AN EXAMINATION OF H.R. 3890, A BILL TO REAUTHORIZE THE METALS PROGRAM AT THE DEPARTMENT OF ENERGY

HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY

COMMITTEE ON SCIENCE

HOUSE OF REPRESENTATIVES

ONE HUNDRED EIGHTH CONGRESS

SECOND SESSION

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AN EXAMINATION OF H.R. 3890, A BILL TO RE-AUTHORIZE THE METALS PROGRAM AT THE DEPARTMENT OF ENERGY

THURSDAY, MAY 20, 2004

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY,
COMMITTEE ON SCIENCE,
Washington, DC.

The Subcommittee met, pursuant to call, at 10:05 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Judy Biggert [Chairwoman of the Subcommittee] presiding.

COMMITTEE ON SCIENCE
SUBCOMMITTEE ON ENERGY
U.S. HOUSE OF REPRESENTATIVES

An examination of H.R 3890, a bill to reauthorize the Metals Program at the Department of Energy

Thursday, May 20, 2004

10:00 AM – 12:00 PM
2318 Rayburn House Office Building

Witness List

Douglas L. Faulkner
Principal Deputy Assistant Secretary for Energy Efficiency and Renewable Energy
The Department of Energy

Richard A. Shulkosky
Vice President for Sales, Marketing and Product Development
Integ Process Group

Lisa A. Roudabush
General Manager-Research
U.S. Steel Corporation

Dr. Ronald Sutherland
Consulting Economist and Adjunct Professor of Law
George Mason University School of Law

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SUBCOMMITTEE ON ENERGY
COMMITTEE ON SCIENCE
U.S. HOUSE OF REPRESENTATIVES

An Examination of H.R. 3890, A Bill to Reauthorize the Metals Program at the Department of Energy

THURSDAY, MAY 20, 2004
10:00 A.M.—12:00 P.M.
2318 RAYBURN HOUSE OFFICE BUILDING

1. Purpose

On Thursday May 20, 2004, the Subcommittee on Energy of the U.S. House of Representatives' Committee on Science will hold a hearing to examine H.R. 3890, a bill to reauthorize energy efficiency research and development (R&D) at the Department of Energy (DOE) to support the domestic metals industry.

2. Witnesses

Mr. Douglas L. Faulkner is the Principal Deputy Assistant Secretary for Energy Efficiency and Renewable Energy at the U.S. Department of Energy.

Mr. Richard A. Shulkosky is Vice President for sales, marketing and product development at the INTEG Process Group, a small company that supplies industrial process control systems and electronics.

Ms. Lisa A. Roudabush is the General Manager of Research for the United States Steel Corporation, where she oversees the company's Research and Technology Center in Monroeville, Pennsylvania.

Dr. Ronald Sutherland is a Consulting Economist and Adjunct Professor of Law at the George Mason University School of Law. His experience includes 17 years as an economist at two DOE national laboratories, and two years as a senior economist at the American Petroleum Institute.

3. Overarching Questions

The hearing will address the following overarching questions:

1. What is the current status of the Federal Government's efforts in energy efficiency R&D for the metals industry? How would H.R. 3890 change the current program? How could H.R. 3890 be improved?
2. What are the benefits of the program, and who are the recipients? How are these benefits measured? What are the costs of the program?
3. What are the primary barriers to increased development and adoption of more energy efficient products and processes in industry, and how can these barriers be removed?

4. Overview

The DOE R&D program to help the domestic metals industry improve its energy efficiency was first authorized by the *Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988* and reauthorized in the *Energy Policy Act of 1992.* Authorization of appropriations expired in 1997, although Congress has appropriated funds each year since then.[1] H.R. 3890 would authorize appropriations for metals-related energy efficiency R&D programs for fiscal years 2005 through 2009 and make other minor modifications to the current law. The hearing will address the implications of reauthorization; past and potential future benefits and costs of the program; and policy alternatives that might also help achieve the public

[1] Under DOE's broad authority to conduct energy efficiency R&D, Congress had appropriated funds for such activities even before the establishment of program in 1988.

benefits associated with improved energy efficiency in the metals industry (e.g., energy security, reduced emissions of pollutants and greenhouse gases).

5. Summary of H.R. 3890

The bill amends the *Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988.* Primarily, the bill authorizes appropriations of $10 million each year for fiscal years 2005 through 2009 for the Department of Energy. The bill also includes provisions to:

- Include the potential for technologies to reduce greenhouse gas emissions as a consideration in research planning;
- Repeal a section related to programs at the National Institute of Standards and Technology (NIST) that have been inactive; and
- Re-establish a requirement for an annual report to the President and the Congress on R&D activities carried out under the program.

6. Background

What did the underlying legislation do?

The underlying act, the *Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988,* (the Act) authorized a program to "increase the energy efficiency and enhance the competitiveness of American steel, aluminum, and copper industries" through research and development activities at DOE. While a program already existed at DOE, the Act required an updated research plan, set the minimum cost share from industry at 30 percent, identified specific priorities for consideration in project selection, required regular reports to Congress, and outlined intellectual property rights for discoveries of the research. The Act also mandated participation by industry and labor in the development of the management plans. The Act also called on NIST to provide instrumentation and measurement R&D support to the programs.

What programmatic changes does H.R. 3890 include?

In addition to authorizing $10 million per year for fiscal year 2005 through fiscal year 2009 to carry out the program, H.R. 3890 proposes to:

- **Authorize research to target greenhouse gas reductions.** As large energy consumers the metals industries make a significant contribution to total emission of greenhouse gasses, including carbon dioxide. This provision, included at the request of the metals industry, would explicitly allow research projects that concentrate on reducing these emissions;
- **Repeal the sections of the Act that refer to NIST.** The NIST portion of the program has not been active for many years. While NIST's general authorities would allow work to continue on competitiveness for the metals industry, the bill's sponsors believe that it is most important to focus the program at the Department of Energy;
- **Require an annual report to Congress.** The report must include a summary of the research and development activities, including budget information, together with any recommendations from the Secretary on other actions that could assist the industry. The report must also contain an analysis of the extent to which projects succeeded in accomplishing the purposes of the Act.

How does the existing program work?

The program is closely coordinated with industry through participation in research planning and cost-sharing. This involvement serves as a "market test" of whether industry perceives the activities as important enough to contribute their time and money. In general, the program solicits proposals, which are concurrently reviewed by the industry's trade organization and DOE to ensure that the projects meet the criteria and objectives of both. The resulting list of qualified proposals is then distributed to the trade group's member companies, which determine priority projects by identifying projects for which they are willing to cost share. Project awards are made, and the research is generally conducted at universities and national laboratories, although some research may also be carried out on-site at participating companies' facilities. To ensure that the benefits are realized domestically, the Act limits company participation to those companies "substantially involved in the United States domestic production, processing, or use" of steel, aluminum or copper.

What are the funding levels for the program?

In 2004, Congress appropriated $6.7 million for the steel program and $6.6 million for the aluminum program. The 2005 Budget includes $3.8 million and $2.7 million for these programs, respectively. Historic funding levels are provided in Appendix III.

What methods are used to calculate the past and expected future benefits of the program as reauthorized in H.R. 3890?

Benefits of R&D programs are notoriously difficult to quantify. Moreover, federally-funded applied R&D programs frequently supplement private sector investments, making it difficult to attribute benefits of technology developments to either the Federal Government or the private sector. Proponents of the program say that federal funding helps push private research investments to pursue public goals, such as emission reduction, job creation, and energy efficiency that might be less of a consideration in a more traditional business investment. The industry claims that in addition to savings to the industry, improved products mean additional benefits to the public. For example, the industry says that improved metal casting as a result of this research has allowed the automobile industry to reduce weight without sacrificing strength, resulting in a savings of two billion gallons of gasoline in 2001. This is equal to about 50 million barrels, or over two days of total domestic oil consumption. It is difficult to know how much of these benefits would have been realized without an incentive program. Clearly, the methods used to estimate public benefits, and to identify how much of those benefits are attributable to the federal investment, are important to deciding if the program is a sound investment of taxpayer dollars.

7. Questions for the Witnesses

The witnesses were asked to address the following questions in their testimony:

Questions for Mr. Faulkner

1. What is the Administration's view on H.R. 3890, a bill to reauthorize the Steel and Aluminum Competitiveness Act of 1988? What recommendations would the Administration make, if any, to improve it?
2. What has been the total taxpayer cost to date for DOE's R&D program to improve energy efficiency in the steel and aluminum industries? What public benefits has the program produced to date? What are the expected future benefits of further taxpayer investment? Please summarize the methods DOE uses to calculate benefits, both retrospectively and prospectively.

Questions for Mr. Shulkosky

1. Please briefly describe your company's experience with the energy efficiency programs funded by the Department of Energy (DOE). How has federal funding affected decision-making at your company?
2. What products and processes have been designed or improved as a result of the program? To what extent has private industry adopted these products and processes? How has the public benefited from this work? How can the program be improved?
3. How competitive is the U.S. aluminum and steel industry on an international basis? Has the work conducted in the DOE metals program contributed to a more robust U.S. metals industry?
4. Should the Federal Government continue to support R&D to improve energy efficiency of the steel and aluminum industries? To what extent are other countries supporting their steel and aluminum industries? What percent of steel and aluminum comes from multinational corporations?
5. Please comment on H.R. 3890, the legislation being considered in this hearing.

Questions for Ms. Roudabush

1. Please briefly describe your company's experience with the energy efficiency programs funded by the Department of Energy (DOE). How has federal funding affected decision-making at your company?
2. What products and processes have been designed or improved as a result of the program? To what extent has private industry adopted these products and processes? How has the public benefited from this work? How can the program be improved?

3. How competitive is the U.S. aluminum and steel industry on an international basis? Has the work conducted in the DOE metals program contributed to a more robust U.S. metals industry?
4. Should the Federal Government continue to support R&D to improve energy efficiency of the steel and aluminum industries? To what extent are other countries supporting their steel and aluminum industries through R&D funding? What percent of steel and aluminum comes from multinational corporations?
5. Please comment on H.R. 3890, the legislation being considered in this hearing.

Questions for Dr. Sutherland

1. Should the Federal Government continue to support R&D to improve energy efficiency of the steel and aluminum industries? To what extent are other countries supporting their steel and aluminum industries through R&D funding? What percent of steel and aluminum comes from multinational corporations?
2. Please comment on H.R. 3890, the legislation being considered in this hearing.
3. What are the primary barriers to increased development and adoption of more energy efficient products and processes, and how can these barriers be removed?

APPENDIX I

SECTION-BY-SECTION SUMMARY OF H.R. 3890, A BILL TO REAUTHORIZE THE STEEL AND ALUMINUM ENERGY CONSERVATION AND TECHNOLOGY COMPETITIVENESS ACT OF 1988

Authorizes appropriations of $10 million for each of the fiscal years 2005 through 2009, amends one of the list of priorities to delete "coatings for sheet steels" and substitute "sheet and bar steels," adds a new priority that authorizes research on technologies that reduce greenhouse gas emissions, strikes the section referring to activities at NIST, and inserts language requiring a report to Congress.

APPENDIX II

108TH CONGRESS
2D SESSION

H. R. 3890

To reauthorize the Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988.

IN THE HOUSE OF REPRESENTATIVES

MARCH 4, 2004

Ms. HART (for herself, Mr. MURPHY, and Mr. ENGLISH) introduced the following bill; which was referred to the Committee on Science

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A BILL

To reauthorize the Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. AMENDMENTS.

(a) AUTHORIZATION OF APPROPRIATIONS.—Section 9 of the Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988 (15 U.S.C. 5108) is amended to read as follows:

"SEC. 9. AUTHORIZATION OF APPROPRIATIONS.

"There are authorized to be appropriated to the Secretary to carry out this Act $10,000,000 for each of the fiscal years 2005 through 2009.".

(b) STEEL PROJECT PRIORITIES.—Section 4(c)(1) of the Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988 (15 U.S.C. 5103(c)(1)) is amended—

(1) in subparagraph (H), by striking "coatings for sheet steels" and inserting "sheet and bar steels"; and

(2) by adding at the end the following new subparagraph:

"(K) The development of technologies which reduce greenhouse gas emissions.".

(c) CONFORMING AMENDMENTS.—The Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988 is further amended—

(1) by striking section 7 (15 U.S.C. 5106); and

(2) in section 8 (15 U.S.C. 5107), by inserting ", beginning with fiscal year 2005," after "close of each fiscal year".

