

**COMBUSTION TECHNOLOGY UNIVERSITY ALLIANCE WORKSHOP  
USDOE/NATIONAL ENERGY TECHNOLOGY LABS  
September 12, 2002**

***“APPLIED RESEARCH & COLLABORATIONS”***

Good morning. My name is Jackie Bird, and I am the Director of the Ohio Department of Development's Ohio Coal Development Office (OCDO). On behalf of the U.S. Department of Energy (USDOE) and the State of Ohio, **welcome**. We're very pleased you were able to arrange your busy schedules at the beginning of the school year to join us.

I'd like to commend the folks from the USDOE's National Energy Technology Labs (USDOE/NETL) for hosting and structuring this conference on Applied Research. When I dug a little further as to the purpose for the conference--what they wanted, what they hoped to achieve--a couple themes quickly became prominent, and those are what I will briefly address. The first theme was the need to build better Collaborations among academia, industry, and various levels of government (such as state and federal). The second was on the need to put a much sharper emphasis on Applied Research, specifically in the area of coal combustion technology.

However, before we get too far into this, I'd like to take a little survey.

- How many of you are from Ohio?
- How many of you are from academia?
- How many of you are from some branch of government?
- How many of you are from industry?

The last three are very important pieces of a whole. If successful Applied Research is to ensue, these three entities MUST be communicating with each other, and communicating well--which involves SHARING information, not just funding. More than anything, collaboration means open communication and a true spirit of partnership and coordination to meet a set goal.

Today's focus is on **Collaborations** in Coal Combustion Applied Research, but it could be on any problem industry has that it needs to take back to the drawing board. These types of problems are where universities and research institutions (such as Battelle or the Electric Power Research Institute) excel.

Government (and in this country that represents the collective will of the majority of the people who *perceive*—correctly or not—problems with coal and drive their legislators' agendas) sets the overall goals. Government oftentimes helps bear some of the risk of meeting those goals through various means of support, including funding. Industry must take the steps to meet those goals, which often are difficult, untried and expensive (which goes back to risk). When industry hits an impasse, it goes back to the research community for answers (which goes back to the item of funding).

To have a successful applied research program, government—particularly regulatory agencies—must set clear goals (you may already see a problem) and industry must clearly articulate its needs such that it can reach the goals. Ideally, the research community should be in frequent touch with industry on this score. It should be on-site reviewing day-to-day operations before going back to the lab to address the issues. Solutions must be practical, not just doable. There are plenty of things out there that work, but they're too intricate or too expensive and not used—so what was the point? Something may have been proven, but the problem isn't solved if the supposed answer isn't used.

A good, thorough literature review is invaluable. However, in this situation, there are plenty of places for researchers to communicate directly with industry to determine what its technical and research needs are. A few examples can include: talking with those in charge of power generation and environmental performance at your local utility or power generating company, attending meetings or reviewing the web sites of bodies such as the National Coal Council which include industry, or trade organizations such as the Edison Electric Institute or the Coal Utilization Research Coalition (CURC), which are composed

primarily of industry personnel. I've brought and placed on the table some very recent draft white papers from CURC as to what its members believe are industry research needs at present. You might find them of interest. So, too, should you find of interest the programs defined by technology roadmaps. These have been developed through the input of industry, academia, and the general public and can determine efforts and funding sources such as PRIER (the Powerplant Reliability Improvement & Emissions Reduction) and Vision 21. How does the work you want to do fit into these? Not too surprisingly, you will discern that industry and government while very close in what they hope to achieve, may not always be completely in agreement on how to get there. Nevertheless, both points of view of these potential users and funders should be carefully weighed.

Another example of collaborations can include Ohio Coal Research Consortium, primarily supported by the Ohio Coal Development Office. I've also brought a listing of the Consortium's current projects for this school year; a more fulsome description of the projects is available on our web site. The Consortium is a group of five Ohio universities: Case Western Reserve University, Ohio University, The Ohio State University, the University of Akron, and the University of Cincinnati. You'll note on the sheet a "mentors" column. The Consortium is overseen by an independent panel primarily comprised of industry, although members from government and research institutions also participate. Thus, all three components (research, government and industry) are present and active. Some of the Consortium members' work has led to research partnerships between professors from different universities, or collaborations between the researchers and the mentors when the project is ready for its next step.

As these new technologies emerge, they are by definition untried, and their initial use by industry poses high risk. Because the technologies' success is a priority for government, it will help assume some of the risk, which is a proper function of government. Some of this risk assumption will be through tax incentives or tax credits, through grants for applied research or pilot and commercial scale demonstrations, through its own research with a cadre of researchers on its payroll (as can be found at NETL, LANL, Oak Ridge, etc.), or

through technical assistance to industry and academia by its own engineers and researchers, some of whom are here today. This takes place at the federal level on a large scale, and in several states--including Ohio--on a smaller scale.

