's about and I'm glad we have people here from other countries.

I'm on the North Atlantic Assembly as one of the delegates and now, in that body, we're talking about environmental issues. We used to talk about how we could kill each other; today we're talking about how we can create economic growth and jobs around the world. At our last meeting, I looked up at the dias where they have the flags of the countries. There normally would be 16 flags (16 NATO countries). This year there were 33 flags because 17 other countries were participating in these NATO discussions and talking about environmental issues and jobs. That's where it is in the future, and that's why clean coal technology is vital not only in the United States, but around the world. And I'm glad that we have people representing these other countries.

What I hope you remember is that each of you needs to be a lobbyist and each of you need to educate members' of congress or others. I met with a delegation from the Ukraine who was visiting probably the most modern steel mill in the world, the Timkin Company that's in my district. They were Ukraine steel plant managers who were in the United States because they were getting pressure from back home to clean up the steel industry. They were here in the United States visiting steel companies to find out how.

When I visited with them, I said that's fine but you also need to interact with your legislatures; after all they're part of the team. That's so important to all of you--to get on a one-to-one basis with members of congress, governors, and state legislators because we have critical issues coming up. It does make a difference and what you need to talk about is how it affects jobs.

Bill Clinton got reelected President because the economy is good, because of the pocketbook issue--that's what people understand. The best job of lobbying I've ever seen was done by the Chrysler Corporation. If you remember back when they were almost bankrupt, and we had to bail them out, we had to co-sign their note in effect, we the United States government. They came into my office and had documented, down to the last screw and bolt and nut, what was made in the 16th District of Ohio, because we have no auto industry. They had documented how many people were working in Chrysler agencies fixing cars and it turned out that the 16th District had 50 million dollars worth of activity, all affecting jobs. And believe it or not, they as you well know, got the bail out. I didn't vote for it because I didn't happen to think that it was an appropriate way for government to be involved. But never the less, it saved Chrysler. Today I read in *Forbes* magazine that they were nominated as the number one company of the year by the 400 CEOs that were polled by *Forbes*.

So, it illustrates that you need to talk about jobs, and the two big issues that will be of interest to all of you this year, next year, and probably a couple of years down the road, is the issue of the deregulation of electricity. It's coming. We deregulated trucking, shipping, telecommunications, and electricity is next in line. I tell my audiences back home, now at 5:30 when you sit down to dinner the telephone rings and somebody wants to sell you long distance service--MCI, Sprint, you name it. You get ready, in a couple of years they'll want to sell you electricity. It may be Pacific Gas, Tampa Electric, I hope I get a call from Bonneville because they've got a great rate because the government's taking care of that one. But I don't think I'll get a call from REA, rural electrification. I'll get a call from them, not to sell me electricity, but to tell me that deregulation is not a great idea.

So all I'm saying is, get in touch and don't just say I'm against it or for it. Tell people who represent you in the state legislature, in the Congress and the governors how this will affect jobs, how it will affect economic growth, how it will affect the competitiveness. Our governor in Ohio likes to say "the rust is off the belt" because Ohio was for many years called the "rust belt." It's not the "rust belt" anymore. People understand that this deregulation issue is very complex to say the least. You've got the problem of the stranded cost, you've got the problem of the REAs, you've got the problem of the Bonneville, how do they fit in TVA? I see enormous problems, but somehow we're going to work it out. And you, therefore, ought to be part of the process, and I hope if you forget everything I say that in the few minutes that I have, you'll remember that and take some responsibility for it.

And, of course, the second issue this time is going to be the clean air question. EPA has proposed changes to the clean air regulations. One of the things that we did in this session in the Small Business Recovery Act is put in a provision that a proposal and change of regulations require an economic impact statement. Meaning that when EPA proposes these, they've also got to say how it is going to impact on the economy; what it's going to cost in jobs; what it's going to add to the cost of electricity and of gasoline; and all kinds of other things, because regulations do have that kind of impact. What's it going to do to our competitive position in the world today, which of course relates back to jobs. It relates back to taxes for school systems, United Way contributions and on and on and on. It affects the quality of life all across the board, and, therefore, it's important that you have input to us.