○

APPENDIX III

Funding History for the Metals Program

Fiscal Year	Steel	Aluminum	Total, Metals
1986	ND	ND	$7,134,000
1987	ND	ND	$2,000,000
1988	ND	ND	$4,000,000
1989	ND	ND	$0
1990	ND	ND	$16,639,000
1991	ND	ND	$17,394,000
1992	ND	ND	$17,742,000
1993	ND	ND	$17,937,000
1994	ND	ND	$19,336,000
1995	ND	ND	$5,072,000
1996	ND	ND	$3,869,800[1]
1997	$8,905,000	$5,503,000	$14,408,000
1998	$9,547,000	$7,203,000	$16,750,000
1999	$10,308,000	$7,925,000	$18,233,000
2000	$10,486,000	$11,178,000	$21,664,000
2001	$10,365,000	$10,876,000	$21,241,000
2002	$10,119,000	$7,948,000	$18,067,000
2003	$10,083,000	$7,908,000	$17,991,000
2004	$6,685,000	$6,583,000	$13,268,000
Total	**N/A**	**N/A**	**$239,187,800**[2]

Source: Department of Energy. ND = No Data. N/A = Not Applicable.

[1] Reflects an adjustment of $230,200 to fund a contract audit and a deobligation of $500,000.

[2] Reflects rescission of $13,558,000 in 1995

Chairwoman BIGGERT. The Energy Subcommittee of the Science Committee will be in order. I apologize for starting a few minutes late. We had an unexpected visit from the President this morning, so—in our conference, and it is very difficult to get up and leave, so I apologize.

Good morning, and thank you for coming to this hearing of the Energy Subcommittee. Today, we will hear testimony about H.R. 3890, *To Reauthorize the Steel and Aluminum Energy Conservation Technologies Competitive Act of 1988.* This bill will reauthorize a research and development program at the Department of Energy (DOE) aimed at improving the energy efficiency of the metals industry. I would like to commend my colleague, Representative Melissa Hart, for the great work she has done for this subcommittee and for the many efforts she has undertaken on behalf of her constituents in Pennsylvania. When any of us in Congress think of the metals industry, we think of Melissa Hart, and I trust her constituency knows what a tireless and indomitable advocate they have in her.

Just yesterday, I chaired a hearing of this subcommittee on the broader issue of energy efficiency and renewable energy R&D. So why are we focusing on our hearing today on the metals industry? Well, first of all, the metals industry is highly energy-intensive. Taken together, the steel, aluminum, and copper industries account for more than 10 percent of industrial energy usage in the United States. And we all know that President Bush's national energy plan recognized that improving energy efficiency in our most energy-intensive industries could yield large improvements in productivity, product quality, safety, and pollution prevention.

Second, we have a strategic national interest in helping our metals industry remain competitive. For any industry, energy efficiency means that you achieve increased production without increased energy consumption or cost. Improving energy efficiency helps improve the bottom line, making American metal products more competitive on the global market. That means more jobs here at home.

But energy efficiency is more than just lower costs. Reducing energy use means reducing our emissions of pollutants and the greenhouse gases and increasing our energy security. In this way, energy efficiency just makes sense, dollars and cents, for the Nation.

Our hearing today will look at what we have accomplished through R&D and energy efficiency and how those accomplishments have been put to use in the most energy-intensive industry, metals. Perhaps most importantly, we will explore what we can do to strengthen our efforts in this area.

[The prepared statement of Mrs. Biggert follows:]

PREPARED STATEMENT OF CHAIRMAN JUDY BIGGERT

Good morning, and thank you for coming to this hearing of the Energy Subcommittee. Today, we will hear testimony about H.R. 3890, the *Steel and Aluminum Energy Conservation and Technology Competitiveness Act.* This bill would reauthorize a research and development (R&D) program at the Department of Energy aimed at improving the energy efficiency of the metals industry.

I'd like to commend my colleague, Representative Melissa Hart, for the great work she has done for this subcommittee, and for the many efforts she has undertaken on behalf of her constituents in Pennsylvania. When any of us in Congress think

of the metals industry, we think of Melissa Hart, and I trust her constituents know what a tireless and indomitable advocate they have in her.

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But energy efficiency is more than just lower costs. Reducing energy use means reducing our emissions of pollutants and greenhouse gases, and increasing our energy security. In this way, energy efficiency just makes sense—dollars and cents—for the Nation.

Our hearing today will look at what we've accomplished through R&D in energy efficiency, and how those accomplishments have been put to use in the most energy intensive industry—metals. Perhaps most importantly, we'll explore what we can do to strengthen our efforts in this area. I am now delighted to turn to my colleague from Pennsylvania, the sponsor of H.R. 3890, Melissa Hart, who will tell us more about her proposed legislation.

Chairwoman BIGGERT. I am now delighted to recognize the Ranking Member from Connecticut, Mr. Larson.

Mr. LARSON. Thank you, Madame Chairman. And I want to thank our witnesses for joining us today and also providing your expert testimony to the panel.

I am glad that we have a chance to examine Congresswoman Hart's bill reauthorizing the metals R&D program, which our own Jim Turner on our staff, I believe, originally wrote. And I think that is rather significant. The implications for the programs, such as this, extend far beyond steel and the aluminum industry. It is no secret that our domestic manufacturing capabilities are quickly heading overseas. And once they are gone, it is difficult to get these back. Congresswoman Hart is to be applauded for her efforts. I am sure she is lobbying President Bush as we speak, but I hear from Jack Mertha and Mike Doyle from Pennsylvania as well and Members of Congress, as I have pointed out, who share similar concerns.

To keep this capacity at home, our industries must be the most technologically advanced in the world, recognize that the steel industry faces intense competition while being limited in its capabilities to conduct research to develop the cleanest, most efficient technologies. I believe that the Federal Government has an obligation to step in and use its vast resources to facilitate cooperative research and development with industry.

The Department of Energy has a long and successful history of partnerships with industry. For example, through the *Industries of the Future Program,* the Department has seen substantial technological benefits in a wide range of industry sectors. Research programs in mining, chemicals, forest product, agriculture, glass, and petroleum have been conducted in addition to the work done on steel and aluminum. Together, these industries employ a very large part of the domestic manufacturing workforce. And we all know from manufacturing that it is a value-added industry. In my home

state of Connecticut, we know that manufacturing has a four to one relationship in terms of the jobs that it creates. And so these are incredibly important industries that we must preserve and work in collaborative and collective enterprise with to make sure that we provide for their ongoing sustainability.

Regrettably, we are used to seeing the Administration take money away from valuable research and development at DOE, but by cutting funding for the Industries of the Future by 53 percent, they have sent a very clear signal to the industrial sector that says, "You are on your own." I believe, and I think my view is shared by many, that this is the wrong message to send.

The benefits of sustaining R&D partnerships with industry in this area are many. We see the results in the energy savings and the cleaner environment, competitive industries, high-paying jobs, and ultimately, a solid foundation for our economy.

I look forward to hearing from our experts, and again, I would congratulate Congresswoman Hart, and hope that she was successful in her lobbying effort with the President.

[The prepared statement of Mr. Larson follows:]

PREPARED STATEMENT OF REPRESENTATIVE JOHN B. LARSON

Thank you Madame Chairman. And thank you to our witnesses for joining us today and providing your expert testimony.

I am glad that we have a chance today to examine H.R. 3890, Congresswoman Hart's bill reauthorizing the metals R&D program at the Department of Energy. The implications for programs such as this extend far beyond the steel and aluminum industries. It is no secret that our domestic manufacturing capabilities are quickly heading overseas. And once they are gone, these are jobs that we won't get back.

To keep this capacity at home, our industries must be the most technologically advanced in the world. We recognize that the steel industry faces intense competition while being limited in its capabilities to conduct research to develop the cleanest, most efficient technologies. I believe that the federal government has an obligation to step in and use its vast resources to facilitate cooperative research and development with industry.

The Department of Energy has a long and successful history of partnerships with industry. For example, through the *Industries of the Future* program, the Department has seen substantial technological benefits in a wide range of industrial sectors. Extensive research programs in mining, chemicals, forest products, agriculture, glass and petroleum have been conducted, in addition to the work done on steel and aluminum. Together, these industries employ a very large part of the domestic manufacturing workforce.

I believe our witnesses would agree that technologies transferred out of those cost-shared programs resulted in significant gains in efficiency as well as development of environmentally sound processes.

Regrettably, we are used to seeing the Administration take money away from valuable research and development at DOE. But, by cutting funding for *Industries of the Future* by 53 percent, they have sent a very clear signal to the industrial sector that says, "You're on your own."

The benefits of sustaining R&D partnerships with industry in this area are many. We see results in energy savings, a cleaner environment, competitive industries, high-paying jobs and ultimately a more solid foundation for our economy. That is why it is important for us to work together to make bills such as H.R. 3890 as effective as they can be to achieve the goal of maintaining U.S. global competitiveness in core industries.

Chairwoman BIGGERT. You yield back?

Mr. LARSON. I yield back.

Chairwoman BIGGERT. Yes.

Now that we have said all of those nice things that Congresswoman Hart did not hear, I am delighted to yield to the sponsor

of H.R. 3890, Melissa Hart, who will tell us more about her proposed legislation before we begin with the witnesses.

Ms. HART. Thank you, Madame Chair. Thank you, also, Mr. Ranking Member. I did not hear it, but the very end sounded good to me.

Also, I want to thank the Subcommittee and Chairman Boehlert for calling this hearing to discuss the legislation, H.R. 3890, *To Reauthorize the Steel and Aluminum Energy Conservation Technologies Competitiveness Act of 1988.* The devastating effects on the economy from the collapse of the domestic steel industry in the '70s and the early '80s were certainly a problem for us to maintain our footing and certainly to move forward. Back in my District, which, at the time, was very heavily dependent on steel, in the city of Aliquippa, there were 15,000 steel-producing jobs in the city alone, and there are probably fewer than that number living there at this time. Currently, there are 15,000 steel-producing jobs in all of not only my District but including some other counties: Butler, Fayette, Washington, Westmoreland, Beaver, and Allegheny counties in Western Pennsylvania, in fact.

Recently, we saw the complete—almost the complete folding of the industry, as it has been under siege by unfair trade practices, such as dumping, by foreign competitors and really with complicit approval, really, from their governments.

The purpose of the original legislation was to authorize federal cost sharing of the research that needs to be done for the metals industry. The legislation, at the time, established three goals. One was energy efficiency, the other, increasing competitiveness of our industry worldwide, and also improving the environment. Now the steel industry and the Department of Energy continued this partnership under the Metals Initiative and its predecessor, the Steel Initiative, even after the authorization expired by annually re-appropriating, so obviously this Congress has believed repeatedly that this is an important goal to pursue.

For fiscal year 2005, the Administration only recommended a total of $6.5 million and that was broken down as $3.8 million for steel, $2.7 million for aluminum, which is half of the $13.3 million that had been provided in the last budget in 2004. This legislation would reauthorize the original 1988 Act and extend it through 2009 at a constant level of $10 million per year.

Over the years, 58 steel companies and 23 research organizations have participated in and benefited from this program. Many of those companies are from the region I represent, including two who are participating today in this hearing, INTEG Process Group and United States Steel. I want to thank them for being here. But also in my region, the University of Pittsburgh and Carnegie-Mellon University have participated and, I believe, added quite a bit to the advancement of the industry as well. Obviously, that is not only true in my region, I know it is true also in the Midwest and in the Northeast and now in other regions of the United States that have become more competitive and more involved in the steel industry.

The Metals Initiative has helped push private research investment to pursue public goals, and I look forward to hearing from our witnesses regarding those issues, and I thank you, Madame Chairman.

[The prepared statement of Ms. Hart follows:]

PREPARED STATEMENT OF REPRESENTATIVE MELISSA HART

I would like to thank Madam Chair of the Energy Subcommittee, and Congressman Boehlert, Chairman of the Science Committee, for calling this hearing to discuss issues around my legislation H.R. 3890, To Reauthorize the Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988.

As a lifelong Western Pennsylvanian, I saw the devastating effects on my region by the collapse of the domestic steel industry in the 1970s and early 1980s. In the 1960's there were 15,000 steel-producing jobs in the City of Aliquippa alone. Currently, there are 15,000 steel-producing jobs in all of Allegheny, Beaver, Butler, Fayette, Washington and Westmoreland counties combined. Recently, we almost saw the complete folding of the industry as they were attacked by unfair trade practices and dumping by foreign competitors.

However, the steel industry itself has worked within itself to stay efficient, cost effective and productive, despite these exterior set backs. As one of the largest energy consumers in manufacturing they sought way to be energy efficient and environmentally sensitive. In such a cash strapped business, they needed the help of the Federal Government to be able to seek these benefits. The purpose of the original legislation was to authorize federal cost sharing of research in the metals industry. The legislation established three goals: energy-efficiency, increasing the competitiveness of U.S. industry and improving the environment. The steel industry and Department of Energy continued this partnership under the Metals Initiative, and its predecessor, the Steel Initiative, even after the authorization expired.