Anyone engaged in applied coal R&D should know industry's needs and the research programs supported by their respective state and federal governments, what their priorities are, and WHERE THE PROGRAMS COMPLEMENT EACH OTHER. If the researcher knows this, then s/he is well positioned to engage in some very savvy collaboration by leveraging value from each of these entities. This is important since no one entity can afford to fund a venture of this magnitude by itself. These days, a "patch work quilt" of funding is not only common, but also a necessary element to having your work supported over the long haul. The good news is these entities typically want to collaborate--it extends their limited resources and secures broader results.

Just another quick survey:

- How many of you have ever applied to USDOE for project funding?
- How many of you have ever applied to your State for funding?
- How many of you have ever applied to a foundation or similar source for funding? To industry for funding?
- How many of you have ever JOINTLY applied for funding of a given project to both the Federal and State government at the same time? To two OR MORE of the above at the same time?

If you have not done those last, you really are missing some big opportunities. Assuming the project application has merit, the feds and the states like nothing better than to leverage off of each other or other entities. Further, government agencies especially like to see industry interest and true involvement in a project. (True interest translates into offering a host site, offering technical review or some form of their employees' time and expertise, and/or funding—not just some nice, warm, fuzzy letter of endorsement—but a true commitment.) It works well for them in a number of ways, and benefits the applicant as well. Hopefully, while listening to the initiatives and programs USDOE will discuss today, you will

also research the coal R&D programs in the various states and learn how to package an application that meets the goals and requirements of each. If you don't see the connections, call the State and Federal programs and find out. You most likely will find that they've already been working together for quite some time. Ohio and USDOE certainly have. Our collaborations extend as far back as 1984, and we've had so many, I've lost count.

Returning to this session's other theme: Why Applied Research vs. Fundamental Research? The value of fundamental research is understood, but it's not where the urgency is, especially for coal. Society and the American political structure want answers to the cleaner use of coal *yesterday*. There is not much understanding or patience on that score. Surveys conducted by the Center for Energy and Economic Development (CEED) show that the American public will accept coal ONLY if it can be used within increasingly stringent environmental limits. Remember, these are Americans' *perceptions*—facts and logic need not apply—they want those tougher clean environmental standards, and through their elected officials they are going to have them. The bright spot in the CEED survey is that Americans generally have great confidence that the needed technologies can and will be developed to meet those ever-tougher limits. Given these considerations, applied rather than fundamental work is where the bulk of the research effort is, and where the funds are going to be allocated in the foreseeable future.

The use of coal is under tremendous pressure today, often by those who know little about the energy industry or the large role coal plays in it. You already know that coal will, of necessity, be the backbone of the United States' and the world's power generation for a long time to come. For most audiences, I usually say I expect coal to be a major player for at least the next several decades--because a lay audience would have a hard time accepting that in truth, it probably will be for several more generations. But it must also be understood that coal use--and particularly its combustion--needs to hit some very ambitious targets, which is one reason we are here today.

Yes, it's true. We really and truly ARE striving for targets of zero or near-zero emitting coal-fired power plants by 2020. The American public and the world public really won't settle for anything less. (If you need any validation of that statement, read the last two week's coverage of the Johannesburg meetings, or listen to the BBC early in the morning.) I know some of you are openly skeptical of this goal. To that group: You have two choices. You can tie up your shoelaces and wholeheartedly get into this ball game, because this is where the action is. Or, if you can't do that, hang up your cleats and go home, because there is no place for you here.

Yes, these goals are ambitious. Yes, they are difficult and appear nearly impossible. And guess what? We've done it before with less. When President Kennedy in the early 1960s set the goal of reaching the moon before the end of the decade, most people applauded the ideal and wondered how in blazes we were going to reach the goal. To accomplish it, we needed materials that didn't exist, computers the like of which we didn't have, knowledge we didn't even know yet that we needed, and literally hundreds of other things of which we had yet to even conceive. And they'd already been working on rocket science for a while. But through some incredible collaborations, we did reach the moon—many times. And because of the applied R&D that went into that work, many, many areas of a modern society coincidentally were dramatically advanced and improved.

And they were just going to the moon. We intend to improve the planet's environment and advance civilization as we know it through providing clean, affordable electric power to places on this planet that still use dried dung to cook dinner. Yes, it's an ambitious goal. It's a worthy goal. And it's not impossible. So, lace up your shoes and let's get to it.

Thank you.