You know the 435 members of the House, 100 members of the Senate, legislatures and the governors, we've got it coming at us from all directions. I vote with a card, it's the world's greatest credit card because I can vote with this card and my grandchildren are going to get the bill. You put this voting card in a slot--I used it six or seven hundred times last year--and there are only two buttons. One that says present, if you want to cop out, otherwise it's yes or no. And when I vote, there are wide reaching ramifications.

The point is that I have to use that on a myriad of subjects. Therefore, it's important that I be educated, and the way that happens is that people that I know in my district, that are involved in the power industry or whatever, talk with me about what kind of impact deregulation will have; and what kinds of impacts Clean Air Act Amendments will have. And we're going to get the economic statement. That's a big improvement to the regulatory process. But also we're going to add 60 days in which we have to decide whether or not to try to modify these proposals or block them. It's a very important decision and we need as much information as possible, particularly because those who are on the other side for whatever reason are going to be very aggressive, very assertive in their position and, therefore, it's important that all of you be involved in that process. I think those will be the two big items that will affect your industry in 1997.

With respect to the deregulation issue, I think it will go on into 1998. There will be others that affect you. I thought one of the most significant pieces of testimony I heard last year was Alan Greenspan. Alan Greenspan, Chairman of the Federal Reserve, obviously sets monetary policy for the United States. By the way, he's going to get married. If you've read the papers, you can tell Alan is not one to act quickly. He's been going with Andrea Mitchell for 12 years, but he's finally taking the plunge. Maybe that will moderate interest rates, I don't know.

Alan Greenspan said, and I quote him almost verbatim, to the budget committee members "if you balance the budget in the next seven years," I think this was in 1995, "if you will do that, your children, your grandchildren will have a better standard of living than you do." Now that's an enormous promise and a very important one. Why did he say that? Because interest rates will come down and you and your industries can expand. My consultant companies, i.e., Republic Steel, Hoover, Rubbermaid and Smuckers can expand and produce more jobs, we're back to J-O-B-S, and be more competitive in the world marketplace. Because interest is a very significant part of the process of doing business. And so our mission on the legislative side is to help make that happen. Therefore, I think the number one issue in 1997 will be the budget.

I was in the President's office about a month ago--he signed a bill that I was involved in with a number of other members. After he signed the bill the press was out, the TV cameras and the first question from the presses was "Mr. Clinton, what is your number one issue for 1997?" And he immediately responded "balancing the budget." That's good news, now how we do it becomes a different matter, and how the priorities end up being allocated, but I think just agreeing to balance the budget is very important. It's important not only in the United States but around the world.

I noticed that some of the countries like Sweden and Norway, which traditionally have socialistic governments are beginning to discover that the cost of all these programs is becoming an excessive burden and makes them less competitive in the marketplace. So, the number one issue next year is going to be the budget issue. Another issue for 1997 will be taxes. Bill Archer is Chairman of the Ways and Means Committee. He went down and had a one-on-one with the President--no staff present, just the two of them talking about tax reform--and he came back somewhat optimistic. The President, in the campaign, promised some changes like making your home sale tax free and allowing you to deduct the cost of sending your children to college. But in order to get those, which he obviously will propose, we the Republicans will probably say how about some capital gains relief. How much, I don't know? How about some individual relief. So all I'm saying is this whole tax issue, I think, will be discussed at great length in the 1997 session.

We, of course, have the "flat tax" proposal that Steve Forbes put out there. It has its fans, including Dick Armey, the number two Republican in the House and then Bill Archer, Chairman of the Tax Writing Committee who would like to go to a national sales tax or something like a "value added tax." So there's going to be a lot discussion, but again it will affect your businesses considerably. Therefore, it's important again that you get involved. I'm not going to ask a show of hands, but if any of you do not personally have a contact with your congressman, senator and your state legislature, you're missing the boat. I don't mean sending a check for their campaign, I mean getting to know them. Call them up, go to a meeting if necessary and buttonhole them. They buttonhole me all over the place.