While the Metals Initiative benefited from years of high funding levels, we have seen a steady decline in the funding over the last four years. For the fiscal year 2005 the Administration only recommended a total of $6.5 million ($3.8 million for steel, $2.7 for aluminum) which is half the $13.3 million provided in 2004. My legislation would reauthorize the 1988 Act through 2009 at a constant level of $10 million per year. However, this funding level in my opinion, is a base to start from, not a ceiling and I look forward to hearing the opinions of our witnesses on this matter.

Over the years 58 steel companies and 23 research organizations have participated and benefited from the program. Many of those companies are from my region including two participating today INTEG Process Group and U.S. Steel, but also universities in my region, including the University of Pittsburgh and Carnegie Mellon University. The Metals Initiative has helped push private research investments to pursue public goals and I look forward to hearing from our witnesses regarding these issues.

Chairwoman BIGGERT. And I thank you.

[The prepared statement of Mr. Costello follows:]

PREPARED STATEMENT OF REPRESENTATIVE JERRY F. COSTELLO

Good morning. I want to thank the witnesses for appearing before our committee to discuss H.R. 3890, a bill to reauthorize energy efficiency research and development at the Department of Energy to support the domestic metals industry.

H.R. 3890, introduced by my colleague Melissa Hart, would establish metal research and development funding for the next five years. The bill provides federal incentives for public-private research and development projects in an effort to increase the energy efficiency and competitiveness of the U.S. metals industry.

As a member of the Steel Caucus, this funding would allow the continuation of the steel research and development that has led to significant technological and economical benefits and advancement. Further, I believe important investments like this will assist in maintaining much-needed jobs.

I want to thank the witnesses for appearing before this committee and look forward to their testimony.

Chairwoman BIGGERT. I would now like to welcome the members of our witness panel today, and I look forward to hearing your testimony and learning from each of you.

Our witnesses today are Mr. Douglas L. Faulkner. He is the Principal Deputy Assistant Secretary for Energy Efficiency and Renewable Energy at the U.S. Department of Energy. Mr. Richard Shulkosky, Vice President for Sales, Marketing, and Product Devel-

opment at the INTEG Process Group. Prior to joining INTEG, he served in several posts in the metal industry including Manager of Manufacturing and Technology for the American Iron and Steel Institute in Washington, DC. Welcome. Ms. Lisa Roudabush currently is the General Manager of Research for the United States Steel Corporation where she oversees the company's research and technology center in Monroeville, Pennsylvania. Dr. Ronald Sutherland is a Consulting Economist and Adjunct Professor of Law at the George Mason University School of Law. His experience includes 17 years as an economist at two DOE national laboratories and 2 years as a senior economist at the American Petroleum Institute.

So thank you all for coming, and if I slaughtered your name, please let me know, because I have—I usually do at least with one of the panel.

So thank you. Before we begin, just let me remind you that we ask you to keep your remarks to five minutes, and I think most often, if you haven't gotten through your testimony, we will be asking questions, which will bring about further exploration of that testimony.

And without objection, all written testimony will be inserted in the record.

And after your five minutes, then we will ask—the Committee will ask questions of you, and we will each try and keep our questions to five minutes as well. In fact, we will. We are a little bit better than, sometimes, the witnesses. So we will begin with Mr. Faulkner.

STATEMENT OF MR. DOUGLAS L. FAULKNER, PRINCIPAL DEPUTY ASSISTANT SECRETARY FOR ENERGY EFFICIENCY AND RENEWABLE ENERGY, UNITED STATES DEPARTMENT OF ENERGY

Mr. FAULKNER. Madame Chair, Members of the Committee, thank you for inviting me to testify at your hearing today. My oral statement is a summary of my written testimony, which has already been submitted for the record.

The Department of Energy's steel research and development effort was established in 1986 under the Steel Initiative, Public Law 99–190. That was later expanded by the *Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988,* commonly referred to as the Metals Initiative. Our office promotes collaborative, cost-shared public R&D with the metals industries, the DOE national labs, universities, states, and others.

Steel production is one of the most energy-intensive industries in the United States, and steel-makers are highly motivated to reduce energy intensity. While the steel industry has made significant progress in reducing energy intensity over the past several decades, the U.S. steel industry consumes approximately two quadrillion Btu's of energy each year, accounting for about two percent of all U.S. energy consumption. We estimate that the steel industry can save 20 to 30 percent of its energy costs by applying advanced energy efficiency technologies.

The strategy of DOE's Steel Industry of the Future R&D effort is to foster revolutionary iron-making and steel-making projects as

well as incremental improvements to existing processes. Since 2001, the program has increased its emphasis on steel-making "Grand Challenge" concepts that promise to maximize energy savings. This shift in focus should produce large drops in industry energy intensity over the long-term.

In the mid 1990s, DOE worked with the American Iron and Steel Institute to develop broad goals for the program and established a unified research agenda, the Steel Industry Technology Roadmap, to guide R&D collaboration. A revised Roadmap was released in 2002 to reflect changes in the industry and emerging technological priorities. DOE is providing cost-sharing for approximately 25 steel-specific R&D projects, including the revolutionary Mesabi Nugget Iron-making Project, which, when combined with other funds, totals $10 million annually in public/private investment.

While the U.S. aluminum industry has reduced its energy intensity by 58 percent over the past 40 years, the aluminum industry still consumes approximately 800 trillion Btu of energy each year, slightly below one percent of all U.S. energy use. Based on a recent study, the energy consumed by the U.S. primary aluminum industry is more than three times greater than what is theoretically necessary. Secondary processing also offers many cost-effective energy savings opportunities.

My office has reviewed H.R. 3890 and offers the following comments. Regarding reauthorizing appropriations to DOE for each of fiscal years 2005 through 2009, the Department does not object to this authorization—or reauthorization. The Department's fiscal year 2005 request for the Steel and Aluminum Industries of the Future is $3.8 million for steel and $2.7 million for aluminum, for a total of $6.5 million. Funding for this program is, of course, always subject to the annual appropriations process.

Regarding amending the list of projects that DOE is to consider for research, we believe that both of the issues in this category are currently already being addressed through the Steel Industry of the Future implementation. The current research focus areas are chosen by industry and cover key steel manufacturing processes and a broad range of product applications, including the development of advanced sheet and bar steels listed in the legislation. DOE is already working in partnership with the U.S. steel industry through the American Iron and Steel Institute to help it achieve its Climate Vision commitment.

Regarding abolishing the National Institute of Standards and Technology's program of steel and aluminum research, the current Department of Energy Steel and Aluminum Industries of the Future partnerships address selected instrumentation and measurement R&D that are considered high priority by the industry. We have no objection to the elimination of this program.

Regarding updating the requirement for DOE to report annually to the President and Congress on progress of the program, DOE already publishes annual reports for the Steel and Aluminum Industries of the Future R&D activities. Additionally, the Department publishes a multi-year program plan and an annual operating plan for the aluminum and steel areas.

Madame Chair, this concludes my prepared remarks. I would be happy to answer any questions you have, or the Committee.

[The prepared statement of Mr. Faulkner follows:]

PREPARED STATEMENT OF DOUGLAS L. FAULKNER

I appreciate the opportunity to discuss the Department of Energy's Steel and Aluminum Industries of the Future Research and Development (R&D) activities and to comment on H.R. 3890, the *Steel and Aluminum Energy Efficiency and Technology Competitiveness Act*.

The DOE's steel R&D effort was established in 1986 with a goal to increase significantly the energy efficiency of processes that produce steel under the Steel Initiative (Public Law 99–190). The Steel Initiative was later expanded by the Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988, to include aluminum, which is commonly referred to as the Metals Initiative. The 1988 Act directs the Secretary to re-establish an industrial energy conservation and a competitive technology program to conduct scientific research and development of steel and aluminum technologies. The purpose of the program is to increase the energy efficiency, international competitiveness and environmental performance of these American industries by aligning the research and development resources of industry and government. The program promotes collaborative, cost-shared, public-private research and pre-competitive development, bringing together the expertise and experience of the metals industries, the DOE National Laboratories, universities, states and others.

Steel Industry of the Future

As Members of the Subcommittee know, steel production is one of the most energy-intensive industries in the United States, and steel-makers are highly motivated to reduce energy intensity. While the steel industry has made significant progress in reducing energy intensity over the past several decades, the U.S. steel industry consumes approximately two quadrillion Btu's (quads) of energy each year, accounting for about two percent of all U.S. energy consumption. The cost of purchasing this amount of energy represents about 15 percent of the total manufacturing cost for steel. We estimate that the steel industry can save 20 to 30 percent of its energy costs by applying advanced energy efficiency technologies.

The strategy of DOE's Steel Industry of the Future R&D effort is to foster both revolutionary iron-making and steel-making projects as well as incremental improvements to existing processes, thereby addressing both long-term goals and short-term needs. The program also strives to expand the industry's fundamental base of knowledge to optimize key processes and resource efficiency. Since 2001, the program has increased its emphasis on steel-making "Grand Challenge" concepts that promise to maximize energy savings. This shift in focus should produce large drops in industry energy intensity over the long-term.

Both industry and universities widely participate in the Steel Industries of the Future R&D effort, providing both cost-sharing and in-kind support. Universities not only provide innovative technological solutions, they also indoctrinate the next generation of the scientific and engineering workforce. The involvement of industry accelerates technology transfer and dissemination of research results. Industry partners represent the diversity of the steel industry and include integrated producers, mini-mill producers, suppliers, and end-users in several industries. Strong industry involvement ensures direct application of research results and testifies to the importance of this cost-shared research partnership. Involving industry in the early R&D stages helps accelerate the development and application of energy-efficient technologies.

In the mid 1990s, DOE facilitated the development of a steel industry technology roadmap to help identify energy efficiency priorities mutually beneficial to government and industry. Led by the American Iron and Steel Institute, the industry worked to develop broad goals for the program and established a unified research agenda—the Steel Industry Technology Roadmap—to guide collaborative research, development, and demonstration. By reaching a consensus on industry-wide goals and R&D priorities, the industry has been able to attract public and private investment for new technology development. Collaborative teams share the costs and risks. The Roadmap was revised in 2002 to reflect changes in the industry and emerging technological priorities. DOE and its partners have jointly commercialized about 15 technologies and have disseminated valuable scientific information that will help steel-makers improve their productivity, efficiency, and product quality.

The R&D priorities and needs identified in the Roadmap provided valuable input to DOE's internal planning process. DOE is providing cost-sharing for approximately 25 steel-specific R&D projects, which when combined with other funds, totals $10 million annually in public-private investment.

These include:

- **Mesabi Nugget Iron-making.** DOE has successfully demonstrated the technical and economical viability of this direct iron-making technology which uses 30 percent less energy compared to the traditional route of making iron in a blast furnace. The Department will participate in a full-scale pilot campaign to reduce the technical risk even further. This revolutionary technology eliminates the need for the environmentally problematic coke-making process required for traditional iron-making.
- **Novel Direct Steel-making by Combining Microwave, Electric Arc, and Exothermal Heating Technologies.** We have made significant progress in defining this next generation steel-making concept which would eliminate the need for a separate iron-making step and greatly reduce the energy intensity of the overall steel-making process. This technology should be market-ready by the end of the decade.
- **Future Steel-making Processes.** Carnegie Mellon University and U.S. Steel are examining the feasibility of using a combination of proven technologies to produce iron more efficiently and with lower capital and operating costs. The goal is to develop a flexible fossil fuel-based process as an alternative to energy- and emissions-intensive coke-based blast furnace iron-making.

Aluminum Industry of the Future

While the U.S. aluminum industry has reduced its energy intensity by 58 percent over the past 40 years, the aluminum industry still consumes approximately 800 trillion Btu of energy each year, or slightly below one percent of all U.S. energy use. Based on a recent study, the energy consumed by the U.S. primary aluminum industry is more than three times greater than what is theoretically necessary. In addition to the savings in primary aluminum production, secondary processing offers many cost-effective savings opportunities.

Like the Steel Industry of the Future R&D effort, this government-industry partnership performs high-impact research projects on primary, melting, and forming operations in aluminum production. Fifty percent of DOE's funding is directed toward lowering the energy required to produce primary aluminum metal, the largest opportunity for improving energy efficiency.

Current projects include:

- **Aluminum Carbothermic Technology.** We have made significant progress in designing the prototype carbothermic reactor. Successful development of this revolutionary technology will provide 23 percent energy saving and 32 percent in emissions reduction. Additionally, this technology has a smaller footprint than the existing Hall-Heroult Cell and could be sited near the secondary customers plant.
- **Vertical Flotation Melter.** Researchers have developed a continuous melting system that uses the thermal energy of the flue gas to preheat scrap aluminum. When fully commercialized, this technology is projected to save almost 10 trillion Btu of energy in the aluminum industry. This technology has been proven at the single-plant level. DOE is participating in a technology validation project to accelerate market acceptance.

The Steel and Aluminum Energy Efficiency and Technology Competitiveness Act

DOE's Office of Energy Efficiency and Renewable Energy has reviewed H.R. 3890, which would enhance DOE's steel and aluminum initiatives. The bill would do the following:

1. *Reauthorize appropriations to DOE for the DOE program under the* Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988 *of $10 million for each of fiscal years 2005–2009.*

The Department does not object to this authorization. The Department's Fiscal Year 2005 request for the Steel and Aluminum Industries of the Future is $3.8 million for steel and $2.7 million for aluminum, for a total of $6.5 million. Funding for this program is always subject to the annual appropriations process.

2. *Amend the list of projects DOE is to consider for research by:*

- *amending the project listed as "the development of advanced coatings for sheet steels" to "the development of advanced sheet and bar steels," and*

- *expanding the list to include development of technologies that reduce greenhouse gas emissions.*

We believe that both of these issues are currently being addressed through the Steel Industry of the Future R&D implementation. As mentioned above, the IOF partnership focuses on developing a wide range of new technologies that improve productivity, lower energy consumption, and reduce emissions. The research focus areas are chosen by industry and cover key steel manufacturing processes and a broad range of product applications, including "development of advanced sheet and bar steels."

DOE is already working in partnership with the U.S. steel industry through the American Iron and Steel Institute (AISI) to help it implement activities in support of AISI achieving its Climate VISION commitment. A Climate VISION work plan is being developed where AISI will be voluntarily collaborating with the federal government on near-term energy efficiency activities, cross-sectoral projects, and R&D to promote and commercialize advanced technologies.

3. Abolish the National Institute of Standards and Technology's program of steel and aluminum research whose purpose was to provide necessary instrumentation and measurement R&D in support of activities conducted by DOE.

The current Steel and Aluminum Industries of the Future partnerships address selected instrumentation and measurement research and development that are considered high priority by the industry. We have no objection to the elimination of this program.

4. Update the requirement for DOE to report annually to the President and Congress on progress of the program to require a report at the close of FY 2005 and at the close of each following fiscal year.

The DOE publishes annual reports for the Steel and Aluminum Industries of the Future R&D activities. Additionally, the Department publishes a multi-year program plan and an annual operating plan that includes the technical objectives and milestone charts for the Aluminum and Steel Program areas. It would be helpful if the requirement for a "Management Plan" under the current Metals Initiative were updated to describe current roles and responsibilities of the organizations involved and to incorporate result-driven program management principles such as "analytic-based planning" and "management by milestone" that we currently use. The "Research Plan" under the Metals Initiative should also be modified to incorporate long-term strategic planning and priority setting and include the R&D needs identified in the industry technology roadmaps.

Madame Chair, this concludes my prepared statement. I am happy to answer any questions the Subcommittee may have.

BIOGRAPHY FOR DOUGLAS L. FAULKNER

Douglas Faulkner was appointed by President George W. Bush on June 29, 2001, to serve as the political deputy in the Office of Energy Efficiency and Renewable Energy (EERE). This $1.2 billion research and development organization has over five hundred federal employees in Washington, D.C. and six regional offices, supported by thousands of contractors at the National Renewable Energy Laboratory and elsewhere.

Mr. Faulkner oversees all aspects of EERE's operations in a close partnership with the Office's two career Deputy Assistant Secretaries. He has worked closely with Assistant Secretary David K. Garman to reorganize EERE, replacing an outdated and fragmented organization with what arguably is the most innovative business model ever used in the Federal Government. This has resulted in fewer management layers, fewer but more productive staff, streamlined procedures, stronger project management in the field and lower operating costs overall. These reforms have been recognized as a success by the White House and the National Association of Public Administration.

Mr. Faulkner organized and led an internal management board which completely revamped EERE's biomass programs. Many projects were ended and those funds pooled for an unprecedented solicitation to refocus R&D for new bio-refineries.

Interviews of Mr. Faulkner about renewable energy and energy efficiency have appeared on television and radio and in the print media.

Before assuming his leadership post in EERE, Mr. Faulkner had progressed rapidly through the ranks of the civil service at the Central Intelligence Agency and the Department of Energy. In his over-twenty year career he rose from junior China

intelligence analyst to a nationally-recognized leader in bio-based products and a senior policy advisor to the Secretaries of Energy in both Bush Administrations.

Born and raised in central Illinois, Principal Deputy Faulkner received a Bachelor's degree in Asian Studies from the University of Illinois and a Master's degree from the Johns Hopkins University, School of Advanced International Studies. He also attended the University of Singapore as a Rotary Scholar. At these institutions, he studied French and Mandarin Chinese languages. Mr. Faulkner played intercollegiate basketball at home and abroad.

He is involved in his church and community as well as Boy Scouts and youth baseball. Mr. Faulkner was appointed in the early 1990s to two Arlington County, Virginia, economic commissions.

Mr. Faulkner lives in Arlington, Virginia, with his wife and son.

Chairwoman BIGGERT. Thank you very much.

Mr. Shulkosky, if you would proceed.

STATEMENT OF MR. RICHARD A. SHULKOSKY, VICE PRESIDENT FOR SALES, MARKETING, AND PRODUCT DEVELOPMENT, INTEG PROCESS GROUP

Mr. SHULKOSKY. Good morning. My name is Rick Shulkosky, and I am the Vice President and co-owner of INTEG Process Group. INTEG is a small engineering company located in Wexford, Pennsylvania outside of Pittsburgh. We provide technology for industrial clients, including the steel industry. I appreciate having the opportunity to share with you my thoughts on the benefit of the Metals Initiative to the steel industry.

As with any company, in order to survive, a certain amount of resources have to be allocated to research. Several decades ago, many steel companies in the U.S. had world-class research facilities. Today, those facilities are non-existent or a fraction of their original size. Instead, steel companies collaborate to develop new, high-risk technologies, which will provide them with a competitive advantage versus foreign steel-makers by developing new technologies that can lower their cost and improve the performance of the steel they produce, which in turn, lowers their customers' costs. The U.S. steel industry has to maintain a competitive advantage in technology, because they are at a competitive disadvantage in other cost factors, such as labor and social costs.

I have personally been involved with collaborative research programs, and I would like to share with you some of the highlights of the program as I have experienced it.

The Metals Initiative contains three important provisions: a 70/30 cost-share, ownership of the technology by industry, and a repayment provision.

The first provision, a 70/30 cost-share, means that industry dollars go farther so that we can broaden and accelerate our research projects and increase our successes. The 70/30 cost-share is important, because by sharing the costs, steel companies have the proper incentive and buy-in to make sure that technology is needed by the industry and to help make it a success.

The second provision requires the industrial participants to own the developed technology. Although they have a royalty-free use of the technology, they also have an obligation to commercialize it.

And the last provision is the repayment provision. This focuses the research projects with the greatest chance of success, which gets the technology on the plant floor faster and allows royalties from sales to be paid.

INTEG, my company, has been involved with the Metals Initiative research for several years working on the development of the AISI Hot Strip Mill Model under the Technology Roadmap program. This is a PC-based computer software program that simulates the rolling of steel in the hot mill. The model can help the user to optimize production and conduct what-if studies to improve their process operations and to develop new products more cost-effectively in an off-line manner. Several of our steel company participants have already realize savings by using the model. INTEG is also the commercialization partner to sell the Hot Strip Mill Model. Initial royalties have already been paid with ongoing royalties expected to occur from future sales.

In summary, I believe the Metals Initiative must be reauthorized and continued to be funded. I have spent all of my 20-plus year career working in the steel industry. I have seen the ups and downs of the industry with the most recent years being some of the most traumatic in terms of the restructuring taking place. From my perspective, I see stronger companies emerging, but I have no idea how they will be able to continue to develop leading technologies without support. To make matters worse, not only are the steel companies getting smaller in terms of research resources, the engineering companies who once flourished in the Pittsburgh area and elsewhere developing new technologies are also smaller or no longer around.

We need the U.S. steel industry, and we need it to be competitive through innovative research. We need a viable metals industry, because it is vital to the national security and economic prosperity of the U.S. The Metals Initiative has proven itself in the past, and I am sure it will in the future.

Thank you.

[The prepared statement of Mr. Shulkosky follows:]

PREPARED STATEMENT OF RICHARD A. SHULKOSKY

Good morning. My name is Rick Shulkosky and I am the Vice President and co-owner of INTEG Process Group. INTEG is a small engineering company located in Wexford, PA who primarily develops technology for industrial clients, including the steel industry.

I am here to discuss the Metals Initiative, which is the foundation upon which steel industry collaboration is based. It is the only collaborative research program concerned with industrial competitiveness. I appreciate having the opportunity to share with you my thoughts on the benefit of the Metals Initiative to the steel industry.

As with any company, in order to survive, a certain amount of resources have to be allocated to research. New products and processes must be developed to be able to increase the value proposition of your final product. Customer's requirements change. New competitors emerge. Costs need to be controlled. Several decades ago, almost every steel company had world-class research facilities. Today, those facilities are non-existent or are a small fraction of their original size.

These dedicated research facilities are gone because it is cost-prohibitive to have your own extensive research facility. Instead, steel companies collaborate to develop new technologies, which will provide them with a competitive advantage vs. foreign steel-makers. By developing new technologies, they can lower their cost and improve the performance of the steel they produce, which in turn lowers their customer's cost. As we all know, the world is getting smaller and becoming one global trading zone. The U.S. steel industry has to maintain a competitive advantage in technology because they are at a competitive disadvantage in other cost factors [e.g., labor and social costs] vs. our international competitors.

With your continued support, the Metals Initiative can provide the needed funding to continue the steel industry's collaborative research programs. Metals Initia-

tive funds accelerate the delivery of technology to the plant floor and increase the breadth of technology advances we can make. I have personally been involved with the collaborative research activities of the steel industry and have experienced the reasons why this method of research works. I would like to give you some highlights of the program in action.

The Metals Initiative is structured to help domestic steel producers achieve a competitive advantage while gaining additional benefits such as lower energy consumption, and it has three important provisions:

- A 70/30 cost-share for conceptual, bench-scale and pilot-scale research [demonstration scale projects are 50/50],
- Ownership of the technology by industry and
- A repayment provision.

The first provision, a 70/30 cost-share means that industry dollars go farther, so that we can broaden and accelerate our research projects. Individual steel companies cannot afford the inherent high-risk and total costs associated with research projects. Steel companies are small and medium sized businesses that can invest on the order of one half percent of sales in R&D, compared to a software or pharmaceutical company that invest up to 20 percent of sales. The Metals Initiative provides the proper framework because the steel companies are responsible for a share of the costs. A steel company investing its precious resources ensures that the projects undertaken are of high-value. Sharing the costs among steel companies and with the Federal Government also allows us to increase the number of successes and gets results onto the plant floor faster by having multiple programs going on at the same time.

The second provision requires the industrial participants in a project to own the developed technology. The participants get royalty-free use of the technology, but also have an obligation to commercialize the developed technology. This provision ensures the widespread dissemination of the technology throughout the industry and provides opportunities for companies like mine to grow.

The last key provision of the Metals Initiative is the repayment provision. It requires the government's investment to be repaid from the commercial licensing of developed technology. This focuses the research on projects with a chance of success and goes right to the competitive advantage intent—it gets technology on the plant floor.

INTEG has been involved in Metals Initiative research for several years working on the development of the AISI Hot Strip Mill Model (HSMM). The HSMM is a computer program that runs on a PC that allows a steel company to simulate the complete hot rolling process. The model can help the user to optimize production, conduct what-if studies and develop new products to lower their overall costs. Several of our industrial participants have already realized savings by using the model.

One participant was using the HSMM to conduct studies for their hot mill modernization program. The model helped them to analyze different upgrade options so they could select the most cost effective and optimal configuration. Another participant is using the model to reduce the number of trials needed to develop a new grade of steel saving them thousands of dollars in inefficient and wasted mill trials.

INTEG also benefits by being able to employee several people directly involved with the project research and by being the commercialization partner to sell the finished product. Initial royalties have already been paid with on-going royalties to occur from future sales.

In summary, I believe the Metals Initiative must be reauthorized and continue to be funded. I have spent all my 20-plus year career working in the steel industry. I have seen the ups and downs of the industry with the most recent years being one of the most dramatic in terms of the restructuring taking place. From my perspective, I see stronger companies emerging, but I have no idea how they will be able to continue to develop leading technologies without support. Not only are the steel companies getting smaller in terms of research resources, the engineering companies who once flourished in the Pittsburgh area developing new technologies are also smaller or no longer around.

We need the U.S. steel industry and we need it to be competitive through innovative research. The Metals Initiative has proven itself in the past and I am sure it will in the future.

BIOGRAPHY FOR RICHARD A. SHULKOSKY

Richard Shulkosky is responsible for all sales, marketing and product development activities at the company, as well as all office operations, including accounting,

financial, and human resources. Prior to INTEG, he served as general manager of sales for Pittsburgh-based Kvaerner Metals, where he was responsible for the sales activities for three automation offices in the United States. Mr. Shulkosky also served as manager of manufacturing and technology for the American Iron and Steel Institute in Washington, D.C. and held various positions at Dave McKee (Kvaerner) and U.S. Steel Corp.