Best lobbying job I ever had was when I was in the State Senate--we were going to change the driving age. The AAA was for it, the state patrol was for it, the insurance industry was for it. Ohio's age was 16, and we were going to raise it to 18. Well my two boys who were about 15 and 13 said Dad we want to have a little meeting with you. They said Dad how are you going to vote on the driving change, the age? Well I said, everybody is for it. They said if you vote for it, you can mow the lawn yourself. That got my attention.

All I'm saying is that you have got to get to know and contact people. You bring to us this process called education because again we've got so many different things to deal with everyday and, therefore, it becomes important that we have this base of knowledge when we go in and put this voting card in the slot. And, of course, in the committee hearings it's not just the card in the slot. It's the committee hearings I vote in, but there's not normally public awareness on committee votes, yet those are the ones that have a great impact on how you put a bill together. The Commerce Committee has to deal with the deregulation issues, and, once a bill gets to the floor, it's tough to change. You can offer amendments, but the real work is done in the committees, that's where the house is built. You might put a little extra around the house but you do most of the building in the committees.

So beyond talking to members, you should talk to members that are on the Commerce Committee in the case of deregulation. You should talk to members on the Ways and Means Committee in the case of taxes.

Now another area I think would be important in 1997 is "education." We've passed the Welfare Reform Bill. We're saying that in two years people are off of welfare. Well we're a compassionate society and we're not going to shove people out on the street with their three or four kids--that single mother--it's just not going to happen. That means, of course, that we've got a two-year window to ensure that individuals get some education, some skills, and we need to work on that. I think that's a big issue and it's a big social problem that we all need to be involved with. Your companies ought to be looking at ways in which you may be able to offer some employment opportunities to these people, because welfare is changing and that means that these people have to have jobs. I think that in terms of entitlements, that'll be another tough issue. I don't have time to get into that, but I would say overall what we're trying to do, believe it or not, in the Congress is manage government better.

I'm a fan of Edward Demning. Japan had to teach us that Edward Demning had the right idea, he was not a prophet in his own country. He went to Japan and they learned well from him and then he finally came back here. We've got to do that in government. We can't balance the budget in the way that Alan Greenspan is talking about unless we manage better; and we have taken some steps. I'm on the Appropriations Committee and we cut \$53 billion dollars out of the budget over the last two years. That's \$53 billion dollars that we're not going to send to my grandchildren in the way of a bill; not only the \$53 billion dollars but that compounded interest that goes on and on and on.

The interest on just the National debt now is one of the biggest items in the budget and it's growing, so we need to address it, and it can be done. There are some very popular things like parks, forests, recreation, and the Smithsonian--yet we've cut employment levels--just in our Subcommittee 15%, and we've cut the budget 9½%. It can be done, just as you are. Because of competition, we're going to have to continue to look at that. That will be one of the phases of deregulation; you'll no longer have a Public Utility Commission standing guard and telling you here's what your guaranteed profit will be for the next period of time. You're going to be looking at ways on how to be more competitive, and I hope that the use of coal will be one of them. I think it will be and that's why these clean coal technologies becomes extremely important.

Housekeeping issues: At least for the time being, the focus will move to the Senate in the Congress. In the last two years, the House has tended to be the place where the initiatives came from, but I see that changing, partly because the Speaker has some difficulties. The Senate picked up a seat and Trent Lott is a new person. Trent is going to be a very effective leader. He will be able to communicate extremely well with the President. I know Trent, he and I came to Congress together, and he's a very able-bodied individual. The President is going to be interested in his place in history, he certainly is not going to run for any more offices, I don't think. The Republicans want to demonstrate that we know how to govern; we discovered that when we shut government down, it didn't do any good for us politically, so we're not going to do that again. But, we are going to try to work with the President to manage this government better to accomplish his goal, which is a balanced budget, and there will be some give and take. We demonstrated in the last six months of 1996 that it can happen. We worked out a number of very significant issues, a budget got signed, we had Welfare Reform, emigration reforms, some

regulatory reform and a number of other things--because we had a little give and take. What the American people want is for the politicians to work in ways that will be beneficial to the public and not worry so much about partisanship. I think that could well be the hallmark of the 1997 session as we deal with some of these tough issues. But you're part of the team too and you have to have your input not only in terms of your professional association but as individuals. Therefore, I come full circle and say get involved, get to know the people that represent you give them your input so that we can make good judgements, so that we can make policy that will be of significance and worthwhile value for a long time.

Deregulation, that's going to have an impact for decades, and, therefore, we need to do it right. On the Telecommunications Bill, we sent it down and the President vetoed it (it came back). I didn't vote for it the first time. I didn't like all the characteristics of it. We finally got something, it may not be perfect, but it's better than when it went into the shoot to start with, and that's all a part of the legislative process.

Lastly, we're going to make an effort to get growth. We're at about 2.3%, 2.5% annual. We need to do things to get it up to 4% because that will help to solve the entitlement problem, that will help to solve the deficit problem, that will help to solve the problem of being competitive in the world marketplace. So many things could flow out of getting this country in a 4% growth pattern, which it used to be. It will, of course, come back to jobs, when you have 4% growth you have jobs available, you have a high level of employment. We can make jobs for those people who are going to be pushed off of welfare, but, they in turn have to do their share by learning a skill. We need to give them the opportunity.

Right now we've got 165 post-high school programs. I'm not talking about college, I'm talking about skill programs--some big ones and some little ones. We want to consolidate those into three or four really good programs that will help these people get skills. But again, you need to be involved in the mix in the local communities so that there's a market for the skills given them, because there'll be nothing worse than to have somebody spend six months acquiring a skill and there's no job that fits that skill. Too often we have not tried to coordinate it.

Well again, you're my heros because you're working on a program, the Clean Coal Program, which we had a real struggle to get. What I like about it is, its going to reduce our dependency on oil long-term. We required a 50/50 match in terms of the private sector and that's become a pattern on a lot of things in government. I think clean coal is one of the first major policy areas where we did that requirement of having 50% from the private sector. As it's worked out, its really 60/40, because it's a bidding process: 60% private, 40% government. It's been very successfully--we're going to do our children and grandchildren a great favor if we can expand the use of coal. We're now at 56% of the power produced in this country from coal generation. I think it would be a shame to give them a legacy of dependency on imported petroleum because we've used it to produce electricity when coal can do it so well, while at the same time taking care of the emission requirements to meet the standards.

Luncheon Address
Completing the CCT Mission:
The Challenge of Change

Remarks by

Hazel R. O'Leary
Secretary of Energy
to the
Fifth Annual
Clean Coal Technology Conference

January 10, 1997

I wanted to join you today for two reasons.

First, I believe it is altogether fitting to enter the final 10 days of my post in much the same way as I started my very first association with energy -- watching coal head out over the horizon, in pursuit of new opportunities.

As a youngster growing up in Virginia, I sat on the docks at Hampton Roads with my father and watched coal colliers being loaded and bound for European markets.

There was a touch of mystery in what lay over the horizon for those ships. It was from that early lesson that I learned energy was global and it meant jobs at home. In those huge coal piles at the docks, I gained a sense of familiarity. At a young age I sensed the power and strength represented by those storehouses of coal. I saw firsthand the linkage between coal and jobs and economic prosperity.

The interconnection between coal and energy and the advancement of people in every corner of the globe was real to me watching those ships being loaded and disappear over the horizon to faraway, exotic places.

I gained an appreciation for the people whose hardwork and sweat was responsible for those huge coal piles.

My father was a physician in the Tidewater area. He took care of longshoremen who helped load that coal. They were his patients and our friends.

So, for this Secretary of Energy, very early on, coal was both life and livelihood.

Today those distant horizons are much closer...the world in many ways much smaller...the health and prosperity of each of us now much more dependent upon the actions of all of us. Our economies are global. Economic security and environmental protection are no longer the priorities of individual nations....today, they are universal imperatives.

We live today much more like a single, worldwide community...our futures interdependent.

We share common horizons for tomorrow. And increasingly, those horizons are being set -- and achieved -- by technology....in this case, clean coal technology.

I wanted to join you in Tampa today because, like the youngster on the docks at Hampton Roads, the horizons I see today for coal offer the same remarkable opportunities.