He holds a Bachelor of Science degree in Electrical Engineering and a Master's degree in Business Administration from the University of Pittsburgh.

Chairwoman BIGGERT. Thank you very much.

Ms. Roudabush, you are recognized for five minutes.

STATEMENT OF MS. LISA A. ROUDABUSH, GENERAL MANAGER OF RESEARCH, U.S. STEEL CORPORATION

Ms. ROUDABUSH. Thank you. My name is Lisa Roudabush. I am the General Manager of the United States Steel Corporation. We have steel-making operations and joint ventures in ten states in this country, and I am obviously here to offer my support and endorsement of the Metals Initiative Reauthorization bill.

This has been a cornerstone of collaborative research for the steel industry for the past 15 years. U.S. Steel is an investor and an active investor in this program. I appreciate the opportunity to describe to you maybe some more personal U.S. Steel relationships of how we participated in this program and review the benefits that we can attribute to our ability to achieve the goals of the initiative, which include strengthening our competitive position of the steel industry, advancing energy savings, and promoting environmental improvements.

The first activity I would like to highlight is the Technology Roadmap program. This was formalized in 1997. It is a five-year program that supported 36 projects. The best illustration of realized benefits come from ten specific projects that dealt with the Advanced High Strength Steel. These projects advanced the findings of ULSAB, which was the Ultra-Light Steel Auto Body program consortium, to reduce the weight of automobiles, thereby advancing weight reduction, energy savings, and emissions control.

The ten projects related to research in Advanced High Strength dealt with how to use the steel actually, how—the structure of the steel, the forming characteristics, and the joining characteristics. The findings of these studies allowed for our customers, actually, to have an understanding of how to use these steels, how to design with them, how they would form, how they would weld in their current processes. This led to an increased demand in High Strength Steel currently in the United States. In the past 10 years, we have seen a 52 percent increase in the use of High Strength Steels, and we project a 40 percent additional increase in the next six years.

The Advanced High Strength Steel applications have been rapidly adopted by our automotive manufacturers, including two models, which I will cite, the Chevy Malibu and the Chrysler Pacifica, which have a content of greater than 50 percent Advanced High Strength Steels. This led us, as steel-makers, to develop these products that our customers required. U.S. Steel has developed 50 new chemistries of steel over the past 10 years in support of the Advanced High Strength Steel applications.

The consumer benefits are evident with reduced vehicle weight, reduced fuel usage, reduced emissions. At the same time, we saw

increased crash-worthiness, so increased safety, still using a low-cost metal: steel. The benefit projections calculated from only a seven percent market penetration of vehicles using commercially available High Strength Steels include an annual reduction in gas consumption of 171 million gallons, and in today's prices, that is upwards of $350 million to consumers, and a reduction in CO_2 emissions of 2.1 million tons.

A second example is an example from one of our plants. The Mon Valley Edgar Thompson plant hosted the May 2000 DOE Office of Industrial Technology showcase of that in which four DOE-sponsored technologies were installed and demonstrated. I won't go into detail about these, however, we are using two of these technologies daily. We have ordered new equipment based on these technologies. They are providing energy savings through our plants, mostly through improved productivity and reduced downtime, and are in the commercialization phase by the manufacturers of these technologies. The commercialization, again, leads to the fulfillment of the payback provision of the initiative.

Through these activities, the Mon Valley works of U.S. Steel reduced energy consumption by seven percent as measured in MMBtu per ton of steel produced from the time frame of 1998 through 2000. And this complements the recent AISI publications of data showing a reduced energy of 17 percent since 1990.

Our third issue is the CO_2 breakthrough initiative to develop new processes to minimize the release of CO_2 to the environment in support of Climate Vision. Currently, nine industry companies have opted in to a two-year cost-sharing program, and we are asking for government funding of $2 million over two years for the phase one. This funding has not yet been committed, but we need to be aware of the global importance of this activity. We are already a year behind our global competition, and foreign governments have invested over $44 million with their steel industries up to this point. These are basic research activities, high-risk. No one single company could support this activity by itself, and this is a great example of the collaborative research program that is in the public interest that we are supporting through this initiative.

In summary, the Metal Initiative is very important for a competitive, viable domestic steel industry. Federal dollars act as a multiplier and accelerator, and industry shares in this cost. It provides a way to maintain a viable scientific and educational community also. We have seen a positive impact from the Metals Initiative as we try to maintain a strong manufacturing base in the United States. Our steel is globally competitive. We are efficient, and we are productive despite the lower global labor cost disadvantage, health care cost disadvantage, currency policy, and government subsidies. The only way we can maintain our global competitiveness is through technology and technological advancements.

Thank you.

[The prepared statement of Ms. Roudabush follows:]

PREPARED STATEMENT OF LISA A. ROUDABUSH

Good morning. I'm Lisa A. Roudabush, General Manager-Research for U.S. Steel Corporation. Thank you for the opportunity to testify. I'm here today to explain the importance of the Metals Initiative to our industry. The Metals Initiative has been at the center of steel industry research since the late 1980's and significant ad-

vances in melting, casting and rolling have been made in research projects under the Metals Initiative. For example, since 1990, energy utilization per ton of steel shipped has decreased 17 percent, much of it the result of collaborative research. This is particularly impressive for an industry composed mainly of small and medium-sized businesses, in fact if you were to combine the three largest steel companies into one, the company they would form would be four percent the size of General Electric.

One of the most important programs under the Metals Initiative is the highly successful, highly leveraged Technology Roadmap Program (TRP), which has nearly 60 industrial participants. It brings together stakeholders from across the country for the purpose of developing next generation steel-making technology, reducing energy consumption in the steel industry and in downstream industries (such as automotive), while improving our environment.

As an example, ten projects, leveraging $4.2 million of federal funding, have been focused on the development of Advanced High Strength Steels for automobile manufacturing. Advanced High Strength Steels enable the design of automobiles that are lightweight while retaining all the safety and affordability of a basic carbon steel. Porsche Engineering and the steel industry developed Ultra-Light Steel Auto Body—Advanced Vehicle Concept (ULSAB–AVC). It uses 80 percent Advanced High Strength Steel and results in 52 mpg (gas) and 68 mpg (diesel). Advanced High Strength Steels are rapidly being adopted by automakers—in 2004 the Chevy Malibu and Chrysler Pacifica both use approximately 50 percent AHSS. The following benefits are calculated using a market penetration of seven percent of ULSAB–AVC type vehicles, a low hurdle given the rapid adoption already evidenced:

Item	Savings per year	Savings per yr per federal $ spent
Gallons of gasoline	171000000	41
Dollars at $1.50 per gallon	256500000	61.5
Barrels of oil	4071429	0.84
CO_2 emissions reduction (tons)	2100000	0.5

To summarize my example, here we have a set of projects that save nearly a barrel of oil (0.84) per federal dollar invested or, in terms of the environment, a ton of CO_2 for every $2 of federal money invested, all the while delivering real technology to the plant floor to help us maintain a competitive advantage.

Staying with our focus on the environment, the Metals Initiative specifically focuses research on reduction of CO_2 emissions. The steel industry believes, as the Administration does, that technology development is the appropriate means for reducing greenhouse gases. Steel companies, as a sector, have joined the president's Climate Vision program and have committed to a goal of 10 percent reduction in energy intensity by 2012 over a 2002 baseline. There is a major international effort in the steel industry to eliminate CO_2 emissions, including governments and steelmakers in Europe, Korea, Japan and Canada. Foreign governments are cost-sharing this very high-risk research. The European Commission will provide approximately 23 million euro. The U.S. intends to be a part of this initiative, called the CO_2 Breakthrough Program, and we will rely on the Metals Initiative for the necessary cost-sharing to help us develop and deliver technologies for CO_2 abatement, such as carbon sequestration and the use of alternative fuels.

Continuous technology development is at the heart of any industry's success and the Metals Initiative is the catalyst for steel industry research. Federal dollars accelerate the research and act as a multiplier—they allow more work to be done and to be delivered to the factory floor sooner, both critical for the health of any industrial sector in a global market. The federal cost-share has a positive impact on steel industry competitiveness compared to other government involvement in industry, e.g., various regulatory policies, monetary policy, pensions and health care, which are anti-competitive, in that they add cost. Much of the Metals Initiative research is done at universities around the country. Steel research at universities plays the lead role in the development of the next generation of workers in America's steel plants. So, the program develops technologies to maintain a healthy steel sector, and the healthy steel sector provides jobs. As an example, just the projects we have under consideration for 2004 will add 95 jobs in western Pennsylvania.

The terms of the Metals Initiative also allow us to protect proprietary information for up to five years, which gives us time to implement the developed technology and gain a competitive advantage. The Metals Initiative is the only federal program I am aware of that specifically cites competitive advantage as a goal. The results of our Metals Initiative research propagate through the entire supply chain of materials—higher performing steels equal higher performing consumer goods and a cleaner environment.

I hope my colleague, Mr. Shulkosky, and I, have conveyed the importance of Metals Initiative research to our industry, in the broadest sense. Thank you for your attention, I would be happy to answer any questions.

BIOGRAPHY FOR LISA A. ROUDABUSH

Lisa A. Roudabush is currently the General Manager of Research for the United States Steel Corporation, where she oversees the company's Research and Technology Center in Monroeville, Pa. Her appointment was effective September 1, 2003.

Ms. Roudabush, 43, began working at U.S. Steel in 1982 as a student co-op at the Research and Technology Center in Monroeville, Pa. She joined the company that same year as a Management Associate at the Research Center and progressed through a series of increasingly responsible research engineer positions before she was named Research Manager for Coated Products in 1992.

In 1994, Roudabush was transferred to the Quality Assurance department at Gary Works as Manager of Technology Planning. She moved through several different Quality Assurance positions in various areas of Gary Works before she was named Quality Assurance Manager of Sheet Products in 1997. Two years later she was promoted to Manager of Technology for the department, and in 2000 she was promoted to Manager of Process Technology at Mon Valley Works.

Roudabush earned a Bachelor of Science degree in Metallurgical Engineering and Material Science from Carnegie Mellon University in 1982 and has completed graduate-level work in Metallurgical Engineering and Engineering Management at the University of Pittsburgh.

Chairwoman BIGGERT. Thank you very much.

Dr. Sutherland, you are recognized for five minutes.

STATEMENT OF DR. RONALD J. SUTHERLAND, CONSULTING ECONOMIST AND ADJUNCT PROFESSOR OF LAW, GEORGE MASON UNIVERSITY SCHOOL OF LAW

Dr. SUTHERLAND. Thank you.

Good morning. My name is Ronald J. Sutherland. I am an economist who has spent most of my career assessing energy policy issues. From 1980 through 1988, I worked at the Los Alamos National Laboratory. And from 1988 through 1997, I was employed by Argonne National Laboratory, but was located at the Department of Energy's building here in DC where I supported the DOE Policy Office and the Energy Information Administration. At present, I am an independent consulting economist and continue to work on energy policy issues. My testimony reflects only my own views. I am not associated with any organization that has an interest in this legislation.

The history of the DOE Industrial Technology program is one of limited successes and probably produces net cost to taxpayers. These net costs result from three program characteristics: the DOE policy objective is to enhance energy efficiency, the program justification is based on market barriers, and three, the DOE program is not accountable in terms of providing benefits to taxpayers. The DOE focus on energy efficiency does not make business sense. It contributes neither to the productivity of business nor to the value of customers. Instead, businesses become more competitive by reducing average costs, increasing overall productivity, and particularly, by increasing the productivity of labor and capital.

Energy efficiency is an inappropriate policy goal from the perspective of taxpayers. Indeed, the single most important point that Congress should recognize in forming energy policy is energy efficiency and the efficient use of energy resources are different and unrelated concepts. Programs and policies that contribute to energy efficiency may or may not improve the efficient use of energy resources. The flawed conceptual DOE model results in subsidizing technology development that does not improve the productivity of the industrial sector and does not produce net benefits to taxpayers.

The DOE justifies its interference in private markets in terms of market barriers. However, the adoption of all new technologies, products, and processes is impeded by market barriers. Such barriers are merely benign characteristics of well functioning markets. A necessary condition for a beneficial government program is a market failure. There is no expectation that DOE programs reduce market failures. The DOE is not, and perhaps can not, be held accountable for its technology development investments. Consequently, the flawed policy model practiced by the DOE continues indefinitely, and DOE technology investments fail to have long-term commercial success.

In a recent litigation case, I attempted to find an example of a new technology that penetrated the market quickly and obtained a substantial market share. In my search, I reviewed the OIT publication, Office of Industrial Technology's "Summary of Program Results," which summarizes the results of more than 100 commercially successful technologies. I found no examples of a technology success for my purpose. Instead, my overall reaction to the DOE 100 technology successes is that when the subsidy continues, technology development continues. When the subsidy stops, technology development and deployment also stop.

I contacted an engineer in a private firm that was participating in this DOE program. The engineer stated that DOE's fixation on energy efficiency is inconsistent with the business objective of increasing overall productivity and reducing average cost. Consequently, the DOE objective in energy efficiency reduces the probability of a commercial success.

While at Argonne National Laboratory, I undertook a study of six large energy-intensive industries in the United States. The report is known as "The Argonne Six Industry Study." The study was based on the first-hand expertise of industry experts. The six industry include iron and steel as well as the aluminum industry. Although the purpose of that study was to focus on Kyoto Protocol, some results are important for current legislation. Note the following general findings from that study. The U.S. industries are losing competitiveness in world markets. U.S. plants are maintaining competitiveness in domestic markets. Domestic employment is declining continuously over time. Labor productivity is continuously increasing. No new "greenfield" plants will likely be constructed. Increased productivity results from capital investments in existing plants.

The last two findings are crucial to this legislation currently being considered. If a successful commercialization of a DOE-sponsored technology requires a new plant, this plant is likely to be con-

structed in a foreign country. In this case, U.S. taxpayers would directly subsidize and contribute to job losses in the United States.

If Congress continues through these programs, I offer the following suggestions. Taxpayers should be assured that most of the economic benefits from these DOE programs accrue in the United States. These benefits must be in the form of improved productivity, reduced costs, or reduced emissions of plants located in the United States. The proposed legislation uses the term "domestic companies." This term is not sufficient to ensure that most of the benefit accrues within the U.S. The proposed legislation states that a purpose of the statute is to develop advanced technologies. My concern is that advanced technologies and processes are most feasible in new "greenfield" plants. As the Argonne study concludes, productivity in energy-intensive industries is increased by retrofitting existing plants, not by constructing new plants in the U.S. The proposed legislation should be crafted more carefully to ensure that technology successes improve the productivity of domestic existing plants.

The DOE policy goals should be specified so as to produce benefits to taxpayers resulting from long-term market success. The OIT report describes 100 technology successes and boasts the amount of energy saved by its various efforts. Merely reducing Btu provides no benefit to taxpayers or to the industrial sector. The rationale for taxpayer support for these DOE investments is that taxpayers share in the initial investments and investment costs but obtain benefits by long-term commercial success and long-term environmental improvement. The DOE does not adequately specify the long-term business objective of improving overall productivity, reducing production costs, or increasing market share.

Three, the net benefits to taxpayers from these DOE investments could increase if the DOE programs were subject to a higher level of accountability. I suggest that the legislation be revised to require the DOE to obtain an independent analysis of the economic benefits of its investments. The outside review must be conducted by independent experts, not by national labs or other financial beneficiaries of the DOE program. Furthermore, the review should be consistent with the basic economic principles of cost-benefit analysis. The independent analysis would also include suggestions for improving the DOE investment process.

This concludes my prepared statement. Thank you.

[The prepared statement of Dr. Sutherland follows:]

PREPARED STATEMENT OF RONALD J. SUTHERLAND

Good morning, my name is Ronald J. Sutherland. I am a Ph.D. economist, and have spent most of my career assessing energy policy issues. From 1980 through 1988, I worked at the Los Alamos National Laboratory. From 1988 through 1997, I was employed by Argonne National Laboratory, but was located at the Department of Energy's Forrestal building here in Washington, DC, where I supported the DOE Policy Office and the Energy Information Administration. At present, I am an independent consulting economist where I continue to work on energy policy issues. My testimony reflects my own views. I am not associated with an organization that has an interest in this legislation.

The history of the DOE industrial technology program is one of limited success, and probably produces net costs to taxpayers. These net costs result from three program characteristics:

1. the DOE policy objective is to enhance energy efficiency;

2. the program justification is based on market barriers; and
3. the DOE program is not accountable in terms of providing benefits to taxpayers.

The DOE focus on energy efficiency does not make business sense; it contributes neither to the productivity of the business, nor to value to customers. Instead, businesses become more competitive by reducing average costs and increasing overall productivity, and particularly by increasing the productivity of labor and capital.

Energy efficiency is an inappropriate policy goal from the perspective of taxpayers. Indeed, the single most important point that Congress should recognize in forming energy policy is: "Energy efficiency and the efficient use of energy resources are different and unrelated concepts."[1] Programs and policies that contribute to energy efficiency may or may not improve the efficient use of energy resources. Policies that contribute to the efficiency of using energy resources may or may not increase energy efficiency. Taxpayers benefit from using energy and all other resources more efficiently; taxpayers do not necessarily benefit from increased energy efficiency. The flawed conceptual DOE model results in subsidizing technology development that does not improve the productivity of the industrial sector, and does not produce net benefits to taxpayers.

The DOE justifies its interference in private markets in terms of "market barriers." However, the adoption of all new technologies, products and processes is impeded by market barriers. Such barriers are merely benign characteristics of well functioning markets. A necessary condition for a beneficial government program is a market failure, and there is no expectation that DOE programs reduce market failures.[2]

The DOE is not, and perhaps cannot, be held accountable for its technology development investments. In contrast, private research institutes, such as the Gas Technology Institute, are highly accountable to sponsors, whose participation is voluntary. Consequently, the flawed policy model practiced by the DOE continues indefinitely, and DOE technology investments fail to have long-term commercial success.

In a recent litigation case, I attempted to find an example of a new technology that penetrated the market quickly and obtained a substantial market share. In my search, I reviewed the OIT publication, "Office of Industrial Technologies: Summary of Program Results" which summarizes the results of more than "100 commercially successful technologies."[3] I found no examples of a technology success for my purposes. Instead, my overall reaction to the DOE 100 technology successes is that when the subsidy continues, technology development continues, when the subsidy stops, technology development and deployment also stop. In reviewing this document again, I find some technologies that appear to achieve market success, but the rate of success is very low considering the DOE claim of reflecting its 100 most successful technologies.

In pursuing some DOE technologies that looked promising, I contacted an engineer in a private firm that was participating in a DOE program. The engineer stated that DOE's fixation on energy efficiency is inconsistent with the business objective of increasing overall productivity and reducing average cost. Consequently, the DOE objective of increasing energy efficiency reduces the probability of a commercial success. The technology that I eventually found to support the litigation case was developed by the Gas Technology Institute. GTI focuses on developing technologies that will be a commercial success, because this success is critical to retaining funding.

While at Argonne National Laboratory I undertook a study of six large and energy intensive industries in the U.S. The report is known as the Argonne six industry study.[4] The study was based on the first-hand expertise of industry experts. The six industries include the iron and steel industry as well as the aluminum industry. Although the purpose of that study was to provide information about the impact of the Kyoto Protocol, some results are important for current legislation. General findings about the six energy intensive industries are as follows:[5]

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[1] Ronald J. Sutherland, "Energy Efficiency or the Efficient Use of Energy Resources," *Energy Sources,* Vol. 16, 1994, pp. 257–268.

[2] Ronald J. Sutherland, "Market Barriers To Energy-Efficiency Investments," *The Energy Journal,* Vol. 12, No. 3, July 1991, pp. 15–34.

[3] Office of Energy Efficiency and Renewable Energy, *Office of Industrial Technologies: Summary of Program Results,* U.S. Department of Energy, Washington, DC, DOE/EE–0184.

[4] Ronald J. Sutherland, "The Impact of Potential Climate Change Commitments on Six Industries in the United States," *Energy Policy,* Vol. 26, No. 10, 1998, pp. 765–776.

[5] Ronald J. Sutherland, Nolan Richards, Michael Nisbet, Dan Steinmeyer, Ronald Slinn, Martin Tallett and Richard Fruehan, *The Impact of High Energy Price Scenarios on Energy-Intensive*

- The U.S. industries are losing competitiveness in world markets;
- U.S. plants are maintaining competitiveness in domestic markets;
- Domestic employment is declining continuously over time;
- Labor productivity is continuously increasing;
- No new "greenfield" plants will likely be constructed; and
- Increased productivity results from capital investments in existing plants.

The Argonne study notes that the domestic steel industry has experienced a significant reduction in energy intensity since the 1980s. The industry capital investments have reduced "yield losses," which in turn improve capital, labor and energy productivity. Improved productivity and cost reduction was the industry objective; energy efficiency was merely a by-product.

The last two findings are crucial to the legislation currently being considered. If a successful commercialization of a DOE sponsored technology requires a new plant, this plant is likely to be constructed in a foreign country. In this case, U.S. taxpayers would directly subsidize, and contribute to, job losses in the United States. The proposed legislation should be carefully crafted so as not to contribute to domestic job losses.

The taxpayers in the U.S. would probably obtain the greatest benefit if federal funding for energy conservation R&D programs were simply terminated.[6] However, if Congress continues with these programs, I offer the following suggestions:

1. Taxpayers should be assured that most of the economic benefits from these DOE programs accrue in the U.S. These benefits must be in the form of improved productivity, reduced costs, or reduced emissions of plants located in the U.S. Such plants provide jobs to American labor and contribute to the domestic economy. The proposed legislation uses the term "domestic companies." This term is not sufficient to ensure that most of the benefit accrues within the U.S.

   The proposed legislation states that a purpose of the statute is ". . .to develop advanced technologies.. . ." My concern is that advanced technologies and processes are most feasible in new "greenfield" plants. As the Argonne study concludes, productivity in energy intensive U.S. industries is increased by retrofitting existing plants, not by constructing new plants in the U.S. The proposed legislation should be crafted more carefully to ensure that technology successes improve the productivity of existing domestic plants. The OIT report provides no recognition of the need to focus on retrofitting technologies, nor to focus on technologies that provide domestic benefits.
2. The DOE policy goals should be specified so as to produce benefits to taxpayers resulting from long-term market success. The OIT report that describes 100 technology successes boasts of the amount of energy saved by its various efforts. Merely reducing Btu provides no benefit to taxpayers, or to the industrial sector. The rationale for taxpayer support for these DOE investments is that taxpayers share in the initial invest costs, but obtain benefits by long-term commercial success and long-term environmental improvement. As indicated in the OIT report, the DOE does not adequately specify the long-term business objective of improving overall productivity, reducing production costs, or increasing market share.
3. The net benefits to taxpayers from these DOE investments could increase if the DOE program were subject to a higher level of accountability. I suggest that proposed legislation be revised to require the DOE to obtain an independent analysis of the economic benefits of its investments. The outside review must be conducted by independent experts, and not by national labs or other financial beneficiaries of the DOE program. Further, the review should be consistent with basic economic principles of cost benefit analysis. The independent analysis would include suggestions for improving the DOE investment process.

This concludes my prepared statement. Thank you.

Sectors: Perspectives from Industry Workshops, Argonne National Laboratory, Washington, DC, July 1997.

[6] Ronald J. Sutherland and Jerry Taylor, "Time to Overhaul Federal Energy R&D," *Policy Analysis,* The Cato Institute, No. 424, February 7, 2002.

BIOGRAPHY FOR RONALD J. SUTHERLAND

Ron Sutherland is a Ph.D. economist with more than 20 years experience analyzing energy issues, including electricity and natural gas markets. Ron began his professional career as an economics professor with the University of Illinois, Springfield, teaching graduate level courses in micro-economics and econometrics. Much of Ron's experience is with two DOE national laboratories: Los Alamos National Laboratory and Argonne National Laboratory, where he assessed several regulatory, environmental and energy policy issues. Ron wrote several articles for *Energy Policy* and *The Energy Journal* on utility deregulation, energy conservation (DSM) programs and long-term contracts. Ron was also a senior economist for the American Petroleum Institute (API). While with API, Ron produced reports and articles on the economics of climate change and energy subsidies.

At present Ron is an independent consulting economist and Adjunct Professor of Law at the George Mason University, School of Law. Ron provides economic expertise on a variety of energy related issues, but focuses mostly on electricity and natural gas regulatory and restructuring issues. As a Center Scholar for the Center for the Advancement for Energy Markets, Ron wrote a paper "The Role of Default Provider in Restructuring Energy Markets," and has just completed "Estimating the Benefits from Restructuring Electricity Markets: An Application of the PJM Region."

DISCUSSION

Chairwoman BIGGERT. Thank you very much, Dr. Sutherland.

We will now turn to questions, and I will yield myself five minutes.

Mr. Shulkosky and Ms. Roudabush, is that right? Yes. Thank you. Dr. Sutherland has just suggested that the Metals program does not necessarily benefit just the U.S. industry. Would you concur with that?

Ms. ROUDABUSH. There are provisions in the program that the supporters of the projects initially get the royalty-free benefit and a five-year, I believe, head start, if you will, before commercialization is available globally. So I do believe we do get the benefits of this in our domestic steel industry.