There is still a touch of mystery in what the 21st century holds, but today we undertake

the voyage toward that new world equipped with new technology.

It is with this new technology that coal can continue, as your conference theme so aptly states, to "power the next millennium."

A Tribute to Clean Coal Pioneers and Partnerships

The second reason I wanted to be here today is to pay tribute to the people whose genius and hardwork made this new technology possible.

"Clean coal technology" is the product of partnerships. Nothing like the TECO project, or the Wabash River project in Terre Haute, Indiana, that I visited in November 1995, or the Pure Air project on the banks of Lake Michigan -- or any of the projects displayed on the posters around this room and in the exhibit hall -- would have been possible had it not been for the determination of farsighted individuals....in the private sector....in state agencies....and in the legislative and executive branches of government....individuals in this room today.

You had the determination to shoulder the risks of this new experiment in public-private cooperation.

For those who may not be familiar with the origins of the clean coal technology program in this country, let me tell you it was a risk.

It was 1984 when the clean coal experiment began, and it is important to reflect back on the mood of the times. I had completed my first tenure in government during the tumultuous '70s, and was happily at work in the private sector.

I can tell you -- from the perspective of both a public and private official -- government's track record as a partner in new energy programs was not good.

The synthetic fuels program, begun with great fanfare when energy expectations were different, had collapsed. Major international demonstration projects in coal technology -- the Solvent Refined Coal projects with Japan and Germany -- had been abruptly terminated. Congress had killed the Clinch River Breeder Reactor. The Great Plains Gasification Project in North Dakota was on the verge of being abandoned even before the first cubic foot of coal gas made it into the pipeline.

One can certainly argue whether any of these "grand initiatives" should have continued...or whether all might have wound up as white elephants. But regardless of whether each was right or wrong, one common thread ran through them all. As a predecessor of mine (Don Hodel) put it at the time, these projects begged the question "Did the federal government have the moral conviction to complete anything it starts?"

It was in that era of broken commitments -- ill will from our friends in Japan over the SRC project, distrust from many in our own private sector -- that the Clean Coal Technology Program was launched. And it is a tribute to many of you in this room that in an era of deep skepticism, the U.S. Clean Coal Technology Program not only succeeded but became a model of government-industry partnerships.

The Clean Coal Program "*is an example of a federal program that works.*" "*Congress should support similar government-industry*

ventures to speed technology transfer...." Those aren't my words. Those are the words of the General Accounting Office, the investigative arm of congress, when it reported on the benefits of government-industry cooperative R&D in 1994.

Why did it work? What made it different from the other "big ticket" initiatives that never got off the drawing boards? Most importantly, what lessons do we take from the clean coal program into the next millennium?

The Environmental Ethic Comes Home

First, Clean Coal was a program that met a clear public need. It responded to an environmental ethic that people in the 1980s began to take personally.

Our environmental consciousness was born in the earth day movements of the late 60s and early '70s, but it changed in the 1980s. It deepened. It began to hit home.

Twenty years ago, the environmental movement spoke about the esthetic effects of human activities -- whether our air was clear or dirty, whether our waters ran pure or polluted, whether the landscape around us remained scenic or obstructed.

Today there is a new environmental consciousness. We are concerned with the effects of human activities on human health and wellbeing.

It's not just whether the air looks dirty or smells bad but whether it is harmful to us and to our children....whether it carries unseen impurities that can damage our health.

In the 1980s, we became concerned about the personal cost of environmental damage, the price we must pay... in monetary and, most importantly, in human terms.

Clean coal technologies succeeded because they responded to that environmental ethic and, at the same time, they made economic sense.

They offered a way for us to improve the quality of our air and to reduce the eyesores of solid wastes without imposing exorbitant new costs on consumers and dragging down our economy.

Clean and affordable energy -- clean coal gave us a way to achieve both.

It gave us a vision of the future in which the public would no longer associate the word "dirty" with the word "coal." It gave us a future in which our most abundant energy resource -- the world's most abundant energy resource -- could continue to fuel economic growth... without sacrificing our environment.