Mr. SHULKOSKY. Yeah, I would just have to agree with Ms. Roudabush that I am a commercial licensee of a technology, the Hot Strip Mill Model. That technology was actually finished up in 1998, and the participating companies have had full access to the research and used it extensively in their own plans, royalty-free. And just last year, we started to commercialize it, so it does benefit the participants for a while.

Chairwoman BIGGERT. It does benefit only the U.S. industry? There is no other benefit to anybody?

Mr. SHULKOSKY. It—well, the——

Ms. ROUDABUSH. Some of the—some of that would be patented. Some of it is going to be intellectual property. You know, intellectual property is as good as you can keep it. We are in a global business. We won't doubt that. And information gets around and advances will get around. We are trying to just be able to have some amount of leeway to produce this stuff domestically, at least for the five-year period.

Chairwoman BIGGERT. Okay. And then another part of his testimony he says that the U.S. industries, the energy-intensive—such as the metals industries, will not be constructing new plants in the United States. Do you agree with that?

Ms. ROUDABUSH. No, we construct new plants, or at least new portions of plants. You know, plants are very large, but we may

add brand new galvanizing lines, brand new EAFs. The mini-mills, I would think, would not agree with the fact that they have produced—or built new plants with new technologies. If—would we build another Gerry Works? Probably not. Would we build another Gerry Works Hotside? That could be a potential. We may not build a brand—you know, there have been 15 new steel plants built between 1989 and 2002, and again, I believe that you see that we have put new "greenfield" sites, or portions or portions of our operations have been built.

Chairwoman BIGGERT. Well, I guess that the statement that Dr. Sutherland was making, and correct me if I am wrong, Dr. Sutherland, was that companies would be building plants in foreign countries. Is that what you meant?

Dr. SUTHERLAND. The statement came from this Argonne Six Industry study where we brought together several teams of experts in all of these six industries, and this was the general result that emerged is that there are, in very few of these industries, no new "greenfield" plants. There are no new cement plants, no new aluminum plants, from what I was told by the experts. And instead, there are tremendous improvements in productivity, but they are in existing plants. And so the point is intended to be a positive contribution to this Committee, and it is that DOE should focus on technologies that need to be integrated in existing plants. And if they require a new plant, then we are likely to see the benefits go. That is the international free rider problem that characterizes R&D and can't be stopped.

Chairwoman BIGGERT. Would you agree with that, Mr. Shulkosky?

Mr. SHULKOSKY. I would say that, you know, the—new plants are built in the States. I don't know about internationally new plants being built, but as Ms. Roudabush said, there were a lot of new plants built in the '90s. And I am aware, being on the supplier side, that there is a new facility being talked about down south. And also as Ms. Roudabush pointed out, there are processing lines being talked about and being picked up. So I still see construction occurring in the United States.

Chairwoman BIGGERT. Okay. Then, Mr. Faulkner, Ms. Roudabush's testimony suggests that the metals program is the only federal program that cites competitive advantage as a goal. Are you aware of any other program at DOE that includes competitive advantage as a goal?

Mr. FAULKNER. I am not aware of any other program at DOE that works specifically with the steel industry. I am not sure I understand exactly what you are driving at, though.

Chairwoman BIGGERT. Well, I just wondered—you know, usually a program will have the mission and the goals, and this certainly is one that will improve the competitive advantage of the United States in businesses. And does DOE usually have programs that have that as a goal?

Mr. FAULKNER. Well, Congress has basically given us our goals and our missions and functions. And on the—in the energy efficiency side of my office, it is reduce energy use. That is the basic mission of our office. And I think that when you do that, when you help—when you reduce energy use, that will reduce costs to the

company. I think that is a derivative of the mission that we have in our office that will help increase the competitive advantage of those companies.

Chairwoman BIGGERT. Okay. All right. My time has expired.

I will yield to the Ranking Member, Mr. Larson, for five minutes.

Mr. LARSON. Thank you very much, Madame Chair.

And let me continue along your excellent line of questioning. And let me thank Dr. Sutherland. I think that you made a very provocative point to your testimony. But in my remarks, I talked about the value added that I think industry brings. And in any of your modeling, and in looking at the Argonne six or whatever, was the value-added aspect, was the national security aspects, were the health and safety and well-being aspects featured in any of those modelings, or are they just pure economic models where the social consequences of actions taken by Congress don't come into play?

Dr. SUTHERLAND. We did not use mathematical modeling or econometric modeling. What we brought together were teams of industry experts with firsthand expertise in the industry and tried to form a consensus of their opinions. So we did not use modeling.

Mr. LARSON. What is the most important factor in terms of industry development? Is it the cost of labor?

Dr. SUTHERLAND. It is the bottom line. It is the bottom line and how you can get to the bottom line. Improve overall productivity and reducing average costs.

Mr. LARSON. And in terms of getting to the bottom line, what is the most significant part of that?

Dr. SUTHERLAND. I think it is capital investments that improve the overall productivity of labor.

Mr. LARSON. Right.

Dr. SUTHERLAND. And as a——

Mr. LARSON. Okay. So if we have a system of capital investments and we have industries in a competitive global economy that are being subsidized by other countries, how, in fact, do we compete if—so then doesn't labor become the ultimate issue here? And so if industry is going to seek the bottom line, won't they always go overseas, then, if the salient factor of achieving the bottom line becomes the lower cost of labor that you can get from the lack of a wage?

Dr. SUTHERLAND. No, I think it is——

Mr. LARSON. And how will investors invest if—that is based on quarterly returns from the stock market where people are held to a different standard over here in our country in terms of return on their investment? So it seems to me that, and maybe I am wrong, without government investment, without government focusing on R&D, that our companies will be forever at a disadvantage, or in fact, other nations that look how to defeat the United States use our own system in a form of economic jujitsu to throw us with the very success of what we do in terms of capital formation by offsetting core industry investments themselves and thereby subsidizing their industries at the expense and loss of Americans.

Dr. SUTHERLAND. My belief is that the best way to develop policy is probably to ignore what other countries are doing, even if they are subsidizing. If we looked, for example, at the French economy and observed they were subsidizing the steel industry and we ob-

served their low rate of economic growth, what would we conclude? We should subsidize the industry or we should not subsidize the industry?

Mr. LARSON. There are core industries that—I don't suggest that we should subsidize industry in general, but aren't there core industries, when you were looking at the six—is, for example, the industries that we are discussing today, are—do they represent core industries for the United States that would require us, A, from a national security perspective, i.e., the need for steel and aluminum in terms of a number of the products that we produce, and B, also from a number of the social consequences that are intended with those?

Dr. SUTHERLAND. I am sorry, but I think the honest answer is no, but I believe there are two very powerful conceptual reasons for supporting this legislation that haven't been mentioned. These are not industries that have a future of extinction. They are industries that have long-term promise of survival. They are not rapidly growing industries, but they are growing at a very stable rate, and they are surviving. So at least, if you support these industries, you are not throwing good money after bad.

A second important point that came out of the Argonne study is that many of these industries have plants that are located in mid-sized and small towns, and so when a plant closes, first we see some labor unemployed, but more to the point, we see the entire community affected, because that plant was the economic base of the community. And we see lost value of houses. The economic consequences are much greater than merely the unemployment statistic that shows up in the nightly news. So I think there are two good conceptual reasons for supporting these industries, and I don't oppose that. But what I do oppose is the DOE policy focus explicitly on energy efficiency. If you——

Mr. LARSON. And that was a very good point you made, I thought, and one that is often lost on trying to discern between efficiency and efficient use of energy. It is a very good point. Also, I would like to give you—in your closing statement, you ended your—you left out of your testimony, one, that you would terminate these programs, number two, the—in your closing statement, you also suggest—and I think rather—and I think a very informative thing that there ought to be independent analysis of this.

Dr. SUTHERLAND. Right.

Mr. LARSON. Now I think that is a very constructive way of looking at core industry and where the government decides to subsidize. And state legislative bodies have something like regulation and review and oversight where that—actually after they adopt procedures and regulations, the legislature then comes back and reviews the extent and evaluates them. But I thought that was a very positive suggestion. I am just interested in how you would implement them. You said independent analysis. What does that mean?

Dr. SUTHERLAND. At—that means not having national laboratories do a cost-benefit analysis of their own programs, someone outside of the financial beneficiary. I was invited to comment before the National Academy of Sciences, and the Academy is doing a study of DOE's R&D policies and programs and trying to improve

them. And I reported to the Academy this general result. And it should concern you. You can flip through this document, or read it rather casually, and what you see is technology after technology being commercialized in the early '90s, 1993, 1995, and in 1997, one or two units are in operation. That is all. And these are DOE's 100 most successful technologies. I don't know about the least successful technologies. But that is not a record that benefits your District or benefits the United States. The DOE needs to have better policy goals and more accountability.

Mr. LARSON. I am sure Mr. Faulkner will want to respond.

Mr. FAULKNER. I was hoping you would give me that chance, sir. Actually, this is the document, the National Academy of Sciences' study from three years ago. They took a retrospective look back in time at our technologies in our office, several technologies. And right now, the National Academy of Sciences, an independent body set up by Congress, is looking at prospective benefits of our office. Two technologies in this Industrial Technologies program that they looked at were the loss foam metal casting and the oxygen fuel glass furnace. But overall, they looked at our—as they looked at our portfolio, the conclusion was that they saw 20 to 1 in terms of dollars, $20 for every dollar that we invest, the government invests, in terms of economic benefits. I think that is a pretty good ratio. In terms of environmental benefits, they saw it was a range of $3 billion to $20 billion, depending on how you calculate, you know, clean air and clean water and those kinds of things, the economic equivalent. So I do think we do—have had an independent body look at our technology, and we are continuing to do that. That is—evaluating our programs is a major thing for us.

Mr. LARSON. Thank you.

Chairwoman BIGGERT. Thank you very much.

I now recognize Ms. Hart for five minutes. I think Mr. Gingrey yielded to you.

Ms. HART. Well, that was very kind of Mr. Gingrey. Thank you, Madame Chairman.

Okay. I have several questions, and I think I am going to start with Ms. Roudabush. And I thank you for going through the specifics of the things that resulted from some of the Department of Energy monies and the advancement, obviously, in your product and, obviously, the consumers of your product, especially the Pacifica, since I drove one all last weekend. And it was a great car. And it got fairly decent gas mileage, so I was really happy with that, especially now.

Can you give us some more details about the collaborative research, the importance of collaboration within the industry and how it is encouraged through this program to your company and about your commitment to the program?

Ms. ROUDABUSH. U.S. Steel has been one of the initial funders, of, you know, company funders, from the inception of this program. And we certainly do have significant upper level management commitment. In fact, I can just relate that in the recent CO_2 emissions, you know, we were probably the first company that actually signed up to opt in on that program. And I think it is a testimony to the fact that for other manufacturers in our industry, in the past few years, and I think you have all heard, about 35 steel companies

have gone bankrupt, yet we still had enough funding from our industry to support these programs. And these programs are funded by the steel industry. You know, we jointly fund these. So we are going to be selecting programs that we feel will benefit us and do have a payback and can be commercially viable for us or that are of importance in the future for energy savings for environmental initiatives. We do see that other governments provide significant amount of funding. I will speak to one that I know of. We do some benchmarking. There is a competitive global company that supports 20 percent of their R&D staff through direct government funding. They have an R&D staff in their central R&D of 40 people—or excuse me, 400 people. And that equates to, in the current exchange rate, $70 million. That is four times my annual budget. So there are things that we can not do ourselves and that are—and we are trying to do through a collaborative effort that foreign governments are funding to the tune of five to ten times what we get funded.

Ms. HART. Thanks for that.

Next question I think I am going to direct to Mr. Faulkner, and it is regarding the President's commitment to maintaining a strong manufacturing sector in the United States. Do you believe this program is a significant part of our plan to support the President's commitment to a strong manufacturing sector?

Mr. FAULKNER. Sure. I think that this partnership with the steel industry, and other industries that we work with in our Industrial Technologies Program, is—has clearly shown by time that it has benefit to the industry, to the American people. We work with a range of industries, industries that use a lot of energy. And I think the continued—the continuance of it in our budget request reflects the importance we place on it.

Ms. HART. Thank you for that.

Mr. Shulkosky, as an organization that contracts with the Department and moves forward with these kinds of programs on a project by project basis, first of all, is that something that your company basically does from—is that how you do your work? You do contract to contract, project to project?

Mr. SHULKOSKY. With the government, it is only a portion of our work.

Ms. HART. Okay.

Mr. SHULKOSKY. This collaborative research is only a portion of our work.

Ms. HART. Okay. And is a significant—is it a significant portion? Like, what percentage, would you say, of your work is this kind of work?

Mr. SHULKOSKY. Well, probably over the last two to three years, it has probably been 20 to 30 percent of our work.

Ms. HART. Okay. All right. And that having been said, since you are involved in so many other things that don't really have anything to do with government projects and you are interested in, obviously, moving things forward, can you shed some light for us on the difficulty of your company from one year to the next basically not having the knowledge whether or not this type of program is going to be able to continue?

Mr. SHULKOSKY. Yeah, it sort of comes on two fronts. When you are doing this collaborative research, they have a very rigorous process to set it up, so you submit a proposal, and we always do things in phases, multiple phases. And the reason to do that is twofold. One is you want checkpoints as you are doing the research and so that if you get that far, you can move on to the next phase, and if it is not making progress, then you would stop it and quit spending money on it. However, the downside is when you don't know the budget, you may get to the next phase and being—having a success but not being able to move on, because there is no funding available. Being a small company and 30 percent of my work being related to that project, it causes me a second problem that I don't know what to do with my staff. I have to reallocate them, hopefully, and we never know when we will be able to pick the research back up.

Ms. HART. That would be tough.

And that kind of research that you are doing, I mean, you guys obviously are doing it, it is really vetted, then—I think my colleagues understand, it is really vetted through a pretty serious process. It is funded partially by the Federal Government, partially by the private sector. And by the time it gets to you, it is something that is determined to be extremely important to a number of different organizations that are out there, you know, working to manufacture products and, obviously, improve their processes and do things better. Now I lost my train of thought. Oh. Do you—are you able—is there another resource that you could go to if this project, this particular funding source disappeared? Is there some other place or some other opportunity that might have to be able to fund the kinds of research that you have been able to obtain through the AISI and through this program?

Mr. SHULKOSKY. We haven't actually found that. We would—at times, have looked at other government programs, such as the SBIRD, but those are more DOD type stuff. And the DOE has other programs. What we tend to do is if we are running out of money, we will try to go back to the steel companies and see if they will be able to pick up the other 70 percent, and it hasn't been a good climate over the last several years to ask them to kick in any more money. So although they are still very interested in their research, things come near to a grinding halt almost, basically.

Ms. HART. Okay. Thank you for that.

And just, if I may, because I am going a little over time, is that all right, Madame Chair? Okay. I am a little hesitant to ask this question of Mr. Sutherland—Dr. Sutherland, sorry. But if one of our goals—no, when I say are, we are government. I am not business, and I am trying to help promote policies that will help promote, you know, American economy, opportunity, growth, technology, and those kinds of things. Everything that I do is not necessarily going to be toward making a profit. And in some of the things that you had stated in your testimony, it seems to me that it might not be a legitimate goal for government to fund these kinds of things if they only provide things like energy efficiency or—that—if they aren't, in other words, moving someone more immediately toward a profit, some bigger profit or some other thing that isn't as, I guess, esoteric as some of the things that we would

be promoting here, because it takes a few steps to get us toward where the technology will actually improve profitability. Do you follow me?

Dr. SUTHERLAND. Until that last sentence, I did.

Ms. HART. Okay. Then forget that last sentence and go with what it was before.

Dr. SUTHERLAND. Okay. I am not suggesting that government only fund technologies that are profitable. Certainly, the correct rationale, in terms of economics, for government supporting industry, is external benefit, some kind of benefit that the industry can't capture itself. For example, suppose industry is required to meet and environmental regulation. I think it is hard to justify government subsidizing the industry to meet that regulation, but suppose there is a new technology that would not only meet that regulation but exceed it and reduce emissions way over and above that required by law. That incremental reduction in emissions is a benefit to taxpayers, but industry has no incentive to pursue that technology, particularly if it is more expensive. But government could well invest taxpayer money in achieving that higher level of environmental quality than required by law. Do you see what I mean? That is an external benefit to taxpayers, and that is where government should focus its R&D money.

Chairwoman BIGGERT. The gentlelady's time has expired.

Ms. HART. Thank you, Dr. Sutherland. Thank you, Madame Chair.

Chairwoman BIGGERT. Mr. Gingrey is recognized for five minutes.

Mr. GINGREY. Thank you, Madame Chairman.

And I would like to thank the staff for assembling this panel. This is a good way to start the day. I am really enjoying this, and that is not a political statement, but we, on the left, we have Mr. Faulkner, and on the right, we have Dr. Sutherland. And I think that if everybody is listening, you would say that these might be slightly extreme views. And I—clearly, I would think, from what I have heard, that Mr. Faulkner and also Mr. Shulkosky and Ms. Roudabush are probably in favor of this bill and see a lot of good in it. And I would think it is fair to say, from what I have heard, that Dr. Sutherland, on the other hand, would say that it stinks and it doesn't pass the smell test.

So what I would like to do is start on the left and have Mr. Faulkner comment on it and then go over to the right. And as Bill O'Reilly says, "What say you, Dr. Sutherland," in how you opine on this, as you already have? But let me just ask a couple of specific questions, because obviously there is a significant difference of opinion here among the four experts who are testifying.

Mr. Faulkner, taxpayers have put millions of dollars in the past 15 to 20 years into the Department of Energy's R&D programs to improve energy efficiency, particularly in the steel and aluminum industries, and that is basically what we are talking about in this bill. What has been the total taxpayer cost to date, if you can give us those figures? If not, if you can submit them to us, I would appreciate it. What are the major public benefits that the program has produced? Ranking Member, Mr. Larson, I think, eluded to that question earlier in his line of inquiry. What are the expected

future benefits of further taxpayer investment? How exactly does the DOE calculate those benefits, both retrospectively and prospectively?

Mr. FAULKNER. Sir, from where I sit, I am on the right side of this table. Mr. Sutherland is on the left.

Mr. GINGREY. I knew you were going to say that.

Mr. FAULKNER. I couldn't let that go without comment, most of all.

You asked several questions, sir. We calculate that the—by appropriations, by as-year appropriations, there have been roughly a little over $240 million of taxpayer dollars appropriated to our office for steel and aluminum research. That is—if it would be broken down, steel is over aluminum by a little bit more. We had to do some estimating in the early years. That goes from '86 through 2004. Steel is about a little over $76 million. Aluminum, a little over $65 million. Those numbers differ a little bit from what the numbers your staff developed, and we could go into that later for the record.

You asked me about public benefits. The steel team has—the technologies that they have worked on with the steel industry, there have been about 15 steel industry technologies commercialized in the aluminum side. There have been roughly ten technologies commercialized. In the earlier years, the research was focused more on incremental progress—incremental process change. And as I mentioned in my testimony, we are now focusing on what we call "Grand Challenge" technologies, where we can pull our money more—and our portfolio more to longer-term, higher-risk research. The—by 2020, we think the potential energy savings to the industry from revolutionary iron-making alone could exceed 100 trillion Btu's and maybe $300 million annually with large reductions and emissions of harmful pollutants. On the aluminum, we are looking at several alternatives to the current method of producing aluminum and electrolytic cells. By 2020, it is anticipated that DOE-sponsored technologies could save between 100 and 150 trillion Btu's of energy, worth more than half a billion dollars. I mentioned earlier, in response to Congressman Larson, a study done by the National Academy of Sciences. I won't go into those—repeat those details again, but they look backward over time and gave us their assessment that there has been a pretty hefty return on taxpayer dollars, and they are working with us to look at how we calculate prospective benefits. That is a little bit harder. We could talk some more about the details of that, if you wish.

Mr. GINGREY. Dr. Sutherland, I don't have much time left, but I will give you the last word.

Dr. SUTHERLAND. Suppose that an industry has a list of ten potential technologies, and the industry ranks these technologies according to expected benefits measured as long-term productivity, long-term health of that industry, long-term economic viability of that industry. Now suppose there is a different ranking by that same industry and it is Btu of energy saved. The ranking would be very different. My point is the best—the interests of our country are advanced if industry invests in the most efficient technologies, the most productive technologies, and that ranking is inconsistent with DOE's fixation on energy efficiency and merely defining bene-

fits as Btu's. That is a waste of resources and a value that we are not receiving. And it all stems from DOE's policy objective of energy efficiency. That is the main point that I am making.

Mr. GINGREY. And the two in the middle, I would like your comments, too, if you will.

Ms. ROUDABUSH. Well, first of all, I would like to comment that, really, our premise is not just energy efficiency. Actually, if we improve our productivity, we do improve our energy efficiency. For instance, if you are making a certain amount of steel, the demand for steel is pretty constant. If I can make steel and improve productivity rates, by nature of that, I am reducing my energy consumption, because you know, I can make more steel in a shorter amount of time with the same amount of energy, or less. So I don't think that the DOE funding precludes us improving productivity or other benefits. This is not just an energy-reduction program. We look at improved productivity, consumer benefits in safety that we have seen, in CO_2 emissions. It is more significant than that. Energy is an important portion, obviously, of our business. You said it was an intensive—an energy-intensive business, so it is a big cost to our industry. In my company alone, a $1 increase in the cost of an MMBtu of natural gas costs my company $80 million. So you know, we are very, very focused on reducing our energy consumption in our industry. It is a big cost, so that improves our productivity, and it improves our profitability, and it improves our competitive ability.

Mr. GINGREY. Madame Chair, I see my time is out. Are we going to have a second round, or can I just give a short follow-up?

Chairwoman BIGGERT. Why don't you have a short follow-up?

Mr. GINGREY. Thank you, Madame Chairman.

And I think it was stated by one of you that two percent of all energy consumption in the United States is from the steel production industry. I mean, that is a mega amount. And as Dr.—Ms. Roudabush said, if you can use some research and development dollars provided by, yes, the taxpayer through DOE R&D to help these companies find a way to produce steel or one of these other metals more efficiently, the main way to do that, or a cost-effective way, is to reduce the dependence and the amount of consumption of energy. I mean, I have been to steel mills, and they will tell you that every time. And I know in my state of Georgia, Atlantic Steel was a great company for many years, and now they are history, because they were just doing it the same old way. And Dr. Sutherland, you said something, I think, you might want to comment on this, and I know I have overused my time, but what is wrong for once to see a government mandate in regard to environmental and everything else that is funded our companies, particularly our manufacturing companies are burdened so much with unfunded mandates. It is not just labor costs that forces jobs outsourcing. The old word is the en vogue word during this election—the presidential election year, but I mean, hey, this is kind of refreshing. For once, we have got a funded mandate.

Dr. SUTHERLAND. I think you are referring to the point that I made that polluters should pay the costs of the pollution themselves rather than shift that on to taxpayers. Certainly, the economy, overall, is more efficient and healthier and GDP is larger if

those who impose costs on others, in the form of pollution, are forced to pay them themselves rather than just shift the cost on to taxpayers. It is just a matter of economic efficiency. So perhaps we disagree on this point, but it has always been the case that Congress regulates and sets environmental standards, along with the EPA, and the polluters have to meet those standards.

Chairwoman BIGGERT. Thank you.

Let me just say that, you know, the purpose of this Science Committee, and I think particularly this Subcommittee in the area of energy, is really—has always been research and development. And that, I think, is so important to what the Department of Energy does. And the basic research of the physical sciences so that we are able to provide help to industry to help whatever. And in fact, I think that this Committee has taken on the charge to try and convince other Members of Congress how important research and development is. And I think the way that we have been able to reach some of the Members of Congress is really to show them that the economy really depends on it, and the—and jobs. And once they see that, they realize how you start with a, you know, very basic idea probably that industry could not afford to develop and then it moves up to applied science, and then it gets to the commercialization where the industries come in. And it is all, I think, working together for the economy of the country as well as our national security. And that is the other issue that comes in here so strongly. And I noted that Dr. Faulkner, in his testimony, said that DOE and its partners have jointly commercialized about 15 technologies and have disseminated valuable scientific information that will help steel-makers improve their productivity efficiency and product quality. And I don't think that there really is a difference between productivity and efficiency or there is—they are not working against each other, but working together. And I think Dr.—or Ms. Roudabush, you brought that up. And I think that is very important to keep in mind that we really need to safeguard our energy and our capabilities in that field as well as—but to be able to develop the products, and I think, even ending up, then, with the value added of a community that—how they—you know, they benefit when there is that industry there. And I think, Dr. Sutherland, you mentioned that.

So I think we are all working together, it just seems like we can't just say, oh, the—energy efficiency is not the only goal that we have, but is one of many to conserve our energy but also to be able to take this scientific—the research and development and to be able to use it most effectively, which, to me, is efficiency, too, when we are able to commercialize these products and develop a better quality of life for all Americans. And I think that this is the charge, I think, that we have here to ensure in that.

And with that, I would thank you all for coming. And let me say that if Members have written questions, that they may submit to you and hopefully that you will respond to those. And again, thank you for being a great panel and being here, and sorry to keep you waiting a few minutes when we got started.

And with that, the Subcommittee is adjourned. Thank you.

[Whereupon, at 11:20 a.m., the Subcommittee was adjourned.]