Just look at one of the many success stories coming out of the clean coal experiment:

Today, more than one-fourth of all coal-fired capacity in this country -- nearly 250 boilers -- have been outfitted with Low-NOx burners demonstrated in the Clean Coal Technology Program. By the year 2000, more than 75% of coal-fired boilers will have this new, lower-cost technology. Emissions are coming down. The air is becoming cleaner. The new technology of coal responded to the new environmental ethic. And the economy is better off.

Ratepayers have saved nearly \$20 billion in emission compliance costs from low-nox burners alone. Commercial sales have amounted to almost \$1 billion.

Not a bad payback for a \$40 million Federal investment...a good lesson for the 21st century as we tackle the problems of CO2, air toxics and particulates.

Industry Picks the Technologies

The Clean Coal program also succeeded because industry was the driver. Government did not pick "winning technologies," it looked to the private sector and picked willing and able partners.

Government programs in the past failed largely because government tried to dictate the portfolio -- so many gasification projects, so many oil shale projects, perhaps even a breeder reactor if anyone would build it.

This time, industry came to the table with technological solutions...and with the conviction and resources to invest in their demonstration. And come to the table they did.

Let me tell you a story about the origins of the Clean Coal Program.

The current program, as many of you remember, began in response to the U.S./Canadian transboundary problem of acid rain.

Then-Prime Minister of Canada Brian Mulroney had hammered President Reagan to adopt the recommendations of the U.S./Canadian Envoys on Acid Rain -- the centerpiece being the Clean Coal Program.

But on that day in March 1987 when Ronald Reagan stunned many inside and outside of his administration by agreeing to a new \$5 billion public-private initiative, several of his budget-cutters -- who certainly didn't want to see another big government initiative, no matter the need -- were quick to tell the Department of Energy "Don't count on seeing any of that money."

Yes, the Federal share would be offered, they said, but it would be window-dressing. Industry would never put up the required matching funds. The program would die on the vine.

But they were wrong.

Those career officials at the Department of Energy -- many in this room today -- fashioned a program that put industry in the drivers' seat. That took courage.

Sure there were safeguards in place. The whole process was set up to run competitively. Performance standards had to be met. But government set only the criteria. Industry determined how best to meet it.

And the skeptics were wrong. Industry not only put their dollars on the table side-by-side those of government, they did much better. For every \$1 dollar the government invested, industry laid down \$2.

The \$5 billion program envisioned by the Special Envoys is today nearly a \$6 billion program because industry and states upped their contribution. The 50/50 funding split originally envisioned -- and required by Congress -- is today 65/35 with the 65 being the contribution of industry and states.

And let's not forget the States. This program succeeded because the Clean Coal partnerships involved states like Ohio and Illinois, Indiana, Pennsylvania, Alaska -- and the tireless, grassroots efforts of state officials like Jackie Bird.

One out of every 3 projects in the clean coal demonstration program (14 out of 40) involves state co-funding.

The Clean Coal formula worked because states were part of it from day one.

It took courage for you in industry and in state agencies to take another chance on the government. And it took courage by many government employees to break from the past and design an effort based on industry's -- not government's -- knowledge of what would work best in the market.

Just as I learned from my father back in Hampton Roads about the personal side of the industry, I fully recognize today that the true strength of the Clean Coal Program lies with the dedication and devotion of the individuals behind the dollars and the technology.

It is appropriate that we pay tribute to those individuals....those in this room today, both in government and industryand those who are not.

I especially want to remember those who played such a key role in forging this program....but who were tragically taken from us before they could see the full results of their labors.

We pledged we would never forget, and so it is appropriate that we remember --

George Weth -- who was to head the selection panel for Round 4 of the Clean Coal Program but who died in a plane crash in Los Angeles in 1991.

The nine employees of our Pittsburgh and Morgantown centers: Bill Peters, Bob Evans, Steve Heintz, Tom Arrigoni, Tim Mcilvried, Manville Mayfield, Randy Dellefield, Bill Langan, and Sandy Webb, who were aboard the USAir flight that crashed outside of Pittsburgh in 1994.

Their colleagues from industry who were aboard the same flight: Ed Wiles and Shelly Ziska, who were with the Center for Energy and Economic Development, our co-sponsor for this conference; Todd Johnson from Babcock and Wilcox, Bernie Koch of CONSOL, John Cooper with Allegheny Power, and Daniel Kwasnoski with Bethlehem Steel.

Let us also not forget the loss of my good friend and colleague Ron Brown and the U.S. delegation he was leading to Croatia in April of last year. Bob Whittaker of Foster Wheeler International, Robert Donovan of ABB, and Claudio Elia of Air and Water Technologies Corporation were part of that delegation because they understood that rebuilding the energy infrastructure of a nation was crucial to restoring a shattered economy.

I believe it is altogether appropriate that we remember someone who spent his entire career as an advocate for coal and coal technology -- Jack O'Leary.

When the Department of Energy was first formed -- coalescing from 30 different departments and programs in the Federal

government -- Jack was the first deputy secretary. One of the battles he took on early in the game was to preserve federal coal technology research.... specifically the research underway at the government laboratories in Morgantown, West Virginia, and Pittsburgh, Pennsylvania.

There were those at high levels in the department who didn't believe those centers should continue...they didn't have the critical mass. But Jack knew they had the critical expertise.

He knew that to sharpen that expertise, the centers had to be kept open and challenged. He worked with others to turn them from inward-looking researchers to outward-focused technology partners.

Jack went to the mat for the centers. And today many of the technologies in the Clean Coal Program cut their teeth in those laboratories. Equally important, those centers were responsible for the federal stewardship of the program.

Another reason the Clean Coal partnership succeeded was that we preserved and nurtured the talents and expertise in the centers. As a result, we have people in government who speak the same language as those in industry.

So it the courage and conviction of individuals -- and their faith in the future -- that we honor today.

Congress' Commitment to Results

There were others acts of courage in those early days of the Clean Coal Program that I also want to acknowledge.

It was the courage of the few in Congress who understood the imperative that government follow through on its commitments.

Congressman Ralph Regula -- here with us today -- was one of the leaders who understood that need. Robert Byrd on the Senate side understood that need. And together, with colleagues from both sides of the aisle, they pushed through full advance funding for the Clean Coal Program.

Mr. Chairman, that was a remarkable act of leadership and vision. But that confidence was well founded.

Perhaps more than any single factor, your action broke with the past and removed the doubts.

Knowing that the government had the dollars up front to back up its words gave industry the confidence to step forward. It sent the signal that government was ready to follow through. This industry and this country owes you and your clean coal colleagues in Congress a great tribute, and I am proud to extend it here today.

Powerful Possibilities

There is a third -- and final -- reason why I am so pleased to join you today. As Thomas Jefferson said, "*I like the dreams of the future better than the history of the past.*"

And that is what I want to leave with you today... "*dreams of the future*".... visions of the challenges that await us... the grand opportunities and powerful possibilities that lie over the horizon.

I am convinced -- as I prepare to leave what will likely be my final post in government -- that governments and industries throughout the world must find ways to maintain the passion -- and courage -- to invest in the future.

How do we keep alive the same spirit of innovation that led to your bold investment in clean coal technology?

First, we must continue to think globally.

The problems we will confront in the 21st century will not be limited by geographical or political boundaries. The quality of our environment, the strength of our economies, the peace and security of our societies...none of these will be confined to lines on a map.

One of the accomplishments I am most proud of in the last 4 years are the efforts we made with industry to open doors to new energy technology throughout the world.

We were driven by a vision...our view that secure, affordable energy could be an instrument for global peace and prosperity, not a reason for competition and conflict.

And I am proud that we acted on that vision... that we had the passion to be bold...that we worked hard in the office buildings of the world's major capitals and the grass huts and shanties of remote villages to bring about greater economic growth...to create jobs, to build the middle class, to attack poverty, to protect the environment and to build democracy.

No future initiative, in my view, will be more worthwhile for any Cabinet secretary...and that includes any future Secretary of

Energy...than strengthening trade relations, improving environmental quality, and promoting peace and prosperity among nations.

We can't ignore the globalization of this technology.

The leaders of this government -- in concert with industry -- have a moral responsibility to deal with global problems, particularly when we have solutions at hand. We cannot let the partisan political climate of Washington destroy our will to take on international initiatives. There is too much at stake.

I am very proud that we made coal a major part of our international efforts.

We worked to advance clean coal in China -- following the way paved for us by Jack Siegel, who guided our fossil energy team through much of the Clean Coal partnership. We worked to deploy clean coal technologies in Pakistan, South Africa, India, Japan, Australia and Eastern Europe.

We supported clean coal in virtually every region of the world because coal will continue to be the most widely-used energy resource.

That is not a fact to be feared, but an opportunity to be seized.

More than one-half of the \$1.4 trillion that the nations of the world are expected to invest in electric power technology in the next dozen years will go to coal-fired plants. Today we have the tools to take full advantage of that enormous opportunity.

The challenge I leave with you for the near-term is to build on what you have accomplished. In the projects you discussed this week, you have offered us a preview of the future.

Now, all of us must work together to bring down the barriers that stand between demonstration of these technologies and our ultimate goal...deployment.

You are true pioneers. You deserve the title. You have reshaped the future of your industry. And pioneers, by their nature, always seek new challenges. They always look to the mysteries over the horizon.

So, my final challenge to you today is to urge you to look beyond the near-term...to look to the "powerful possibilities" that await us in the 21st century....and to recognize that they can only be realized by *global* partnerships in research and technology:

Climate change. Thanks to clean coal technology, the energy plants of the early 21st century will be more efficient, and that means less CO₂ -- perhaps 20 to 30% less from the plants of the early 21st century.

But we believe it is possible to push the envelope further.

In the R&D pipeline today, we have advances in turbine technology... advances in coal gasification and combustion....advances in fuel cells....that could push efficiencies for our visionary power plant of the year 2025 to 60% or more...and cut CO₂ emissions in half.

If we sustain our commitment to research and technology, we can do even better.

We believe it might be possible, one day, to eliminate CO₂ from a coal-fired power plant altogether....capture it and convert it into useful products -- perhaps through artificial photosynthesis.

That's a "powerful possibility." It may be far into the future, but that's the nature of research....to prepare for tomorrow.

Biotechnology. We have achieved remarkable advances in biotechnology. We believe that, one day, we might use these advances to make liquid fuels from coal affordable.

High performance computing. A few weeks ago, we joined with intel to announce a breakthrough in high-speed computing -- the first ever capability to carry out 1 trillion calculations per second.

The computers of the 21st century will be capable of calculating the enormous complexities of nuclear explosions -- allowing us to simulate underground testing of nuclear weapons.

If we can develop this remarkable capacity to simulate a virtual nuclear explosion, might we look to high-performance computers to mimic new coal combustion and conversion processes as well?

Tomorrow's supercomputers will provide new insights that could lead to even more efficient and cleaner technologies. It will mean that expensive pilot plants will be reliably simulated on an engineer's computer terminal, allowing technology to be scaled up at much less cost than required today by the need to build expensive test facilities.

The Power of Partnerships

These are remarkable possibilities. They can be realized....but only if we expand on the one lesson that stands out above all others during the last decade of the clean coal experiment -- the power of partnerships.

To meet the challenges of the 21st century, tomorrow's partnerships in new technology must be global.

But to attain it, we must all look across our boundaries and join together, tackle global problems cooperatively, leverage our resources, carry out research projects jointly.

This conference is meant as a way to forge those partnerships. Use it. Build on it. Dare to be bold in your thinking about tomorrow...about the next millennium.

The future of the 21st century is, quite frankly, our's to get, to have, to keep. To attain it, we must all look across our boundaries and join together, tackle global problems cooperatively, leverage our resources, and carry out research projects jointly.

In short, we must create among our nations partnerships for progress.

You have in front of you a future in which coal use, environmental protection, economic security and global peace are synonymous...and sustainable.

I believed that as a youngster being taught by my father on the docks at Hampton Roads looking out at the horizon and building a personal vision of the possible.

I believe that just as strongly today.

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